

Power Unit Maintenance

Engine

Refer to the engine manufacturer's Operation and Maintenance Manual for complete maintenance instructions and procedures.

Oil: Check the engine oil level daily. Use an oil that meets API classification CE / SG. Change the engine oil every 250 hours or 3 months. It requires 16 quarts (15.1liters) of oil with filter change.

Oil Filter: Change the engine oil filter same as the oil. Use oil filter Fleet Guard Part Number LF3349.

Air Cleaner: Each time the engine is serviced the air cleaner should be inspected. Check all connections for mechanical tightness. In case of leakage and if adjustment does not correct the trouble, replace necessary parts or gaskets. Remove the element from the air cleaner and inspect for mud caking or signs of excessive wear or damage. Inspect and replace as necessary every 250 hours or 3 months.

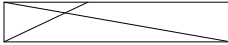
Coolant System: Check coolant level daily with engine cold. Add coolant as necessary to maintain the level at the bottom of the fill neck. Use only a permanent-type coolant that meets ASTM4985 specifications. A 1:1 ratio of antifreeze to water is recommended for most climates. Use only ethylene glycol or propylene glycol antifreeze in the engine cooling system.

Fuel Filter: Change the fuel filter every 500 hours or 6 months.

Fuel Tank: Check fuel level daily, the capacity of the tank is 35 Gallons (132 Liters).

Block Heater: For cold weather starting a 110V Block Heater is available.

Throttle Solenoid: Engine speeds are Low Idle 1000 rpm, High Idle 2250 rpm. **Caution:** Do Not exceed the Maximum operating engine speed setting. Check the linkage to the idle solenoid daily before start up. If linkage locking nuts are loose the throttle linkage will vibrate out of adjustment. This can cause the engine to surge to high idle when the switch is activated but then release back to low idle.



Lubrication

Hose Reels

Hydraulic Hose Reel (3): Lubricate the two swivels and the manual wind-up shaft with a shot of JetLube once a month.

Drilling Fluid Hose Reel (1): Lubricate the swivel with a shot of JetLube once a month.

Case Drain Hose Reel (1): Lubricate the swivel with a shot of JetLube once a month. Note: not all units are equipped with this reel.

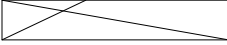
Hydraulics

Hydraulic Fluid: Check hydraulic fluid level daily. The level should be slightly above half full when the oil is cold to allow for normal expansion. Replace the hydraulic oil annually. Engine oil with a API classification of SE is recommended see below for the proper weight.

Above 40 ^o	use	30w
15 ^o - 40 ^o	use	20-20w
0 ^o - 15 ^o	use	10w
0 ^o - Below	use	5w-20

Hydraulic Reservoir: The reservoir has a 60 gallon (227 Liters) capacity.

Hydraulic Filter: Replace the Return Filter after the first 50 hours of operation, thereafter, check the Filter condition indicator weekly and replace the filter elements as required. To check the Indicator, run the engine at high Idle with the oil at operating temperature. The replacement element is Part Number 236-6765-02 a quantity of 2 is required.



Drilling Fluid System

Drilling Fluid Pump (FMC): Check the oil level daily at the sight glass on the rear of the crank case. After the first 50 hours of operation, drain the oil from the crankcase and remove any metal adhering to the magnetic drain plug. Thereafter, drain the oil and clean the plug every 750 hours. If oil has a milky appearance, this indicates water is leaking past the plunger rod seals into the pump. The plunger rod seals should be checked and replaced if necessary. Refill with SAE 30 non-detergent oil.

Lubricate the packing with a water resistant grease such as Jet Lube. The three grease zerks require a couple of shots of grease once a week, but do not over lubricate or damage to the seal will occur.

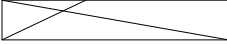
Leakage: A few drops (2-3 drops a minute) of water leakage is normal, and even desirable, but as wear begins to allow heavier leakage, the packing adjusting nut may be tightened to reduce leakage. When leakage can no longer be slowed by tightening, the packing is finally worn out, follow the instructions in the FMC manual to replace them.

Flushing Water Circuit: When using Bentonite, it is important to flush the entire water circuit at the end of each day with fresh water. The small water tank is for fresh water or antifreeze (Dowfrost) if drilling in below freezing conditions.

To flush circuit:

1. Close the ball valve at the bottom of the large tank to prevent the Bentonite mixture from entering the FMC water pump.
2. Open the small ball valve by the fresh water tank to allow fresh water (or) antifreeze to enter the pump.
3. Run the water circuit with the diverter valve turned to the drill rack. When the fresh water (or) antifreeze begins to run out of the sub saver at the drill carriage, switch the diverter valve to agitation in the large water tank. Run till fresh water (or) antifreeze is present at the agitation jets.
4. Next plug the wash wand onto the water hose and pull the trigger several times. This will force the water pressure up to relief setting allowing fresh water (or) antifreeze to run through the water relief bypass valve. When the fresh water (or) antifreeze begins to dump back into the large water tank through the relief's bypass hose at the top of the tank the flushing is complete.
5. If winterizing with antifreeze, remove the Bentonite funnel, open the ball valve, and pour about 2 cups of antifreeze into ball valve and close the valve.

Water Pump Valves: The FMC water pump has three suction valves and three discharge valves located in the head of the pump at the fluid end. The amount of wear and service required to maintain the valves varies with the amount of



Bentonite being pumped, properly mixing the Bentonite, and the amount of care used in flushing the valves clean at the end of each day.

When a valve is worn out, stuck open, or unseated there will be a noticeable hammering sound at the pump and the hoses will be cavitating. If the Bentonite is mixed to a good smooth consistency there will be less chance of plugging up the valves. If the pump sucks in a large clump of Bentonite, the valve can become stuck open allowing the abrasive mixture to jet through the valve. This will cut the valve like a torch.

Using contaminated water with foreign matter in it or not flushing the circuit clean each day will also cause the valves to fail prematurely.

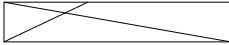
Another cause of hammering valves and cavitating is air in the circuit. Check all fittings on the suction side of the pump for cracks or looseness.

If the water has been drained from the pump, or the valves have recently been serviced, the pump may need to be primed to remove the air. Before priming the pump, try shutting off the flow to the pump at the ball valve for a second or two. Then open the ball valve fast. The quick suction may flush out the air. Use caution when doing this. Running the pump dry will ruin the valves.

If the air is still present in the circuit, remove the three plugs for the discharge valves located on the top side of the fluid head. Pour water into each valve housing and replace the caps. This should prime the pump, removing the air.

To replace the valves follow the instructions in the FMC manual.

The fluid system has several ball valves and banjo fittings which are opened and closed, connected and disconnected to perform several cleaning, draining and flushing operations. If these valves and fittings are not returned to the operating position, the drilling fluid may not have the proper path to operate correctly.



DL2610 Drill Rack Maintenance

Weekly Lubrication

1	Spindle Bearing(1)	Multi-Lube	6 shots
2	Carriage Roller Bearings (8)	JetLube*	1 shot
3	Water Swivel Bearings (2)	JetLube	2 shots
4	Rear Thrust Chain Sprocket (1)	Multi-Lube	2 shots
5	Front Thrust Chain Sprocket (1)	JetLube	3 shots
6	Thrust Gearbox (1)	80/90 Gear Lube	to Level
7	Rod Guide Bearing (1)	JetLube	2 shots
8	Rear Track Drive Bearings (4)	Multi-Lube	2 shots
9	Front Track Drive Bearings (2)	Multi-Lube	2 shots
10	Track Adjustment (4)	Multi-Lube	2 shots
11	PowerLoader Pivot (1)	Multi-Lube	1 shot
12	PowerLoader Clamp (2)	Multi-Lube	1 shot
13	PowerLoader Slides (3)	Dry Graphite	Spray Lightly
14	Thrust Chain	Open Chain Lube	Spray Lightly

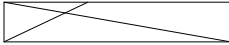
*JetLube is a water resistant grease. it may be used in all locations to simplify application.

Hydraulic Couplers: The most common way to contaminate the hydraulic fluid is through the couplers. Foreign particles entering the couplers accounts for the majority of leaking couplers. Always keep them clean and visually inspect them for debris before coupling them together. After plugging couplers together, always rotate the locking ring to assure they stay together.

Thrust Motor Gearbox: The Thrust Chain is driven by the hydraulic motor through a planetary gearbox. This gear box requires 80/90 EP gear lube. Check when unit is cold. Remove the Check plug on the side of the gear box (at the 9 O' Clock position) if lube is present, the level is correct. If lube is not present, remove the fill plug on top of the gearbox add lube till it starts to run out the check plug. Re-install both plugs.

Thrust Chain: To lubricate the chain, a spray on Open Chain or Open Gear lube, the type that dries and does not stay tacky is recommend. The thrust chain will begin to stretch and loosen up after it wears in. visually inspect chain tightness during pull-back to monitor chain tension. An extremely loose chain may get bunched up at the sprocket during a tough pull-back breaking the chain or damaging the thrust motor, sprockets, and bearings.

Water Swivel Filter: The filter for the water swivel is located inside the steel pipe on the right side of the carriage. Use a suitable filter for the type of drilling fluid used. If using straight water a 100 mesh filter is sufficient. If the fluid is a very thick mixture of Bentonite use the largest mesh filter available (20 mesh). Check the filter at least on every bore and carry plenty of spares to replace as necessary.



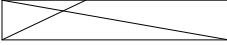
Rotation Motor: The Rotation Motor is a direct drive to the spindle the only maintenance required is the lubrication of the spindle bearings called out above.

Saver Sub: The purpose of the saver sub is to allow a replaceable tool joint for protecting drill stem and the carriage spindle. Always use plenty of Thread lube on the threads every time you load another piece of drill stem. Constantly monitor the threads on the saver sub for wear. When the sharp edges of the threads begin to show rounding or, if the shoulders of the joint will not come together, completely bottoming out, it is time to replace the saver sub. Failure to maintain the saver sub will result in costly damage to the drill stem. Never run the drill stem directly to the carriage spindle shaft. Always carry an extra saver sub to allow servicing when needed. Try to replace saver sub at the end of a day to allow ample curing time for the Loctite to cure.

Carriage Roller Bearings: Maintain the carriage lubrication intervals as outlined above. Monitor the bearings for flat spots and check for slop in the carriage daily. Failure to replace worn bearings may result in accelerated wear to the drill stem and saver sub.

Wrench Cogs: Wrench cogs have a varying life expectancy. Depending on the manner of operation and the amount of drilling time they encounter. When the cogs fail to grip they need to be replaced. When the cogs have been replaced three times, the wrench bodies will probably need to be replaced also.

Rod Guide: The rod guide helps to align the drill stem to the wrenches and protects the drill stem from scoring. Lubricate it with Jet-Lube weekly.



Trailer Maintenance

Tire Pressure: Check inflation of 125 PSI daily. Pressure should be checked cold before operation. Do not bleed air from tires when they are hot. Inflate to capacity rating molded into the tire.

Wheel Nut Torque: Initially check and re-torque at 50, 150, and 300 miles to 485 Ft Lb.. Check monthly thereafter.

NOTE: It is extremely important to apply and maintain proper wheel torque to prevent loose wheels, broken studs, and possible separation of wheels from the axle. Follow torque procedures in the Dexter Manual.

Wheel Bearings: Inspect daily for signs of oil seepage. If cap is leaking, remove, clean oil off with solvent, and check for cracks in cap. Inspect o'ring at this time for wear or nicks. If cap is cracked replace it adding SAE 90 Hypoid Gear Oil. Fill to the level indicated on the clear plastic cap. Torque cap to 25-30 ft. lbs.

Break-Away Switch: The function of the break-away switch, located at the front of the trailer hitch, is to apply the trailer brakes if the trailer detaches from the truck while in tow. Pull the Break Away Pin out of the Switch and try to drive forward, the brakes should be engaged.

NOTE: Do Not remove the Break Away Pin for an extended length of time. This will run down the Break-Away Switch battery.

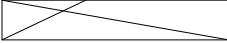
Break-Away Switch Battery: This is a small battery located near the hitch of the trailer. It is used to supply the power to the trailer brakes should the Break-Away Switch be pulled. The Battery is charged through a connection to the tow vehicle brake light circuit.

Brake Adjustment: Proper adjustment of the trailer brakes is critical to performance. Adjustment intervals are after the first 200 miles, and every 3,000 miles thereafter.

Shoes And Lining: Inspect visually. Replace if the lining is worn (to within 1/16" or less), contaminated with grease, or abnormally scored or gouged.

Brake Hardware: Check shoe return spring, hold down springs, and adjuster springs or stretch or wear. Replace as required.

Drums: The two areas of the drums that are subject to wear and require periodic inspection are, the drum surface where the brake shoes make contact and the armature surface where the magnet makes contact. Check the drums for scoring, cracking, or uneven wear.



Maintenance Schedule

Check Daily

- Engine Oil Level
- Engine Coolant Level
- Fuel Level
- Engine Fan and Drive Belt
- Engine/Hydraulic leaks
- Hydraulic Oil level
- Drilling Fluid Pump Oil Level
- Trailer Lights & Brakes
- Break-away Switch
- Drilling Fluid Strainer

Check Weekly

- Grease Lubrication Points
- Tire Pressure
- Hitch & Safety Chains
- Drain Condensation from Fuel Filters
- Inspect Wrench Cogs
- Check Break-Away Switch Battery Charge
- Inspect Battery Fluid Level
- Inspect Thrust Chain
- Inspect Trailer Lug Nuts
- Replace Hydraulic Filter elements after first 50 hours

Every 250 Hours

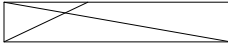
- Change Engine Oil & Filter
- Change/Clean Engine Air Filter
- Inspect & Clean Radiator
- Inspect & Clean Battery Cables
- Inspect & Adjust Brake Shoes/Drums
- Inspect & Adjust Engine Rpm's

Every 500 Hours

- Change Fuel Filters

Annually

- Change Hydraulic Oil
- Clean Suction Strainer
- Change Drilling Fluid Pump Oil
- Inspect & Re-pack Trailer Wheel Bearings



Troubleshooting

Hydraulics:

The DL2610 hydraulic system consists of two pumps, main pump and the auxiliary pump, both are fixed displacement, constant flow (open center) type which produce flow anytime the engine is running.

NOTE: DO NOT RUN THE ENGINE WITH THE HYDRAULIC FLOW BLOCKED. Always provide a flow path to the reservoir for the hydraulic fluid.

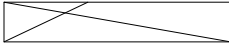
Main Pump: This a tandem gear pump mounted directly to the rear of the diesel engine. The front section (closest to the engine) supplies 35 GPM flow to the drill rack control valve through the hydraulic umbilical connections. This section of the pump is protected by a relief valve mounted at the outlet of the hydraulic pump. The other section provides 14 GPM flow to the drilling fluid pump circuit. This section of the pump is protected by a main relief valve mounted at the outlet pump.

Auxiliary Pump: This pump mounts on the PTO at the front of the engine. It supplies 6 GPM flow for the cooling fan circuit and for the hydraulic mud mixing option if the unit is so equipped.

Drilling fluid Circuit: This circuit receives 14 GPM flow that is regulated by a solenoid valve (Rexroth) which normally bypasses all of the flow from the pump back to the reservoir through the oil cooler when the engine is running but not using the drilling fluid pump.

When the drill rack and the electrical umbilical are properly connected, toggling the drilling fluid control switch to the "ON" position causes a 3-9 volt variable electrical signal to be connected to the solenoid, this in turn, varies the flow through the valve to the drilling pump drive motor. The higher the voltage, the more hydraulic flow to the motor, the higher the pressure in the drilling fluid circuit. The flow control valve bypasses the unused oil around the motor allowing the motor speed to be precisely controlled. This circuit is protected from excess pressure by a relief valve which is mounted at the outlet of the hydraulic pump.

Hydraulic service difficulties generally fall into the categories of leaks or lack of power. Other than normal wear of shafts and seals causing the wear limits to be reached, necessitating replacement of seals and/or components, most problems with hydraulic systems can be traced to hydraulic systems which have be operated with contaminated oil or high temperatures. Dirty oil causes rapid wear on shafts and seals causing external leaks and loss of power due to internal leaks. High heat can be caused by dirt accumulation on the oil cooler, internal oil leaks, or simply by continually holding the valves engaged when there is no function movement. This action causes the system to "dump" over the relief valves.



Electrical

The DL2610 has a self contained drilling system 12 VDC electrical system which draws all electrical power from the power unit storage battery and charge system. The DL2610 trailer lighting and trailer brake system draws it's electrical power independently from the tow vehicle through a standard trailer light connector.

The Power Unit electrical system provides 12 VDC to power the trailer mounted Reels, powers the solenoid valve which controls the drilling fluid pump, the fuel pump, and provides power to the engine kill solenoid and engine idle solenoid. The drill rack control switches are connected to the trailer through an electrical umbilical which has a connector plug only at the drill rack. The analysis of any drill rack electrical problem should start by confirming that the umbilical is securely connected.

The DL2610 uses a triplex style high pressure fluid pump driven by a pair of hydraulic motors controlled by a variable bypass flow control valve to control speed in series with a solenoid on/off control valve to control operation from the drill rack. The duty life of the fluid pump valves is dependent on the type of fluid being pumped and the thoroughness of the cleaning and flushing of the fluid system.