THE DAILY ROUTINE

CHECK LIST

Each day before starting your engine, take a few moments to run this check list:

☐ Visually inspect the engine for fuel, oil, or water leaks.

☐ Check the oil level.

☐ Check the transmission fluid level.

☐ Check for loose wires at the alternator.

☐ Check the starting batteries level (weekly)

☐ Check drive belts for wear and proper tension (weekly).

☐ Log your engine running time. These hours relate to scheduled maintenance.

☐ Check fuel supply; always keep fuel tank(s) as full as possible.

☐ Look for clean fuel in the fuel/water separator bowl.

☐ Check the coolant level in the plastic recovery tank.

NOTE: *Excessive loss of coolant indicates a cooling system leak. Check the entire system. If necessary, use a cooling system pressure tester to pressurize the cooling system to locate the area of leakage. In cases of excessive coolant loss, refill the system as outlined in the ENGINE COOLING CIRCUIT section in this manual.*

START YOUR ENGINE

NOTE: *See STARTING/STOPPING PROCEDURE in this manual for more detailed instructions.*

1. Put transmission in neutral, throttle advanced.
2. Turn KEY to the ON position (2 o'clock)
3. Depress PREHEAT (10 to 15 seconds).
4. While pressing PREHEAT, push START. As engine fires - release START.
5. Hold PREHEAT until oil pressure reaches 15 psi and/or alarm shuts off.

NOTE: *Should engine fail to start, wait 30 seconds, repeat the above procedure, and PREHEAT longer.*

6. Allow a few minutes for the engine to warm at a comfortable rpm (approx. 1200 rpm), then reduce the rpm, shift into gear, and get underway.

> ⚠ **CAUTION:** ***When shifting the transmission, always reduce the engine rpm to idle, then shift the transmission firmly from one direction to another. A slight pause in neutral will allow the propeller to slow. Shifting at high rpm will damage the transmission/damper plate.***

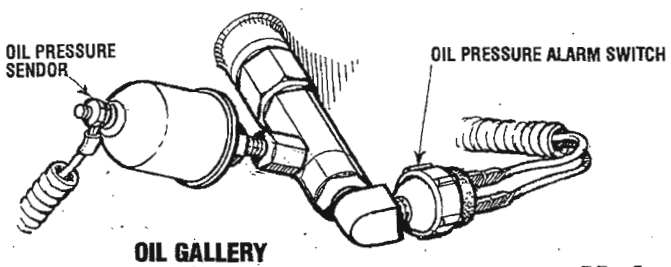
ALARMS AND CIRCUIT BREAKER

ENGINE CIRCUIT BREAKER

The DC harness on the engine is protected by an engine-mounted manual reset circuit breaker (20 amps DC). Excessive current draw or electrical overload anywhere in the instrument panel wiring or engine wiring will cause the breaker to trip. In this event most engines will shut down because the open breaker disconnects the fuel supply. If this should occur, check and repair the source of the problem. After repairing the fault, reset the breaker and restart the engine.

LOW OIL PRESSURE ALARM SWITCH

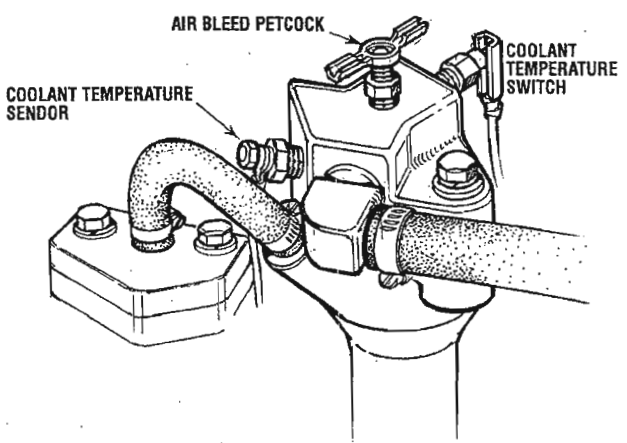
A low oil pressure alarm switch is located off the engine's oil gallery. This switch's sensor monitors the engine's oil pressure. Should the engine's oil pressure fall to 5 -10 psi (0.4 - 0.7 kg/cm²), this switch will activate a **pulsating alarm**.



OIL GALLERY [M-50B SHOWN]

COOLANT TEMPERATURE SWITCH

A coolant temperature switch is located on the thermostat housing. This switch will activate a **continuous alarm** if the coolant's operating temperature reaches approximately 210°F (99°C).



THERMOSTAT ASSEMBLY [M-50B SHOWN]

MAINTENANCE SCHEDULE

NOTE: *Use the engine hour meter gauge to log your engine hours or record your engine hours by running time.*

SCHEDULED MAINTENANCE	CHECK EACH DAY	HOURS OF OPERATION							EXPLANATION OF SCHEDULED MAINTENANCE
		50	100	250	500	750	1000	1250	
Engine Hoses		☐	☐	☐	☐	☐	☐	☐	Hose should be hard & tight. Replace if soft or spongy. Check & tighten all hose clamps.
Heat Exchanger Zinc Anode		☐	☐	☐	☐	☐	☐	☐	Clean or replace anode. Open heat exchanger end cap and clean out debris. Remove every 1000 hours for professional cleaning and pressure testing.
Electric Fuel Lift Pump Filter (if applicable)		☐		☐	☐	☐	☐	☐	Clean at 50 hours, then clean every 250 hours.
Raw Water Pump				☐		☐		☐	Remove pump cover and inspect impeller for wear; replace if needed. Also replace gasket. Lubricate both when reassembled. Inspect pump for internal wear, cover plate wear and cam wear.
Coolant System					☐			☐	Drain, flush, and refill cooling system with appropriate antifreeze mix.
*Fuel Injectors						☐			Check and adjust injection opening pressure and spray condition (see *Engine Adjustments*).
*Starter Motor					☐			☐	Check solenoid and motor for corrosion. Remove and lubricate. Clean and lubricate the Starter motor pinion drive.
*Preheat Circuit					☐			☐	Check operation of preheat solenoid. Remove and clean glow plugs; check resistance (1.1-1.2 ohms).
*Engine Cylinder Compression and Valve Clearance					☐			☐	Incorrect valve clearance will result in poor engine performance; check compression pressure and timing, and adjust valve clearances.
DC Alternator				☐		☐		☐	Check DC charge from alternator. Check mounting bracket; tighten electrical connections.
Heat Exchanger							☐		Remove, have professionally cleaned and pressure tested.
*Engine Transmission Damper Plate							☐		Chattering at idle and low rpms is an indication of damper plate wear. Remove and replace.

*UNIVERSAL recommends this service be performed by an authorized mechanic.

MAINTENANCE SCHEDULE

⚠ WARNING: ***Never attempt to perform any service while the engine is running. Wear the proper safety equipment such as goggles and gloves, and use the correct tools for each job. Disconnect the battery terminals when servicing any of the engine's DC electrical equipment.***

NOTE: *Many of the following maintenance jobs are simple but others are more difficult and may require the expert knowledge of a service mechanic.*

SCHEDULED MAINTENANCE	CHECK EACH DAY	HOURS OF OPERATION							EXPLANATION OF SCHEDULED MAINTENANCE
		50	100	250	500	750	1000	1250	
Fuel Supply	☐								Diesel No. 2 rating of 45 cetane or higher.
Fuel/Water Separator	☐								Check for water and dirt in fuel (drain/replace filter if necessary).
Engine Oil Level	☐								Oil level should indicate between MAX. and LOW on dipstick.
Coolant Level	☐								Check at recovery tank; if empty, check at manifold. Add coolant if needed.
Drive Belts	☐								Inspect for proper tension (3/8" to 1/2" depression) and adjust if needed. Check belt edges for wear.
Visual Inspection of Engine	☐	**NOTE:** *Please keep engine surface clean. Dirt and oil will inhibit the engine's ability to remain cool.*							Check for fuel, oil and water leaks. Inspect wiring and electrical connections. Keep bolts & nuts tight. Check for loose belt tension.
Engine Throttle and Transmission Control Cables and Shutoff Levers		☐		☐	☐	☐	☐	☐	Check for loose fittings, cotter pins, etc. Lubricate with WD-40 or equivalent.
Adjust Engine Idle Speed	☐								Refer to page 10.
Fuel Filter		☐		☐	☐	☐	☐	☐	Initial change at 50 hrs, then change every 250 hrs.
Starting Batteries (and House Batteries)	☐								Every 50 operating hours check electrolyte levels and make sure connections are very tight. Clean off excessive corrosion.
Engine Oil and Filter	☐	☐	☐	☐	☐	☐	☐	☐	Initial engine oil & filter change at 50 hrs., then change both every 100 hours.
*Torque Cylinder Head Hold Down Bolts									At engine overhaul or cylinder head overhaul.
Lubricate Panel Key Switch with "Lockeze"			☐						At first 100 hrs., then each year at winterizing.
Transmission Fluid		☐		☐	☐	☐		☐	Initial fluid change at 50 hrs., then every 250 hrs. or once a year.
Air Cleaner				☐	☐	☐	☐	☐	Clean the filter and element.
Exhaust System		☐				☐		☐	Initial check at 50 hrs., then every 500 hrs. Inspect for leaks. Check siphon break operation. Check the exhaust elbow for carbon and/or corrosion buildup on inside passages; clean and replace as necessary. Check that all connections are tight.