

SERVICE SUGGESTIONS

HYDRAULIC SYSTEMS PREVENTATIVE MAINTENANCE CHECK LIST & TROUBLE SHOOTING HINTS

CHECK LIST See "Service Instructions" on individual components.

E A C H S H I F T

<u>CHECK</u>	<u>METHOD</u>	<u>REMEDY</u>	<u>POSSIBLE RESULTING TROUBLES</u>
Reservoir level.	Visually with main ram retracted.	Fill as required.	Excessive heat, air in system. Pump cavitation.
Fluid leaks.	Visually or pressure test.	Repair as required.	Loss of fluid, loss of pressure, air in system, dirt in system, excessive heat, dirty equipment, safety hazard, pump cavitation.
Fluid temperature exceeds limits.	Visually with Pyrometer.	Determine cause and correct.	Deterioration of fluid; excessive wear to pump, start up problems, erratic operation.
Erratic operations.	Visually.	Report in detail.	Erratic operations are often a warning of impending part failure. Corrective measures can be taken to prevent shut down and provide time to secure replacement parts before complete failure.
Fluid Filters.	Pressure gauges on filters, or filter indicator.	Change cartridge.	Dirt entering system. Cavitation of pump; increased wear rate.

W E E K L Y

<u>CHECK</u>	<u>METHOD</u>	<u>REMEDY</u>	<u>POSSIBLE RESULTING TROUBLES</u>
Heat exchanger.	Check for leaks, scale and corrosion.	Repair, clean or replace.	Excessive heat. Loss of fluid. Wear in fluid. Fluid in cooling water.
Heat exchanger temperature - Flow control valve.	Check valve opening (to permit water flow) temperature.	Reset as required.	Excessive heat or cold if not opening properly.
Flexible hoses for damage and deterioration.	Physically inspect.	Replace as required.	Loss of fluid, loss of production, dirty equipment, safety hazard.

M O N T H L Y

<u>CHECK</u>	<u>METHOD</u>	<u>REMEDY</u>	<u>POSSIBLE RESULTING TROUBLES</u>
Air breathers.	Remove, clean.	Re-oil and re-install.	Dirt in hydraulic system; cavitation. Inadequate pre-filling of main cylinder.
Hydraulic tube connections.	Tighten and check for damage tube.	Replace the damaged fittings and tubing.	Loss of fluid, loss of pilot pressure, air entering system, dirty equipment, safety hazard.
Solenoids.	Tighten all connections, tighten covers.	Replace broken covers or wires. Clean off dirt and oil.	Solenoid failure, loss of production and fire hazard.

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<u>CHECK</u>	<u>METHOD</u>	<u>REMEDY</u>	<u>POSSIBLE RESULTING TROUBLES</u>
Clean Equipment	Wash down as required, remove rags, etc.		Dirt entering system, failure to notice leaks, safety and fire hazard.
Fluid sample for analysis.	Send sample to fluid supplier to analyze for breakdown, contamination level and loss of additives properties.	Drain complete system and refill with new fluid or replenish additives.	Excessive wear in pumps and valves due to loss of lubricating quality. Sticking valves due to contamination, gumming, rust, etc.

T H R E E M O N T H S

<u>CHECK</u>	<u>METHOD</u>	<u>REMEDY</u>	<u>POSSIBLE RESULTING TROUBLES</u>
Tighten all hydraulic pipe connections and pipe braces.	Physically with proper tools.	Replace O-rings and gaskets as required.	Leaks, broken pipes, dirty equipment.
Relief valve pressure switches, timers, etc., settings.	Use pressure gauges and stop watch.	Readjust as required.	Erratic operation, slow down of equipment.
Heat exchanger.	Check water passage for obstructions, leaks, etc.	Clean or replace the zinc pencils. Flush out.	Excessive heat, water entering fluid reservoir.

S I X M O N T H S

<u>CHECK</u>	<u>METHOD</u>	<u>REMEDY</u>	<u>POSSIBLE RESULTING TROUBLES</u>
Fluid filters.		Replace all cartridges in use for over 3 months.	
Pump and motor alignment.	Remove coupling cover and grid and use feeler gauge to check alignment, horizontal, vertical and angular.	Correct as required - repack coupling with proper grease.	Excessive pump and drive motor wear.
Pump, motor and valve mounting bolts.	Physically with proper tools.	Tighten as required.	Misalignment, excessive wear, noise.

TROUBLE SHOOTING HINTS FOR HYDRAULIC SYSTEMS

See "Service Instructions" on individual components.

<u>PROBLEMS</u>	<u>PROBLEM CAUSE AND CORRECTIVE STEPS</u>
Noisy pump - air leaking into the system.	<ul style="list-style-type: none"> a) Be sure the fluid reservoir is filled to maximum, with rams retracted, and that the fluid intake is well below the surface of the fluid. b) Check pump packing, pipe and tubing connections and all other points where air can be drawn into the system. One way of checking a suspected leak on the intake side is to pour fluid over it, or pack grease around the suspected area. If the pump noise stops, you've found your leak. c) Keep your hydraulic system as clean as possible. Avoid allowing lint to get into the system. Avoid condensation occurrence as it can cause damage to pump parts, bearings, valve spools, valve solenoids, etc. Rusty solenoids do not perform satisfactorily. They should be checked periodically for excessive rust moisture and cleaned up when required.
Low pressure in system.	Relief valve setting too low. Relief valve may have been reset. If setting is too low, fluid may flow from pump, through relief valve and back to reservoir without going to output device. To check relief valve setting, block discharge line beyond relief valve and check line pressure with gauge.
Erratic action.	Valves, pistons, etc., sticking or binding. First check suspected part for mechanical deficiencies such as misalignment of shaft, worn bearings, etc., then look for signs of dirt, fluid sludge, varnishes and lacquers caused by fluid deterioration. Look for out of range temperatures, air in the fluid, and low reservoir level.
Relief valve stuck open.	Look for dirt or sludge in valve. Clean if necessary. Stuck valves may be indication that system contains dirty or deteriorated fluid.

PROBLEMS**PROBLEM CAUSE AND CORRECTIVE STEPS**

Leakage in system.	Check the whole system for escaping fluid. Serious leaks in the open are easy to find; however, leaks often occur in concealed piping. Install pressure gauge and relief valve in discharge line near pump and then progressively block circuit down stream until leak is located. A high leakage path through a valve or component generates heat. A hot spot in a circuit often indicates the point of leakage.
Incorrect control valve setting -- fluid short -- circuited to reservoir.	If open center directional control valves are unintentionally set at neutral, fluid will be returned to reservoir. No pressure will be developed. Also, scored control valve pistons and cylinders can cause this trouble.
Air bubbles in the intake fluid.	If fluid level is low, air bubbles will form in the reservoir. Check fluid level daily.
Cavitation.	(The formation of a void in a pump when it does not get enough fluid.) Check for loose suction pipes. Check for clogged or restricted intake line or plugged reservoir breather. Fluid viscosity may be too high to permit pump to prime itself. This condition may result from too low ambient temperature or use of wrong viscosity fluid. Recheck fluid recommendations.
Loose or worn pump parts.	Look for worn gaskets and packing, replace if necessary. Usually there is no way to compensate for wear in a part; it is always better to replace it.
Stuck valves.	Parts may be stuck by metallic chips, bits of lint, carborized fluid, etc. If so, disassemble and clean thoroughly. Avoid the use of files, emery cloths, steel hammers etc., on machined surfaces. Products of fluid deterioration such as gums, sludge, etc., may also cause sticking. Use solvent to clean parts and wipe dry before reassembly. If parts are stuck by corrosion or rust, they will probably have to be replaced.
Overheating.	Fluid viscosity too high. Recheck fluid recommendations. Unusual temperature conditions may cause fluid of improper viscosity to thicken. Cooler plugged. Relief valve blowing. Valve leaking. Cooling water too warm.
Internal leakage too high.	Check for wear and loose packings. Fluid viscosity index may have changed.
Excessive discharge.	Trouble may be caused by abnormal setting of relief valve. If so, reset. Also, check for sticking relief valve.
Fluid cooler clogged.	If temperatures run abnormally high, they will go even higher with clogged fluid passages. If you find this condition, flush out shell side of cooler and "brush clean" the water tubes. If this does not work, try solvent.
Low fluid.	If the fluid supply is low, less fluid will be available to dissipate the heat. This will cause a rise in fluid temperature. Be sure fluid is up to level. Always fill the tank from clean fluid drums and pump the fluid through the circulating fluid filtering unit.

GENERAL TROUBLE SHOOTING FOR MANY TYPES OF PUMPS

See "Service Instructions" on individual components.

<u>TROUBLE</u>	<u>PROBABLE CAUSE AND CHECK</u>	<u>REMEDY</u>
Pump not delivering fluid.	Suction passage blocked.	Clean.
	Suction line loose or disconnected.	Correct.
	Fluid viscosity too heavy.	Heat fluid or change to lighter viscosity. See manufacturer's recommendations.
Pumps not delivering.	Suction filter clogged.	Clean and/or replace. Suction filters should have at least twice the G.P.M. capacity of pump output. Oilgear does not recommend use of suction filters for their pumps.
	Pump rotation not correct. Most pumps are marked to show correct direction of rotation.	Correct immediately. Could cause severe damage.
Pump not developing pressure.	Relief valve setting not high enough.	Block fluid circuit and reset relief valve using a pressure gauge.
	Relief valve stuck open.	
	a) Foreign matter under valve.	a) Disassemble and clean. If valve spool or seat has been damaged, it may require honing or replacement. Reassemble and adjust.

<u>TROUBLE</u>	<u>PROBABLE CAUSE AND CHECK</u>	<u>REMEDY</u>
	b) Broken valve spring.	b) Replace. Be sure to remove all broken particles.
	Relief valve venting.	Check all venting relief valves to be sure vent is being blocked. Remove piping at relief valve and insert plug to test relief valve.
	Worn pump.	Replace pump.
	a) Test Oilgear pumps as described in individual "Service Instruction" bulletin.	
	b) Test pump as directed by it's manufacturers.	Some vane type pumps have a pumping cartridge which may be replaced.
	Open valve in system.	Locate and repair.
Excessive or high peak pressures.	Binding relief valve plunger.	Disassemble and clean out dirt and sludge. Check spool for burrs; dress with a stone, lap or replace.
	Relief valve spring screwed down solid.	Readjust or replace spring with one of higher "K" value.
	Control valve shifting so as to block fluid circuit.	Readjust valve spool shifting rates.
Pump noise.	Air in pump.	
	a) Air bubbles in intake fluid.	a) Return lines must be well below fluid level and baffled from pump intake.
	b) Pump cavitating due to low fluid level.	b) Fill reservoir to proper level.
	c) Suction filter clogged or too small.	c) Clean or replace with larger unit.
	d) Reservoir breather.	d) Clean breather, check size and replace if too small.
	e) Partially clogged intake line.	e) Clean.
	f) Suction pipe loose.	f) Tighten, replace gasket or "O" ring as required.
	g) Leaks in piping subject to suction.	g) Tighten, replace gasket or "O" ring or reweld as required.
	NOTE: A connection that will not leak fluid under pressure may leak air under suction.	Test by pouring fluid over connection while under suction and note change in pump's noise or flow of fluid <u>into</u> connection.
Excessive heating.	Operating above continuous duty rating of pump for extended periods.	<u>DANGEROUS</u> . Alter method of operation. See pump manufacturer's recommendations.
	"Blowing" relief valve.	Alter operations or increase relief valve setting if below pump rating.
	High ambient temperature.	Install or increase heat exchanger capacity.
	Leakage past hydraulic cylinder piston rings.	Replace rings - rehone cylinder, if required.
	Leakage past worn valves.	Replace.
	Low fluid level in reservoir.	Fill reservoir to proper level.

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