POWERTECH® 4.5 L & 6.8 L 4045 and 6068 Marine Diesel Engines

OPERATOR'S MANUAL

POWERTECH 4.5/6.8L Marine Diesel Engines

OMRG28997 Issue (29Mar02) (ENGLISH)

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.

If this product contains a gasoline engine:

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The State of California requires the above two warnings.

John Deere Power Systems
LITHO IN U.S.A.

Record Keeping

POWERTECH Medallion

A medallion is located on the rocker arm cover which identifies each engine as a John Deere Marine *POWERTECH* engine.

RG12080 –UN–26FEB02

POWERTECH Medallion

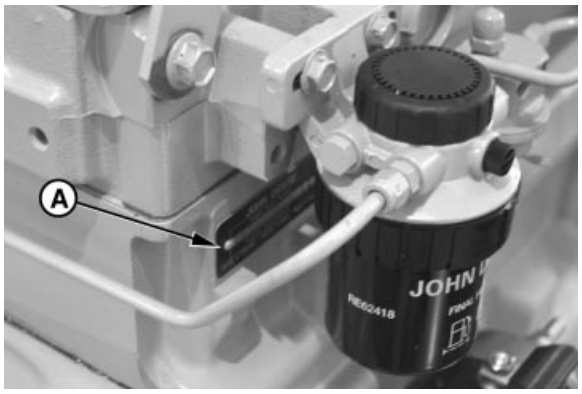
RG,RG34710,5505 –19–11JAN02–1/1

Engine Serial Number Plate

Each engine has a 13-digit John Deere engine serial number. The first two digits identify the factory that produced the engine:

- "CD" indicates the engine was built in Saran, France
- "T0" indicates the engine was built in Dubuque, Iowa
- "PE" indicates the engine was built in Torreon, Mexico

Your engine's serial number plate (A) is located on the right-hand side of cylinder block behind the fuel filter.



RG8007 –UN–15JAN99

Engine Serial Number Plate

A—Serial Number Plate

RG,RG34710,5506 –19–11JAN02–1/1

Record Engine Serial Number

Record all of the numbers and letters found on your engine serial number plate in the spaces provided below.

This information is very important for repair parts or warranty information.

Engine Serial Number (A)_____

Engine Model Number (B)_____

RG99831 –UN–06JAN99

Serial Number Plate

A—Engine Serial Number
B—Engine Model Number

RG,RG34710,5507 –19–20MAY96–1/1

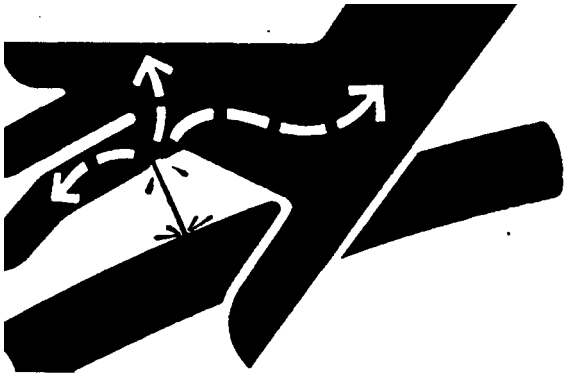
Avoid High-Pressure Fluids

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



X9811 –UN–23AUG88

DX,FLUID –19–03MAR93–1/1

Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.

TS953 –UN–15MAY90

DX,TORCH –19–03MAR93–1/1

Diesel Engine Break-In Oil

New engines are filled at the factory with John Deere ENGINE BREAK-IN OIL. During the break-in period, add John Deere ENGINE BREAK-IN OIL as needed to maintain the specified oil level.

Change the oil and filter after the first 100 hours of operation of a new or rebuilt engine.

After engine overhaul, fill the engine with John Deere ENGINE BREAK-IN OIL.

If John Deere ENGINE BREAK-IN OIL is not available, use a diesel engine oil meeting one of the following during the first 100 hours of operation:

- API Service Classification CD
- API Service Classification CC
- ACEA Specification E1

After the break-in period, use John Deere PLUS-50® or other diesel engine oil as recommended in this manual.

IMPORTANT: Do not use PLUS-50 oil or engine oils meeting any of the following during the first 100 hours of operation of a new or rebuilt engine:

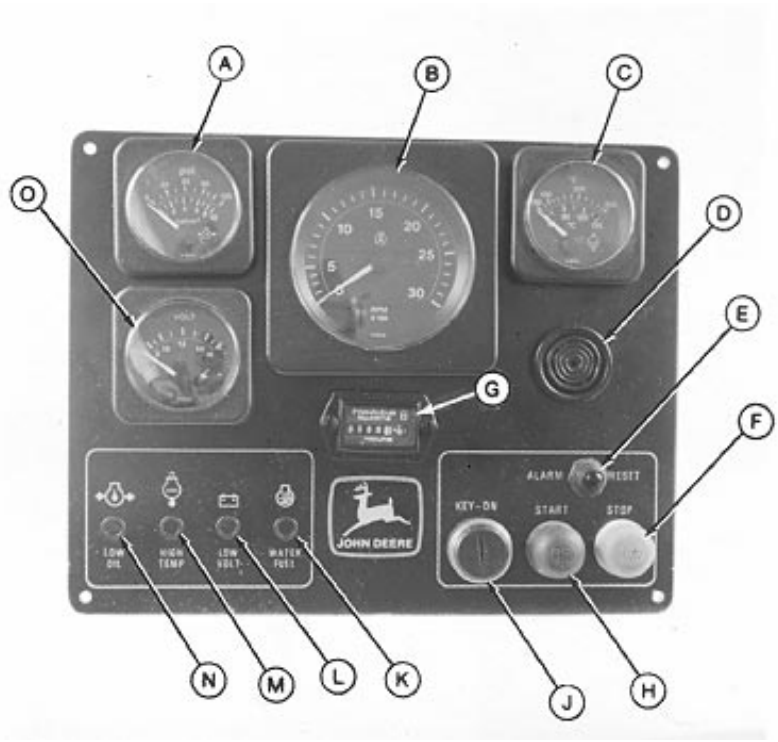
- **API CI-4**
- **ACEA E5**
- **API CH-4**
- **ACEA E4**
- **API CG-4**
- **ACEA E3**
- **API CF-4**
- **ACEA E2**

These oils will not allow the engine to break-in properly.

PLUS-50 is a registered trademark of Deere & Company.

OUOD002,0000178 –19–17DEC01–1/1

Instrument (Gauge) Panel (Propulsion Units Only) (Except 6068SFM50)



RG6097 –UN–30JAN92

A—Oil Pressure Gauge
B—Tachometer
C—Coolant Temperature Gauge
D—Audible Alarm
E—Alarm Reset Switch
F—Stop Switch
G—Hour Meter
H—Start Switch
J—Key Switch
K—Water-in-Fuel Warning Light
L—Low Battery Voltage Warning Light
M—High Coolant Temperature Warning Light
N—Low Oil Pressure Warning Light
O—Voltmeter

All controls and gauges are optional equipment on John Deere Marine Engines. They may be supplied by the boat builder instead of John Deere. The following information applies only to those controls and gauges provided by John Deere. Consult your boat builder for information on instrumentation other than those supplied by John Deere.

IMPORTANT: Any time an electric gauge or meter does not register correctly, replace it with a new one. Do not attempt to repair it.

NOTE: Main station instrument panel shown, flybridge panel is similar except it does not have a key switch (J) or hour meter (G).

The optional instrument (gauge) panel available from your John Deere engine distributor or servicing dealer is recommended for propulsion units only and is not equipped with safety shut-down devices, only audible and visible warning devices provided.

Following is a brief description of the available optional gauges and warning devices:

A—Engine Oil Pressure Gauge

The oil pressure gauge (A) indicates engine oil pressure. It is connected to an audible alarm (D) and a warning light (N) for warning the operator if engine oil pressure falls below a safe operating pressure.

Continued on next page

Generator Set Power Units

To assure that your engine will deliver efficient generator operation when needed, start engine and run at rated speed (with 50%—70% load) for 30 minutes every 2 weeks. DO NOT allow engine to run extended period of time with no load.

RG,RG34710,5556 –19–20MAY96–1/1

Item	Lubrication and Maintenance Service Intervals						
	Daily	50 Hour/Every 2 Weeks	250 Hour	500 Hour/12 Month	1000 Hour/24 Month	2000 Hour	Service As Required
Inspect and Repair Sea Water Pump					•		
Check and Adjust Engine Valve Clearance						•	
Flush Cooling System[e]						•	
Add Coolant							•
Replace Air Cleaner Element							•
Service Dry Air Cleaner Element							•
Replace Drive Belt							•
Inspect Driveline (PTO) (If Equipped)							•
Bleed Fuel System							•

[e]If John Deere COOL-GARD is used, the flushing interval may be extended to 3000 hours or 36 months. If John Deere COOL-GARD is used and the coolant is tested annually AND additives are replenished as needed by adding a supplemental coolant additive, the flushing interval may be extended to 5000 hours or 60 months, whichever occurs first.

DPSG,OUOD007,341 –19–03JAN02–2/2

4. Remove and discard oil filter element (A) using a suitable filter wrench.

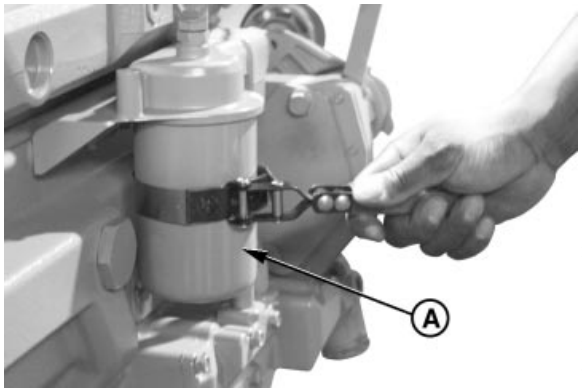
NOTE: Depending on engine application, oil filter may be located on either side of the engine.

5. Remove oil filter packing and clean filter mounting pad.

IMPORTANT: Filtration of oils is critical to proper lubrication. Always change filter regularly. Use filter meeting John Deere performance specifications.

6. Oil new packing and install new filter element. Hand tighten element according to values printed on filter element. If values are not provided, tighten element approximately 3/4 — 1-1/4 turn after packing contacts filter housing. DO NOT overtighten filter element.

7. Install oil pan drain plug with a new seal when equipped. Tighten drain plug to 47 N•m (35 lb-ft) of torque.



RG7961A –UN–22JAN99

Removing Oil Filter

A—Oil Filter Element

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RG,RG34710,5570 –19–04JAN02–2/3

If equipped with water separator, remove filter element from water separator bowl. Drain and clean separator bowl. Dry with compressed air. Install water separator bowl onto new element. Tighten securely.

7. Align keys on filter element with slots in filter base.

8. Install retaining ring onto mounting base making certain dust seal is in place on filter base. Hand tighten ring (about 1/3 turn) until it “snaps” into the detent. DO NOT overtighten retaining ring.

NOTE: The proper installation is indicated when a "click" is heard and a release of the retaining ring is felt.

A plug is provided with the new element for plugging the used element.

9. Open fuel shut-off valve and bleed the fuel system. (See BLEEDING FUEL SYSTEM in Service As Required Section.) Tighten bleed plug (D).

RG,RG34710,5576 –19–04JAN02–2/2

Testing Diesel Engine Coolant

Maintaining adequate concentrations of glycol and inhibiting additives in the coolant is critical to protect the engine and cooling system against freezing, corrosion, and cylinder liner erosion and pitting.

Test the coolant solution at intervals of 12 months or less and whenever excessive coolant is lost through leaks or overheating.

Coolant Test Strips

Coolant test strips are available from your John Deere dealer. These test strips provide a simple, effective method to check the freeze point and additive levels of your engine coolant.

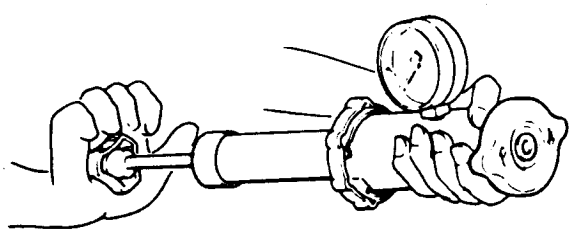
Compare the results to the supplemental coolant additive (SCA) chart to determine the amount of inhibiting additives in your coolant and whether more John Deere COOLANT CONDITIONER should be added.

COOLSCAN Or COOLSCAN PLUS

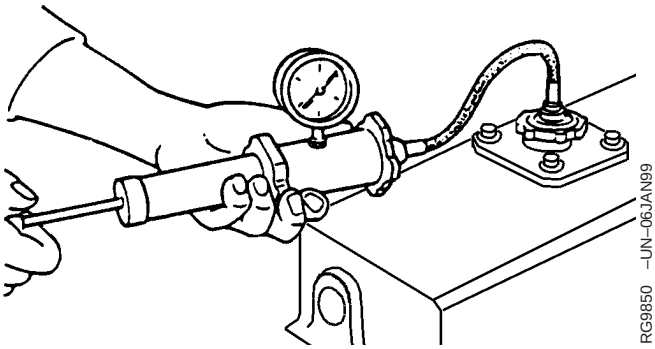
For a more thorough evaluation of your coolant, perform a COOLSCAN or COOLSCAN PLUS analysis. See your John Deere dealer for information about COOLSCAN or COOLSCAN PLUS.

OUOD002,0000175 –19–23NOV01–1/1

Pressure Testing Cooling System



RG6557 –UN–20JAN93



RG9850 –UN–06JAN99

CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

Test Coolant Filler Cap

1. Remove coolant filler cap and attach to an appropriate tester as shown.
2. Pressurize cap to 70 kPa (0.7 bar) (10 psi). Gauge should hold pressure for 10 seconds within the normal range if cap is acceptable.

   If gauge does not hold pressure, replace pressure cap.
3. Remove the cap from gauge, turn it 180°, and retest cap. This will verify that the first measurement was accurate.

Test Cooling System

NOTE: Engine should be warmed up to test overall cooling system.

1. Allow engine to cool, then carefully remove coolant filler cap.
2. Fill tank with coolant to the normal operating level.

IMPORTANT: DO NOT apply excessive pressure to cooling system, doing so may damage coolant tank and hoses.

3. Connect gauge and adapter to filler neck. Pressurize system to 70 kPa (0.7 bar) (10 psi).
4. With pressure applied, check all cooling system hose connections, coolant tank, and overall engine for leaks.

   If leakage is detected, correct as necessary and pressure test system again.

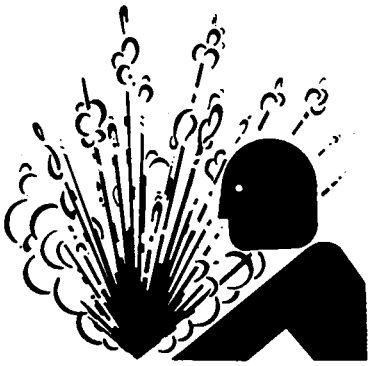
   If no leakage is detected, but the gauge indicated a drop in pressure, coolant may be leaking internally within the system or at the block-to-head gasket. Have your servicing dealer or distributor correct this problem immediately.

RG,RG34710,5586 –19–20MAY96–1/1

Flushing Cooling System

CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



TS281 –UN–23AUG88

High-Pressure Fluids

NOTE: When John Deere COOL-GARD is used, the drain interval is 3000 hours or 36 months. The drain interval may be extended to 5000 hours or 60 months of operation, ***provided that the coolant is tested annually AND additives are replenished, as needed, by adding a supplemental coolant additive (SCA)****.*

If COOL-GARD is not used, the flushing interval is 2000 hours or 24 months of operation.

Drain old coolant, flush the entire cooling system, test thermostats, and fill with recommended clean coolant.

1. Pressure test entire cooling system and pressure cap if not previously done. (See PRESSURE TESTING COOLING SYSTEM, in the Lubrication and Maintenance/500 Hour/12 Month Section.)

2. Slowly open the engine cooling system filler cap or radiator cap to relieve pressure and allow coolant to drain faster.

Continued on next page

RG,RG34710,5587 –19–15FEB02–1/3

Replacing Air Filter Element (Open Element Installations)

IMPORTANT: Replace the element after 10 cleanings.

1. Loosen clamp (A) and remove filter element.

2. Install new filter element and tighten clamp.

A—Clamp

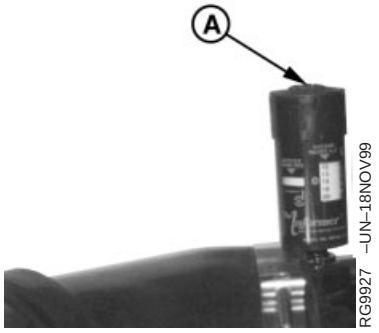
Remove Filter Element

DPSG,OUOD002,1410 –19–04JAN02–1/1

IMPORTANT: Whenever the air cleaner has been serviced, ALWAYS fully depress the air restriction indicator reset button (if equipped) to assure accurate readings.

3. If equipped, fully depress air restriction indicator reset button (A) and release to reset indicator.

A—Reset Button



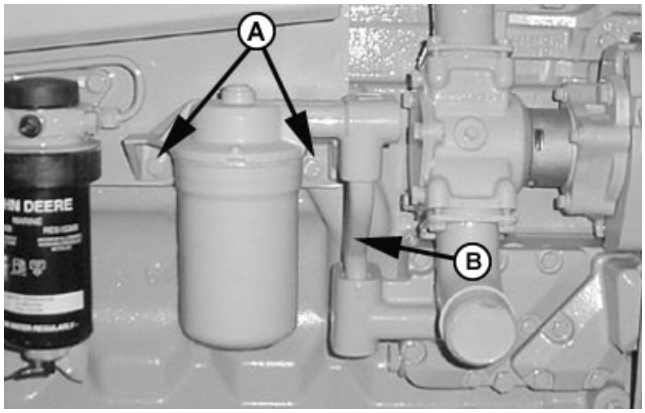
Air Filter Restriction Indicator Reset Button

DPSG,OUOD002,1411 –19–04JAN02–1/1

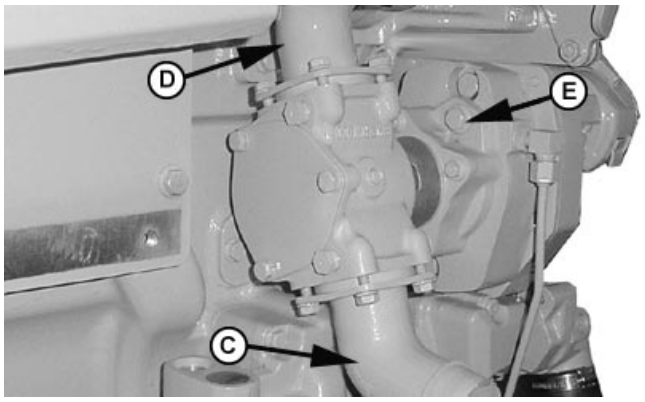
Remove And Install Sea Water Pump (6068SFM50)

NOTE: If engine is equipped with a remote oil filter, steps 2 and 10 are not necessary.

1. Close sea cock and drain sea water system.
2. Remove two cap screws (A) and remove oil filter housing and tubes (B).
3. Remove four flange mount cap screws and remove sea water inlet tube (C) and outlet tube (D).
4. Remove two cap screws (E) and remove sea water pump.
5. Clean all gasket material from both mating surfaces.
6. Position a new gasket on sea water pump mounting flange. Install splined pump shaft in splined ID of drive gear.
7. Align mounting holes in water pump mounting flange and gasket with threaded holes in drive gear housing. Install cap screws with washers and tighten cap screws to 73 N•m (54 lb-ft) of torque.
8. Inspect condition of O-ring in sea water pump inlet and outlet tubes determine if they are reusable. Replace O-rings as needed.
9. Connect sea water inlet and outlet tubes and install and tighten cap screws **evenly** until secure. Tighten hose clamps.
10. Replace O-rings on oil tubes and install oil tubes and oil filter housing. Tighten mounting cap screws to 35 N•m (26 lb-ft).
11. Open sea cock, start engine and check for leaks.



Remove Oil Filter Housing (If Necessary)



Remove Sea Water Pump

A—Cap Screws
B—Oil Tubes
C—Sea Water Inlet
D—Sea Water Outlet
E—Cap Screws

DPSG,OUOD005,3476 –19–20MAR00–1/1

Symptom	Problem	Solution
High fuel consumption	Improper type of fuel.	Use proper type of fuel.
	Clogged or dirty air cleaner.	Service air cleaner.
	Engine overloaded.	Reduce load.
	Improper valve clearance.	See your authorized servicing dealer or engine distributor.
	Injection nozzles dirty.	See your authorized servicing dealer or engine distributor.
	Engine out of time.	See your authorized servicing dealer or engine distributor.
	Defective turbocharger.	See your authorized servicing dealer or engine distributor.
	Low engine temperature.	Check thermostat.

RG,RG34710,5608 –19–04JAN02–7/7

General Engine Specifications—4.5 L Engines

ITEM	UNIT OF MEASURE	4045DFM	4045TFM
Number of Cylinders	—	4	4
Fuel	—	Diesel	Diesel
Bore	mm (in.)	106 (4.19)	106 (4.19)
Stroke	mm (in.)	127 (5.00)	127 (5.00)
Displacement	L (cu in.)	4.5 (276)	4.5 (276)
Compression Ratio	—	17.6:1	17.0:1
Rated Speed: Std. Governor 3—5% Governor	 RPM RPM	 2500 1800	 2400 1800
Fast Idle Speed (Std. Governor)	RPM	2700	2675
Slow Idle Speed: Propulsion Engines Gen-Set Engines	 RPM RPM	 700 850	 700 850
Propulsion/Auxiliary Power Rating @ Rated Speed M1 M2 M3 M4	 kW (hp) kW (hp) kW (hp) kW (hp)	 56 (76) 63 (85) — —	 78 (105) 90 (120) 101 (135) 112 (150)
Gen-Set Prime Power Rating*: @ 1800 RPM @ 1500 RPM Gen Set Recommended Power Rating	 kW (hp) kW (hp) kW (hp)	 48 (64) 40 (54) 38-40 (51-54)	 76 (102) 60 (80) 67-70 (90-94)
Oil Pressure @ Rated Speed	kPa (psi)	345 (50)	345 (50)
Flywheel and Housing	SAE No.	3,4	2,3,4
Injection Nozzles	mm	9.5	9.5
Physical Dimensions: Width Height Length Basic Dry Weight	 mm (in.) mm (in.) mm (in.) kg (lb)	 712 (28) 902 (35.5) 885 (35) 437 (961)	 712 (28) 911 (36) 885 (35) 462 (1017)

RG,RG34710,5614 –19–20MAY96–1/1

1000 Hour/24 Month Service

- Adjust droop on generator set engines (Except 6068SFM50).
- Check crankshaft vibration damper (6-cylinder only).
- Have your authorized servicing dealer or engine distributor pressure test overall cooling system and cap.
- Inspect and repair sea water pump.

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