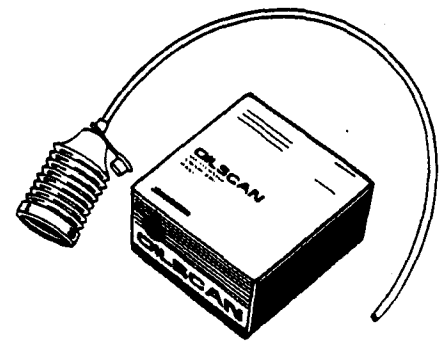
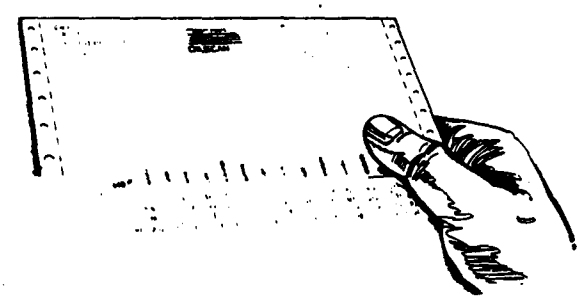
CHECK EFFECTIVENESS OF COOLANT SOLUTION

When your coolant has accumulated 600 hours of operating time, the effectiveness of your engine coolant should be evaluated by obtaining a coolant sample.

COOLSCAN is a John Deere sampling program to help you monitor the effectiveness of your engine's coolant solution and identify potential problems before they cause serious damage. COOLSCAN kits are available from your John Deere dealer. Refer to instructions provided with kit.





RG,OMLM,3 -19-17FEE

REPLACE AIR CLEANER ELEMENTS

If equipped with this air cleaner, service as follows:

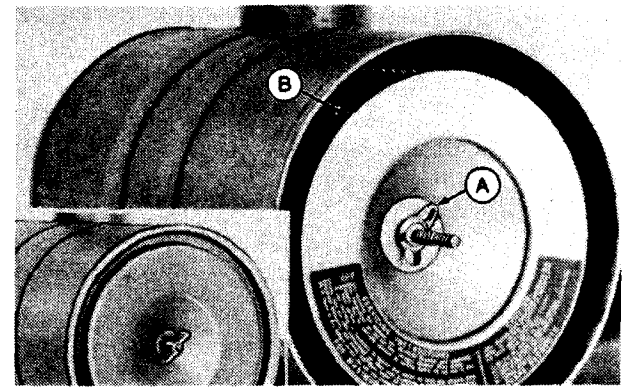
1. Remove wing nut and remove cover shown in small illustration inset.

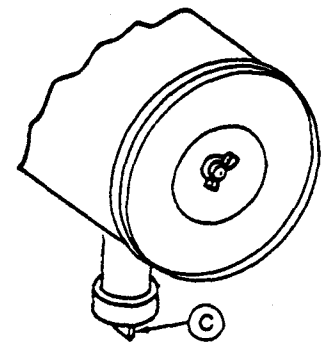
2. Remove wing nut (A) and remove primary air cleaner assembly (B) from canister.

NOTE: Primary air cleaner element fits snugly in canister. It may be necessary to wiggle element as it is removed from canister.

3. Thoroughly clean all dirt from inside of canister.

4. If equipped, squeeze dust unloader valve (C) to discharge any trapped dirt particles. Inspect as instructed in Step 2 of CHECK AIR INTAKE SYSTEM, later in this section.



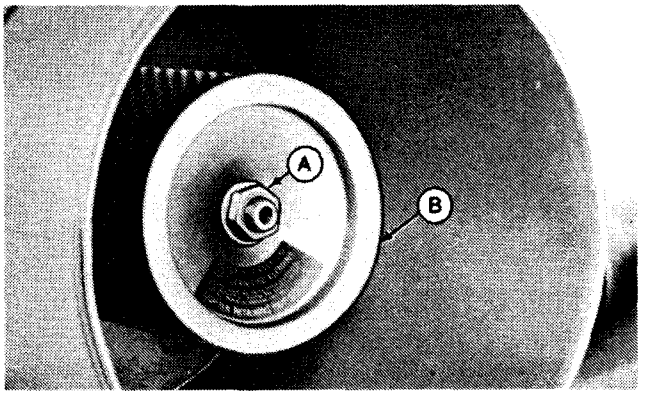


S55,OMLM,R -19-10MA

IMPORTANT: Thoroughly clean all dirt from inside of canister before removing secondary element.

5. Remove retaining nut (A) and secondary element (B). Replace secondary element with new element immediately to prevent dust from entering air intake system.

6. Install new primary element and tighten wing nut securely. Install cover assembly and tighten retaining wing nut securely.

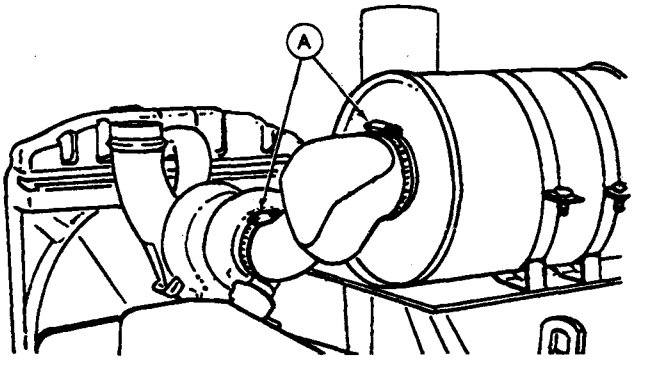


S55,OMLM,S -19-21DEC89

CHECK AIR INTAKE SYSTEM

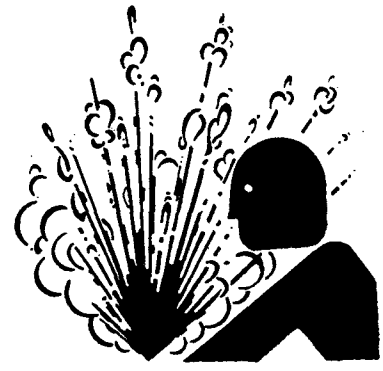
1. Check the clamps (A) on the piping which connect the air cleaner to the engine. Tighten the clamps as necessary. This will help prevent dirt from entering the air intake system through loose connections causing internal engine damage.

2. If engine has a rubber dust unloader valve, inspect the valve on bottom of air cleaner for cracks or plugging. Replace as necessary.



S11,OMLM,DS -19-10MAY91

CHECK 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.

IMPORTANT: Air must be expelled from cooling system when system is refilled. Loosen temperature sending unit fitting at rear of cylinder head or plug in thermostat housing to allow air to escape when filling system. Retighten fitting or plug when all the air has been expelled.

1. Check entire cooling system for leaks. Tighten all clamps securely.

2. Replace hoses when hard, flimsy, or cracked.

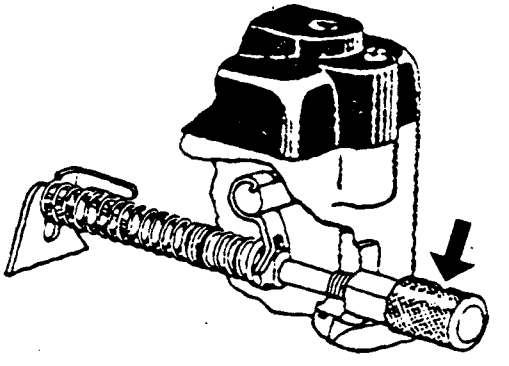
S11,OMLM,DT1 -19-19MAR

CHECK AND ADJUST ENGINE SPEEDS

If equipped with a tachometer on the instrument panel, observe the tachometer to verify engine speeds. Refer to ENGINE SPEEDS in Engine Operating Guidelines section, earlier in this manual.

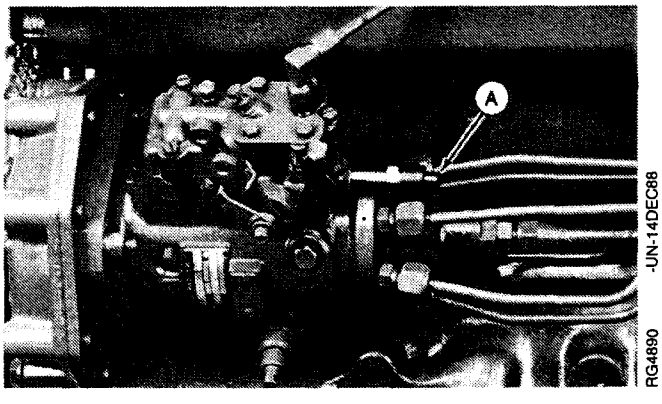
S11,OMOE,DL1 -19-17FEB93

ADJUST VARIABLE SPEED ON GENERATOR SET ENGINES (STANADYNE INJECTION PUMPS ONLY)



T86735 -UN-23FEB89

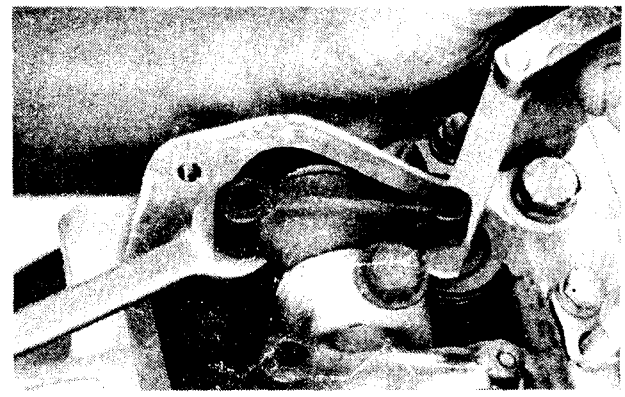
1. Warm engine to normal operating temperature.
2. Run engine at rated speed.
3. Apply full load.
4. Remove load.
5. Note the no-load speed or frequency.
6. If throttle is not spring-loaded type, disconnect throttle linkage or cable.
7. Turn knob (bold arrow) or screw (A) to adjust droop.
8. If necessary, adjust and connect throttle linkage or cables.



RG4890 -UN-14DEC88

S11,OMLM,DM -19-10MAY91

ADJUST ENGINE VALVE CLEARANCE

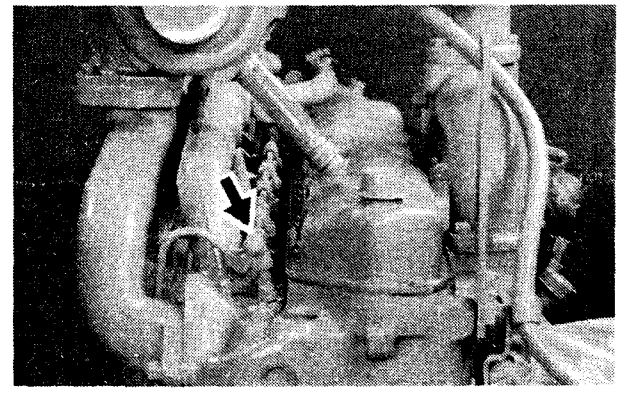


Adjust engine valve clearance. (See ADJUST ENGINE VALVE CLEARANCE in Lubrication and Maintenance 400 Hours or have your authorized servicing dealer or engine distributor adjust the valve clearance.)

IMPORTANT: Have valves adjusted after the first 400 hours of operation on new or rebuilt engines. Then, have them adjusted at 1200 Hr/2-Year interval thereafter.

S11,OMLM,DN -19-02MA

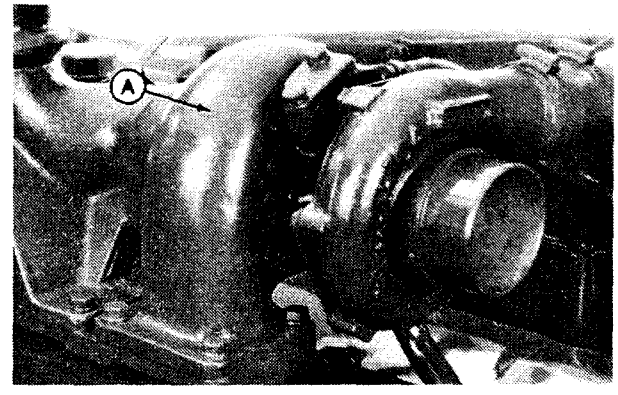
CHECK FUEL INJECTION SYSTEM



Check the overall fuel injection system. Also check the engine/injection pump timing, clean the injection nozzles, and adjust opening pressure. (See your authorized diesel injection repair station, servicing dealer, or engine distributor.)

S11,OMLM,DO -19-02MA

INSPECT TURBOCHARGER



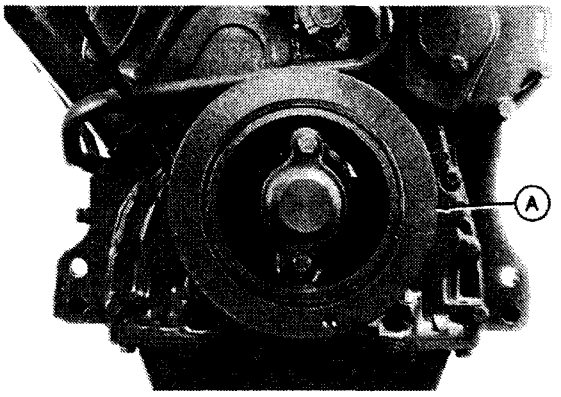
On turbocharged engines, check for excessive radial or axial end play of compressor wheel (A) and turbocharger boost pressure. (See your authorized servicing dealer or engine distributor.)

S11,OMLM,DP -19-07JU

CHECK CRANKSHAFT VIBRATION DAMPER

Grasp vibration damper (A) with both hands and attempt to turn it in both directions. If rotation is felt, damper is malfunctioning and should be replaced.

NOTE: The vibration damper assembly is not repairable and should be replaced every 4500 hours or 5-years, whichever occurs first.

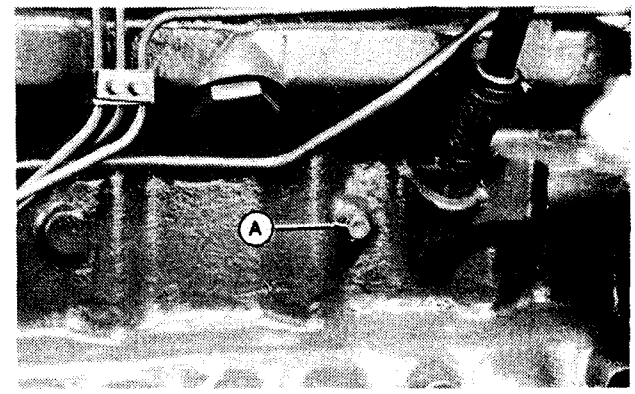


S11,OMLM,DU -19-07JUN91

FLUSH COOLING SYSTEM AND REPLACE THERMOSTATS

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.



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

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

2. Open radiator drain valve. Drain all coolant from radiator.

3. On left side of engine, open drain valve or remove drain plug (A) from engine block. Drain all coolant from engine block.

4. Close all drain valves after coolant has drained.

5. Fill the cooling system with clean water. Run the engine about 10 minutes to stir up possible rust or sediment.

6. Stop engine and immediately drain the water from system before rust and sediment settle.

7. After draining water, close drain valves and fill the cooling system with clean water and TY15979 John Deere Heavy Duty Cooling System Cleaner or an equivalent cleaner such as Fleetguard® RESTORE™. Follow manufacturer's directions on label.

8. After cleaning the cooling system, fill with water to flush the system. Run the engine about 10 minutes, then drain out flushing water.

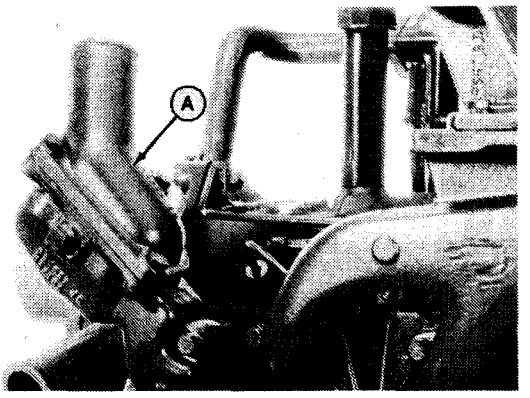
Fleetguard is a registered trademark of Cummins Engine Company.

RESTORE™ is a trademark of Fleetguard.

S11,OMLM,DV1 -19-17FE

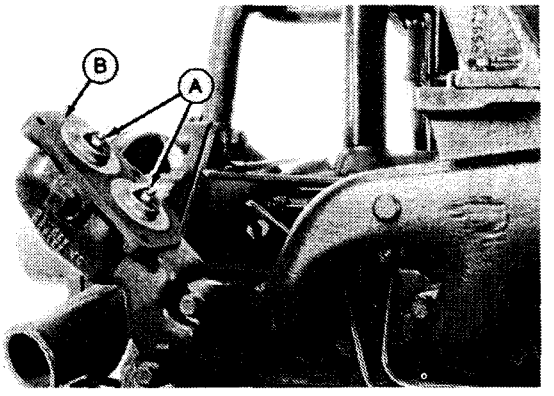
9. For thermostat replacement, remove cap screws and thermostat cover (A).

NOTE: Some engines have only one thermostat. Illustration shows the two-thermostat engine.



S11,OMLM,DX1 -19-15NOV89

10. Remove and discard thermostats (A) and all gasket material (B).



11. Apply gasket sealant to new gasket and install.

12. Install new thermostats and cover. Tighten all cap screws to 27 N·m (20 lb-ft).

13. Close all drain valves on the engine and the radiator.

IMPORTANT: Air must be expelled from cooling system when system is refilled. Loosen temperature sending unit fitting at rear of cylinder head or plug in thermostat housing to allow air to escape when filling system. Retighten fitting or plug when all the air has been expelled.

14. Fill cooling system with recommended amount and concentration of coolant. (See ADDING COOLANT in Service Section.)

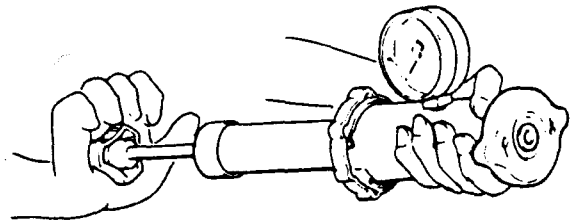
15. Run engine until it reaches operating temperature. This mixes coolant and water uniformly and circulates it through the entire system. The normal engine coolant temperature range is 82°—94°C (180°—202°F).

NOTE: Radiator coolant level should be approximately 19 mm (3/4 in.) below bottom of radiator filler neck.

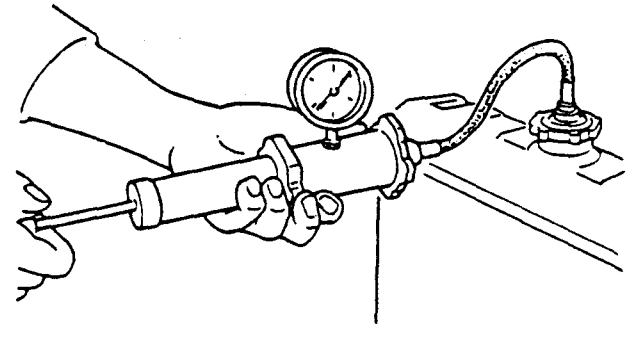
16. After running engine, check coolant level and entire cooling system for leaks.

S11,OMLM,DY -19-17FEB93

PRESSURE TEST COOLING SYSTEM



RG6557 -UN-20JAN93



⚠ 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 Radiator Cap:

1. Remove radiator cap and attach to an approved tester as shown.

2. Pressurize cap to 50 kPa (0.5 bar) (7 psi). Gauge should hold pressure for 10 seconds within the normal range if cap is acceptable.

If gauge does not hold pressure, replace radiator 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 radiator cap.

2. Fill radiator with coolant to the normal operating level.

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

3. Connect gauge and adapter to radiator filler neck Pressurize cooling system to 50 kPa (0.5 bar) (7 ps

4. With pressure applied, check all cooling system hose connections, radiator, 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.

RG18293,6 -19-17FEB

PERFORM ENGINE TUNE-UP

As a general guideline, an engine tune-up is recommended at 1200 Hour or 2-Year intervals (whichever comes first). However, a tune-up should be performed as often as needed to maintain optimum performance within the general condition limits of the engine. Some engine applications, such as generator sets, may require a different tune-up interval than given above. Have your authorized servicing dealer or engine distributor perform the following checks and services:

- Check, and adjust if necessary, engine valve clearance. (Lubrication and Maintenance/400 Hr and 1200 Hr/2-Yr.

- Change oil and filter. (Lubrication and Maintenance/250 Hr.)

- Check electrical system. (Lubrication and Maintenance/250 Hr.)

- Lubricate PTO clutch internal levers and linkage. (Lubrication and Maintenance/600 Hr/1-Yr)

- Clean crankcase vent tube. (Lubrication and Maintenance/600 Hr/1-Yr)

- Replace fuel filters. (Lubrication and Maintenance/600 Hr/1-Yr)

- Check air intake system and replace air cleaner elements. (Lubrication and Maintenance/600 Hr/1-Yr)

- Check, and adjust if necessary, engine speeds. (Lubrication and Maintenance/1200 Hr/2-Yr)

- Check fuel injection system: Check, and if necessary, adjust injection pump timing, clean injection nozzles and adjust opening pressure. (Lubrication and Maintenance/1200 Hr/2-Yr)

- Inspect turbocharger and check turbocharger boost pressure on turbocharged engines. (Lubrication and Maintenance/1200 Hr/2-Yr)

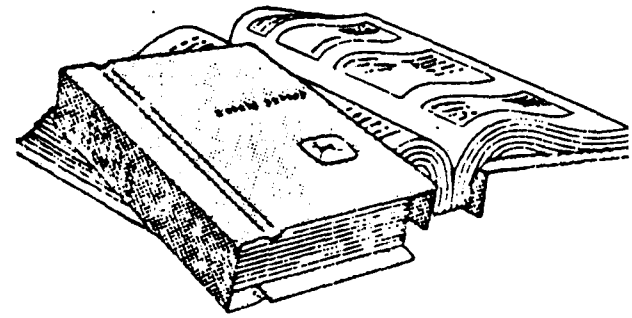
- Check crankshaft vibration damper. (Lubrication and Maintenance/1200 Hr/2-Yr)

- Check and service engine cooling system. (Lubrication and Maintenance/1200 Hr/2-Yr)

- Check engine oil pressure. Adjust, if necessary. (See your authorized servicing dealer or engine distributor.

ADDITIONAL SERVICE INFORMATION

This is not a detailed service manual. If you want more detailed service information, use the form in the back of this manual to order a component technical manual.

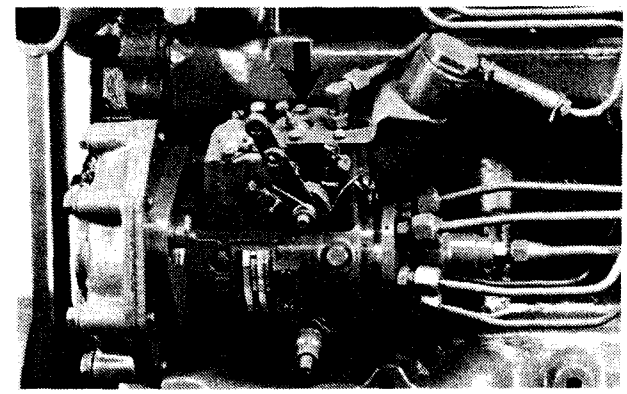


S11,OMSE,AL -19-10JUN

DO NOT MODIFY FUEL SYSTEM

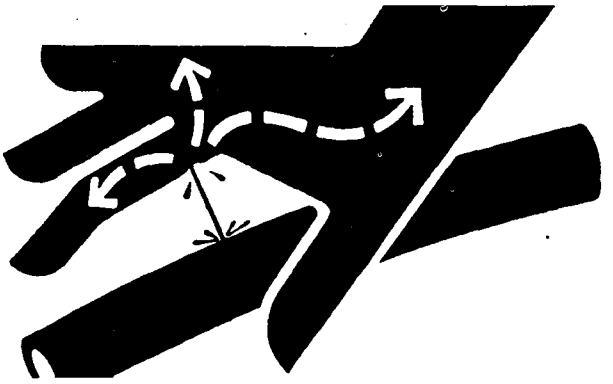
IMPORTANT: Modification or alteration of the injection pump (arrow), the injection pump timing, or the fuel injectors in ways not recommended by the manufacturer will terminate the warranty obligation to the purchaser. See warranty information inside front cover.

Do not attempt to service injection pump or fuel injectors yourself. Special training and special tools are required. (See your authorized servicing dealer or engine distributor.)



S11,OMSE,AM -19-02MAR

BLEED THE FUEL SYSTEM

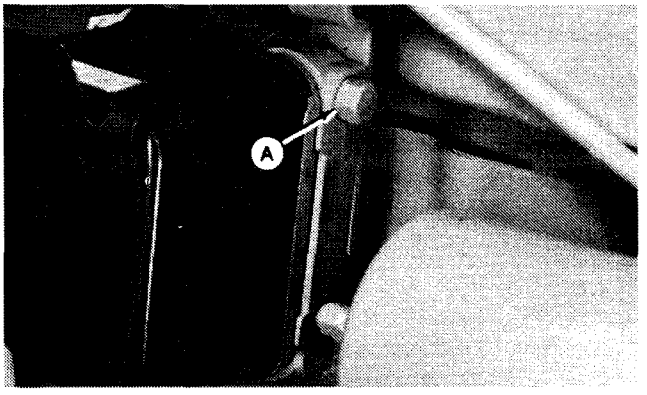


CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting fuel or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

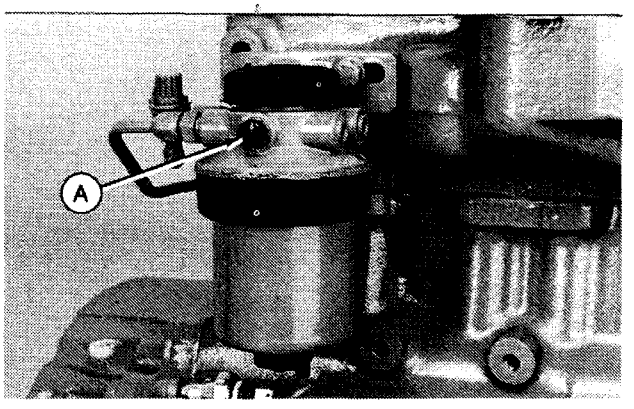
If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

Whenever the fuel system has been opened up for service (lines disconnected or filters removed), it will be necessary to bleed air from the system.

1. Loosen the air bleed plug or air bleed screw (A) on fuel filter base.



Rectangular Fuel Filter

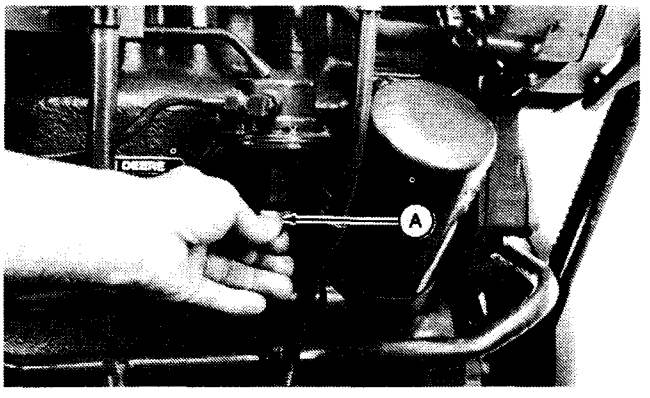


Round Fuel Filter

RG18293,7 -19-17FEB93

2. When equipped, operate supply pump primer lever (A) or switch on the ignition (electric supply pumps) so that supply pump is operating.

3. Wait until fuel flow is free from air bubbles. Tighten bleed plug or screw securely, continue operating hand primer until pumping action is not felt. Push hand primer inward (toward engine) as far as it will go.



S11,OMSE,AO1 -19-17FEB93

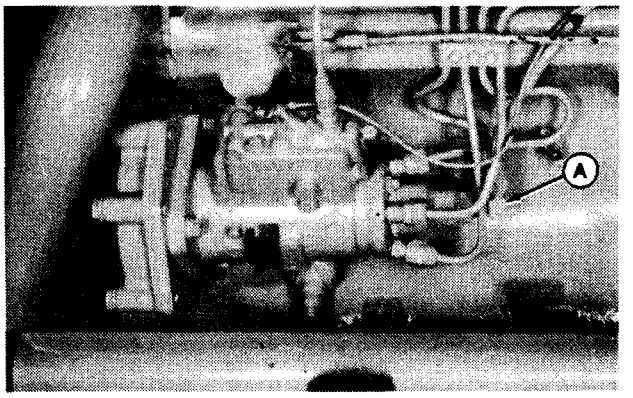
If the engine will not start:

4. Slightly loosen fuel supply line connector (A) at injection pump.

5. Pump hand primer lever until fuel, without air bubbles, flows from fuel supply line connection.

6. Tighten supply line connector to 27 N·m (20 lb-ft).

7. Leave hand primer in the inward position toward cylinder block.



S11,OMSE,AO2 -19-17FEB

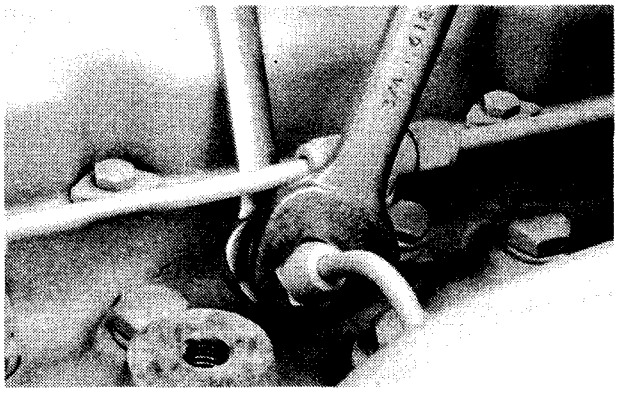
If the engine still will not start:

8. Move the speed control lever to slow idle.

9. While cranking engine with starting motor, loosen one fuel line connector slightly using two wrenches until fuel (free of air bubbles) flows from connector. Tighten connector while cranking engine.

10. Repeat procedure for remaining injection nozzles until engine starts and air has been removed from fuel system.

If engine still will not start, see your authorized servicing dealer or engine distributor.



S11,OMSE,AO3 -19-17FEB

CHECKING COOLANT LEVEL

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

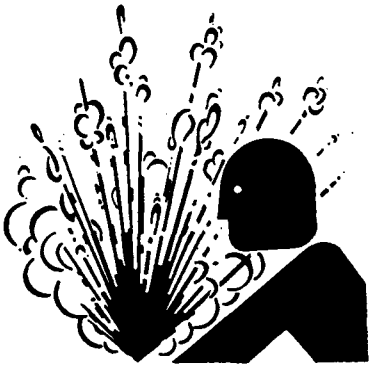
Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

TS281 -UN-23AUG88

Coolant should be maintained at 19 mm (3/4 in.) below bottom of filler neck. Fill radiator with appropriate coolant. See ADDING COOLANT as described later in this section. Check overall cooling system for leaks.

RG,OMSE,1 -19-17FEB93

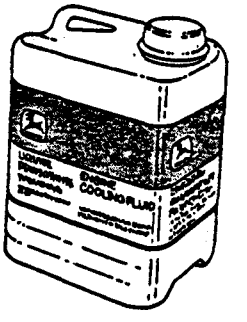
ADDING COOLANT



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.

John Deere TY6377 or TY15886 Low Silicate Antifreeze mixed in a solution with 40—60 CLEAN, SOFT WATER and inhibited with RE23182 Liquid Coolant Conditioner is recommended. Also recommended is John Deere Engine Coling Fluid which already has the proper mixture of antifreeze, water, and inhibitors.



IMPORTANT: Never pour cold liquid into a hot engine, as it may crack cylinder head or block. DO NOT operate engine without coolant for even a few minutes.

- **John Deere TY15161 Cooling System Sealer may be added to the radiator to stop leaks. DO NOT use any other stop-leak additives in the cooling system.**

- **Air must be expelled from cooling system when system is refilled. Loosen temperature sending unit fitting at rear of cylinder head or plug in thermostat housing to allow air to escape when filling system. Retighten fitting or plug when all the air has been expelled.**

Certain geographical areas may require special antifreeze or coolant practices. If you have questions, consult your authorized servicing dealer or engine distributor for the latest information and recommendations.

S11,OMLM,DZ1 -19-02MAF

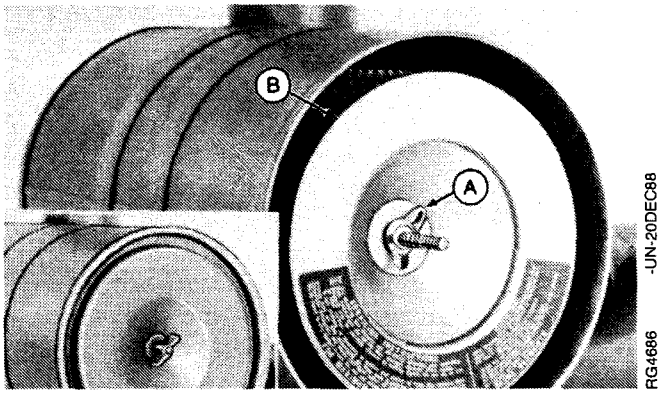
REMOVE AND INSPECT AIR CLEANER ELEMENTS

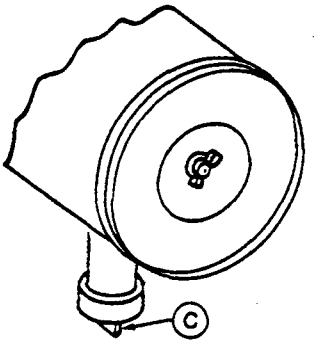
1. Remove wing nut and remove canister cover shown in small illustration inset.

2. Remove wing nut (A) and remove primary element (B) from canister.

3. Thoroughly clean all dirt from inside canister.

NOTE: Some engines may have a dust unloader valve (C) on the air cleaner. If equipped, squeeze valve tip to release any trapped dirt particles.

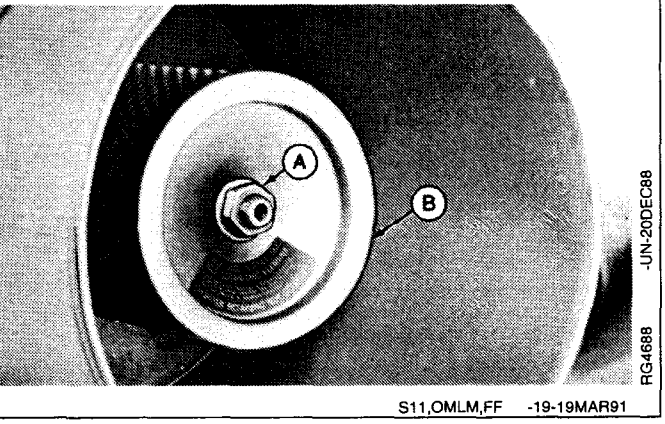




S11,OMLM,FE -19-02MAR93

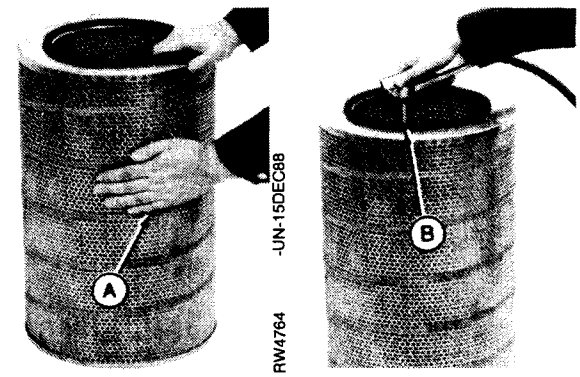
IMPORTANT: Remove secondary element (B) ONLY if it is to be replaced. DO NOT attempt to clean secondary element.

4. To replace secondary element, remove nut (A) and remove element. Immediately install a new element so dirt does not enter air intake system. (See REPLACE AIR CLEANER ELEMENTS in Lubrication and Maintenance/600 Hours/1-Year section.)



S11,OMLM,FF -19-19MAR91

CLEANING PRIMARY ELEMENT



1. Gently pat sides of element (A) to loosen dirt. DO NOT tap element against a hard surface.

CAUTION: Reduce compressed air pressure to less than 210 kPa (2.1 bar) (30 psi) when using for cleaning purposes. Clear area of bystanders, guard against flying chips, and wear proper protective safety equipment including eye protection.

2. Clean element from the inside (B) with compressed air. Hold nozzle next to inner surface, and move up and down pleats.

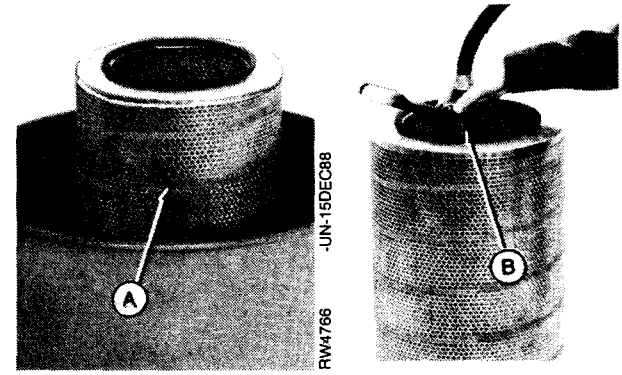
IMPORTANT: Do not direct air against outside of element, as it might force dirt through to inside.

3. Repeat step 1 and 2 to remove additional dirt.

4. Inspect element before reinstalling.

S11,OMLM,AF -19-09OC

WASHING PRIMARY ELEMENT



IMPORTANT: Never wash element in gasoline or any solvent. Never use compressed air on a wet element. Do not oil element.

1. If element is coated with oil or soot, wash in a solution of warm water and John Deere R36757 Filter Element Cleaner. Let element soak at least 15 minutes (A), then agitate gently to flush out dirt.

2. Rinse element thoroughly from inside (B) with clean water. Keep water pressure under 280 kPa (2.8 bar) (40 psi) to avoid damaging filtering pleats.

3. Allow element to dry completely before using. This usually takes from one to three days. Do not oven dry or use drying agents. Protect element from freezing until dry.

4. Inspect element before installing.

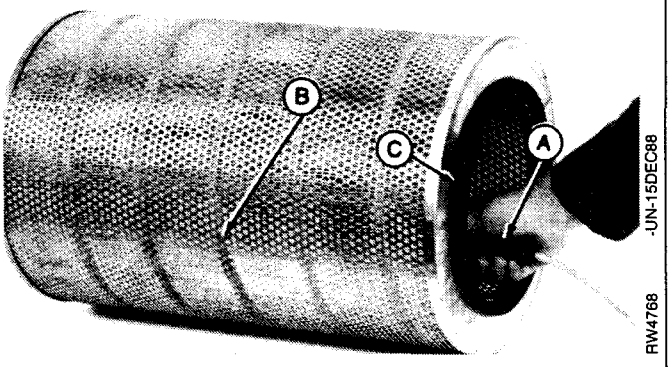
S11,OMLM,AG -19-09OC

NSPECT PRIMARY ELEMENT

. Hold a bright light inside element (A) and check arefully for holes. Discard any element which shows the lightest hole.

:. Be sure outer screen (B) is not dented. Vibration vould quickly wear a hole in filter.

:. Be sure filter gasket (C) is in good condition. If gasket s damaged or missing, replace element.



S11,OMLM,AH -19-24JAN85

:LEMENT STORAGE

Seal element in a plastic bag and store in shipping container to protect against dust and damage.

MPORTANT: Air cleaner element MUST BE DRY before storing in plastic bag.

S11,OMLM,AI -19-19MAR91

REPLACE FAN AND ALTERNATOR BELTS

. Inspect belts for cracks, fraying, or stretched out areas. Replace if necessary. (See CHECK FAN AND ALTERNATOR BELT TENSION in Lubrication and Maintenance/250 Hour.)

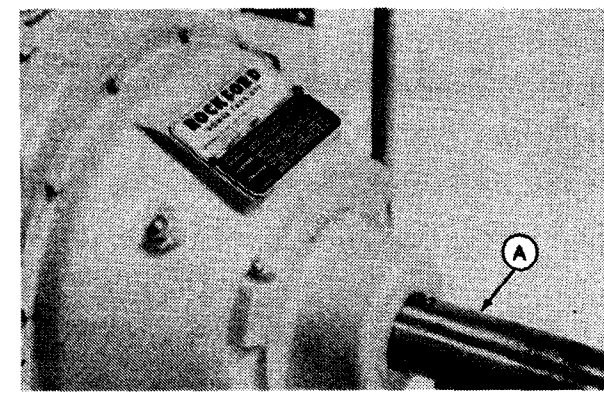
S11,OMSE,AP -19-07JUN91

POWER TAKE-OFF (PTO) CLUTCH

CAUTION: Entanglement in rotating driveline can cause serious injury or death. Keep shield on PTO drive shaft (A) between the clutch housing and the engine driven equipment at all times during engine operation. Wear close fitting clothing. Stop the engine and be sure PTO driveline is stopped before making adjustments.

Proper performance of the power take-off unit will be related to the care it is given. Lubricate it periodically and keep the clutch properly adjusted. (See Lubrication and Maintenance/250 Hour section.)

If the power take-off does not work properly after adjustment and lubrication, contact your authorized servicing dealer or engine distributor.



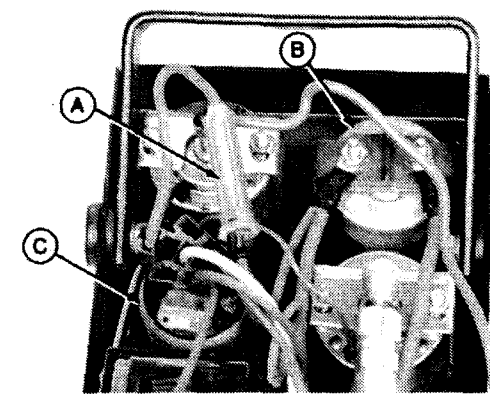
S11,OMSE,U -19-02MA

CHECK FUSES

The following instructions apply to engines equipped with a John Deere instrument panel.

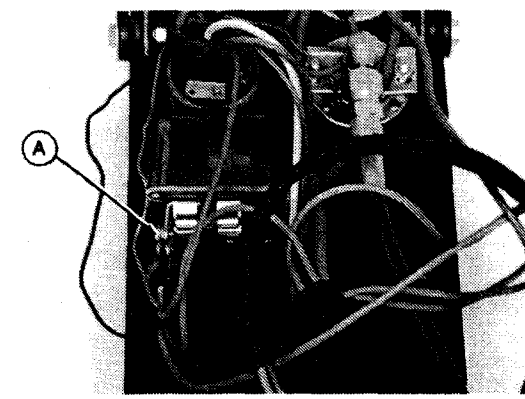
On North American Sourced Instrument (Gauge) Panels:

1. Check the fuse (A) between the ammeter (B) and key switch (C) located on back side of instrument panel. If defective replace with an MDL-25 fuse.



S11,OMSE,AA -19-17FE

2. Check the fuse (A) mounted on the bottom of the magnetic safety switch. If defective, install a new SFE-14 fuse.

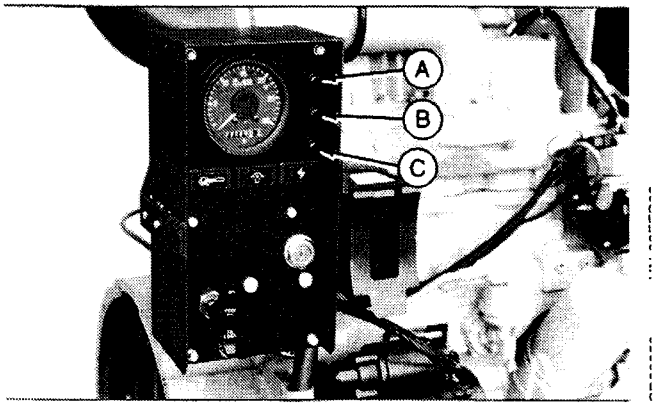


S11,OMSE,W -19-19M/

On European Sourced Instrument (Gauge) Panels:

1. Check the following fuses and replace as necessary:

A—25 amp - Starting Circuit
B— 3 amp - Tachometer Light
C—10 amp - Safety Switch



RG18293,8 -19-17FEB93

Troubleshooting

GENERAL TROUBLESHOOTING INFORMATION

Troubleshooting engine problems can be difficult. An engine wiring diagram is provided in this section to help isolate electrical problems on power units using John Deere wiring harness and instrument (gauge) panel.

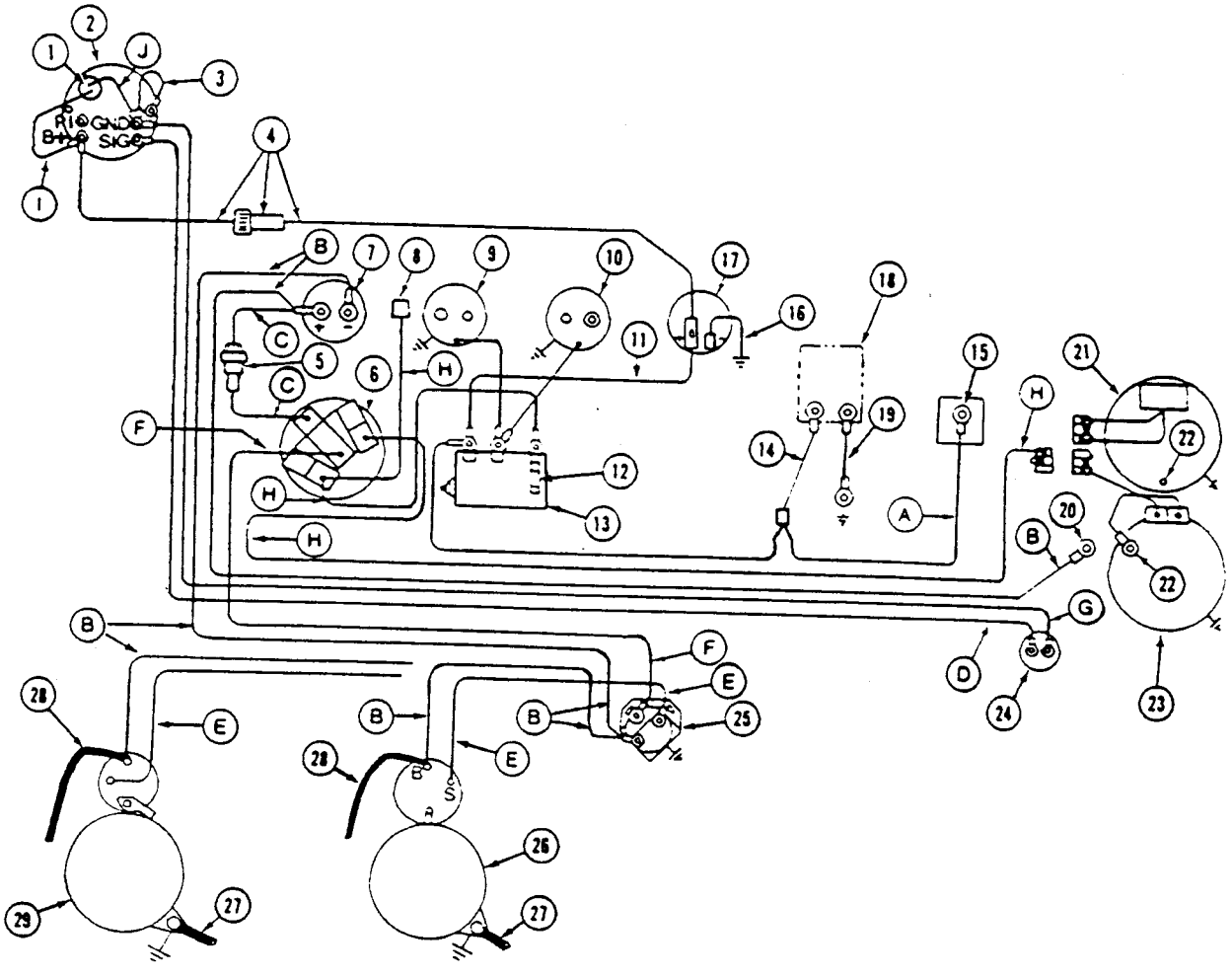
Later in this section is a list of possible engine problems that may be encountered accompanied by possible causes and corrections. The illustrated diagrams and troubleshooting information are of a general nature, final design of the overall system for your engine application may be different. See your engine distributor or servicing dealer if you are in doubt.

A reliable program for troubleshooting engine problems should include the following basic diagnostic thought process:

- Know the engine and all related systems.
- Study the problem thoroughly.
- Relate the symptoms to your knowledge of engin and systems.
- Diagnose the problem starting with the easiest things first.
- Double-check before beginning the disassembly.
- Determine cause and make a thorough repair.
- After making repairs, operate the engine under normal conditions to verify that the problem and cause was corrected.

RG18293,9 -19-02MAF

NORTH AMERICAN SOURCED ENGINE WIRING DIAGRAM



-UN-09JAN90

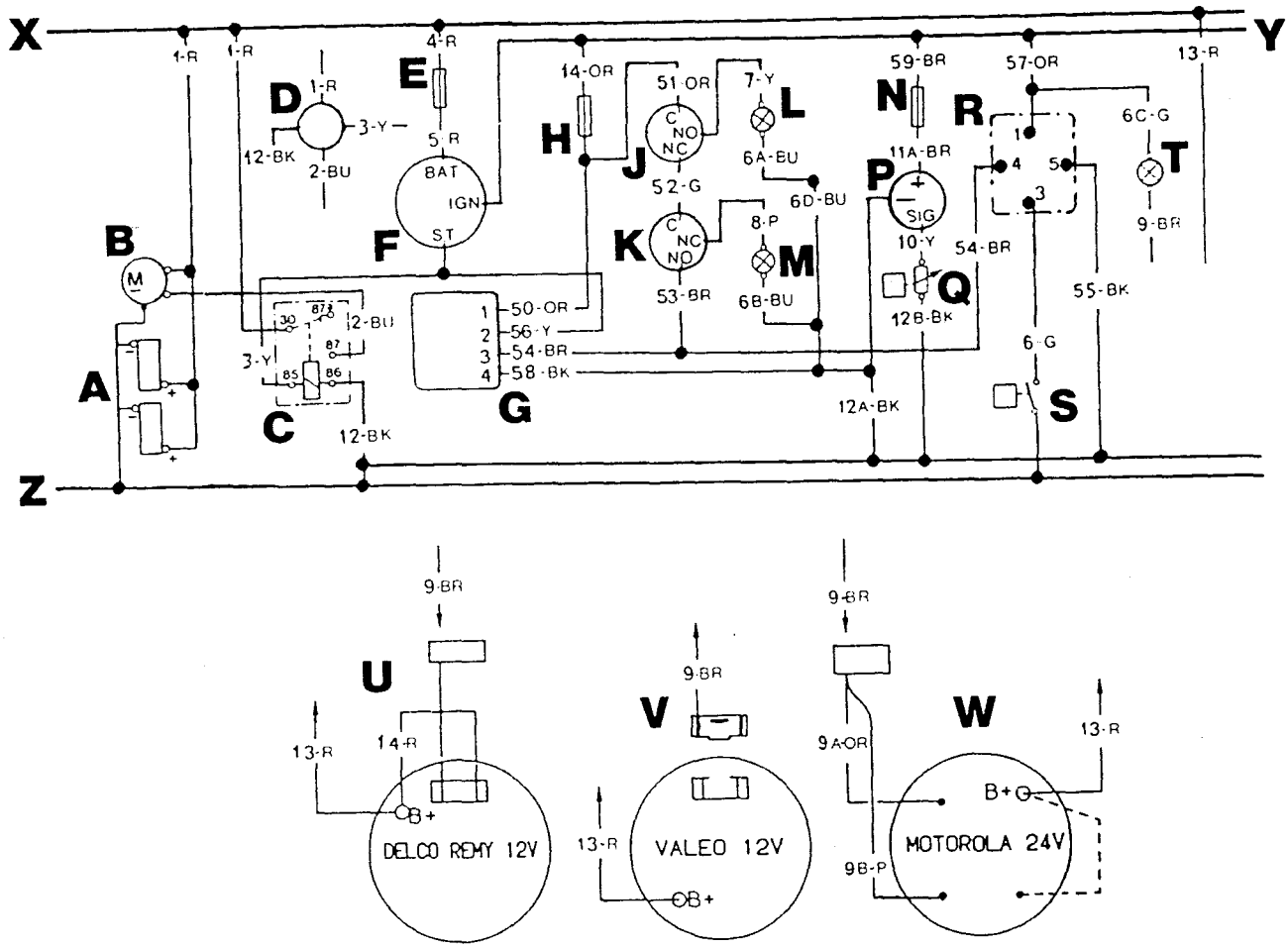
RG5608

1—Light Socket
2—Tachometer
3—Ground Wiring Lead
4—Wiring Lead with 3-Amp MDX Fuse
5—Fuseholder with 25-Amp MDL Fuse
6—Key Switch
7—Ammeter
8—This terminal Not Used
9—Oil Pressure Gauge
10—Coolant Temperature Gauge
11—Wiring Lead
12—14-Amp SFE Fuse
13—Safety Switch with Reset Button
14—Injection Pump Wiring Lead
15—Insulate Terminal to Prevent Grounding
16—Hour Meter Ground Lead
17—Hour Meter
18—Shut-Off Solenoid
19—Ground Lead
20—Ammeter Output Terminal
21—Motorola Alternator
22—Alternator Output Terminal
23—Delco-Remy Alternator
24—Magnetic Speed Sensor
25—Starter Circuit Relay
26—Delco-Remy Starting Motor
27—Negative (-) Battery Cable
28—Positive (+) Battery Cable
29—John Deere (Nippondenso) Starting Motor
A—14 Gauge—Dark Blue (2.0 mm)
B—8 Gauge—Red (8.0 mm)
*C—12 Gauge—Red (3.0 mm)
D—18 Gauge—Red (0.8 mm)
E—10 Gauge—White (5.0 mm)
F—14 Gauge—White (2.0 mm)
G—18 Gauge—Black or Black with White Stripe (0.8 mm)
H—16 Gauge—Purple (1.0 mm)
I—18 Gauge—Yellow (0.8 mm)
J—18 Gauge—Brown (0.8 mm)

*Brown insulation may be used on some red leads.

S11,24005,AF -19-18FEB93

EUROPEAN SOURCED ENGINE WIRING DIAGRAM



A—Battery
B—Starting Motor
C—Starting Motor Relay (24V)
D—Starting Motor Relay (12V)
E—Starting Circuit Fuse (25 amp)
F—Key Switch
G—Safety Switch
H—Safety Switch Fuse (10 amp)
J—Coolant Temperature Sensor
K—Oil Pressure Sensor
L—Coolant Temperature Indicator Light
M—Oil Pressure Indicator Light
N—Tachometer Fuse (3 amp)
P—Tachometer
Q—Magnetic Speed Sensor
R—Shut-off Solenoid Relay
S—Shut-off Solenoid
T—Alternator Indicator Light
U—Delco-Remy Alternator (12V)
V—Valeo Alternator (12V)
W—Motorola Alternator (24V)
X—Positive (+) Permanent
Y—Positive (+) After Ignition
Z—Negative (-) Ground
BK—Black
BR—Brown
BU—Blue
G—Green
OR—Orange
P—Purple
R—Red
Y—Yellow

RG18293,10 -19-17FE

DIAGNOSING ENGINE MALFUNCTIONS

Symptom	Problem	Solution
Engine hard to start or will not start	Improper starting procedure.	Review starting procedure.
	No fuel.	Check fuel tank.
	Air in fuel line.	Bleed fuel line.
	Cold weather.	Use cold weather starting aids.
	Slow starter speed.	See "Starter Cranks Slowly".
	Crankcase oil too heavy.	Use oil of proper viscosity.
	Improper type of fuel.	Consult fuel supplier; use proper type fuel for operating conditions.
	Water, dirt, or air in fuel system.	Drain, flush, fill and bleed system.
	Clogged fuel filter.	Replace filter element.
	Dirty or faulty injection nozzles.	Have authorized dealer or engine distributor check injectors.
	Injection pump shut-off not reset.	Turn key switch to "OFF" then to "ON".
Engine knocks	Low engine oil level.	Add oil to engine crankcase.
	Injection pump out of time.	See your authorized servicing dealer or engine distributor.
	Low coolant temperature.	Remove and check thermostat.
	Engine overheating.	See "Engine Overheats".
Engine runs irregularly or stalls frequently	Low coolant temperature.	Remove and check thermostat.
	Clogged fuel filter.	Replace filter element.
	Water, dirt, or air in fuel system.	Drain, flush, fill, and bleed system.
	Dirty or faulty injection nozzles.	Have authorized dealer or engine distributor check injectors.
Below normal engine temperature	Defective thermostat.	Remove and check thermostat.
	Defective temperature gauge or sender.	Check gauge, sender, and connections.

Continued on next page

Symptom	Problem	Solution
Lack of power	Engine overloaded.	Reduce load.
	Intake air restriction.	Service air cleaner.
	Clogged fuel filter.	Replace filter elements.
	Improper type of fuel.	Use proper fuel.
	Overheated engine.	See "Engine Overheats".
	Below normal engine temperature.	Remove and check thermostat.
	Improper valve clearance.	See your authorized servicing dealer or engine distributor.
	Dirty or faulty injection nozzles.	Have authorized servicing dealer or engine distributor check injectors.
	Injection pump out of time.	See your authorized servicing dealer or engine distributor.
	Turbocharger not functioning. (Turbocharged engines only.)	See your authorized servicing dealer or engine distributor.
	Leaking exhaust manifold gasket.	See your authorized servicing dealer or engine distributor.
	Defective aneroid control line.	See your authorized servicing dealer or engine distributor.
	Restricted fuel hose.	Clean or replace fuel hose.
	Low fast idle speed	See your authorized servicing dealer or engine distributor.
Low oil pressure	Low oil level.	Add oil.
	Improper type of oil.	Drain, fill crankcase with oil of proper viscosity and quality.
High oil consumption	Crankcase oil too light.	Use proper viscosity oil.
	Oil leaks.	Check for leaks in lines, gaskets and drain plug.
	Restricted crankcase vent tube.	Clean vent tube.
	Defective turbocharger.	See your authorized servicing dealer or engine distributor.

Continued on next pag

Symptom	Problem	Solution
Engine emits white smoke	Improper type of fuel.	Use proper fuel.
	Low engine temperature.	Warm up engine to normal operating temperature.
	Defective thermostat.	Remove and check thermostat.
	Defective injection nozzles.	See your authorized servicing dealer or engine distributor.
	Engine out of time.	See your authorized servicing dealer or engine distributor.
Engine emits black or gray exhaust smoke	Improper type of fuel.	Use proper fuel.
	Clogged or dirty air cleaner.	Service air cleaner.
	Engine overloaded.	Reduce load.
	Injection nozzles dirty.	See your authorized servicing dealer or engine distributor.
	Engine out of time.	See your authorized servicing dealer or engine distributor.
	Turbocharger not functioning.	See your authorized servicing dealer or engine distributor.
Engine Overheats	Engine overloaded.	Reduce load.
	Low coolant level.	Fill radiator to proper level, check radiator and hoses for loose connections or leaks.
	Faulty radiator cap.	Have serviceman check.
	Loose or defective fan belts.	Adjust belt tension. Replace as required.
	Low engine oil level.	Check oil level. Add oil as required.
	Cooling system needs flushing.	Flush cooling system.
	Defective thermostat.	Remove and check thermostat.
	Defective temperature gauge or sender.	Check water temperature with thermometer and replace, if necessary.
	Incorrect grade of fuel.	Use correct grade of fuel.

Continued on next page

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.

S11,OMTS,Z -19-17FEB

DIAGNOSING ELECTRICAL SYSTEM MALFUNCTIONS

Symptom	Problem	Solution
Undercharged System	Excessive electrical load from added accessories.	Remove accessories or install higher output alternator.
	Excessive engine idling.	Increase engine rpm when heavy electrical load is used.
	Poor electrical connections on battery, ground strap, starter or alternator.	Inspect and clean as necessary.
	Defective battery.	Test battery.
	Defective alternator.	Test charging system.
Battery Uses Too Much Water.	Cracked battery case.	Check for moisture and replace as necessary.
	Defective battery.	Test Battery.
	Battery charging rate too high.	Test charging system.
Batteries will not charge	Loose or corroded connections.	Clean and tighten connections.
	Sulfated or worn-out batteries.	See your authorized servicing dealer or engine distributor.
	Loose or defective alternator belt.	Adjust belt tension or replace belts.
Starter will not crank	PTO engaged.	Disengage PTO.
	Loose or corroded connections.	Clean and tighten loose connections.
	Low battery output voltage.	See your authorized servicing dealer or engine distributor.
	Faulty start circuit relay.	See your authorized servicing dealer or engine distributor.
	Blown fuse (MDL-25)	Replace fuse.

Continued on next page

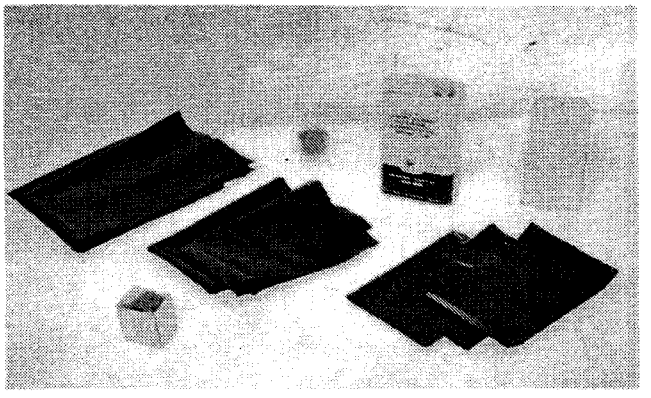
Symptom	Problem	Solution
Starter cranks slowly	Low battery output.	See your authorized servicing dealer or engine distributor.
	Crankcase oil too heavy.	Use proper viscosity oil.
	Loose or corroded connections.	Clean and tighten loose connections.
Starter and hour meter functions; rest of electrical system does not function	Blown fuse on magnetic switch	Replace fuse. (14 amp)
Entire electrical system does not function	Faulty battery connection.	Clean and tighten connections.
	Sulfated or worn-out batteries	See your authorized servicing dealer or engine distributor.
	Blown fuse (MDL-25)	Replace fuse.

S11,OMTS,AB -19-02MAI

USE AR41785 ENGINE STORAGE KIT

See your John Deere servicing dealer or engine distributor for an AR41785 Engine Storage Kit. Closely follow instructions provided with this kit.

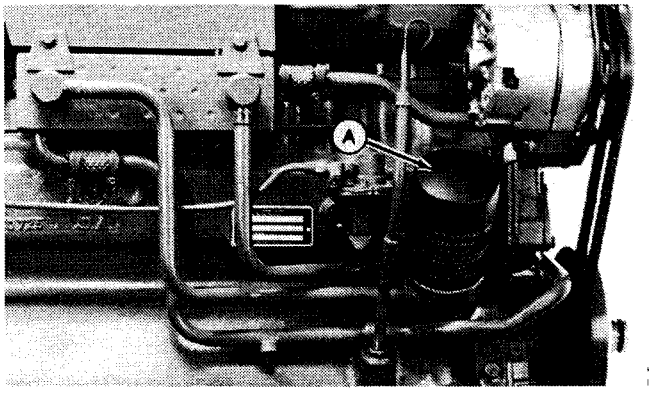
IMPORTANT: Inhibitors can easily change to gas. Seal or tape each opening immediately after adding inhibitor.



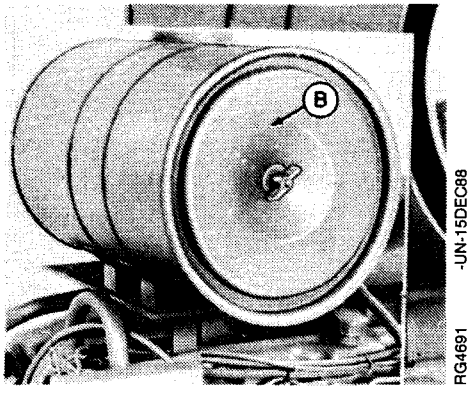
RG21891,58 -19-25JAN93

STORING THE ENGINE

IMPORTANT: Any time your engine will not be used for several months, the following recommendations for storing it and removing it from storage will help to minimize corrosion and deterioration. Use the AR41785 Engine Storage Kit. Follow recommended service procedure included with storage kit.



1. Change engine oil and replace filter (A). Used oil will not give adequate protection. (See CHANGE ENGINE OIL AND FILTER in Lubrication and Maintenance/250 Hour Service.)



RG4691 -UN-15DEC88

2. Service air cleaner (B). (See REMOVE AND INSPECT AIR CLEANER ELEMENTS in Service As Required section.)

3. Draining and flushing of cooling system is not necessary if engine is to be stored for only several months. However, for extended storage periods of a year or longer, it is recommended that the cooling system be drained, flushed, and refilled with proper coolant solution. See ENGINE COOLANT RECOMMENDATIONS in Fuels, Lubricants, and Coolant Section and ADDING COOLANT in Service As Required Section.)

S11,OMST,H1 -19-17FEB93

4. Drain fuel tank and add 30 ml (1 oz) of inhibitor to the fuel tank for each 15L (4 U.S. gal) of tank capacity.

5. Add 30 ml (1 oz) of inhibitor to the engine crankcase for each 0.95 L (1 qt) of crankcase oil.

6. Disconnect air intake piping from the manifold. Pour 90 ml (3 oz) of inhibitor into intake system and reconnect the piping.

7. Crank the engine several revolutions with starter (do not allow the engine to start).

8. Loosen fan and alternator belts to relieve tension. Remove belts if desired.

9. Remove and clean batteries. Store them in a cool, dry place and keep them fully charged.

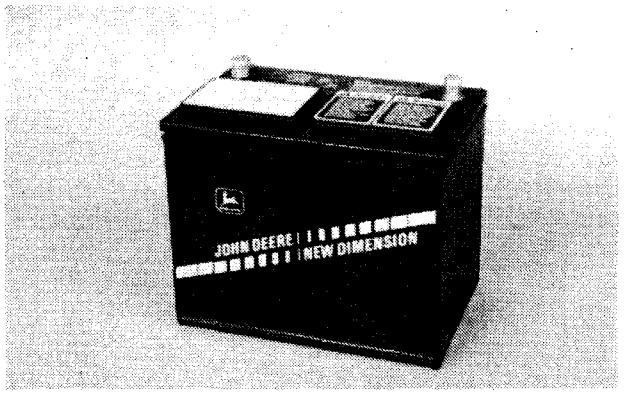
10. Disengage the PTO clutch.

11. Seal all openings on engine with plastic bags and tape supplied in storage kit. Follow instructions supplied in kit.

12. Coat all exposed metal surfaces with grease or corrosion inhibitor.

13. Clean the exterior of the engine and touchup any scratched or chipped painted surfaces.

14. Store the engine in a dry protected place. If engine must be stored outside, cover it with a waterproof canvas or other suitable protective material and use a strong waterproof tape.



S11,OMST,G1 -19-19MAR

REMOVING ENGINE FROM STORAGE

1. Remove all protective coverings from engine. Unseal all openings in engine and remove covering from electrical systems.

2. Remove the batteries from storage. Install batteries and connect the cables.

3. Install new fan and alternator belts. Adjust belt tensions to their appropriate specifications. (See REPLACE FAN AND ALTERNATOR BELTS in Service As Required section).

4. Fill fuel tank.

5. Perform all appropriate prestarting checks. (See PRESTARTING CHECKS, in Engine Operating Guidelines section.)

6. Crank engine for 20 seconds with starter (do not allow the engine to start). Then start engine.

IMPORTANT: DO NOT operate starter more than 30 seconds at a time. Wait at least 2 minutes for starter to cool before trying again.

7. Operate engine at slow idle for several minutes. Warm up carefully and check all gauges before placing engine under load.

S11,OMST,J -19-17FEB93

GENERAL OEM ENGINE SPECIFICATIONS

Item	Unit Of Measure	3029D	3029T
Number of Cylinders	——	3	3
Fuel	——	Diesel	Diesel
Bore	mm (in.)	106.5 (4.19)	106.5 (4.19)
Stroke	mm (in.)	110.0 (4.33)	110.0 (4.33)
Displacement	L (cu.in.)	2.9 (179)	2.9 (179)
Compression Ratio	——	17.8:1	17.8:1
Rated Speed:			
Std. Governor	RPM	2200	2200/2500
3—5% Governor	RPM	1500/1800	1500/1800
Fast Idle Speed	RPM	2400	2400/2700
Slow Idle Speed (factory)	RPM	800—850	800—850
Industrial Power Rating—			
(maximum intermittent)	kW	43	59
@ Rated Speed w/o Fan	(hp)	(58)	(79)
Basic Weight (dry)	kg (lb)	315 (694)	330 (728)
Flywheel and Housing			
(SAE No.)	——	4	4
Injection Nozzles	mm	9.5	9.5
Fuel Filter Area	cm^2 ($in.^2$)	5162/2581 (800/400)	5162/2581 (800/400)
Physical Dimensions:			
Width	mm (in.)	519 (20.4)	519 (20.4)
Height	mm (in.)	820 (32.3)	927 (36.5)
Length	mm (in.)	716 (28.2)	716 (28.2)

See ENGINE CRANKCASE OIL FILL QUANTITIES with filter change later in this group.

RG18293,11 -19-02MAI

GENERAL OEM ENGINE SPECIFICATIONS—CONTINUED

Item	Unit Of Measure	4039D	4039T	4045D	4045T
Number of Cylinders	——	4	4	4	4
Fuel	——	Diesel	Diesel	Diesel	Diesel
Bore	mm (in.)	106.5 (4.19)	106.5 (4.19)	106.5 (4.19)	106.5 (4.19)
Stroke	mm (in.)	110.0 (4.33)	110.0 (4.33)	127.0 (5.00)	127.0 (5.00)
Displacement	L (cu.in.)	3.9 (239)	3.9 (239)	4.5 (276)	4.5 (276)
Compression Ratio	——	17.8:1	17.8:1	17.8:1	17.2:1
Rated Speed: Std. Governor 3—5% Governor	 RPM RPM	 2500 1500/1800	 2500 1500/1800	 2400 1500/1800	 2400 1500/1800
Fast Idle Speed	RPM	2700	2700	2600	2600
Slow Idle Speed (factory)	RPM	800—850	800—850	800—850	800—850
Industrial Power Rating— (maximum intermittent) @ Rated Speed w/o Fan	 kW (hp)	 60 (80)	 82 (110)	 63 (85)	 86 (115)
Basic Weight (dry)	kg (lb)	422 (929)	437 (962)	474 (1043)	487 (1071)
Flywheel and Housing (SAE No.)	——	2,3,4	2,3,4	2,3,4	2,3,4
Injection Nozzles	mm	9.5	9.5	9.5	9.5
Fuel Filter Area	cm^2 ($in.^2$)	5162/2581 (800/400)	5162/2581 (800/400)	5162/2581 (800/400)	5162/2581 (800/400)
Physical Dimensions: Width	 mm (in.)	 519 (20.4)	 536 (21.1)	 519 (20.4)	 512 (20.1)
Height	mm (in.)	818 (32.2)	993 (39.1)	818 (32.2)	1029 (40.5)
Length	mm (in.)	844 (33.2)	869 (34.2)	844 (33.2)	869 (34.2)

See ENGINE CRANKCASE OIL FILL QUANTITIES with filter change later in this group.

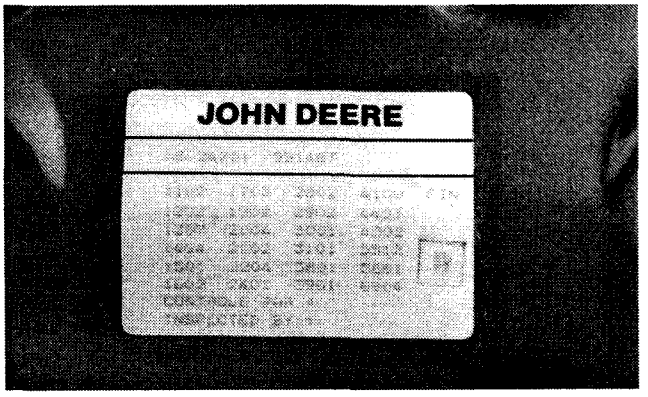
GENERAL OEM ENGINE SPECIFICATIONS—CONTINUED

Item	Unit Of Measure	6059D	6059T	6068D	6068T
Number of Cylinders	——	6	6	6	6
Fuel Type	——	Diesel	Diesel	Diesel	Diesel
Cylinder Bore	mm (in.)	106.5 (4.19)	106.5 (4.19)	106.5 (4.19)	106.5 (4.19)
Engine Stroke	mm (in.)	110.0 (4.33)	110.0 (4.33)	127.0 (5.00)	127.0 (5.00)
Engine Displacement	L (cu.in.)	5.9 (359)	5.9 (359)	6.8 (414)	6.8 (414)
Compression Ratio	——	17.8:1	17.8:1	17.8:1	17.2:1
Rated Speed:					
Std. Governor	RPM	2500	2500	2400	2400
3—5% Governor	RPM	1500/1800	1500/1800	1500/1800	1500/1800
Fast Idle Speed	RPM	2700	2700	2600	2600
Slow Idle Speed (factory)	RPM	800—850	800—850	800—850	800—850
Industrial Power Rating—					
(maximum intermittent)	kW	89	123	97	130
@ Rated Speed w/o Fan	(hp)	(120)	(165)	(130)	(175)
Flywheel and Housing (SAE No.)	——	2,3,4	2,3,4	2,3,4	2,3,4
Injection Nozzles	mm	9.5	9.5	9.5	9.5
Fuel Filter Area	cm^2 ($in.^2$)	5162/2581 (800/400)	5162/2581 (800/400)	5162/2581 (800/400)	5162/2581 (800/400)
Basic Weight (dry)	kg (lb)	518 (1140)	525 (1155)	588 (1294)	602 (1324)
Physical Dimensions:					
Width	mm (in.)	569 (22.4)	569 (22.4)	513 (20.2)	513 (20.2)
Height	mm (in.)	936 (36.8)	1033 (40.7)	1017 (40.0)	1070 (42.1)
Length	mm (in.)	1125 (44.3)	1125 (44.3)	1125 (44.3)	1125 (44.3)

See ENGINE CRANKCASE OIL FILL QUANTITIES with filter change later in this group.

S11,OMSP,L1 -19-17FEB93

ENGINE OPTION CODES



In addition to the serial number plate, OEM engines have an engine option code label affixed to the rocker arm cover. These codes indicate which of the engine options were installed on your engine at the factory. When in need of parts or service, furnish your authorized servicing dealer or engine distributor with these numbers.

The first two digits of each code identify a specific group, such as alternators. The last two digits of each code identify one specific option provided on your engine, such as a 12-volt, 55-amp alternator.

If an engine is ordered without a particular component, the last two digits of that functional group option code will be nines (99). The following list shows only the first two digits of the code numbers. For future reference such as ordering repair parts, it is important to have these code numbers available. To ensure this availability, enter the third and fourth digits shown on your engine option code label in the spaces provided on the following pages.

NOTE: Your engine option code label may not contain all option codes if an option has been added after the engine left the producing factory.

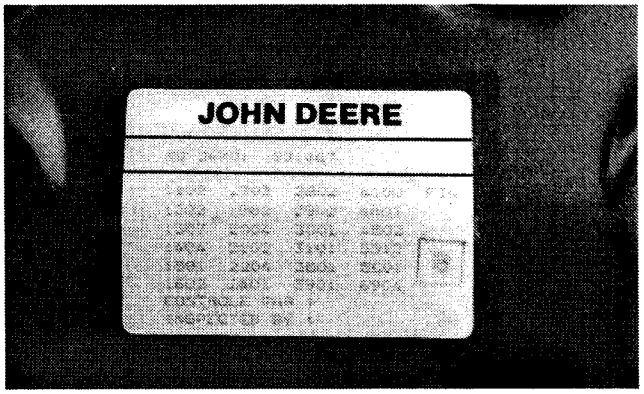
S11,OMSN,P -19-02MAR93

ENGINE OPTION CODES—CONTINUED

Option Codes	Description	Option Codes	Description
11 _____	Rocker Arm Cover	40 _____	Dipstick
12 _____	Oil Filler	41 _____	Belt Driven Front Auxiliary Drive
13 _____	Crankshaft Pulley	43 _____	Air Inlet Heater
14 _____	Flywheel Housing	44 _____	Timing Gear Cover With Gears
15 _____	Flywheel	45 _____	Balancers For 4-Cylinder Engines
16 _____	Injection Pump	46 _____	Cylinder Block With Liners and Camsh
17 _____	Air Inlet	47 _____	Crankshaft and Bearings
18 _____	Air Cleaner	48 _____	Connecting Rods and Pistons
19 _____	Oil Pan	49 _____	Valve Actuating Mechanisms
20 _____	Water Pump	50 _____	Oil Pumps
21 _____	Thermostat Cover	51 _____	Cylinder Head With Valves
22 _____	Thermostat	52 _____	Auxiliary Gear Drive
23 _____	Fan Drive	55 _____	Shipping Stand
24 _____	Fan Belt	56 _____	Paint Option
25 _____	Fan	59 _____	Oil Cooler and Filter
27 _____	Radiator	62 _____	Alternator Mounting
28 _____	Exhaust Manifold	64 _____	Exhaust Elbow
29 _____	Ventilator System	65 _____	Turbocharger
30 _____	Starting Motor	66 _____	Temperature Switch
31 _____	Alternator	69 _____	Engine Serial Number PLate
32 _____	Instrument Panel	75 _____	Air Restriction Indicator
35 _____	Fuel Filter	76 _____	Oil Pressure Switch
36 _____	Front Plate	91 _____	Special Equipment (Factory Installed)
37 _____	Fuel Transfer Pump	97 _____	Special Equipment (Field Installed)
39 _____	Thermostat Housing	98 _____	Shipping

S11,OMSN,Q -19-17FEB

ENGINE CRANKCASE OIL FILL QUANTITIES



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

"T0" indicates the engine was built in Dubuque, Iowa
"CD" indicates the engine was built in Saran, France

To determine the option code for the oil fill quantity of your engine, refer to the engine option code label affixed to the rocker arm cover. The first two digits of the code (40) identify the dipstick tube group. The last two digits of each code identify the specific dipstick and tube assembly on your engine.

RG,OMSP,1 -19-17FEB93

Listed below are engine crankcase oil fill quantities:

• Saran-Built Engines

OEM Engine Model	Dipstick Tube Option Code(s)	Crankcase Oil Capacity
CD3029DF	4001,4003	6.0 L (6.5 qt)
CD3029DF,TF	4002	6.0 L (6.5 qt)
CD3029TF	4001,4003	8.0 L (8.5 qt)
CD4039DF	4001,4002,4005	8.5 L (9.0 qt)
CD4039DF	4006,4010,4019	8.0 L (8.5 qt)
CD4039TF	4002	13.5 L (14.5 qt)
CD4039TF	4005,4006,4020	12.5 L (13.0 qt)
CD4039TF	4008	11.5 L (12.0 qt)
CD6059DF,TF	4001,4004	17.0 L (18.0 qt)
CD6059DF,TF	4010,4012	17.0 L (18.0 qt)
CD6059DF,TF	4004	19.0 L (20.0 qt)
CD6059DF	4005	14.0 L (15.0 qt)
CD6059DF,TF	4007,4011,4015	15.0 L (16.0 qt)
CD6059TF	4009	14.0 L (15.0 qt)

• Dubuque-Built Engines

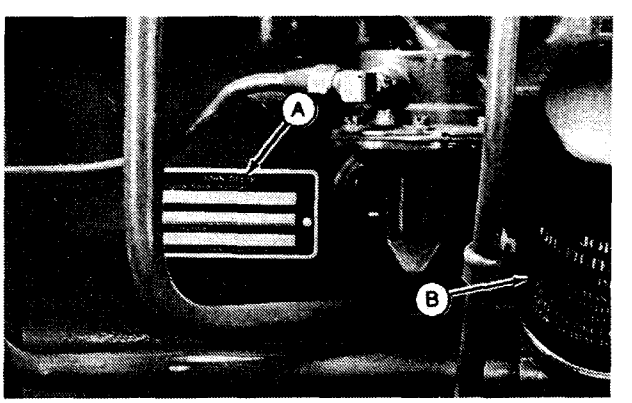
OEM Engine Model	Dipstick Tube Option Code(s)	Crankcase Oil Capacity
T04039DF	4001	9.5 L (10.0 qt)
T04039DF	4002	9.0 L (9.5 qt)
T04039DF,TF	4004	13.5 L (14.5 qt)
T04039DF,TF	4006	13.0 L (14.0 qt)
T04039DF	4007	8.5 L (9.0 qt)
T04039DF	4012	13.0 L (14.0 qt)
T04039DF,TF	4013,4014	11.5 L (12.0 qt)
T04039TF	4001	13.0 L (14.0 qt)
T04039TF	4007	12.5 L (13.0 qt)
T04045DF	4001,4002	9.0 L (9.5 qt)
T04045DF	4003	13.0 L (14.0 qt)
T04045DF,TF	4004	13.5 L (14.5 qt)
T04045TF	4005	13.0 L (14.0 qt)
T06059DF,TF	4001	19.5 L (21.0 qt)
T06059DF	4002	11.5 L (12.0 qt)
T06059DF,TF	4004	19.0 L (20.0 qt)
T06059DF,TF	4005	24.5 L (26.0 qt)
T06059TF	4007	17.0 L (18.0 qt)
T06068DF,TF	4001	19.0 L (20.0 qt)
T06068DF,TF	4004	19.0 L (20.0 qt)
T06068DF	4005	24.5 L (26.0 qt)

Crankcase oil capacity may vary slightly from amount shown. ALWAYS fill crankcase to full mark or within crosshatch on dipstick, whichever is present. DO NOT overfill.

RG,OMSP,2 -19-22FEE

ENGINE SERIAL NUMBER PLATE

Your engine's serial number plate (A) is located on right-hand side of cylinder block near the oil filter housing (B).



S11,OMSN,L -19-02MAF

RECORD ENGINE SERIAL NUMBER

Your engine will have a serial number plate.

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)

_____

Application Data (B)

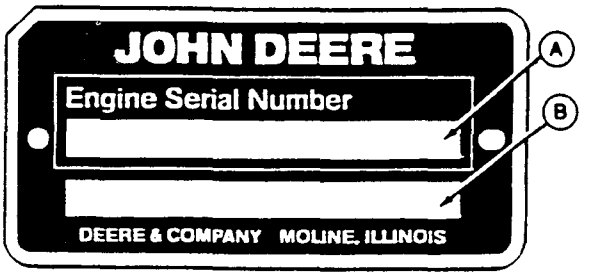
_____

European Customer Model/Application Data (C)

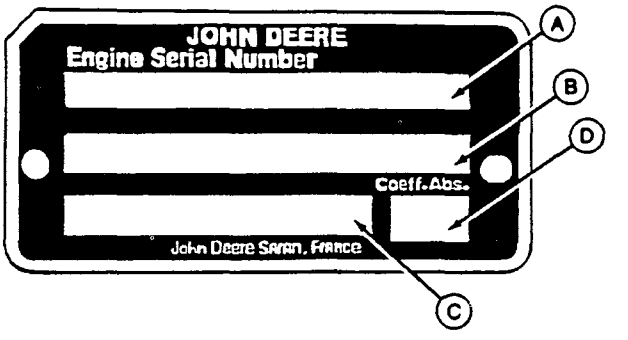
_____

Coefficient of Absorption Value (D)

_____



Dubuque Serial Number Plate



Saran Serial Number Plate

S55,OMSN,B -19-02MAR93

RECORD PTO SERIAL NUMBER

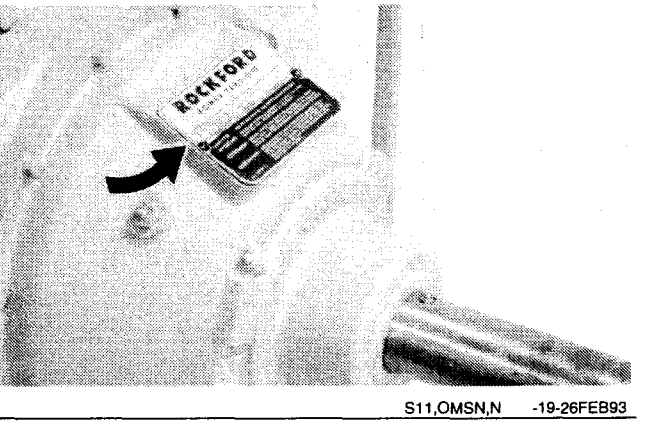
Serial number and model number are located on cover plate (Bold Arrow) of PTO housing. Record the numbers in the following spaces:

Serial Number

_____

Model Number

_____



S11,OMSN,N -19-26FEB93

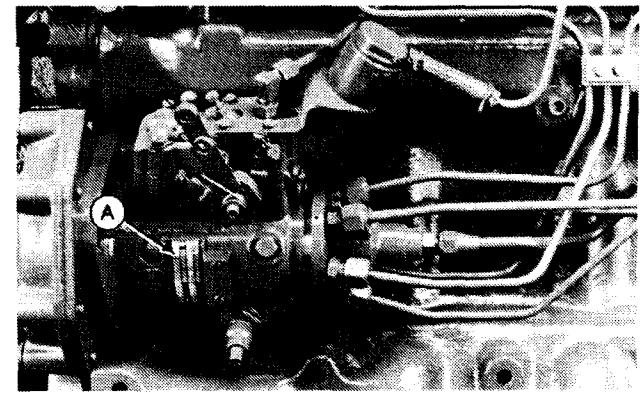
RECORD FUEL INJECTION PUMP MODEL NUMBER

Record the fuel injection pump model and serial information found on the serial number plate (A).

Model No. _____ RPM _____

Manufacturer's No. _____

Serial No. _____



S11,OMSN,O -19-02JUL

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2[b]	5 5.1 5.2	8 8.2
SAE Grade and Nut Markings	NO MARK	2	5	8

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

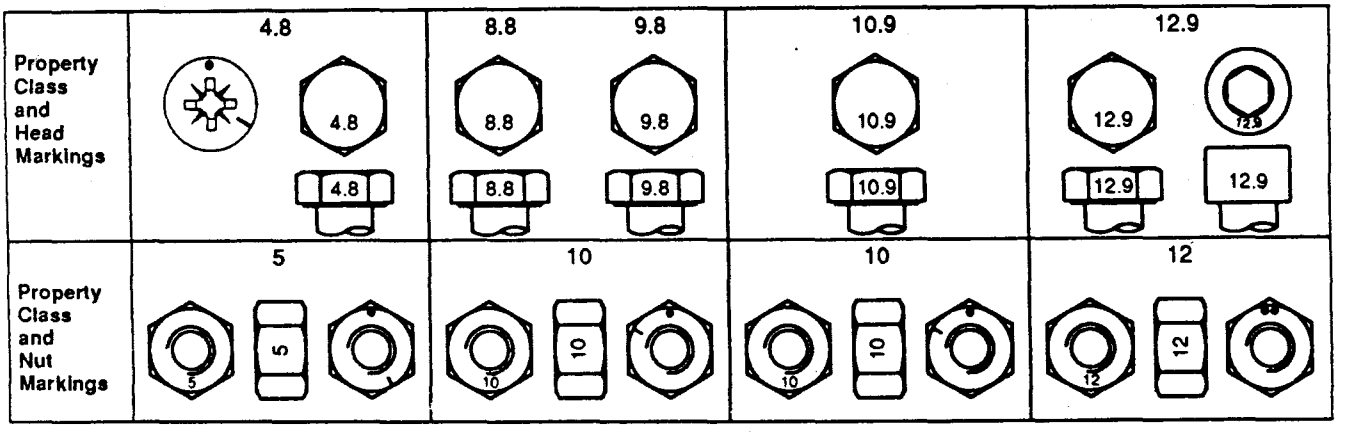
[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

[b] *Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.*

DX,TORQ1 -19-15MAR91

0803

METRIC BOLT AND CAP SCREW TORQUE VALUES



Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	3
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	7
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	12
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	19
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	30
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	41
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	58
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	80
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	10
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	15
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	20
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	27
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	35

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nut to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

DX,TORQ2 -19-16APR

USING LUBRICATION AND MAINTENANCE RECORDS

Refer to specific Lubrication and Maintenance Section for detailed service procedures.

1. Keep a record of the number of hours you operate your engine by regular observation of hour meter.

2. Check your record regularly to learn when your engine needs service.

3. DO ALL the services within an interval section. Write the number of hours (from your service records) and the date in the spaces provided. For a complete listing of all items to be performed and the service intervals required, refer to the quick-reference chart near the front of the Lubrication and Maintenance section.

IMPORTANT: The service recommendations covered in this manual are for the accessories that are provided by John Deere. Follow manufacturer's service recommendations for servicing engine driven equipment not supplied by Deere.

RG21891,65 -19-17FEB93

DAILY (PRESTARTING) SERVICE

NOTE: Refer to DAILY PRESTARTING CHECKS in Engine Operating Guidelines Section for detailed procedures.

- Check engine oil level.
- Check coolant level.
- Lubricate PTO release bearing
- Check air cleaner dust unloader valve.
- Cecck fuel filter glass bowl for water.

S11,OMMR,I1 -19-17FEB93

100 HOUR SERVICE

- Lubricate PTO clutch shaft bearings.
- Service fire extinguisher

Hours									
Date									
Hours									
Date									

S11,OMMR,A1 -19-02MAR9

250 HOUR SERVICE

- *Change engine oil and filter.
- Service battery
- Check PTO clutch adjustment
- Check fan and alternator belt tension

Hours									
Date									
Hours									
Date									

**If TORQ-GARD SUPREME PLUS-50 oil is used along with a John Deere oil filter, the oil change interval maybe extended by 50 hours.*

S11,OMMR,AB -19-17FEB9

400 HOUR SERVICE

- *Initial valve clearance adjustment

Hours									
Date									

**Have your authorized servicing dealer or engine distributor adjust valve clearance after the first 400 hours of operation. Thereafter, have the valve clearance adjusted at 1200 Hour/2-Year intervals.*

S55,OMMR,BB -19-17FEB

600 HOUR/1-YEAR SERVICE

- Clean crankcase vent tube
- Check air intake hoses and connections.
- Lubricate PTO clutch internal levers and linkage
- Replace fuel filter
- Coolant solution analysis - add inhibitor as needed
- Replace air cleaner elements
- Check air intake system
- Check cooling system

Hours									
Date									
Hours									
Date									

S11,OMMR,AD -19-17FEB93

1200 HOUR/2-YEAR SERVICE

NOTE: An engine tune-up is recommended every 1200 hours or two years, whichever comes first. If the engine tune-up is not performed at 1200 hours, the following checks must take place:

- Have your authorized servicing dealer or engine distributor check and adjust engine speeds
- Have you authorized servicing dealer or engine distributor adjust valve clearance
- Have you authorized servicing dealer or engine distributor check fuel injection system
- Have you authorized servicing dealer or engine distributor inspect turbocharger
- Check crankshaft vibration damper
- Flush cooling system
- Change thermostats
- Have your authorized servicing dealer or engine distributor test radiator and cap
- Perform engine tune-up

Hours									
Date									
Hours									
Date									

S11,OMMR,J -19-17FEB

SERVICE AS REQUIRED

- Service air cleaner
- Replace V-belts.

Hours									
Date									

S11,OMMR,Z -19-22FEB

Index

T

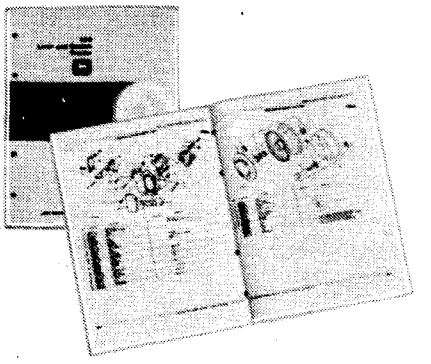
V

W

John Deere Service Literature Available

PARTS CATALOG

The parts catalog lists service parts available for your machine with exploded view illustrations to help you identify the correct parts. It is also useful in assembling and disassembling.



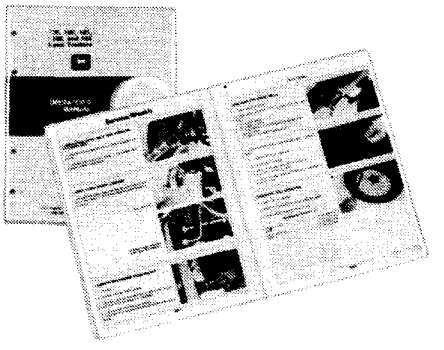
TS189 -UN-17JAN89

DX,PARTS -19-03MAR93

OPERATOR'S MANUAL

The operator's manual provides safety, operating, maintenance, and service information about John Deere machines.

An extra copy of the operator's manual is available. The operator's manual and safety signs on your machine may also be available in other languages. (See your John Deere dealer to order.)



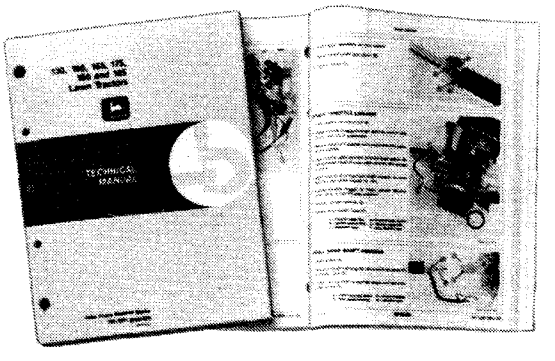
TS190 -UN-17JAN89

DX,OM -19-03MAR93

TECHNICAL AND SERVICE MANUALS

Technical and service manuals are service guides for your machine. Included in the manual are specifications, diagnosis, and adjustments. Also illustrations of assembly and disassembly procedures, hydraulic oil flows, and wiring diagrams.

Component technical manuals are required for some products. These supplemental manuals cover specific components.

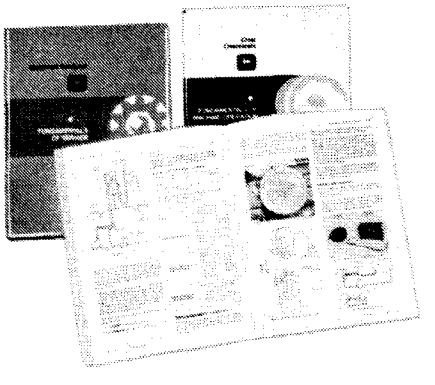


TS224 -UN-17JAN89

DX,TM -19-03MAR93

FMO AND FOS MANUALS

These are basic manuals covering most types and makes of machinery. FMO manuals tell you how to OPERATE agricultural machinery; FOS manuals tell you how to SERVICE machine systems. Each manual starts with basic theory and is fully illustrated with colorful diagrams and photographs. Both the "whys" and "hows" of adjustments and repairs are covered in this reference library.



TS195 -UN-02DEC88

DX,FMOFOS -19-03MAR93

John Deere Service Literature Available

John Deere Distribution Service Center
Department S/P
1400-13th St., East Moline, IL. 61244-1493

To order these publications, fill out this form and the payment information and mail it to the address above. Make checks payable to Deere & Co. Service Publications. Please allow three weeks for delivery. No COD orders, please. Do not send cash or stamps. To place credit card orders, call **1-800-544-2122**. If you want manuals or catalogs for equipment not shown on this list, provide the model number, serial number, and name of the product.

Name _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

Title	Order Number	Price Each	x Quantity	= Total
300 Series Liter Engines Parts Catalogs:				
3029 Saran-Built Engines	PC3194	$ 16.20	x	=
4039 and 4045 Dubuque-Built Engines	PC2305	20.25	x	=
4039 Saran-Built Engines	PC3191	23.30	x	=
6059 and 6068 Dubuque-Built Engines	PC2294	16.20	x	=
6059 Saran-Built (100000—) Engines	PC3192	16.20	x	=
Operator's Manuals: English Version	OMRG18293	3.42	x	=
Component Technical Manuals: 3029, 4039, 4045, 6059, and 6068 Engines	CTM8	24.12	x	=
Engine Accessories	CTM11	41.85	x	=
			x	=
			x	=
			x	=
			x	=
			x	=
			x	=
			x	=
FOS Manual—Hydraulics	FOS1005B	17.95	x	=
FOS Manual—Electrical Systems	FOS2006B	20.95	x	=
FOS Manual—Engines	FOS3007B	19.95	x	=
FOS Manual—Power Trains	FOS4006B	15.95	x	=
FOS Manual—Shop Tools	FOS5105B	7.95	x	=
FOS Manual—Welding	FOS5207B	14.95	x	=
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We help minimize downtime by putting genuine John Deere parts in your hands in a hurry.

That's why we maintain a large and varied inventory—to stay a jump ahead of your needs.

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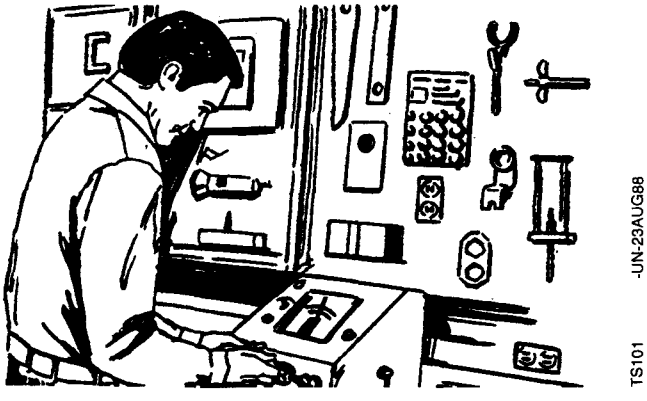
Precision tools and testing equipment enable our Service Department to locate and correct troubles quickly . . . to save you time and money.



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School is never out for John Deere service technicians.

Training schools are held regularly to be sure our personnel know your equipment and how to maintain it.

Result?

Experience you can count on!

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PROMPT SERVICE

Our goal is to provide prompt, efficient care when you want it and where you want it.

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JOHN DEERE SERVICE SUPERIORITY: We'll be around when you need us.

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