3029, 4039, 6059, 4045, and 6068 OEM Diesel Engines

OPERATOR'S MANUAL

Deere Power Systems Group
OMRG18293 Issue C3
(This manual replaces OMRG18293 C1)
LITHO IN U.S.A.
ENGLISH

Introduction

READ THIS MANUAL CAREFULLY to learn how to operate and service your engine corectly. Failure to do so could result in personal injury or equipment damage.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your engine and should remain with the engine when you sell it.

MEASUREMENTS IN THIS MANUAL are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

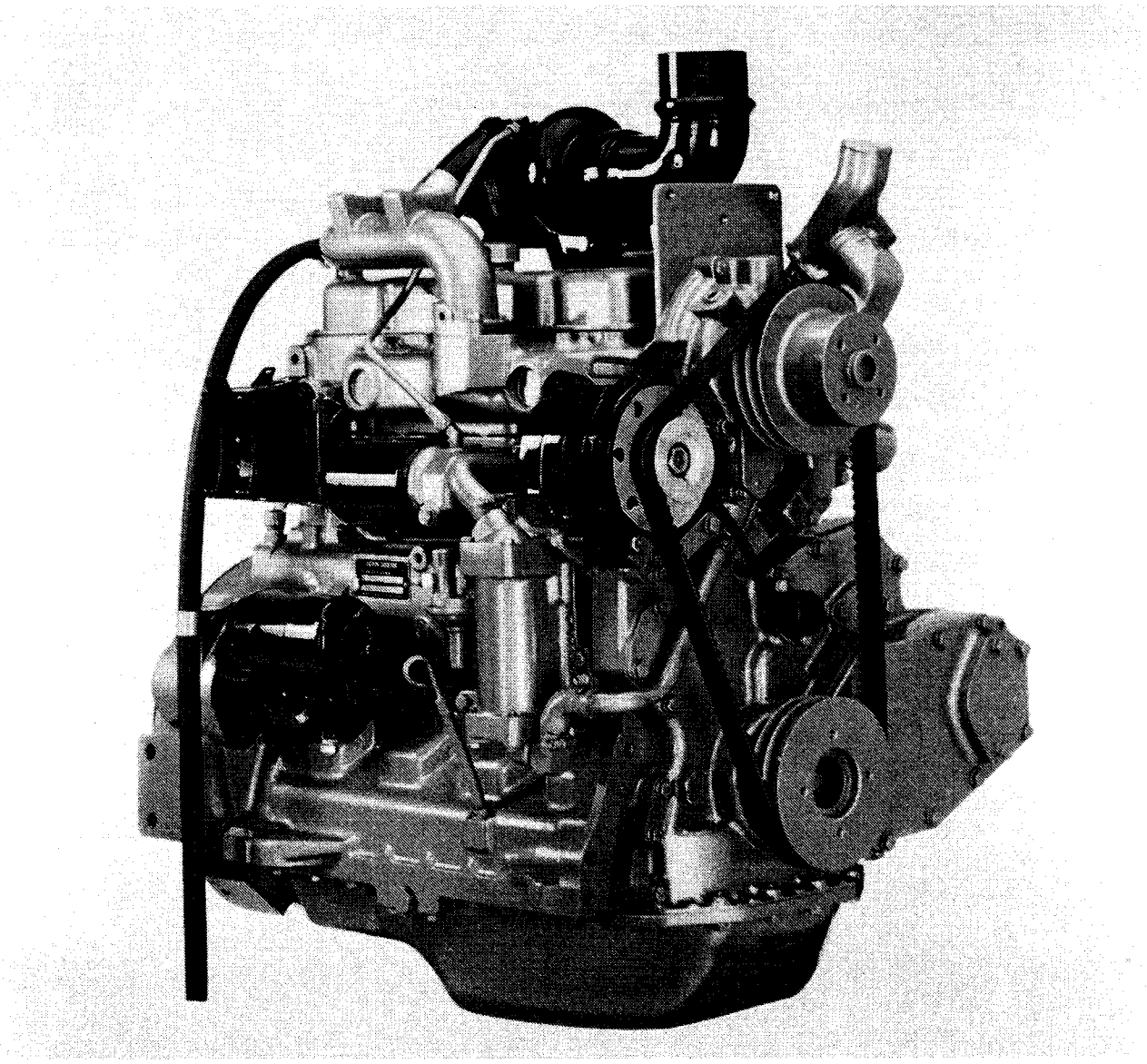
RIGHT-HAND AND LEFT-HAND sides are determined by standing at the drive or flywheel end (rear) of the engine and facing toward the front of the engine.

WRITE ENGINE SERIAL NUMBERS and the option codes in the spaces indicated in the Specifications section. Accurately record all the numbers. Your dealer also needs these numbers when parts are ordered. File the identification numbers in a secure place off the engine.

SETTING FUEL DELIVERY beyond published factory specifications or otherwise overpowering will result in loss of warranty protection for this engine.

CERTAIN ENGINE ACCESSORIES such as radiator, air cleaner, and instruments are optional equipment on John Deere OEM Engines. These accessories may be provided by the equipment manufacturer instead of John Deere. This operator's manual applies only to the engine and those options available through the John Deere distribution network.

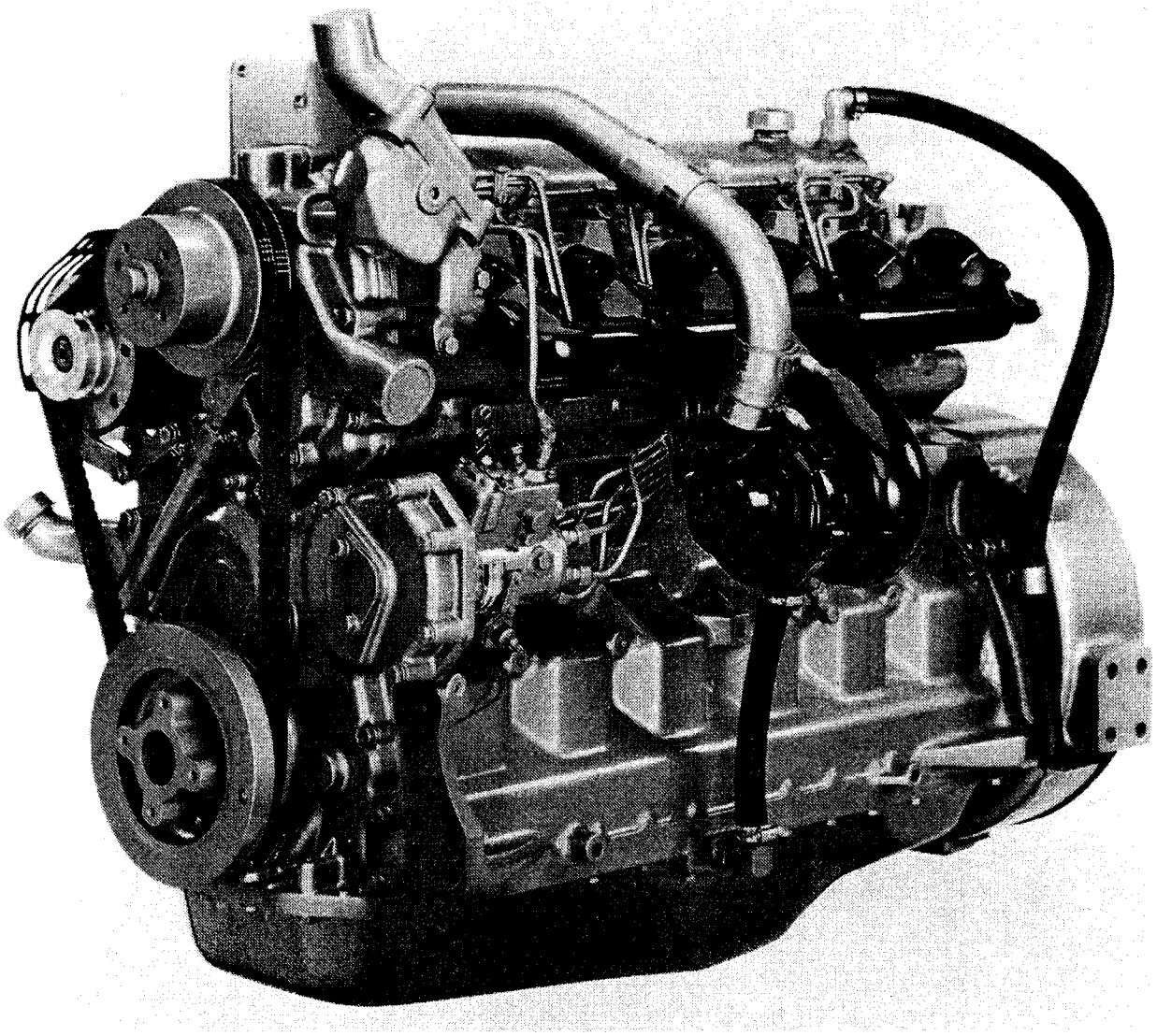
Identification Views



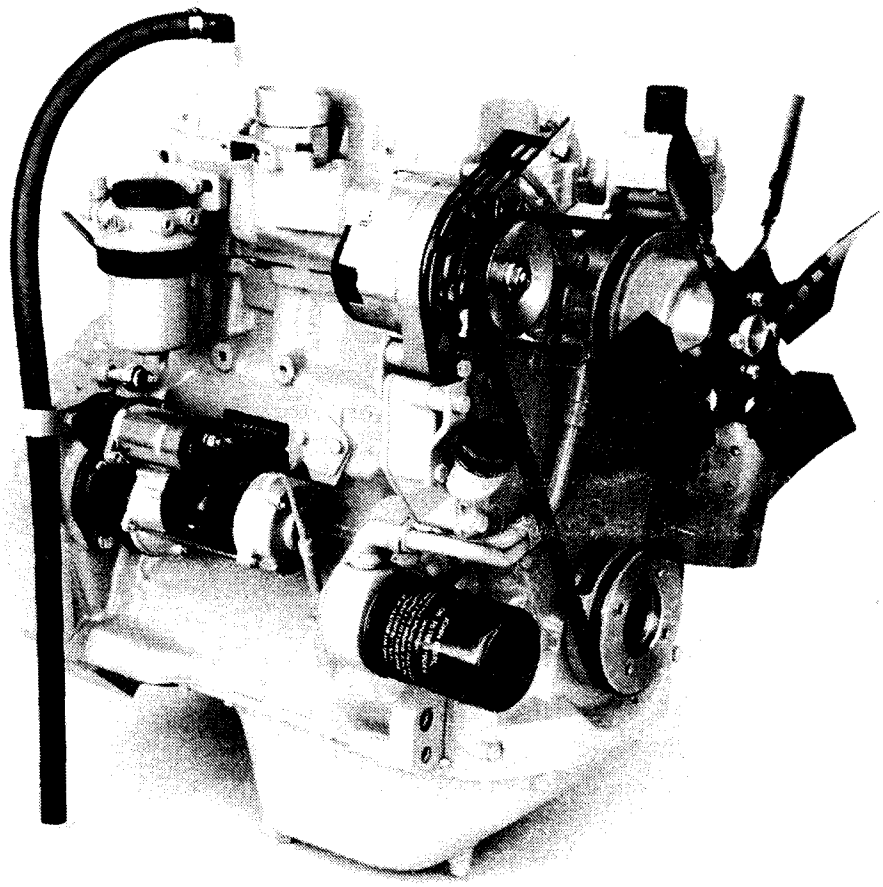
RG5603 -UN-30NOV89

4045T Engine

S11,CONT,L1 -19-08FEB91



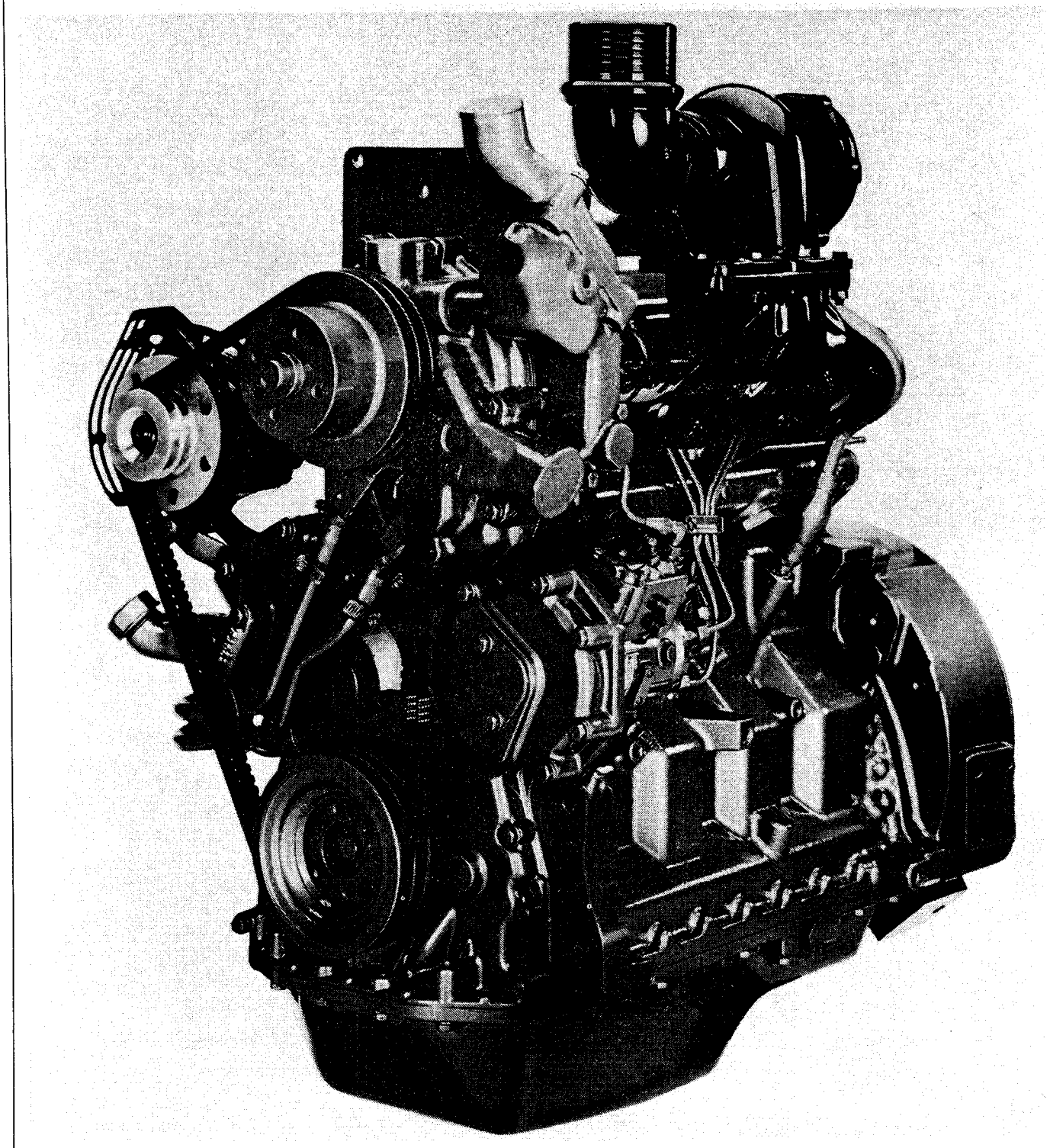
6068T Engine



3029D Engine

CD30356 -UN-03FEB93

S11,CONT,L3 -19-17FEB93



4039T Engine

S11,CONT,L4 -19-17FEI

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All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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Safety

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

T81389 -UN-07DEC88

DX,ALERT -19-03MAR93

UNDERSTAND SIGNAL WORDS

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

TS187 -19-30SEP88

DX,SIGNAL -19-03MAR93

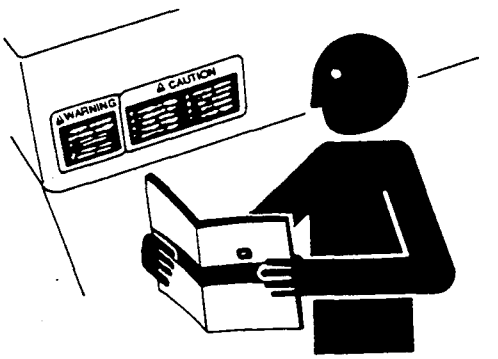
FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.



TS201 -UN-23AUG88

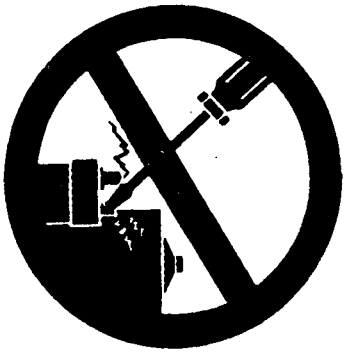
DX,READ -19-03MAR93

PREVENT BYPASS STARTING

Avoid possible injury or death from engine runaway.

Do not start engine by shorting across starter terminal. Engine will start with PTO engaged if normal circuitry is bypassed.

Start engine only from operator's station with PTO disengaged or in neutral.



RG,BYPAS1 -19-19MAR

HANDLE FUEL SAFELY—AVOID FIRES

Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine. Fill fuel tank outdoors.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris. Always clean up spilled fuel.

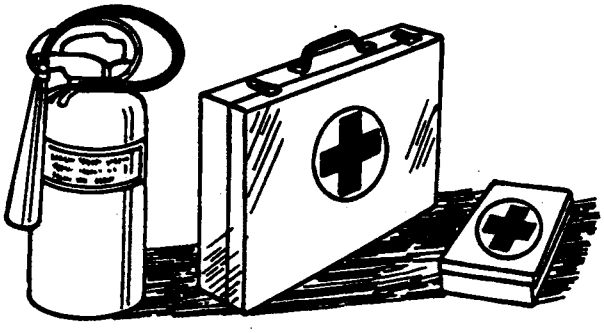
DX,FIRE1 -19-03MAR

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



DX,FIRE2 -19-03MAR

HANDLE STARTING FLUID SAFELY

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.

TS1356 -UN-18MAR92

DX,FIRE3 -19-16APR92

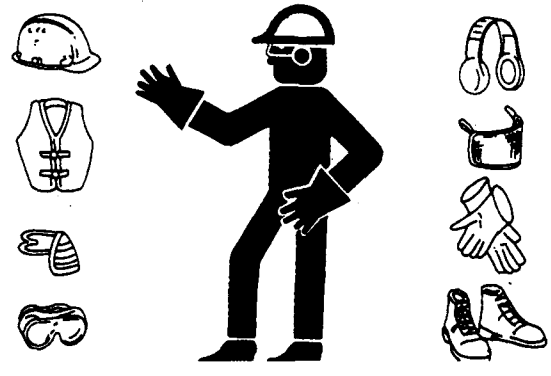
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



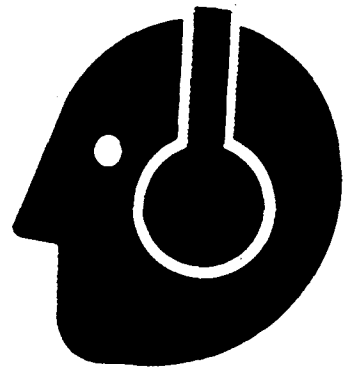
TS206 -UN-23AUG88

DX,WEAR -19-10SEP90

PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



TS207 -UN-23AUG88

DX,NOISE -19-03MAR93

HANDLE CHEMICAL PRODUCTS SAFELY

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)

DX,MSDS,NA -19-03MAI

STAY CLEAR OF ROTATING DRIVELINES

Entanglement in rotating driveline can cause serious injury or death.

Keep master shield and driveline shields in place at all times. Make sure rotating shields turn freely.

Wear close fitting clothing. Stop the engine and be sure the PTO driveline is stopped before making adjustments or performing any type service on the engine or PTO-driven equipment.

RG21891,3 -19-25JA

PRACTICE SAFE MAINTENANCE

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet , and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

TS218 -UN-23AUG88

DX,SERV -19-03MAR93

WORK IN VENTILATED AREA

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

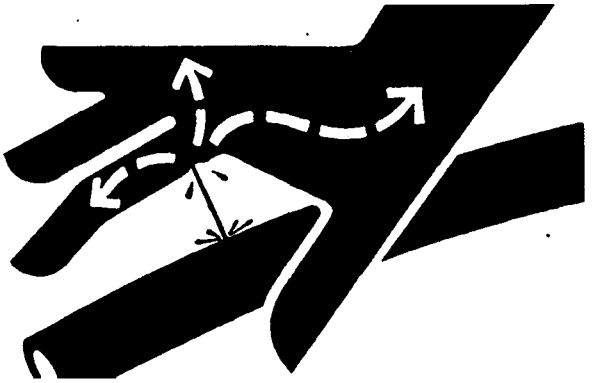
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

TS220 -UN-23AUG88

DX,AIR -19-04JUN90

CAUTION: 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.



DX,FLUID2 -19-09AUG

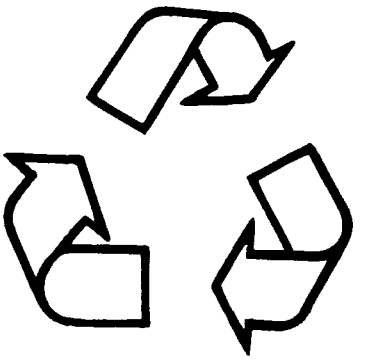
SERVICE COOLING SYSTEM SAFELY

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.

DX,RCAP -19-04JUN

DISPOSE OF WASTE PROPERLY



Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.

DX,DRAIN -19-03MAR93

DIESEL FUEL

IMPORTANT: To ensure proper engine performance, buy good quality, clean fuel from a reputable supplier.

Use either Grade No. 1-D or Grade No. 2-D fuel as defined by ASTM Designation D-975 for diesel fuels. In European countries, use ISO 1585 commercial diesel fuel. Find expected air temperature at time of start on thermometer scale in chart. Correct diesel fuel grade (A,B) is shown to the right of scale.

NOTE: At altitudes above 1500 m (5000 ft) and for engines operated under "stand-by" conditions, use grade No. 1-D for all temperatures.

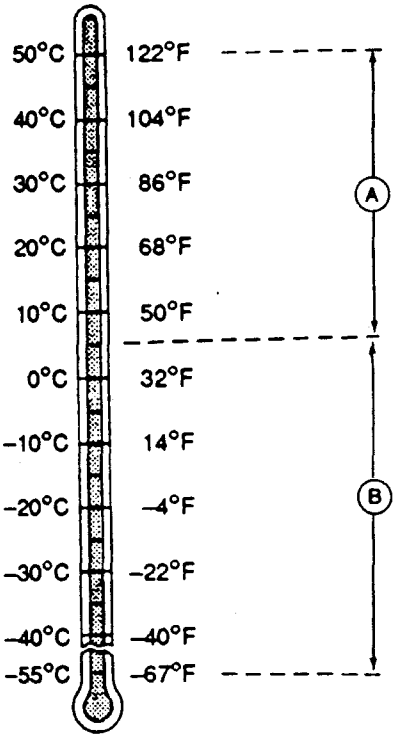
IMPORTANT: If engine is operated at temperatures of -40° to -57°C (-40° to -70°F), Grade DF-A arctic fuel is recommended. Also, consult your authorized servicing dealer or engine distributor for special lubricants and starting aids when operating at or below the temperatures shown.

If fuel sulphur content exceeds 0.5 percent, the engine oil drain interval must be reduced by 50 percent. DO NOT use fuel with more than 1.0 per cent sulfur.

Cetane number should be a minimum of 40 to assure satisfactory starting and overall performance. At low temperatures and/or high altitude, a minimum cetane number of 45 is recommended.

NOTE: Excessive white smoke at start-up could be the result of low cetane fuel.

Cloud point should be at least 6°C (10°F) below lowest expected air temperature at time of starting. Wax can separate from fuel when temperature decreases to cloud point and may plug filter.



A—Use Grade No. 2-D Fuel
B—Use Grade No. 1-D Fuel

S11,OMFL,A -19-22FE

DIESEL FUEL STORAGE

Proper fuel storage is critically important. Use clean storage and transfer tanks. Periodically drain water and sediment from bottom of tank. Store fuel in a convenient place away from buildings.

IMPORTANT: DO NOT store diesel fuel in galvanized containers. Diesel fuel stored in galvanized containers reacts with zinc coating on container to form zinc flakes. If fuel contains water, a zinc gel will also form. The gel and flakes will quickly plug fuel filters, damage injection nozzles and injection pump.

DO NOT use use brass-coated containers for fuel storage. Brass is an alloy of copper and zinc.

Store diesel fuel in plastic containers, aluminum containers, and specially coated steel containers made for diesel fuel storage.

Avoid storing fuel over long periods of time. If there is a very slow turnover in fuel tank or supply tank, it may be necessary to add John Deere TY22030 All Season Diesel Fuel Conditioner to prevent water condensation. TY22030 Conditioner also reduces fuel gelling and controls wax separation during cold weather.

Consult your John Deere Parts Network for local availability and always follow manufactuter's directions on label.

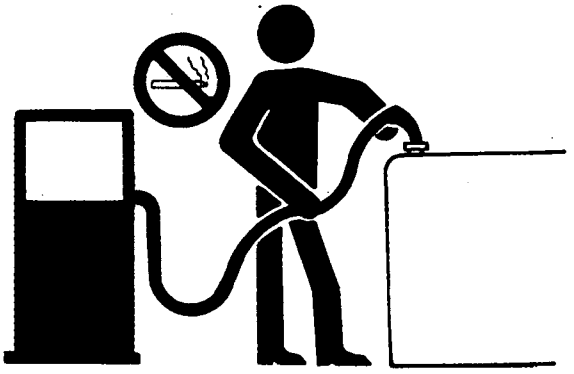
RG21891,5 -19-02MAR93

FILLING FUEL TANK

CAUTION: Be careful when handling fuel. Never fill tank while engine is hot or running. DO NOT smoke while filling fuel tank.

IMPORTANT: The fuel tank should be vented through filler cap. If new filler cap is required, always replace it with a vented cap.

Fill fuel tank at end of each day's operation. This prevents condensation in tank as moist air cools.



TS202 -UN-23AUG88

S11,OMFL,C -19-02MAR93

ENGINE OIL

Use oil viscosity based on the expected air temperature range during the period between oil changes.

The following oil is preferred:

- John Deere TORQ-GARD SUPREME PLUS-50™

The following oils are also recommended:

- John Deere TORQ-GARD SUPREME®
- John Deere UNI-GARD™

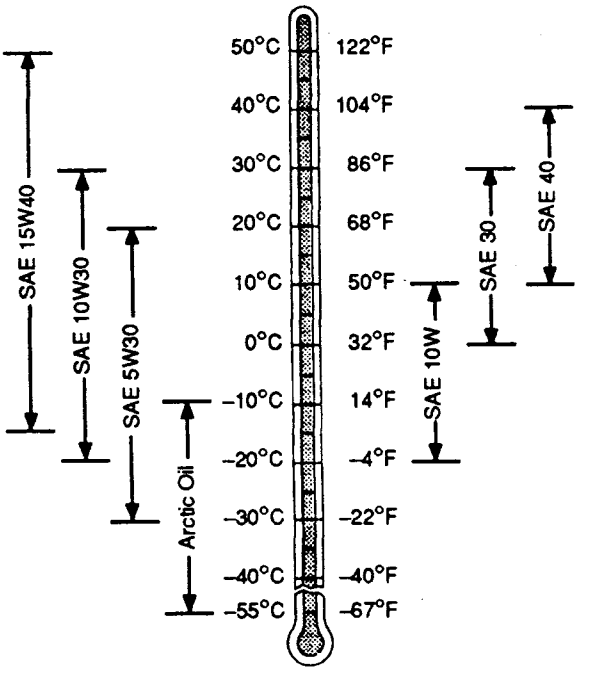
Other oils may be used if they meet one of the following:

- API Service Classification CE
- API Service Classification CD
- CCMC Specification D5
- CCMC Specification D4

If John Deere TORQ-GARD SUPREME PLUS-50 engine oil and a John Deere oil filter are used, the oil and filter service interval may be extended by 50 hours.

If diesel fuel exceeding 0.5% sulfur content is used, reduce the service interval for engine oil and filter by 50%.

Oils meeting Military Specification MIL-L-46167B may be used as arctic oils.



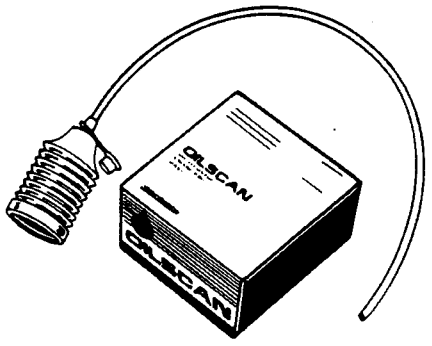
DX,ENOIL -19-03MAI

)ILSCAN® AND COOLSCAN™

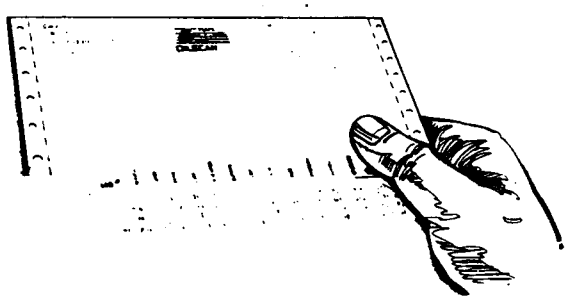
)ILSCAN and COOLSCAN are John Deere sampling)rograms to help you monitor machine performance and)dentify potential problems before they cause serious)amage.

)il and coolant samples should be taken from each)ystem prior to its recommended change interval.

)heck with your John Deere dealer for the availability of)ILSCAN and COOLSCAN kits.



T6828AB -UN-15JUN89



T6829AB -UN-18OCT88

DX,OILSCAN -19-16APR92

)LTERNATIVE AND SYNTHETIC LUBRICANTS

)onditions in certain geographical areas may require ubricant recommendations different from those)rinted in this operator's manual. Some John Deere ubricants may not be available in your location.)onsult your John Deere dealer to obtain information)nd recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this operator's manual.

DX,ALTER -19-03MAR93

GREASE

Use grease based on the expected air temperature range during the service interval.

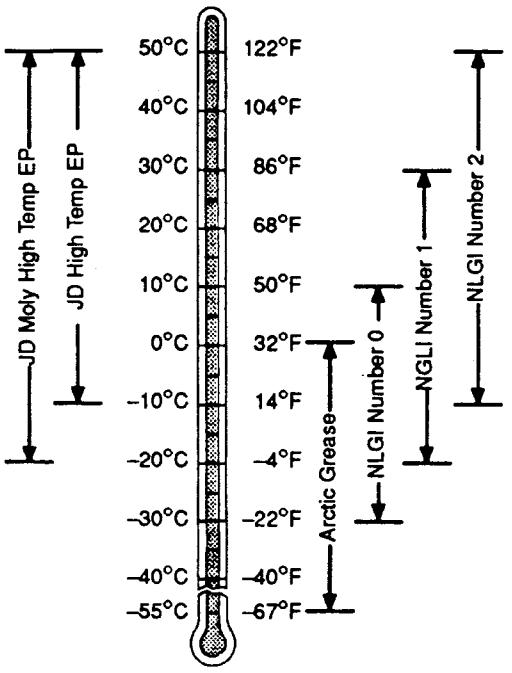
The following greases are preferred:

- John Deere MOLY HIGH TEMPERATURE EP GREASE
- John Deere HIGH TEMPERATURE EP GREASE
- John Deere GREASE-GARD™

Other greases may be used if they meet one of the following:

- SAE Multipurpose EP Grease with a maximum of 5% molybdenum disulfide
- SAE Multipurpose EP Grease

Greases meeting Military Specification MIL-G-10924F may be used as arctic grease.



DX,GREA1 -19-03MA

LUBRICANT STORAGE

Your equipment can operate at top efficiency only if clean lubricants are used.

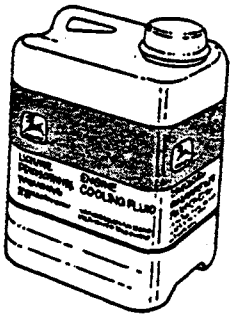
Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers an area protected from dust, moisture, and other contamination. Store containers on their side to av water and dirt accumulation.

DX,LUBST -19-03MA

ENGINE COOLANT RECOMMENDATIONS

TS281 -UN-23AUG88



RG6214 -UN-14DEC88

⚠ **CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns. Shut off engine. Remove the radiator filler cap only when the cap is cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.**

Solutions of antifreeze and supplemental coolant additives MUST be used year-round for freeze protection, boil-over protection, and to provide a stable, non-corrosive environment for seals, hoses, and metal engine parts.

IMPORTANT: ALWAYS maintain coolant at correct level. If frequent make-up is required, glycol concentration should be checked with a refractometer to maintain the desired freeze point.

ALWAYS add water to the coolant concentrate BEFORE adding supplemental coolant additives.

In certain geographical areas, John Deere Engine Cooling Fluid is marketed for use in the engine cooling system. John Deere Cooling Fluid contains the proper solution of water and low silicate antifreeze to protect the engine from freezing down to -37°C (-35°F). Supplemental coolant additives, in the form of liquid coolant conditioner, must be added to the Cooling Fluid to provide additional engine protection. Contact your John Deere Parts Network for local availability.

Engine coolant must be drained and replaced every two years (every year if water with conditioner only is used) regardless of hours operated.

RG,COOL,REQ1 -19-22FEB93

ENGINE COOLANT SPECIFICATIONS

To meet cooling system protection requirements, the coolant must consist of:

- appropriate water quality
- correct type and concentration of antifreeze
- correct type and concentration of supplemental coolant additives

1. Water Quality:

Distilled or de-ionized water is preferred for use in cooling systems. However, water that meets the following water quality specifications is acceptable.

Water Quality Specifications

	Parts Per Million	Grains Per Gallon
Chlorides (maximum)	40	2.5
Sulfates (maximum)	100	5.8
Total Dissolved Solids (maximum)	340	20
Total Hardness (maximum)	170	10

If Chlorides, Sulfates, or Total Dissolved Solids are higher than the above given specifications, the water must be distilled, de-mineralized, or de-ionized before using in cooling system.

If Total Hardness is higher than the above given specification and all other parameters are within the given specifications, the water must be softened before using in cooling system.

2. Antifreeze Concentration:

IMPORTANT: DO NOT use methyl alcohol or methoxy propanol base antifreeze. This antifreeze is not compatible with additives used in coolant conditioner. Damage can occur to rubber seals on cylinder liners whi are in contact with coolant.

DO NOT use antifreeze-coolant mi containing sealer or stop-leak additives.

DO NOT use antifreeze containing less than 10% ethylene glycol.

DO NOT use antifreeze containing more than 0.1% anhydrous metasilicate.

John Deere Low Silicate Antifreeze is recommende for all John Deere Diesel Engines. This antifreeze i concentrated and should be mixed 50% water-50% antifreeze. Do not exceed 60% (maximum) antifree concentration. Consult your John Deere Parts Network for local availability.

If John Deere Low Silicate Antifreeze is not availab use an ethylene-glycol base antifreeze containing n more than 0.1 percent anhydrous metasilicate, and meeting General Motors Performance Specification GM1899M, or formulated to GM6038M.

Some types of ethylene-glycol antifreeze are intend for use in aluminum engines, and may contain mor than 0.1 percent anhydrous metasilicate. Use of thi type antifreeze can cause a gel-like deposit to form that reduces heat transfer and coolant flow. Check container label or consult with antifreeze supplier before using.

RG,COOL,REQ2 -19-07APR

3. Additives:

IMPORTANT: DO NOT over-inhibit antifreeze solutions, as this can cause silicate-dropout. When this happens, a gel-type deposit is created which retards heat transfer and coolant flow.

DO NOT use soluble oil.

ALWAYS inhibit the antifreeze-coolant mix with a non-chromate inhibitor such as RE23182 John Deere Liquid Coolant Conditioner. Follow the supplier's recommendations printed on the container.

RG4690 -UN-14DEC88

Liquid Coolant Conditioner

IMPORTANT: John Deere Liquid Coolant Conditioner does NOT protect against freezing.

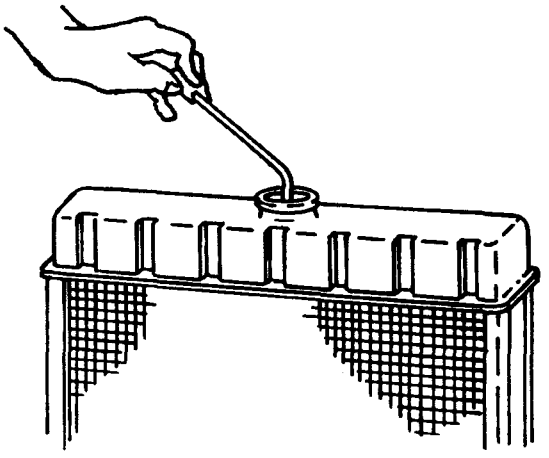
In tropical areas where antifreeze or John Deere Engine Cooling Fluid is not available, it is acceptable to use water meeting the quality specifications on the previous page and John Deere Liquid Coolant Conditioner. The recommended concentration of John Deere Liquid Coolant Conditioner must be doubled to 6% (60 mL per Liter of cooling system capacity) by volume when used with water only (no antifreeze).

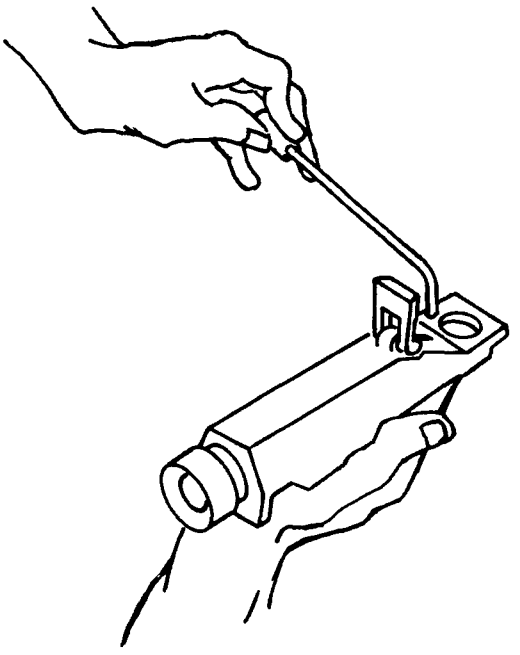
Additives eventually lose their effectiveness and must be recharged with additional liquid coolant conditioner. See label on container for recommended service intervals and concentration rates.

Contact your authorized servicing dealer or engine distributor, if there are further questions.

RG,COOL,REQ3 -19-23MAR92

REPLENISHING SUPPLEMENTAL COOLANT ADDITIVES (SCA'S) BETWEEN COOLANT CHANGES





RG6261 -UN-22APR92

Through time and use, original additives eventually lose their effectiveness and must be recharged with additional supplemental coolant additives available in the form of liquid coolant conditioner.

NOTE: Service intervals listed are a recommended engineering guideline. Refer to your vehicle operator's manual for a specific service interval.

At 600 hours or 1 year service interval, it is recommended to perform a COOLSCAN analysis as described earlier. If a COOLSCAN analysis is not available, recharge system per instructions printed on bottle.

IMPORTANT: ALWAYS maintain coolant at corre level and concentration. DO NOT operate engine without coolant fo even a few minutes.

If frequent coolant make-up is required, the glycol concentration should be checked with JT05460 Refractometer to assure that the desired freeze point is maintained Follow manufacturer's instructions provided with refractometer.

See ENGINE COOLANT SPECIFICATIONS earlier i this group for proper mixing of coolant ingredients before adding to the cooling system.

RG,COOL,REQ4A -19-22FE

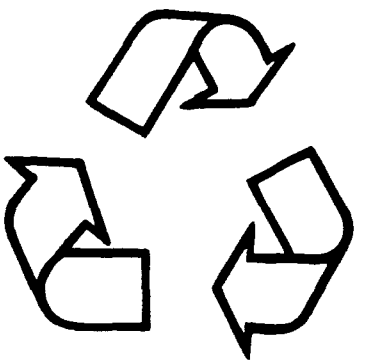
DISPOSING OF COOLANT

Improperly disposing of engine coolant can threaten the environment and ecology.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



TS1133 -UN-26NOV90

RG,COOL,REQ5 -19-26FEB93

INSTRUMENT (GAUGE) PANEL

All controls and gauges are optional equipment for John Deere OEM Engines. They may be provided by the equipment manufacturer instead of John Deere. The following information applies only to those controls and gauges provided 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.

Following is a brief description of the components on the John Deere instrument (gauge) panel:

A—Electric Hour Meter—Indicates the operating hours of the engine while key switch is in the "ON" position. The hourmeter should be used as a guide for scheduling periodic service.

B—Coolant Temperature Gauge—Indicates the engine coolant temperature.

C—Mechanical Tachometer—Indicates engine speed in revolutions per minute (rpm).

NOTE: A combination tachometer and hour meter is also an available option. See your authorized servicing dealer or engine distributor.

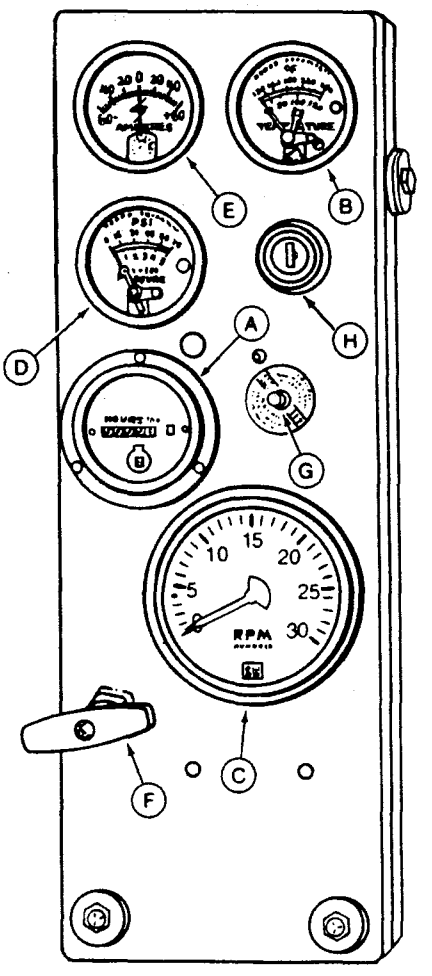
D—Oil Pressure Gauge—Indicates engine oil pressure.

E—Ammeter—Indicates charging current within electrical system.

F—Hand Throttle—Controls engine speed.

G—Reset (Safety) Switch—Overrides safety shutdown switch when depressed and held in during engine startup. Hold button in until engiine oil pressure is at a safe operating level.

H—Key Switch—The four position key switch controls the electrical system.



A—Electric Hour Meter
B—Coolant Temperature Gauge
C—Tachometer
D—Oil Pressure Gauge
E—Ammeter
F—Hand Throttle
G—Reset Switch
H—Key Switch

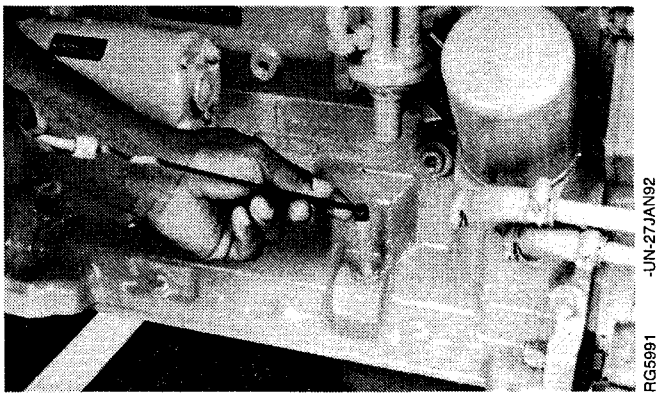
BREAK-IN SERVICE

The engine is ready for normal operation, however, extra care during the first 100 hours will result in a more satisfactory long-term engine performance and life. DO NOT exceed 100 hours of operation with break-in oil.

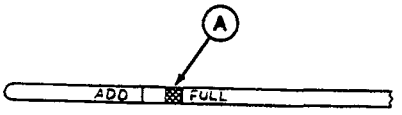
1. This engine is factory-filled with SAE 10W-30 break-in oil. Minimum engine oil pressure at slow idle speed is 103 kPa (1.03 bar) (15.0 psi) at normal operating temperature. Normal engine coolant temperature range is 82°—94°C (180—202°F). Run the engine the first 100 hours maximum with break-in oil. When operating a new engine in extreme (high temperature or dusty) conditions, break-in oil MUST be drained after the first 50 hours of operation.

IMPORTANT: DO NOT operate engine when oil level is below ADD mark on dipstick. ALWAYS keep oil level within the crosshatch pattern (A) or at the full mark, whichever is present. Oil levels anywhere within crosshatch are considered full.

2. Check oil more frequently during engine break-in period. If oil must be added during this period, use seasonal viscosity grade oil. (See DIESEL ENGINE OIL, in Fuels, Lubricants, and Coolant Section.)



RG5991 -UN-27JAN92



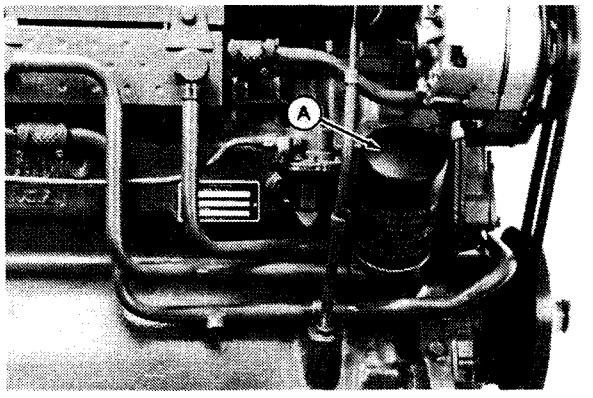
RG5420 -UN-15DEC88

S11,OMBI,I -19-02MAR93

3. During the first 20 hours, avoid prolonged periods of engine idling or sustained maximum load operation.

4. If engine will idle longer than 5 minutes, stop engine.

5. After the first 100 hours maximum, drain engine oil and change engine oil filter (A). (See CHANGE ENGINE OIL AND FILTER in Lubrication and Maintenance/250 Hour section.) Fill with seasonal viscosity grade oil. (See DIESEL ENGINE OIL, in Fuels, Lubricants, and Coolant section.)



NOTE: Some increase in oil consumption may be expected when low viscosity oils are used. Check oil levels more frequently.

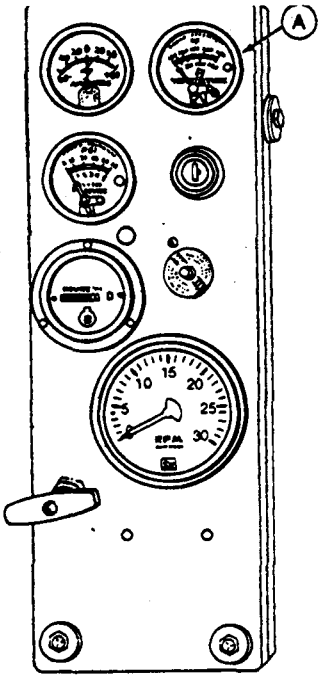
If air temperature is below —10°C (14F), use an engine heater.

S11,OMBI,J -19-19MAR

6. Watch coolant temperatures (A) closely. If coolant temperature rises above 99°C (210°F), reduce load on engine. Unless temperature drops quickly, stop the engine and determine the cause before resuming operation.

NOTE: When the coolant temperature gauge reads approximately 104°C (220°F), the engine will shutdown automatically, if equipped with safety controls.

7. The tension on newly installed V-belts should be checked daily for the first few days of operation because of the initial stretching. Also, check belts for proper seating in pulley grooves.



S11,OMBI,K -19-19MAR

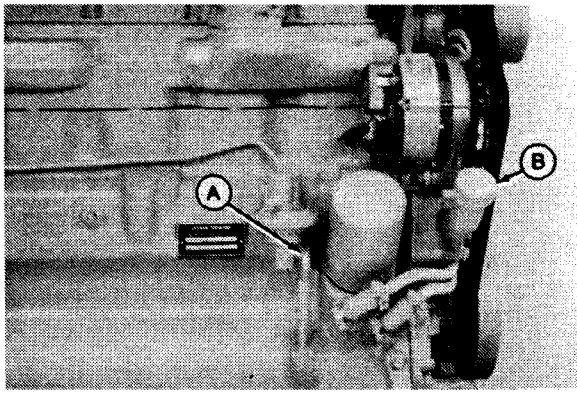
DAILY PRESTARTING CHECKS

Do the following before starting the engine for the first time each day:

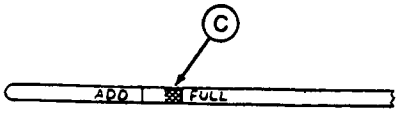
1. Check engine oil level on dipstick (A). Do not operate engine when oil level is below the ADD mark on dipstick. Add oil at filler cap (B), as required, using seasonal viscosity grade oil. (See DIESEL ENGINE OIL in Fuels, Lubricants, and Coolant section for oil specifications.)

Some engines may have the oil filler cap on rocker arm cover, while others will have the filler cap on the timing gear cover.

NOTE: ALWAYS keep oil level within the crosshatch pattern (C) on dipstick when operating engine. Oil levels anywhere within crosshatch are considered full.



T5953AH -UN-24FEB89

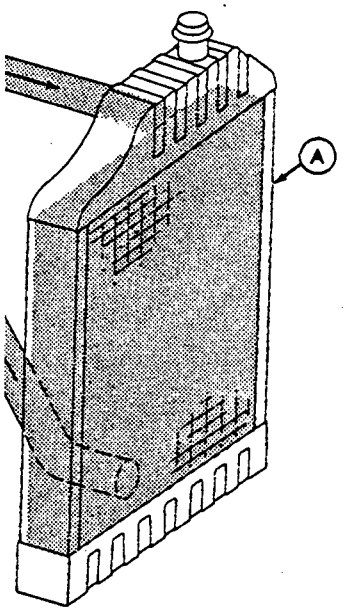


RG5421 -UN-15DEC88

S11,OMPC,O -19-02MAR93

2. Check the coolant level when engine is cold. Coolant level should be approximately 19 mm (3/4 in.) below bottom of filler neck. Fill radiator (A) with appropriate coolant. (See ENGINE COOLANT RECOMMENDATIONS in Fuels, Lubricants, and Coolant section.)

IMPORTANT: Engine coolant must contain coolant conditioner to guard against rust and corrosion in the engine. (See ADDING COOLANT in Lubrication and Maintenance/1200 Hours/2-Year Section.)

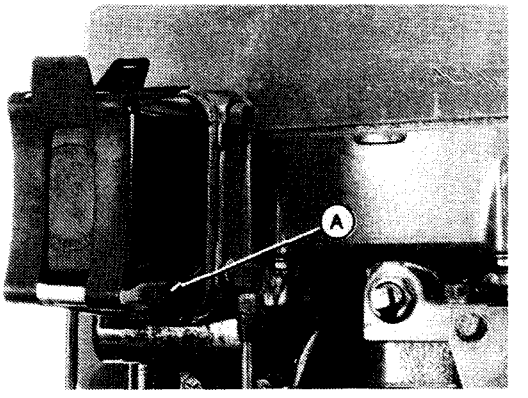


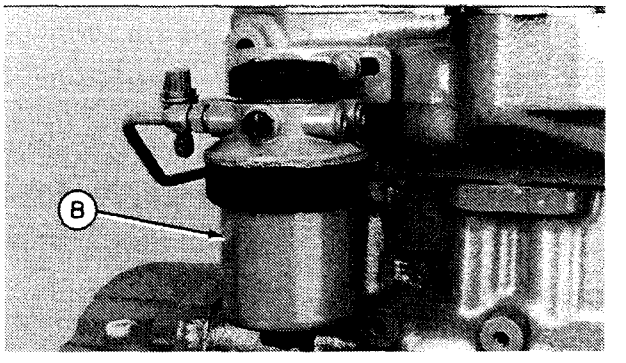
RG4675 -UN-14DEC88

S11,OMPC,P -19-26OCT92

3. Check the glass sediment chamber of the rectangular fuel filter (A) for water or debris. If present, drain the filter. (See REPLACE FUEL FILTER ELEMENT in Lubrication and Maintenance/600 Hours/1-Year Section.)

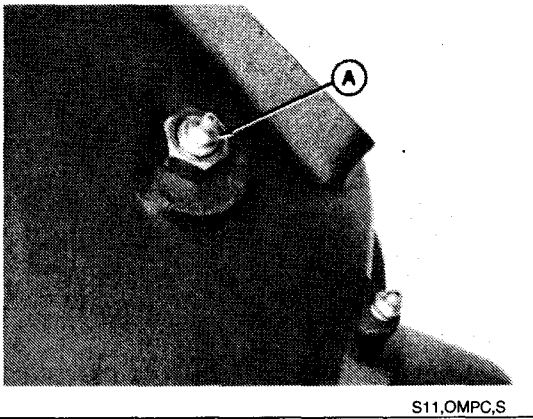
NOTE: Some engines may be equipped with metal rectangular fuel filter(s) or a round fuel filter (B). If so, periodically drain to remove water or debris and bleed the fuel system, as outlined later in Service Section.





RG18293,1 -19-17FE

4. Apply one shot of John Deere Multi-Purpose Lubricant or its equivalent at PTO release bearing grease fitting (A). DO NOT over lubricate.

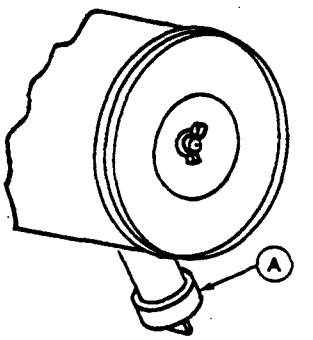


S11,OMPC,S -19-07JU

5. If the air cleaner has an automatic dust unloader valve (A), squeeze the unloader valve on air cleaner assembly to clear away any dust buildup.

If equipped with restriction indicator gauge, check gauge to determine if air cleaner needs to be serviced.

IMPORTANT: Maximum air intake restriction is 6.22 kPa (0.06 bar) (1.0 psi) (25 in. H_2O). A clogged air cleaner element will cause excessive intake restriction and a reduced air supply to the engine.



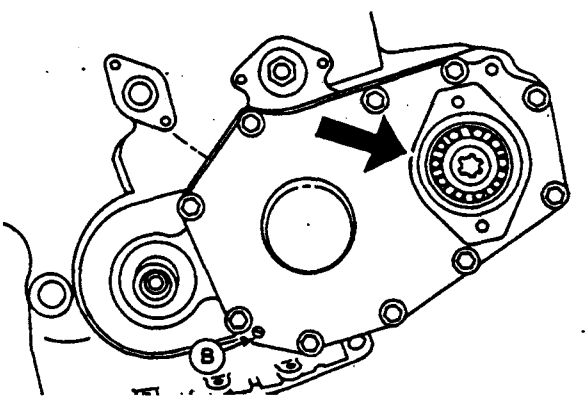
RG4676 -UN-20DEC88

S11,OMPC,R -19-03JUL86

AUXILIARY GEAR DRIVE LIMITATIONS

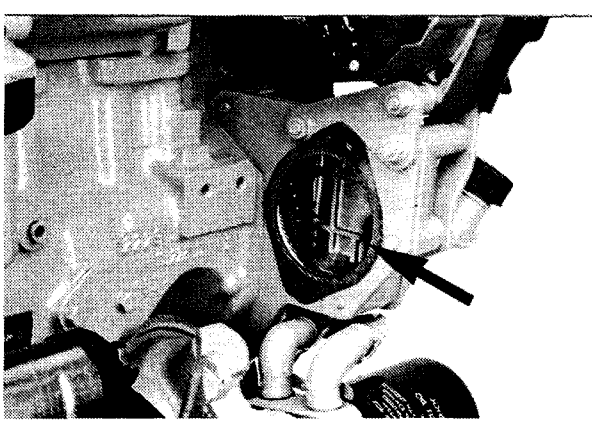
IMPORTANT: When attaching an air compressor, hydraulic pump, or other attachment to be driven by the auxiliary gear drive (engine timing gear train at front of engine), power requirements of the accessory must be limited to:

- **Left-Hand Auxiliary Gear Drive:**
  - **— 30 kW (40 hp) Continuous Operation**
  - **— 37 kW (50 hp) Intermittent Operation**
- **Right-Hand Auxiliary Gear Drive:**
  - **— 11 kW (15 hp) Continuous Operation**
  - **— 19 kW (26 hp) Intermittent Operation**



RG5213 -UN-14DEC88

Left-hand auxiliary drive



CD30354 -UN-03FEB93

Right-hand auxiliary drive

RG18293,2 -19-22FEB93

STANDBY POWER UNITS

To assure that your engine will deliver efficient standby operation when needed, run engine (at rated speed) without load for 30 minutes every 2 weeks.

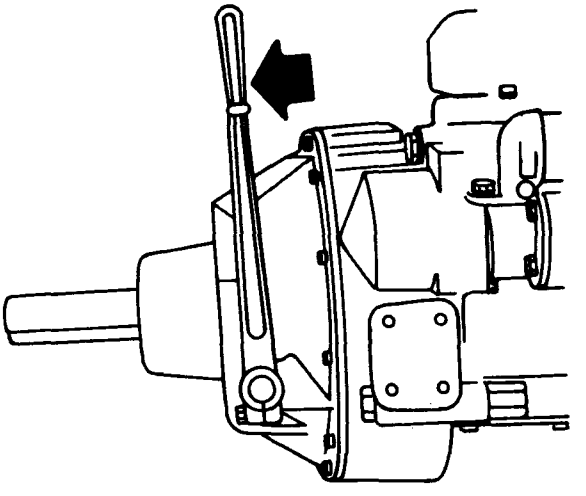
S55,OMOE,BE -19-08MAY

STARTING THE ENGINE

The following instructions apply to the optional controls and instruments available thru the John Deere Parts Distribution Network. The controls and instruments for your engine may be different from those shown here; always follow manufacturer's instructions.

CAUTION: Before starting engine in a confined building, install proper outlet exhaust ventilation equipment. Always use safety approved fuel storage and piping.

NOTE: If temperature is below 0°C (32°F), it may be necessary to use cold weather starting aids (See COLD WEATHER OPERATION, later in this section).



1. Perform all prestarting checks outlined in previous section.

2. Open the fuel supply shut-off valve, if equipped.

3. If equipped with PTO clutch, pull lever (arrow) rearward (away from engine) to disengage PTO clutch.

S11,OMOE,AS -19-17FEB

4. Pull hand throttle (A) 1/3 of the way out. Turn the handle in either direction to lock it in place.

5. If equipped, depress and hold reset button (B) while starting.

IMPORTANT: Do not operate the starter for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, wait at least 2 minutes before trying again. If engine does not start after four attempts, see Troubleshooting Section.

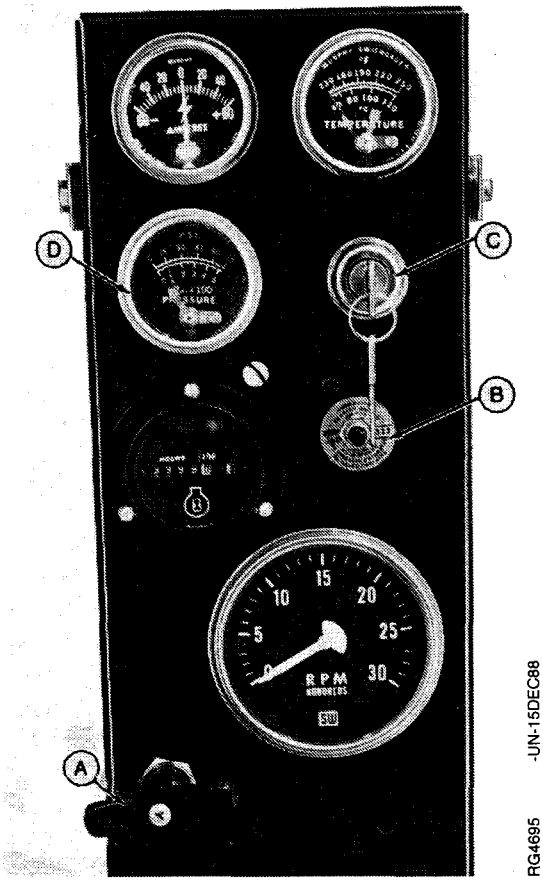
6. Turn the key switch (C) clockwise to crank the engine. When the engine starts, release the key so that it returns to the "ON" position.

IMPORTANT: If the key switch is released before the engine starts, wait until the starter and the engine stop turning before trying again. This will prevent possible damage to the starter and/or flywheel.

7. After the engine starts, continue to hold the reset button in until the oil pressure gauge (D) reads at least 103 kPa (1.03 bar) (15 psi). The safety controls will not allow the engine to run at a lower oil pressure unless the reset button is held in.

IMPORTANT: Should the engine die when operating under load, immediately disengage PTO and restart the engine to prevent overheating of turbocharged parts, caused when the flow of oil for cooling and lubrication is stopped.

8. Check all gauges for normal engine operation. If operation is not normal, stop the engine and determine the cause.



A—Hand Throttle
B—Reset Button
C—Key Switch
D—Oil Pressure Gauge

S11,OMOE,AT -19-17FEB93

COLD WEATHER OPERATION

Additional information on cold weather operation is available from your authorized servicing dealer.

NOTE: The location of the glow plug switch varies depending on the application.

Some engines are equipped with an electric glow plug which will make starting the engine easier in cold weather. If equipped, follow steps 1—4 as listed under STARTING THE ENGINE, earlier in this section. Switch on the glow plug for 30 seconds and then proceed to operate the starter. Follow remaining steps 5—8.

CAUTION: Starting fluid is highly flammable. DO NOT use starting fluid on engines equipped with glow plugs.

DO NOT use starting fluid near fire, sparks, or flames. DO NOT incinerate or puncture a starting fluid container.

RG18293,13 -19-02MAR

WARMING ENGINE

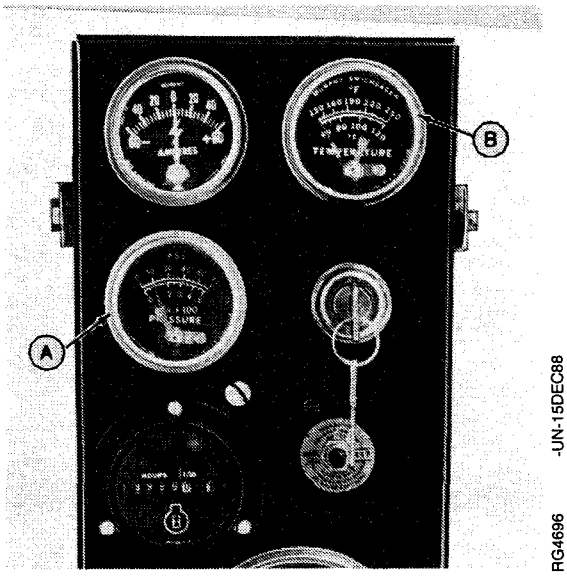
IMPORTANT: To assure proper lubrication, operate engine at 1200 rpm with no load for 1—2 minutes. Extend this period 2—4 minutes when operating at temperatures below freezing.

1. Check oil pressure gauge (A) as soon as engine starts. If gauge needle does not rise above minimum oil pressure specification of 103 kPa (1.03 bar) (15.0 psi) within 5 seconds, stop the engine and determine the cause. Normal engine oil pressure is 380 ± 103 kPa (3.80 bar ± 1.03 bar) (55 ± 15 psi) at rated full load speed (1800—2500 rpm) with oil at normal operating temperature of 105°C (220°F).

NOTE: On certain engines, the oil pressure and coolant temperature gauges are replaced by indicator warning lights. The lights must be "OFF" when engine is running.

2. Watch coolant temperature gauge (B). Do not place engine under full load until it is properly warmed up. The normal engine coolant temperature range is 82°—94°C (180°—202°F).

NOTE: It is a good practice to operate the engine under a lighter load and at lower speeds than normal for the first few minutes after start-up.

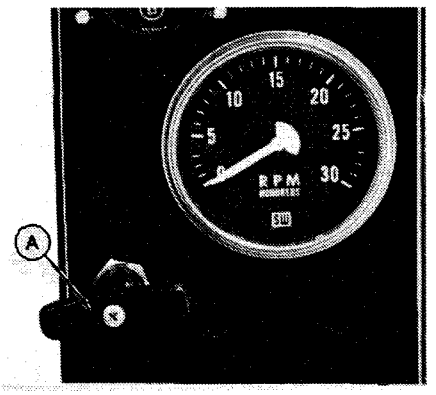


RG4696 -UN-15DEC88

S11,OMOE,AU1 -19-22FEB93

CHANGING ENGINE SPEED—STANDARD (MECHANICAL) GOVERNOR

To increase engine speed, turn handle (A) to the horizontal position and pull out until desired engine speed is obtained. Turn the handle in either direction to lock throttle position. The handle is pushed inward to decrease engine speed.



RG4697 -UN-15DEC88

S11,OMOE,M -19-08FEB91

ENGINE SPEEDS

NOTE: If equipped with a tachometer on the instrument panel, observe the tachometer to verify engine speeds. See your authorized servicing dealer or engine distributor for any necessary speed adjustments.

• Recommended normal working range, rated full load, and fast idle speeds on standard governor engines are as follows:

Engine	Normal Working Range RPM (Minimum*—Maximum**)	Rated Full Load RPM	Fast Idle RPM
3029DF	1500—2200	2200	2400
3029TF	1500—2200	2200	2400
3029TF	1500—2500	2500	2700
4039DF[1]	1600—2500	2500	2700
4039DF[2]	1500—2900	2900	3100
4039TF[3]	1500—2900	2900	3100
4039DF	1500—2500	2500	2700
4039TF	1500—2500	2500	2700
4045DF	1500—2400	2400	2600
4045TF	1500—2400	2400	2600
6059DF	1500—2500	2500	2700
6059TF	1500—2500	2500	2700
6068DF	1500—2400	2400	2600
6068TF	1500—2400	2400	2600

• Slow idle speeds are set at 800—850 rpm at the producing factory on all engines. Equipment manufacturers may reset slow idle according to specific application. Refer to your machine operator's manual for this specification.

**The engine will run at any speed from slow idle to fast idle. For constant operation, keep speed at or above 1500 rpm.*

***Generator set engines (3—5% governor) usually run at 1500 rpm (50 Hz) or 1800 rpm (60 Hz) when operating under load depending on cycles of AC current.*

[1]Option code 1664, slow idle speed 1600 rpm.

[2]Option code 1614.

[3]Option code 1605.

S11,OMOE,AV1 -19-02MAR

IDLING ENGINE

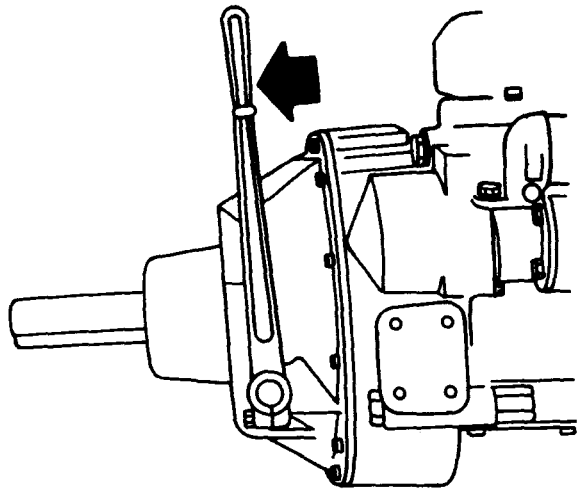
Avoid unnecessary engine idling. Prolonged idling may cause the engine coolant temperature to fall below its normal range. This, in turn, causes crankcase oil dilution, due to incomplete fuel combustion, and permits formation of gummy deposits on valves, pistons, and piston rings. It also promotes rapid accumulation of engine sludge and unburned fuel in the exhaust system.

Slow idle speed for this engine is 800—850 rpm at factory. If engine must be left running more than 3 or 4 minutes, minimum engine speed should be 1200 rpm. DO NOT allow engine to idle longer than 5 minutes.

NOTE: Generator set applications where the governor is locked at a specified speed may not have a slow idle function. These engines will idle at no load governed speed (high idle).

S11,OMOE,G -19-02MAR93

STOPPING THE ENGINE



1. Pull PTO clutch lever (arrow) rearwards (away from engine) to disengage clutch.

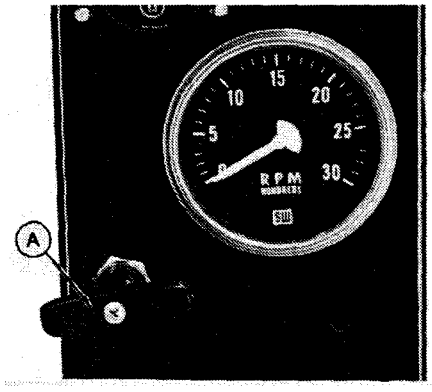
2. Move the throttle lever (A) to slow idle on standard (mechanical) governor engines.

IMPORTANT: Before stopping an engine that has been operating at working load, idle engine at least 2 minutes at 1000—1200 rpm to cool hot engine parts.

Engines in generator set applications, where the governor is locked at a specified speed and no slow idle function is available, should be unloaded and idled for at least 2 minutes at high idle.

3. Turn key switch to "OFF" position to stop the engine. Remove ignition key.

IMPORTANT: Make sure that exhaust stack cap (rain cap) is installed when engine is not running. This will prevent water and dirt from entering engine.



RG4697 -UN-15DEC88

S11,OMOE,AW -19-02MAF

USING A BOOSTER BATTERY OR CHARGER

A 12-volt booster battery can be connected in parallel with battery(ies) on the unit to aid in cold weather starting. ALWAYS use heavy duty jumper cables.

CAUTION: Gas given off by battery is explosive. Keep sparks and flames away from battery. Before connecting or disconnecting a battery charger, turn charger off. Make last connection and first disconnection at a point away from battery. Always connect NEGATIVE (-) cable last and disconnect this cable first.

IMPORTANT: Be sure polarity is correct before making connections. Reversed polarity will damage electrical system. Always connect positive to positive and negative to ground. Always use 12-volt booster battery for 12-volt electrical systems and 24-volt booster battery(ies) for 24-volt electrical systems.

1. Connect booster battery or batteries to produce the required system voltage for your engine application.

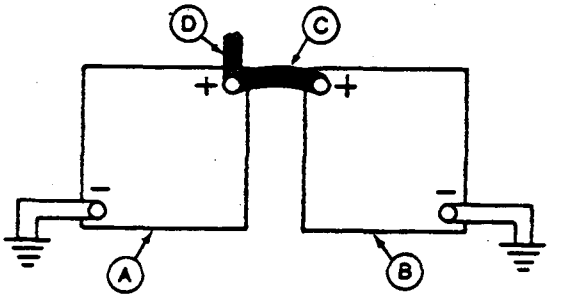
2. Connect one end of jumper cable to the POSITIVE (+) post of battery connected to the starting motor.

3. Connect the other end of the jumper cable to the POSITIVE (+) post of the booster battery.

4. Connect one end of the other jumper cable to the NEGATIVE (-) post of the booster battery.

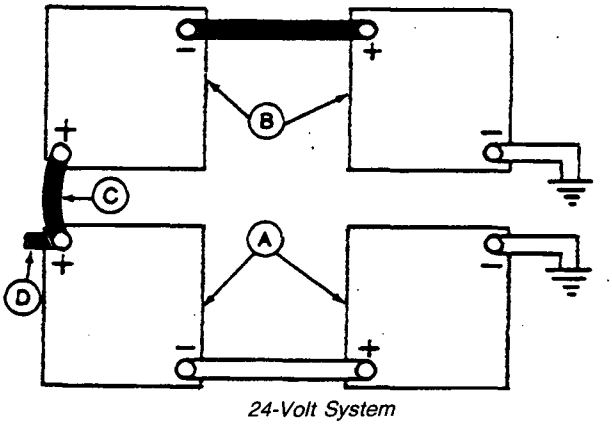
5. ALWAYS complete the hook-up by making the last connection of the NEGATIVE (-) cable to a good ground on the engine frame and away from the battery(ies). When disconnecting, make this the first connection to disconnect.

TS204 -UN-23AUG88



12-Volt System

RG4678 -UN-14DEC88



24-Volt System

RG4698 -UN-14DEC88

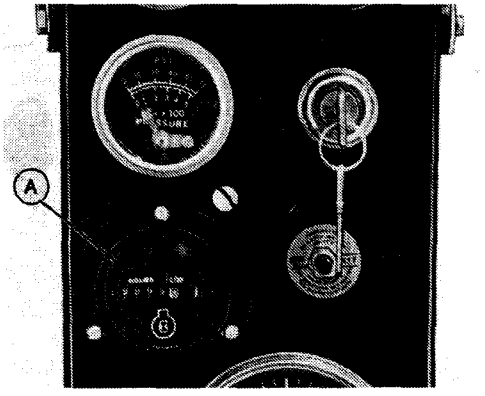
A—12-Volt Machine Battery(ies)
B—12-Volt Booster Battery(ies)
C—Booster Cable
D—Cable To Starting Motor

S11,OMOE,AX1 -19-07JUN91

OBSERVE SERVICE INTERVALS

Using hour meter (A) as a guide, perform all services at the hourly intervals indicated on following pages. At each scheduled maintenance interval, perform all previous maintenance operations in addition to the ones specified. Keep track of services performed in Lubrication and Maintenance Records section.

IMPORTANT: Recommended service intervals are for normal operating conditions. Service MORE OFTEN if engine is operated under adverse conditions. Neglecting maintenance can result in failures or permanent damage to the engine.



RG4699 -UN-15DEC88

S11,OMLM,BJ -19-02MAR

USE CORRECT FUELS, LUBRICANTS AND COOLANT

IMPORTANT: Use only fuels, lubricants and coolants meeting specifications outlined in Fuels, Lubricants and Coolant Section when servicing your John Deere Engine.

Consult your John Deere Servicing Distributor or your nearest John Deere Parts Network for recommended fuels, lubricants, and coolant. Also available are necessary additives for use when operating engines in tropical, arctic, or any other adverse conditions.

S11,OMLM,B1 -19-13NOV

LUBRICATION AND MAINTENANCE SERVICE INTERVAL CHART

	Lubrication and Maintenance Service Intervals						
Item	**Daily**	**100 Hour**	**250 Hour**	**400 Hour**	**600 Hour/ 1-Year**	**1200 Hour/ 2-Year**	**As Required**
Check Engine Oil and Coolant Level	•						
Check Fuel Filter	•						
Lubricate PTO Release Bearing	•						
Check Air Cleaner Dust Unloader Valve	•						
Lubricate PTO Clutch Shaft Bearing		•					
Service Fire Extinguisher		•					
Service Battery			•				
Change Engine Oil and Filter*			•				
Check V-Belt Tension			•				
Check PTO Clutch Adjustment			•				
Initial Valve Clearance Adjustment**				•			
Lubricate PTO Clutch Levers & Linkage					•		
Clean Crankcase Vent Tube					•		
Check Air Intake Hoses and Connections					•		
Replace Fuel Filter Element					•		
Coolant Solution Analysis					•		
Service Air Intake System					•		
Check Cooling System					•		
Perform Engine Tune-Up						•	
Check and Adjust Engine Speeds						•	
Adjust Engine Valve Clearance						•	
Check Fuel Injection System						•	
Inspect Turbocharger						•	
Check Crankshaft Vibration Damper						•	
Flush Cooling System & Replace Thermostats						•	
Pressure Test Cooling System						•	
Inspect and Service Air Cleaner Elements							•

*** Change the oil for the first time after 100 hours maximum of operation, then every 250 hours thereafter. If TORQ-GARD SUPREME PLUS-50 oil is used along with a John Deere oil filter, the oil change interval may be extended by 50 hours.**

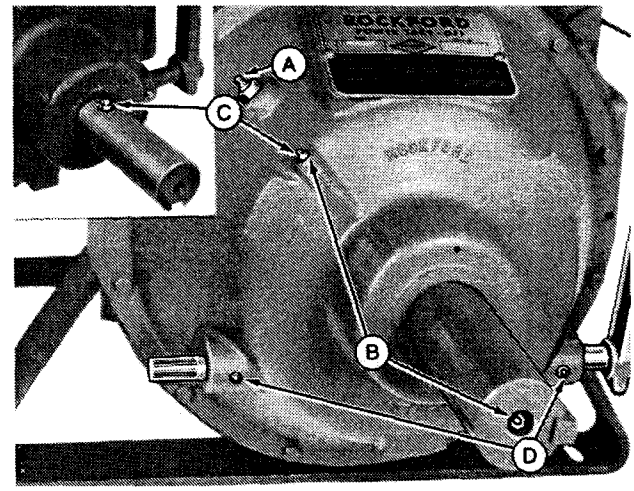
**** Have your authorized servicing dealer or engine distributor adjust valve clearance after the first 400 hours of operation. Then, have the valve clearance adjusted at 1200 hour/2-Year intervals thereafter.**

RG,OMLM,2 -19-02MAR93

LUBRICATE PTO CLUTCH SHAFT BEARINGS

Apply one or two shots of John Deere Multipurpose Lubricant or its equivalent at clutch drive shaft bearing fittings (B or C). DO NOT over-lubricate to avoid getting oil on clutch facings.

IMPORTANT: Lubricate release bearing fitting (A) daily or at 10 hour intervals for continuous operation. (See Prestarting Checks section.) Lubricate shaft fittings (D) at 600 Hours or 1-Year intervals. (See LUBRICATE PTO CLUTCH SHAFT BEARINGS in 600 Hour/1-Year Service section.)



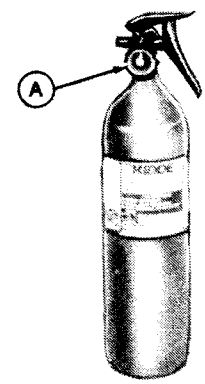
A—Release Bearing Grease Fitting
B—Fittings for Side-Loaded Drive
C—Fittings for In-Line Drive
D—Lever Shaft Fittings

S11,OMLM,C -19-09OCT

SERVICING FIRE EXTINGUISHER

A fire extinguisher (A) is available from your authorized servicing dealer or engine distributor.

Read and follow the instructions which are packaged with it. The extinguisher should be inspected at least every 100 hours of engine operation or once a month. Once extinguisher is operated, no matter how long, it must be recharged. Keep record of inspections on the tag which comes with the extinguisher instruction booklet.



S11,OMLM,AP -19-22FEB

SERVICE BATTERY

TS204 -UN-23AUG88

CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace it last.

RG4694 -UN-15DEC88

In freezing weather, run engine at least 30 minutes to assure thorough mixing after adding water to battery.

1. On regular batteries, check electrolyte level. Fill each cell to bottom of filler neck with distilled water.

NOTE: Low-maintenance or maintenance-free batteries should require little additional service. However, electrolyte level can be checked by cutting the center section of decal on dash-line, and removing cell plugs. If necessary, add clean, soft water to bring level to bottom of filler neck.

2. Keep batteries clean by wiping them with a damp cloth. Keep all connections clean and tight. Remove any corrosion, and wash terminals with a solution of 1 part baking soda and 4 parts water. Tighten all connections securely.

NOTE: Coat battery terminals and connectors with a mixture of petroleum jelly and baking soda to retard corrosion.

3. Keep battery fully charged, especially during cold weather. If a battery charger is used, turn charger off before connecting charger to battery(ies). Attach POSITIVE (+) battery charger lead to POSITIVE (+) battery post. Then attach NEGATIVE (-) battery charger lead to a good ground.

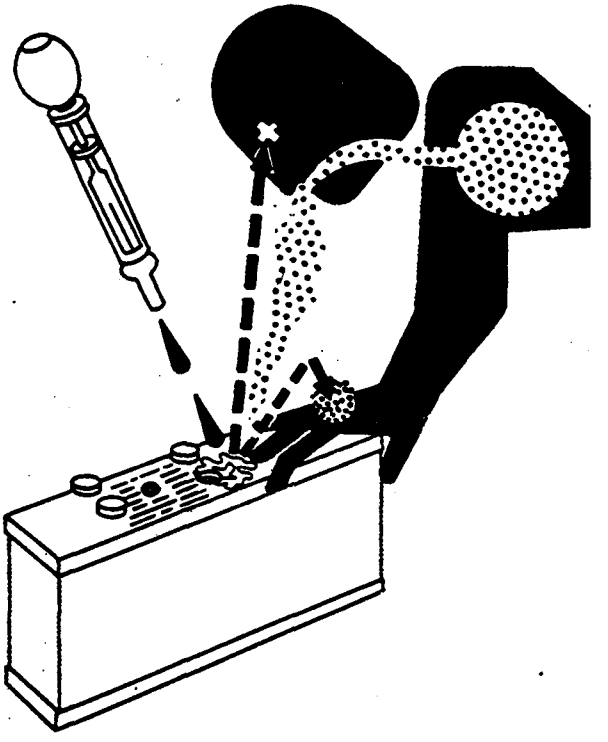
S55,OMLM,P -19-07JUN91

CAUTION: Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:
1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10—15 minutes. Get medical attention immediately.

If acid is swallowed:
1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.

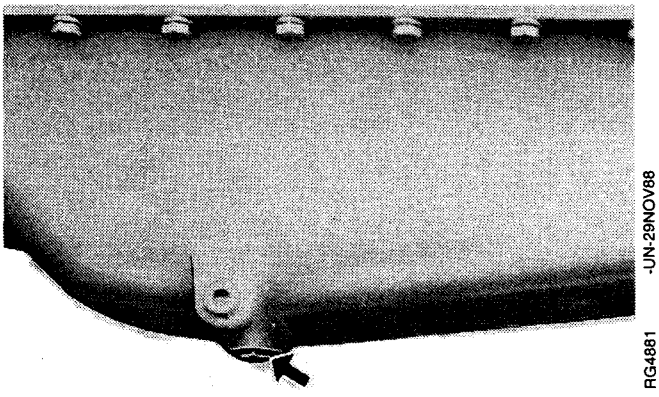


If necessary to replace battery(ies), replacements must meet or exceed the following recommended capabilities at -18° C (0° F):

Std. Duty Starter . . . . . 640 Cold Cranking Amps
Heavy Duty Starter . . . . . 800 Cold Cranking Amps

S55,OMLM,Q -19-19MAR

CHANGE ENGINE OIL AND FILTER



If John Deere TORQ-GARD SUPREME PLUS-50 engine oil and a John Deere oil filter are used, the oil and filter change interval may be extended by 50 hours.

OILSCAN is a John Deere sampling program to help you monitor machine performance and identify potential problems before they cause serious damage. OILSCAN kits are available from your John Deere dealer. Oil samples should be taken prior to the oil change. Refer to instructions provided with kit.

1. Run engine approximately 5 minutes to warm up oil. Shut engine off.

2. Drain oil while warm.

3. Remove plug (arrow) and drain oil from engine crankcase.

NOTE: Drain plug location may vary, depending on the application.

S11,OMLM,CW -19-02MAR93

4. Remove and discard oil filter element (A).

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 one turn after packing contacts filter housing. DO NOT overtighten filter element.

7. Install drain plug.

8. Fill engine crankcase with correct John Deere engine oil through rocker arm cover opening or on some engine applications, the timing gear cover opening. (See DIESEL ENGINE OIL in Fuels, Lubricants, and Coolant section for determining correct engine oil.)

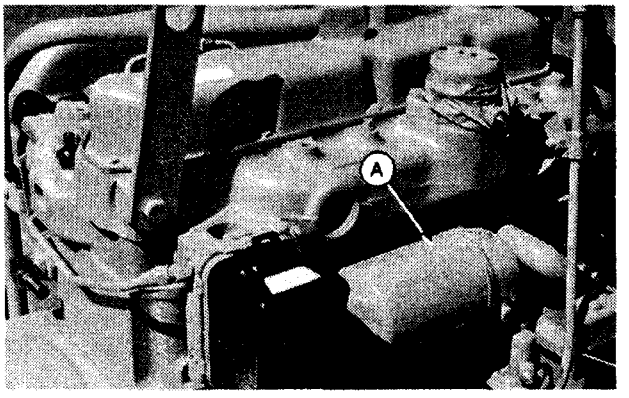
To determine the correct oil fill quantity for your engine, see ENGINE CRANKCASE OIL FILL QUANTITIES in the Specifications section.

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

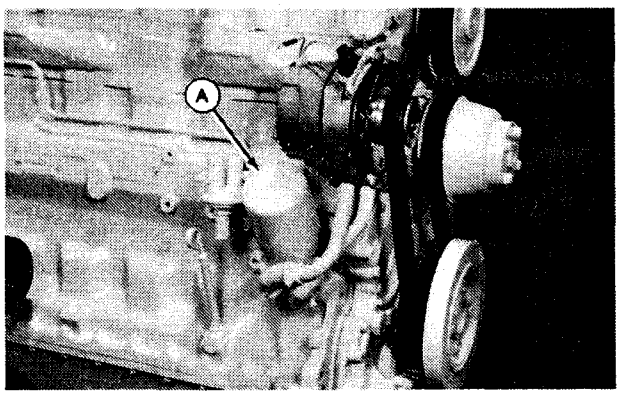
IMPORTANT: Immediately after completing any oil change, crank engine for 30 seconds without permitting engine to start. This will help insure adequate lubrication to engine components before engine starts.

9. Start engine and run to check for possible leaks.

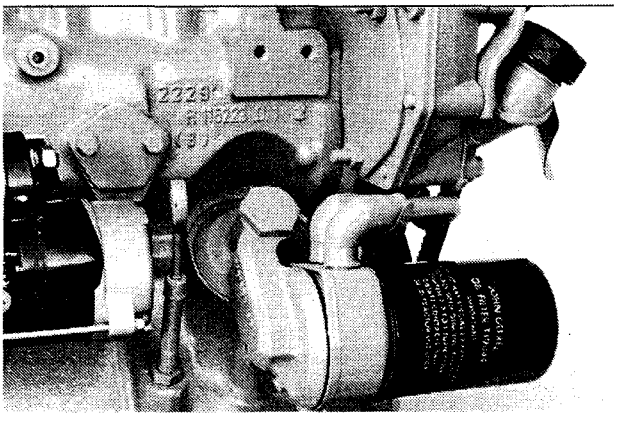
10. Stop engine and check oil level after 10 minutes. Oil level reading should be on upper mark of dipstick.



4045 and 6068 Engines

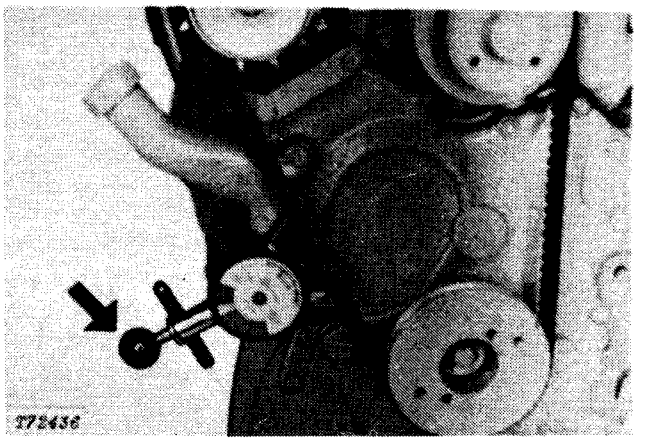


4039 and 6059 Engines



3029 Engines

CHECK FAN AND ALTERNATOR BELT TENSION

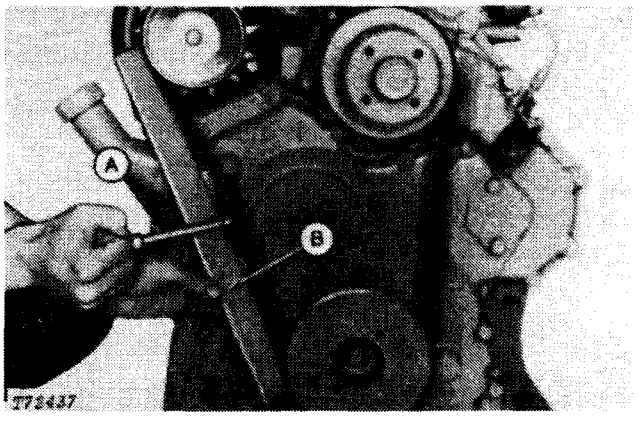


1. Inspect belts for cracks, fraying, or stretched out areas. Replace if necessary. (See REPLACE FAN AND ALTERNATOR BELTS in the Service Section.)

Sheave alignment is extremely important in order to avoid early belt failure from heat buildup and side wear. Misalignment can also cause bearing failure. Remember also that V-Belts should ride on the sides of standard sheaves, not on the bottom of the groove.

NOTE: Engine having dual belts, check front belt tension only. Measure tension on the long part of the belt as illustrated.

IMPORTANT: Do not pry against alternator rear frame. Do not tighten or loosen belts while they are hot.



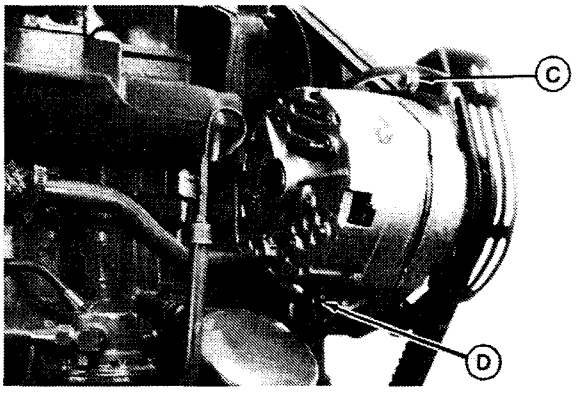
2. Check belt tension and compare readings with specifications given on following page. Use one of the following methods to check tension with the belts warm:

- JDG529 Belt Tension Gauge (arrow) or equivalent belt tension gauge (for use on standard V-belts), capable of measuring up to 667 N (150 lb) force.

- Tension Tester (A)/Straightedge (B).

NOTE: Poly V-belt tension is measured by deflection method with a tension tester and straightedge.

Run engine for 5 minutes if belt is cold. If belt is hot, let engine cool for 10—15 minutes. If engine has dual belts, check front belt tension only.



3. If belts need adjustment, loosen alternator bracket cap screw (C) and nut (D) on mounting bolt.

Apply outward pressure to alternator front frame until belt tension is correct.

A—Tension Tester
B—Straightedge
C—Alternator Bracket Cap Screw
D—Nut on Mounting Bolt

4. Tighten alternator bracket cap screw and nut securely.

5. Immediately after a 10 minute run-in of a new or used belt, recheck belt tension.

6. If tension is not within specifications, wait 10 minutes, loosen belt and retighten to used belt strand tension, as outlined in next module.

FAN AND ALTERNATOR BELT TENSION SPECIFICATIONS

Too little tension causes slippage or "slip and grab," causing the belt to break. If the belt does not break, the slip will cause excessive cover wear, burn spots, and overheating.

Too much tension causes belt heating and excessive stretch, as well as damage to drive components, such as sheaves and shafts. Excessive tightness will also place heavier loads on the bearings causing them to fail prematurely.

Standard V-Belts

	Tension New Belt	Tension Used* Belt
JDG529 Belt Tension Gauge Method:		
Single Belt	578—622 N (130—140 lb force)	378—423 N (85—94 lb force)
Dual Belt	423—467 N (95—104 lb force)	378—423 N (85—94 lb force)

Tension Tester/Straightedge Method:

- An 89 N (20 lb force) halfway between the pulleys should deflect the belt 19 mm (3/4 in.). Use a straightedge when measuring distance belt moves.

Single Poly V-Belts
Tension New And Used* Belt

Tension Tester/Straightedge Method:

- A 130 N (30 lb force) applied halfway between pulleys should deflect belt 13 mm (1/2 in.)

**Belts are considered used after 10 minutes of operation.*

RG,OMLM,1 -19-02MAR

CHECK PTO CLUTCH ADJUSTMENT

TS198 -UN-23AUG88

CAUTION: Never attempt to service the PTO while it is in operation. Loose clothing could get caught in moving parts; keep clothing tight against body. Use extreme care when working around the PTO.

1. Measure clutch engagement force at handle grip using a spring scale. The engagement force should be 267—311 N (60—70 lb force).

IMPORTANT: Improper adjustments of the PTO clutch may shorten clutch life. Make sure adjustments are made properly.

2. If adjustments are needed, disengage clutch and stop engine. Remove cover plate from clutch housing (shown removed).

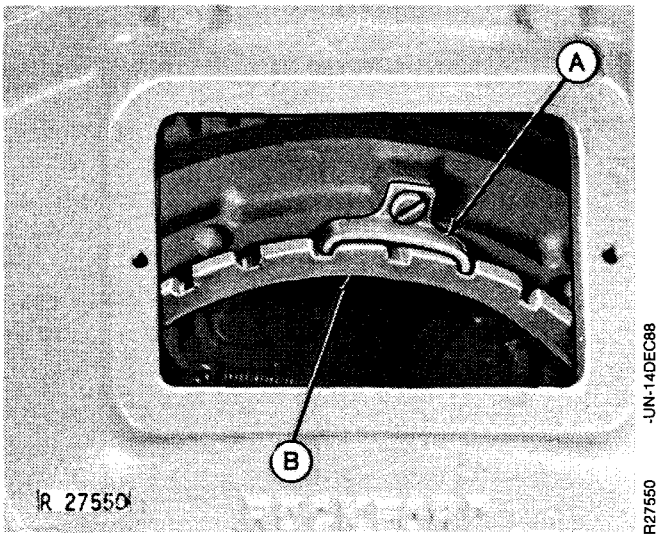
3. Remove adjusting lock (A).

4. Turn adjusting ring (B) to adjust clutch engagement pressure.

5. Measure engagement force at clutch handle with spring scale.

6. Install adjusting lock and tighten screw securely.

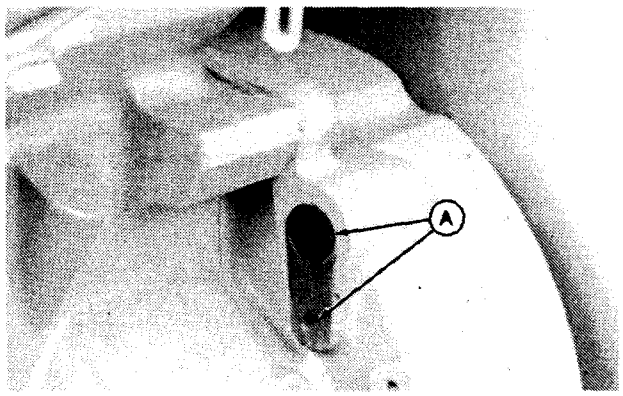
7. Install cover plate and recheck clutch engagement force.



R27550 -UN-14DEC88

S11,OMLM,CZ -19-02MAR93

CHECK AND ADJUST ENGINE VALVE CLEARANCE



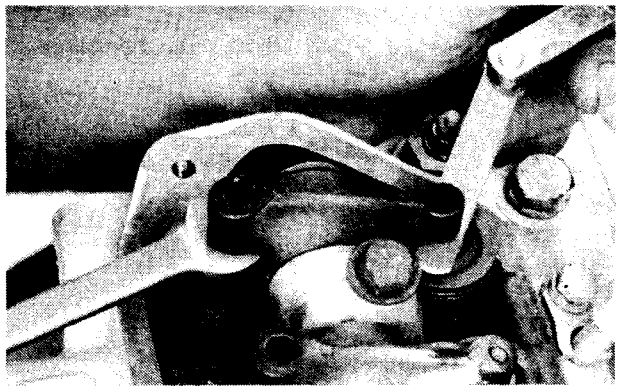
IMPORTANT: Any time air intake system is opened, it must be checked for leaks before machine is returned to service. (See CHECK AIR INTAKE HOSES in 600 Hour/1-Year section.)

Engine valve clearance SHOULD BE checked and/or adjusted with engine COLD.

1. Remove rocker arm cover and crankcase ventilator hose.

2. Remove plugs or cover plate from flywheel housing timing holes (A).

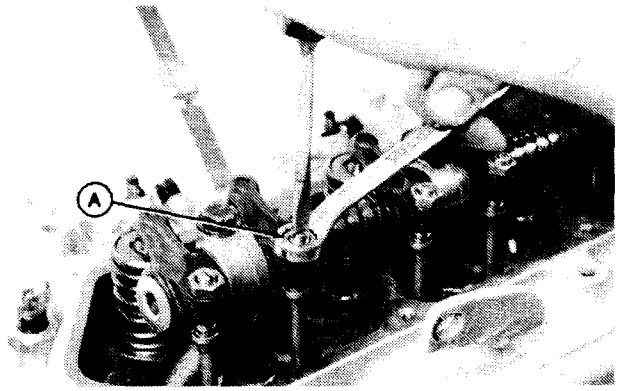
RG18293,3 -19-22FEB



3. Using JD281A, JDE81-1, or JDE83 Engine Rotation Tool and JDE81-4 Timing Pin, rotate engine in running direction (clockwise viewed from front) until No. 1 cylinder is at TDC Compression stroke. Insert timing pin in flywheel.

NOTE: Some engines are equipped with flywheel housings which do not allow use of an engine rotation tool.

If No.1 cylinder rocker arms are loose, the engine is at No. 1 "TDC-Compression". If No. 1 cylinder rocker arms are not loose, rotate engine one full revolution (360°) to No. 1 "TDC-Compression".



4. Check and adjust valve clearance to specifications, as directed in the following procedures for 3-, 4-, or 6-cylinder engines.

VALVE CLEARANCE (ROCKER ARM-TO-VALVE TIP) SPECIFICATION

Intake Valve	0.35 mm (0.014 in.)
Exhaust Valve	0.45 mm (0.018 in.)

5. If rocker arm is equipped with adjusting screw and jam nut (A), tighten jam nut to 27 N·m (20 lb-ft) after adjusting valve clearance.

RG18293,4 -19-17FEB

• 3-Cylinder Engine:

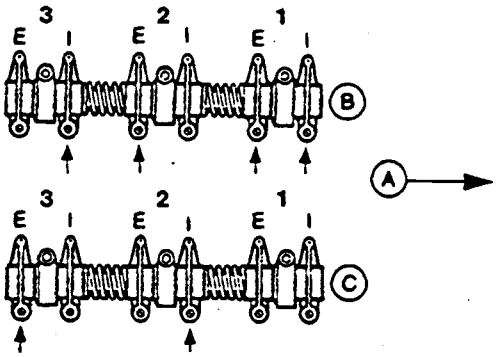
NOTE: Firing order is 1-2-3.

Lock No. 1 piston at TDC compression stroke (B).

Adjust valve clearance on No. 1 and 2 exhaust valves and No. 1 and 3 intake valves.

Turn crankshaft 360° and lock No. 1 piston at TDC exhaust stroke (C).

Adjust valve clearance on No. 3 exhaust valve and No.2 intake valve.



A—Front of Engine
B—No. 1 Piston at TDC Compression Stroke
C—No. 1 Piston at TDC Exhaust Stroke
E—Exhaust Valve
I—Intake Valve

RG,CTM8,G05,67 -19-10JUL92

• 4-Cylinder Engine:

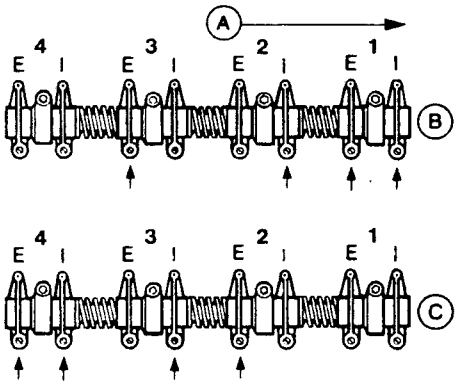
NOTE: Firing order is 1-3-4-2.

Lock No. 1 piston at TDC compression stroke (B).

Adjust valve clearance on No. 1 and 3 exhaust valves and No. 1 and 2 intake valves.

Turn crankshaft 360°. Lock No. 4 piston is at TDC compression stroke (C).

Adjust valve clearance on No. 2 and 4 exhaust valve and No. 3 and 4 intake valves.



A—Front of Engine
B—No. 1 Piston at TDC Compression Stroke
C—No. 4 Piston at TDC Compression Stroke
E—Exhaust Valve
I—Intake Valve

RG,CTM8,G05,9 -19-10JUL92

- **6-Cylinder Engine:**

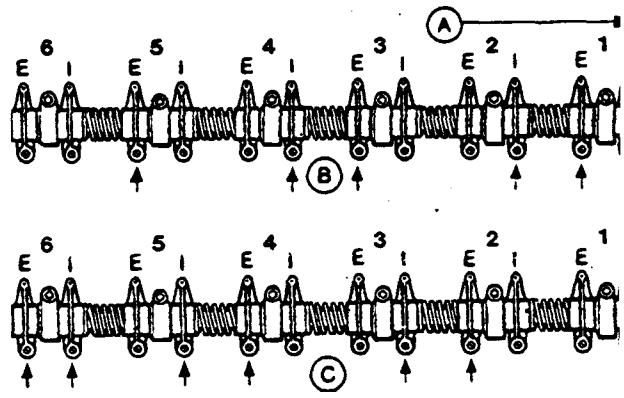
NOTE: Firing order is 1-5-3-6-2-4.

LocK No. 1 piston at TDC compression stroke (B).

Adjust valve clearance on No. 1, 3 and 5 exhaust valves and No. 1, 2 and 4 intake valves.

Turn crankshaft 360°. Lock No. 6 piston is at TDC compression stroke (C).

Adjust valve clearance on No. 2, 4 and 6 exhaust valve and No. 3, 5 and 6 intake valves.



A—Front of Engine
B—No. 1 Piston at TDC Compression Stroke
C—No. 6 Piston at TDC Compression Stroke
E—Exhaust Valve
I—Intake Valve

RG,CTM8,G05,10 -19-10JUL

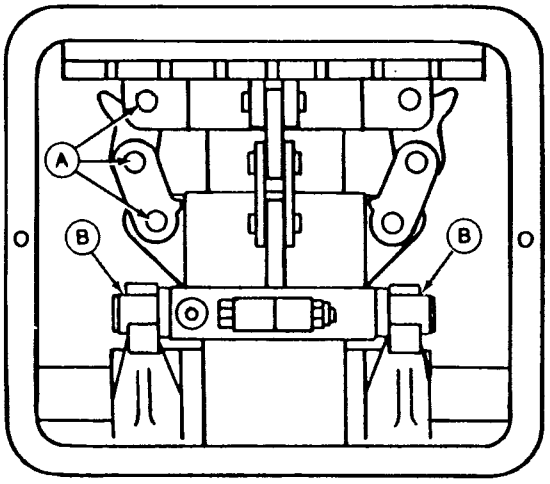
LUBRICATING PTO CLUTCH INTERNAL LEVERS AND LINKAGE

CAUTION: Never attempt to service the PTO while it is in operation. Loose clothing could get caught in moving parts; keep clothing tight against body. Use extreme care when working around the PTO.

TS198 -UN-23AUG88

1. Remove the PTO housing cover and apply one shot of John Deere Multipurpose Lubricant to the pivot points (A) of each clutch linkage.

2. Apply one shot of John Deere Multipurpose Lubricant to the two PTO release lever shaft fittings (B).



RG6641 -UN-18FEB93

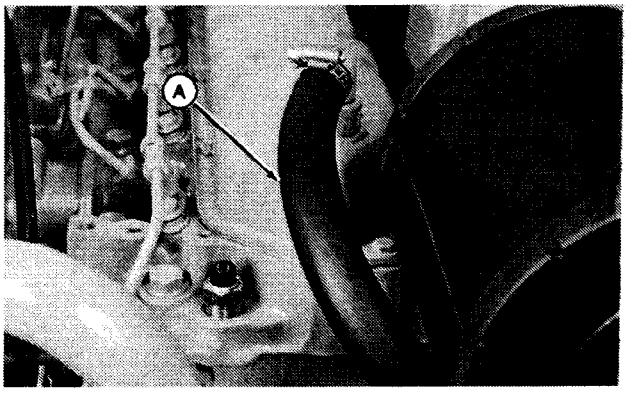
RG,21881,PTO4 -19-26FEB93

CLEAN CRANKCASE VENT TUBE

1. Remove and clean crankcase vent tube (A).

If you operate the engine in dusty conditions, clean the tube at shorter intervals.

2. Install the vent tube. Be sure the O-ring fits correctly in the rocker arm cover for elbow adapter. Tighten hose clamp securely.



RG6005 -UN-27JAN92

RG,20144,64 -19-17DEC91

CHECK AIR INTAKE HOSES

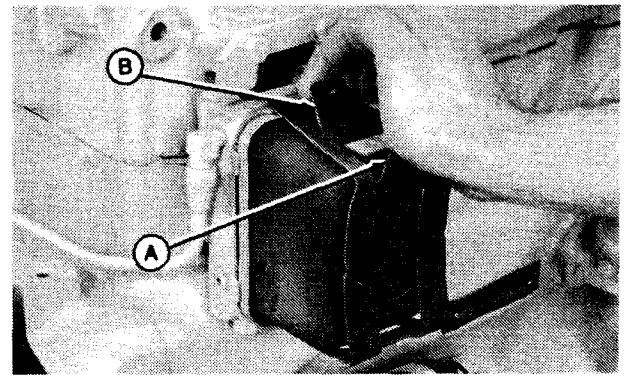
Check the clamps on the hoses which connect the air cleaner, engine and, if present, turbocharger. If necessary, tighten the hose clamps. Inspect the hoses for cracks.

IMPORTANT: The air intake system must not leak. Any leak, no matter how small, may result in engine failure due to abrasive dirt and dust entering the intake system.

S11,OMLM,DG -19-17DEC

REPLACE FUEL FILTER ELEMENT

On Rectangular Fuel Filters:



1. Close the fuel shut-off valve at bottom of fuel tank, if equipped.

NOTE: Keep a small container under drain plug to catch draining fuel.

2. Loosen bleed plug on side of filter base. Remove drain plug from bottom of filter base to drain fuel from filter.

3. Push tab (A) inward while lifting tab (B) upward and release the retaining spring. Pull fuel filter off fuel filter base.

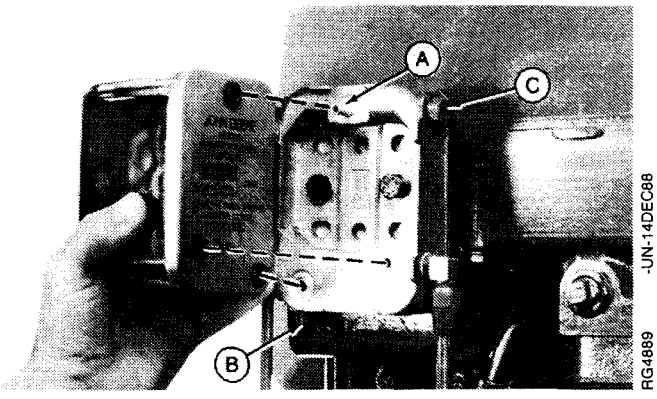
S11,3010,RF1 -19-17FEB

4. Place filter on filter base with upper seal over spring pin (A) on filter base.

5. Hook bottom end of retaining spring first; then hook the top end.

6. Install drain plug (B). Tighten drain plug securely.

7. Open fuel shut-off valve and bleed filters. (See BLEED FUEL SYSTEM in Service As Required Section.) Tighten bleed plug (C).



RG4889 -UN-14DEC88

A—Spring Pin
B—Drain Plug
C—Bleed Plug

S11,OMLM,DK -19-17FEB93

On Round Fuel Filters:

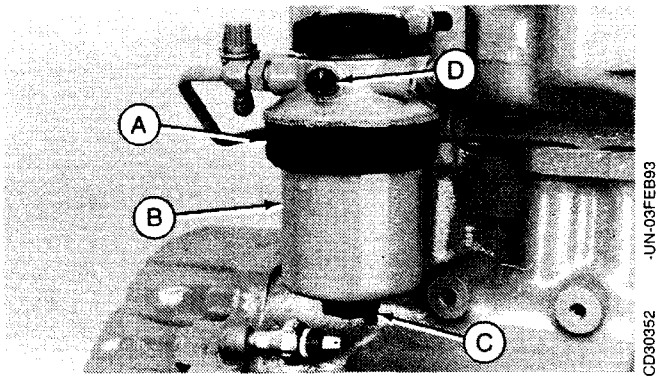
1. When equipped, close the fuel shut-off valve.

2. Loosen retaining ring (A) and remove filter element (B).

3. When equipped, remove filter element from glass sediment bowl. Clean sediment bowl and reinstall a new element onto bowl.

4. Position new element in correct location, then hand tighten the retaining ring.

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



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A—Retaining Ring
B—Filter element
C—Drain Plug
D—Bleed Plug

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