

# **F912, F915 and F935 Front Mowers**

## **TECHNICAL MANUAL**

**John Deere  
Lawn & Grounds Care Division**

**TM1350 (Mar-87)**

**F912/F915/F935  
Front Mowers**

**TM1350 (Mar-87)**



# F912/F915/F935 FRONT MOWER TECHNICAL MANUAL TM-1350 (APR-87)

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*All information, illustrations and specifications contained in this technical 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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# Section 10 GENERAL INFORMATION

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## INTRODUCTION

This manual is part of a total service support program.

### FOS Manuals—reference

### Technical Manuals—machine service

### Component Manuals—component service

*Fundamentals of Service (FOS) Manuals* cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

*Technical Manuals* are concise service guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.

*Component Technical Manuals* are concise service guides for specific components. Component technical manuals are written as stand alone manuals covering multiple machine applications.



AB6;RW5559 053;INTR02 030785

## FEATURES OF THIS TECHNICAL MANUAL

John Deere ILLUSTRATION format emphasizing illustrations and concise instructions in easy-to-use modules.

Emphasis on diagnosis, analysis, and testing so you can understand the problem and correct it.

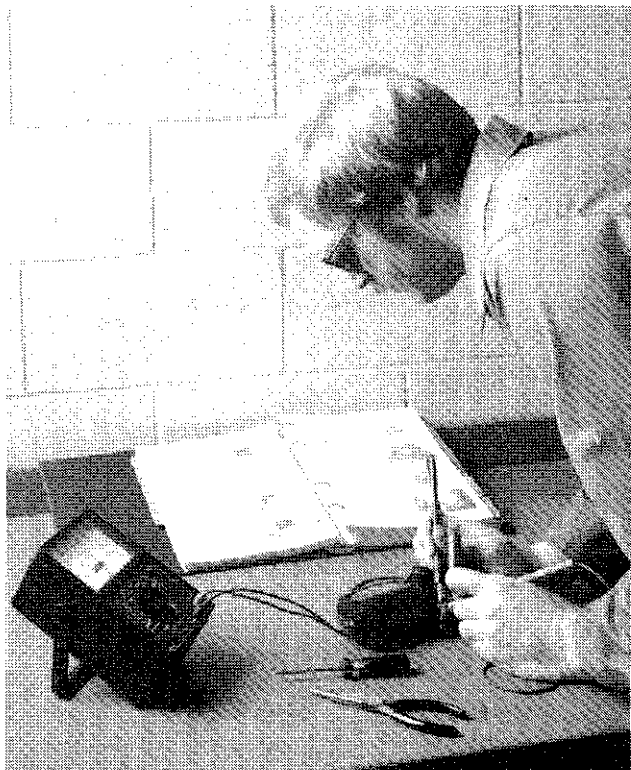
Diagnostic information presented with the most logical and easiest to isolate problems first to help you identify the majority of routine failures quickly.

Step-by-step instructions for teardown and assembly.

Summary listing at the beginning of each group of all applicable specifications, wear tolerances, torque values, essential tools, and materials needed to do the job.

An emphasis throughout on safety—so you do the job right without getting hurt.

This technical manual was planned and written for you—an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it when you need to know correct service procedures or specifications.



AB6;RW5560 053;INTR03 071085

## SAFETY AND YOU



**CAUTION:** This safety symbol is used for important safety messages. When you see this symbol, follow the safety message to avoid personal injury.



4A9;T81389 M45;1005A 3 090185

## AVOID FIRE HAZARDS

Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located—know how to use them.

Do not smoke while you fill the fuel tank, service fuel system or handle highly flammable material.

Do not remove fuel cap or add fuel to tank when engine is hot or running. Allow engine to cool for several minutes. Do not use open pans of gasoline or diesel fuel for cleaning parts. Use good commercial, nonflammable solvents.

Provide adequate ventilation when charging batteries.

Do not check battery charge by placing metal objects across the posts.

Do not allow sparks or open flame near batteries.

Do not smoke near battery.

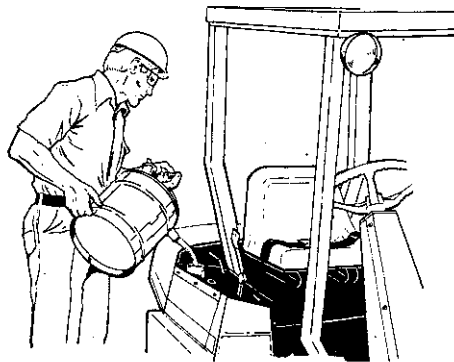
Never check fuel or battery electrolyte with an open flame.

Never use an open flame to look for leaks anywhere on the equipment.

Never use an open flame as light anywhere on or around the equipment.

When preparing engine for storage, remember that inhibitor is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.

Inspect electrical wiring for worn or frayed insulation. Install new wiring if wires are damaged.



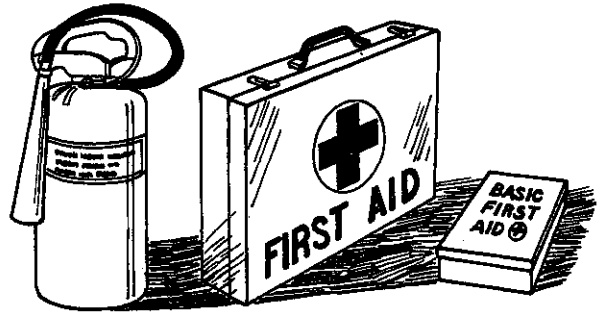
4A9;M38702 M45;1005A 4 040286

## PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguishers handy.

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



AB6;TS186 053;FIRE2 080785

## PREVENT BATTERY EXPLOSIONS

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.



AB6;TS181 053;EXPL0. 290186

## AVOID ACID BURNS

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:

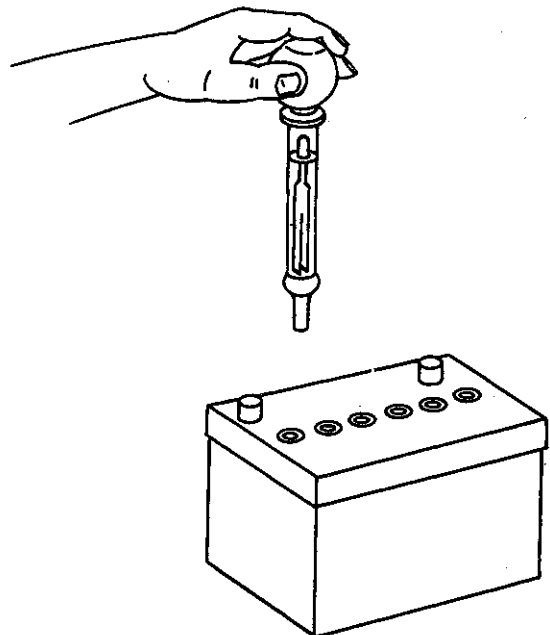
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.

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.



AB6;TSS182 053;ACID. 290186

## UNDERSTAND MACHINE OPERATION

Only qualified people should operate the machine.

Carefully read this manual and manuals furnished with attachments. Learn the location and purpose of all controls, instruments, indicators, and labels.



4A9;M34552 M45;;1005A 5 090185

## WEAR PROTECTIVE CLOTHING

Wear fairly tight clothing . . . . and safety equipment.

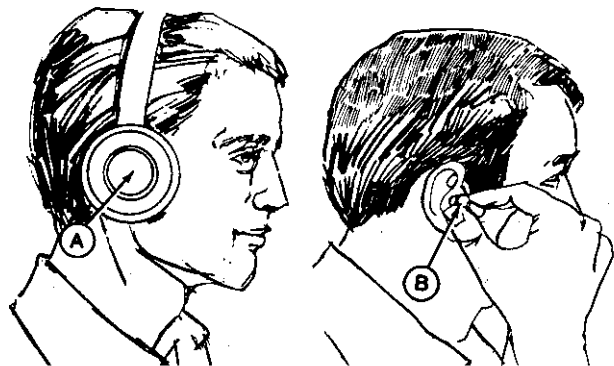


4A9;M34583 M45;;1005A 6 090185

## PROTECT AGAINST NOISE

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

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

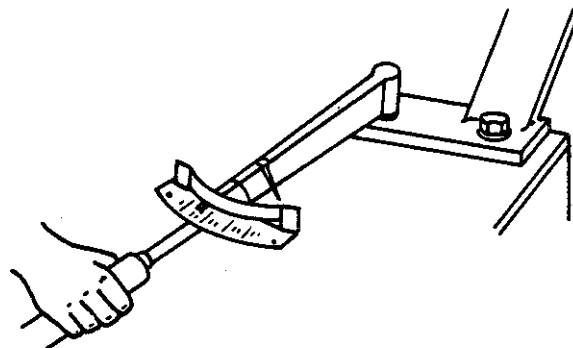


AB6;X7662 053;NOISE 270886

## KEEP ROPS INSTALLED PROPERLY

Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting. A damaged ROPS should be replaced, not reused.



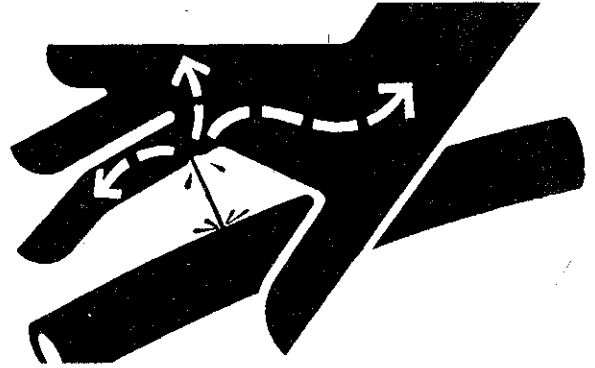
AB6;TS176 053;ROPS3 280186



## AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic 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.

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.



AB6;X9811 053;FLUID. 290186

## START ENGINE SAFELY

Avoid possible injury or death from machine runaway.

Do not start engine by shorting across starter terminals.

Before you start the engine:

- Sit on the operators seat.
- Move hydrostatic control to "STOP" position.
- Engage the park brake.
- Lower equipment to the ground.



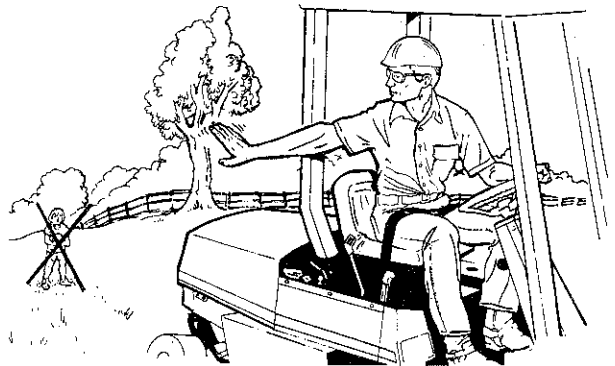
4A9;M38706 M45;1005C 1 300186

## OPERATE MACHINE SAFELY

Before you move any equipment, be sure all persons are away from the machine.

When the machine is operating, ONLY the operator should be on it.

Keep operating area level.



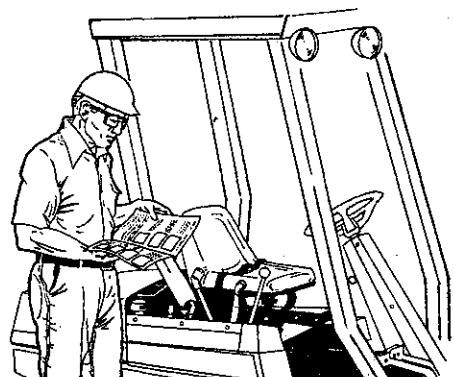
4A9;M38334 M45;1005C 2 300186

## UNDERSTAND CORRECT SERVICE

Be sure you understand a service procedure before you work on the machine.

Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If it is necessary to make checks with the engine running, ALWAYS USE TWO PEOPLE—with the operator at the controls, able to see the person doing the checking.

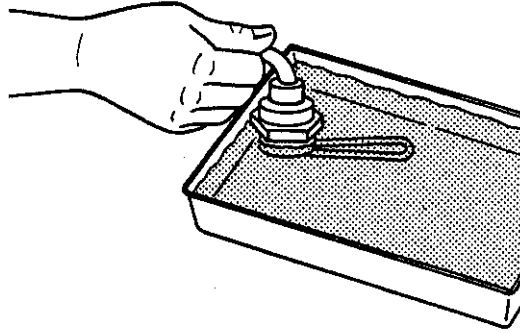


4A9;M34552 M45;1005A 9 130385

### TEST COOLANT HEATER IN LIQUID ONLY

Do not plug coolant heater into electrical power unless heating element is immersed in coolant. Sheath could burst and result in personal injury.

Use a heavy-duty grounded cord to connect coolant heater to electrical power.

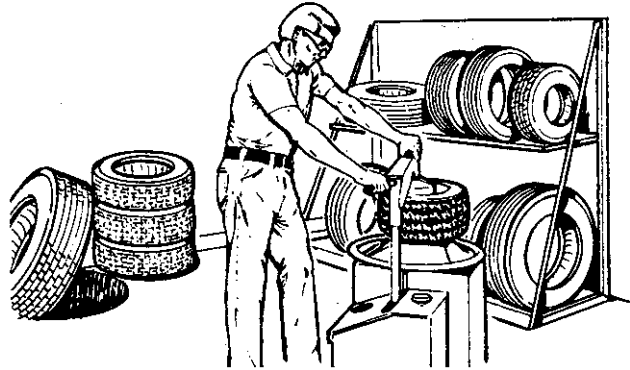


AB6;TS174 053;HEAT. 290186

### SERVICE TIRES SAFELY

Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death. Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. Have it done by your John Deere dealer or a qualified tire repair service.

When sealing tire beads on rims, never exceed 35 psi (241 kPa) (2.4 bar) or maximum inflation pressures specified by tire manufacturers for mounting tires. Inflation beyond this maximum pressure may break the bead, or even the rim, with dangerous explosive force. If both beads are not seated when the maximum recommended pressure is reached, deflate, reposition tire, relubricate bead and reinflate.



AB6;M34163 053;TIRE4 210486

## TRANSPORT FRONT MOWER SAFELY

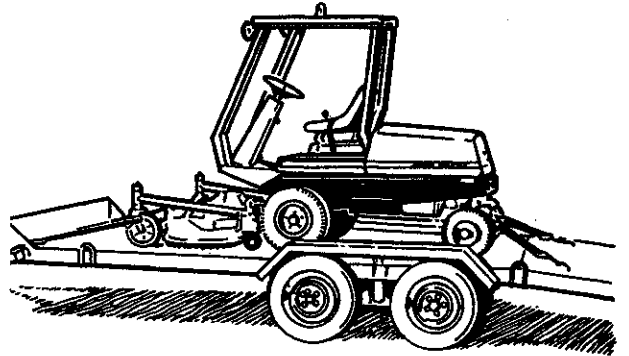
Transport the Front Mower on a heavy-duty trailer.

Do not pull Front Mower behind any other vehicle.

Fasten the Front Mower to the trailer with straps, chains, or cables.

Be sure trailer has all necessary lights and signs required by local, state, provincial, or federal laws.

Be sure Front Mower hood is latched securely.

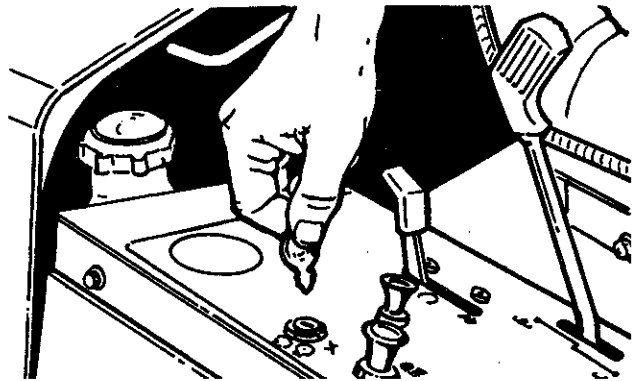


6MA;M34561 M45;SAC M 050885

## PREPARE MACHINE FOR REPAIR

1. Move hydrostatic control to "STOP" position.
2. Disengage PTO.
3. Lower all equipment to the ground.
4. Engage park brake.
5. Stop the engine.
6. Remove key.
7. Operate all hydraulic control levers to release hydraulic pressure in the system.

Before you leave the operator's seat, wait for engine and attachment parts to stop moving.



4A9;M33731 M45;1005A 10 121186



**F935 FRONT MOWER SPECIFICATIONS**

**Engine**

Manufacturer . . . . . Yanmar  
 Engine Model Number . . . . . 3TNA72UJ  
 Fuel Type . . . . . No. 1 or No. 2 Diesel  
 Fuel Delivery . . . . . Fuel Injection  
 (Yanmar made)  
 Cylinder . . . . . Three  
 Cycle . . . . . Four  
 Bore . . . . . 72 mm (2.84 in.)  
 Stroke . . . . . 72 mm (2.84 in.)  
 Displacement . . . . . 879 cm<sup>3</sup> (53.8 cu. in.)  
 Horsepower\* . . . . . 17 kW (22 hp)  
**Speeds**  
 Idle . . . . . 1450 ± 50 rpm  
 High (No load) . . . . . 3635 ± 35 rpm

*\*Horsepower rating is established by engine manufacturer.*

**Electrical System**

Battery, John Deere  
 (AM100241) . . . . . Category II, 12-Volt, BCI  
 Group 22 FC, 491 cold cranking amps at  
 -18° C (0° F), 102 minute reserve capacity  
 Alternator Charging Capacity . . . . . 35 amps  
 System Polarity . . . . . Negative Ground  
 Starter . . . . . 12-Volt Motor, Key and Solenoid  
 Timing . . . . . Index

**Power Train**

Hydrostatic Transmission  
 Sundstrand 15 Series . . . . . (U-Type)  
 Differential . . . . . Peerless Single-Speed  
 (with Differential Lock)  
 Brakes . . . Individual Front Wheel (Drum-Type)

**Travel Speeds**

Forward . . . . . Variable 0 to 17 Km/hr.  
 (0. to 11 mph)  
 Reverse . . . . . Variable 0 to 8 Km/hr.  
 (0 to 5 mph)

**Hydraulics**

Control Valve . . . . . 2-Spool (open-center)  
 Outlets . . . . . 1 Set (front)  
 Lift Cylinders . . . . . Front-mounted

**Tire Size**

Front . . . . . 23 x 8.50—12 Turf  
 Rear . . . . . 16 x 6.50—8 Rib

**Tire Inflation\*** (See Operator's Manual)

**Dimensions**

Wheelbase . . . . . 1.43 m (56.3 in.)  
 Over-all Length . . . . . 2.16 m (85.2 in.)  
 Over-all Width (Max.) . . . . . 1.09 m (42.8 in.)

**Approximate Curb Weight** . . . . 645 Kg (1422 lb)

*\*Inflation will vary with attachment used.*

**F912 FRONT MOWER SPECIFICATIONS**

**Engine**

Manufacturer . . . . . Yanmar  
 Engine Model Number . . . . . 3TG66UJ  
 Fuel Type . . . . . Gasoline  
 Cylinder . . . . . Three  
 Cycle . . . . . Four  
 Bore . . . . . 66 mm (2.60 in.)  
 Stroke . . . . . 64.2 mm (2.53 in.)  
 Displacement . . . . . 658 cm<sup>3</sup> (40.3 cu. in.)  
 Horsepower\* . . . . . 14.9 kw (20 hp)  
**Speeds**  
 Idle . . . . . 1300 ± 100 rpm  
 High (No load) . . . . . 3700 ± 100 rpm

*\*Horsepower rating is established by engine manufacturer.*

**Electrical System**

Battery, John Deere  
 (AM100241) . . . . . Category II, 12-Volt, BCI  
 Group 22 FC, 491 cold cranking amps at  
 -18°C (0°F), 102 minute reserve capacity  
 Alternator Charging Capacity . . . . . 20 amps  
 System Polarity . . . . . Negative Ground  
 Starter . . . . . 12-Volt Motor, Key and Solenoid  
 Timing . . . . . Fixed

**Power Train**

Hydrostatic Transmission  
 Sundstrand 15 Series . . . . . (U-Type)  
 Differential . . . . . Peerless Single-Speed  
 (with Differential Lock)  
 Brakes . . . Individual Front Wheel (Drum-Type)

**Travel Speeds**

Forward . . . . . Variable 0 to 16 Km/hr.  
 (0 to 10 mph)  
 Reverse . . . . . Variable 0 to 8 Km/hr.  
 (0 to 5 mph)

**Hydraulic**

Control Valve . . . . . 2-Spool (open-center)  
 Outlets . . . . . 1 Set (front)  
 Lift Cylinders . . . . . Front-mounted

**Tire Size**

Front . . . . . 20 x 8.00—10  
 Rear . . . . . 16 x 6.50—8

**Tire Inflation\*** (See Operators Manual)

**Dimensions**

Wheelbase . . . . . 1.43 m (56.3 in.)  
 Over-all Length . . . . . 2.16 m (85.2 in.)  
 Over-all Width (Max.) . . . . . 1.09 m (42.8 in.)

**Approximate Curb Weight . . . 574 kg (1266 lb)**

*\*Inflation will vary with attachment used.*

**BOLT TORQUE CHART**

Grade of Bolt		SAE-2	SAE-5	SAE-8	Socket or Wrench Size	
Min. Tensile Strength		64,000 PSI	105,000 PSI	150,000 PSI		
Grade Marking on Bolt						
U.S. Standard					U.S. Regular	
Bolt Dia.	U.S. Dec. Equiv.	TORQUE IN FOOT POUNDS			Bolt Head	Nut
1/4	0.250	(8.14 N-m) 6	(13.56 N-m) 10	(18.98 N-m) 14	7/16	7/16
5/16	0.3125	(17.63 N-m) 13	(27.12 N-m) 20	(40.68 N-m) 30	1/2	1/2
3/8	0.375	(31.19 N-m) 23	(47.46 N-m) 35	(67.80 N-m) 50	9/16	9/16
7/16	0.4375	(47.46 N-m) 35	(74.58 N-m) 55	(108.48 N-m) 80	5/8	11/16
1/2	0.500	(74.58 N-m) 55	(115.26 N-m) 85	(162.72 N-m) 120	3/4	3/4
9/16	0.5625	(101.70 N-m) 75	(176.28 N-m) 130	(237.30 N-m) 175	13/16	7/8
5/8	0.625	(142.38 N-m) 105	(230.52 N-m) 170	(325.44 N-m) 240	15/16	15/16
3/4	0.750	(250.86 N-m) 185	(406.80 N-m) 300	(576.30 N-m) 425	1-1/8	1-1/8
7/8	0.875	(216.96 N-m) 160	(616.98 N-m) 445	(928.86 N-m) 685	1-5/16	1-5/16
1	1.000	(339.00 N-m) 250	(908.52 N-m) 670	(1396.68 N-m) 1030	1-1/2	1-1/2

Multiply readings by 12 for inch-pound values.

\* "B" Grade bolts larger than 3/4-inch (19.1 mm) are sometimes formed hot rather than cold, which accounts for the lower recommended torque.

NOTE: Allow a tolerance of plus or minus 10 per cent on all torques given in this chart.

**SET SCREW SEATING TORQUE CHART**

Screw Size	Cup Point	Square Head
Torque in Inch Pounds		
#5	(1.02 N-m) 9	—
#6	(1.02 N-m) 9	—
#8	(2.26 N-m) 20	—
#10	(3.73 N-m) 33	—
1/4	(9.83 N-m) 87	(23.96 N-m) 212
5/16	(18.65 N-m) 165	(47.46 N-m) 420
3/8	(32.77 N-m) 290	(93.79 N-m) 830
7/16	(48.59 N-m) 430	—
1/2	(70.06 N-m) 620	(237.30 N-m) 2100
9/16	(70.06 N-m) 620	—
5/8	(138.43 N-m) 1225	(480.25 N-m) 4250
3/4	(240.13 N-m) 2125	(870.10 N-m) 7700

Divide readings by 12 for foot-pound values

NOTE: Allow a tolerance of plus or minus 10 per cent on all torques given in this chart.

## METRIC HARDWARE TORQUE SPECIFICATIONS

### Metric Standard Thread

Thread	8.8		10.9		12.9	
	N·m	(lb-ft)	N·m	(lb-ft)	N·m	(lb-ft)
M5	5.9	(4.4)	7.9	(5.8)	9.8	(7.2)
M6	9.8	(7.2)	13.8	(10.2)	16.7	(12.3)
M8	24.6	(18.1)	34.4	(25.4)	40.2	(29.6)
M10	48.1	(35.5)	67.8	(50.0)	81.5	(60.1)
M12	84.4	(62.2)	118.0	(87.0)	142.0	(105.0)
M14	133.0	(98.0)	187.0	(138.0)	226.0	(187.0)
M16	206.0	(152.0)	290.0	(214.0)	348.0	(257.0)
M18	285.0	(210.0)	398.0	(294.0)	476.0	(351.0)
M20	402.0	(296.0)	570.0	(420.0)	677.0	(499.0)
M22	540.0	(398.0)	765.0	(564.0)	914.0	(674.0)
M24	697.0	(514.0)	980.0	(723.0)	1180.0	(870.0)

### Metric Fine Thread

Thread	8.8		10.9		12.9	
	N·m	(lb-ft)	N·m	(lb-ft)	N·m	(lb-ft)
M8 x 1	26.5	(19.5)	37.3	(27.5)	44.2	(32.6)
M10 x 1	47.1	(34.7)	68.8	(50.7)	81.5	(60.1)
M12 x 1.5	88.4	(65.2)	123.0	(91.0)	147.0	(106.0)
M14 x 1.5	147.0	(108.0)	206.0	(152.0)	246.0	(181.0)
M16 x 1.5	221.0	(163.0)	309.0	(228.0)	373.0	(275.0)
M18 x 1.5	319.0	(235.0)	451.0	(333.0)	540.0	(398.0)
M20 x 1.5	451.0	(333.0)	628.0	(463.0)	755.0	(557.0)
M22 x 1.5	599.0	(442.0)	845.0	(623.0)	1030.0	(760.0)
M24 x 2	765.0	(564.0)	1080.0	(796.0)	1275.0	(940.0)
M26 x 2	1130.0	(833.0)	1570.0	(1158.0)	1915.0	(1412.0)



## O-RINGS BOSS FITTING SERVICE RECOMMENDATIONS

1. Inspect boss O-ring seat. It must be free of dirt and defects. If repeated leaks occur, inspect for defects with a magnifying glass. Some raised defects can be removed with a slip stone.

Occasionally a lower durometer O-ring will seal against a rough seat. If neither of these solutions work, the component must be replaced.

2. Put hydraulic oil, petroleum jelly or soap on the O-ring. Put a thimble over the threads to protect O-ring from nicks. Slide O-ring over the thimble and into the turned down section of fitting.

For angle fittings, loosen special nut and push special washer against threads so O-ring can be installed into the turned down section of fitting.

3. Turn fitting into the boss by hand until special washer or washer face (straight fitting) contacts boss face and O-ring is squeezed into its seat.

4. To position angle fittings, turn the fitting counterclockwise a maximum of one turn.

5. Tighten straight fittings to the torque value shown in chart. For angle fittings, tighten the special nut to valve shown in the chart while holding body of fitting with a wrench.

### STRAIGHT FITTING OR SPECIAL NUT TORQUE (1)

Thread Size	Torque <sup>1</sup>		Number of Flats <sup>2</sup>
	N-m	(lb-ft)	
7/16-20 UNF	12	(9)	2
1/2-20 UNF	16	(12)	2
9/16-18 UNF	24	(18)	2
3/4-16 UNF	46	(34)	2
7/8-14 UNF	62	(46)	1-1/2
1-1/16-12 UN	102	(75)	1
1-3/16-12 UN	122	(90)	1
1-5/16-12 UN	142	(105)	3/4
1-5/8-12 UN	190	(140)	3/4
1-7/8-12 UN	217	(160)	1/2

1. Tolerance  $\pm$  10 percent.

2. To be used if a torque wrench cannot be used. After tightening fitting by hand, put a mark on nut and boss; then tighten special nut or straight fitting the number of flats shown.

### FUEL (DIESEL ENGINES)



**CAUTION:** Handle fuel carefully. If the engine is hot or running, do not fill the fuel tank. Do not smoke while you fill the fuel tank or service the fuel system. Fill fuel tank only to bottom of filler neck.

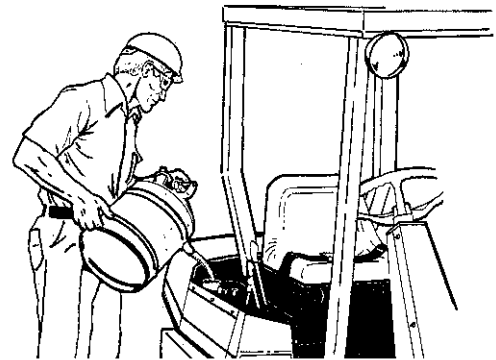
**IMPORTANT:** DO NOT use gasoline or any diesel fuel/gasoline mixtures.

1. No 1. or No.2 fuel oil is recommended. Do not use fuel that has been stored for a long period of time.

Fuel tank capacity:

Single Tank . . . . . 21 L (5.5 gal)  
Dual Tank . . . . . 42 L (11.gal)

2. Fill fuel tank at end of each day's operation. Fill fuel tank only to bottom of filler neck.



4A9;M38859 M45;;1025C -1 190387

### DO NOT USE GALVANIZED CONTAINERS

**IMPORTANT:** Diesel fuel stored in galvanized containers reacts with zinc coating on the container to form zinc flakes. If fuel contains water, a zinc gel will also form. The gel and flakes will quickly plug fuel filters and damage fuel injectors and fuel pumps.

DO NOT USE a galvanized container to store diesel fuel.

Store fuel in:

- plastic containers.
- aluminum containers.
- specially coated steel containers made for diesel fuel.

DO NOT USE brass-coated containers: brass is an alloy of copper and zinc.

M21;;FLQ B1 020885

## DIESEL ENGINE OIL

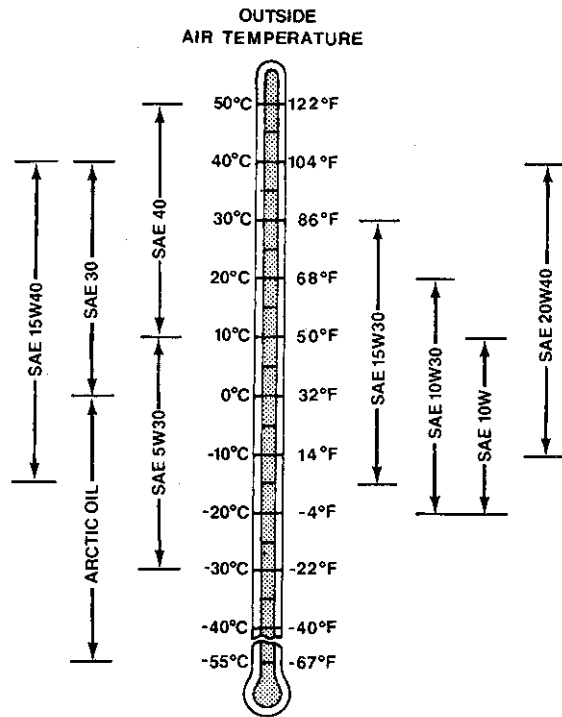
Use oil viscosity based on expected air temperature range during the drain interval.

John Deere TORQ-GARD SUPREME® Engine Oil is recommended. Other oils may be used if they meet the requirements of one of the following:

- API Service Classifications CD/SF or CD/SE.
- Military Specification MIL-L2104D or MIL-L-2104C

SAE 5W30 viscosity grade oils meeting API Service Classification, CC/SF or CC/SE may be used, but oil and filter must be changed at 100 hour intervals.

Oils meeting Military Specification MIL-L-46167A are recommended as arctic oils. Other specially formulated oils may be used if they meet API Service Classification CC/SF or CC/SE and have a pour point at least 5°C (9°F) below the lowest expected air temperature during the 100 hour interval between oil and filter changes



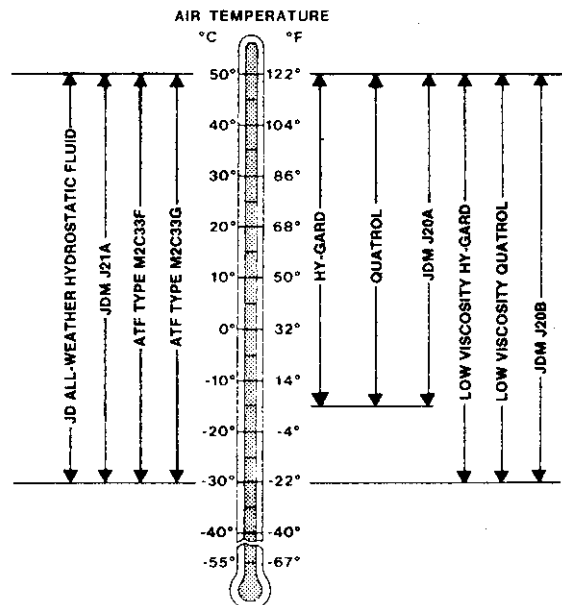
AB6;TS196 053;ENOIL. 050886

## HYDROSTATIC OIL

Use oil viscosity based on expected air temperature range during the drain interval.

John Deere All-Weather Hydrostatic Fluid is recommended. If other oils are used, they must meet performance requirements of:

- John Deere Standard JDM J21A
- Automatic transmission fluids meeting:
  - Ford M2C33F specification
  - Ford M2C33G specification
- John Deere HY-GARD® transmission and hydraulic oil
- QUATROL® oils, which are oils that meet John Deere standards
- John Deere Standard JDM J20A or J20B

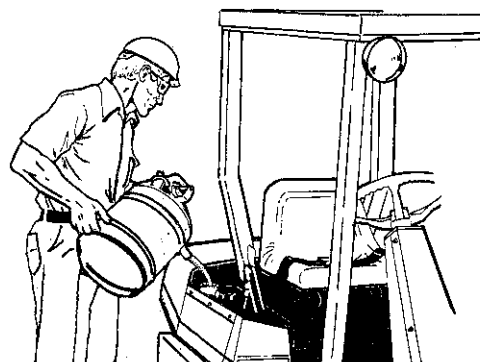


AB6;X9320 053;HYOIL. 050886

## FUEL (GASOLINE ENGINES)



**CAUTION:** Handle fuel carefully. If the engine is hot or running, do not fill the fuel tank. Do not smoke while you fill the fuel tank or service the fuel system. Fill fuel tank only to bottom of filter neck.



**IMPORTANT: DO NOT** mix oil with gasoline.

1. Unleaded fuel is recommended. Regular leaded gasoline with an anti-knock index of 87 or higher may be used. Do not use gasoline that has been stored for a long period of time.

Use of gasohol is acceptable as long as the ethyl alcohol blend does not exceed 10 percent. Unleaded gasohol is preferred over leaded gasohol.

Fuel tank capacity

Single tank . . . . . 21 L (5.5 gal)  
Dual tank . . . . . 42 L (11 gal)

2. Fill fuel tank at end of each day's operation. Fill fuel tank only to bottom of filler neck.

4A9;M38859 M45;1025C -2 190387

## GASOLINE ENGINE OIL

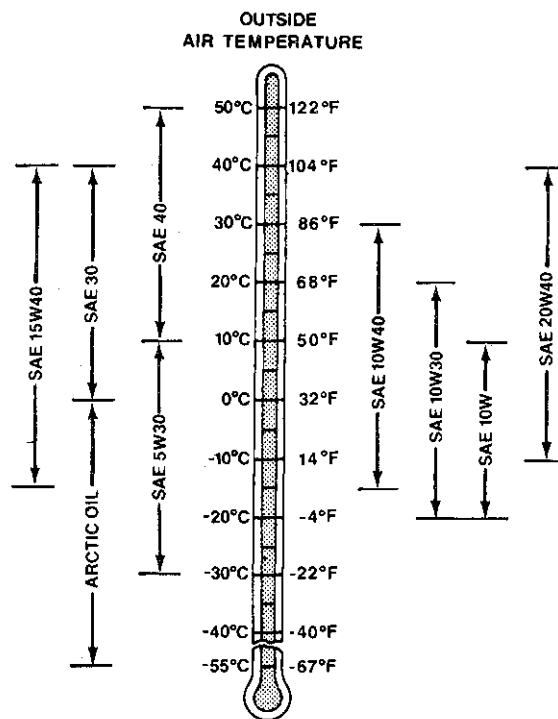
Use oil viscosity based on expected air temperature range during the drain interval.

Starting aids which directly or indirectly warm the oil before cranking may permit the use of oils at temperatures below the limits shown on the chart. See your John Deere dealer for assistance.

John Deere PLUS-4 Engine Oil is recommended.

Other oils may be used if they meet the requirements of API Service Classification SE or SF.

Oils meeting Military Specifications MIL-L-46167A are recommended as arctic oils. Other specially formulated oils may be used if they have a pour point at least 5°C (9°F) below the lowest expected air temperature between oil changes.



AB6;TS199 053;GAS. 310786

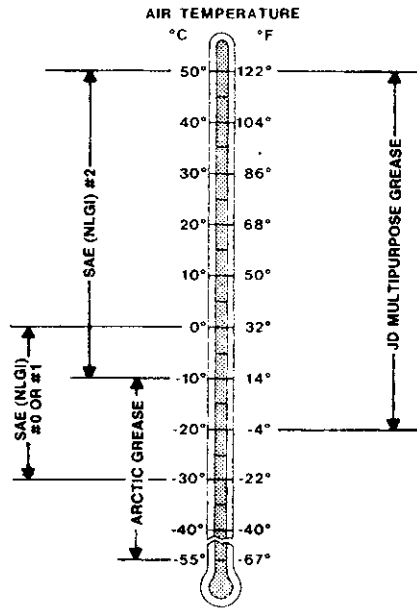
## GENERAL PURPOSE GREASE

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

John Deere Multipurpose Grease is recommended. If other greases are used, use:

- SAE Multipurpose Grease
- SAE Multipurpose Grease containing 3 to 5 per cent molybdenum disulfide.

At temperatures below  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ), use arctic greases such as those meeting Military Specification MIL-G-10924C.



AB6;X9326 053;GREAE2. 121586

## SERIAL NUMBERS

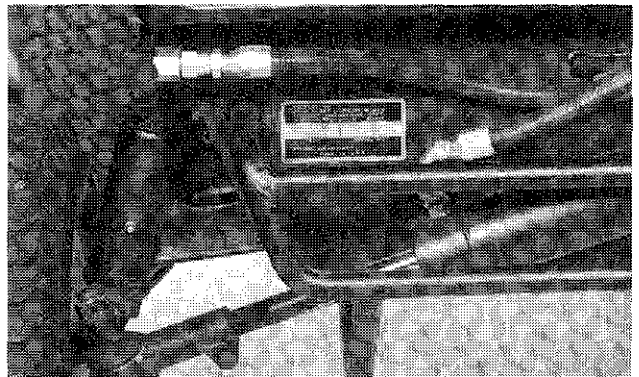
When working on machines or components that are covered by warranty, it is **IMPORTANT** that you include the tractor Product Identification Number and the component serial number on the warranty claim form.

The location of component serial number plates are shown below.

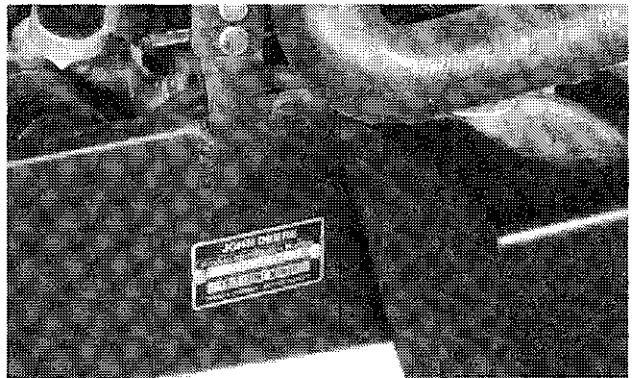
M21;1030R 1 220485

## PRODUCT IDENTIFICATION NUMBER

*Older Units*



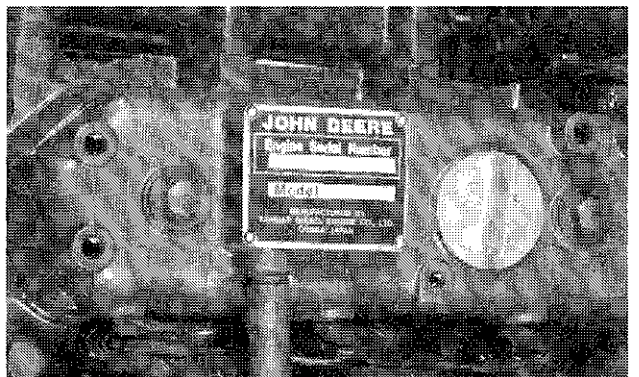
*Newer Units*



4A9;M33853 M44212 M45;1030C -1A 200387

## ENGINE SERIAL NUMBER

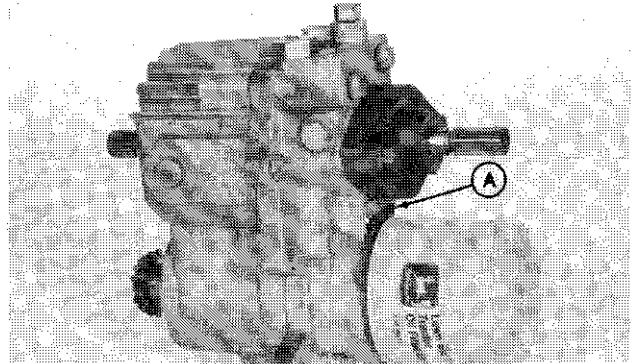
The engine serial number is located on the rocker arm cover.



4A9;M37502 M45;1030C 1 300186

### TRANSMISSION SERIAL NUMBER

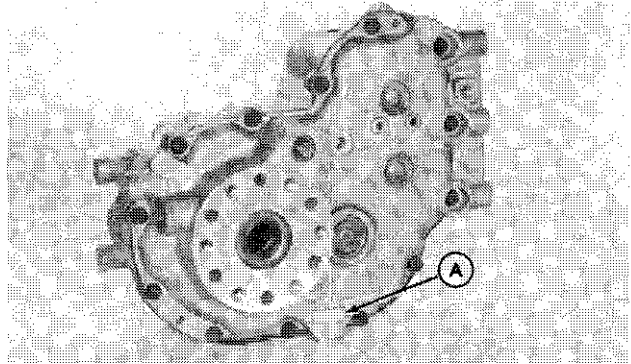
Serial number plate (A) location.



2AF;M38478 M21;;1030R 4 220485

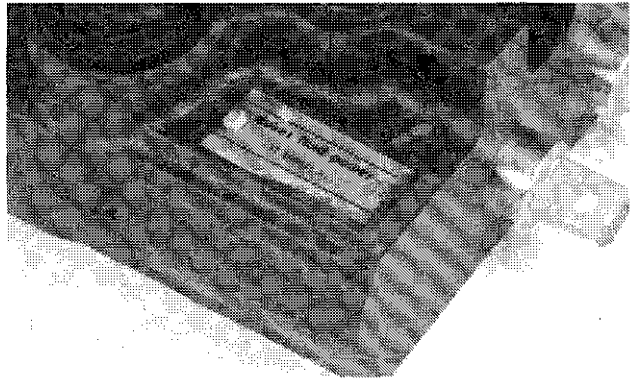
### DIFFERENTIAL SERIAL NUMBER

Serial number plate (A) location.



2AF;M38479 M21;;1030R 5 111186

### CONTROL VALVE SERIAL NUMBER



2AF;M38480 M21;;1030R 6 111186

# Section 20 ENGINE REPAIR

## CONTENTS

### REPAIR INFORMATION

For complete repair information on the engine, the component technical manual is also required.

CTM-3 for Yanmar diesel engines  
CTM-12 for Yanmar gasoline engines

Use the component manual in conjunction with this machine manual.

	Page
<b>GROUP 05—ENGINE INSTALLATION</b>	
Service Equipment and Tools . . . . .	20-05-1
Specifications . . . . .	20-05-1
Install Engine . . . . .	20-05-1
<b>GROUP 10—COOLING SYSTEM</b>	
Specifications . . . . .	20-10-1
Install Radiator . . . . .	20-10-1
Install Water Pump . . . . .	20-10-2



### SERVICE EQUIPMENT AND TOOLS

*NOTE: Order tools from your SERVICE-GARD™ Catalog. Some tools may be available from a local supplier.*

Name	Use
Load-Positioning Sling	To remove and install engine.
Repair Stand	To hold engine during disassembly and assembly

M45;;2005C 1 091285

### SPECIFICATIONS

Item	Measurement	Specification
Engine Mounting Bracket Front and Rear Cap Screws (16 used)	Torque	$49 \pm 5$ N·m ( $36 \pm 4$ lb-ft)
Engine Mount Nuts (4 used)	Torque	$49 \pm 5$ N·m ( $36 \pm 4$ lb-ft)

M45;;2005C 2 240186

### INSTALL ENGINE

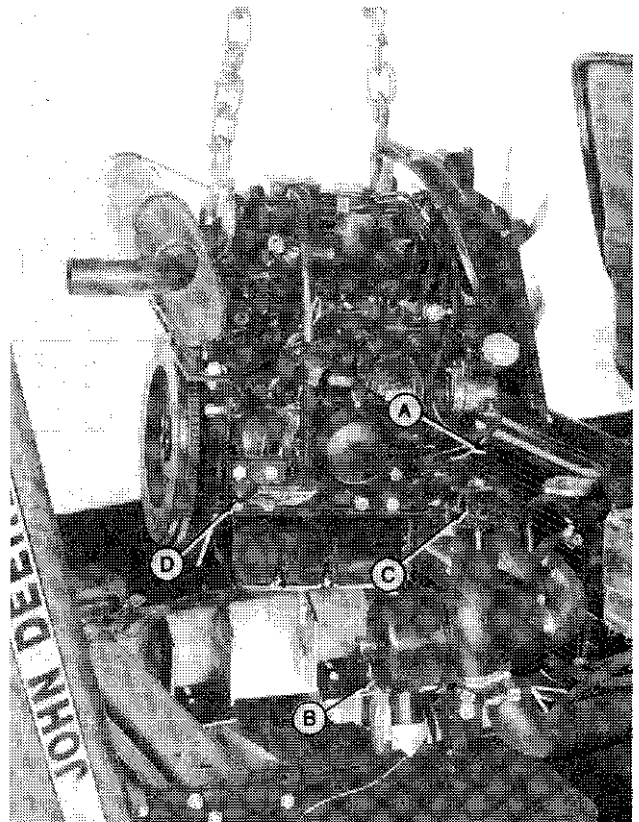
1. Fasten engine to a hoist with a load-positioning sling. Remove engine from repair stand.
2. Install front and rear engine mounting brackets (D) and fasten with 16 cap screws. Tighten cap screws to  $49 \pm 5$  N·m ( $36 \pm 4$  lb-ft).
3. Install engine mounts (C), if removed, and fasten with four nuts.

**IMPORTANT: Do not damage radiator fins (A) or air cleaner (B) when installing engine.**

4. Put fan shroud over fan blades against engine.
5. Carefully lower the engine until the fan is near the radiator. Pull the engine to the rear so there is clearance between fan and radiator. Lower engine onto mounts.

A—Radiator Fins  
B—Air Cleaner

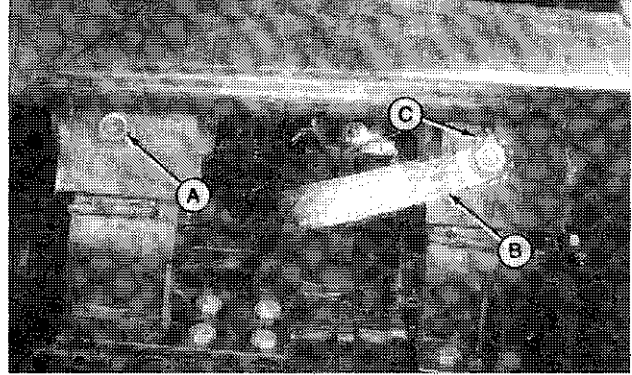
C—Engine Mount (4 used)  
D—Engine Mounting  
Bracket (4 used)



5A0;M37496 M45;;2005C 12 130185

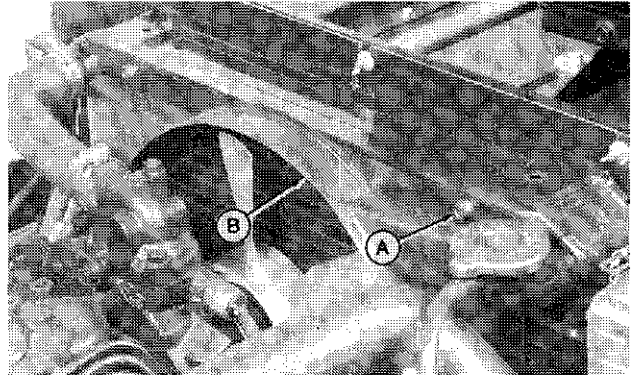
## Engine Removal and Installation

6. Install lock washer (C), ground strap (B), and four nuts (A) on bottom of engine mounts. Tighten nuts to  $49 \pm 5$  N·m ( $36 \pm 4$  lb-ft).



5A0;M37482 M45;;2005C 13 091285

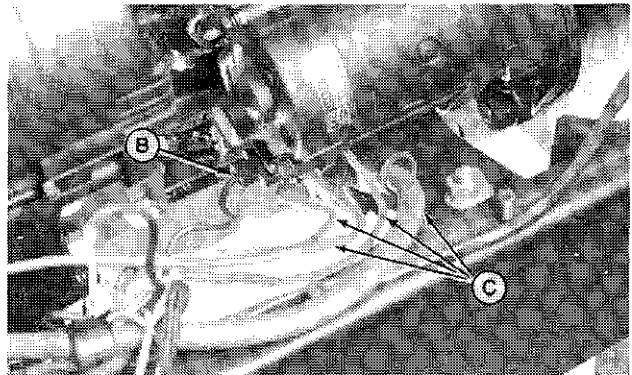
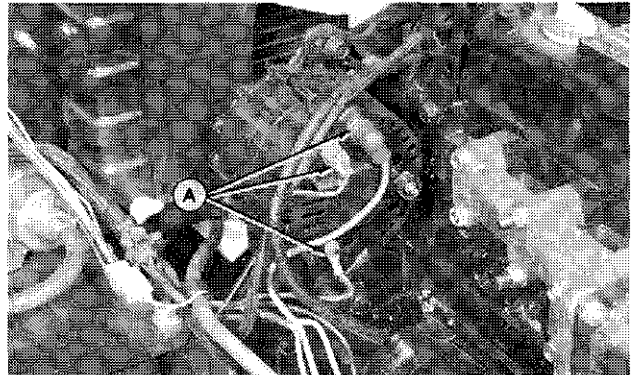
7. Fasten fan shroud (B) to radiator with four cap screws (A).



5A0;M37480 M45;;2005C 14 091285

## CONNECT WIRING AND THROTTLE CABLE

1. Connect wiring leads (A-C).



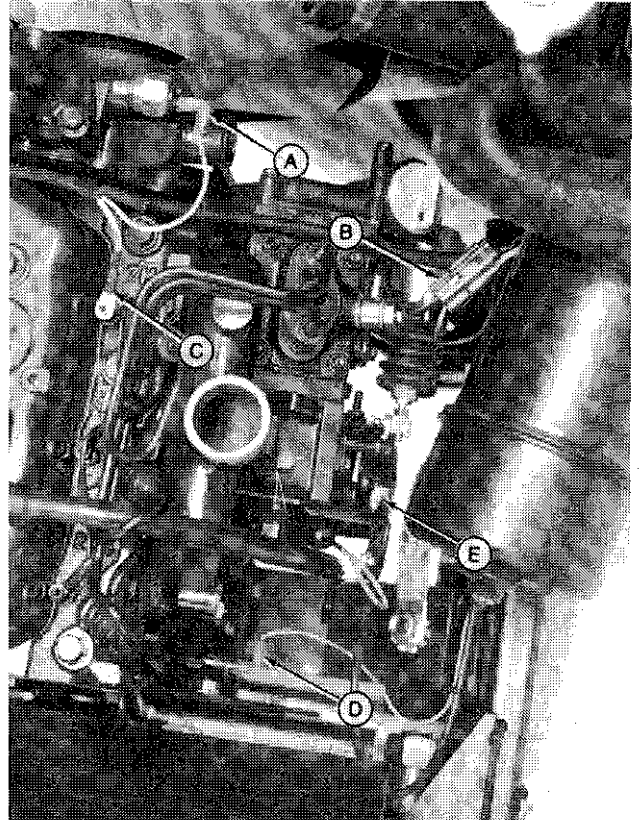
A—Alternator Terminals  
B—Starter Spade Terminal

C—Starter Stud Terminals

5A0;M37478 M37479 M45;;2005C 15 240186

2. Connect throttle cable (E).
3. Adjust throttle cable. (See Section 220).
4. Connect wiring leads (A-D).

- A—Coolant Temperature Sender
- B—Fuel Shut-Off Solenoid
- C—Glow Plugs
- D—Oil Pressure Sender
- E—Throttle Cable

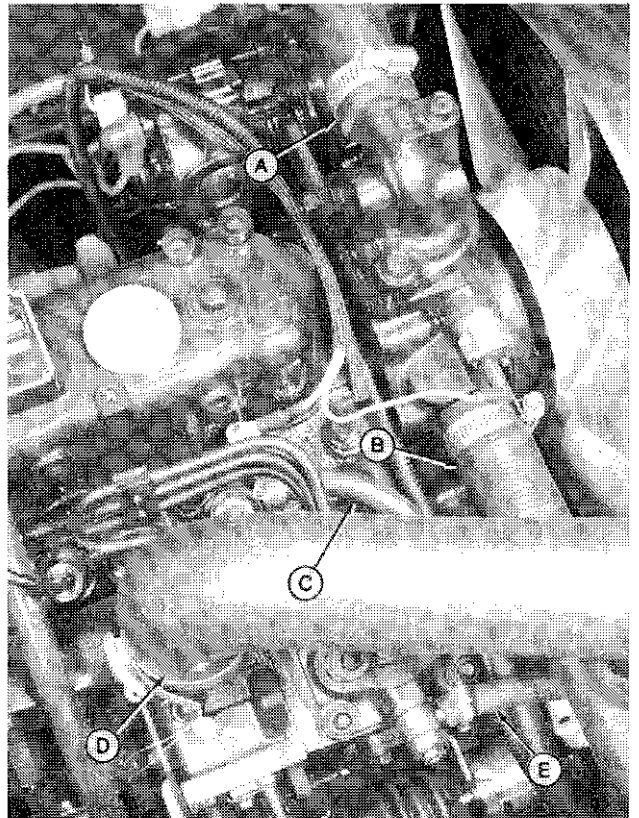


5A0;M37477 M45;;2005C -16 090487

## CONNECT HOSES

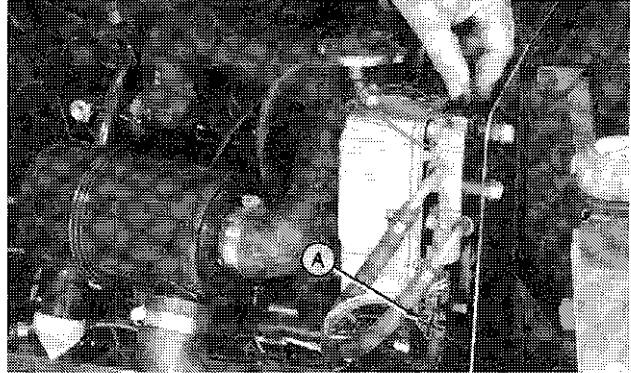
1. Connect hoses (A-E). Tighten hose clamps.

- A—Water Pump Outlet Hose
- B—Water Pump Inlet Hose
- C—Fuel Leak-Off Hose
- D—Air Filter Hose
- E—Fuel Injection Pump Inlet Hose



5A0;M37475 M45;;2005C 17 091285

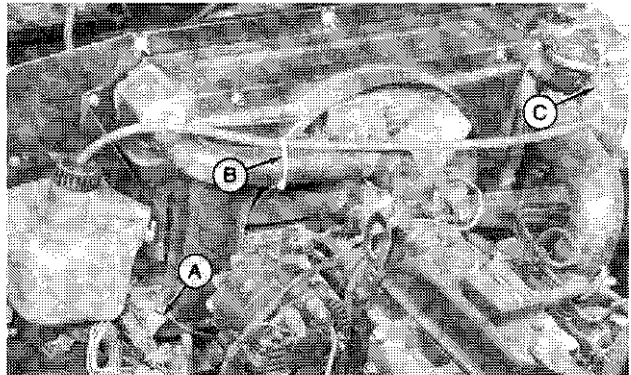
2. Close drain plug (A) and air vent plug.



5A0;M37476 M45;;2005C 18 091285

## FINAL INSTALLATION

1. Install electric PTO clutch. (See Group 05, Section 40.)
2. Close radiator valve (A).
3. Install tie band (B).
4. Install drain tube (C) on radiator.
5. Connect battery negative (–) cable.
6. Fill cooling system.
7. Fill engine crankcase with recommended oil.
8. Bleed fuel system. (See Section 30, Group 05.)



5A0;M37474 M45;;2005C 19 091285

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