322, 330, 332 and 430 Lawn and Garden Tractors

For complete service information also see:

John Deere Horicon Works
TM1591 (15JUL95)
LITHO IN U.S.A.
ENGLISH

Introduction

FOREWORD

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

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

Technical manuals are divided in two parts: repair and diagnostics. Repair sections tell how to repair the components. Diagnostic sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, other materials needed to do the job and service parts kits.

Section 10, Group 15—Repair Specifications, consist of all applicable specifications, near tolerances and specific torque values for various components on each individual machine.

Section 10, Group 20—Test and Adjustment Specifications, consist of all applicable test and adjustment specifications for various systems for each individual machine.

Binders, binder labels, and tab sets can be ordered by John Deere dealers direct from the John Deere Distribution Service Center.

This manual is part of a total product 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 type of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

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

MX,1590,IFC -19-09DEC94

Contents

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.

TM1591-19-15JUL95

Dealer Presentation Sheet

JOHN DEERE DEALERS

IMPORTANT: Please remove this page and route through your service department.

This is a complete revision for models 322, 330, 332 and 430 found in TM1277, TM1309 and TM1345. The complete revision of remaining machines (316, 318 and 420) can be found in TM1590. AFTER recieving both TM1590 and TM1591, please discard old TM1277 dated December 1987, TM1309 dated July 1985 and TM1345 dated June 1986.

NOTE: There are several "versions" of each model tractor. All versions were not availble at time of latest printing. Some versions may not be covered.

MX,1591,DLR -19-13JUL95

Section 10
GENERAL INFORMATION

Contents

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

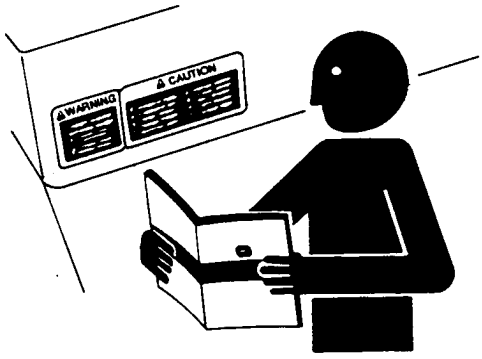
FOLLOW SAFETY INSTRUCTIONS

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

HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

TS227 -UN-23AUG88

DX,FLAME -19-04JUN90

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

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

Do not charge a frozen battery; it may explode. Warm battery to 16˚C (60˚F).

TS204 -UN-23AUG88

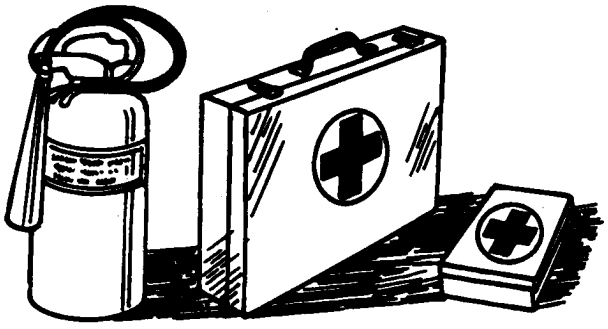
DX,SPARKS -19-03MAR93

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.



TS291 -UN-23AUG88

DX,FIRE2 -19-03MAR93

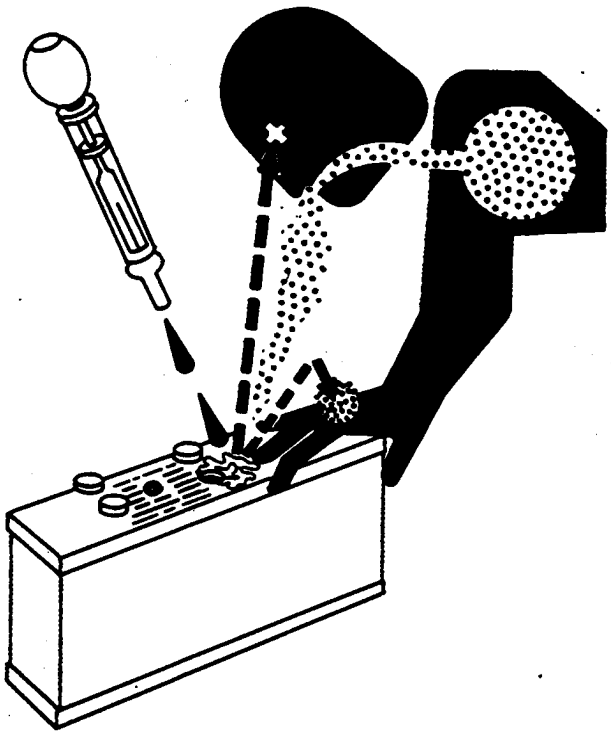
PREVENT ACID BURNS

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.
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 15—30 minutes. Get medical attention immediately.

If acid is swallowed:
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 -UN-23AUG88

DX,POISON -19-21APR93

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.

TS281 -UN-23AUG88

DX,RCAP -19-04JUN90

HANDLE CHEMICAL PRODUCTS SAFELY

TS1132 -UN-26NOV90

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.

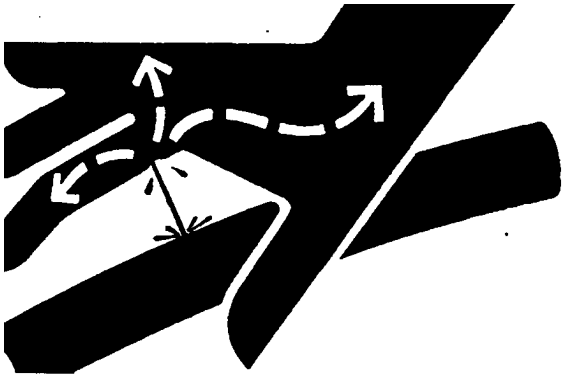
A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

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 -19-03MAR93

AVOID HIGH-PRESSURE FLUIDS



X9811 -UN-23AUG88

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,FLUID -19-03MAR93

PREPARE MACHINE FOR REPAIR

1. Move hydrostatic control lever to STOP position.

2. Disengage PTO's

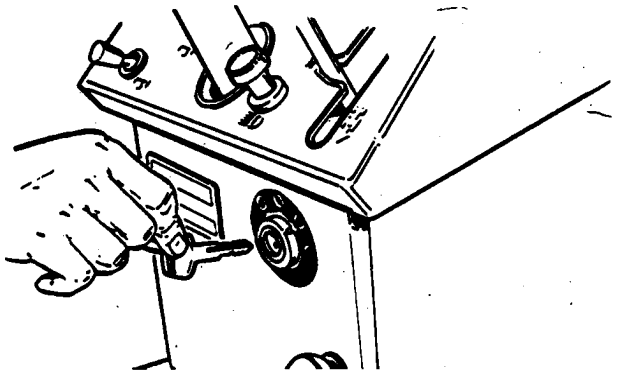
3. Lower all equipment to the ground.

4. Engage park brake.

5. Stop the engine and remove the key.

6. 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.



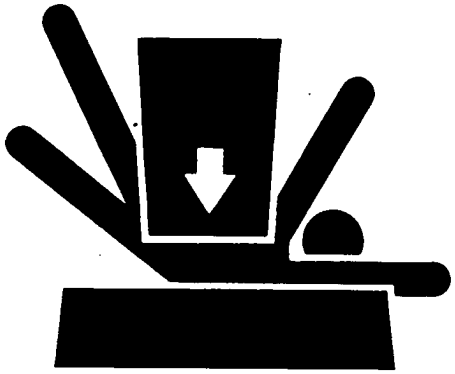
M34228 -UN-24APR89

MX,1005R,8 -19-01APR86

SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



TS229 -UN-23AUG88

DX,LOWER -19-04JUN90

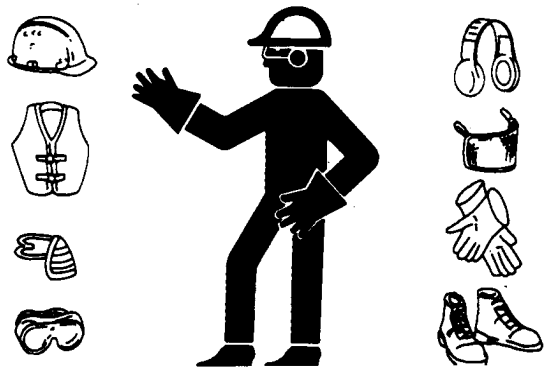
WEAR PROTECTIVE CLOTHING

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.

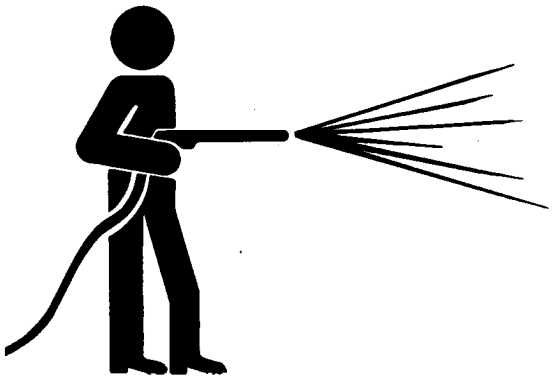


TS206 -UN-23AUG88

DX,WEAR -19-10SEP90

WORK IN CLEAN AREA

Before starting a job:
- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



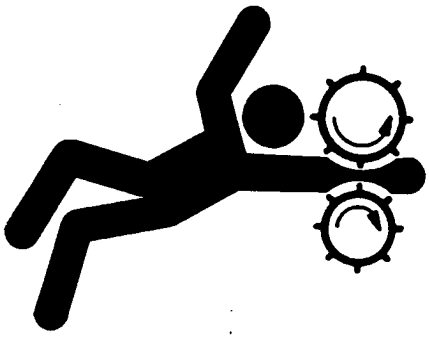
T6642EJ -UN-18OCT88

DX,CLEAN -19-04JUN90

SERVICE MACHINES SAFELY

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



TS228 -UN-23AUG88

DX,LOOSE -19-04JUN90

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.

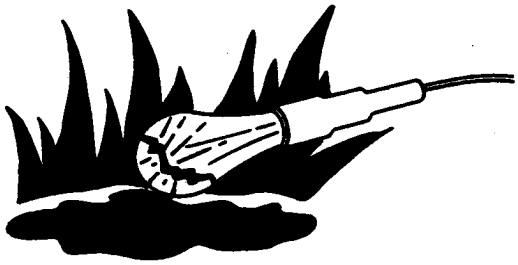
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

TS220 -UN-23AUG88

DX,AIR -19-04JUN90

ILLUMINATE WORK AREA SAFELY

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

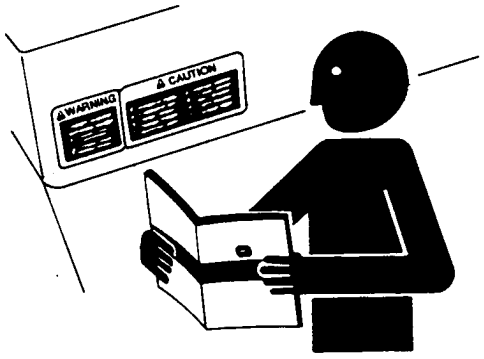


TS223 -UN-23AUG88

DX,LIGHT -19-04JUN90

REPLACE SAFETY SIGNS

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



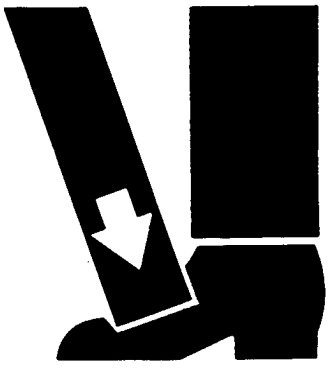
TS201 -UN-23AUG88

DX,SIGNS1 -19-04JUN90

USE PROPER LIFTING EQUIPMENT

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



TS226 -UN-23AUG88

DX,LIFT -19-04JUN90

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REMOVE PAINT BEFORE WELDING OR HEATING

TS220 -UN-23AUG88

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

• If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.

• If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

DX,PAINT -19-03MAR93

AVOID HEATING NEAR PRESSURIZED FLUID LINES

TS953 -UN-15MAY90

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

DX,TORCH -19-03MAR93

SERVICE TIRES SAFELY

TS952 -UN-12APR90

Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

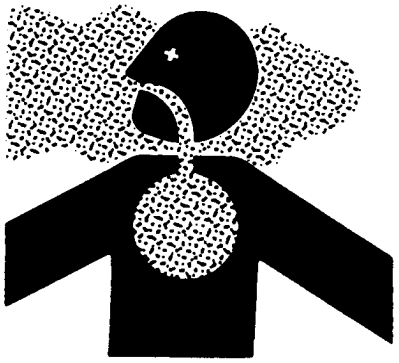
Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

DX,TIRECP -19-24AUG90

AVOID HARMFUL ASBESTOS DUST



TS220 -UN-23AUG88

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.

DX,DUST -19-15MAR91

PRACTICE SAFE MAINTENANCE

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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

USE PROPER TOOLS

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

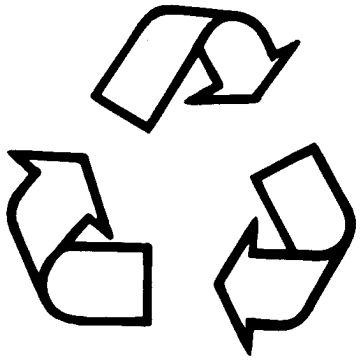
For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.

TS779 -UN-08NOV89

DX,REPAIR -19-04JUN90

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.

TS1133 -UN-26NOV90

DX,DRAIN -19-03MAR93

LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

TS231 -19-07OCT88

DX,LIVE -19-25SEP92

MACHINE SPECIFICATIONS—322 AND 330

	322	330
ENGINE		
Manufacturer	Yanmar	Yanmar
Model Number	3TG66UJ	3TN66UJ
Horsepower (SAEJ1349)	13.4 kW (18 hp)	12 kW (16 hp)
Torque	4.2 kg m (30.3 ft lbs)	4.2 kg m (30.3 ft lbs)
Engine Rated Speeds		
Fast Idle (No Load)	3500 rpm	3450 rpm
Low Idle (No Load)	1300 rpm	1300 rpm
Number of Cylinders	3	3
Crankshaft Alignment	Horizontal	Horizontal
Stroke/Cycle	4 Cycle	4 Cycle
Bore	66 mm (2.6 in.)	66 mm (2.6 in.)
Stroke	64.2 mm (2.5 in.)	64.2 mm (2.5 in.)
Displacement	658 cm^3 (40.1 cu in.)	658 cm^3 (40.1 cu in.)
Compression Ratio	8.7:1	22.4:1
Cooling	Liquid	Liquid
Coolant Capacity	2.8 L (3 U.S. qt)	2.8 L (3 U.S. qt)
Air Filter Type	Dry with Primary and Secondary Elements	Dry with Primary and Secondary Elements
Lubrication System	Full Pressure w/Filter	Full Pressure w/Filter
Crankcase Capacity (w/o Filter)	2.5 L (2.6 U.S. qt)	2.5 L (2.6 U.S. qt)
Oil Filter	Replaceable	Replaceable
Spark Plugs	NGK BPR4BS Champion RN11YC	N/A
FUEL SYSTEM		
Fuel Tank Location	Rear	Rear
Fuel Gauge	Standard	Standard
Fuel Tank Capacity	17 L (4.5 U.S. gal)	17 L (4.5 U.S. gal)
Fuel	85 Octane Unleaded	No.1 or No.2 Diesel
Fuel Pump Location	Frame	Frame
Fuel Pump Type	Electric	Electric
Fuel Delivery	Fixed Jet Carburetor	Indirect Injection
Injection Pump Type	N/A	In-Line Multi-Plunger
Fuel Shutoff	Electric Solenoid	Manual
ELECTRICAL SYSTEM		
Ignition	Electronic	N/A
Type of Starter	12 Volts, Solenoid	12 Volts, Solenoid
Charging System	Remote Alt. 20 amp	Remote Alt. 20 amp
Battery Type	BCI Group, U1	BCI Group, U1
Battery Voltage	12V	12V
Battery Reserve Capacity @25 amp	44 minutes	44 minutes
Battery		
Cold Cranking amp @0˚F	342 amp	342 amp
Headlights	Standard	Standard
Reflector/Tail Lights	Standard	Standard
Dash Indicator Lights	Standard	Standard
Operator Presence System	Standard	Standard
Hourmeter	Standard	Standard

Continued on next page.

MX,15911010,1 -19-13JUL95

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	322	330
POWER TRAIN		
Transmission Type	Hydrostatic	Hydrostatic
Number of Speeds	Infinite	Infinite
Travel Speeds		
Forward	0—12.38 km/h (0—7.69 mph)	0—12.38 km/h (0—7.69 mph)
Reverse	0—6.19 km/h (0—3.85 mph)	0—6.19 km/h (0—3.85 mph)
Transmission Capacity (w/Filter)	6.1 L (13 U.S. pt)	6.1 L (13 U.S. pt)
Trans. Oil Cooler	Optional	N/A
Trans. Oil Filter	Standard	Standard
Differential Lock	N/A	N/A
STEERING		
Type	Power, Hydrostatic	Manual
BRAKES		
Location	Rear Wheels	Rear Wheels
Individual Control	Standard	N/A
Type	Shoe and Drum	Shoe and Drum
Return-to-Neutral Braking	Standard	Standard
Parking	Yes	Yes
HYRAULIC SYSTEM		
Type	Two-Function (One w/Float)	Single-Function
Hydraulic Couplers	Two Sets	One Set
PTO		
Front	Standard	Standard
Rear	Optional	Optional
Type	Electric Clutch	Electric Clutch
Control	Elec. Switch on Dash	Elec. Switch on Dash
PTO rpm (No Load)		
Front	3500	3450
Rear	2000	2000
MOWER ATTACHMENT		
Compatibility	38, 46 and 50 Inch	38, 46 and 50 Inch
Lift System	Hydraulic	Hydraulic
WHEEL TREAD		
Front	813 mm (32 in.)	813 mm (32 in.)
Rear		
Narrow	775 mm (30.5 in.)	775 mm (30.5 in.)
Wide	834 mm (32.8 in.)	834 mm (32.8 in.)

Continued on next page.

MX,15911010,2 -19-13JUL95

	322	330
TIRES		
Standard Tires		
Front Turf	16 x 6.50-8, 2 PR	16 x 6.50-8, 2 PR
Rear Turf or Bar	23 x 10.50-12, 2 PR	23 x 10.50-12, 2 PR
Optional Tires		
Front (Turf)	16 x 6.50-8, 4 PR	16 x 6.50-8, 4 PR
Rear (Turf or Bar)	23 x 8.50-12, 2 PR	23 x 8.50-12, 2 PR
Inflation Pressure		
Front	41—110 kPa (6—16 psi)	41—110 kPa (6—16 psi)
Rear	34—69 kPa (5—10 psi)	34—69 kPa (5—10 psi)
SEAT		
Style	High-Back	High-Back
Suspension	2 Spring	2 Spring
Adjustment	Slide Rail	Slide Rail
DIMENSIONS		
Wheel Base	1.2 m (46 in.)	1.2 m (46 in.)
Overall Length	1.8 m (69.5 in.)	1.8 m (69.5 in.)
Overall Height	1.1 m (44.5 in.)	1.1 m (44.5 in.)
Overall Width (max.)	1.1 m (43.3 in.)	1.1 m (43.3 in.)
Overall Width (min.)	1.04 m (41 in.)	1.04 m (41 in.)
Turning Radius		
Inside Rear Wheel	0.66 m (26 in.)	0.66 m (26 in.)
Outside Front Wheel	2.0 m (80 in.)	2.0 m (80 in.)
NET WEIGHT (No Fuel)	408 kg (900 lbs)	408 kg (900 lbs)
SHIPPING WEIGHT	445 kg (980 lbs)	445 kg (980 lbs)

(Specifications and design subject to change without notice.)

MX,15911010,3 -19-13JUL95

MACHINE SPECIFICATIONS—332 AND 430

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	332	430
ENGINE		
Manufacturer	Yanmar	Yanmar
Model Number	3TN66UJ	3TNA72UJ
Horsepower (SAEJ1349)	12 kW (16 hp)	15 kW (20 hp)
Torque	4.2 kg m (30.3 ft lbs)	5.1 kg m (36.8 ft lbs)
Engine Rated Speeds		
Fast Idle (No Load)	3425 rpm	3400 rpm
Low Idle (No Load)	1400 rpm	1300 rpm
Number of Cylinders	3	3
Crankshaft Alignment	Horizontal	Horizontal
Stroke/Cycle	4 Cycle	4 Cycle
Bore	66 mm (2.6 in.)	72 mm (2.84 in.)
Stroke	64.2 mm (2.5 in.)	72 mm (2.84 in.)
Displacement	658 cm^3 (40.1 cu in.)	879 cm^3 (53.6 cu in.)
Compression Ratio	22.4:1	21.6:1
Cooling	Liquid	Liquid
Coolant Capacity	2.8 L (3 U.S. qt)	3.8 L (1 U.S. gal)
Air Filter Type	Dry with Primary and Secondary Elements	Dry with Primary and Secondary Elements
Lubrication System	Full Pressure w/Filter	Full Pressure w/Filter
Crankcase Capacity (w/o Filter)	2.5 L (2.6 U.S. qt)	2.9 L (3.1 U.S. qt)
Oil Filter	Replaceable	Replaceable
FUEL SYSTEM		
Fuel Tank Location	Rear	Rear
Fuel Gauge	Standard	Standard
Fuel Tank Capacity	17 L (4.5 U.S. gal)	24.6 L (6.5 U.S. gal)
Fuel	No.1 or No.2 Diesel	No.1 or No.2 Diesel
Fuel Pump Location	Frame	Frame
Fuel Pump Type	Electric	Electric
Fuel Delivery	Indirect Injection	Indirect Injection
Injection Pump Type	In-Line Multi-Plunger	In-Line Multi-Plunger
Fuel Shutoff	Electric Solenoid	Electric Solenoid
ELECTRICAL SYSTEM		
Ignition	N/A	N/A
Type of Starter	12 Volts, Solenoid	12 Volts, Solenoid
Charging System		
Early Machines	Remote Alt. 20 amp	Remote Alt. 35 amp
Later Machines	Remote Alt. 20 amp	Remote Alt. 40 amp
Battery Type	BCI Group, U1	BCI Group, 22F
Battery Voltage	12V	12V
Battery Reserve Capacity @25 amp	44 minutes	102 minutes
Battery		
Cold Cranking amp @0˚F	342 amp	491 amp
Headlights	Standard	Standard
Reflector/Tail Lights	Standard	Standard
Dash Indicator Lights	Standard	Standard
Operator Presence System	Standard	Standard
Hourmeter	Standard	Standard

Continued on next page.

MX,15911010,4 -19-13JUL95

	332	430
POWER TRAIN		
Transmission Type	Hydrostatic	Hydrostatic, 2 Ranges
Number of Speeds	Infinite	Infinite
Travel Speeds		
Forward	0—12.38 km/h (0—7.69 mph)	N/A
Reverse	0—6.19 km/h (0—3.85 mph)	N/A
Forward, High	N/A	0—16.09 km/h (0—10 mph)
Forward, Low	N/A	0—9.35 km/h (0—5.80 mph)
Reverse, High	N/A	0—6.44 km/h (0—4 mph)
Reverse, Low	N/A	0—4.66 km/h (0—2.90 mph)
Transmission Capacity (w/Filter)	6.1 L (13 U.S. pt)	7.1 L (15 U.S. pt)
Trans. Oil Cooler	Optional	Standard
Trans. Oil Filter	Standard	Standard
Differential Lock	N/A	Standard
STEERING		
Type	Power, Hydrostatic	Power, Hydrostatic
BRAKES		
Location	Rear Wheels	Rear Wheels
Individual Control	Standard	Standard
Type	Shoe and Drum	Shoe and Drum
Return-to-Neutral Braking	Standard	Standard
Parking	Yes	Yes
HYRAULIC SYSTEM		
Type	Two-Function (One w/Float)	Three-Function (One w/Float)
Hydraulic Couplers	Two Sets	Two Sets
PTO		
Front	Standard	Standard
Rear	Optional	Optional
Type	Electric Clutch	Electric Clutch
Control	Elec. Switch on Dash	Elec. Switch on Dash
PTO rpm (No Load)		
Front	3425	3400
Rear	2000	2000
MOWER ATTACHMENT		
Compatibility	38, 46 and 50 Inch	50 and 60 Inch, 260 Rotary
Lift System	Hydraulic	Hydraulic

Continued on next page.

MX,15911010,5 -19-13JUL95

	332	430
WHEEL TREAD		
Front	813 mm (32 in.)	914 mm (36 in.)
Rear		
Narrow	775 mm (30.5 in.)	818 mm (32 in.)
Wide	834 mm (32.8 in.)	980 mm (38.6 in.)
TIRES		
Standard Tires		
Front Turf	16 x 6.50-8, 2 PR	18 x 8.50-8, 4 PR
Rear Turf or Bar	23 x 10.50-12, 2 PR	26 x 12.00-12, 2 PR
Optional Tires		
Front (Turf)	16 x 6.50-8, 4 PR	N/A
Rear (Turf or Bar)	23 x 8.50-12, 2 PR	N/A
Inflation Pressure		
Front	41—110 kPa (6—16 psi)	41—152 kPa (6—22 psi)
Rear	34—69 kPa (5—10 psi)	34—69 kPa (5—10 psi)
SEAT		
Style	High-Back/Tilt	High-Back/Tilt
Suspension	2 Spring	Deluxe Seat Suspension
Adjustment	Slide Rail	Slide Rail
DIMENSIONS		
Wheel Base	1.2 m (46 in.)	1.3 m (52 in.)
Overall Length	1.8 m (69.5 in.)	2.13 m (84 in.)
Overall Height	1.1 m (44.5 in.)	1.22 m (48.5 in.)
Overall Width (max.)	1.1 m (43.3 in.)	1.31 m (51.5 in.)
Overall Width (min.)	1.04 m (41 in.)	1.14 m (45 in.)
Turning Radius		
Inside Rear Wheel	0.66 m (26 in.)	0.66 m (26 in.)
Outside Front Wheel	2.0 m (80 in.)	2.2 m (86 in.)
NET WEIGHT (No Fuel)	408 kg (900 lbs)	533 kg (1116 lbs)
SHIPPING WEIGHT	445 kg (980 lbs)	567 kg (1219 lbs)

(Specifications and design subject to change without notice.)

MX,15911010,6 -19-13JUL95

REPAIR SPECIFICATIONS

Item	Specifications
ENGINE	
For all repair specifications—Use CTM12 (322) and CTM3 (330, 332 and 430)	
Engine Mounting Cap Screw/Nut Torque	49 N·m (36 lb-ft)
Drive Shaft to Engine Cap Screw Torque	
330 and 430	27 N·m (20 lb-ft)
322 and 332	37 N·m (27 lb-ft)
Drive Shaft Universal Joint Cap Screw Torque	60 N·m (45 lb-ft)
PTO Belt Tension Spring Length (430)	35 mm (1.38 in.)
Fuel/Water Separator Cap Screw Torque (430)	20 N·m (180 lb-in.)
ELECTRICAL	
Front PTO Clutch-to-Crankshaft Cap Screw Torque	47 N·m (35 lb-ft)
PTO Clutch Armature to Rotor Clearance	0.46 mm (0.018 in.)
PTO Belt Tension Spring Length (430)	35 mm (1.380 in.)
POWER TRAIN	
Transmission	
Charge Pump-to-Transmission Cap Screw Torque	70 N·m (52 lb-ft)
Transmission Cover Bearing Installation Height	3 mm (0.118 in.) above housing surface
Center Section-to-Housing Cap Screw Torque	35 N·m (26 lb-ft)
Transmission-to-Differential Cap Screw Torque	45 N·m (33 lb-ft)
Axle Housing-to-Frame Cap Screw Torque	100 N·m (75 lb-ft)
Brake Rod Spring Length	42 mm (1.650 in.)
Differential-to-Frame Support Cap Screw Torque	61 N·m (45 lb-ft)
Swashplate Control Arm-to-Control Shaft Nut Torque	60 N·m (44 lb-ft)
Drive Shaft Clamping Yoke-to-Transmission Pump Shaft Cap Screw Torque	60 N·m (44 lb-ft)
Differential	
Case and Cover Oil Groove Depth (Minimum)	0.25 mm (0.010 in.)
Carrier Cap Screw Torque	53 N·m (39 lb-ft)
Cover-to-Case Cap Screw Torque	23 N·m (204 lb-in.)
Axle Housing	
Differential Seal Depth	3 mm (0.118 in.) below differential surface
Axle Housing-to-Differential Cap Screw Torque	81 N·m (60 lb-ft)
Brake Plate-to-Axle Housing Cap Screw Torque	68 N·m (50 lb-ft)
Axle Housing-to-Frame Cap Screw Torque	100 N·m (75 lb-ft)
Brake Rod Spring Length	42 mm (1.650 in.)
Brake Drum Nut Torque	88 N·m (65 lb-ft)
Rear Wheel Cap Screw Torque	70 N·m (52 lb-ft)
Drive Shaft—322 and 332	
Isolator-to-Engine Cap Screw Torque	37 N·m (27 lb-ft)
Drive Shaft Cap Screws and Lock Nut Torque	
Flange-to-Isolator	27 N·m (20 lb-ft)
Clamping Yoke-to-Transmission Pump Shaft	60 N·m (44 lb-ft)
Drive Shaft—330	
Isolator-to-Engine Cap Screw Torque	27 N·m (20 lb-ft)
Drive Shaft Cap Screws and Lock Nut Torque	
Flange-to-Isolator	27 N·m (20 lb-ft)
Clamping Yoke-to-Transmission Pump Shaft	60 N·m (44 lb-ft)

Continued on next page.

MX,15911015,1 -19-13JUL95

Item	Specifications
10 15 2	
POWER TRAIN, continued	
Drive Shaft—430	
Flange-to-Engine Cap Screw Torque	27 N·m (20 lb-ft)
Clamping Yoke-to-Transmission Pump Shaft Cap Screw Torque	60 N·m (44 lb-ft)
Tube Yoke Shaft-to-Bushing Yoke Tube Lock Nut Torque	3 N·m (25 lb-in.)
STEERING AND BRAKES	
Steering—330	
Gearbox Mounting Cap Screw Torque	95 N·m (70 lb-ft)
Steering Wheel-to-Shaft Nut Torque	15 N·m (133 lb-in.)
Pitman Arm Nut Torque	224 N·m (165 lb-ft)
Preload Adjuster Maximum End Clearance	0.05 mm (0.002 in.)
Side Cover-to-Gearbox Housing Cap Screw Torque	40 N·m (30 lb-ft)
Worm Bearing Preload Rolling Torque	0.60—1.0 N·m (5—8 lb-in.)
Over-Center Preload Rolling Torque	0.50—1.20 N·m (4—10 lb-in.)
Preload Adjuster Lock Nut Torque	34 N·m (25 lb-ft)
Steering Shaft Universal Joint-to-Worm Shaft Cap Screw Torque	24 N·m (212 lb-in.)
Steering—322, 332 and 430	
Steering Wheel-to-Shaft Nut Torque	15 N·m (133 lb-in.)
Rotor-to-Stator Maximum Allowable Clearance	0.08 mm (0.003 in.)
Steering Tube Bushing Depth	2.5 mm (0.100 in.) below top of tube
Commutator Cover-to-Commutator Screw Torque	1.4 N·m (12 lb-in.)
Port Cover Nut Torque	30 N·m (22 lb-ft)
Check Ball Plug Torque (Early Version)	14 N·m (124 lb-in.)
Steering Cylinder Mounting Nut Torque	163 N·m (120 lb-ft)
Brakes	
Brake Plate-to-Axle Housing Cap Screw Torque	68 N·m (50 lb-ft)
Axle Housing-to-Frame Cap Screw Torque	100 N·m (75 lb-ft)
Brake Rod Spring Length	42 mm (1.650 in.)
Brake Drum-to-Axle Nut Torque	88 N·m (65 lb-ft)
Rear Wheel Cap Screw Torque	70 N·m (52 lb-ft)
HYDRAULICS	
Single-Spool Valve	
Spool Screw Torque	4 N·m (35 lb-in.)
Spool Cap-to-Body Screw Torque	4 N·m (35 lb-in.)
Check Valve Plug Torque	31 N·m (23 lb-ft)
Two-Spool Valve	
Versions One and Two	
Spool Cap-to-Body Screw Torque	31 N·m (23 lb-ft)
Versions Three and Four	
Spool Screw and Detent Torque	4 N·m (35 lb-in.)
Spool Cap-to-Body Screw Torque	4 N·m (35 lb-in.)
Check Valve Plug Torque	31 N·m (23 lb-ft)
Three-Spool Valve	
Spool Screws and Detent Torque	4 N·m (35 lb-in.)
Spool Cap-to-Body Screw Torque	4 N·m (35 lb-in.)
Check Valve Plug Torque	31 N·m (23 lb-ft)

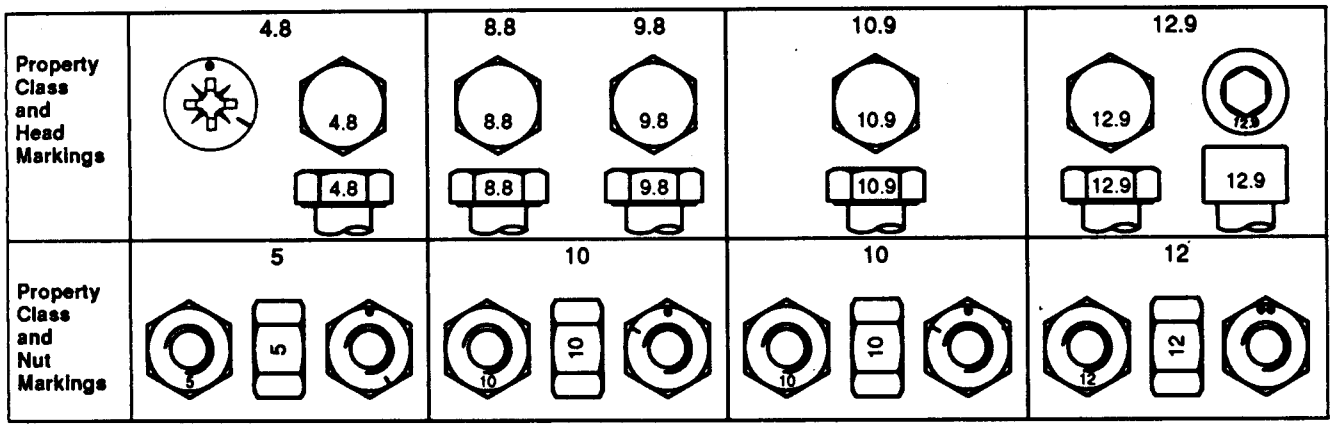
Continued on next page.

MX,15911015,2 -19-13JUL95

Item	Specifications
MISCELLANEOUS	
Front Axle	
PTO Belt Tension Spring Length (430)	35 mm (1.380 in.)
Toe-In	4.8 mm (3/16 in.)
Mower Blade Spindles	
Driven Sheave-to-Spindle Lock Nut Torque	140 N·m (103 lb-ft)
Blade-to-Spindle Cap Screw Torque	73 N·m (54 lb-ft)
Mower Blade Jack Sheave	
Jack Sheave-to-Spindle Lock Nut Torque	140 N·m (103 lb-ft)
Blade-to-Spindle Cap Screw Torque	73 N·m (54 lb-ft)
50-Inch Mower Gear Case	
Plug Installation Depth	1.59 mm (0.062 in.) below gear case surface
Retainer Seal Installation Depth	2.54 mm (0.100 in.) below retainer surface
Retainer-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)
Pillow Block Seal Installation Depth	2.54 mm (0.100 in.) below block surface
Pillow Block-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)
Early 60-Inch Mower Gear Case	
Cap-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)
Output Shaft Endplay	0.025—0.076 mm (0.001—0.003 in.)
Input Shaft Backlash	0.076—0.130 mm (0.003—0.005 in.)
Later 60-Inch Mower Gear Case	
Gear Case Seal Installation Depth	2.54 mm (0.100 in.) below gear case surface
Retainer-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)
Pillow Block Seal Installation Depth	2.54 mm (0.100 in.) below block surface
Pillow Block-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)
260 Rotary Mower Gear Case	
End Cap-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)
Input Shaft Endplay	0.025—0.076 mm (0.001—0.003 in.)
Output Shaft Backlash	0.076—0.130 mm (0.003—0.005 in.)
Housing-to-Gear Case Cap Screw Torque	30 N·m (22 lb-ft)

MX,15911015,3 -19-13JUL95

METRIC BOLT AND CAP SCREW TORQUE VALUES



TS1163 -19-04MAR91

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

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

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

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

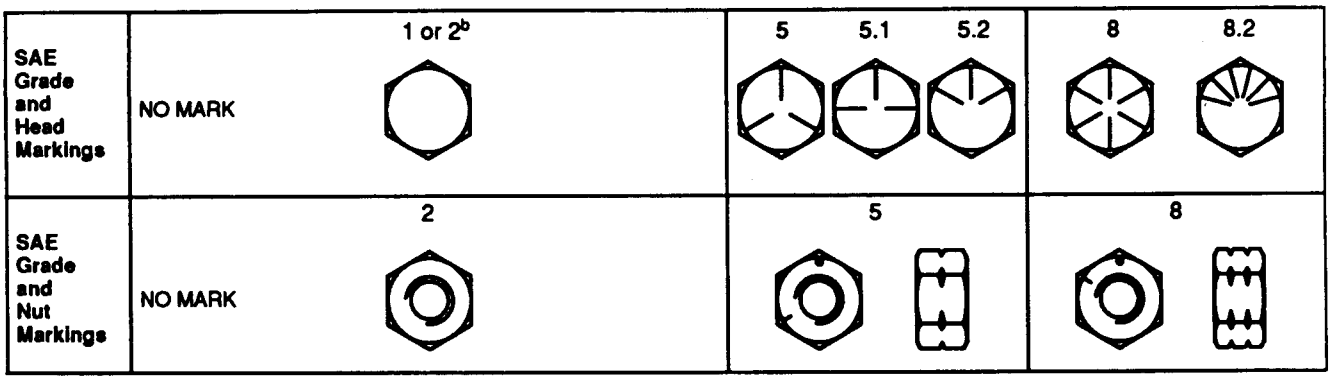
Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

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

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

DX,TORQ2 -19-20JUL94

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



TS1162 -19-04MAR91

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

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

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

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

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

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

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

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

DX,TORQ1 -19-20JUL94

METRIC CAP SCREW TORQUE VALUES—GRADE 7

NOTE: When bolting aluminum parts, tighten to 80% of torque specified in table.

Size	N·m	(lb-ft)
M6	9.5 - 12.2	(7-9)
M8	20.3 - 27.1	(15-20)
M10	47.5 - 54.2	(35-40)
M12	81.4 - 94.9	(60-70)
M14	128.8 - 146.4	(95-108)
M16	210.2 - 240	(155-177)

MX,15901015,3 -19-01MAR95

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

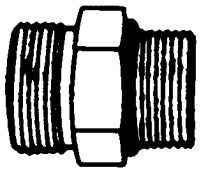
M77900 -19-15DEC94

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

Divide readings by 12 for foot-pound values.

MX,TORQ,SET -19-09DEC94

SERVICE RECOMMENDATIONS FOR O-RING BOSS FITTINGS



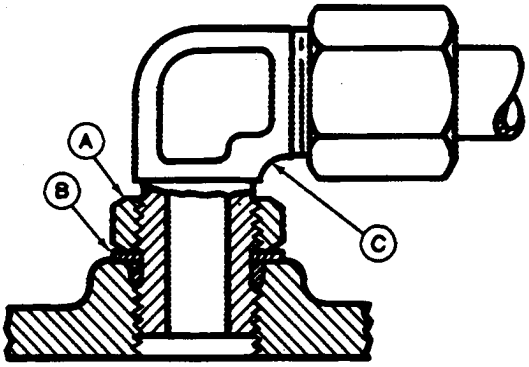
T6243AE -UN-18OCT88

STRAIGHT FITTING

1. Inspect O-ring boss seat for dirt or defects.

2. Lubricate O-ring with petroleum jelly. Place electrical tape over threads to protect O-ring. Slide O-ring over tape and into O-ring groove of fitting. Remove tape.

3. Tighten fitting to torque value shown on chart.



T6520AB -UN-18OCT88

ANGLE FITTING

1. Back-off lock nut (A) and back-up washer (B) completely to head-end (C) of fitting.

2. Turn fitting into threaded boss until back-up washer contacts face of boss.

3. Turn fitting head-end counterclockwise to proper index (maximum of one turn).

4. Hold fitting head-end with a wrench and tighten locknut and back-up washer to proper torque value.

NOTE: Do not allow hoses to twist when tightening fittings.

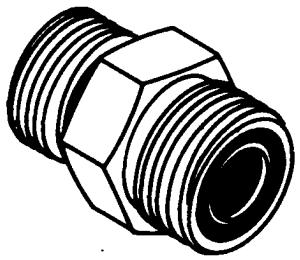
TORQUE VALUE

Thread Size	N·m	lb-ft
3/8-24 UNF	8	6
7/16-20 UNF	12	9
1/2-20 UNF	16	12
9/16-18 UNF	24	18
3/4-16 UNF	46	34
7/8-14 UNF	62	46
1-1/16-12 UN	102	75
1-3/16-12 UN	122	90
1-5/16-12 UN	142	105
1-5/8-12 UN	190	140
1-7/8-12 UN	217	160

NOTE: Torque tolerance is ± 10%.

MX,159110153,A -19-13JUL95

SERVICE RECOMMENDATIONS FOR FLAT FACE O-RING SEAL FITTINGS



T6243AD -UN-18OCT88

1. Inspect the fitting sealing surfaces. They must be free of dirt or defects.

2. Inspect the O-ring. It must be free of damage or defects.

3. Lubricate O-rings and install into groove using petroleum jelly to hold in place.

4. Push O-ring into the groove with plenty of petroleum jelly so O-ring is not displaced during assembly.

5. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.

6. Tighten fitting or nut to torque valve shown on the chart per dash size stamped on the fitting. Do not allow hoses to twist when tightening fittings.

FLAT FACE O-RING SEAL FITTING TORQUE

Nominal Tube O.D. mm	(in.)	Dash Size	Thread Size In.	Swivel Nut Torque N·m	(lb-ft)	Bulkhead Nut Torque N·m	(lb-ft)
6.35	0.250	-4	9/16-18	16	12	5.0	3.5
9.52	0.375	-6	11/16-16	24	18	9.0	6.5
12.70	0.500	-8	13/16-16	50	37	17.0	12.5
15.88	0.625	-10	1-14	69	51	17.0	12.5
19.05	0.750	-12	1 3/16-12	102	75	17.0	12.5
22.22	0.875	-14	1 3/16-12	102	75	17.0	12.5
25.40	1.000	-16	1 7/16-12	142	105	17.0	12.5
31.75	1.250	-20	1 11/16-12	190	140	17.0	12.5
38.10	1.500	-24	2-12	217	160	17.0	12.5

NOTE: Torque tolerance is +15 -20%.

OR,SEAL,FIT -19-03MAR89

TUBE AND HOSE FITTING, 37° FLARE AND 30° CONE SEAT CONNECTOR SERVICE RECOMMENDATIONS

1. Inspect the flare and the flare seat. They must be free of dirt and defects. If repeated leaks occur, inspect for defects with a magnifying glass. If burrs and raised nicks on the connector body cannot be removed with a slip stone, replace the connector.

2. Defects in the tube flare cannot be repaired. Replace the tube. Overtightening a defective flared fitting will not stop leaks.

3. As a field repair, a ductile truncated cone shaped washer can be used between the tube flare and connector body. These washers are soft enough to fill defects in the seat and flare. They will also seal the connection. Ductile washers are available from industrial supply houses.

4. Align the tube with the fitting before attempting to start the nut. Failure to do so can cause a deformed flare and subsequent leaks. Install hoses without twists. A twisted hose attempts to straigten out when pressure is applied. This exerts a torque on the connection, eventually causing failure.

5. Lubricate the connection with hydraulic fluid, petroleum jelly or soap. Tighten the swivel nut by hand until it is snug.

6. Mark a line across the nut and connector body. This line will serve as a visual indicator as to whether the nut has been tightened and by how much.

7. Using two wrenches, one on the connector body and a torque wrench on the nut, tighten the nut to the torque value as shown in the chart. In the case of a hose, it may be necessary to use three wrenches to prevent twisting.

MX,15901015,4 -19-17JAN95

TUBE AND HOSE FITTING, 37° FLARE AND 30° CONE SEAT CONNECTOR TORQUE

10
15
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Thread Size	N·m	Torque[1] (lb-ft)	New[2] Number of Flats	Used [3] Number of Flats
3/8-24 UNF	8	(6)	2-1/2	1
7/16-20 UNF	12	(9)	2-1/2	1
1/2-20 UNF	16	(12)	2-1/2	1
9/16-18 UNF	24	(18)	2	1
3/4-16 UNF	46	(34)	2	1
7/8-14 UNF	62	(46)	1-1/2	1
1-1/16-12 UN	102	(75)	1	3/4
1-3/16-12 UN	122	(90)	1	3/4
1-5/16-12 UN	142	(105)	3/4	3/4
1-5/8-12 UN	190	(140)	3/4	3/4
1-7/8-12 UN	217	(160)	1/2	1/2

1. Tolerance of ± 10 percent.

2. To be used if a torque wrench cannot be used. After tightening fitting by hand, put a mark across the fittings, then tighten fitting the number of flats shown.

3. Flare connection seal by deforming or squeezing the tube between the nut and the connector. More deformation is possible with new parts than with old. Therefore, if a torque
rench is not used for re-assembly, the values in this column must be used to
revent damage.

MX,15901015,5 -19-17JAN95

TEST AND ADJUSTMENT SPECIFICATIONS

Item	Specifications
ENGINE—322	
Slow Idle Speed	
3TG66UJ	1350 ± 50 rpm
Fast Idle Speed	
3TG66UJ	3450 ± 50 rpm
Fuel Pump	
Minimum Fuel Flow	
3TG66UJ	200 mL (7 oz.)/30 seconds
Minimum Fuel Pressure	
3TG66UJ	14 kPa (2 psi)
Choke Plate Clearance (Later models)	2 mm (0.78 in.)
Oil Pressure	
3TG66UJ	294—440 kPa (43—64 psi)
Spark Plug Gap	
3TG66UJ	0.80 mm (0.032 in.)
Cooling System Pressure Test	
3TG66UJ	117 kPa (17 psi)
Minimum Pressure After After 15 Seconds	
3TG66UJ	90 kPa (13 psi)
Radiator Cap	
Opening Pressure	
3TG66UJ	97—104 kPa (14—15 psi)
Compression	
Minimum	
3TG66UJ	779 kPa (113 psi)
Maximum Difference Between Cylinders	
3TG66UJ	97 kPa (14 psi)
Engine Cranking Speed	
3TG66UJ	300 rpm

MX,15911020,1 -19-13JUL95

Item	Specifications
ENGINE—330, 332, and 430	
Fuel Pump	
Minimum Fuel Flow	
3TN66UJ	200 mL (7 oz.)/30 seconds
3TNA72UJ	600 mL (20 oz.)/30 seconds
Minimum Fuel Pressure	
3TN66UJ	21 kPa (3 psi)
3TNA72UJ	21 kPa (3 psi)
Compression	
Minimum	
3TN66UJ	2448 kPa (355 psi)
3TNA72UJ	2448 kPa (355 psi)
Maximum Difference Between Cylinders	
3TN66UJ	490 kPa (71 psi)
3TNA72UJ	490 kPa (71 psi)
Miniumum Engine Cranking Speed	250 rpm
Oil Pressure	
3TN66UJ	365 ±69 kPa (53 ±10 psi)
3TNA72UJ	365 ±69 kPa (53 ±10 psi)
Slow Idle Speed	
3TN66UJ and Later 3TNA72UJ	1350 ± 50 rpm
Early 3TNA72UJ	1300 ± 50 rpm
Fast Idle Speed	
3TN66UJ and Later 3TNA72UJ	3450 ± 50 rpm
Early 3TNA72UJ	3400 ± 50 rpm
Cooling System Pressure Test	
3TN66UJ	117 kPa (17 psi)
3TNA72UJ	117 kPa (17 psi)
Minimum Pressure After After 15 Seconds	
3TN66UJ	90 kPa (13 psi)
3TNA72UJ	90 kPa (13 psi)
Radiator Cap	
Opening Pressure	
3TN66UJ	97—104 kPa (14—15 psi)
3TNA72UJ	97—104 kPa (14—15 psi)
Fuel Injection Pump Cover Nut Torque	
3TN66UJ and Later 3TNA72UJ	9 N·m (78 lb-in.)
Fuel Injection Pump Cover Cap Screw Torque	
Early 3TNA72UJ	9 N·m (78 lb-in.)

MX,15911020,3 -19-13JUL95

Item	Specifications
ELECTRICAL SYSTEM	
Pulser Coils—322	
Minimum Voltage Output	0.05 VAC
Resistance	15.5—23.3 ohms
Ignition Coils—322	
Primary Coil Resistance	3.8—5.2 ohms
Secondary Coil Resistance	10.8—16.2 K-ohms
Glow Plugs—330, 332 and 430	
Minimum Resistance	1.00 ohms
PTO Clutch Armature-to-Rotor Clearance	0.46 mm (0.018 in.)
Starter—322, 330 and 332	
Current Draw (Maximum)	230 amps
No-Load rpm (Minimum)	7000 rpm
No-Load Amp Draw (Maximum)	60 amps
Starter—430	
Current Draw (Maximum)	230 amps
No-Load rpm (Minimum)	3000 rpm
No-Load Amp Draw (Maximum)	90 amps
Fuel Shutoff Solenoid (430 S.N. —420468)	
Lever-to-Stop Clearance	2 mm (0.080 in.)
Alternator—322, 330 and 332	
Regulated Voltage Output	13.5—15 volts
Unregulated Voltage Output (Minimum)	30 volts
Regulated Current Output (Minimum)	18 amps
Alternator—430	
Regulated Voltage Output	13.8—14.7 volts
Unregulated Current Output (Minimum)	
(S.N. —420468)	35 amps
(S.N. 420469—)	40 amps
POWER TRAIN	
Oil Temperature for Hydraulic Tests	43˚C (110˚F)
Charge Pump Pressure	620—1240 kPa (90—180 psi)
Implement Relief Valve Pressure	5861—6722 kPa (850—975 psi)
Minimum Charge Pump Flow at 3450 kPa (500 psi)	11 L/min (3 gpm)
322, 332 and 430; Steering Valve Pressure in Neutral Position	620—1240 kPa (90—180 psi)
Hydrostatic Lever Tension	31—44.5 N (7—10 lb force)
Turnbuckle Lock Nut Torque (Transmission Control Lever Linkage, 330 and Version One—322, 332 and 430)	33 N·m (24 lb-ft)
Detent Spring Length (Transmission Control Lever Linkage, Later Versions—322, 332 and 430)	50 mm (1.970 in.)

MX,15911020,2 -19-13JUL95

Item	Specifications
STEERING AND BRAKES	
Oil Temperature for Hydraulic Tests	43˚C (110˚F)
Steering System Leakage Test at Slow Idle	
Torque Applied to Steering Wheel Nut	6.8 N·m (60 lb-in.)
Maximum Left and Right Turn rpm	6 rpm
HYDRAULIC SYSTEM	
Oil Temperature for Hydraulic Tests	43˚C (110˚F)
Control Valve Leakage Test	
Control Valve Pressure	5860—6550 kPa (850—950 psi)
Control Valve Leakage	15 mL/min (1/2 fl oz/min)

MX,15911020,4 -19-13JUL95

FUEL—322

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 mix oil with gasoline.

1. Unleaded fuel is recommended. Regular leaded gasoline with an anti-knock index of 87 or higher may be used. Avoid switching from unleaded to regular gasoline to prevent engine damage.

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

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

M33122 -UN-25AUG88

MX,15911025,1 -19-13JUL95

DIESEL FUEL—330, 332 AND 430

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25
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Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed. Recommended standard grades are shown on the temperature charts.

Diesel fuels meeting Military Specification VV-F-800E are preferred. If diesel fuel specified to ASTM D975 is used, the fuel must meet the following properties:

• Cetane Number 40 minimum.
Cetane number greater than 50 is preferred, especially for temperatures below -20˚C (-4˚F) or elevations above 1500 m (5000 ft).

• Cold Filter Plugging Point (CFPP) below the expected low temperature OR Cloud Point at least 5˚C (9˚F) below the expected low temperature

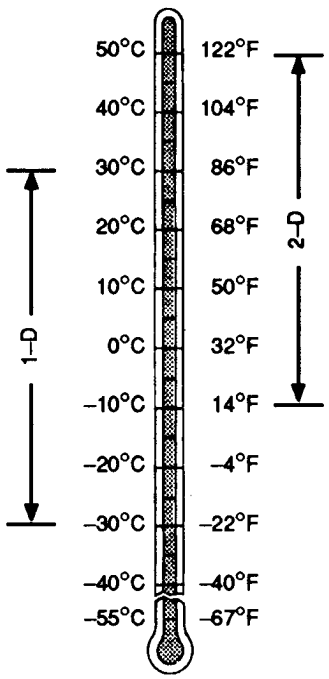
• Sulfur content:
— Sulfur content should not exceed 0.5% Sulfur content less than 0.05% is preferred.
— If diesel fuel with sulfur content greater than 0.5% sulfur content is used, reduce the service interval for engine oil and filter by 50%
— DO NOT use diesel fuel with sulfur content greater than 1.0%

• Lubricity
— Fuel lubricity must pass the BOCLE scuffing test at 3300 gram minimum load level.
— If fuel of low or unknown lubricity is used, add John Deere All-Season Diesel Fuel Conditioner at specified concentration.

Bio-diesel fuels with these properties and meeting an appropriate specification may be used as an alternative to petroleum-based diesel fuel.

Arctic fuels (such as Military Specification VV-F-800E, Grade DF-A) may be used at temperatures below -30˚C (-22˚F).

CAUTION: Handle fuel carefully. Do not fill the fuel tank when engine is running. DO NOT smoke while you fill the fuel tank or service the fuel system.



North America ASTM D975

TS1611 -UN-31JAN94

MX,15911025,2 -19-13JUL95

STORING FUEL

If there is a very slow turnover of fuel in the fuel tank or supply tank, it may be necessary to add a fuel conditioner to prevent water condensation. Contact your John Deere dealer for proper service or maintenance recommendations.

DX,FUEL -19-03MAR93

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 -19-02AUG85

ENGINE OIL—322

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

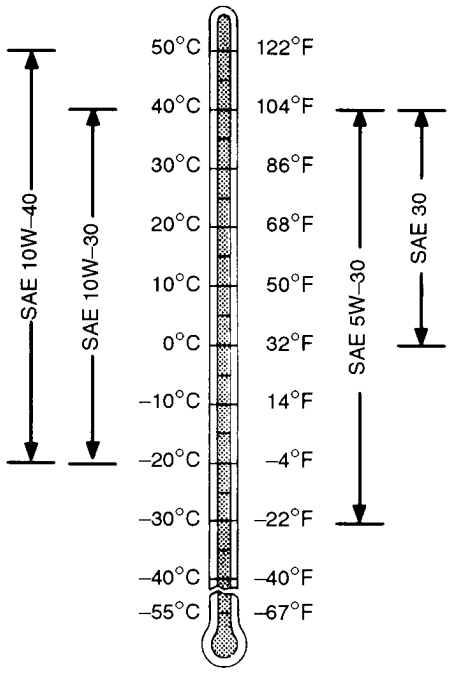
The following oils are preferred:

- John Deere TURF-GARD™
- John Deere PLUS-4®

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

- API Service Classification SH
- API Service Classification SG
- CCMC Specification G5

Arctic oils (such as Military Specification MIL-L-46167B) may be used at temperature below -30˚C (-22˚F).



MX,15911025,3 -19-13JUL95

DIESEL ENGINE OIL—330, 332 AND 430

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

Viscosity grade SAE 15W-40 is preferred.

If other viscosity grades are used, reduce the service interval for oil and filter changes by 50%

The following oil is preferred:
• John Deere TORQ-GARD SUPREME© PLUS-50™

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

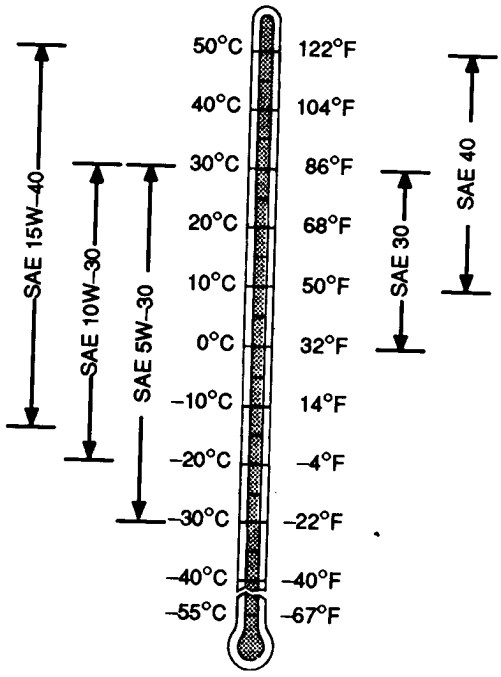
The following oil is also recommended:
• John Deere TORQ-GARD SUPREME©

Other oils may be used if they meet one or more of the following:
• API Service Classification CG4
• API Service Classification CF4
• API Service Classification CE

Oils meeting one of the following may be used, but reduce the service interval for engine oil and filter changes by 50%:
• John Deere UNI-GARD™
• CCMC Specification D5
• CCMC Specification D4

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

Arctic oils (such as Military Specification MIL-L-46167B) may be used at temperatures below -30˚C (-22˚F). Reduce the service interval for oil and filter changes by 50%



-UN-22JUL94

TS1618

MX,15911025,4 -19-13JUL95

ENGINE COOLANT

John Deere Low Silicate Antifreeze is recommended.

Also recommended is low silicate antifreeze formulated to GM6038M or equivalent.

Other antifreezes that may be used:
- Ethylene-glycol type.
- Those containing not more than 0.1 percent anhydrous metasilicate.
- Those meeting General Motors Performance Specification GM1899M

IMPORTANT: Some types of ethylene-glycol antifreeze are intended for automotive use. These products are often labeled for use in aluminum engines and usually contain more than 0.1 percent of anhydrous metasilicate.

Check container label or consult with antifreeze supplier before using.

Mix 50-67 percent low silicate antifreeze with 33-50 percent distilled or deionized water.

Low silicate antifreeze provides:
- Adequate heat transfer.
- Corrosion-resistant environment within the cooling system.
- Compatibility with cooling system hose and seal material.
- Protection during cold and hot weather operations.

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

DX,COOL -19-04JUN90

LIQUID COOLANT CONDITIONER

John Deere Liquid Coolant Conditioner is recommended for wet-sleeve diesel engines not having a coolant filter option. Other conditioners may be used if it contains non-chromate inhibitors.

IMPORTANT: If engine is equipped with a John Deere Coolant Filter Conditioner, the correct inhibitors are contained in the filter. If both are used, a gel-type deposit is created which could inhibit heat transfer and block coolant flow. John Deere Liquid Coolant Conditioner does not protect against freezing.

Various sizes of coolant conditioners are available from your John Deere dealer.

RG4690 -UN-14DEC88

DX,COOL1 -19-04JUN90

TRANSMISSION AND HYDRAULIC OIL

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

The following oils are preferred:

- John Deere HY-GARD®
- John Deere Low Viscosity HY-GARD®

The following oils are also recommended:

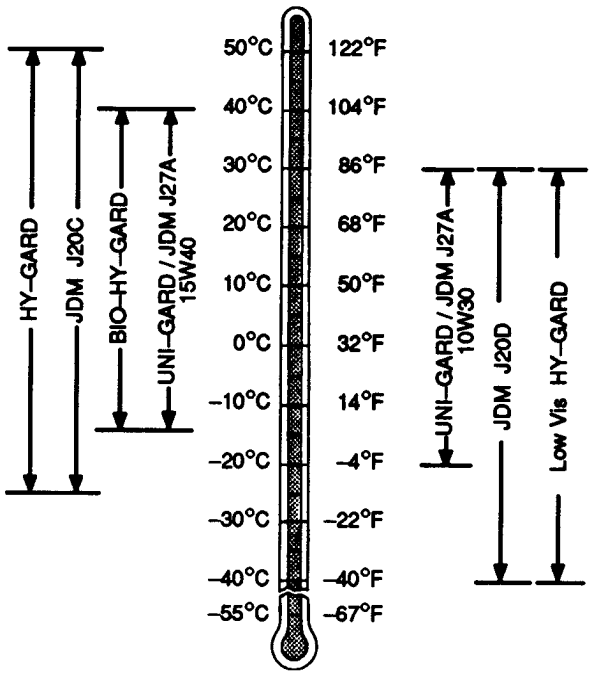
- John Deere UNI-GARD™
- John Deere BIO-HY-GARD™[1]

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

- John Deere Standard JDM J20C
- John Deere Standard JDM J20D
- John Deere Standard JDM J27A

IMPORTANT: Do not use engine oil for this application.

Arctic oils (such as Military Specification MIL-L-46167B) may be used at temperatures below -30˚C (-22˚F).



[1]BIO-HY-GARD meets or exceeds the minimum biodegradability of 80% within 21 days according to CEC-L-33-T-82 test method. BIO-HY-GARD should not be mixed with mineral oils because this reduces the biodegradability and makes proper oil recycling impossible.

DX,ANTI -19-01FEB94

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GREASE

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

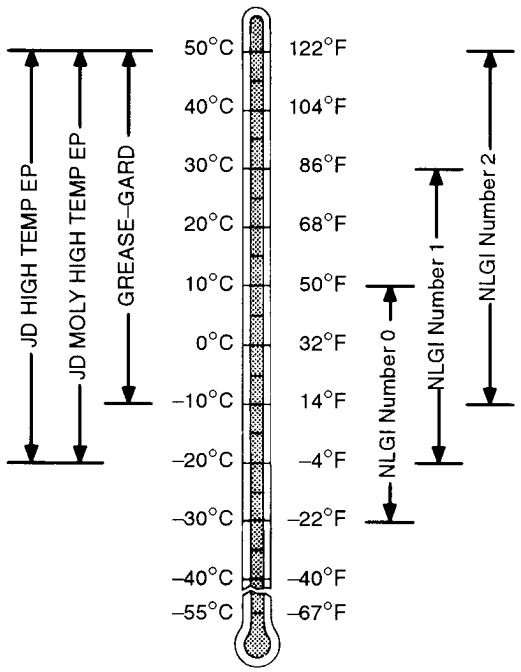
The following greases are preferred:

- 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.



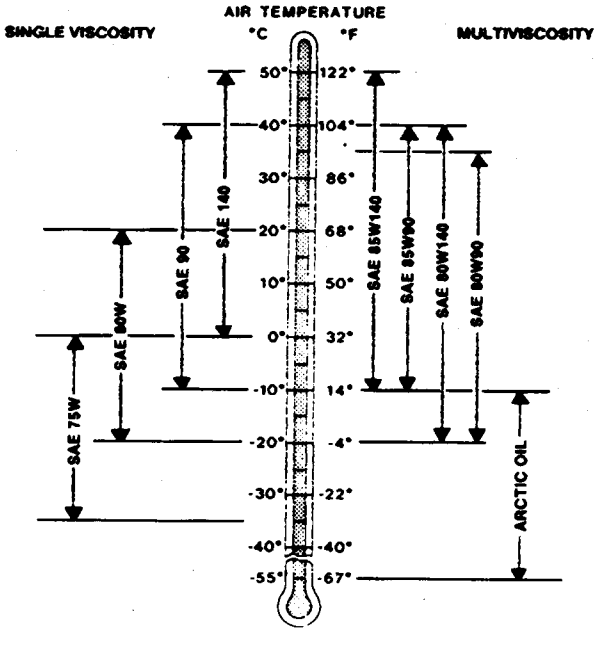
DX,GREA1 -19-02NOV94

MOWER DECK GEAR CASE OIL

Depending upon the expected air temperature range during the drain interval, use oil viscosity shown on the adjoining temperature chart.

John Deere API GL-5 Gear Oil is recommended. If other oils are used, they must meet performance requirements of:

•API Service Classification GL-5
•Military Specificaiton MIL-L-2105C



MX,15901025,3 -19-14FEB95

ALTERNATIVE AND SYNTHETIC LUBRICANTS

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual. Some John Deere lubricants may not be available in your location. Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements listed in this manual.

DX,ALTER -19-01FEB94

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 in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

DX,LUBST -19-01FEB94

MIXING OF LUBRICANTS

In general, avoid mixing different brands or types of oil. Oil manufacturers blend additives in their oils to meet certain specifications and performance requirements. Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

DX,LUBMIX -19-01FEB94

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.

MX,M21,1030R,1 -19-22APR85

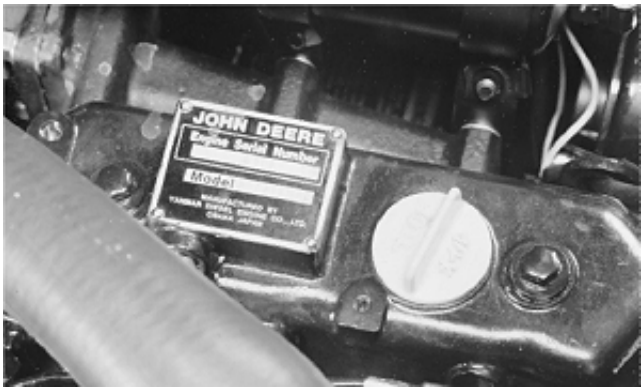
PRODUCT IDENTIFICATION NUMBER

NOTE: All identification number plates are located on the pedestal. On some models, the plate is on the right-hand side. On others, front top left corner.

M34494 -UN-08NOV89

MX,15901030,1 -19-12MAY95

ENGINE SERIAL NUMBER

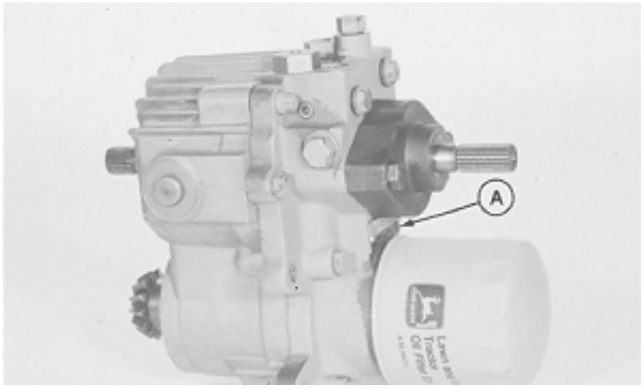


M34495 -UN-08NOV89

MX,15911030,1 -19-13JUL95

TRANSMISSION SERIAL NUMBER

Serial number plate (A) location.

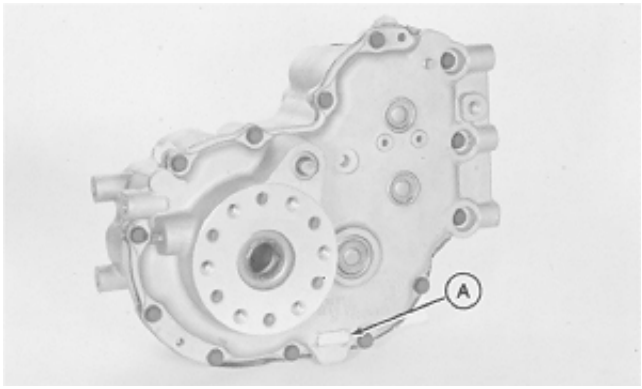


M38478 -UN-29AUG88

MX,15901030,3 -19-12MAY95

DIFFERENTIAL SERIAL NUMBER

Serial number plate (A) location.



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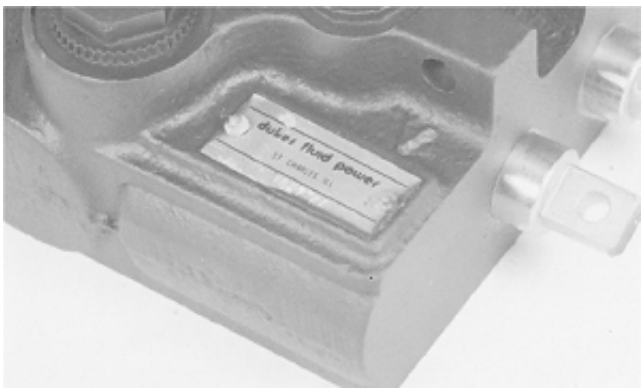
M38479

MX,15901030,4 -19-12MAY95

CONTROL VALVE SERIAL NUMBER



-UN-29AUG88
M38480

MX,15901030,5 -19-12MAY95

Section 20
ENGINE REPAIR

Contents

YANMAR GASOLINE ENGINE REPAIR—USE CTM12

For complete repair information, the component technical manual (CTM) is also required. Use the component technical manual in conjunction with this machine manual.

TS225 -UN-17JAN89

MX,15912005,1 -19-13JUL95

REMOVE AND INSTALL ENGINE—322

1. Remove grille, side panels, battery, battery base and belly screen.

2. Disconnect headlight and hour meter leads.

3. Remove hood, hood support and battery base support.

TS281 -UN-23AUG88

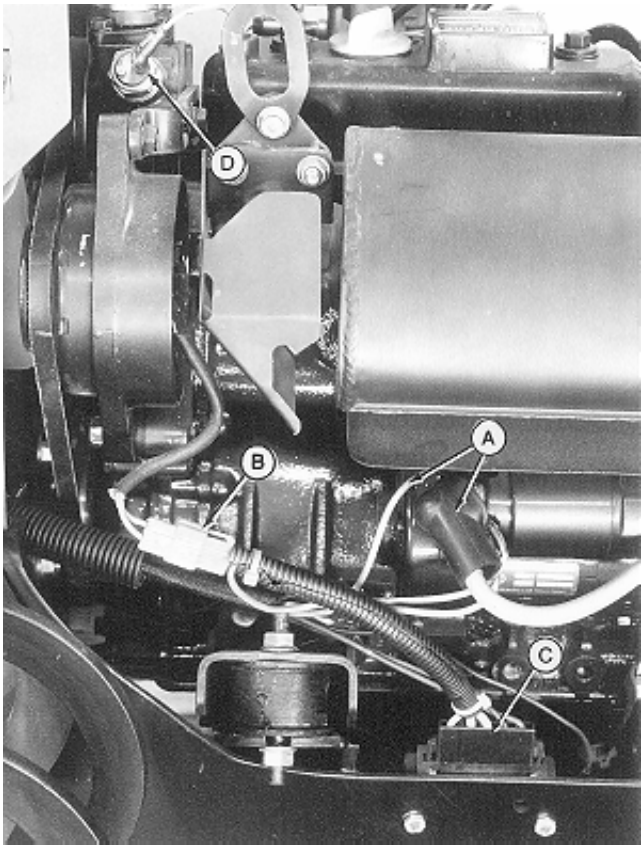
CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

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

4. Drain radiator. Approximate capacity is 2.8 L (3 U.S. qt).

5. Disconnect items (A—D).

A—Starter Cable and Leads
B—Alternator Lead
C—Voltage Regulator Lead
D—Temperature Coolant Lead

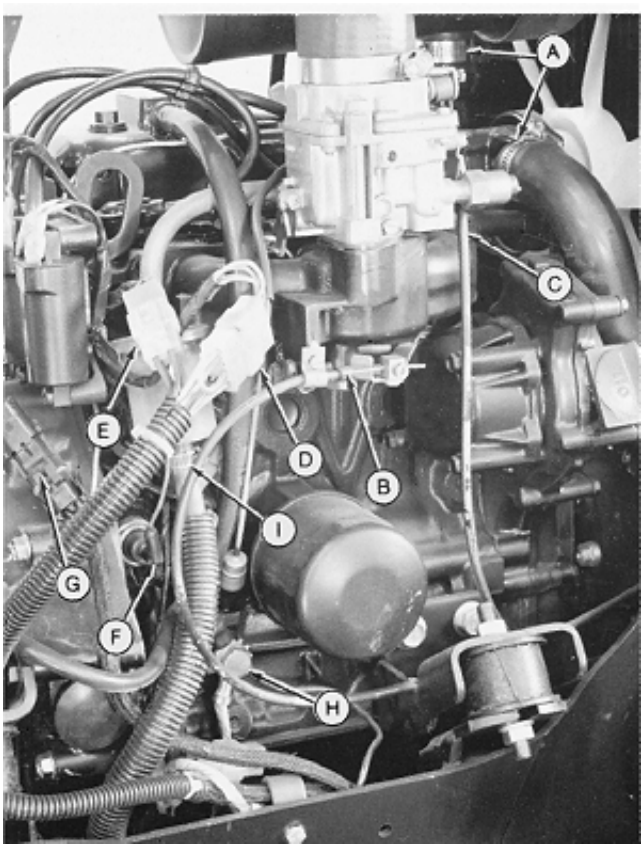


M77901 -UN-15DEC94

MX,15912005,2 -19-13JUL95

6. Disconnect items (A—I).

A—Radiator Hoses
B—Throttle Cable
C—Choke Cable
D—Ignition Coil Lead
E—Ignition Trigger Lead
F—Oil Pressure Sensor Lead
G—PTO Clutch Lead
H—Wire Harness Ground and Frame to Engine Ground
I—Fuel Line at Filter



M49504 -UN-20DEC89

MX,5M3,2005K,H -19-18DEC87

7. Remove cap screws (A) holding rubber drive shaft isolator to engine.

8. Loosen cap screws at universal joint at transmission input shaft and slide drive shaft toward transmission. This will eliminate any preload on the drive shaft when reassembling.

9. Remove engine mounting nuts.

10. Attach load positioning sling to lift eyes and remove engine.

11. Make repairs as necessary. (See CTM12.)

12. Installation is done in the reverse order of removal.

• Tighten engine mounting nuts to specifications.

• When connecting drive shaft, tighten cap screws to specifications.

• Close drain valve and fill radiator with proper coolant until coolant is 13—25 mm (0.500—1 in.) below bottom of filler neck. (See Engine Coolant in Section 10, Group 25.)

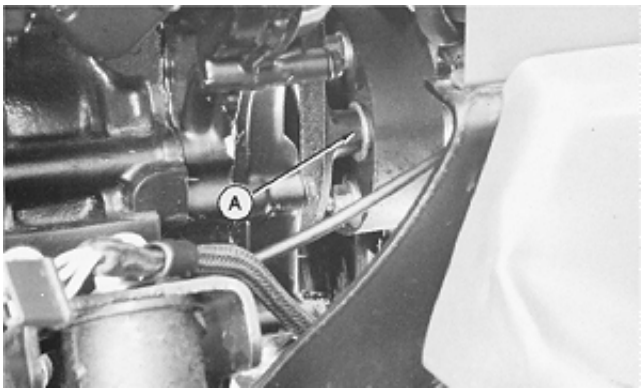
NOTE: On Early models, the choke is activated manually by a cable. On Later models, the choke operates automatically.

• Early models; Adjust choke cable. (See Section 220, Group 10.)

• Adjust slow and fast idle. (See Section 220, Group 10.)

TORQUE SPECIFICATIONS

Engine Mounting Nuts	49 N·m (36 lb-ft)
Drive Shaft	
Engine Mounting Cap Screws	37 N·m (27 lb-ft)
Universal Joint Cap Screws	60 N·m (45 lb-ft)



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MX,15912005,3 -19-13JUL95

YANMAR DIESEL ENGINE REPAIR—USE CTM3

For complete repair information, the component technical manual (CTM) is also required. Use the component technical manual in conjunction with this machine manual.

-UN-17JAN89
TS225

MX,15912006,1 -19-13JUL95

REMOVE AND INSTALL ENGINE—330 AND 332

1. Remove grille, side panels, battery, battery base and belly screen.

2. Disconnect headlight and hour meter leads.

3. Remove hood, hood support and battery base support.

-UN-23AUG88
TS281

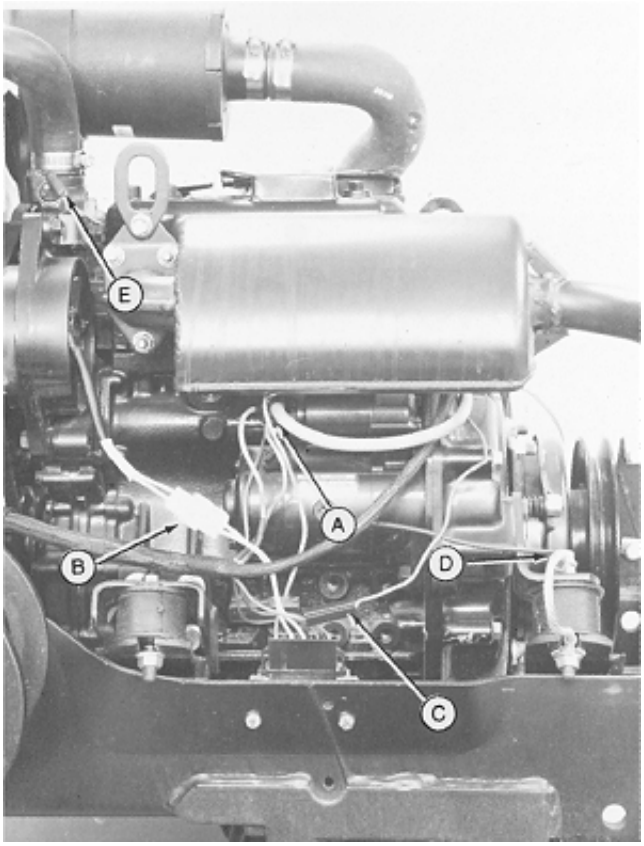
CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

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

4. Drain radiator. Approximate capacity is 2.8 L (3 U.S. qt).

NOTE: On 330, wiring harness ground and engine-to-frame ground (D) are connected to rear engine mount.

5. Disconnect items (A—E).



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M49506

A—Battery Positive (+) Cable and Starter Leads
B—Alternator Lead
C—PTO Clutch Lead
D—Wiring Harness Ground and Engine to Frame Ground
E—Coolant Temperature Lead

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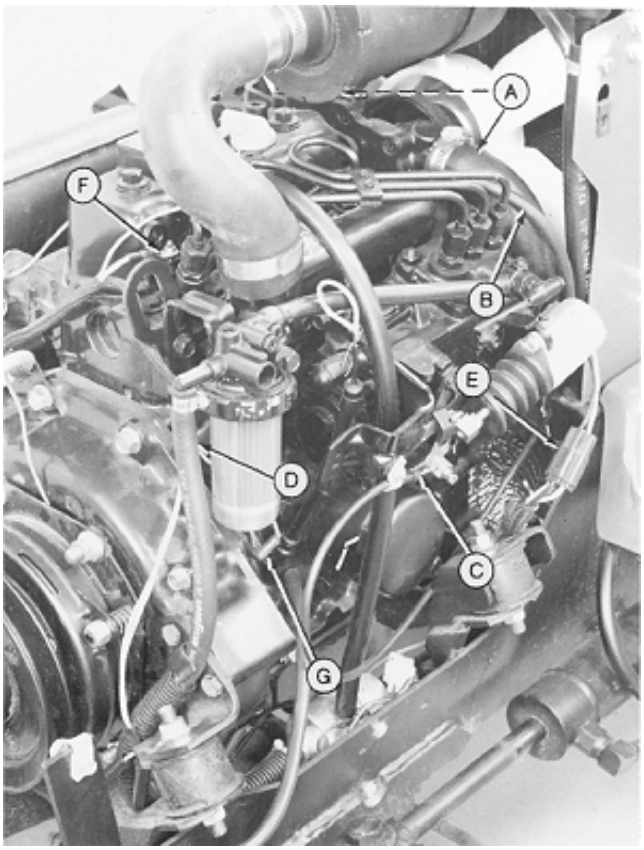
NOTE: On Early 330, fuel shutoff solenoid is activated manually by a cable. On 332 and Later 330, fuel shutoff solenoid is activated electronically.

6. Disconnect items (A—G).

A—Radiator Hoses
B—Return Fuel Line
C—Throttle Cable
D—Fuel Pump Hose
E—Fuel Shutoff Solenoid Connector (332, Later 330)
—Fuel Shutoff Solenoid Cable (Early 330)
F—Glow Plug Lead
G—Oil Pressure Sensor Lead



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