# 322, 330, 332 and 430 Lawn and Garden Tractors

**For complete service information also see:**

**Yanmar Gasoline Engines. . . . . CTM12**
**John Deere Series 220 Diesel Engines . . . CTM3**

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

## 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.

# Contents


**SECTION 10—GENERAL INFORMATION**
- Group 05—Safety
- Group 10—General Specifications
- Group 15—Repair Specifications
- Group 20—Test and Adjustment Specifications
- Group 25—Fuels and Lubricants
- Group 30—Serial Number Locations

**SECTION 20—ENGINE REPAIR**
- Group 05—Engine—322
- Group 06—Engine—330, 332 and 430

**SECTION 40—ELECTRICAL REPAIR**
- Group 05—Front PTO Clutch

**SECTION 50—POWER TRAIN REPAIR**
- Group 05—Transmission
- Group 10—Transmission Control Linkage
- Group 15—Differential
- Group 20—Rear Axles
- Group 25—Drive Shaft—322, 330 and 332
- Group 26—Drive Shaft—430

**SECTION 60—STEERING AND BRAKE REPAIR**
- Group 05—Steering—330
- Group 06—Steering—322, 332 and 430
- Group 10—Brakes

**SECTION 70—HYDRAULIC REPAIR**
- Group 05—Hydraulic Control Valve

**SECTION 80—MISCELLANEOUS REPAIR**
- Group 05—Front Axle
- Group 10—Mower Spindle and Jack Sheave Repair
- Group 15—Mower Gear Case Repair

**SECTION 220—ENGINE, FUEL AND AIR SYSTEM CHECKOUT AND DIAGNOSIS**
- Group 05—Engine, Fuel and Air System Checkout
- Group 10—Diagnosis, Tests and Adjustments—322
- Group 11—Diagnosis, Tests and Adjustments—330, 332 and 430

**SECTION 240—ELECTRICAL SYSTEM CHECKOUT, OPERATION AND DIAGNOSIS**
- Group 05—Electrical System Checkout
- Group 10—Electrical Schematics
- Group 15—Component Location and Operation
- Group 20—Electrical System Diagnosis
- Group 25—Electrical System Component Tests and Adjustments

**SECTION 250—POWER TRAIN CHECKOUT, OPERATION AND DIAGNOSIS**
- Group 05—Power Train Checkout
- Group 10—Theory of Operation
- Group 15—Diagnosis, Tests and Adjustments

**SECTION 260—STEERING AND BRAKES CHECKOUT, OPERATION AND DIAGNOSIS**
- Group 05—Steering And Brakes System Checkout
- Group 10—Theory of Operation
- Group 15—Diagnosis, Tests and Adjustments

**SECTION 270—HYDRAULIC SYSTEM CHECKOUT, OPERATION AND DIAGNOSIS**
- Group 05—Hydraulic System Checkout
- Group 10—Hydraulic Schematics
- Group 15—Theory of Operation
- Group 20—Diagnosis, Tests and Adjustments

**SECTION 299—DEALER FABRICATED TOOLS**
- Group 00—Dealer Fabricated Tools

**Index**


*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

10

20

40

50

60

70

80

220

240

250

260
270
299
INDX

260

270

299

INDX

# 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


Page

**Group 05—Safety** . . . . . 10-05-1

**Group 10—General Specifications**
Machine Specifications
322 and 330 . . . . . 10-10-1
332 and 430 . . . . . 10-10-4

**Group 15—Repair Specifications**
Repair Specifications . . . . . 10-15-1
Metric Series Torque Chart . . . . . 10-15-4
Inch Series Torque Chart . . . . . 10-15-5
Metric Torque Values—Grade 7 . . . . . 10-15-6
Set Screw Torque Chart . . . . . 10-15-6
Service Recommendations
Flat Face O-Ring Seal Fittings . . . . . 10-15-8
Tube and Hose Fitting, 37˚ Flare and 30˚ Cone Seat Connectors . . . . . 10-15-9

**Group 20—Test and Adjustment Specifications** . . . . . 10-20-1

**Group 25—Fuels and Lubricants**
Fuel—322 . . . . . 10-25-1
Diesel Fuel—330, 332 and 430 . . . . . 10-25-2
Storing Fuel . . . . . 10-25-3
Do Not Use Galvanized Containers . . . . . 10-25-3
Engine Oil—322 . . . . . 10-25-4
Diesel Engine Oil—330, 332 and 430 . . . 10-25-5
Engine Coolant . . . . . 10-25-6
Liquid Coolant Conditioner . . . . . 10-25-6
Transmission and Hydraulic Oil . . . . . 10-25-7
Grease . . . . . 10-25-8
Mower Deck Gear Case Oil . . . . . 10-25-8
Alternative and Synthetic Lubricants . . . . 10-25-9
Lubricant Storage . . . . . 10-25-9
Mixing of Lubricants . . . . . 10-25-9

**Group 30—Serial Number Locations**
Serial Numbers
Product Identification . . . . . 10-30-1
Engine . . . . . 10-30-1
Transmission . . . . . 10-30-1
Differential . . . . . 10-30-2
Control Valve . . . . . 10-30-2

## 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

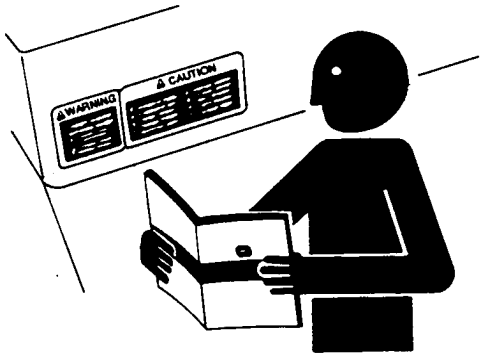
## FOLLOW SAFETY INSTRUCTIONS

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

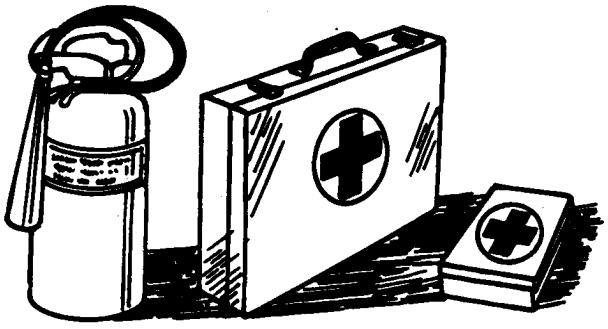
DX,SPARKS -19-03MAR93

## 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

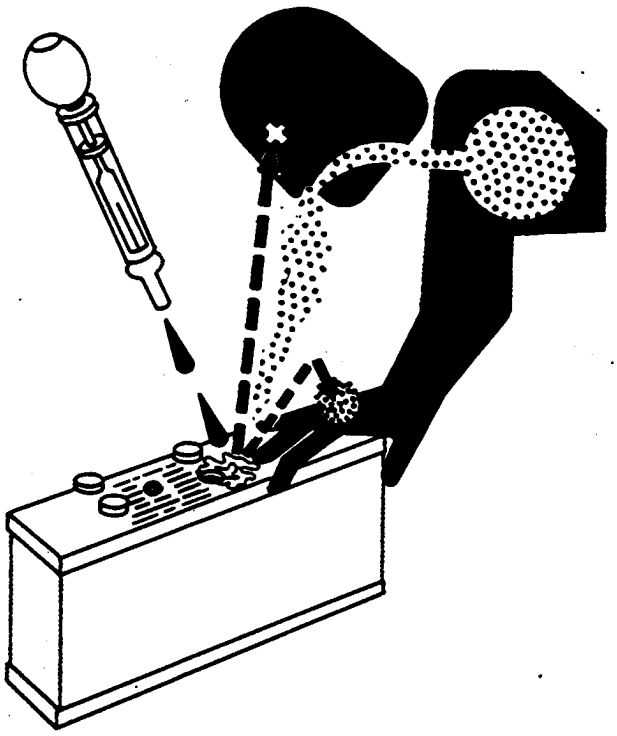
## PREVENT ACID BURNS

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.

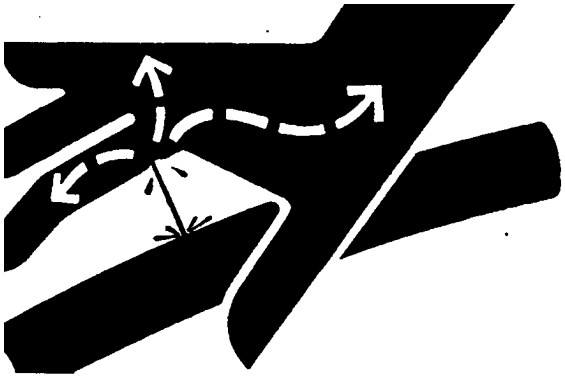
A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

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.

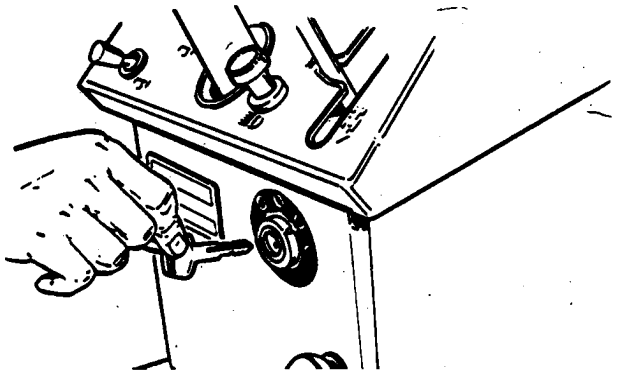
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

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



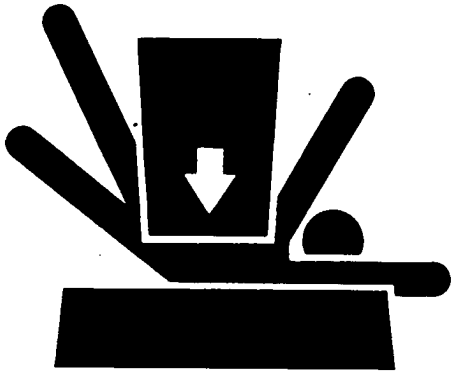
M34228 -UN-24APR89

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.

MX,1005R,8 -19-01APR86

## SUPPORT MACHINE PROPERLY



TS229 -UN-23AUG88

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.

DX,LOWER -19-04JUN90

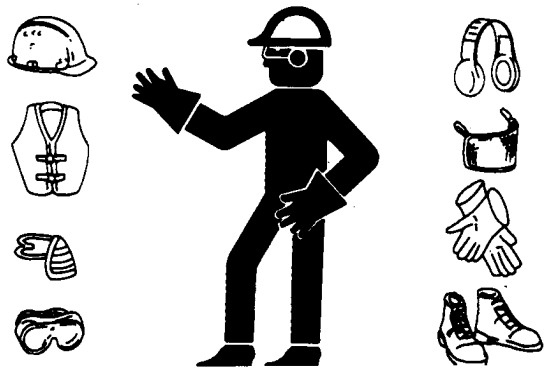
## WEAR PROTECTIVE CLOTHING

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.

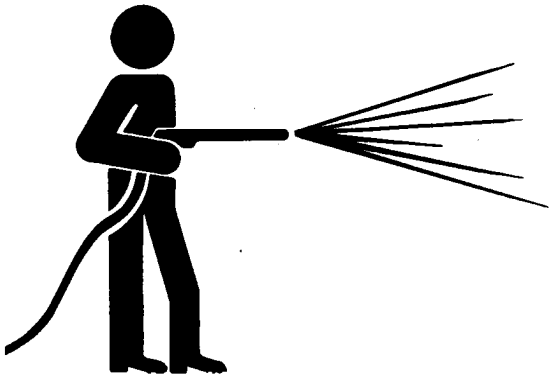


TS206 -UN-23AUG88

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.



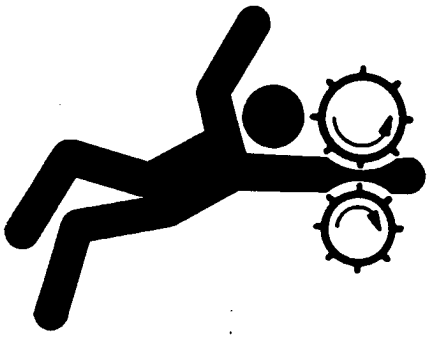
T6642EJ -UN-18OCT88

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.

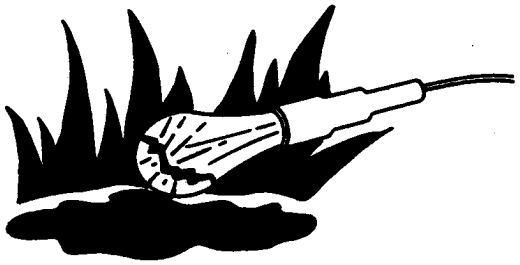
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

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.

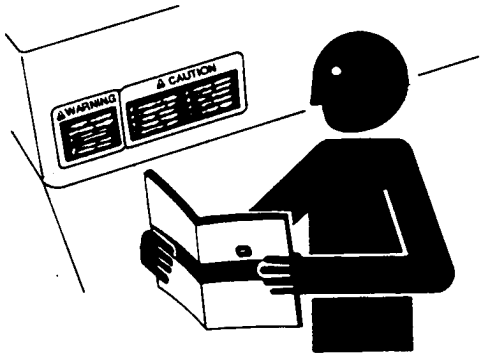


TS223 -UN-23AUG88

DX,LIGHT -19-04JUN90

## REPLACE SAFETY SIGNS

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



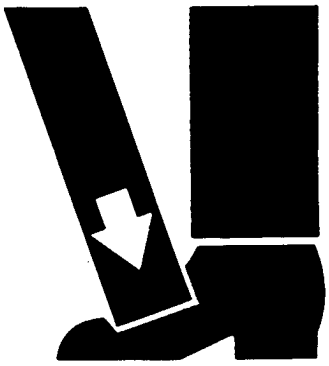

TS201 -UN-23AUG88

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

10
05
8

## 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.

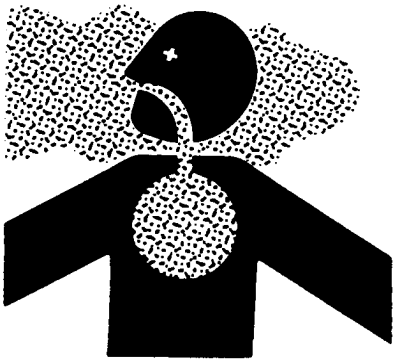
Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

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

10
05
10

## PRACTICE SAFE MAINTENANCE

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

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

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

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

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

TS218 -UN-23AUG88

DX,SERV -19-03MAR93

## 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.

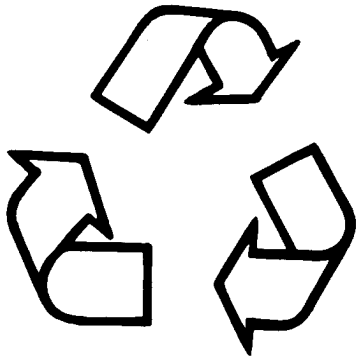
For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

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<br>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

10
10
2

| | 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

10
10
4

| | 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 |
|---|---|
| **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