

# **F1145 Front Mower**

## **TECHNICAL MANUAL**

**John Deere  
Worldwide Commercial and  
Consumer Equipment Division**

**TM1519 (01Sep96)**

This technical manual is written for an experienced technician and contains sections that are specifically for this product. It is a part of a total product support program.

The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- Specifications
- Component Location
- System Schematic
- Theory of Operation
- Troubleshooting Chart
- Diagnostics
- Tests & Adjustments
- Repair









*NOTE: Depending on the particular section or system being covered, not all of the above groups may be used.*

Each section will be identified with a symbol rather than a number. The groups and pages within a section will be consecutively numbered.

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.

We appreciate your input on this manual. To help, there are postage paid post cards included at the back. If you find any errors or want to comment on the layout of the manual please fill out one of the cards and mail it back to us.

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<b>Safety</b>	
<b>Specifications and Information</b>	
<b>Engine—3TNE75-RJF</b>	
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<b>Steering and Brakes</b>	
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## GENERAL INFORMATION

### HANDLE FLUIDS SAFELY - AVOID FIRES



TS227

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.

### PREVENT BATTERY EXPLOSIONS



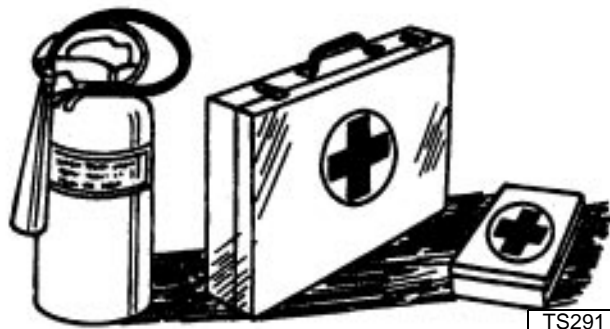
TS204

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).

## PREPARE FOR EMERGENCIES



TS291

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 phone.

### PREVENT ACID BURNS



TS203

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

Avoid the hazard by:

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

4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10-15 minutes. Get medical attention immediately.

If acid is swallowed:

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

## AVOID HIGH-PRESSURE FLUIDS



X9811

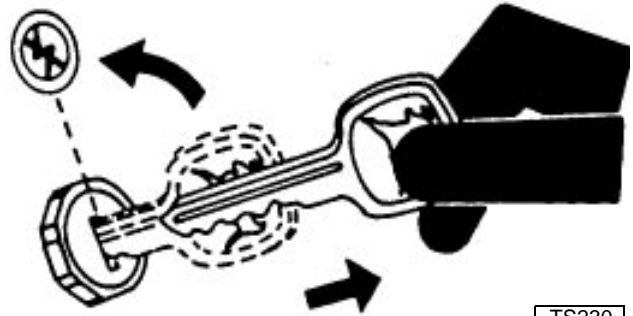
Escaping fluid under pressure can penetrate the skin causing serious injury.

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.

## PARK MACHINE SAFELY



TS230

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.

## SUPPORT MACHINE PROPERLY



TS229

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.



## WEAR PROTECTIVE CLOTHING



TS206

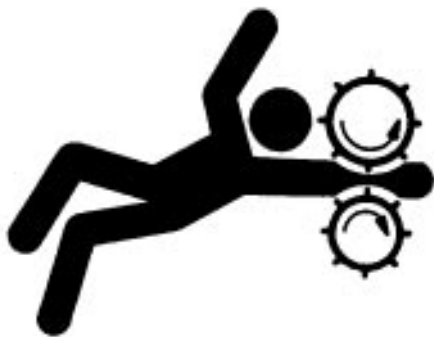
Wear close fitting clothing and safety equipment appropriate to the job.

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 machines.

## SERVICE MACHINES SAFELY



TS228

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.

## WORK IN VENTILATED AREA



TS220

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.

## ILLUMINATE WORK AREA SAFELY



TS223

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.

## REPLACE SAFETY SIGNS



TS201

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

## USE PROPER LIFTING EQUIPMENT

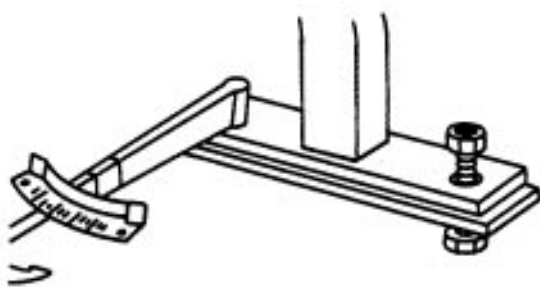


TS226

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

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

## KEEP ROPS INSTALLED PROPERLY



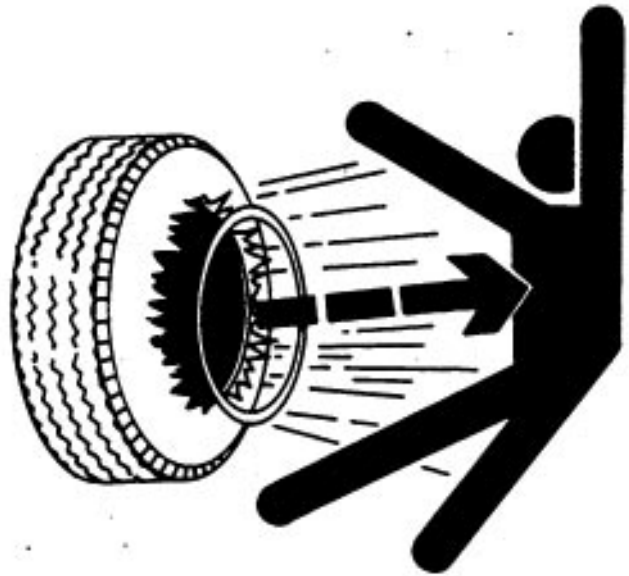
TS212

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

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



## SERVICE TIRES SAFELY



TS211

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.



## AVOID HARMFUL ASBESTOS DUST



TS220

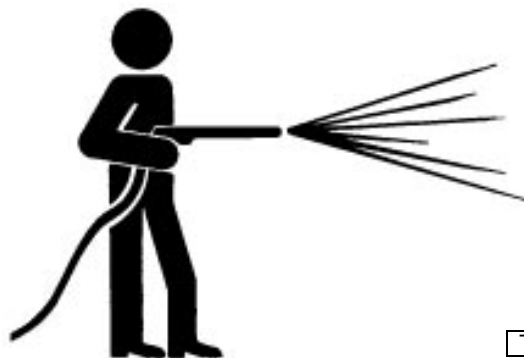
Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

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 mists of oil or water on the material containing asbestos.

Keep bystanders away from the area.

## WORK IN CLEAN AREA



T6642EJ

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.

## USE PROPER TOOLS



TS779

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.



**DISPOSE OF WASTE PROPERLY**

TS1133

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.

**LIVE WITH SAFETY**

TS231

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





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**MACHINE SPECIFICATIONS**

<b>ITEM</b>	<b>F1145</b>	<b>F1145</b>
<b>ENGINE:</b>		
Engine Model . . . . .	3TN75—RJF . . . . .	3TNE78A—JFM
Engine Horsepower . . . . .	17.9 kW (24 hp) . . . . .	20.9 kW (28 hp)
PTO Horsepower . . . . .	14.2 kW (19 hp) . . . . .	14.2 kW (19 hp)
Rated Engine Speed . . . . .	3200 rpm . . . . .	3200 rpm
Type . . . . .	Diesel . . . . .	Diesel
Operating Range . . . . .	1400—3425 rpm . . . . .	1400—3425 rpm
Number of Cylinders . . . . .	3 . . . . .	3
Displacement . . . . .	995 cm <sup>3</sup> (60.7 cu. in.) . . . . .	1204 cm <sup>3</sup> (73.5 cu. in.)
Bore and Stroke . . . . .	75x75 mm (2.95x2.95 in.) . . . . .	78x84 mm (3.07x3.11 in.)
Compression Ratio . . . . .	17.8:1 . . . . .	17.8:1
Lubrication . . . . .	Pressurized by Gerotor Gear Pump . . . . .	Pressurized by Gerotor Gear Pump
Cooling System . . . . .	Water-Centrifugal Pump . . . . .	Water-Centrifugal Pump
Air Cleaner . . . . .	Dry Element . . . . .	Dual Dry Element
Engine Shutoff . . . . .	Key . . . . .	Key
Engine Torque at rated speed . . . . .	58 N·m (39 lb-ft) . . . . .	@3200 rpm 62.4 N·m (46 lb-ft) @2200 rpm 74.6 N·m (55 lb-ft)

**ITEM**  
**ELECTRICAL SYSTEM:**

Type . . . . .	12 volt
Battery Size . . . . .	491 Cold Cranking Amps @ -18° C (0°F) 102 Minutes Reserve Capacity @ 25 amps
Alternator . . . . .	40 Amp
Starter Size . . . . .	1.0 kW (1.3 hp)

**FUEL SYSTEM:**

Type . . . . .	Direct Injection
Injection Pump Type . . . . .	Mechanical

**DRIVE TRAIN:**

Transmission Type . . . . .	Hydrostatic
Transaxle Speed Ranges . . . . .	High/Lo
Number of Speeds . . . . .	Infinite
Final Drive . . . . .	Planetary
Brakes . . . . .	Wet Disk
Steering . . . . .	Hydrostatic Power
Draw Bar Capacity . . . . .	544 kg (1200 lb) Max.
Tongue Weight . . . . .	135 kg (300 lb) Max.



**MACHINE SPECIFICATIONS—CONTINUED**

<b>ITEM</b>	<b>F1145</b>
<b>HYDRAULIC SYSTEM:</b>	
Type of System . . . . .	Open center
Working Pressure . . . . .	10342 kPa (1500 psi)
Pump (type) . . . . .	Gerotor Gear
Pump Capacity . . . . .	0.35 L/s (5.6 gpm)
Weight Transfer System . . . . .	Optional
 <b>PTO:</b>	
Type . . . . .	Live independent
Speed (PTO rpm at 3200 engine rpm-full load) . . . . .	2400 rpm
Clutch . . . . .	Hydraulic Multi-Disk with Delay Relief Valve
Brake . . . . .	Hydraulically Controlled, Spring Actuated
 <b>FLUID CAPACITIES:</b>	
Fuel tank (total both tanks) . . . . .	41.6 L (11 gal) 20.8 L (5.5 gal per tank)
Cooling System . . . . .	7.6 L (2 gal)
Crankcase (w/ filter) . . . . .	3.9 L (4.1 qt)
Transmission and Hydraulic System . . . . .	17 L (4.5 gal)
MRWD Gear Case . . . . .	2.5 L (2.6 qt)
 <b>WEIGHT:</b>	
Vehicle less mower . . . . .	839 kg (1850 lb)
Deck (72 in.) . . . . .	213 kg (470 lb)
 <b>GROUND SPEEDS (at 3200 rpm)</b>	
Forward high range . . . . .	0—17.7 Km/h (0—11.0 mph)
Forward low range . . . . .	0—13.5 Km/h (0—8.4 mph)
Reverse high . . . . .	0—8.8 Km/h (0—5.5 mph)
Reverse low . . . . .	0—6.8 Km/h (0—4.2 mph)
 <b>TIRES:</b>	
Front . . . . .	23x10.50-12
Rear . . . . .	18x8.50-8
Ply . . . . .	4
Pressure (front and rear) . . . . .	20 psi
Tread setting . . . . .	2
 <b>MOWER DECK:</b>	
Deck width . . . . .	72 in.
Cutting width . . . . .	1849 mm (72.8 in.)
Overall width . . . . .	2159 mm (85 in.)
Blades . . . . .	3
Blade rpm @3200 engine rpm . . . . .	2400 rpm (domestic) 2120 rpm (export)
Gearbox ratio . . . . .	1.04:1

**REPAIR SPECIFICATIONS**

*NOTE: For repair specification specifically for the engine, refer to CTM3 for the 3TN75-RJF engine and Section 3 for the 3TNE78A-JFM engine.*



Item	Measurement	Specifications
<b>ENGINE REPAIR</b>		
Fan Blade . . . . .	Radiator Clearance . . . . .	12 mm (1/2 in.)
Engine Mount Cap Screws and Lock Nuts . . . . .	Torque . . . . .	50 N·m (36 lb-ft)
Drive Shaft Engine Coupler Cap Screws . . . . .	Torque . . . . .	49 N·m (36 lb-ft)
Drive Shaft Transmission Coupler Cap Screws and Lock Nuts . . . . .	Torque . . . . .	60 N·m (45 lb-ft)
Fuel Filter/Water Separator Cap Screws . . . . .	Fasten Assembly to Engine . . . . .	25 N·m (18 lb-ft)
Fuel Tank Cap Screws and Nuts . . . . .	Fasten Fuel Tank Supports . . . . .	25 N·m (18 lb-ft)
<b>ENGINE REPAIR</b>		
Primary Air Cleaner . . . . .	Air Restriction . . . . .	635 mm (25 in.) Vacuum
Secondary Air Cleaner . . . . .	Air Restriction . . . . .	508 mm (20 in.) Vacuum
Air Restriction Indicator . . . . .	Torque . . . . .	FINGER TIGHT ONLY
<b>ELECTRICAL SYSTEM REPAIR</b>		
Minimum Exposed Brush Length . . . . .	Length . . . . .	4.5 mm (0.17 in.)
Maximum Exposed New Brush Length . . . . .	Length . . . . .	10.5 mm (0.41 in.)
Rotor Slip Ring . . . . .	Minimum Diameter . . . . .	14 mm (0.55 in.)
Belt Sheave Nut . . . . .	Torque . . . . .	69 N·m (51 lb-ft)
Belt Deflection . . . . .	Tightness . . . . .	13 mm (0.5 in.) at 107 N (24 lb) Force Between Sheaves
<b>POWER TRAIN REPAIR</b>		
<b>HYDROSTATIC TRANSMISSION:</b>		
Charge Pump Cap Screw . . . . .	Torque . . . . .	37—50 N·m (27—37 lb-ft)
Charge Inlet Fitting . . . . .	Torque . . . . .	95—230 N·m (70—170 lb-ft)
Drive Shaft to Engine Cap Screw . . . . .	Torque . . . . .	49 N·m (35 lb-ft)
Drive Shaft to Hydro Cap Screw . . . . .	Torque . . . . .	60 N·m (45 lb-ft)
Neutral Return Lever Bushing . . . . .	Inside Diameter . . . . .	19.088 ± 0.025 mm (0.7515 ± 0.001 in.)
Center Section Needle Bearings . . . . .	Depth . . . . .	3 mm (7/64 in.) Above the Surface of Housing
Oil Cooler Fittings . . . . .	Torque . . . . .	34 N·m (25 lb-ft)
Bushing Grease Hole . . . . .	Minimum Diameter . . . . .	19.088 ± 0.025 mm (0.7515 ± 0.001 in.)
Swash Plate End Caps Cap Screws . . . . .	Torque . . . . .	8—9 N·m (72—84 lb-in.)
Trans. Center Section to Housing Cap Screw . . . . .	Torque . . . . .	44—55 N·m (33—41 lb-ft)
Gear to Output Shaft Cap Screw . . . . .	Torque . . . . .	54 N·m (40 lb-ft)
Transmission Attaching Cap Screw . . . . .	Torque . . . . .	142 N·m (105 lb-ft)
Neutral Return Lever Spring . . . . .	Adjusted Coil Length . . . . .	133 mm (5.24 in.)
3/4-16 Plug/SAE O-ring . . . . .	Torque . . . . .	45—95 N·m (33—70 lb-ft)
1/4-20 Plug/SAE O-ring . . . . .	Torque . . . . .	4—7 N·m (36—60 lb-in.)

REPAIR SPECIFICATIONS—CONTINUED

Item	Measurement	Specification
<b>POWER TRAIN REPAIR - CONTINUED</b>		
<b>TRANSAXLE:</b>		
Flow Divider Fitting . . . . .	Torque . . . . .	34 N·m (25 lb-ft)
Swivel Elbow Line & Nut . . . . .	Torque . . . . .	27 N·m (20 lb-ft)
Charge Inlet Line Fitting . . . . .	Torque . . . . .	95—230 N·m (70—170 lb-ft)
<b>Front Cover Assembly</b>		
M12 Cap Screw . . . . .	Torque . . . . .	90 N·m (66 lb-ft)
M10 Cap Screw . . . . .	Torque . . . . .	50 N·m (37 lb-ft)
M8 Cap Screw . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
<b>Rear Cover Cap Screws</b>		
M12 Cap Screw . . . . .	Torque . . . . .	90 N·m (66 lb-ft)
M10 Cap Screw . . . . .	Torque . . . . .	55 N·m (37 lb-ft) (0.006—0.008 in.)
Case to Differential Carrier Cap Screw . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
Differential Shaft Bearing Retainer Cap Screw . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
Differential Ring Gear . . . . .	Backlash . . . . .	0.17—0.23 mm (0.007—0.009 in.)
Ring Gear Cap Screws . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
<b>Final Drives</b>		
M10 Cap Screws . . . . .	Torque . . . . .	52 N·m (38 lb-ft)
M16 Cap Screws . . . . .	Torque . . . . .	187 N·m (138 lb-ft)
Transaxle to Frame Cap Screw . . . . .	Torque . . . . .	142 N·m (105 lb-ft)
Drive Wheel Lug Bolts . . . . .	Torque . . . . .	150 N·m (110 lb-ft)
<b>PTO CLUTCH:</b>		
Separator Plate to Cylinder . . . . .	Maximum Distance . . . . .	4.7 mm (0.185 in.)
Top Plate . . . . .	Minimum Thickness . . . . .	2.9 mm (0.114 in.)
Clutch Disk . . . . .	Minimum Thickness . . . . .	1.9 mm (0.075 in.)
Separator Plate . . . . .	Minimum Thickness . . . . .	1.0 mm (0.039 in.)
Piston Return Spring . . . . .	Minimum Free Length . . . . .	29 mm (1.14 in.)
	Minimum Working Load . . . . .	17.5 mm at 540 N
PTO Inertia Brake Inner Spring . . . . .	Minimum Free Length . . . . .	61.6 mm (2.425 in.)
	Minimum Working Load . . . . .	47.5 mm at 327 N (1.870 in. at 73 lb)
PTO Inertia Brake Outer Spring . . . . .	Minimum Free Length . . . . .	64.3 mm (2.531 in.)
	Minimum Working Load . . . . .	47.5 mm at 700.5 N (1.870 in. at 157.5 lb)
Separator Plates . . . . .	Minimum Thickness . . . . .	1.0 mm (0.039 in.)
Brake Disks . . . . .	Minimum Thickness . . . . .	1.9 mm (0.075 in.)
Clutch Pack to Face of Housing . . . . .	Maximum Distance . . . . .	46.4 mm (1.827 in.)
Differential Cap Screws . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
<b>PTO VALVE:</b>		
PTO Solenoid Armature Stud . . . . .	Torque . . . . .	22 N·m (16 lb-ft) (0.689 in. at 121 lb)
PTO Solenoid End Nut . . . . .	Torque . . . . .	4.9 N·m (44 lb-in.)



REPAIR SPECIFICATIONS—CONTINUED

Item	Measurement	Specification
<b>POWER TRAIN REPAIR - CONTINUED</b>		
PTO Valve Cover Cap Screw . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
PTO Valve Line Fitting . . . . .	Torque . . . . .	49 N·m (36 lb-ft)
<b>MRWD:</b>		
Oil Seal Wear Sleeve . . . . .	Depth . . . . .	Flush with Lip of Shaft
Ring Gear to Differential Housing Cap Screw . . . . .	Torque . . . . .	22 N·m (16 lb-ft) (0.007—0.009 in.)
Differential Ring Gear. . . . .	Backlash . . . . .	0.15-0.21 mm (0.006—0.008 in.)
Input Drive Housing Bearing Retainer Cap Screw . . . . .	Torque . . . . .	26 N·m (19 lb-ft)
Input Drive Housing to Axle Housing Cap Screw . . . . .	Torque . . . . .	82 N·m (60 lb-ft)
Bearing Case Cover Cap Screw . . . . .	Torque . . . . .	52 N·m (38 lb-ft)
<b>Final Drives</b>		
M10 Cap Screws . . . . .	Torque . . . . .	52 N·m (38 lb-ft)
M16 Cap Screws . . . . .	Torque . . . . .	187 N·m (138 lb-ft)
MRWD Gear Assembly Cover Cap Screw . . . . .	Torque . . . . .	21 N·m (15 lb-ft)
Drive Wheel Lug bolts . . . . .	Torque . . . . .	88 N·m (65 lb-ft)
Tie Rod Ends . . . . .	Torque . . . . .	53 N·m (39 lb-ft)
MRWD End-Play . . . . .	Feeler Gauge . . . . .	0.127—1.016 mm (0.005—0.040 in.)
MRWD Pivot Pin Hardware . . . . .	Torque . . . . .	88 N·m (65 lb-ft)
<b>STEERING AND BRAKE REPAIR</b>		
<b>STEERING VALVE:</b>		
Rotor to Stator Clearance . . . . .	Maximum Clearance . . . . .	0.08 mm (0.003 in.)
Top of Steering Tube to Bushing . . . . .	Dimension . . . . .	2.5 mm (0.1 in.)
Metering Assembly Screws . . . . .	Torque . . . . .	1.4 ± 0.1 N·m (12 ± 1 lb-in.)
Port Cover Nuts . . . . .	Torque . . . . .	30 ± 3 N·m (266 ± 27 lb-in.)
Relief Valve Cap. . . . .	Torque . . . . .	34—47 N·m (25—35 lb-ft)
Steering Wheel Nut . . . . .	Torque . . . . .	13—16 N·m (10—12 lb-ft)
<b>BRAKES:</b>		
Brake Disk (New) . . . . .	Thickness . . . . .	4.6—4.8 mm (0.181—0.189 in.)
	Minimum . . . . .	4.4 mm (0.173 in.)
Brake Disk Spline. . . . .	Backlash New . . . . .	0.13—0.31 mm (0.005—0.012 in.)
	Maximum . . . . .	1.2 mm (0.047 in.)
Brake Plate . . . . .	Thickness New . . . . .	2.5—2.7 mm (0.098—0.106 in.)
Brake Plate . . . . .	Minimum . . . . .	2.3 mm (0.090 in.)
	Warpage New . . . . .	0.15 mm (0.006 in.)
	Maximum . . . . .	0.3 mm (0.012 in.)

