

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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Safety



Specifications and Information



Engine—3TNE75-RJF



Engine—3TNE78-JFM



Electrical



Gear Power Train



Steering and Brakes



Hydraulics



Miscellaneous



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manual**

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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



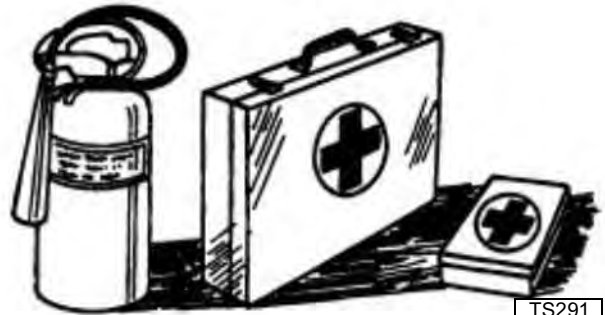
TS204

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.

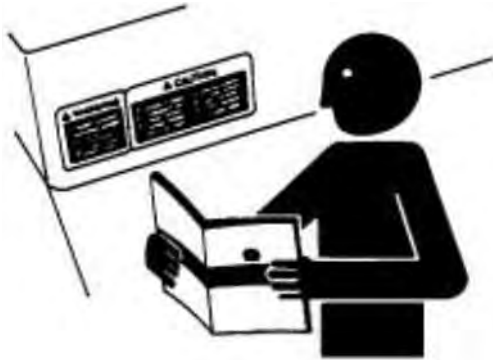
ILLUMINATE WORK AREA SAFELY



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

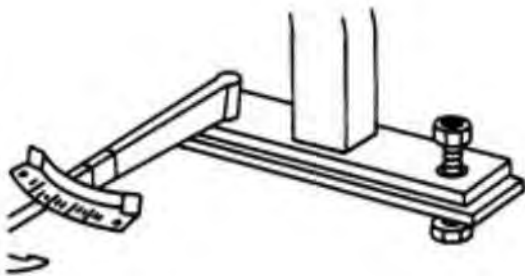


TS226

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

ITEM	F1145	F1145
ENGINE:		
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 ³ (60.7 cu. in.)	1204 cm ³ (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

ITEM	F1145
HYDRAULIC SYSTEM:	
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
 PTO:	
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
 FLUID CAPACITIES:	
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)
 WEIGHT:	
Vehicle less mower	839 kg (1850 lb)
Deck (72 in.)	213 kg (470 lb)
 GROUND SPEEDS (at 3200 rpm)	
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)
 TIRES:	
Front	23x10.50-12
Rear	18x8.50-8
Ply	4
Pressure (front and rear)	20 psi
Tread setting	2
 MOWER DECK:	
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
ENGINE REPAIR		
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)
ENGINE REPAIR		
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
ELECTRICAL SYSTEM REPAIR		
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
POWER TRAIN REPAIR		
HYDROSTATIC TRANSMISSION:		
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
POWER TRAIN REPAIR - CONTINUED		
TRANSAXLE:		
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)
Front Cover Assembly		
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)
Rear Cover Cap Screws		
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)
Final Drives		
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)
PTO CLUTCH:		
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)
PTO VALVE:		
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
POWER TRAIN REPAIR - CONTINUED		
PTO Valve Cover Cap Screw	Torque	26 N·m (19 lb-ft)
PTO Valve Line Fitting	Torque	49 N·m (36 lb-ft)
MRWD:		
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)
Final Drives		
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)
STEERING AND BRAKE REPAIR		
STEERING VALVE:		
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)
BRAKES:		
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.)



REPAIR SPECIFICATIONS—CONTINUED

Item	Measurement	Specification
HYDRAULIC REPAIR		
Relief Valve Spring	Free length	50.7 mm (2 in.)
	Compressed length	42 mm at 325 N (1.65 in at 73 lb)
Proportional Flow Divider Spring	Free length	58.5 mm (2.3 in.)
	Compressed length	46 mm at 4.9 N (1.81 in at 1.1 lb)
Flow Divider Bolts	Torque	17 N·m (12 lb-ft)
Hydraulic Pump Pressure Lines	Torque	34 N·m (25 lb-ft)
Hydraulic Pump Adapter	Torque	47 N·m (35 lb-ft)
Hydraulic SCV Line	Torque	27 N·m (20 lb-ft)
Hydraulic Pump Inlet Fitting	Cap Screws	25 N·m (18 lb-ft)
Main Relief Seat Retainer	Torque	29 N·m (22 lb-ft)
Main Relief Valve Plug	Torque	98 N·m (72 lb-ft)
Proportioning Valve Plugs	Torque	44 N·m (33 lb-ft)
Directional Spool Plugs	Torque	98 N·m (72 lb-ft)
Proportioning Valve Union Connectors	Torque	47 N·m (35 lb-ft)
Proportioning Valve Hydraulic Lines	Torque	34 N·m (25 lb-ft)
Transaxle Case	Capacity	17 L (4.5 gal)

MISCELLANEOUS REPAIR

72-INCH MOWER DECK:

Drive Shaft Cap Screw	Torque	73 N·m (54 lb-ft)
Idler Stop Nut	Torque	140 N·m (105 lb-ft)
Spindle Seal	Depth	Flush
Left and Right Spindle Nut	Torque	164 N·m (121 lb-ft)
Spindle Assembly Mounting Lock Nuts	Torque	50 N·m (37 lb-ft)
Blade Cap Screws	Torque	113 N·m (83 lb-ft)
Gearbox Mounting Bracket Cap Screws	Torque	73 N·m (54 lb-ft)
Gearbox Soft Plug	Depth	1.6 mm (0.0625 in.)
Gearbox Seal	Depth	2.5 mm (0.100 in.)
Gearbox Drain Plug	Torque	7—10 N·m (60—90 lb-in.)
Gearbox Input/Output Shaft Cover Cap Screws	Torque	20—24 N·m (180—216 lb-in.)
Gearbox Input Shaft	End Play	Zero With 0.4—1.0 N·m (5—15 oz-in.) of rotational drag torque after nut is tightened
Gearbox Output Shaft	End Play	Zero - set by crush ring installation procedure
Gearbox Output Shaft/Spindle Assembly Hub Nut	Torque	25 N·m (240 lb-ft)
Gearbox Side Plugs	Torque	13—24 N·m (120—216 lb-in.)
Discharge Chute		
Small Hardware	Torque	35 N·m (26 lb-ft)
Large Hardware	Torque	75 N·m (55 lb-ft)

ROLL-GARD®:

Mounting Hardware	Torque	136 N·m (100 lb-ft)
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