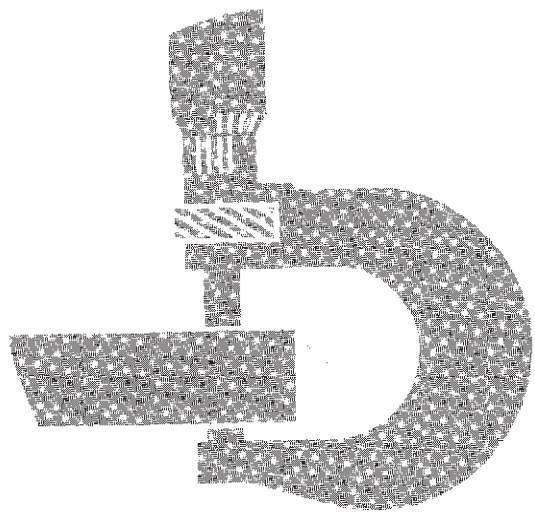
640D Skidder
648D Grapple Skidder
Repair



TECHNICAL MANUAL

For complete service information also see:

TM1440 (11SEP90)

LITHO IN U.S.A.

JOHN DEERE DEALERS

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

This is a complete revision for TM-1440, 640D Skidder and 648D Grappler Skidder.

This manual was revised to:

1. Add front and rear differential serial number break information.

2. Add axle shaft-to-bearing cup grease dam wear specification information.

3. Add information concerning old and new style clutch pack disks.

4. Add additional information on clutch pressure plate and disk.

5. Add information on hydraulic pump.

6. Add 4000 series winch story with adjustments.

7. Add or update miscellaneous information throughout manual.

Contents

Continued on next page

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.

TM1440-19-11SEP90

Section I
GENERAL INFORMATION

Contents

120990

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

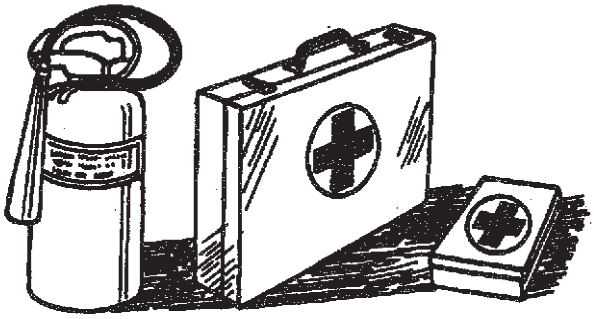
DX,SPARKS -19-04JUN90

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 -19-04JUN90

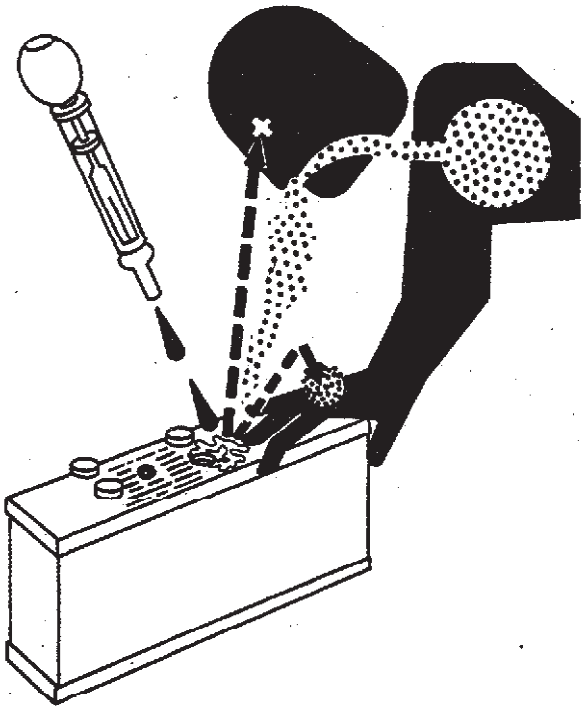
PREVENT ACID BURNS

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 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.



TS206 -UN-23AUG88

DX,POISON -19-04JUN90

AVOID HIGH-PRESSURE FLUIDS

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.

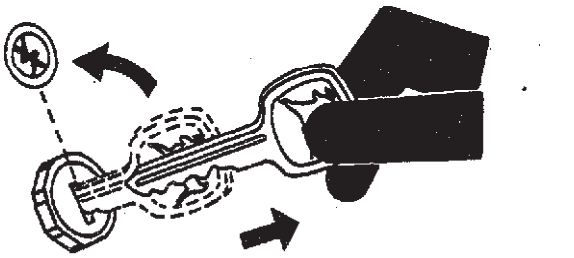
Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

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 may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

DX,FLUID,NA 10 11JUN90

PARK MACHINE SAFELY

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.

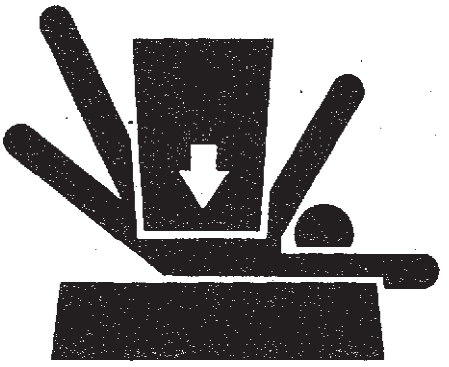


DX,PARK -19-04JUN90

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

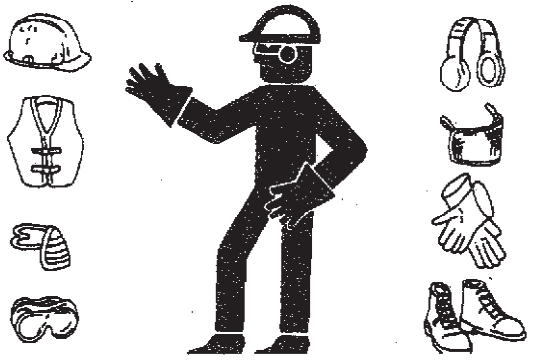
WEAR PROTECTIVE CLOTHING

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

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.

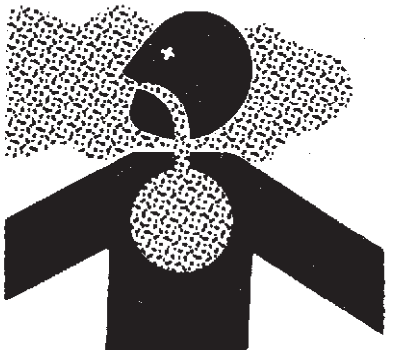
TS228 -UN-23AUG88

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.

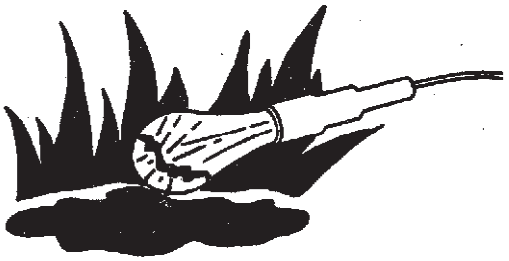


TS220 -UN-23AUG88

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.

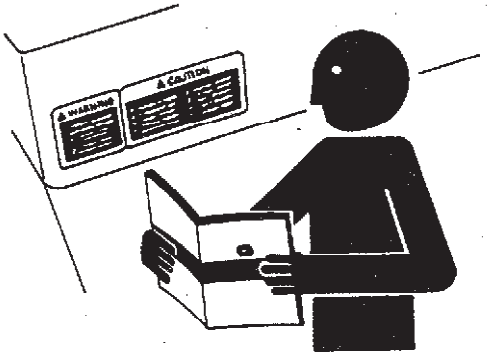


TS22? -UN-23AUG88

DX,LIGHT 19-04JUN90

REPLACE SAFETY SIGNS

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



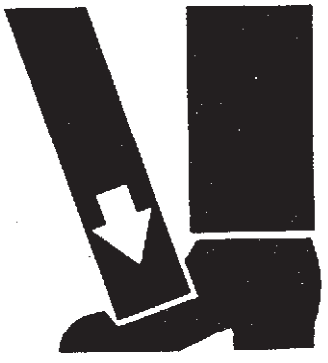
TS201 -UN-23AUG88

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.



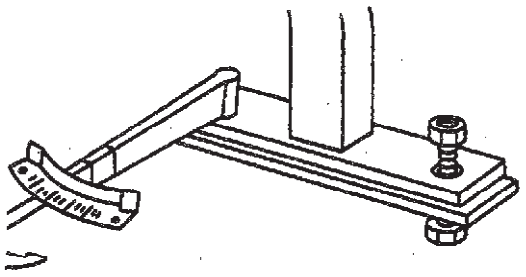
TS226 -UN-23AUG88

DX,LIFT -19-04JUN90

KEEP ROPS INSTALLED PROPERLY

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

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



TS212 -UN-23AUG88

DX,ROPS3 -19-04JUN90

SERVICE TIRES SAFELY

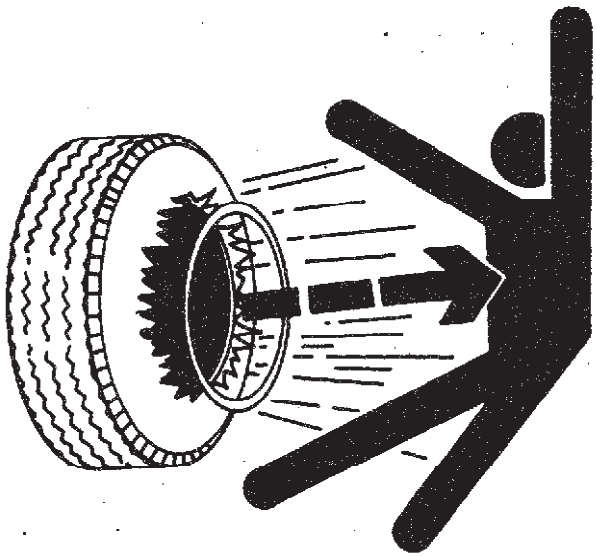
Explosive separation of a tire and rim parts can cause serious injury or death.

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.



TS211 -UN-23AUG88

DX,RIM -19-24AUG90

AVOID HARMFUL ASBESTOS DUST

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 of asbestos containing materials. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, wet the asbestos containing materials with a mist of oil or water.

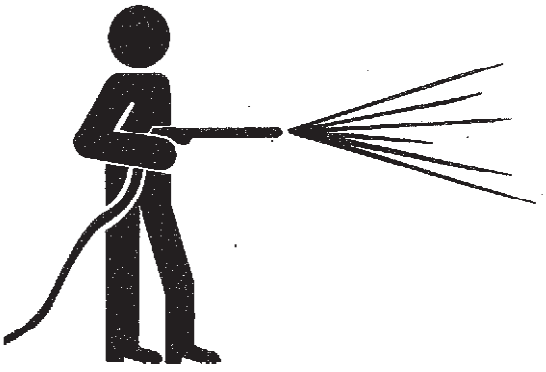
Keep bystanders away from the area.

TS220 -UN-23AUG88

DX,DUST 10 27AUG90

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.



TS642EJ -UN-18OCT88

DX,CLEAN -19-04JUN90

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

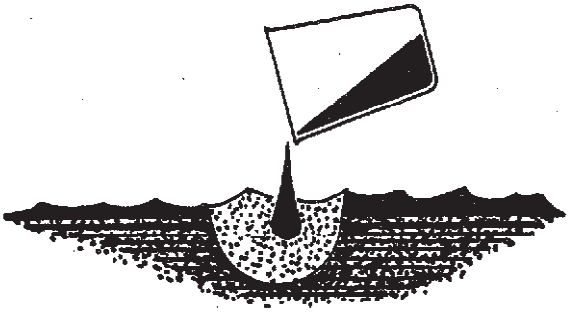
DX,REPAIR -19-04JUN90

DISPOSE OF FLUIDS PROPERLY

Improperly disposing of fluids can harm the environment and ecology. Before draining any fluids, find out the proper way to dispose of waste from your local environmental agency.

Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

DO NOT pour oil into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, batteries, and other harmful waste.



TS222 -UN-23AUG88

DX,DRAIN -19-05JUN90

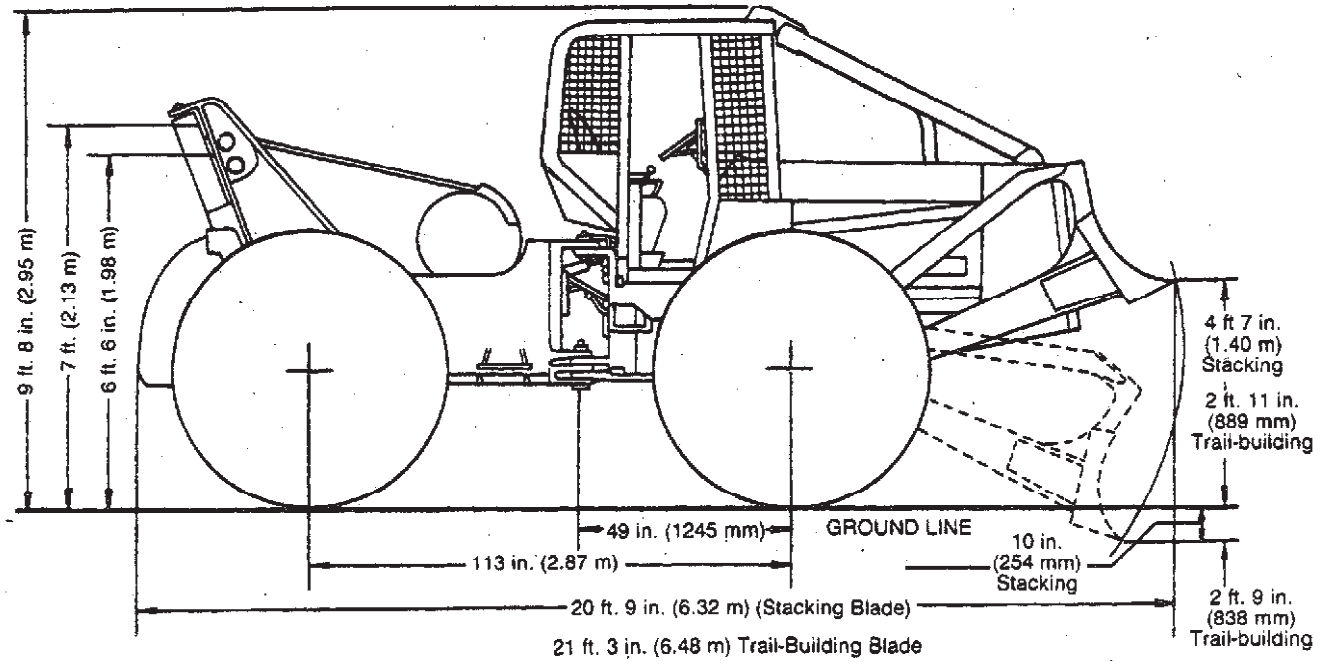
LIVE WITH SAFETY

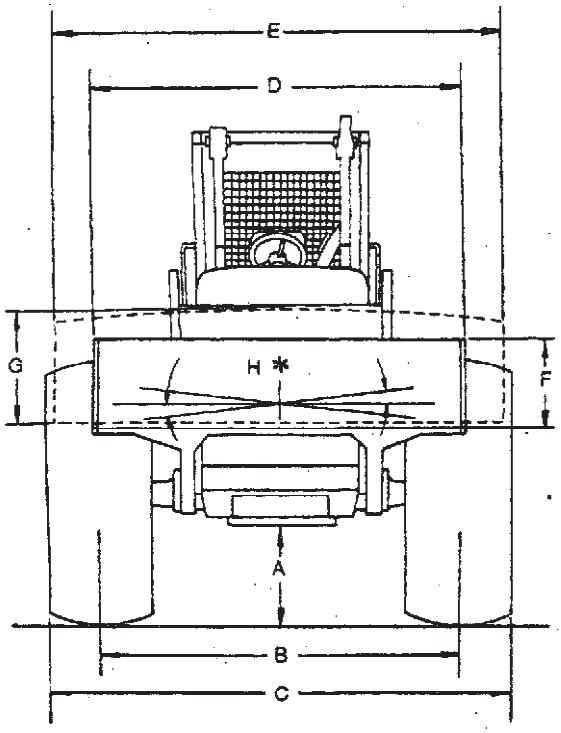
Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

TS231 -19-07OCT88

DX,LIVE -19-04JUN90

640D SKIDDER





* ± 7° Trail-building blade oscillation from horizontal

TIRE SIZE	A GROUND CLEARANCE	B WHEEL TREAD	C OVERALL WIDTH
23.1-26	19.2 in. (488 mm)	80.2 in. (2.04 m)	8 ft. 8 in. (2.64 m)
24.5-32	23.8 in. (605 mm)	84.2 in. (2.14 m)	9 ft. 0.7 in. (2.76 m)
28L-26	20 in. (508 mm)	87.5 in. (2.22 m)	9 ft. 8 in. (2.95 m)
30.5-32	24.4 in. (620 mm)	90.2 in. (2.29 m)	9 ft. 11.6 in. (3.04 m)

BLADES

D WIDTH Stacking	E WIDTH Trail-Building	F HEIGHT Stacking	G HEIGHT Trail-Building
7 ft. 2 in. (2.18 m)	9 ft. 4 in. (2.84 m)	1 ft. 9 in. (533 mm) Ends	2 ft. 8 in. (813 mm)
		2 ft. 4 in. (711 mm) Middle	

T6793AI -19-02MAR89

NOTE: Unit equipped with 23.1 x 26 tires.

05T,115,K70 -19-11MAY90

120990

640D SKIDDER—CONTINUED

NOTE: Unit equipped with 23.1 x 26 tires.

Specifications and design are subject to change without notice. Wherever applicable, specifications are in accordance with SAE Standards. Except where otherwise noted, these specifications are based on a unit with 23.1-26, 10 PR, steel-ply tires, full fuel tank, 175-lb. (80 kg) operator and standard equipment.

Rated Power @ 2200 rpm:	**SAE**	**DIN 70 020**
Net	120 hp (90 kW)	90 kW
Gross	128 hp (95 kW)	

Net engine power is with standard equipment including air cleaner, exhaust system, alternator, and cooling fan, at standard conditions per SAE J1349 and DIN 70 020, using No.2-D fuel @ 35 API gravity. No derating is required up to 10,000 feet (3050 m) altitude. Gross power is without cooling fan.

Engine: John Deere 6-414T

Type	4-stroke cycle, turbocharged diesel
Bore and stroke	4.19 x 5.00 in. (106.5 x 127 mm)
No. of cylinders	6
Displacement	414 cu. in. (6.785 L)
Maximum net torque @ 1300 rpm	358 lb-ft (485 Nm) (50 kg-m)
Compression ratio	16.8 to 1
Cooling fan	Blower
Lubrication	Pressure system w/full-flow filter
Air cleaner w/service indicator and unloader valve	Dry
Electrical system	12-volt w/42-amp alternator
Batteries (2)	Reserve capacity: 320 minutes

Differentials:
Front and rear ..... Full differentials with hydraulic lock

Engine Clutch Disconnect:
Hand-operated, spring-loaded, dry disk. Single plate, 12 in. (305 mm).

Transmission:
Power Shift with planetary gears, hydraulically actuated wet-disk clutches and brakes; provides 8 speeds forward, 4 reverse. Controlled by single lever on console. Air-to-oil cooler.

Travel Speeds: (2200 engine rpm, no tire slip)

	mph	**km/h**
Forward	1.58-17.13	2.5-27.6
Reverse	2.03-5.76	3.3-9.3

Drive Axles:
Four-wheel drive with inboard planetary gears on all axles. Front axle oscillates 15 degrees above and below horizontal. 21 in. (533 mm) travel at tire center line.

Power Steering:
Articulated frame hydraulically actuated by two double-acting cylinders with cushioned stops. Steering system has hydraulic pressure priority.
Outside clearance circle w/o blade ..... 38 ft. 4 in. (11.68 m)
Outside clearance circle w/blade ..... 39 ft. 7 in. (12.07 m)

Brakes:
Service ..... Wet-disk brakes.
Parking, winching and emergency stop ..... Hand-operated mechanical wet-disk. Brake located on driveline for braking front and rear axles. Has hydraulic release.

Hydraulic System:
Closed center, constant pressure. Variable-displacement pump driven from crankshaft ..... 25 gpm (95 L/min), 2000 psi (13 790 kPa) (140.6 kg/cm²) @ 2200 engine rpm. Full-flow filtration.

Hydraulic Cylinders:	**Rod Dia.**	**Bore**	**Stroke**
Blade lift cylinders (2)	1.75 in. (44.5 mm)	4.00 in. (101.6 mm)	13.82 in. (351 mm)
Blade tilt cylinder (1)	2.25 in. (57.2 mm)	4.50 in. (114.3 mm)	3.00 in. (76.2 mm)
Steering cylinders (2)	1.75 in. (44.5 mm)	3.00 in. (76.2 mm)	15.75 in. (400 mm)

Cylinder rods are ground, heat-treated, chrome-plated and polished.

Tires:
23.1-26, 10 PR, steel-ply, LS2
24.5-32, 12 PR, steel-ply, LS2
28L-26, 14 PR, steel-ply, LS2
30.5-32, 12 PR, steel-ply, LS2, dual bead

Capacities:	**U.S.**	**Liters**
Fuel tank	46.5 gal.	176
Cooling system	8.5 gal.	32.2
Engine lubrication including filter	20 qt.	18.9
Transmission-hydraulic system	9 gal.	34.1
Winch	12 gal.	45.4
Front differential	4.5 gal.	17
Rear differential	4.5 gal.	17

SAE Operating Weight w/Stacking Blade ... 20,180 lb. (9154 kg)
SAE Operating Weight w/o Stacking Blade .. 18,815 lb. (8534 kg)

Winch:
Winch capacities*

½-in. (12.7 mm) cable	569 ft. (173.4 m)
⅝-in. (15.8 mm) cable	373 ft. (114 m)
¾-in. (19.1 mm) cable	263 ft. (80.2 m)
⅞-in. (22.2 mm) cable	189 ft. (58 m)
1-in. (25.4 mm) cable	147 ft. (45 m)

*Calculated: No allowance made for loose or uneven spooling.

Linepull**:

Bare drum	32,100 lb. (143 kN) (14 600 kg)
Full drum	20,400 lb. (91 kN) (9300 kg)

**Based on winch clutch capacity and .75 in. (19 mm) cable.

Line speed (2200 rpm) and .75 in. (19 mm) cable:

Bare drum	145 fpm (44.2 m/min)
Full drum	228 fpm (69.6 m/min)

Arch:
Horizontal rollers ..... 6 in. (152 mm) dia.
Vertical rollers ..... 4.5 in. (114 mm) dia.
Working height (top of horizontal roller to ground): Adjustable to two positions.

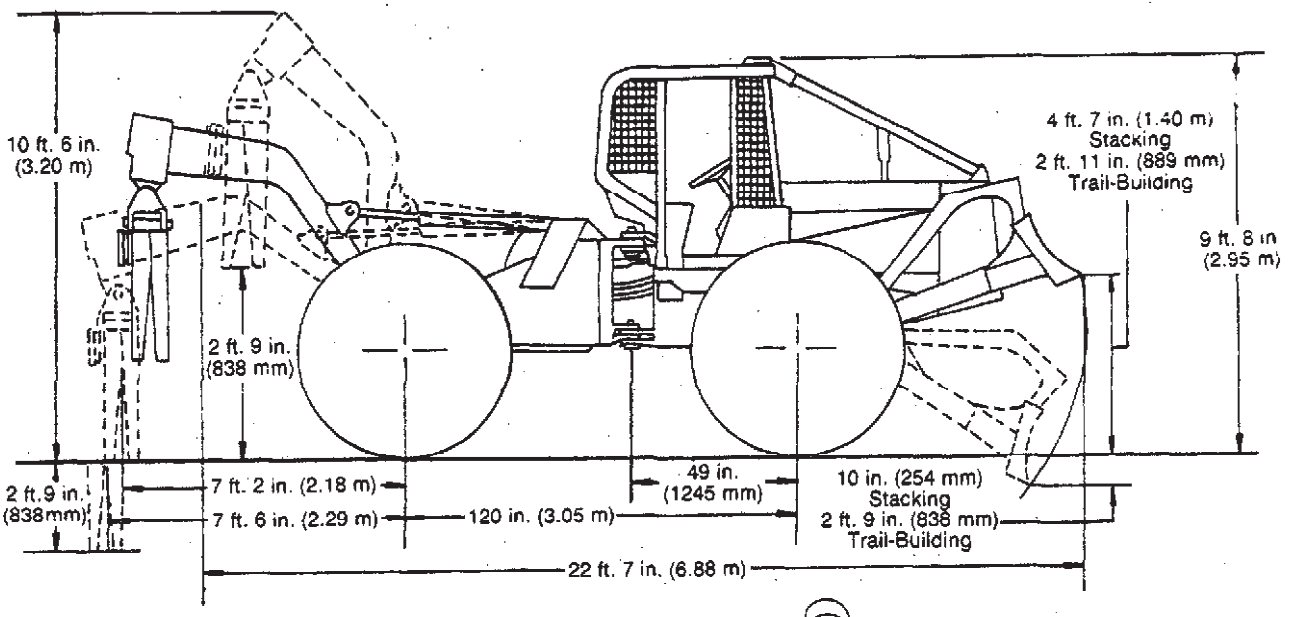
T6793AJ -19-02MAR89

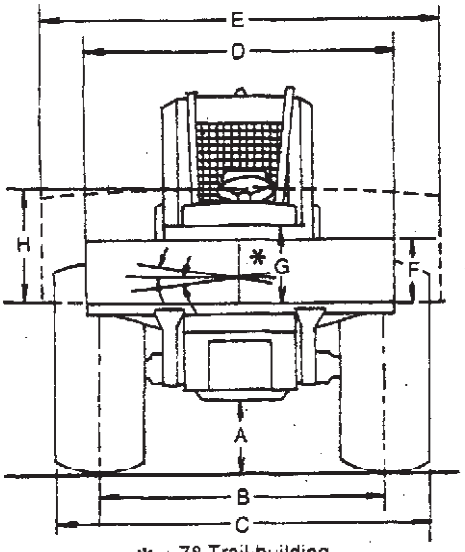
05T,115,K71 -19-11MAY90

120990

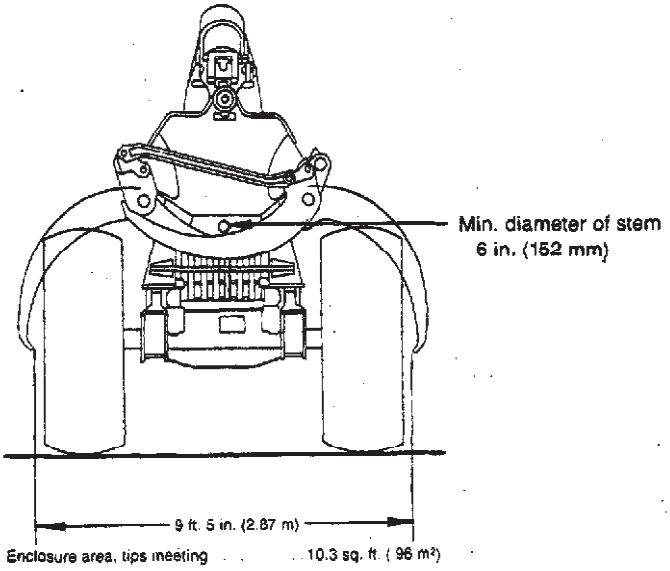
640D/7413 GRAPPLE SKIDDER (SINGLE FUNCTION BOOM)

NOTE: Unit equipped with 23.1 x 26 tires.





* ±7° Trail-building blade oscillation from horizontal



Enclosure area, tips meeting . . . . . 10.3 sq. ft. (96 m²)

BLADES

D WIDTH Stacking	E WIDTH Trail-Building	F HEIGHT Stacking	G HEIGHT Stacking	H HEIGHT Trail-Building
7 ft. 2 in. (2.18 m)	9 ft. 4 in. (2.84 m)	1 ft. 9 in. (533 mm)	2 ft. 4 in. (711 mm)	2 ft. 8 in. (813 mm)

TIRE SIZE	A GROUND CLEARANCE	B WHEEL TREAD	C OVERALL WIDTH
23.1-26	19.2 in. (488 mm)	80.2 in. (2.04 m)	8 ft. 8 in. (2.64 m)
24.5-32	23.8 in. (605 mm)	84.2 in. (2.14 m)	9 ft. 0.7 in. (2.76 m)
28L-26	20 in. (508 mm)	87.5 in. (2.22 m)	9 ft. 8 in. (2.95 m)
30.5-32	24.4 in. (620 mm)	90.2 in. (2.29 m)	9 ft. 11.6 in. (3.04 m)

T67793AH -19-02MAR89

05T,115,K72 -19-11MAY90

120990

648D/7413 GRAPPLE SKIDDER (SINGLE FUNCTION BOOM)—CONTINUED

Specifications and design are subject to change without notice. Wherever applicable, specifications are in accordance with SAE Standards. Except where otherwise noted, these specifications are based on a unit with 23.1-26, 10 PR, steel-ply tires, full fuel tank, 175-lb. (80 kg) operator and standard equipment.

Rated Power @ 2200 rpm:	**SAE**	**DIN 70 020**
Net	120 hp (90 kW)	90 kW
Gross	128 hp (95 kW)	

Net engine power is with standard equipment including air cleaner, exhaust system, alternator, and cooling fan, at standard conditions per SAE J1349 and DIN 70 020, using No.2-D fuel @ 35 API gravity. No derating is required up to 10,000 feet (3050 m) altitude. Gross power is without cooling fan.

Engine: John Deere 6-414T

Type	4-stroke cycle, turbocharged diesel
Bore and stroke	4.19 x 5.00 in. (106.5 x 127 mm)
No. of cylinders	6
Displacement	414 cu. in. (6.785 L)
Maximum net torque @ 1300 rpm	358 lb-ft (485 Nm) (50 kg-m)
Compression ratio	16.8 to 1
Cooling fan	Blower
Lubrication	Pressure system w/full-flow filter
Air cleaner w/service indicator and unloader valve	Dry
Electrical system	12-volt w/42-amp alternator
Batteries (2)	Reserve capacity: 320 minutes

Differentials:
Front and rear . . . . . Full differentials with hydraulic lock

Engine Clutch Disconnect:
Hand-operated, spring-loaded, dry disk. Single plate, 12 in. (305 mm).

Transmission:
Power Shift with planetary gears, hydraulically actuated wet-disk clutches and brakes; provides 8 speeds forward, 4 reverse. Controlled by single lever on console. Air-to-oil cooler.

Travel Speeds: (2200 engine rpm, no tire slip)

	mph	**km/h**
Forward	1.56-16.96	2.5-27.3
Reverse	2.01-5.7	3.2-9.2

Drive Axles:
Four-wheel drive with inboard planetary gears on all axles. Front axle oscillates 15 degrees above and below horizontal. 21 in. (533 mm) travel at tire center line.

Power Steering:
Articulated frame hydraulically actuated by two double-acting cylinders with cushioned stops. Steering system has hydraulic pressure priority.

Outside clearance circle w/o blade	38 ft. 4 in. (11.68 m)
Outside clearance circle w/stacking blade	39 ft. 7 in. (12.07 m)

Brakes:

Service	Wet-disk brakes.
Parking, winching and emergency stop	Hand-operated mechanical wet-disk brake located on driveline for braking front and rear axles. Has hydraulic release.

Hydraulic System:
Closed center, constant pressure. Variable-displacement pump driven from crankshaft . . . . . 51 gpm (193 L/min), 2000 psi (13 790 kPa) (140.6 kg/cm²) @ 2200 engine rpm. Full-flow filtration.

Hydraulic Cylinders:	**Rod Dia.**	**Bore**	**Stroke**
Blade lift cylinders (2)	1.75 in. (44.5 mm)	4.00 in. (101.6 mm)	13.82 in. (351 mm)
Blade tilt cylinder (1)	2.25 in. (57.2 mm)	4.50 in. (114.3 mm)	3.00 in. (76.2 mm)
Steering cylinders (2)	1.75 in. (44.5 mm)	3.00 in. (76.2 mm)	15.75 in. (400 mm)
Grapple boom cylinders (2)	2.00 in. (51 mm)	4.00 in. (101.5 mm)	29.15 in. (740.5 mm)
Grapple tong cylinder (1)	2.50 in. (63.5 mm)	5.50 in. (139.7 mm)	19.74 in. (501.5 mm)

Cylinder rods are ground, heat-treated, chrome-plated and polished.

Tires:
23.1-26, 10 PR, steel-ply, LS2
24.5-32, 12 PR, steel-ply, LS2
28L-26, 14 PR, steel-ply, LS2
30.5-32, 12 PR, steel-ply, dual bead, LS2

Capacities:	**U.S.**	**Liters**
Fuel tank	46.5 gal.	176
Cooling system	8.5 gal.	32.2
Engine lubrication w/filter	20 qt.	18.9
Transmission	6 gal.	22.7
Hydraulic system	15 gal.	56.8
Winch	1.8 gal.	6.8
Front differential	4.5 gal.	17
Rear differential	4.5 gal.	17

SAE Operating Weight w/Stacking Blade 23,028 lb. (10 446 kg)
SAE Operating Weight w/o Stacking Blade 21,663 lb. (9826 kg)

Winch:
Winch capacities*

½-in. (12.7 mm) cable	223 ft. (68 m)
⅝-in. (15.8 mm) cable	146 ft. (44.5 m)
¾-in. (19.1 mm) cable	103 ft. (31.4 m)

*Calculated: No allowance made for loose or uneven spooling.

Linepull**:

Bare drum	26,700 lb. (119 kN) (12 100 kg)
Full drum	18,100 lb. (81 kN) (8200 kg)

**Based on winch clutch capacity and .75 in. (19 mm) cable.

Line speed (2200 rpm) and .75 in. (19 mm) cable:

Bare drum	126 fpm (38.3 m/min)
Full drum	176 fpm (53.6 m/min)

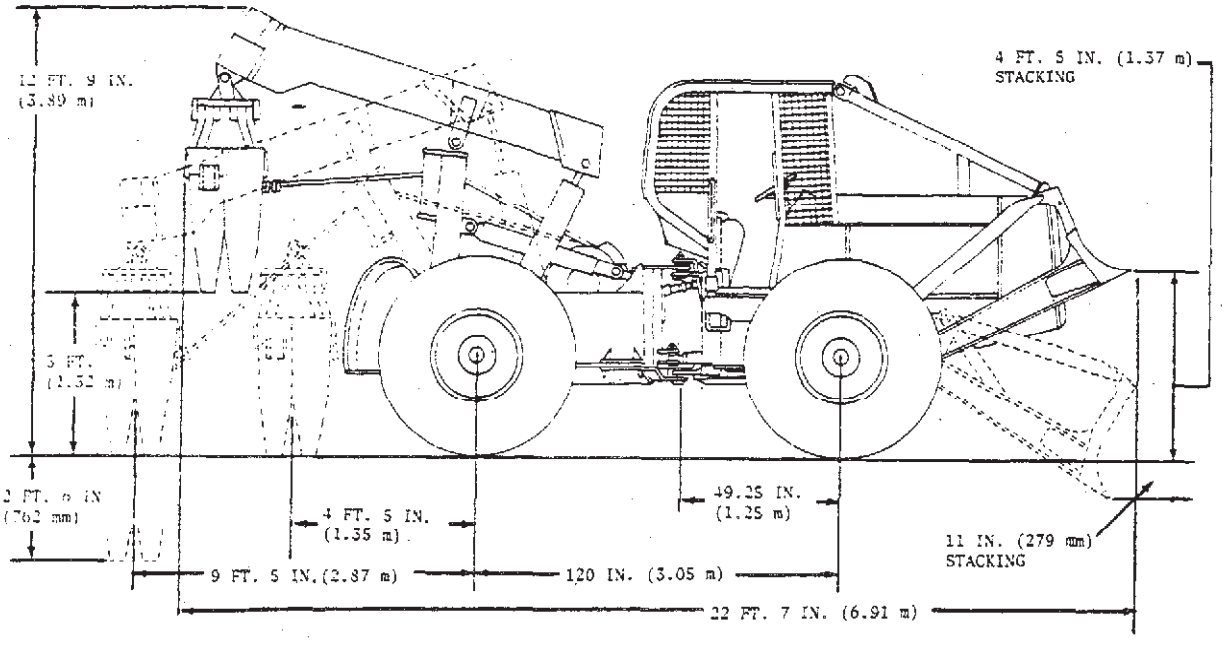
Optional Winch:
Linepull

Bare drum	32,100 lb. (143 kN) (14 600 kg)
Full drum	20,400 lb. (91 kN) (9300 kg)

T6793AK -19-02MAR89

05T,115,K73 -19-11MAY90

648D GRAPPLE SKIDDER (DUAL FUNCTION BOOM)



Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, these specifications are based on a unit equipped with stacking blade and 24.5—32, 12-ply tires and standard equipment.

Overall Width	109 in. (2.77 m)
Ground clearance (under differential case)	23.8 in. (605 mm)
Clearance Circle (with blade)	39 ft 7 in. (12.07 m)
Maximum Grapple Opening	113 in. (2.87 m)
Stacking Blade:	
Width	86.0 in. (2.18 m)
Height Ends	21.0 in. (533 mm)
Middle	28.0 in. (711 mm)
Trail Building Blade:	
Width	112.0 in. (2.84 m)
Height	32.0 in. (813 mm)
Wheel Treads:	
24.5—32 Tires	84.2 in. (2.14 m)
30.5—32 Tires	90.2 in. (2.29 m)
68 x 34.00—26 Tires	97.5 in. (2.48 m)
SAE Operating Weight with Stacking Blade	25756 lb (11683 kg)

Capacities:	U.S.	Liters
Fuel tank	46.5 gal	176
Cooling system	8.5 gal	32.2
Engine oil including filter	20 qt	18.9
Transmission	6 gal	22.7
Hydraulic system	15 gal	56.8
Winch	1.8 gal	6.8
Front differential	4.5 gal	17
Rear differential	4.5 gal	17

Winch Cable:*	Feet	Meters
1/2-in. (12.7 mm)	223	68
5/8-in. (15.8 mm)	146	44.5
3/4-in. (19.1 mm)	103	31.4

Weight:

Maximum allowable gross weight ..... 32,250 lbs (14 625 kg)

*Calculated: No allowance made for loose or uneven spooling.

05T,115,K74 -19-11MAY90

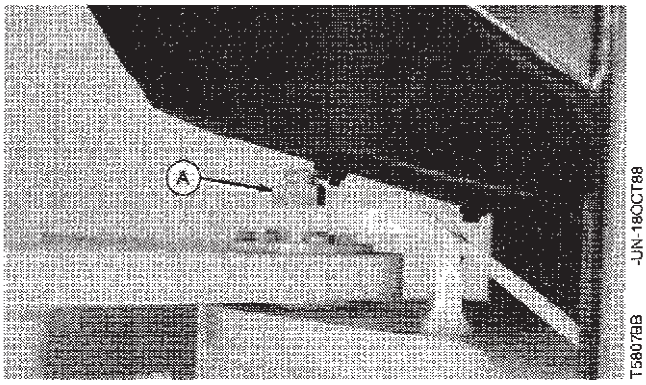
HARDWARE TORQUE SPECIFICATIONS

Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

T82,SKMA,AT -19-14JUN90

TIGHTEN UPPER FRAME PIVOT PIN

Annually or every 1000 hours, tighten upper frame pivot pin nut (A) to 1000 lb-ft (1350 N·m).



T82,SKMA,AR 10 23AUG84

METRIC CAP SCREW TORQUE VALUES

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

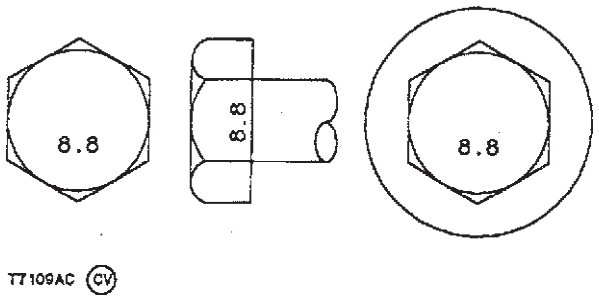
DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

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

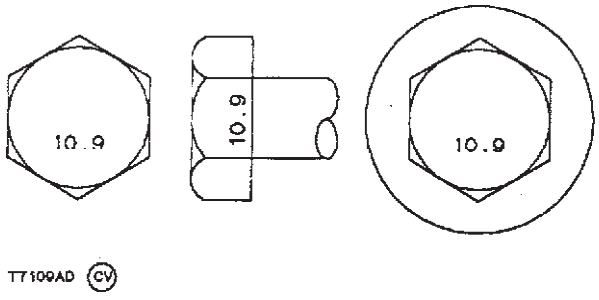
Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and 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 amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.



Class 8.8 Cap Screw Head Markings



Class 10.9 Cap Screw Head Markings

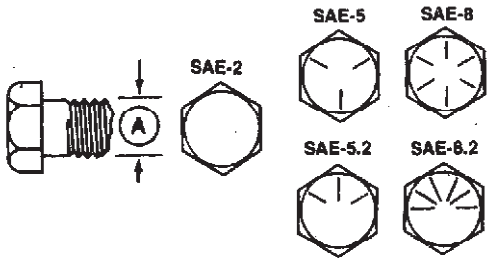
TORQUE VALUES*

	Class 8.8				Class 10.9			
	Dry		Lubricated		Dry		Lubricated	
Size	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
3	1.4	1	1.1	0.9	2.1	1.5	1.7	1.2
4	3.3	2.4	2.6	1.9	4.8	3.6	3.9	2.9
5	6.7	4.9	5.3	3.9	9.8	7.2	7.8	5.8
6	11.3	8.4	9.1	6.7	16.6	12.3	13.3	9.8
8	28	20	22	16	40	30	32	24
10	55	40	44	32	80	59	64	47
12	95	70	76	56	140	103	112	82
14	150	110	120	90	220	165	180	130
16	235	175	190	140	350	255	275	205
20	475	350	380	280	675	500	540	400
24	825	605	650	480	1170	860	935	690
30	1630	1200	1300	960	2320	1710	1850	1370
36	2850	2100	2280	1680	4060	3000	3250	2400

*Torque tolerance is ±10%.

TX,90,FF607 -19-05JUL90

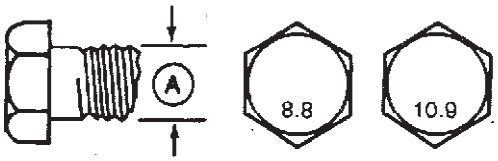
CAP SCREW TORQUE VALUES



TS289 -UN-09AUG89

Inch Cap Screw Head Markings

TS300 -UN-09AUG89



Metric Cap Screw Head Markings

INCH CAP SCREW TORQUE VALUES

Bolt Diameter (A)	Wrench Size	Cap Screw Grade SAE 2 N·m	SAE 2 lb-ft	SAE 5 N·m	SAE 5 lb-ft	SAE 8 N·m	SAE 8 lb-ft
1/4"	7/16"	7	(5)	11	(8)	16	(12)
5/16"	1/2"	14	(10)	23	(17)	33	(24)
3/8"	9/16"	24	(18)	41	(30)	54	(40)
7/16"	5/8"	41	(30)	68	(50)	95	(70)
1/2"	3/4"	61	(45)	102	(75)	142	(105)
9/16"	13/16"	88	(65)	142	(105)	203	(150)
5/8"	15/16"	122	(90)	197	(145)	278	(205)
3/4"	1-1/8"	217	(160)	353	(260)	495	(365)
7/8"	1-5/16"	224	(165)	563	(415)	800	(590)
1"	1-1/2"	332	(245)	848	(625)	1193	(880)
1-1/4"	1-7/8"	665	(490)	1492	(1100)	2393	(1765)

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

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

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

METRIC CAP SCREW TORQUE VALUES

Bolt Diameter (A)	Wrench Size	Markings on Cap Screw Heads 8.8 N·m	8.8 lb-ft	10.9 N·m	10.9 lb-ft
5 mm	8 mm	6	(4.5)	9	(6.5)
6 mm	10 mm	10	(7.5)	15	(11)
8 mm	13 mm	25	(18)	35	(26)
10 mm	16 mm	50	(37)	75	(55)
12 mm	18 mm	85	(63)	130	(97)
16 mm	24 mm	215	(159)	315	(232)
20 mm	30 mm	435	(321)	620	(457)
24 mm	36 mm	750	(553)	1070	(789)
30 mm	46 mm	1495	(1103)	2130	(1571)

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 fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

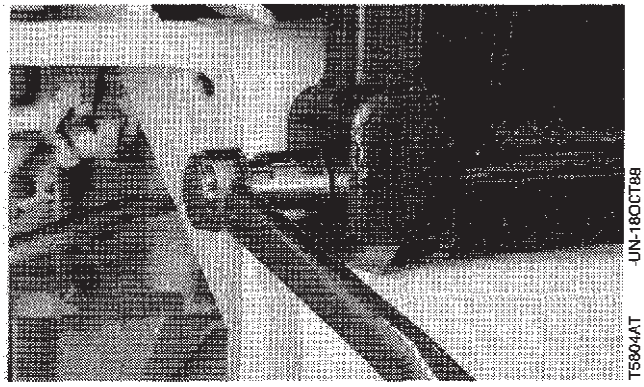
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.

DX,TORQ3 -19-04JUN90

KEEPS ROPS INSTALLED PROPERLY

CAUTION: Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts (A) 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. A damaged ROPS should be replaced, not reused.



SPECIFICATION

ROPS mounting bolts torque	70—150 ft-lb (95—203 N·m)
Limb risers to canopy	70—150 ft-lb (95—203 N·m)

When installation of equipment on a machine requires loosening or removing Roll-Over Protective Structure, mounting bolts must be tightened.

04T,90,K149 10-09MAY98

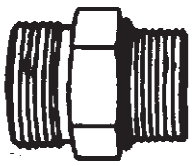
SERVICE RECOMMENDATIONS FOR O-RING BOSS FITTINGS

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.



T6243AE -UN-18OCT88

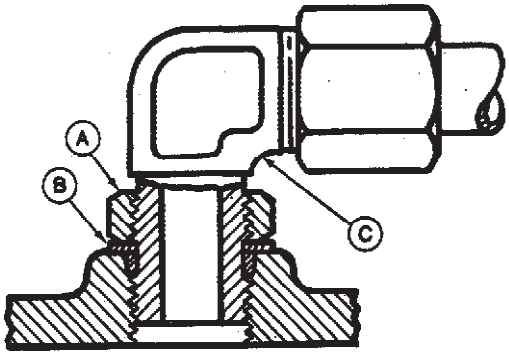
ANGLE FITTING

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 (B) contacts face of boss.

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

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



T6520AB -UN-18OCT88

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

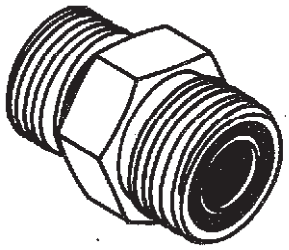
TORQUE VALUE

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%.

04T,90,K66 -19-05SEP90

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 value 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.		Dash	Thread Size	Swivel Nut		Bulkhead Nut	
mm	in.	Size	in.	N·m	lb-ft	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%.

04T,90,K67 -19-05SEP90

SAE FOUR BOLT FLANGE FITTING SERVICE RECOMMENDATIONS

1. Inspect the sealing surfaces for nicks or scratches, roughness or out-of-flat condition. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If these defects cannot be polished out, replace the component.

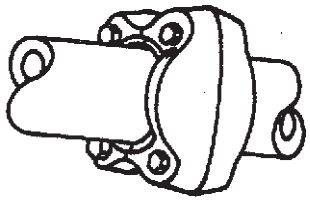
2. Install the correct O-ring (and backup washer if required) into the groove using petroleum jelly to hold it in place.

3. For split flange; loosely assemble split flange halves, being sure that the split is centrally located and perpendicular to the port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring.

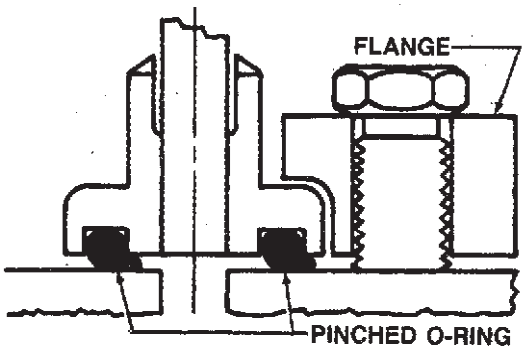
4. For single piece flange; put hydraulic line in the center of the flange and install four cap screws. With the flange centrally located on the port, hand tighten cap screws to hold it in place. Do not pinch O-ring.

5. For both single piece flange and split flange, be sure the components are properly positioned and cap screws are hand tight. Tighten one cap screw, then tighten the diagonally opposite cap screw. Tighten the two remaining cap screws. Tighten all cap screws within the specified limits shown in the chart.

DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT overtighten.



T6575AG -UN-18OCT88



T6561AG -19-19DEC86

04T,90,K68 -19-02APR90

SAE FOUR BOLT FLANGE FITTING TORQUE[2]

Nominal Flange Size	Cap Screw Size[1]	N·m Min.	N·m Max.	(lb-ft) Min.	(lb-ft) Max.
1/2	5/16 - 18 UNC	20	31	(15)	(23)
3/4	3/8 - 16 UNC	28	54	(21)	(40)
	M10 10.9	58	88	(43)	(65)
1	3/8 - 16 UNC	37	54	(27)	(40)
	M12 10.9	104	156	(77)	(115)
1-1/4	7/16 - 14 UNC	47	85	(35)	(63)
1-1/2	1/2 - 13 UNC	62	131	(46)	(97)
2	1/2 - 13 UNC	73	131	(54)	(97)
2-1/2	1/2 - 13 UNC	107	131	(79)	(97)
3	5/8 - 11 UNC	158	264	(117)	(195)
3-1/2	5/8 - 11 UNC	158	264	(117)	(195)
4	5/8 - 11 UNC	158	264	(117)	(195)
5	5/8 - 11 UNC	158	264	(117)	(195)

1. SAE Grade 5 or better cap screws with plated hardware.

2. Tolerance ± 10%. The torques given are enough for the given size connection with the recommended working pressure. Torques can be increased to the maximum shown for each cap screw size if desired. Increasing cap screw torque beyond this maximum will result in flange and cap screw bending and connection failures.

04T,90,K68,A -19-02APR90

FUEL SPECIFICATIONS

Use ONLY clean, high-quality fuel.

Use Grade No. 2-D fuel above 4°C (40°F).

Use Grade No. 1-D fuel below 4°C (40°F).

Use Grade No. 1-D fuel for all air temperatures at altitudes above 1 500 m (5000 ft).

IMPORTANT: If fuel sulfur content exceeds 0.5 percent, change the engine oil at one-half the normal interval.

Use fuel with less than 1.0 percent sulfur. If possible, use fuel with less than 0.5 percent sulfur.

For maximum filter life, sediment and water should not be more than 0.10 percent.

The cetane number should be 40 minimum. If you operate your machine where air temperatures are normally low or where altitudes are high, you may need fuel with a higher cetane number.

Cloud Point—For cold weather operation, cloud point should be 12°C (10°F) below lowest normal air temperature.

02T,45,C25 -19-05SEP90

FUEL STORAGE

NOTE: Diesel fuels stored for a long time may form gum or bacteria and plug filters.

Keep fuel in a clean container in a protected area. Water and sediment must be removed before fuel gets to the engine. Do not use de-icers to remove water from fuel. Do not depend on fuel filters to remove water.

If possible, install a water separator at the storage tank outlet. (See your John Deere dealer).

IMPORTANT: Keep all dirt, scale, water or other foreign material out of fuel.

Store fuel drums on their sides.

02T,45,K8 -19-28FEB90

FUEL TANK

CAUTION: Handle fuel carefully. If the engine is hot or running, do not fill the fuel tank. Do not smoke while you fill fuel tank or work on fuel system.

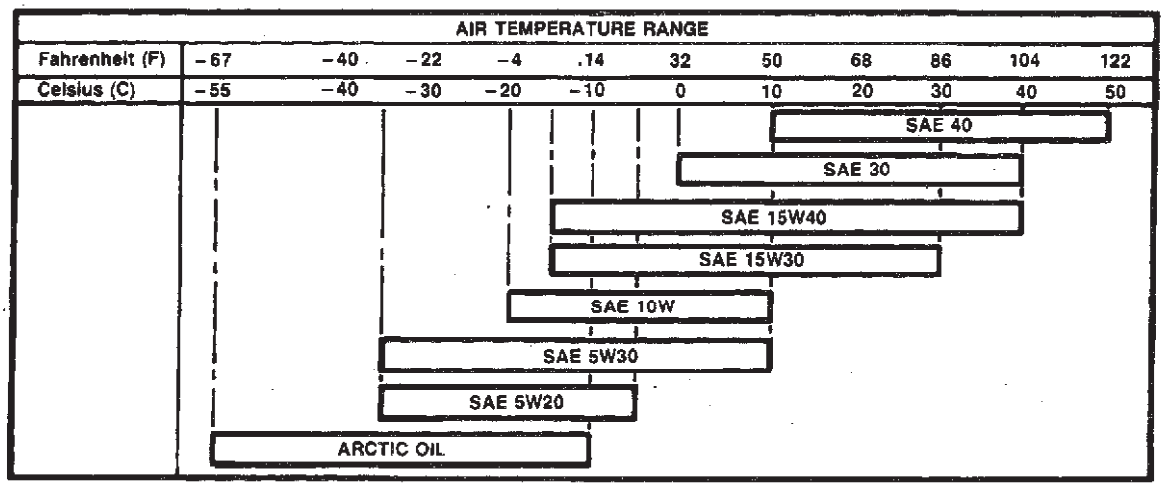
To avoid condensation, fill the fuel tank at the end of each day's operation. Capacity is 41 gal (155.8 L).

TS185 -UN-23AUG88

02T,45,K36 -19-14MAR88

120990

ENGINE OIL



T6921AP -19-17APR89

Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

Additives are not required nor recommended.

JOHN DEERE TORQ-GARD SUPREME PLUS 50® ENGINE OIL IS RECOMMENDED BECAUSE IT IS A SPECIFICALLY BALANCED FORMULATION TO PROVIDE MAXIMUM ENGINE LIFE. It provides excellent protection against mechanical wear, carbon deposits, and lacquer formation, plus providing superior cold weather starting performance.

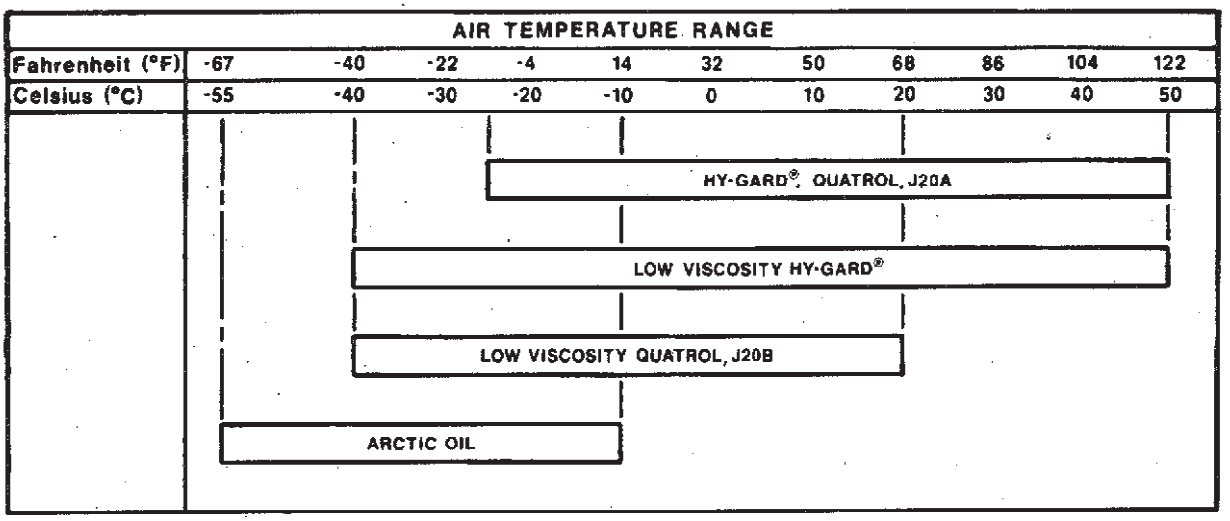
If other oils are used, they must have one of the following specifications:

Oil Specification	Use
API Service: CD/SF, CD/SE, CD/SD, CD/SC, or MIL-L-2104C, MIL-L-2104D	Recommended
*API Service CC/SF, CC/SE, CC/SD, CC/SC or *MIL-L-46152, *MIL-L-46152B	For SAE 5W20, SAE 5W30 and arctic oil only, use if recommended oil is not available
*MIL-L-46167A	For arctic oil only

Change oil at one-half the normal interval.

02T,45,K22 -19-01MAR90

TRANSMISSION-HYDRAULIC, PARK BRAKE, DIFFERENTIAL, AND WINCH OIL



Depending on the expected air temperature range between oil changes, use oil viscosity shown on the chart above.

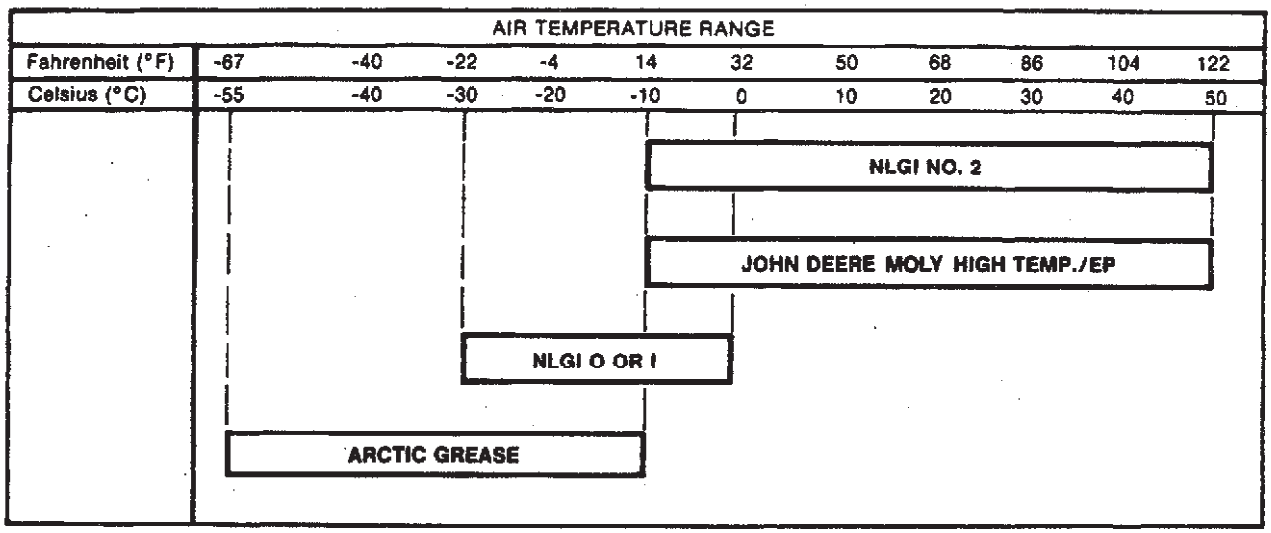
John Deere HY-GARD® transmission and hydraulic oil is recommended because it is specifically formulated to minimize brake chatter, provide optimum clutch engagement, and to provide maximum protection against mechanical wear, rust, corrosion, and foaming.

You may also use QUATROL® oils, which are oils that meet John Deere standards, or other oils meeting John Deere Standard JDM J20A and J20B.

Oils meeting MIL-L-46167 may be used as arctic oil.

02T,45,K37 -19-23APR88

GREASE



Depending on the expected air temperature range during use, use grease shown on chart above.

Greases recommended are:

JOHN DEERE MOLY HIGH TEMPERATURE/EP GREASE (PREFERRED)

SAE Multipurpose Grease with Extreme Pressure (EP) performance and containing 3 to 5 percent molybdenum disulfide (preferred).

SAE multi-purpose EP grease.

Grease meeting MIL-G-10924C specifications may be used as arctic grease.

02T,45,C49 -19-02APR90

LUBRICANT STORAGE

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination. Store drums on their sides.

T82,BHFL,J -19-28FEB90

ALTERNATIVE LUBRICANTS

Additional information on cold weather operation is available from your John Deere dealer.

Conditions in certain geographical areas may require special lubricants and lubrication practices which do not appear in this operator's manual. If you have any questions, consult your John Deere dealer to obtain the latest information and recommendations.

DX,ALTER -19-04JUN90

PREDELIVERY INSPECTION (PDI)

Do the predelivery services shown on the inspection checklist before you deliver the machine to the customer. The checklist is in the back of the Operator's Manual.

06T,PIM,C1 -19-15FEB90

AFTER-SALE INSPECTION (ASI)

Do the after-sale services shown on the inspection checklist during the warranty period after 50—100 hours of machine operation. The after-sale checks are also found on the inspection checklist in the back of the Operator's Manual.

Terms of this inspection are outlined on the customers John Deere Delivery Receipt.

06T,PIM,C2 -19-28FEB90

PLANNED INSPECTION PROGRAM I (PIP I)

When you deliver the machine, explain to the customer the advantage of the Planned Inspection Program I (PIP I):

Top production from the machine
Minimum downtime
Lower long-term operating costs
Overall greater satisfaction

Prepare a contract with the customer specifying the number of field inspections by your service technician and the cost.

Use the PIP I Inspection Checklists in this group as a guide in preparing the contract.

06T,PIM,C3 -19-18APR90

PLANNED INSPECTION PROGRAM II (PIP II)

PIP II is a continuation of PIP I.

This program tests critical machine systems and will enable the customer to keep the machine in the best possible condition.

Prepare a contract with the customer specifying the number of field inspections by your service technician and the cost. Use the PIP II Inspection Checklist in this group as a guide in preparing the contract.

06T,PIM,C4 -19-18APR90

USING THE CHECKLISTS

Do an inspection procedure only if there is a "box" behind the procedure in the service column which you are following. Mark the box with an "x" when the procedure is done.

For specific instructions on how to do each procedure, refer to the operator's manual or the technical manual.

If a box is not marked, write an explanation in the comments column. For example:

If engine oil level is low, note amount of oil needed to fill crankcase.

If the machine is not lubricated according to the Periodic Maintenance Chart, note this.

When the inspection is done, put the checklist in the customer's file. Use the same checklist for additional inspections.

06T,PIM,C5 -19-18APR90

DELIVERY SERVICE

Use the operator's manual as a guide. Discuss the following points thoroughly with the customer:

The importance of safety.
Controls and instruments.
All functions of the hydraulic system.
How to start and stop the engine.
The importance of the break-in period.
The importance of lubrication and periodic maintenance.
Have the owner sign the Delivery Receipt.
Give the owner the operator's manual.

T82,TLPD,P -19-18APR90

PIP PLANNED INSPECTION PROGRAM

JOHN DEERE

T6855AT -19-19DEC88

JOHN DEERE 640D SKIDDER AND 648D GRAPPLE SKIDDER

CHECK LIST FOR PLANNED INSPECTION PROGRAM I (PIP I) — Field inspections contracted with the owner.

NOTE: Illustrated planned inspection program checks can be found in SP600.

	Inspection 1	Inspection 2	Inspection 3	Inspection 4
Machine Hours				
Performed by				
Mechanic Signature				
Date				

Owner's Name _____
Address _____
Signature _____
Dealership _____

NOTE: Do not remove these pages. Make photocopies for extra copies.

Item	OK	Comments
1. Coolant level and coolant freeze protection	☐	
2. Check radiator area	☐	
3. Belt tension	☐	
4. Clean engine compartment	☐	
5. Check exhaust system	☐	
6. Engine oil level	☐	

02T,05,J50 -19-24MAY88