850, 900HC, 950 and 1050 Tractors

JOHN DEERE

TECHNICAL MANUAL

850, 900HC, 950 and 1050
Tractors

TM1192 (01AUG86) English

John Deere
Lawn & Grounds Care Division
TM1192 (01AUG86)

LITHO IN U.S.A.
ENGLISH

850, 900HC, 950 AND 1050 TRACTORS
Technical Manual
TM-1192 (Aug-86)

SECTION AND GROUP CONTENTS

John Deere Series 220 Diesel Engines

COMPONENT TECHNICAL MANUAL

John Deere
Lawn & Grounds Care Division

CTM3 (10AUG93)

Replaces CTM3 (28NOV89)

Litho in U.S.A.

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.

Use this component technical manual in conjunction with the machine technical manual. An application listing in the Specifications and General Information section identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

This manual is organized so that all the information on a particular engine is kept together in a single section.

Information in each section 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. All specifications, wear tolerances, and torque values appear at the beginning of each section.

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.

JOHN DEERE DEALERS

IMPORTANT: The changes listed below make your current CTM obsolete. Discard CTM3, dated 28 NOV 89. Please remove this page and route through your service department.

- The format or "style" of the book has been changed. The familiar "modular" layout has been replaced by a two-column "floating text" format. Also, a heavy emphasis on the use of "exploded" line art, to illustrate specific yet "simple" procedures, is used.
- The layout of the book also changed. It has been completely reorganized to cover a different engine "family" in its own section, similar to how a Technical manual is layed out, using sections and groups.
  - Sections 1 through 4 cover engine service. This includes; engine teardown, diagnosis, checks, tests, adjustments and operational tests.
  - Section 10 covers removal/installation and repair of accessories, primarily on Series 220 OEM Power Unit engines.
  - Section 20 covers Theory of Operation of the various engine systems.
  - Section 21 covers Electrical System component location and schematics for Series 220 OEM Power Unit engines.
- Turbocharger analysis, inspection and repair information has been added. See Accessories - Series 220 Power Unit Engines.
- Information/model designation for Series 220 engines (3009, 3011, 3014 and 4019) have been added wherever applicable.
- Engine application charts have been updated to include the latest product models. See Specifications and General Information section.
- The book's title. The title was changed from "3TN and 4TN Series Yanmar Diesel Engines" to "John Deere 220 Series Diesel Engines", to include information pertaining to the OEM Stand-alone power packs.
- A safety section, fuels, lubricants and coolant information and an alphabetical index have also been added.
- A nominal or "standard" specification has been added and listed with the "wear limit" specification.

ABOUT THIS MANUAL

This Component Technical Manual (CTM3) covers the recommended repair and adjustment procedures for the following engines:

- 3 and 4TN Series Diesel Engines used in John Deere Lawn and Grounds Care and small Industrial products.
- Series 220 Diesel Engines offered as OEM units. Three different configurations are available: Base industrial engine, industrial power unit or a generator drive unit.

Before beginning repair of an engine, clean the engine and mount on a repair stand.

This manual contains SI Metric units of measure, followed immediately by the U.S. customary units of measure.

Direction of engine crankshaft rotation in this manual is referenced facing the flywheel looking toward the water pump. Front of engine is water pump end.

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manuals for information on components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Read each story completely before performing service to check engine model differences in procedure or specifications.

Each section will be identified with a symbol, letter or a number.

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.

Introduction

RECOGNIZE SAFETY INFORMATION

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

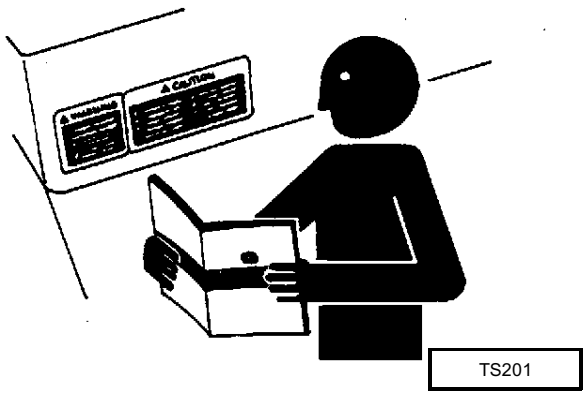
Follow recommended precautions and safe servicing practices.

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.

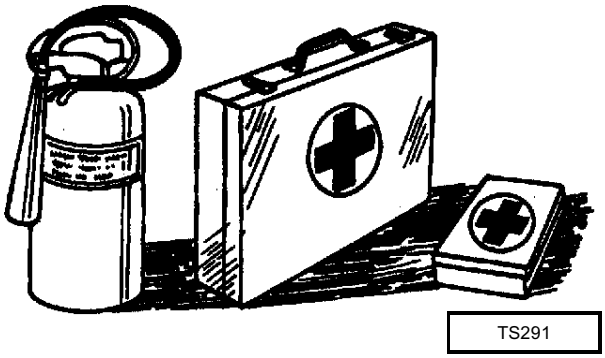
REPLACE SAFETY SIGNS



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

HANDLE FLUIDS SAFELY-AVOID FIRES

Be Prepared For Emergencies



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 engine is clean of trash, grease, and debris.

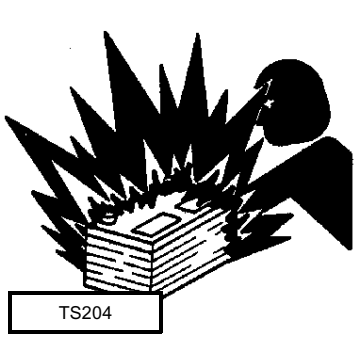
Do not store oily rags; they can ignite and burn spontaneously.

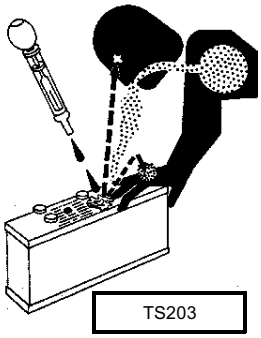
Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

USE CARE IN HANDLING AND SERVICING BATTERIES


TS204


TS203

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).

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 acid burns 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.
4. 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 1.9 L (2 quarts).
3. Get medical attention immediately.

SERVICE COOLING SYSTEM SAFELY


TS281

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.

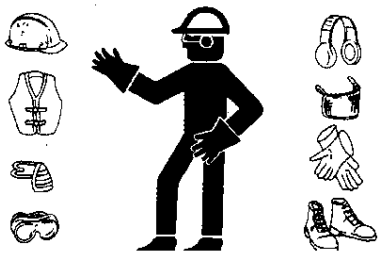
USE SAFE SERVICE PROCEDURES

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.

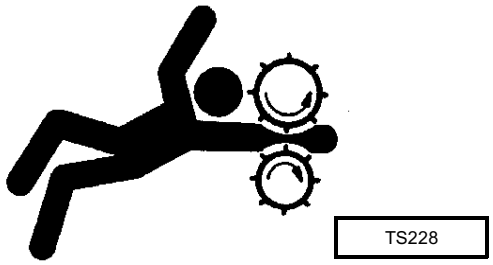
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating engine.


TS206

Service Engines 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.

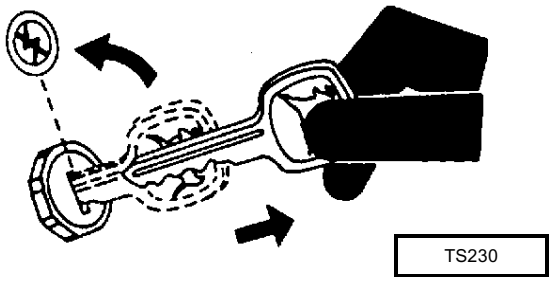
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



Use Proper Tools

Use tools appropriate to the work. Makeshift tools 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. Use only service parts meeting John Deere specifications.

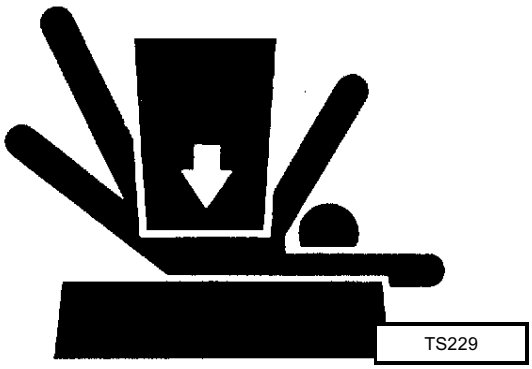
Shut Down Engine



- **Before working on the engine:**

1. Stop the engine and remove the key.
2. Disconnect the battery ground strap.
3. Hang a "DO NOT OPERATE" tag on the instrument panel.

Support Engine Properly and Use Proper Lifting Equipment



If you must work on a lifted engine, securely support the engine.

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

Lifting heavy components incorrectly can cause severe injury or engine damage. Follow recommended procedure for removal and installation of components in the manual.

Work In A Clean Area

- **Before starting a job:**

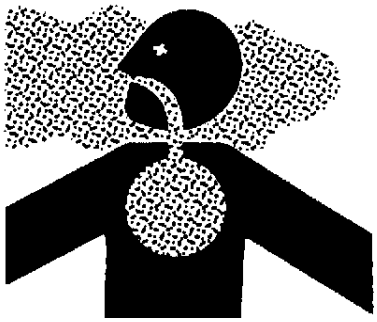
1. Clean work area and engine.
2. Make sure you have all necessary tools to do your job.
3. Have the right parts on hand.
4. Read all instructions thoroughly; do not attempt shortcuts.

Illuminate Your Work Area Safely

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

S

Work In A 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.

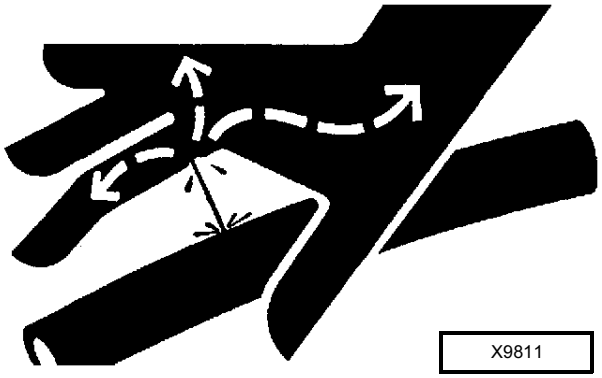
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

Remove Paint Before Welding Or Heating

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.

USE CARE AROUND HIGH-PRESSURE FLUID LINES

Avoid High-Pressure Fluids



X9811

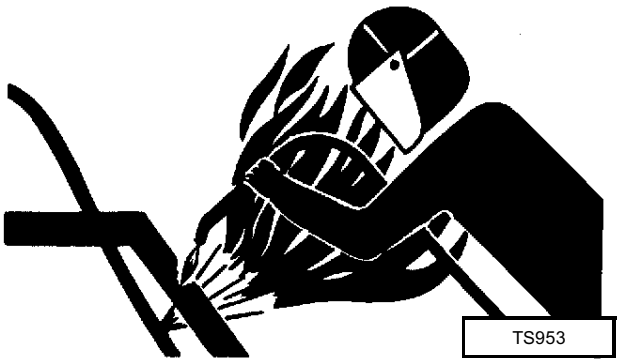
Escaping fluid under pressure can penetrate the skin causing serious injury.

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.

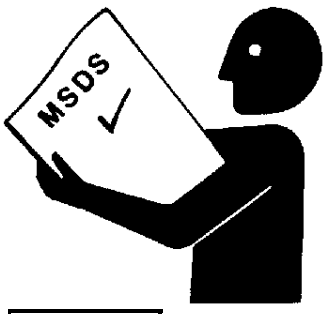
Avoid Heating Near Pressurized Fluid Lines



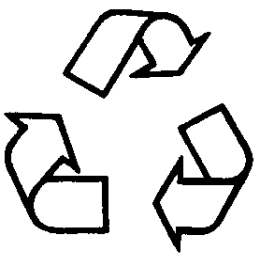
TS953

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.

HANDLE CHEMICAL PRODUCTS SAFELY



TS1132



TS1133

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.

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. 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 engine is functioning properly, especially the safety systems. Install all guards and shields.

SPECIFICATIONS AND GENERAL INFORMATION

G

ENGINE SERIAL NUMBER PLATE

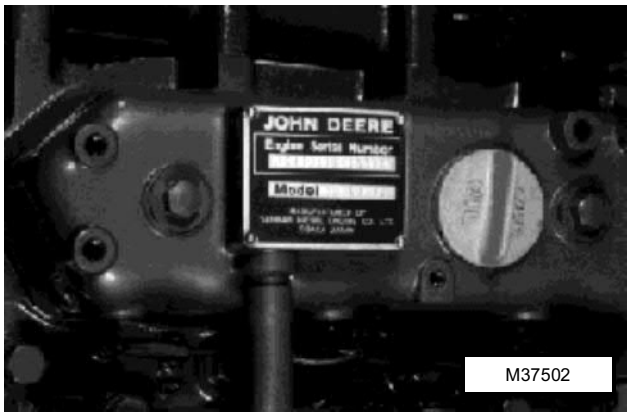
NOTE: The engine serial number plate can be easily destroyed. Before "hot tank" cleaning the block, remove the plate or record the information elsewhere.

Location

All except 4TN100: The engine serial number plate is located on the rocker arm cover.

4TN100: The engine serial number plate is located on the side of the engine, under exhaust manifold.

Refer to the engine model designation on your engine's serial number plate to identify as to which section to use for repair information.



Engine Serial Number Information

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine model designation, and a 6-digit sequential number. The following are examples:

3TN and 4TN Series Engines

CH3029D000000

CH . . . . . Factory producing engine (Yanmar)
3029D . . . . . Engine model designation
000000 . . . . . Sequential serial number

Series 220 OEM Engines

CH3009D000000

CH . . . . . .Factory producing engine
3009D . . . . . Engine model designation
000000 . . . . . Sequential serial number

Factory Code

CH . . . . . Yanmar

Engine Model Designation

3009D . . . . . Definition explained following. (See "Engine Model Designation".)

Sequential Number

000000 . . . . . 6-digit sequential serial number

Engine Model Designation - 3TN and 4TN Series Engines

John Deere engine model designation includes number of cylinders, usage, engine type, bore diameter, fuel injection (type) and application. For example:

3TNA72UJK Engine

3 . . . . . .Number of cylinders
T . . . . . Usage (tractor)
NA . . . . . Engine type
72 . . . . . .Bore diameter
U . . . . . Fuel Injection (Type)
JK . . . . . .Application

Engine Type

NA . . . . . Diesel
G . . . . . Gasoline

Fuel Injection (Type)

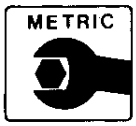
U . . . . . Indirect injection
R . . . . . .Direct injection

Application

JK . . . . . John Deere
E-SP . . . . . Export - Sperry Company

SECTION AND GROUP CONTENTS—Continued

**850 (-009000), 950 (-012000)*
***850 (009001-), 950 (012001-)*



This tractor is of metric design. All hardware is therefore metric. Make sure you use the specified metric hardware when replacement becomes necessary. For your convenience most specifications are given in customary U.S. measurement with metric measurement following.
Some specifications cannot be converted. Those appear in metric only.

All information, illustrations and specifications contained in this technical 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.

Section 10
GENERAL

CONTENTS OF THIS SECTION

Group 00
SPECIFICATIONS AND SPECIAL TOOLS
GENERAL TRACTOR SPECIFICATIONS (850-950)

	850 TRACTOR	950 TRACTOR
HORSEPOWER (Official PTO horsepower)	16.61 kW (22.27 hp) at 2600 rpm	20.40 kW (27.36 hp) at 2400 rpm
ENGINE:		
Type	3-cylinder, in-line, valve-in-head, diesel	3-cylinder, in-line, in-line, valve-in-head, diesel
Slow idle speed	800 rpm	800 rpm
Working speed range	1900 to 2600 rpm	1700 to 2400 rpm
Bore and stroke	80 x 85 mm (3.15 x 3.35 in.)	90 x 90 mm (3.54 x 3.54 in.)
Displacement	1.3 L (78 cu-in)	1.7 L (105 cu-in)
Compression ratio	21 to 1	20 to 1
Firing order (No. 1 in rear)	1-3-2	1-3-2
Valve clearance		
Intake	0.20 mm (0.008 in.)	0.15 mm (0.006 in.)
Exhaust	0.20 mm (0.008 in.)	0.15 mm (0.006 in.)

SPECIFICATIONS (850 and 950)—Continued

	850	950
Injection pump timing	26° BTDC	25° BTDC
Lubrication system	force-feed, pressurized with full-flow filter	force-feed, pressurized with full-flow filter
FUEL SYSTEM:		
Type	precombustion chamber	precombustion chamber
Injection pump type	plunger	plunger
Air cleaner	dry type	dry type
COOLING SYSTEM:		
Type	pressurized with centrifugal pump	pressurized with centrifugal pump
Temperature control	heavy duty thermostat	heavy duty thermostat
CAPACITIES		
Fuel tank	32 L (8.5 U.S. gal.)	32 L (8.5 U.S. gal.)
Cooling system	5.5 L (6 U.S. qt.)	6 L (6.5 U.S. qt.)
Crankcase (with filter change)	4.5 L (5 U.S. qt.)	6.4 L (7 U.S. qt.)
Transmission-hydraulic system		
850 (-16000) and 950 (-20000)	18 L (19 U.S. qt.)	18 L (19 U.S. qt.)
850 (16001-), 950 (20001-) 2WD	20 L (21 U.S. qt.)	20 L (21 U.S. qt.)
850 (16001-), 950 (20001-) MFWD	22 L (23 U.S. qt.)	22 L (23 U.S. qt.)
MFWD Axle	6.5 L (6.9 U.S. qt.)	8.5 L (9 U.S. qt.)
TRANSMISSION:		
Type	2-speed range selector and 4-speed gear selector	2-speed range selector and 4-speed gear selector
Gear selections	8 forward and 2 reverse	8 forward and 2 reverse
Clutch		
850 (-16000) and 950 (-20000)	single-disk, dry	single-disk, dry
850 (16001-) and 950 (20001-)	two-stage transmission clutch	two-stage transmission clutch
POWER TAKE-OFF:		
Type		
850 (-16000) and 950 (-20000)	transmission driven, with overrunning clutch	transmission driven, with overrunning clutch
850 (16001-) and 950 (20001-)	continuous running clutch	continuous running clutch
Speed (2260 engine rpm)	540 rpm	540 rpm
Size	35 mm (1-3/8 in.)	35 mm (1-3/8 in.)
Clutch		
850 (-16000) and 950 (-20000)	uses transmission clutch	uses transmission clutch
850 (16001-) and 950 (20001-)	two-stage transmission clutch	two-stage transmission clutch
HYDRAULIC SYSTEM:		
Type	open center, constant flow	open center, constant flow
Working pressure	13 790 kPa (138 bar) (2000 psi)	13 790 kPa (138 bar) (2000 psi)
Pump	gear pump, driven by engine	gear pump, driven by engine
BRAKES		
Type	mechanical dry, internal expanding shoe	mechanical, dry, internal expanding shoe
ELECTRICAL SYSTEM:		
Type	12-volt, negative ground	12-volt, negative ground
Battery	one, 12-volt, BCI group 30H, 475 amps cold cranking, 160 minutes reserve capacity	one, 12-volt, BCI group 30H, 475 amps cold cranking, 160 minutes reserve capacity
Alternator	25-amp	25-amp
TIRES AND TREADS:		
	See pages 05-6 and 05-7 in this section.	See pages 05-6 and 05-7 in this section.

	850	950
DIMENSIONS:		
Wheelbase	850 (-16000) 1.63 m (64 in.) 850 (16001-) 1.7 m (67.5 in.)	1.75 m (69 in.)
Overall length	850 (-16000) 2.29 m (118 in.) 850 (16001-) 3.07 m (121 in.)	3.10 m (122 in.)
Height to muffler cover*	2.18 m (85.8 in.)	2.28 m (89.6 in.)
Height to top of ROLL-GARD® Canopy*	2.06 m (81.1 in.)	2.13 m (84.0 in.)
Overall width (minimum tread)	1.35 m (53 in.)	2.48 m (58 in.)
Turning radius	2.80 m (110 in.)	2.99 m (118 in.)
SHIPPING WEIGHT**	1065 kg (2350 lbs.)	1200 kg (2650 lbs.)

**850 Tractor equipped with 11.2-24 rear tires and 5.00-15 front tires. 950 Tractor equipped with 12.4-28 rear tires and 5.50-16 front tires.*

***Equipped for average field service, without fuel and ballast.*

TRAVEL SPEEDS:*

	850 Tractor		950 Tractor	
Gear	Rated Engine Speed (2600 rpm)	Standard PTO Speed (2260 rpm)	Rated Engine Speed (2400 rpm)	Standard PTO Speed (2260 rpm)
1	1.3 km/h 0.8 mph	1.1 km/h 0.7 mph	1.3 km/h 0.8 mph	1.2 km/h 0.8 mph
2	1.8 km/h 1.1 mph	1.6 km/h 1.0 mph	1.9 km/h 1.2 mph	1.8 km/h 1.1 mph
3	2.7 km/h 1.7 mph	2.4 km/h 1.5 mph	2.8 km/h 1.7 mph	2.6 km/h 1.6 mph
4	4.0 km/h 2.5 mph	3.5 km/h 2.2 mph	4.1 km/h 2.6 mph	3.9 km/h 2.4 mph
5	6.0 km/h 3.8 mph	5.2 km/h 3.3 mph	6.2 km/h 3.9 mph	5.9 km/h 3.7 mph
6	8.6 km/h 5.4 mph	7.5 km/h 4.7 mph	8.9 km/h 5.5 mph	8.4 km/h 5.2 mph
7	12.7 km/h 8.0 mph	11.1 km/h 6.9 mph	13.1 km/h 8.2 mph	12.3 km/h 7.7 mph
8	18.7 km/h 11.7 mph	16.3 km/h 10.2 mph	19.3 km/h 12.1 mph	18.2 km/h 11.4 mph
1R	1.8 km/h 1.1 mph	1.6 km/h 1.0 mph	1.9 km/h 1.2 mph	1.8 km/h 1.1 mph
2R	8.6 km/h 5.4 mph	7.5 km/h 4.7 mph	8.9 km/h 5.5 mph	8.4 km/h 5.2 mph

**850 Tractor equipped with 11.2-24 rear tires. 950 Tractor equipped with 12.4-28 rear tires.*

GENERAL TRACTOR SPECIFICATIONS (1050)

HORSEPOWER (Factory observed PTO horsepower)	24.6 kW (33 hp) at 2400 rpm
ENGINE:	
Type	3-cylinder, in-line, valve-in-head, turbocharged diesel
Slow idle speed	800 rpm
Working speed range	1700 to 2400 rpm
Bore and stroke	90 x 90 mm (3.54 x 3.54 in.)
Displacement	1717 cm^3 (105 cu-in)
Compression ratio	21 to 1
Firing order (No. 1 in rear)	1-3-2
Valve clearance	
Intake	0.15 mm (0.006 in.)
Exhaust	0.15 mm (0.006 in.)
Injection pump timing	25° BTDC
Lubrication system	force-feed, pressurized with full-flow filter

SPECIFICATIONS (1050)—Continued

FUEL SYSTEM:	
Type	precombustion chamber
Injection pump type	plunger
Air cleaner	dry type with secondary element
COOLING SYSTEM:	
Type	pressurized with centrifugal pump
Temperature control	heavy duty thermostat
CAPACITIES:	
Fuel tank	42 L (11 U.S. gallons)
Cooling system	6.7 L (7.5 U.S. quarts)
Crankcase (with filter change)	6.4 L (7 U.S. quarts)
Transmission-hydraulic system	26 L (7 U.S. gallons)
Front axle housing	8.5 L (9 U.S. quarts)
TRANSMISSION:	
Type	2-speed range selector and 4-speed gear selector
Gear selections	8 forward and 2 reverse
Clutch	two-stage, dry
POWER TAKE-OFF:	
Type	continuous running
Speed (2260 engine rpm)	540 rpm
Size	35 mm (1-3/8 in.)
Clutch	uses two-stage transmission clutch
HYDRAULIC SYSTEM:	
Type	open center, constant flow
Working pressure	13800 kPa (138 bar) (2000 psi)
Pump	gear pump, driven by engine
BRAKES:	
Type	mechanical, dry, internal expanding shoe
ELECTRICAL SYSTEM:	
Type	12-volt, negative ground
Battery	one, 12-volt, BCI group 30H, 475 amps cold cranking, 160 minutes reserve capacity
Alternator	25-amp
TIRES AND TREADS:	See pages 06-6 and 06-7 in this section.

DIMENSIONS:

Wheelbase	1750 mm (69 in.)
Overall length (with 3-point hitch)	3100 mm (122 in.)
Height to muffler cover*	1970 mm (78 in.)
Height to top of ROLL-GARD canopy*	2180 mm (86 in.)
Overall width (minimum tread)	1650 mm (65 in.)
Turning radius	3100 mm (122 in.)

SHIPPING WEIGHT** ..... 1350 kg (3000 lbs.)

**Tractor equipped with 13.6 - 28 rear tires and 6.00 - 16 front tires.*
***Equipped for average field service, without fuel and ballast.*

TRAVEL SPEEDS:*

Gear	km/h	mph
1st	1.37	.85
2nd	1.96	1.22
3rd	2.89	1.80
4th	4.28	2.66
5th	6.45	4.00
6th	9.20	5.72
7th	13.60	8.45
8th	20.10	12.50
1 R	1.96	1.22
2 R	9.20	5.72

**1050 Tractor equipped with 13.6 - 28 rear tires and engine at rated speed of 2400 rpm (575 PTO rpm).*

Tune-Up

ITEM	SPECIFICATION
PTO Horsepower	
850	16.4 kW (22 hp)
950	20.1 kW (27 hp)
1050	24.6 kW (33 hp)
Compression	2916-4405 kPa (39.1-44.0 bar) (568 to 639 psi)
Thermostat opening temperature	71°C (160°F)
Radiator cap pressure release	98 kPa (1.0 bar) (14 psi)
Engine speeds	
850	
Slow idle	800 rpm
Fast idle	2700 rpm
Rated speed at full load	2600 rpm
950	
Slow idle	800 rpm
Fast idle	2600 rpm
Rated speed at full load	2400 rpm
1050	
Slow idle	800 rpm
Fast idle	2575 rpm
Rated speed at full load	2400 rpm

Lubrication

Engine crankcase oil capacity	
850	4.5 L (5 U.S. quarts)
950	6.4 L (7 U.S. quarts)
1050	6.4 L (7 U.S. quarts)
Transmission-hydraulic system capacity	
850 (-16000) and 950 (-20000) 2WD	18 L (19 U.S. quarts)
850 (16001-) and 950 (20001-) 2WD	20 L (21 U.S. quarts)
850 (16001-) and 950 (20001-) MFWD	22 L (23 U.S. quarts)
1050 (All)	27 L (28.5 U.S. quarts)
MFWD axle housing capacity	
850	6.5 L (6.9 U.S. quarts)
950 and 1050	8.5 L (8.9 U.S. quarts)
Service intervals	
Check engine oil level	Every 10 hours
Change engine oil	After first 50 hours then Every 100 hours
Replace engine oil filter	Every 200 hours
Clean crankcase breather tube	Every 600 hours
Check transmission-hydraulic oil level	Every 50 hours
Change transmission-hydraulic oil	Every 200 hours
Clean transmission-hydraulic oil screen	
850 and 950 without hydraulic filter	Every 200 hours
850, 950 and 1050 with hydraulic filter	After first 100 hours then Every 600 hours
Replace transmission-hydraulic oil screen	
850 and 950 without hydraulic filter	Every 600 hours
850, 950 and 1050 with hydraulic filter	Every 1200 hours
1050 (all)	Every 1200 hours

Tune-Up

ITEM	SPECIFICATION
PTO Horsepower	
850 and 900HC	16.4 kW (22 hp)
950	20.1 kW (27 hp)
1050	24.6 kW (33 hp)
Compression	3916-4405 kPa (39.1-44.0 bar) (568 to 639 psi)
Thermostat opening temperature	71°C (160°F)
Radiator cap pressure release	98 kPa (1.0 bar) (14 psi)
Engine speeds	
850 and 900HC	
Slow idle	800 rpm
Fast idle	2700 rpm
Rated speed at full load	2600 rpm
950	
Slow idle	800 rpm
Fast idle	2600 rpm
Rated speed at full load	2400 rpm
1050	
Slow idle	800 rpm
Fast idle	2575 rpm
Rated speed at full load	2400 rpm

Lubrication

Engine crankcase oil capacity	
850 and 900HC	4.5 L (5 U.S. quarts)
950	6.4 L (7 U.S. quarts)
1050	6.4 L (7 U.S. quarts)
Transmission-hydraulic system capacity	
850 (-16000) and 950 (-20000)	18 L (19 U.S. quarts)
850 (16001-), 950 (20001-), and 1050	27 L (28.5 U.S. quarts)
900HC	28 L (29.6 U.S. quarts)
MFWD axle housing capacity	
850	6.5 L (6.9 U.S. quarts)
950 and 1050	8.5 L (8.9 U.S. quarts)
Service intervals	
Check engine oil level	Every 10 hours
Change engine oil	After first 50 hours then Every 100 hours
Replace engine oil filter	After 50 hours then Every 200 hours
Clean crankcase breather tube	Every 500 hours
Check transmission-hydraulic oil level	Every 50 hours
Change transmission-hydraulic oil	After 100 hours then Every 200 hours
Clean transmission-hydraulic oil screen	
850, 900HC and 950 without hydraulic filter	Every 200 hours
850, 900HC, 950 and 1050 with hydraulic filter	After first 100 hours then Every 500 hours
Replace transmission-hydraulic oil screen	
850, 900HC and 950 without hydraulic filter	Every 500 hours
850, 900HC and 950 with hydraulic filter	Every 1000 hours
1050 (all)	Every 1000 hours

'Front wheel drive 950 and 1050 Tractors only.'

Lubrication—Continued

Replace transmission-hydraulic oil filter	
850, 900HC and 950 (if equipped)	After first 100 hours then Every 200 hours
1050 (all)	After first 100 hours then Every 200 hours
Check lubricant level in front axle housing*	Every 50 hours
Change lubricant in front axle housing*	After first 100 hours then Every 600 hours
Clean and repack front wheel bearings	Every 500 hours
Lubricate grease fittings	
Front axle pivot pin	Every 10 hours
All others	Every 50 hours

*Front-wheel drive 950 and 1050 tractors only

Separation

ITEM	SPECIFICATIONS
Fan belt deflection (at 89 N [20 lbs.] push)	10 to 15 mm (3/8 to 5/8 in.)
ROLL-GARD Cap Screws	
Top	100 N·m (75 ft-lbs)
Lower	245 N·m (180 ft-lbs)
Engine Fender-to-Axle housing	90 N·m (65 ft-lbs)
Fender-to-step	30 N·m (22 ft-lbs)
Step-to-transmission case	50 N·m (36 ft-lbs)
Axle housing-to-transmission case	50 N·m (36 ft-lbs)
Drag Link-to-Pitman Arm	50 N·m (36 ft-lbs)
Clutch housing-to-transmission case	
850 and 950 without front wheel drive	120 to 150 N·m (87 to 108 ft-lbs)
950 with front wheel drive and all 1050	170 to 200 N·m (123 to 145 ft-lbs)
Clutch housing-to-engine	90 N·m (65 ft-lbs)
Side frames-to-engine	90 N·m (65 ft-lbs)
Hydraulic lines-to-pump	8 N·m (5.8 ft-lbs)
Hood mounting bracket cap screws	50 N·m (36 ft-lbs)

SERVICE EQUIPMENT AND TOOLS

Name	Use
JDST-28 Belt Tension Tool	Check fan belt tension.
Note: Order from your SERVICE-GARD™ Catalog.	
Hand Tachometer	Check engine speed.
D-05104ST Radiator Tester	Pressure test cooling system and radiator caps.
AR62377 Dry Element Cleaning Gun	Clean air filter.
Note: Order from Service Tools *P.O. Box 314* *Owatonna, MN 55060*	

Separation

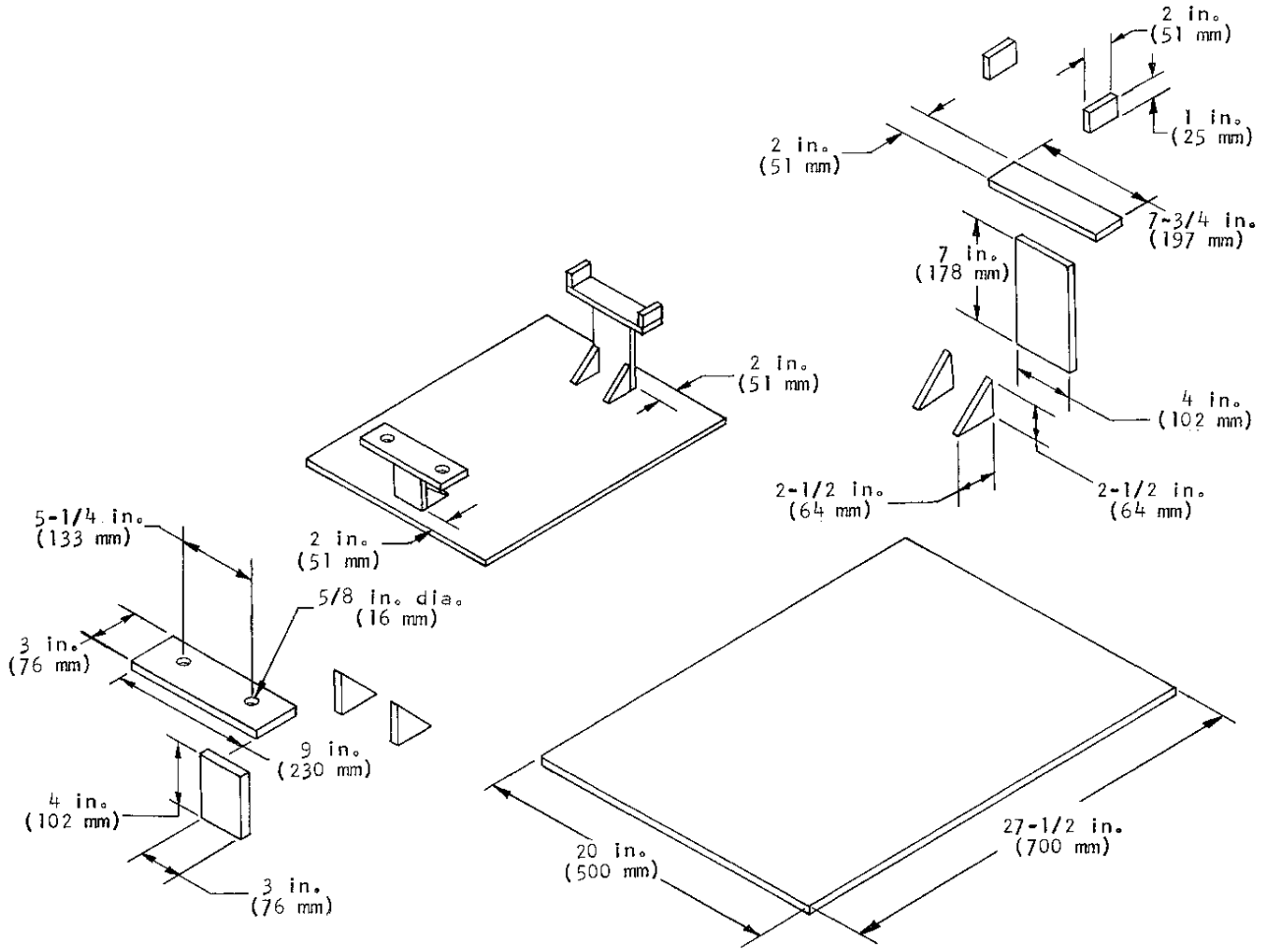


Fig. 5-Transmission Stand

NOTE: Make from 5/16 in. steel and weld all joints.

Group 05
PREDELIVERY, DELIVERY, AND AFTER-SALE SERVICES 850 AND 950 TRACTORS

IMPORTANT: The 850 and 950 Tractors require set-up and assembly per instructions in shipping crates. Perform these operations prior to predelivery which follows.

The John Deere Delivery Receipt, when properly filled out and signed by the dealer and customer verifies that the predelivery and delivery services were satisfactorily performed. When delivering this machine give the customer his copy of the delivery receipt and the operator's manual. Explain their purpose to him.

Because of the shipping factors involved, plus extra finishing touches that are necessary to promote customer satisfaction, proper predelivery service is of prime importance to the dealer.

Instructions pointing out factory-recommended procedure for tractor setup and a tag pointing out factory-recommended procedure for predelivery are attached to the tractor.

After completing the factory-recommended dealer checks and services listed on the set up instructions and the predelivery tag, remove the tag and file it with the shop order for the job. The tag will certify that the tractor has received the proper predelivery service when that portion of the customer's John Deere Delivery Receipt is completed.

BEFORE STARTING TRACTOR

Before starting tractor, make a few quick checks to be sure it is in good operating condition. Check for any missing parts or damage.

Checking Engine Oil Level

Remove engine oil dipstick (Fig. 1) and wipe it off. Re-insert dipstick, but do not screw it down. Remove dipstick and check oil level. If necessary, add enough oil to bring oil level to top of cross hatch marks on dipstick. Use JOHN DEERE TORQUE-GARD SUPREME SAE 10W-20 or its equivalent.

NOTE: Tractor should be on a level surface when oil level is checked. If it is not, check only to make sure the crankcase is not dry. Recheck oil level later, when tractor is on level ground.

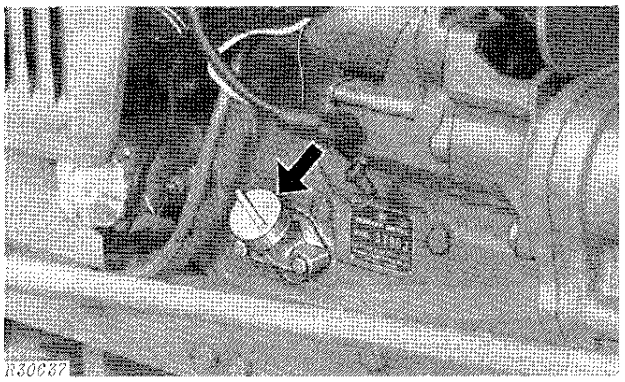
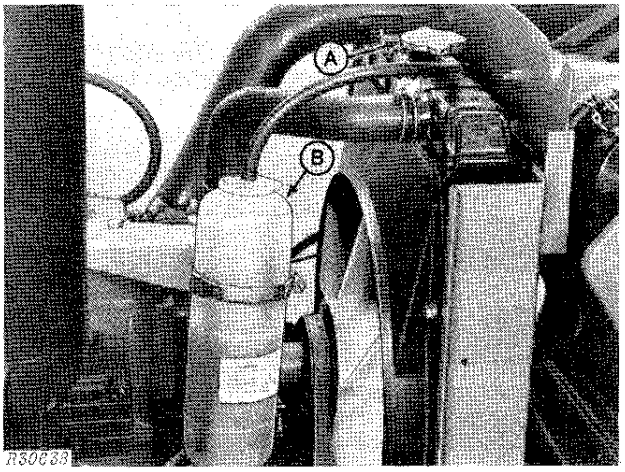


Fig. 1-Engine Oil Dipstick

Checking Coolant Level



A—Radiator Cap **B—Expansion Tank**

Fig. 2-Coolant Level Checks

Remove the radiator cap (A, Fig. 2) and check the radiator coolant level. The radiator should be full of coolant. The expansion tank (B) should have coolant up to the full mark on the expansion tank.