



# 2940 Tractor



## TECHNICAL MANUAL 2940 Tractor

TM1220 (01MAR83) English

**John Deere Tractor Works  
TM1220 (01MAR83)**

LITHO IN U.S.A.  
ENGLISH





## 2940 TRACTOR TECHNICAL MANUAL TM-1220 (MAY-82)

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# Section 10 GENERAL

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## Group 00

# SPECIFICATIONS AND SPECIAL TOOLS

## SPECIFICATIONS

### Serial Numbers

The engine serial number is stamped into the plate located on the lower front right-hand side of the cylinder block.

*NOTE: When ordering engine parts, quote all digits of serial number stamped on the plate*

The plate showing the tractor serial number is located on the right-hand side of the front axle carrier.

*NOTE: When ordering tractor service parts (excluding engine parts), quote all digits of serial number stamped on the plate.*

A plate showing the tractor type, transmission serial number, cone point measurement etched into pinion face of differential drive shaft (as well as reduction of differential) is located on the right-hand side of the transmission case.

### Model Numbers

The fuel injection pump, fuel injection nozzles, alternator, starting motor, hydrostatic steering valve and hydraulic pump have model numbers to facilitate identification of different makes of a given unit.

### Engine

Number of cylinders .....	6
Cylinder liner bore .....	106.5 mm (4.19 in.)
Stroke .....	110 mm (4.33 in.)
Displacement .....	5883 cm <sup>3</sup> (359 cu. in.)
Compression ratio .....	16.8:1
Maximum torque at 1400 rpm .....	320 N·m (236 ft-lb)
Firing order .....	1-5-3-6-2-4
Valve clearance (engine hot or cold)	
Intake valve .....	0.35 mm (0.014 in.)
Exhaust Valve .....	0.45 mm (0.018 in.)
Fast idle speed .....	2660 rpm
Slow idle speed .....	750 rpm
Rated engine speed .....	2500 rpm
Working speed range .....	1400 to 2500 rpm



PTO\* Horsepower at engine rated speed—2500 rpm ..... 60 kW (80 HP)

Lubrication system ..... Full internal force feed system with full flow filter

**Engine Clutch** ..... Single dry disk clutch with torsion damper, foot-operated

### Cooling System

Type ..... Pressurized system with centrifugal pump

Temperature regulation ..... Two thermostats

### Fuel System

Type ..... Direct injection

Fuel injection pump timing to engine ..... TDC

Fuel injection pump type ..... Distributor type

Air cleaner ..... Dry-type air cleaner with secondary (safety) element

### Electrical System

Batteries ..... 2 x 12 volts, 88 Ah

Alternator with internal regulator ..... 14 volts, 33 or 55 amps.

Starting motor ..... 12 volts (3 kW) (4 HP)

Battery terminal grounded ..... Negative

### Synchronized Transmission

Type ..... Synchronized transmission

Gear selections ..... 8 forward and 4 reverse

Gear shifting ..... Two forward groups and one reverse group  
Synchronized forward and reverse shifting  
within groups

### Hi-Lo Shift Unit

Type ..... Hydraulic gear reduction unit which can be shifted under load with "wet" multiple disk clutch and brake packs

Travel speed decreases in each gear by ..... Approx. 20 percent

Shifting to reduced (Low) speed ..... Preloaded cup springs

Shifting to normal (High) speed ..... Hydraulic

\* With the engine run in (above 100 hours of operation) and having reached operating temperature (engine and transmission); measured by means of a dynamometer. Permissible variation  $\pm$  5 percent.

**Differential and Final Drives**

Type of differential ..... Spiral bevel gears  
 Type of final drive ..... Planetary reduction drive

**Differential Lock**

Operation ..... Hand or foot operated  
 Disengage ..... Will disengage automatically as soon as traction has equalized

**PTO**

Type ..... Independent of transmission, can be engaged and disengaged under load  
 PTO speeds (with engine speed of 2400 rpm) ..... 540/1000 rpm  
 PTO clutch ..... Hydraulically operated "wet" disk clutch  
 PTO brake ..... Hydraulically operated "wet" disk brake

**ENGINE/PTO SPEED RELATIONSHIPS**

Engine speed	540 rpm shaft	1000 rpm shaft
800	180	335
2400	540	1000
2500	565	1040
2660	600	1110

**Mechanical Front Wheel Drive**

Type ..... Engaged hydraulically, under full load with "wet" disk clutch  
 Control ..... Electrical/hydraulic solenoid switch  
 Engagement ..... Preloaded cup springs  
 Disengagement ..... Hydraulic

**Hydrostatic Steering** ..... Without mechanical linkage between steering valve and the front wheels

**Foot Brakes** ..... Self-adjusting, hydraulically operated "wet" disk brakes

**Handbrake** ..... Mechanically operated band-type locking brake acting on the differential

**Hydraulic System**

Type ..... Closed center, constant pressure system

Standby pressure ..... 15500 kPa (155 bar) (2250 psi)

Operating pressure ..... 14000 kPa (140 bar) (2050 psi)

Hydraulic pump ..... 8-piston pump with variable displacement

**Capacities**

Fuel tank ..... 126 liters (33.3 U.S. gals.)

Cooling system

Without Sound-Gard Body ..... 19 liters (5.0 U.S. gals.)

With Sound-Gard Body ..... 24 liters (6.3 U.S. gals.)

Engine crankcase

Without filter change ..... 11 liters (2.9 U.S. gals.)

With filter change ..... 11.5 liters (3.0 U.S. gals.)

Transmission - Hydraulic system

Initial filling ..... 68 liters (18.0 U.S. gals.)

Oil change ..... 60 liters (15.9 U.S. gals.)

Mechanical front wheel drive

Front axle housing ..... 6.5 liters (1.7 U.S. gals.)

Final drive housing, each ..... 1 liter (0.3 U.S. gals.)

**Travel Speeds** ..... See Operator's Manual

**Front and Rear Wheels**

Tires, tread widths, tire pressure and ballast weights ..... See Operator's Manual

**Dimensions and Weights** ..... See Operator's Manual

**PREDELIVERY, DELIVERY AND AFTER-SALES INSPECTIONS**

**Engine Speeds**

Slow idle .....	750 rpm
Fast idle .....	2660 rpm
Rated speed .....	2500 rpm

**Fan Belt**

The fan belt should have 19 mm (0.75 in.) flex with 90 N (20 lb) pull midway between crankshaft and alternator or water pump (use a spring scale).

**Compressor Belt**

The compressor belt should have 6 mm (1/4 in.) flex with 70 N (15 lb) pull midway between pulleys.

**Batteries**

Specific gravity at an electrolyte temperature of 20°C (68°F)

Normal and arctic conditions .....	1.28
Tropical conditions .....	1.23

**[D] Clutch Operating Assy.**

**[G] Tractors Without Sound-Gard Body**

Clutch pedal free travel .....	approx. 25 mm (1 in.)
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**[G] Tractors With Sound-Gard Body**

Slave cylinder operating rod, stroke .....	8.5 to 9.5 mm	(0.33 to 0.37 in.)
--------------------------------------------	---------------	--------------------

**Front Wheel Toe-In**

Tractors without MFWD .....	3 to 6 mm	(0.12 to 0.25 in.)
Tractors with MFWD .....	0 to 3 mm	(0 to 0.12 in.)

**Torques for Hardware**

Start safety switch in rockshaft housing, max. ....	50 N·m	(35 ft-lbs)
Front wheel rim to hub		
Tractors without MFWD .....	180 N·m	(130 ft-lbs)
Tractors with MFWD .....	300 N·m	(220 ft-lbs)
Axle knees to axle center, cap screws .....	400 N·m	(300 ft-lbs)
Tie rod clamps, cap screws .....	110 N·m	(80 ft-lbs)
Tie rod tube, cap screw .....	50 N·m	(35 ft-lbs)
Wheel disk to hub (rack-and-pinion axle) .....	400 N·m	(300 ft-lbs)
2-post ROLL-GARD protective structure		
Supports to crossbar, cap screws .....	200 N·m	(145 ft-lbs)
Supports to final drives, cap screws and nuts .....	400 N·m	(300 ft-lbs)

**LUBRICATION AND SERVICE**

**Capacities**

Engine crankcase

Without filter change .....	11 L	(2.9 U.S. gal.)
With filter change .....	11.5 L	(3.0 U.S. gal.)

Transmission - Hydraulic system

Initial filling .....	68 L	(18.0 U.S. gal.)
Oil change .....	60 L	(15.9 U.S. gal.)

Mechanical front wheel drive

Front axle housing .....	6.5 L	(1.7 U.S. gal.)
Final drive housing, each .....	1.0 L	(0.3 U.S. gal.)

**Service Intervals**

Checking crankcase oil level .....	every 10 hours
Changing engine oil .....	every 100 hours
Changing engine oil filter .....	every 200 hours
Checking transmission/hydraulic system oil level .....	every 50 hours
Changing transmission/hydraulic system oil filter .....	every 500 hours
Changing transmission/hydraulic oil .....	every 1000 hours
Changing hydrostatic steering filter .....	every 1000 hours
Cleaning hydraulic pump strainer .....	every 1000 hours
Checking MFWD oil level .....	every 100 hours
MFWD oil change .....	every 1000 hours
Cleaning and packing front wheel bearings .....	every 1000 hours
Lubricating grease fittings	
Front axle and front axle bearings .....	every 50 hours
Rear axle bearings .....	every 500 hours
in wet and muddy conditions .....	every 10 hours
Three-point hitch .....	every 200 hours

**TUNE-UP**

PTO horsepower* at 2500 rpm rated engine speed .....	60 kW	80 HP
Compression .....	2100 kPa	21 bar (300 psi)
Slow idle .....		750 rpm
Fast idle .....		2660 rpm
Rated engine speed .....		2500 rpm
Air intake system vacuum .....	3.5 to 6.0 kPa	35 to 60 mbar (14 to 25 in. water head)
Air cleaner restriction warning switch closes at a vacuum of .....	5.5 to 6.5 kPa	55 to 65 mbar (22 to 26 in. water head)
Blow-by at crankcase vent tube, max. ....	3.5 m <sup>3</sup> /h	(123.5 cu.ft./h)
Thermostats open at .....	82°C	(180°F)
Radiator cap high pressure valve opens at .....	40 to 50 kPa	0.4 to 0.5 bar (6 to 7 psi)
Radiator cap low pressure valve opens at .....	0 to 4 kPa	0 to 0.04 bar (0 to 0.6 psi)

**Fan Belt**

Fan belt should have 19 mm (0.75 in.) flex with 90 N (20 lb) pull midway between crankshaft and alternator or water pump (use a spring scale).

**Compressor Belt**

Compressor belt should have 6 mm (1/4 in.) flex with 70 N (15 lb) pull midway between pulleys.





*\* With the engine run in ( more than 100 hours of operation) and having reached operating temperature ( engine and transmission); measured by means of a dynamometer. Permissible variation ± 5%.*

## TRACTOR SEPARATION

### Torques for Hardware

Front axle carrier to engine block, cap screws .....	230 N·m	(170 ft-lbs)
Front axle carrier to oil pan, cap screws .....	400 N·m	(300 ft-lbs)
Engine block to front axle carrier, cap screws .....	230 N·m	(170 ft-lbs)
Hydraulic pump drive shaft, cap screws .....	50 N·m	(35 ft-lbs)
Jointed shaft flange to front axle drive hub (tractors with MFWD), cap screws .....	70 N·m	(50 ft-lbs)
Clutch housing to engine block		
Cap screws .....	230 N·m	(170 ft-lbs)
Hex. nuts .....	325 N·m	(240 ft-lbs)
Oil pan to clutch housing, cap screws .....	230 N·m	(170 ft-lbs)
Clutch housing to transmission case, cap screws .....	160 N·m	(120 ft-lbs)
Transmission case drain plugs .....	135 N·m	(100 ft-lbs)
Hydraulic lines retainer to clutch housing, cap screw .....	45 N·m	(32 ft-lbs)
Final drive housings to transmission case, cap screws .....	230 N·m	(170 ft-lbs)
Rockshaft housing to transmission case, cap screws .....	120 N·m	(85 ft-lbs)
Wheel disk to hub .....	400 N·m	(300 ft-lbs)
Rear fenders to final drive housings, hex. nuts .....	200 N·m	(145 ft-lbs)
2-post ROLL-GARD protective structure to final drive housings .....	400 N·m	(300 ft-lbs)
Both supports to crossbar .....	200 N·m	(135 ft-lbs)
Basic weight to front axle carrier, cap screws .....	400 N·m	(300 ft-lbs)
Drawbar to transmission case		
Front cap screws .....	230 N·m	(170 ft-lbs)
Rear cap screws .....	120 N·m	(85 ft-lbs)
Sound - Gard Body to rubber bearing block, cap screws and hex. nuts .....	200 N·m	(145 ft-lbs)

**STANDARD TORQUES**

RECOMMENDED TORQUES IN N-m, AND FT-LBS FOR UNC AND UNF CAP SCREWS				
Head marking (identifying strength)	  or 10.9*		  or 12.9**	
	Thread-O.D. (in.)	N-m	ft-lbs	N-m
1/4	15	10	20	15
5/16	30	20	40	30
3/8	50	35	70	50
7/16	80	55	110	80
1/2	120	85	170	120
9/16	180	130	240	175
5/8	230	170	320	240
3/4	400	300	580	425
7/8	600	445	930	685
1	910	670	1400	1030
1-1/8	1240	910	1980	1460
1-1/4	1700	1250	2800	2060

RW7097

*NOTE: A variation of ± 10% is permissible for all torques indicated in this chart.*

Torque figures indicated above and in the Specification sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

\* Tempered steel high-strength bolts and cap screws

\*\* Tempered steel extra high-strength bolts and cap screws



RECOMMENDED TORQUES IN N·m, AND FT-LBS FOR METRIC CAP SCREWS						
Head marking (identifying strength)	8.8*		10.9**		12.9***	
	N·m	ft-lbs	N·m	ft-lbs	N·m	ft-lbs
M5	7	5	9	6.5	10	8.5
M6	10	8.5	15	10	20	15
M8	30	20	40	30	40	30
M10	50	35	80	60	90	70
M12	100	75	140	100	160	120
M14	160	120	210	155	260	190
M16	240	175	350	260	400	300
M20	480	355	650	480	780	575
M24	820	605	1150	850	1350	995
M30	1640	1210	2250	1660	2700	1990
M36	2850	2110	4000	2950	4700	3465

RW7095

NOTE: A variation of  $\pm 10\%$  is permissible for all torques indicated in this chart.

Torque figures indicated above and in the Specification sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

\* Regular bolts and cap screws

\*\* Tempered steel high-strength bolts and cap screws

\*\*\* Tempered steel extra high-strength bolts and cap screws

RECOMMENDED TORQUES IN N·m, AND FT-LBS FOR PIPE AND HOSE CONNECTIONS				
Thread size	with O-rings		with cone	
	N·m	ft-lbs	N·m	ft-lbs
3/8-24 UNF	7.5	5.5	8	6
7/16-20 UNF	10	7	12	9
1/2-20 UNF	12	9	15	11
9/16-18 UNF	15	11	25	18
3/4-16 UNF	25	20	45	35
7/8-14 UNF	40	30	60	45
1-1/16-12 UNC	60	45	100	75
1-3/16-12 UNC	70	50	120	90
1-5/16-12 UNC	80	60	140	105
1-5/8-12 UNC	110	80	190	140
1-7/8-12 UNC	150	110	220	160

RW7096

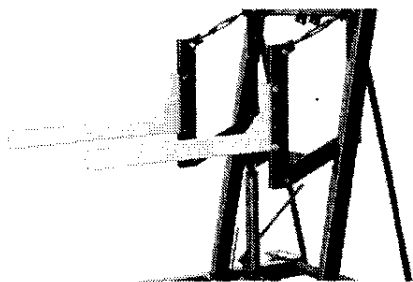
**SPECIAL TOOLS**

**Tune-Up**

Tool	Number	Use
	D - 14546BA	Checking engine compression

*Fig. 1 - Compression Test Gauge*

**Tractor Separation**



Brown Body Lift To remove Sound-Gard Body

*Fig. 2 - Brown Body Lift*

**Tractor Separation — Continued**

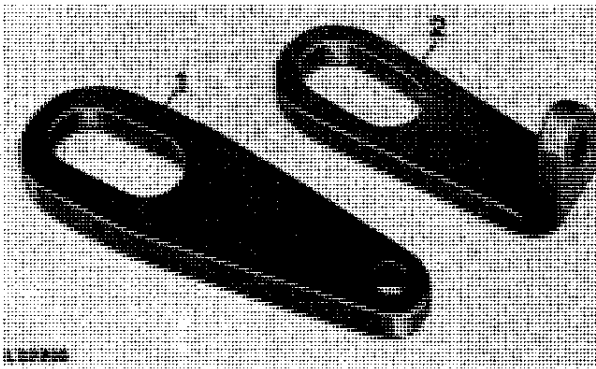
**Tool**

**Number**

**Use**

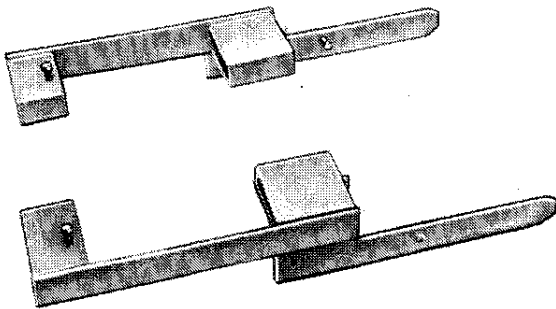
- 1. JD244-1 (Straight)
- 2. JD244-2 (Bent)

Tractor separations



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*Fig. 3 - Lifting Eyes*



R28518N

*Fig. 4 - Fork Lift Adapters*

JDG-21 Fork Lift  
Adapters

To remove Sound-Gard  
Body