2940
Tractor

JOHN DEERE

TECHNICAL MANUAL

2940
Tractor

TM1220 (01MAR83) English

John Deere Tractor Works
TM1220 (01MAR83)

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ENGLISH

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

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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.

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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 cm³ (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 ± 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.)

[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^3/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**	**ft-lbs**
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

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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***	
Thread-O.D. (mm)	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

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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.

* *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				
	with O-rings		with cone	
Thread size	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

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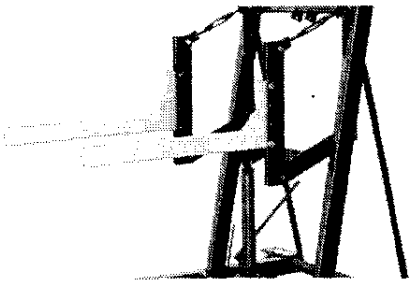
SPECIAL TOOLS

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

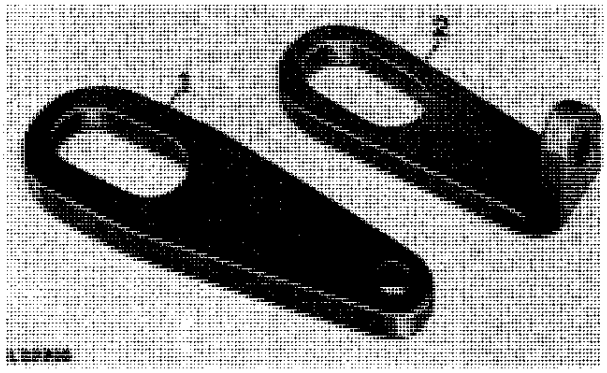
Tool	Number	Use
 L23985	1. JD244-1 (Straight) 2. JD244-2 (Bent)	Tractor separations

Fig. 3 - Lifting Eyes

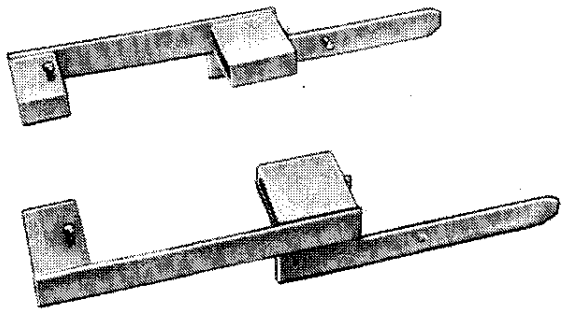
 R28518N	JDG-21 Fork Lift Adapters	To remove Sound-Gard Body

Fig. 4 - Fork Lift Adapters