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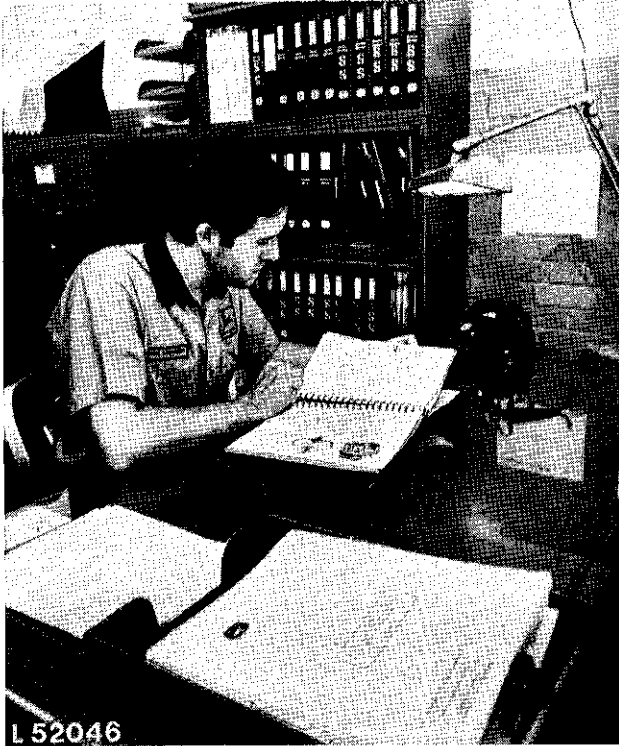
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## Introduction



L 52046

### Use FOS Manuals for Reference

This technical manual is part of a twin concept of service:

- FOS Manuals — for reference
- Technical Manuals — for actual service

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

*Fundamentals of Service (FOS) Manuals* cover basic theory of operation, fundamentals of trouble shooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

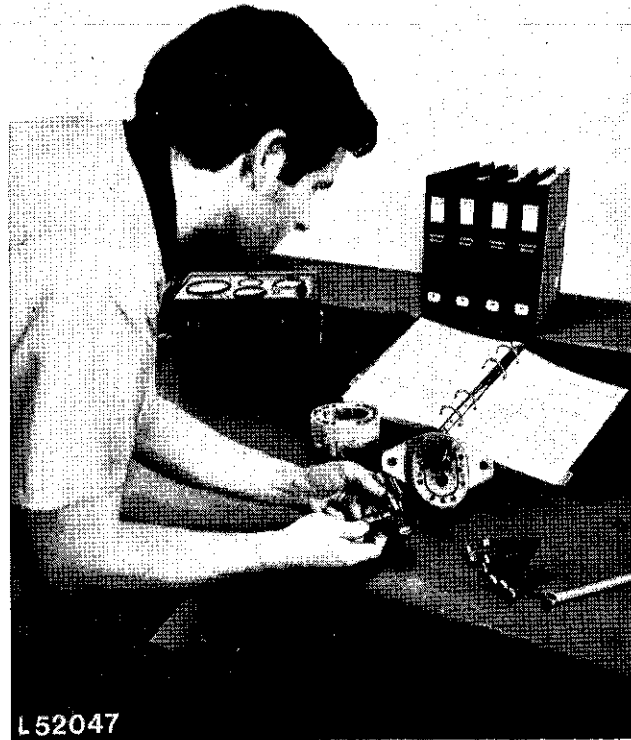
*Technical Manuals* are concise service guides for a specific machine. Technical Manuals are on-the-job guides containing only the vital information needed by an experienced technician.

**IMPORTANT:** Your technical manual contains the new SI metric measurements which have been standardized internationally.

### Example:

New		Old
10 N (Newton)	≈	1 kp
10 Nm (Newton-Meter)	≈	1 mkp
1 bar	≈	1 kp/cm <sup>2</sup>
1 kW = 1.36 PS (1.34 HP)		

Exact conversion: 1 kp = 9.81 N; 1 mkp = 9.81 Nm; 1 kp/cm<sup>2</sup> = 0.981 bar



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### Use Technical Manuals for Actual Service

When a technician should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.



Some features of this technical manual:

- Table of contents on page 1
- Contents at front of each Section
- Specifications at end of each Group
- Torques for hardware at end of each Group
- Special tools at end of each Group

This technical manual was planned and written for you — an experienced technician. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.



This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follow.

# Section 10 General

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# Group 5

## Specifications

### SERIAL NUMBERS

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

*NOTE: If ordering engine parts, indicate all digits of the serial number on the name plate.*

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

*NOTE: If ordering tractor parts, (excluding engine parts), indicate all digits of the serial number on the name plate.*

### MODEL NUMBERS

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

### ENGINE

Number of cylinders . . . . .	4
Cylinder liner bore . . . . .	106.5 mm (4.19 in.)
Stroke . . . . .	110 mm (4.33 in.)
Displacement . . . . .	3920 cm <sup>3</sup> (239 cu. in.)
Compression ratio . . . . .	16.8 : 1
Maximum torque at 1400 rpm . . . . .	246 Nm = 24.6 mkp (181 ft-lb)
Firing order . . . . .	1 - 3 - 4 - 2
Valve clearance (engine hot or cold) Intake valve . . . . .	0.35 mm (0.014 in.)
Exhaust valve . . . . .	0.45 mm (0.018 in.)
Fast idle . . . . .	2660 rpm
Slow idle . . . . .	750 rpm
Working speed range . . . . .	1400 to 2500 rpm

Flywheel horsepower at rated engine speed of 2500 rpm according to DIN 70020 . . . . . 55 kW (75 HP)

PTO horsepower\*  
at rated engine speed of:  
2500 rpm engine speed  
according to DIN 70020 . . . . . 51 kW (69 HP)  
according to SAE J 816 B . . . . . 49 kW (66 HP)

### ENGINE CLUTCH

Single dry disk clutch with torsion damper (isolator), foot-operated.

### ELECTRICAL SYSTEM

Batteries . . . . .	2 x 12 volts, 55 ampere-hours
Starting motor . . . . .	12 volt, 3 kW (4 HP)
Alternator . . . . .	14 volts, 28 amps.
Battery terminal grounded . . . . .	negative

### TRANSMISSION

Collar shaft transmission with helical cut gears.

This transmission is available in two variations:

- 8 speed transmission with parking lock, without independent hand brake and
- 8 speed transmission without parking lock and with independent hand brake;

With this transmission 8 forward and 4 reverse speeds are available.

\* 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  $\pm 5\%$ .

### HIGH-LOW SHIFT UNIT

Hydraulically controlled reduction gear which can be shifted under load, with "wet" multiple disk clutch and "wet" multiple disk brake. Allows reduction of the individual gear speeds by 21 %.

### CREEPER TRANSMISSION

Mechanically controlled reduction gear. Allows reduction of range I and reverse gear speeds by 77 %.

### DIFFERENTIAL AND FINAL DRIVES

Planetary reduction gear and differential with spiral bevel gears.

### DIFFERENTIAL LOCK

Hand or foot operated; spring-loaded out of engagement.

### POWER TAKE-OFF (PTO)

Independent of transmission, can be engaged and disengaged under load.

The independent PTO is engaged by a hydraulically operated disk clutch. Disengaging the clutch is achieved by operating the hydraulically actuated band type brake.

#### *PTO Speeds (in rpm)*

Engine speed in rpm	540 rpm shaft	1000 rpm shaft
750	195	365
2070	540	1000
2500	650	1210
2660	695	1285

### HYDRAULIC SYSTEM

Closed center, constant pressure system; also includes rockshaft, power steering and selective control valves.

*System pressure* . . . . . 155 bar (2250 psi)

*Pump* . . . . . 4 or 8-piston pump  
 driven by the engine

### POWER STEERING

The steering system is a "closed center" type incorporated in the hydraulic system and supplied with oil by the hydraulic pump. It is connected to the front wheels by means of a steering linkage.

### MANUAL STEERING

The manual steering is a recirculating ball bearing, worm and nut type. A number of steel balls between ball nut and steering wheel shaft provide for positive engagement of steering wheel and steering linkage.

### HYDRAULIC BRAKES

The disk brakes run in an oil bath and are hydraulically controlled.

### HANDBRAKE

Band-type locking brake acting on differential.

### CAPACITIES

	Liters	U.S.gals.
Fuel tank . . . . .	90.0	23.8
Cooling system . . . . .	11.4	3.0
Engine crankcase incl. filter . . . . .	8.5	2.25
without filter . . . . .	8.00	2.1
Transmission-hydraulic system		
Dry system . . . . .	36.0	9.5
At service intervals. . . . .	28.0	7.4
Belt pulley . . . . .	1.0	0.3

### TRAVEL SPEEDS

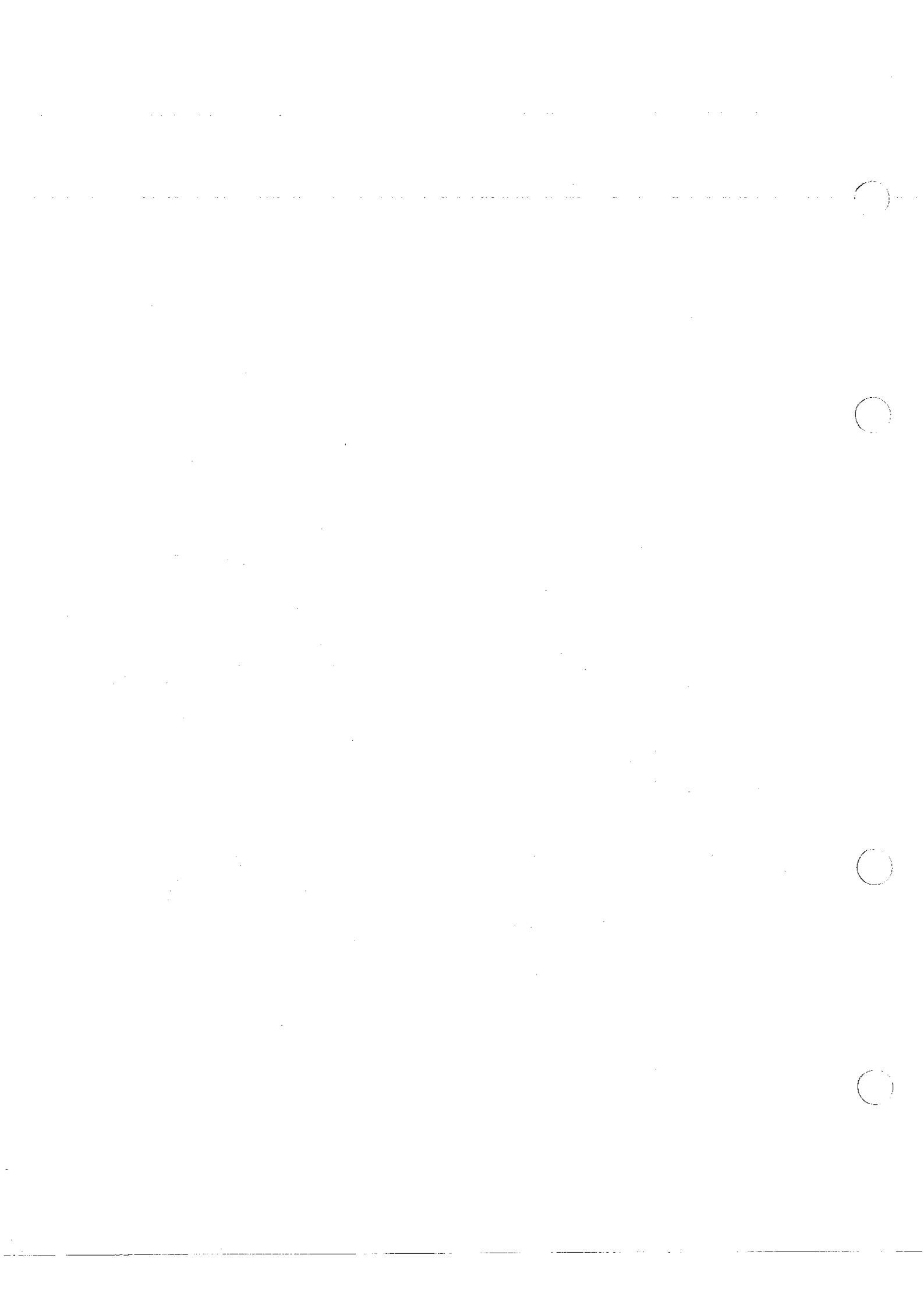
See Operator's Manual.

### FRONT AND REAR WHEELS

For tire sizes, treads, inflation pressure and weights see Operator's Manual.

### DIMENSIONS

See Operator's Manual.



**Group 10**

# Predelivery, Delivery and After-Sales Inspections

## PREDELIVERY INSPECTION

Every new JOHN DEERE tractor leaves the factory in such a condition that it can be delivered to the customer after a minimum of service.

To promote complete customer satisfaction, proper predelivery service including mending of possible shipping damage and giving the finishing touches to the tractor, are of prime importance to the dealer.

A tag pointing out the factory-recommended procedure for predelivery service is attached to every

new tractor before it leaves the factory. The reverse side of this tag is filled in by the factory after the tractor has undergone a thorough inspection prior to shipping.

After completing the factory-recommended dealer checks and services listed on the predelivery tag, remove the tag from the tractor and file it with the shop order for the job. The tag will then serve as a basis for certifying that the tractor has received the proper predelivery service.

### Temporary Tractor Storage

Service	Specifications	Reference
Check radiator for coolant loss and antifreeze protection (gravity of anti-freeze and rust inhibitor mixture)	Coolant level should be mid-way between radiator core and bottom edge of filler neck	Operator's manual
<b>If the tractor is to be operated for a short time without battery (using a slave battery for starting), do not, under any circumstances, interrupt the circuit by switching off the main switch before stopping the engine by means of fuel pump shut off cable. Use additional current (lights) whilst engine is running. Insulate terminal of battery cable before starting by means of slave battery. If this advice is disregarded, damage to alternator and regulator may result.</b>	.....	Section 40, group 10
Remove batteries	Store in a cool and dry room	.....
Reduce shipping pressure of tires	.....	Operator's manual
Cover tractor and tires for protection and cleanliness	.....	.....

PREDELIVERY INSPECTION (Contd.)

Service	Specifications	Reference
<b>COOLING SYSTEM</b>		
Check radiator for coolant loss	Coolant level should be midway between radiator core and bottom edge of filler neck.	Operator's manual
Check gravity of antifreeze and rust inhibitor mixture	.....	Operator's manual
<b>ELECTRICAL SYSTEM</b>		
If the tractor is to be operated for a short time without battery (using a slave battery for starting), do not, under any circumstances, interrupt the circuit by switching off the main switch before stopping the engine by means of fuel pump shut off cable. Use additional current (lights) whilst engine is running. Insulate terminal of battery cable before starting the engine by means of slave battery.	.....	Section 40, group 10
If this advice is disregarded, damage to alternator and regulator may result.		
If the batteries are to be installed, connect them in the proper polarity (negative to ground). If they are improperly connected, the rectifier diodes will be immediately destroyed.	.....	Section 40, group 10
First connect positive (+) cable and then ground (-) strap of each battery. Only then start tractor engine.	.....	Section 40, group 10



**PREDELIVERY INSPECTION (Contd.)**

Service	Specifications	Reference
<b>TIRES AND WHEELS</b>		
Check tire inflation pressure	.....	Operator's manual
Retighten wheel bolts	.....	Section 80, group 15 and Operator's manual
<b>LUBRICATION</b>		
Check crankcase oil level	Top mark on dip stick	Operator's manual
Check transmission-hydraulic system oil level	.....	Operator's manual
Lubricate all lubrication points on the tractor	.....	Operator's manual
<b>ENGINE</b>		
Check dry type air cleaner	.....	Operator's manual
Fill fuel tank and start engine	Fuel tank capacity: 90 liters (23.8 U.S. gals.)	Operator's manual
Check lighting system, indicator lights and instruments for proper operation	.....	Operator's manual
Check if speed control linkage moves easily	.....	Section 20, group 40
Check engine idle speeds	.....	Section 20, group 40
Check injection timing	.....	Section 30, group 15
<b>OPERATION</b>		
Engine clutch	Check clutch pedal adjustment- should be 25 mm (approx. 1 in.)	Section 50, group 5
Check operation of High-Low shift	.....	Section 50, group 10
Check operation of creeper transmission	.....	Section 50, group 11
Shift transmission through all gears	.....	Operator's manual
Check differential lock operation	.....	Operator's manual
Check PTO operation	.....	Operator's manual
Check 3-point hitch operation	.....	Operator's manual
Check hydraulic system operation	.....	Section 70, group 5
Check brake operation	.....	Section 60, group 15

**PREDELIVERY INSPECTION (Contd.)**

Service	Specifications	Reference
Check steering operation	.....	Section 60, group 10
Check seat adjustment	.....	Operator's manual
Check operation of remote hydraulic cylinder (if equipped)	.....	Section 70, group 5
<b>GENERAL</b>		
Tighten accessible nuts and attaching screws	.....	Section 10, group 20
Attach roll guard	.....	Section 80, group 20
Clean tractor and touch up paint	.....	.....

**DELIVERY INSPECTION**

A thorough discussion of the operation and service of the tractor at the time of its delivery helps to assure complete customer satisfaction.

Proper delivery should be an important phase of the dealer's program.

It is well-known fact that many complaints have arisen simply because the owner was not shown how to operate and service his new tractor properly. Therefore, enough time should be devoted, at the customer's convenience, to introducing him to this new tractor and explaining to him how to operate and service it.

Using the tractor operator's manual as a guide, be sure that the owner understands the following points properly:

1. Adjusting the seat
2. Operation of control levers and instruments
3. Starting and shutting off the engine
4. The importance of the tractor break-in period
5. Use of counterweights and proper tire inflation pressure as well as filling of tires with water and calcium chloride, if required
6. All functions of the hydraulic system
7. Operating the PTO and belt pulley (if equipped)
8. The importance of the safety rules
9. The importance of lubrication and periodic service

**AFTER-SALES INSPECTION**

In the interest of the purchaser and the dealer an after-sales inspection should be carried out by the dealer after the first 100 hours of using a new John Deere tractor.

The purpose of this inspection is to make sure that the customer is receiving satisfactory performance from his tractor. At the same time, the inspection should reveal whether or not the tractor is being operated, lubricated and serviced properly.

Through this inspection a needless volume of service work can be eliminated by preventing minor difficulties from developing into serious problems later on. It also will promote stronger dealer-customer relations and give the customer an opportunity to ask questions that may have arisen during the first few days of use.

Thereby the dealer has the further opportunity of promoting the possible sale of other new equipment.

The following inspection program is recommended:

**AFTER-SALES INSPECTION (Contd.)**

Service	Specifications	Reference
<b>COOLING SYSTEM</b>		
Check coolant level	Coolant level should be midway between radiator core and bottom edge of filler neck	Operator's manual
Clean exterior of radiator	.....	.....
Check hose connections	.....	.....
<b>FUEL SYSTEM</b>		
Check fuel filter housing for water or sediment deposits and clean transfer pump screen	.....	Operator's manual
Check line connections	.....	.....
<b>ELECTRICAL SYSTEM</b>		
Check gravity of battery electrolyte	Gravity should be: 1.28 with normal and arctic conditions and 1.23 with tropical conditions at an electrolyte temperature of 20°C (68°F)	
Check electrolyte level of batteries	To bottom of filler neck in each cell	Operator's manual
Check tension of fan belt	19 mm (3/4 in.) deflection with a 90 N (20 lb) force	Operator's manual and section 20, group 35
Start engine and check operation of lights, indicator lamps and instruments	.....	Operator's manual
<b>LUBRICATION</b>		
Check crankcase oil level	Top mark on dip stick	Operator's manual
Check transmission oil level	.....	Operator's manual
Check oil level of manual steering gear housing	Add oil up to filler hole	Operator's manual
Check oil level of belt pulley housing	Add oil up to filler hole	Operator's manual
Lubricate 3-point hitch	.....	Operator's manual

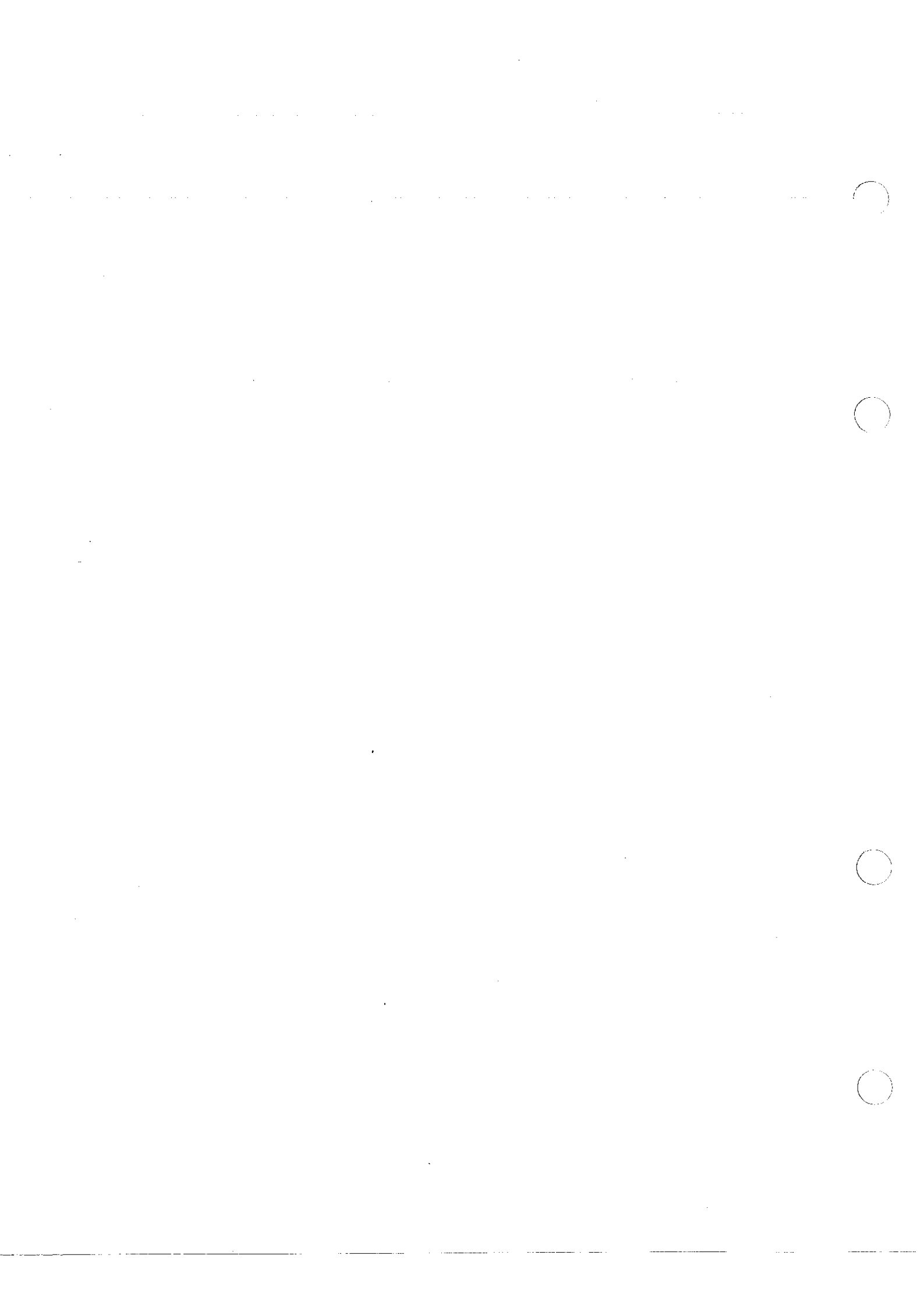
AFTER-SALES INSPECTION (Contd.)

Service	Specifications	Reference
<b>ENGINE</b>		
Check dry-type air cleaner	.....	Operator's manual
Check valve clearance	Intake valve: 0.35 mm (0.014 in.) Exhaust valve: 0.45 mm (0.018 in.)	Section 20, group 10
Check engine speed under load as well as fast and slow idle speed	.....	Section 20, group 40
Check engine performance	.....	Section 10, group 20
<b>GENERAL</b>		
Check clutch pedal adjustment	25 mm (approx. 1 in.) free travel	Section 50, group 5
Check operation of High-Low shift unit	.....	Section 50, group 10
Shift transmission through all gears	.....	Operator's manual
Check operation of PTO	.....	Operator's manual
Check differential lock	.....	Operator's manual
Check operation of hydraulic system	.....	Section 70, group 5
Check steering system	.....	Section 60, group 10
Check brakes	.....	Section 60, group 15
Tighten accessible nuts and cap screws	.....	Section 10, group 20
Tighten roll guard attaching cap screws and nuts	.....	Section 80, group 20
Tighten accessible hydraulic lines	.....	.....
Visual inspection of tractor	Damaged paint, loose connections, proper positioning of hoses and lines, leaks, operation of all mechanical parts	.....

## Group 15

# Lubrication and Periodic Service

For brands of oil and lubricants to be used as well as for lubricating and servicing the 2130 tractor see operator's manual.





# Group 20

# Engine and Tractor Tune-Up

## GENERAL INFORMATION

Before tuning up the engine, determine whether a tune-up will restore operating efficiency. If there is doubt, the following preliminary tests will help to determine if the engine can be tuned up.


### PRELIMINARY ENGINE TESTING

Service	Specifications	Reference
Checking air intake system by means of vacuum gauge	35 to 60 mbar (14 to 25 in. water head) engine running at fast idle speed	 "Fundamentals of Service, Engine" manual under "Diagnosis and Testing"
Check radiator for air bubbles or oil film	.....	.....
Measure blow-by at crankcase vent tube*	2.2 m <sup>3</sup> (77 cu-ft/h)	.....
Check compression which should be at least (using special tool No. 19.58-90.578)	21 bar (300 psi)	 "Fundamentals of Service, Engine" manual under "Diagnosis and Testing"
Measure engine horsepower at powershaft (using a dynamometer)	Record measured performance and compare with performance measured after carrying out "Engine Tune-up"	.....

\* Measure with a standard gas gauge, placing hose over end of crankcase vent tube. The engine must be tested at 2500 rpm and full load, normal running temperature and should be run in (at least 100 hours). Measure over a period of 5 minutes and multiply measured value by 12 (for hourly rate). Compare with values quoted above.


There is no undue wear on piston rings and cylinder liners if the measured value is lower than that quoted above. Should a further test be desired, carry out a compression test. If the "blow-by" reading is more than that quoted above, the decline in performance is due to excessive wear and the engine should be overhauled.

**ENGINE TUNE-UP**

Service	Specifications	Reference
<b>AIR INTAKE SYSTEM</b>		
Service air cleaner and check system for leaks	.....	 Operator's manual and "Fundamentals of Service, Engine" manual
Check crankcase vent tube for foreign particles (restriction)	.....	.....
<b>CYLINDER HEAD</b>		
Re-tighten cylinder head cap screws	130 NM = 13 mkp (95 ft-lb)	Section 20, group 10
Check and adjust valve clearance	Intake valve: 0.35 mm (0.014 in.) Exhaust valve: 0.45 mm (0.018 in.)	Section 20, group 10
<b>BATTERIES</b>		
Thoroughly clean wires, connections and batteries	.....	.....
Tighten cable clamp screws	.....	.....
Liberally coat battery terminals and cable connectors with petroleum jelly	.....	.....
Check electrolyte level of battery	.....	Operator's manual
Check specific gravity of electrolyte	.....	Operator's manual
<b>ALTERNATOR</b>		
Check fan belt tension	19 mm (3/4 in.) deflection with 90 N (20 lb) force	Section 20, group 35
<b>FUEL SYSTEM</b>		
Check fuel tank and lines for leaks or restriction	.....	.....
Clean screen of fuel transfer pump	.....	Operator's manual
Check fuel filter element and replace, if necessary	.....	Section 30, group 10 and Operator's manual
Check injection timing and adjust, if necessary	.....	Section 30, group 15
Bleed fuel system	.....	Section 30, group 15
Check engine speeds and adjust speed control linkage, if necessary	.....	Section 20, group 40



**ENGINE TUNE-UP - Continued**

Service	Specifications	Reference
<b>ENGINE LUBRICATION SYSTEM</b> Check minimum engine oil pressure	1 bar (14 psi) at 800 rpm	Section 20, group 30
<b>COOLING SYSTEM</b> Clean and flush cooling system	.....	 "Fundamentals of Service, Engine" manual
Check radiator hoses for damage and leaks	.....	
Clear radiator core of restrictions	.....	

**CHECKING ENGINE PERFORMANCE**



After the engine has been tuned up as explained above, determine powershaft horsepower by means of a dynamometer, see "Fundamentals of Service, Engine" manual.

Compare measured performance in HP with output measured before carrying out "Engine Tune-Up".

**TRACTOR TUNE-UP**




After carrying out engine tune-up, make the following adjustments on the tractor:

Service	Specifications	Reference
<b>ENGINE CLUTCH</b> Adjust clutch pedal free travel	Approx. 25 mm (1 in.)	Section 50, group 5
<b>FRONT WHEELS</b> Clean and lubricate front wheel bearings	.....	Section 80, group 15
Adjust front wheel bearings	.....	Section 80, group 15
Check toe-in	3 to 6.5 mm (1/8 to 1/4 in.)	Section 60, group 5
Check torque of front wheel bolts	180 Nm (18 mkp; 130 ft-lb)	
<b>HYDRAULIC BRAKES</b> Bleed brake system	.....	Section 60, group 15

TRACTOR TUNE-UP - Continued

Service	Specifications	Reference
<b>HYDRAULIC SYSTEM</b>		
Check stand-by pressure of hydraulic pump	155 bar (2250 psi)	Section 70, group 5
Check rockshaft lift cycle time at 2500 rpm engine speed	1.8 to 2.3 sec.	Section 70, group 5
Check time required for extending or retracting remote cylinder at 2100 rpm engine speed	2 sec.	Section 70, group 5
Check operating pressure of High-Low shift unit	9 to 9.5 bar (125 to 135 psi)	Section 50, group 10
Check operating pressure of PTO clutch and PTO brake	9 to 9.5 bar (125 to 135 psi)	Section 50, group 30
<b>TIRES</b>		
Check tire inflation pressure	.....	Operator's manual
<b>TORQUES</b>		
Check all accessible cap screws and nuts of tractor for proper torque	.....	Torque chart

### STANDARD TORQUES

Recommended torques in Nm, mkp and ft.lbs. for UNC and UNF cap screws									
Head marking (identifying strength)	 or 6.8 *			 or 10.9 **			 or 12.9 ***		
	Thread-O.D. (in.)	Nm	mkp	ft.lbs.	Nm	mkp	ft.lbs.	Nm	mkp
1/4	—	—	—	15	1.5	10	20	2	14
5/16	—	—	—	30	3	20	40	4	30
3/8	—	—	—	50	5	35	70	7	50
7/16	50	5	35	80	8	55	110	11	80
1/2	80	8	55	120	12	85	170	17	120
9/16	100	10	75	180	18	130	240	24	175
5/8	150	15	105	230	23	170	320	33	240
3/4	260	26	185	400	41	300	580	59	425
7/8	220****	22****	160****	600	61	445	930	95	685
1	340	35	250	910	92	670	1400	142	1030
1-1/8	450	46	330	1240	126	910	1930	202	1460
1-1/4	650	66	480	1700	173	1250	2800	285	2060

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

Torque figures indicated above and in the Specifications 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
- \*\*\*\* Bolts and screws 7/8 in. and larger are often formed hot rather than cold, which accounts for the lower torque.

#### SPECIAL TOOLS\*

Part No.	Description	Use
19.58-90.578	Special adapter	Checking compression pressure
19.58-90.260**	Special tool	Checking oil pressure

\* For ordering instructions please contact your sales branch service department  
 \*\* Details see section 70, group 5

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