650 and 750 Tractors

JOHN DEERE

TECHNICAL MANUAL

650 and 750
Tractors

TM1242 (01SEP84) English

John Deere
Lawn & Grounds Care Division
TM1242 (01SEP84)

LITHO IN U.S.A.
ENGLISH

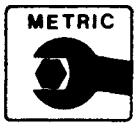
650 AND 750 TRACTORS TECHNICAL MANUAL TM-1242 (MAR-81)

CONTENTS—REPAIR SECTIONS

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.

U03;GEN A 080181

CONTENTS—OPERATION AND TEST SECTIONS



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 metric measurement with customary U.S. measurement following.

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Section 10
GENERAL

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GROUP 25 - 750 SEPARATION

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GENERAL TRACTOR SPECIFICATIONS

	650 TRACTOR	750 TRACTOR
HORSEPOWER		
(Official PTO horsepower)	10.8 kW (14.5 hp) at 2600 rpm	13.4 kW (18.0 hp) at 2400 rpm
ENGINE:		
Type	2-cylinder, in line, valve-in-head, diesel	3-cylinder, in-line, valve-in-head, diesel
Slow idle speed	800 rpm	800 rpm
Working speed range	1825 to 2600 rpm	1650 to 2400 rpm
Bore and stroke	80 x 85 mm (3.15 x 3.35 in.)	80 x 85 mm (3.15 x 3.35 in.)
Displacement	0.9 L (52.0 cu. in.)	1.3 L (78.0 cu. in.)
Compression ratio	22.5 to 1	22.5 to 1
Firing order (No. 1 in rear)	1-2	1-3-2
Valve clearance		
Intake	0.2 mm (0.008 in.)	0.15 mm (0.006 in.)
Exhaust	0.20 mm (0.008 in.)	0.15 mm (0.006 in.)
Injection pump timing	22°BTDC	22°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	23.5 L (6.2 U.S. gal.)	23.5 L (6.2 U.S. gal.)
Cooling system	3.5 L (3.7 U.S. qt.)	4.2 L (4.4 U.S. qt.)
Crankcase (with filter change)	2.5 L (2.6 U.S. qt.)	4.0 L (4.2 U.S. qt.)
Transmission-hydraulic system	13 L (14 U.S. qt.)	14 L (15 U.S. qt.)
Front-wheel drive axle housing	3.0 L (3.2 U.S. qt.)	6.5 L (6.9 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	single-disk, dry	single-disk, dry
POWER TAKE-OFF:		
Type	transmission driven, with overrunning clutch	transmission driven, with overrunning clutch
PTO Speed (engine speed)	540 rpm (2350 rpm)	540 rpm (2300 rpm)
Size	35 mm (1-3/8 in.)	35 mm (1-3/8 in.)
Clutch	uses transmission clutch	uses transmission clutch

Continued

GENERAL TRACTOR SPECIFICATIONS—Continued

	650 TRACTOR	750 TRACTOR
HYDRAULIC SYSTEM:		
Type	open center, constant flow	open center, constant flow
Working pressure	13790 kPa (138 bar) (2000 psi)	13790 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, 24 370 amps cold cranking, 106 minutes reserve capacity	one, 12-volt, BCI group, 24 370 amps cold cranking, 106 minutes reserve capacity
Alternator	15-amp	15-amp
TIRES AND TREADS:	See page 10-05-5	See page 10-05-5
DIMENSIONS:		
Wheelbase	1425 mm (56 in.)	1550 mm (61 in.)
Overall length	2606 mm (102.5 in.)	2845 mm (112.0 in.)
Height to muffler top*	1965 mm (77.4 in.)	2004 mm (78.9 in.)
Height to top of ROLL-GARD frame*	1865 mm (73.4 in.)	1904 mm (75.0 in.)
Overall width	1041 mm (41.0 in.)	1132 mm (44.6 in.)
Turning radius with brakes	1.9 m (6.2 ft.)	2.2 m (7.2 ft.)
SHIPPING WEIGHT**		
Tractor without MFWD	645 kg (1450 lbs.)	770 kg (1700 lbs.)
Tractor with MFWD	695 kg (1530 lbs.)	860 kg (1896 lbs.)

*650 Tractor equipped with 9.5-16 rear tires and 5.00-12 front tires. 750 Tractor equipped with 9.5-24 rear tires and 4.00-15 front tires.

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

DETERMINING 650 TRACTOR TRAVEL SPEED

Travel speeds shown are for tractor with 9.5-16 rear tires.

Due to difference in tire radius, all speeds would be six percent faster with 31/15.50-15 rear tires.

650 TRACTOR TRAVEL SPEEDS

Range	Gear	Lowest Working Speed (1825 rpm) km/h (mph)	Standard PTO Speed (2350 rpm) km/h (mph)	Rated Engine Speed (2600 rpm) km/h (mph)
	1	0.9 (0.6)	1.1 (0.7)	1.1 (0.7)
L	2	1.1 (0.7)	1.4 (0.9)	1.6 (1.0)
	3	1.6 (1.0)	2.1 (1.3)	2.3 (1.4)
	4	2.6 (1.6)	3.4 (2.1)	3.8 (2.3)
	5	3.6 (2.2)	4.7 (2.9)	5.2 (3.2)
H	6	5.0 (3.1)	6.5 (4.0)	7.2 (4.5)
	7	7.1 (4.4)	9.1 (5.7)	10.1 (6.3)
	8	11.6 (7.2)	15.0 (9.3)	16.6 (10.3)
R	1	0.8 (0.5)	1.0 (0.6)	1.1 (0.7)
	2	1.1 (0.7)	1.4 (2.7)	4.9 (3.1)

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DETERMINING 750 TRACTOR TRAVEL SPEEDS

Travel speeds shown are for tractor with 9.5-24 rear tires.

Due to difference in tire radius, all speeds would be eight percent faster with 13.6-16 rear tires.

750 TRACTOR TRAVEL SPEEDS

Range	Gear	Lowest Working Speed (1650 rpm) km/h (mph)	Standard PTO Speed (2300 rpm) km/h (mph)	Rated Engine Speed (2400 rpm) km/h (mph)
	1	0.9 (0.6)	1.3 (0.8)	1.3 (0.8)
L	2	1.1 (0.7)	1.6 (1.0)	1.8 (1.1)
	3	1.8 (1.1)	2.5 (1.5)	2.6 (1.6)
	4	2.8 (1.7)	4.0 (2.5)	4.2 (2.6)
	5	3.9 (2.4)	5.6 (3.5)	5.8 (3.6)
H	6	5.2 (3.2)	7.4 (4.6)	7.7 (4.8)
	7	7.6 (4.7)	10.8 (6.7)	11.3 (7.0)
	8	12.3 (7.6)	17.5 (10.8)	18.3 (11.4)
R	1	0.9 (0.6)	1.3 (0.8)	1.4 (0.9)
	2	4.1 (2.5)	5.9 (3.7)	6.2 (3.9)

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PREDELIVERY

Toe-in	3 to 9 mm (1/8 - 3/8 in.)

ENGINE SPEEDS

Slow Idle	800 rpm
650 Fast Idle	2800 rpm
750 Fast Idle	2600 rpm
650 at Full Load	2600 rpm
750 at Full Load	2400 rpm

CLUTCH PEDAL FREE TRAVEL

650 Tractor	16 mm (5/8 in.)
750 Tractor	22 mm (7/8 in.)
Fan Belt Tension	13 mm (1/2 in.) 98 N (22 lbs.) force
Battery Specific Gravity	1.260 at 27°C (80°F)

TORQUES

650 Front and Rear Wheel Bolts	133 N.m (98 ft-lbs)
750 Front Wheel Bolts	133 N.m (98 ft-lbs)
750 Rear Wheel Bolts	186 N.m (137 ft-lbs)

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GENERAL TRACTOR SPECIFICATIONS—Continued

TUNE-UP

PTO Horsepower	
650 Tractor at 2600 rpm	10.8 kW(14.5 hp)
750 Tractor at 2409 rpm	13.4 kW(18.0 hp)
Compression	3914-4403 kPa (39.0-44.0 bar) (568-639 psi)
Thermostat Opening Temperature	71°C (160°F)
Radiator Cap Pressure Release	98 kPa (1.0 bar) (14 psi)
650 Engine Speeds	
Slow Idle	800 rpm
Fast Idle	2800 rpm
Rated Speed at Full Load	2600 rpm
750 Engine Speeds	
Slow Idle	800 rpm
Fast Idle	2600 rpm
Rated Speed at Full Load	2400 rpm
Injection Pump Timing	TDC
Battery Specific Gravity	1.260 at 27°C (80°F)
Front Wheel Toe-In	3-9 mm (1/8 - 3/8 in.)

LUBRICATION

Engine Crankcae Oil Capacity (with filter change)	2.5 L (2.6 U.S. qt.)
Transmission-Hydraulic System Capacity	
650 Tractor	13 L (14 U.S. qt.)
750 Tractor	14 L (15 U.S.qt.)
Front Wheel Drive Axle Housing	
650 Tractor	3.0 L (3.2 U.S. qt.)
750 Tractor	6.5 L (6.9 U.S. qt.)
Service Intervals	
Check Engine Oil Level	Every 10 hours
Change Engine Oil	After first 50 hours and again at 100 hours and then every 200 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	
Without Hydraulic Filter	Every 200 hours
With Hydraulic Filter	Every 600 hours
Clean Transmission-Hydraulic Oil Screen	
Without Hydraulic Filter	Every 200 hours
With Hydraulic Filter	Every 600 hours
Replace Transmission-Hydraulic Oil Screen	
Without Hydraulic Filter	Every 600 hours
With Hydraulic Filter	Every 1200 hours
Replace Transmission-Hydraulic Oil Filter	AFter first 100 hours then every 200 hours
Check Oil Level MFWD Axle	Every 50 hours
Change Oil in MFWD Axle	After first 100 hours then every 600 hours

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LUBRICATION

Clean and Repack Front Wheel Bearings	Every 600 hours
Lubricate Grease Fittings	
Front Axle Pivot Pin	Every 10 hours
Drag Link Ends	Every 10 hours
Tie Rod Ends	Every 10 hours
Clutch and Brake Pedal Fittings	Every 50 hours
Right-Hand Hitch Lift Link	Every 50 hours
Steering Spindles (without MFWD)	Every 50 hours

SEPARATION

Fan Belt Deflection (at 98 N (22 lbs.) force)	13 mm (1/2 in.)
ROLL-GARD Protection Structure Cap Screws	
Rear	100 N.m (74 ft-lbs)
Side	245 N.m (181 ft-lbs)
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	120-150 N.m (87-108 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)

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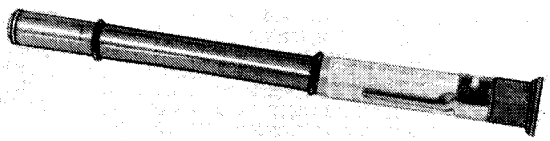
SPECIAL TOOLS

NOTE: Order tools from your Service-Gard Catalog, unless otherwise indicated.

JDST-28 Belt Tensioning Tool is used for checking fan belt tension.



R 26415N

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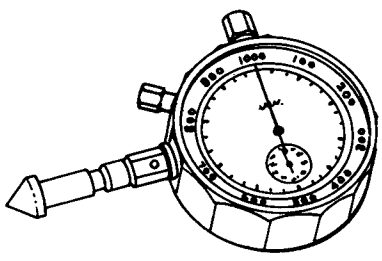
Hand Tachometer is used for checking engine speed.



R 30607

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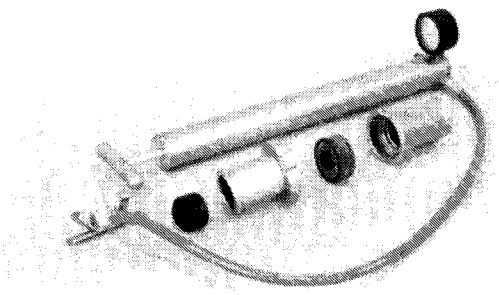
D-05104ST Radiator Tester is used for pressure testing cooling system and radiator caps.



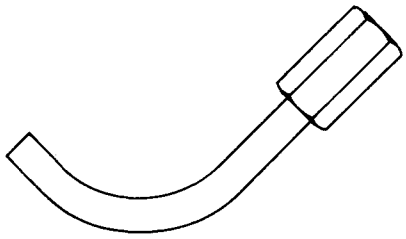
A14;T75866 U03;01000 I 260784

AR62377 Dry Element Cleaning Gun is used for cleaning air filter.

R27167N

A14;R27167 N U03;01000 J 080181

JDF-14 Timing Fixture is used for checking pump beginning of injection timing on engine.



R 30234

A14;R30234 U03;01000 K 080181

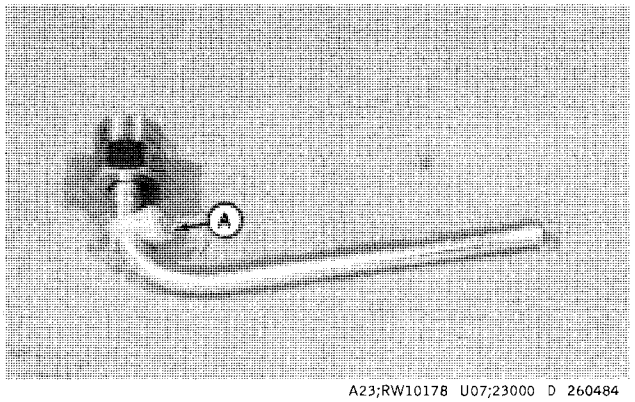
INJECTION PUMP TIMING TOOL

NOTE: Two injection pump timing tools can be made from one CH18358 Injection Line.

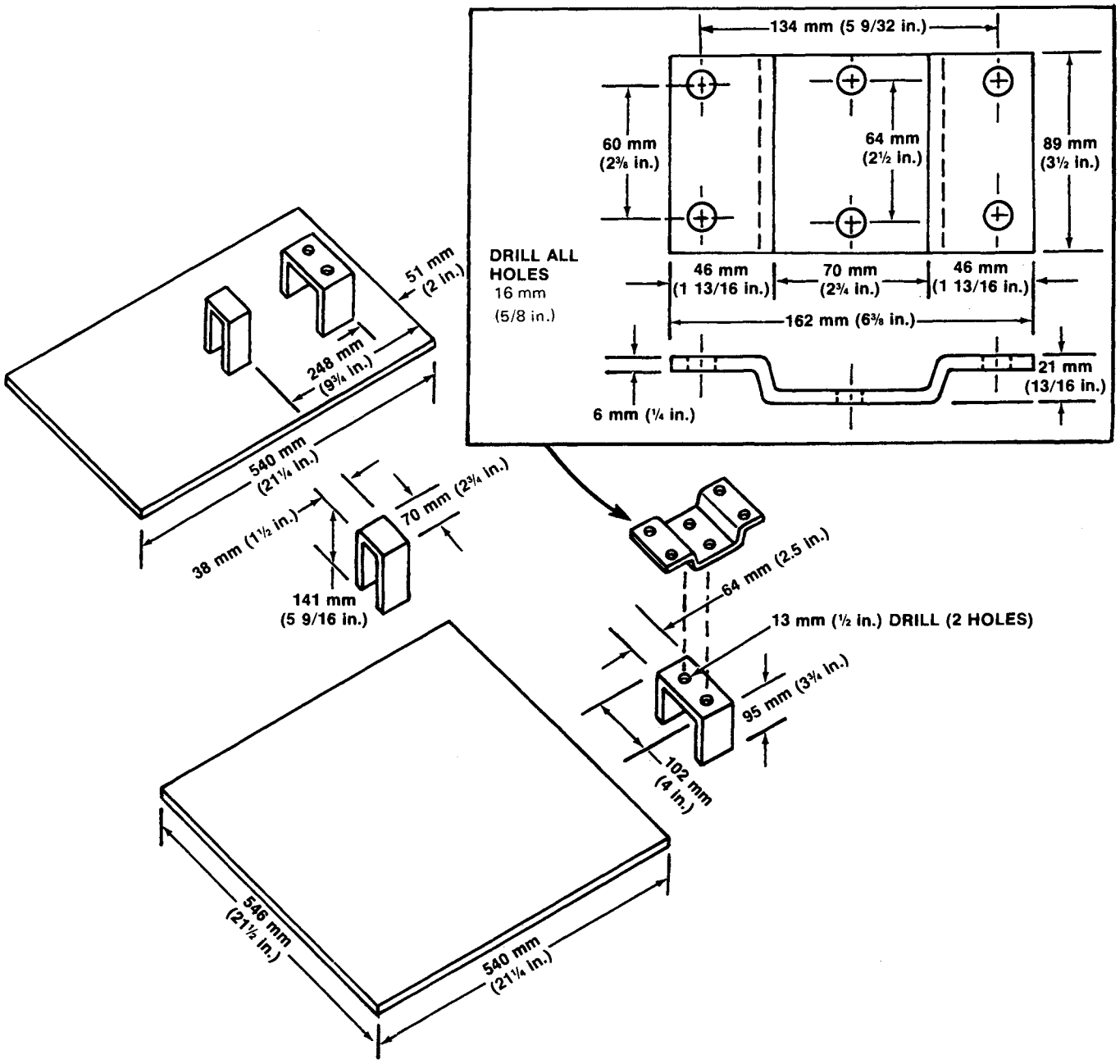
Obtain from dealer stock:

1—CH18358 Injection Line
2—H77628 Band

Cut injection line, on straight portion of line, approximately 133 mm (5-1/4 in.) from each end. Install band (A) around injection line to prevent loss of nut.



A23;RW10178 U07;23000 D 260484



650 Transmission Disassembly Stand is used for supporting transmission and differential.

NOTE: Make sure all joints are welded properly.

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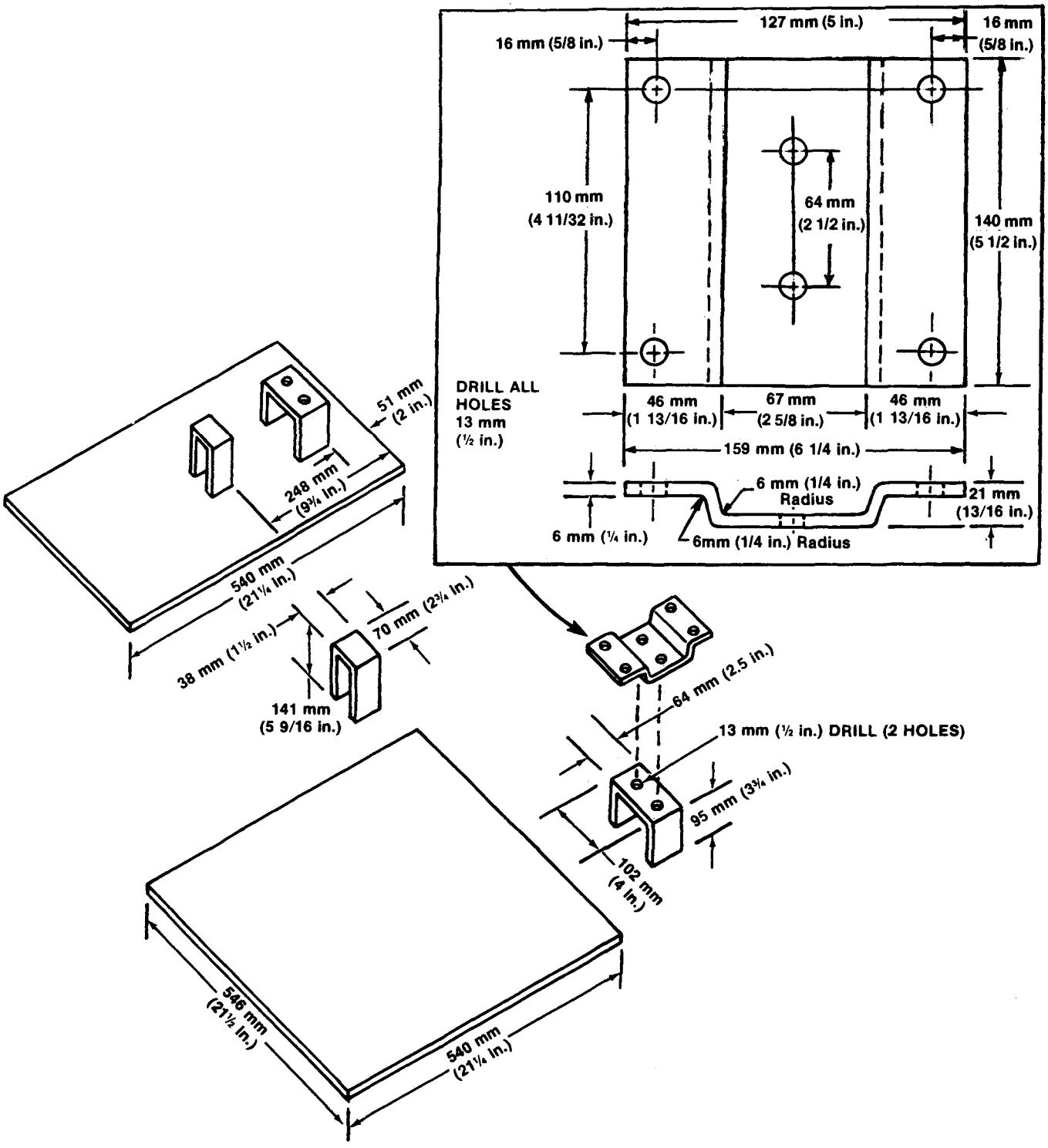
SPECIAL TOOLS—Continued



750 Transmission Disassembly Stand is used for supporting transmission and differential cases.

NOTE: Make sure all joints are welded properly.

RW1608 01000 M 080181

PREDELIVERY SERVICE - GENERAL INFORMATION

The John Deere delivery receipt, when properly filled out and signed by the dealer and customer, verifies that predelivery and delivery services were satisfactorily performed. When delivering the tractor, give the customer his copy of the delivery receipt and operators manual. Be sure to explain their purposes to him.

Because of the shipping factors involved, plus extra finishing touches necessary to promote customer satisfaction, there are certain predelivery services that must be performed by the dealer. These services are listed in the first of two sections on the predelivery form which is attached to the tractor. The second section is a list of factory inspections that must be verified by the dealer.

Fill the form in completely and sign it. Send a copy to the factory and file the orignal with the shop order for the job. This will certify that the proper predelivery service has been completed.

DEALER PREDELIVERY SERVICE

Using the following illustrated procedures, perform all services listed and check each job off as it is completed.

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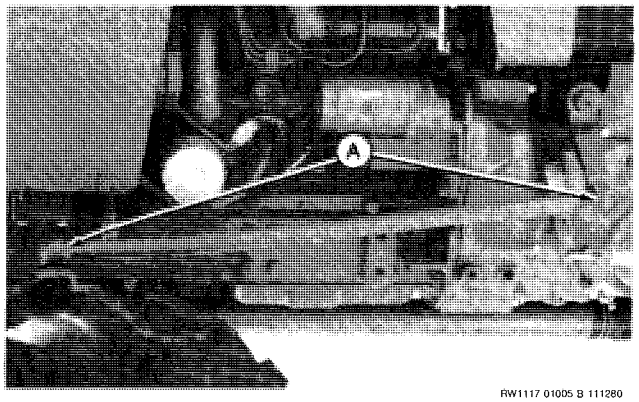
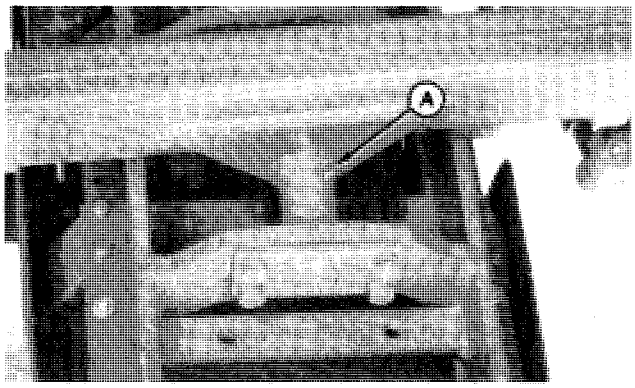
LUBRICATE GREASE FITTINGS

1. Lubricate drag link ends (A) with several shots of grease.



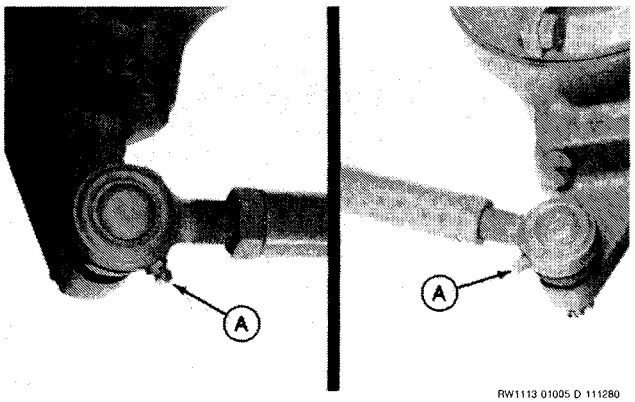
RW1117 01005 B 111280

2. Lubricate front axle pivot pin (A) on tractors without front-wheel drive, with several shots of grease.



RW1110 01005 C 111280

3. Lubricate tie rod ends (A) with several shots of grease.



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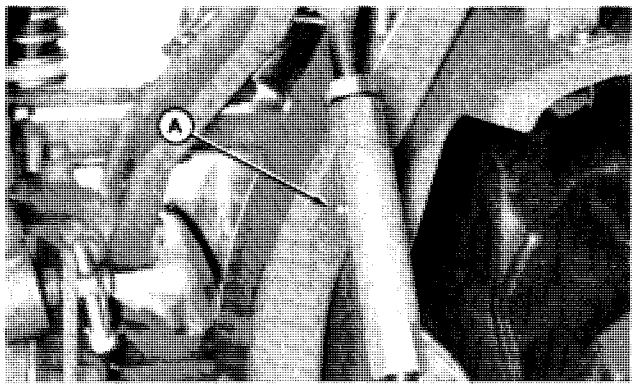
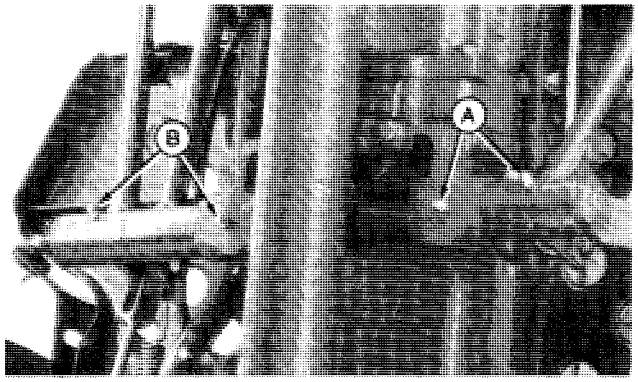
4. Lubricate right-hand hitch lift link (A) with several shots of grease.



RW1107 01005 E 111280

5. Lubricate clutch pedal (A) and brake pedal (B) with several shots of grease.



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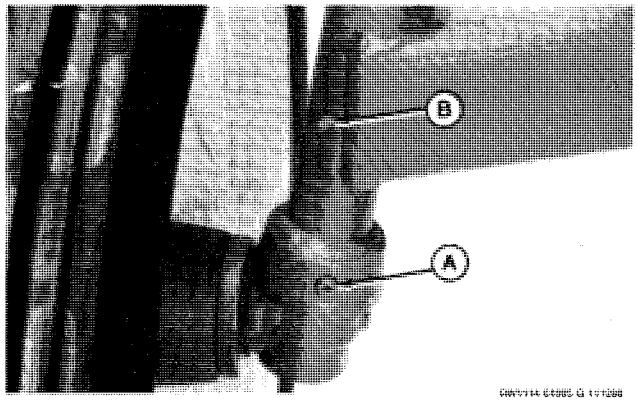
6. Lubricate steering spindles on tractors without MFWD. Remove relief plugs (A) and apply several shots of grease to steering spindle fittings (B). Reinstall relief plugs.



ALIGN MUFFLER

1. Make sure muffler extension pipe is perpendicular to the tractor hood.

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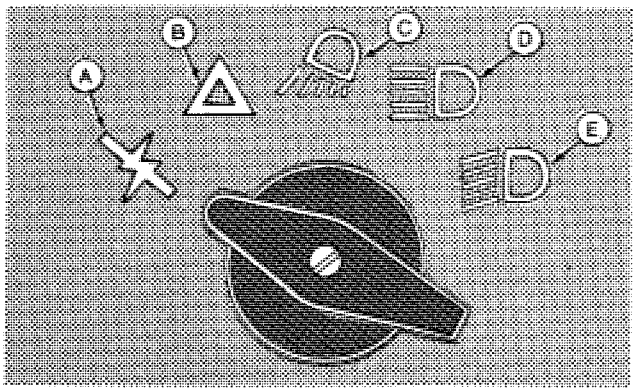
ADJUST ALL LAMPS



1. Check operation of lamps in all switch positions.

(A)—Turns off all lamps.

(B)—Turns on warning lamps. Use for daytime highway driving only.

(C)—Turns on bright head lamps and rear flood lamp. For field use only. Do not use on roads. Flood lamp might blind or confuse other drivers.

(D)—Turns on bright head lamps, tail lamps, and warning lamps. For highway driving during daytime or night-time.

(E)—Turns on dim head lamps, tail lamp, and warning lamps.

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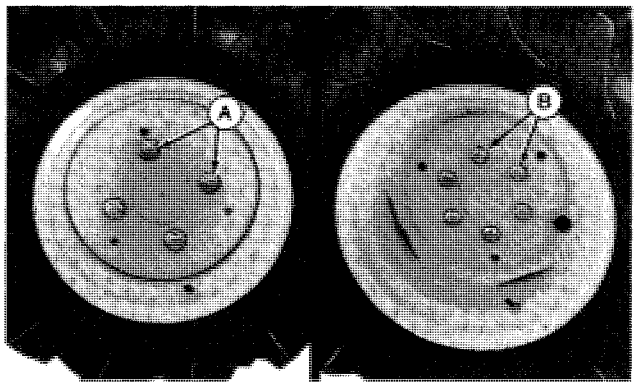
TORQUE WHEEL HARDWARE

1. Torque 650 tractor front (A) and rear (B) wheel bolts to 133 N.m (98 ft-lbs).



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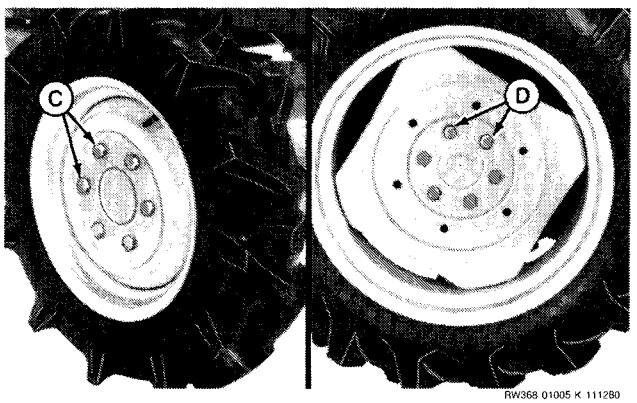
2. Torque 750 tractor wheel bolts (C) to 133 N.m (98 ft-lbs) and rear wheel bolts (D) to 186 N.m (137 ft-lbs).



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CHECK TIRE PRESSURE

Check tire pressure to be sure it is within the specifications listed in the chart.

TIRE SIZE	PLY RATING	†MINIMUM kPa (bar) (psi)	MAXIMUM kPa (bar) (psi)
Front			
5.00-12	4	140(1.4) (20)	280(2.8) (41)
6-12	4	140(1.4) (20)	200(2.0) (29)
23/8.50-12	2	70(0.7) (10)	70(0.7) (10)
6-14	4	160(1.6) (23)	200(2.0) (29)
25/8.50-14	2	70(0.7) (10)	160(1.6) (23)
4.00-15	4	250(2.5) (36)	360(3.6) (52)
Rear			
31/15.50-15	4	80(0.8) (12)	140(1.4) (20)
9.5-16	4	80(0.8) (12)	140(1.4) (20)
13.6-16	4	80(0.8) (12)	100(1.0) (14)
9.5-24	4	80(0.8) (12)	140(1.4) (20)

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ADJUST WHEEL SPACING - FRONT TREAD

Width in chart for tractors with wheels dished in to narrowest position.

IMPORTANT: Mounting wheels with dish out to increase tread width is not recommended.

650 TRACTOR			
Standard Axle	Tread mm (in.)	Front-wheel Drive	Tread mm (in.)
5.00-12	830 (33)	6-12	870 (34)
23/8.50-12	915 (36)	23/8.50-12	985 (39)

750 TRACTOR			
Standard Axle	Tread mm (in.)	Front-wheel Drive	Tread mm (in.)
4.00-15	900 (35)	6-14	922 (36)
25/8.50-14	934 (37)	25/8.50-14	1014 (40)

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ADJUST WHEEL SPACING - REAR THREAD

1. Wheels with regular tires should be mounted in wide tread position whenever possible. If necessary, wheels can be mounted in narrow tread position.

2. Wheels with turf tires should be mounted only with wheels dished out to wide tread position.

3. Tread width dimensions are shown in chart. Tread width is measured between centers of tires.

REAR TREAD WIDTH		
Tire Size	Wide Tread mm (in.)	Narrow Tread mm (in.)
31/15.50-15 (Turf)	950 (37)	DO NOT USE
9.5-16	900 (35)	800 (32)
13.6-16 (Turf)	1020 (40)	DO NOT USE
9.5-24	1000 (39)	900 (35)

WT06G 01005 N 111280

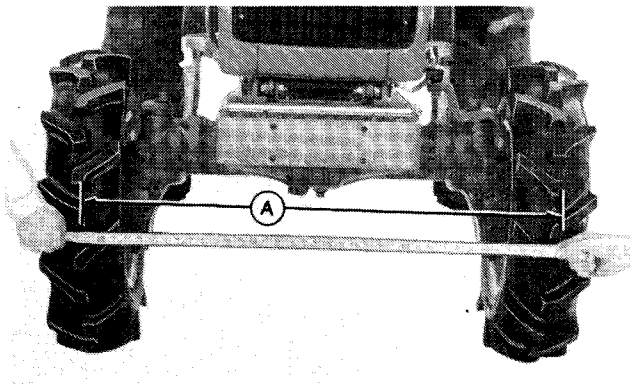
ADJUST FRONT WHEEL TOE-IN

NOTE: Check toe-in before making any adjustments.

1. Steer front wheels straight ahead.

2. Measure distance between tires at hub level (A). Mark the point at which you measured.

3. Move tractor back about one meter (3 ft.), so mark is at hub level behind the axle. Again measure distance between tires at same point on tire. Tires should be 3 to 9 mm (1/8 to 3/8 in.) closer at front.



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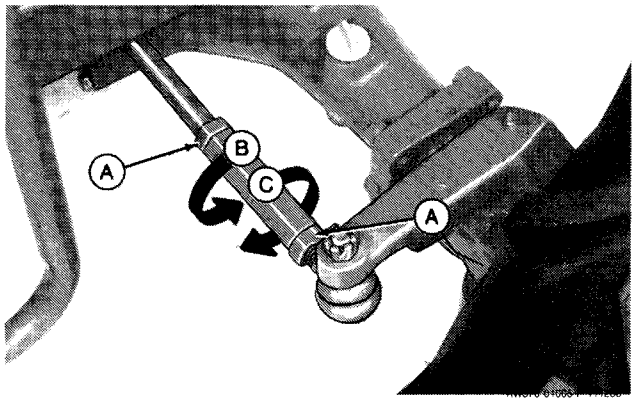
ADJUST 650 TRACTOR TOE-IN

Loosen lock nuts (A).

2. Change tie rod length to adjust toe-in. Rotate turnbuckle clockwise (B) to shorten tie rod. Rotate counterclockwise (C) to lengthen tie rod. Adjust toe-in to 6 mm (1/4 in.).

3. Retighten lock nuts.

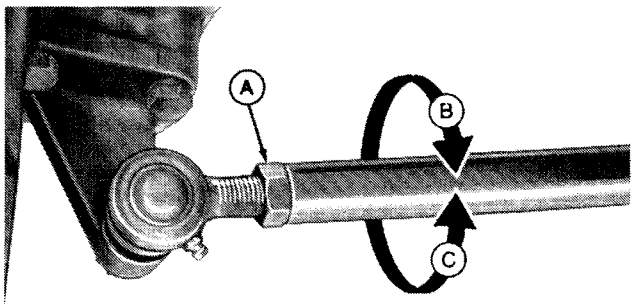


ADJUST 750 TRACTOR TOE-IN

Loosen lock nuts at each end of tie rod (A).

2. Change tie rod length to adjust toe-in. Rotate tie rod clockwise (B) to shorten it. Rotate counterclockwise (C) to lengthen it. Adjust toe-in to 6 mm (1/4 in.).

3. Retighten lock nuts.



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ENGINE BREAK-IN

Follow procedure for engine break-in as instructed in Section 220, Group 10.

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