

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)

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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.

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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.)	1.75 m (69 in.)
	850 (16001-) 1.7 m (67.5 in.)	
Overall length	850 (-16000) 2.29 m (118 in.)	3.10 m (122 in.)
	850 (16001-) 3.07 m (121 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
2	1.8 km/h 1.1 mph	1.6 km/h 1.0 mph	1.9 km/h 1.2 mph
3	2.7 km/h 1.7 mph	2.4 km/h 1.5 mph	2.8 km/h 1.7 mph
4	4.0 km/h 2.5 mph	3.5 km/h 2.2 mph	4.1 km/h 2.6 mph
5	6.0 km/h 3.8 mph	5.2 km/h 3.3 mph	6.2 km/h 3.9 mph
6	8.6 km/h 5.4 mph	7.5 km/h 4.7 mph	8.9 km/h 5.5 mph
7	12.7 km/h 8.0 mph	11.1 km/h 6.9 mph	13.1 km/h 8.2 mph
8	18.7 km/h 11.7 mph	16.3 km/h 10.2 mph	19.3 km/h 12.1 mph
1R	1.8 km/h 1.1 mph	1.6 km/h 1.0 mph	1.9 km/h 1.2 mph
2R	8.6 km/h 5.4 mph	7.5 km/h 4.7 mph	8.9 km/h 5.5 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

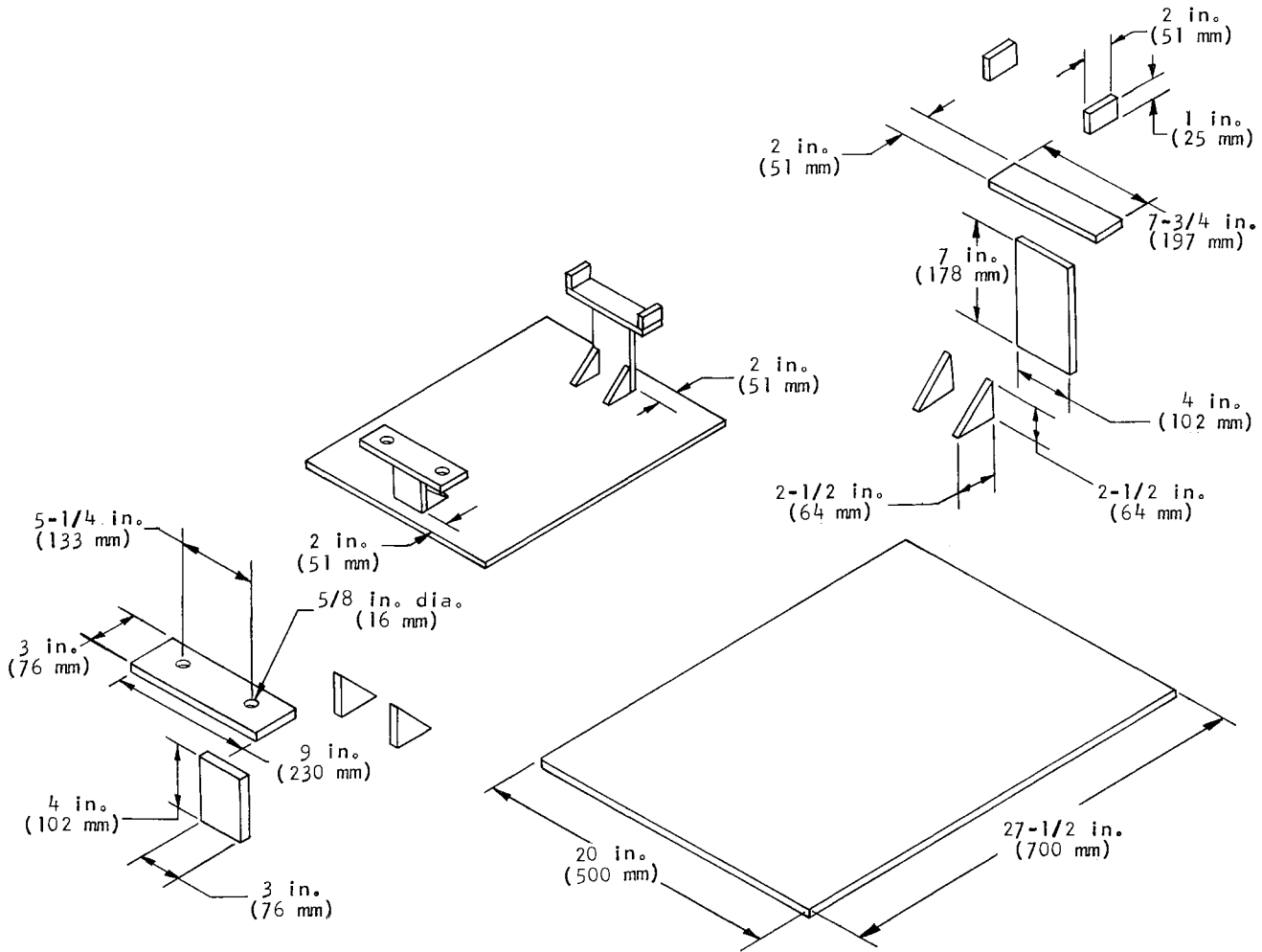
Separation

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.
<i>Note: Order from your SERVICE-GARD™ Catalog.</i>	
Hand Tachometer	Check engine speed.
D-05104ST Radiator Tester	Pressure test cooling system and radiator caps.
AR62377 Dry Element Cleaning Gun	Clean air filter.
<i>Note: Order from Service Tools P.O. Box 314 Owatonna, MN 55060</i>	

Separation



R 30803

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.

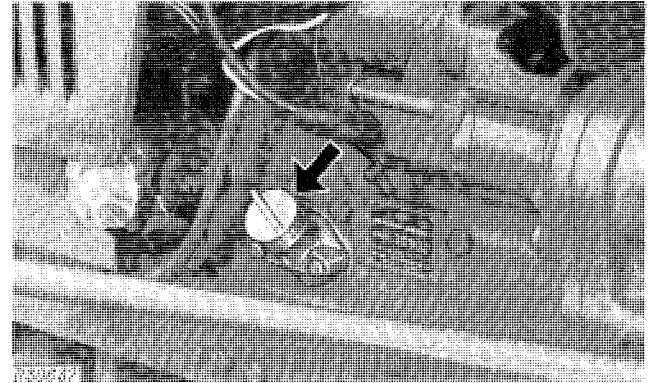
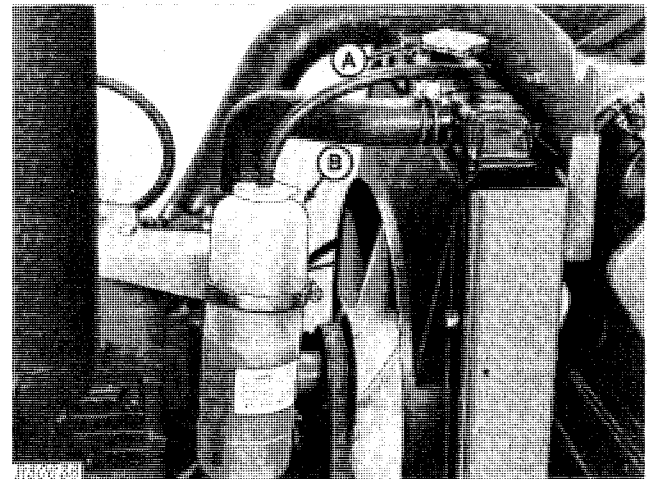


Fig. 1-Engine Oil Dipstick

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.