ISS-1051B

READ THIS

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This revised manual, ISS-1051B "International MODEL 150 Loader and TD-9 SERIES B Crawler Tractor Chassis" dated (10-64) replaces ISS-1051 dated (3-63) which should be destroyed.

TECHNICAL PUBLICATIONS SECTION
CONSTRUCTION EQUIPMENT DIVISION
INTERNATIONAL HARVESTER COMPANY
Melrose Park, Illinois

ISS-1051B (10-64)

PRINTED IN UNITED STATES OF AMERICA

INTERNATIONAL
MODEL 150 LOADER AND TD-9 SERIES B
CRAWLER TRACTOR CHASSIS

CONTENTS

CONSTRUCTION EQUIPMENT SERVICE MANUAL

INTRODUCTION

GENERAL

The instructions contained in this service manual are for the information and guidance of servicemen who are responsible for overhauling and repairing the International TD-9 SERIES B crawler tractor and MODEL 150 loader.

LUBRICATION

Instructions on the lubrication of each assembly is given in the lubrication chart in the operator's manual. When assembling any parts, always coat all wearing surfaces with the lubricant specified in the chart. Except for such installations as taper pins, etc., whose surface should be clean and dry, use sufficient quantities of lubricant to prevent any danger of seizing, scoring or excessive wear when the assembly is first operated. Failure to provide "starting lubrication" may result in serious damage.

GASKETS AND SEALS

Always use new gaskets and seals. When installing a seal, be sure to install it as specified in the instructions. Be extremely careful not to damage the seal in any way during installation.

DIESEL FUEL SYSTEM

If detailed information on the diesel fuel system is desired, refer to the "ROOSA MASTER FUEL INJECTION PUMP MANUAL," ISS-1042 or the "MODEL RD DIESEL INJECTION PUMP MANUAL," ISS-1052.

SERVICE TOOLS

When the use of inexpensive special service equipment will facilitate work, such equipment is mentioned in this manual. Other than this, it is assumed that servicemen will select such tools as are required. Information regarding most special tool equipment is given in the "SERVICE TOOLS MANUAL," ISS-1002.

SERVICE PARTS

For the correct service parts to be used, always refer to the parts catalog. The loose-leaf parts catalogs are accurate and are brought up to date continually by issuing new pages covering any changes in parts numbers.

SERIAL NUMBERS

The engine serial number is stamped on the crankcase where it is plainly visible. The chassis serial number is stamped on a name plate which is located on the dash.

ENGINE

Instructions for removal and installation of the engine are covered in this manual. For detailed information on repair and adjustment of the TD-9 SERIES B or MODEL 150 loader engine, refer to the engine service manual, ISS-1040.

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GENERAL DATA

	MODEL 150 Loader	TD-9 SERIES B
ENGINE SPEEDS (rpm):		
Rated:		
Manual shift	1800 ± 10	1700 ± 10
Manual shift (agricultural)	- - - - -	1850 ± 10
Power shift	2200 ± 10	2300 ± 10
High Idle:		
Manual shift	1965 ± 35	1855 ± 35
Manual shift (agricultural)	- - - - -	2015 ± 40
Power shift (engine in chassis)	2370 ± 50	2490 ± 50
Low idle	650 ± 25	650 ± 25

	TD-9 SERIES B (Manual Shift)	TD-9 SERIES B (Agricultural)
BELT PULLEY:		
Diameter, inches	11 or 12-1/2	11 or 12-1/2
Face, inches	8-1/2	8-1/2
Rpm at rated engine speed	1067	1161
Belt speed, feet per minute	3073 (11 inch) 3388 (12-1/2 inch)	3343 (11 inch) 3685 (12-1/2 inch)
REDUCED SPEED REAR POWER TAKE-OFF:		
Rpm at rated engine speed	652	709
Direction of rotation (looking forward at rear)	Clockwise	Clockwise
Spline connection, inches	1-3/8	1-3/8
Type of spline connection	SAE-6B	SAE-6B

REAR POWER TAKE-OFF (ALL APPLICATIONS):	
Rpm at rated engine speed:	
1700	1133
1800	986
1850	1233
2200	1194
2300	1249
Direction of rotation (looking forward at rear)	Clockwise
Spline connection, inches	1-3/8
Type of spline connection	SAE-6B

	MODEL 150 Loader	TD-9 SERIES B
TRACTOR DIMENSIONS:		
Approx. length (over-all), inches	- - - - -	123.6
Bucket on ground and rolled back (4-in-1)	175	- - - - -
Bucket on ground and rolled back (skid shovel)	169	- - - - -
Width (over-all), inches	- - - - -	75
(width of bucket), inches	78	- - - - -
Height (grouser tip to highest point, less exhaust and air cleaner pipes), inches	72-1/2	75
Tread, inches	60	60
Ground contact length, inches	81-1/2	72.3
Area of ground contact, sq. in.	2445	1880
Track shoe width, inches	15	13
Drawbar lateral movement at pin, inches	19-1/2	19-1/2
Drawbar height (drawbar center line-to-ground line), inches	14	14
Minimum ground clearance, inches	13	10
WEIGHTS (including fuel and coolant), pounds:		
Less blade	- - - - -	12,870
4-in-1	20,685	- - - - -
Skid shovel	20,200	- - - - -

GENERAL DATA

STANDARD TORQUE DATA FOR NUTS AND BOLTS
(For special torque data refer to specification paragraph of the pertinent section of this manual.)

Recommended torques, in foot-pounds, for standard application nuts and bolts shown below are applicable, provided:

A. All threads are lubricated with engine oil or chassis grease. (Refer to NOTE.)

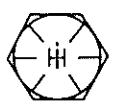
B. Joints are rigid; for example, no gaskets or compressible materials are used.

NOTE:

1. Multiply the standard torque by .85 when metallic plated bolts or nuts are used.
2. Multiply the standard torque by .75 when parkerized bolts or nuts are used.
3. Multiply the standard torque by .70 when Molykote, white lead or similar mixtures are used as lubricants.
4. Multiply the standard torque by .90 when hardened surfaces are used under the nut or bolt head.

Bolt Size	Type 2		Type 4	
	Min.	Max.	Min.	Max.
1/4	9	10	12	14
5/16	19	21	27	30
3/8	33	37	45	50
7/16	53	60	75	85
1/2	80	90	115	130
9/16	110	125	160	180
5/8	160	180	220	250
3/4	290	320	400	450
7/8	420	470	650	730
1	630	710	970	1090
1-1/8	850	950	1380	1550
1-1/4	1200	1350	1940	2180

BOLT TYPE IDENTIFICATION CHART

IH Type	SAE Grade	DESCRIPTION	BOLT HEAD * MARKING
2	5	WILL HAVE AN IH AND 3 RADIAL LINES Quenched and tempered medium carbon steel	
4	8	WILL HAVE AN IH AND 6 RADIAL LINES Quenched and tempered special carbon or alloy steel	

* The center marking identifies the bolt manufacturer. The IH monogram is currently used. Some bolts may still have a raised dot which previously identified IH bolts.

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CONTENTS

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GENERAL

1. DESCRIPTION

The cooling system used on the TD-9 SERIES B and the MODEL 150 loader tractors, is a closed type system that permits operation at extreme angles without loss of coolant through the overflow pipe, and also permits operation at higher engine temperatures without boiling. Extra care must be taken that all connections are tight.

A centrifugal water pump circulates the coolant from the lower water tank through the crankcase and cylinder head water jackets, past the thermostat into the radiator upper tank and down through the tubes of the radiator core to the lower water tank; then the cycle is repeated. Hoses provide the connections between the radiator inlet and outlet headers and the water pump.

The pressure type system is controlled by a pressure relief valve located in the overflow pipe assembly. The relief valve is set to open at approximately six pounds pressure. For servicing the pressure relief valve, refer to the operator's manual.

The replaceable core has four rows of tubes and six fins per inch.

Operation

When the engine is started cold, the by-pass type thermostat is closed, preventing circulation of low temperature coolant through the radiator core. The coolant circulates only through the water pump and engine water passages. This circulation during the warm-up period prevents formation of steam pockets. When the engine reaches operating temperature, which is determined by thermostat specifications, the coil of the thermostat expands and opens the passage for the coolant to flow from the engine water passages through the radiator and back to the water pump. The temperature of the coolant controls the extent of the thermostat opening which, in turn, controls the amount of coolant circulation.

2. SPECIFICATIONS*

Cooling system capacity (gals.)	Refer to operator's manual
Water pump type	Centrifugal
Radiator:	
Core	Replaceable
Tubes	4 rows
Fins	6 per inch

* For specifications of cooling system components on the engine, such as water pump, fan, etc., refer to the engine manual, ISS-1040.

3. CHECKING MECHANICAL PROBLEMS

PROBABLE CAUSE	REMEDY
Defective Cooling System	
1. Insufficient water	Add water; inspect for leaks.
2. Faulty thermostat	Test. If necessary, replace.
3. Dirty water	Drain and clean system.
4. Defective connections	Replace swelled, worn or loose hose connections.
5. Radiator defective	Repair radiator. If necessary, replace.
6. Fan defective	Inspect fan. If damaged, replace.
7. Defective overflow pressure valve	Replace.
8. Defective water pump	Inspect water pump impeller and shaft. If necessary, replace.
9. Water pump leaks	Repair or replace pump.
10. Dirty, scaled coolant passages	Clean and flush passages.
11. Radiator clogged	Flush out radiator.
12. Fan belt slippage	Check the tension; replace if greasy or worn.

RADIATOR

4. DESCRIPTION

The radiator consists of pre-formed steel upper and lower water tanks and a replaceable core with four rows of flat tubes and fins spaced six to the inch.

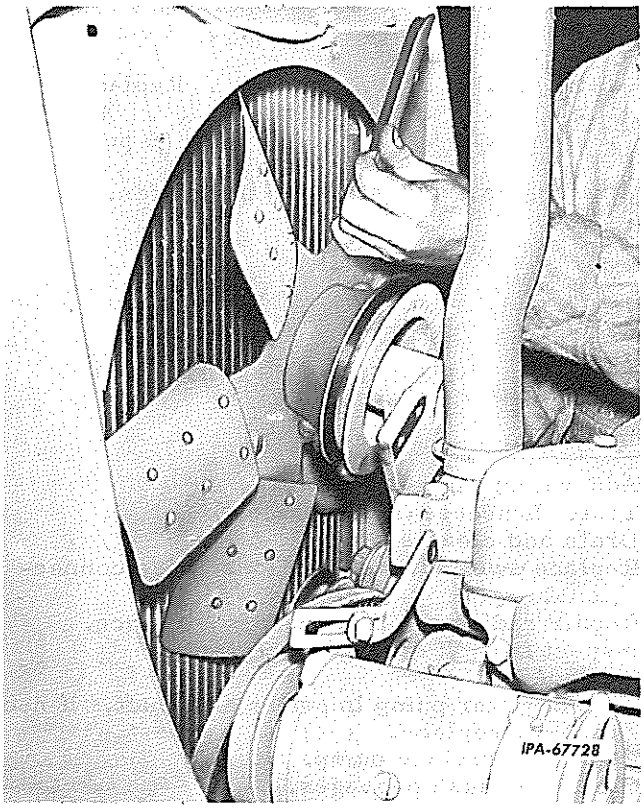
5. REMOVAL

1. Drain the cooling system. Remove the air intake cap, exhaust pipe extension, engine hood and engine side sheets.

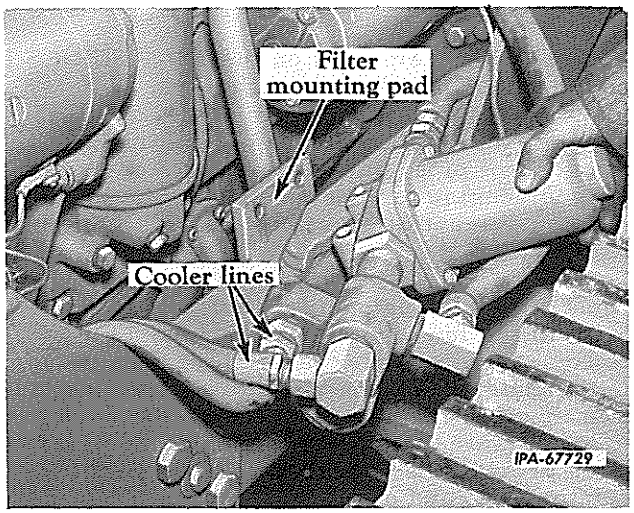
2. Remove the radiator guard door. If equipped with a fan guard, first remove the guard and then remove the fan and fan drive assembly (Illust. 1). Disconnect the light switch cable from the junction block on the upper sheet (32, Illust. 4).

3. Remove the inspection cover from the bottom of the radiator guard. Disconnect the baffles (28 and 29, Illust. 4) from the bottom of the radiator. Disconnect the upper and lower radiator hoses from the engine.

4. POWER SHIFT TRACTORS ONLY: Remove the safety filter mounting screws and move the filter and thermo by-pass valve assembly away from the tractor side channel. Disconnect the cooler lines at the thermo by-pass valve (refer to Illust. 2).



Illust. 1
Removing Fan and Fan Drive Assembly.

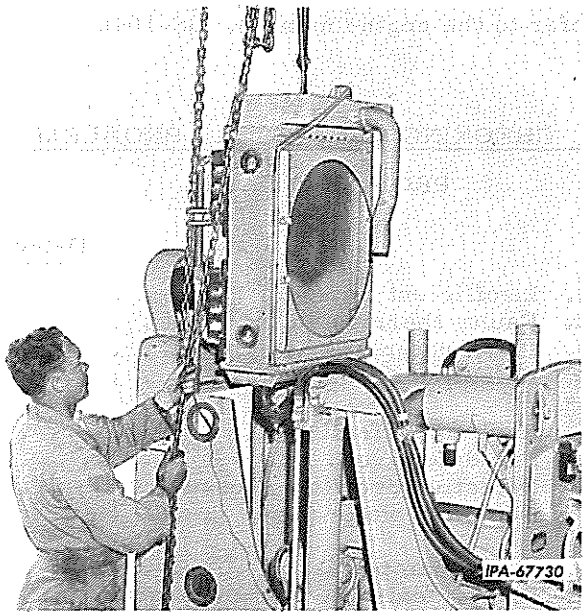


Illust. 2
Safety Filter Disconnected.

5. Position a high lift hoist (or "A" frame) over the radiator and, using a cable, support the weight of the radiator.

6. Remove the cap screws securing the four brackets (19) to the radiator and remove the brackets and spacers (18). It is not necessary to remove the rubber mountings (17) to remove the radiator (refer to Illust. 4).

7. When the mounting brackets have been removed, carefully hoist the radiator out of the tractor (Illust. 3).



Illust. 3
Removing the Radiator.

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RADIATOR

6. DISASSEMBLY

(Ref. Nos. Refer to Illust. 4.)

Inspect the radiator carefully to determine its serviceability. If necessary to repair or replace the radiator core or the upper or lower water tanks, refer to the following procedures.

1. Remove the fan housing sheets (30 and 32). Remove the oil coolers from the radiator (if equipped).

2. Support the radiator assembly in a horizontal position on a bench. Be sure to protect the core fins from damage.

3. Remove the four core stiffeners (15).

4. Remove all of the cap screws around the lower tank. Remove the tank (27) and tank gasket (16).

5. Remove all of the cap screws around the upper tank (13). Remove the upper tank and gasket (16). The mounting bar (14) will also be released. Remove the side channels (20).

NOTE: Unless replacement is necessary, do not remove the core snubbers (21). They are held in place with Minnesota Mining and Mfg. Co. adhesive EC-711, EC-847, EC-870 or equivalent.

7. INSPECTION AND REPAIR

1. Flush out the upper and lower water tanks thoroughly with water. Flush out the core with water under pressure, both inside and outside. If the core is greasy, clean it with steam cleaning equipment. Clean all other radiator parts.

2. Inspect the water tanks for cracks. Examine the radiator tubes and fins for damage. Straighten bent fins, if possible, to avoid air flow restrictions.

3. Examine all hoses for cracks or ruptures and install a new hose when in doubt.

8. REASSEMBLY

(Ref. Nos. Refer to Illust. 4.)

1. Place the radiator core (22) in a horizontal position and supported on its side or flat, whichever is preferable, on a bench. Protect the fins and tubes against damage.

2. Place the side channels (20) in position on each side of the core (22). Be sure the gasket surfaces of the core and water tanks are clean. Place a new gasket (16) in position and install the lower water tank (27). Install the end cap screws first to hold the side channels (20) and the lower tank in position. Position the bottom core stiffener (15) and install the cap screws. Tighten all of the cap screws securely.

3. Install a new upper water tank gasket (16), and the upper water tank (13). Install the upper core stiffener (15) and the mounting bar (14). Tighten all cap screws.

4. Install the oil coolers (if equipped) and fan housing sheets to the radiator.

9. INSTALLATION

(Ref. Nos. Refer to Illust. 4.)

1. Support the radiator in a sling and hoist it into position on the tractor.

2. Position the spacer (18) on the bracket (19).

3. Apply a soapy solution to the inner surface of the radiator mounting (17) and the mating surface of the mounting bracket (19). Align the mounting bracket screw holes. Substitute longer cap screws than the regular attaching cap screws to draw the bracket into place; then replace the substitute cap screws with the regular cap screws and lock washers. Draw up evenly and tighten.

4. Install all four mountings and brackets in the same manner as in Steps 2 and 3.

5. Install and connect the baffles (28 and 29) to the radiator.

6. POWER SHIFT TRACTORS ONLY: Connect the cooler lines (Illust. 2) to the thermo by-pass valve. Secure the filter assembly to the welded pad on the tractor side channel.

7. Connect the upper and lower radiator hoses to the engine and secure with clamps. Install and secure the inspection cover to the bottom of the radiator guard.

8. Install the fan and fan drive assembly (Illust. 1). If equipped, secure the fan guard to the fan sheets (30 and 32). Connect the light switch cable to the junction block on the upper sheet (32).

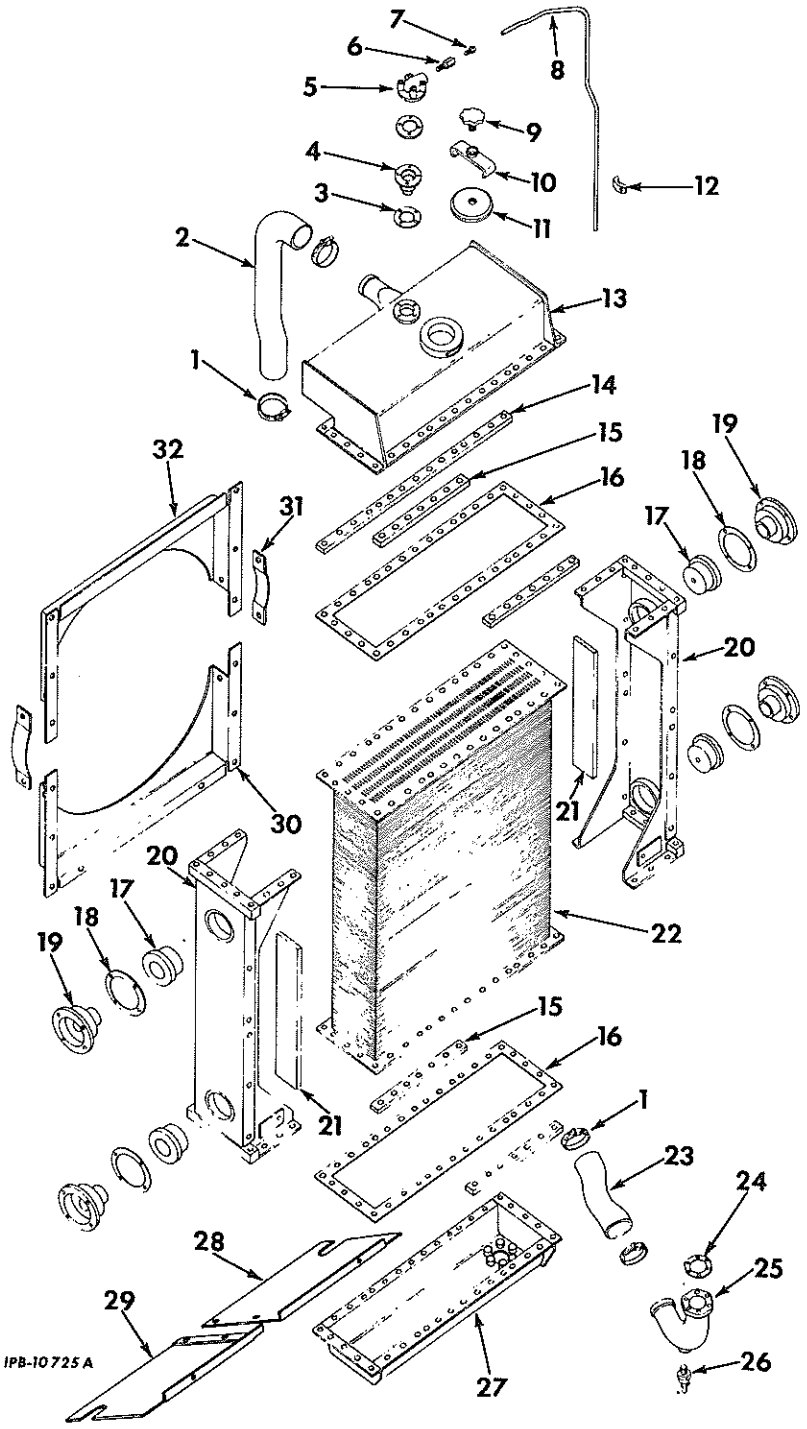
9. Install the radiator guard door.

10. Install the hood, side sheets, exhaust pipe extension and the air intake cap.

11. Refill the cooling system. (Refer to the operator's manual.)

12. Check the main frame oil level and add the proper amount for operation. (Refer to the operator's manual for proper grade and amount.)

RADIATOR



Illust. 4
Exploded View of Radiator and Connections.

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RADIATOR

Legend for Illust. 4.

1. Hose clamp.
2. Inlet hose.
3. Pressure relief valve gasket.
4. Pressure relief valve.
5. Relief valve housing.
6. Connector.
7. Coupling nut.
8. Overflow pipe.
9. Cap clamp handle.
10. Cap clamp.
11. Radiator cap.
12. Pipe clip.
13. Upper tank.
14. Mounting bar.
15. Core stiffener.
16. Tank gasket.
17. Radiator mounting.
18. Bracket spacer.
19. Mounting bracket.
20. Side channel.
21. Core snubber.
22. Radiator core.
23. Outlet hose.
24. Elbow gasket.
25. Outlet elbow.
26. Drain valve.
27. Lower tank.
28. Bottom air baffle, L.H.
29. Bottom air baffle, R.H.
30. Lower sheet.
31. Side sheet extension.
32. Upper sheet.

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The 282 series engine is equipped with two 6-volt batteries, glow plugs, glow plug switch and glow plug meter. This engine is of the direct starting diesel type.

The starting system includes batteries, cranking motor, generator, voltage and current regulator, and cut-out relay. The electrical system is basically a single wire, ground return type with the negative (-) terminal of the battery circuit grounded.

For further description of each component and complete servicing, specifications, etc., refer to the engine service manual, ISS-1040.

For specific components, wiring diagram and instrument panel gauges, etc., refer to the operator's manual.

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