



Allis Chalmers

Service Manual

H-3 & HD-3

Service Manual

JENSALES.COM

or Call 800-443-0625



THIS IS A MANUAL PRODUCED BY JENSALES INC. WITHOUT THE AUTHORIZATION OF ALLIS CHALMERS OR IT'S SUCCESSORS. ALLIS CHALMERS AND IT'S SUCCESSORS ARE NOT RESPONSIBLE FOR THE QUALITY OR ACCURACY OF THIS MANUAL.

TRADE MARKS AND TRADE NAMES CONTAINED AND USED HEREIN ARE THOSE OF OTHERS, AND ARE USED HERE IN A DESCRIPTIVE SENSE TO REFER TO THE PRODUCTS OF OTHERS.

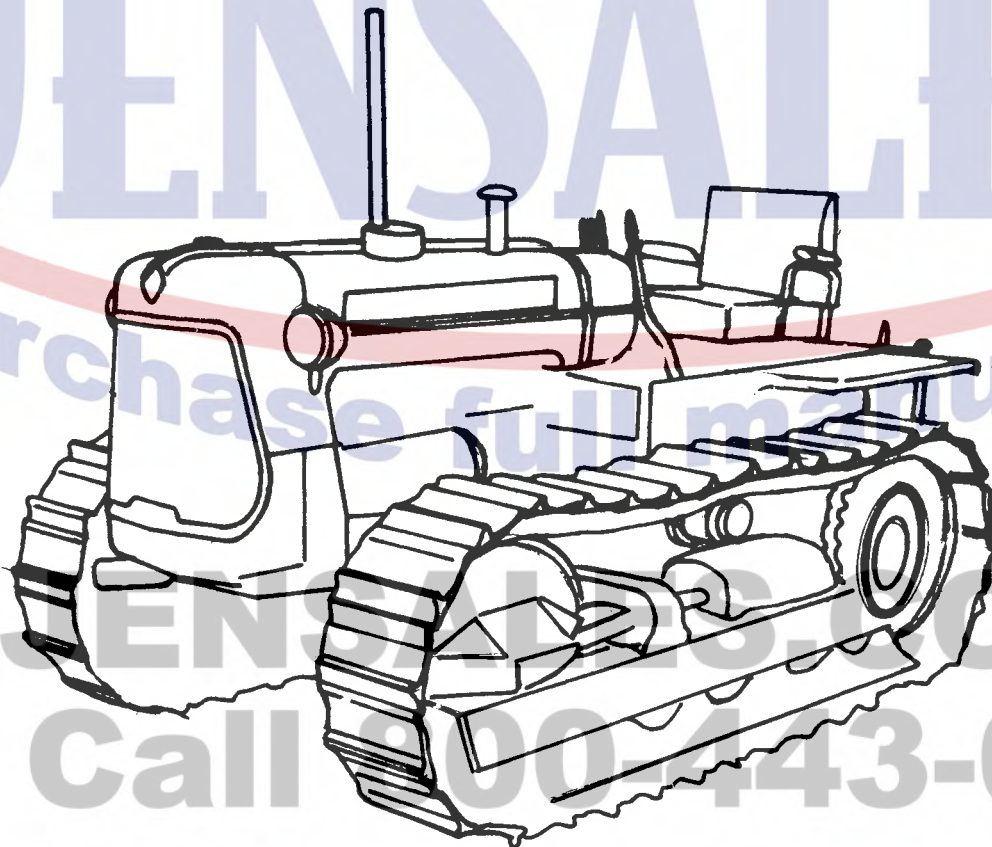
AC-S-H3,HD3



ALLIS-CHALMERS

SERVICE SECTION

H-3 & HD-3 TRACTORS



Industrial Tractor Division

LITHO IN USA

No. 1013044

Compiled and Reproduced From Original by Jensales Inc.

TABLE OF CONTENTS

149 GASOLINE ENGINE (H-3 CRAWLER TRACTOR)

A

CARBURETOR

B

DIESEL ENGINE (HD-3 CRAWLER TRACTOR)

C

FUEL INJECTION PUMP

D

ELECTRICAL SYSTEM

E

TORQUE HOUSING AND SHUTTLE CLUTCH

F

TRANSMISSION ASSEMBLY

G

FINAL DRIVE, STEERING CLUTCHES AND BRAKES

H

TRACKS AND UNDERCARRIAGE

I

HYDRAULIC PUMP

J

CONTROL VALVE

K

HYDRAULIC CYLINDERS (SERVICE INFORMATION)

L

INDEX

149 GASOLINE ENGINE H-3 CRAWLER TRACTOR

DISTRIBUTOR REMOVAL AND ASSEMBLY	A-36
ENGINE REMOVAL AND ASSEMBLY	A-9
Camshaft	A-17
Connecting Rod Bearings	A-22
Connecting Rods and Pistons	A-18
Crankshaft and Main Bearings	A-23
Cylinder Head	A-12
Flywheel	A-26
Oil Pump	A-27
Oil Sump	A-29
Rocker Arm and Shaft	A-11
Thermostat	A-32
Timing - Gear Cover	A-16
Water Pump	A-30
GOVERNOR	A-32
Adjustment	A-32
Removal	A-34
Operation	A-34
SPECIFICATIONS	A-2
Engine Specifications	A-8
Fits and Tolerances	A-6
149 Gas Prior to S/N 6959	A-2
160 Gas S/N 6959 - 8694	A-4
160 Gas S/N 8694 and up	A-4
Torque Specifications	A-3
TIMING THE ENGINE	A-35
Distributor Timing	A-37 - A-38
Front Crankshaft Timing	A-36
Flywheel Timing	A-35 - A-38

H-3 CRAWLER TRACTOR

149 Gasoline Engine

Prior To S/N 6959

SPECIFICATIONS**ENGINE**

No. of Cylinders	4
Firing Order	1-2-4-3
Bore	3-1/2
Stroke	3-7/8
Piston Displacement	149 cu. in.
Piston Travel	
Ⓐ (Rated Gov. Speed)	1066 F. P. M.
Compression Ratio	7.5 - 1
Compression Pressure	
At Cranking Speed	160 - 165
R. P. M. (Low Idle)	550 - 575
R. P. M. (High Idle)	1850 - 1900
R. P. M. (Rated Load)	1650

CAMSHAFT

Drive	Gear
Timing	Marked Gear
Journal Diameter	1.749" - 1.750"
Bushing Diameter (Inside)	1.752" - 1.753"
Bushing Clearance	.002 - .004
End Thrust	Spring Loaded

CRANKSHAFT

Bearing Length	
Front and Center	1.250"
Rear	1.448" - 1.500"
Journal Length	
Front and Center	1.5626"
Rear	1.504" - 1.506"
End Thrust Clearance	.004" - .008"
Bearing Diameter	2.751" - 2.752"
Journal Diameter	2.748" - 2.749"
Bearing Clearance	.002" - .004"
Adjustment	Replaceable Inserts
Bearing Torque	90 - 95 ft. lbs.

CONNECTING ROD

Type	Offset
Bearing	Precision Inserts
Bearing Length	1.219" - 1.229"
Journal Length	1.436" - 1.439"
Rod Width	1.428" - 1.430"
Side Clearance	.006" - .011"
Bearing Diameter	1.938" - 1.939"
Journal Diameter	1.936" - 1.937"
Bearing Clearance	.001" - .003"
Adjustment	Replaceable Inserts
Rod Length (Center to Center)	6-1/2"
Nut Torque	35 to 40 ft. lbs.
Clamp Screw Torque	35 to 40 ft. lbs.
Pal Lock Nut Torque	40 to 60 in. lb.

CYLINDER LINERS

Liner Stand Out	.002" - .005"
Inside Diameter	3.4995" - 3.5005"

PISTON

Type	Cam Ground
Cam Ground	.0085" - .0095"
Material	Cast Aluminum
Skirt Dia. (Large)	3.497"
Skirt Dia. (Small)	3.485"
Ring Groove Width	
(3 Comp)	.1255" - .1256"
Ring Groove Width	
(1 Oil)	.1875" - .189"
Skirt Clearance	
(Large Dia.)	.0015" - .003"
Pin Bore	.8139" - .8141"

Measurements to be taken at bottom of Skirt

PISTON PIN

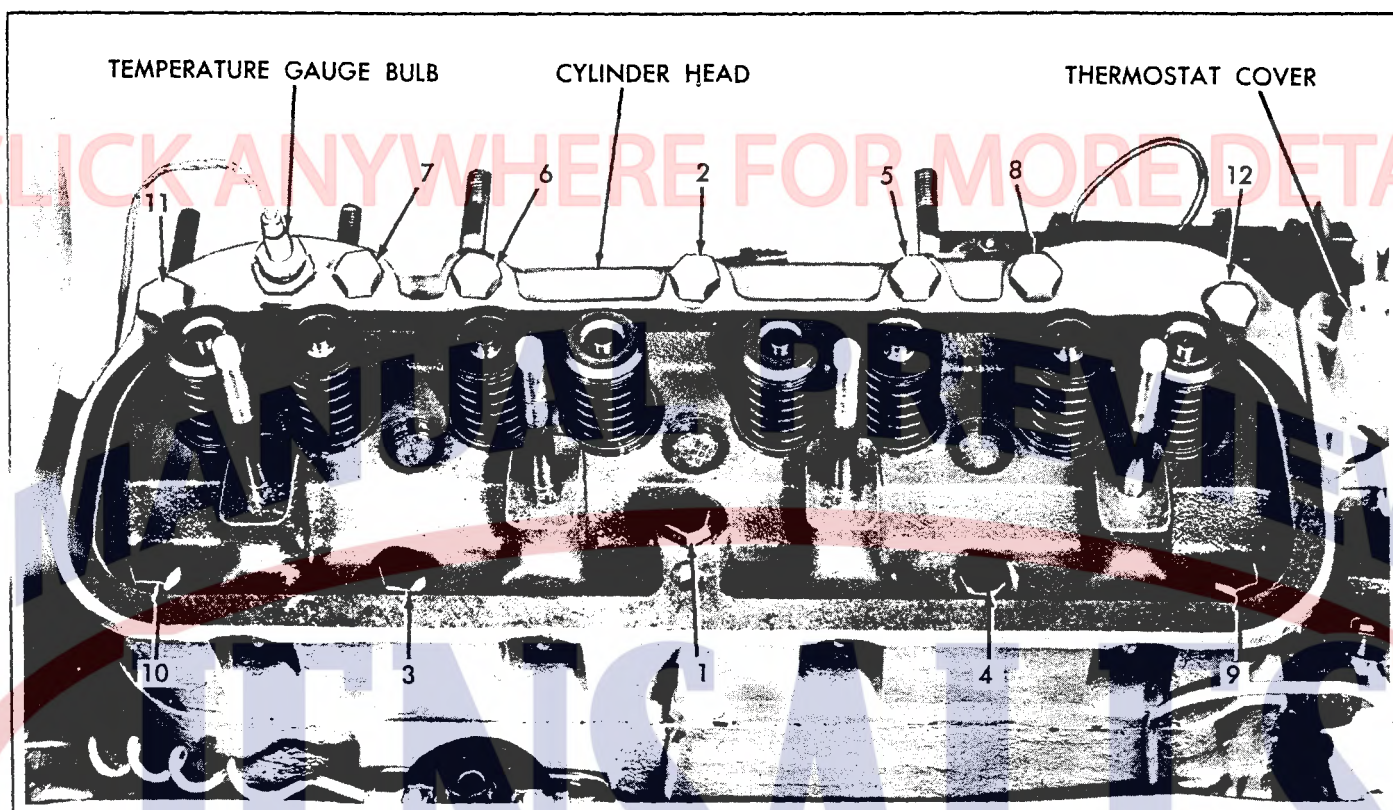
Pin Length	2-7/8"
Pin Diameter	.8133" - .8135"
Pin Clearance	.0004" - .0006"®
Clearance With Piston and Pin at 70°F.	

PISTON RINGS

Ring Gap (Comp.)	.010" - .020"
Ring Gap (Oil) (3 Piece)	.015" - .055"
Ring Width (Comp.)	.123" - .124"
Ring Width (Oil) (3 Piece)	.186" - .1865"
Ring Groove Clearance	.001" - .003"
Compression Rings have a Tapered Face, and Must be Installed With the Word "TOP" Toward Top of Piston.	

VALVES

Exhaust Diameter	1.313" - 1-5/16"
Intake Diameter	1.438" - 1-7/16"
Stem Diameter	.3407" - .3417"
Guide Diameter Inside	.344" - .345"
Stem Clearance	.0023" - .0043"
Seat Angle	45°
Margin	1/16"
Seat Width	1/32"
Spring Length	2-31/64"
Exhaust Seat Insert Dia.	1.4415"
Intake Seat Insert Dia.	1.540"
Tappet Clearance Hot	
Intake	.008" - .010"
Exhaust	.014" - .016"



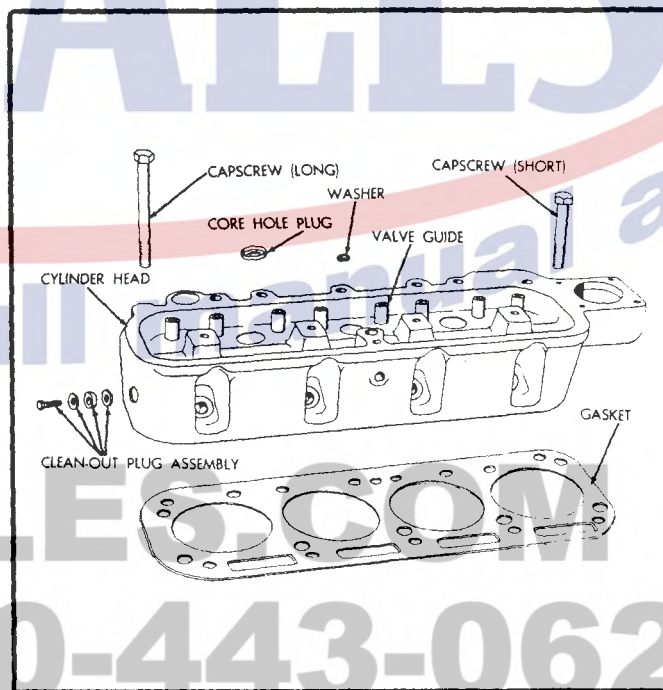
TORQUE SEQUENCE

REMOVAL

Remove radiator and cylinder block. Remove hood. Remove air cleaner. Shut off fuel and remove fuel line from carburetor. Remove the choke control rod. Remove the manifold, muffler and carburetor all in one assembly. Remove temperature gauge pellet from cylinder head. Remove the upper radiator hose, and thermostat by-pass hose. Remove valve cover, rocker arm shaft assembly and push rods. Remove cap-screws attaching head to block and remove cylinder head.

ASSEMBLY (149) Engine Prior To Tr
S/N-6959

When reinstalling cylinder head, be sure gasket surface of head and block is perfectly clean. Install a new gasket using sealer on both sides of gasket. The gasket and head is easier to locate to block if two dowel studs are used. There are eight long and four short capscrews for attaching cylinder head to block. Install capscrews and tighten from 80 to 85 ft. lbs. torque. Start tightening at center of head and work back and forth toward each end of head.


ASSEMBLY (160) Engine - Eff W/Tr S/N-
6959

When reinstalling cylinder head, be sure gasket surface of head and block is perfectly clean. The gasket and head are easier to locate to block if two dowel studs are used. There are eight long and four short

INDEX

CARBURETOR

ADJUSTMENT	B-9
ASSEMBLY	B-7
High Angle Carburetor	
TSX 879/TSX 912	B-8
GENERAL PRINCIPLES OF OPERATION	B-2
Choke System	B-5
Float System	B-3
Idle System	B-4
Power Fuel Feed System	B-5
REMOVAL OF CARBURETOR	B-6



MANUAL PREVIEW

JENSALES®

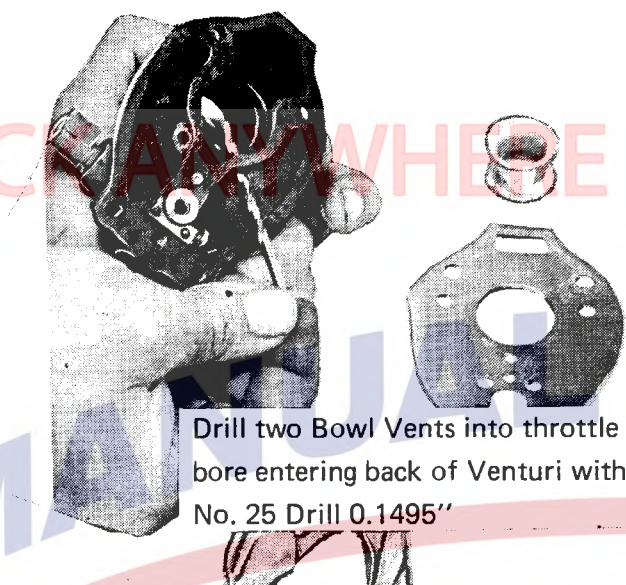
purchase full manual at

JENSALES.COM

or Call 800-443-0625

CLICK ANYWHERE FOR MORE DETAILS

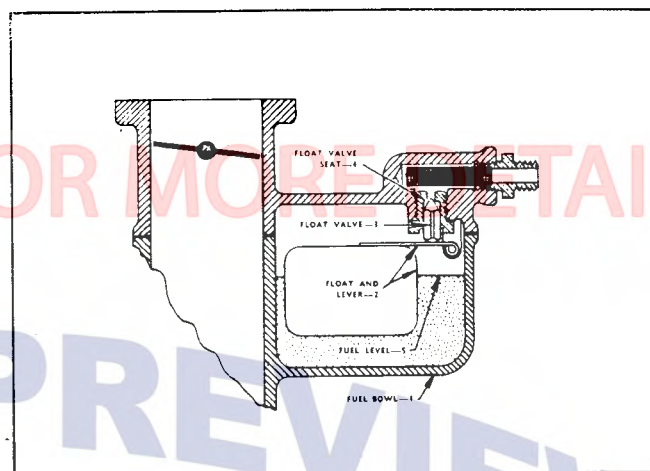
FLOAT SYSTEM



FLOAT SYSTEM

The float system controls the level and supply of gasoline in the fuel bowl throughout the operating range of the engine.

When the fuel bowl (1) is empty the float and lever (2) and float valve (3) drop and fuel under pressure from the fuel pump (or gravity feed) is forced through the float valve seat (4) around the float valve (3) and into the fuel bowl (1). As the fuel in the bowl approaches the correct operating level it raises the float and lever (2) with enough force to raise the float valve and cut off the flow of fuel into the bowl. As fuel feeds through the carburetor jets into the engine, the fuel level (5) drops, allowing additional fuel to enter the fuel bowl.



Float System

Under actual operating conditions the fuel level (5) and float and lever (2) automatically position themselves so that the inward flow of gasoline to the carburetor is equal to the outward flow of gasoline to the engine.

As can readily be seen the float system under the most favorable of operating conditions is subjected to a certain amount of wear. Under severe conditions or conditions that result in excessive vibrations being transmitted to the carburetor, float valve seat wear is accelerated.

It should be an established policy that whenever the carburetor is disassembled for whatever cause the service man make the following checks:

1. Examine float valve for any signs of wear. If it is not absolutely true or is grooved and hasn't a perfect taper, a new float valve and also a new float valve seat must be used. These float valves and seats are supplied in matched sets and are tested at the factory for leaks. Always use a new float valve seat gasket to make sure of a perfect seal.
2. Examine float for any signs of failure. To test metal float submerge float in pan of hot water and if air bubbles are observed, replace with new float.

Examine cork float for bare places or cracks in coating. If either are found, or if float shows evidence of having been soggy, replace with new one. (Do not attempt to recover float with shellac or varnish.)

INDEX

DIESEL ENGINE

ENGINE REMOVAL AND DISASSEMBLY

Camshaft	C-7
Connecting Rods	C-13
Crankshaft	C-14
Cylinder Head	C-16
Cylinder Liners	C-10
Flywheel	C-16
Oil Pressure Relief Valve	C-19
Oil Pump	C-22
Oil Sump	C-20
Rear Oil Seal and Adaptor Plate	C-22
Rocker Arm Shaft	C-18
Thermostat	C-8
Timing Gear and Cover	C-25
	C-11

SPECIFICATIONS (D175 ENGINE)

Fits and Tolerances of New Parts	C-23
	C-4

TROUBLE SHOOTING

Air Intake System	C-26 - C-30
Cooling System	C-32
Electrical System	C-32
Engine	C-35
Fuel System	C-79 - C-82
Lubricating System	C-31
	C-33

JENSALES.COM

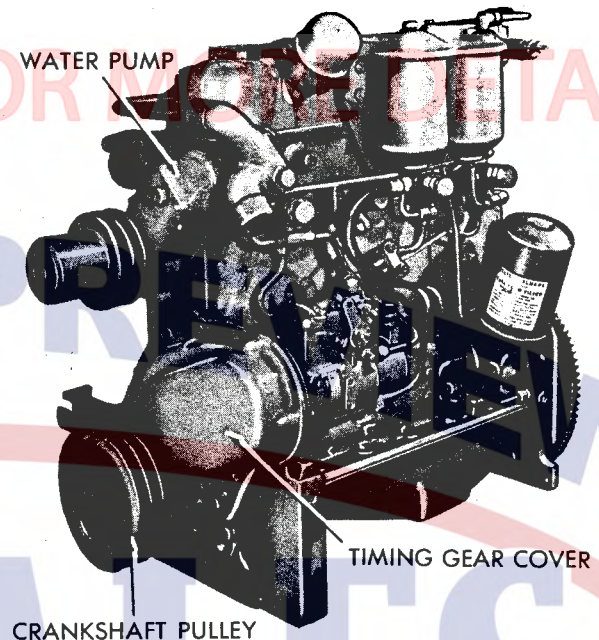
or Call 800-443-0625

TIMING GEAR COVER

REMOVAL

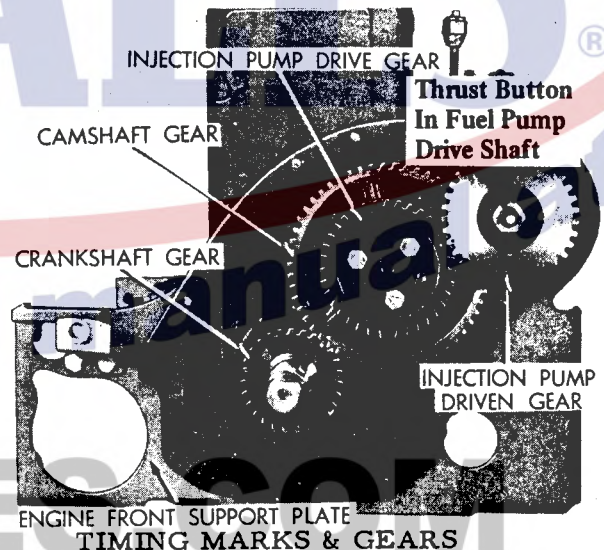
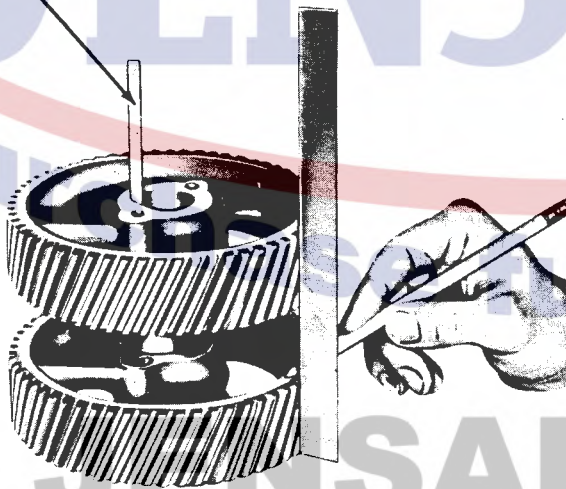
Remove the nut from end of crankshaft, and pull the pulley from shaft. The clearance between pulley and shaft may be from .000" to .002" loose, making the use of a puller unnecessary.

Remove the capscrews retaining the timing gear cover to engine block and remove cover. Replace the front crankshaft oil seal in place in gear cover. The gear cover is located to engine block by two dowel pins, therefore, the oil seal should be properly centered to crankshaft when the gear cover is installed. Tighten the capscrews from 18 to 21 ft. lbs. torque. Tighten the pulley nut at end of crankshaft from 250 ft. lbs. torque.



TIMING GEARS

LONG KEY THROUGH BOTH GEARS



The timing gears should be checked for backlash with a dial indicator. The gears should be replaced if backlash exceeds .008" or more. Backlash between mating gears should be .001" to .005" with new parts. The gears are a press fit to the shafts and may be replaced if necessary. The gears are marked. These marks must be aligned during assembly.

The fuel injection pump drive gear is attached to the camshaft gear hub with dowel pin and capscrews. This gear meshes with (and drives) the driven gear on the injection pump shaft. These two gears are of the same size, therefore, the pump drive shaft turns at engine camshaft speed which is one half engine speed.

THRUST BUTTON

The thrust button must be installed in fuel injection drive shaft. This button controls the drive shaft end thrust.

INDEX

FUEL INJECTION PUMP
ROOSA MASTER MODEL "DB" PUMP

AIR TIMING	D-30
AIR OR ENERGY CELL	D-30
DISASSEMBLY	D-11
DRIVE SHAFT (INJECTION PUMP)	D-23
GENERAL TESTS AND BENCH TESTS	D-25 - D-27
INSTALLATION	D-29
FUEL SYSTEM	D-2
Construction and Operation	D-5
A. Components	D-5
B. Fuel Flow	D-6
C. Charging and Discharging	D-7
(Delivery Valve Type Rotor)	
D. Delivery Valve Function	D-7
E. Return Oil Circuit	D-8
F. End Plate Operation	D-9
G. Centrifugal Governor	D-10
PARTS INSPECTION	D-15
PRIMING PUMP	D-30
REASSEMBLY (STEPS 1 THRU 22)	D-17 - D-23
TRANSFER PUMP (DISASSEMBLY)	D-14
Metering Valve	D-13
NOZZLE HOLDER AND NOZZLE	D-31

FUEL INJECTION

ROOSA MASTER MODEL "DB" PUMP

This section is expressly intended to provide sufficient information for qualified technicians experienced in diesel engines and diesel injection equipment to disassemble and assemble the Roosa Master Fuel Injection Pump and to make such adjustments and parts replacements as may be needed. It is recommended that an inexperienced person refrain from making adjustments and repairs, as such action may result in very extensive damage to the pump and possibly to the engine.

No services should be performed on the pump before making a careful study of this section and becoming familiar with the principles and instructions which follow.

This section completely describes the operating principles of the various mechanism of the pump itself as well as its accessories.

Only through a thorough knowledge of these principles of the various mechanisms of the pump itself as well as its accessories can the service man locate and correct possible operational faults.

INDEX

ELECTRICAL SYSTEM

BATTERY	E-2
Charging	E-5
Maintenance and Service	E-3
Operation	E-2
Specifications	E-2
Testing	E-4
GENERATOR	E-15
Disassembly and Testing	E-15
Reassembly and polarizing	E-17
REGULATOR	E-20
Adjustment	E-26
Action (Load Checks)	E-23
Current Operation and Cut-out Relay Action	E-21
Current Voltage Regulator Action	E-22
Electrical Check	E-25
STARTING MOTOR GAS AND DIESEL	E-6
Cranking Motor Tests	E-7
Disassembly	E-8
Operation	E-6
Reassembly	E-9
WIRING DIAGRAM	
Diesel	E-31
Gas	E-32

JENSALES.COM

or Call 800-443-0625

INDEX

TORQUE HOUSING - SHUTTLE CLUTCH

TORQUE HOUSING

ASSEMBLY AND ALIGNMENT PROCEDURE	F-11
ENGINE CLUTCH SHAFT	F-4
HOLLOW SHAFT W/GEARS.	F-2
IDLER SHAFT AND GEARS	F-7
INTERMEDIATE SHAFT AND GEARS	F-9
PIVOT AXLE BRACKET AND BUMP STOP BRACKET	F-13
POWER TAKE OFF SHAFT (FRONT)	F-6

SHUTTLE CLUTCH

ASSEMBLY	F-19
LEVER ADJUSTMENT	F-17
POWER DIRECTOR.	F-19
REMOVAL AND DISASSEMBLY	F-18

JENSALES.COM

or Call 800-443-0625

INDEX

TRANSMISSION ASSEMBLY

GEAR SHAFT

Assembly and Removal	G-5
Cover	G-3
Forward and Reverse Transmission	G-3
4 Speed and Power Director	G-4

HOUSING	G-7
-------------------	-----

MAINSHAFT AND GEARS	G-12
-------------------------------	------

POWER TAKE OFF	G-16
Driven Shaft	G-16
Idler Shaft and Gears	G-16

PINION SHAFT AND GEARS	G-10
----------------------------------	------

REAR PTO - SHAFT OIL SEAL	G-14
-------------------------------------	------

REVERSE IDLER GEAR	G-13
------------------------------	------

STANDARD AND POWER DIRECTOR TRANSMISSION GEARS	G-9
--	-----

purchase full manual at  G

JENSALES.COM
or Call 800-443-0625

INDEX

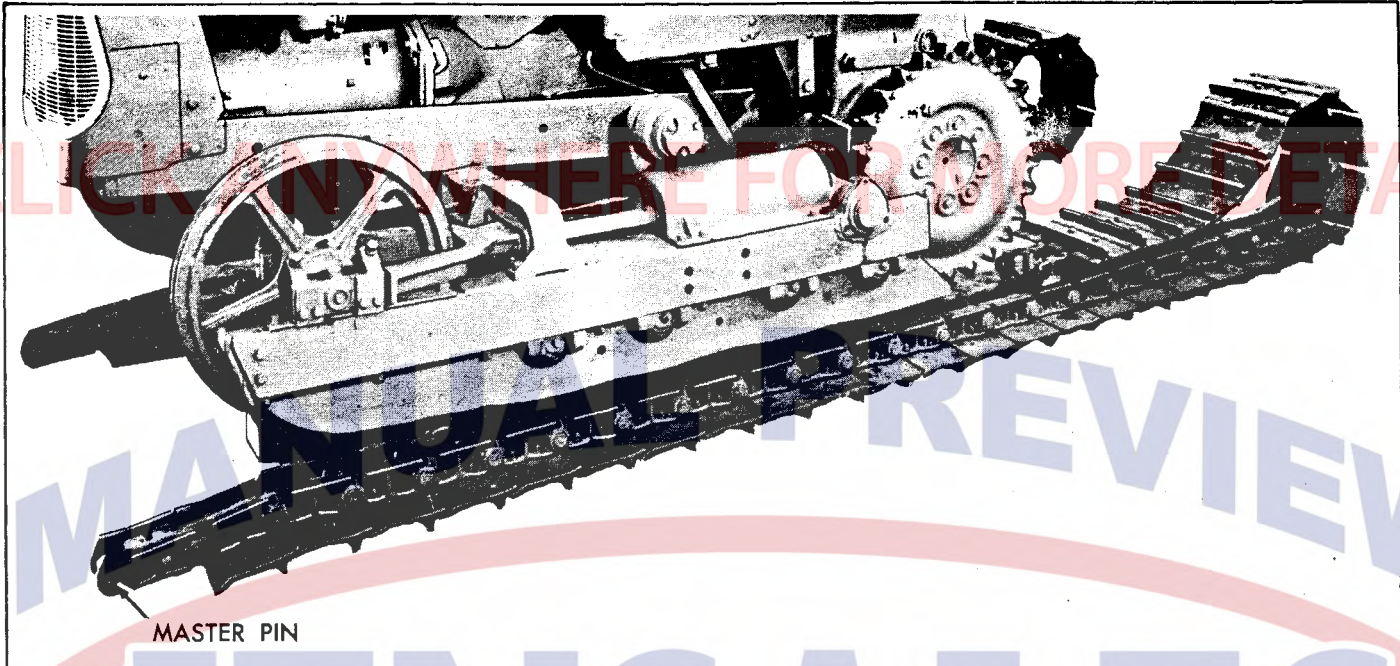
TRACKS AND UNDERCARRIAGE

FRONT IDLER (EFF. w/H-3 - HD-3 S/N 8298)	I-23 - I-25
LUBRICATION	I-2
SPROCKET	I-11 - I-16
TRACK FRAME	I-26
TRACK AND UNDERCARRIAGE	
Adjustment	I-6
Wear Gauge	I-7
Alignment	I-22
Dimensions	I-27
Idler Wear Pattern Gauge	I-3 - I-6
Roller Frame	I-13
Removal	I-12
Support Rollers	
Prior to S/N (8298)	I-19
Eff. w/H-3 S/N (8298)	I-20
Tension Spring	I-17

purchase full manual at

JENSALES.COM
or Call 800-443-0625

CLICK ANYWHERE FOR MORE DETAILS



Block tractor securely under the front cross member and the drawbar bail. Locate the master track pin. It may be identified because it is 5/16" longer than the regular track pins. Release the left steering clutch and apply brake. Roll track around until master pin is at front on right hand track. Release right hand steering clutch and apply brake. Roll left track until master pin is at front.

Remove the inner and outer front idler guards. Remove the track shoes (2) on either side of the master pin so that the OTC puller may be installed. Press master pin from track.

If the track pin is worn it may catch on the track rail. In this event when the pin is half way out, rotate pin 180° to put the unworn side against the track weight.

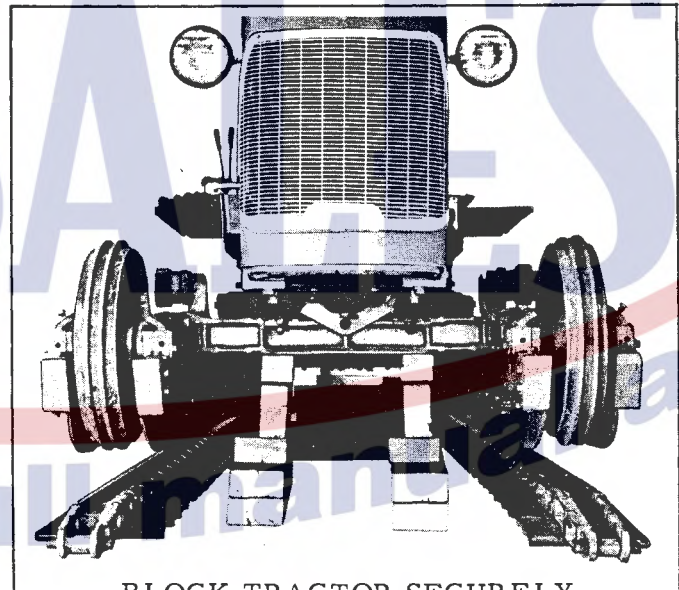
If the pin is to be removed with a sledge hammer and punch, turn the track adjusting screw back to give the track extra slack. Place a block under the grouser lug. (Do not remove track shoes). Use the power of the tractor and force the track against the block to remove all tension from the track pin.

Protect the eyes with safety goggles as the track pins are glass hard and there is danger of flying metal.

Back up the inside track rail with a heavy bar at least 110 lbs. weight. This is to prevent spreading of the rails. If the rails spread it will tighten the pin making it almost impossible to remove.

TRACK INSTALLATION

The track is usually replaced as a last operation



—BLOCK TRACTOR SECURELY—

when the tractor may be operated. Place the track under tractor with both tracks spaced evenly and with the bushing end to the front. The front idler must be back far enough to give track extra slack. Let tractor down on the tracks and back up to the end of track.

Insert a bar through the pin hole and pick track up and catch bar in rear sprocket tooth. Hold in this position and drive tractor forward. Feed track over support roller and front idler. Place a block under the front shoe grouser so that it is supported about 10 inches from floor. Drive tractor forward until all slack is in the top of the track. Lap the two ends and insert the master pin. If the pin hole does not align, place a chain through the track rail, and with a bar through the chain and under the first grouser pull the slack ends of the track together to align pin holes.

INDEX

HYDRAULIC PUMP

DRIVE AND MOUNTING

Eff. w/Tractor S/N 8694 and up	J-5
--	-----

FLO RATING (2 STAGE PUMP)

J-15

GENERAL INFORMATION

J-2

IDENTIFICATION AND PUMP REFERENCE NUMBERS

J-2

PUMP

Inspection	J-11
Alignment	J-11
Bearings	J-11
Dimensions Inspection	J-14
Drive Shaft and Seals	J-11
Gears and Gear Plate	J-12 - J-13
Rings (Sealing, Loading and Backup)	J-12
Wear Plate	J-12

SINGLE STAGE 11.5 GPM PUMP

J-9

Removal, Disassembly and Assembly	J-9
---	-----

2 STAGE 11.5 – 6 GPM PUMP

J-6

Removal, Disassembly and Assembly	J-6
Seals (End Section)	J-7

2JDS2-L, 4JDS3-L and 4JDS2-L

J-3

Removal, Disassembly and Assembly	J-4
---	-----

TYPICAL PERFORMANCE CURVES

J-16

2JDS2-L Pump	J-16
4JDS3-L Pump	J-17
IYDS6/IYID6-LB Pump	J-17
IYDS6/OYD6-LB Pump	J-18

INDEX

HYDRAULIC CYLINDERS
SERVICE INFORMATION

1066 LOADER, 1003 SCARIFIER AND ATTACHMENTS	L-2
(w/Threaded Piston)	
Assembly	L-4
Removal and Disassembly	L-2
1080, 1081 AND 1090 DOZER	L-6
(Lift, Angle and Hydraulic Till Cylinders)	
Removal, Disassembly and Assembly	L-6

MANUAL PREVIEW

JENSALES®

purchase full manual at

JENSALES.COM

or Call 800-443-0625

CLICK ANYWHERE FOR MORE DETAILS

