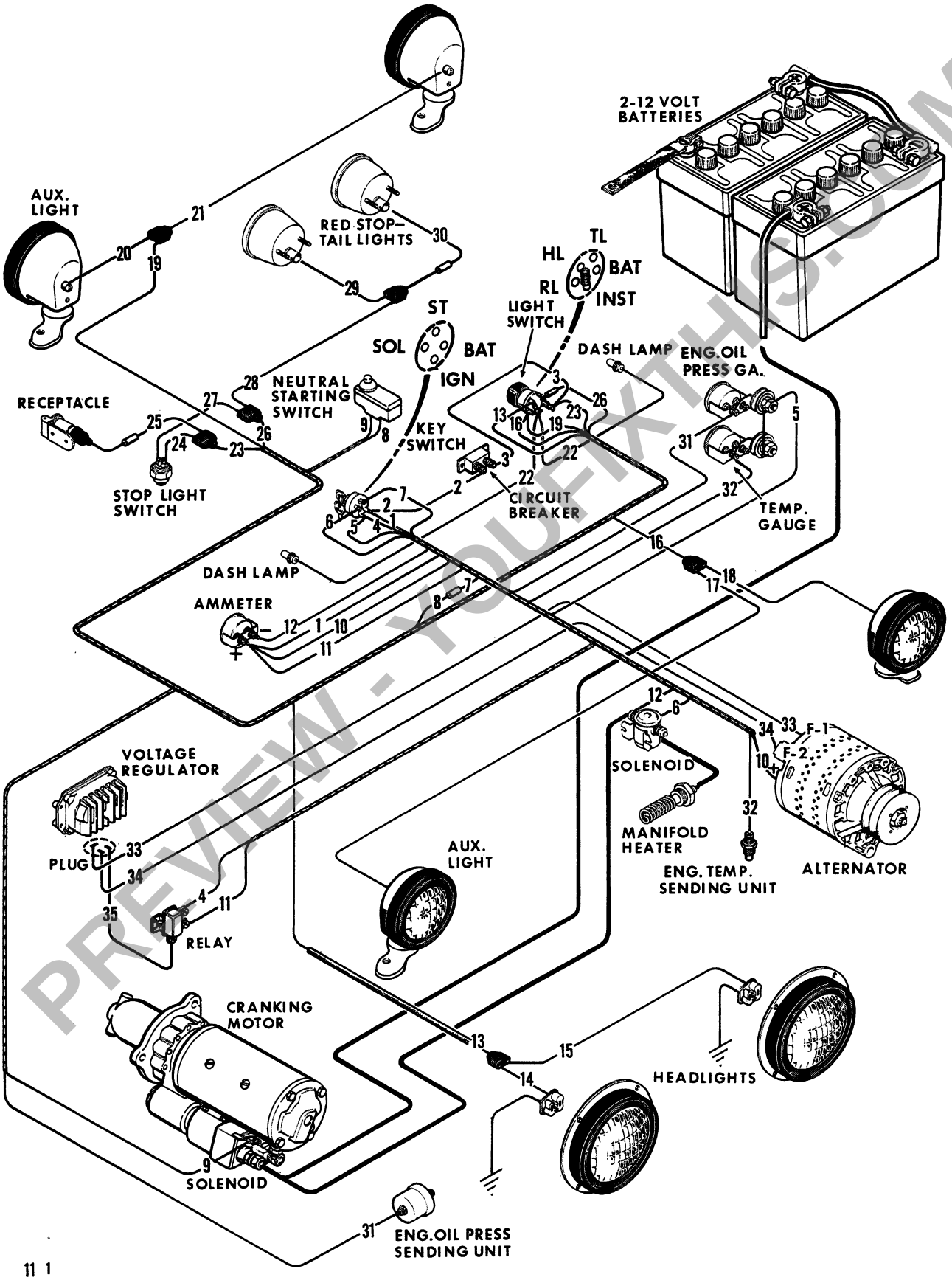
WIRING DIAGRAM
SERIAL NUMBER 9800221 AND AFTER



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A451 ENGINE SPECIFICATIONS

Type ---------- CASE Full Diesel, 6 Cylinder 4 Stroke Cycle Valve-in-Head Engine.

Cylinder Heads ---------- Multiple Cylinder Heads can be removed individually for Servicing(2 cylinders per head).

Firing Order ---------- 1-5-3-6-2-4

Bore
A451 ---------- 4-3/8 Inches

Stroke ---------- 5 Inches

Piston Displacement
A451 ---------- 451 Cubic Inches

Compression Ratio ---------- 15 to 1

Oil Filter, Crankcase ---------- Replaceable Full Flow Element Type.

Method of Starting Diesel Engine ---------- Engine Starts on Diesel Fuel (Electric Starting Motor).

Exhaust Valve Rotators ---------- Positive Type

Maximum Compression Pressures
ENGINE WARMED UP TO OPERATING TEMP. AND RUNNING AT 1600 RPM

Altitude	Sea Level	1000 ft.	2000 ft.	3000 ft.	4000 ft.	5000 ft.
Compression Pressure	480 to 510 PSI	455 to 485 PSI	435 to 465 PSI	415 to 425 PSI	395 to 425 PSI	375 to 405 PSI

Allowable Variance Between Cylinders - 25 Pounds Pressure at 1600 RPM

CYLINDER SLEEVES

Type ---------- Replaceable Wet Type:Two Rubber O-Ring Seals carried on each sleeve.

Inside Diameter of Sleeve Bore
A451 ---------- 4.375 to 4.376 Inches. Replace Sleeve when inside Diameter below Top Ring Ridge Exceeds 4.383 Inches.

Piston Clearance in Sleeve (At Skirt)
A451 ---------- .004 to .005 Inches

Cylinder Sleeve Out-of-Round ---------- Max. .002 Inch

PISTON AND PISTON PINS

Piston Material
A451 ---------- Aluminum

Piston Weight (Less Pin)
A451 ---------- 3.937 to 3.939 Pounds

Diameter of Piston at Top of Skirt (Below Oil Ring)
A451 ---------- 4.3635 to 4.3665 Inches

Diameter of Piston at Bottom of Skirt
A451 ---------- 4.3665 to 4.3675 Inches

Piston Pins ---------- Full Floating Type:Held in Position with Snap Rings in Piston. Replaceable Bronze Bushing in Connecting Rod.

Piston Pin Length
A451 ---------- 3.670 to 3.675 Inches

Piston Pin Diameter
A451 ---------- 1.4994 to 1.4995 Inches

Piston Pin Fit in Piston
A451 ---------- .0000 to .0003

Piston Pin Fit in Connecting Rod Bushing
A451 ---------- .0005 to .0010 Inch

PISTON RINGS

Rings Per Piston ---------- 4- (3 Compression and 1 Oil).

Compression Rings
Width of Ring (All 3) ---------- .0930 to .0935 Inch
Ring End Gap(All 3) when Compressed in 4.375 Inch Cylinder A451 ---------- .013 to .025 Inch

Side Clearance in Groove of 1st (Top)Ring
A451 ---------- .0045 to .0060 Inch

Side Clearance in Groove of 2nd and 3rd Ring ---------- .0025 to .004 Inch

Oil Ring ---------- To install Replacement Ring, Follow Instructions Packed with Rings.

Width of Rings (Original Equipment)
A451 ---------- .2470 to .2490 Inch

Replacement Ring ---------- .2441 to .2474 Inch

Side Clearance in Groove(Original Equipment)
A451 ---------- .0025 to .0085 Inch

Replacement Ring
A451 ---------- .0025 to .0085 Inch

CONNECTING RODS

Connecting Rod Bushing ---------- Replaceable Bronze Bushing Replacement Bushing must be Reamed.
A451 ---------- Use 1.5004 to 1.5008 Reamer

Piston Pin Hole Diameter in Rod (Without Bushing)
A451 ---------- 1.686 to 1.688 Inches

Inside Diameter of Piston Pin Bushing in Rod
1.5004 to 1.5008 Inches. Install New Bushing if inside Diameter Exceeds 1.504 Inches.

Connecting Rod Bearing ---------- Replaceable, Precision, Steel Backed Copper Lead Alloy Liners.

Connecting Rod Capscrews ---------- Self Locking Type, No. Lock Wires Required May be used More Than Once.

Connecting Rod Length (Center to Center Between Pin Hole and Bearing Journal Hole) ---------- 10.499 to 10.501 Inches

Bearing Liner Width ---------- 1-5/8 Inch

Diameter of Crankshaft Journal Hole in Rod(Without Liner) ---------- 2.9005 to 2.9010 Inches

Inside Diameter of Bearing Liner(Standard Liner in place in Rod and Capscrews Tight) ---------- 2.7503 to 2.7518 Inches

Diameter of Crankshaft Rod Journal ---------- 2.748 to 2.749

Clearance Between Rod Bearing and Crankshaft Journal ---------- .0013 to .0038 Inch; Install New Bearing Liners When Clearance Exceeds .006 Inch.

Undersize Bearing Liners Available for Service ---------- .002,.010,.020,.030 Inch

Allowable Connecting Rod Bearing End Play ---------- .005 to .012 Inch

CRANKSHAFT AND MAIN BEARINGS

Crankshaft ---------- Balanced; Drilled to Provide Pressure Lubrication to Main and Connecting Rod Bearings.

Type Main Bearings ---------- Replaceable, Precision, Steel Backed Copper - Lead Alloy Liners.

Bearing Capscrews ---------- Self Locking Type, No Lock Wires Required May Be Used More Than Once.

Bearing Taking End Thrust ---------- 5th(Two Replaceable Bronze Thrust Washers.)

Crankshaft End Play(Measured at No. 5 Main Bearing) ---------- .004 to .012 Inch;Install New Thrust Washers if End Play Exceeds .020 Inch.

Oversize Thrust Washers for End Play Available for Service ---------- .006 Inch

Connecting Rod Bearing Journal Diameter ---------- 2.748 to 2.749 Inches

Main Bearing Journal Diameter ---------- 2.998 to 2.999 Inches

Crankshaft Main and Connecting Rod Journal Bearings out of Round ---------- Maximum .001 Inch

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REMOVAL OF CYLINDER HEAD AND COMPONENTS (Refer to Figure K-1)

Steam clean the engine completely before doing any disassembly or service work. Drain the cooling system. Remove the intake, exhaust and water manifolds. Remove the rocker arm covers. Disconnect and remove the decompressor if so equipped (Refer to Page K-4).

Remove the rocker arm assemblies and tag or mark them for proper installation. (Refer to Page K-6).

Disconnect the high pressure fuel lines to the injectors and cap them. Disconnect the fuel leak-off tubes between each cylinder head and cap them.

Remove the push rods and tag or store them in a holder or rack so they can be installed in their same locations.

Remove the cylinder head bolts or nuts and lift the heads off the engine. Remove the head gaskets and discard them.

INSTALLATION (Refer to Figure K-1)

Remove all carbon and clean all parts before installation. Install new cylinder head gasket with new rubber seals. ***IMPORTANT*** Gasket must be installed with either the copper side up or the side with the Case part number up. Install cylinder head in its original location. Install cylinder head bolts or nuts finger tight. Install intake and exhaust manifold ferrules and new gaskets. (Refer to Inset B). ***NOTE*** When the manifolds are designed for the one piece manifold gasket, the ferrules are used only in the intake ports.

Coat the water manifold gaskets with permatex and install them. Install intake, exhaust and water manifold, nuts and bolts finger tight. Torque the head bolts or nuts to the proper torque. Refer to "Specification" Section. Follow the tightening sequence shown in Inset A. Use special box end wrench Case part number 010316AB.

Torque the manifold bolts and nuts. Refer to the "Specification" Section for proper torque. Install the push rods in their original locations. Connect the high pressure fuel lines and fuel leak-off tubes. Install the rocker arm assemblies in their original locations.

Install the decompressor assembly if equipped. Refer to the "Specification" Section for proper torque of the mounting bolts. Adjust the valve tappet clearances (Refer to Page K-14). Fill the cooling system and start the engine. Check that the rocker arms are receiving lubrication. Operate the engine at 1/2 throttle until it reaches proper operating temperature. Continue to run the engine for 45 minutes. Stop the engine and torque the head bolts or nuts while the engine is still hot. Check and readjust the tappet clearances.

Clean the rocker arm covers and remove the old gasket. Install new gaskets and seals and install covers. Refer to "Specification" Section for proper torque. Do not over torque the valve cover nuts.

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WIRING CODE

From	To	Color
1. Key Switch "Bat"	Ammeter "+"	Orange
2. Key Switch "Bat"	Circuit Breaker "B"	Black
3. Circuit Breaker "Aux."	Light Switch "Bat"	Black
4. Key Switch "IGN"	Field Relay	Purple
5. Key Switch "IGN"	Oil Pres. Gauge Resistor	Purple
6. Key Switch "SOL"	Heater Solenoid	Yellow W/Black
7. Key Switch "ST"	Connector	White
8. Connector	Neutral Start Switch	White
9. Neutral Start Switch	Cranking Motor Solenoid	White
10. Ammeter "+"	Alternator"+"	Orange
11. Ammeter "+"	Field Relay	Orange
12. Ammeter "-"	Heater Solenoid	Red
13. Light Switch "HL"	Front Light Conn.	Pink
14. Front Light Conn.	R.H. Front Light	Black
15. Front Light Conn.	L.H. Front Light	Black
16. Light Switch "RL"	Front Aux. Light Conn.	Dark Blue
17. Front Aux. Light Conn.	R.H. Front Aux. Light	White
18. Front Aux. Light Conn.	L.H. Front Aux. Light	White
19. Light Switch "RL"	Rear Aux.Light Conn.	Dark Blue
20. Rear Aux. Light Conn.	R.H. Rear Aux. Light	White
21. Rear Aux. Light Conn.	L.H. Rear Aux. Light	Black
22. Light Switch "INST"	Panel Lights	Black
23. Light Switch "B"	Rec. & Stop Light Switch Conn.	Red
24. Rec. & Stop Light Switch Conn.	Stop Light Switch	Red
25. Rec. & Stop Light Switch Conn.	Receptacle	Red
26. Light Switch "T" Resistor	Tail Light Conn.	Yellow
27. Tail Light Conn.	Stop Light Switch	Red
28. Tail Light Conn.	Tail Light Conn.	Yellow
29. Tail Light Conn.	R.H. Tail Light	Black
30. Tail Light Conn.	L.H. Tail Light	Yellow
31. Eng. Oil Press. Gauge	Eng. Oil Press. Sending Unit	Brown
32. Coolant Temp. Gauge	Coolant Temp. Sending Unit	Blue
33. Regulator Plug	Alternator F-1	Blue
34. Regulator Plug	Alternator F-2	Black
35. Regulator Plug	Field Relay	Red

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Maximum Allowable Taper on Crankshaft Rod Journal ---------- .002 Inch

Inside Diameter of Main Bearing Liners (In Place and Capscrews Tight) ---------- 3.0006 to 3.0026 Inches

Clearance Between Main Bearing Liner and Journal ---------- .0016 to .0046 Inch; Install New Bearing Liner when Clearance Exceeds .0065 Inches.

Width of 1st, 3rd 5th and 7th Main Bearing Liners ---------- 2-7/32 Inches

Width of 2nd, 4th and 6th Main Bearing Liners ---------- 1-5/32 Inches

Width Between Crankshaft Main Bearing Cheeks

A. 3rd, 7th ---------- 2.620 to 2.630 Inches

B 2nd, 4th and 6th ---------- 1.5575 to 1.5675 Inches

C. 5th ---------- 2.624 to 2.626 Inches

Width Between Crankshaft Rod Bearing Journal Cheeks ---------- 1.9975 to 2.0025 Inches

Undersize Main Bearing Liners Available for Service ---------- .002,.010,.020,.030 Inch

Crankshaft Main Bearing Journals Should Be
2.988-2.989 Inches for .010 Inch Undersize Bearing
2.978-2.979 Inches for .020 Inch Undersize Bearing
2.968-2.969 Inches for .030 Inch Undersize Bearing

Undersize Connecting Rod Bearing Shells Available for Service ---------- .002,.010,.020,.030 Inch

Connecting Rod Crankshaft Journals Should Be Ground to ------- 2.738-2.739 Inches for .010 Inch Undersize Bearing
2.728-2.729 Inches for .020 Inch Undersize Bearing
2.718-2.719 Inches for .030 Inch Undersize Bearing

CAMSHAFT AND BUSHINGS

Number of Bearing Surfaces on Camshaft ---------- 5

Type Bushing ---------- Replaceable, Precision, Steel Backed Babbitt

Bushing Lubrication ------ Pressure Lubricated from Oil Pump; Camshaft Drilled to Provide Pressure Lubrication to Valve Rocker Arm Assembly, and to Timing Gear Train.

Diameter of Camshaft at Each Bearing Surface
A451 ---------- 2.246 to 2.247 Inches

Inside Diameter of Each Bushing (Measured when in Place in Block)
A451 ---------- 2.2484 to 2.5414 Inches

No. 1 (Front) Bushing Length ---------- 1-21/32 Inches

No. 2,3 and 4 Bushing Lengths ---------- 1-7/16 Inches

No. 5 Bushing Length (w/cup type Camshaft plug) ---------- 1-5/32 Inches

Camshaft End Play ---------- Automatically Taken Up by Spring Loaded Thrust Button in Front End of Camshaft. Camshaft Washer Provided Between Drive Gear and Front Bearing.

Camshaft Washer

Outside Diameter ---------- 3.240 to 3.260 Inches

Inside Diameter
A451 ---------- 2.250 to 2.260 Inches

Thickness ---------- .1225 to .1275 Inch

VALVE PUSH ROD LIFTERS

Type ---------- Mushroom Type

Outside Diameter of End that Projects into Block

A451 ---------- .8097 to .8102 Inch

Diameter of Bore in Block for Lifter ---------- .8115 to .8130 Inch

Oversize Lifter Available for Service ---------- .010 In. Oversize Lifter

Bore in Block Must Be Reamed to ------- .8215 to .8225 Inch for .010 Inch Oversize Lifter.

VALVES

Valve Tappet Clearance

*A451 ---------- .020 In., Engine Hot (Both Intake and Exhaust)

*Hot Settings Are Made At Low Idle After The Engine Has Operated At Thermostat Control Temperature For At Least Fifteen Minutes.

Exhaust Valves

Angle of Valve Face ---------- 44 Degrees

Valve Length ---------- 6.382 Inches

Maximum Valve Face Runout ----- .002 Inch as Determined with a Dial Indicator.

Diameter of Valve Stem --- .4000 to .401 Inch. Install New Valve if there is More than. 002 Inch Difference in Diameter at any Point on Stem.

Diameter of Valve Head ---------- 1.750 Inches

Inside Diameter of Valve Guide ----- .4045 to .4055 Inch (After Assembly).

Valve Stem Clearance in Guide ---------- .0035 to .0055 Inch

Exhaust Valve Seat Insert

Seat Angle ---------- 45 Degrees

Seat Contact Width ---------- .073 to .084 Inch

Insert Height ---------- .312 to .317 Inch

Outside Diameter of Insert
A451 ---------- 1.722 to 1.723 Inches

Inside Diameter of Insert
A451 ---------- 1.401 to 1.411 Inches

Maximum Allowable Seat Runout ---------- .002 Inch as Determined with a Dial Indicator

Intake Valves

Angle of Valve Face ---------- 44 Degrees

Valve Length ---------- 7.368 Inches

Maximum Valve Face Runout ---------- .002 Inch as Determined with a Dial Indicator.

Diameter of Valve Stem ---------- .402 to .403 Inch Install New Valve if there is More than .002 Inch Difference in Diameter at any Point on Stem.

Diameter of Valve Head ---------- 1.875 Inches

Inside Diameter of Valve Guide ---- .4045 to .4055 Inch. (After Assembly)

Stem Clearance in Guide ---------- .0015 to .0035 Inch

Intake Valve Seat

Seat Angle ---------- 45 Degrees

Seat Contact Width
A451 ---------- .070 to .086 Inch

Maximum Allowable Seat Runout ---------- .002 Inch as Determined with a Dial Indicator

Exhaust Valve Guides

Length ---------- 3-7/32 Inches

Outside Diameter ---------- .7510 to .7515 Inch

Inside Diameter ---------- .4045 to .4055 Inch. (After Assembly)

Valve Stem Clearance in Guide ---------- .0035 to .0055 Inch

Distance Above Head Guide Must Protrude --- 1-1/16 Inches, Press Fit

Intake Valve Guides

Length ---------- 4-3/8 Inches

Outside Diameter ---------- .7510 to .7515 Inch

Inside Diameter ---------- .4045 to .4055 Inch (After Assembly)

Valve Stem Clearance in Guide ---------- .0015 to .0035 Inch

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REMOVAL AND INSTALLATION OF CYLINDER HEAD AND COMPONENTS

CAUTION
DO NOT OVER TIGHTEN COVER NUTS

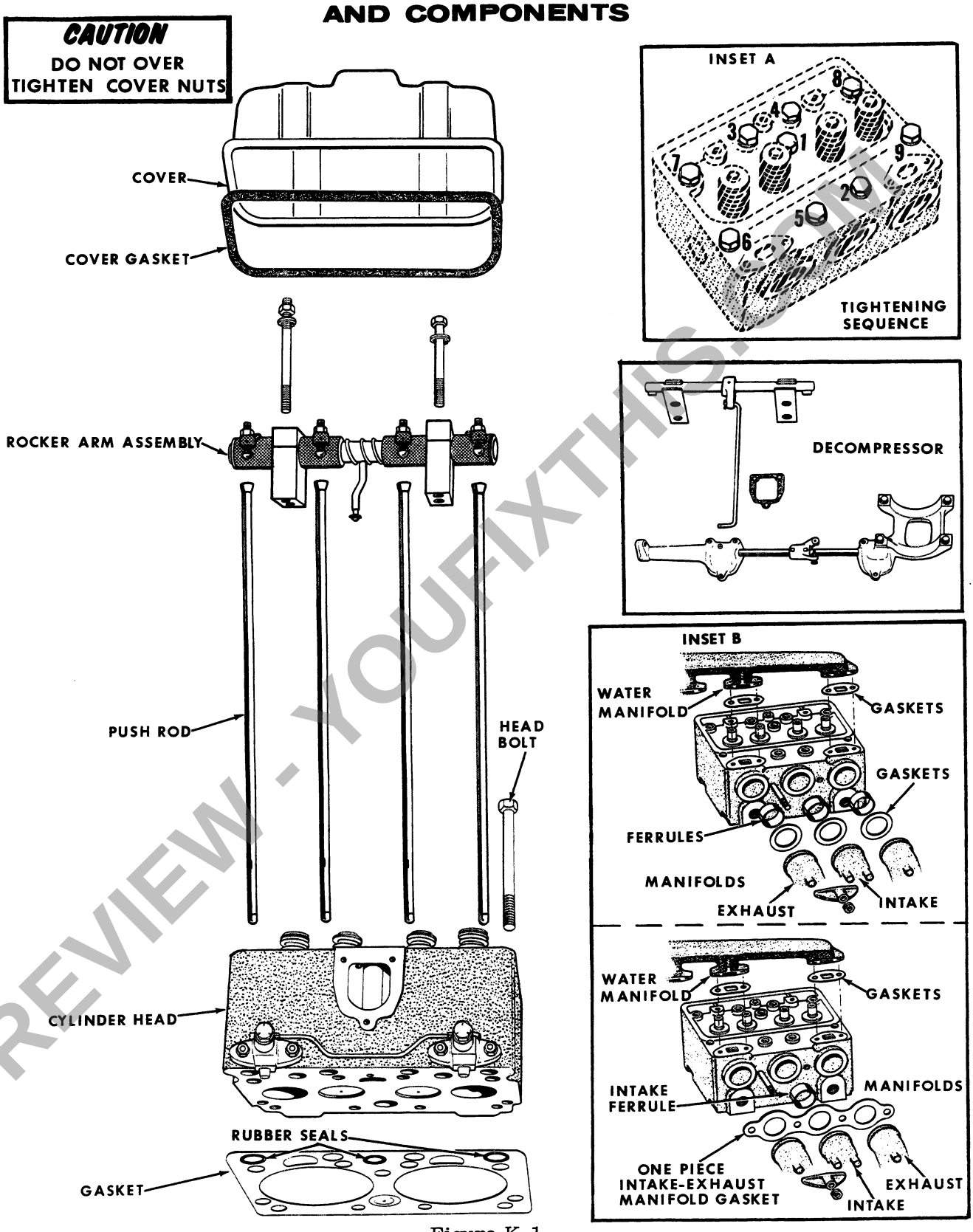
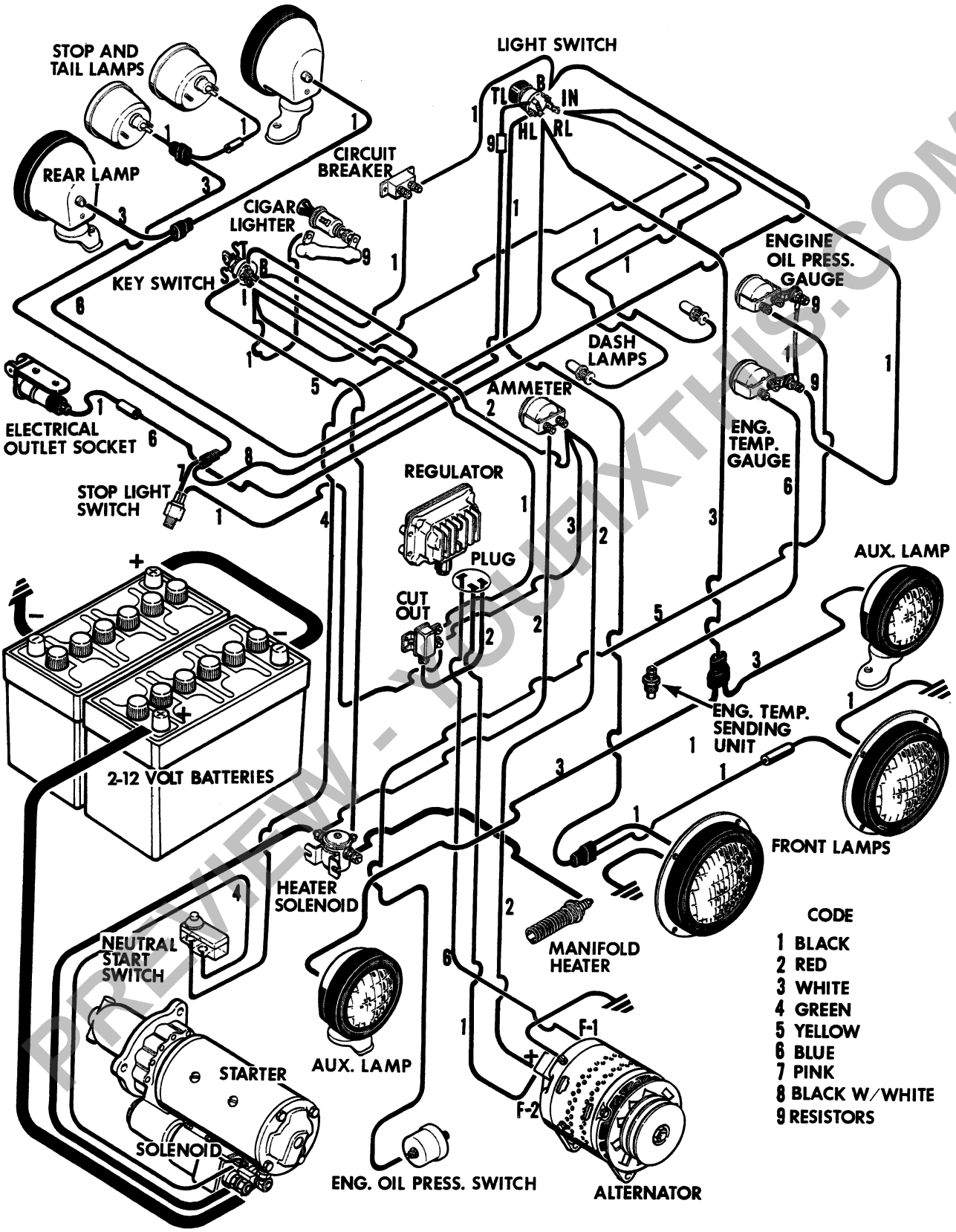


Figure K-1

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WIRING DIAGRAM
PRIOR TO SERIAL NUMBER 9800221



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Distance Above Head
Guide Must Protrude ---------- 1-1/16 Inches, Press Fit

VALVE SPRINGS

Free Length ---------- Approximately 2.438 Inches

Spring Pressure at Compressed Height of
1-31/64 Inches (Valve Open)-------- 102 Pounds; Install New Spring if Pressure is Less than 92 Pounds.

Spring Pressure at Compressed Height of
1-15/16 Inches(Valve Closed)---45 Pounds; Install New Spring if Pressure is Less than 41 Pounds.

ROCKER ARM ASSEMBLY

Rocker Arm Bushing --------- Replaceable Precision Bronze Bushing

Number of Bushings ---------- 12

Lubrication ---------- Pressure Lubricated; Crankcase Oil to Rocker Arms Metered By Camshaft.

Oil Holes in Rocker Arm Shaft --------Oil Holes must Face Push Rod Side of Engine Only. Shaft Cannot Be Rotated.

Positioning of Exhaust
Valve Rocker Arms ---------- Spacer Washers Position Exhaust Valve Rocker Arm and Eliminate End Play without Binding.

Outside Diameter of
Rocker Arm Shaft ---------- .872 to .873 Inch

Inside Diameter of Rocker
Arm Bushing (Installed)---------- .8745 to .8755 Inch

Rocker Arm Shaft Spring

Spring Pressure at Compressed Height of
1-9/16 Inches---------- 10 Pounds; Install New Spring If Pressure is Less than 8-1/2 Pounds

OIL PUMP

Type ---------- Positive Displacement, Gear Type Pump; Driven Off Camshaft.

Pressure Relief Valve ----------Maintains 40 to 45 Pounds Full Pressure(Oil Warm,Engine Operating at Full Governed Speed)Relief Valve is Adjustable.

WATER PUMP AND THERMOSTAT

Type of System ----------Pressurized Thermostat Controlled By-Pass Type; Forced Circulation(Pump)

Type Pump ---------- Impeller Vane Type

Radiator ---------- Heavy Duty Fin and Tube Type

Temperature Control ---------- By-Pass Type Thermostat

FUEL SYSTEM

Injection Pump --------Robert Bosch,Type PES Multiple Plunger Pump

Direction of Pump Rotation ---------- Counter-Clockwise

Pump Mounting---------- Right Hand Side of Engine

Pump Drive ------ Gear Driven from Camshaft Gear at Camshaft Speed

Injection Pump Drive Lubrication ---------- Pressure Lubricated From Front Camshaft Bearing.

Injection Pump Drive Shaft Diameter ---------- 1.3700 to 1.3705 Inches

Normal Clearance Between
Drive Shaft and Bushings ---------- .001 to .002 Inch

Number of Drive
Shaft Bushings ----------2- These Bushings are Not Replaceable. A Replacement Drive Housing with Bushings in Place Aligned and Fine Bored is Provided.

Injection Pump Drive
Shaft End Play ---------- Automatically Taken Up By a Spring Loaded Thrust Button on Front End of Drive Shaft. Thrust Washers Provided Between Front Drive Gear and Drive Shaft Housing.

Thrust Washer

Outside Diameter ---------- 2.085 to 2.105 Inches

Inside Diameter ---------- 1.3725 to 1.3825 Inches

Thickness ---------- .1225 to .1275 Inch

Timing Marks on Engine-------- Timing Marks Located on Crankshaft Pulley Flange(0 through 5 and 20 through 35 Degrees Before Top Dead Center). Pointer Located on Timing Gear Cover.

Fuel Injectors ---------- Robert Bosch Pintle Type;Opening Pressure 2350 Pounds Per Square Inch

Governor --------- Mechanical Variable Speed Fly-Weight Centrifugal Type; Integral Part of Injection Pump.

Fuel Filters

Fuel Tank Breather Air Filter -----Located in Fuel Tank Filler Cap

Fuel Tank Water Trap ---------- Located in Base of Fuel Tank

1st Stage Fuel Filter ---------- Replaceable Element Type

2nd Stage Fuel Filter ---------- Replaceable Element Type

Final Fuel Filter ---------- Replaceable Sealed "Can"Type Filter.

TIGHTENING TORQUE SPECIFICATIONS

Engine	Torque in Ft. Lbs.	Size	Threads per In.	Type
Camshaft Nut ----------	125	1-1/8	12	NF*
Connecting Rod Bearing Capscrews-------	95 to 105	1/2	20	NF
Crankshaft Pulley Bolt----	100	5/8	18	NF
Cylinder Head Cover (Valve Cover)Stud Nuts----	5 Max.	7/16	20	NF
Cylinder Head Stud Nuts---	120 to 125	9/16	18	NF
Cylinder Head Bolts (Grade 8)----------	145 to 150	9/16	18	NF
Engine to Flywheel Housing-	80	1/2	20	NF
Dust Cover and Capscrews----------	50	1/2	13	NC**
Flywheel to Crankshaft Capscrews----------	100	5/8 9/16	18 18	NF NF
Crankshaft Rear Oil Seal Retainer Capscrews-----	25	3/8	16	NC
Engine Mount----------	200	3/4(spring mounted)	10	NC
Injectors, Diesel Fuel				
Clamp Stud Nuts, Injector to Cylinder Head (Diesel)----------	14 to 17	3/8	24	NF
Injector Nozzle Cap Nut (Diesel)----------	50 to 55			
Powrcel Clamp Screws (Diesel)----------	100	1-1/8	16	NC
Mainbearing Capscrews--	145 to 155	5/8	11	NC
Manifolds				
Manifold Clamp Stud Nuts----------	25	7/16	20	NF
Water Manifold Hold Down Capscrews----------	15	5/16	18	NC
Oil Filter Mounting Capscrews ----------	25	3/8	16	NC
Oil Pan Capscrews-------	10	3/8	16	NC
Oil Pump Cover Capscrews----------	25	1/4	20	NC

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INSPECTION OF DECOMPRESSOR

(If So Equipped)

(Refer to Figure K-2)

When the decompressor is engaged all the exhaust valves must be held in an open position. Inspect the trip pins for excessive wear. Inspect for bent or worn control linkage if the valves are not held open.

When the decompressor is disengaged and the tappet clearance is correct be sure the trip pins release the rocker arms completely. Inspect for loose coupling set screws, bent or worn control linkage, control link cotter pin missing or a pin in one of the control levers sheared off.

DISASSEMBLY OF DECOMPRESSOR

(Refer to Figure K-2)

Remove the control link cotter pins (1) and link (2). Remove the decompressor control housings (3) and the housing gaskets (4). Loosen the coupling set screws (5) and remove the coupling (6).

Remove the roll pins (7) from the control levers (8). Remove the control shafts (9) from the housings. Remove the control levers (8). Remove the trip pins (10) from the decompressor shaft (11). Remove and discard the "O" rings (12) from the shafts.

ASSEMBLY

(Refer to Figure K-2)

Install the trip pins (10) and lever (8) with roll pin (7) to the decompressor mounting brackets (13). Install the new "O" rings (12) on the shafts - Install the shafts (9) into the housings (3) and install the control levers (8) with roll pins (7). Install the shaft coupling (6) and tighten square head set screws (5).

Install the housing and shaft assembly to the cylinder heads with new gaskets (4). Install the control link (2) with cotter pins (1).

DECOMPRESSOR ADJUSTMENTS

(Refer to Figure K-2)

The stop bolts (14) in the coupling stop (6) should be adjusted so the decompressor can open the valves when engaged and lift the trip pins so they are clear of the rocker arms when disengaged (Refer to Inset A). Tighten the lock nuts (15) on the stop bolts (14) after adjustment is made.

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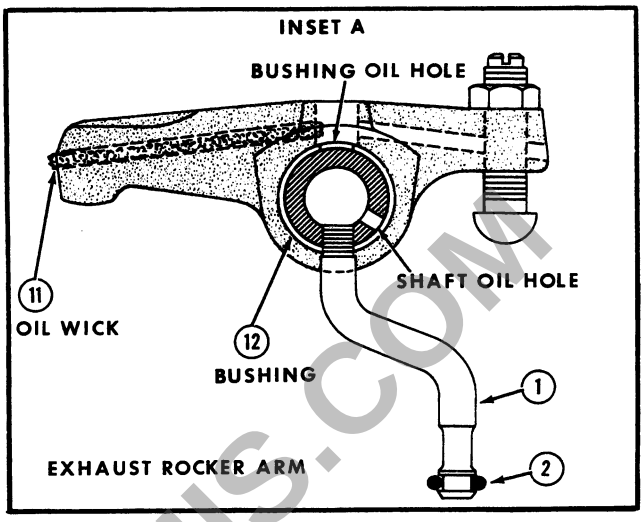
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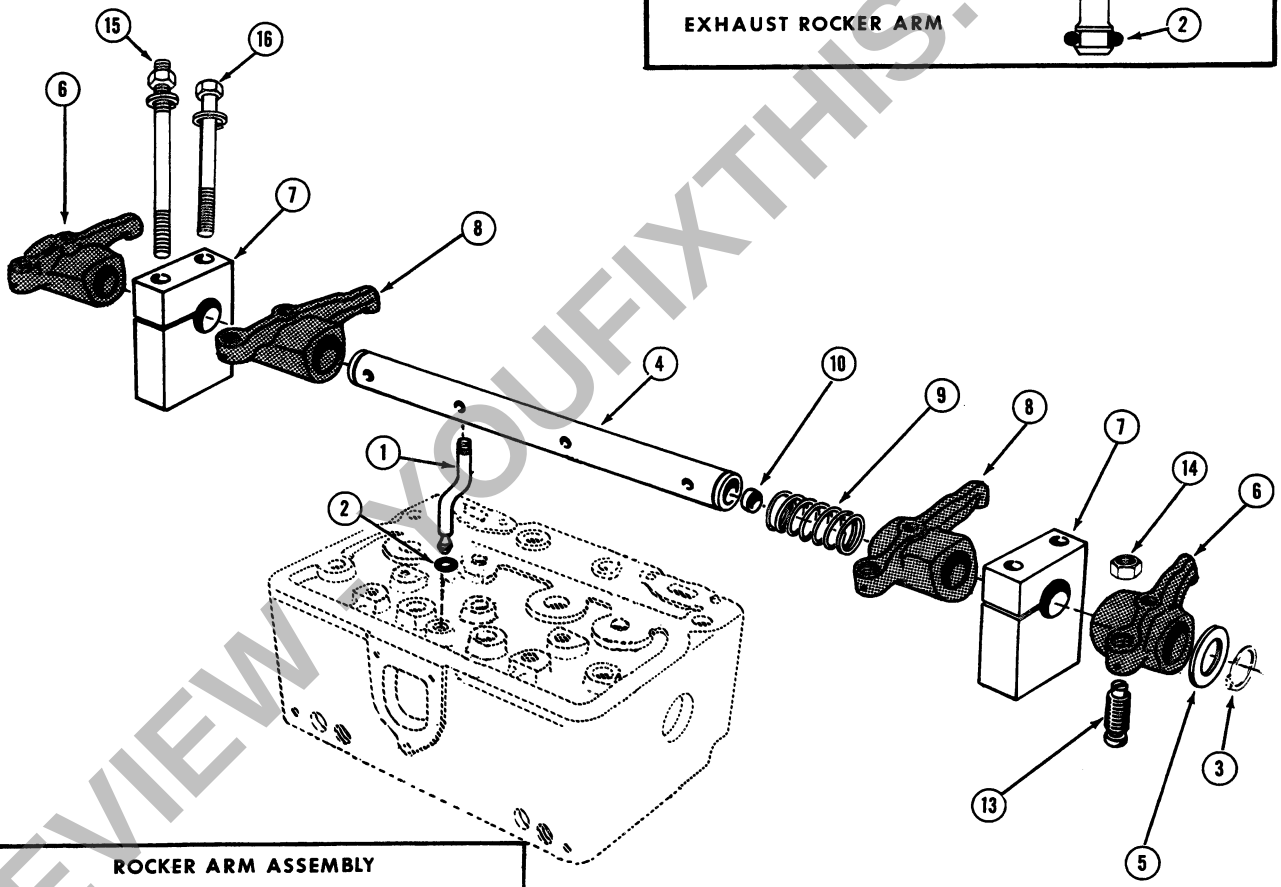
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DISASSEMBLY AND ASSEMBLY OF THE ROCKER ARMS





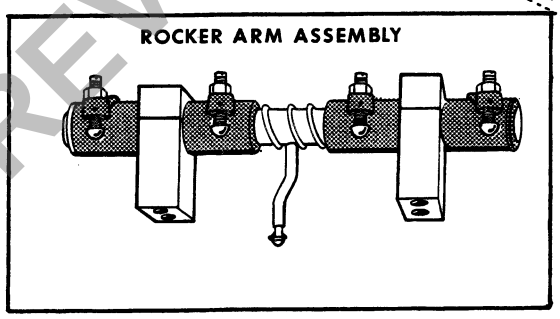


Figure K-3

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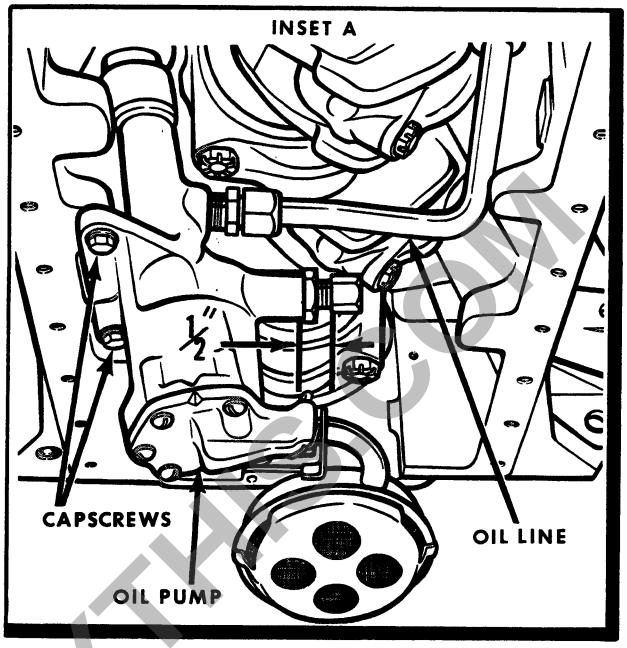


Figure M-6

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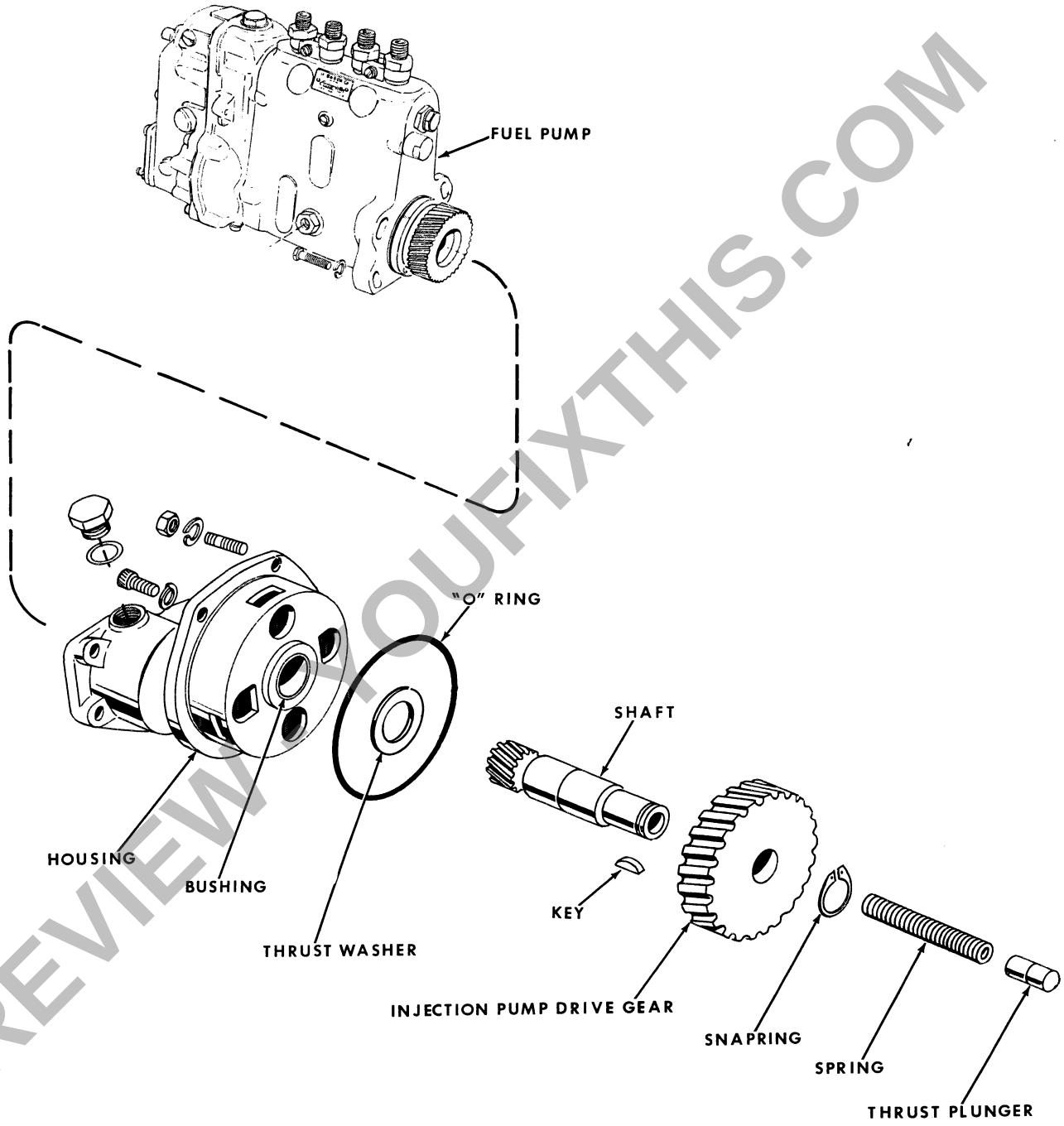


Figure M-52

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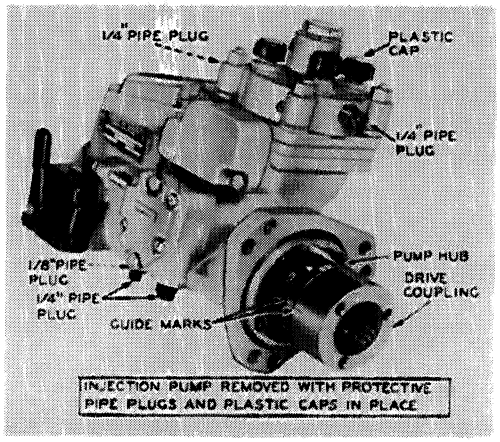


Figure I-50. STEP 5 -- Fuel Injection Pump Removed with Protective Pipe Plugs and Plastic Caps in Place

IMPORTANT

DO NOT BEND FUEL LINES. IMMEDIATELY INSTALL PIPE PLUGS IN EXPOSED PUMP OPENINGS AND PLASTIC CAPS IN FUEL LINE OPENINGS.

NOTE: The drive coupling shown in Figure I-50 must be removed for installation on the replacement pump. Use a 1/2 inch open end wrench.

INSTALLING AND TIMING INJECTION PUMP

STEP 6 -- Install the drive coupling on the replacement pump. The timing mark on the drive coupling must be located within range of the guide marks on the pump drive hub, as shown in Figure I-50. The drive coupling cannot be installed backwards since the mounting holes in the coupling are threaded in one end only.

Temporarily tighten the three capscrews just enough so the coupling can be moved with a slight drag in the slotted mounting holes in the pump hub. After the timing procedure is completed, the hub capscrews must be tightened.

CAUTION

THE TIMING ADJUSTMENTS MUST BE EXACT. AS LITTLE AS ONE DEGREE OFF MAY AFFECT ENGINE PERFORMANCE.

NOTE: If the engine has been cranked while the pump was removed, the engine must be reset so number one piston is at the correct degrees before top dead center on the compression stroke. Refer to Figure I-51.

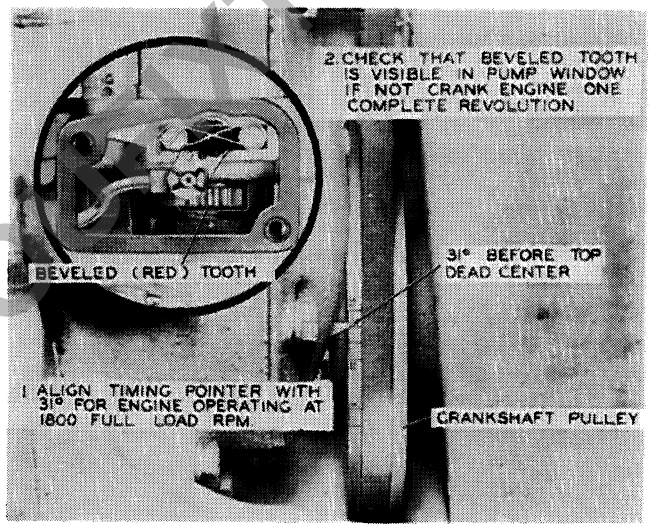


Figure I-51. STEP 7. Timing Injection Pump to Engine

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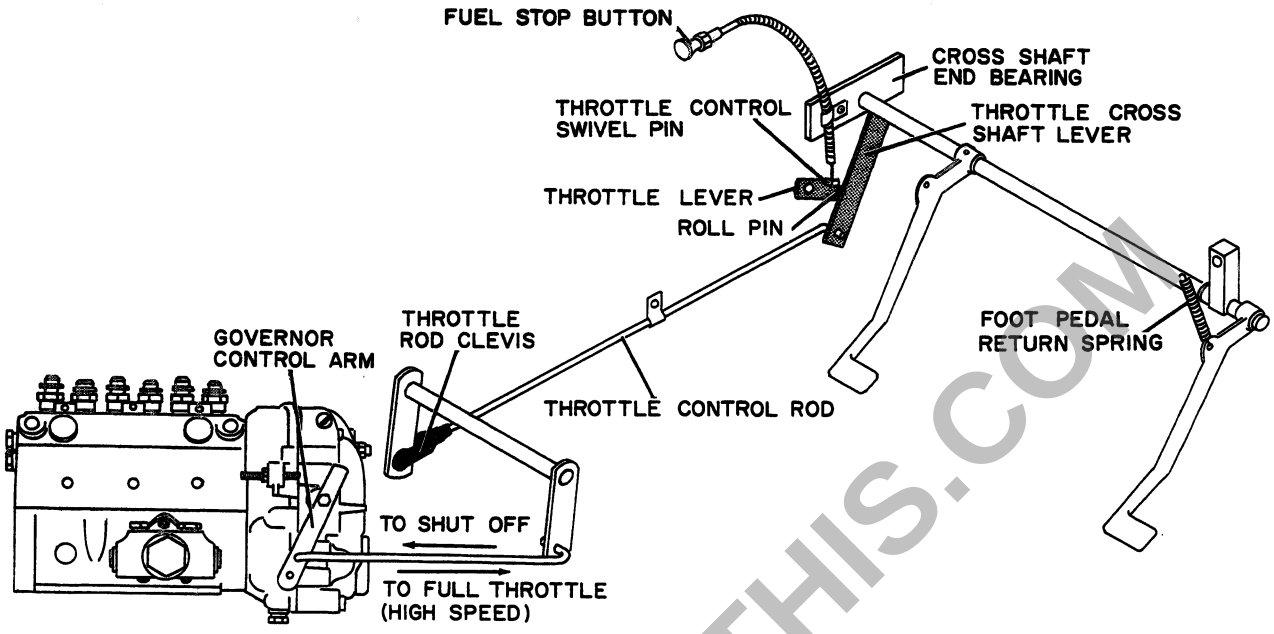


Figure I-97

b. If you find the injection pump governor lever is against the high speed adjusting screw, but the engine speed is still low, the engine speed can be increased a limited amount by means of the high speed adjusting screw.
IMPORTANT: The high speed adjusting screw is sealed with a wire and lead seal. If you have the necessary equipment, reseal the adjusting screw when the governor adjustment is complete. Always make a record of the date you broke the seal, the serial number of the machine or engine and the reason why you broke the seal. Also record whether or not you resealed the stop, and if so, describe the seal.
TO INCREASE the engine speed by means of the high speed adjusting screw, loosen the lock nut and turn the adjusting screw out toward the front of the pump (counter-clockwise) 1/2 turn at a time, Figure I-98. Check engine speed after each 1/2 turn.
CAUTION: Before changing or adjusting the full speed adjusting screw on the pump, make sure the engine is operating with the correct injection pump. The pump can be identified by the number stamped on the governor housing.

Engines that are factory equipped to operate at 1800 RPM Full Governed Engine Speed are stamped EP/RSV 300 - - 900.

Engines that are factory equipped to operate at 2000 RPM Full Governed Engine Speed are stamped EP/ RSV 300 - - 1000.

If the engine does not have the correct injection pump, install the correct pump before making any adjustments.

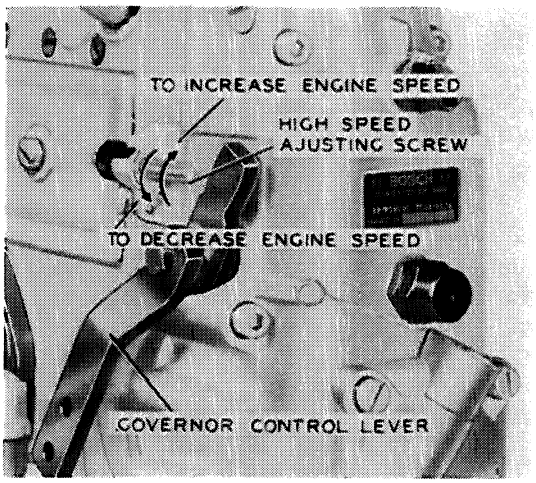


Figure I-98

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OIL FLOW - FLOATING POSITION

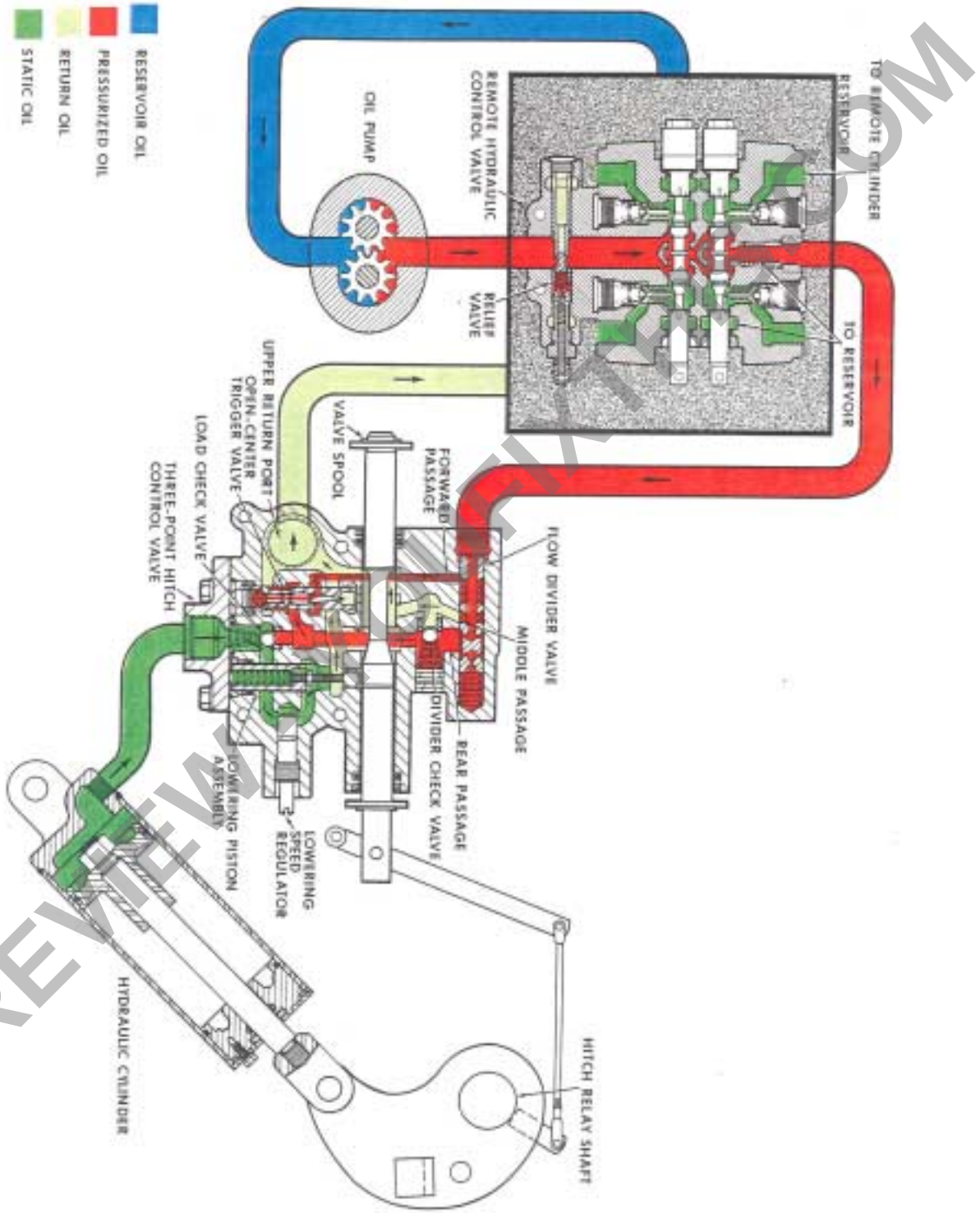


Figure D-6

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INSTALLATION OF THE HYDRAULIC PUMP

1. Install the pump onto the transmission housing. Torque the pump mounting capscrews evenly. Refer to "Specifications".

2. Connect the inlet (suction) hose and the outlet (pressure) hose.

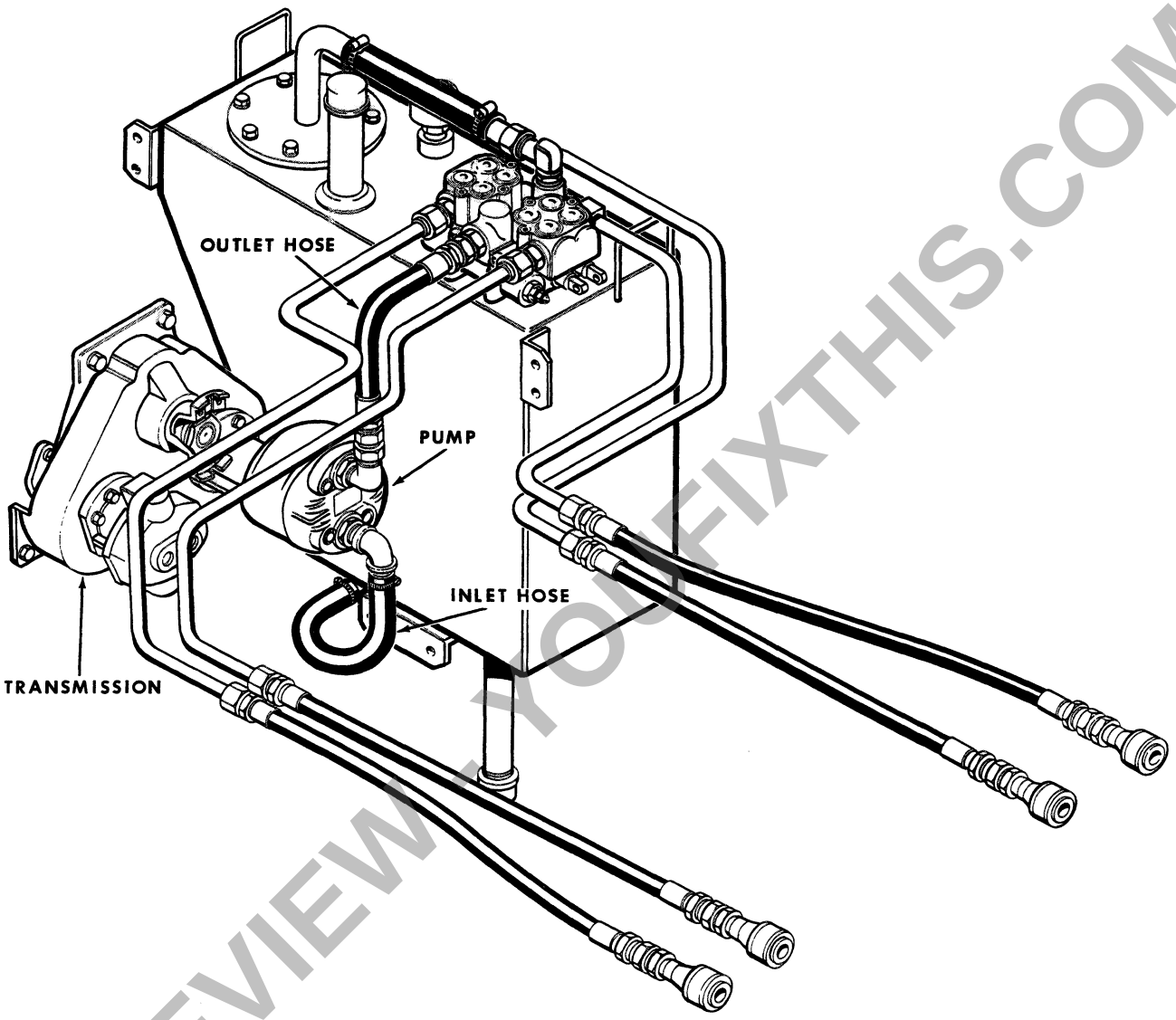


Figure J-6

NOTE After the pump has been installed, fill the hydraulic reservoir with clean oil. Then start the engine and check the pump for noise and leaks. Shut off the engine and check the reservoir, fill to full mark on dipstick.

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CHECKING STEERING WHEEL SLIPPAGE

1. With the engine operating at 1500 RPM turn the steering wheel either to the Right or Left until one of the front stop bolts makes contact with the axle housing.

2. Measure the steering wheel slip by using an input torque of 3 foot pounds (equivalent to the approximate force that can be applied to the steering wheel spoke with one finger) continue to steer against the limit stop - the rate of steering wheel slip should not exceed approximately 5 RPM.

3. If the steering wheel slip exceeds approximately 5 RPM - disconnect both hoses from either of the steering cylinders and plug the hose ends. Recheck steering wheel slip as described in Nos. 1 and 2 above - If the slip has not decreased by approximately 1-1/2 RPM, disconnect both hoses from the remaining cylinder and plug the ends. Recheck the steering wheel slip as described in Nos. 1 and 2 above. If the slip has decreased approximately 1-1/2 RPM, repair or replace the damaged cylinder - if replacing the cylinder does not decrease the slip by approximately 1-1/2 RPM, proceed with Step 4.

4. If steering wheel slip still exceeds (approximately 5 RPM) without the cylinders connected in the system and the engine running - shut off the engine and measure the slip rate. If the slip rate drops to approximately 1/2 to 1-1/2 RPM the problem is in the control valve and should be repaired or replaced.

5. In the event excessive wheel slip (approximately 5 RPM) still exists without the engine and without the cylinders connected, the problem is in the hand pump and should be repaired or replaced.

REAR STEERING INDICATOR ADJUSTMENT

Turn the rear wheels so they are in a straight ahead position. This position can be checked by taking measurements A and B between the wheel and chassis, inset A. These measurements should be equal when the wheels are straight ahead. Turn the wheels in either direction a little at a time until these measurements are equal.

Remove the cotter pin and clevis pin from the control rod yoke end, Figure O-16. Turn the yoke on or off the rod until the indicator on the panel is in the center (O) position and the clevis pin can be installed without forcing in place. Reinstall cotter pin.

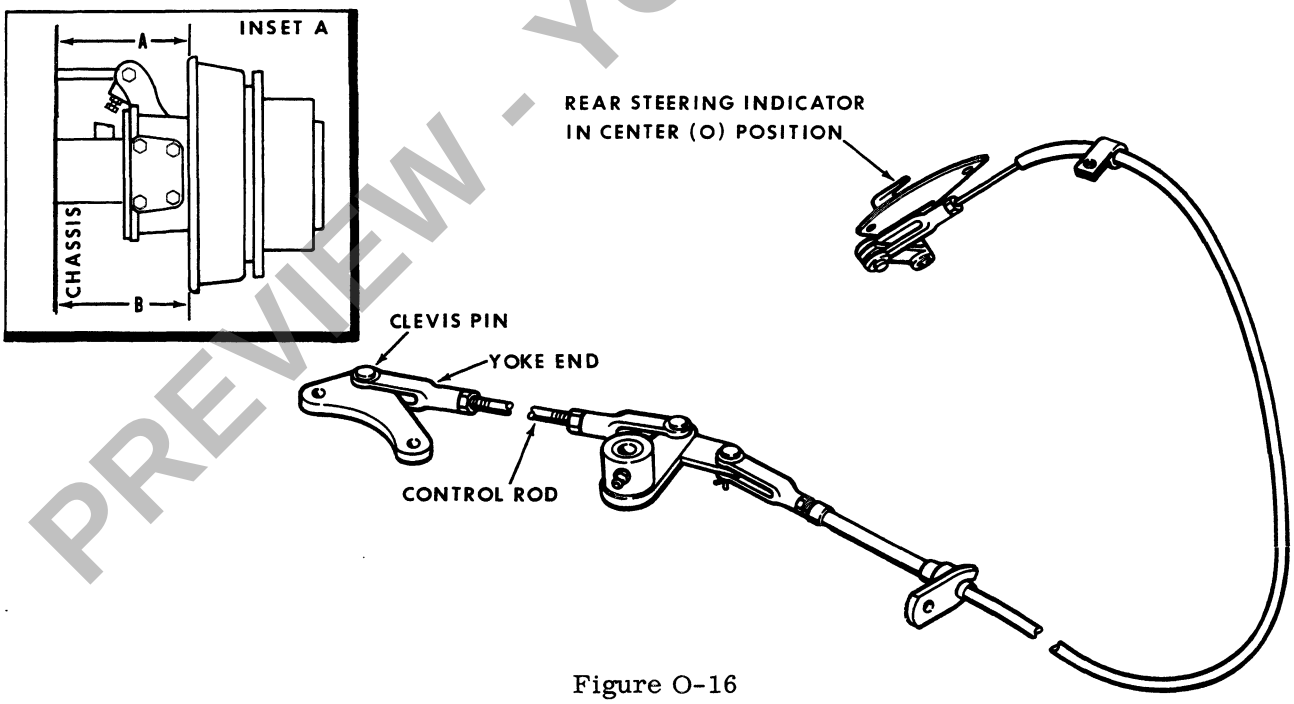


Figure O-16

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FORWARD AND REVERSE CONTROL COVER (CONT'D)

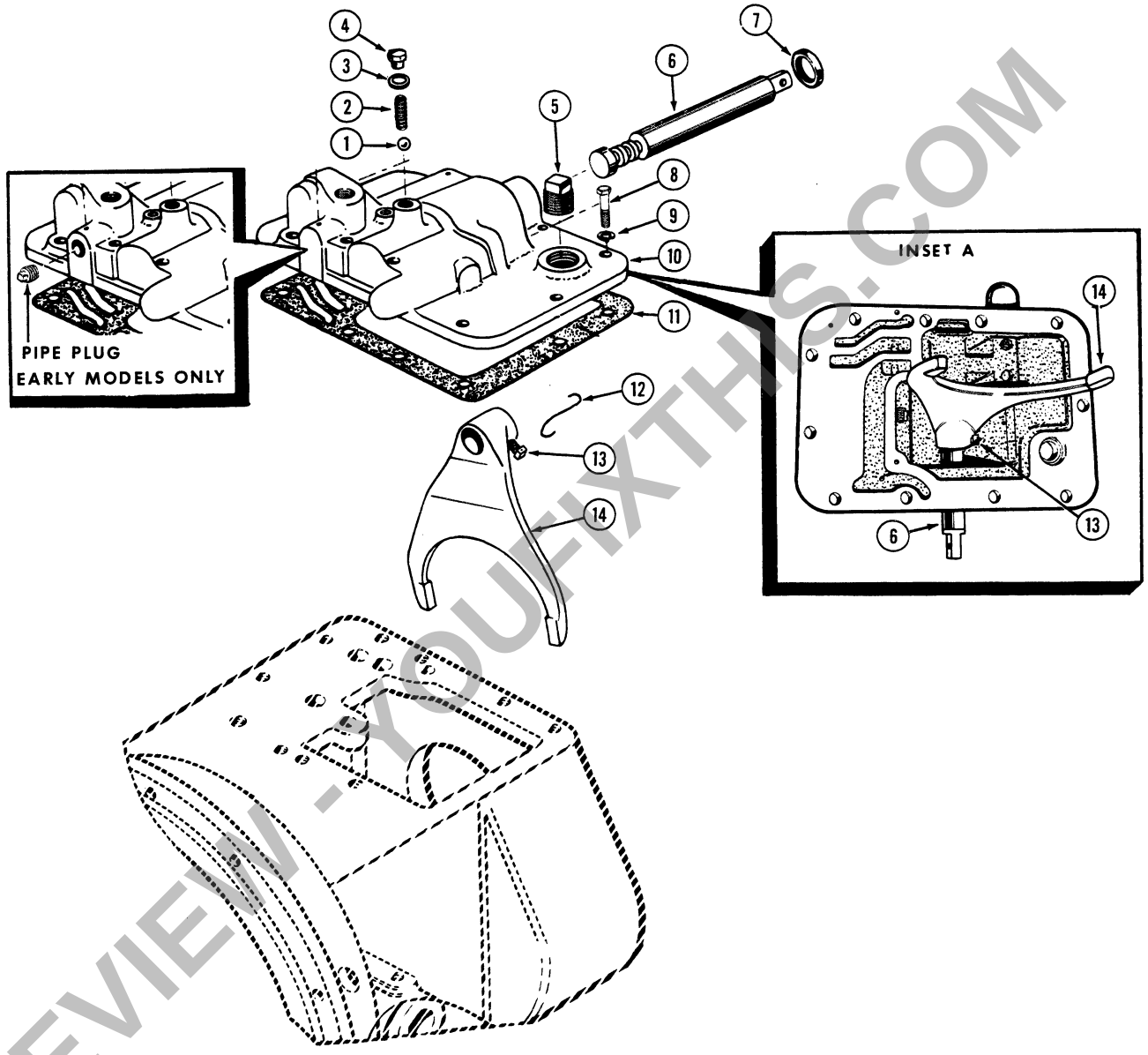


Figure S-7

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MAIN SHAFT AND HI-LOW SHIFT RAIL
Trans. Serial No. 109962 and After

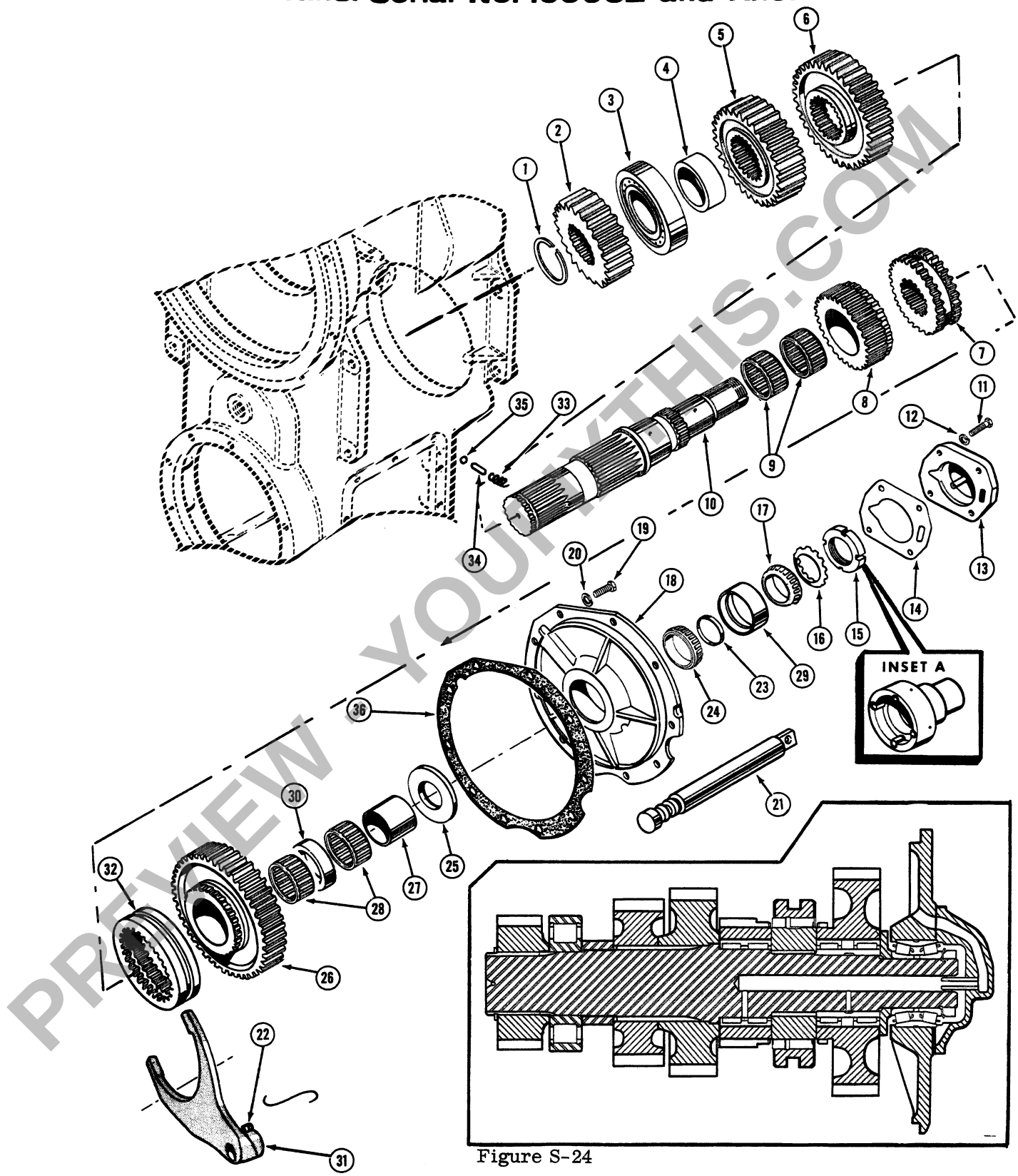


Figure S-24

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TRANSMISSION LINKAGE ADJUSTMENTS

(Refer to Figure S-3)

Hi-Low Shift Link Adjustment

1. Disconnect the hi-low shift link at the hi-low shift spool.

2. Push the hi-low shift spool in to the innermost position, and then pull the spool out to the first position which is neutral.

3. Adjust the hi-low shift linkage assembly to approximately 7-1/4" from center to center of the yoke holes. Refer to Inset D.

NOTE At this time the operator should note the feel of the shift lever. If a higher or lower position is desired, lengthen or shorten the hi-low shift lever assembly.

Forward-Reverse Range Control Adjustment

IMPORTANT - Prior to adjusting the Forward - Reverse Range Control linkage - make sure the control lever is properly positioned in the console as described on Page S-6.

1. Disconnect the inner and outer vertical connecting link assemblies from the upper and lower bell cranks.

2. Move both the Forward-Reverse Range links connected to the transmission side cover, so the keyways in the control cover levers are in a vertical position. Refer to Inset A.

3. Position the hand control lever on the console to the right in neutral. Refer to Inset B.

4. With the hand control lever to the right as shown in inset B, adjust the outer vertical connecting link assembly so it just fits the holes in the upper and lower outer bell cranks. With the link assembly properly adjusted, turn the lower yoke out one turn more and connect to bell cranks. Secure with jam nuts.

5. Position the hand control lever on the console to the left in neutral. Refer to Inset B.

6. With the hand control lever to the left as shown in Inset B, adjust the inner vertical connecting link assembly so it just fits the holes in the upper and lower inner bell cranks. With the link assembly properly adjusted, turn the lower yoke out one turn more and connect to the bell cranks. Secure with jam nuts.

Forward-Reverse Speed Control Adjustment

1. Adjust the forward-reverse speed control spool link to approximately 7-1/8". Check speed control lever for proper forward and rearward movement and readjust if necessary.

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MINOR BRAKE SHOE ADJUSTMENT

Occasionally it will be necessary to adjust the brake shoes to compensate for lining wear. All minor adjustments are made with the eccentric cams, Figure A.

Turn the eccentric cam as shown, Figure A, until the brake shoe contacts the drum and the wheel can no longer be turned, then back off the eccentric cam sufficiently to permit a free rolling wheel.

REFER TO PAGE W-7 FOR A MORE DETAILED EXPLANATION OF PROPER LINING AND DRUM CONTACT WHEN NEW LININGS ARE INSTALLED.

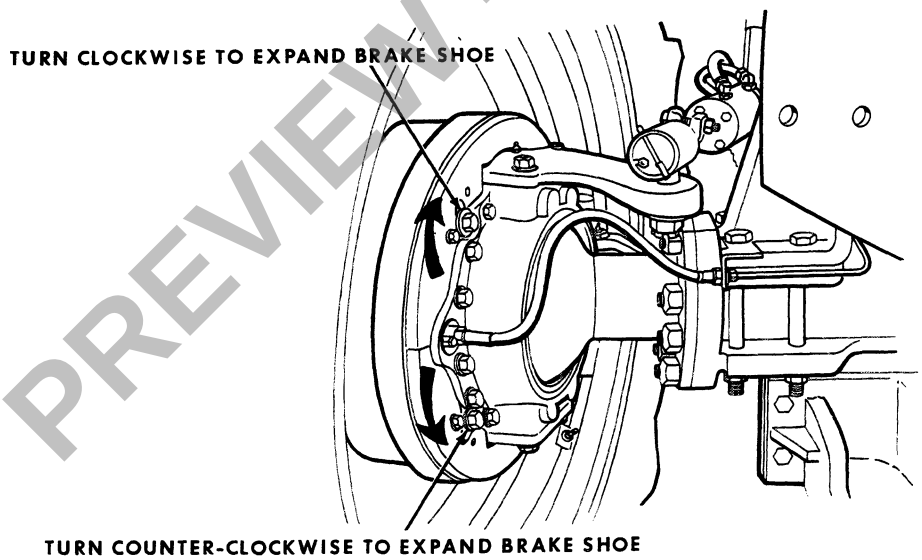


Figure A

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ASSEMBLY

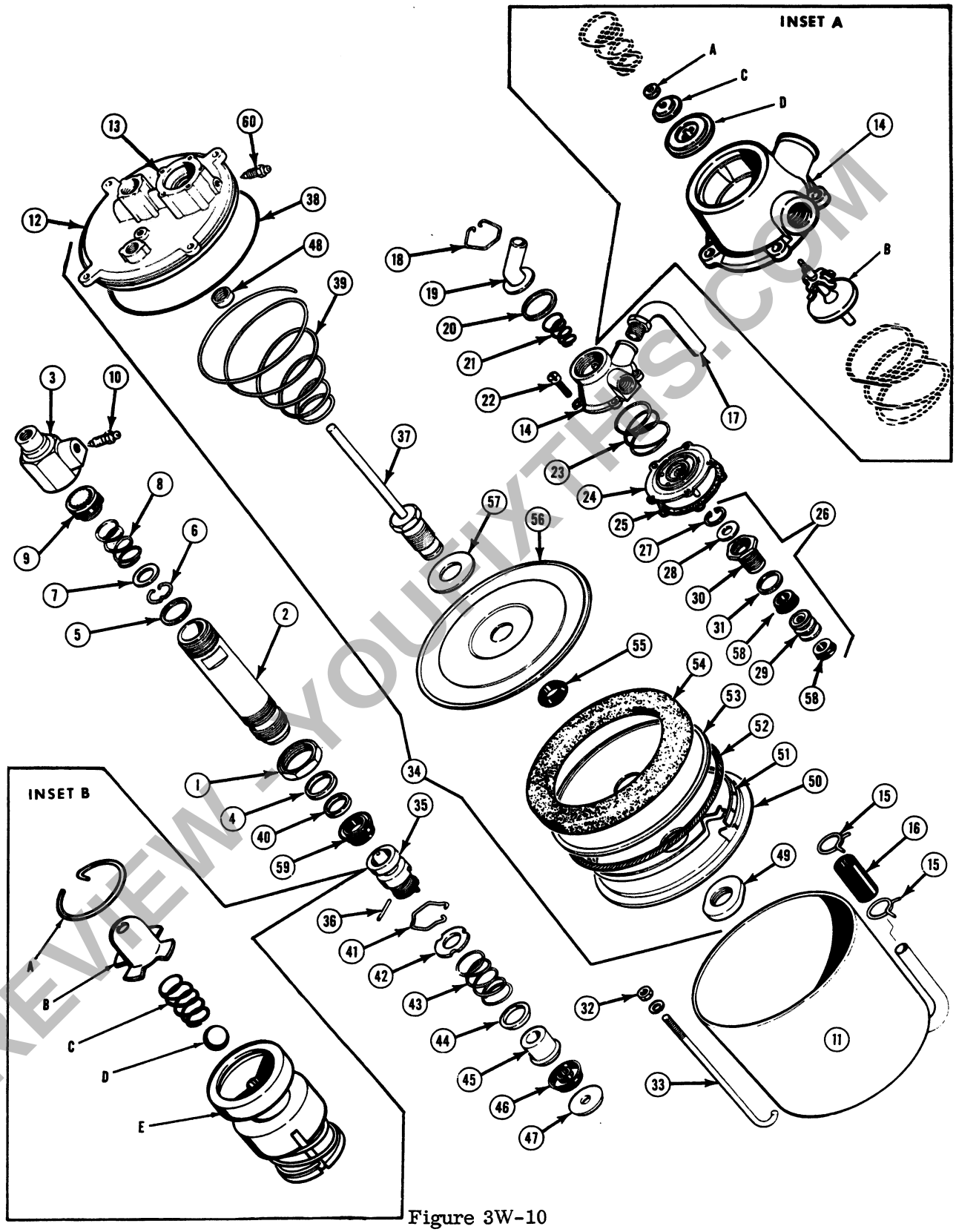
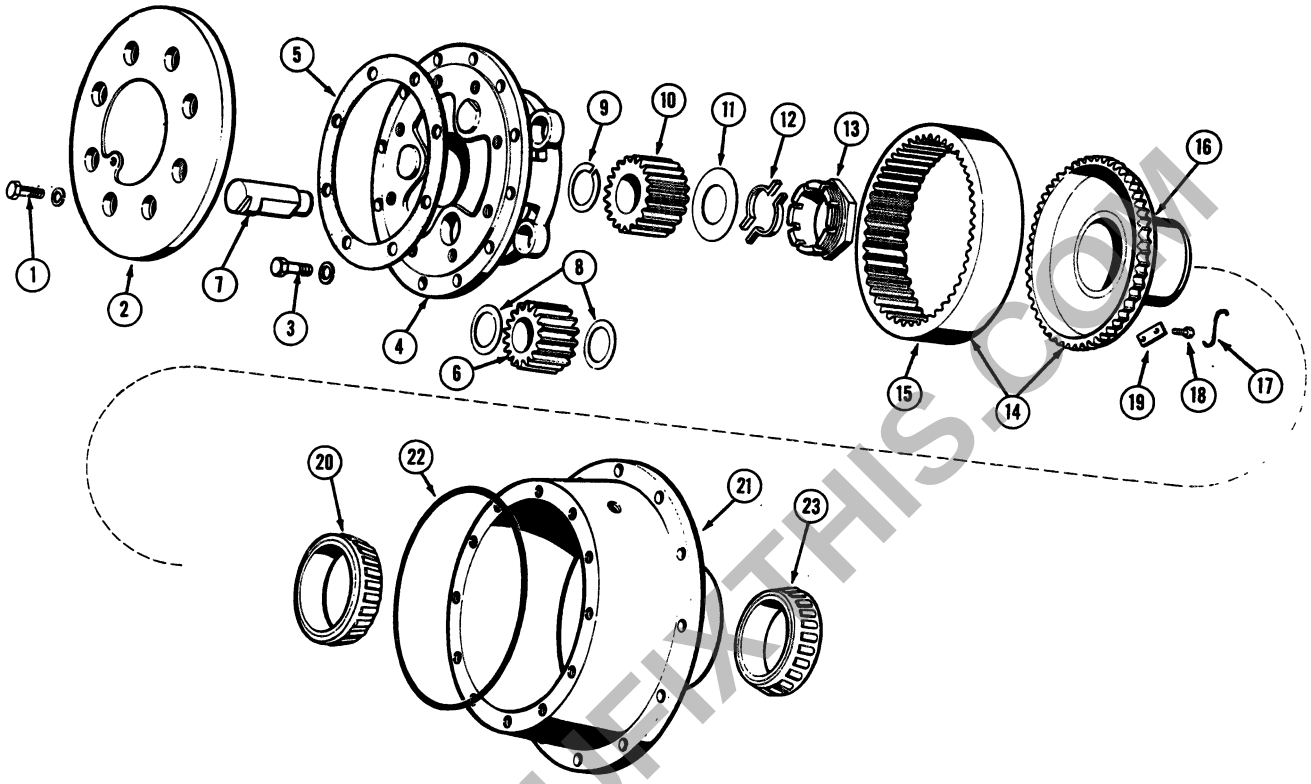


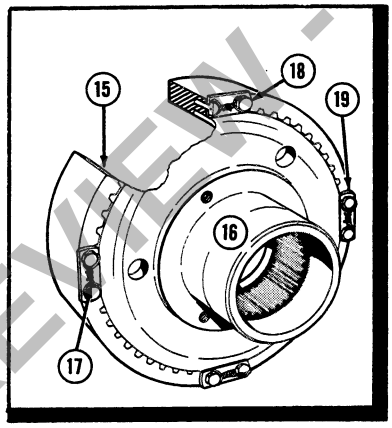
Figure 3W-10

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Assembly of the Planetary System





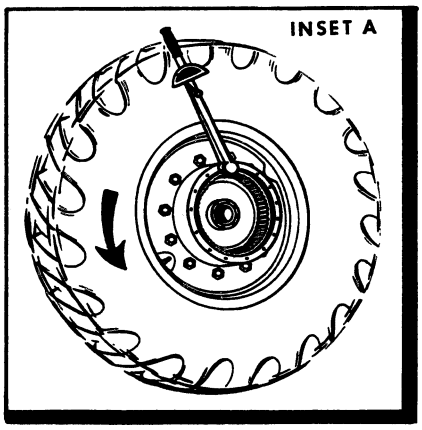


Figure U-15

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