



MANUAL PREVIEW

J.I. Case

Service Manual

1200

Traction King

Service Manual

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CA-S-1200 TK

diesel engines

C-2

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	480 to	455 to	435 to	415 to	395 to	375 to
Pressure	510 PSI	485 PSI	465 PSI	425 PSI	425 PSI	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 -----.0050 to .0060 Inch

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 -----4.341 to 4.345 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

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 ----- 1.5675 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; Cam-
shaft 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 Cam-
shaft. 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

C-3

Valve Tappet Clearance

A451 ----- .025 In., Engine Cold (Both Intake and Exhaust)

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 Assem-
bly).

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

Specific Gravity Check

The most reliable way to determine the concentration of sulfuric acid in the electrolyte is to measure the relative weight or specific gravity of the solution. A hydrometer is used for this, and only enough solution is removed from a battery cell so the float is suspended freely and not touching the top, bottom or sides of the glass tube, Figure F-2. Always hold the hydrometer at eye level and in vertical position when taking a reading. A hydrometer reading is only correct when the temperature of the solution is 80° F.

NOTE Most hydrometers have a calibrated thermometer to correct this.

When it is above or below this reading, it has to be corrected either by adding .004 gravity points for every 10° above 80° F. or subtracting .004 gravity points for every 10° below 80° F., Figure F-2.

When the specific gravity readings between the cells show a variation of .025, the battery should be replaced.

Specific gravity readings will change depending upon climate.

State of Charge	Specific Gravity Range for Climate Zone		
	Frigid	Temperate	Tropical
100% Full	1.280	1.260	1.225
75%	1.230	1.215	1.180
50%	1.180	1.170	1.135
Discharged	1.080	1.070	1.045

The battery should never be allowed to drop below 75% charge while not in use.

When a battery is to be charged, it may be charged at any rate which does not allow the battery terminal voltage to exceed 15.5 volts while charging. The battery temperature should never exceed 110° F. while charging if it does reduce charging rate.

The charger should be left on until the specific gravity readings stay the same after three checks of an hour apart.

A fast charge method is used only to give the batteries a boost for starting. This type of charge puts out a very high amperage until the battery temperature is up to 110° F., then it shuts off.

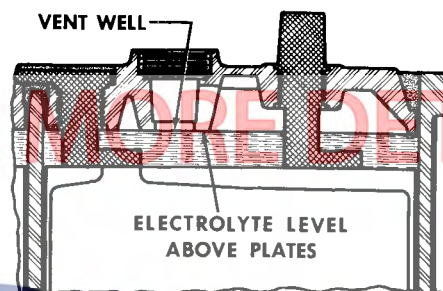


Figure F-1

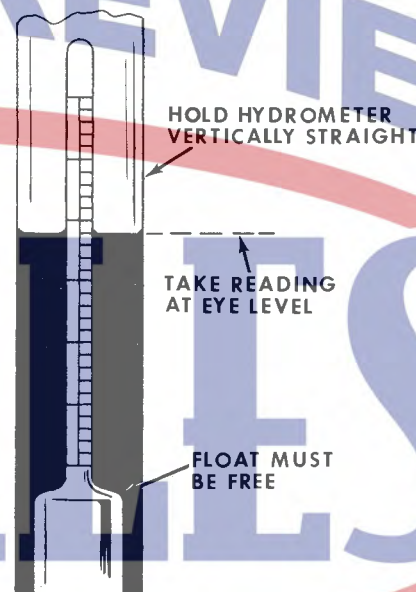


Figure F-2

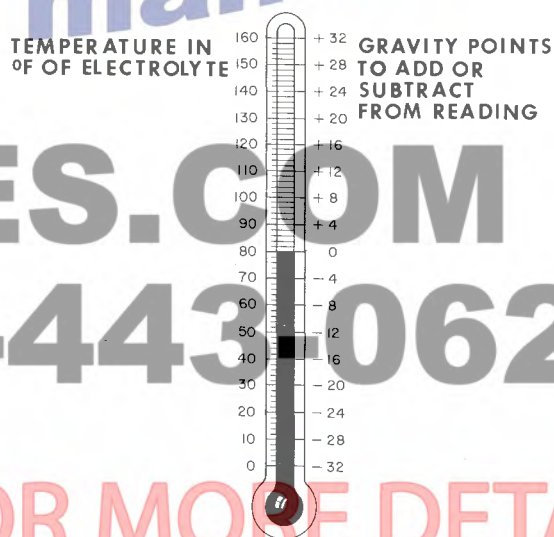


Figure F-3

Individual Battery Cell Check

Place a light load on the battery by cranking engine (do not start engine) for 3 seconds. Turn on headlights, after one minute proceed with check. Using a 4 volt voltmeter check the voltage of each cell, refer to Figure F-4.

If cell voltage varies more than .05 volts replace battery. If cell voltage is below 1.95 volts, charge battery and recheck the cell voltages. If cell voltage is still below 1.95 volts or varies .05 volts replace battery.

Battery Cranking Voltage Check

To perform the cranking voltage check:

NOTE The fuel supply must be shut off at the fuel tank shut off valve located below the fuel tank. This will allow the engine to start and run until the fuel in the system is used up. Then proceed with the following test. The fuel system will have to be bled of all air before engine can be started after test is completed.

1. Connect a volt meter (30 volt) between the positive and negative terminals of the batteries, Figure F-5.

Crank the engine for 15 seconds and record voltage.

2. Connect voltmeter (30 volt) between the cranking motor terminal and ground on cranking motor, Figure F-5.

Crank the engine and record voltage. If voltage is not the same or varies more than .5 volt, check the battery cables, clean and tighten connections.

Battery Bench Load Check

When batteries are removed from the tractor, connect a volt meter (12 volt) between the negative and positive post, Figure F-6.

A load of 270 amps. (12 volt battery) is connected between the positive and negative posts and after 15 seconds, check the volt meter reading.

If it is less than 9.5 volts (12 volt battery) the battery should be replaced.

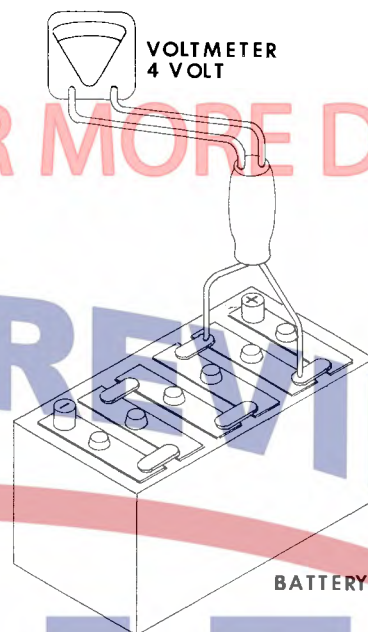


Figure F-4

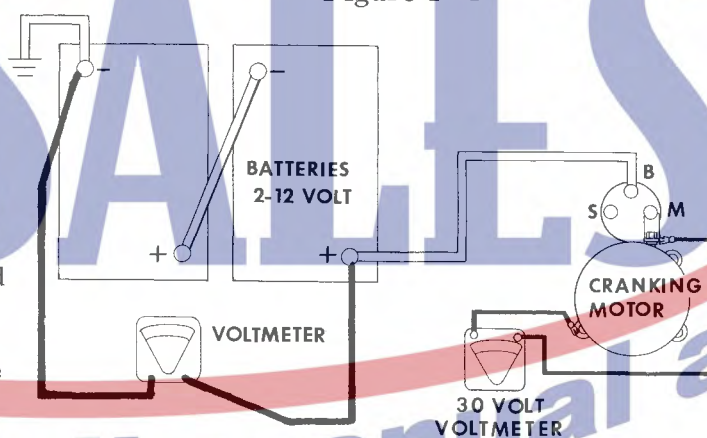


Figure F-5

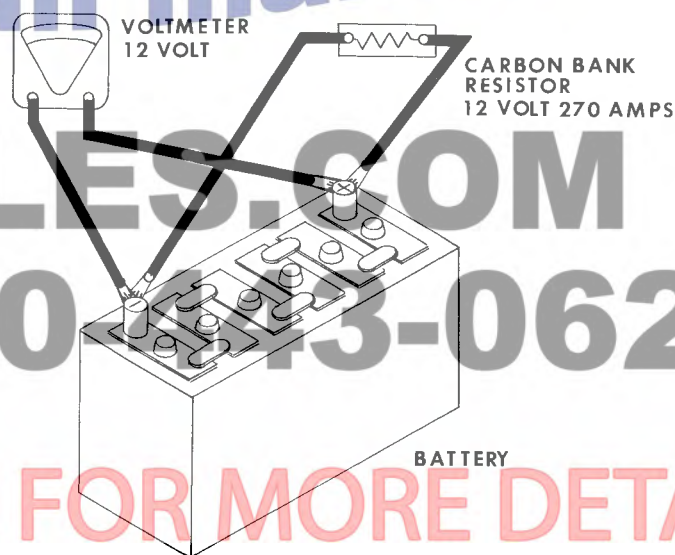


Figure F-6

CRANKING MOTOR CHECK AND SPECIFICATIONS

The test specifications listed below are listed according to the manufacturers number listed on the name plate.

DELCO-REMY NO.	CASE NO.	BRUSH TENSION (OZ.)	NO LOAD TEST 80°F.			TORQUE TEST 80° F.		
			VOLTS	MAX. AMPS	MIN. RPM	MIN. TORQUE FOOT LBS.	VOLTS	MAX. AMPS
1113353	A20751	80	23.5	75*	7000	26	4	500

*Includes Solenoid Switch

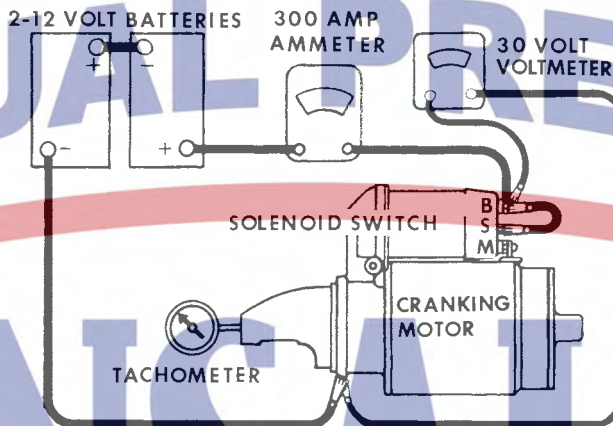


Figure F-7. "Hook Up" Cranking Motor No Load Check

SOLENOID SWITCH CHECK AND SPECIFICATIONS

Make hook up per Figure F-8. Slowly decrease load until voltmeter reads specified voltage then record ammeter reading. It should be within specified amperage for both windings. Disconnect jumper wire and adjust load until voltmeter reads specified voltage then record ammeter reading. It should be within specified amperage for hold in winding. When either check does not meet specifications replace solenoid.

DELCO-REMY NO.	CASE NO.	AMPERE DRAW		VOLTAGE
		BOTH WINDINGS	HOLD-IN WIND	
1119832	A15358	46.1 - 52.3	6.1 - 6.8	20

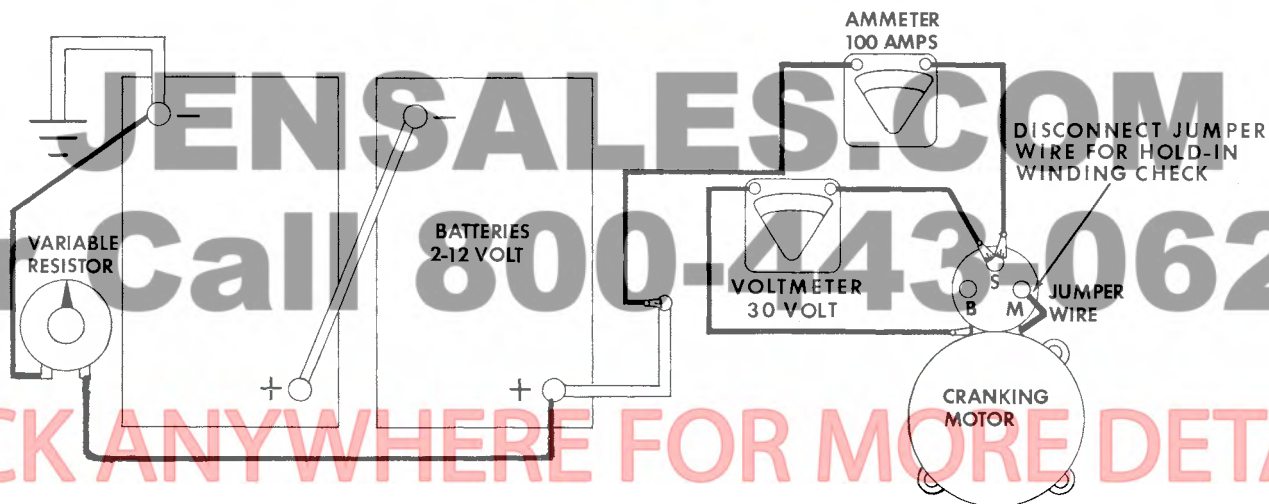


Figure F-8. "Hook Up" For Solenoid Switch Check

Wiring Diagram

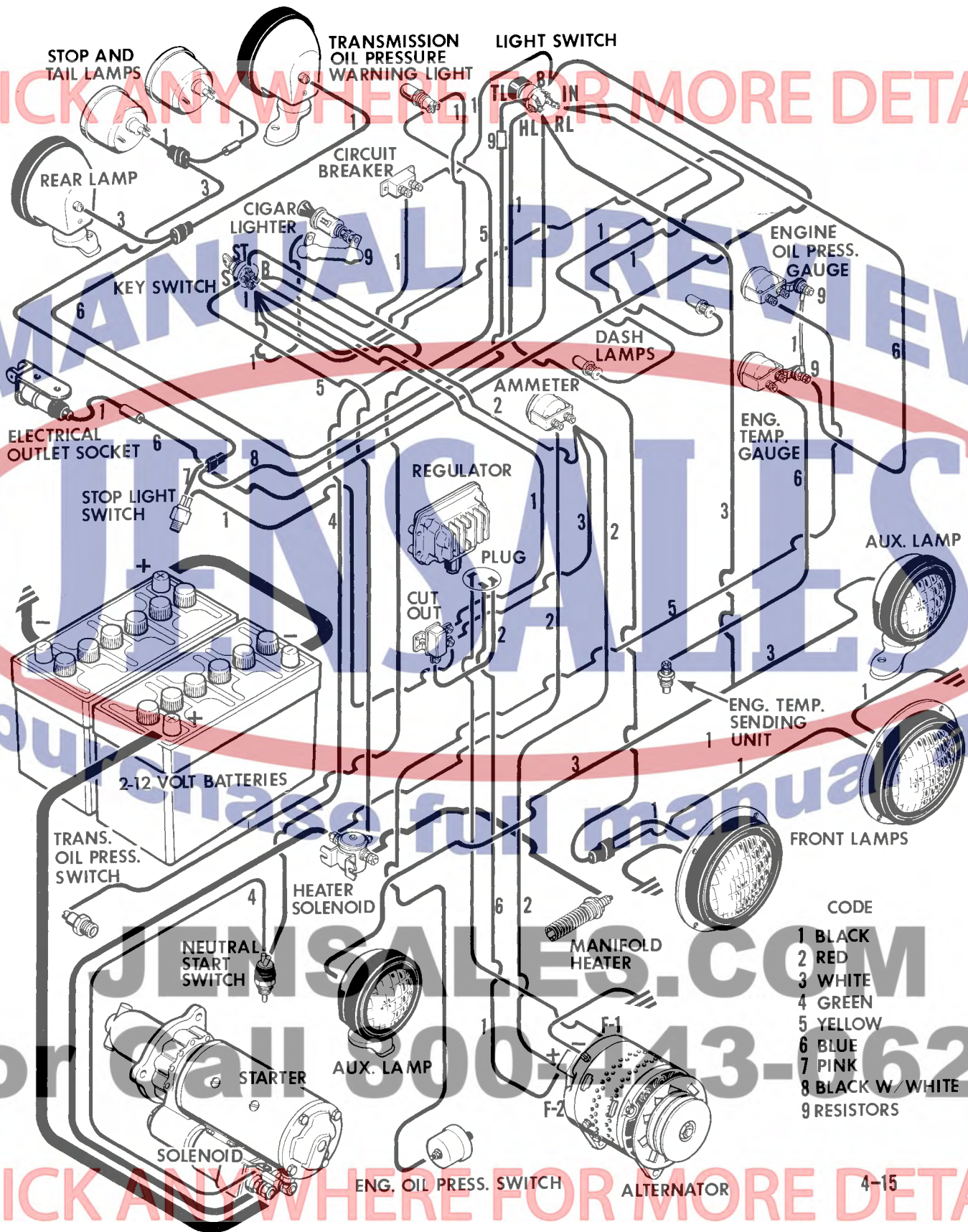


Figure F-18

NOTE: The J. I. Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

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SECTION

MANUAL **K** PREVIEW

SERVICING THE

●
CYLINDER HEADS

●
VALVE SYSTEMS

●
ROCKER ARMS

●
DECOMPRESSOR

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CASE POWRCEL DIESEL ENGINES

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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 tor-

que. 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.

REMOVAL AND INSTALLATION OF CYLINDER HEAD AND COMPONENTS

CAUTION

DO NOT OVER
TIGHTEN COVER NUTS

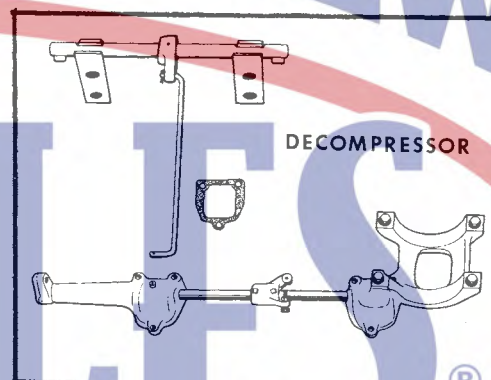
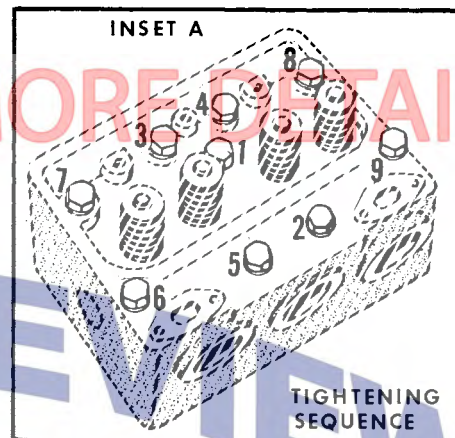
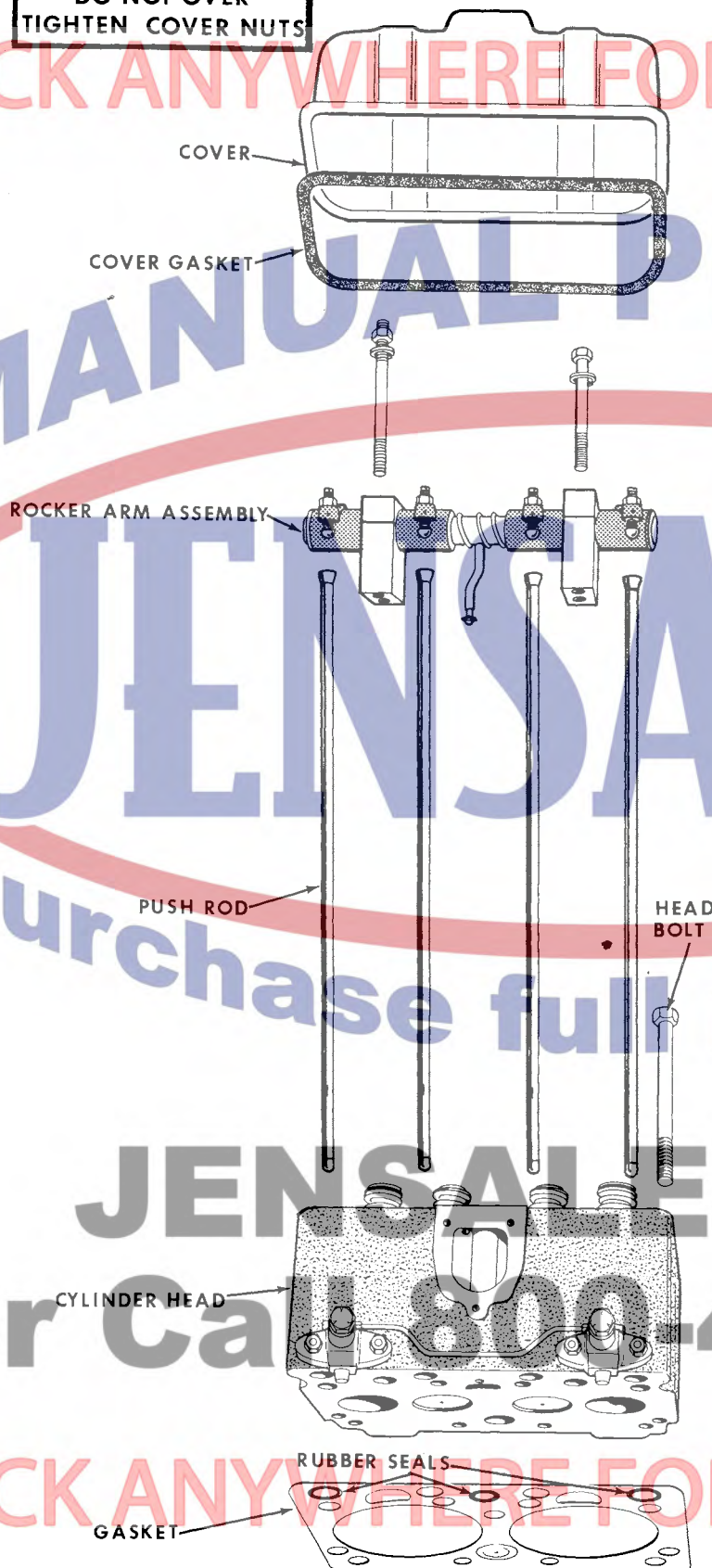


Figure K-1

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 coupl-

ing (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)

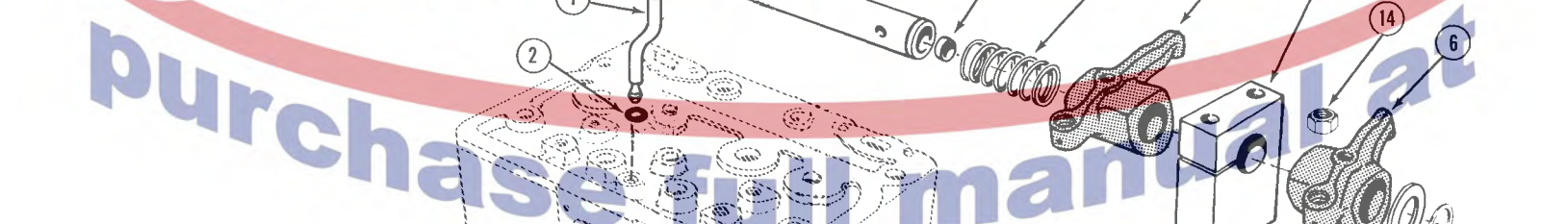
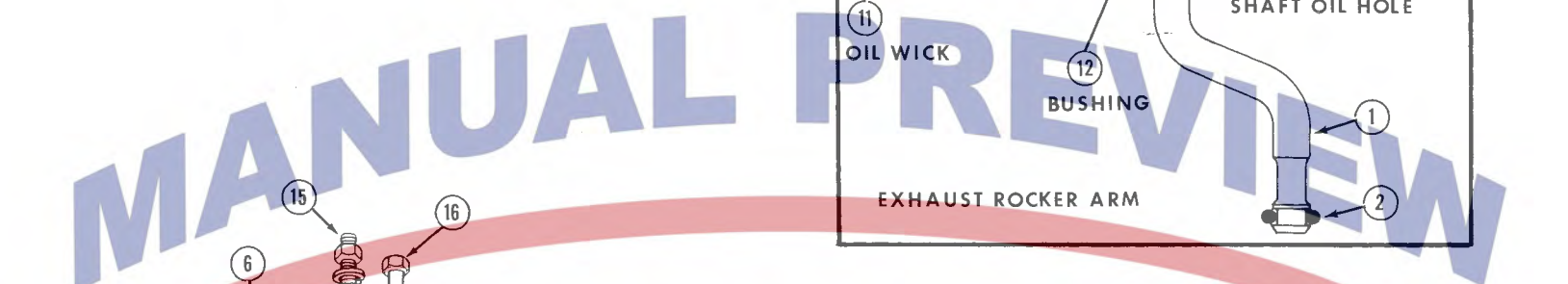
The stop bolts (14) in the coupling stop (6) should be adjusted so the decompressor can open the valves when engaged and lift the trip pins so they are clear of the rocker arms when disengaged (Refer to Inset A). Tighten the lock nuts (15) on the stop bolts (14) after adjustment is made.

CLICK ANYWHERE FOR MORE DETAILS



K-5

CLICK ANYWHERE FOR MORE DETAILS



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REMOVAL OF THE HYDRAULIC PUMP

Before starting to remove the hydraulic pump, the pump and transmission must be steam cleaned to prevent dirt from entering either the transmission or hydraulic system. Also drain the hydraulic reservoir oil. Use clean oil when refilling the reservoir.

1. Disconnect the inlet (suction) and outlet (pressure) hoses. Cap hoses to prevent entry of dirt.
2. Remove the pump to transmission housing capscrews.
3. Remove the pump from the transmission housing.

NOTE Cover the transmission housing opening after the pump has been removed.

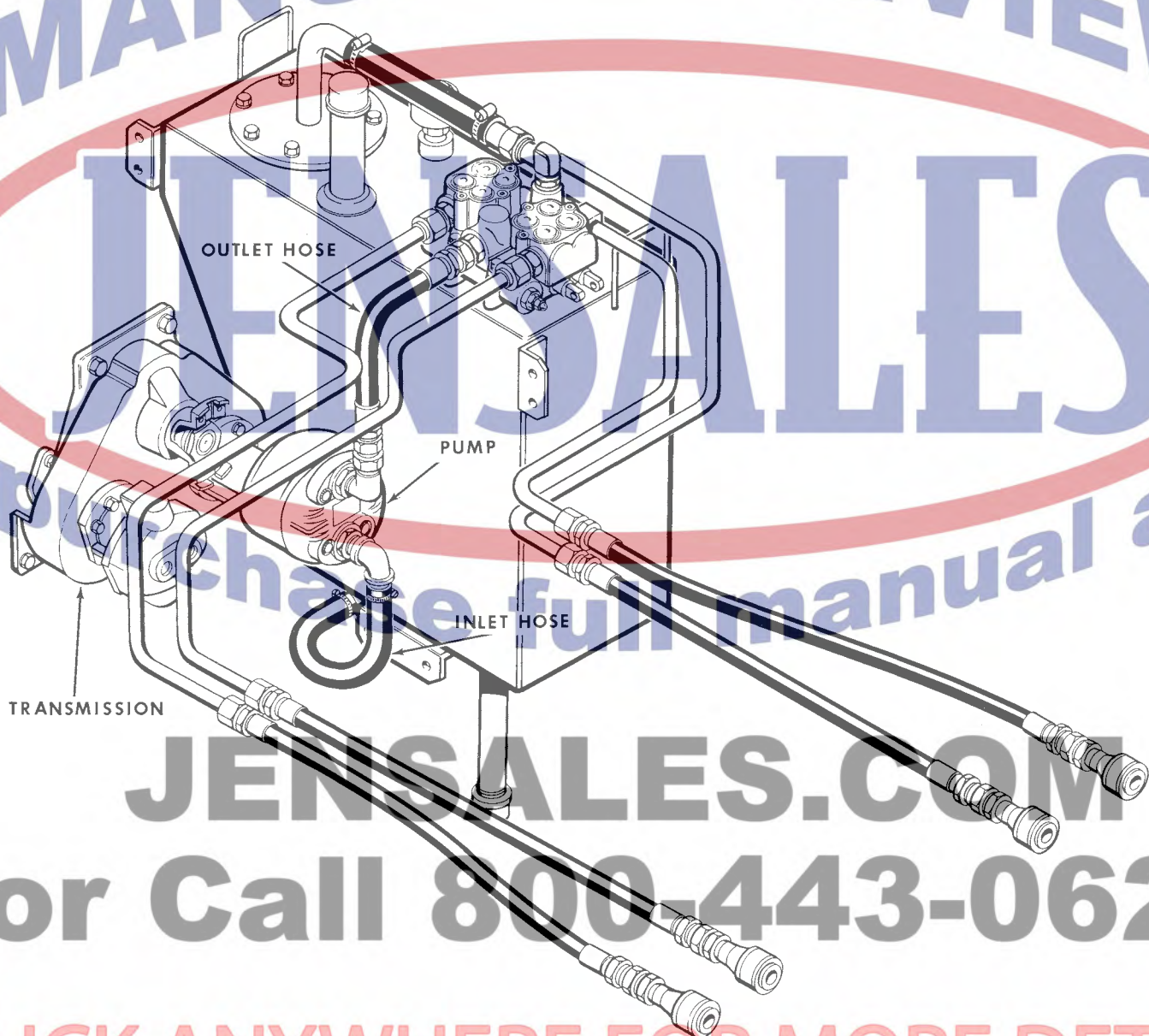


Figure J-2

DISASSEMBLY OF THE HYDRAULIC PUMP

(Refer to Figure J-3)

1. Clean the exterior of the pump before starting disassembly.
2. Remove the pump cover to adapter cap-screws.
3. Remove the pump cover.
4. Remove the wear plate, "O" ring and shims.

5. Before removing the pump gears, mark the gears as shown with an India stone so the gears can be installed in proper mesh.
 6. Remove the drive gear, drive gear pin and driven gear.
 7. Remove the pump body, wear plate and wear plate shim.
- NOTE** The number of shims used will vary.



Figure J-3

8. Remove the drive shaft seal retainer.
9. The drive shaft and seal assembly can now be pulled out of the adapter.
10. Remove the sleeve containing the sleeve seal and "O" ring.

11. Remove the drive shaft ball bearing, bearing retainer and snap ring.
12. Remove the inner sleeve and "O" ring, seal cup, spacers and "O" ring.
13. Remove the spring sleeve, pin, spring, spacer and small snap ring.

Ring Gear Removal and Replacement (Cont'd)

Bolt Installation

Whenever the ring gear rivets are removed they are to be replaced with special bolts. When installing the special bolts make sure the bolt head is on the back side of the ring gear, Figure T-14.

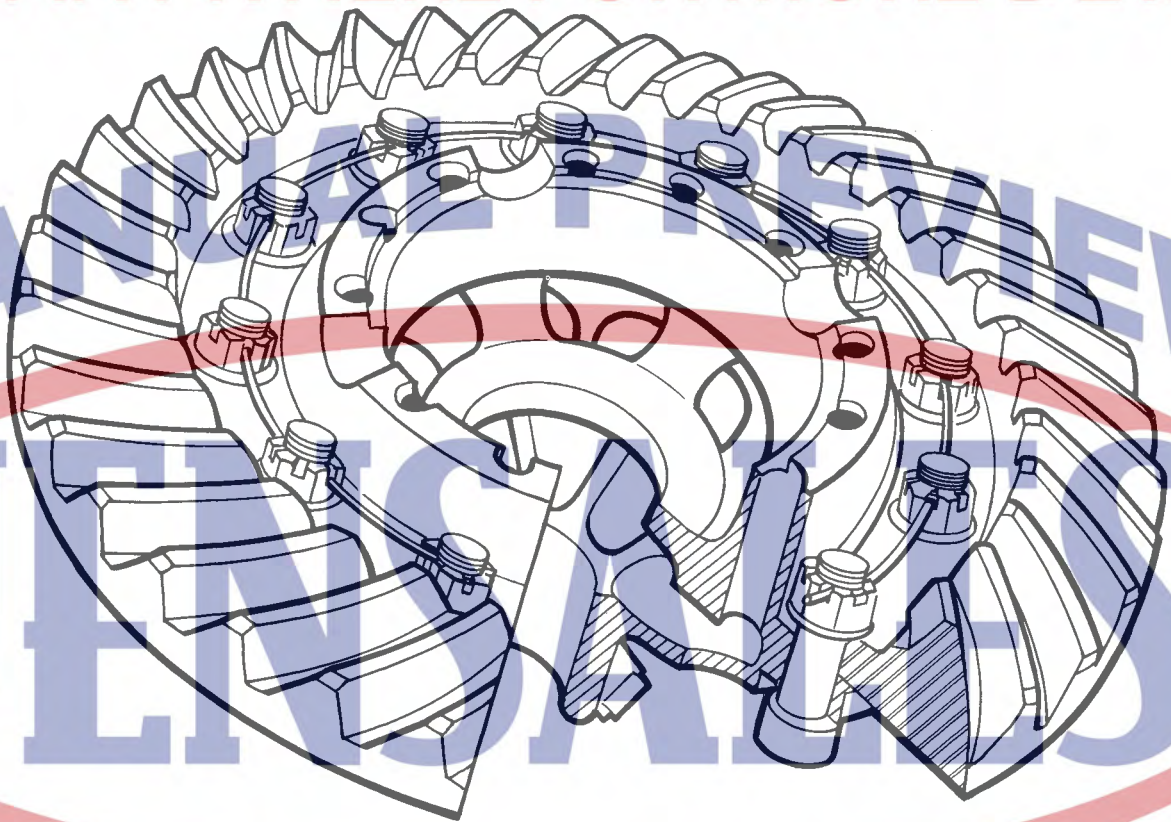


Figure T-14

With the bolt installed correctly install the nut down against the ring gear and tighten to proper torque. Refer to "Specification" Section. These special bolts are all Grade 8 - DO NOT SUBSTITUTE.

IMPORTANT

AFTER THE SPECIAL BOLTS HAVE BEEN PROPERLY TORQUED, LOCK IN PLACE WITH COTTER PIN OR SOFT IRON LOCKING WIRE, REFER TO FIGURE T-14.

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