



Caterpillar
Service Manual
977K Traxcavator
S/n 11K1, 48J1,
70J1, & Up

Service Manual

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CT-S-977KTX11K

FORM NO. REG01349-01

FOR USE IN SERVICE MANUALS:

D4 TRACTOR, REG00632

D4 TRACTOR, SPECIAL APPLICATION,
REG00784

D5 TRACTOR, REG00633

D5 TRACTOR, SPECIAL APPLICATION,
REG00785

D6 TRACTOR, REG00530

D6 TRACTOR, SPECIAL APPLICATION,
REG00871

D7 TRACTOR, REG00691

D7G TRACTOR, SENR7112

12G MOTOR GRADER, REG01544

NO. 12—NO. 14 MOTOR

GRADER, REG00507

NO. 14G MOTOR GRADER, REG01542

NO. 112F MOTOR GRADER, REG00885

120G MOTOR GRADER, REG01654

NO. 120—NO. 140 MOTOR GRADERS,
REG00762

130G—140G MOTOR GRADERS,
REG01652

225 EXCAVATOR, REG01578

235 EXCAVATOR, REG01388

518 SKIDDER, REG00971

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561 PIPELAYER, REG00913

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941 TRAXCAVATOR, REG00527

950 WHEEL LOADER, REG00548

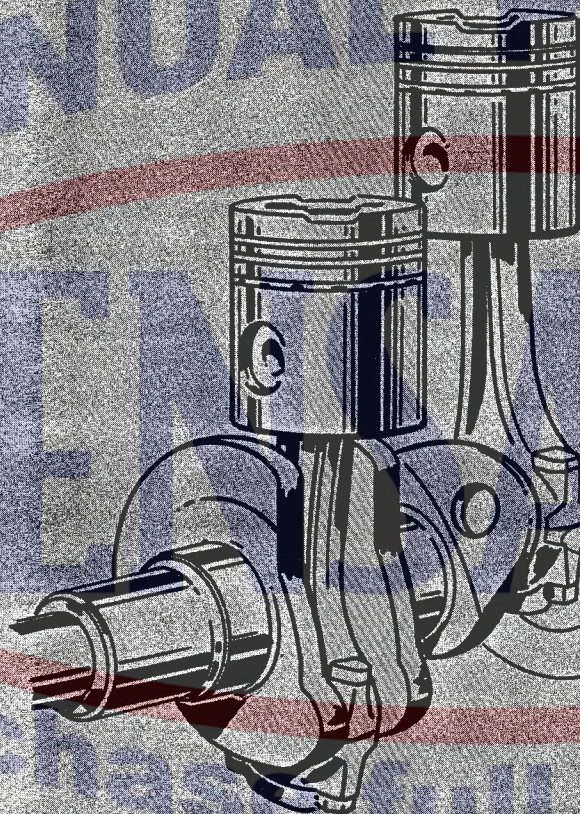
951 TRAXCAVATOR, REG00783

955 TRAXCAVATOR, REG00634

966 WHEEL LOADER, REG00484

977 TRAXCAVATOR, REG00635

980 WHEEL LOADER, REG00698



SERVICE MANUAL

3304 & 3306 VEHICLE ENGINES

SERIAL NUMBERS

3304: 78P

3306: 3N

NOTICE
This book also includes information for all 4.75" bore, four and six cylinder vehicle engines with vehicle serial numbers. This book supersedes Forms REG00502-05 and REG00511-03.

SYSTEMS OPERATION

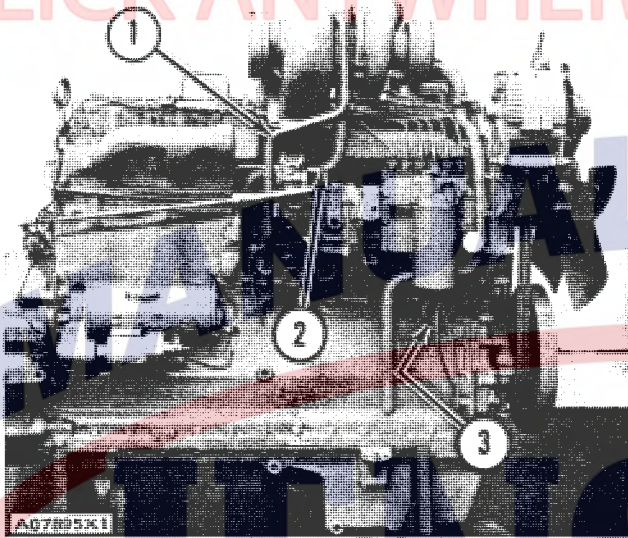
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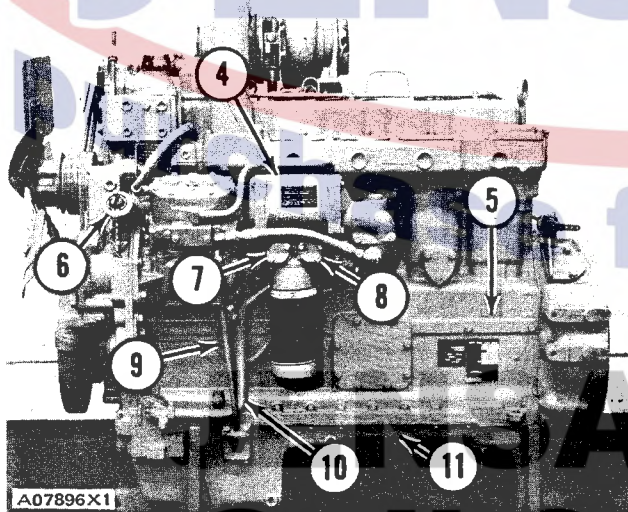
LUBRICATION SYSTEM

LUBRICATION SYSTEM COMPONENTS



LUBRICATION SYSTEM COMPONENTS
(Typical Example)

1. Supply line for turbocharger. 2. Return line for turbocharger. 3. Supply line for automatic timing advance unit.

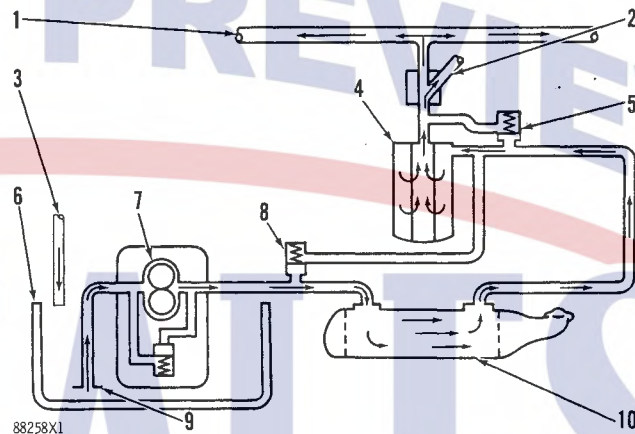


LUBRICATION SYSTEM COMPONENTS
(Typical Example)

4. Oil cooler. 5. Oil manifold in cylinder block. 6. Oil filter cap. 7. Bypass valve for oil cooler. 8. Bypass valve for oil filter. 9. Oil supply line for air compressor. 10. Oil line to cooler and filter. 11. Oil pan.

OIL FLOW THROUGH THE OIL FILTER AND OIL COOLER

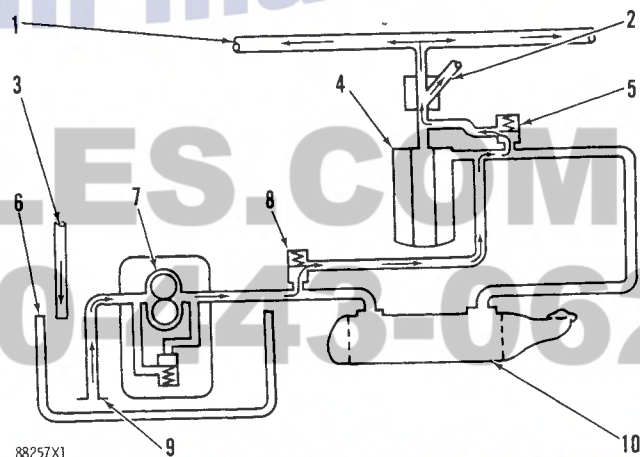
With the engine warm (normal operation), oil comes from the oil pan (6) through the suction bell (9) to the oil pump (7). The oil pump sends warm oil to the oil cooler (10) and then to the oil filter (4). From the oil filter, oil is sent to the oil manifold (1) in the cylinder block.



FLOW OF OIL (ENGINE WARM)

1. Oil manifold in cylinder block. 2. Oil supply line to turbocharger. 3. Oil return line from turbocharger. 4. Oil filter. 5. Bypass valve for the oil filter. 6. Oil pan. 7. Oil pump. 8. Bypass valve for the oil cooler. 9. Suction bell. 10. Oil cooler.

With the engine cold (starting conditions), oil comes from the oil pan (6) through the suction bell (9) to the oil pump (7). When the oil is cold, an oil pressure difference in the bypass valve (installed in the oil filter housing) causes the valves to open.



FLOW OF OIL (ENGINE COLD)

1. Oil manifold in cylinder block. 2. Oil supply line to turbocharger. 3. Oil return line from turbocharger. 4. Oil filter. 5. Bypass valve for the oil filter. 6. Oil pan. 7. Oil pump. 8. Bypass valve for the oil cooler. 9. Suction bell. 10. Oil cooler.

The lubrication system has the following components: oil pan, oil pump, oil cooler, oil filter, oil passages in the cylinder block, and lines to engine components and attachments such as turbocharger, air compressor and others.

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NOTE: For Systems Operation and Testing and Adjusting, make reference to 3304 & 3306 Vehicle Engines, Form No. REG01349.

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*See SPECIFICATIONS, FORM NO. SENR7141

SPECIFICATIONS

NOTE: For Specifications with illustrations, make reference to POWER TRAIN SPECIFICATIONS FOR 977 TRACK TYPE LOADERS, Form No. SENR7141. If the Specifications in Form SENR7141 are not the same as in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications in the book with the latest date.

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NOTE: The "C" is an indication of a change from the former issue.

SPECIFICATIONS

NOTE: For Specifications with illustrations, make reference to the SPECIFICATIONS FOR 977 LOADER HYDRAULIC SYSTEM, Form No. SENR7296. If the Specifications in Form SENR7296 are not the same as in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications in the book with the latest date.

TEST RESULTS	PROBABLE CAUSE
Drifting occurs only in Test No. 1.	1. Tilt circuit relief valve (head ends) damaged or leaking. 2. Tilt cylinder make-up valve (head ends) leaking.
Drifting occurs only in Test No. 3.	1. Tilt circuit relief valve (rod ends) damaged or leaking. 2. Tilt circuit make-up valve (rod ends) leaking. 3. Bucket positioner hydraulic circuit leaking.
Drifting occurs only in Tests No. 1 and No. 3.	1. Leakage between pistons and cylinders. 2. Leakage between tilt circuit valve spool and body.
Drifting occurs only in Tests No. 2 and No. 4.	1. Tilt circuit check valve leaking. (Leakage between valve and seat and/or seat and body.)

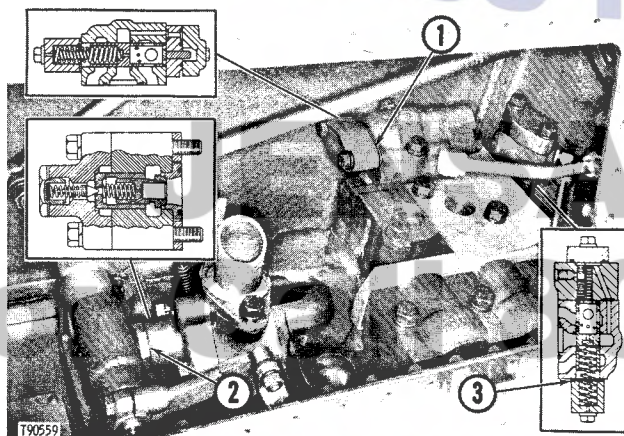
MAIN PRESSURE RELIEF VALVE AND TILT CIRCUIT RELIEF VALVES

The tilt circuit relief valves and the main pressure relief valve can be tested on the machine.

The pressure at which the relief valves open should be checked occasionally and, if necessary, reset to insure correct operating pressure. The tank or control valve need not be disturbed to check the pressure settings.

CAUTION: Use only high pressure testing equipment; pressure can exceed 2800 psi (196.8 kg/cm²) (19 305 kPa).

Before installing test equipment, place the bucket flat on the ground. With the engine shut

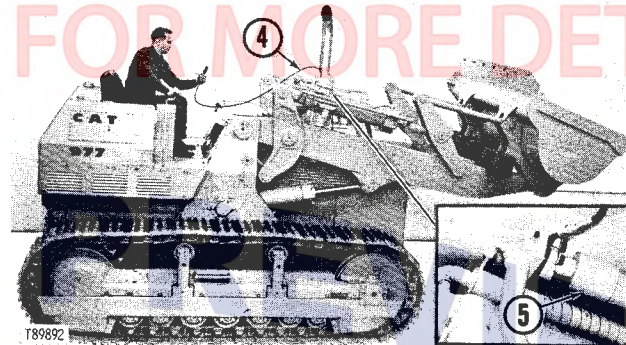


HYDRAULIC TANK WITH SIDE COVER REMOVED
(Earlier machine with dual sensing relief valve shown)

1. Shims, adjustment of tilt circuit relief valve (rod ends). 2. Shims, adjustment of main pressure relief valve. 3. Shims, adjustment of tilt circuit relief valve (head ends, dual sensing).

off, move the lift and tilt control levers to all positions to relieve pressure in the hydraulic lines. Return the control levers to the HOLD position.

Tilt Circuit Relief Valve (Rod Ends):



TYPICAL TEST GAUGE INSTALLATION

4. Pressure plate, hose assembly and 7S8714 Pressure Gauge (0 to 4000 psi). 5. Tilt cylinder oil line (rod end).

Assemble the pressure plate, hose assembly and 7S8714 Pressure Gauge (0 to 4000 psi) (4) in the tilt cylinder oil line (rod end) (5).

Start the engine. Raise bucket so lift arm is horizontal. Place blocks on lever stops on both sides of the lift arm. Tilt bucket back against the block to build up pressure in rod ends of the tilt cylinders. Return tilt control lever to HOLD position.

With engine speed at low idle, lower the bucket. Observe the pressure reading on the gauge as the tilt cylinder rods are pulled out of their cylinders. The reading should be within ± 25 psi (± 1.7 kg/cm²) (173 kPa) of the pressure stamped on the retainer of the valve. 2650 psi (186.3 kg/cm²) (18 272 kPa) is on the retainer of 3J8878 Relief Valve. 5J9106 Relief Valve pressure is 2800 psi (196.84 kg/cm²) (19 306 kPa).

PRESSURE CHANGE BY REMOVAL OR ADDITION OF ONE 2J8200 SHIM		
VALVE NO.	SHIM THICKNESS	CHANGE IN psi
3J8878	.010 in. (0.25 mm)	42 psi (2.9 kg/cm ²) (290 kPa)

PRESSURE CHANGE BY REMOVAL OR ADDITION OF ONE SHIM IN 5J9106 VALVE		
SHIM NO.	SHIM THICKNESS	CHANGE IN PSI
5J9100	.005 in. (0.13 mm)	25 psi (1.7 kg/cm ²) (173 kPa)
5J9101	.010 in. (0.25 mm)	50 psi (3.52 kg/cm ²) (345 kPa)

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When the word "permissible" is in the description, the specification given is the "maximum or minimum" tolerance permitted before adjustment, repair and/or new parts are needed.

A comparison can be made between the measurements of a worn part, and the specifications of a new part to find the amount of wear. A part that is worn can be safe to use if an estimate of the remainder of its service life is good. If a short service life is expected, replace the part.

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NOTE: For Systems Operation and Testing and Adjusting, make reference to the 977 POWER TRAIN, Form No. REG00655. For POWER SHIFT TRANSMISSION TESTING AND ADJUSTING see Form No. REG01613 and REG01662.

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CLICK ANYWHERE FOR MORE DETAILS

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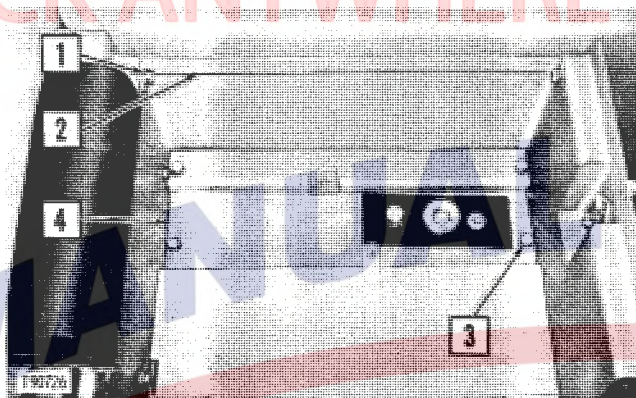
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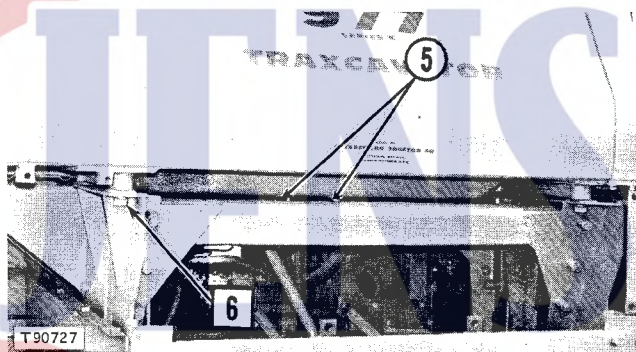
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SEAT, FUEL TANK AND MISCELLANEOUS

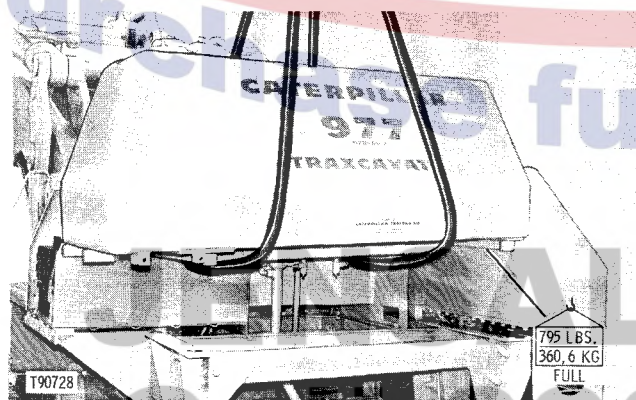
FUEL TANK REMOVAL AND INSTALLATION



1—Bolts (two). 2—Brace. 3—Bolts (four). 4—Plate.

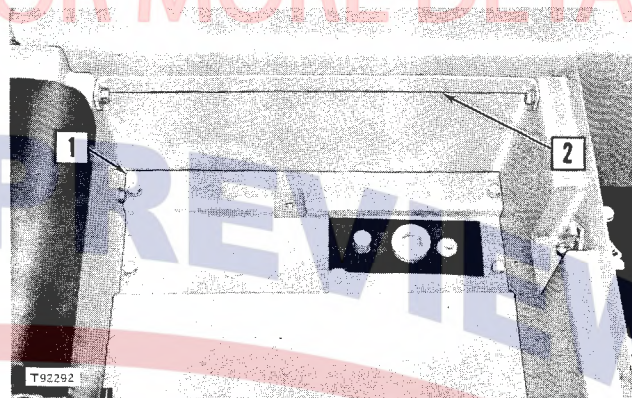


5—Fuel shut-off valves. Close the valves and disconnect the lines. 6—Bolts (four).



795 LBS.
360, 6 KG
FULL

BATTERY BOX AND CONSOLE REMOVAL AND INSTALLATION

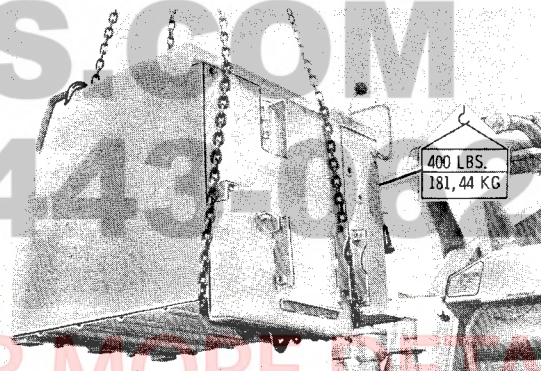


1—Plate. 2—Brace.



3—Bolts (four). 4—Bolts (two). 5—Floor plates. 6—Bolts (two). 7—Bolts (three).

8. From inside the battery box, disconnect the governor control linkage and the battery ground cable. Attach a hoist and remove as shown.



400 LBS.
181, 44 KG

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INTRODUCTION

The specifications given in this book are on the basis of information available at the time the book was written. These specifications give the torques, operating pressure, measurements of new parts, adjustments and other items that will affect the service of the product.

When the words “use again” are in the description, the specification given can be used to determine if a part can be used again. If the part is equal to or within the specification given, use the part again.

When the word “permissible” is in the description, the specification given is the “maximum or minimum” tolerance permitted before adjustment, repair and/or new parts are needed.

A comparison can be made between the measurements of a worn part, and the specifications of a new part to find the amount of wear. A part that is worn can be safe to use if an estimate of the remainder of its service life is good. If a short service life is expected, replace the part.

NOTE: The specifications given for “use again” and “permissible” are intended for guidance only and Caterpillar Tractor Co. hereby expressly denies and excludes any representation, warranty or implied warranty of the reuse of any component.

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NOTE: For Systems Operation and Testing and Adjusting, make reference to 977 LOADER HYDRAULIC SYSTEM, Form No. REG00658.

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