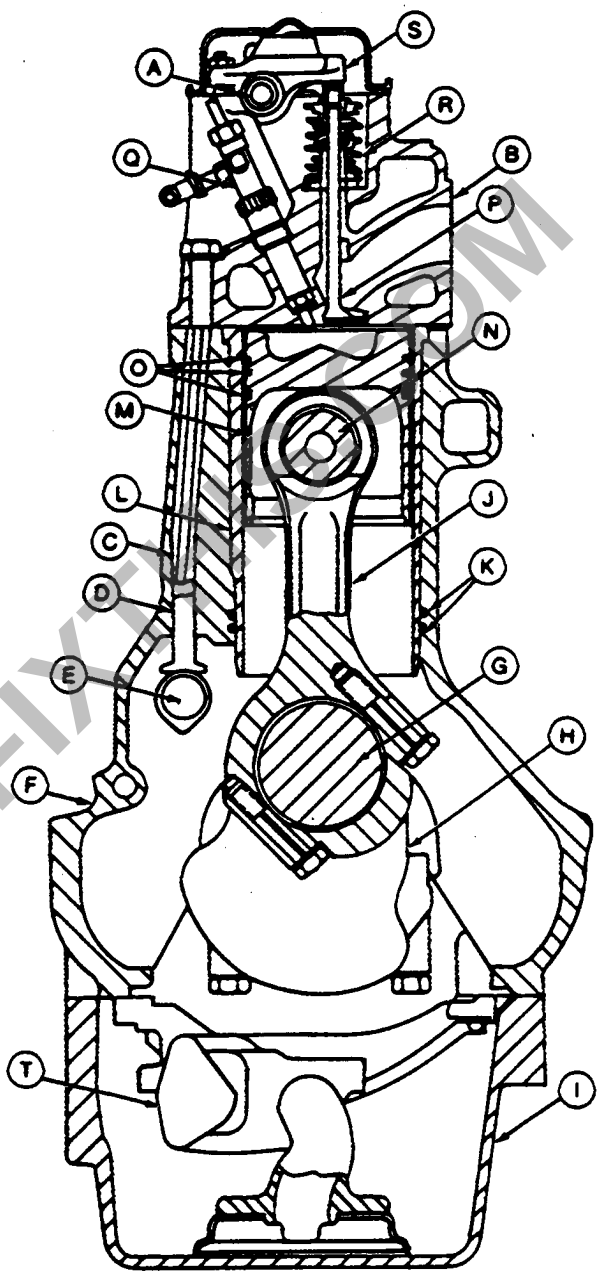
ENGINE—SECTIONAL VIEW

A—Rocker Arm Shaft
B—Cylinder Head
C—Push Rod
D—Cam Follower
E—Camshaft
F—Cylinder Block
G—Crankshaft
H—Crankshaft Counterweight
I—Oil Pan
J—Connecting Rod
K—Liner Packing Rings
L—Cylinder Liner
M—Piston
N—Piston Pin
O—Piston Rings
P—Valve
Q—Fuel Injection Nozzle
R—Valve spring
S—Rocker Arm
T—Oil Pump



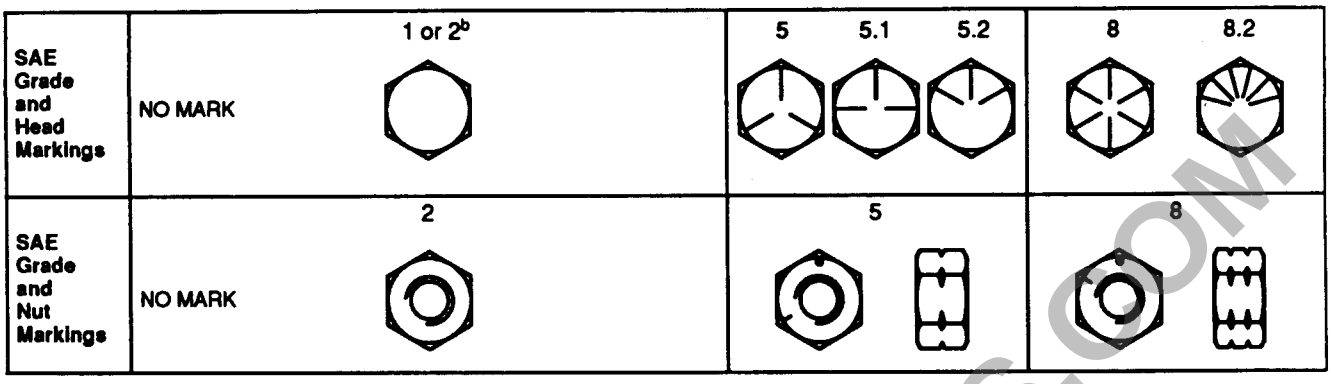
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UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



TS1162 -19-04MAR91

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

DX,TORQ1 -19-15MAR91

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DIAGNOSING MALFUNCTIONS

• Sticking Valves:

Carbon deposits on valve stem.
Worn valve guides.
Warped valve stems.
Cocked or broken valve springs.
Worn or distorted valve seats.
Insufficient lubrication.

• Warped, Worn, or Distorted Valve Guides:

Lack of lubrication.
Cylinder head distortion.
Excessive heat.
Unevenly tightened cylinder head cap screws.

• Distorted Cylinder Head and Gasket Leakage:

Loss of cylinder head cap screw torque.
Broken cylinder head cap screw.
Overheating from low coolant level operation.
Insufficient liner standout.
Coolant leakage into cylinder causing hydraulic failure of gasket.
Leaking aftercooler.
Cracked cylinder head.
Cracked cylinder liner.
Damaged or incorrect gasket.
Overpowering or overfueling.
Damaged cylinder head or block surfaces.
Improper surface finish on cylinder head.
Improperly tightened cylinder head cap screws.
Faulty gasket installation (misaligned).

• Worn or Broken Valve Seats:

Misaligned valves.
Distorted cylinder head.
Carbon deposits on seats due to incomplete combustion.
Valve spring tension too weak.
Excessive heat.
Improper valve clearance.
Improper valve timing.

• Burned, Pitted, Worn, or Broken Valves:

Worn or distorted valve seats.
Worn valve guides.
Insufficient cooling.
Cocked or broken valve springs.
Improper engine operation.
Improper valve train timing.
Faulty valve rotators.
Warped or distorted valve stems.
“Stretched” valves due to excessive spring tension.
Warped cylinder head.
Bent push rods.
Carbon build-up on valve seats.
Rocker arm failure.

• Improper Valve Clearance:

Inefficient use of fuel.
Engine starts harder.
Maximum engine power will not be achieved.
Shorter service life of valve train.
Greater chance for engine to overheat.

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REMOVE CYLINDER HEAD

It is not necessary to remove engine from machine to service cylinder head on all applications. Refer to your Machine Technical Manual for engine removal procedure, if required.

CAUTION: After operating engine, allow exhaust system to cool before removal.

DO NOT drain coolant until the coolant temperature is below operating temperature. Always loosen drain valve slowly to relieve any excess pressure.

1. Drain engine coolant.

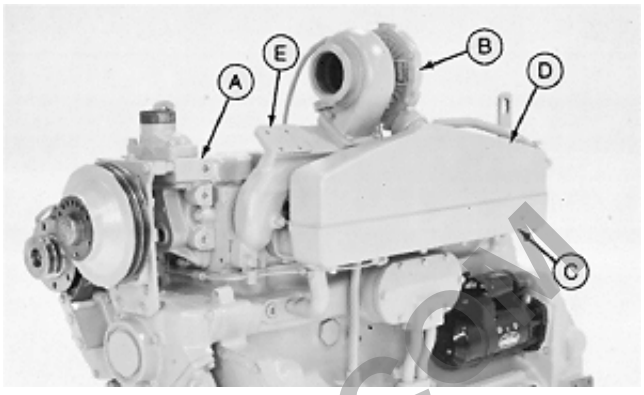
2. Remove water manifold (A) and all coolant piping. (See Cooling System, Group 25.)

3. Remove turbocharger (B) and exhaust elbow. (See Air Intake and Exhaust System, Group 30.)

4. On 6076A Engines, remove aftercooler assembly (D). (Group 30.)

5. Remove air intake manifold (C). (Group 30.)

6. Remove exhaust manifold (E). (Group 30.)



RG5243 -UN-06DEC88

A—Water Manifold
B—Turbocharger
C—Intake Manifold
D—Aftercooler Assembly
E—Exhaust Manifold

S11,2005,MP -19-25MAR91

7. Remove fuel injection lines (A) and nozzles (B). (See Fuel System, Group 35.)

8. Remove rocker arm cover (C) and ventilator outlet hose assembly.



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ENGINE CRANKCASE OIL FILL QUANTITIES

Listed below are crankcase oil fill quantities with filter change for all 6076 Engine applications.

Fill crankcase with quantity of oil shown for your engine application.

• JOHN DEERE AGRICULTURAL APPLICATIONS

Machine Model No.	Engine Model	Crankcase Oil Fill Quantity with Filter Change
COMBINES*		
Harvester Works		
9500	6076TH001, TH004,	25.0 L (26.5 qt)
9500	6076HH001	25.0 L (26.5 qt)
9600	6076HH001, TH001	25.0 L (26.5 qt)
9600 Export	6076HH002	25.0 L (26.5 qt)
COTTON PICKERS		
Des Moines		
9960	6076AN001	24.0 L (25.5 qt)
TRACTORS - WATERLOO		
4055	6076TRW06, 08	18.0 L (19.0 qt)
4055 Export	6076TRW08	18.0 L (19.0 qt)
4255	6076TRW01	18.0 L (19.0 qt)
4255 Export	6076TRW03	18.0 L (19.0 qt)
4255 Hi-Crop	6076TRW02	18.0 L (19.0 qt)
4455	6076TRW04	18.0 L (19.0 qt)
4455 Export	6076TRW05	18.0 L (19.0 qt)
4555	6076TRW07	21.0 L (22.0 qt)
4560	6076TRW09	21.0 L (22.0 qt)
4755	6076ARW01, 06	21.0 L (22.0 qt)
4755 Export	6076ARW02	21.0 L (22.0 qt)
4760	6076ARW07	21.0 L (22.0 qt)
4955	6076ARW03, 05	21.0 L (22.0 qt)
4955 Export	6076ARW02, 04	21.0 L (22.0 qt)
4960	6076ARW08, 11	21.0 L (22.0 qt)
8560 4-Wheel Drive	6076HRW01, 02	24.0 L (25.5 qt)
TRACTORS - VENEZUELA		
4255	6076TCZ01	18.0 L (19.0 qt)
4455	6076TCZ02	18.0 L (19.0 qt)
4555	6076TCZ03	21.0 L (22.0 qt)

**Combine Serial Number (—644999)*

RG,CTM6,G20,1 -19-03SEP91

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GENERAL TUNE-UP RECOMMENDATIONS

A tune-up should be performed as often as necessary to maintain optimum performance within the general condition limits of the engine. Refer to your operator's manual.

The following services are recommended each time a tune-up is performed. Disregard those services that do not apply to any particular application.

Operation	Detailed Reference
Change engine oil and filters.	Operator's Manual
Lubricate PTO clutch internal levers and linkage.	Operator's Manual
Replace fuel filter.	Group 35
Clean crankcase vent tube.	This Group
Check air intake system. Replace air cleaner elements.	This Group/Operator's Manual
Check entire exhaust system.	This Group
Check and service engine cooling system.	This Group/Operator's Manual
Check entire electrical system.	This Group
Check crankshaft vibration damper.	Group 105
Inspect turbocharger and check turbocharger boost pressure.	Group 110
Check fuel injection system: Check engine-to-injection pump timing, clean injection nozzles, and adjust nozzle opening pressure.	Group 35 and 115
Check engine oil pressure. Adjust if necessary.	Group 105
Check engine valve clearance. Adjust if necessary.	Group 105
Check engine speeds. Adjust if necessary.	Group 115
Check engine performance on dynamometer.	Group 105

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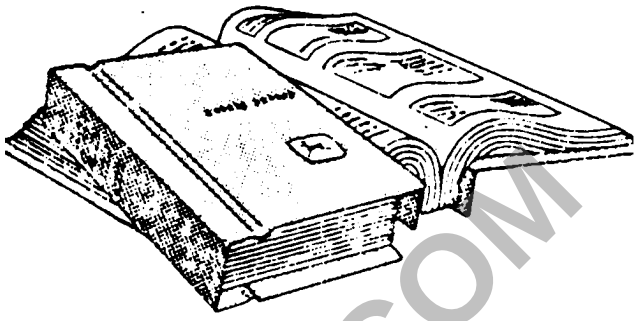
ABOUT THIS MANUAL

This Component Technical Manual (CTM6) covers the recommended repair procedure for all 6076, 7.6 L (466 cu. in.) diesel engines, serial no. (—499999), and produced in Waterloo, Iowa. For repair information on 6076 engines produced after serial no. (499999—) refer to CTM42.

Before beginning repair of an engine, clean engine and mount on a repair stand. (See ENGINE MOUNTING in Group 03.)

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manuals for information or components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Follow only the procedures that apply to the engine model number you are working on. If only one procedure is given, that procedure applies to all 6076 diesel engines in this manual.



RG4624 -UN-15DEC88

S55,2000,DA -19-24SEP91

HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227 -UN-23AUG88

DX,FLAME -19-04JUN90

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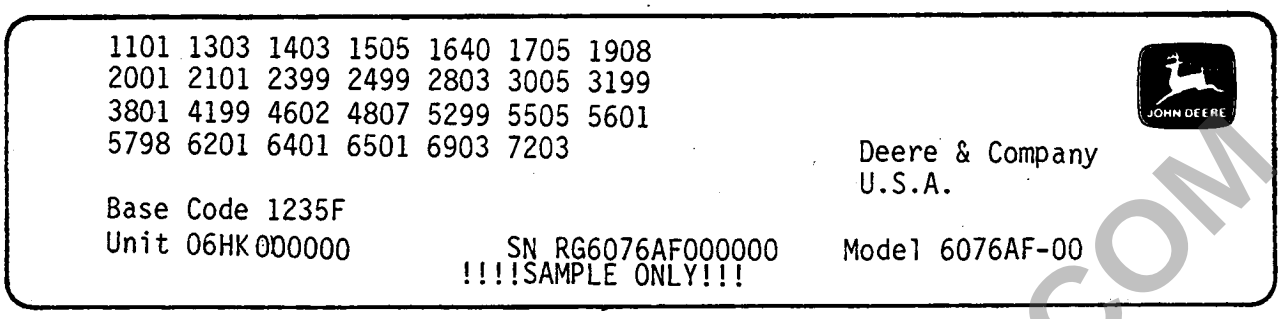
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OPTION CODE LABEL



An option code label is affixed to the rocker arm cover on all OEM engines. (Label is not installed on engines for John Deere machines.) The option code label can be easily destroyed, so keep a copy of options on your engine in a safe place.

The label identifies only the factory-installed options on each engine. Distributor/Dealer installed kits would not be shown.

A four-digit number is used to identify a particular option. For example, Code 1403 indicates that the engine is equipped with an SAE No. 3 flywheel housing.

Always provide option code information when ordering repair parts. A listing of option codes is given in the Operator's Manual.

S55,2000,DF -19-20MAR91

JOHN DEERE INDUSTRIAL EQUIPMENT APPLICATIONS

Machine Model No.	Engine Model
LOADERS	
644E	6076TDW01, 02
644EH	6076ADW01
FORKLIFTS, 4-WHEEL DRIVE	
644ER	6076ADW02
SKIDDERS	
740E, 740EH	6076TDW02
SP740E	6076ADW03

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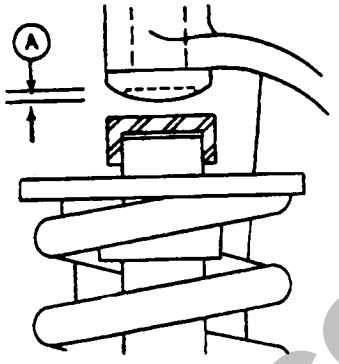
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6. Check for cups or concave wear (A) on ends of rocker arms where they contact wear caps.

7. Examine spacer springs on shaft between rocker arms. Be sure they are strong enough to exert a positive pressure on rocker arms.

NOTE: If the rocker arm has been damaged by a valve failure, replace it and the push rods when replacing valves.

8. Roll rocker arm shaft and push rods on a flat surface to check for bends or distortion. Replace parts as necessary.

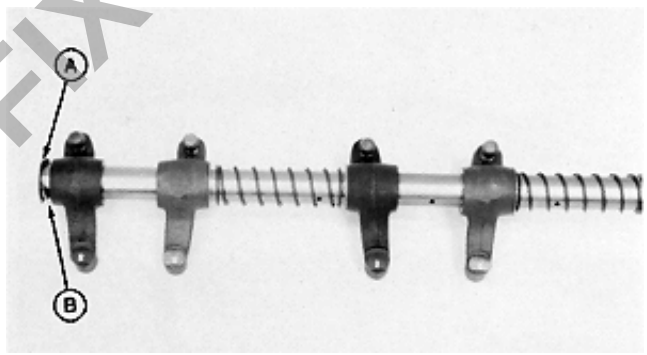


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S11,0401,N -19-05FEB85

9. Assemble parts on rocker arm shaft opposite removal procedure.

Make sure rocker arm shaft end plugs (A) are firmly seated against end of shaft, and washers (B) are installed on shaft.



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S11,0401,O -19-23APR82

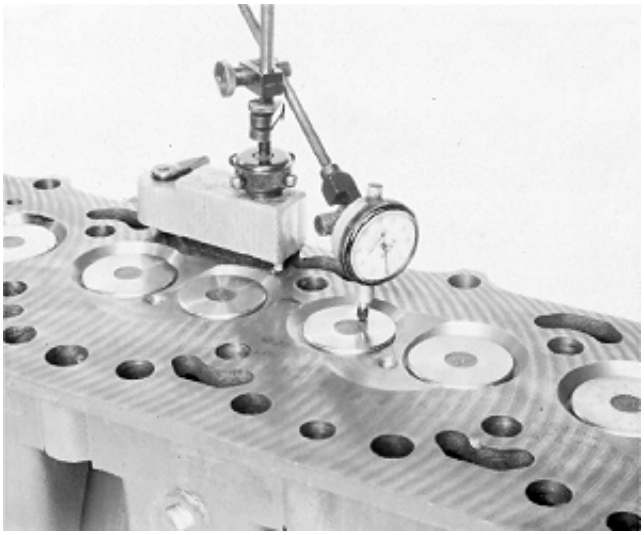
MEASURE VALVE RECESS

1. Measure and record valve recess dimensions for all valves using a magnetic base dial indicator.

VALVE RECESS SPECIFICATIONS

Valve Recess Below Cylinder Head:	
Exhaust	1.19—1.70 mm (0.047—0.067 in.)
—Maximum Recess	2.46 mm (0.097 in.)
Intake	3.35—3.86 mm (0.132—0.152 in.)
—Maximum Recess	4.62 mm (0.182 in.)

NOTE: If measurement does not meet specifications, install either new valves or inserts, or both to obtain proper valve height. (See REPLACE VALVE SEAT INSERTS, later in this group.)

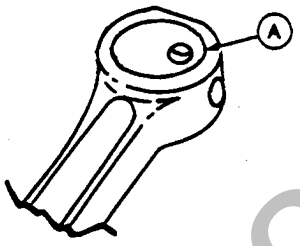


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CLEAN AND INSPECT ROD PIN BUSHING BORE



-UN-13DEC88
RG5227

1. Clean rod bushing bore using a medium grit emery cloth, as burrs will distort bushing. Install bushing on opposite side of rod burr.

2. If necessary, file a slight chamfer (A) around bore to remove any sharp edges. Chamfer will also aid in bushing installation.

3. Measure rod bushing bore in three places approximately 45° apart. Compare the measurements with the specifications given below:

ROD PIN BUSHING SPECIFICATIONS

Rod Pin Bore Diameter Without Bushing	52.354—52.380 mm (2.0612—2.0622 in.)
Rod Pin Bore-to-Bushing Press Fit Specification	0.084—0.147 mm (0.0033—0.0058 in.)
ID of Installed Service Rod Pin Bushing (Before Honing)	47.58—47.63 mm (1.8732—1.8751 in.)
ID of Installed Rod Pin Bushing (After Honing)	47.65—47.68 mm (1.8762—1.8772 in.)

IMPORTANT: If rod pin bushing bore diameter is not within specification or bushing has spun in rod, discard rod and replace with a new one.

10
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S11,2010,JJ -19-24SEP91

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CHECK OIL SEAL HOUSING RUNOUT

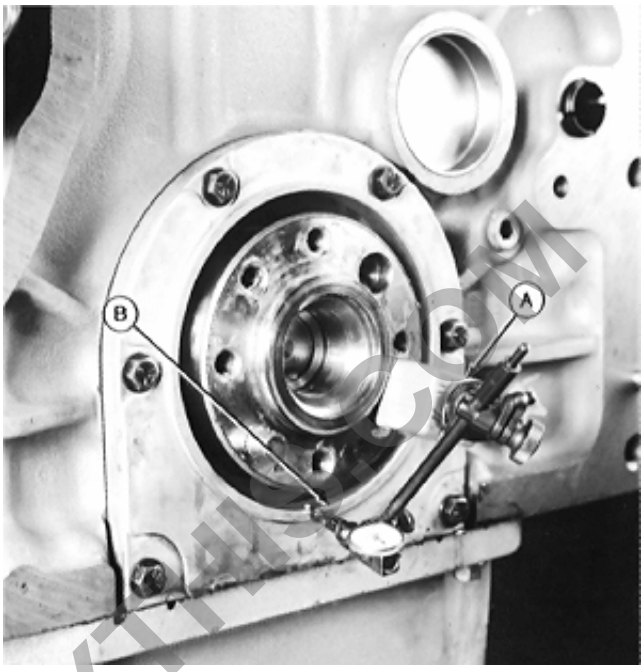
IMPORTANT: On service “shortblock” assemblies, rear oil seal housing runout is preset at the factory. Do not remove housing from block.

1. Position magnetic base dial indicator (A) on end of crankshaft flange as shown. Preset dial indicator tip on ID of oil seal housing bore (B).

2. Zero dial indicator and rotate crankshaft one full revolution, observe full indicator movement. The maximum oil seal housing bore runout is 0.15 mm (0.006 in.).

If runout exceeds specification, loosen cap screws and adjust housing to obtain an acceptable runout while keeping bottom of seal housing flush with oil pan mating surface.

3. Recheck oil seal housing bore runout. If runout still exceeds specification, oil seal housing bore is possibly distorted and should be replaced. See INSTALL REAR CRANKSHAFT OIL SEAL HOUSING, earlier in this group.



RG5751 -UN-05AUG91

S11,2515,AK -19-22AUG91

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REMOVE VERTICAL OIL FILTER AND HOUSING ASSEMBLIES

1. Turn oil filter (D) counterclockwise and remove filter from filter base.

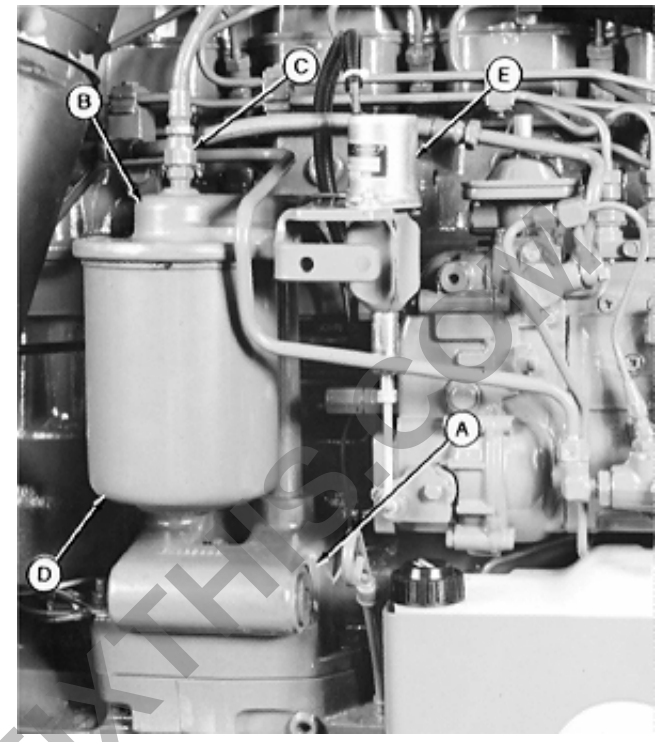
2. Disconnect turbocharger oil inlet line (C) from oil filter base.

3. Disconnect electrical wiring connector and remove fuel shut-off solenoid and bracket (E) from oil filter base (B). Note location of solenoid ground wire for reassembly.

4. Remove two cap screws securing oil filter base to cylinder block and remove filter base. Remove two oil delivery tubes (not shown) and discard O-rings.

5. Remove valve housing (A) from cylinder block.

A—Valve Housing
B—Oil Filter Base
C—Turbocharger Oil Inlet Line
D—Oil Filter
E—Fuel Shut-off Solenoid



RG5735 -UN-05AUG91

RG,CTM6,G20,6 -19-04SEP91

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REMOVE TURBOCHARGER

CAUTION: After operating engine, allow exhaust system to cool before removal.

1. Clean exterior of turbocharger to prevent entry of dirt into the air intake system during removal.

IMPORTANT: When cleaning turbocharger, do not spray directly into compressor cover or turbine housing. If turbocharger inspection is required, do not clean exterior prior to removal. Doing so may wash away evidence of a potential failure mode. (See Turbocharger Seven Step Inspection, later in this group.)

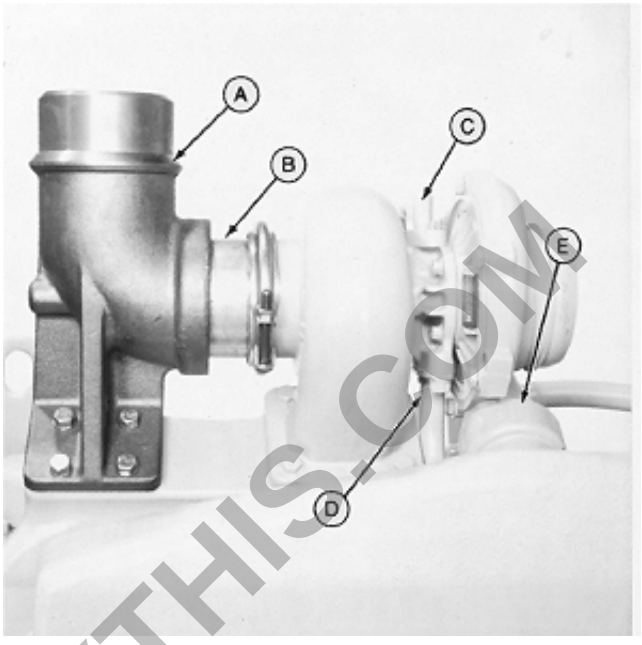
NOTE: Your 6076 Engine is equipped with either AiResearch/Garrett, Holset, or Schwitzer turbochargers. Removal and installation procedures are the same for all turbochargers, but repair of AiResearch/Garrett and Schwitzer differ. Refer to the proper repair section when repairing turbocharger. Repair parts are not available for Holset turbochargers; if defective, install a replacement.

2. Remove exhaust elbow (A). Remove clamp and exhaust adapter (B).

3. Disconnect oil inlet line (C). Loosen oil return tube cap screws using JDG626 Special Socket Adapter with JDE80 and standard 9/16 12-point, 3/8 in. drive socket and remove oil return tube (D). Discard gasket.

4. Remove four turbocharger mounting cap screws with washers and lift turbocharger from exhaust manifold. Disengage turbocharger from intake manifold coupling (E). Discard turbocharger-to-coupling O-ring.

5. Cap or plug all openings (exhaust and intake manifold related) and place turbocharger on a clean flat table for inspection.



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6076A shown, 6076T and H similar

A—Exhaust Elbow
B—Exhaust Adapter
C—Oil Inlet Line
D—Oil Return Tube
E—Intake Manifold Coupling

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DISASSEMBLE AND CLEAN HYDRAULIC ANEROID ACTIVATOR PARTS

1. Remove gasket (G), piston (F) and piston spring (E).

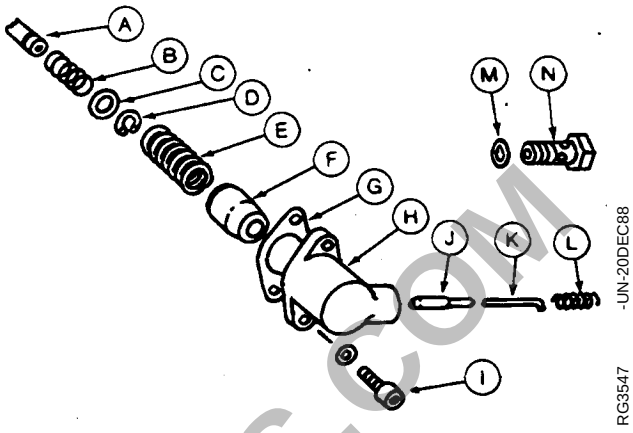
2. Wash all parts in clean solvent and dry with compressed air. Blow out all openings to make sure they are open.

3. Check piston (F) and activator housing (H) for general condition. Piston must move freely in its bore.

4. Inspect piston spring (E) and capillary valve spring (L). Replace if weak or broken.

5. Inspect condition of restrictor wire (K). Wire must not be bent or broken and must fit loosely in capillary valve (J).

6. Check condition of return spring (B), washer (C) and retaining ring (D) on starting fuel control shaft (A). Replace spring if weak or broken. Be sure retaining ring is secure on shaft.



A—Starting Fuel Control Shaft
B—Return Spring
C—Washer
D—Retaining Ring
E—Piston Spring
F—Piston
G—Gasket
H—Activator Housing
I—Mounting Screw (2 used)
J—Capillary Valve
K—Restrictor Wire
L—Capillary Valve Spring
M—Washers
N—Special Screw

S11,3010,DT -19-11SEP91

ASSEMBLE AND INSTALL HYDRAULIC ANEROID ACTIVATOR

NOTE: Refer to previous illustration.

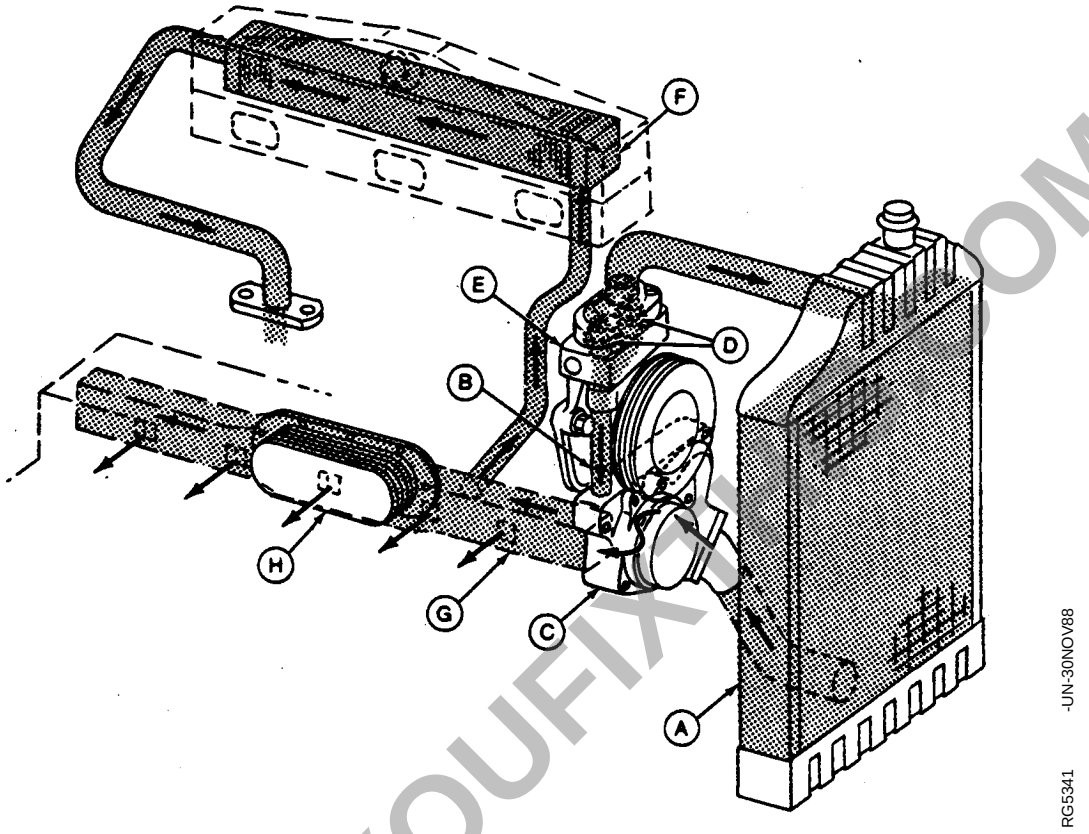
1. Insert piston spring (E) into piston (F). Place these parts in activator housing (H).

2. Using a new gasket (G) mount activator assembly on governor housing. Tighten Allen head mounting screws (I) and washers securely.

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HOW THE COOLING SYSTEM WORKS



A—Radiator
B—Coolant Bypass Pipe
C—Water Pump
D—Thermostats (2 used)
E—Water Manifold
F—Aftercooler ('A' Engines)
G—Main Coolant Gallery
H—Engine Oil Cooler

6076A Engine Cooling System

The pressurized cooling system consists of a conventional radiator (A), water pump (C), thermostats (D), and water manifold (E).

The pump draws coolant from the bottom of the radiator and discharges it into the main coolant gallery (G) on the left-hand side of the engine block. Coolant from the gallery circulates through the block to cool block and cylinder liners, then flows into the cylinder head. From the cylinder head, the coolant passes into the water manifold and thermostat housing.

If the thermostats are closed (as during warm-up periods), coolant is directed back to the pump through the bypass pipe (B) to be recirculated. This provides a faster and more uniform warm-up.

If the thermostats are open (engine at normal operating temperature), some coolant flows back through the thermostats to the top of the radiator.

On 6076A engines, coolant is also taken from the main gallery into the aftercooler (F) to cool intake air. It circulates through the aftercooler and back into the the cylinder head.

The engine oil cooler (H) located in the main gallery, receives its cooling capability from the coolant flow around it.

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