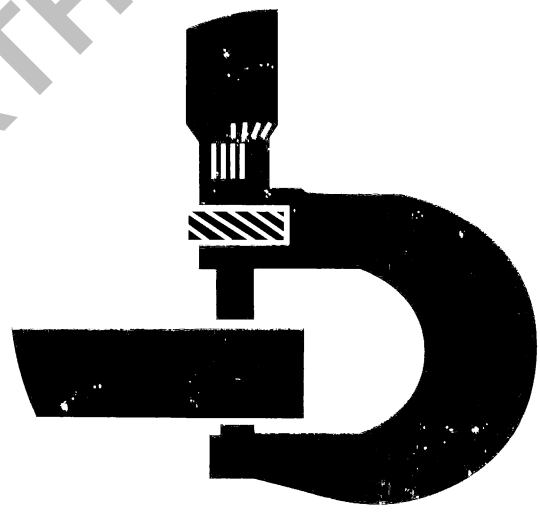
POWERTECH® 4.5L & 6.8L 4045 and 6068 Diesel Engines



PREVIEW - YOUFIXTHIS.COM

For complete service information also see:

Alternators and Starting Motors	CTM77
OEM Engine Accessories	CTM67

Deere Power Systems Group
CTM104 (12OCT98)
LITHO IN U.S.A.
ENGLISH

JOHN DEERE

DEERE POWER

Download full manual at youfixthis.com

Contents

SECTION —4.5 L and 6.8 L Engines
Group 00—Safety
Group 01—General Information
Group 02—Fuels, Lubricants and Coolant
Group 03—Engine Mounting
Group 04—Engine Rebuild Guide
Group 05—Cylinder Head and Valves
Group 10—Cylinder Block, Liners, Pistons and Rods
Group 15—Crankshaft, Main Bearings and Flywheel
Group 16—Camshaft, Balancer Shafts and Timing Gear Train
Group 20—Lubrication System
Group 25—Cooling System
Group 30—Air Intake and Exhaust System
Group 35—Fuel System
Group 40—Starting and Charging Systems
Group 100—Engine Tune-Up and Break-In
Group 105—Engine System Operation and Tests
Group 110—Air Intake and Exhaust System Operation and Tests
Group 115—Fuel System Operation and Tests
Group 199—Dealer Fabricated Tools

PREVIEW - YOUFIXTHIS.COM

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

COPYRIGHT © 1998
DEERE & COMPANY
Moline, Illinois
All rights reserved
A John Deere ILLUSTRUCTION® Manual
Previous Editions
Copyright © 1996

Download full manual at youfixthis.com

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–

DX,FLAME –19–04JUN90–1/1

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



TS204 –UN–

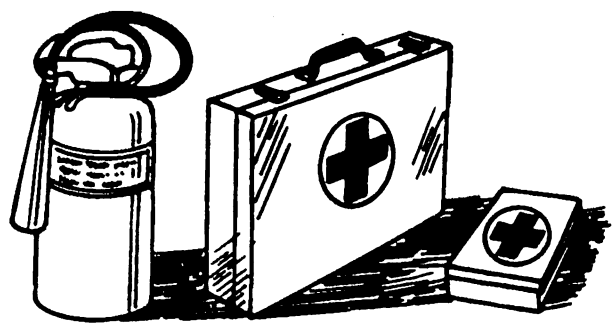
DX,SPARKS –19–03MAR93–1/1

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 –UN–

DX,FIRE2 –19–03MAR93–1/1

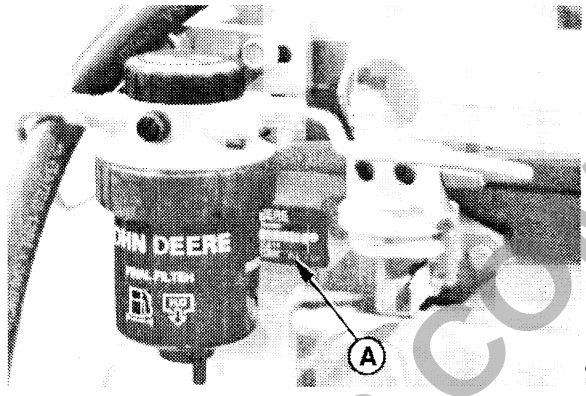
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

01
4

ENGINE SERIAL NUMBER PLATE INFORMATION

IMPORTANT: The engine serial number plate (A) can be easily destroyed. Before "hot tank" cleaning the block, remove the plate.



RG7778 –UN–

Engine Serial Number (B)

Each engine has a 13—digit John Deere engine serial number identifying the producing factory, engine model designation, and a 6—digit sequential number. The following is an example:

T04045T000000

T0	Factory producing engine
4045T	Engine model designation
000000	Sequential serial number
Factory Code (Manufacturer)	
T0	Dubuque, Iowa
CD	Saran, France
PE	Torreon, Mexico
Engine Model Designation	
4045T	Definition explained previously. (See ENGINE MODEL DESIGNATION earlier in this group.
Sequential Number	
000000	6-digit sequential serial number



RG9060 –UN–

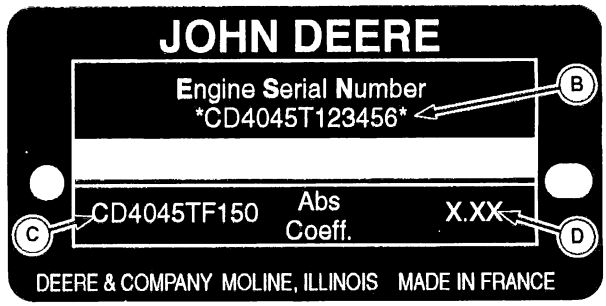
Dubuque Engine Serial Number Plate

Engine Application Data (C)

The second line of information on the serial number plate identifies the engine/machine or OEM relationship. See ENGINE APPLICATION CHART later in this group.

Coefficient of Absorption (D) — (Saran-built engines only)

The second line of information on Saran serial number plate also contains the coefficient of absorption value for smoke emissions.



RG9061 –UN–

Saran Engine Serial Number Plate



RG9062 –UN–

Torreon Engine Serial Number Plate

A—Engine Serial Number Plate
B—Engine Serial Number
C—Engine Application Data
D—Coefficient of Absorption (Saran Engines Only)

RG,01,DT7029 –19–29OCT97–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

10
40

INSPECT AND CLEAN CYLINDER BLOCK

Before inspecting and cleaning cylinder block, remove all of the following:

- piston cooling orifices (A)
- soft plugs (B)
- oil galley plugs (C) (using JDG782 Oil Galley Plug Tool)

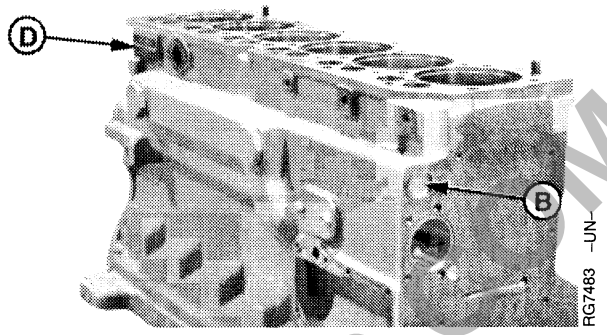
- all external and internal mounted components (refer to the proper group for removal procedures)

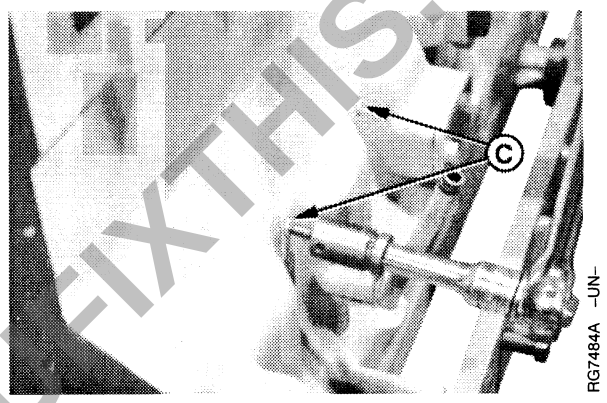
IMPORTANT: If block is cleaned in a hot tank, be sure to remove any aluminum parts such as nameplates (D). Aluminum parts can be damaged or destroyed by hot tank solutions.

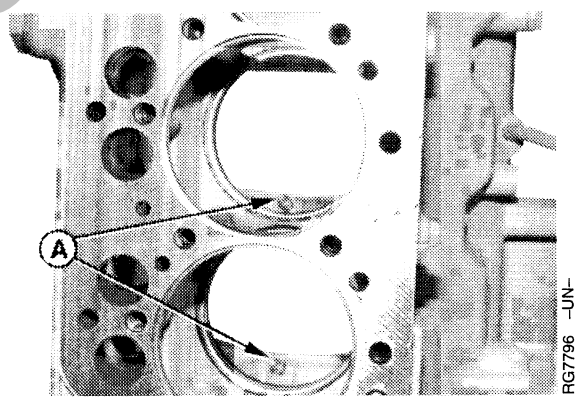
1. Clean block thoroughly using cleaning solvent, pressure steam, or a hot tank.

2. All passages and crevices must be clear of sludge, and grease.

3. All coolant passages must be clear of lime deposits and scale.







A—Piston Cooling Orifice
B—Soft Plug
C—Oil Galley Plug
D—Nameplate

Continued on next page

RG,10,DT7402 –19–11NOV97–1/2

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

CYLINDER HEAD AND VALVES SPECIFICATIONS

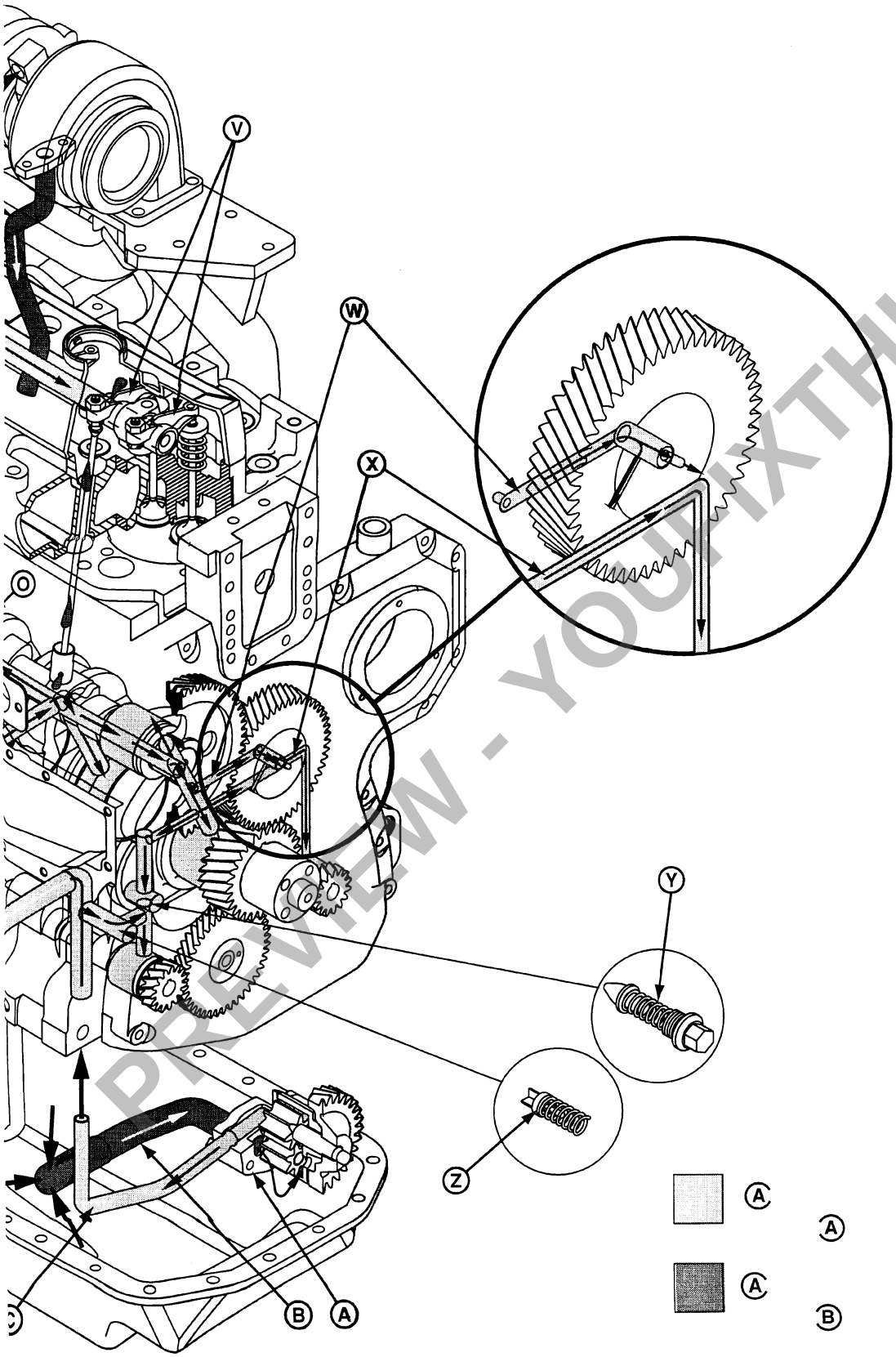
Item	Measurement	Specification
Intake Valve Clearance Checking (Rocker Arm-to-Valve Tip) (Engine Cold)	Clearance	0.31—0.38 mm (0.012—0.015 in.)
Exhaust Valve Clearance Checking (Rocker Arm-to-Valve Tip) (Engine Cold)	Clearance	0.41—0.48 mm (0.016—0.019 in.)
Intake Valve Clearance Adjustment (Rocker Arm-to-Valve Tip) (Engine Cold)	Clearance	0.36 mm (0.014 in.)
Exhaust Valve Clearance Adjustment (Rocker Arm-to-Valve Tip) (Engine Cold)	Clearance	0.46 mm (0.018 in.)
Rocker Arm Adjusting Screw Jam Nut	Torque	27 N•m (20 lb-ft)
Intake Valves	Lift	11.77—12.21 mm (0.463—0.481 in.)
	Wear Limit	11.34 mm (0.447 in.)
Exhaust Valves	Lift	11.51—11.94 mm (0.453—0.470 in.)
	Wear Limit	11.08 mm (0.436 in.)
Rocker Arm Assembly		
Spring Tension at 46 mm (1.81 in.) Compressed Height	Spring Tension	18—27 N (4—6 lb-force)
Spring Compressed Height	Height	46 mm @ 18—27 N (1.81 in. @ 4—6 lb force)
Shaft	OD	19.99—20.02 mm (0.787—0.788 in.)
	Wear Limit	19.94 mm (0.785 in.)
Shaft Support ID	Maximum ID	20.17 mm (0.794 in.)

Continued on next page

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

HOW THE ENGINE LUBRICATION SYSTEM WORKS

RG9104 –UN–



PREVIEW - YOUFIXTHIS.COM

DPSG,OUO1004,131 –19–15MAY98–1/2

Download full manual at youfixthis.com

Cylinder Head (See Group 05.)

- Check surface flatness/finish.
- Inspect for surface damage.
- Check cylinder head thickness, if resurfacing.

Cylinder Block and Liners (assembled and clamped) (See Group 05 or 10.)

- Check liner standout at four places on each liner.
- Check liner standout difference between cylinders.

Cylinder Block (See Group 10.)

- Check surface flatness/finish.
- Inspect for surface damage.
- Check liner counterbore depth (if liner is removed).
- Check top deck to crankshaft centerline dimension.
- Inspect cap screw bosses, must be clean/intact.

Cylinder Liner (See Group 10.)

- Check liner flange flatness/finish.
- Check liner flange thickness (if liner is removed).
- Inspect flange for damage.

Cylinder Head Cap Screws (See Group 05.)

- Inspect for corrosion damage.
- Inspect condition of threads.
- Inspect for straightness.
- Check length.

9. When inspections and measurements have been completed, determine most probable causes of joint failure. Make all necessary repairs to joint components, cooling system, and fuel injection system.
10. Reassemble the engine according to procedures and specifications in the repair groups of this manual.

RG,105,JW7656 –19–21NOV97–2/2

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

ENGINE DISASSEMBLY SEQUENCE

The following sequence is suggested when complete disassembly for overhaul is required. Refer to the appropriate repair group for removal, inspection and repair of individual engine components.

1. Mount engine on a safety approved repair stand. (Group 03)
2. Drain coolant and oil. Perform John Deere OILSCAN®and CoolScan™ analysis. (Group 02)
3. Remove fan belts, fan, and belt tensioner. (Group 25)
4. Remove alternator. (Group 40)
5. Remove turbocharger (if equipped) and exhaust manifold. (Group 30)
6. Remove rocker arm cover and vent tube. If option code label is located on rocker arm cover, be careful not to damage label. (Group 05)
7. On applications where the water manifold is not an integral part of cylinder head, remove water manifold or thermostat housing. (Group 25)
8. Remove oil cooler piping and water pump. (Groups 20 and 25)
9. Remove dipstick, oil filter, oil cooler, and adapter housing (if equipped). (Group 20)
10. Remove oil pressure regulating valve assembly. (Group 20)
11. Remove fuel filter, fuel supply pump, and fuel line. (Group 35)
12. Remove injection lines, injection pump, and injection nozzles. (Group 35)
13. Remove starting motor. (Group 40)
14. Remove rocker arm assembly and push rods. Keep rods in order (Group 05). Check for bent push rods and condition of wear pad contact surfaces on rockers.
15. Remove cylinder head. Check piston protrusion. (Groups 05 and 10).
16. Remove cam followers. Keep followers in order. (Groups 05 and 16)
17. Remove flywheel and flywheel housing. (Group 15)
18. Remove oil pan. (Group 20)
19. Remove crankshaft pulley. (Group 15)
20. Remove timing gear cover. (Group 16)
21. Remove oil pump drive gear, outlet tube, and pump body. (Group 20)
22. Remove timing gears and camshaft. Perform wear checks. (Group 16)
23. Remove balancer shafts (4045 engines). (Group 16)
24. Remove engine front plate. (Group 16)
25. Remove oil by-pass valve. (Group 20)
26. Stamp cylinder number on connecting rod. Remove pistons and rods. Perform wear checks with PLASTIGAGE®. (Group 10)

PREVIEW - YOUFIXTHIS.COM

OILSCAN is a registered trademark of Deere & Company.
CoolScan is a trademark of Deere & Company.
PLASTIGAGE is a registered trademark of the DANA Corp.

Continued on next page

RG,04,JW7725 –19–01DEC97–1/2

Download full manual at youfixthis.com

01
8

GENERAL OEM ENGINE SPECIFICATIONS

ITEM	ENGINE								
	4045DF150	4045TF150	4045TF250	4045HF150	6068DF150	6068TF150	6068TF250	6068HF150	6068HF250
Number of Cylinders	4	4	4	4	6	6	6	6	6
Bore	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)	106 mm (4.19 in.)
Stroke	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)	127 mm (5.0 in.)
Displacement	4.5 L (276 cu in.)	4.5 L (276 cu in.)	4.5 L (276 cu in.)	4.5 L (276 cu in.)	6.8 L (414 cu in.)	6.8 L (414 cu in.)	6.8 L (414 cu in.)	6.8 L (414 cu in.)	6.8 L (414 cu in.)
Compression	17.6:1	17.0:1	17.0:1	17.0:1	17.6:1	17.0:1	17.0:1	17.0:1	17.0:1
Max. Crank Pressure	0.5 kPa (2 H_2O)	0.5 kPa (2 H_2O)	0.5 kPa (2 H_2O)	0.5 kPa (2 H_2O)	0.5 kPa (2 H_2O)	0.5 kPa (2 H_2O)	0.5 kPa 2 H_2O)	0.5 kPa (2 H_2O)	0.5 kPa (2 H_2O)
Governor Regulation (Industrial)	7—10 %	7—10 %	7—10 %	7—10 %	7—10 %	7—10 %	7—10 %	7—10 %	7—10 %
Governor Regulation (Generator)	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %
Oil Pressure Rated Speed	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)	345 kPa (50 psi)
Oil Pressure Low Idle	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)	105 kPa (15 psi)
Length	861.0 mm (33.9 in.)	861.0 mm (33.9 in.)	861.0 mm (33.9 in.)	861.0 mm (33.9 in.)	1117 mm (44.0 in.)	1117 mm (44.0 in.)	1117 mm (44.0 in.)	1116 mm (43.9 in.)	1141 mm (44.9 in.)
Width	598 mm (23.5 in.)	598 mm (23.5 in.)	598 mm (23.5 in.)	598 mm (23.5 in.)	598 mm (23.5 in.)	598 mm (23.5 in.)	598 mm (23.5 in.)	623 mm (24.5 in.)	623 mm (24.5 in.)
Height	854 mm (33.6 in.)	980 mm (38.6 in.)	980 mm (38.6 in.)	980 mm (38.6 in.)	956 mm (37.6 in.)	984 mm (38.7 in.)	984 mm (38.7 in.)	1009 mm (39.7 in.)	1009 mm (39.7 in.)
Weight	387 kg (851 lb)	396 kg (872 lb)	396 kg (872 lb)	396 kg (872 lb)	522 kg (1149 lb)	533 kg (1172 lb)	533 kg (1172 lb)	550 kg (1210 lb)	568 kg (1250 lb)

DPSG,OUO1004,102 –19–28APR98–1/1

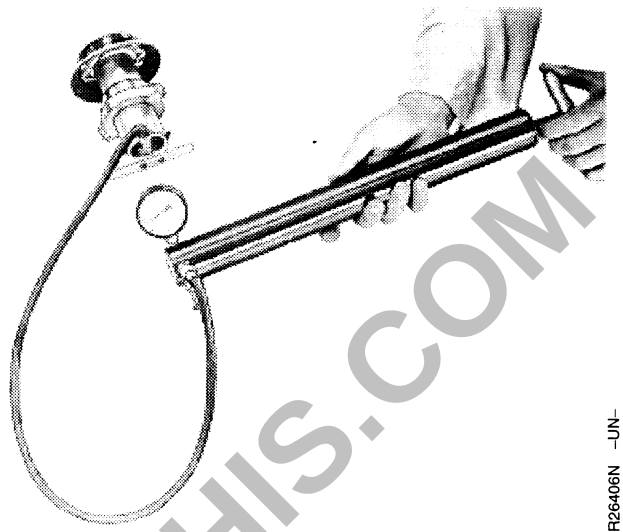
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

105
2

Cooling System Pressure Pump D05104ST

Used to pressure test radiator cap and cooling system.



DPSG,OUO1004,201 –19–07JUL98–5/5

ENGINE TEST SPECIFICATIONS

Item	Measurement	Specification
Engine Compression Pressure Test	Engine Compression Pressure: Minimum	2400 kPa (24 bar) (350 psi)
	Maximum Difference Between Cylinders	350 kPa (3.5 bar) (50 psi)
Minimum Oil Pressure-No Load at Slow Idle and 93°C (200°F) Oil Temperature	Minimum Pressure	100 kPa (1.0 bar) (14 psi)
Minimum Oil Pressure-Full Load at Rated Speed and 105°C (220°F) Oil Temperature[1]	Minimum Pressure	275 kPa (2.75 bar) (40 psi)
Cooling System[2]	Test Pressure	70 kPa (0.7 bar) (10 psi)

[1]Gauge fluctuations and tolerance extremes can result in readings up to 586 kPa (5.86 bar) (85 psi).

[2]Test pressures recommended for all Deere OEM cooling systems. On specific vehicle applications, test cooling system and pressure cap according to the recommended pressure for that vehicle.

DPSG,OUO1004,238 –19–10JUL98–1/1

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

CYLINDER BLOCK, LINERS, PISTONS AND RODS SPECIFICATIONS

Item	Measurement	Specification
Piston Rings—4045DF, TF150 and 6068DF, TF150 Engines	End Gap (No. 1 Compression)) End Gap (No. 2 Compression) End Gap (No. 3 Oil Control)	0.33—0.58 mm (0.013—0.023 in.) 1.24—1.49 mm (0.049—0.059 in.) 0.30—0.56 mm (0.011—0.022 in.)
Piston Rings—4045TF250 and 6068TF250 Engines	End Gap (No. 1 Compression)) End Gap (No. 2 Compression) End Gap (No. 3 Oil Control)	0.33—0.64 mm (0.013—0.025 in.) 0.75—1.00 mm (0.030—0.039 in.) 0.33—0.64 mm (0.013—0.025 in.)
Cylinder Liner Height	Height above block Maximum permissible difference between readings within one cylinder or between adjacent cylinders	0.030—0.100 mm (0.001—0.004 in.) 0.05 mm (0.002 in.)
Cylinder Liner	Thickness	5.875—6.375 mm (0.2313—0.2510 in.)
Cylinder Liner Packing Step	Dimension	2.0185—2.2865 mm (0.07947—0.09002 in.)
Piston Ring-to-Groove Clearance—New Piston Ring (Second and Third Ring Grooves)	Maximum Clearance	0.20 mm (0.008 in.)
Piston Pin Bore (Small Pin)	ID	34.935—34.945 mm (1.3754—1.3758 in.)
Piston Pin Bore (Large Pin)	ID	41.285—41.295 mm (1.6254—1.6258 in.)
Piston Skirt (Measurement taken bottom of skirt 28 mm (1.1 in.) from bottom of piston)	Diameter	106.38—106.40 mm (4.188—4.189 in.)
Piston	Height (Measured From Center of Pin Bore to Top of Piston)	71.64—71.70 mm (2.820—2.823 in.)

Continued on next page

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

DIESEL ENGINE COOLANT RECOMMENDATIONS

Contact your engine distributor or servicing dealer to determine what the cooling system of this engine is filled with and the winter freeze protection level.

Solutions of antifreeze and supplemental coolant additives MUST be used year-round for freeze protection, boil-over protection, and to provide a stable, noncorrosive environment for seals, hoses, and metal engine parts.

The following engine coolant is preferred for service:

- John Deere PREDILUTED ANTIFREEZE/SUMMER COOLANT
- John Deere COOL-GARD™, where available.

John Deere ANTIFREEZE/SUMMER COOLANT CONCENTRATE in a 40 to 60 percent mixture of concentrate with quality water is also recommended.

JOHN DEERE PREDILUTED ANTIFREEZE/SUMMER COOLANT

This product contains all the necessary ingredients that make up the proper coolant solution: chemically pure water, ethylene glycol (low silicate antifreeze), and supplemental coolant additives (SCAs). It is ready to use; no mixing is required.

John Deere Prediluted Antifreeze/Summer Coolant permits extended service life to 36 months or 75,000 miles of operation.

JOHN DEERE COOL-GARD™

In certain geographical areas, John Deere COOL-GARD™ is marketed for use in the engine cooling system. This product contains all the necessary ingredients that make up the proper coolant solution: chemically pure water, ethylene glycol (low silicate antifreeze), and supplemental coolant additives (SCAs). It is ready to add to cooling system as is; no mixing or supplemental coolant additives required. Contact your John Deere Parts Network for local availability.

John Deere COOL-GARD™ has a service life of 2000 hours or 24 months of operation.

JOHN DEERE ANTIFREEZE/SUMMER COOLANT CONCENTRATE

This product contains ethylene glycol (low silicate antifreeze) and supplemental coolant additives (SCAs). It must be mixed with quality water, as described later in this section, before adding to the engine cooling system. The proportion of water to be used depends upon the lowest freeze protection temperature desired according to the following table:

% CONCENTRATE	FREEZE PROTECTION LIMIT
40	-24° C (-12° F)
50	-37° C (-34° F)
60	-52° C (-62° F)

John Deere Antifreeze/Summer Coolant Concentrate has a service life of 24 months or 50,000 miles of operation.

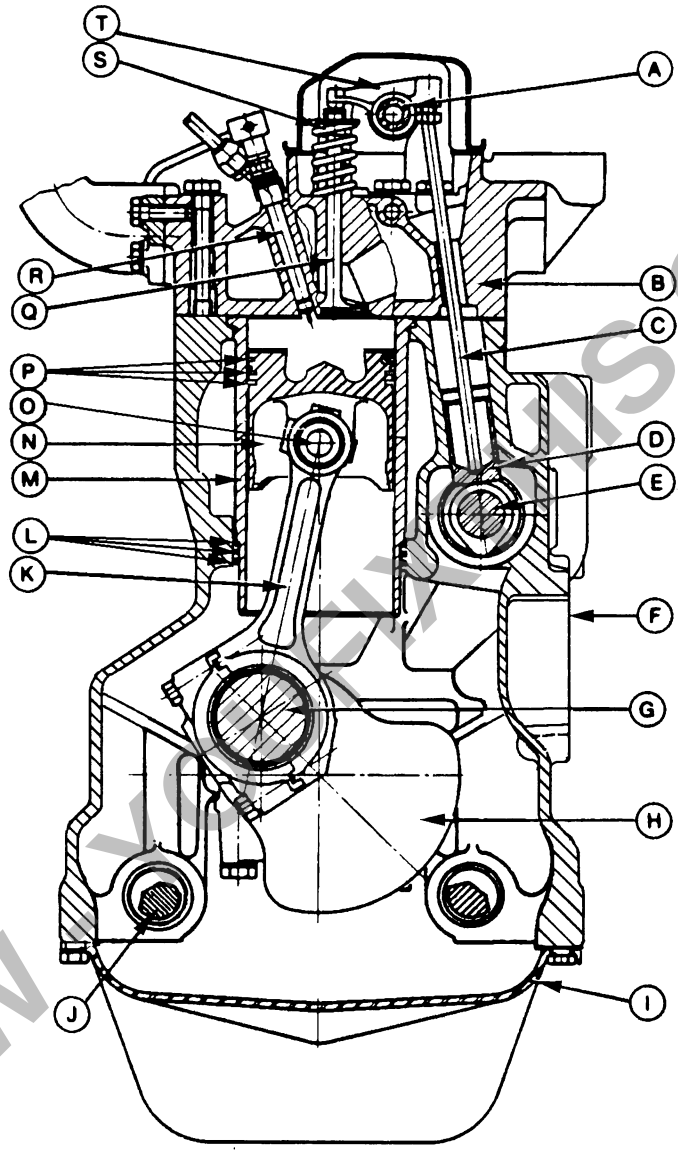
COOL-GARD is a trademark of Deere & Company.

RG,02,JW7721 –19–01DEC97–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

ENGINE—SECTIONAL VIEW



RG7635 –UN–

As viewed from flywheel end

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—Balancer Shafts[1]
K—Connecting Rod
L—Liner Packing Rings
M—Cylinder Liner
N—Piston
O—Piston Pin
P—Piston Rings
Q—Valve
R—Fuel Injection Nozzle
S—Valve Spring
T—Rocker Arm

[1]4-Cylinder Engines Only

RG,105,JW7662 –19–21NOV97–1/1

PREVIEW YOUFIXTHIS.COM

Download full manual at youfixthis.com

Index

Page

A

Aftercooler 30-22
Air cleaner operation 110-5
Air filter restriction indicator test 110-6
Air heater 30-24
Air in fuel test 115-33
Air intake and exhaust system
  Theory 110-4
Air intake pipe 30-23
Air intake system
  Check 100-11
  Diagnosing malfunctions 110-3
Alternator 40-3
Altitude and temperature effect 100-1
Aneroid, repair 35-56
Aneroid
  Diagnose malfunctions 115-77
  Operation 115-76
Auxiliary drive 16-20

B

Balancer shafts
  Bushing ID, measure 10-45
  Bushings and journals, measure 16-36
  Bushings, remove and install 16-37
  Endplay, measure 16-21
  Gears and thrust plates, inspect 16-37
  Gears, remove and install 16-38
  Install and time 16-49
  Remove 16-35
Belt tensioner
  Check spring tension 25-21
  Manual tensioner, adjust 25-23
  Remove and install 25-20
Blow-by, check 105-25
Break-in oil 02-2
Breather tube, crankcase, inspect 100-10

C

Camshaft followers
  Inspect measure and assemble 05-25
Camshaft
  Bushing bores, measure 10-43
  Bushing, remove and install 16-17
  Endplay, measure 16-21
  Followers and bores, measure 10-43
  Followers, inspect 16-31
  Gear, remove and install 16-29
  Inspect and measure 16-28
  Inspect 16-26
  Install 16-53
  Lobe height, measure 16-29
  Remove 16-24
  Thrust plate clearance, measure 16-27
Cold start advance
  Check operation 115-48
  Switch, operational check 115-47
  System operation 115-46
Connecting rods
  Bearings, inspect and measure 10-30
  Center-to-center bores, measure 10-39
  Disassemble 10-20
  General information 10-12
  Pin bore, clean and inspect 10-37
  Piston pin bushing, install 10-38
  Pistons and rods, assemble 10-55
  Pistons and rods, install 10-58
  Preliminary checks 10-19
  Remove 10-13
  Rod and cap, inspect 10-32
  Torque-turn cap screws 10-62
Coolant heater 25-32
Coolant 02-7
Cooling system
  Check 100-13
  Deaeration 25-20
  Diagnostics 25-5
  Flush and service 02-14
  Pressure test 105-26
  Theory 105-8
Crankcase pressure, check 105-25
Crankcase ventilation system, check 100-10
Cranking speed test 105-29
Crankshaft
  Damper pulley, check 15-15
  Endplay, check 15-20
  Failure analysis 15-9
  Flange, clean and inspect 15-31
  Front wear sleeve and oil seal 16-59
  Gear, remove and install 15-38
  Grinding guidelines 15-44
  Grinding specifications 15-45
  Inspect 15-41
  Install 15-50
  Journals, measure 15-42
  Main and thrust bearing inserts, install 15-48
  Main bearing ID, measure 15-42
  Main bearing caps, measure 15-46
  Main bearings, check clearance 15-37
  Main bearings, remove 15-35

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

- Revised procedure and specifications for removal and installation of fan drive assembly.
- Revised procedure for removal and installation of coolant heater.
- Added procedure for removal and installation of temperature switch for cold start advance.
- Added cooling system deaeration procedure.
- Added manual belt tensioner adjustment procedure.

GROUP 30

- Revised turbocharger radial and axial bearing specifications.
- Added turbocharger wastegate actuator adjustment.
- Added procedure for removal and installation of air intake pipe.
- Added procedure for removal and installation of air heater.
- Revised procedure for removal and installation of exhaust manifold.

GROUP 35

- Revised procedure for removal and installation of primary and final fuel filters.
- Revised procedure for removal and installation of rotary fuel supply pump.
- Revised procedures for static timing of rotary and in-line injection pumps.
- Revised procedure for installation of in-line injection pump.
- Revised aneroid repair procedures.
- Revised procedure for transfer of front plate timing mark.

GROUP 40

- Added new Group 40 covering removal and installation of starting motors and alternators.

GROUP 100

- Revised altitude performance specifications.
- Revised dynomometer test specifications.
- Revised engine break-in procedure.
- Added engine oil consumption information.

GROUP 105

- Added engine cranking speed test.
- Revised engine crankcase pressure (blow-by) check.

GROUP 110

- Added turbocharger boost pressure specifications for engines in all machine applications.
- Added turbocharger oil seal leak test.
- Added intake and exhaust restriction check.
- Added exhaust leak check.
- Added turbocharger wastegate test.

GROUP 115

- Revised rotary fuel injection pump specifications.
- Added procedure for using TIMETRAC as a tachometer.
- Added procedure for static timing of in-line injection pumps.
- Revised theory of operation on rotary fuel supply pump.
- Added fuel shut-off solenoid test (Lucas pumps).
- Revised theory of operation on primary fuel filter.
- Added theory of operation on final fuel filter.
- Added theory of operation and operational checks on cold start advance and light load advance.
- Added fuel supply quality check.
- Added air in fuel test.
- Added restricted fuel return line check.
- Added pressure check for in-line fuel supply pumps.

GROUP 199

- Added dealer fabricated tool DFRG5, Injection Pump Front Plate Timing Mark Transfer Tool.
- Added dealer fabricated tool Engine Oil Dipstick Tube Driver for 6010 Series Tractors.

PREVIEW - YOUFIXTHIS.COM

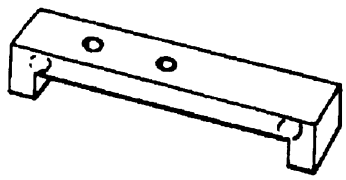
Download full manual at youfixthis.com

05
4

RG7029 –UN–

Height Gauge . . . . . JDG451 or KJD10123

Used with a dial indicator to measure valve recess in cylinder head. Also used to measure piston and liner height.



RG7029

DPSG,OUO1004,166 –19–07JUL98–13/15

RG6246 –UN–

Dial Indicator . . . . . D17526CI (English, in.) or D17527CI (Metric, mm)

Use with JDG451, KJD10123 or magnetic base to measure valve recess in cylinder head and piston and liner height.

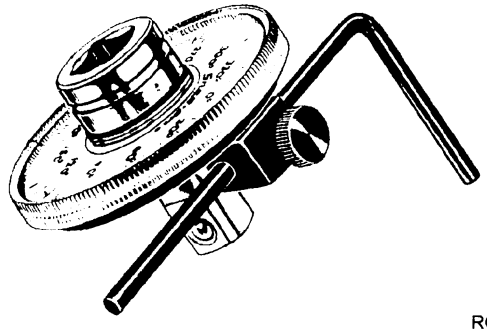


RG6246

DPSG,OUO1004,166 –19–07JUL98–14/15

Torque Angle Gauge JT05993

Used to TORQUE-TURN flanged-head cylinder head and connecting rod cap screws.



RG5698 –UN– RG5698

DPSG,OUO1004,166 –19–07JUL98–15/15

SERVICE EQUIPMENT AND TOOLS

NOTE: Order tools according to information given in the U.S. SERVICEGARD™ Catalog or from the European Microfiche Tool Catalog (MTC). Some tools may be available from a local supplier.

SERVICEGARD is a trademark of Deere & Company

Continued on next page

DPSG,OUO1004,167 –19–07JUL98–1/8

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Item	Measurement	Specification
Connecting Rod Cap Screws	Torque Turn	1/4 Turn (90—100°) After Initial Torque
Piston Protrusion (Using JDG451 or KJD10123 Gauge)		
4-Cyl Standard Duty Codes 4801, 4803, 4809. 6-Cyl Standard Duty Codes 4805, 4807.	Piston Protrusion	0.08—0.31 mm (0.003—0.012 in.)
4-Cyl Heavy Duty Code 4804. 6-Cyl Heavy Duty Codes 4808, 4810.	Piston Protrusion	0.08—0.25 mm (0.003—0.010 in.)
Piston Protrusion (Using Magnetic Base Dial Indicator)		
4-Cyl Standard Duty Codes 4801, 4803, 4809. 6-Cyl Standard Duty Codes 4805, 4807.	Piston Protrusion	0.15—0.38 mm (0.006—0.015 in.)
4-Cyl Heavy Duty Code 4804. 6-Cyl Heavy Duty Codes 4808, 4810.	Piston Protrusion	0.15—0.33 mm (0.006—0.013 in.)

DPSG,OUO1004,230 –19–10JUL98–6/6

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

15
8

Item	Measurement	Specification
Flywheel Pilot Bearing Bore (Option Code 1508)	ID	34.978—35.004 mm (1.3770—1.3781 in.)
Flywheel Pilot Bearing Bore (Option Code 1502 and 1515)	ID	44.978—45.004 mm (1.7708—1.7719 in.)
Flywheel Mounting Cap Screws	Torque	138 N•m (102 lb-ft)
Rear Crankshaft Flange	OD	55.387—55.413 mm (2.1806—2.1816 in.)
Crankshaft Main Bearing-to-Journal	Oil Clearance	0.041—0.109 mm (0.0016—0.0043 in.)
Crankshaft Main Bearing	ID	79.391—79.433 mm (3.1256—3.1273 in.)
Crankshaft Main Journal	OD	79.324—79.350 mm (3.1229—3.1240 in.)
Crankshaft Rod Journal	OD	77.800—77.826 mm (3.0629—3.0640 in.)
Crankshaft Main Bearing-to-Journal	Oil Clearance	0.041—0.109 mm (0.0016—0.0043 in.)
Crankshaft Main or Rod Journal	Maximum Taper	0.010 mm (0.0004 in.)
Crankshaft Main or Rod Journal	Maximum Out-of-Round	0.005 mm (0.0002 in.)
Crankshaft Main Thrust Bearing Journal (New)	Width	38.952—39.028 mm (1.5335—1.5365 in.)
Crankshaft Main Thrust Bearing	Overall Width	38.79—38.87 mm (1.527—1.530 in.)
Crankshaft Main Bearing Bore (Without Bearings)	ID	84.455—84.481 mm (3.3250—3.3260 in.)
Crankshaft Main Bearing Bore Centerline-to-Top Deck	Distance	337.896—337.972 mm (13.3029—13.3059 in.)
Piston Cooling Orifice	Diameter	1.4 mm (0.055 in.)

PREVIEW - YOUFIXTHIS.COM

Continued on next page

Download full manual at youfixthis.com

REMOVE AND INSTALL CAMSHAFT BUSHING WITH FRONT PLATE INSTALLED

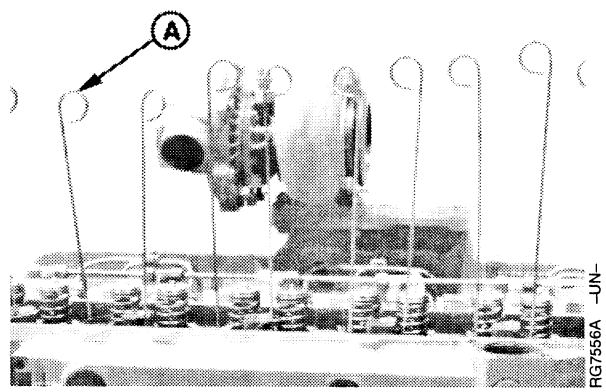
NOTE: A camshaft bushing is installed in front (No. 1) camshaft bore only. The front plate has a chamfered edge allowing camshaft bushing removal and installation with the front plate installed.

REMOVE CAMSHAFT BUSHING

1. Set engine at No. 1 "TDC" compression.
2. On turbocharged engines, disconnect the turbocharger oil inlet line. (See DISCONNECT TURBOCHARGER OIL INLET LINE in Group 03.)
3. Remove timing gear cover, as described earlier in this group.
4. Remove rocker arm cover and rocker arm assembly. (See procedure in Group 05.)
5. Remove push rods. (See procedure in Group 05.)
6. On engines with rotary fuel injection pumps, remove fuel supply pump. (See Group 35.)

RG,16,DT7505 –19–14NOV97–1/4

7. Revolve engine to an angle where camshaft followers fall away from camshaft or use D15001NU Magnetic Holding Set (A) to hold followers.



Continued on next page

RG,16,DT7505 –19–14NOV97–2/4

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

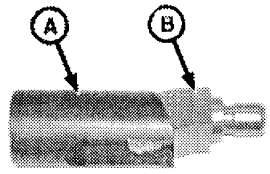
20
18

REMOVE AND INSTALL DIPSTICK TUBE WITH FITTING

1. Unscrew dipstick tube from fitting and remove.
2. Remove fitting from block.
3. Coat smooth end of dipstick fitting with LOCTITE® 271 Thread Lock and Sealer.
4. Position fitting (B) in JDG1146 Dipstick Fitting Installer (A) as shown.

   Orient fitting with threaded end pointing out and straight up from block.

   Drive fitting flush with block.
5. Install dipstick tube on fitting.



RG9115 –UN–

A—JDG1146 Dipstick Fitting Installer Tool
B—Dipstick Fitting (Angled Design)

LOCTITE is a registered trademark of Loctite Corp.

DPSG,OUO1004,80 –19–24APR98–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

30
16

ADJUST TURBOCHARGER WASTEGATE ACTUATOR

1. Loosen jam nut (A).
2. Disconnect hose and pressurize actuator to 12 psi and hold at this calibration pressure.
3. Push bypass lever (D) as far as possible toward the actuator and apply pressure to keep lever in that position.

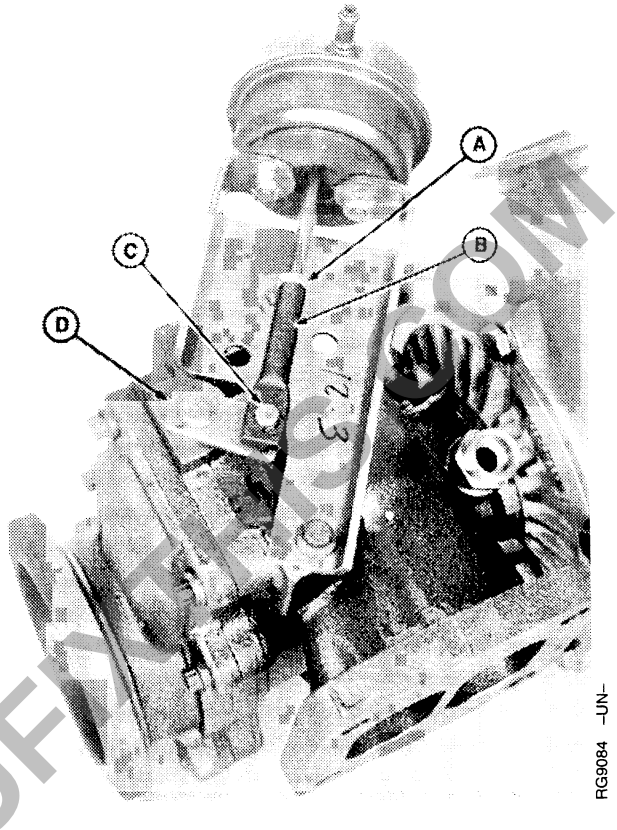
IMPORTANT: Twisting or forcing the entire rod in or out will change the calibration, causing damage to engine from overboost.

4. Turn rod end (B) in either direction until rod eye can just be slipped over bypass lever pin. Loosen rod end an additional half turn, install onto pin and secure with retainer clip (C). Release pressure on actuator.
5. Pressurize the actuator to 12 psi. Measure the end play with a dial indicator, moving the bypass assembly back and forth in a direction perpendicular to the actuator rod. End play should be within specifications listed. If necessary to adjust, set end play at 0.38 mm (0.015 in.)

Turbocharger—Specification

Actuator End Play ..... 0.05—0.056 mm (0.002-0.022 in.)

6. Vary the pressure from 9—12 psi. a few times to verify smooth and free operation of the bypass assembly.
7. Attach hose to actuator and secure with hose clamp.



RG9084 –UN–

A—Jam Nut
B—Rod End
C—Retainer Clip
D—Bypass Lever

DPSG,OUO1004,4 –19–31MAR98–1/1

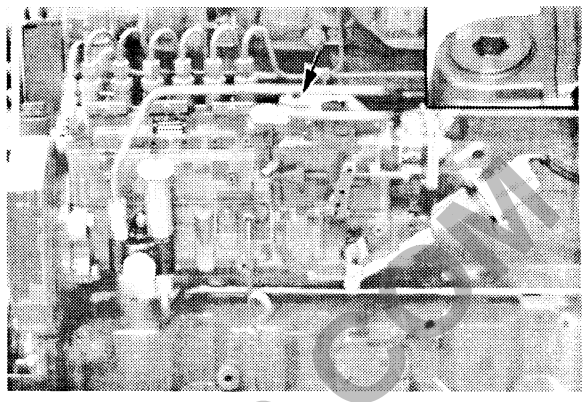
PREVIEW - YOUFIXTRS.COM

Download full manual at youfixtrs.com

17. Remove oil fill plug (arrow) from governor housing and add 3/4 pint of clean engine oil. (On later pumps with no oil plug, remove supply pump from side of pump housing and pour oil in.)

18. Bleed fuel system. (See BLEED THE FUEL SYSTEM in Group 115.)

19. Connect throttle levers and adjust engine speeds as required. (See ADJUST ENGINE SPEEDS in Group 115.)



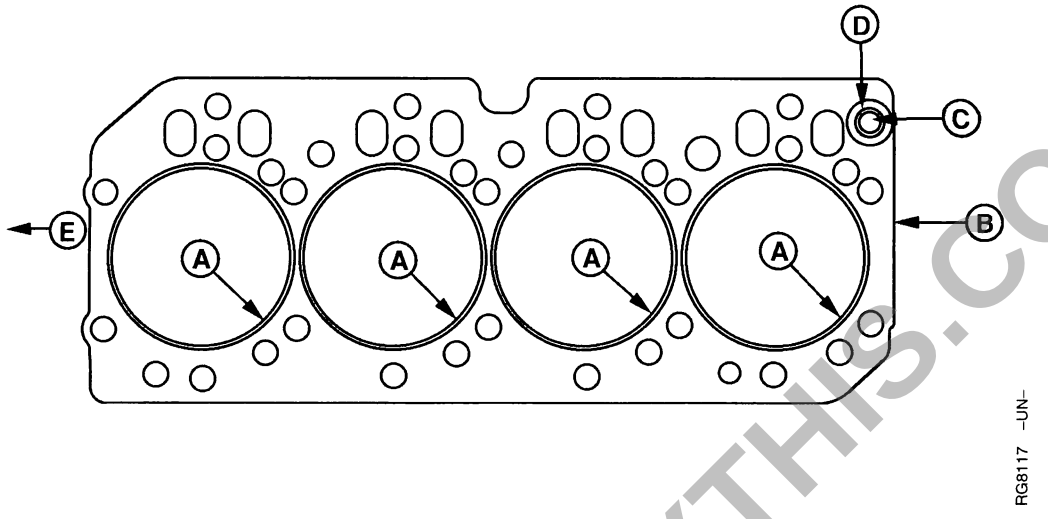
RG7752 –UN–

RG,35,JW7600 –19–20NOV97–6/6

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

HEAD GASKET INSPECTION AND REPAIR SEQUENCE



A—Combustion Seals (Flanges) **B—Gasket Body** **C—Rocker Arm Oil Port** **D—Elastomer Beading Strip** **E—Front of Engine**

The following inspection procedures are recommended whenever a head gasket joint failure occurs, or when joint disassembly takes place.

1. Review historical data relating to machine operation, maintenance and repair, along with diagnostic observations. Note all areas requiring further inspection and analysis.

2. Remove rocker arm cover and check for presence of coolant in the oil.

3. Record head cap screw torques prior to removal. Upon removal, check cap screw length differences.

4. Remove cylinder head using appropriate lifting devices to prevent handling damage to head gasket. (See REMOVE CYLINDER HEAD in Group 05.)

5. Observe surfaces of removed head gasket.

   Examine combustion seals (A) for the following:

   - Flange severed/expanded/cracked/deformed.
   - Adjacent body area burned/eroded.
   - Fire ring severed/displaced/missing.
   - Flange sealing pattern eccentric/contains voids.
   - Discoloration of flange and adjacent body areas.
   - Flange surfaces rough/abraided/channelled.

   Examine gasket body (B) for the following:

   - Combustion gas erosion paths or soot deposits originating at combustion seals.
   - Extreme discoloration/hardening/embrittlement in localized areas.
   - O-ring seal missing/damaged in port area (C).
   - Elastomer missing/damaged in port area (D).
   - Oil or coolant paths from port areas.
   - Localized areas of low compression.

6. Before cleaning components, inspect head, block, and liners for evidence of combustion gas and fluid leakage. Inspect cylinders and valve ports for unusual deposits.

7. Clean block, head, liners, and cap screws. (See Groups 05 and 10.)

8. Proceed with the following dimensional checks and visual inspections:

Continued on next page

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

The supply pump pressurizes the fuel so that it flows through the filter to the injection pump galley. Supply pump output pressure will vary depending on load and application.

The galley is kept full by the supply pump. Injection pump plungers further pressurize the fuel. Injection pressure lines route the fuel to the nozzles (C).

The high pressure fuel (K) opens the nozzle valve and forces fuel out the small orifices in the nozzle tip. This atomizes the fuel as it enters the combustion chamber.

There are two sources of excess fuel incorporated into the system. The supply pump supplies more fuel to the pump than is required by the engine, and the nozzle requires excess fuel to lubricate the nozzle valve. A leak-off line (L) returns this excess fuel to the tank from both the pump and nozzles.

RG,115,JW7717 –19–24NOV97–2/2

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 635 pages

The full manual includes:

- All 635 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

John Deere 4.5L, 6.8L, 4045, 6068 Diesel Engines Technical Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual