# 9060 Excavator Service Manual

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J I Case
A Tenneco Company
Bur 7-47040

Printed in U.S.A.
Issued April 1993

# 9060 Excavator Service Manual

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J I Case
A Tenneco Company

Bur 7-47050




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# Section

# 1001

## STANDARD TORQUE SPECIFICATIONS FOR 9000 SERIES EXCAVATORS

Bur 7-44790


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# TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.

## Grade 5 Bolts, Nuts, and Studs

| Size | Pound-Feet | Newton metres |
|---|---|---|
| 1/4 in | 9-11 | 12-15 |
| 5/16 in | 17-21 | 23-28 |
| 3/8 in | 35-42 | 48-57 |
| 7/16 in | 54-64 | 73-87 |
| 1/2 in | 80-96 | 109-130 |
| 9/16 in | 110-132 | 149-179 |
| 5/8 in | 150-180 | 203-244 |
| 3/4 in | 270-324 | 366-439 |
| 7/8 in | 400-480 | 542-651 |
| 1.0 in | 580-696 | 787-944 |
| 1-1/8 in | 800-880 | 1085-1193 |
| 1-1/4 in | 1120-1240 | 1519-1681 |
| 1-3/8 in | 1460-1680 | 1980-2278 |
| 1-1/2 in | 1940-2200 | 2631-2983 |

## Grade 8 Bolts, Nuts, and Studs

| Size | Pound-Feet | Newton metres |
|---|---|---|
| 1/4 in | 12-15 | 16-20 |
| 5/16 in | 24-29 | 33-39 |
| 3/8 in | 45-54 | 61-73 |
| 7/16 in | 70-84 | 95-114 |
| 1/2 in | 110-132 | 149-179 |
| 9/16 in | 160-192 | 217-260 |
| 5/8 in | 220-264 | 298-358 |
| 3/4 in | 380-456 | 515-618 |
| 7/8 in | 600-720 | 814-976 |
| 1.0 in | 900-1080 | 1220-1465 |
| 1-1/8 in | 1280-1440 | 1736-1953 |
| 1-1/4 in | 1820-2000 | 2468-2712 |
| 1-3/8 in | 2380-2720 | 3227-3688 |
| 1-1/2 in | 3160-3560 | 4285-4827 |

NOTE: *Use thick nuts with Grade 8 bolts.*

# TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or molydisulfide grease or oil is used.

## Grade 8.8 Bolts, Nuts, and Studs


| Size | Pound-Feet | Newton metres |
|---|---|---|
| M6 | 6-7 | 8-9 |
| M8 | 14-17 | 20-23 |
| M10 | 29-34 | 39-46 |
| M12 | 50-59 | 68-80 |
| M16 | 128-149 | 173-202 |
| M20 | 249-291 | 337-393 |
| M22 | 342-399 | 464-541 |
| M24 | 431-503 | 584-681 |
| M27 | 637-743 | 864-1008 |
| M30 | 863-1007 | 1170-1365 |
| M33 | 1180-1377 | 1600-1867 |
| M36 | 1977-2307 | 2680-3127 |
| M42 | 2434-2840 | 3300-3850 |
| M45 | 3054-3563 | 4140-4830 |
| M48 | 3658-4268 | 4960-5787 |
| M52 | 4757-5549 | 6450-7525 |
| M56 | 5908-6893 | 8010-9345 |
| M64 | 8925-10413 | 12100-14117 |

## Grade 10.9 Bolts, Nuts, and Studs


| Size | Pound-Feet | Newton metres |
|---|---|---|
| M6 | 8-10 | 11-13 |
| M8 | 20-24 | 28-32 |
| M10 | 41-47 | 55-64 |
| M12 | 71-83 | 96-112 |
| M16 | 178-208 | 242-282 |
| M20 | 350-408 | 475-554 |
| M22 | 481-561 | 652-761 |
| M24 | 606-707 | 821-958 |
| M27 | 900-1050 | 1220-1423 |
| M30 | 1217-1420 | 1650-1925 |
| M33 | 1667-1945 | 2260-2637 |
| M36 | 2124-2478 | 2880-3360 |
| M39 | 2773-3235 | 3760-4387 |
| M42 | 3422-3992 | 4640-5413 |
| M45 | 4293-5009 | 5820-6790 |
| M48 | 5141-5998 | 6970-8132 |
| M52 | 6690-7805 | 9070-10582 |
| M56 | 8334-9723 | 11300-13183 |
| M64 | 12612-14714 | 17100-19950 |

## Grade 12.9 Bolts, Nuts, and Studs


Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

# TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

| Tube OD Hose ID | Thread Size | Pound-Feet | Newton metres |
|---|---|---|---|
| **37 Degree Flare Fittings** | | | |
| **1/4 in** 6.4 mm | 7/16-20 | 6-12 | 8-16 |
| **5/16 in** 7.9 mm | 1/2-20 | 8-16 | 11-22 |
| **3/8 in** 9.5 mm | 9/16-18 | 10-25 | 14-34 |
| **1/2 in** 12.7 mm | 3/4-16 | 15-42 | 20-57 |
| **5/8 in** 15.9 mm | 7/8-14 | 25-58 | 34-79 |
| **3/4 in** 19.0 mm | 1-1/16-12 | 40-80 | 54-108 |
| **7/8 in** 22.2 mm | 1-3/16-12 | 60-100 | 81-135 |
| **1.0 in** 25.4 mm | 1-5/16-12 | 75-117 | 102-158 |
| **1-1/4 in** 31.8 mm | 1-5/8-12 | 125-165 | 169-223 |
| **1-1/2 in** 38.1 mm | 1-7/8-12 | 210-250 | 285-338 |

| Tube OD Hose ID | Thread Size | Pound-Feet | Newton metres |
|---|---|---|---|
| **Straight Threads with O-ring** | | | |
| **1/4 in** 6.4 mm | 7/16-20 | 12-19 | 16-26 |
| **5/16 in** 7.9 mm | 1/2-20 | 16-25 | 22-34 |
| **3/8 in** 9.5 mm | 9/16-18 | 25-40 | 34-54 |
| **1/2 in** 12.7 mm | 3/4-16 | 42-67 | 57-91 |
| **5/8 in** 15.9 mm | 7/8-14 | 58-92 | 79-124 |
| **3/4 in** 19.0 mm | 1-1/16-12 | 80-128 | 108-174 |
| **7/8 in** 22.2 mm | 1-3/16-12 | 100-160 | 136-216 |
| **1.0 in** 25.4 mm | 1-5/16-12 | 117-187 | 159-253 |
| **1-1/4 in** 31.8 mm | 1-5/8-12 | 165-264 | 224-357 |
| **1-1/2 in** 38.1 mm | 1-7/8-12 | 250-400 | 339-542 |

| Split Flange Mounting Bolts* | | |
|---|---|---|
| Size | Pound-Feet | Newton metres |
| 5/16-18 | 15-20 | 20-27 |
| 3/8-16 | 20-25 | 27-34 |
| 7/16-14 | 35-45 | 47-61 |
| 1/2-13 | 55-65 | 74-88 |
| 5/8-11 | 140-150 | 190-203 |

*NOTE: *Use standard metric hardware torque for metric split flange mounting bolts.*

# TORQUE SPECIFICATIONS - O-RING FACE SEAL FITTINGS

| Nom. SAE Dash Size | Tube OD | Thread Size | Pound-Feet | Newton metres | Thread Size | Pound-Feet | Newton metres |
|---|---|---|---|---|---|---|---|
| | | O-ring Face Seal End | | | O-ring Boss End Fitting or Lock Nut | | |
| -4 | 1/4 in 6.4 mm | 9/16-18 | 10-12 | 14-16 | 7/16-20 | 17-20 | 23-27 |
| -6 | 3/8 in 9.5 mm | 11/16-16 | 18-20 | 24-27 | 9/16-18 | 25-30 | 34-41 |
| -8 | 1/2 in 12.7 mm | 13/16-16 | 32-40 | 43-54 | 3/4-16 | 45-50 | 61-68 |
| -10 | 5/8 in 15.9 mm | 1-14 | 46-56 | 62-76 | 7/8-14 | 60-65 | 81-88 |
| -12 | 3/4 in 19.0 mm | 1-3/16-12 | 65-80 | 90-110 | 1-1/16-12 | 85-90 | 115-122 |
| -14 | 7/8 in 22.2 mm | 1-3/16-12 | 65-80 | 90-110 | 1-3/16-12 | 95-100 | 129-136 |
| -16 | 1.0 in 25.4 mm | 1-7/16-12 | 92-105 | 125-140 | 1-5/16-12 | 115-125 | 156-169 |
| -20 | 1-1/4 in 31.8 mm | 1-11/16-12 | 125-140 | 170-190 | 1-5/8-12 | 150-160 | 203-217 |
| -24 | 1-1/2 in 38.1 mm | 2-12 | 150-180 | 200-254 | 1-7/8-12 | 190-200 | 258-271 |

# Section 1002

## FLUIDS AND LUBRICANTS

J I Case
A Tenneco Company

Bur 7-47000


Issued April 1993

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**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

# CAPACITIES AND LUBRICANT SPECIFICATIONS

Fuel Tank
- Capacity ..... 132.1 U.S. gallons (500 litres)
- Type of fuel ..... See Diesel Fuel on page 6

Engine Oil Capacity
- Capacity with filter change ..... 7.7 U.S. gallons (29 litres)
- Type of Lubricant ..... Case IH Engine Oil, see Engine Lubrication on page 5

Engine Cooling System
- Capacity ..... 12.7 U.S. gallons (48 litres)
- Type of coolant ..... Use a mixture of 55% ethylene glycol and 45% water. If lowest ambient temperature will be below -34˚F (-36.6˚C) adjust the mixture.

Hydraulic Reservoir
- Tank Capacity ..... 55.5 U.S. gallons (210 litres)
- System Capacity ..... 118.9 U.S. gallons (450 litres)
- Type of fluid ..... See Hydraulic Oil Chart on page 4

Swing Gearbox
- Capacity ..... 5.5 U.S. gallons (21 litres)
- Type of lubricant ..... Case IH 135H EP Gear Lube

Swing Ring Gear
- Capacity ..... 68.3 pounds (31 kg)
- Type of lubricant ..... Case No. 2 Lithium Grease

Turntable Bearing
- Capacity ..... As required
- Type of lubricant ..... Case No. 2 Lithium Grease

Final Drives
- Capacity ..... 1.8 U.S. gallons (6.8 litres)
- Type of lubricant ..... Case IH 135H EP Gear Lube

Track Roller
- Capacity ..... 14.5 ounces (440 cc)
- Type of lubricant ..... Shell Rimula Oil No. 30 or equivalent to API Class CD, SAE 30

Carrier Roller
- Capacity ..... 6.6 ounces (200 cc)
- Type of lubricant ..... Shell Rimula Oil No. 30 or equivalent to API Class CD, SAE 30

Idler Wheel
- Capacity ..... 11.9 ounces (360 cc)
- Type of lubricant ..... Shell Rimula Oil No. 30 or equivalent to API Class CD, SAE 30

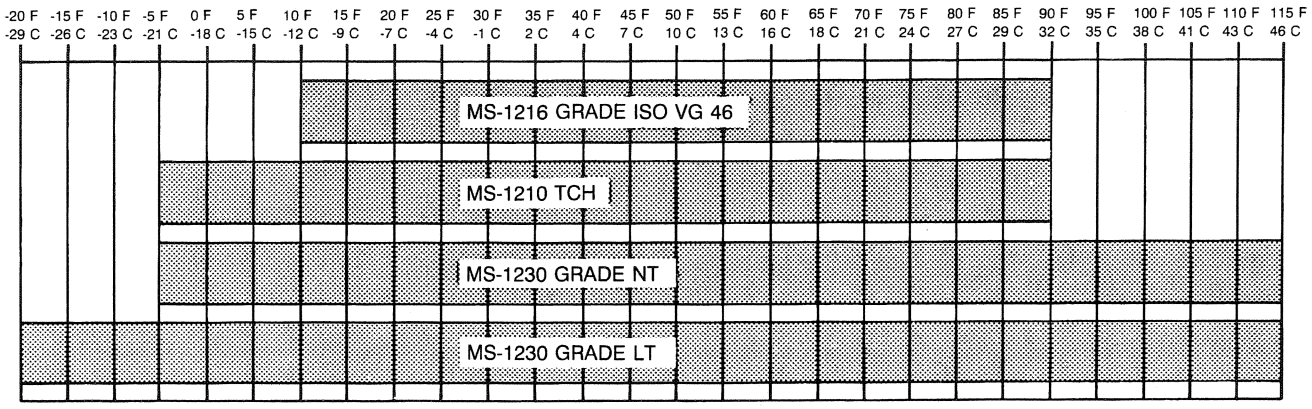
Track Adjustment Cylinder
- Capacity ..... As required
- Type of lubricant ..... Case No. 2 Lithium Grease

Grease Fitting
- Type of lubricant ..... Case No. 2 Lithium Grease

Batteries
- Capacity ..... As required
- Type of lubricant ..... Use drinking or distilled water

# HYDRAULIC OIL CHART

Use only hydraulic oils meeting Case specifications of equivalent AW (anti-wear) hydraulic oils.

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**NOTE:** *Case specification MS-1210 TCH Fluid is used in place of ISO VG 32 (-5˚ to +65˚F) and ISO VG 46 (+10˚ to +90˚F).*

Case specifications MS-1230 Grade NT or Grade LT is used in place of ISO VG 32 (-5˚ to +65˚F), ISO VG 46 (+10˚ to +90˚F), ISO VG 100 (+30˚ to 115˚F), and MS-1210 TCH.

# ENGINE LUBRICATION

## Engine Oil Selection

Case No. 1 Engine Oil is recommended for use in your Case Engine. Case Engine Oil will lubricate your engine correctly under all operating conditions.


If Case No. 1 Multi-Viscosity or Single Grade Engine Oil is not available, use only oil meeting API engine oil service category CE.


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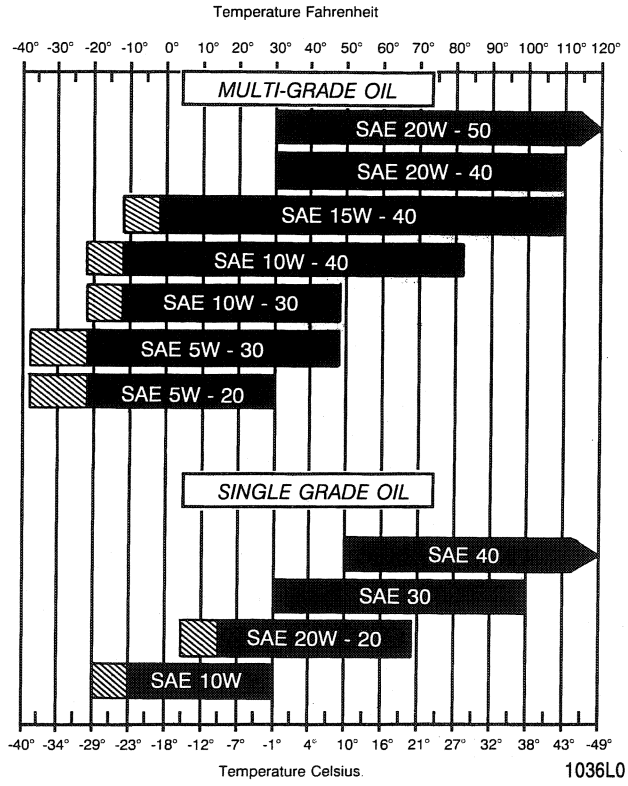
**NOTE:** *Do not put Performance Additives or other oil additive products in the engine crankcase. The oil change intervals given in this manual are according to tests with Case lubricants.*

## Oil Viscosity/Temperature Ranges




**NOTE:** *Use of an engine oil pan heater or an engine coolant heater is required when operating temperatures are in the crosshatched area.*

# DIESEL FUEL

Use No. 2 diesel fuel in the engine of this machine. The use of other fuels can cause the loss of engine power and high fuel consumption.

In very cold temperatures, a mixture of No. 1 and No. 2 diesel fuels is temporarily permitted. See the following Note.

**NOTE:** *See your fuel dealer for winter fuel requirements in your area. If the temperature of the fuel lowers below the cloud point (wax appearance point), wax crystals in the fuel will cause the engine to lose power or not start.*

The diesel fuel in this machine must meet the specifications in the chart below or Specification D975-81 of the American Society for Testing and Materials.

## Fuel Storage

If you keep fuel in storage for a period of time, you can get foreign material or water in the fuel storage tank. Many engine problems are caused by water in the fuel.

Keep the fuel storage tank outside and keep the fuel as cool as possible. Remove water from the storage container at regular periods of time.

Fill the fuel tank at the end of the daily operating period to prevent condensation in the fuel tank.

Specifications for Acceptable No. 2 Diesel Fuel

| | |
|---|---|
| API gravity, minimum | 34 |
| Flash point, minimum | 140°F (60°C) |
| Cloud point (wax appearance point), maximum | -5°F (-20°C) See Note above |
| Pour point, maximum | -15°F (-26°C) See Note above |
| Distillation temperature, 90% point | 540 to 640°F (282 to 338°C) |
| Viscosity, at 100°F (38°C) | |
| Centistokes | 2.0 to 4.3 |
| Saybolt Seconds Universal | 32 to 40 |
| Cetane number, minimum | 43 (45 to 55 for winter or high altitudes) |
| Water and sediment, by volume, maximum | 0.05 of 1% |
| Sulfur, by weight, maximum | 0.50 of 1% |
| Copper strip corrosion, maximum | No. 2 |
| Ash, by weight, maximum | 0.01 of 1% |

*Engine fuel is flammable and can cause a fire or an explosion. Do not fill the fuel tank or service the fuel system near an open flame, welding, burning cigars, cigarettes, etc.*

# SECTION INDEX - ENGINES




J I Case
A Tenneco Company

Bur 7-47060

# Section

# 2000

## ENGINE SPECIFICATION DETAILS

**IMPORTANT:** *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

**J I Case**
A Tenneco Company

Bur 7-47010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**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.

# ENGINE SPECIFICATION DETAILS

## Engine Specifications

| | |
|---|---|
| Engine model | 6D22-TC |
| Type | Water cooled, 4-cycle, diesel |
| Number and arrangement of cylinders | 6 in-line |
| Valve mechanism | Overhead valve |
| Combustion chamber | Direct injection type |
| Cylinder bore x stroke (mm) | 130 x 140 |
| Total displacement (cc) | 11 149 |
| Compression ratio | 15.5 |
| Firing order | 1-5-3-6-2-4 |
| Cylinder liner | Wet type |
| Piston | Trunk, slipper skirt type (cooling cavity provided) |
| Piston ring | Compression ring: 2, Oil ring: 1 |

# Engine Service Standards

Unit: mm

| Description | Nominal value [Basic diameter] | Limit |
|---|---|---|
| Compression pressure (at 200 rpm) | 2.75 MPa (28 kgf/cm2) | 1.96 MPa (20 kgf/cm2), difference between cylinder within 0.39 Mpa (4 kgf/cm2) |
| Rocker to rocker shaft clearance | [28] 0.03 to 0.08 | 0.2 |
| Outer valve spring | | |
| Free length | 89.38 | 85 |
| Load (Installed length: 58.35) | 450 N (46.1 kgf) | 380 N (39 kgf) |
| Inner valve spring | | |
| Free length | 65.04 | 62.0 |
| Load (Installed length: 50.35) | 115 N (12 kgf) | 100N (10.2 kgf) |
| Squareness | - | 2.5 |
| Crankcase tappet hole to tappet clearance | [35] 0.06 to 0.10 | 0.2 |
| Push rod runout | - | 0.5 |
| Cylinder head bottom surface distortion | 0.07 or less | 0.08 |
| Height from top to bottom surface of cylinder head | 130 | 129.8 |
| Valve stem OD | | |
| Inlet | 11.95 to 11.96 | 11.85 |
| Exhaust | 11.91 to 11.93 | 11.85 |
| Valve stem to valve guide clearance | | |
| Inlet | [12] 0.05 to 0.09 | 0.2 |
| Exhaust | [12] 0.09 to 0.12 | 0.2 |
| Depth of valve from cylinder head bottom surface | | |
| Inlet | 0.25 to 0.75 | 1.0, replace valve seat insert. Service limit: value when a new valve is installed, (- indicates projection amount). |
| Exhaust | -0.05 to 0.45 | 0.7, replace valve seat insert. Service limit: value when a new valve is installed, (- indicates projection amount). |
| Valve seat angle | 45° | - |
| Valve margin | | |
| Inlet | 2.2 | 1.7 |
| Exhaust | 2.5 | 2.0 |
| Seat width of valve seat insert | 2.69 to 2.96 | 3.5 |
| Eccentricity of flywheel housing | - | 0.2 |
| Backlash of Timing gears | | |
| Between crankshaft gear and idler gear "B" | 0.12 to 0.26 | 0.4 |
| Between idler gear "A" and camshaft gear | 0.13 to 0.26 | 0.4 |
| Between idler gear "A" and idler gear "C" | 0.13 to 0.26 | 0.4 |

# Engine Service Standards

Unit: mm

| Description | Nominal value [Basic diameter] | Limit |
|---|---|---|
| Between injection pump gear and idler gear "C" | 0.12 to 0.26 | 0.4 |
| End play of idler gear | 0.1 to 0.28 | 0.4 |
| Idler shaft "A" to idler gear "A" bushing clearance | [40] 0.03 to 0.06 | 0.2 |
| Idler shaft "C" to idler gear "C" bushing clearance | [46] 0.03 to 0.06 | 0.2 |
| End play of camshaft gear | 0.05 to 0.22 | 0.4 |
| Camshaft journal to camshaft bushing clearance | | |
| No. 1 journal | [65] 0.03 to 0.08 | 0.25 |
| No. 2 journal | [65.25] 0.03 to 0.08 | 0.25 |
| No. 3 journal | [65.50] 0.03 to 0.08 | 0.25 |
| No. 4 journal | [65.50] 0.03 to 0.08 | 0.25 |
| No. 5 journal | [65.75] 0.03 to 0.08 | 0.25 |
| No. 6 journal | [65.75] 0.03 to 0.08 | 0.25 |
| No. 7 journal | [66] 0.03 to 0.08 | 0.25 |
| Cam profile (Difference between lobe height and base circle diameter) | | |
| Inlet | [8.83] | 8.3, inlet: lobe height, 56.167; base circle diameter, 47.334 |
| Exhaust | [8.82] | 8.3, exhaust: lobe height, 56.036; base circle diameter, 47.216 |
| Camshaft bend | 0.05 or less | 0.08 |
| Crankcase top surface distortion | 0.07 or less | 0.2 |
| Cylinder liner | | |
| ID | 130.014 to 130.054 | 130.25 |
| Cylindricity (diameter base) | 0.02 or less | - |
| Projection from crankcase top surface | 0 to 0.08 | - |
| Piston to cylinder liner clearance (selection fit) | [130] 0.188 to 0.214 | - |
| Piston ring groove to ring clearance | | |
| 1st ring | 0.06 to 0.11 | 0.25 |
| 2nd ring | 0.07 to 0.10 | 0.15 |
| Oil ring | 0.03 to 0.06 | 0.15 |
| Piston ring open end clearance | 0.4 to 0.6 | 1.5 |
| Projection of piston from top surface of crankcase | 0.87 to 1.33 | - |
| Piston pin hole to piston pin clearance | [50] 0.01 to 0.02 | 0.1 |
| Flatness of cylinder liner flange supporting surface on crankcase | - | More than 0.1 |

# Engine Service Standards

Unit: mm

| Description | Nominal value [Basic diameter] | Limit |
|---|---|---|
| Connecting rod | | |
| Bushing to piston pin clearance | [50] 0.02 to 0.05 | 0.1 |
| Bend and torsion | - | 0.05 or less |
| End play | 0.2 to 0.5 | 1.0 |
| Connecting rod bearing | | |
| Oil clearance | [84] 0.07 to 0.13 | 0.25 |
| Tension when free | - | Less than 90.5 |
| Crankshaft | | |
| End play | 0.09 to 0.23 | 0.4 |
| Bend | 0.04 or less | 0.1 |
| Out of roundness of journal and pin | 0.01 or less | 0.08 |
| Cylindricity of journal and pin | 0.006 or less | - |
| Main bearing | | |
| Oil clearance | [100] 0.08 to 0.15 | 0.25 |
| Tension when free | - | Less than 106.5 |
| Valve clearance | | |
| Inlet | 0.4 | - |
| Exhaust | 0.6 | - |
| Injection nozzle injection pressure | | |
| One spring nozzle | 21.6 MPa (220 kgf/cm2) | |
| Two spring nozzle | 17.7 MPa (180 kgf/cm2) | |
| Prelift | 0.10 +/- 0.02 | |
| Two spring regulated pressure (open pressure) | 24.8 to 25.4 MPa (253 to 259 kgf/cm2) | |
| Two spring regulated pressure (cover pressure) with a 0.05 needle valve lift | 23 to 23.5 MPa (235 to 240 kgf/cm2) | |

# Tightening Torque Table

| Description | Thread size OD x Pitch mm | Tightening torque Nm (kgfm) |
|---|---|---|
| Cylinder head bolt | M14 x 2 | For tightening procedure refer to 5.2.3 (6) in the engine section of the service manual. Wet. |
| Rocker shaft bracket bolt | M10 x 1.5 | 34 (3.5) |
| Rocker cover bolt | M10 x 1.25 | 9.8 (1) |
| Rocker adjusting screw lock nut | M10 x 1.25 | 59 (6) |
| Oil jet check valve | M12 x 1.75 | 34 (3.5) |
| Connecting rod nut | M13 x 1.25 | 115 (12) Wet |
| Main bearing cap bolt | M18 x 2.5 | 370 (38) Wet |
| Crankshaft pulley bolt | M14 x 1.5 | 175 (18) |
| Camshaft gear nut | M27 x 1.5 | 265 (27) Wet |
| Idler shaft bolt "A" | M16 x 2 | 155 (16) |
| Idler shaft bolt "C" | M16 x 2 | 155 (16) |
| Idler shaft nut (for mounting collar) | M16 x 1.5 | 98 (10) |
| Flywheel bolt | M16 x 1.5 | 315 (32) Wet |
| Flywheel housing bolt | M12 x 1.75 | 69 (7) |
| Oil pump idler gear shaft nut | M12 x 1.25 | 59 to 78 (6 to 8), apply Loctite 262 |
| Oil bypass alarm | M20 x 1.5 | 44 to 54 (4.5 to 5.5) |
| Oil filter center bolt | M16 x 1.5 | 59 to 69 (6 to 7) |
| Oil cooler bypass valve | M27 x 1.5 | 15 to 20 (1.5 to 2.0) |
| Regulator valve | M27 x 1.5 | 98 to 115 (10 to 12) |
| Oil pan drain plug | M18 x 1.5 | 69 (7) |
| Injection pump bracket | M10 x 1.5 | 35 to 53 (3.6 to 5.4) |
| Injection nozzle | | |
| One spring nozzle | | |
| Retaining nut | M22 x 1.5 | 59 to 78 (6 to 8) |
| Inlet connector | M14 x 1.5 | 69 to 78 (7 to 8) |
| Cap nut | M14 x 1 | 39 to 49 (4 to 5) |
| Two spring nozzle | | |
| Retaining nut | M19 x 1 | 59 to 78 (6 to 8) |
| Set screw | - | 49 to 59 (5 to 6) |
| Lock nut | - | 20 to 25 (2 to 2.5) |
| Cap nut | M22 x 1.5 | 39 to 49 (4 to 5) |
| Inlet connector | M14 x 1.5 | 69 to 78 (7 to 8) |
| Injection nozzle bolt (for attaching to cylinder head) | M8 x 1.25 | 15 (1.5) |
| Injection pipe union nut | | |
| On pump side | M14 x 1.5 | 29 (3) |
| On nozzle side | M12 x 1.5 | 29 (3) |

# Tightening Torque Table

| Description | Thread size OD x Pitch mm | Tightening torque Nm (kgfm) |
|---|---|---|
| Leak off pipe eye bolt | M8 x 1 | 9.8 to 15 (1 to 1.5) |
| Fuel filter connector bolt | M14 x 1.5 | 25 (2.5) |
| Water separator | | |
| Ring nut | - | 5.9 to 7.8 (0.6 to 0.8) |
| Drain plug | - | 2.9 to 3.9 (0.3 to 0.4) |
| Air plug | M8 x 1.25 | 7.8 to 9.8 (0.8 to 1.0) |
| Connector bolt | M14 x 1.5 | 25 (2.5) |
| Injection pump piping tightening eye bolt | | |
| Fuel inlet | - | 20 to 25 (2 to 2.5) |
| Fuel feed (feed pump) | - | 20 to 25 (2 to 2.5) |
| Fuel feed (pump proper) | - | 20 to 29 (2 to 3) |
| Fuel overflow | - | 20 to 29 (2 to 3) |
| Lubricant (inlet) | - | 12 to 15 (1.2 to 1.5) |
| Lubricant (outlet) | - | 20 to 29 (2 to 3) |
| Fan drive flange nut | M20 x 1.5 | 145 (15) |
| Tension pulley shaft nut | M16 x 1.5 | 98 (10) |
| Exhaust manifold nut | M10 x 1.25 | 41 (4.2) |
| Turbocharger attaching nut | | |
| Attaching nut | M10 x 1.25 | 26 (2.7) |
| Lock nut | M10 x 1.25 | 35 (3.6) |
| Turbocharger (TD-08) | | |
| Coupling assembly | - | 5.9 (0.6), apply MOLYKOTE grease or equivalent to threads |
| Shaft and turbine wheel lock nut | - | 20 (2), apply MOLYKOTE grease or equivalent to threads |
| Alternator pulley nut | M17 x 1.5 | 83 to 105 (8.5 to 11) |
| | M20 x 1.5 | 135 to 160 (13.5 to 16.5) |
| Alternator shaft nut | - | 345 to 360 (35 to 37) |

# Section

# 2001

## ENGINE REMOVAL AND INSTALLATION

J I Case
A Tenneco Company

Bur 7-47070


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**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.

# SPECIFICATIONS

Cooling system capacity ..... 12.7 U.S. gallons (48 litres)

Special torques

Bolts that hold the engine mounts to the frame
(apply Loctite 262 on the threads of the bolts) ..... 213 to 249 pound-feet (289 to 337 Nm)

Cap screws that hold the rear engine mounts to the engine
(apply Loctite 262 on the threads of the cap screws) ..... 197 to 230 pound-feet (267 to 312 Nm)

Cap screws that hold the front engine mounts to the engine
(apply Loctite 262 on the threads of the cap screws) ..... 128 to 149 pound-feet (173 to 202 Nm)

Cap screws that hold the fan and the spacer to the engine ..... 38 to 45 pound-feet (51 to 61 Nm)

Cap screws that hold the hydraulic pump to the flywheel housing
(apply Loctite 262 on the threads in the holes in the flywheel housing) ..... 80 to 93 pound-feet (108 to 126 Nm)

Socket head screws that hold the coupling and drive plate to the flywheel
(apply Loctite 262 on the threads of the socket head screws) ..... 318 to 354 pound-feet (431 to 480 Nm)

Weight of the hydraulic pump ..... 485 pounds (220 kg)

Weight of the engine ..... 2392 pounds (1085 kg)