

## Replace Final Fuel Filter and Primary Fuel Filter/Water Separator

**IMPORTANT:** Prevent machine damage. Drain water and sediment and replace filter elements at specified intervals. Contaminated fuel can cause premature failure of fuel injection pump.

If appropriate, substitute longer filter elements and/or add sediment bowls to filter elements.

**NOTE:** Refer to operator's manual for proper servicing and (hourly) replacement intervals.

*Final fuel filters can be equipped with a sediment bowl and/or hand primer.*

*Replacement of primary and final fuel filter elements are similar. Differences will be noted.*

1. Thoroughly clean fuel filter/water separator assembly and surrounding area, if not previously done.
2. Connect a drain line to filter drain adapters and drain all fuel from filters.

**NOTE:** Lifting up on retaining ring (A) as it is rotated helps to get it past raised locators.

3. Firmly grasp the retaining ring and rotate it counterclockwise 1/4 turn (when viewed from top). Remove ring with filter element (B).
4. Inspect filter mounting base for cleanliness. Clean as required.
5. Remove sediment bowl, if equipped. Drain and clean sediment bowl. Dry with compressed air.
6. Install sediment bowl, if equipped, onto new filter element. Tighten securely.
7. Thoroughly inspect filter base seal ring. Replace as needed.

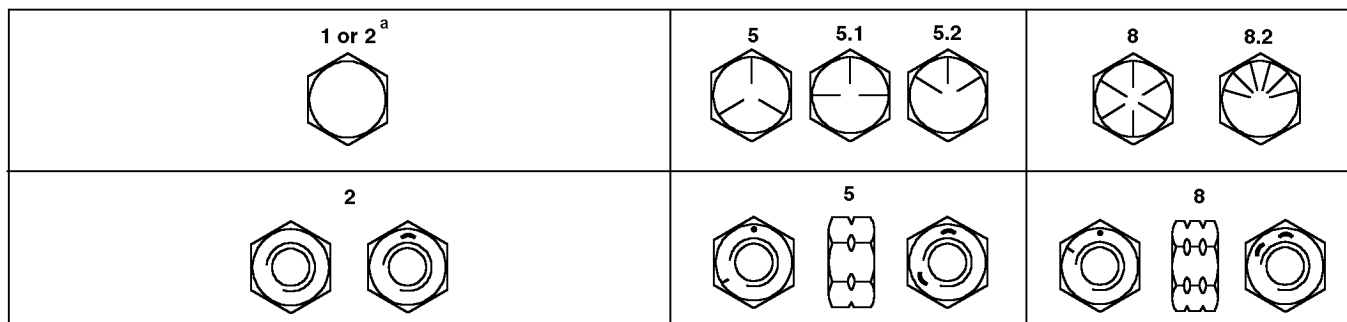


Final and Primary Fuel Filter/Water Separator

A—Retaining Ring  
B—Filter Element

RG7745C -UN-07NOV97

### Unified Inch Bolt and Cap Screw Torque Values



Top, SAE Grade and Head Markings; Bottom, SAE Grade and Nut Markings

| Size  | Grade 1 (No Mark)                     |                                | Grade 2 <sup>a</sup> (No Mark)        |                                | Grade 5, 5.1 or 5.2                   |                                | Grade 8 or 8.2                        |                                |
|-------|---------------------------------------|--------------------------------|---------------------------------------|--------------------------------|---------------------------------------|--------------------------------|---------------------------------------|--------------------------------|
|       | Lubricated <sup>b</sup><br>N•m(lb-ft) | Dry <sup>c</sup><br>N•m(lb-ft) | Lubricated <sup>b</sup><br>N•m(lb-ft) | Dry <sup>c</sup><br>N•m(lb-ft) | Lubricated <sup>b</sup><br>N•m(lb-ft) | Dry <sup>c</sup><br>N•m(lb-ft) | Lubricated <sup>b</sup><br>N•m(lb-ft) | Dry <sup>c</sup><br>N•m(lb-ft) |
| 1/4   | 3.8 (2.8)                             | 4.7 (3.5)                      | 6 (4.4)                               | 7.5 (5.5)                      | 9.5 (7)                               | 12 (9)                         | 13.5 (10)                             | 17 (12.5)                      |
| 5/16  | 7.7 (5.7)                             | 9.8 (7.2)                      | 12 (9)                                | 15.5 (11.5)                    | 19.5 (14.5)                           | 25 (18.5)                      | 28 (20.5)                             | 35 (26)                        |
| 3/8   | 13.5 (10)                             | 17.5 (13)                      | 22 (16)                               | 27.5 (20)                      | 35 (26)                               | 44 (32.5)                      | 49 (36)                               | 63 (46)                        |
| 7/16  | 22 (16)                               | 28 (20.5)                      | 35 (26)                               | 44 (32.5)                      | 56 (41)                               | 70 (52)                        | 80 (59)                               | 100 (74)                       |
| 1/2   | 34 (25)                               | 42 (31)                        | 53 (39)                               | 67 (49)                        | 85 (63)                               | 110 (80)                       | 120 (88)                              | 155 (115)                      |
| 9/16  | 48 (35.5)                             | 60 (45)                        | 76 (56)                               | 95 (70)                        | 125 (92)                              | 155 (115)                      | 175 (130)                             | 220 (165)                      |
| 5/8   | 67 (49)                               | 85 (63)                        | 105 (77)                              | 135 (100)                      | 170 (125)                             | 215 (160)                      | 240 (175)                             | 305 (225)                      |
| 3/4   | 120 (88)                              | 150 (110)                      | 190 (140)                             | 240 (175)                      | 300 (220)                             | 380 (280)                      | 425 (315)                             | 540 (400)                      |
| 7/8   | 190 (140)                             | 240 (175)                      | 190 (140)                             | 240 (175)                      | 490 (360)                             | 615 (455)                      | 690 (510)                             | 870 (640)                      |
| 1     | 285 (210)                             | 360 (265)                      | 285 (210)                             | 360 (265)                      | 730 (540)                             | 920 (680)                      | 1030 (760)                            | 1300 (960)                     |
| 1-1/8 | 400 (300)                             | 510 (375)                      | 400 (300)                             | 510 (375)                      | 910 (670)                             | 1150 (850)                     | 1450 (1075)                           | 1850 (1350)                    |
| 1-1/4 | 570 (420)                             | 725 (535)                      | 570 (420)                             | 725 (535)                      | 1280 (945)                            | 1630 (1200)                    | 2050 (1500)                           | 2600 (1920)                    |
| 1-3/8 | 750 (550)                             | 950 (700)                      | 750 (550)                             | 950 (700)                      | 1700 (1250)                           | 2140 (1580)                    | 2700 (2000)                           | 3400 (2500)                    |
| 1-1/2 | 990 (730)                             | 1250 (930)                     | 990 (730)                             | 1250 (930)                     | 2250 (1650)                           | 2850 (2100)                    | 3600 (2650)                           | 4550 (3350)                    |

<sup>a</sup> Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

<sup>b</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

<sup>c</sup> "Dry" means plain or zinc plated without any lubrication.

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 fastener 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.

**General OEM Engine Specifications**

| ITEM                                     | ENGINE                          |                                 |                                 |                                 |                                 |                                 |                                 |                                 |                                 |
|------------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                                          | 4045DF120                       | 4045DF270                       | 4045DF150                       | 4045TF120                       | 4045TF150                       | 4045TF250                       | 4045TF270                       | 4045HF120                       | 4045HF150                       |
| Number of Cylinders                      | 4                               | 4                               | 4                               | 4                               | 4                               | 4                               | 4                               | 4                               | 4                               |
| Bore                                     | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            | 106 mm<br>(4.19 in.)            |
| Stroke                                   | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             | 127 mm<br>(5.0 in.)             |
| Displacement                             | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            | 4.5L<br>(276 cu in.)            |
| Compression                              | 17.6:1                          | 17.6:1                          | 17.6:1                          | 17.0:1                          | 17.0:1                          | 17.0:1                          | 17.0:1                          | 17.0:1                          | 17.0:1                          |
| Max. Crank Pressure                      | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) | 0.5 kPa<br>(2 H <sub>2</sub> O) |
| 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 at Full Load at Rated Speed | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             | 345 kPa<br>(50 psi)             |
| Oil Pressure Low Idle                    | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             | 105 kPa<br>(15 psi)             |
| Length                                   | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          | 861.0 mm<br>(33.9 in.)          |
| Width                                    | 598 mm<br>(23.5 in.)            | 612 mm<br>(24.1 in.)            | 598 mm<br>(23.5 in.)            | 598 mm<br>(23.5 in.)            | 598 mm<br>(23.5 in.)            | 598 mm<br>(23.5 in.)            | 612 mm<br>(24.1 in.)            | 598 mm<br>(23.5 in.)            | 598 mm<br>(23.5 in.)            |
| Height                                   | 854 mm<br>(33.6 in.)            | 856 mm<br>(33.7 in.)            | 854 mm<br>(33.6 in.)            | 980 mm<br>(38.6 in.)            | 980 mm<br>(38.6 in.)            | 980 mm<br>(38.6 in.)            | 994 mm<br>(39.1 in.)            | 980 mm<br>(38.6 in.)            | 980 mm<br>(38.6 in.)            |
| Weight                                   | 387 kg<br>(851 lb)              | 387 kg<br>(851 lb)              | 387 kg<br>(851 lb)              | 396 kg<br>(872 lb)              | 396 kg<br>(872 lb)              | 396 kg<br>(872 lb)              | 451 kg<br>(993 lb)              | 396 kg<br>(872 lb)              | 396 kg<br>(872 lb)              |

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200  
3

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DPSG,OUO1004,102 -19-19AUG04-1/2

**E1—Engine Cranks/Won't Start****E1—Engine Cranks/Won't Start Diagnostic Procedure**

*NOTE: This procedure applies to engines using mechanical fuel systems. For engines using electronic fuel systems, refer to the manual that corresponds to the ECU being used.*

*NOTE: This procedure should be used if engine cranking speed is OK, but it will not start or starts only after prolonged cranking. If the engine will not crank, determine problem in the starting/charging system.*

**Before using this diagnostic procedure:**

Ensure fuel quantity and quality are OK. See CHECK FUEL SUPPLY QUALITY later in this group.

Ensure engine cranking speed is OK. See TEST ENGINE CRANKING SPEED in Group 150 in Section 4 of 4.5 L & 6.8 L Diesel Engines Base Engine Manual (CTM104).

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150  
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|                                            |                                                                                                                                                                                                                                                                                                              |                                                                                                                        |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>① FUEL SHUT-OFF<br/>OPERATION CHECK</b> | <p><b>In-Line Injection Pumps:</b></p> <p>Check operation of fuel shut-off mechanism. See CHECK FUEL SHUT-OFF SOLENOID OPERATION—IN-LINE INJECTION PUMPS later in this group.</p> <p><b>Rotary Injection Pumps:</b></p> <p>While turning key to ON position, listen for fuel shut-off solenoid to click.</p> | <p><b>Operation normal/solenoid clicks:</b> Go to 3.</p> <p><b>Problem found with shut-off mechanism:</b> Go to 2.</p> |
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|                                                          |                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                   |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>② FUEL SHUT-OFF<br/>SOLENOID<br/>RESISTANCE CHECK</b> | <p><b>In-Line Injection Pumps:</b></p> <p>Check resistance of fuel shut-off mechanism. See TEST FUEL SHUT-OFF SOLENOID RESISTANCE—DENSO PUMP or TEST FUEL SHUT-OFF SOLENOID RESISTANCE—MOTORPAL PUMP later in this group.</p> <p><b>Rotary Injection Pumps:</b></p> <p>Check resistance of fuel shut-off mechanism. See TEST FUEL SHUT-OFF SOLENOID RESISTANCE—DELPHI/LUCAS PUMP later in this group.</p> | <p><b>Resistance is within specifications:</b> Check wiring harness.</p> <p><b>Resistance is not within specifications:</b> Replace solenoid.</p> |
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## Remove Lucas and Stanadyne Fuel Supply Pump

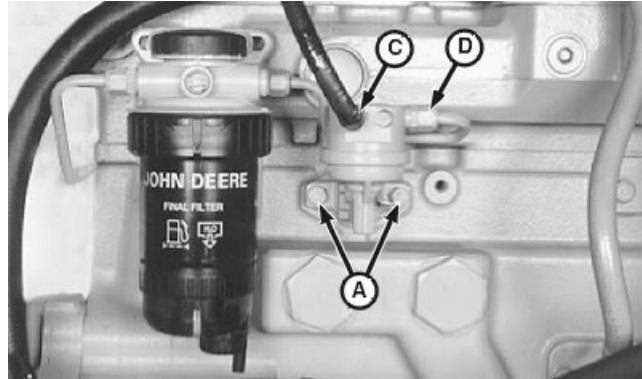
**IMPORTANT:** A backup wrench must always be used when disconnecting fittings or fuel lines from supply pump to avoid damage to fittings.

1. Disconnect fuel inlet line (C) and outlet line (D) and cap connections on fuel supply pump and fuel lines to keep debris out of fuel system.
2. Remove cap screws (A) and remove fuel supply pump assembly from cylinder block.

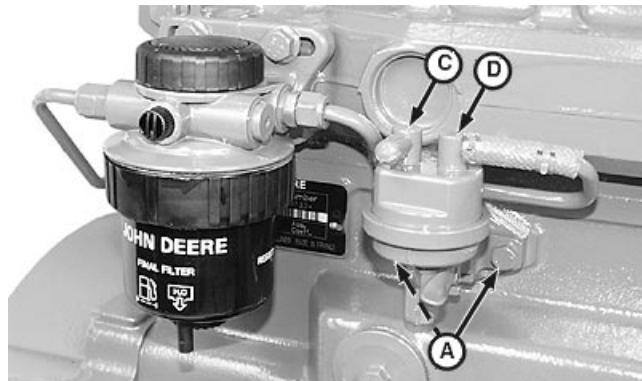
**NOTE:** The fuel supply pump is driven by a push rod (B) that rides on an eccentric camshaft lobe. The cylinder head must be removed to remove this push rod.

3. Cover opening on cylinder block to prevent dirt from entering the engine.
4. Inspect face of pump lever for wear. If lever face is worn flat or concave, replace pump.

- A—Cap Screws  
B—Push Rod  
C—Supply Pump Inlet from Fuel Tank  
D—Supply Pump Outlet to Final Fuel Filter



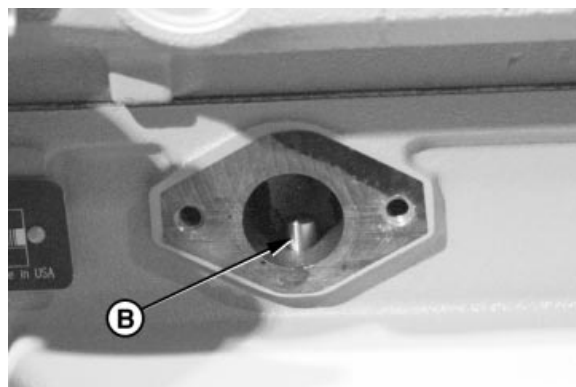
Fuel Supply Pump with Metal Cover



Fuel Supply Pump with Composite Cover

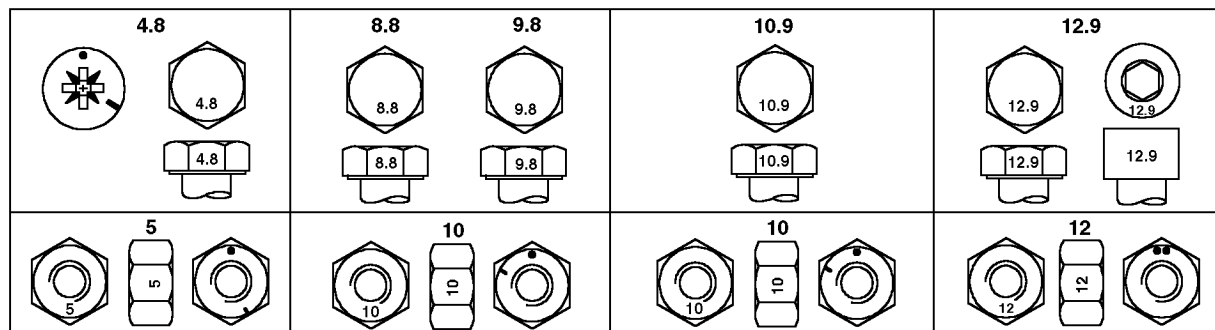


Remove Fuel Supply Pump



Fuel Supply Pump Push Rod

## Metric Bolt and Cap Screw Torque Values



Top, Property Class and Head Markings; Bottom, Property Class and Nut Markings

| Size | Class 4.8                             |                                | Class 8.8 or 9.8                      |                                | Class 10.9                            |                                | Class 12.9                            |                                |
|------|---------------------------------------|--------------------------------|---------------------------------------|--------------------------------|---------------------------------------|--------------------------------|---------------------------------------|--------------------------------|
|      | Lubricated <sup>a</sup><br>N•m(lb-ft) | Dry <sup>b</sup><br>N•m(lb-ft) | Lubricated <sup>a</sup><br>N•m(lb-ft) | Dry <sup>b</sup><br>N•m(lb-ft) | Lubricated <sup>a</sup><br>N•m(lb-ft) | Dry <sup>b</sup><br>N•m(lb-ft) | Lubricated <sup>a</sup><br>N•m(lb-ft) | Dry <sup>b</sup><br>N•m(lb-ft) |
| M6   | 4.7 (3.5)                             | 6 (4.4)                        | 9 (6.6)                               | 11.5 (8.5)                     | 13 (9.5)                              | 16.5 (12.2)                    | 15.5 (11.5)                           | 19.5 (14.5)                    |
| M8   | 11.5 (8.5)                            | 14.5 (10.7)                    | 22 (16)                               | 28 (20.5)                      | 32 (23.5)                             | 40 (29.5)                      | 37 (27.5)                             | 47 (35)                        |
| M10  | 23 (17)                               | 29 (21)                        | 43 (32)                               | 55 (40)                        | 63 (46)                               | 80 (59)                        | 75 (55)                               | 95 (70)                        |
| M12  | 40 (29.5)                             | 50 (37)                        | 75 (55)                               | 95 (70)                        | 110 (80)                              | 140 (105)                      | 130 (95)                              | 165 (120)                      |
| M14  | 63 (46)                               | 80 (59)                        | 120 (88)                              | 150 (110)                      | 175 (130)                             | 220 (165)                      | 205 (150)                             | 260 (190)                      |
| M16  | 100 (74)                              | 125 (92)                       | 190 (140)                             | 240 (175)                      | 275 (200)                             | 350 (255)                      | 320 (235)                             | 400 (300)                      |
| M18  | 135 (100)                             | 170 (125)                      | 265 (195)                             | 330 (245)                      | 375 (275)                             | 475 (350)                      | 440 (325)                             | 560 (410)                      |
| M20  | 190 (140)                             | 245 (180)                      | 375 (275)                             | 475 (350)                      | 530 (390)                             | 675 (500)                      | 625 (460)                             | 790 (580)                      |
| M22  | 265 (195)                             | 330 (245)                      | 510 (375)                             | 650 (480)                      | 725 (535)                             | 920 (680)                      | 850 (625)                             | 1080 (800)                     |
| M24  | 330 (245)                             | 425 (315)                      | 650 (480)                             | 820 (600)                      | 920 (680)                             | 1150 (850)                     | 1080 (800)                            | 1350 (1000)                    |
| M27  | 490 (360)                             | 625 (460)                      | 950 (700)                             | 1200 (885)                     | 1350 (1000)                           | 1700 (1250)                    | 1580 (1160)                           | 2000 (1475)                    |
| M30  | 660 (490)                             | 850 (625)                      | 1290 (950)                            | 1630 (1200)                    | 1850 (1350)                           | 2300 (1700)                    | 2140 (1580)                           | 2700 (2000)                    |
| M33  | 900 (665)                             | 1150 (850)                     | 1750 (1300)                           | 2200 (1625)                    | 2500 (1850)                           | 3150 (2325)                    | 2900 (2150)                           | 3700 (2730)                    |
| M36  | 1150 (850)                            | 1450 (1075)                    | 2250 (1650)                           | 2850 (2100)                    | 3200 (2350)                           | 4050 (3000)                    | 3750 (2770)                           | 4750 (3500)                    |

<sup>a</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

<sup>b</sup> "Dry" means plain or zinc plated without any lubrication.

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 property class.

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

Make sure fastener 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.

TORQ2 -UN-07SEP99

**NOTE:** Engine speeds are as preset to factory specifications. In most cases, slow idle speed will be reset upon specific vehicle application requirements. Refer to your machine technical manual for engine speeds that are different from those preset at the factory.

**IMPORTANT:** Make sure engine is warmed up to operating temperature and running at full load/rated speed when setting dynamic timing on injection pump.

| FUEL INJECTION PUMP SPECIFICATIONS (AGRICULTURAL APPLICATIONS)                                                                                                                                                                          |              |                                    |                                       |                       |                   |                 |                                     |                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------------------|---------------------------------------|-----------------------|-------------------|-----------------|-------------------------------------|-------------------------------------------------------|
| Machine Model                                                                                                                                                                                                                           | Engine Model | Original Injection Pump (Part No.) | Replaced By Injection Pump (Part No.) | Slow Idle Speed (rpm) | Rated Speed (rpm) | Fast Idle (rpm) | Dynamic Timing (Degrees Before TDC) | DD Engine No. <sup>a</sup> (for European Tier I only) |
| <b>Des Moines, Iowa</b>                                                                                                                                                                                                                 |              |                                    |                                       |                       |                   |                 |                                     |                                                       |
| 4700/4710 Sprayer (138 kW)                                                                                                                                                                                                              | T06068TN050  | RE62366                            | RE69791                               | 925                   | 2400              | 2600            | 6.5                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE69791                            |                                       | 925                   | 2400              | 2600            | 8.5                                 |                                                       |
|                                                                                                                                                                                                                                         | PE6068TN050  | RE69791                            |                                       | 925                   | 2400              | 2600            | 8.5                                 |                                                       |
|                                                                                                                                                                                                                                         | T06068TN053  | RE504153 <sup>b</sup>              |                                       | 925                   | 2400              | 2600            | 4.3                                 |                                                       |
|                                                                                                                                                                                                                                         | PE6068TN053  | RE504153 <sup>b</sup>              |                                       | 925                   | 2400              | 2600            | 4.3                                 |                                                       |
| 4700/4710 Sprayer (149 kW)                                                                                                                                                                                                              | PE6068TN052  | RE504321 <sup>b</sup>              |                                       | 925                   | 2400              | 2600            | 4.0                                 |                                                       |
| 6700/6700S Sprayer                                                                                                                                                                                                                      | T04045TN050  | RE69155                            |                                       | 850                   | 2200              | 2400            | 6.5                                 |                                                       |
|                                                                                                                                                                                                                                         | PE4045TN050  | RE69155                            |                                       | 850                   | 2200              | 2400            | 6.5                                 |                                                       |
| 7455 Cotton Stripper                                                                                                                                                                                                                    | T06068TN051  | RE63559                            | RE501302                              | 950                   | 2200              | 2400            | 6.6                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE501302                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE503674                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
|                                                                                                                                                                                                                                         | PE6068TN051  | RE63559                            | RE501302                              | 950                   | 2200              | 2400            | 6.6                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE501302                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE503674                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
| 7460 Cotton Stripper                                                                                                                                                                                                                    | PE6068TN054  | RE516791                           |                                       | 950                   | 2200              | 2400            | 7.0                                 |                                                       |
| 9935 Cotton Picker                                                                                                                                                                                                                      | T06068TN051  | RE63559                            | RE501302                              | 950                   | 2200              | 2400            | 6.6                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE501302                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE503674                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
|                                                                                                                                                                                                                                         | PE6068TN051  | RE63559                            | RE501302                              | 950                   | 2200              | 2400            | 6.6                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE501302                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
|                                                                                                                                                                                                                                         |              | RE503674                           |                                       | 950                   | 2200              | 2400            | 7.3                                 |                                                       |
| <b>East Moline, Illinois</b>                                                                                                                                                                                                            |              |                                    |                                       |                       |                   |                 |                                     |                                                       |
| <sup>a</sup> Reference number is listed on label on side of rocker arm cover and represents applications which are certified to European Tier I regulations. The dynamic timing value is different than the non-certified applications. |              |                                    |                                       |                       |                   |                 |                                     |                                                       |
| <sup>b</sup> In-line mechanical fuel injection pump.                                                                                                                                                                                    |              |                                    |                                       |                       |                   |                 |                                     |                                                       |

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**E2—Engine Misfires/Runs Irregularly Diagnostic Procedure**

*NOTE: This procedure applies to engines using mechanical fuel systems. For engines using electronic fuel systems, refer to the manual that corresponds to the ECU being used.*

**Before using this diagnostic procedure:**

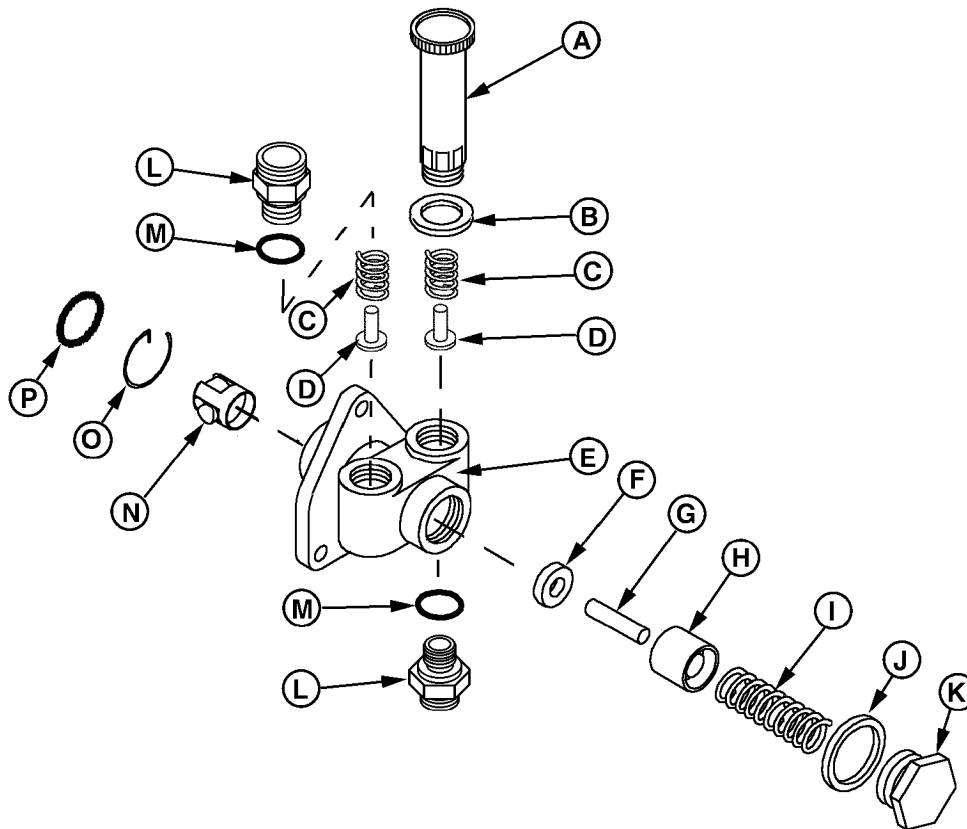
Ensure fuel quantity and quality are OK. See CHECK FUEL SUPPLY QUALITY later in this group.

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|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                               |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 CYLINDER MISFIRE CHECK</b>   | Check cylinders for misfire. See CYLINDER MISFIRE TEST (ENGINE RUNNING) later in this group.                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Single cylinder misfire:</b> Go to 2.<br><br><b>Random or all cylinder misfire:</b> Go to F1—FUEL SUPPLY SYSTEM CHECK later in this group. |
| <b>2 HEAD GASKET CHECK</b>        | Check for head gasket joint failures. See CHECK FOR HEAD GASKET FAILURES in Group 150 in Section 4 of 4.5 L & 6.8 L Diesel Engines Base Engine Manual (CTM104).                                                                                                                                                                                                                                                                                                                                         | <b>No sign of head gasket failure:</b> Go to 3.<br><br><b>Signs of head gasket failure found:</b> Replace head gasket and retest.             |
| <b>3 FUEL DELIVERY LINE CHECK</b> | <b>Perform the following steps to determine if fuel delivery lines are restricted:</b> <ol style="list-style-type: none"> <li>1. Disconnect the suspected fuel delivery line on the injection nozzle end and injection pump end.</li> <li>2. Force air through one end of the delivery line.</li> <li>3. If the delivery line is not restricted, the compressed air should flow freely out the other side.</li> <li>4. If air does not flow freely, there are restrictions in the fuel line.</li> </ol> | <b>Lines are not restricted:</b> Go to 4.<br><br><b>Lines are restricted:</b> Repair or replace lines and retest.                             |

-- 1/1

## Disassemble Denso In-Line Fuel Supply Pump



Fuel Supply Pump

- |                   |                       |                |                          |
|-------------------|-----------------------|----------------|--------------------------|
| A—Hand Primer     | E—Pump Housing        | I—Spring       | M—O-Ring                 |
| B—Washer (4 used) | F—O-Ring/Spindle Seal | J—Washer       | N—Roller/Tappet Assembly |
| C—Spring (2 used) | G—Pressure Spindle    | K—Plug         | O—Snap Ring              |
| D—Valve           | H—Plunger             | L—Flex Fitting | P—O-Ring                 |

Continued on next page

RG,35,JW7616 -19-19AUG04-1/6

## Mechanical Fuel System Repair Specifications

| Item                                                           | Measurement | Specification                       |
|----------------------------------------------------------------|-------------|-------------------------------------|
| Fuel Filter Base Mounting Bracket-to-Cylinder Head             | Torque      | 35 N•m (26 lb-ft)                   |
| Primary Fuel Filter/Water Separator Mounting Base-to-Bracket   | Torque      | 35 N•m (26 lb-ft)                   |
| Final Fuel Filter Mounting Base-to-Bracket                     | Torque      | 35 N•m (26 lb-ft)                   |
| Fuel Supply Pump (Engine with Rotary Injection Pump)           | Pressure    | 28—41 kPa (0.28—0.41 bar) (4—6 psi) |
| Fuel Supply Pump Cap Screws (Rotary)                           | Torque      | 30 N•m (22 lb-ft)                   |
| Fuel Supply Pump (Denso) Cap Screws                            | Torque      | 5—7 N•m (4—5 lb-ft) (45—60 lb-in.)  |
| Motorpal Fuel Supply Pump Mounting Cap Screws                  | Torque      | 8 N•m (6 lb-ft) (72 lb-in.)         |
| Fuel Supply Pump Inlet and Outlet Lines                        | Torque      | 10 N•m (7 lb-ft)                    |
| Fuel Shut-Off Solenoid Actuator Rod Cap Screw/Nut              | Torque      | 15—20 N•m (11—15 lb-ft)             |
| Remove and Install Delphi/Lucas Fuel Shut-Off Solenoid         |             |                                     |
| Solenoid Tightening                                            | Torque      | 24 N•m (18 lb-ft)                   |
| Cold Start Advance Valve                                       | Torque      | 11.5 N•m (8.5 lb-ft)                |
| Cold Start Advance Solenoid-to-Valve                           | Torque      | 5.5 N•m (48 lb-in.)                 |
| Delphi/Lucas Cold Start Advance Temperature Switch             | Torque      | 5 N•m (44 lb-in.)                   |
| Delphi/Lucas and Stanadyne Rotary Injection Pump Mounting Nuts | Torque      | 27 N•m (20 lb-ft)                   |

Continued on next page

OUO1032,00014C3 -19-23AUG04-1/8

# Diagnostic Specifications

## FUEL INJECTION PUMP SPECIFICATIONS (AGRICULTURAL APPLICATIONS)

| Machine Model             | Engine Model | Original Injection Pump (Part No.) | Replaced By Injection Pump (Part No.) | Slow Idle Speed (rpm) | Rated Speed (rpm) | Fast Idle (rpm) | Dynamic Timing (Degrees Before TDC) | DD Engine No. <sup>a</sup> (for European Tier I only) |
|---------------------------|--------------|------------------------------------|---------------------------------------|-----------------------|-------------------|-----------------|-------------------------------------|-------------------------------------------------------|
| 2254 Combine              | CD6068HZ050  | RE500574                           |                                       | 1200                  | 2200              | 2390            | 9.0                                 |                                                       |
| 3200/3400 Telehandler     | CD4045TZ050  | RE501192                           |                                       | 850                   | 2200              | 2400            | 6.0                                 |                                                       |
| <b>Ottumwa, Iowa</b>      |              |                                    |                                       |                       |                   |                 |                                     |                                                       |
| 4890 Windrower            | T04045TE050  | RE63309                            | RE69779                               | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
|                           |              | RE69779                            | RE502708                              | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
|                           |              | RE502708                           |                                       | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
|                           | PE4045TE050  | RE63309                            | RE69779                               | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
|                           |              | RE69779                            | RE502708                              | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
|                           |              | RE502708                           |                                       | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
| 4895 Windrower            | T04045TE051  | RE69781                            |                                       | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
|                           | PE4045TE051  | RE69781                            |                                       | 850                   | 2500              | 2700            | 7.0                                 |                                                       |
| 4990 Windrower            | T06068TE050  | RE70390                            | RE502709                              | 900                   | 2300              | 2500            | 6.5                                 |                                                       |
|                           |              | RE502709                           |                                       | 900                   | 2300              | 2500            | 6.5                                 |                                                       |
|                           | PE6068TE050  | RE70390                            | RE502709                              | 900                   | 2300              | 2500            | 6.5                                 |                                                       |
|                           |              | RE502709                           |                                       | 900                   | 2300              | 2500            | 6.5                                 |                                                       |
| 4995 Windrower            | PE6068TE051  | RE509430                           |                                       | 900                   | 2300              | 2500            | 6.0                                 |                                                       |
| <b>Waterloo, Iowa</b>     |              |                                    |                                       |                       |                   |                 |                                     |                                                       |
| 7210 Tractor (SYNCRPLUS™) | T06068TRW53  | RE59526                            | RE70937                               | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE70937                            | RE502824                              | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE502824                           |                                       | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           | PE6068HRW53  | RE502824                           |                                       | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
| 7210 Tractor (POWRQUAD™)  | T06068TRW50  | RE59526                            | RE70937                               | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE70937                            | RE502824                              | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE502824                           |                                       | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           | PE6068TRW50  | RE59526                            | RE70937                               | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE70937                            | RE502824                              | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE502824                           |                                       | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
| 7220 Tractor              | CD6068TRW01  | RE516840                           |                                       | 850                   | 2300              | 2460            | 5.6                                 |                                                       |
| 7410 Tractor (SYNCRPLUS™) | T06068TRW54  | RE59527                            | RE70938                               | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE70938                            | RE502825                              | 900                   | 2100              | 2300            | 6.5                                 |                                                       |
|                           |              | RE502825                           |                                       | 900                   | 2100              | 2300            | 6.5                                 |                                                       |

<sup>a</sup>Reference number is listed on label on side of rocker arm cover and represents applications which are certified to European Tier I regulations. The dynamic timing value is different than the non-certified applications.

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POWRQUAD is a trademark of Deere & Company

Continued on next page

OUC1032.00014B2 -19-18AUG04-4/29

**E3—Engine Does Not Develop Full Power Diagnostic Procedure**

*NOTE: This procedure applies to engines using mechanical fuel systems. For engines using electronic fuel systems, refer to the manual that corresponds to the ECU being used.*

**Before using this diagnostic procedure:**

Ensure fuel quantity and quality are OK. See CHECK FUEL SUPPLY QUALITY later in this group.

Check for restricted or plugged air filter.

-- -1/1

|                                       |                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 EXHAUST EMISSION CHECK</b>       | Operate engine at full load rated speed. Under these conditions, determine type of exhaust emitted.                                    | <p><b>Small amount or no smoke:</b> Go to 2.</p> <p><b>Heavy white exhaust smoke:</b> Go to E4—ENGINE EMITS EXCESSIVE WHITE EXHAUST SMOKE diagnostic procedure later in this group.</p> <p><b>Heavy gray or black exhaust smoke:</b> Go to E5—ENGINE EMITS EXCESSIVE BLACK OR GRAY EXHAUST SMOKE diagnostic procedure later in this group.</p> |
| <b>2 POWER AND RESPONSE TEST</b>      | Run engine through different loads at multiple speeds. Check for low power at each range and responsiveness to the increase in speeds. | <p><b>Engine does not develop full power:</b> Go to 5.</p> <p><b>Engine does not accelerate satisfactorily:</b> Go to 3.</p>                                                                                                                                                                                                                   |
| <b>3 THROTTLE CABLE BINDING CHECK</b> | Check throttle cable for any binding that could restrict the movement of the cable.                                                    | <p><b>Throttle cable is OK:</b> Go to 4.</p> <p><b>Throttle cable is bound:</b> Repair or replace throttle cable and retest.</p>                                                                                                                                                                                                               |

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|                                                                 |                      | Install . . . . .                           | 02-090-43          |
|                                                                 |                      | Operation . . . . .                         | 03-130-14          |
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## 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 -19-29SEP98-1/1

## Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.



TS1356 -UN-18MAR92

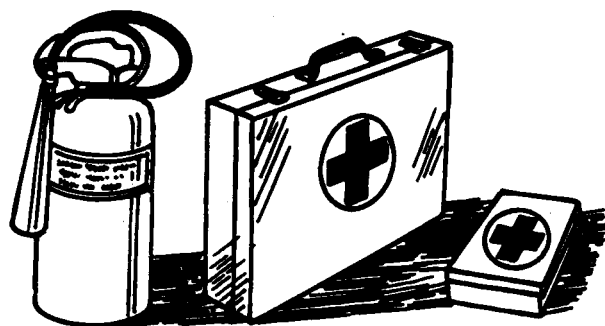
DX,FIRE3 -19-16APR92-1/1

## 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-23AUG88

DX,FIRE2 -19-03MAR93-1/1

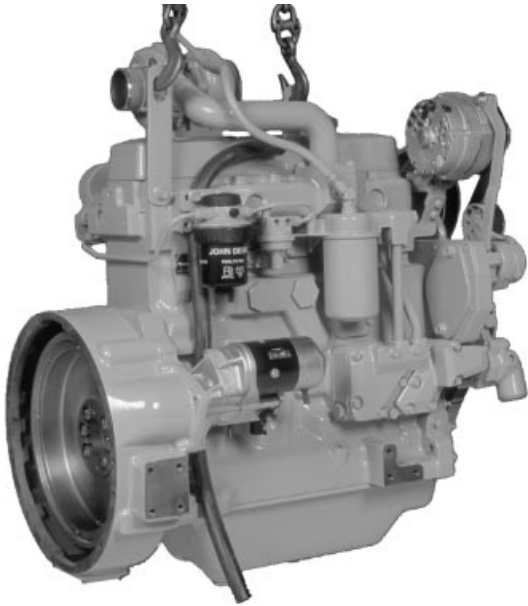
## Engine Application Charts

| JOHN DEERE AGRICULTURAL EQUIPMENT |                                                    |
|-----------------------------------|----------------------------------------------------|
| Machine Model                     | Engine Model                                       |
| <b>Des Moines, Iowa</b>           |                                                    |
| 4700/4710 Sprayer (138 kW)        | T06068TN050, T06068TN053, PE6068TN050, PE6068TN053 |
| 4700/4710 Sprayer (149 kW)        | PE6068TN052                                        |
| 6700/6700S Sprayer                | T04045TN050, PE4045TN050                           |
| 7455 Cotton Stripper              | T06068TN051, PE6068TN051                           |
| 7460 Cotton Stripper              | PE6068TN054                                        |
| 9935 Cotton Picker                | T06068TN051, PE6068TN051                           |
| <b>East Moline, Illinois</b>      |                                                    |
| 9400 Combine                      | T06068HH050                                        |
| 9410 Combine                      | T06068HH051                                        |
| 9450 Combine                      | T06068HH052, PE6068HH052                           |
| <b>Horizontina, Brazil</b>        |                                                    |
| 1075 Combine                      | J06068TYC50                                        |
| 1165 Combine                      | J06068TCQ11                                        |
| 1170 Combine                      | CD6068TCQ50                                        |
| 1175 Combine                      | J06068TJ12                                         |
| 1450 Combine                      | J06068TCQ04, J06068TJ04                            |
| 1550 Combine                      | J06068ACQ01                                        |
| 3518 Combine                      | J06068TYC51                                        |
| 5403/5605 Tractor                 | J04045DCQ01, J04045DJ01                            |
| 5705 Tractor                      | J04045TJ02                                         |
| 6400 Tractor                      | J04045TCQ01                                        |
| 6403 Tractor                      | J04045TP057                                        |
| 6405 Tractor                      | J04045TCQ01                                        |
| 6415 Tractor                      | J04045TCQ03                                        |
| 6603 Tractor                      | J6068TP03                                          |
| 6605 Tractor                      | J06068TJ02                                         |
| 6615 Tractor                      | J06068TCQ13                                        |
| 7505 Tractor                      | J06068TCQ03                                        |
| 7515 Tractor                      | J06068TCQ14                                        |
| <b>Jiamusi, China</b>             |                                                    |
| 1065 Combine                      | CD4045TYC50                                        |
| 1075 Combine                      | CD6068TYC50                                        |
| 3060 Combine                      | CD4045DYC50                                        |
| 3518 Combine                      | CD6068TYC51, CD6068HYC50                           |
| <b>Zweibrucken, Germany</b>       |                                                    |
| 2254 Combine                      | CD6068HZ050                                        |

Continued on next page

DPSG.OUO1004,2764 -19-20AUG04-1/10

## POWERTECH® 4.5L Engine with Mechanical Fuel System



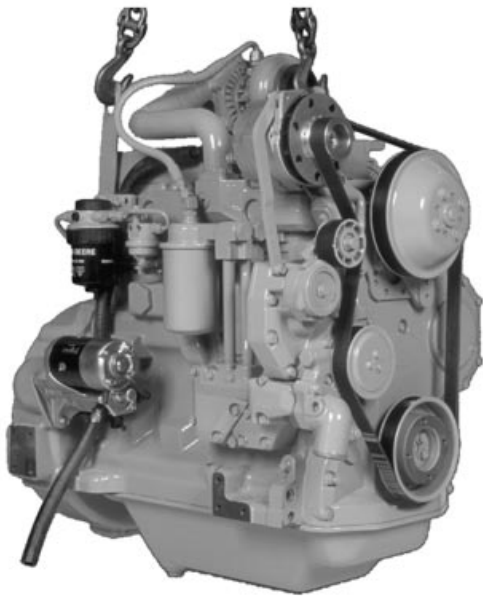
3/4 Right Rear View

RG7636 -UN-23NOV97



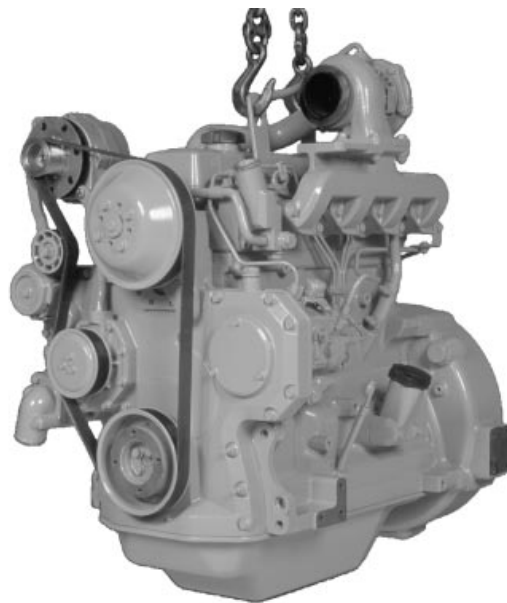
3/4 Left Rear View

RG7638 -UN-23NOV97



3/4 Right Front View

RG7639 -UN-23NOV97



3/4 Left Front View

RG7637 -UN-23NOV97

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DPSG,OUO1004,129 -19-09SEP02-1/1

If the intake manifold pressure is below 100 kPa (1 bar) (15 psi) because of low engine speed, or is under light load at higher engine speeds, the aneroid spring pressure is greater than the intake manifold pressure. As a result, the control rack travel is limited (therefore, fuel delivery is limited) by the arm and adjusting shaft.

Aneroid control will be in effect until the manifold pressure is high enough to overcome diaphragm spring pressure.

RG,115,JW7683 -19-25APR00-2/2

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