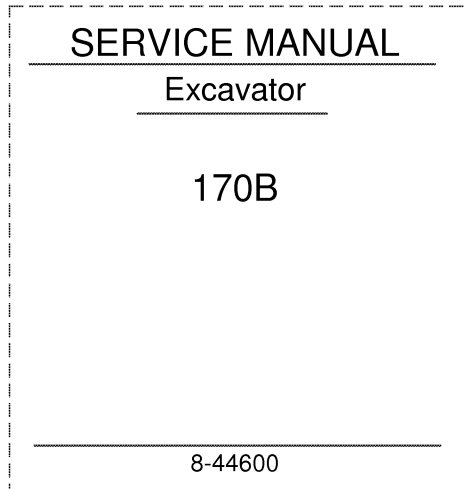
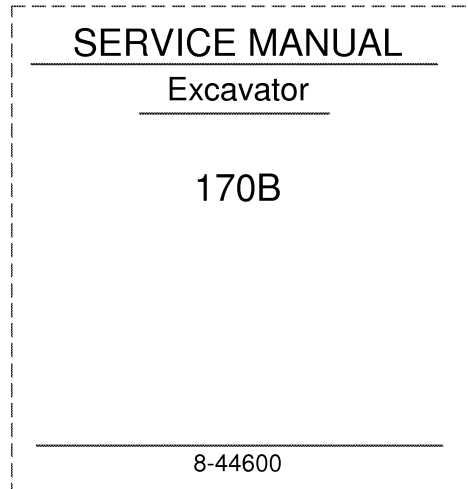




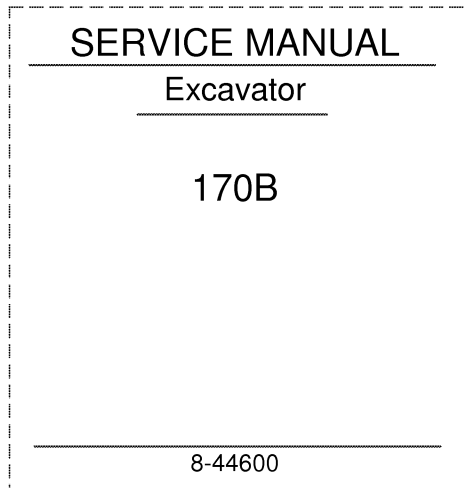
1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



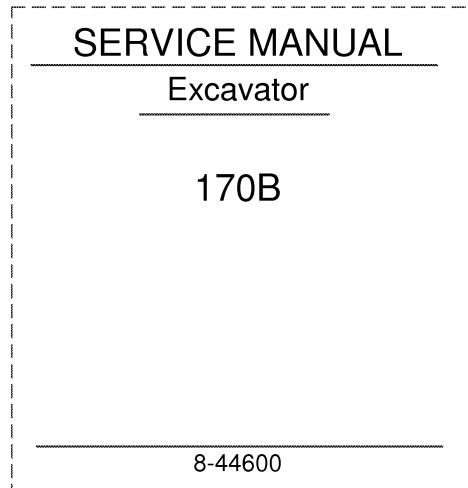
1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4



1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

# 170B EXCAVATOR TABLE OF CONTENTS

| DIVISION/SECTION                                            | SECTION NO. | FORM NO. |
|-------------------------------------------------------------|-------------|----------|
| <b>1 GENERAL</b>                                            |             |          |
| Safety Rules, Service Manual Introduction, and Torque       |             |          |
| Specifications .....                                        | 1001        | 8-43910  |
| Maintenance and Lubrication .....                           | 1002        | 8-44600  |
| <b>2 ENGINES</b>                                            |             |          |
| Engine Removal and Installation .....                       | 2000        | 8-44600  |
| Engine Accessories .....                                    | 2001        | 8-44600  |
| Deutz Engine Service Manual .....                           |             | 291-1842 |
| <b>3 FUEL SYSTEM</b>                                        |             |          |
| Fuel Lines, Fuel Tank, and Engine Controls .....            | 3001        | 8-44600  |
| <b>4 ELECTRICAL</b>                                         |             |          |
| Electrical System Specifications and Troubleshooting .....  | 4002        | 8-44600  |
| Wiring Schematics .....                                     | 4003        | 8-44600  |
| Batteries .....                                             | 4005        | 8-43910  |
| Starter .....                                               | 4006        | 8-43910  |
| Alternator .....                                            | 4007        | 8-43910  |
| <b>5 TRACK AND SUSPENSION</b>                               |             |          |
| Removal and Installation of Track Components .....          | 5501        | 8-44600  |
| Troubleshooting .....                                       | 5502        | 8-43910  |
| Track Chain and Shoes .....                                 | 5503        | 8-44600  |
| Track Rollers, Carrier Rollers, Idlers, and Sprockets ..... | 5506        | 8-44600  |
| <b>6 POWER TRAIN</b>                                        |             |          |
| Removal and Installation of Power Train Components .....    | 6301        | 8-44600  |
| Drive Motor .....                                           | 6312        | 8-44600  |
| Final Drive Transmission .....                              | 6317        | 8-44600  |
| <b>8 HYDRAULICS</b>                                         |             |          |
| Removal and Installation of Hydraulic Components .....      | 8200        | 8-44600  |
| Maintenance and Service .....                               | 8201        | 8-44600  |
| Specifications and Troubleshooting .....                    | 8202        | 8-44600  |
| Low Pressure Hydraulic Pump .....                           | 8204        | 8-44600  |
| Main Hydraulic Pump .....                                   | 8205        | 8-44600  |
| Attachment Control Valve .....                              | 8206        | 8-43910  |
| Swing and Drive Control Valve .....                         | 8207        | 8-43911  |
| Control Valve for Options .....                             | 8208        | 8-43910  |
| Hand Control Valves and Foot Control Valves .....           | 8209        | 8-43910  |
| Solenoid Control Valves .....                               | 8210        | 8-44600  |
| Parallel Supply Control Valve for the Arm Circuit .....     | 8211        | 8-43910  |
| Power Sensing Valve .....                                   | 8212        | 8-43910  |
| Pressure Regulator Valves .....                             | 8213        | 8-44600  |
| Swing Motor .....                                           | 8215        | 8-43911  |
| Oil Cooler Motor .....                                      | 8217        | 8-43910  |
| Hydraulic Swivel .....                                      | 8218        | 8-43910  |
| Cylinders .....                                             | 8290        | 8-44600  |

|          |                                           |      |         |
|----------|-------------------------------------------|------|---------|
| <b>9</b> | <b>MOUNTED EQUIPMENT</b>                  |      |         |
|          | Boom, Arm, and Tool .....                 | 9211 | 8-44600 |
|          | Turntable Bearing and Related Parts ..... | 9216 | 8-44600 |

|                            |  |  |         |
|----------------------------|--|--|---------|
| <b>REAR POCKET</b>         |  |  |         |
| Electrical Schematic ..... |  |  | 850451A |
| Location Schematic .....   |  |  | 850450A |
| Hydraulic Schematic .....  |  |  | 851904  |

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# 1001

## SAFETY RULES, SERVICE MANUAL INTRODUCTION, AND TORQUE SPECIFICATIONS

### TABLE OF CONTENTS

|                                                      |               |
|------------------------------------------------------|---------------|
| <b>Safety Rules .....</b>                            | <b>1001-2</b> |
| <b>Service Manual Introduction .....</b>             | <b>1001-4</b> |
| <b>Torque Specifications - Metric Hardware .....</b> | <b>1001-5</b> |
| <b>Torques for Hydraulic Fittings .....</b>          | <b>1001-6</b> |

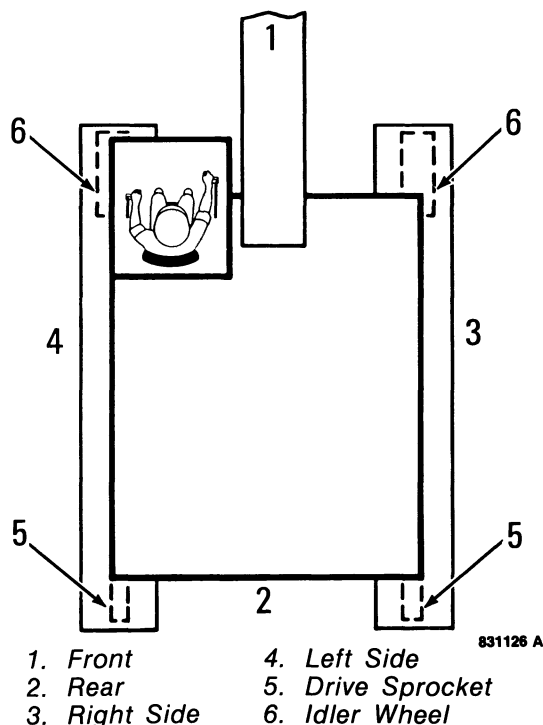
Written In *Clear  
And  
Simple  
English*

## SERVICE MANUAL INTRODUCTION

This service manual has been prepared with the latest service information available. Troubleshooting, removal, disassembly, inspection and installation procedures, and complete specifications and tightening references can be found in most sections. Some sections have drawings but no written procedure because the job is so easily done. This service manual is one of the most important tools available to the service technician.

### Right, Left, Front, and Rear

The terms right-hand and left-hand and front and rear as used in this manual indicate the right and left sides, and front and rear of the machine as seen from the operator's seat for correct operation of the machine or attachment.



### Table of Contents

A Table of Contents is in the front of this manual. The Table of Contents shows the main divisions and the sections that are in each division. The individual sections, also have a Table of Contents.

### Page Numbers

All page numbers are made of two numbers separated by a dash, such as 4002-9. The number before the dash is the section number. The number following the dash is the page number in that section. Page numbers will be found at the upper right or left of each page.

### Illustrations

Illustrations are put as near as possible to the text and are to be used as part of the text.

### Clear and Simple English

This manual is written in C.A.S.E. (Clear and Simple English). C.A.S.E. is easier to read than "regular" English because C.A.S.E. uses a small number of common words and has special rules for writing.

All sections written in C.A.S.E. are indicated by the symbol below.

Written In *Clear  
And  
Simple  
English*

### Special Tools

Special tools are needed to remove and install, disassemble and assemble, check and adjust some component parts of this machine. Some special tools can be easily made locally and the necessary information to make the tool is in this service manual. Other special tools are more difficult to make locally and are available from Service Tools in the U.S. and from Jobborn Manufacturing in Canada. Use these tools according to the instructions in this service manual for your personal safety and to do the job correctly.

Order special tools from either of the following companies.

Service Tools  
P.O. Box 314  
Owatonna, Minnesota 55060

Jobborn Manufacturing Co.  
97 Frid Street  
Hamilton, Ontario L8P 4M3  
Canada

## TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when special torques 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 moly-disulfide grease or oil is used.

| <b>Grade 8.8 Bolts, Nuts, and Studs</b><br> |            |               |                 |
|------------------------------------------------------------------------------------------------------------------------------|------------|---------------|-----------------|
| Size                                                                                                                         | Pound-Feet | Newton metres | Kilogram metres |
| <b>M4</b><br>0.15 in                                                                                                         | 2-3        | 3-4           | 0.3-0.4         |
| <b>M5</b><br>0.19 in                                                                                                         | 5-6        | 6.5-8         | 0.7-0.8         |
| <b>M6</b><br>0.23 in                                                                                                         | 8-9        | 10.5-12       | 1.1-1.2         |
| <b>M8</b><br>0.31 in                                                                                                         | 19-23      | 26-31         | 2.6-3.2         |
| <b>M10</b><br>0.39 in                                                                                                        | 38-45      | 52-61         | 5.3-6.2         |
| <b>M12</b><br>0.46 in                                                                                                        | 66-79      | 90-107        | 9.1-10.9        |
| <b>M14</b><br>0.55 in                                                                                                        | 106-127    | 144-172       | 14.7-17.6       |
| <b>M16</b><br>0.62 in                                                                                                        | 160-200    | 217-271       | 22.1-27.7       |
| <b>M20</b><br>0.78 in                                                                                                        | 320-380    | 434-515       | 44.2-52.5       |
| <b>M24</b><br>0.94 in                                                                                                        | 500-600    | 675-815       | 69.1-83.0       |
| <b>M30</b><br>1.17 in                                                                                                        | 920-1100   | 1250-1500     | 127-152         |
| <b>M36</b><br>1.40 in                                                                                                        | 1600-1950  | 2175-2600     | 221-270         |

### Grade 10.9 Bolts, Nuts, and Studs

|  |            |               |                 |
|-------------------------------------------------------------------------------------|------------|---------------|-----------------|
| Size                                                                                | Pound-Feet | Newton metres | Kilogram metres |
| <b>M4</b><br>0.15 in                                                                | 3-4        | 4-5           | 0.4-0.5         |
| <b>M5</b><br>0.19 in                                                                | 7-8        | 9.5-11        | 1.0-1.1         |
| <b>M6</b><br>0.23 in                                                                | 11-13      | 15-17.5       | 1.5-1.8         |
| <b>M8</b><br>0.31 in                                                                | 27-32      | 37-43         | 3.7-4.4         |
| <b>M10</b><br>0.39 in                                                               | 54-64      | 73-87         | 7.5-8.8         |
| <b>M12</b><br>0.46 in                                                               | 93-112     | 125-150       | 12.9-15.5       |
| <b>M14</b><br>0.55 in                                                               | 149-179    | 200-245       | 20.6-24.7       |
| <b>M16</b><br>0.62 in                                                               | 230-280    | 310-380       | 31.8-38.7       |
| <b>M20</b><br>0.78 in                                                               | 450-540    | 610-730       | 62.2-74.7       |
| <b>M24</b><br>0.94 in                                                               | 780-940    | 1050-1275     | 108-130         |
| <b>M30</b><br>1.17 in                                                               | 1470-1770  | 2000-2400     | 203-245         |
| <b>M36</b><br>1.40 in                                                               | 2580-3090  | 3500-4200     | 357-427         |

### 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.

## TORQUES FOR HYDRAULIC FITTINGS

| Unions and Connections (Hoses) | Torque                            |
|--------------------------------|-----------------------------------|
| 13 mm                          | 22 pound-feet (30 N m, 3 kg/m)    |
| 17 mm                          | 40 pound-feet (55 N m, 5.5 kg/m)  |
| 21 mm                          | 72 pound-feet (100 N m, 10 kg/m)  |
| 27 mm                          | 144 pound-feet (200 N m, 20 kg/m) |
| 34 mm                          | 202 pound-feet (280 N m, 28 kg/m) |
| 42 mm                          | 275 pound-feet (380 N m, 38 kg/m) |
| 49 mm                          | 108 pound-feet (150 N m, 15 kg/m) |

| Tube Nuts |       | Torque                              |                                   |
|-----------|-------|-------------------------------------|-----------------------------------|
| ID        | OD    | High Pressure                       | Low Pressure                      |
| 5 mm      | 10 mm | 32 pound-feet (45 N m, 4.5 kg/m)    | 22 pound-feet (30 N m, 3 kg/m)    |
| 12 mm     | 17 mm | 61 pound-feet (85 N m, 8.5 kg/m)    | 51 pound-feet (70 N m, 7 kg/m)    |
| 15 mm     | 21 mm | 116 pound-feet (160 N m, 16 kg/m)   | 87 pound-feet (120 N m, 12 kg/m)  |
| 20 mm     | 27 mm | 206 pound-feet (285 N m, 28.5 kg/m) | 108 pound-feet (150 N m, 15 kg/m) |
| 26 mm     | 34 mm | 333 pound-feet (460 N m, 46 kg/m)   | 108 pound-feet (150 N m, 15 kg/m) |

| Flanges        | Torque                            |
|----------------|-----------------------------------|
| 17 mm          | 13 pound-feet (18 N m, 1.8 kg/m)  |
| 21 mm          | 20 pound-feet (28 N m, 2.8 kg/m)  |
| 27 mm          | 40 pound-feet (55 N m, 5.5 kg/m)  |
| 34 mm          | 64 pound-feet (88 N m, 8.8 kg/m)  |
| 42 mm          | 101 pound-feet (140 N m, 14 kg/m) |
| 49 mm          | 64 pound-feet (88 N m, 8.8 kg/m)  |
| (low pressure) |                                   |
| 50 mm          | 152 pound-feet (210 N m, 21 kg/m) |

# 2000

## ENGINE REMOVAL AND INSTALLATION

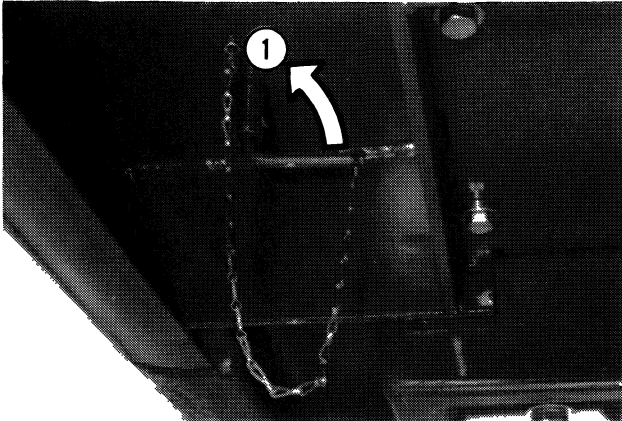
### TABLE OF CONTENTS

|                           |        |
|---------------------------|--------|
| Engine Removal .....      | 2000-2 |
| Engine Installation ..... | 2000-3 |

## ENGINE REMOVAL

Before you disconnect any hoses, put identification tags on the hoses. Install plugs and caps in the hoses and fittings to keep dirt out of the engine.

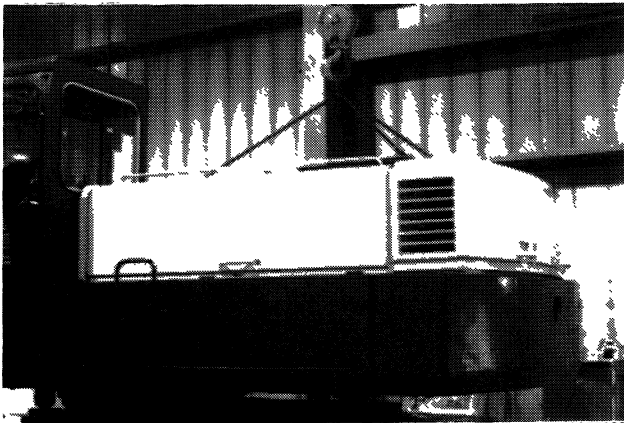
1. Put the battery disconnect switch in the OFF position.



1. OFF Position

856683

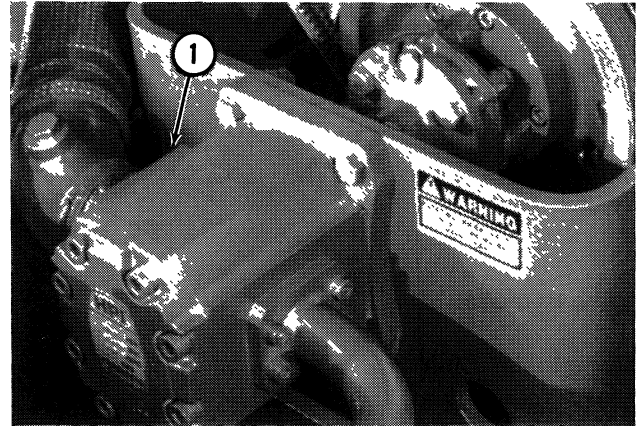
2. Loosen and remove the cap screws, flat washers, and spacers that fasten the cowlings to the upper structure.
3. Close the doors on the cowlings.
4. Connect lifting equipment to the cowlings.
5. Remove the cowlings from the machine.



A855026

6. Loosen the two screws that fasten the coupling to the low pressure hydraulic pump.

7. Loosen and remove the self-locking nuts, washers, and bolts that fasten the low pressure hydraulic pump to the mounting plate.

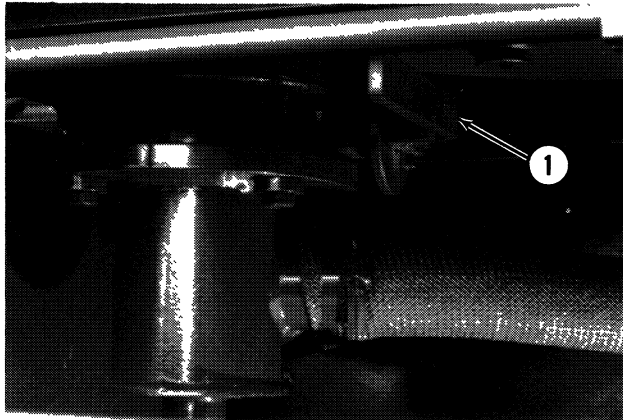


1. Low Pressure Hydraulic Pump

856696

8. Pull the low pressure hydraulic pump away from the mounting plate until the shaft is clear of the mounting plate.
9. Disconnect the air cleaner hose from the turbocharger.
10. Loosen and remove the cap screws and flat washers from the rear engine mounts.
11. Put identification tags on all the electrical wires connected to the engine.
12. Disconnect the wires from all the switches and senders on the engine.
13. Cut the tie straps that fasten the wires to the engine. Move the wires out of the way.
14. Disconnect the battery cable and ground strap from the starter.
15. Disconnect the fuel lines from the engine.
16. Disconnect the hoses for the cab heater from the housing for the engine oil filter.
17. Disconnect the throttle cable and fuel shutoff cable from the fuel injection pump.
18. Disconnect the throttle cable and fuel shutoff cable from the bracket on the engine.
19. Disconnect the heater control cable from the housing for the engine oil filter.

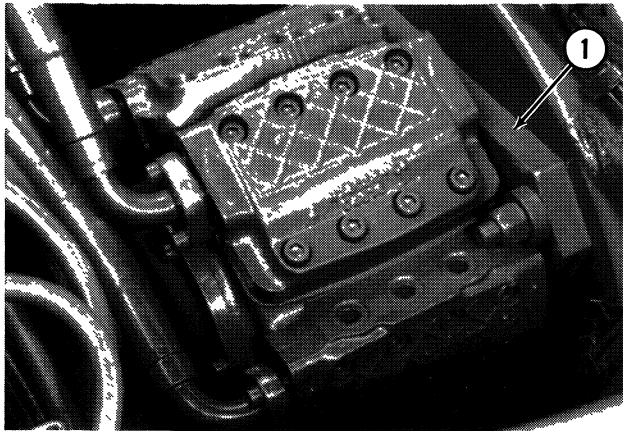
20. Close the shutoff valve on the hydraulic reservoir.



1. Closed

856666

21. Disconnect the hoses from the main hydraulic pump.



1. Main Hydraulic Pump

856715

22. Connect lifting equipment to the engine. The weight of the engine is approximately 1100 pounds (490 kg).

23. Loosen and remove the cap screws and flat washers from the front engine mount.

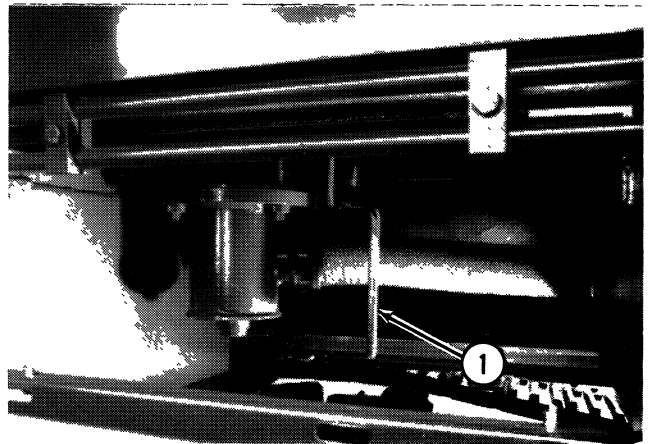
24. Slowly raise the engine and check to make sure that all wires and hoses are disconnected from the engine.

25. Remove the engine from the machine.

## ENGINE INSTALLATION

1. Connect lifting equipment to the engine.
2. Move the engine into position in the machine.
3. Align the front engine mounts. Install the cap screws and flat washers.
4. Align the rear engine mounts. Install the cap screws and flat washers.
5. Tighten the cap screws for the engine mounts to 44 pound-feet (60 N m, 6 kg/m).
6. Disconnect the lifting equipment from the engine.
7. Connect the hoses to the main hydraulic pump.

8. Open the shutoff valve on the hydraulic reservoir.



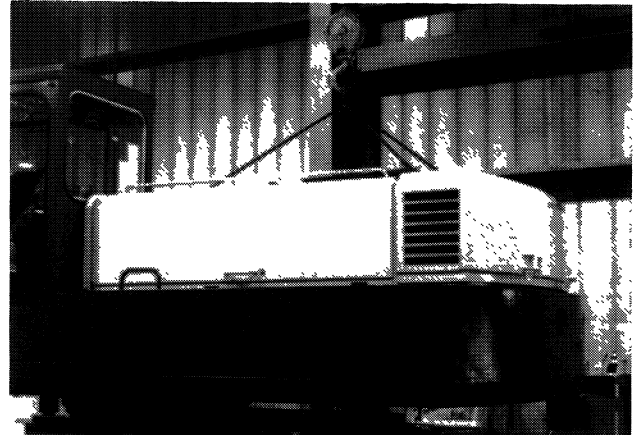
1. Open

856667

9. Connect the heater control cable to the housing for the engine oil filter.

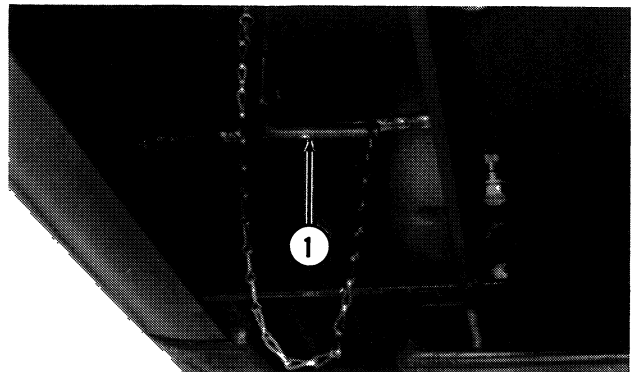
10. Connect the throttle cable and fuel shutoff cable to the bracket on the engine.
11. Connect the throttle cable and shutoff cable to the fuel injection pump.
12. Connect the hoses for the cab heater to the housing for the engine oil filter.
13. Connect the fuel lines to the engine.
14. Connect the ground strap and battery cable to the starter.
15. Connect the electrical wires to the switches and senders on the engine.
16. Install tie straps to fasten the wires to the engine.
17. Connect the air cleaner hose to the turbocharger.
18. Align the shaft of the low pressure hydraulic pump with the coupling. Push the low pressure hydraulic pump against the mounting bracket and install the bolts, flat washers, and self-locking nuts.
19. Tighten the screws to fasten the coupling to the shaft of the low pressure hydraulic pump.

20. Connect lifting equipment to the cowling. Install the cowling on the machine.



A855026

21. Install the cap screws, flat washers, and spacers to fasten the cowling to the machine.
22. Move the battery disconnect switch to the ON position.



1. ON Position

856683

23. Start and run the engine at idle for two minutes. Stop the engine and check for oil leakage.

## AIR CLEANER

### Restriction Indicator Warning Lamp

You must service the air cleaner if the warning lamp for air cleaner illuminates when the engine is running. It is recommended that you do not run the engine until after you service the air cleaner.

### Dust Valve

Clean the dust valve every 10 hours of operation or each day, whichever occurs first.

Remove the dust valve from the dust cup to clean.

### Precleaner Service

When you service the air cleaner elements, remove and clean the precleaner.

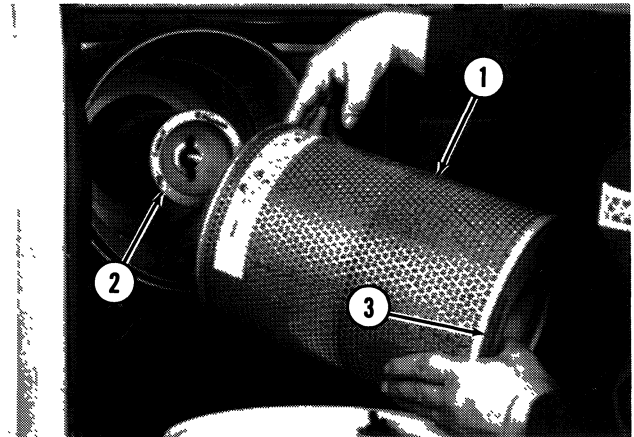
1. Loosen the clamp and remove the dust cup.
2. Loosen the clamp for the precleaner and remove the precleaner.
3. Use a stiff brush to clean the tubes of the precleaner.
4. Use compressed air or warm water 160°F (70°C) to clean the precleaner.

**NOTE:** Do not steam clean the precleaner.

### Element Service

1. Remove the air cleaner cover.
2. Remove and clean the primary element. See Cleaning Primary Element on page 2001-3. Replace the primary element after cleaning six times.

**NOTE:** The date of manufacture is on the end cap of the primary element. Do not install a primary element that is more than two years old.

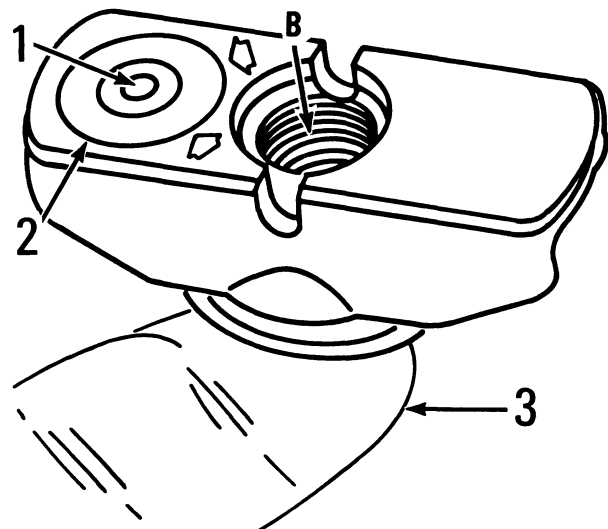


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1. Primary Element
2. Secondary Element
3. Date of Manufacture

3. Check the condition of the secondary element. If the indicator in the wing nut is green, the secondary element is good. If the indicator is red, replace the secondary element. Then make the indicator ready for use again by doing the following steps:

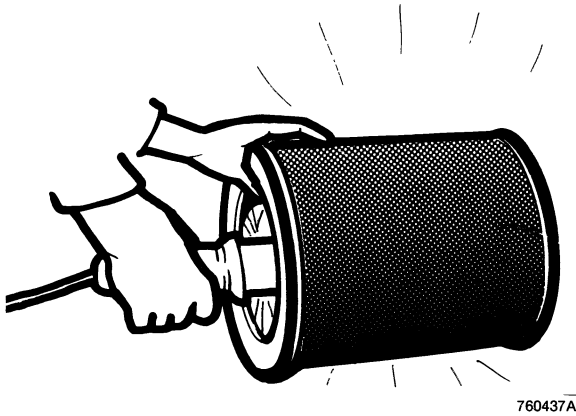
- a. Cover the opening A with your finger.
- b. Blow air in B until the green point appears.



1. Green Point
2. Indicator
3. Finger

851603

4. After the primary element is clean and dry, use a lamp to inspect the primary element for damage. Look for holes, wear, bent end covers, etc. Discard the primary element if damaged.



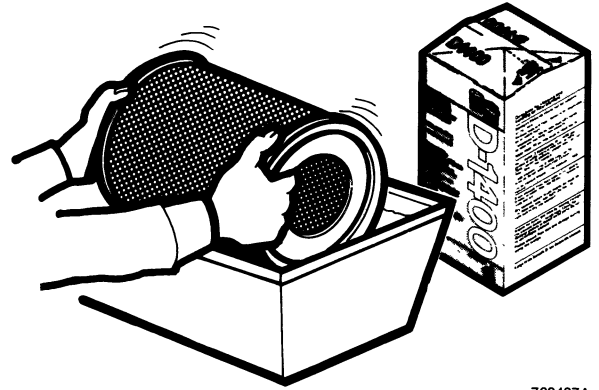
760437A

5. Install the primary element.
6. Install the air cleaner cover.
7. Start the engine. If the warning lamp for the restriction indicator illuminates, replace the secondary element.

**NOTE:** Do not clean the secondary element. Always replace the secondary element.

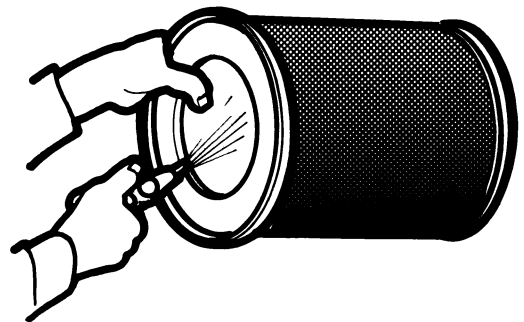
## Cleaning Primary Element

**WASHING:** Washing is the best method for cleaning the primary element. Wash the primary element with D-1400 detergent (Case part number A40910). The primary element must be dry before installation in the air cleaner. Do not use compressed air to dry a wet element.

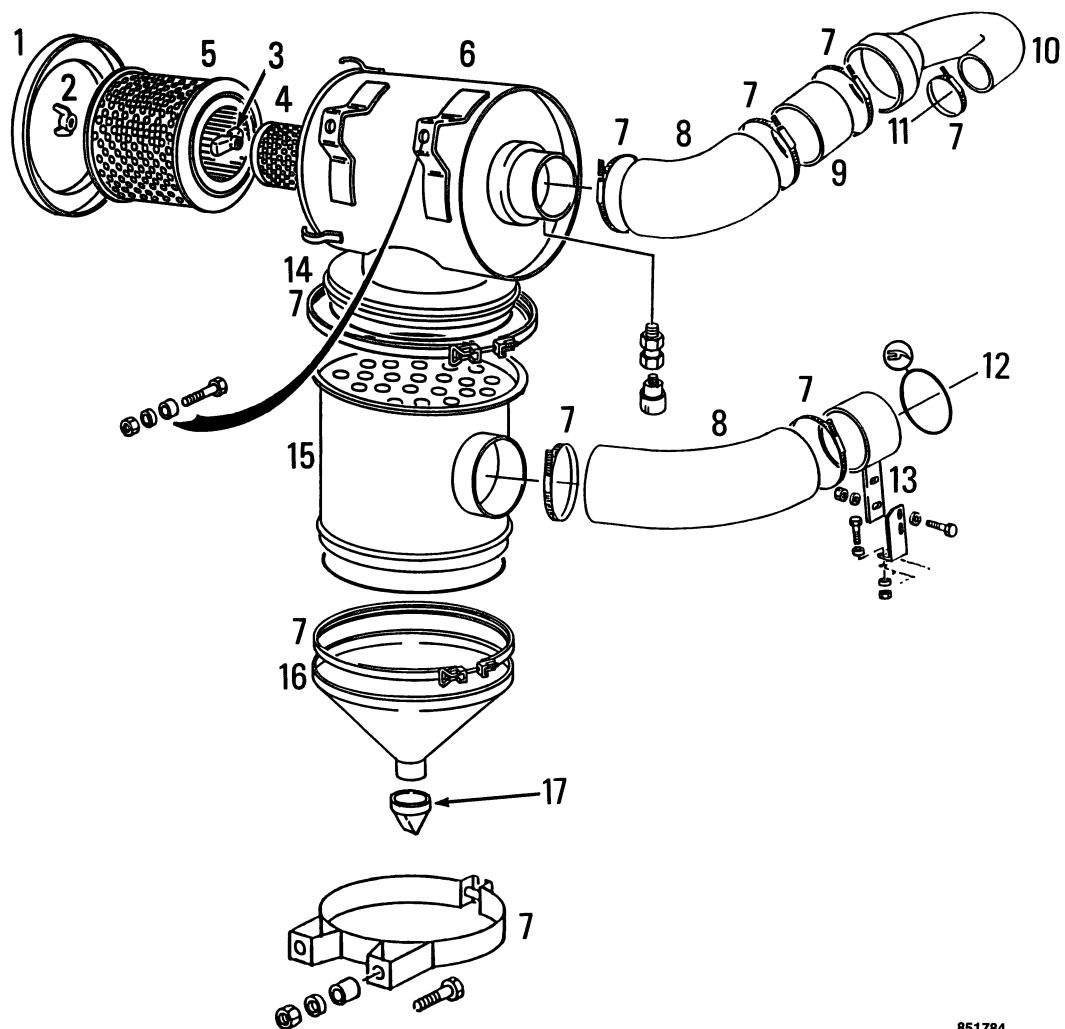


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**COMPRESSED AIR:** Use compressed air that is not more than 30 psi (206 kPa, 2.1 kg/cm<sup>3</sup>) at the nozzle. Use the compressed air inside the primary element and 1 inch (25 mm) or more in distance from the primary element. Cleaning the primary element with compressed air will not remove carbon or soot.



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851784

- |                                                    |                                     |                |
|----------------------------------------------------|-------------------------------------|----------------|
| 1. Cover                                           | 7. Clamp                            | 12. Air Intake |
| 2. Wing Nut                                        | 8. Hose                             | 13. Bracket    |
| 3. Wing Nut and Indicator<br>For Secondary Element | 9. Connector                        | 14. Seal       |
| 4. Secondary Element                               | 10. Elbow                           | 15. Precleaner |
| 5. Primary Element                                 | 11. To Intake Manifold<br>of Engine | 16. Dust Cup   |
| 6. Body                                            |                                     | 17. Dust Valve |



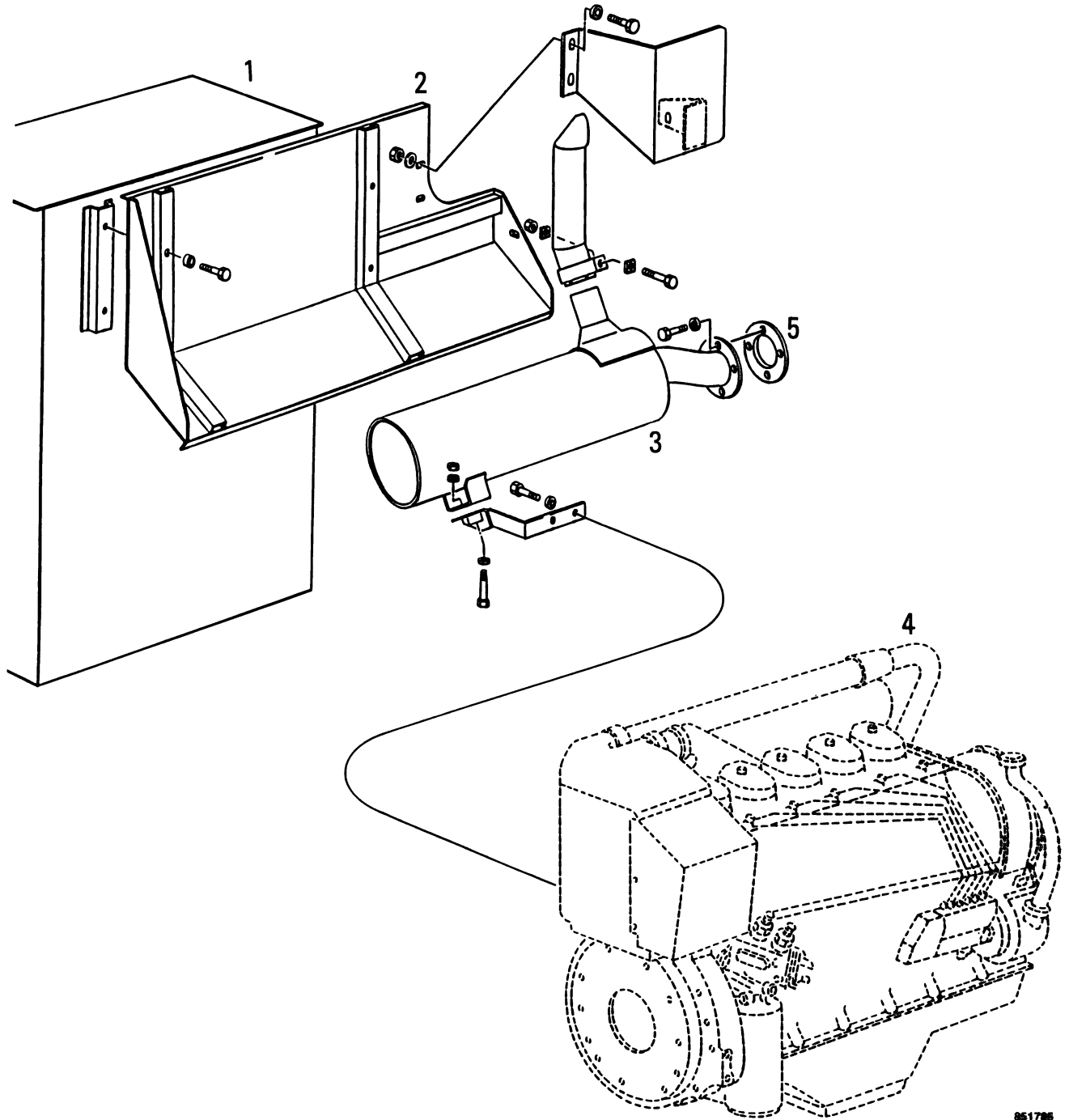
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# EXHAUST SYSTEM



1. Fuel Tank  
2. Heat Shield

3. Muffler  
4. Engine

5. To Turbocharger

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