

The CASE logo is displayed in white, bold, italicized capital letters. It is positioned on a black trapezoidal background that tapers to the right. A horizontal orange line is located directly beneath the letters.

**REPAIR MANUAL**  
**SKID STEER/COMPACT TRACK LOADER**

**410**  
**420**  
**420CT**  
**SERIES 3**

87634765 NA

Issued 01Jan08

# 410/420 SKID STEER AND 420CT COMPACT TRACK LOADER

## Repair Manual

### Mechanical and Pilot Control Machines (Tier 3 and Cab Up-Grade Machines)

Bur 87634765  
Table of Contents

| Description                                                                                 | Section Number | Publication<br>Form Number |
|---------------------------------------------------------------------------------------------|----------------|----------------------------|
| <b>General</b>                                                                              | <b>Tab 1</b>   |                            |
| Section Index - General                                                                     |                | 6-79041                    |
| Fluids and Lubricants                                                                       | 1001           | 6-79031                    |
| Fluids and Lubricants Tier 3 Engines                                                        | 1001           | 5-7580                     |
| Standard Torque Specifications                                                              | 1002           | 7-52931                    |
| Metric Conversion Chart                                                                     | 1003           | 7-52950                    |
| <b>Engines</b>                                                                              | <b>Tab 2</b>   |                            |
| Section Index - Engines                                                                     |                | 6-79051                    |
| Engine and Radiator Removal and Installation                                                | 2000           | 6-79130                    |
| Engine and Radiator Removal and Installation (410 Tier 3 Engines)                           | 2000           | 5-7650                     |
| Engine and Radiator Removal and Installation (420/420CT Tier 3 Engines)                     | 2000           | 5-7660                     |
| For Engine Repair - See Engine Repair Manual                                                |                | 6-79550                    |
| For 420/420CT Tier 3 Engine Repair - See Tier 3 Engine Repair Manual                        |                | 87693888                   |
| <b>Fuel Systems</b>                                                                         | <b>Tab 3</b>   |                            |
| Section Index - Fuel Systems                                                                |                | 6-79061                    |
| For Fuel System Repair - See the Engine Repair Manual                                       |                | 6-79550                    |
| For 420/420CT Tier 3 Fuel System Repair - - See Tier 3 Engine Repair Manual                 |                | 87693888                   |
| <b>Electrical</b>                                                                           | <b>Tab 4</b>   |                            |
| Section Index - Electrical                                                                  |                | 6-79071                    |
| Electrical Specifications and Troubleshooting and Schematics                                | 4001           | 6-79540                    |
| Electrical Specifications and Troubleshooting and Schematics (Tier 3 Cab Up-Grade Machines) | 4001           | 5-9590                     |
| Battery                                                                                     | 4005           | 7-51310                    |
| Starter and Starter Solenoid                                                                | 4006           | 7-53091                    |
| <b>Tracks</b>                                                                               | <b>Tab 5</b>   |                            |
| Section Index - Tracks                                                                      |                | 5-2631                     |
| Tracks                                                                                      | 5001           | 5-2610                     |
| Drive Sprocket, Idler Wheels, and Rollers                                                   | 5002           | 5-2620                     |
| Track Drive Motor                                                                           | 5003           | 5-7630                     |

# 410/420 SKID STEER AND 420CT COMPACT TRACK LOADER

## Repair Manual

### Mechanical and Pilot Control Machines (Tier 3 and Cab Up-Grade Machines) Bur 87634765

#### Table of Contents (Continued)

| Description                                                                                           | Section Number | Publication<br>Form Number |
|-------------------------------------------------------------------------------------------------------|----------------|----------------------------|
| <b>Power Train</b>                                                                                    | <b>Tab 6</b>   |                            |
| Section Index - Power Train                                                                           |                | 6-79081                    |
| Hydrostatic System "How it Works" (ISO and H-Pattern Pilot Control Machines)                          | 6000           | 5-4930                     |
| Hydrostatic System Troubleshooting                                                                    | 6001           | 6-79331                    |
| Hydrostatic System Troubleshooting (Machines Equipped with Pilot Controls)                            | 6001           | 5-7610                     |
| Removal and Installation of Hydrostatic Components                                                    | 6002           | 6-79532                    |
| Drive Coupling                                                                                        | 6003           | 6-79120                    |
| Drive Coupling - Tier 3 Engines                                                                       | 6003           | 5-9440                     |
| Piston Pump                                                                                           | 6004           | 6-49580                    |
| Piston Pump (Machines Equipped with Pilot Controls)                                                   | 6004           | 5-7600                     |
| Drive Motors (Eaton)                                                                                  | 6005           | 6-79020                    |
| Drive Motors -Single Speed                                                                            | 6005           | 6-79000                    |
| Sprocket, Chains, and Axle Assemblies                                                                 | 6007           | 6-79300                    |
| Wheels and Tires                                                                                      | 6011           | 6-79310                    |
| Load Management System                                                                                | 6012           | 5-7590                     |
| <b>Brakes</b>                                                                                         | <b>Tab 7</b>   |                            |
| Section Index - Brakes                                                                                |                | 6-79091                    |
| Removal and Installation of Park Brake Components                                                     | 7002           | 6-79571                    |
| 410 Brakes - Spring Applied - Hydraulic Release<br>(Refer to Section 6005 - Single Speed Drive Motor) |                |                            |
| 420 Brakes - Spring Applied - Hydraulic Release                                                       | 7004           | 6-79580                    |
| 420CT Brakes - Refer to Section 5003 Track Drive Motor                                                |                |                            |
| <b>Hydraulics</b>                                                                                     | <b>Tab 8</b>   |                            |
| Section Index - Hydraulics                                                                            |                | 6-79102                    |
| Hydraulic System Troubleshooting and Schematics (Mechanical and Pilot Control Machines)               | 8001           | 6-79512                    |
| Cleaning the Hydraulic System and Hydrostatic System                                                  | 8002           | 6-45290                    |
| Removal and Installation of Hydraulic Components                                                      | 8003           | 6-79520                    |
| Gear Pump (Equipment and High Flow)                                                                   | 8004           | 6-79350                    |
| Loader Control Valve                                                                                  | 8005           | 5-2640                     |
| Cylinders                                                                                             | 8006           | 6-79360                    |
| Flat Faced Couplers                                                                                   | 8007           | 7-54740                    |
| Accumulator for Ride Control                                                                          | 8013           | 6-45550                    |

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**(Tier 3 and Cab Up-Grade Machines)**  
**Bur 87634765**

**Table of Contents** (Continued)

| Description                                                                                                  | Section Number | Publication<br>Form Number |
|--------------------------------------------------------------------------------------------------------------|----------------|----------------------------|
| <b>Mounted Equipment</b>                                                                                     | <b>Tab 9</b>   |                            |
| Section Index - Mounted Equipment                                                                            |                | 6-79111                    |
| Pedals and Levers                                                                                            | 9001           | 6-79500                    |
| Pedals and Levers (Cab Up-Grade Machines)                                                                    | 9001           | 5-7670                     |
| Loader                                                                                                       | 9002           | 6-79390                    |
| Attachment Coupler                                                                                           | 9003           | 6-79400                    |
| ROPS Canopy, Seat, Seat Belts, and Operators Compartment                                                     | 9004           | 6-79410                    |
| ROPS Canopy, Seat, Seat Belts, and Operators Compartment (Cab Up-Grade Machines)                             | 9004           | 5-9460                     |
| Heater                                                                                                       | 9006           | 6-79450                    |
| Air Conditioning Troubleshooting for Systems with R134A Refrigerant (Cab Up-Grade Machines)                  | 9011           | 5-9480                     |
| Air Conditioner System Gauges and Testing for Systems with R134A Refrigerant (Cab Up-Grade Machines)         | 9012           | 5-9490                     |
| Refrigerant Recovery, Compressor Removal and System Evacuation and Recharging (Cab Up-Grade Machines)        | 9013           | 5-9500                     |
| Air Conditioner System Gauges and Testing for Systems with R134A Refrigerant (Cab Up-Grade Machines)         | 9014           | 5-9510                     |
|                                                                                                              |                |                            |
| <b>Schematic Set</b>                                                                                         |                |                            |
| Hydraulic and Electrical Schematic Foldout                                                                   | In Rear Pocket | 6-78971                    |
| Hydraulic and Electrical Schematic Foldout (Tier 3 - Cab Up-Grade and Machines Equipped with Pilot Controls) | In Rear Pocket | 5-9610                     |

**410/420 SKID STEER AND 420CT COMPACT TRACK LOADER**  
**Repair Manual**  
**Mechanical and Pilot Control Machines**  
**(Tier 3 and Cab Up-Grade Machines)**  
**Bur 87634765**

**Table of Contents** (Continued)

**NOTES**

**SECTION INDEX**  
**GENERAL**

| <b>Section Title</b>                             | <b>Section Number</b> |
|--------------------------------------------------|-----------------------|
| Fluids and Lubricants . . . . .                  | 1001                  |
| Fluids and Lubricants - Tier 3 Engines . . . . . | 1001                  |
| Standard Torque Specifications . . . . .         | 1002                  |
| Metric Conversion Chart . . . . .                | 1003                  |

# Section 1001

## FLUIDS AND LUBRICANTS



TABLE OF CONTENTS

CAPACITIES AND LUBRICANTS ..... 3

ENVIRONMENT ..... 3

ENGINE LUBRICATION ..... 4

    Engine Oil Selection ..... 4

    Oil Viscosity/Temperature Ranges ..... 4

DIESEL FUEL SYSTEM ..... 5

    Fuel Storage ..... 5

    Specifications for Acceptable No. 2 Diesel Fuel ..... 5

## CAPACITIES AND LUBRICANTS

### FUEL TANK

Capacity ..... 83.3 litres (22 U.S. gallons)  
 Specifications ..... See diesel fuel specifications on page 5

### COOLING SYSTEM

Capacity ..... 17 litres (17.9 quarts)  
 Recovery bottle capacity ..... 2 litres (2.1 quarts)  
 Specifications ..... 50% water and 50% ethylene glycol

### HYDRAULIC SYSTEM

Capacity - Total System ..... 50.2 litres (13.3 gallons)  
 Capacity - Reservoir ..... 32.4 litres (7.1 gallons)  
 Specifications ..... Case Akcela No. 1 Engine Oil SAE 10W30

### CHAIN COMPARTMENTS

Capacity - Each Side ..... 5.7 litres (6.0 quarts)  
 Specifications ..... Case Akcela No. 1 Engine Oil, SAE 10W30

### FINAL DRIVE (CT MODELS)

Capacity - Each Side ..... 0.55 L (0.58 quarts)  
 Specifications ..... CASE AKCELA GEAR LUBE SSL 75W-90 (Synthetic)

### BATTERY

Quantity ..... As required  
 Specifications ..... Distilled water

### GREASE FITTINGS

Quantity ..... As required  
 Attachments (If equipped) ..... Quantity as required  
 Specifications ..... Case molydisulfide grease

### ENGINE CRANKCASE OIL (410/420 and 420CT MACHINES)

Capacity - with filter change ..... 8.7 litres (9.2 quarts)  
 Capacity - without filter change ..... 8.5 litres (9 quarts)  
 Specifications ..... Case Akcela No. 1 Engine Oil SAE 10W-30 (API service CH-4)  
 ..... (See Oil Viscosity/Temperature Ranges Chart on page 4)

### ENGINE CRANKCASE OIL (430/440 and 440CT MACHINES)

Capacity - with filter change ..... 12 litres (12.7 quarts)  
 Specifications ..... Case Akcela No. 1 Engine Oil SAE 10W-30 (API service CH-4)  
 ..... (See Oil Viscosity/Temperature Ranges Chart on page 4)

## ENVIRONMENT

Before you service this machine and dispose of oil, fluids and lubricants, always remember the environment. Do not put oil or fluids into the ground or into containers that can leak. Check with your local environmental, recycling center or your Case dealer for correct disposal information.

## ENGINE LUBRICATION

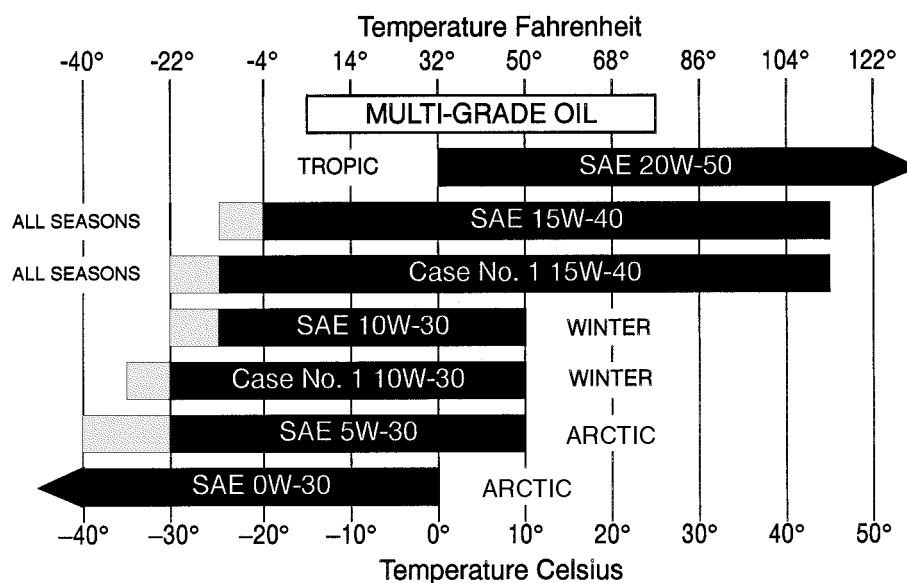
### Engine Oil Selection

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

See the chart below for recommended viscosity at ambient temperature ranges.

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

### Oil Viscosity/Temperature Ranges



Indicates use of an engine oil heater or a jacket water heater is required.

BS99N019

## DIESEL FUEL SYSTEM

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

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

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

The diesel fuel used in this machine must meet the specifications below, "Specifications for Acceptable No. 2 Diesel Fuel" or Specification D975-81 of the American Society for Testing and Materials.

### Fuel Storage

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

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

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

### Specifications for Acceptable No. 2 Diesel Fuel

|                                                   |                                            |
|---------------------------------------------------|--------------------------------------------|
| API Gravity, Minimum .....                        | 34                                         |
| Flash Point, Minimum .....                        | 60° C (140° F)                             |
| Cloud Point (wax appearance point), Maximum ..... | -20° C (-5° F)                             |
| Pour Point, Maximum .....                         | -26° C (-15° F)                            |
| Distillation Temperature, 90% Point .....         | 282 to 338° C (540 to 640° F)              |
| Viscosity, at 38° C (100° F)                      |                                            |
| Centistokes .....                                 | 2.0 to 4.3                                 |
| Saybolt Seconds Universal .....                   | 32 to 40                                   |
| Cetane Number, Minimum .....                      | 43 (45 to 55 for winter or high altitudes) |
| Water and Sediment, by Volume, Maximum .....      | 0.5 of 1%                                  |
| Sulphur, by Weight, Maximum .....                 | 0.5 of 1%                                  |
| Copper Strip Corrosion, Maximum .....             | No. 2                                      |
| Ash, by Weight, Maximum .....                     | 0.1 of 1%                                  |

# Section 1001

## FLUIDS AND LUBRICANTS

TABLE OF CONTENTS

CAPACITIES AND LUBRICANTS ..... 3

ENVIRONMENT ..... 4

ENGINE LUBRICATION ..... 5

    Engine Oil Selection ..... 5

    Oil Viscosity/Temperature Ranges ..... 5

DIESEL FUEL SYSTEM ..... 6

    Fuel Storage ..... 6

    Specifications for Acceptable No. 2 Diesel Fuel ..... 6

## CAPACITIES AND LUBRICANTS

### FUEL TANK

#### All Models

|                      |                                          |
|----------------------|------------------------------------------|
| Capacity .....       | 88.2 litres (23.3 U.S. gallons)          |
| Specifications ..... | See diesel fuel specifications on page 6 |

### COOLING SYSTEM - TIER 3 ENGINES

#### 410 (North American Machines)

|                                                           |                                   |
|-----------------------------------------------------------|-----------------------------------|
| Total Capacity .....                                      | 11.5 litres (12.2 U.S. quarts)    |
| Additional Coolant Required If Equipped with Heater ..... | 3.8 litres (4.0 U.S. quarts)      |
| Recovery Bottle Capacity .....                            | 1.9 litres (1.0 U.S. quart)       |
| Specifications .....                                      | 50% water and 50% ethylene glycol |

#### 410 (European Machines)

|                                                           |                                   |
|-----------------------------------------------------------|-----------------------------------|
| Total Capacity .....                                      | 11.5 litres (12.2 U.S. quarts)    |
| Additional Coolant Required If Equipped with Heater ..... | 3.8 litres (4.0 U.S. quarts)      |
| Recovery Bottle Capacity .....                            | 1.9 litres (1.0 U.S. quart)       |
| Specifications .....                                      | 50% water and 50% ethylene glycol |

#### 420/420CT (North American Machines)

|                                                           |                                   |
|-----------------------------------------------------------|-----------------------------------|
| Total Capacity .....                                      | 11.5 litres (12.2 U.S. quarts)    |
| Additional Coolant Required If Equipped with Heater ..... | 3.8 litres (4.0 U.S. quarts)      |
| Recovery Bottle Capacity .....                            | 1.9 litres (1.0 U.S. quart)       |
| Specifications .....                                      | 50% water and 50% ethylene glycol |

#### 420/420CT (European Machines)

|                                                           |                                   |
|-----------------------------------------------------------|-----------------------------------|
| Total Capacity .....                                      | 11.5 litres (12.2 U.S. quarts)    |
| Additional Coolant Required If Equipped with Heater ..... | 3.8 litres (4.0 U.S. quarts)      |
| Recovery Bottle Capacity .....                            | 1.9 litres (1.0 U.S. quart)       |
| Specifications .....                                      | 50% water and 50% ethylene glycol |

### HYDRAULIC SYSTEM

#### All Models

|                               |                                        |
|-------------------------------|----------------------------------------|
| Capacity - Total System ..... | 50 litres (13.2 U.S. gallons)          |
| Capacity - Reservoir .....    | 26.6 litres (7.1 U.S. gallons)         |
| Specifications .....          | Case Akcela No. 1 Engine Oil SAE 10W30 |

### CHAIN COMPARTMENTS

#### All Models

|                            |                                         |
|----------------------------|-----------------------------------------|
| Capacity - Each Side ..... | 3.8 litres (4.0 U.S. quarts)            |
| Specifications .....       | Case Akcela No. 1 Engine Oil, SAE 10W30 |

### FINAL DRIVE

#### (CT Models Only)

|                            |                                  |
|----------------------------|----------------------------------|
| Capacity - Each Side ..... | 1.3 L (1.4 U.S. quarts)          |
| Specifications .....       | CASE AKCELA GEAR LUBE SSL 80W-90 |

### BATTERY

|                      |                 |
|----------------------|-----------------|
| Quantity .....       | As required     |
| Specifications ..... | Distilled water |

### GREASE FITTINGS

|                                 |                           |
|---------------------------------|---------------------------|
| Quantity .....                  | As required               |
| Attachments (If equipped) ..... | Quantity as required      |
| Specifications .....            | Case molydisulfide grease |

### ENGINE CRANKCASE OIL - TIER 3 ENGINES

#### 410 (North American and European Machines)

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| Capacity - with filter change .....    | 10.5 litres (11.1 U.S. quarts))                            |
| Capacity - without filter change ..... | 9.9 litres (10.5 U.S. quarts))                             |
| Specifications .....                   | Case Akcela No. 1 Engine Oil SAE 10W-30 (API service CH-4) |
| .....                                  | (See Oil Viscosity/Temperature Ranges Chart on page 5)     |

ENGINE CRANKCASE OIL - TIER 3 ENGINES

420 and 420CT (North American and European Machines)

|                                       |                                                            |
|---------------------------------------|------------------------------------------------------------|
| Capacity - with filter change.....    | 8.5 litres (9 U.S.quarts))                                 |
| Capacity - without filter change..... | 8.0 litres (8 U.S.quarts))                                 |
| Specifications.....                   | Case Akcela No. 1 Engine Oil SAE 15W-40 (API service CH-4) |
| .....                                 | (See Oil Viscosity/Temperature Ranges Chart on page 5)     |

ENVIRONMENT

Before you service this machine and dispose of oil, fluids and lubricants, always remember the environment. Do not put oil or fluids into the ground or into containers that can leak. Check with your local environmental, recycling center or your Case dealer for correct disposal information.



# Section 2000

## 410 ENGINE AND RADIATOR REMOVAL AND INSTALLATION Tier 3 Engines

TABLE OF CONTENTS

RADIATOR ..... 3

    Removal ..... 3

    Installation ..... 6

ENGINE ..... 7

    Removal ..... 7

    Installation ..... 11

## RADIATOR

### Removal

**NOTE:** Put caps on all fittings and plugs in all disconnected hoses.

#### STEP 1

Park the machine on a level surface.

#### STEP 2

Lift the hood and open the rear access door on the machine.

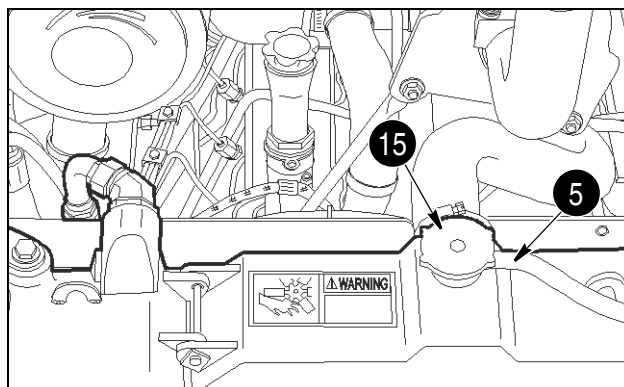
#### STEP 3

Turn the ignition switch and the master disconnect switch (if equipped) to the OFF position.

#### STEP 4

Disconnect the negative battery cable from the battery.

#### STEP 5

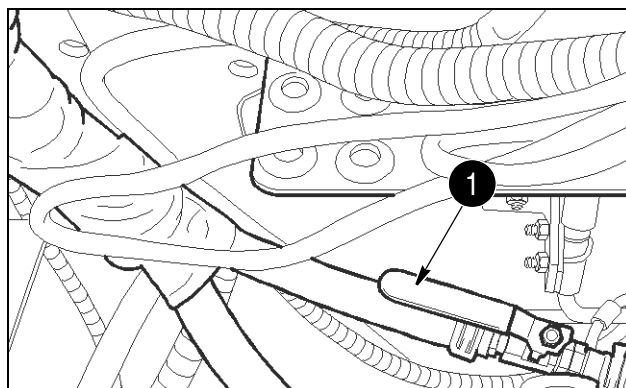


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Slowly loosen the radiator cap (15). Disconnect the overflow hose (5) from the radiator neck.

**NOTE:** Refer to illustration on page 5.

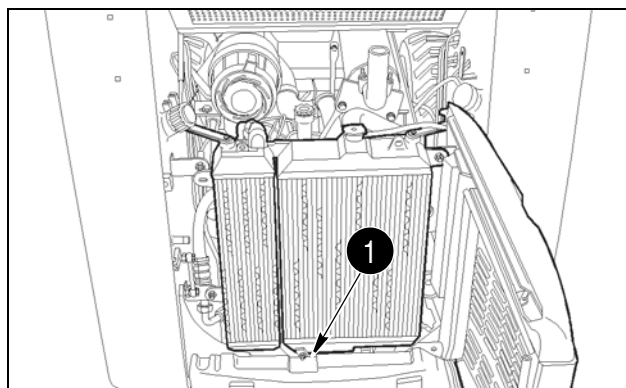
#### STEP 6



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If equipped with a heater, open the heater coolant valve.

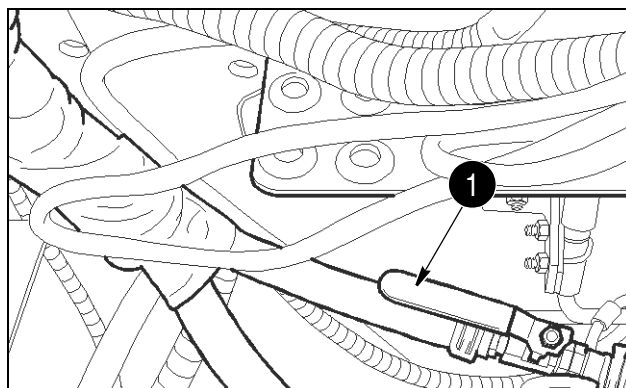
#### STEP 7



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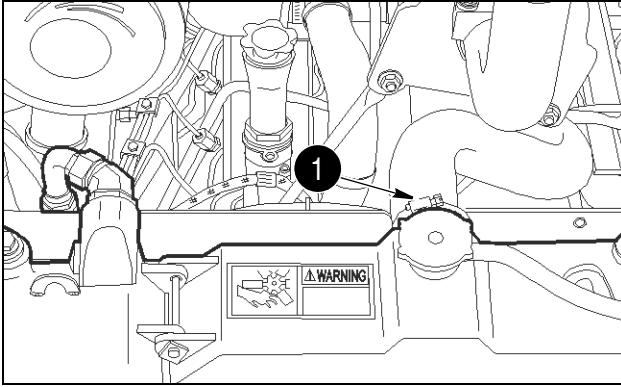
Install a hose on the drain valve (1) and drain the radiator into a clean container that holds approximately 17 litres (4.5 gallons).

#### STEP 8



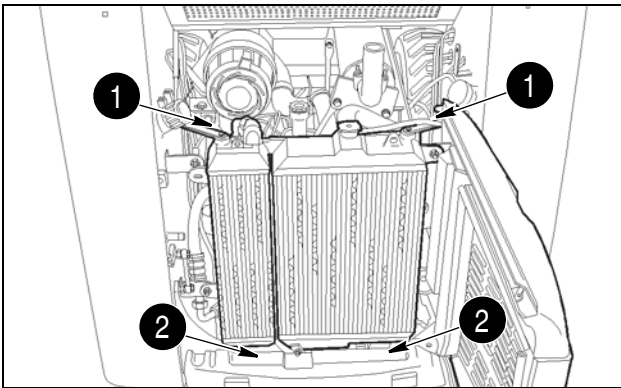
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If equipped with a heater, close the heater coolant valve (1).

**STEP 9**

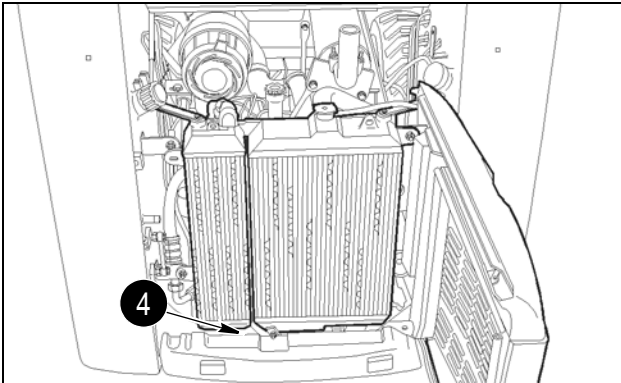
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Loosen the clamp (1) on the upper radiator hose and remove the hose from the upper radiator connection.

**STEP 10**

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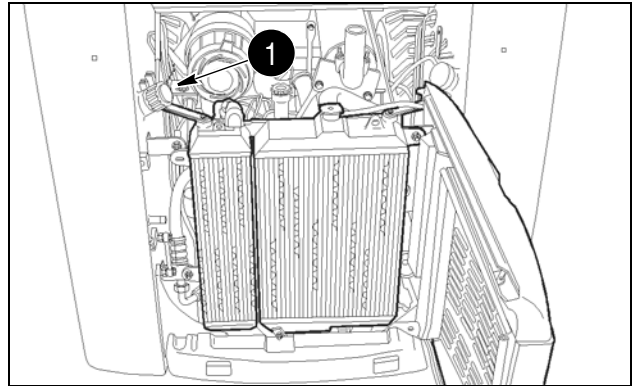
Loosen and remove the top (1) and bottom (2) mounting bolts on the radiator and oil cooler module. Use acceptable lifting equipment to support the radiator and oil cooler module after removal of the mounting bolts. Pull the radiator and oil cooler module away from the fan shroud until you can access the lower radiator hose clamp.

**STEP 11**

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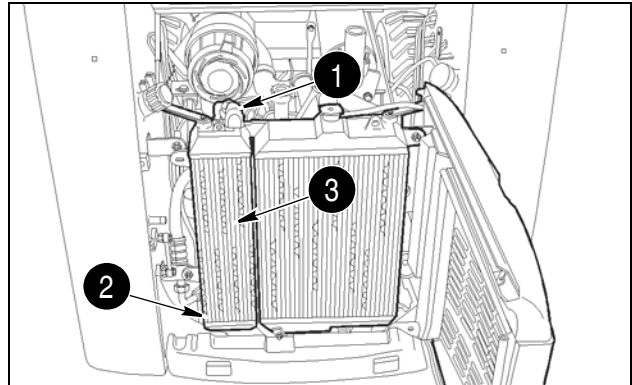
Loosen the clamp (4) on the lower radiator hose and remove the hose from the lower radiator connection.

**NOTE:** Refer to illustration on page 5.

**STEP 12**

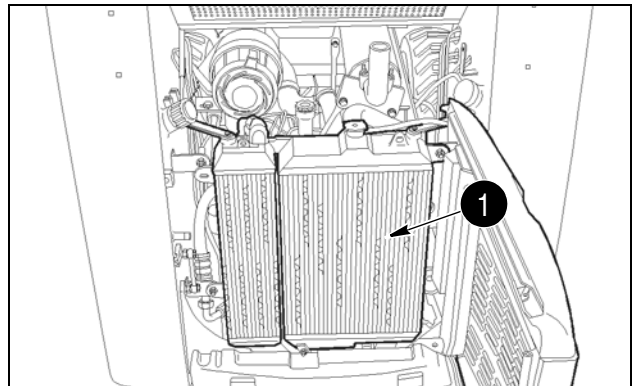
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Remove the cap (1) from the hydraulic reservoir. Connect a vacuum pump to the hydraulic reservoir. Start the vacuum pump.

**STEP 13**

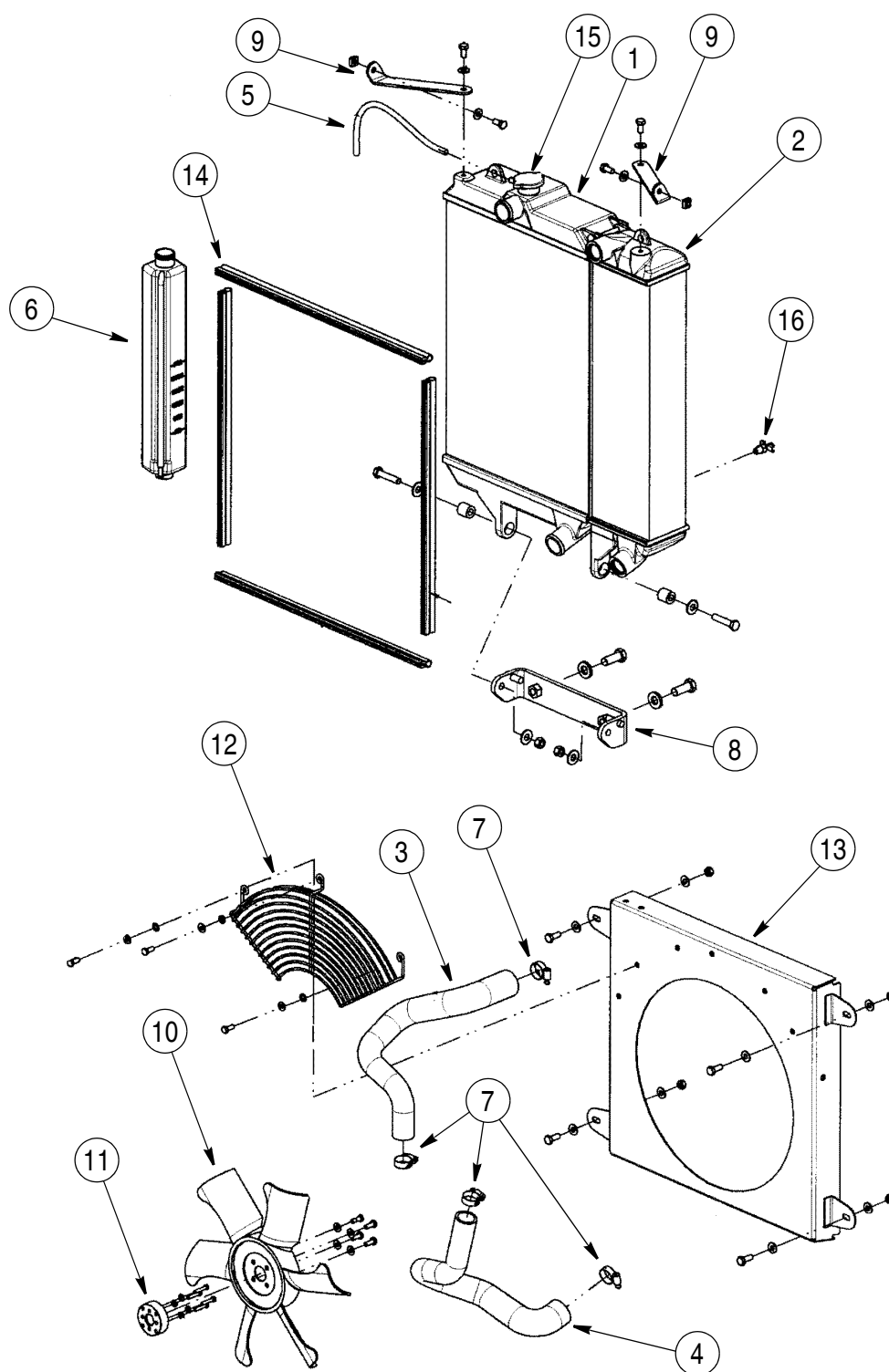
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Loosen and remove the upper (1) and lower (2) hoses from the oil cooler (3). Install plugs in the hoses and caps on the fittings to prevent loss of hydraulic oil from the hydraulic system. Stop the vacuum pump.

**STEP 14**

BD07K006-01

Remove the radiator and oil cooler module from the machine.



1. RADIATOR MODULE
2. OIL COOLER MODULE
3. UPPER RADIATOR HOSE
4. LOWER RADIATOR HOSE
5. COOLANT RECOVERY HOSE
6. COOLANT RECOVERY BOTTLE
7. CLAMP
8. LOWER HINGE MOUNTING BRACKET

9. UPPER MOUNTING BRACKET
10. FAN BLADE
11. FAN SPACER
12. FAN GUARD
13. FAN SHROUD
14. SEAL
15. RADIATOR CAP
16. DRAIN VALVE

#### 410 RADIATOR MOUNTING

BS07M067

## **Installation**

### **STEP 15**

Installation of the radiator is the reverse procedure of removal.

### **STEP 16**

After the radiator has been installed, fill the cooling system. See Section 1001 for the correct coolant mixture and quantity.

### **STEP 17**

Start and run the engine until it reaches operating temperature and check for any leaks. Stop the engine. After the engine has cooled, check the level of the cooling system and add coolant as required.

## ENGINE

### Removal

#### STEP 1

Remove the radiator from the machine.

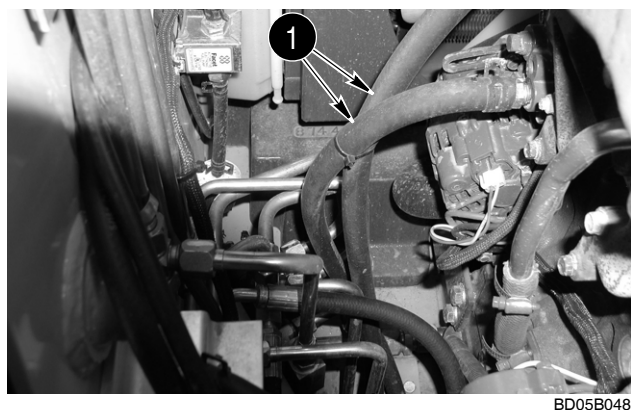
#### STEP 2

Install plugs and caps on all disconnected hoses and fittings.

#### STEP 3

Tag all electrical connection for identification during assembly.

#### STEP 4



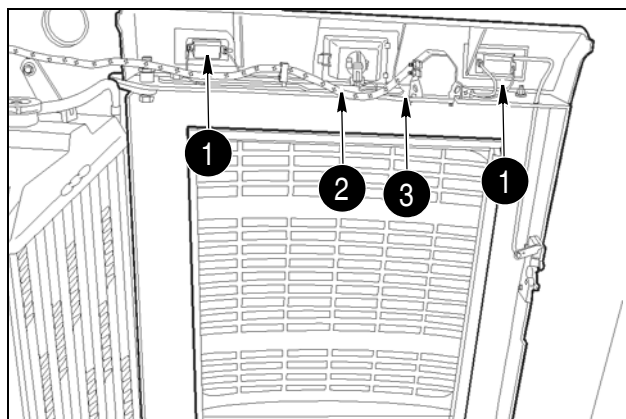
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If equipped with a heater, disconnect the heater hoses (1) from the engine.

#### STEP 5

Lift the rear hood and open the rear access door.

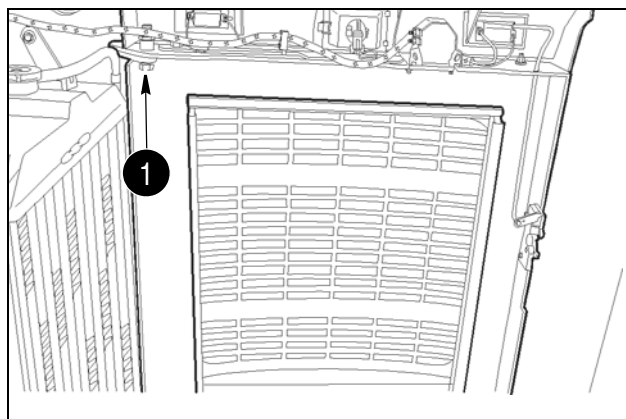
#### STEP 6



BD07M168-01

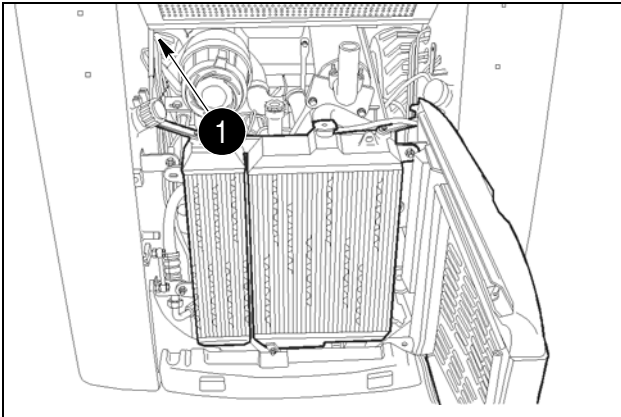
Disconnect the electrical connectors from the rear tail lamps (1) on both sides of the rear access door. Disconnect the electrical connectors from the rear worklight (2). Disconnect the electrical connectors from the backup alarm (3). Remove mounting hardware from the wiring harness (4) and remove the harness (4) from the rear access door.

#### STEP 7



BD07M168-01

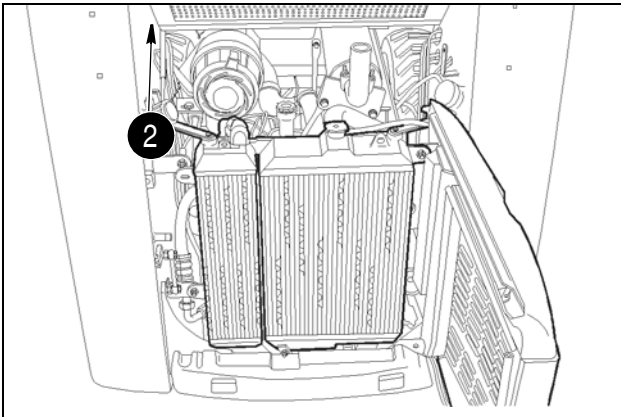
Connect acceptable lifting equipment to the rear access door. Remove the pivot bolt (1) and lift the rear access door and remove from the machine.

**STEP 8**

1. CYLINDER PIVOT BOLT

BD07K006-01

Remove the nut from cylinder pivot bolt (1) on the hood end of the cylinder.

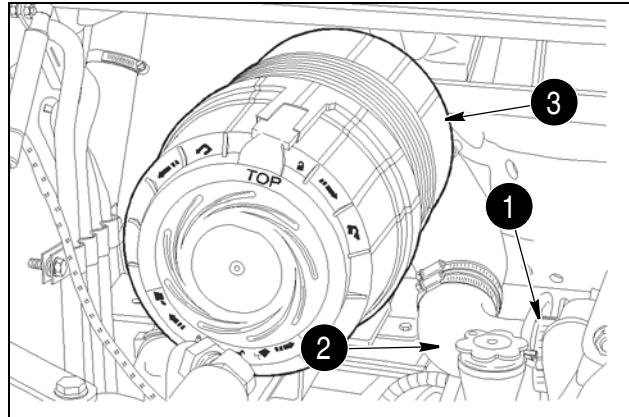
**STEP 9**

BD07K006-01

Remove the plastic clip (2) from the hood pivot shaft. Slide the hood to the left and remove the hood from the hood pivot shaft on both sides of the machine. Remove the hood from the machine.

**STEP 10**

Push the hood to the right hand side of the machine and remove the left hand side of the hood from the pivot pin. Remove the hood from the machine.

**STEP 11**

BD07K060-01

Loosen the clamp (1) on the outlet hose (2). Remove the outlet hose (2) from the intake and air filter assembly (3).

**NOTE:** Torque clamps (1) 3 to 4 Nm (25 to 35 pound-inches) during assembly.

**STEP 12**

Loosen and remove the mounting bolts and washers from the air filter housing mounting bracket.

**STEP 13**

Remove the air cleaner and bracket from the machine.

**STEP 14**

Remove the bolts and washers that fasten the front muffler support rods (5 and 8) and the rear muffler support rods (14 and 16) to the engine.

**NOTE:** Torque bolts 23 to 26 Nm (204 to 228 pound-inches) during assembly.

**STEP 15**

Loosen and remove the bolts and washers that fasten the muffler to the exhaust manifold.

**NOTE:** Torque the bolts 51 to 61 Nm (38 to 45 pound-feet) during assembly.

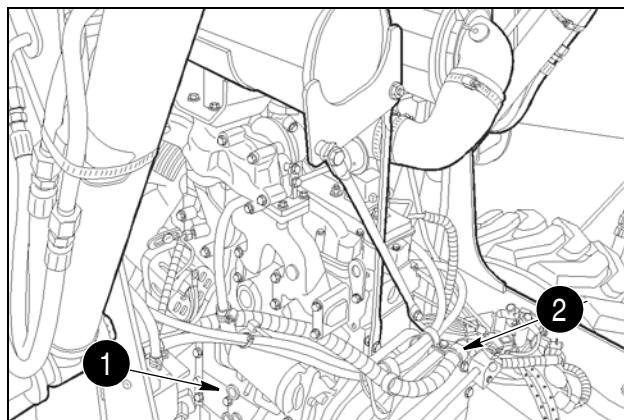
**STEP 16**

Remove the muffler from the engine.

**STEP 17**

Remove the cap screws (7), washers (8), fan blade (1), from the engine. Loosen and remove cap screws (4), washers (3) and spacer (2) from the engine.



**STEP 18**

1. STARTER WIRES  
2. WIRE HARNESS CLAMP

BD07M186-01

Disconnect the wires (1) from the starter and from the alternator (2). Loosen and remove the bolts and wire harness clamp (2) from the engine.

**STEP 19**

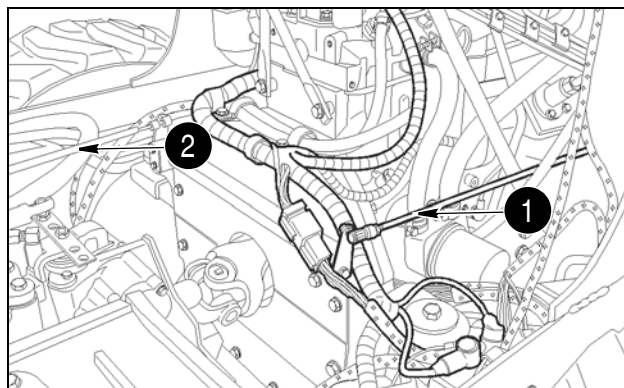
Loosen and remove the bolts that fastens the ground wires to the engine. Keep all ground wires together.

**STEP 20**

1. ALTERNATOR WIRES

BD07M169-01

Disconnect the wires from the alternator.

**STEP 21**

BD07M172-01

Remove the throttle linkage (1) from the fuel injection pump and the linkage (2) to the throttle control lever.

**STEP 22**

Disconnect the wire for the engine coolant temperature switch and the engine oil pressure switch.

**STEP 23**

BD07M173-01

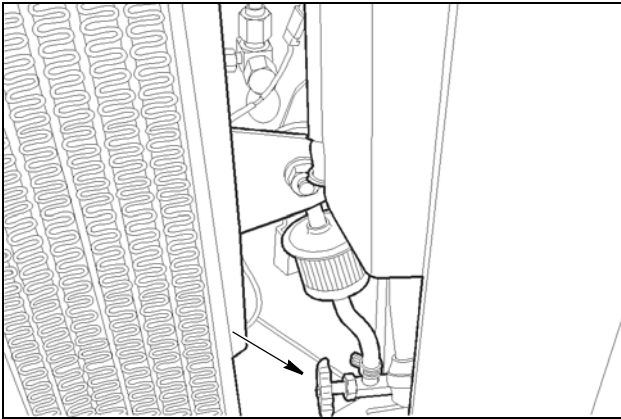
Disconnect the wire connector for the fuel injection pump solenoid.

**STEP 24**

Loosen and remove the bolts that fasten the wire harness to the right side of the machine.

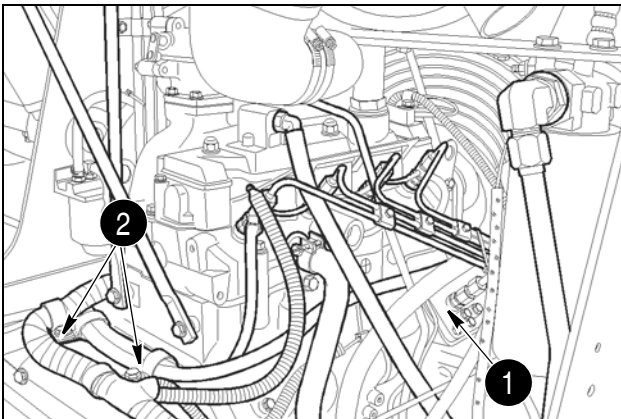
**STEP 25**

Move the all of the wiring harness out of the way.

**STEP 26**

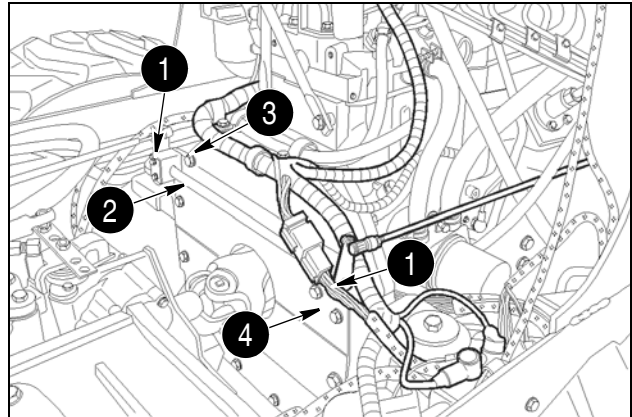
BD07M175-01

Close the fuel shut off valve.

**STEP 27**

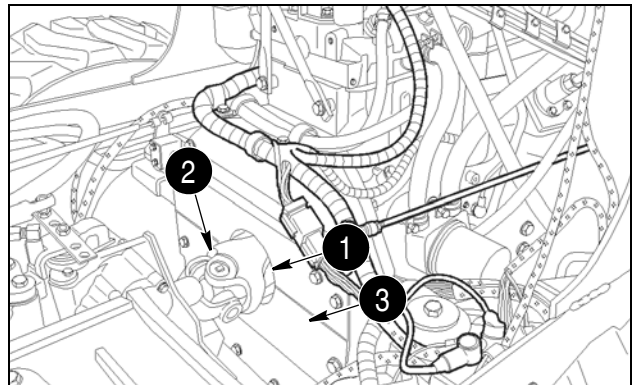
BD07M171-01

Disconnect the fuel lines (1) from the engine. Remove the bolts from the clamps (2) and remove the fuel lines (1) from the engine.

**STEP 28**

BD07M172-01

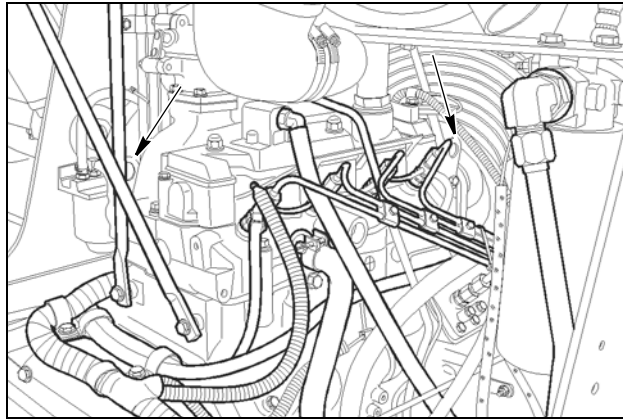
Loosen and remove the mounting bolts (1) which fasten the throttle linkage assembly (2) to the engine. Remove the linkage assembly (2) from the engine. Loosen and remove the mounting bolts (3) which fasten the cover (4) to the engine. Remove the cover (4).

**STEP 29**

BD07M172-01

Loosen and remove the mounting bolts (1) which fasten the pump drive joint (2) to the flywheel (3). Remove the pump drive joint (2) from the flywheel (3).

**NOTE:** Tighten pump drive joint bolts to a torque of 94 to 106 Nm (68 to 78 pound-feet) during assembly.

**STEP 30**

BD07M171-01

Connect acceptable lifting equipment to the engine lifting eyes at the front and rear of the engine.

**STEP 31**

Remove the bolt, washers, and nut from the rear engine mount (2).

**NOTE:** Torque the bolts 110 to 122 Nm (80 to 90 pound-feet) during assembly.

**STEP 32**

Remove the bolts, washers, and nut from the front engine mounts (1).

**NOTE:** Torque the bolts 110 to 122 Nm (80 to 90 pound-feet) during assembly.

**NOTE:** Refer to illustration on page 13.

**STEP 33**

Use lifting equipment and remove the engine from the chassis.

**NOTE:** During assembly apply Molykote GN to the pump drive joint splines before assembly.

**Installation****STEP 34**

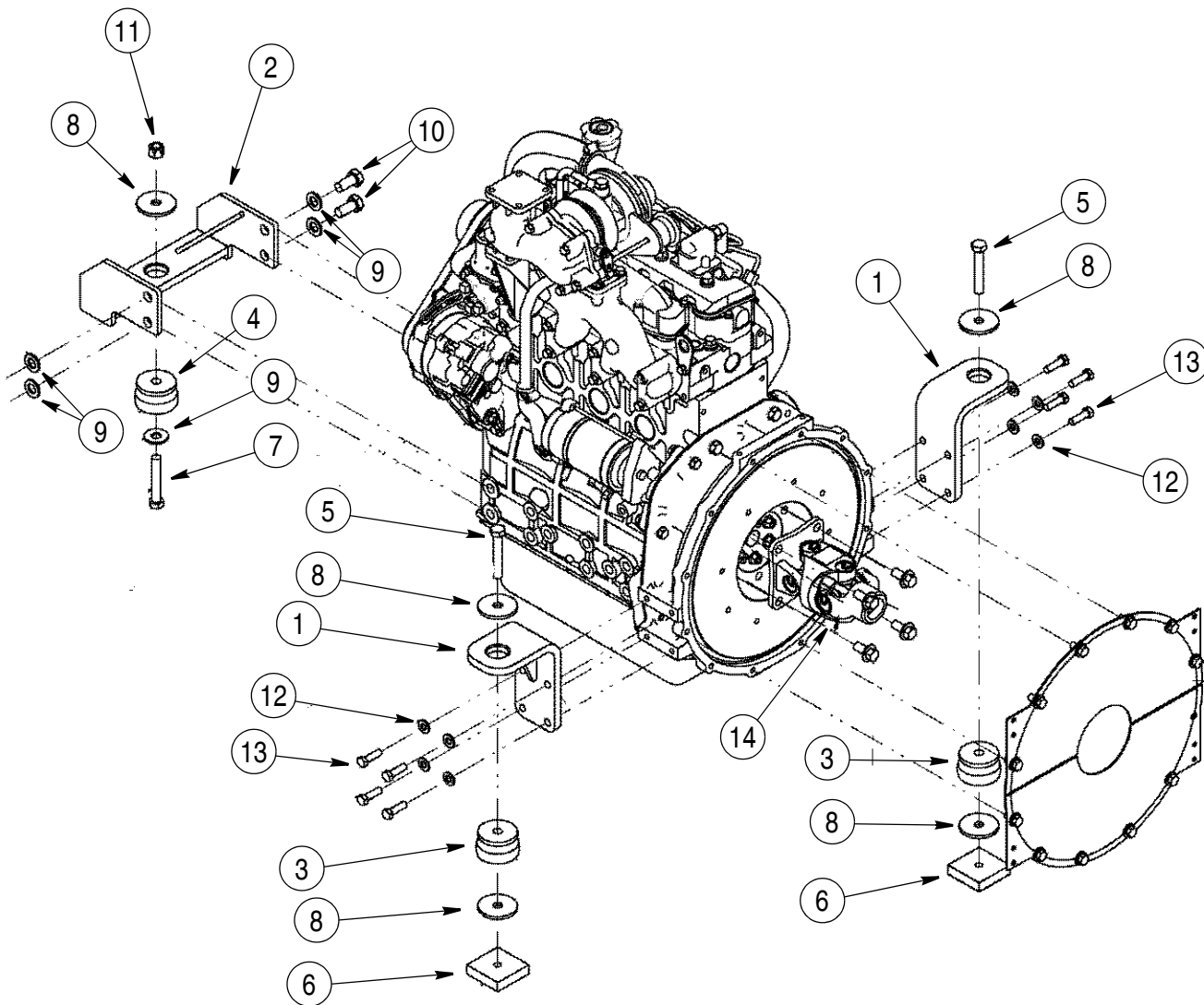
Installation of the engine is the reverse procedure of removal.

**STEP 35**

After the engine and radiator have been installed, refill the engine cooling system. Refill the engine crankcase with engine oil. See Section 1001 for the correct type and quantity of engine coolant and engine oil.

**STEP 36**

Start and run the engine at low idle until the engine reaches operating temperature and check for any leaks. Stop the engine. After the engine has cooled, check the level of the coolant in the cooling system. Add coolant as required. Check the oil level in the engine crankcase. Add engine oil as required.



1. FRONT ENGINE MOUNT
2. REAR ENGINE MOUNT
3. FRONT ISO MOUNTS
4. REAR ISO MOUNT
5. FRONT MOUNTING BOLTS
6. FRONT MOUNTING PLATE NUT
7. REAR MOUNTING BOLT

8. LARGE MOUNTING WASHERS
9. WASHER
10. CAP SCREW
11. NUT
12. WASHER
13. CAP SCREW
14. PUMP DRIVE JOINT

#### 410 ENGINE MOUNTING

BS07K678

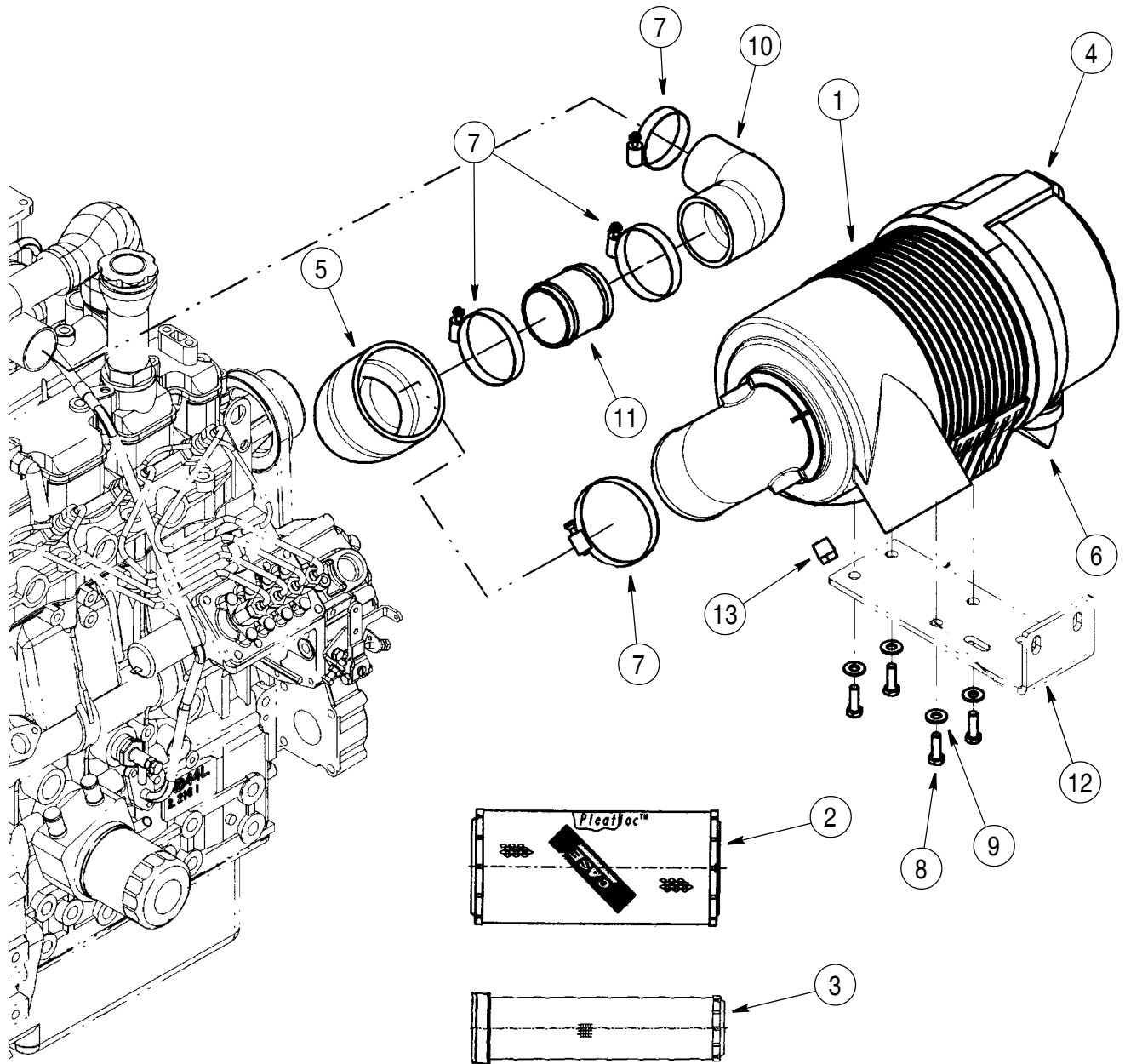


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1. AIR CLEANER BODY
2. PRIMARY FILTER ELEMENT
3. SECONDARY FILTER ELEMENT
4. COVER
5. AIR CLEANER INLET HOSE
6. DUST VALVE
7. CLAMP

8. CAP SCREW
9. WASHER
10. AIR CLEANER INLET HOSE
11. AIR CLEANER INLET COUPLER
12. AIR CLEANER MOUNTING BRACKET
13. PLASTIC PLUG

BS07K857

#### 410 AIR FILTER ASSEMBLY

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