HEATER

BASIC TROUBLESHOOTING 80-30-1
- Checking The Electrical System 80-30-2
- Cleaning The Heater Coil. 80-30-1
- Engine Coolant By-Passing The Heater Valve 80-30-7
- Heater Valve Not Opening Or Closing 80-30-7

COMPONENTS. 80-10-1
- Identification. 80-10-1

HEATER UNIT. 80-50-1
- Disassembly And Assembly. 80-50-2
- Removal And Installation 80-50-1

HEATER COIL. 80-60-1
- Removal And Installation 80-60-1

HEATER FAN 80-70-1
- Disassembly And Assembly. 80-70-2
- Removal And Installation 80-70-1
- Wire Connector Removal and Installation 80-70-4

HEATER VALVE 80-80-1
- Disassembly And Assembly. 80-80-2
- Removal and Installation 80-80-1

REGULAR MAINTENANCE 80-20-1
- Filter Elements Removal And Installation 80-20-1

SYSTEM TROUBLESHOOTING CHART 80-40-1

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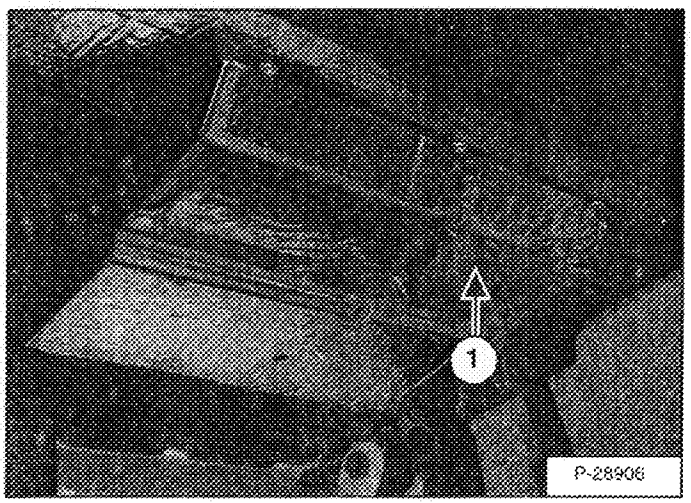
COMPONENTS

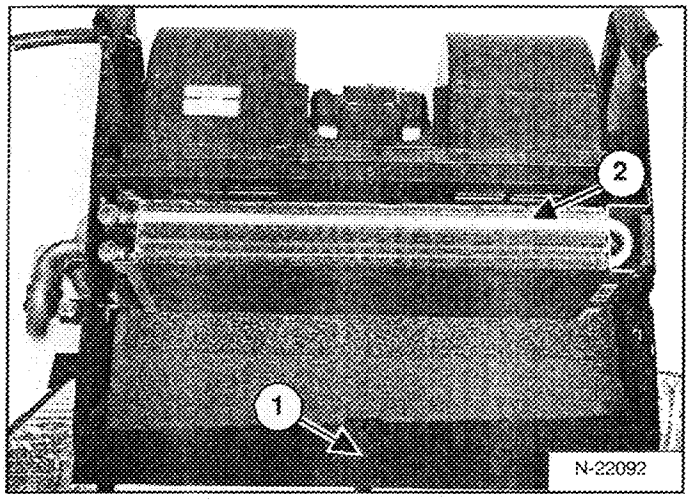
Identification

Figure 80-10-1



Heater Unit: The heater (Item 1) **[Figure 80-10-1]** is located behind the loader cab. The unit delivers the warm air for heat into the cab. The unit contains the blower, heater coil and thermostat.

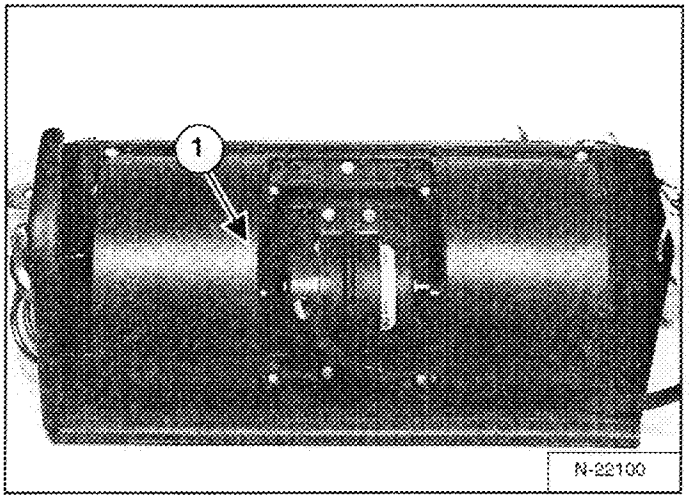
Figure 80-10-2



Thermostat: The thermostat (Item 1) **[Figure 80-10-2]** controls the temperature of the evaporator coil.

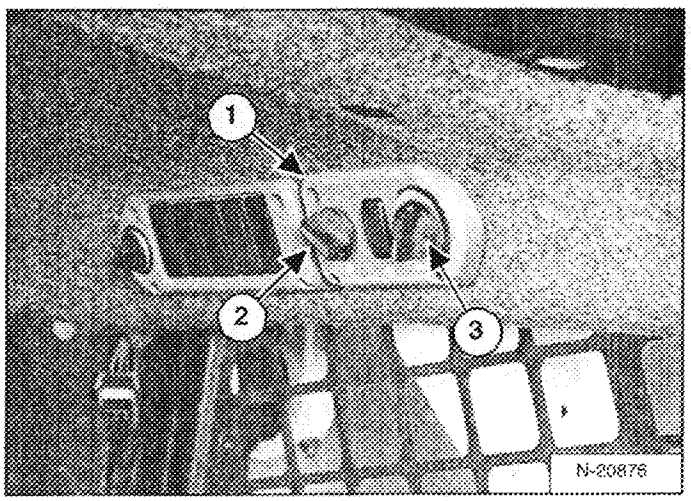
Heater Coil: The heater coil (Item 2) **[Figure 80-10-2]** supplies the warm air into the cab by passing air through the coil.

Figure 80-10-3



Heater Blower: The blower (Item 1) **[Figure 80-10-3]** is used to push air through the heater and into the cab.

Figure 80-10-4



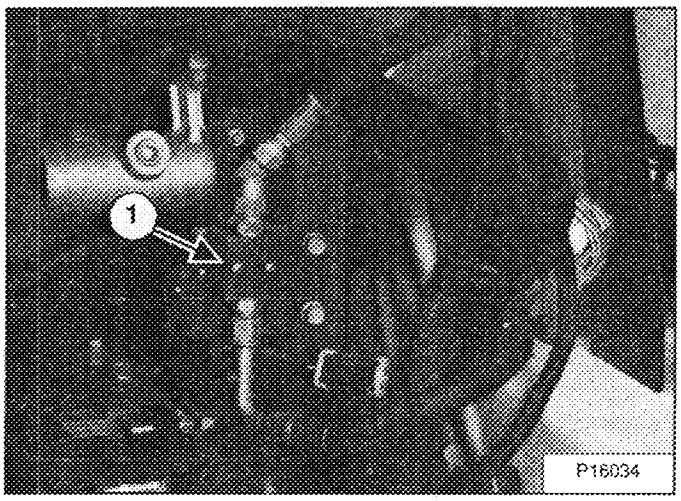
Control Panel: The panel (Item 1) **[Figure 80-10-4]** has two separate components.

Fan Switch: This is a four position rotary switch (Item 2) **[Figure 80-10-4]**. When the fan switch is in the off position the heat valve will operate, as it is controlled by the ignition power.

Potentiometer: The potentiometer (Item 3) **[Figure 80-10-4]** controls the Heat Valve from fully Off to fully On. This can be used for defrost of the windows and temperature control.

Identification (Cont'd)

Figure 80-10-5



Heater Valve: The heater valve (Item 1) **[Figure 80-10-5]** is used to control the amount of engine coolant that flows to the heater coil.

Filter Elements Removal And Installation

Figure 80-20-1

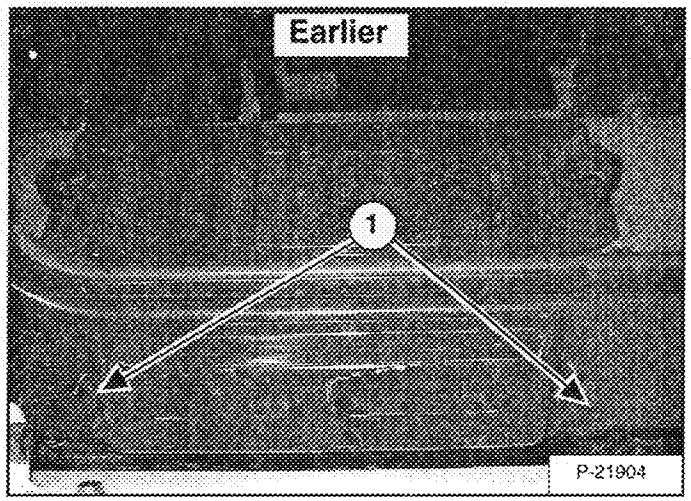
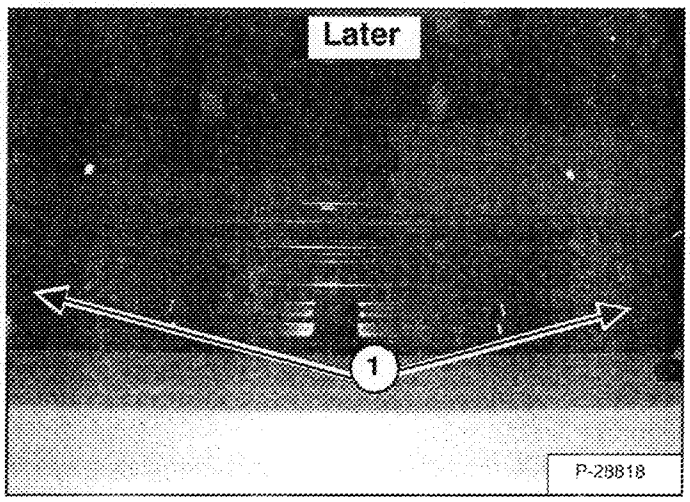


Figure 80-20-2



Remove the two mount bolts (Item 1) **[Figure 80-20-1]** & **[Figure 80-20-2]** from the fresh air filter cover at the rear of the loader cab.

Figure 80-20-3

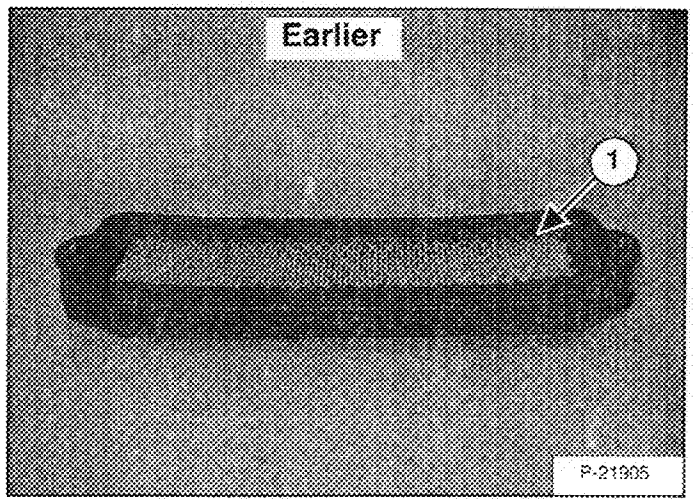
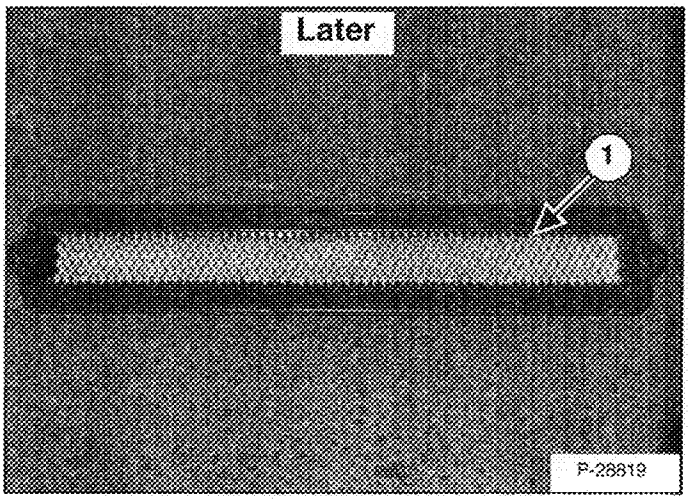


Figure 80-20-4



Remove the filter cover and filter (Item 1) **[Figure 80-20-3]** & **[Figure 80-20-4]** from the loader.

Filter Elements Removal And Installation (Cont'd)

Figure 80-20-5

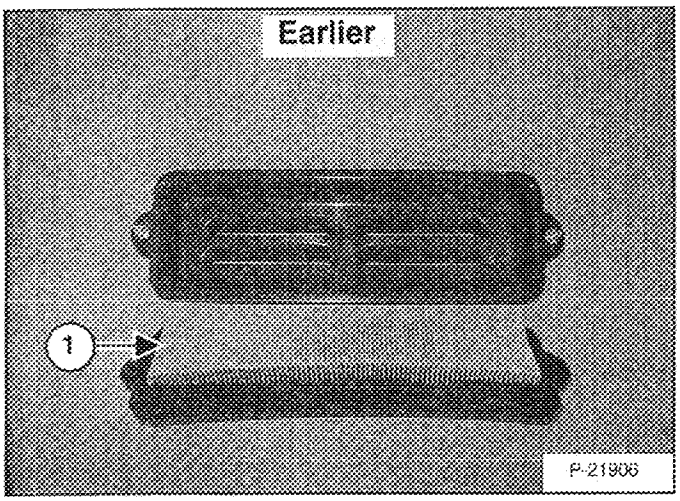
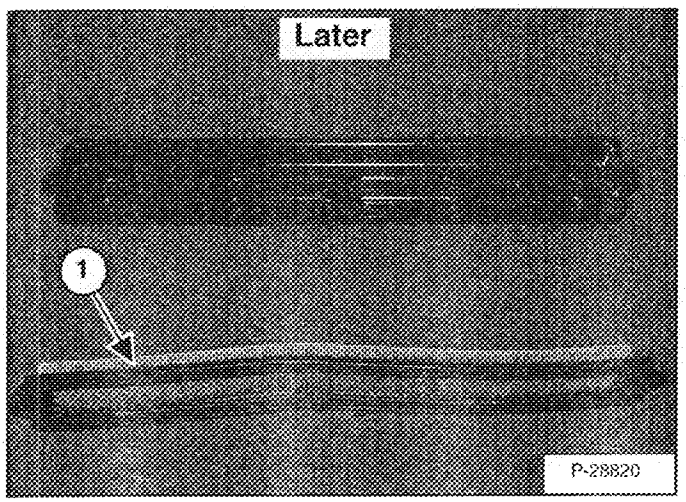


Figure 80-20-6



Remove the filter (Item 1) **[Figure 80-20-5]** & **[Figure 80-20-6]** from the cover.

The fresh air filter must be cleaned sometimes as often as twice a day, depending on the operating environment. The filter can be cleaned by removing and shaking it. A small amount of air pressure can be used to clean the filter. However the fresh air filter should be changed at least 2-4 times per year in normal conditions. In extremely dusty conditions the fresh air filter may need to be changed weekly.

Figure 80-20-7

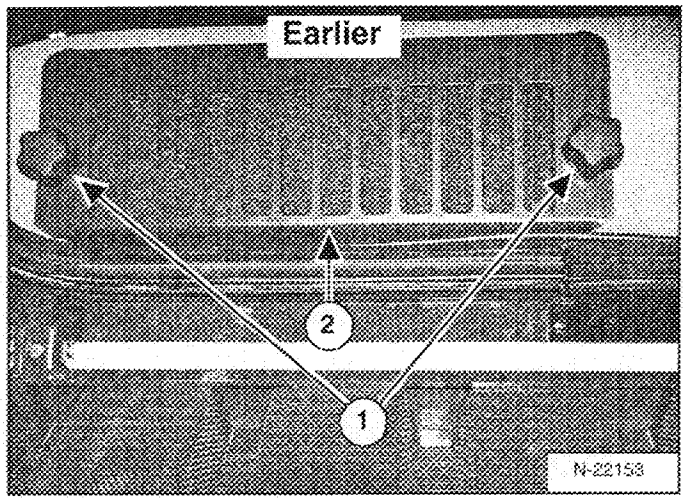
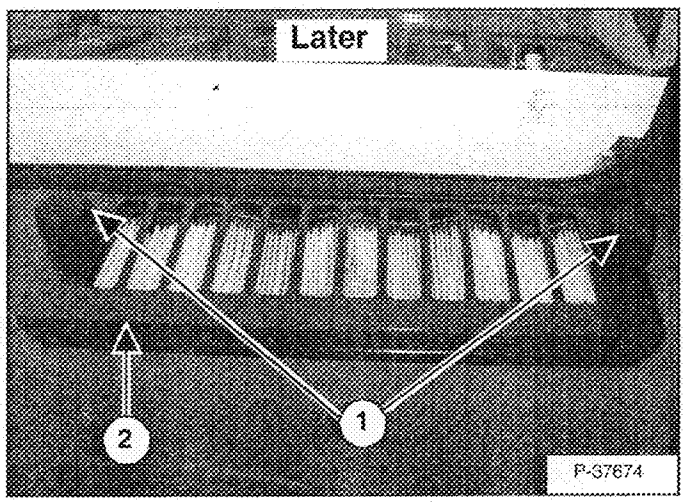


Figure 80-20-8



Remove the two retaining knobs (Item 1) **[Figure 80-20-7]** & **[Figure 80-20-8]** from the recirculating air filter cover, at the back of the cab.

Remove the retaining cover (Item 2) **[Figure 80-20-7]** & **[Figure 80-20-8]** from the loader cab.

Filter Elements Removal And Installation (Cont'd)

Figure 80-20-9

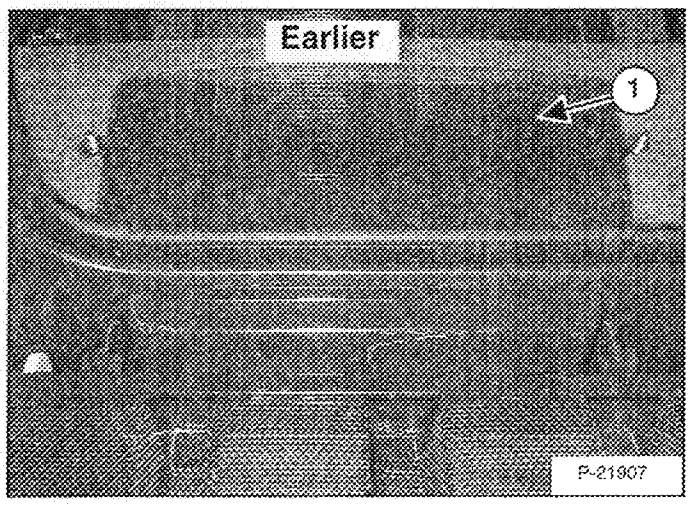
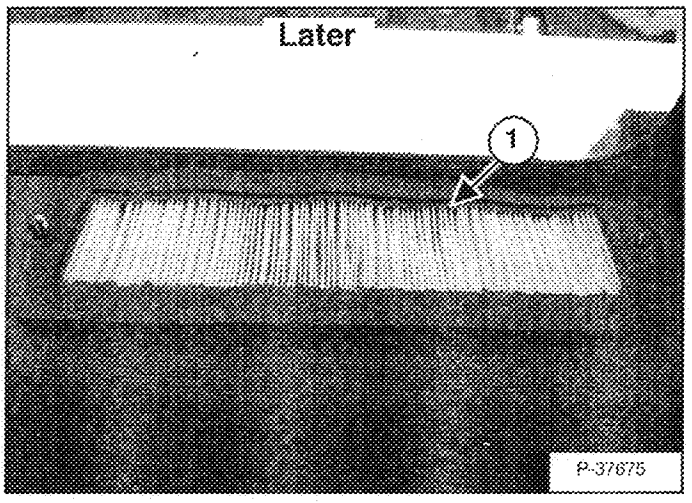
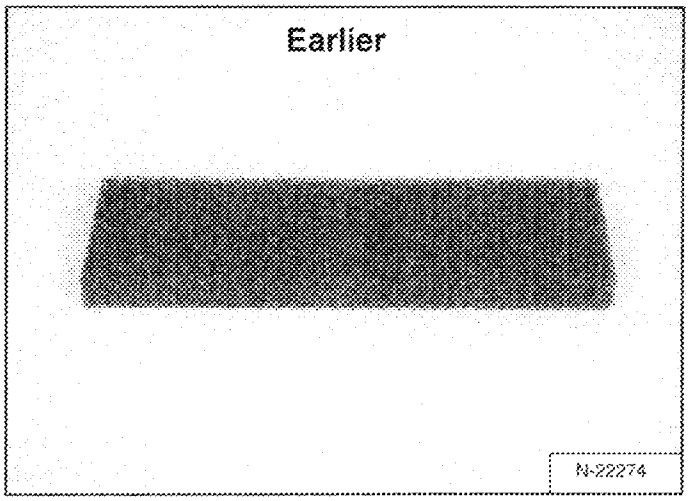


Figure 80-20-10



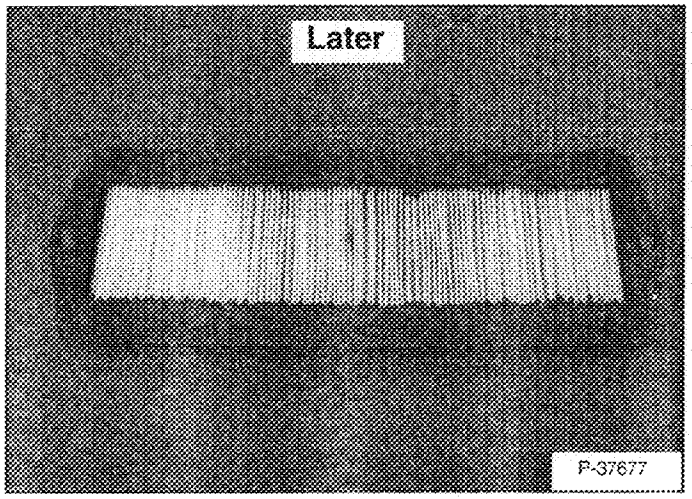
Remove the recirculating air filter (Item 1) **[Figure 80-20-9]** & **[Figure 80-20-10]** from the rear of the cab.

Figure 80-20-11



The recirculating air filter **[Figure 80-20-11]** is made of open cell foam and should be cleaned with water. A mild detergent may also be used. It does not require cleaning as frequently as the fresh air intake filter.

Figure 80-20-12



The recirculating air filter **[Figure 80-20-12]** does not require cleaning as frequently as the fresh air intake filter. The filter can be cleaned by removing and shaking it. A small amount of air pressure can be used to clean the filter.

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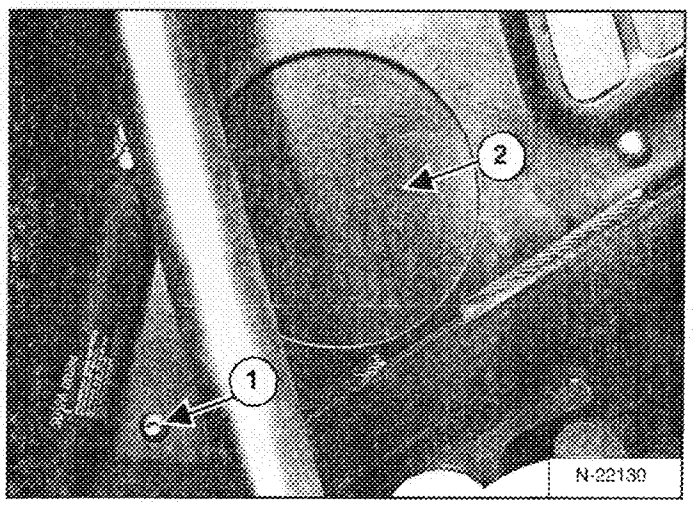
Cleaning The Heater Coil

Figure 80-30-1



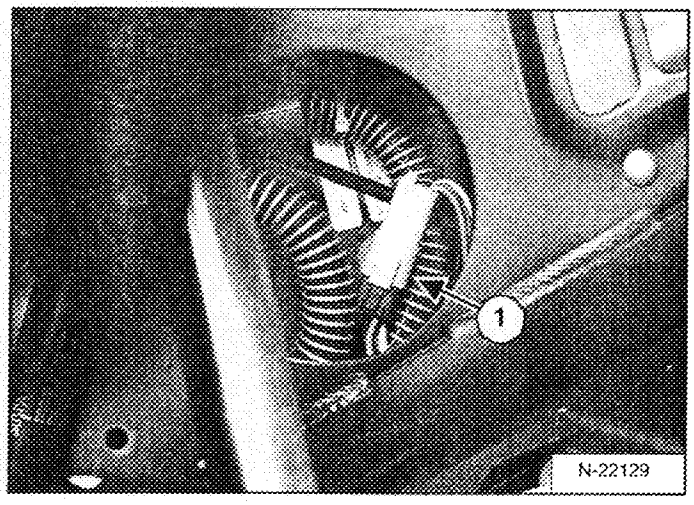
Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Raise the operator cab. (See Contents, Page 10-01.)

Remove the mount bolt (Item 1) **[Figure 80-30-1]** from the left side cab access cover.

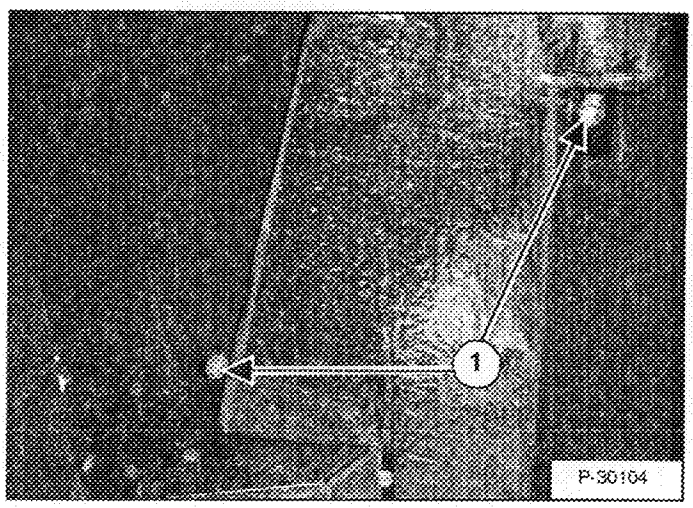
Remove the access cover (Item 2) **[Figure 80-30-1]** from the loader.

Figure 80-30-2



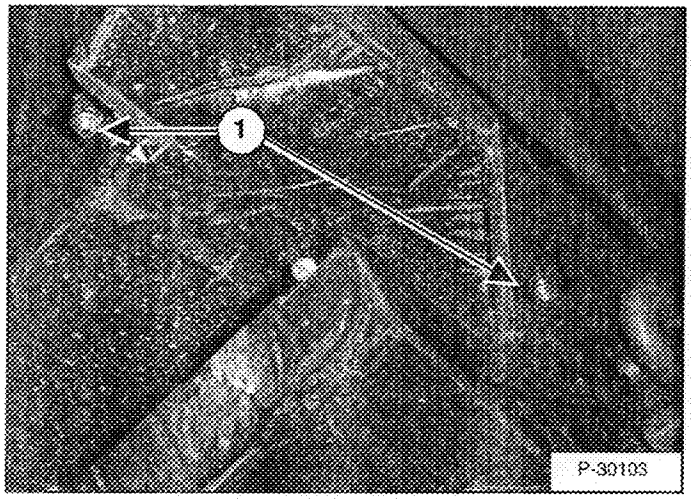
Disconnect the blower fan wiring connector (Item 1) **[Figure 80-30-2]** from the loader wiring harness.

Figure 80-30-3



Remove the two mounting nuts (Item 1) **[Figure 80-30-3]**.

Figure 80-30-4



Remove the two mounting nuts (Item 1) **[Figure 80-30-4]**.

Cleaning The Heater Coil (Cont'd)

Figure 80-30-5

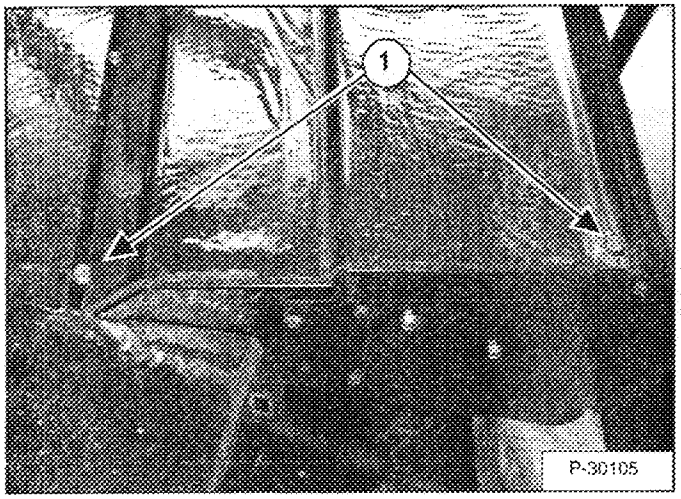
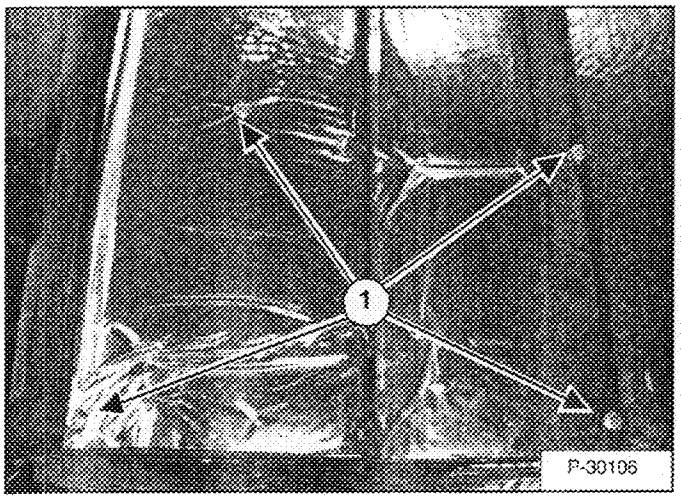


Figure 80-30-6

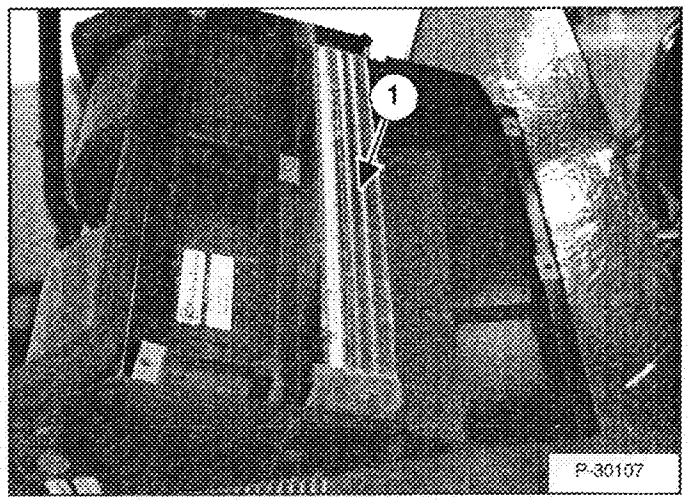


Remove the Heater Unit from the rear of the cab. Place it on the fenders of the loader supported with blocks across mainframe **[Figure 80-30-5]**.

Remove the six mount bolts (Item 1) **[Figure 80-30-5]** & **[Figure 80-30-6]** from the rear cover.

Remove the rear cover from the unit.

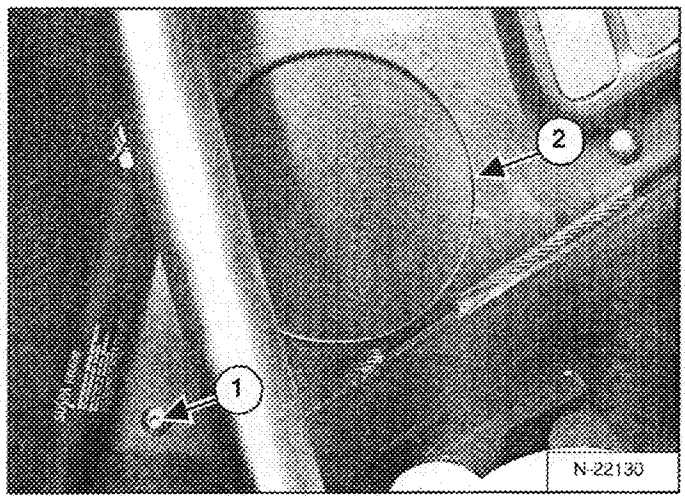
Figure 80-30-7



With air or water, clean the heater coil (Item 1) **[Figure 80-30-7]**.

Checking The Electrical System

Figure 80-30-8

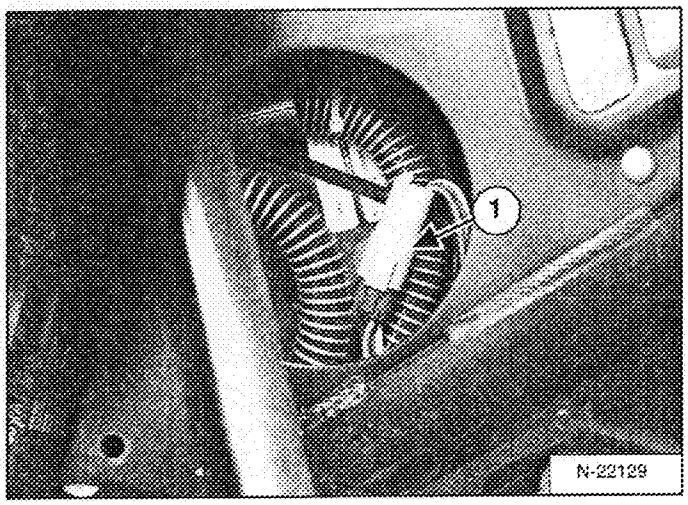


Remove the mount bolt (Item 1) **[Figure 80-30-8]** from the left side cab access cover.

Remove the access cover (Item 2) **[Figure 80-30-8]** from the loader.

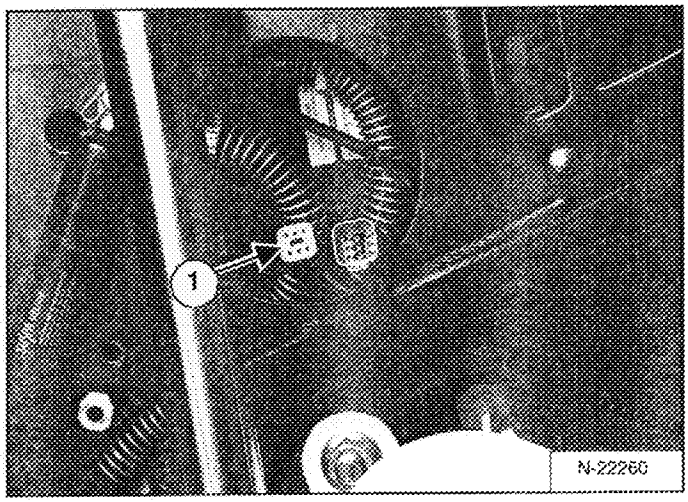
Checking The Electrical System (Cont'd)

Figure 80-30-9



Disconnect the blower fan wiring connector (Item 1) **[Figure 80-30-9]** from the loader wiring harness.

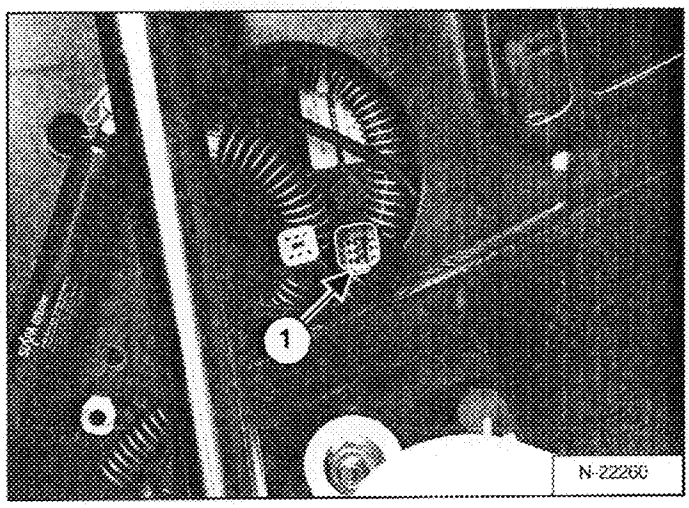
Figure 80-30-10



Check the loader harness (Item 1) **[Figure 80-30-10]** for voltage. The voltage should be 12 volts.

If there is no voltage at the wiring harness, check the harness for broken wires or blown fuse.

Figure 80-30-11

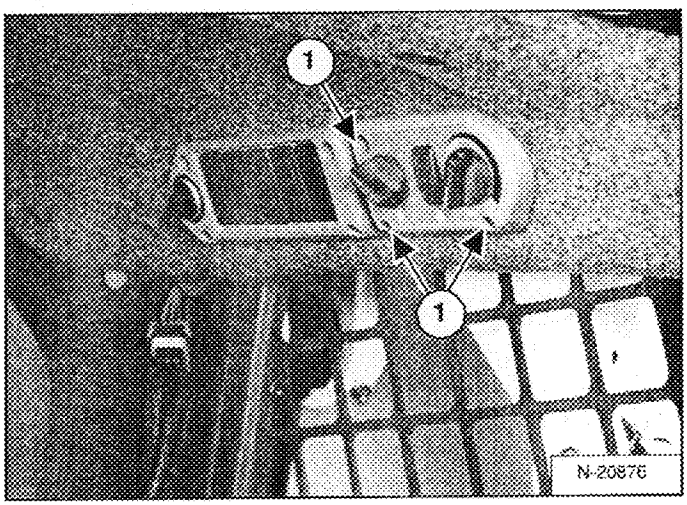


If there is voltage at the wiring harness, check the resistance to the blower fan at the blower fan wiring connector (Item 1) **[Figure 80-30-11]**.

If there is no resistance value replace the blower fan. (See Contents, Page 70-01)

If there is a resistance value check the climate conirols at the control panel inside the loader cab.

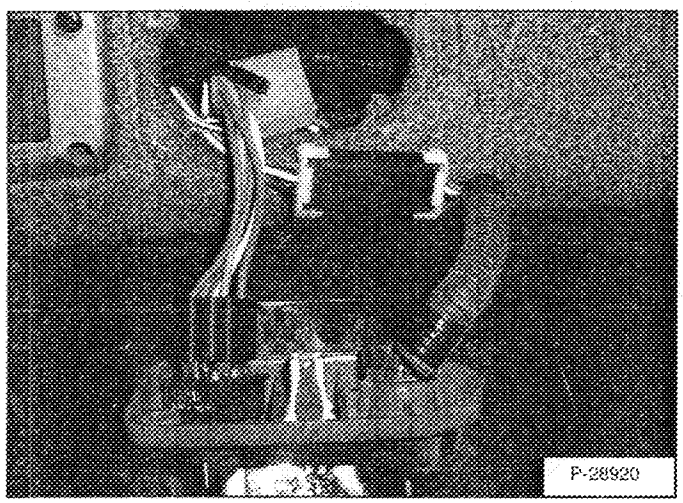
Figure 80-30-12



Remove the three mount bolts (Item 1) **[Figure 80-30-12]** from the cab control panel.

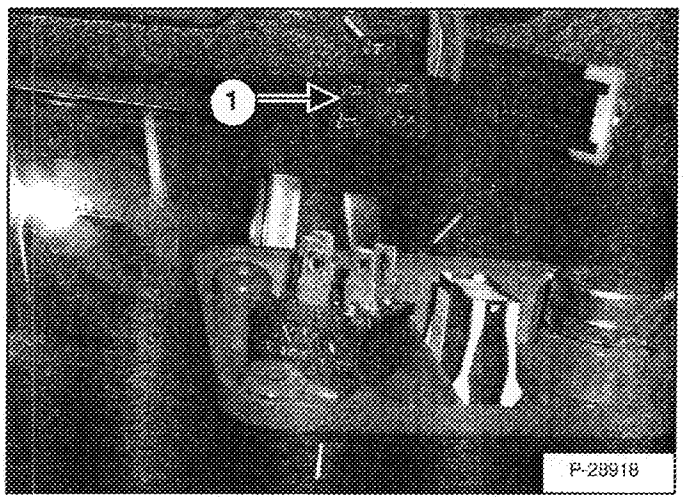
Checking The Electrical System (Cont'd)

Figure 80-30-13



Remove the control panel and wiring harness from the cab **[Figure 80-30-13]**.

Figure 80-30-14

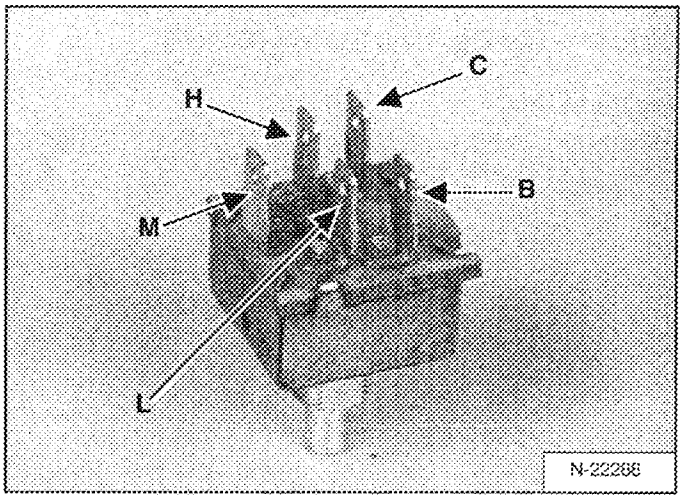


Disconnect the loader wiring harness (Item 1) **[Figure 80-30-14]** from the blower switch.

Check the loader harness for voltage. The voltage should be 12 volts.

If there is no voltage at the wiring harness, check the harness for broken wires or blown fuse.

Figure 80-30-15



If there is voltage at the wiring harness, check the blower switch **[Figure 80-30-15]** for resistance.

With the switch in the **OFF** position, there should be zero resistance between all terminals.

With the switch in the **1** position, there should be resistance between **C** terminal and the **B** terminal. And also between the **C** terminal and the **L** terminal frame **[Figure 80-30-15]**.

With the switch in the **2** position, there should be resistance between **C** terminal and the **B** terminal. And also between the **C** terminal and the **M** terminal frame **[Figure 80-30-15]**.

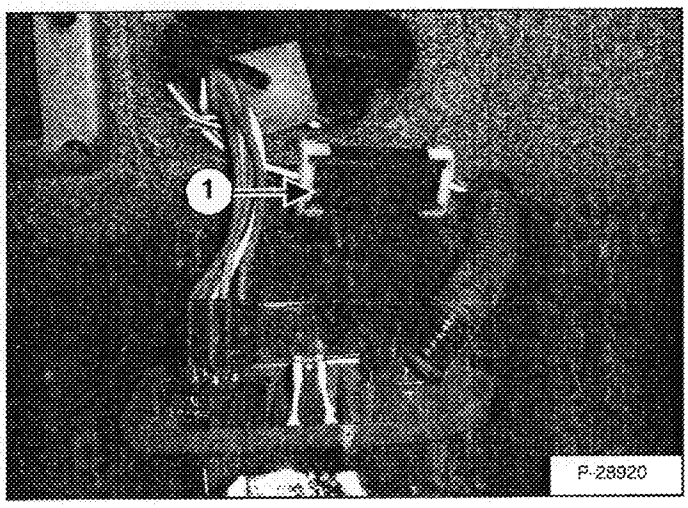
With the switch in the **3** position, there should be resistance between **C** terminal and the **B** terminal. And also between the **C** terminal and the **H** terminal frame **[Figure 80-30-15]**.

If any of the above resistance tests fail, replace the blower switch.

If the above resistance tests are good, check the potentionmeter.

Checking The Electrical System (Cont'd)

Figure 80-30-16

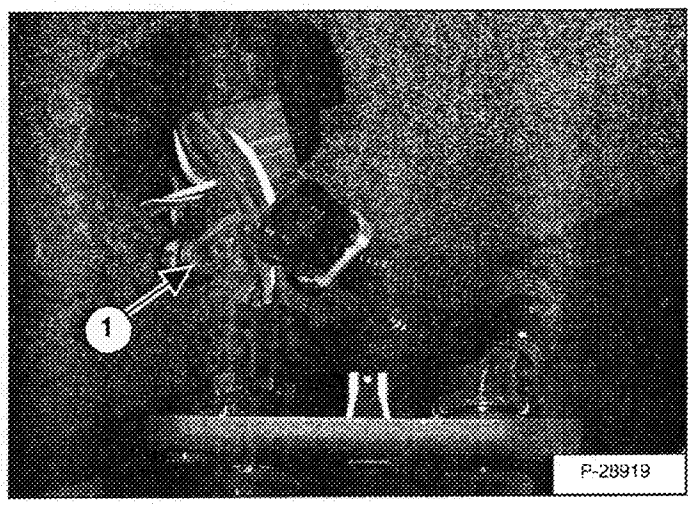


The potentiometer will effect the operation of the heater.

If heater valve does not open, or close, check the potentiometer.

At the loader cab, disconnect the loader harness (Item 1) **[Figure 80-30-16]** from the potentiometer.

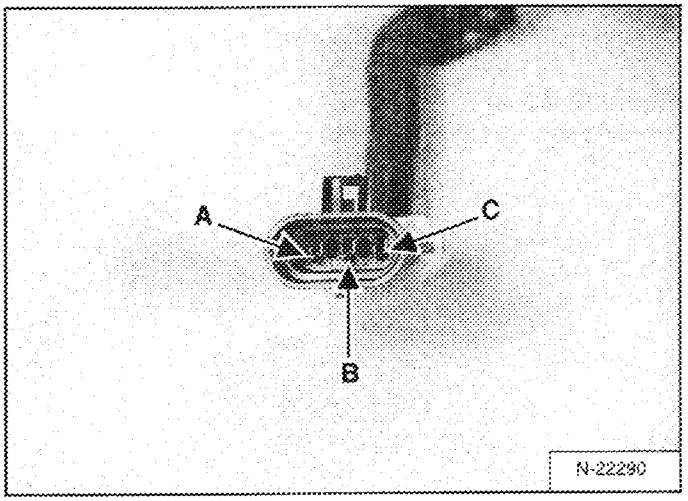
Figure 80-30-17



Check the loader harness (Item 1) **[Figure 80-30-17]** for voltage. The voltage should be 12 volts.

If there is no voltage at the wiring harness, check the harness for broken wires or blown fuse.

Figure 80-30-18

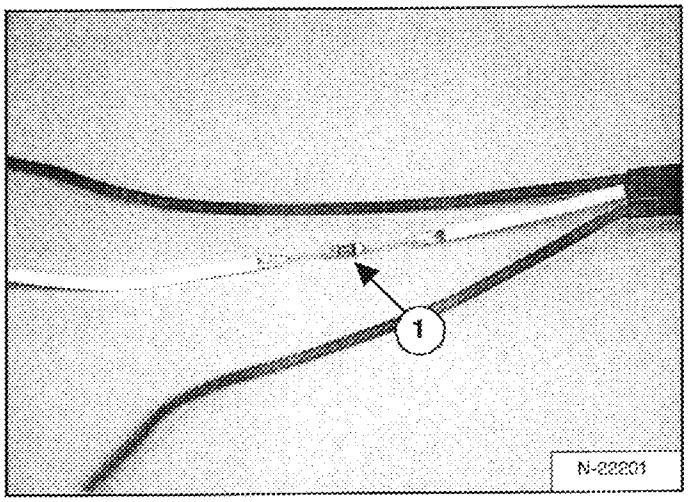


If there is voltage at the wiring harness, check the potentiometer **[Figure 80-30-18]** for resistance.

The resistance should be 10 K Ohm's between wire terminal **A** and wire terminal **C** frame **[Figure 80-30-18]**.

If no resistance is found replace the potentiometer.

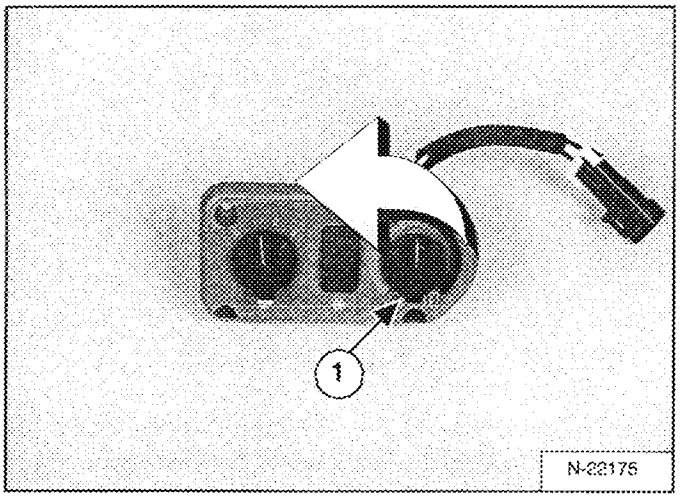
Figure 80-30-19



The white wire **B**, (Item 1) **[Figure 80-30-19]**, on the potentiometer, is a resister wire.

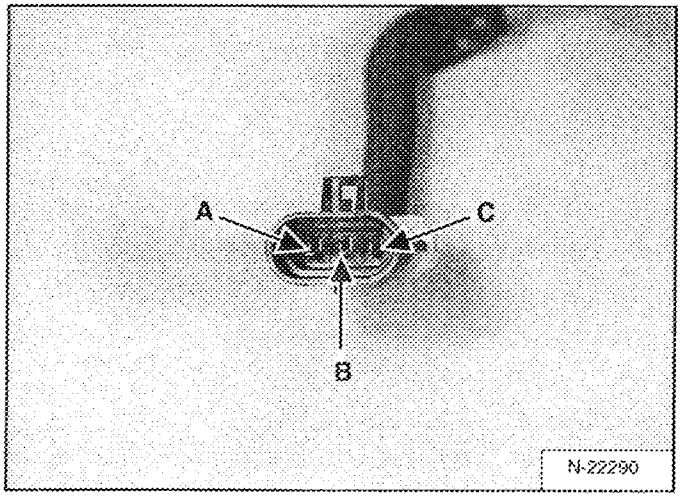
Checking The Electrical System (Cont'd)

Figure 80-30-20



To check the resistance of the white wire, turn the potentiometer control (Item 1) **[Figure 80-30-20]** to the full A/C position **[Figure 80-30-20]**.

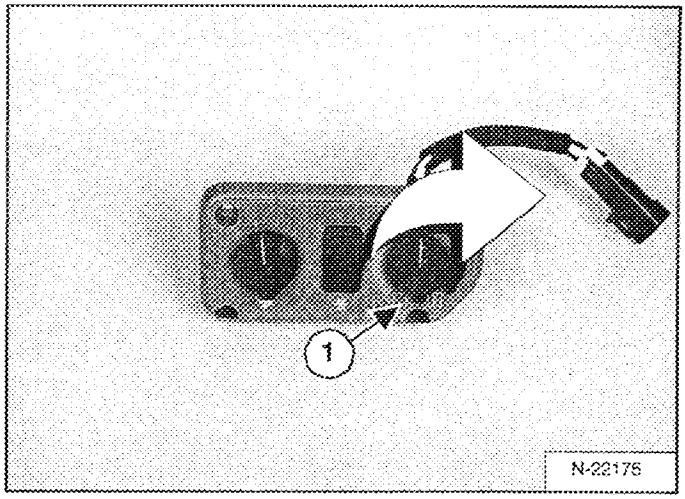
Figure 80-30-21



The resistance between the wire terminal **A** and wire terminal **B** frame **[Figure 80-30-21]** should be approximately 49 K Ohm's.

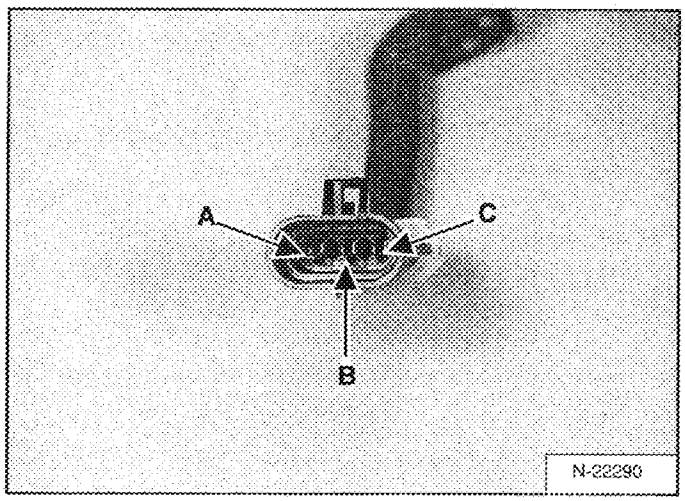
Check the resistance between the wire terminal **C** and wire terminal **B** frame **[Figure 80-30-21]** should be approximately 39 K Ohm's.

Figure 80-30-22



To check the resistance of the white wire, turn the potentiometer control (Item 1) **[Figure 80-30-22]** to the full Heater position.

Figure 80-30-23



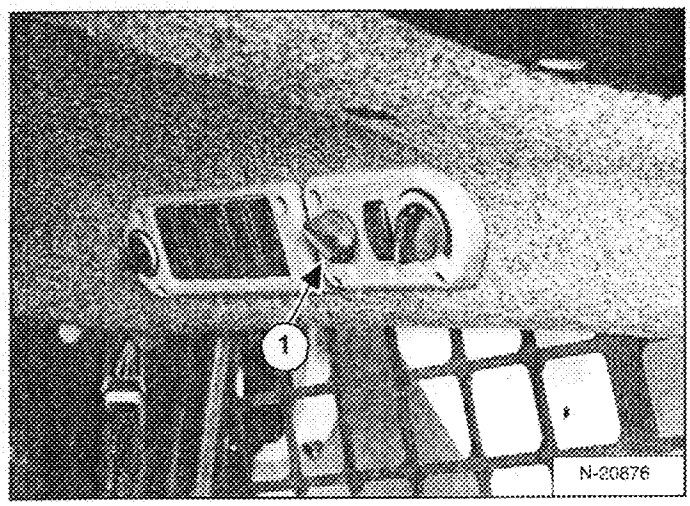
Check the resistance between the wire terminal **A** and wire terminal **B** frame **[Figure 80-30-23]** should be approximately 39 K Ohm's.

Check the resistance between the wire terminal **C** and wire terminal **B** frame **[Figure 80-30-23]** should be approximately 49 K Ohm's.

If the resistance is not found replace the potentiometer.

Engine Coolant By-Passing The Heater Valve

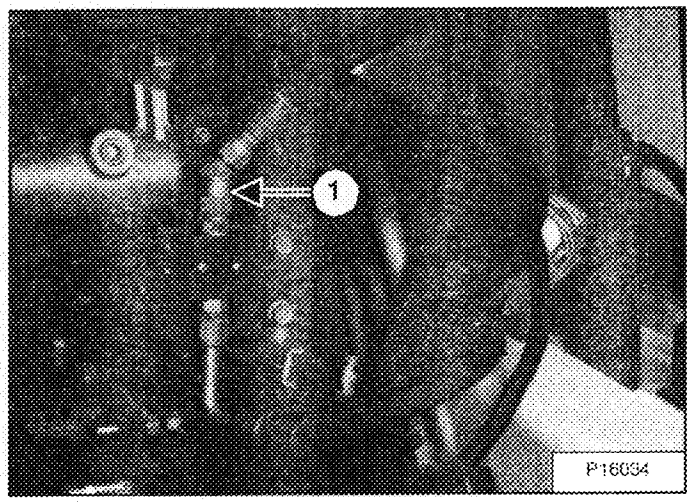
Figure 80-30-24



Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Turn the fan switch (Item 1) **[Figure 80-30-24]** to the High Speed position, with the loader ignition switch OFF.

Figure 80-30-25



Raise the operator cab. (See Contents, Page 10-01.)

Connect the remote start tool to the loader. (See Contents, Page 10-01.)

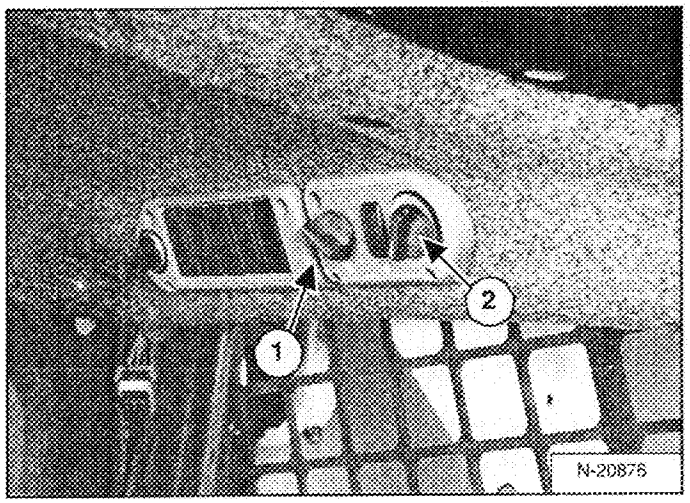
Start the loader and run at high idle, for ten minutes.

Check the heater hose (Item 1) **[Figure 80-30-25]** for temperature.

If the hose is hot, the heater valve is leaking internally, and needs to be replaced.

Heater Valve Not Opening Or Closing

Figure 80-30-26



Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Turn the fan switch (Item 1) **[Figure 80-30-26]** to position **1**. Turn the temperature control (Item 2) **[Figure 80-30-26]** to the High cold position, with the loader ignition switch OFF.

Raise the operator cab. (See Contents, Page 10-01.)

Connect the remote start tool to the loader. (See Contents, Page 10-01.)

Place the remote start tool on the left fender of the loader, so the heater valve can be clearly seen. Watch the valve shaft (Item 1) **[Figure 80-30-27]**, as the key of the remote start tool is turned to the ON position without starting the loader. The heater valve should rotate. Place a mark on the loader shaft.

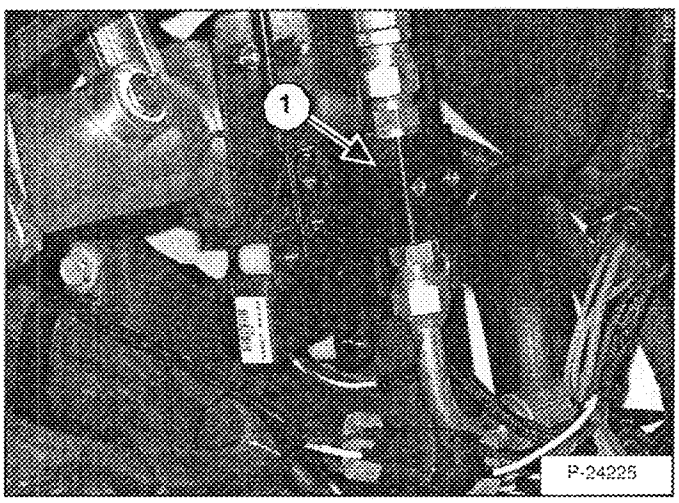
Turn the key of the remote start tool to the OFF position and remove the remote start tool from fender.

Lower operator cab.

Turn the temperature control (Item 2) **[Figure 80-30-26]** to the High Heater position, with the loader ignition switch OFF.

Heater Valve Not Opening Or Closing (Cont'd)

Figure 80-30-27



Raise the operator cab.

Place the remote start tool on the left fender of the loader, so the heater valve can be clearly seen. Watch the valve shaft (Item 1) **[Figure 80-30-27]**, as the key of the remote start is turned to the ON position without starting the loader. The heater valve should rotate.

If it does not rotate, check the potentiometer for proper function. (See Contents, Page 80-01.)

Replace the heater valve. (See Contents, Page 80-01.)

SYSTEM TROUBLESHOOTING CHART

Blower motor does not operate

Possible Cause	Inspection	Solution
1. Blown Fuse.	Inspect the fuse/wiring.	Replace fuse/repair wiring.
2. Broken wiring or bad connection.	Check the fan motor ground and connectors.	Repair the wiring or connector.
3. Fan motor malfunction.	Check the lead wires from the motor with a circuit tester.	Replace Motor.
4. Resistor malfunction.	Check resistor using a circuit tester.	Replace Resistor.
5. Fan motor switch malfunction.	Check power into and out of the fan switch.	Replace Fan Switch.

Blower motor operates normally, but air flow is insufficient

Possible Cause	Inspection	Solution
1. Air leak.	Check to make sure air hoses are properly hooked to Louvers, and air ducts.	Repair or adjust.

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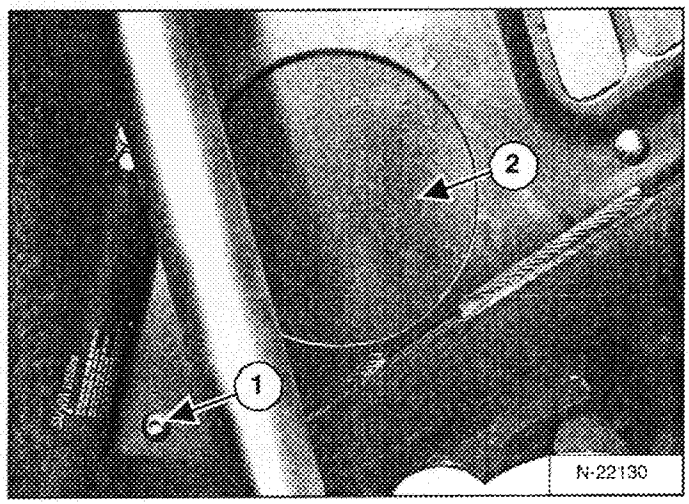
HEATER UNIT

Removal And Installation

Figure 80-50-1



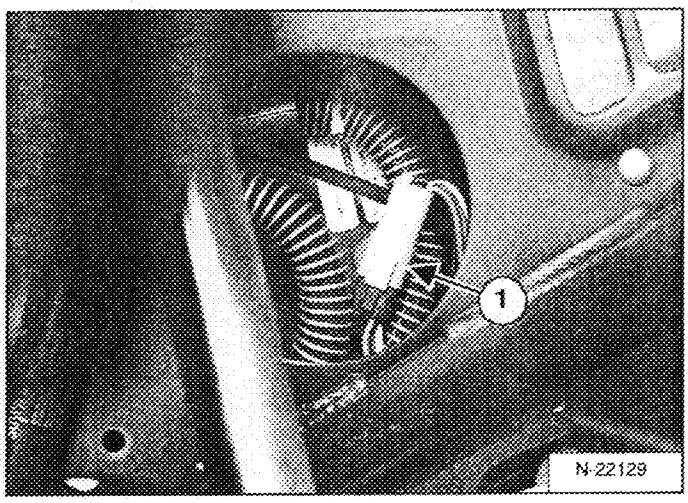
Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Raise the operator cab. (See Contents, Page 10-01.)

Remove the mount bolt (Item 1) **[Figure 80-50-1]** from the left side cab access cover.

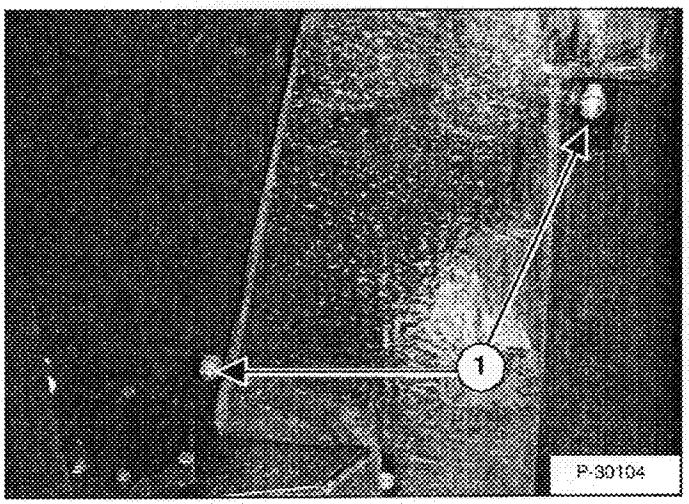
Remove the access cover (Item 2) **[Figure 80-50-1]** from the loader.

Figure 80-50-2



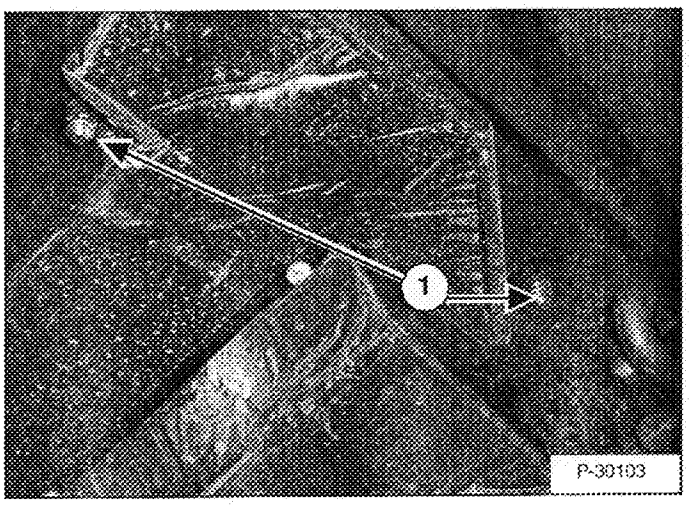
Disconnect the blower fan wiring connector (Item 1) **[Figure 80-50-2]** from the loader wiring harness.

Figure 80-50-3



Remove the two mounting nuts (Item 1) **[Figure 80-50-3]**.

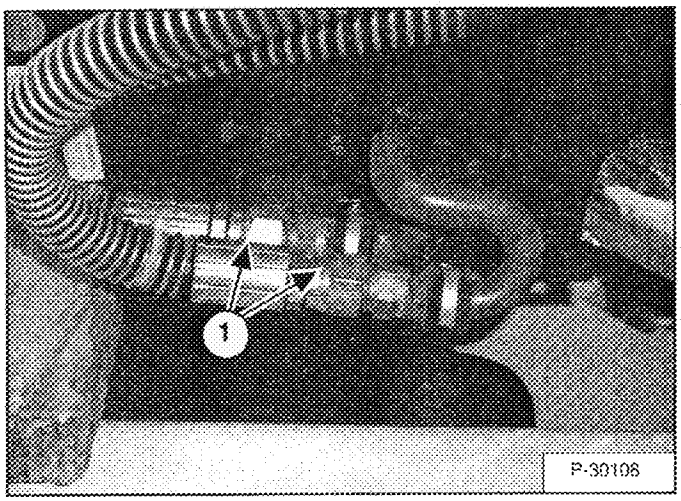
Figure 80-50-4



Remove the two mounting nuts (Item 1) **[Figure 80-50-4]**.

Removal And Installation (Cont'd)

Figure 80-50-5



Remove the Heater Unit from the rear of the cab. Place it on the fenders of the loader supported by 2X4's (blocking) **[Figure 80-50-5]**.

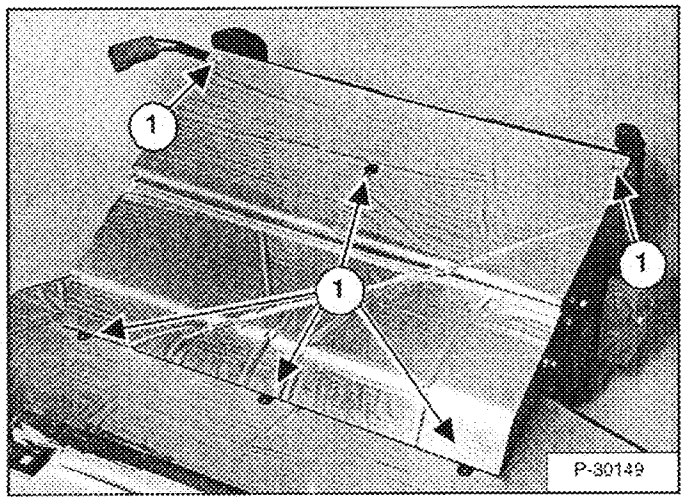
Remove the heater hoses (Item 1) **[Figure 80-50-5]** from the heater coil.

Installation: Tighten the Heater hoses to 22 ft.-lbs. (29.8 Nm) torque.

Remove the heater unit from the loader.

Disassembly And Assembly

Figure 80-50-6



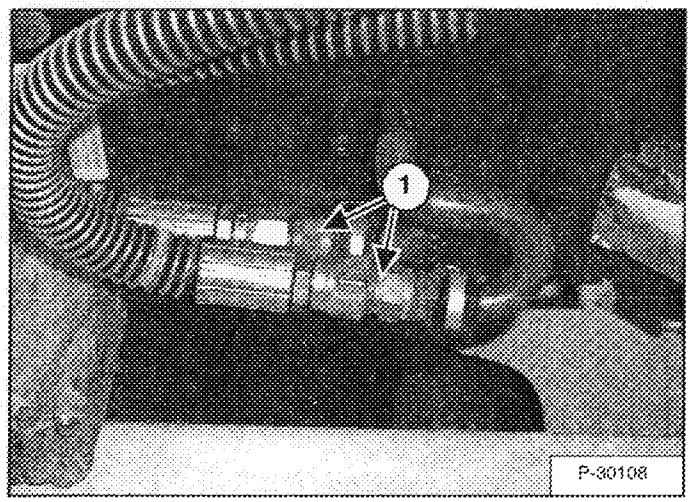
Remove the six mount bolts (Item 1) **[Figure 80-50-6]** from the Heater Unit rear cover.

Remove the rear cover from the unit.

HEATER COIL

Removal And Installation

Figure 80-60-1



Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Raise the operator cab. (See Contents, Page 10-01.)

Remove the heater unit from the back of the cab. (See Contents, Page 80-01.)

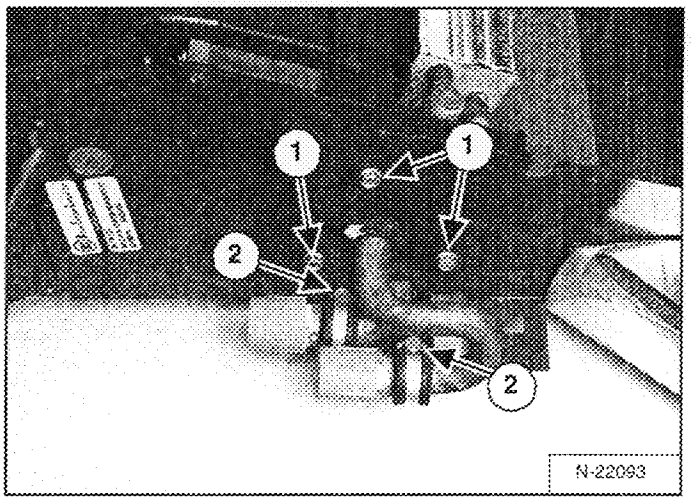
Mark the heater hoses (Item 1) **[Figure 80-60-1]** for proper installation.

Remove the two heater hoses from the heater coil.

Cap the hoses and the heater coil with hydraulic caps and plugs to prevent coolant loss from the system.

Installation: Tighten the two heater hose fittings to 22 ft.-lbs. (29,8 Nm) torque.

Figure 80-60-2

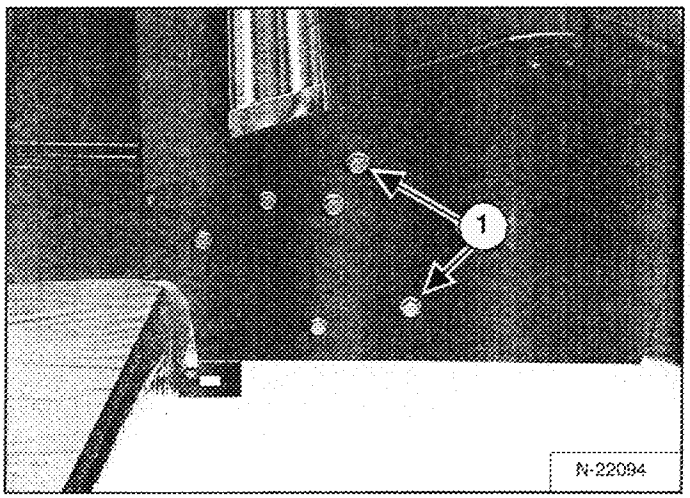


Remove the rear cover from the heater unit. (See Contents, Page 80-01.)

Remove the three mount bolts (Item 1) **[Figure 80-60-2]** and remove the mount plate from the end of the unit.

Remove the two mount bolts (Item 2) **[Figure 80-60-2]** that support the heater coil tubelines to the unit.

Figure 80-60-3



Remove the two mount bolts (Item 1) **[Figure 80-60-3]** from the heater coil.

Remove the heater coil from the unit.

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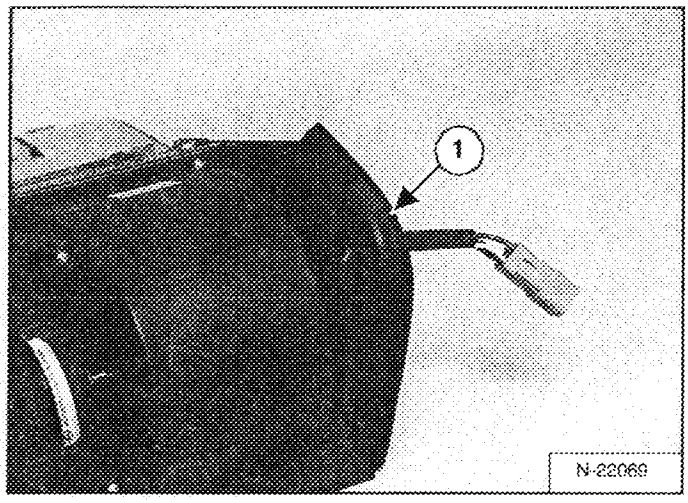
HEATER FAN

Removal And Installation

Figure 80-70-1



Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

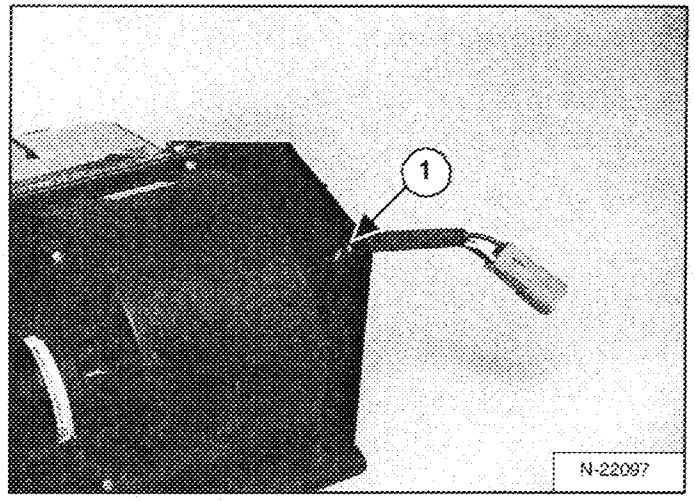
Raise the operator cab. (See Contents, Page 10-01.)

Remove the heater unit from the back of the cab. (See Contents, Page 80-01.)

NOTE: The heater fan assembly can be removed from the heater unit without disconnecting the heater plumbing. The unit is removed here for photo clarity.

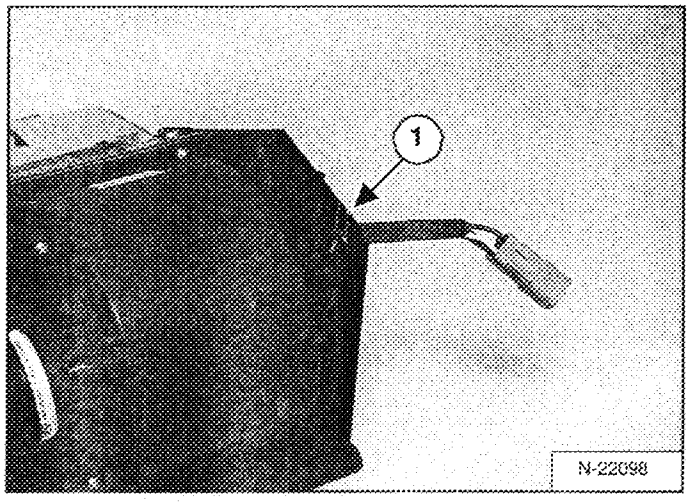
Remove the grommet (Item 1) **[Figure 80-70-1]** from the side of the evaporator/heater unit.

Figure 80-70-2



NOTE: On some early heater units the metal was not cut out, so the blower wiring harness (Item 1) [Figure 80-70-2] could not be removed without removing the wiring connector.

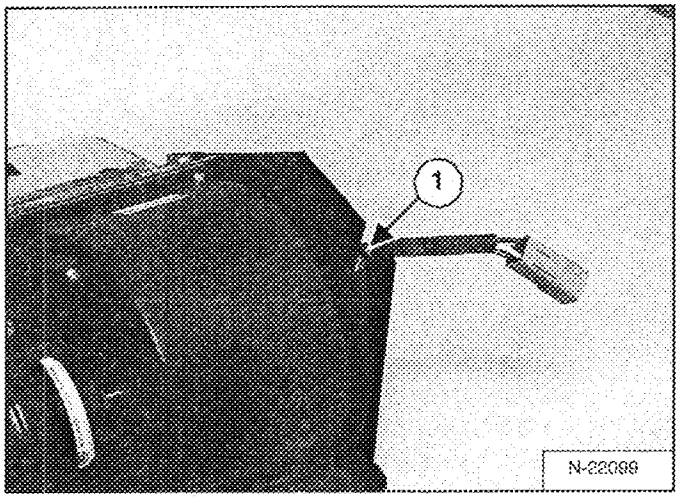
Figure 80-70-3



If the metal is not cut out on the housing, mark the area (Item 1) **[Figure 80-70-3]** and remove it with a metal shears.

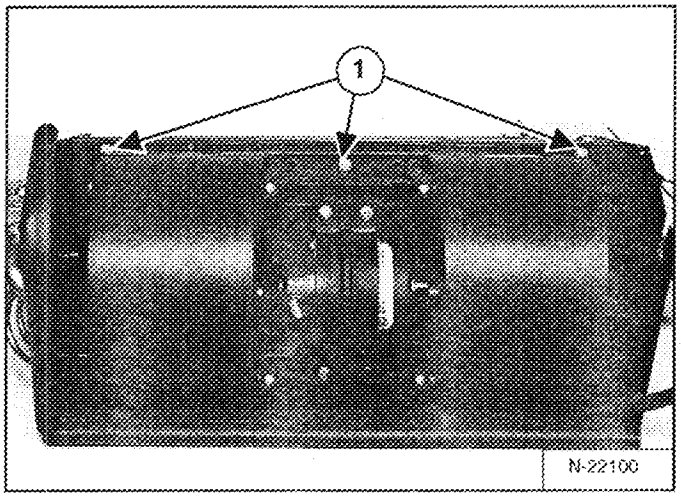
Removal And Installation (Cont'd)

Figure 80-70-4



Remove the blower fan wiring harness and grommet (Item 1) **[Figure 80-70-4]** from the unit.

Figure 80-70-5

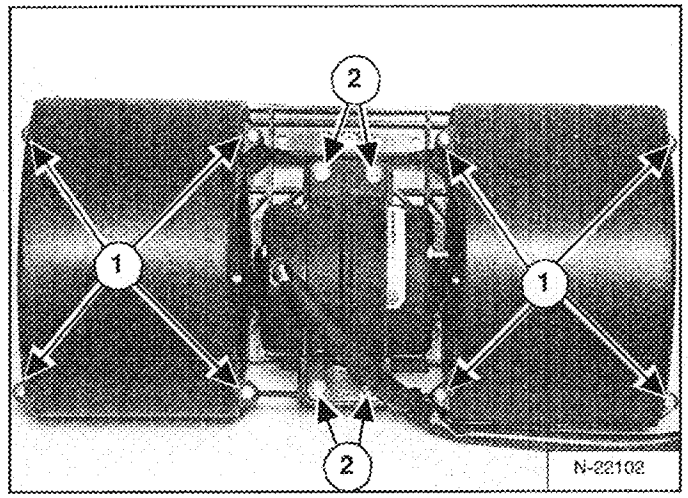


Remove the three mount bolts (Item 1) **[Figure 80-70-5]** from the blower fan housing.

Remove the blower fan housing from the heater unit.

Disassembly And Assembly

Figure 80-70-6



Remove the eight mount bolts (Item 1) **[Figure 80-70-6]** from the blower wheel cover.

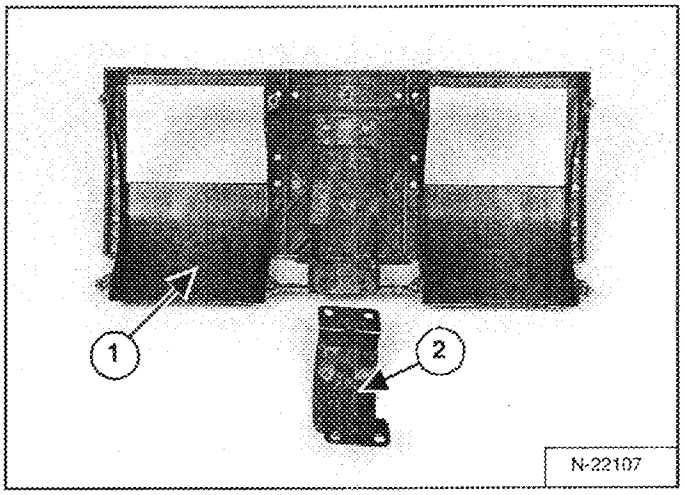
Remove the blower wheel cover from the fan housings.

Remove the four mount bolts (Item 2) **[Figure 80-70-6]** from the fan motor mount.

Remove the fan motor mount.

Remove the fan motor assembly from the housing.

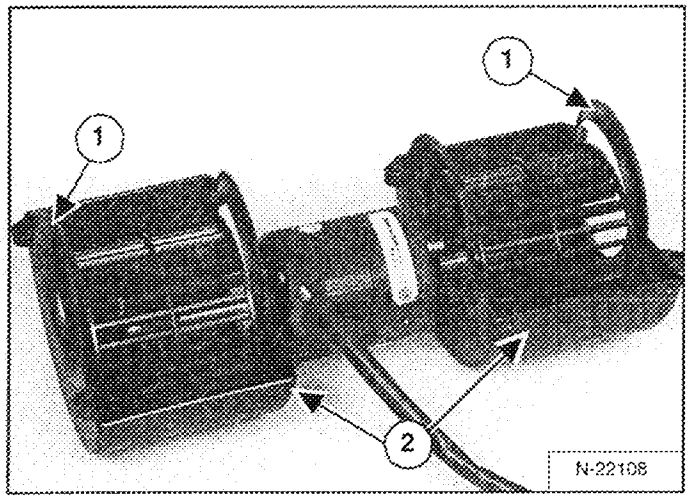
Figure 80-70-7



Check the blower housing (Item 1) **[Figure 80-70-7]** and fan motor mount (Item 2) **[Figure 80-70-7]** for wear and replace as needed.

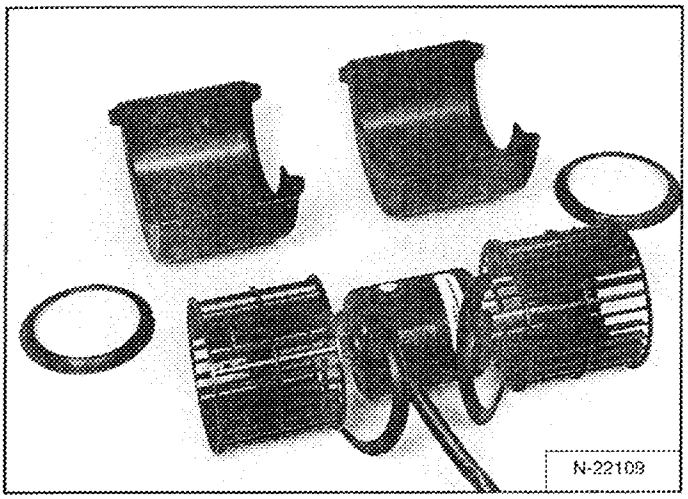
Disassembly And Assembly (Cont'd)

Figure 80-70-8



Remove the outside rings (Item 1) **[Figure 80-70-8]** and fan wheel covers (Item 2) **[Figure 80-70-8]** from the fan motor and blower wheels.

Figure 80-70-9



Inspect the end rings and fan wheel covers for wear and replace as needed **[Figure 80-70-9]**.

Figure 80-70-10

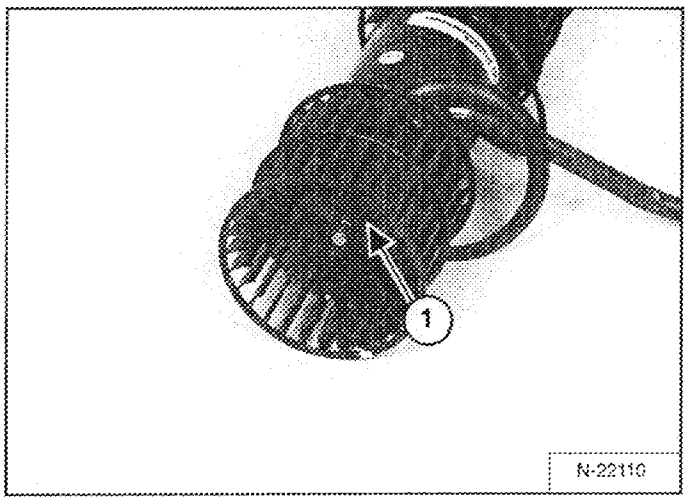
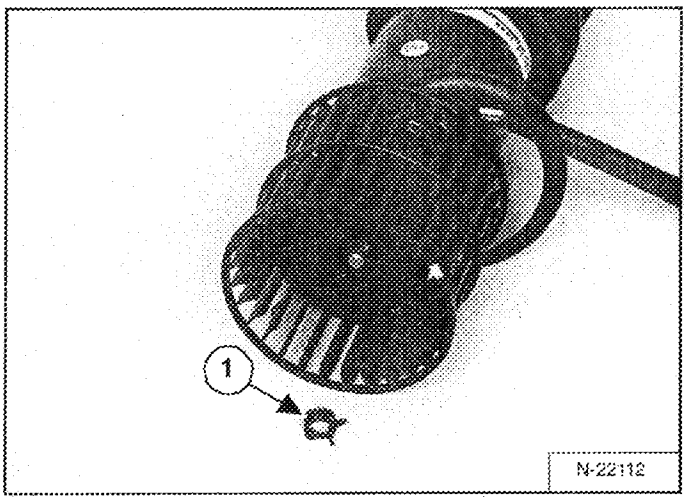


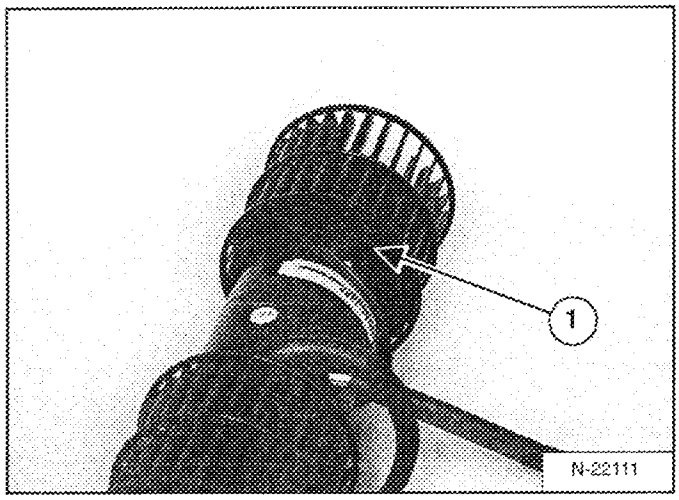
Figure 80-70-11



Remove the outside blower wheel clamp (Item 1) **[Figure 80-70-10]** & **[Figure 80-70-11]** from the blower wheel.

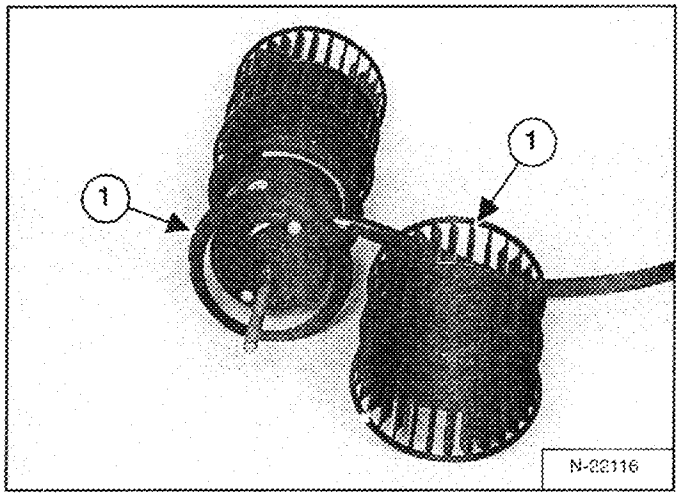
Disassembly And Assembly (Cont'd)

Figure 80-70-12



Remove the inside blower wheel clamp (Item 1) **[Figure 80-70-12]** from the blower wheel.

Figure 80-70-13



Remove the blower wheel (Item 1) **[Figure 80-70-13]** and inside ring (Item 2) **[Figure 80-70-13]** from the blower fan motor shaft.

Repeat the procedure for the other blower wheel.

Wire Connector Removal and Installation

Figure 80-70-14

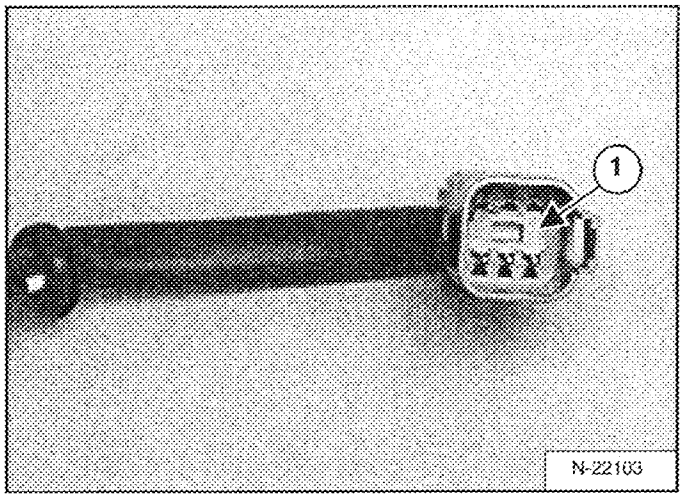
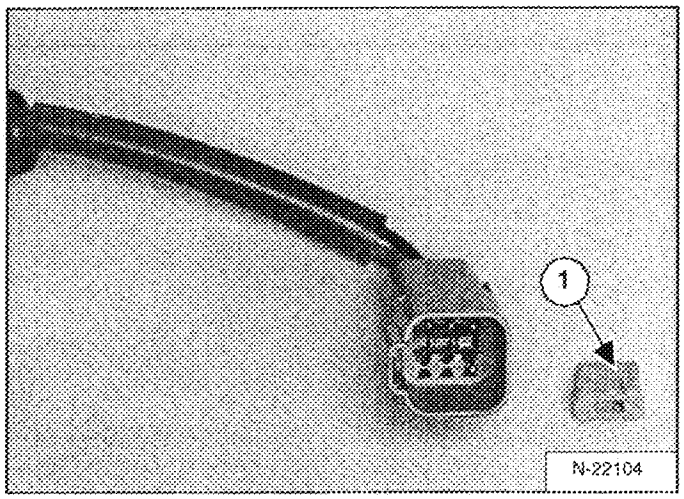


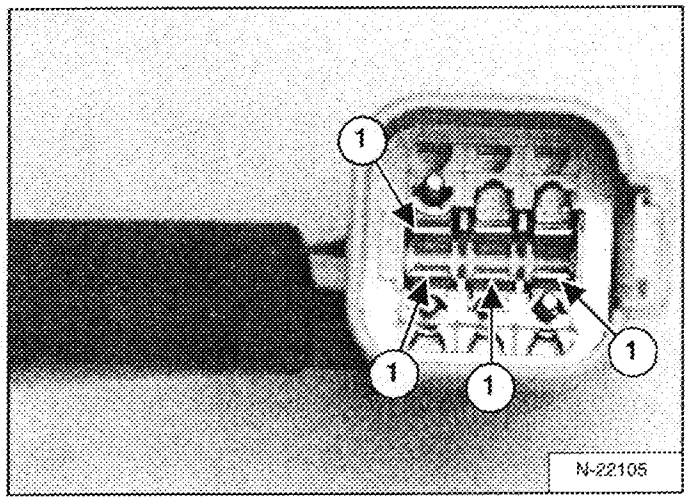
Figure 80-70-15



Remove the plastic wedge (Item 1) **[Figure 80-70-14]** & **[Figure 80-70-15]** from the center of the blower fan motor wiring connector.

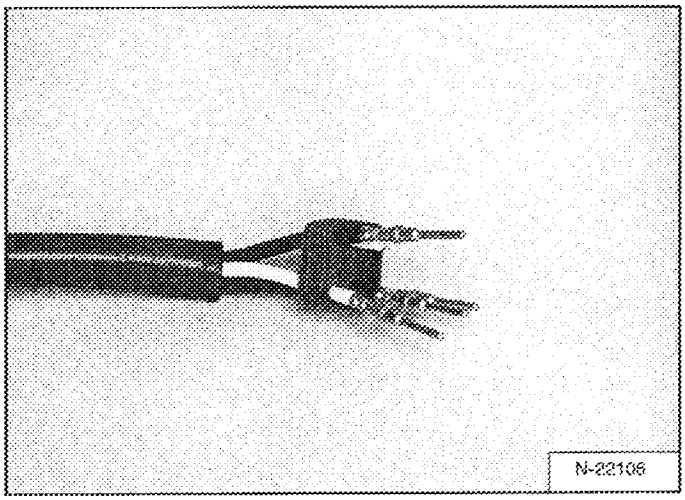
Wire Connector Removal and Installation (Cont'd)

Figure 80-70-16



With a pointed screw driver lightly press in on the tabs (Item 1) **[Figure 80-70-16]** and remove the individual wires from the connector.

Figure 80-70-17



The wiring code for the blower fan connector **[Figure 80-70-17]** is:

Number on Connector	Wire Color
1	Orange
2	Red
3	Yellow
4	Black
5	Open
6	Open

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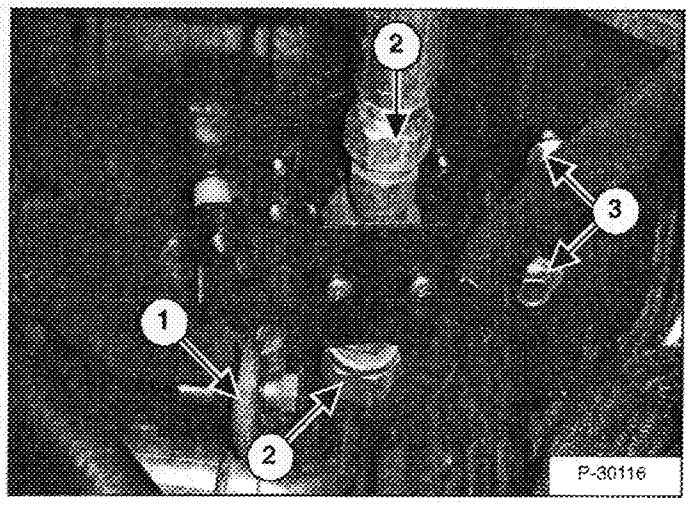
HEATER VALVE

Removal and Installation

Figure 80-80-1



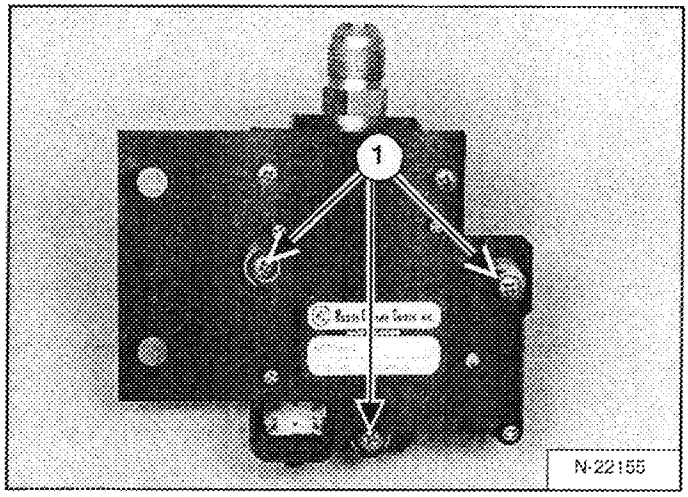
Disconnect the loader wiring harness (Item 1) **[Figure 80-80-1]** from the heater valve.

Remove the two coolant hoses (Item 2) **[Figure 80-80-1]** from the heater valve.

Cap the hoses and the heater valve with caps and plugs to prevent coolant loss from the system.

Remove the two mount bolts (Item 3) **[Figure 80-80-1]** from the heater valve mount bracket.

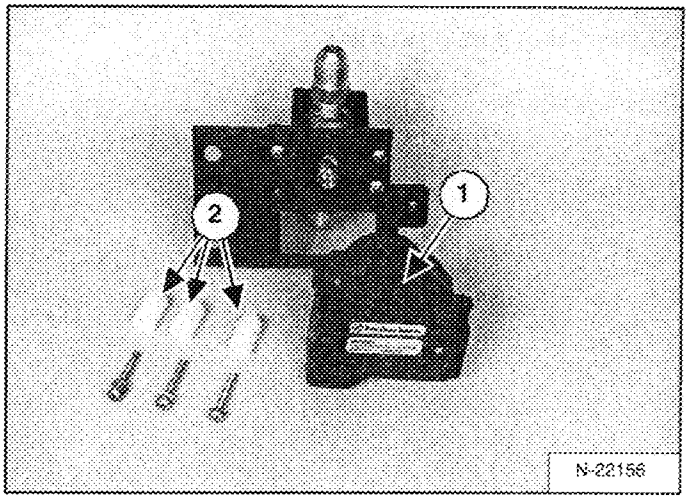
Figure 80-80-2



Remove the heater valve and mount bracket from the loader.

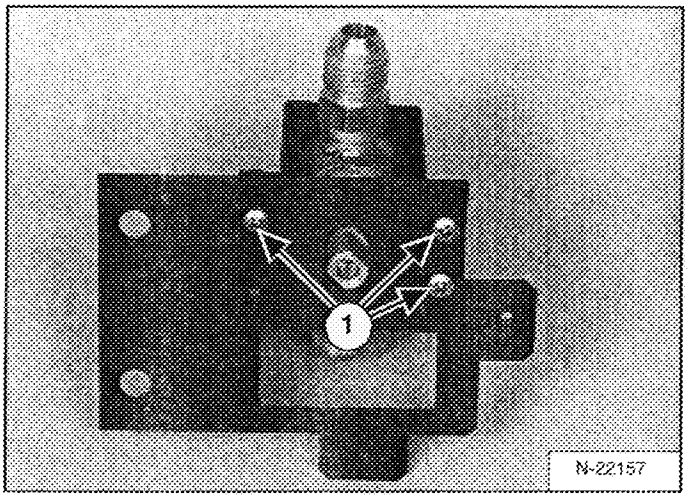
Remove the three mount bolts (Item 1) **[Figure 80-80-2]** from the heater valve actuator.

Figure 80-80-3



Remove the actuator (Item 1) **[Figure 80-80-3]** and the three mounting spacers (Item 2) **[Figure 80-80-3]** from the heater valve mount plate.

Figure 80-80-4

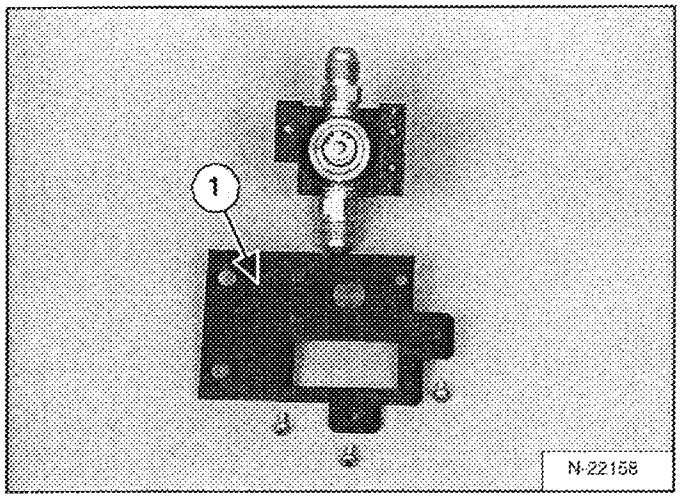


Remove the three mounting bolts (Item 1) **[Figure 80-80-4]** from the heater valve mount plate.

HEATER VALVE (CONT'D)

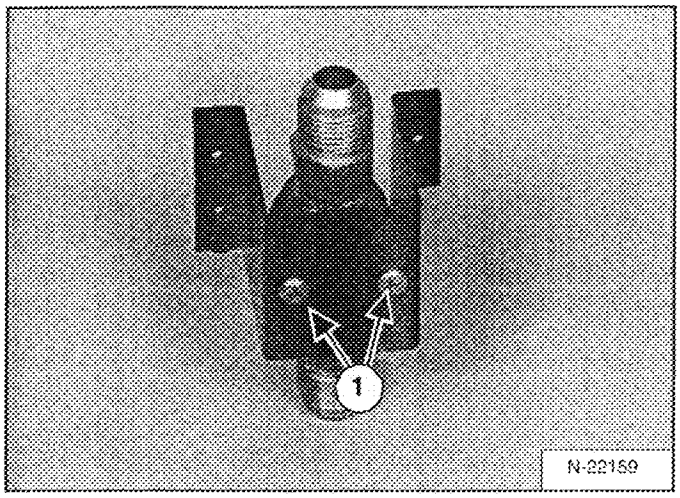
Disassembly And Assembly

Figure 80-80-5



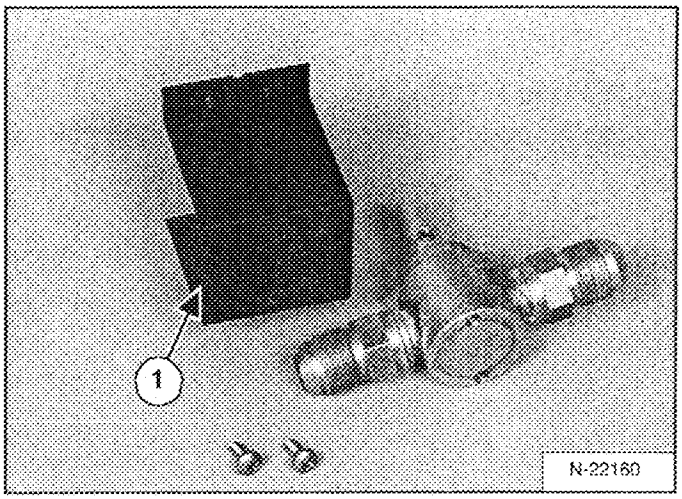
Remove the mount plate (Item 1) **[Figure 80-80-5]** from the heater valve bracket.

Figure 80-80-6



Remove the two mounting bolts (Item 1) **[Figure 80-80-6]** from the heater valve.

Figure 80-80-7



Remove the heater valve mount bracket (Item 1) **[Figure 80-80-7]** from the heater valve.

Replace the parts as needed.