4.0 *Repair and Disassembly*

4.1   Tools

During disassembly and replacement, the following tools may be required:

- Phillips screwdrivers
- Wire cutters
- Sharp nose pliers
- Metric wrenches
- Metric nut drivers

4.2   Preparation for Disassembly

Before disassembling the monitor: stop monitoring patients, turn off the monitor, disconnect all the accessories and peripheral devices, remove the battery, and disconnect the monitor from the mains power supply.

CAUTION: **Before disassembling the monitor, eliminate static charges. When disassembling the parts labeled with static-sensitive symbols, wear electrostatic discharge protection such as antistatic wristband or gloves. Follow the correct sequence to disassemble the monitor. Otherwise, the monitor may be damaged permanently. Disconnect all the cables before disassembling any parts. Take care not to damage any cables or connectors.**

CAUTION: **Properly connect the cables or wires when reassembling the monitor to avoid short circuits. When assembling the monitor, select proper screws. If the wrong size screw is tightened by force, the monitor may be damaged and the screw or the part may not function as expected.**

4.3 Disassembly

4.3.1 Separating the Front and Rear Halves of the Monitor

1. If the monitor is not configured with an Optional Temperature module, proceed to step 2. If the monitor is configured with an Optional Temperature module:

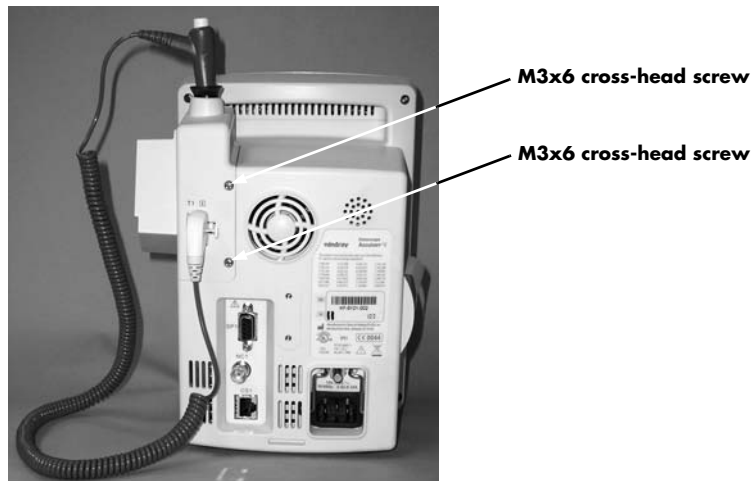**a.** Remove the two (2) M3×6 cross-head screws (as shown in Figure 4-1).

M3x6 cross-head screw

M3x6 cross-head screw

FIGURE 4-1 Remove two (2) M3x6 cross-head screws.

b. Disconnect the Temp cable connector from the PCBA as shown in Figure 4-2.

Temp cable connector
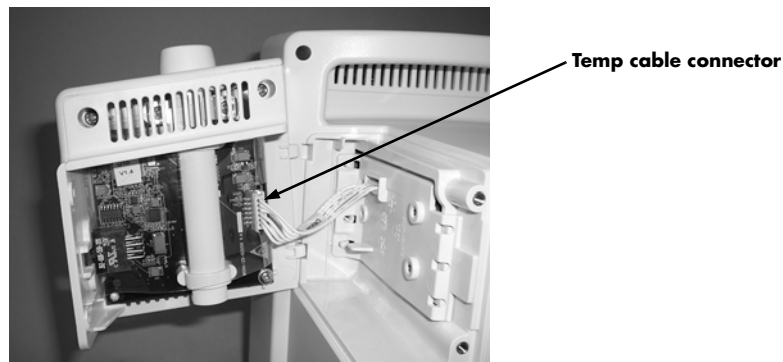
FIGURE 4-2 Disconnect the Temp cable connector.

2. Remove the four (4) M3×8 cross-head screws (as shown in Figure 4-3).

M3x8 cross-head screw

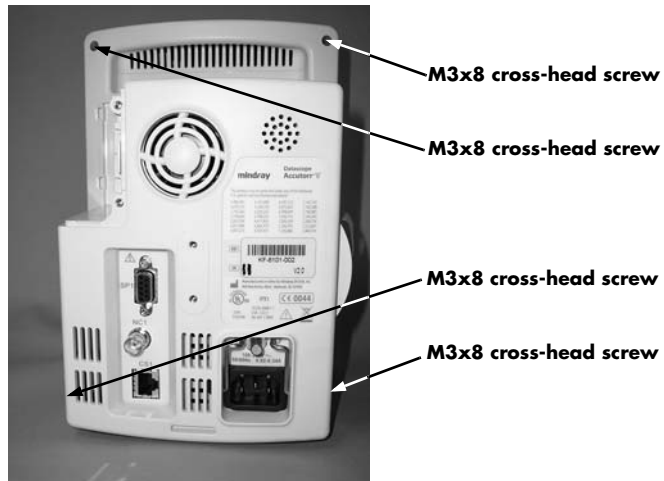**M3x8 cross-head screw**

M3x8 cross-head screw

M3x8 cross-head screw

FIGURE 4-3 Remove four (4) M3x8 cross-head screws.

3. Release the clips (as shown in Figure 4-4) on the front and rear housings.
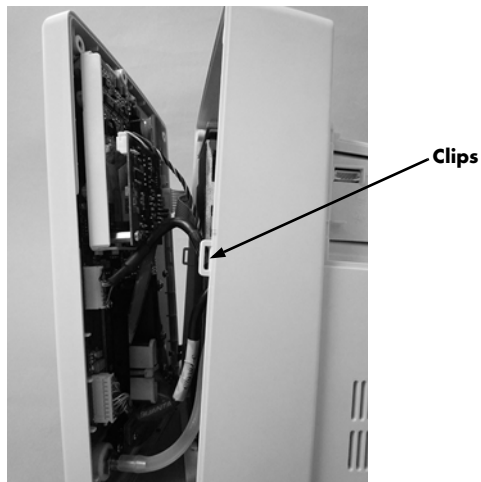

Clips

FIGURE 4-4 Release the clips.

4. Disconnect the cables and air tubing connecting the front and the rear housings.

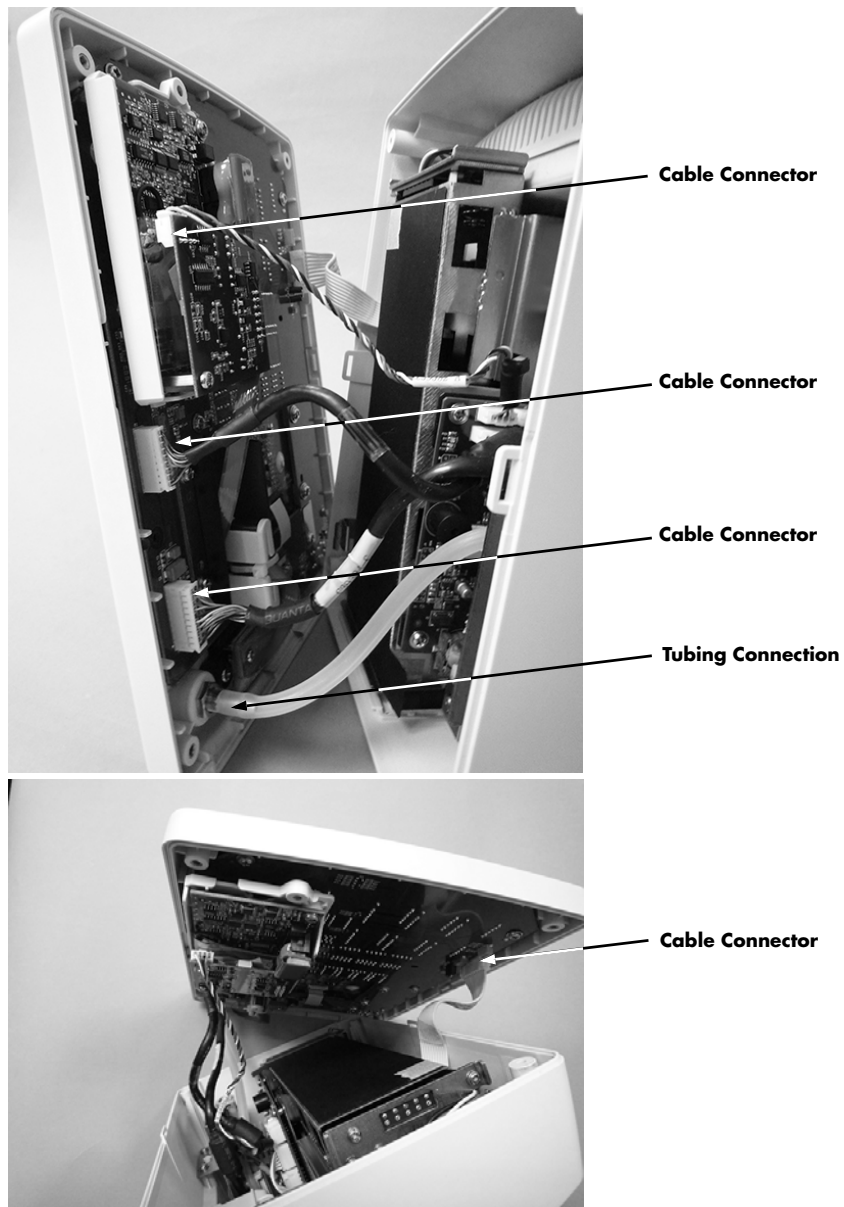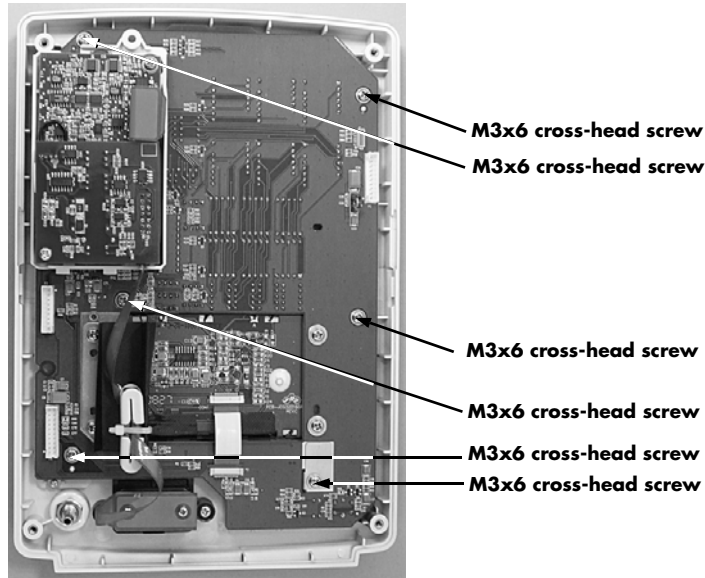5. Separate the front and the rear housings (Figure 4-5).
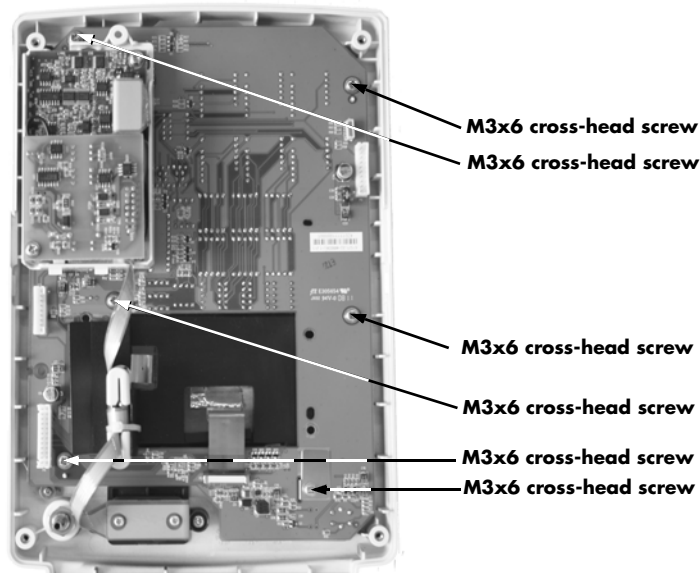

FIGURE 4-5 Separate the front and rear housings.

NOTE: **Exercise care when separating the front and the rear housings. Be sure not to damage the cables and connectors.**

4.3.2   Disassembling the Front Housing Assembly

1. Remove the six (6) M3×6 cross-head screws (as shown in Figure 4-6), and remove the key board.

M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw

Black-and-White LCD Front Housing Assembly

M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw
M3x6 cross-head screw

Color LCD Front Housing Assembly

FIGURE 4-6 Remove six (6) M3x6 cross-head screws.

2. Remove the four (4) M3×8 cross-head screws (as shown in Figure 4-7).The monitor with color LCD does not need this step.
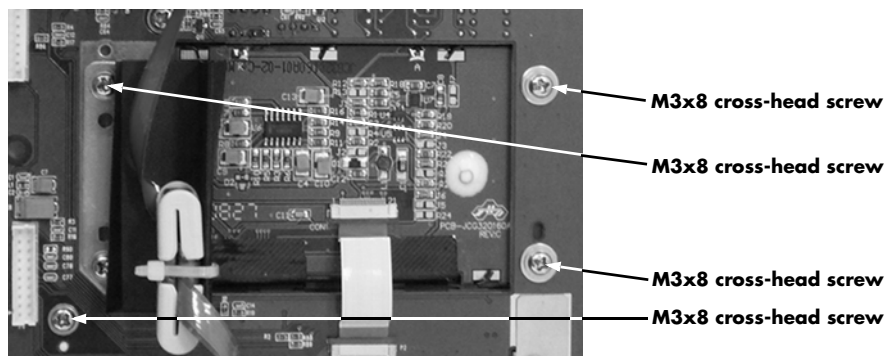

FIGURE 4-7 Remove four (4) M3x8 cross-head screws.

3. Disconnect the flexible cables on the button board.

4. Remove the LCD.

5. Remove the two (2) M3×6 cross-head screws (as shown in FIGURE 4-8), and take out the SpO$_2$ rack.
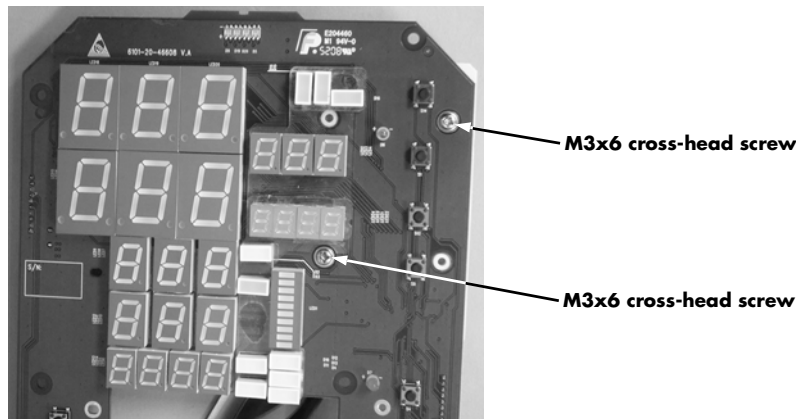

FIGURE 4-8 Remove two (2) M3x6 cross-head screws.

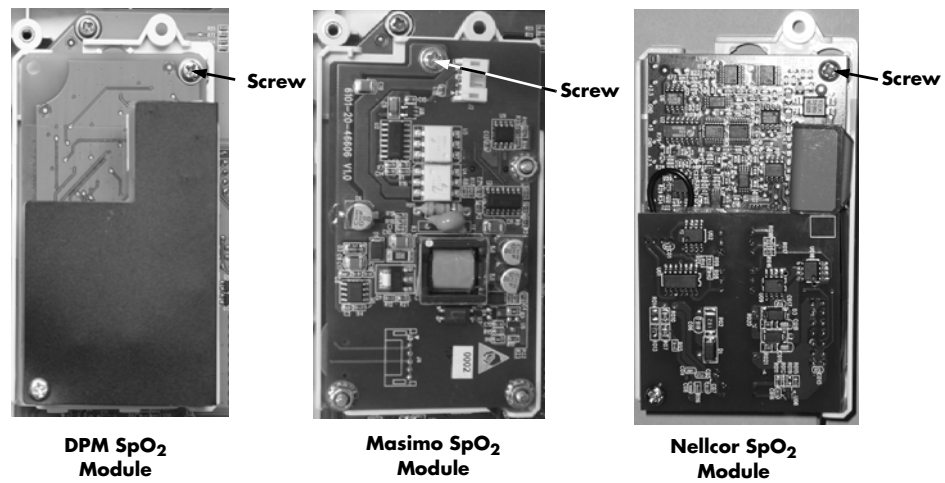**6.** Remove the screw (as shown in FIGURE 4-9) to remove the SpO_2 module from the SpO_2 rack.

DPM SpO₂
Module   **Masimo SpO₂**
                            Module   **Nellcor SpO₂**
                                                        Module

FIGURE 4-9 Remove the screw.

7. Remove the two (2) screws for the SpO_2 signal cable (as shown in Figure 4-10).
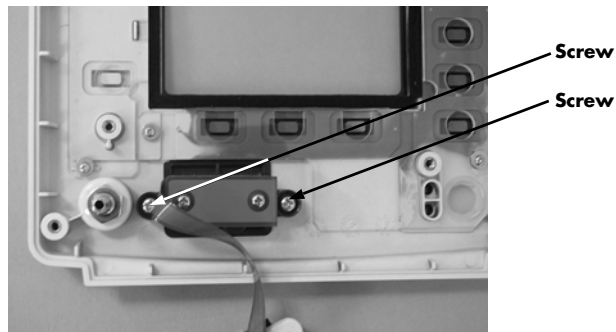
8. Take out the SpO_2 signal cable.

FIGURE 4-10 Remove two (2) screws.

9. For DPM SpO_2 only, unscrew the plastic nut for the DPM SpO_2 signal cable (as shown in Figure 4-11).
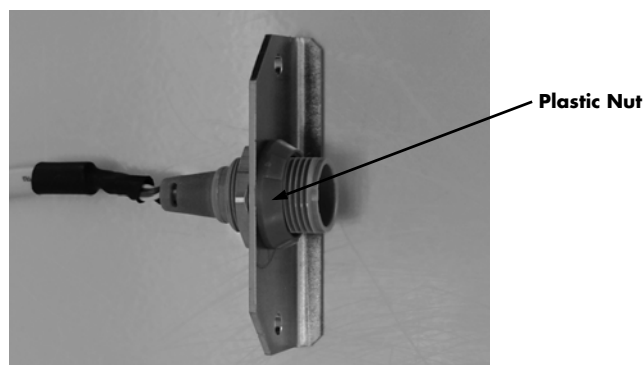

FIGURE 4-11 For DPM SpO_2 only, unscrew the plastic nut.

4.3.3   Removing the Main Rack Assembly

1. Remove the two (2) M3×6 cross-head screws (as shown in Figure 4-12).

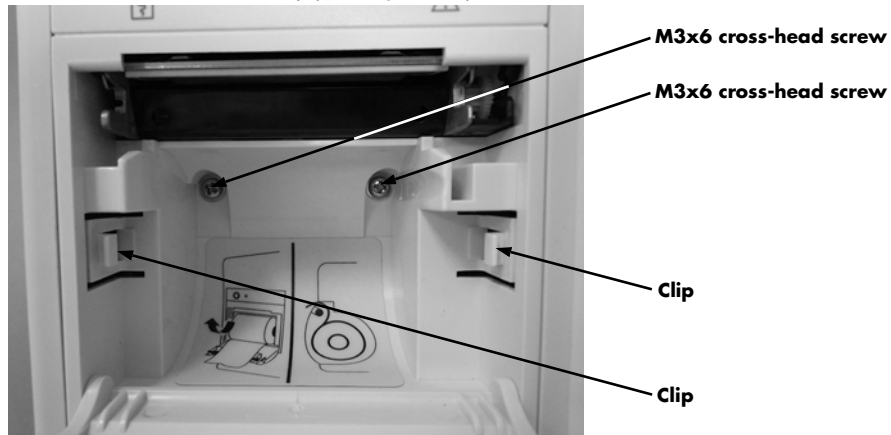**2.** Take out the recorder by pushing the clips inward.

FIGURE 4-12 Remove two (2) M3x6 cross-head screws.

3. Unplug the two (2) cable connectors (as shown in Figure 4-13) from the recorder.
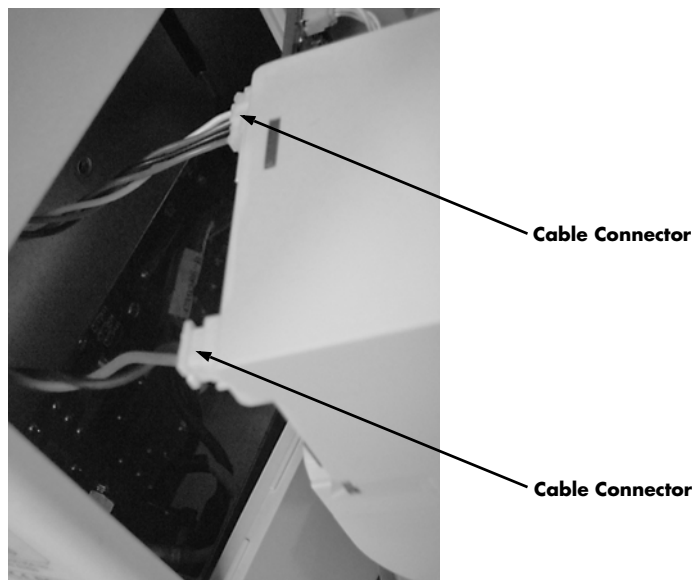

FIGURE 4-13 Unplug two (2) cable connectors.

4. If the device is not configured with an optional Temperature module, skip to Step 6.

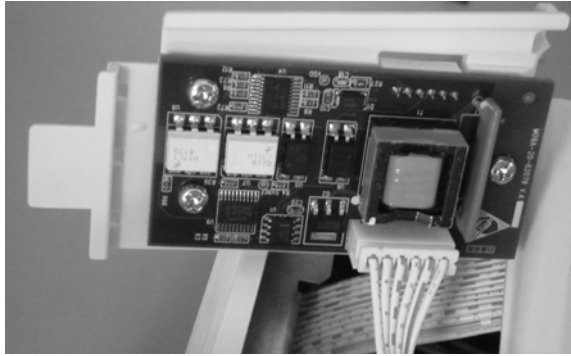**5.** If the device is configured with an optional Temperature module, remove the Temperature module board.

FIGURE 4-14 Remove optional temperature module board.

6. Remove the six (6) M3×6 cross-head screws (as shown in Figure 4-15).
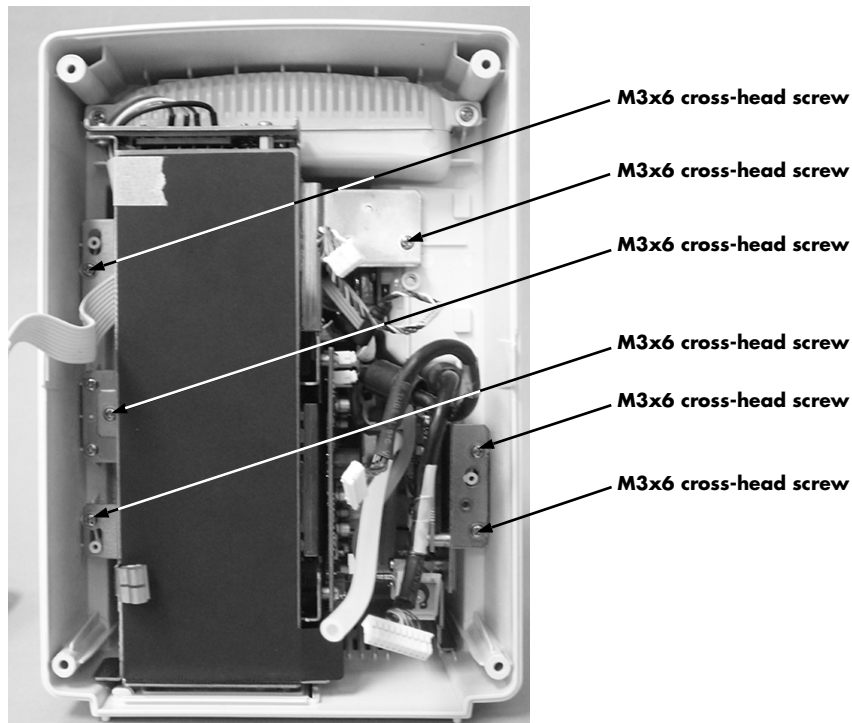
7. Take out the main rack assembly.

FIGURE 4-15 Remove six (6) M3x6 cross-head screws.

4.3.4   Removing NIBP Module

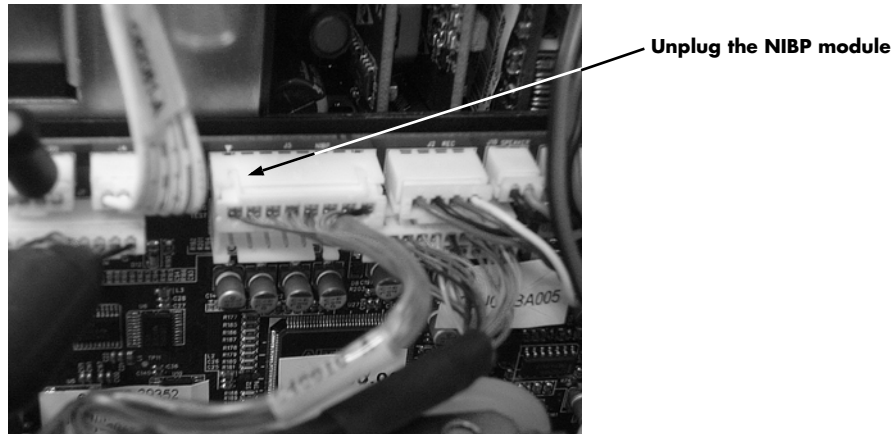**1.**   Unplug the NIBP module from the CPU Board (as shown in Figure 4-16).

Unplug the NIBP module

FIGURE 4-16 Unplug the NIBP module.

2.   Remove the three (3) M3×6 cross-head screws (as shown in Figure 4-17).

3.   Take out the NIBP rack.

M3x6 cross-head screw

M3x6 cross-head screw

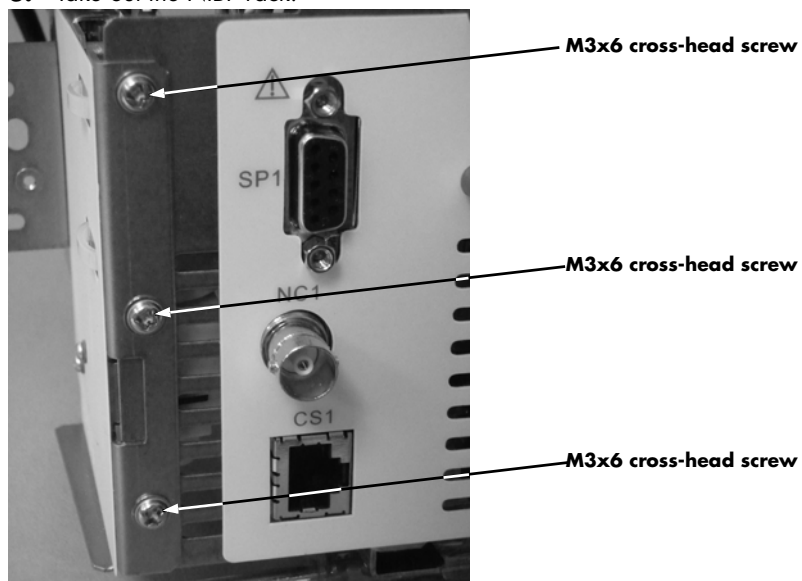M3x6 cross-head screw

FIGURE 4-17 Remove three (3) M3x6 cross-head screws.

4.3.5   Removing the Main (CPU) Board

1. Unplug the Main board power cable from the power supply as shown in FIGURE 4-18.

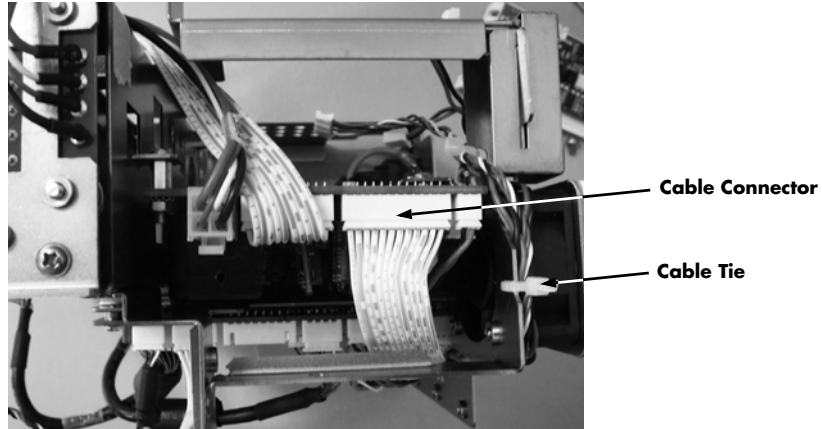**2.** Cut the tie wrap to the speaker as shown in FIGURE 4-18.

FIGURE 4-18 Unplug the Main board cable connector and cut one (1) tie wrap.

3. Unplug the speaker cable (J10) from the Main board (see FIGURE 4-19).

4. Unplug the recorder cable (J8) from the Main board (see FIGURE 4-19).

5. Take out the main board by removing the four (4) M3×6 cross-head screws (as shown in FIGURE 4-19).
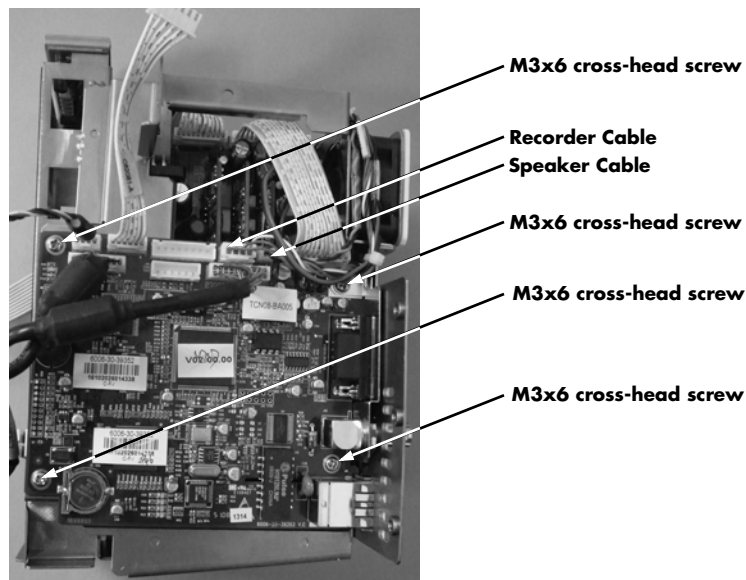

FIGURE 4-19 Unplug (2) two cable connectors and remove four (4) M3x6 cross-head screws.

4.3.6   Removing the Power Board

1.   Unplug the battery connector cable.

2.   Remove the power board by removing the three (3) M3×6 cross-head screws (as shown in Figure 4-20).

3.   Unplug the remaining cable connectors (fan, AC mains connector, and Main (CPU) board) from the Power board.
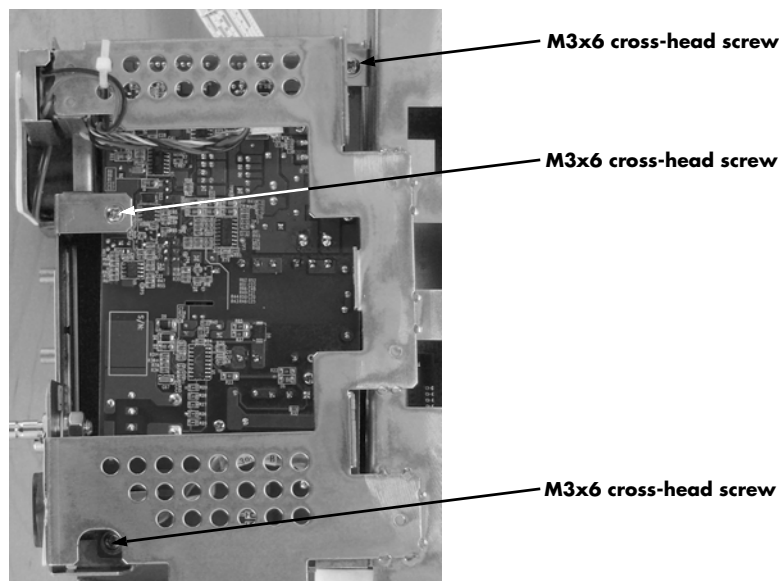

FIGURE 4-20 Remove three (3) M3x6 cross-head screws.

4.3.7   Removing the Battery Connector Assembly

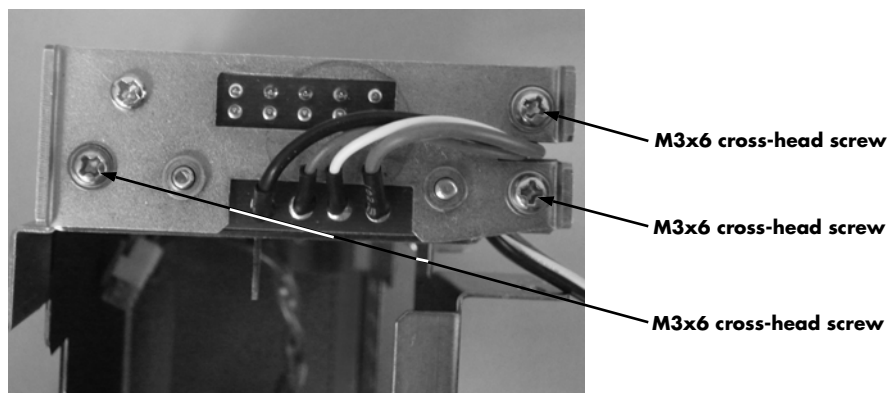Remove the three (3) M3×6 cross-head screws (as shown in Figure 4-21).

FIGURE 4-21 Remove three (3) M3x6 cross-head screws.

4.3.8 Removing the Fan and Speaker

1. Cut the cable ties on the fan, speaker, and the main rack.

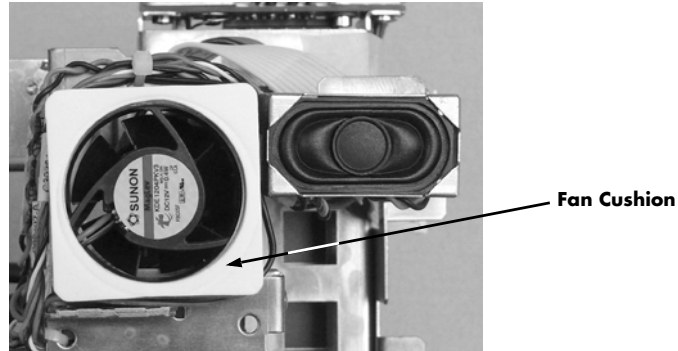**2.** Remove the fan cushion (as shown in Figure 4-22).

FIGURE 4-22 Remove the Fan Cushion.

3. Remove the three (3) M3×25 cross-head screws (as shown in Figure 4-23).

4. Remove the fan.

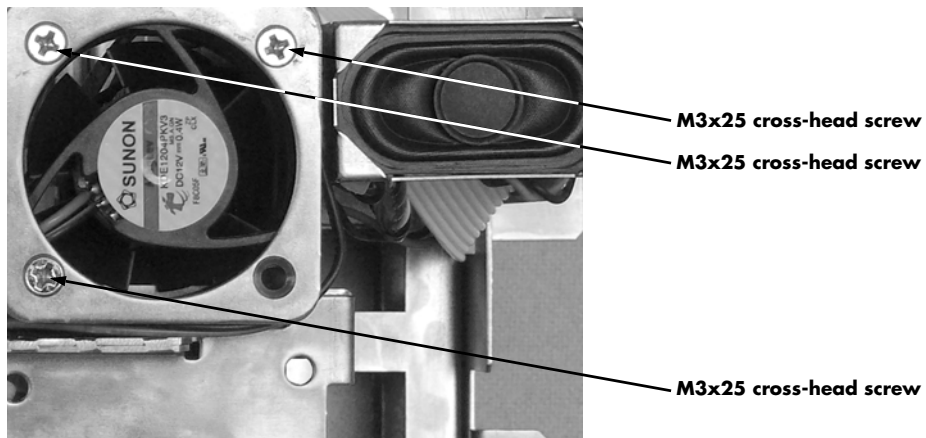**5.** Remove the speaker from the main rack.

FIGURE 4-23 Remove Three (3) M3x25 cross-head screws.

4.3.9   Removing the Power Socket

1. Remove the retaining nut securing the grounding post (as shown in Figure 4-24).
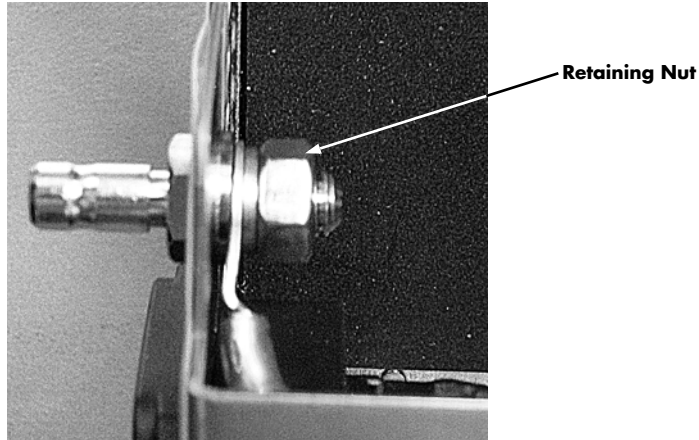2. Remove the grounding terminal.

FIGURE 4-24 Remove the retaining nut.

3. Remove the two (2) M3×8 cross-head screws (as shown in Figure 4-25).
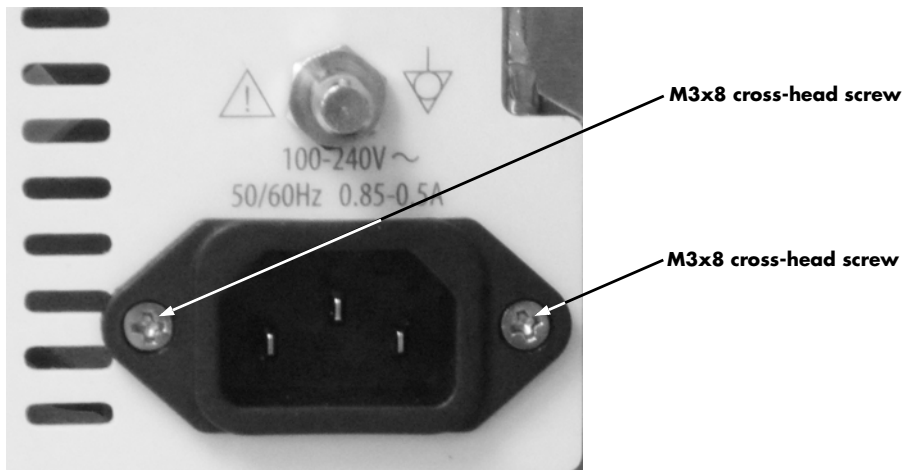4. Remove the power socket.

FIGURE 4-25 Remove Two (2) M3x8 cross-head screws.

4.3.10   Disassembling the Temperature Module

1. Remove the two (2) M3×6 cross-head screws (as shown in Figure 4-26).
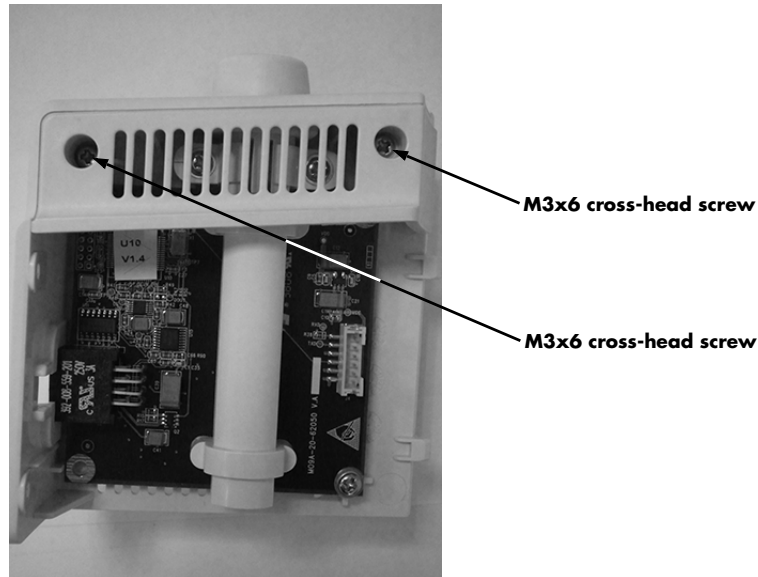
2. Take the cover plate off.

M3x6 cross-head screw

M3x6 cross-head screw

FIGURE 4-26 Remove Two (2) M3x6 cross-head screws

3. Remove the three (3) M3×6 cross-head screws (as shown in Figure 4-27).

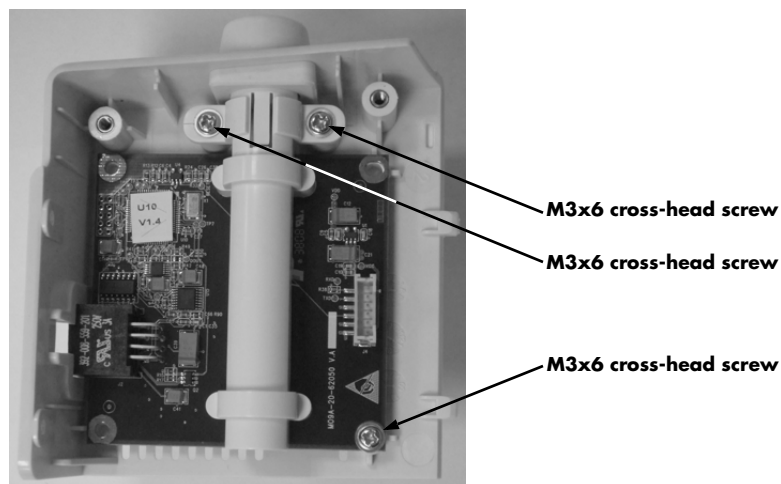**4.** Remove the Temperature module board.

5. Remove the mylar sleeve.

M3x6 cross-head screw

M3x6 cross-head screw

M3x6 cross-head screw

FIGURE 4-27 Remove three (3) M3x6 cross-head screws.

4.3.11   Disassembling SpO$_2$ Modules

4.3.11.1   Disassembling a DPM SpO$_2$ module

1. Remove the M3×6 cross-head screw (as shown in FIGURE 4-28).
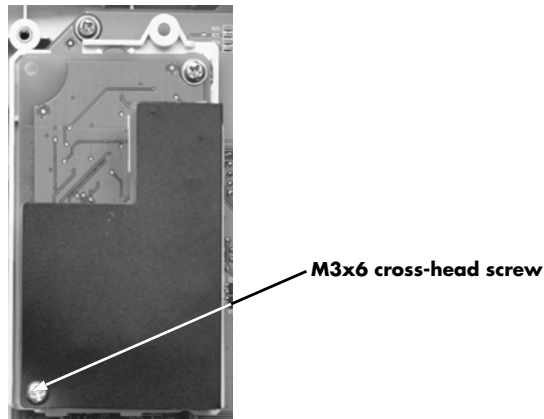

M3x6 cross-head screw

FIGURE 4-28 Remove one M3 X 6 cross-head screw

2. Remove the SpO$_2$ board. (as shown in FIGURE 4-29)
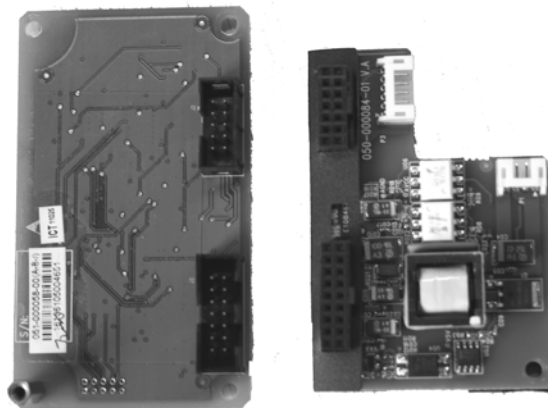

FIGURE 4-29 DPM SpO$_2$ board and isolated power supply.

4.3.11.2   Disassembling a Masimo SpO$_2$ module

1. Remove the isolation power board by removing the three (3) M3 nuts (as shown in Figure 4-30).

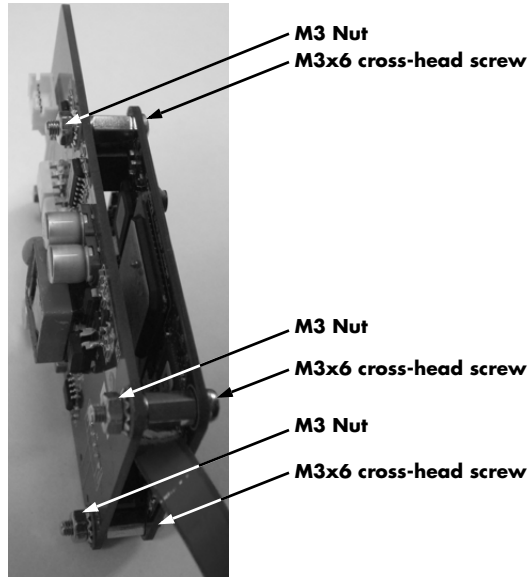**2.** Remove the three (3) M3×6 cross-head screws.

FIGURE 4-30 Remove three (3) M3 nuts, and three (3) M3x6 cross-head screws.

3. Remove the SpO$_2$ board.

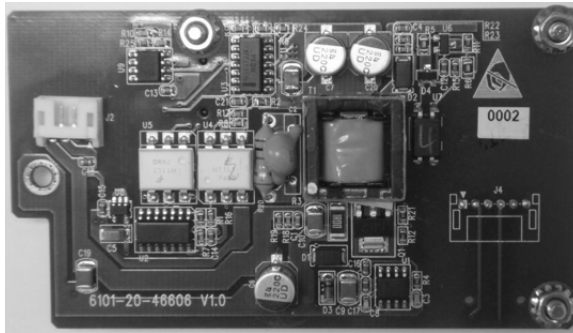**FIGURE 4-31** Masimo SpO$_2$ board and isolated power supply.

FIGURE 4-32 Masimo isolated power supply.

4.3.11.3 Disassembling a Nellcor SpO$_2$ module

1. Remove the M3×6 cross-head screw (as shown in FIGURE 4-33) to separate the SpO$_2$ module from its isolated power supply (as shown in FIGURE 4-34).
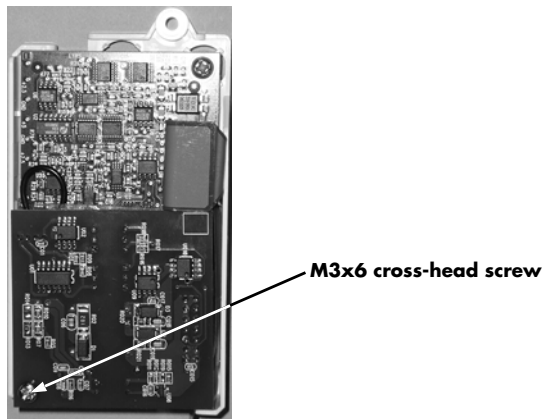

M3x6 cross-head screw

FIGURE 4-33 Remove one (1) M3x6 cross-head screw.
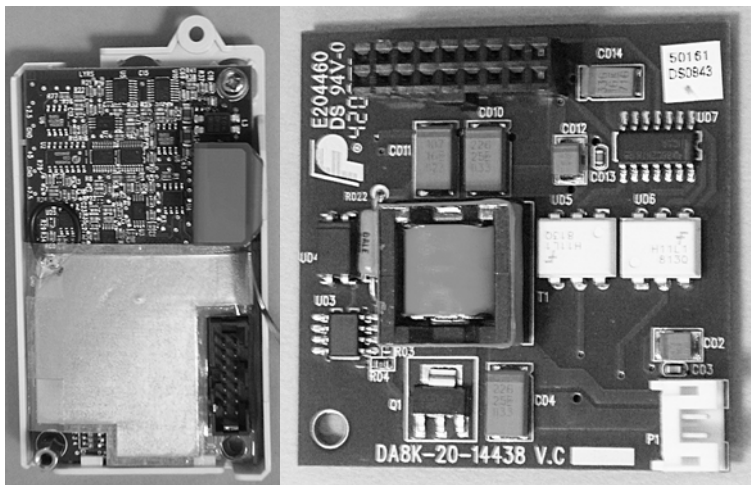

FIGURE 4-34 Nellcor SpO$_2$ board and isolated power supply.

4.3.12   Disassembling the NIBP Module

4.3.12.1   Removing the NIBP Pump

1. Unplug the pump cable connector from the NIBP board.
2. Disconnect the tubing.
3. Cut the two tie wraps holding the NIBP pump as shown in FIGURE 4-35.
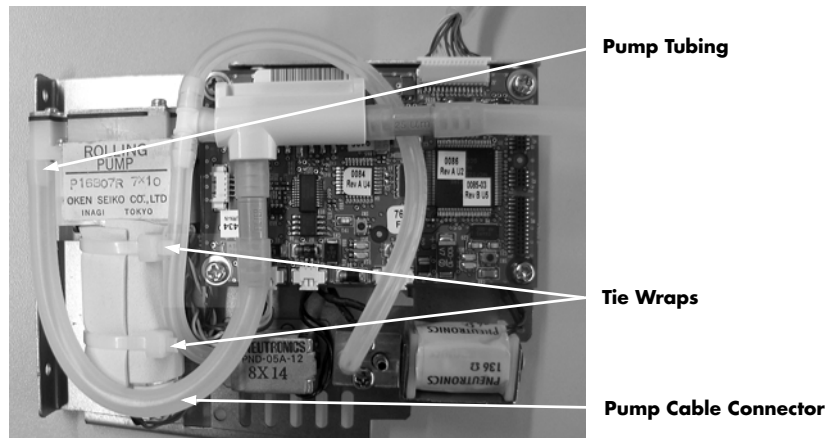4. Remove the pump.

FIGURE 4-35 Cut two (2) tie wraps.

4.3.12.2   Removing the NIBP Dump Valve

1. Unplug the dump valve cable connector from the NIBP board.
2. Disconnect the tubing.
3. Remove the two (2) screws on the bottom of the NIBP rack as shown in FIGURE 4-36.
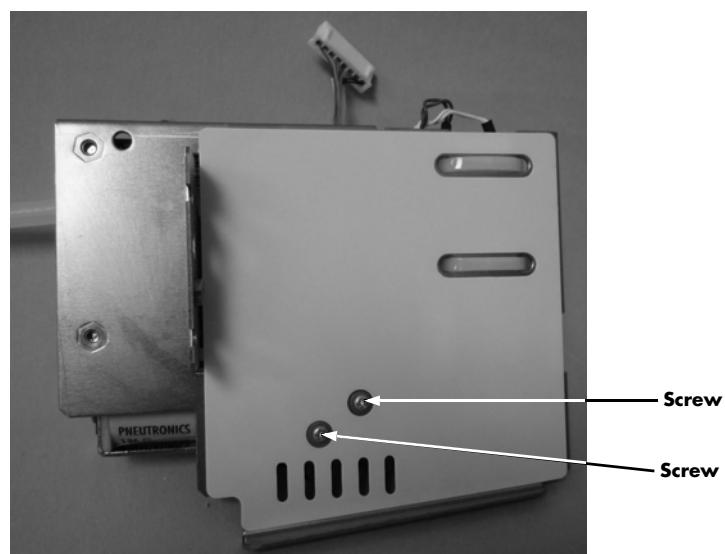4. Remove the dump valve.

FIGURE 4-36 Remove two (2) screws.

4.3.12.3   Removing the NIBP Bleed Valve

1. Unplug the bleed valve cable connector from the NIBP board.

2. Disconnect the tubing.
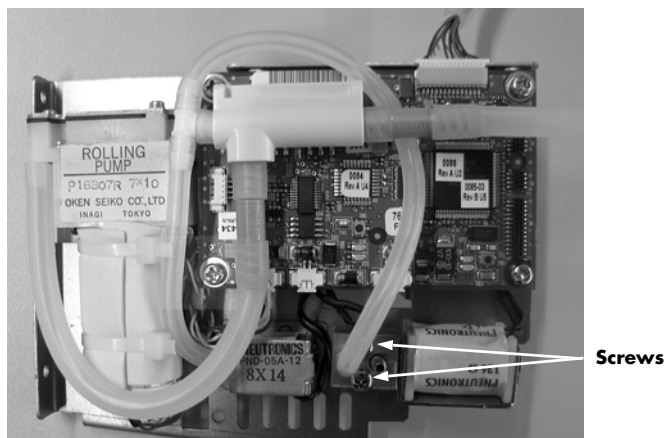
3. Remove the two (2) screws as shown in FIGURE 4-37.

4. Remove the bleed valve.

FIGURE 4-37 Remove two (2) screws.