

5

Disassembly procedure

Procedures overview

These procedures cover monitor disassembly and board removal. Unless otherwise noted, the assembly procedure is the reverse of the disassembly procedure.



WARNING Electrical shock hazard. The battery can deliver currents sufficient to cause serious personal injury and to damage the monitor. When opening the monitor for any reason, always remove and disconnect the battery immediately, before proceeding with disassembly.



Caution Do all repairs at a static-protected station.

Caution Observe recommended screw torque specifications, especially with screws that secure directly into plastic standoffs.

Screws



Caution To avoid mismatching screws and holes, keep the screws for each piece with that piece as you remove modules, circuit assemblies, and other components.

Following are recommended torque specs for all screws:

Qty	Location	Part Number	Type	Size/length	Torque
4	Battery Door	620-0399-00	Machine	#4-40, 5/16"	4 lbf/in.
3	Case	620-0399-00	Machine	#4-40, 5/16"	4 lbf/in.
5	Display Board	620-0393-00	Thread-forming	#4-20, 5/16"	4 lbf/in.
4	Main Board	620-0393-00	Thread-forming	#4-20, 5/16"	4 lbf/in.
4	NIBP Board	620-0393-00	Thread-forming	#4-20, 5/16"	4 lbf/in.
4	SpO ₂ Panel	620-0393-00	Thread-forming	#4-20, 5/16"	4 lbf/in.
2	SpO ₂ Board	620-0047-00	Machine	#6-32, 1/4"	4 lbf/in.
2	Printer	620-0165-00	Thread-forming	#2-28, 5/16"	3 lbf/in.
1	Printer Board	620-0165-00	Thread-forming	#2-28, 5/16"	3 lbf/in.
2	Printer door/roller	620-0091-00	Thread-forming	#2-32, 3/16"	3 lbf/in.
2	Temp. Module	620-0394-00	Machine	#4-40, 3/4"	4 lbf/in.
4	Temp. Panel	620-0393-00	Thread-forming	#4-20, 5/16"	4 lbf/in.
4	Temp Board	620-0393-00	Thread-forming	#4-20, 5/16"	4 lbf/in.

Connectors



Caution All connectors are keyed or coded to facilitate proper connection. Take care to correctly align all connector halves before attempting to connect them.

Connector types

The procedures described below require you to disconnect and reconnect ZIF (zero-insertion force) connectors, squeeze-release connectors, and pressure connectors.

Zero-insertion force (ZIF) flex-cable connectors

ZIF flex-cable connectors include J1 on the display board, CN2 on the printer board, J1 on the temperature board, and J5 and J12 on the main board.

ZIF connectors use a sliding outer piece that latches and unlatches to secure and release the flex cable.

- To release a ZIF cable, slide the latching piece of the connector away from the connector body and toward the cable; the cable can then be removed without effort.
- To connect a ZIF cable, slide the latching piece of the connector body toward the cable, insert the flex cable easily into the connector, and slide the latching piece back toward the connector body until it clicks into place.



Caution Do not attempt to remove a flex cable until the ZIF latch has been opened.

Side-release connectors

Side-release connectors include J7 and J9 on the main board and J2 on the NIBP board.

To use side-release connectors, squeeze the sides of the connectors to insert or remove the cables.

Pressure connectors

Pressure connectors include CN1 and CN3 on the printer board; J2, J3, J4, J6, J8, J10, and J11 on the main board; J1 and J2 on the SpO₂ board.

To use pressure connectors, grasp each mating connector half and pull the halves apart or insert one half into the other.



Caution Never attempt to disconnect cables by pulling on the wires. Always disconnect cables by grasping and pulling only on the connector halves.

Main board connectors

For the best results when disconnecting cables from the main board, disconnect the upper cables first and work your way to the bottom of the board, in approximately the following order:

Note See the illustration in [“Main board reassembly notes”](#) on page 64.

Order of disconnection					
Main-board Connector		Connects With	Main-board Connector		Connects With
1	J2	External DC Input	7	J8	* Printer data – CN3
2	J1	External RS-232	8	J10	* Printer power – CN1
3	J6	LCD	9	J3	Battery
4	J5	Display board – J1	10	J9	NIBP board
5	J12	* Temperature board – J1	11	J7	* SpO ₂ board – J2
6	J4	Nurse call connector	12	J11	Speaker

(* Denotes optional hardware.)

When reassembling the monitor, connect the cables in reverse order.

Display board connector

Connector	Connects With
J1	Main board – J5

Printer board connectors

Connector	Connects With
CN1	Main board – J10
CN2	Fujitsu printer
CN3	Main board – J8

SpO₂ board connectors

Connector	Connects With	Connector	Connects With
J1	SpO ₂ side panel	J2	Main board – J7

NIBP board connectors

Connector	Connects With	Connector	Connects With
J2	Main board – J9	J6	Pump

Temperature board connectors

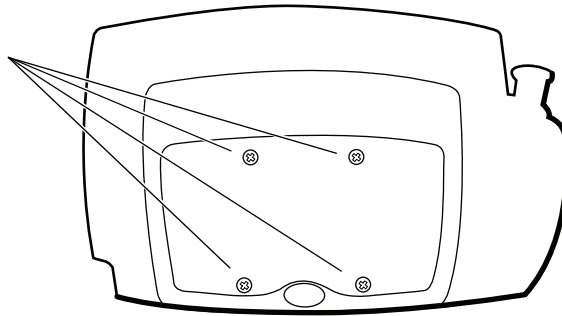
Connector	Connects With	Connector	Connects With
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J1	Main board – J12	J5	External Probe
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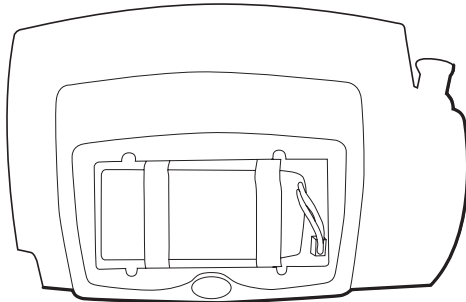
Remove and disconnect the battery

1. Remove the four screws securing the battery door.

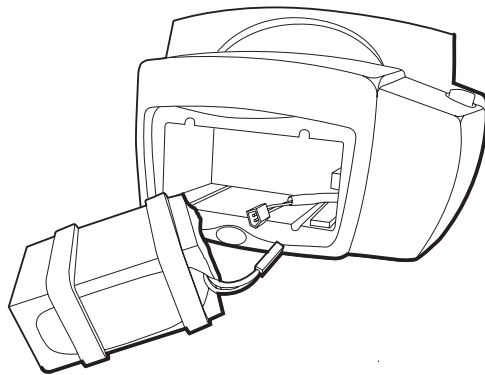
Four screws securing the battery door



2. Remove the battery door.

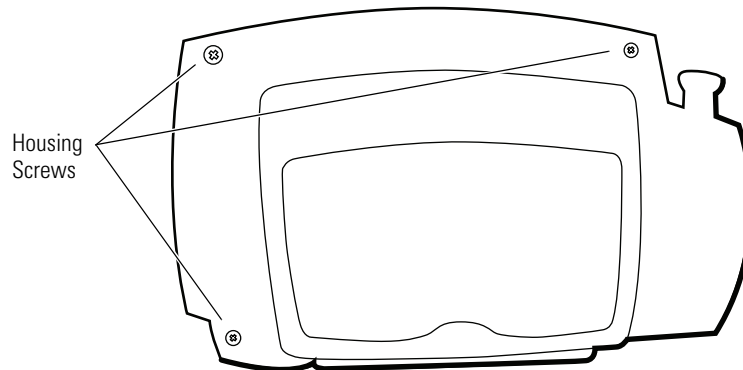


3. Slide the battery out of the battery compartment. This might require lightly shaking the monitor.
4. Disconnect the battery from the monitor.



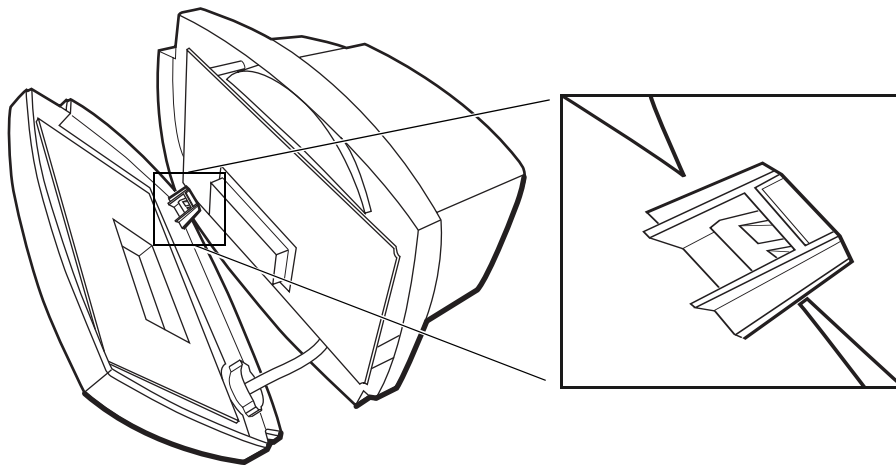
Separate the front and rear chassis

1. Remove the three screws securing the rear chassis.

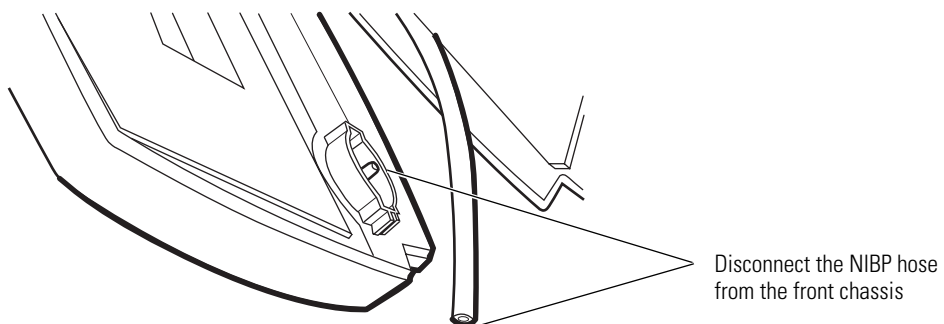


2. Place the unit upright, with the front of the unit facing you.
3. Tilt the top of the front chassis away from the rear chassis while lifting the front chassis, freeing the front chassis from the corner tab feature on the bottom left-hand corner of the rear chassis.

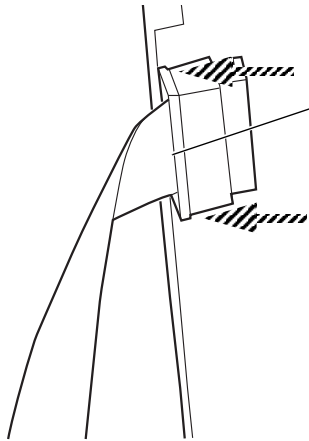
Note On reassembly, engage the tab and the tab receiver before attempting to align and close the chassis halves.



4. Disconnect the NIBP hose from the connector on the front chassis.



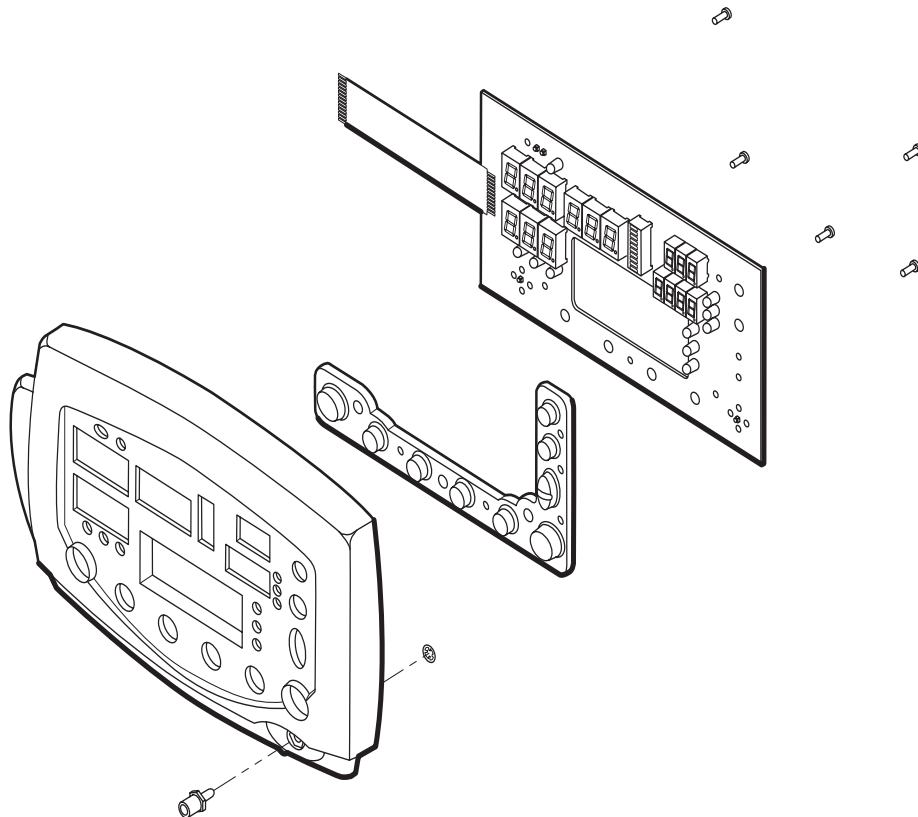
5. Disconnect the display-board flex cable (J5) from the main board.



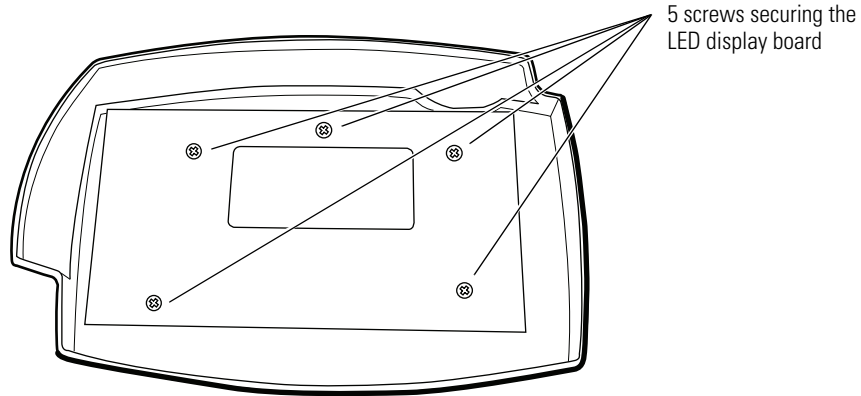
Disconnect the display-board flex cable from the main board (J5). Slide the outer piece of the connector toward the cable to release the cable; then slide the cable out of the connector.

Disassemble the front chassis assembly

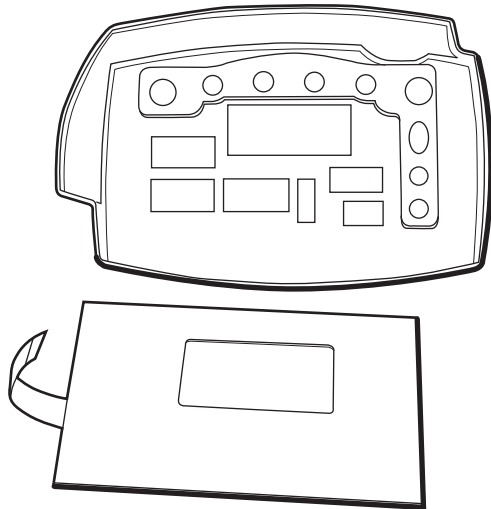
The front chassis assembly contains the display board, keypad, and NIBP air fitting.



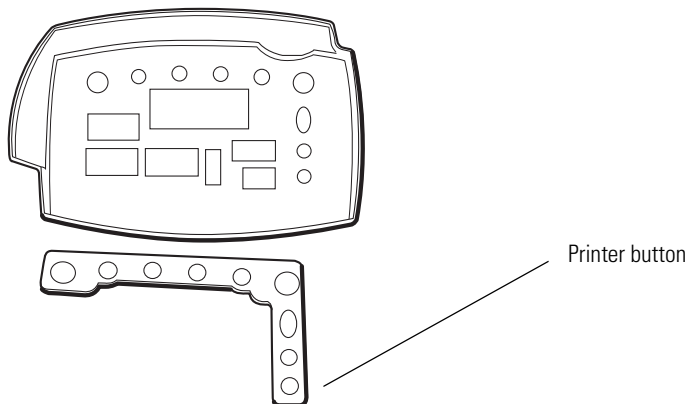
1. Remove the five screws securing the display board.




2. Lift out the display board.

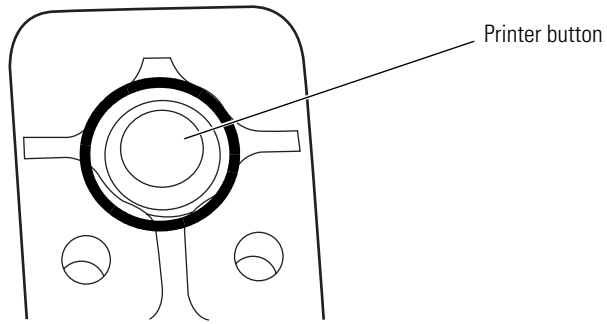


3. Remove the keypad.

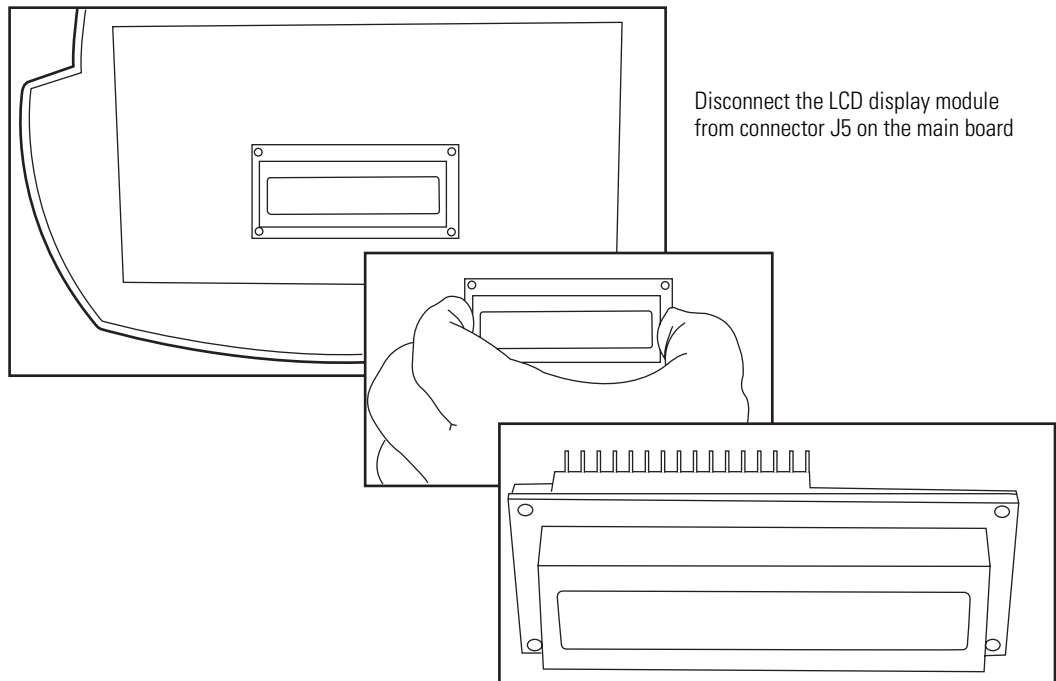


Reassembly notes

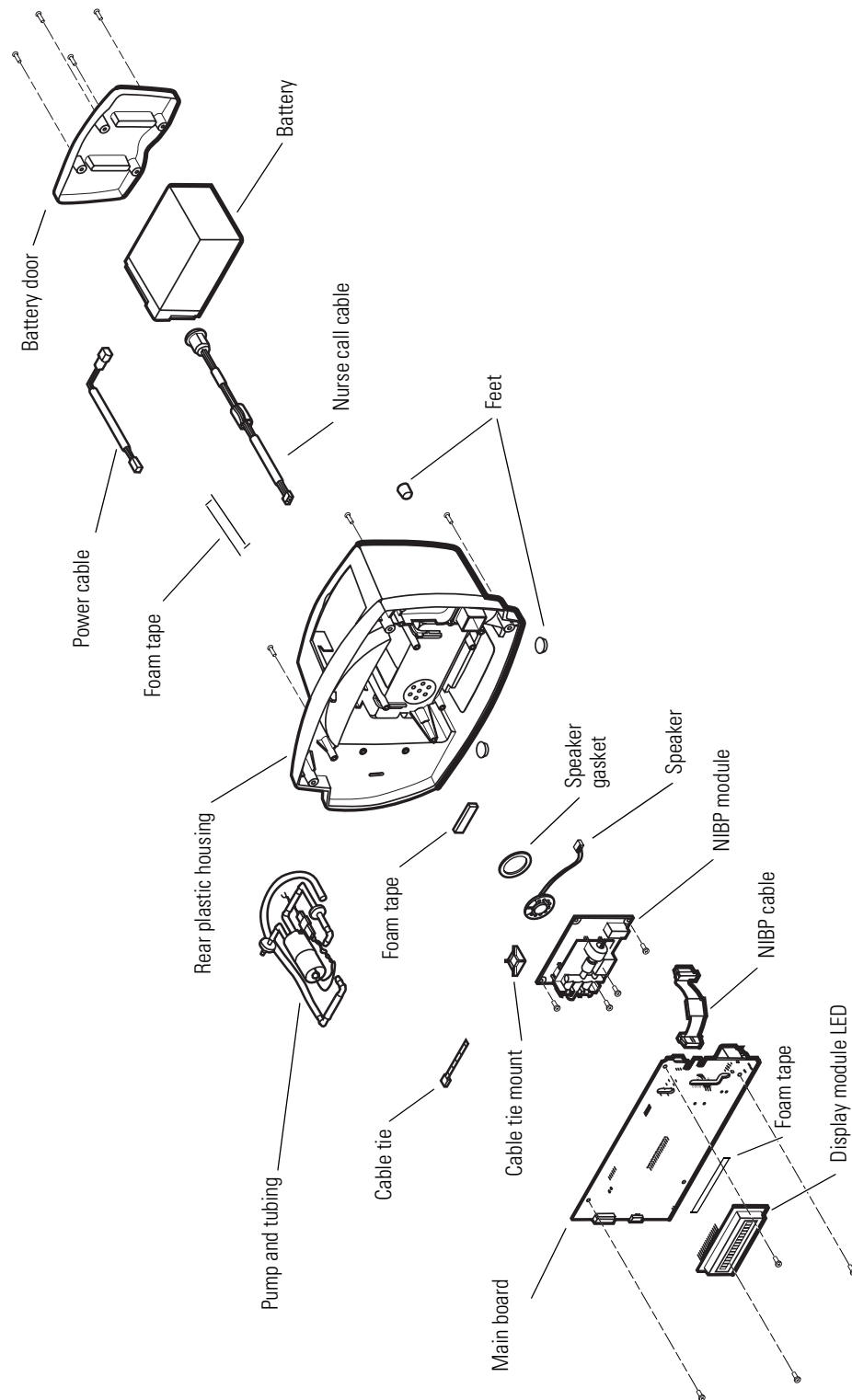
If you are replacing the keypad and your monitor does not include the thermal printer option, the Printer button  must be removed from the keypad before you reinstall the keypad. To remove the Printer button, cut the membrane connecting the button to the keypad. (Note the circled area in the illustration below.)



Remove the LCD display from the main board

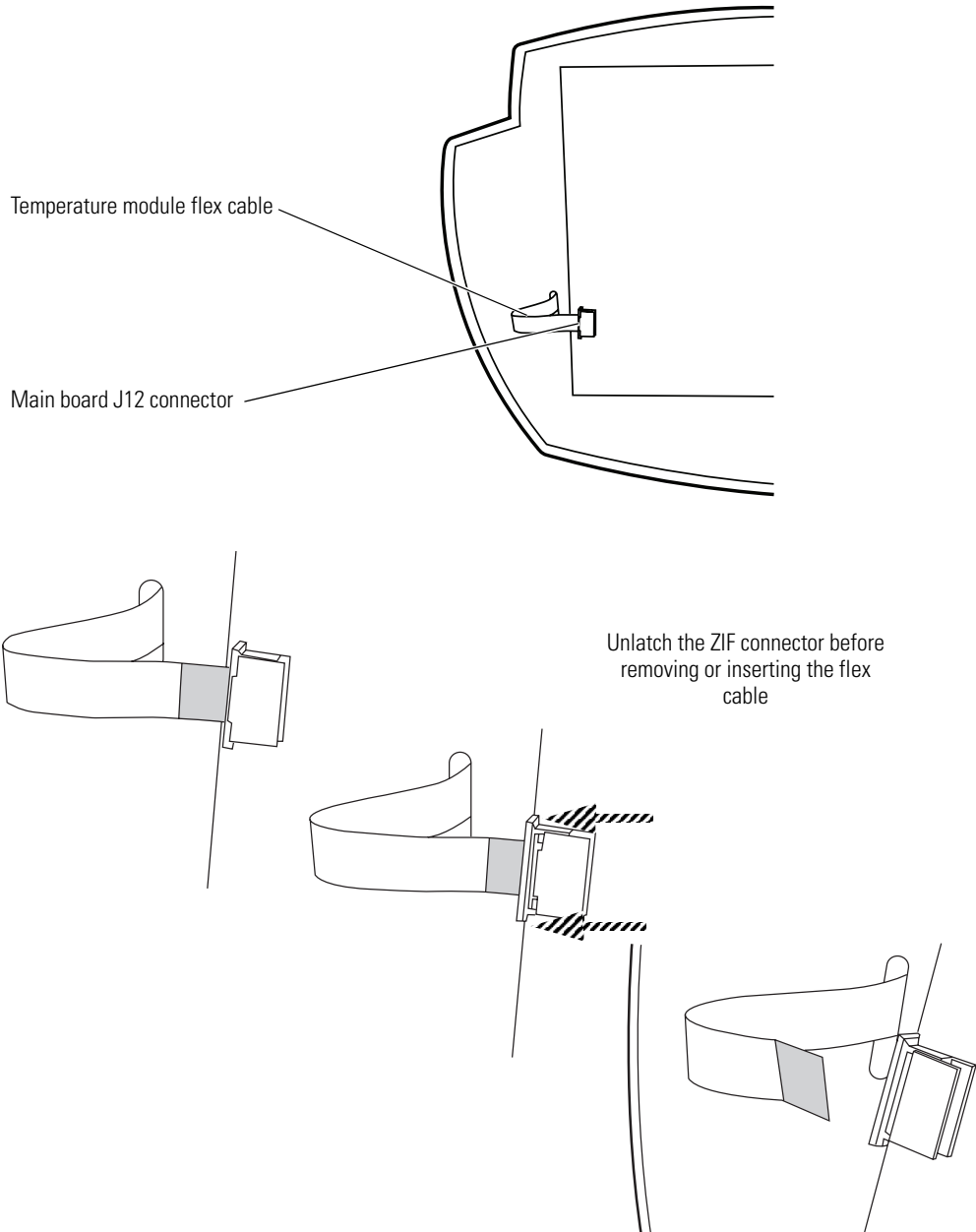


Disassemble the rear chassis assembly

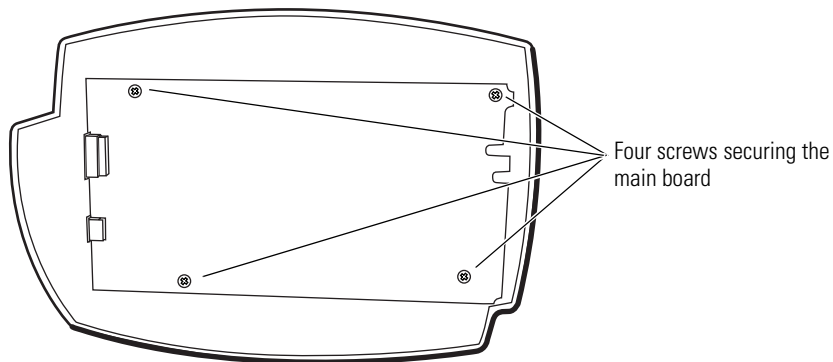


Remove the main board

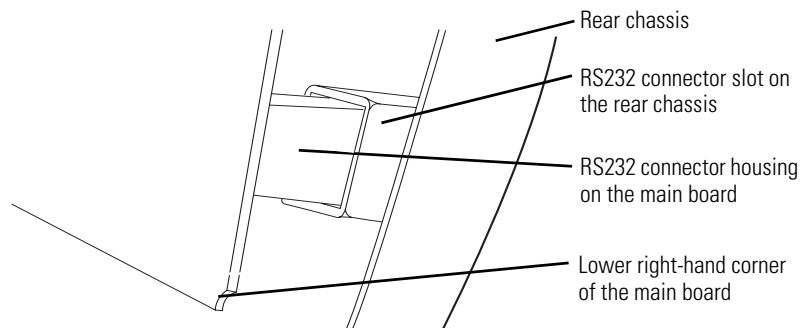
1. Disconnect the temperature module flex cable from J12 on the main board.



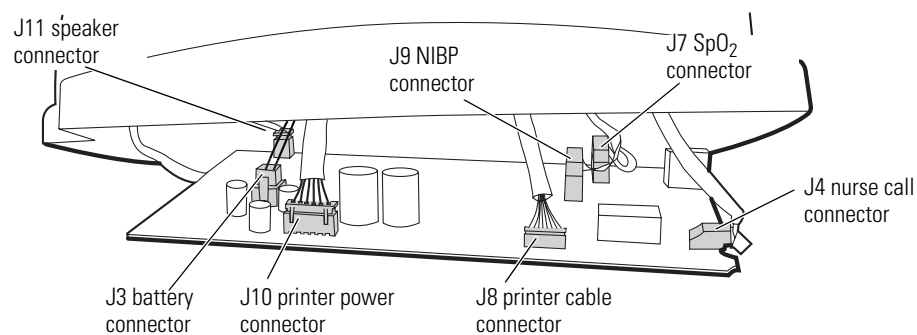
2. Remove the four screws securing the main board to the rear chassis.



3. Pull the lower right corner of the main board away from the rear chassis, just far enough to free the RS232 connector housing on the main board from the RS232 connector slot on the rear chassis.



4. Carefully tip the upper edge of the main board away from the rear chassis, far enough to access the uppermost connectors on the component side of the board.



5. For best results, disconnect the uppermost cables first and work your way to the bottom of the main board. For a monitor configured with all options, the approximate order of disconnection is as follows:

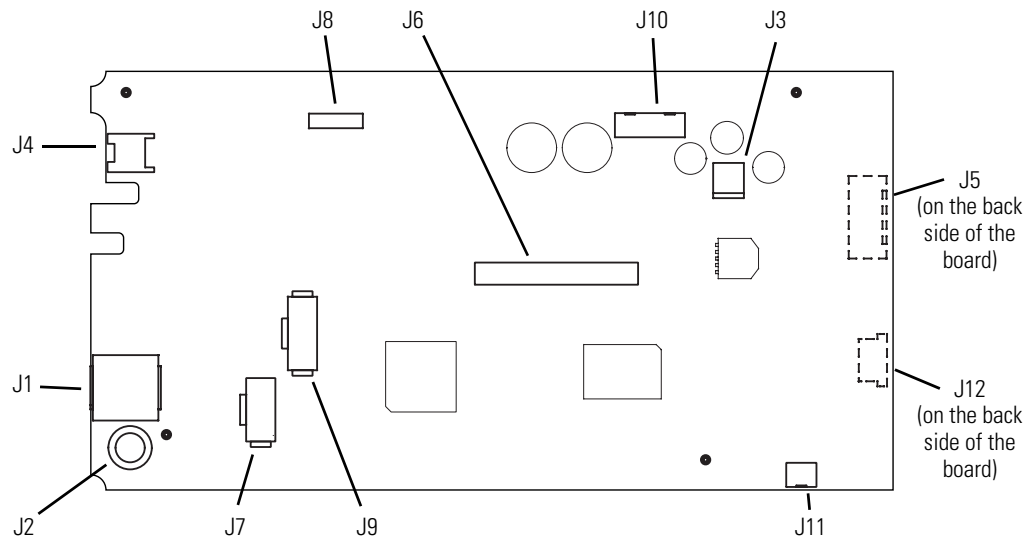
Note Refer also to the drawing of the main board in "[Main board reassembly notes](#)" on page 64.

Order of disconnection		
	Main-board Connector	Connects With
1	J4	Nurse call connector
2	J8	* Printer data – CN3
3	J10	* Printer power – CN1
4	J3	Battery

	Main-board Connector	Connects With
5	J9	NIBP board
6	J7	* SpO ₂ board – J2
7	J11	Speaker

(* Denotes optional hardware.)

- Remove the main board.



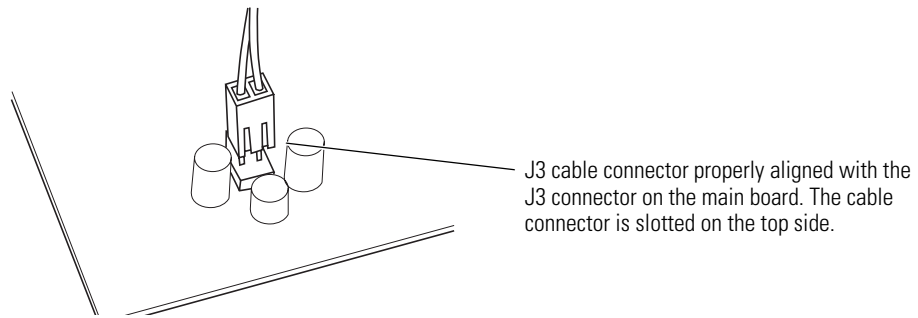
Main board reassembly notes



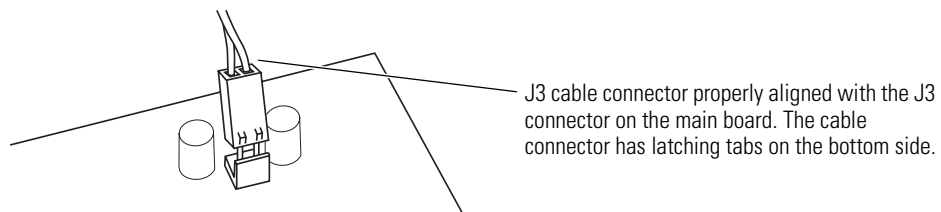
Caution Take care when reconnecting the main board power connector (J3). If the cable connector is connected improperly, the monitor could be damaged when power is applied.

Older main boards (version 031-0150-01)

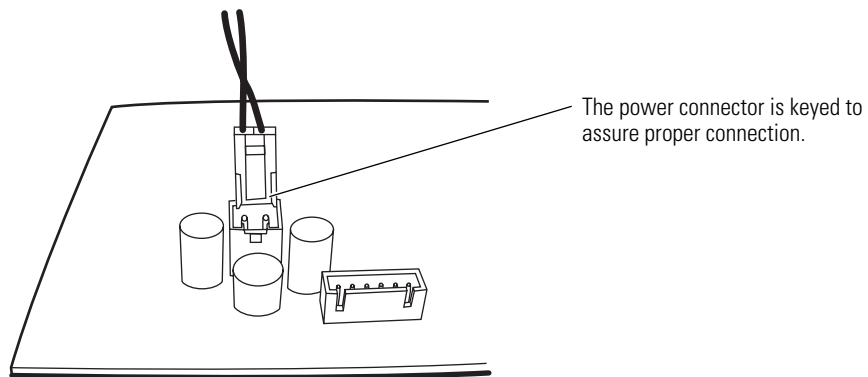
To reconnect the main board power connector (J3), be certain that the cable connector is oriented with the slotted side up...



...and the flanged side down.

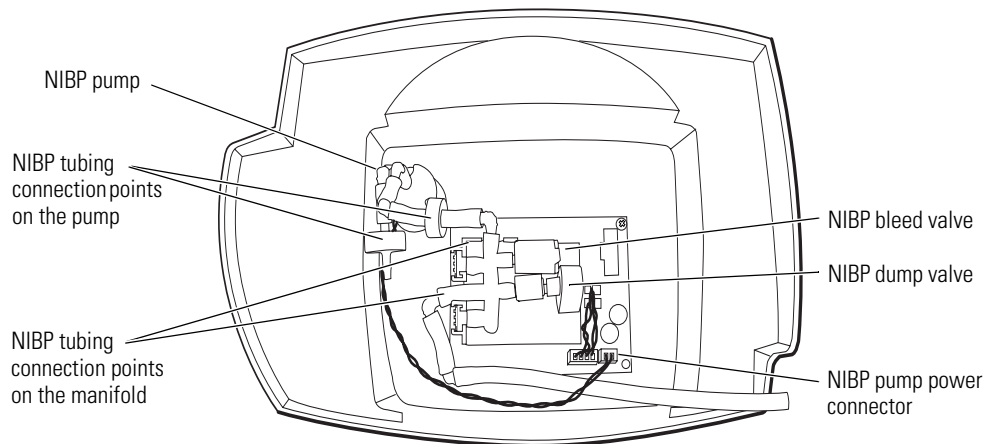


Newer main boards (versions 031-0150-03 and -04)



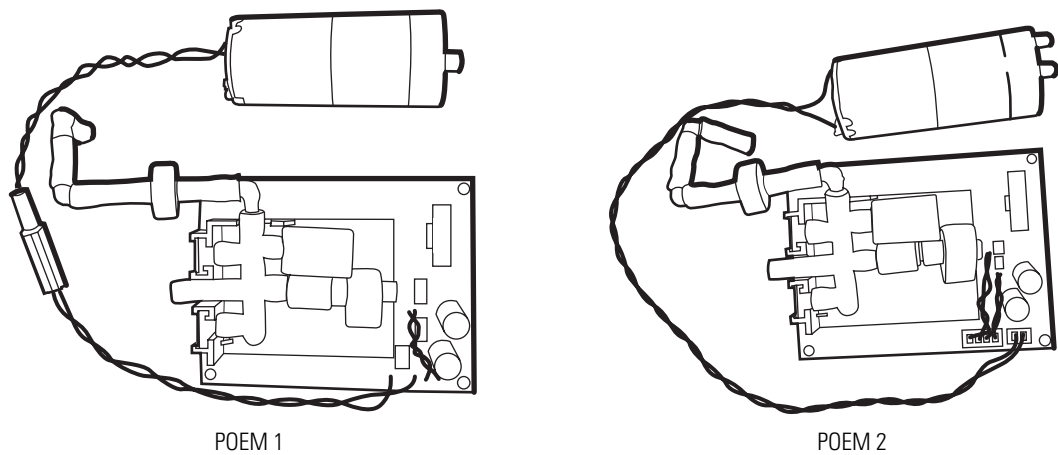
Disassemble and remove the NIBP assembly

1. Remove the tubing and the pump.
 - a. Disconnect the tubing from the manifold on the NIBP board.
 - b. Disconnect the two sections of tubing from the pump.
 - c. Disconnect the pump power from the NIBP board.



Note POEM 1 NIBP modules use a flying NIBP pump power connector that is soldered to the board.

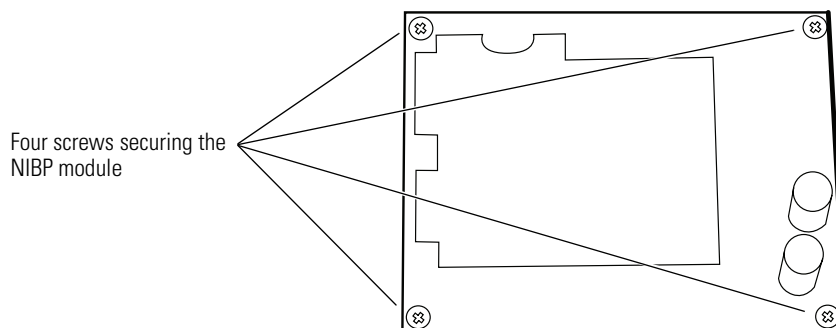
POEM 2 NIBP modules use a standard connector on the board.



- d. Cut the tie-wrap to free the pump from the pump holder.

Note If your monitor has a printer, it is much easier to remove and install the NIBP pump through the printer door, after the printer assembly is removed.

2. Remove the NIBP module.
 - a. Remove the four screws securing the NIBP module to the rear chassis.



- b. Remove the NIBP module.

NIBP reassembly notes

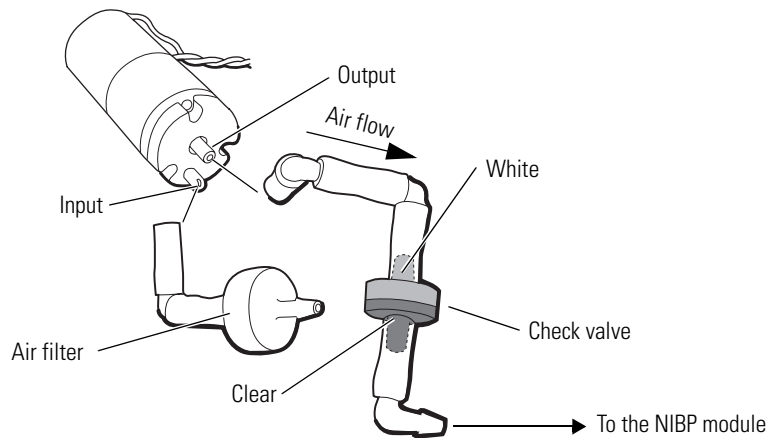


WARNING You must characterize the NIBP module whenever you replace any NIBP component (pump, tubing, air filter, check valve, or NIBP module).

WARNING If the NIBP module is not properly characterized, the pump could overinflate a neonatal cuff, which could be hazardous to neonatal patients. (See [“NIBP characterization”](#) on page 35.)

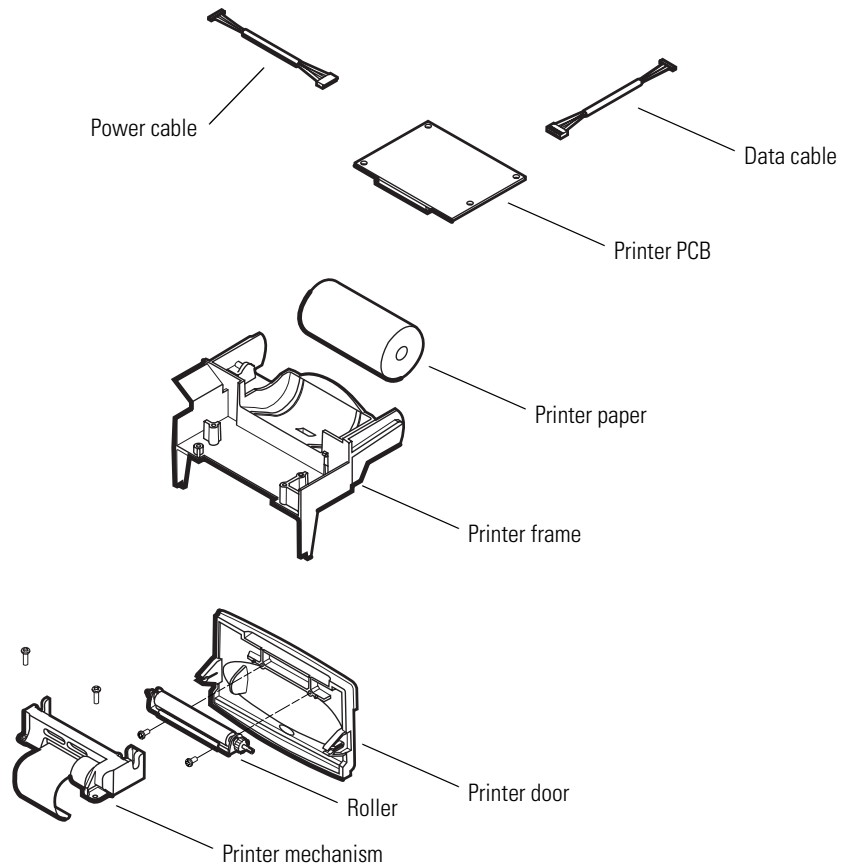
The shorter tubing section contains the air filter. It connects to the pump input/suction fitting on the outer edge of the front.

The longer tubing section contains the check valve. It connects to the pump pressure/output fitting in the center of the pump and to the manifold on the NIBP board.

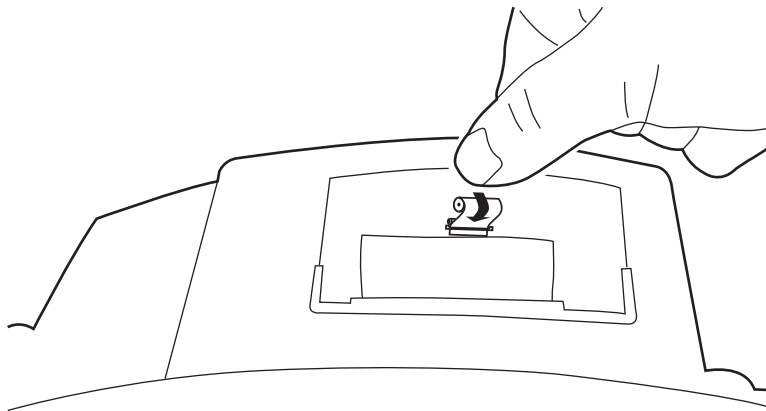


Caution Do not confuse the NIBP pump power cable connection with the speaker cable connection. On monitors with the newer NIBP module, the connectors are similar.

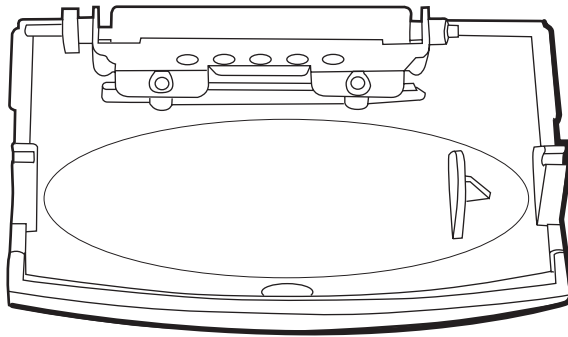
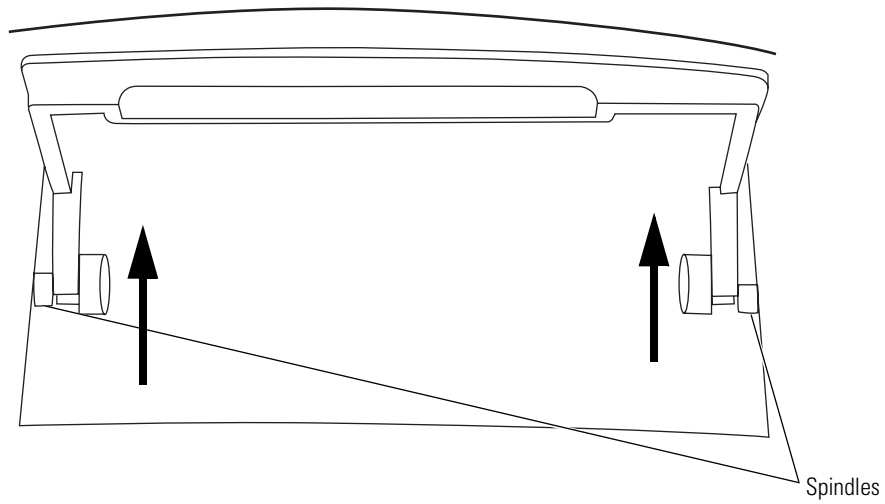
Remove and disassemble the printer assembly



1. Remove the printer door.
 - a. Open the printer door and remove the roll of printer paper.

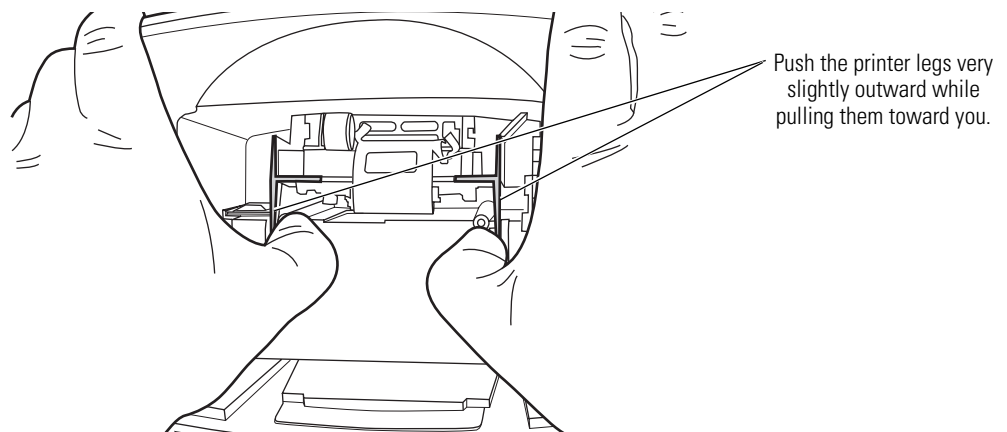


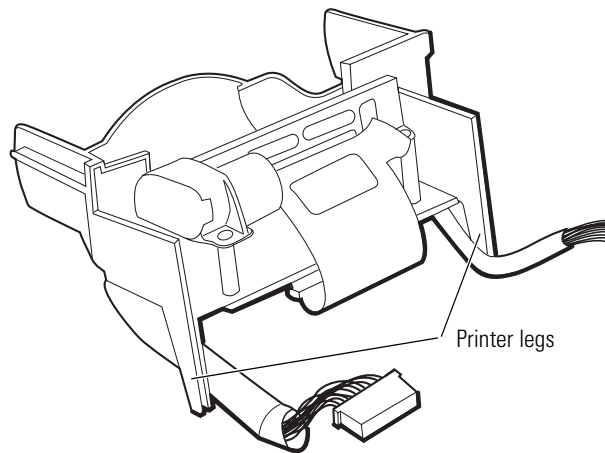
- b. Push the printer door toward the rear of the monitor until it snaps out of the two support spindles on the printer frame.



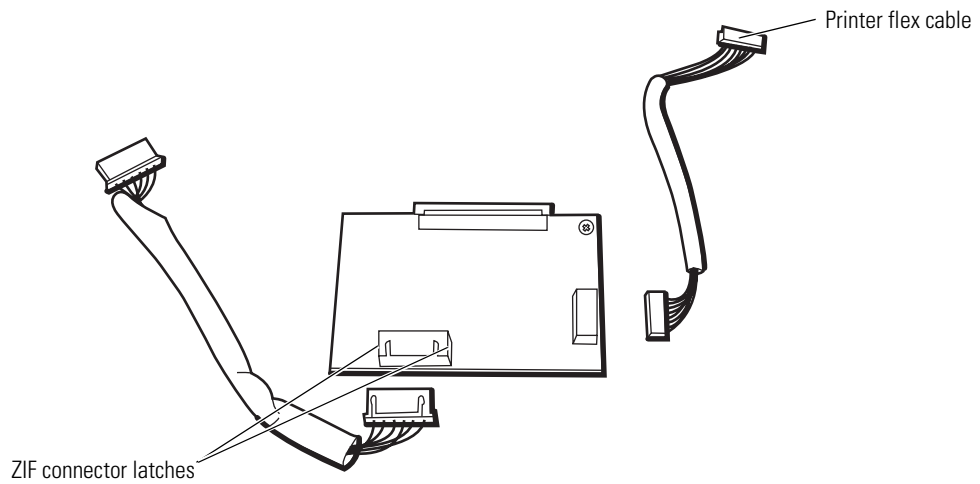
2. Remove the printer assembly.

Push the plastic legs of the printer assembly outward and pull the printer assembly forward to free it from the snap-in seating of the rear chassis bulkhead.

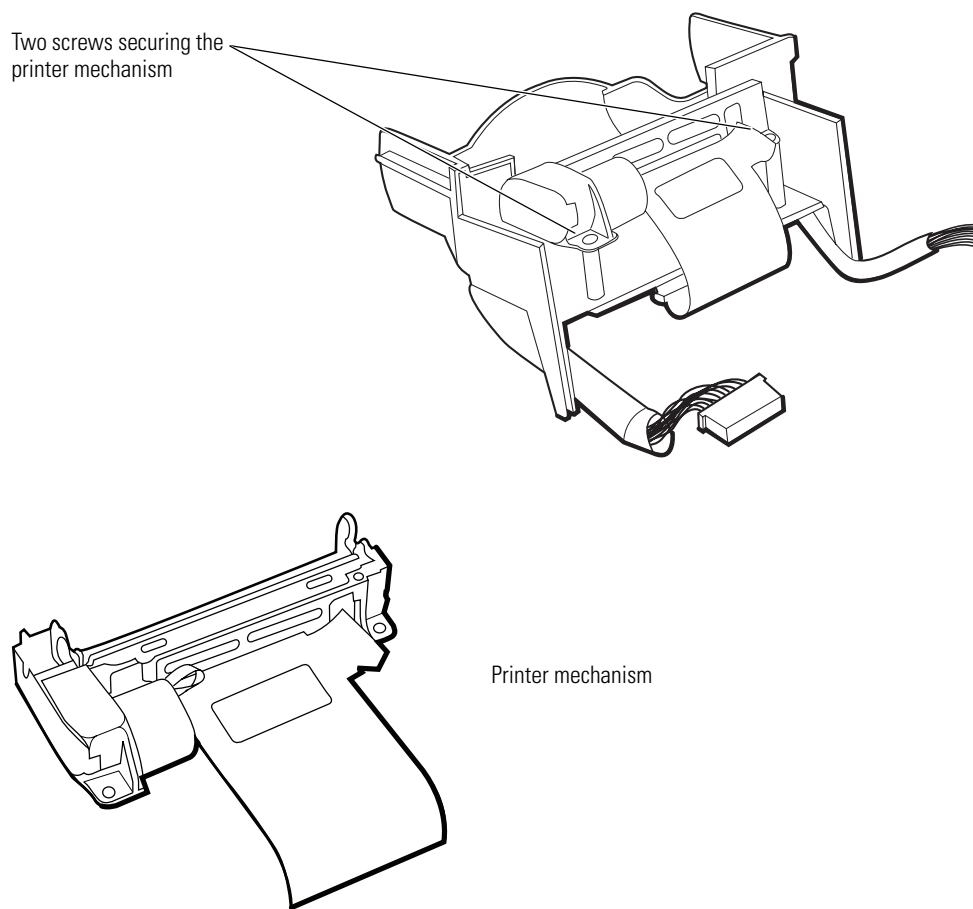




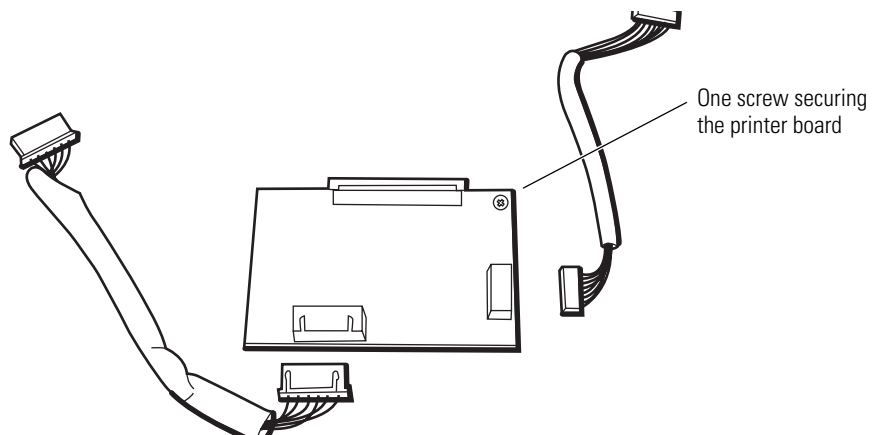
3. Remove the printer subassembly (printer mechanism, printer well, printer board, and cables).
 - a. Turn the printer assembly upside-down, and release the ZIF connector latches (CN2) on the printer board.



- b. Disconnect the printer flex cable from CN2 on the printer board.
 - c. Turn the printer assembly upright, remove the two screws securing the printer mechanism, and remove the printer mechanism.



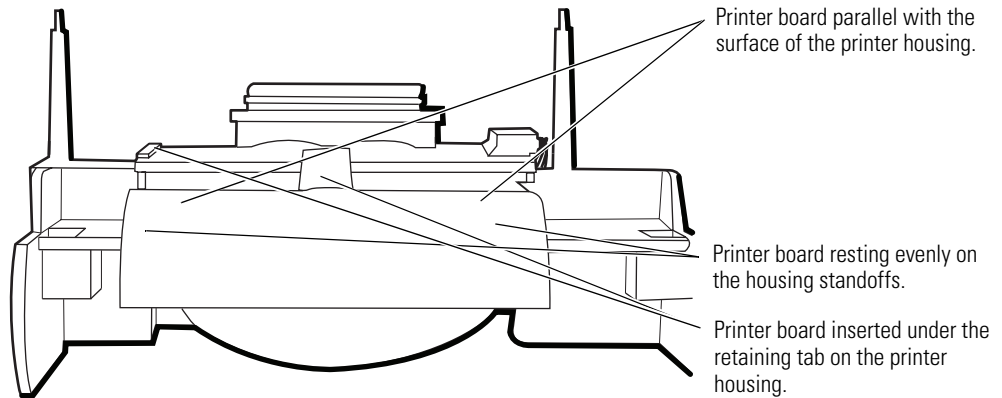
- d. Turn the printer assembly upside-down.
- e. Remove the screw securing the printer board to the printer frame.
- f. If you are replacing the printer board, remove the cables from connectors CN1 and CN3 for use on the replacement board.



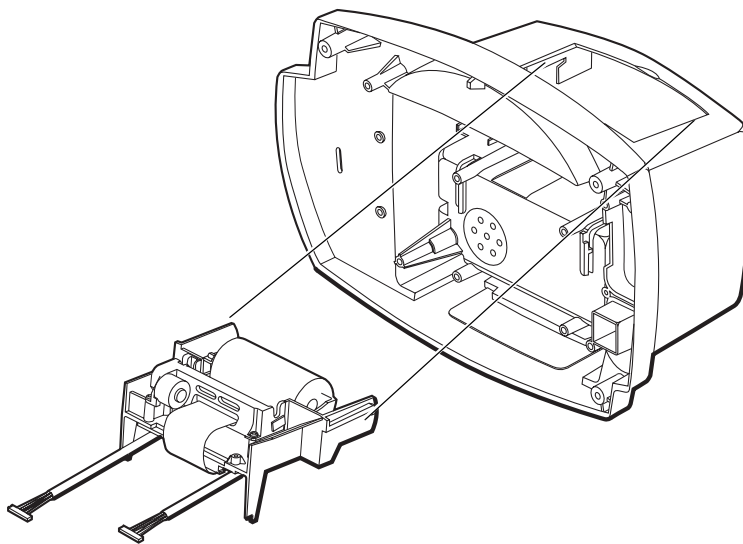
Printer reassembly notes

1. When connecting the printer assembly board to the plastic printer housing, be sure the printer board is seated flat on the housing, within the guide rails on either side of

the housing and with the front of the board secured under the tab on the front of the housing.




- To install the printer assembly into the cavity in the monitor, orient the printer assembly so that the side rails of the plastic frame are on the left and right and the two printer-frame "piano" legs are toward the front, extending downward from the assembly.



- Partially insert the printer frame assembly into the printer well in the rear chassis, aligning the rear side rails for insertion between the two slotted side latches on the top of the printer well of the rear chassis.
- Align the bottom of the two printer frame legs toward the top of the vertical bulkhead slots.
- Fully insert the printer assembly into the printer well until the side rails engage in the slotted side latches and the legs click into the vertical slots. Be sure that the white plastic shield on the housing rests on the top of the SpO₂ board.
- Install the printer door by inserting it in the printer slot, tilted slightly forward, and snapping the latches onto the printer frame spindles.

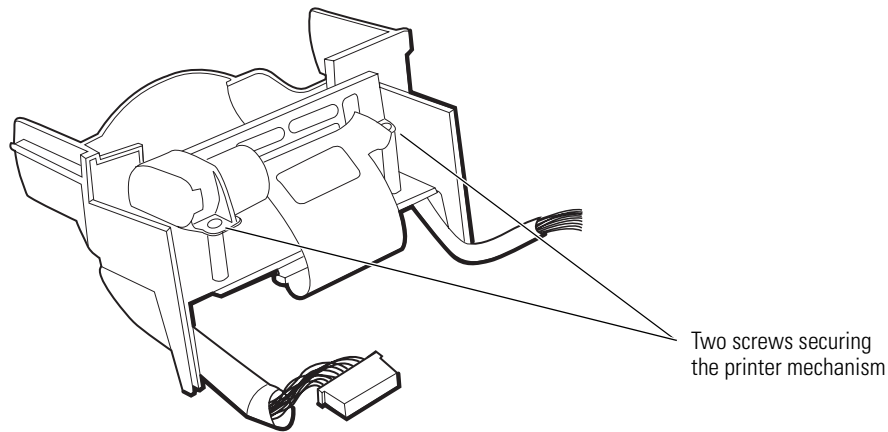
Paper guide and sensor reassembly

The operator, while replacing the printer paper, can inadvertently push the paper guide and sensor out of the chassis, rendering the printer inoperable.

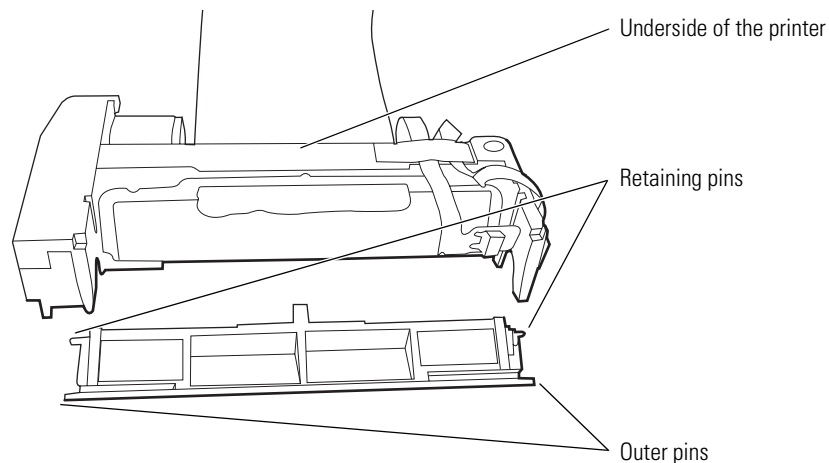
 **Caution** Do not disassemble the paper guide if it is properly attached to the printer chassis. Improper disassembly of the paper guide can damage it.

To reassemble the paper guide and the sensor

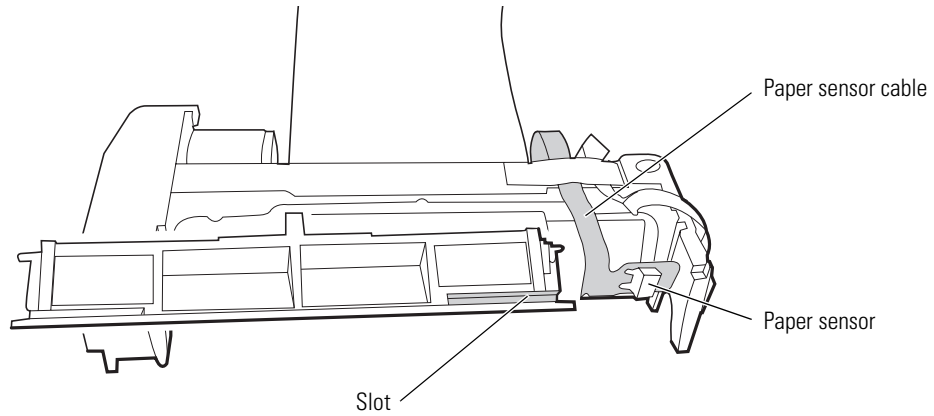
1. Remove the two screws securing the printer mechanism to the plastic printer frame and remove the printer.



2. See whether the retaining pins or the outer pins on the ends of the black plastic paper guide are bent or broken.



- If the pins are broken, the printer must be replaced.
 - If the pins are bent, you might be able to bend them back into position.
3. Slide the cable and the paper sensor into the slot on the end of the paper guide until the paper sensor and the edge of the cable are completely inside the paper guide.



When properly aligned, the paper sensor is visible through the hole in the top of the paper guide. (Not shown.)

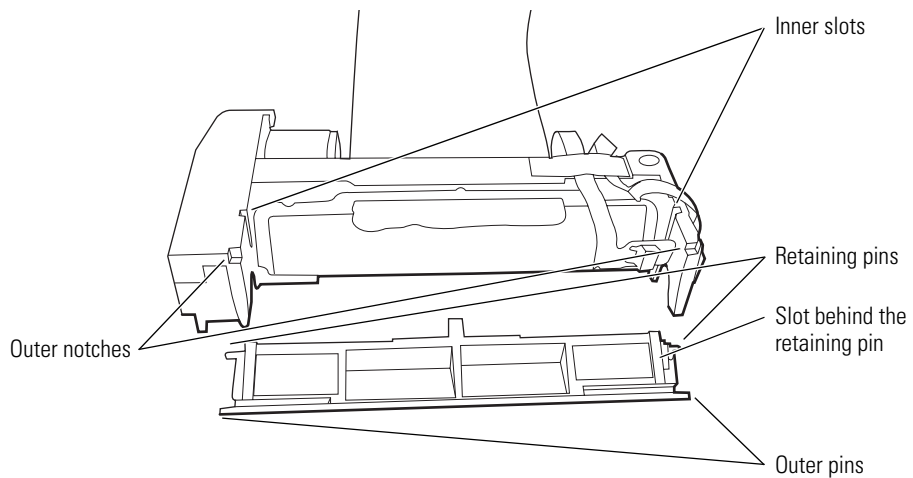
4. Position the outer pins in the outer notches of the printer chassis, with the retaining pins just above the inner slots of the chassis.
5. Rotate the paper guide such that the retaining pins slide into the inner slots and snap into place.

The bottom of the paper guide is now flush with the printer mechanism.

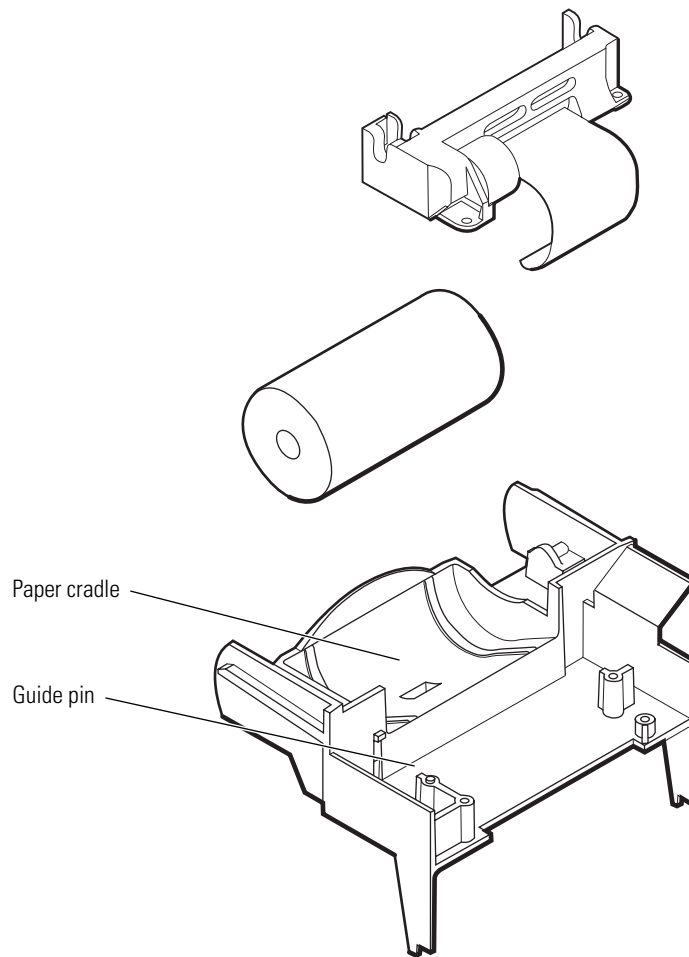
6. To verify that the rear retaining pins hold the paper guide in place, apply light pressure to the top of the paper guide.

If the retaining pins do not securely hold the paper guide, follow these steps:

- a. Hold the paper guide flush with the printer.
- b. Place a small slotted screwdriver in the slot behind the rear retaining pins and push the pins outward into the slots in the printer mechanism.



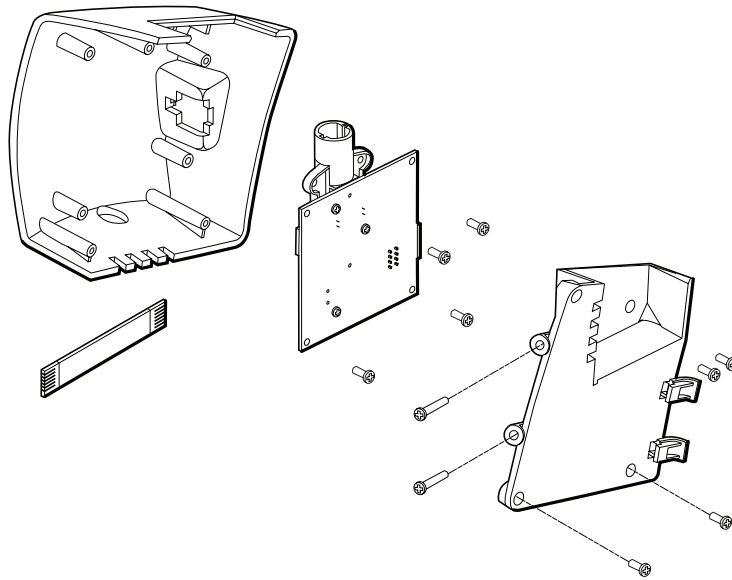
7. Seat the printer in the plastic printer chassis.



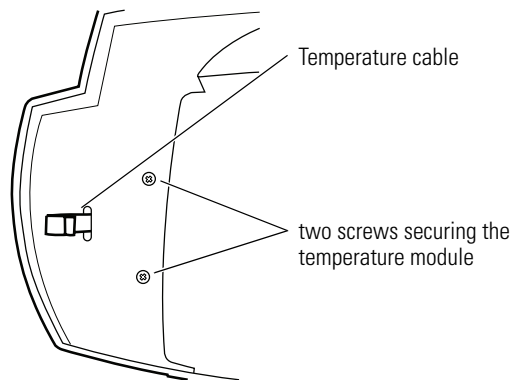
- a. Align the guide pin on the chassis with the hole on the bottom of the printer. The paper guide and the paper cradle on the plastic chassis must be flush.
- b. Use the two screws to secure the printer to the chassis.

Disassemble the temperature module

Note Disassembly of the temperature module does NOT require removal of the main board.



1. Remove the temperature module from the monitor.
 - a. Remove the two screws (located on the left side, inside the rear chassis) securing the module to the slots on the left side of the rear chassis. To prevent the module from dropping, hold it as you remove the screws.

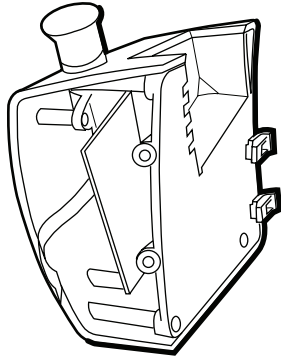


- b. Separate the temperature module from the rear chassis and pull the temperature cable through the slot in the rear chassis.

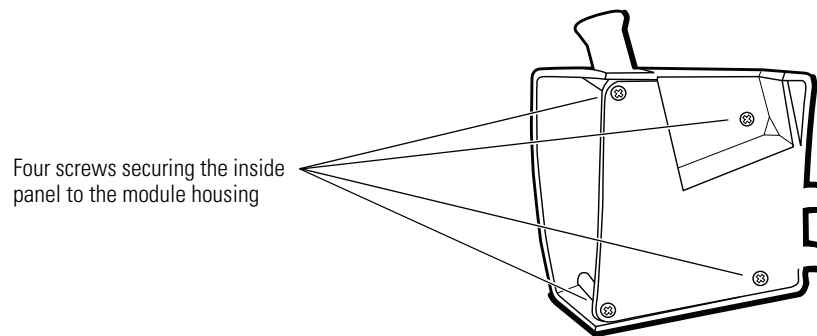
Note For older monitors where the temperature cable is routed through a ferrite bead on the rear chassis:

If the temperature cable is pulled through the slot and out of the ferrite bead, it will be difficult to reroute the cable through the bead. To avoid this difficulty, ...

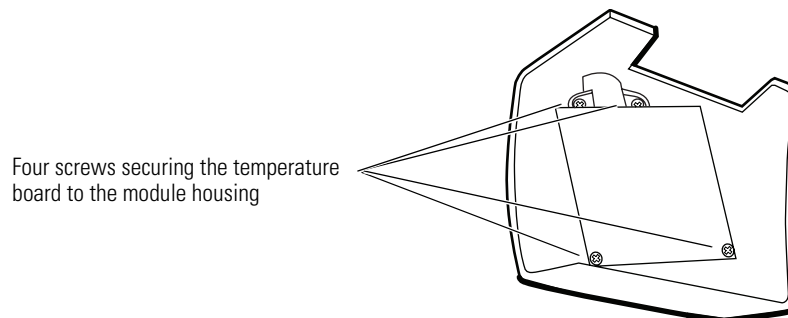
Separate the temperature module housing from the rear chassis just far enough to enable you to release the temp cable from the ZIF connector.



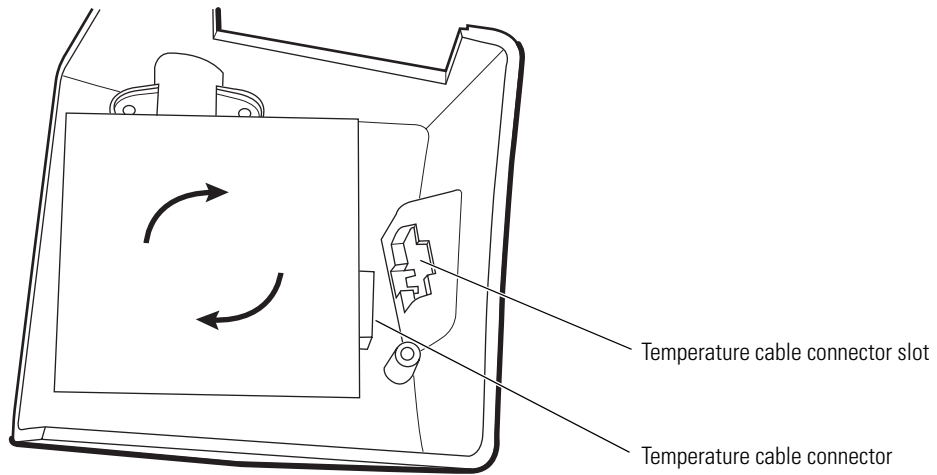
2. Remove the temperature-board assembly from the SureTemp Plus module as follows:
 - a. Remove the four screws securing the inside panel to the module housing.



- b. Remove the four screws securing the temperature board to the module housing.

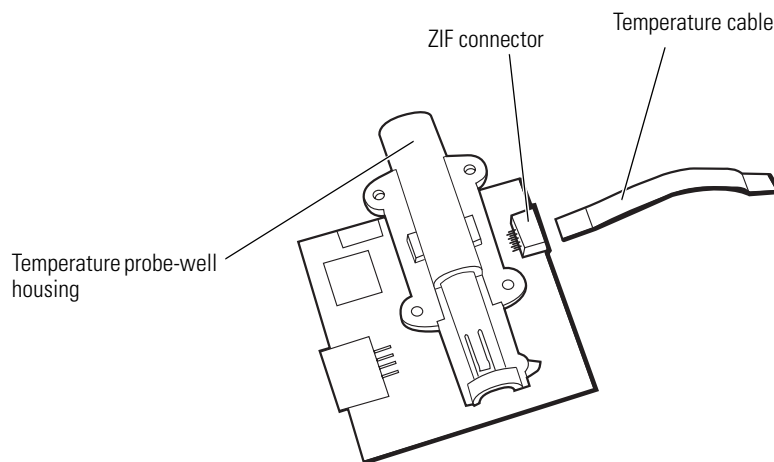
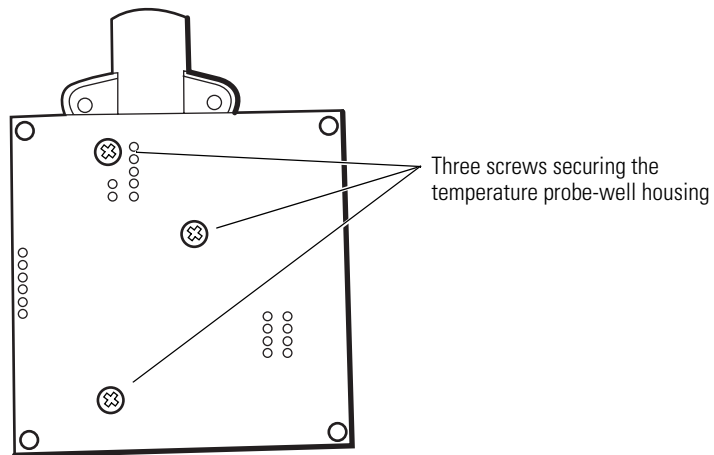


- c. Tilt the temperature board and rotate it clockwise to free the cable connector from the connector slot (J5) in the housing; then lift the board out of the housing.



- d. Release the ZIF latches (J1) and disconnect the temperature cable.

Note It is not necessary to remove the temperature probe-well housing when replacing the temperature module.

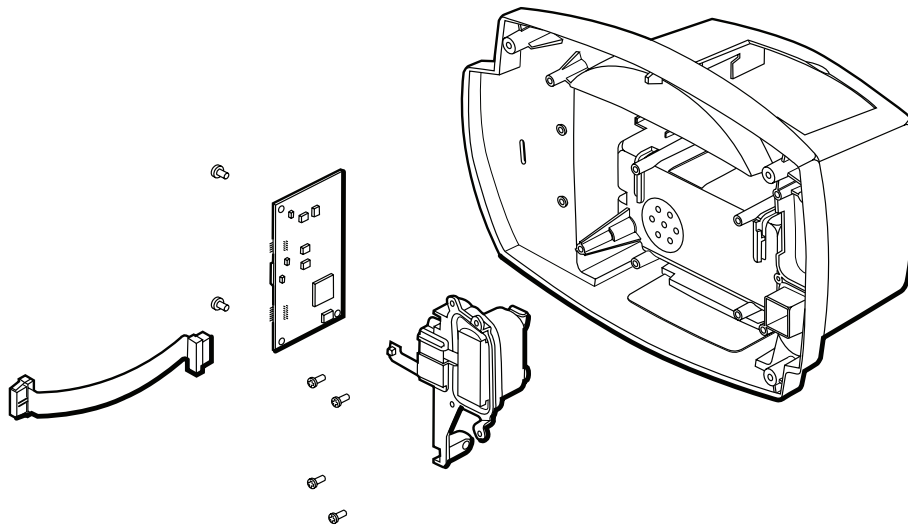


Temperature module reassembly notes

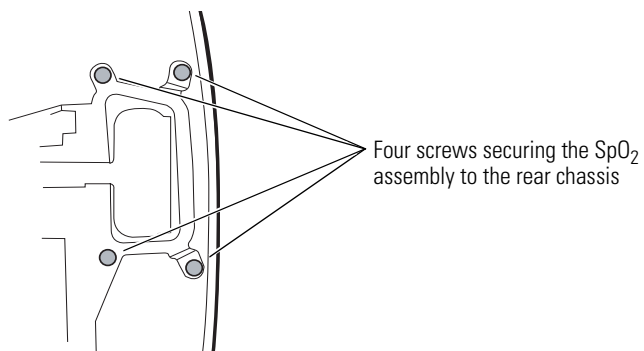
To install the temperature board in the module housing:

1. Square the circuit board in the housing to fit the probe-well receiver into the top of the outside housing.
2. Tilt the board and rotate it counterclockwise so that the temperature cable connector (J5) fits down into the connector slot in the housing.

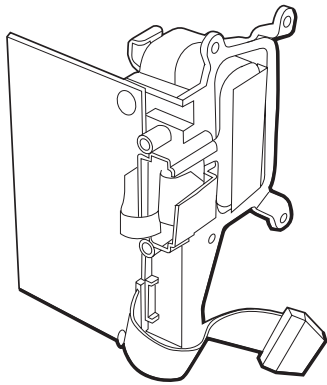
Disassemble the Nellcor SpO₂ assembly



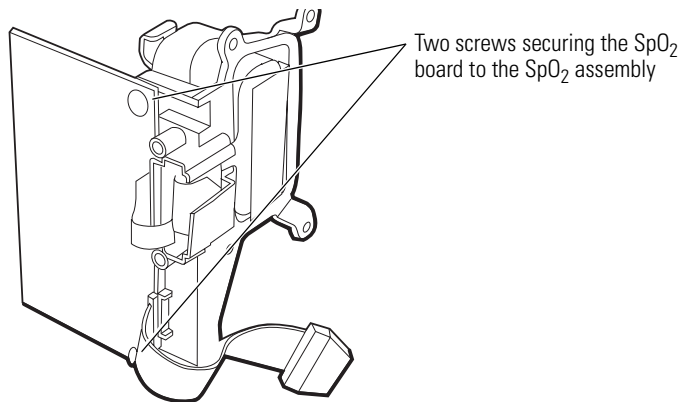
1. Remove the SpO₂ assembly from the rear chassis and disassemble it as follows:
 - a. Remove the four screws (located on the inside of the rear chassis on the right side) securing the SpO₂ assembly to the rear chassis.



- b. Remove the side panel and board assembly from the rear chassis.



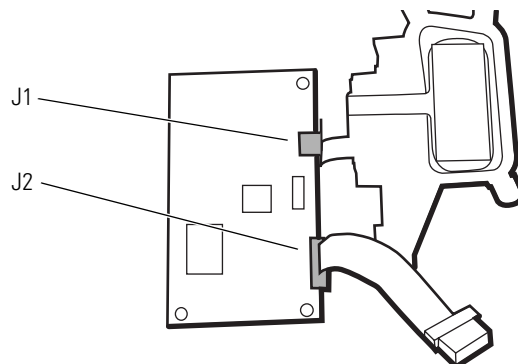
2. Remove the SpO₂ board.
 - a. Remove the two screws securing the board to the side panel.



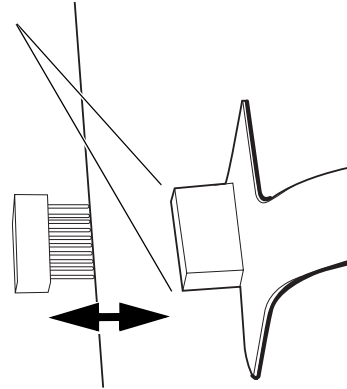
- b. Disconnect J1 and J2.



Caution To avoid stressing and damaging the J1 flex cable, disconnect the cable by gripping the J1 flex-cable connector with pliers and separating the connector halves without stressing or otherwise putting any pressure on the flex cable itself.

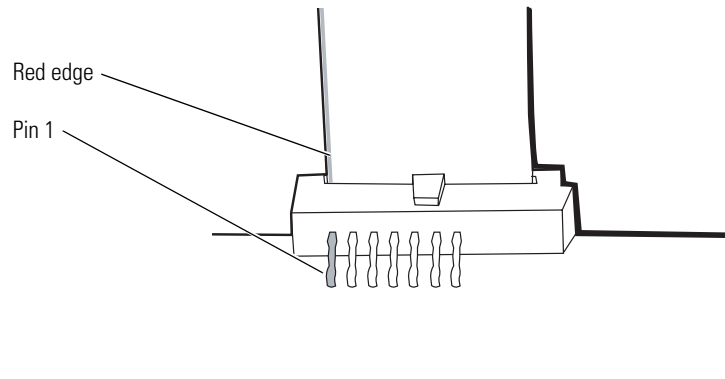


Grip with pliers here, and separate the J1 connector halves. Never pull directly on the cable itself.



SpO₂ reassembly notes (Nellcor)

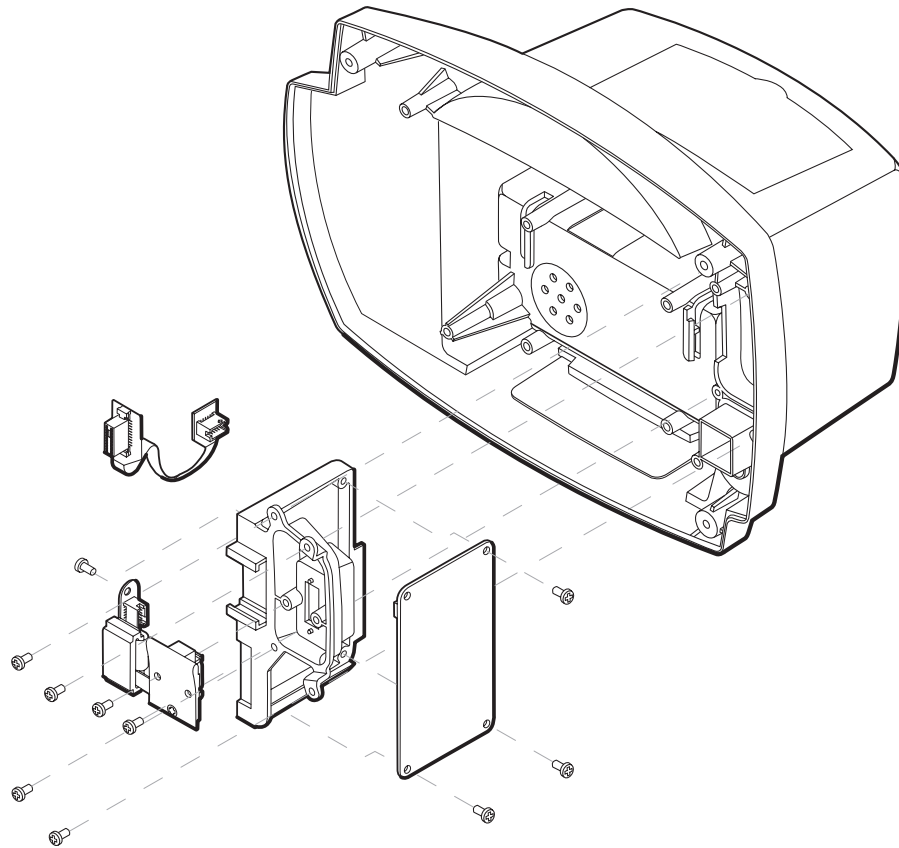
The J2 connector halves are keyed to prevent incorrect connection. However, to facilitate the connection, align the red line on the edge of the ribbon cable with pin 1 of the connector on the SpO₂ board.



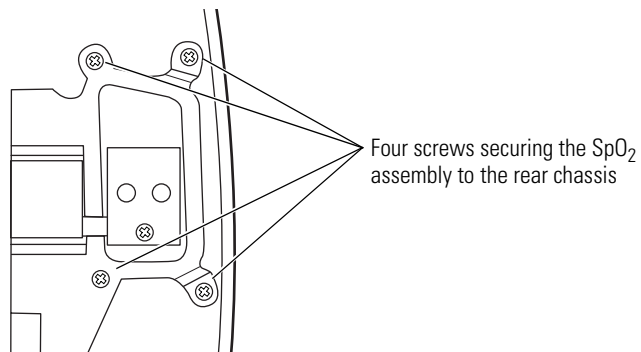
Note When replacing the Nellcor SpO₂ board, be sure that the DIP switch is set as follows:

1 - ON 2 - ON 3 - OFF 4 - OFF

Disassemble the Masimo SpO₂ assembly

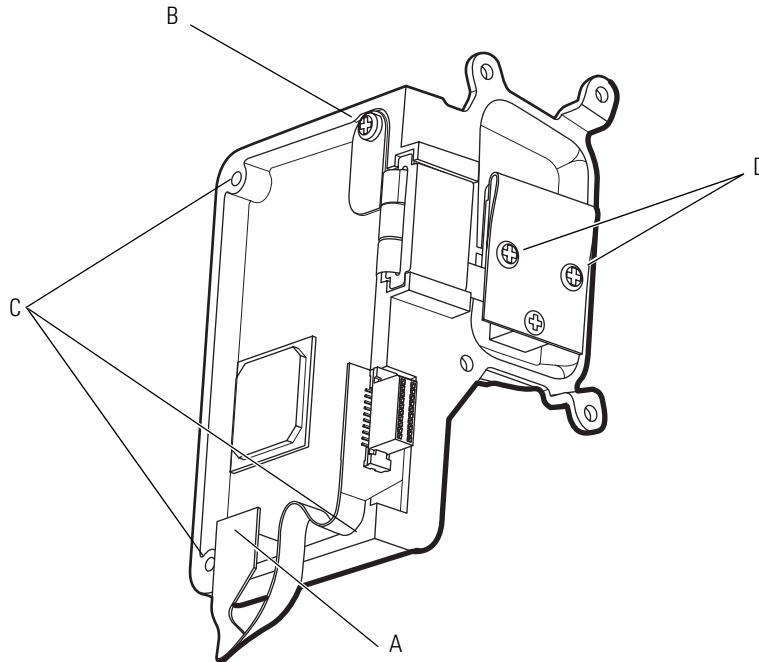


1. Remove the SpO₂ assembly from the rear chassis and disassemble as follows:
 - a. Remove the four screws (located on the inside of the rear chassis on the right side) that secure the SpO₂ assembly to the rear chassis.



- b. Slide the SpO₂ assembly out of the rear chassis.
2. Remove the SpO₂ board and sensor flex cable assembly from the connector panel.
 - a. Disconnect the mating end of the power flex cable (A) from J3 on the circuit-board assembly.
 - b. Remove the screw (B) securing the sensor flex connector to the plastic chassis.
 - c. Disconnect the sensor flex connector at J1 (B) to the plastic chassis.

- d. Remove the three screws (C) securing the circuit board to the plastic chassis.
- e. Remove the two screws (D) securing the SpO₂ sensor flex to the connector housing.
- f. Slide the SpO₂ sensor flex cable assembly out of the rails on the connector housing.



SpO₂ reassembly notes (Masimo)

1. Place the SpO₂ sensor flex into the connector housing and secure it with two screws (D). (Torque = 4 lbf-in.)
2. Place the circuit board (C) into the plastic chassis and secure it with three screws. (Torque = 4 lbf-in.)
3. Connect the sensor flex connector to the circuit board at J1.
4. Fasten the sensor flex connector in place with one screw (B) . (Torque = 4 lbf-in.)
5. Connect the mating end of the power flex cable (A) to J3 on the circuit board.
6. Slide the SpO₂ assembly into place in the monitor rear chassis, seating the rail of the connector housing into the slots in the rear chassis.
7. Secure the SpO₂ panel with four screws. (Torque = 4 lbf-in.)

