

11

Disassembly and Repair

This chapter provides the instructions for removing and replacing serviceable modules in the Spot Vital Signs LXi.

In general, re-assembly procedures are the reverse order of the disassembly procedures.



WARNING Electric shock hazard. There are no user-serviceable parts inside Spot Vital Signs LXi other than battery replacement (see “Battery Replacement” on page 46). Only an individual specifically trained and approved for the repair and/or verification of this specific Welch Allyn product may perform maintenance procedures specifically described in this manual. For service, refer the device to an Authorized Service Center.

Note Always disconnect the sealed lead-acid battery in the Spot Vital Signs LXi before performing any repair function.

Tool list

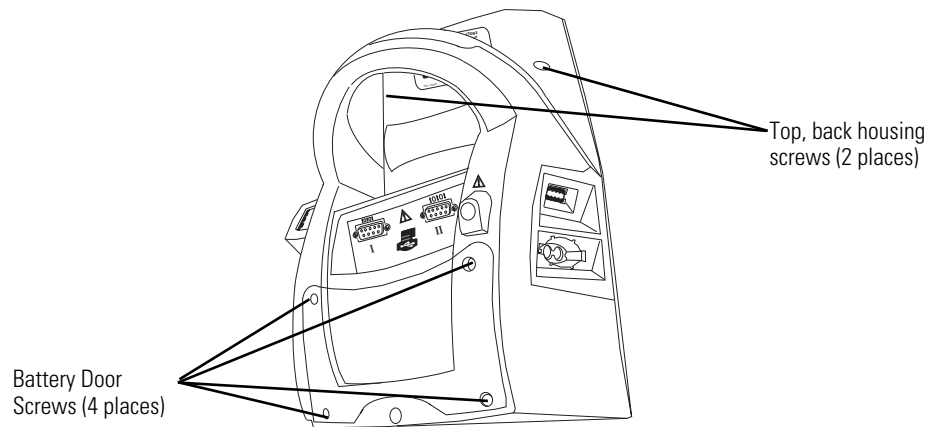
Description	Part Number	Qty	Source
Blood Pressure Test Volume Repair Fixture	407672	1	Welch Allyn
Spot LXi Service Tool Software	4500-905	1	Welch Allyn
Service Manual, Spot Vital Signs LXi	704432	1	Welch Allyn
Spot Vital Signs LXi Directions for Use	705310	1	Welch Allyn
802.11b Radio	4500-920	1	Welch Allyn
802.11b Radio Directions for Use	4500-921	1	Welch Allyn
802.11a/b/g Radio	4500-922	1	Welch Allyn
802.11a/b/g Radio Directions for Use	4500-923	1	Welch Allyn
Tester, Calibration, 9600 Plus	01802-110	1	Welch Allyn
SureTemp Oral Probe	02895-000	1	Welch Allyn
Blood Pressure Y-Tube, No Fittings 1/8 Tube	5082-183	1	Welch Allyn
Welch Allyn Cuff	Soft-11-2MQ	1	Welch Allyn
Welch Allyn Blood Pressure Hose, 5ft.	4500-30	1	Welch Allyn
Cable, USB A to 5 pin mini	704889	1	Welch Allyn
DPAC Wireless Module	706514	1	Welch Allyn
Needle Nose Pliers		1	Tool/Supply Store
Wire Cutter		1	Tool/Supply Store

Description	Part Number	Qty	Source
Tweezers		1	Tool/Supply Store
#2 Phillips Screwdriver		1	Tool/Supply Store
T10 Torx Driver		1	Tool/Supply Store
4" PVC Pipe		1	Tool/Supply Store
Soldering Station		1	Tool/Supply Store
Cable Tie Tool - T9921	GS2B	1	Marsh Electronics +1 800 877-8919
*Setra Pressure Meter	2270-01	1	Setra +1 800 257 3872
*Netech Pressure Meter	2000 in	1	Netech +1 800 547 6557
Nellcor Sensor Ext Cable (4' Cable)	Dec-4	1	Nellcor +1 800 635 5267
Nellcor Sensor Ext Cable (8' Cable)	Dec-8	1	Nellcor +1 800 635 5267
Nellcor Sensor	DS-100A	1	Nellcor +1 800 635 5267
Masimo SpO ₂ Tester	1795	1	Masimo +1 800 326-4890
Nellcor SRC-MAX SpO ₂ Tester	SRC-MAX	1	Nellcor +1 800 635 5267
Masimo Patient Cable	1005	1	Masimo +1 800 326-4890
Masimo Adult SpO ₂ Reusable Sensor	1269	1	Masimo +1 800 326-4890
Digital Volt Meter with 4 1/2 Digit Display		2	Electronics Supply Store
Power Supply: 0-20 Vdc adjustable with 0-3A output		1	Electronics Supply Store
Wireless Router		1	Electronics Supply Store
Ethernet Cable		1	Electronics Supply Store
IBM compatible computer Windows 2000, XP, NT4		1	

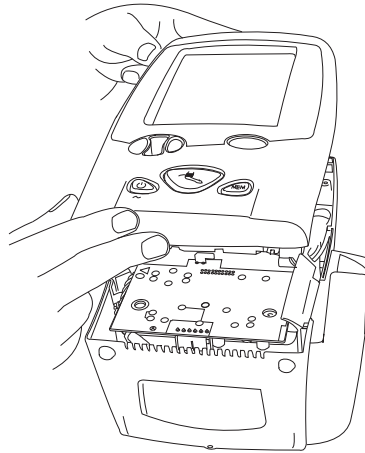
* Only requires one of the pressure meters

To disassemble Spot Vital Signs LXi:

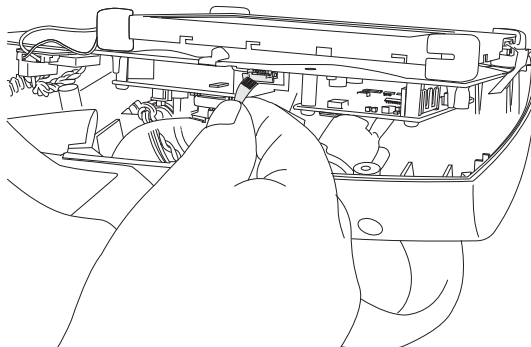
1. Disconnect the power and all accessories from the Spot Vital Signs LXi.
2. Remove the four screws holding the battery door using a phillips-head screwdriver. Remove the battery door to expose the battery.



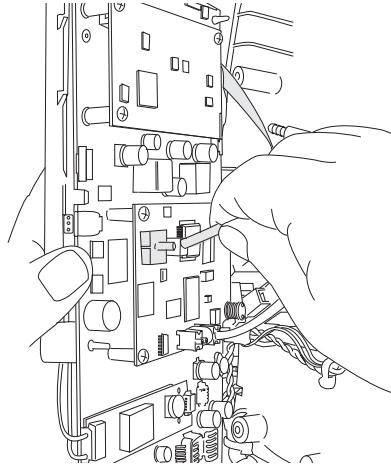
3. Tip the Spot Vital Signs LXi backward and slide the battery out. Disconnect the one-way connector.
4. Remove the two screws inside the battery housing that are identified with arrows molded into the housing and the two screws at the top of the back upper housing.
5. Hold the device together, lay the back housing on the bench, and carefully lift the top housing off.



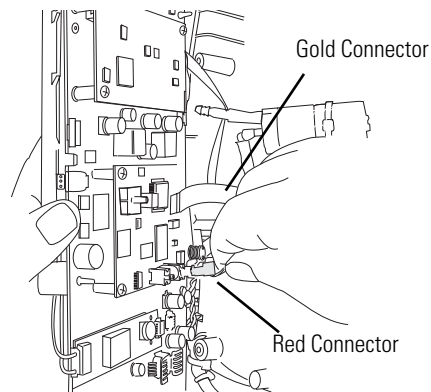
6. Remove the screw and slightly lift the circuit board from the right facing side and disconnect the flex cable (J103).



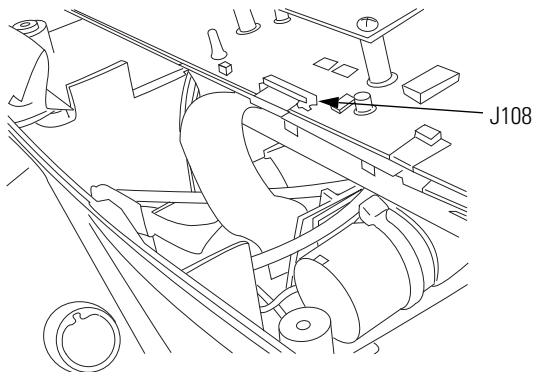
7. Observe the locations of the two tubes before disconnecting. Lift and disconnect the wire harnesses and the pneumatic tubing. The two wire harnesses are a 6-wire harness that connects to J104 and a 2-wire harness that connects to J80 on the small, mounted blood pressure board.

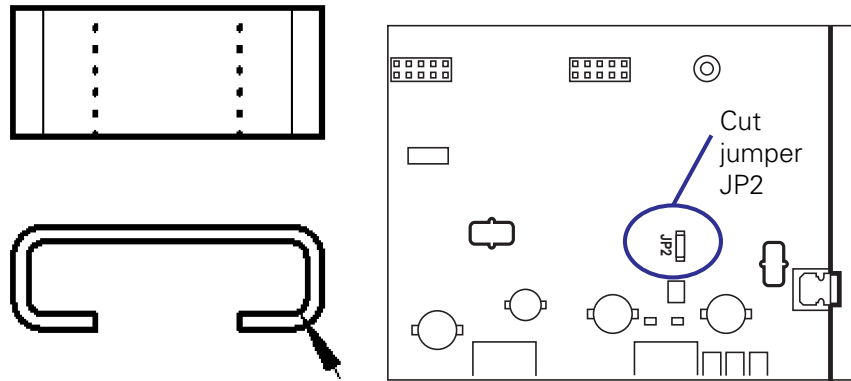


8. Disconnect the red electrical connector and the gold ribbon connector. This is located on the main board. Lift up the tab on the white cable retainer so cable can slide out after it is unplugged.



9. Lift the flap on the beige connector (large ribbon cable) to remove the main board. This releases the serial board cable from connector J108.

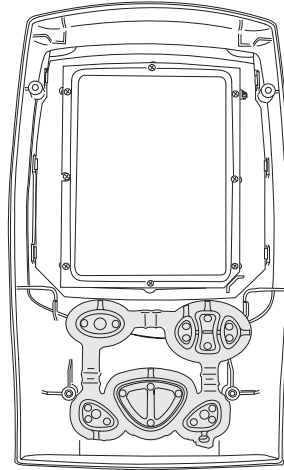




Note This step only applies to devices configured with Masimo SpO₂ sensors. Cut jumper JP2 with diagonal cutting pliers twice so that it is open. Cut it on each end on the dotted lines as illustrated, so that it is an open connection.

Key Pad Disassembly

1. Gently pull the button switch array out of the cover.
2. Align and push the new button switch array into place.



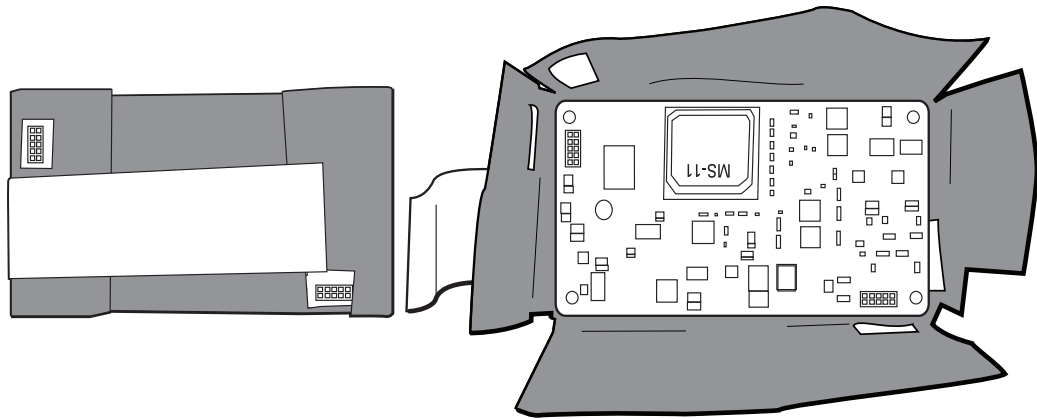
SpO₂ Circuit Board Disassembly

Note To assure proper SpO₂ operation, replace the SpO₂ board using only the Welch Allyn specified part.

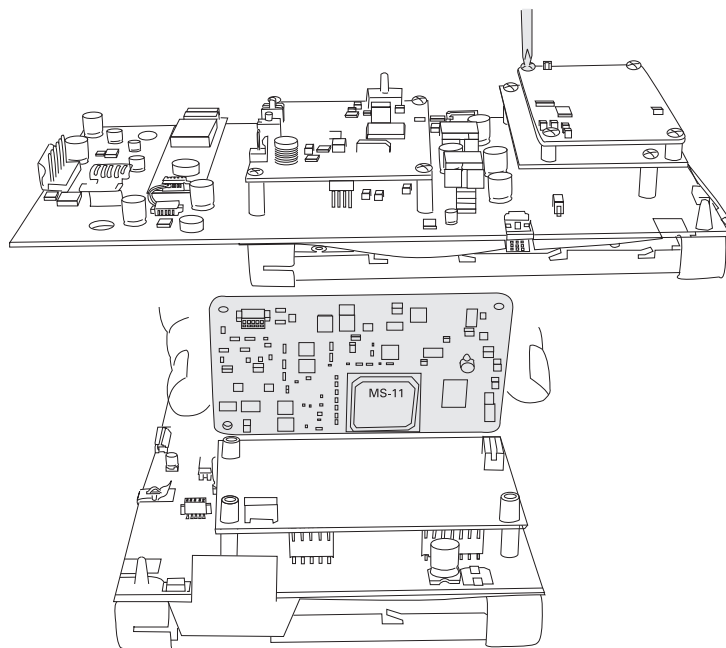
To assure patient electrical isolation, after the main board is nearly back in position, verify that the SpO₂ flex cable is freely floating in space and is not pressed up against the main board.

Masimo

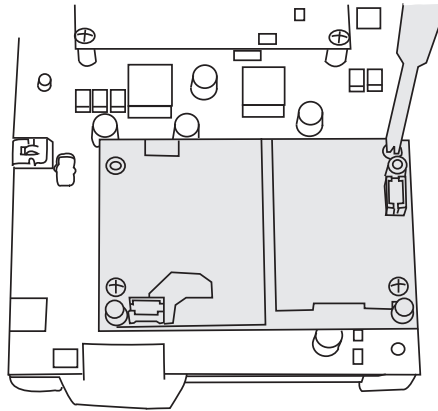
Note Masimo configurations ship with an EMI foil shield, copper tape, and Nomex insulator. These components are removed from the illustrations to show clarity of detail. These components must be reinstalled to comply with EMC requirements.



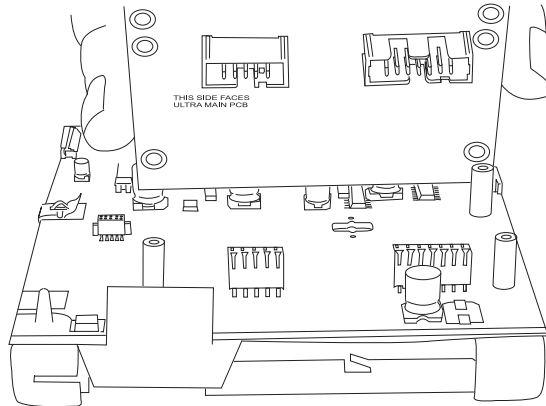
1. Lay the LCD flat on an ESD mat.
2. Find the double-stack of circuit boards and remove the four corners screws. Carefully lift the circuit board straight up.



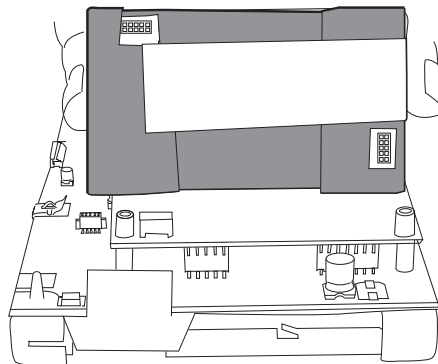
3. Remove the three screws on the circuit board located behind the LCD.



4. Slightly rock the circuit board back and forth while lifting straight up.

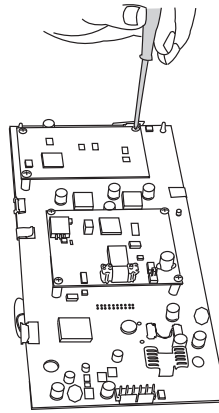


5. Replace with a new circuit board.

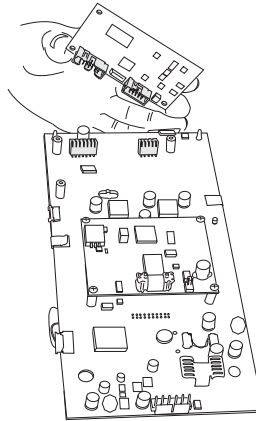


Nellcor

1. Lay the LCD flat on an ESD mat.
2. Remove the three screws on the circuit board located behind the LCD.



3. Slightly rock the circuit board back and forth while lifting straight up.

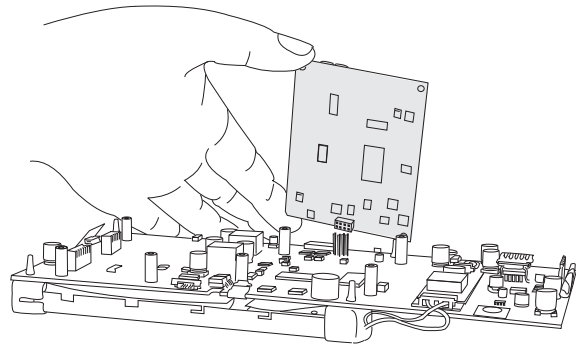
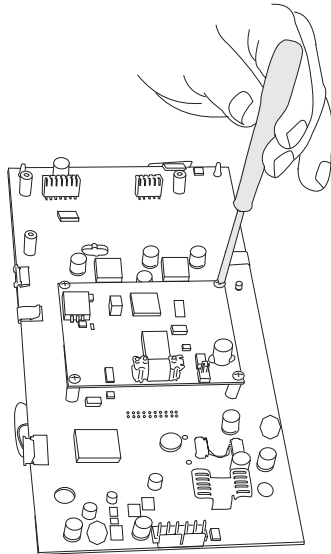


4. Replace with a new circuit board and set the dip switches to match the original board (dip 1 and 2: up / dip 3 and 4: down).

Blood Pressure Circuit Board Disassembly

Note When replacing the NIBP board see “NIBP board Initialization” on page 62 for instructions.

Remove the four screws and carefully lift the circuit board straight up. There is one stationary connector.

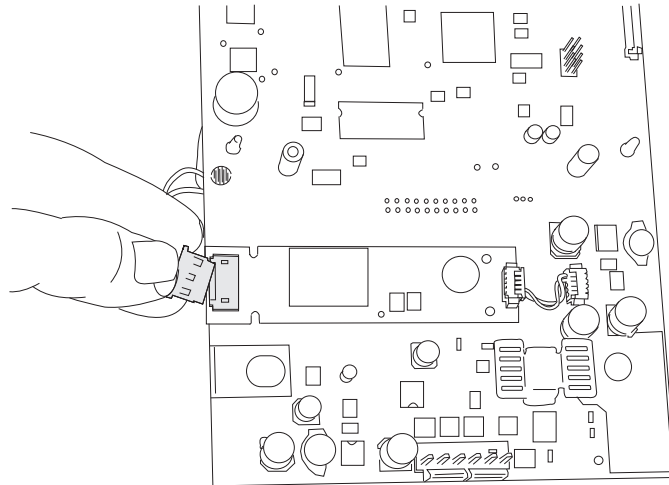


LCD Inverter Ballast Board Disassembly

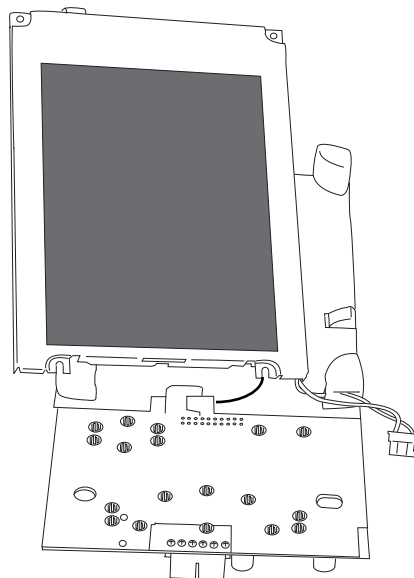
This is a small board held in place with two-sided tape. It is located towards the bottom of the main board. Remove the connector at each end and pull straight up while taking care not to damage the board because the adhesive tape has considerable sticking strength.

LCD Disassembly

1. Remove the main board. At the bottom of this board is a circuit board with a pink connector at the bottom.



2. Pull the brown tabs of the top connector forward and remove the ribbon cable. Inspect connector tabs for wear and replace if worn.
3. Turn the board over and pull back the soft rubber holders. Pull the cable from the lug to remove the grounding strap and remove the LCD.



4. Replace with a new LCD.

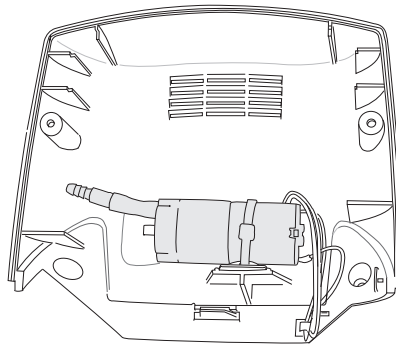
Pump Disassembly

Note For proper blood pressure operation, replace the pump using only the Welch Allyn specified part.

To assure patient electrical isolation, route the pump wires through the rear housing clip feature (near the pump terminals) and held in place with a tie-wrap to the holes in the rear housing at the back of the battery compartment.

To assure patient electrical isolation, do not modify the length of the pump wires.

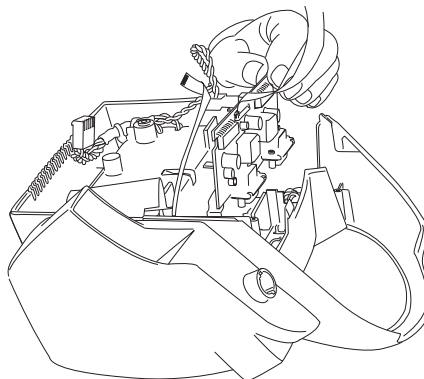
1. Snip the wire ties (2 places).



2. Disconnect the pneumatic tubing and unhook the wiring.
3. Replace with a new pump.

RS232-Communication Circuit Board Disassembly

1. Remove the pneumatic connector and associated hoses from the pump and the two screws in the rear housing. Remove the associated hoses.
2. Release the catch and remove the cover and inner handle assembly.
3. Remove the connection port panel.
4. Remove the two screws inside the back housing and the ribbon cable that hold the RS232 board in place. Take care since the connector is easily broken.
5. Slide the board straight out and remove the wire harness.



6. Replace with a new circuit board.

Fan and Power Circuit Board Disassembly

Note To prevent buildup of hydrogen gas, replace the fan using only the Welch Allyn specified part.

This is a small board held in place with two-sided tape and one connector. Remove the screw before disconnecting the connector.

Thermometry Circuit Board Disassembly



Caution To assure patient electrical isolation, trap the flex cable to the thermometer pod behind the clip on the main housing adjacent to the main board connection point.

Caution To assure patient electrical isolation, verify that the correct flex cable is used to connect the thermometer pod to the main board. The Braun and SureTemp Plus flex cables are slightly different in length and are not interchangeable.

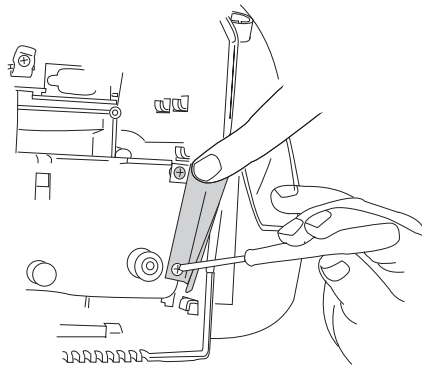
Caution To protect the user from high voltage, properly install the thermometer pod insulating paper separating the LCD ballast wires from the housing crack.

SureTemp Plus

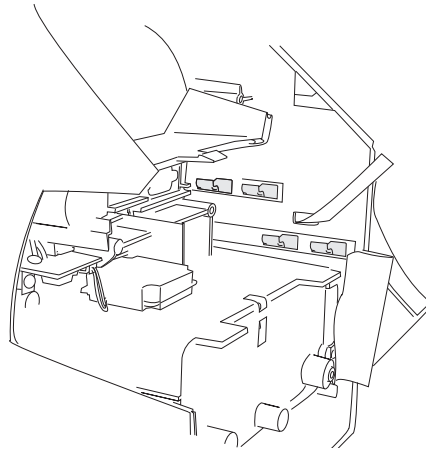


Caution Do not attempt to repair or clean the solder joints on either SureTemp Plus board. Incorrect flux or technique can degrade thermometer accuracy.

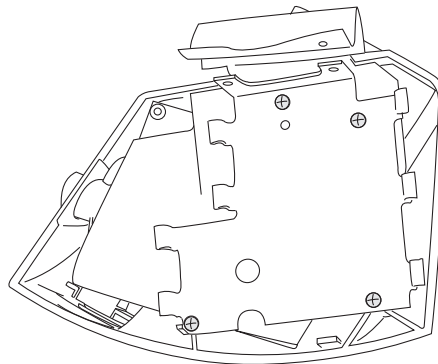
1. Remove the two screws located at the thermometer housing with a T-10 torx wrench. Save the Nomex.



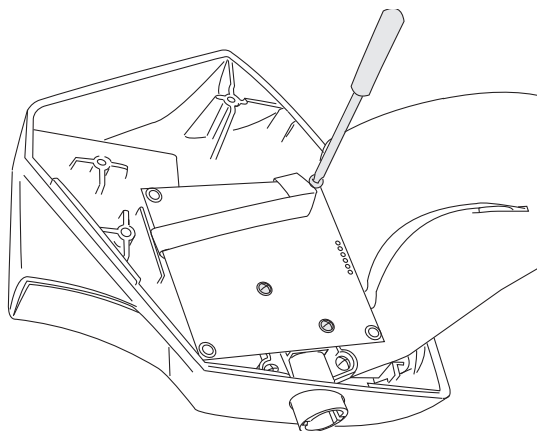
2. Locate the path of the notched tabs on the housing. Slide the housing up and out following this path and set the case aside.



3. Remove the four screws from the mounting plate and save the Nomex. This exposes the circuit board.



4. Remove the three Torx screws (T10) on the board (one on bottom and one on either side of the probe well cover) and lift the board out of the housing and orient the part as shown.



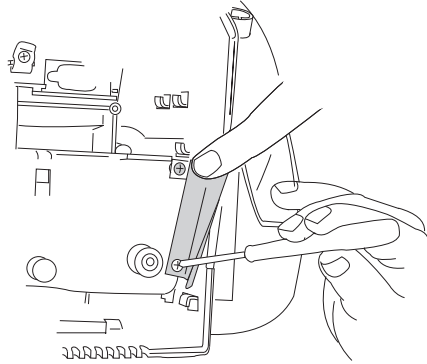
5. Disconnect all connectors and replace with a new board.

To replace the temperature connector, remove the one screw holding the temperature board and connector. Verify the Nomex is properly mounted upon reassembly.

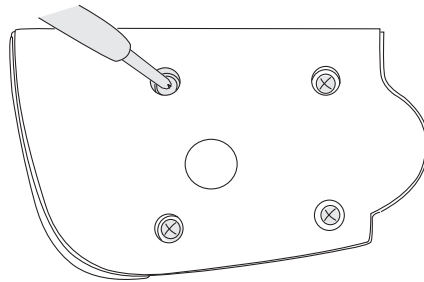
When replacing the SpO₂/blood pressure housing, verify the orange and white twisted wire is pushed as far into the handle housing as possible. Failure to do so can cause the wires to stretch when the SpO₂/blood pressure housing is inserted.

Braun ThermoScan PRO 4000

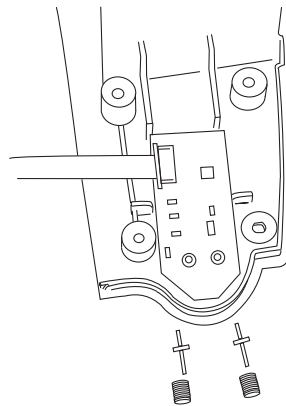
1. Remove the two screws located at the thermometer housing with a T-10 torx wrench. Save the Nomex.



2. Locate the path of the notched tabs on the housing. Slide the housing up and out following this path and set the case aside.
3. Remove the four screws that hold the metal shield in place.



4. Remove the springs and posts. Carefully rock the board back and forth while lifting straight up.



5. Disconnect all connectors and replace with a new board.
6. Reassembly is the reverse of disassembly.