Welch Allyn Connex® Integrated Wall System

Service manual

Software version 2.3X

Welch Allyn®

Advancing Frontline Care™

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EC REP

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Advancing Frontline Care™

Contents

Symbols

For information on the origin of these symbols, see the Welch Allyn symbols glossary: www.welchallyn.com/symbolsglossary.

Documentation symbols

	**WARNING** The warning statements in this manual identify conditions or practices that could lead to illness, injury, or death.
	**CAUTION** The caution statements in this manual identify conditions or practices that could result in damage to the equipment or other property, or loss of data. This definition applies to both yellow and black and white symbols.
	**WARNING** Hot surface. Do not touch.
	Follow the operating instructions/directions for use (DFU) — mandatory action. A copy of the DFU is available on this website. A printed copy of the DFU can be ordered from Welch Allyn for delivery within 7 days.

Power symbols

	Power on/Display power-saving [recent models]		Equipotential terminal
	Power on/Display power-saving [older models]		
	(on the display) Device is plugged into Alternating Current power		Battery absent or faulty

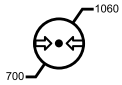
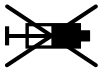
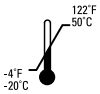
	(on the device, green indicator) Alternating Current power present, battery fully charged		Battery charge level
	(on the device, amber indicator) Alternating Current power present, battery is charging		Battery cover
	Alternating Current (AC)		Rechargeable battery
	Li-ion battery		AC input power

Connectivity symbols

	USB		Ethernet RJ-45
	Wireless signal strength • Best (4 bars) • Good (3 bars) • Fair (2 bars) • Weak (1 bar) • No signal (no bars) • No connection (blank)		Nurse call [recent models]
			Nurse call [older models]
	Connected to central station		Disconnected from central station

Miscellaneous symbols

	Manufacturer		Limited rotation/Turn completely to right
	Reorder number		Serial number
	Do not reuse		China RoHS markings for control of pollution caused by electronic information products. XX indicates Environmentally Friendly Use Period in years.

	Nonionizing electromagnetic radiation		Recycle the product separate from other disposables
	Restrictions for use of wireless device in Europe. European Community's Class 2 radio equipment.		Call for maintenance
	Defibrillation-proof Type BF applied parts		Do not expose to open flame
	Atmospheric pressure limitation		Not for injection
	Transport and storage temperature range	EC REP	Authorized Representative of the European Community
	Maximum safe working load limits (specific values presented with symbol)		Mass in kilograms (kg)
	Recycle	**IPX1** (Vital Signs Monitor) **IPX0** (Integrated Wall System)	Degree of protection provided by the enclosure with respect to harmful ingress of liquids

Safety

All users of the system must read and understand all safety information presented in this manual before using or repairing the system.

United States federal law restricts this device to sale, distribution, or use by or on the order of a licensed medical practitioner.

Warnings and cautions

WARNING Safety risk. Make frequent electrical and visual checks on cables, sensors, and electrode wires. All cables, sensors, and electrode wires must be inspected and properly maintained and in proper working order to allow the equipment to function properly and to protect patients.

WARNING Safety risk. Place the system and accessories in locations where they cannot harm the patient should they fall from a shelf or mount.

WARNING Fire and explosion hazard. Do not operate the system in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide; in oxygen-enriched environments; or in any other potentially explosive environment.

WARNING Inaccurate measurement risk. Dust and particle ingress can affect the accuracy of blood pressure measurements. Use the system in clean environments to ensure measurement accuracy. If you notice dust or lint build-up on the system's vent openings, have the system inspected and cleaned by a qualified service technician.

CAUTION Before disassembling the device or installing options, disconnect the patient from the system, power down the device, and disconnect the AC power and any attached accessories (for example, SpO2 sensors, blood pressure hoses and cuffs, and temperature probes) from the device.

CAUTION To ensure that the system meets its performance specifications, store and use the system in an environment that maintains the specified temperature and humidity ranges.

CAUTION The system may not function properly if dropped or damaged. Protect it from severe impact and shock. Do not use the system if you notice any signs of damage.

CAUTION Do not connect more than one patient to a system or connect more than one system to a patient.

CAUTION Do not operate the system in the presence of magnetic resonance imaging (MRI) or hyperbaric chambers.

CAUTION Do not autoclave the system. Autoclave accessories only if the manufacturer's instructions clearly approve it.

General safety considerations

- If the system detects an unrecoverable problem, it displays an error message. For more information see "Troubleshooting."
- To ensure patient safety, use only accessories recommended or supplied by Welch Allyn. (See the accessories list in the *Welch Allyn Connex Integrated Wall System Directions for use* on the user documentation CD or http://www.welchallyn.com. Always use accessories according to your facility's standards and according to the manufacturer's recommendations and instructions. Always follow the manufacturer's directions for use.
- Welch Allyn recommends that only Welch Allyn service personnel or an authorized repair center perform warranty service. Performing unauthorized service on a device that is within warranty may void the warranty.

Electrostatic discharge (ESD)

CAUTION Electrostatic discharge (ESD) can damage or destroy electronic components. Handle static-sensitive components only at static-safe workstation.

CAUTION Assume that all electrical and electronic components of the system are static-sensitive.

Electrostatic discharge is a sudden current flowing from a charged object to another object or to ground. Electrostatic charges can accumulate on common items such as foam drinking cups, cellophane tape, synthetic clothing, untreated foam packaging material, and untreated plastic bags and work folders, to name only a few.

Electronic components and assemblies, if not properly protected against ESD, can be permanently damaged or destroyed when near or in contact with electrostatically charged objects. When you handle components or assemblies that are not in protective bags and you are not sure whether they are static-sensitive, assume that they are static-sensitive and handle them accordingly.

- Perform all service procedures in a static-protected environment. Always use techniques and equipment designed to protect personnel and equipment from electrostatic discharge.

- Remove static-sensitive components and assemblies from their static-shielding bags only at static-safe workstations—a properly grounded table and grounded floor mat—and only when you are wearing a grounded wrist strap (with a resistor of at least 1 megohm in series) or other grounding device.
- Use only grounded tools when inserting, adjusting, or removing static-sensitive components and assemblies.
- Remove or insert static-sensitive components and assemblies only with system power turned off.
- Insert and seal static-sensitive components and assemblies into their original static-shielding bags before removing them from static-protected areas.
- Always test your ground strap, bench mat, conductive work surface, and ground cord before removing components and assemblies from their protective bags and before beginning any disassembly or assembly procedures.

Overview

Purpose and scope

This manual is a reference for periodic preventive maintenance and corrective service procedures for the Welch Allyn Connex Integrated Wall System, firmware version 2.3X. It is intended for use only by trained and qualified service personnel.

Corrective service is supported to the level of field-replaceable units. These include circuit-board assemblies and some subassemblies, case parts, and other parts.

CAUTION No component-level repair of circuit boards and subassemblies is supported. Use only the repair procedures described in this manual.

WARNING When performing a service procedure, follow the instructions exactly as presented in this manual. Failure to do so could damage the device, invalidate the product warranty, and cause serious personal injury.

Find instructions for functional testing and performance verification in the Welch Allyn Service Tool help files.

This manual applies only to this device. For servicing of any other device, see the service manual for the specific device.

Service work not described in this manual must be performed by qualified service personnel at the factory or at an authorized Welch Allyn service center.

Related documents

When using this manual, refer to the following:

- *Welch Allyn Connex® Devices Directions for use, Software version 2.3X* (on the user documentation CD)
- Welch Allyn Service Tool http://www.welchallyn.com/en/service-support/service-center/service-tool.html
- *Welch Allyn Service Tool Installation and configuration guide* http://www.welchallyn.com/en/service-support/service-center/service-tool.html
- *Welch Allyn Braun ThermoScan® PRO 6000 Ear Thermometer, Service manual* (80020325) click here to download the PDF
- *Welch Allyn 9600 Plus Calibration Tester Directions for use*
- *Welch Allyn Radio Configuration guide* click here to download the PDF
- Welch Allyn website: www.welchallyn.com

Technical support services

Welch Allyn offers the following technical support services:

- Telephone support
- Loaner equipment
- Service agreements
- Service training
- Replacement service parts
- Product service

For information on any of these services, go to www.welchallyn.com.

Service loaners

For warranty or non-warranty repairs not covered under a support agreement, loaners are available for a nominal charge, subject to availability. Payment is required prior to shipment for all loaners not covered under a support agreement.

Welch Allyn Service Centers that provide repair service for this product can, on request, loan a device for use while the device is being repaired. Loaned devices are provided free of charge for products repaired while under a support agreement that includes a free loaner provision.

Loaner equipment for the individual component modules is not available.

Service options

Partners in Care service agreements

While product warranties provide basic assurance of Welch Allyn hardware quality, they may not include the full range of services and support you need. Welch Allyn offers premium service and support through our *Partners in Care* program. Whether you service your own devices and require a minimum of support or rely on us to service your device, Welch Allyn provides a program that will meet your needs. For more information visit our web site at www.welchallyn.com or call your sales representative.

Warranty service

All repairs on products under warranty must be performed or approved by Welch Allyn. Refer all warranty service to Welch Allyn Product Service or another authorized Welch Allyn Service Center. Obtain a Return Material Authorization (RMA) number for all returns to Welch Allyn Product Service.

CAUTION Unauthorized repairs will void the product warranty.

Non-warranty service

Welch Allyn product service and authorized service centers support non-warranty repairs. Contact any Welch Allyn regional service center for pricing and service options.

Welch Allyn offers modular repair parts for sale to support non-warranty service. This service must be performed only by qualified end-user biomedical/clinical engineers using this service manual.

Service training is available from Welch Allyn for biomedical/clinical engineers. Follow this link for more information.

Partners in Care service and support agreements

Material no.	Item	Material no.	Item
S1-CIWS	Connex Integrated Wall System, Comprehensive partnership program 1 year	S1-CIWS-2	Connex Integrated Wall System, Comprehensive, Comprehensive partnership program 2 years
S2-CIWS	Connex Integrated Wall System, Bio-med partnership program 1 year	S2-CIWS-2	Connex Integrated Wall System, Bio-med partnership program 2 years
S4-CIWS (International only)	Connex Integrated Wall System, extended warranty, 1 year	S4-CIWS-2 (International only)	Connex Integrated Wall System, extended warranty, 2 years

Repairs

A Welch Allyn Service Center must perform all repairs on products under warranty, unless you have purchased a Welch Allyn Partners in Care Biomed agreement allowing you to service the device while under warranty.

CAUTION Unauthorized repairs will void the product warranty.

Qualified service personnel or a Welch Allyn Service Center should repair products out of warranty.

If you are advised to return a product to Welch Allyn for repair or routine maintenance, schedule the repair with the service center nearest you.

Welch Allyn Technical Support

If you have a problem with the device that you cannot resolve, call the Welch Allyn Technical Support Center nearest you for assistance. A representative will assist you in troubleshooting the problem and will make every effort to solve the problem over the phone, potentially avoiding an unnecessary return.

To expedite response to your issue, be prepared to provide details on how (steps executed) and when (time and date) the problem occurred. Also, log and configuration files captured on the device can assist with diagnosis and troubleshooting. You can easily save these files from the device to a flash drive using controls on the Service tab. See the "Service menu" section of this manual for details.

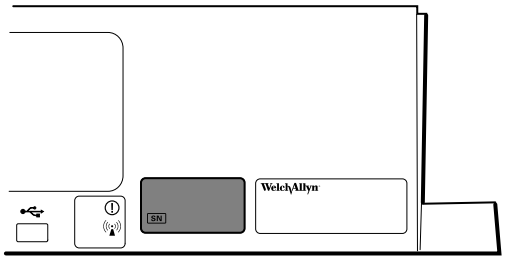
If your product requires warranty, extended warranty, or non-warranty repair service, a Welch Allyn Technical Support representative will record all necessary information to issue an RMA number. The support representative will provide you with the address of the Welch Allyn Service Center to send your device to.

Technical support is available during local business hours.

Returning products

When returning a product to Welch Allyn for service, ensure that you have the following information:

- Product name, model number, and serial number. This information may be found on the product and serial number labels on the bottom of the device.



- A complete return shipping address.
- A contact name and phone number.
- Any special shipping instructions.
- A purchase order number or credit card number if the product is not covered by a warranty.
- A Partners in Care contract number if product is covered under a service agreement.
- A full description of the problem or service request.

Unless noted in the RMA, the device will be updated to the current software version. If you prefer that the device not be updated, please state "Do not update software" in the service request.

Note When requesting an upgrade, check the "Options, upgrades, and licenses" section to determine if a software upgrade is required.

1. Obtain an RMA number:
   - Visit us on the web at www.welchallyn.com/customer-self-service.htm, or
   - Contact Welch Allyn to make a request.

   Note Welch Allyn does not accept returned products without an RMA.

2. Ship the device to Welch Allyn, observing these rules:
   a. Remove from the package the battery, all hoses, connectors, cables, sensors, power cords, and other ancillary products and equipment, except those items that might be associated with the problem.
   b. Follow shipping and handling requirements regarding Lithium-ion batteries to comply with new IATA regulations.

      Requirements for returning Lithium-ion batteries

      - Remove the Lithium-ion battery from the device. You cannot ship these devices with batteries installed.
      - Follow packaging requirements (presented next in this section)
      - Do not ship any battery that has been physically damaged or shows signs of leakage.

- Do not ship any battery that has been recalled by the supplier or manufacturer.
- Do not ship any waste batteries that should be recycled or discarded.
- Do not ship multiple batteries together.
- Use ground transportation only to ship Lithium-ion batteries.

Packaging requirements for Lithium-ion batteries and associated devices

- Use packaging provided by Welch Allyn or the battery manufacturer to pack the battery. Seal the battery in the anti-static bag and place it in the shipping box. Return shipments without approved packing materials will not be accepted.

  Note If the original shipping carton or replacement battery shipping box is unavailable, consult the manufacturer website for information regarding shipping Lithium-ion batteries: http://www.iata.org/lithiumbatteries

- If returning both the battery and the device, pack the battery and the device separately.
- If returning multiple batteries, pack and ship each battery individually. Do not consolidate multiple batteries in a single package.

c. Clean the device.

Note To ensure safe receipt of your device by the service center and to expedite processing and return of the device to you, **thoroughly clean all residues from the device before you ship it to Welch Allyn**. For decontamination and cleaning requirements, see the appendices.
If a returned device is found to be contaminated with bodily fluids, it will be returned at the owner's expense. United States federal regulations prohibit the processing of any device contaminated with blood-borne pathogens. Welch Allyn thoroughly cleans all returned devices on receipt, but any device that cannot be adequately cleaned cannot be repaired.

d. Pack the device. Put the device, enclosed in a plastic bag **with a packing list**, into the original shipping carton with the original packing materials or into another appropriate shipping carton, and seal appropriately for shipping. Remember that the device and any batteries must be packed and shipped separately.

e. Write the Welch Allyn RMA number with the Welch Allyn address on the outside of the shipping carton.

WARNING Safety risk. Do not ship any battery that has been physically damaged or shows signs of leakage unless you receive specific instructions which meet the requirements for the shipment of Lithium batteries. Dispose of damaged or leaking batteries in an environmentally safe manner consistent with local regulations.

WARNING Safety risk. Do not pack a defective battery in checked or carry-on baggage if traveling by air.

Note In the United States, the applicable regulations can be found in the Code of Federal Regulations (CFR). Refer to 49 CFR 173.185 for shipping lithium batteries by air or ground. Use 49 CFR 172.102 sections 29, 188, 189, A54, A55, A100, A101, A103, and A104 to find the special provisions for shipping lithium batteries.

Recommended service intervals

To confirm that the device is functioning within the design specifications, perform periodic service as indicated in the following table. Customers who have the Standard unlicensed edition of the Welch Allyn Service Tool can perform the basic functional verification and calibration procedures referenced in the table by following the instructions in this manual. If you have the Gold licensed edition of the service tool, use the tool to perform a complete functional verification and calibration of the device in lieu of performing the basic tests.

Component	Service interval	Service procedure
NIBP module	Annually	Basic functional verification
SpO2 module	Annually	Basic functional verification
SpHb parameter	Annually	Basic functional verification
RRa parameter	N/A	N/A
SureTemp Plus	Annually	Basic functional verification
Braun ThermoScan PRO 6000	Annually	Basic functional verification
Braun ThermoScan PRO 4000	Annually	Basic functional verification
Battery	300 charge cycles	Replace the battery

Use the service tool, Gold licensed edition, to perform a complete functional verification and calibration of the device whenever any of the following conditions exist:

- Based on the basic functional verification, the device does not meet specifications
- The device has been dropped or otherwise damaged
- The device is malfunctioning
- The case has been opened
- An internal part has been replaced (battery excluded)

Note For instructions on using the Gold licensed edition, see the service tool help files.

Maintenance

For device maintenance information, see "Maintenance and service" in the wall system's directions for use. Covered topics include the following:

- Inspecting and cleaning the system and accessories
- Changing the battery

The Welch Allyn Service Tool

The Welch Allyn Service Tool is available in the following editions:

- **Standard unlicensed**: Download from http://www.welchallyn.com/service tool.
- **Gold licensed**: Required to perform complete functional verification and calibration. This edition requires an additional license. For more information about acquiring this license, contact Welch Allyn.

  Note To qualify for the Gold license, you must attend the Welch Allyn technical training course or complete online training for the device.

Clinicians and technical service personnel can use the service tool to manage and maintain supported Welch Allyn products. You can use the service tool to do the following:

- **Review device information**. When connected to the device, the service tool lists installed modules, installed firmware and hardware versions, warranty and repair information, status, and usage history.
- **Receive notifications when periodic maintenance is needed**. The service tool can help you manage and maintain your entire inventory of supported Welch Allyn products. Through the remote service function, the service tool can connect to Welch Allyn Customer Service. With this functionality you can automatically receive firmware updates and feature upgrades for your supported products, including software upgrades for the service tool.
- **Install updates and upgrades**. The service tool can read the firmware version for each module and check for available updates or upgrades.
- **Create a work list**. The work list provides information about service actions—referred to as work orders—that are waiting for you to perform on your maintained devices. Work orders may include periodic calibrations, upgrades, or license installations.
- **Schedule periodic maintenance**. You can use the service tool to set the service interval for each maintained device.
- **View and save logs**. You can download and save log files from the device for analysis to help diagnose and identify reported issues.
- **Create user accounts**. Administrators can create user accounts and set permission levels to control access to the features, allowing one group to perform administrative tasks and another to perform service tasks. Restricting access prevents the service tool from being used to make unauthorized changes on a connected device.
- **Perform functional verification and calibration**. The service tool can check any device requiring calibration and, if necessary, calibrate the device to match the design specifications. This feature is not supported for all products and requires the service tool, Gold licensed edition, for each supported product.

- **Recover devices**. In the rare case where a device can no longer boot because of corrupted firmware, the service tool can connect the device to Welch Allyn Technical Support to reinstall the firmware.
- **Extensible**. The service tool software accepts new plug-ins to support future Welch Allyn products.

Some of these features are enabled for any user (Standard unlicensed edition). Others require special user account privileges or a Welch Allyn service contract (Gold licensed edition). If you require gold-level support for a Welch Allyn product, please contact Welch Allyn technical support.

Battery performance

About the battery

Note The battery in the wall system provides backup power during a power outage, not power for normal use. Except during cleaning and maintenance activities, the wall system should remain connected to AC power at all times.

The device uses a rechargeable Lithium-ion smart battery. Internal circuitry enables the battery to report its condition to the device. The device displays the battery status via the LED power indicator, icons on the screen, and status messages appearing in the Device Status area of the display. Battery information may be collected using the service tool.

New batteries are shipped from the manufacturer with a 30 percent charge to extend shelf life. When installing a new battery in the device, you must plug the device into AC power to wake up the battery. If the AC power is not applied to the device, the new battery will appear discharged.

The Device Status area displays a low-battery status message when 30 minutes of power remain and again when 5 minutes remain.

Battery charging is provided by the device's internal power supply.

For a complete list of battery specifications, see the device's directions for use.

Best practices

The following practices help to extend the life of the battery and the device.

WARNING Safety risk. When handling and storing Lithium batteries: Avoid mechanical or electrical abuse. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

- Whenever possible, keep the monitor plugged in to charge the battery.
- Remove the battery when storing the device for an extended amount of time.
- Replace batteries that trigger a low battery status message when fully charged.
- Do not use damaged or leaking batteries.
- Store batteries with a 30 to 50 percent charge.
- Store batteries within the temperature range indicated for each period:

  - For storage less than 30 days: Maintain temperature between –4 °F and 122 °F (–20 °C and 50 °C).
  - For storage between 30 days and 90 days: Maintain temperature between –4 °F and 104 °F (–20 °C and 40 °C).
  - For storage more than 90 days up to 2 years: Maintain temperature between –4 °F and 95 °F (–20 °C and 35 °C).
- Recycle batteries where ever possible. In the United States call 1-877-723-1297 for information about recycling your Lithium-ion battery or go to the Call2Recycle website at http://www.call2recycle.org for additional information.
- When recycling is not an option dispose of batteries in an environmentally safe manner consistent with local regulations.

Factors affecting battery operating time

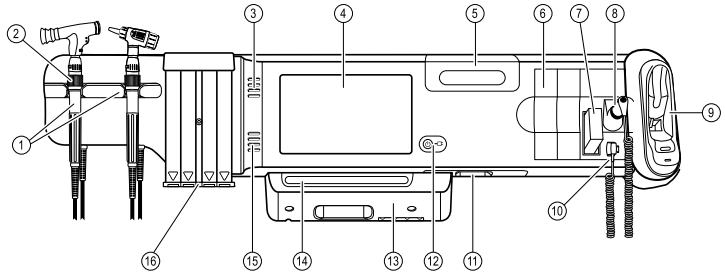
The following settings and conditions affect the battery operating time.

- The display brightness setting
- The display power-saver setting
- The device power-down setting
- Frequency and duration of alarms and alerts
- Amount of motion artifact during NIBP measurements
- Radio searching for an access point

Controls, indicators, and connectors

Note Your model might not contain all of these features.

No.	Feature	Description
Front view		

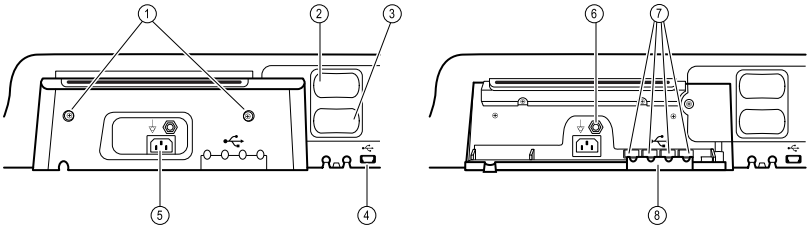


1	Physical assessment instruments - Handles and handle cradles	Handles accept any 3.5V Welch Allyn instrument head. Handle cradles support using one handle at a time. A handle turns on automatically when you remove it from a cradle and turns off when you return it.
2	Rheostat	Light output adjustment located on each handle. Turn clockwise to increase light output; turn counterclockwise to decrease light output.
3	Exhaust vents	Provide openings for heat to escape and cool the device.
4	LCD screen	1024 x 600 color touchscreen provides a graphical user interface.
5	Storage compartment	Provides covered storage for additional probe covers and other small accessories.
6	Expansion slots	Provide space to add modules.
7	SureTemp® Plus thermometer probe cover storage area	Provides storage for thermometer probe covers.
8	SureTemp® Plus thermometer probe	Supports temperature measurements from oral, axillary, and rectal sites.

No.	Feature	Description
9	Braun ThermoScan® PRO thermometer and dock	Support temperature measurements from the ear. Dock charges the thermometer battery.
10	SureTemp® Plus thermometer connector	Secures the probe connection to the wall system.
11	Blood pressure and pulse oximetry	See front underside view for more detail.
12	Power switch and LED	Power-on/Standby switch. The LED indicates the charging status when connected to AC power: • Green: The battery is charged. • Amber: The battery is charging.
13	USB/Comms cover	Houses light bar. Provides access to host USB connections for optional accessories and some routing for cords and cables.
14	Light bar	Provides a visual alarm with red and amber LEDs.
15	Speaker	Provides tones. A piezo beeper inside the monitor provides backup.
16	Specula dispenser	Dispenses KleenSpec® disposable specula in pediatric (2.75 mm) and adult (4.25 mm) sizes.

Front underside views

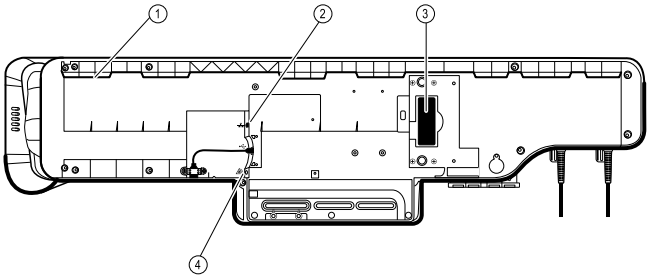
(Left: USB/Comms cover attached; Right: USB/Comms cover removed)



1	Retention screws	Attach USB/Comms cover.
2	Blood pressure	Self-contained module for easy replacement. Supports dual-lumen or single-lumen hoses.
3	Pulse oximetry	Optional Nellcor (SpO2) or Masimo Rainbow SET (SpO2 or combined SpO2/SpHb) in a self-contained module for easy replacement.
4	USB-to-computer connector	Provides a connection to an external computer for testing, data transfer, and software upgrades.
5	Power connection	Provides an external AC power connection.
6	Ground lug (equipotential terminal)	Supports electrical safety testing; terminal for connecting a potential equalization conductor.

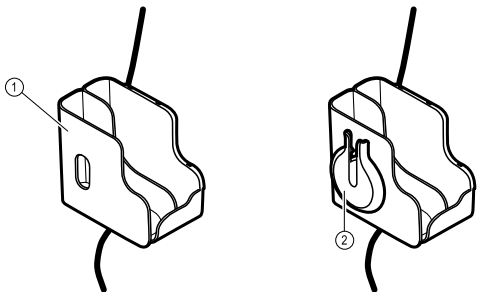
No.	Feature	Description
7	USB connectors	Provides access to host USB connections for optional accessories.
8	USB cable retainer	Reduces strain on USB cables and connectors; helps prevent cables from disconnecting.

Back view

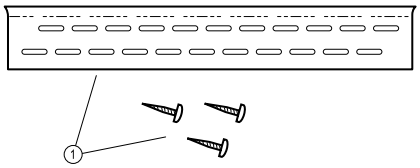
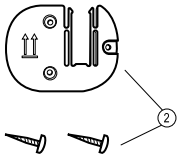


1	Recess for mounting bracket	Secures the monitor when mounted on the wall.
2	Ethernet RJ-45	Provides a hardwired connection to the computer network.
3	Li-ion battery	Provides backup power to wall system.
4	Nurse call	Provides a connection to the hospital nurse call system.

Accessory bin



1	Accessory bin	Stores accessories and organizes cables.
2	SpO2 holder	Provides location to wrap SpO2 cable and attach SpO2 finger clip.

No.	Feature	Description
Mounting materials		
		
1	Wall mounting rail bracket and hardware	Secures the wall system to the wall.
2	Accessory bin mounting bracket and hardware	Secure accessory bin to the wall and provide routing and strain relief for power cord.

Service menu

Access the Service screens

Note You cannot access the Service screens if sensors or physiological alarms are active or if vital sign measurements are displayed.

1. From the **Home** tab, touch the **Settings** tab.
2. Touch the **Advanced** tab.
3. Enter `6345` as the access code and touch **OK**.
4. Touch the **Service** tab.

   The **General** screen appears.
5. Perform service tasks by making selections or touching other tabs.

   Note Service tasks and how to do them are detailed in this section.
6. When you are done, touch **Exit**.

   The **Home** tab appears.

General tab

Restore factory default settings

Note This process deletes the custom data file. All custom data will be lost.

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **General** tab.
3. Restore factory default settings:
   - To restore radio settings to factory default values, touch **Radio settings**.
   - To restore all current settings to factory default values, touch **All settings**.

   A confirmation dialog appears.
4. Touch **OK**.

   The factory default settings are restored.

   If you selected **Radio settings**, the radio reboots, and the device remains powered on.

If you selected **All settings**, the device reboots.

Save the device configuration or custom data to a drive

You can save the device configuration or custom data (custom modifiers and custom scoring) to a USB flash drive. You can use the saved configuration to restore the device's configuration or to copy this configuration to use on other devices. You can use the saved custom data to restore custom modifiers or custom scores or you can copy them to another device.

Note Not all flash drives are supported.

Note When saving the device configuration, the location ID and asset tag information is not included in the configuration file.

1. Connect a flash drive to the USB port.
2. Go to the Service screens as described in "Access the Service screens."
3. Touch the **General** tab.
4. Touch **Save to USB**.

   A confirmation dialog appears. You can save the device configuration or custom data if either custom scores or custom modifiers are present.
5. Touch **OK**.

   If the selected file or files already exist on the USB flash drive, a popup dialog appears with the message **Device configuration file already exists. Select OK to continue with save and overwrite existing file or cancel**.
6. Touch **OK** to save the data to the USB drive or touch **Cancel** to exit without saving.

   A save confirmation message appears.

Note If the USB drive is incompatible, an information message **Unable to save configuration to USB** message appears. Touch **OK** to continue.

Note The configuration file is saved as CONFIG.PMP. The custom data file is saved as CUSTOMDATA.XML.

Load a device configuration or custom data

You can load a configuration from a USB flash drive to the device.

Note Not all flash drives are supported.

Note If your configuration includes radio parameters, make sure the radio is enabled. The radio must be enabled before you can import radio parameters.

Note If a device setting is not available in the configuration file, the setting returns to the factory default. This might be the case when the configuration file was saved from a device with a different firmware version.

Note Configuration files cannot be cloned between devices with different host software, except where the version change is minor.

1. Connect a flash drive to the USB port.

2. Go to the Service screens as described in “Access the Service screens.”
3. Touch the **General** tab.
4. Select **Configure from USB**.

   A confirmation dialog appears.
5. Select **Device configuration and/or Custom data XML**.

   A confirmation dialog appears to confirm overwriting the existing configuration.
6. Select **OK** to proceed, or **Cancel** to quit.

   The configuration from the USB flash drive overwrites the configuration on the device, and the device reboots.

Note If device configuration data is not present on the USB drive, that option will be disabled.

Note If custom modifiers are not present on the USB drive, that option will be disabled.

Note If the configuration file is incompatible, an **Unable to read configuration from USB** message appears. This might be the case if the configuration file was cloned from a device with different software version.

Delete custom data

To delete custom data, you must restore the monitor to factory defaults. Restoring the monitor to factory defaults also deletes all configuration settings.

To restore the custom configuration settings, save the configuration file to a drive and reload the file after restoring factory defaults.

To determine if custom data is loaded on the device, complete these steps:

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **Device** tab.
   A Custom file line displays the configuration name and the CRC in the Firmware version column.

Enter an asset tag

You can enter an alpha-numeric identifier in the data field to serve as an asset tag for device identification.

1. Go to the Service screens as described in “Access the Service screens.”
2. Touch the **General** tab.
3. Touch  and enter up to 20 characters.
4. Touch **OK**.

   Note If the device language changes, the asset tag remains unchanged.

Send device information to PartnerConnect

The device sends technical information, such as log files, to PartnerConnect periodically. You can also manually send this information at any time by following this procedure.

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **General** tab.
3. Touch **Sync with server**.

Self-tests tab

Calibrate the touchscreen

This tab calibrates the touchscreen, if needed.

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **Self-tests** tab.
3. Touch **Start**.
   a. Touch the location indicated by the device. The device checks the current calibration. If the location coordinates and touched location match, a Calibration Confirmation dialog appears. Touch **OK** to finish.
   b. If the locations do not match, a calibration failure dialog appears. Touch **Calibrate**, and then touch the screen as indicated. When calibration is complete, a Calibration Confirmation dialog appears. Touch **OK** to finish.

Logs tab

View an error or event log

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **Logs** tab.
3. View a log report.
   - To view an error log, select **Error.**
   - To view an event log, select **Event.**

Save error and event logs to a USB flash drive

This feature is available in software versions 1.71.03 and later.

You can save a copy of the error and event logs to a USB flash drive.

Note Not all flash drives are supported.

1. Connect a flash drive to the USB port.
2. Go to the Service screens as described in "Access the Service screens."
3. Touch the **Logs** tab.
4. Touch **Save to USB**.

   A confirmation dialog appears.

5. Touch **OK**.

   Copies of both log files are saved to the drive.

Device tab

View device and module information

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **Device** tab.

   Device and module information appears for you to view.

Licensing tab

View device licenses

Note After activating a new license, make sure to restart the device to complete the activation process.

1. Go to the Service screens as described in "Access the Service screens."
2. Touch the **Licensing** tab.

   A list of available licenses appears. Checks indicate installed licenses.

Power-up sequence

The system performs a power-on self test (POST) each time the device is powered on. During power up, the system performs a comprehensive self test of the software. If software testing is successful, the system then tests internal hardware. If all tests are successful, the system completes power up and the Home screen appears.

To perform the POST:

1. Disconnect any patient cables connected to the system.
2. Insert a fully charged battery into the system.
3. Upon each power up, confirm the following:
   a. The light bar flashes amber.
   b. The Welch Allyn startup screen appears.
   c. A beep sounds, followed by one chime.

      Note If no chimes sound, replace the speaker as specified in "Remove the speaker."

   d. The product line logo appears at the bottom of the screen.
   e. The Home screen appears.

WARNING Equipment failure risk. The system includes a fan that circulates air through the device. If the fan does not run when you power up the device, remove it from use and inform qualified service personnel immediately. Do not use the system until the problem is corrected.

If the internal self-check is successful, the system shows its normal functions with all values blank and the system is ready for operation. If the self-check fails, an error message appears in the system status area at the top of the screen. If a fault that could adversely affect the product is detected, the system enters a safe mode and stops monitoring patients. The system remains in safe mode until it is turned off by pressing the **Power** button or until it shuts down automatically after a period of inactivity.

If a system error is detected, the system becomes inactive until you press ⏻ or until the system shuts down automatically. The system displays a system fault message that contains a wrench icon(🔧) and a system fault code to aid service personnel and engineers in diagnosing the problem.

While in safe mode, the red LED bar and the piezo buzzer cycle on and off.

Troubleshooting

This section provides the following tables to help you troubleshoot the system.

- **Symptoms and solutions**: These tables list symptoms you might observe, list possible causes, and suggest actions that might eliminate the problem.
- **Technical alarm messages**: These tables list messages generated by the system software when a problem is detected. The tables explain possible causes and suggest actions that can resolve the problem.

These tables can help you diagnose and fix a problem. They do not replace basic troubleshooting skills. You must still trace the source of the problem to the board or module level to decide the best course of action.

Welch Allyn does not support component-level repair to the board or module.

For available replacement parts, see "Field Replaceable Units."

WARNING Do not perform troubleshooting on a system that is emitting smoke or exhibits other signs of excessive overheating. Disconnect the system from AC power and call Welch Allyn Technical Support immediately.

CAUTION Replace parts, components, or accessories only with parts supplied or approved by Welch Allyn. The use of any other parts can lead to inferior performance and will void the product warranty.

Symptoms and solutions

Power

Symptom	Possible cause	Suggested action
The device does not power up	A new battery was installed	Connect AC power to wake up the battery.
	The AC power is disconnected	Connect AC power.
	The power cord is defective	Replace the power cord.
	The battery is discharged	Charge the battery.
	The power button is defective	Replace the power button.

Symptom	Possible cause	Suggested action
	An internal connection is faulty	Check the power-flex cable connection at J6 on the main board.
		Check the AC power harness connections from the IEC connector to the power supply.
		Check the power harness from the power supply J2 to J30 on the main board.
		Check the battery power harness from J2 on the battery connector board to J29 on the main board.
	The power supply is defective	Check the output voltage on the power supply. The voltage should be 15 V ± 0.45V DC. If it is not, replace the power supply.
	The battery is defective	Charge the battery for 5 hours. If the battery icon on the display still shows an empty battery symbol, replace the battery.
	The main board is defective	Replace the main board.
The battery doesn't charge or run time is low	The battery is defective	Charge the battery for 5 hours. If the battery icon on the display still shows an empty battery symbol, replace the battery.
	The battery connector board is defective	Check the battery connector board for an open short or broken connector and replace if necessary.
	The battery has reached the end of its useful life	Use the service tool to check cycle count. If the cycle count exceeds 300, replace the battery.

Hardware

Mechanical Symptom	Possible cause	Suggested action
Noisy fan	Dust build up	Use canned air to blow dust out of fan.
	Fan is out of balance	Replace fan.

Mechanical Symptom	Possible cause	Suggested action
Cracks in housing	Non-approved cleaning agents	Replace plastic housing as necessary. Use only approved cleaning agents.

Display

Symptom	Possible cause	Suggested action
The touchscreen does not respond	Software error	Reboot the device. Press and hold the power button until the device shuts down. **Note** Any configuration settings not saved as default will be lost. Press the power button to restart.
	The touchscreen is out of calibration	Recalibrate the screen. In Advanced Settings, touch the **Service** tab and then touch the **Self-tests** tab.
	The touchscreen lock is activated	To unlock the touchscreen, touch  at the bottom of the screen. To disable the touchscreen lock, touch the **Settings** tab, touch the **Device** tab, and uncheck **Allow display lock timeout**.
	An internal connection is faulty	Check the connection at J48 on the main board with display flex cable.
	A display flex cable is broken	Replace the touchscreen and display assembly.
	The main board has a faulty touchscreen controller	Replace the main board.
	Excessive force or prolonged rubbing in an area of the touchscreen	Replace the touchscreen.
The display is blank when the power is on	The device is in Power-Saver mode	Wake the display by touching the screen or the **Power** button.

Symptom	Possible cause	Suggested action
	The device powered down after a period of inactivity	Turn on the device by pressing the **Power** button. In Advanced Settings, touch the **General** tab and then touch the **Display** tab. Set **Device power down** to the desired interval.
	An internal connection is faulty	Check the display harness connections at the display and J19 on the main board. Replace the cable if damaged.
	A cable is damaged	Replace the cable.
The display is dim	The brightness setting is too low	Increase the brightness setting. Touch the **Settings** tab, touch the **Device** tab, touch **Defaults**, and set **Display brightness** to the desired level.
	The display has reached the end of its useful life	Replace the display.

User interface

Symptom	Possible cause	Suggested action
Unable to access advanced settings or enter the advanced settings code	Patient monitoring is active or being simulated	Discontinue patient monitoring or stop the simulation.
	The parameter alarm is on	Dismiss the alarm.
	Intervals are turned on	Stop intervals.
Desired profile does not appear in the Profiles tab	The profile license is not installed	Check for the license: In Advanced settings, touch the **Service** > **Licensing** tabs. Verify that the profile license box is checked. If not, purchase the license and install using the service tool.
	The profile is not enabled	Enable the profile: In Advanced settings, touch the **Device** tab, then check the profile(s) you want to enable.

Communication

Symptom	Possible cause	Suggested action
Cannot communicate through the USB client connection	The battery charge is low	Connect the device to AC power and allow the battery to fully charge.
	The communications board does not receive power	Check the voltage from J49 on the main board for +5.0, ±0.5V DC. Replace the main board if necessary.
	The USB client is defective	Test the connection by connecting a PC running the service tool. Verify that the service tool is configured properly on the PC to communicate with the device. See the service tool help files.
		Replace the power cable to the communications board.
USB accessories do not communicate with the monitor	The accessory is defective	Replace with a known good accessory.
	The communications board is not receiving power	Check the voltage from J49 on the main board for +5.0, ±0.5V DC. Replace the main board if necessary.
	One or more USB host connections are defective	Test the connection with a USB thumb drive. If no power or enumeration is present, such as an LED on a thumb drive, replace the communications board.
	A USB connection from the communications board to the main board is faulty	Verify that the USB cables are connected correctly.
		Replace the USB cables.
The device does not communicate via Ethernet with the computer network	The device is not configured properly	Check the settings with your network administrator.
	The communications board is not receiving power	Check the voltage from J49 on the main board for +5.0, ±0.5V DC. Replace the main board if necessary.
	The Ethernet connection from the main board is faulty	Test the internal Ethernet cable. Replace if necessary.
		Verify that the shim is installed, if required, on the Ethernet cable connector at J11. See the reassembly notes for the main board.

Symptom	Possible cause	Suggested action
	The network Ethernet switches are not set to the correct speed to work with the device	Set the switches to 10 Mbps full duplex.
	The cable run to the switch is too long	Use a shorter patch cable.
The radio does not connect to the network	The device is out of range of the access point	Check the network status screen's RSSI value.
	The device is not configured properly	Check the settings with your network administrator.
	The antenna is defective	Check the antenna cable and antenna connection. Replace the cable and antenna if necessary.
	The communications board is not receiving power	Check the voltage from J49 on the main board for +5.0, ±0.5V DC. Replace the main board if necessary.

Alarms

Symptom	Possible cause	Suggested action
The light bar does not turn on	No alarm was triggered	Verify that the light bar flashes when the system starts.
		Verify that the alarm is triggered by a visual indicator in the message status area and an audio alarm occurs.
	There is a faulty connection	Check the light-bar harness and connections at the light bar and J46 on the main board. Replace the defective cable if necessary.
	The light-bar board is defective	Apply +3.3V to pin 1 of the harness and ground to pin 2. Verify that the amber LEDs illuminate. Connect the ground to pin 3. Verify that the red LEDs illuminate. If one or both do not illuminate, replace the LED light bar.
	The main board is defective	Verify that there are +3.3V at pin 1 of J46 on the main board.
No audible alarm occurs	No alarm was triggered	Verify that the alarm is triggered by a visual indicator in the message status area and light bar. Listen for audible sounds on start up.

Symptom	Possible cause	Suggested action
	The alarm audio is set to off	Touch the **Alarms** tab and then touch the **General** tab. Select **Alarm Audio on**.
		In Advanced settings, touch the **General** tab and then touch the **Alarms** tab. Uncheck **Allow user to turn off general audio**.
	The alarm audio is set too low	Touch the **Alarms** tab and then touch the **General** tab. Set **Volume** to the desired level.
		In Advanced settings, touch the **General** tab and then touch the **Alarms** tab. Set **Minimum alarm volume** to the desired level.
	There is a faulty connection	Check the speaker harness and connections at the speaker and J12 on the main board. Replace the defective cable if needed.
	The speaker is defective	Replace the speaker.
	The main board is defective	Test speaker output using an oscilloscope on J12.

NIBP

Symptom	Possible cause	Suggested action
The NIBP frame on the display is blank	The USB cable is defective	Replace the USB cable.
	The NIBP module is not connected	Check the internal USB connection.
	The NIBP module is not functional	Check the error logs for NIBP errors. See the service tool help files for details on specific errors and suggested actions.
		Check with Welch Allyn for software updates.
	If no NIBP error is logged, the main board might be defective	Replace the main board if necessary.

SpO2

Symptom	Possible cause	Suggested action
The SpO2 frame on the display is blank	The USB cable is defective	Replace the USB cable.
	The SpO2 module is not connected	Check the internal USB connection.
	The SpO2 module is not functional	Check the error logs for SpO2 errors. See the service tool help files for details on specific errors and suggested actions.
		Check with Welch Allyn for software updates.
	If no SpO2 error is logged, the main board might be defective	Replace the main board if necessary.

SpHb

Symptom	Possible cause	Suggested action
The SpHb frame on the display is blank	The UI license is not installed.	Purchase a license and install the license using the service tool.
	The wrong sensor is connected.	Use a sensor that supports the SpHb parameter.
	The sensor or cable expired.	Replace the sensor or cable.
	The sensor or cable is defective.	Replace the sensor or cable.
	The Masimo SpO2 module does not have the SpHb parameter enabled.	Purchase the parameter and install using the service tool.
The SpHb frame is unavailable	The selected profile does not support SpHb.	Change the profile to Intervals Monitoring or Continuous Monitoring.

Weight scale

Symptom	Possible cause	Suggested action
Weight does not appear in manual parameter frame	The weight was not selected in advanced settings	Select weight in the Advanced settings (**Settings**>**Advanced**; enter **6345** and touch **OK**>**Parameters**>**Manual**.) **Note**: You can select only four manual parameters.

Symptom	Possible cause	Suggested action
	The weight scale is not licensed	Purchase a license and install the license using the service tool.
	The weight scale is not connected	Check cables and connections. Use the service tool to test connectivity. Replace cables.
	The weight scale is not configured	Consult the scale directions for use.

Temperature

Symptom	Possible cause	Suggested action
The temperature frame on the display is blank	The USB cable is defective	Replace the USB cable.
	The temperature module is not connected	Check the internal USB connection.
	The temperature module is not functional	Check the error logs for temperature errors. See the service tool help files for details on specific errors and suggested actions.
	If no temperature error is logged, the main board might be defective	Replace the main board if necessary.

Braun ThermoScan PRO 4000 thermometer

Symptom	Possible cause	Suggested action
The thermometer batteries don't charge	The rechargeable battery pack no longer takes a charge	Replace the rechargeable battery pack.
	Primary AA batteries are installed in the thermometer	Replace the batteries with a rechargeable battery pack.
The dock LED is green, but the battery is low or depleted	Primary AA batteries are installed in the thermometer	Replace the batteries with a rechargeable battery pack.
	The dock is defective	Replace the dock.
Thermometer readings do not transfer to the device	The external USB cable is unplugged	Check the external USB connection.
	The USB bus has stopped communicating with the Braun dock. (The device displays wrench error #00000014.)	Reboot the host device.

Note For additional troubleshooting tips for the thermometer, see the manufacturer's product documentation.

Braun ThermoScan PRO 6000 thermometer

Symptom	Possible cause	Suggested action
Braun measurements are inaccurate	Probe lens is displaced	Examine lens for displacement. If you observe a gap in the seam between the bezel and the lens, replace the thermometer.
	Use inconsistent with DFU	See DFU for proper operation. Perform the Braun functional verification test using the service tool or the manual test described in this manual. Replace as necessary.
	Ingress of cleaning solutions has corroded the electronics	Replace the thermometer. Review cleaning procedures in the DFU.
Temperature tile displays ++ Braun displays HI 	Temperature taken is not within typical human temperature range. HI will be displayed when temperature is higher than 108°F (42.2°C).	Change probe cover to reset. Then, make sure thermometer is properly inserted and take a new temperature.
Temperature tile displays - - Braun displays LO 	Temperature taken is not within typical human temperature range. LO will be displayed when temperature is lower than 68°F (20°C).	
Braun displays "POS" error 	The infrared monitor cannot find a temperature equilibrium and allows no measurement.	Change the probe cover to reset. Restrict patient movement and ensure that the positioning of the probe is correct and remains stable while taking new temperature.
Braun displays "Err" error 	Ambient temperature is not within the allowed operating range (50 – 104 °F or 10 – 40 °C) or changing too rapidly.	Wait 20 seconds until thermometer turns off automatically, then turn on again. Ensure thermometer and patient are in an environment for 30 minutes where the temperature is between 50 °F and 104 °F or 10 °C and 40 °C.

Symptom	Possible cause	Suggested action
Braun display is blank or displays all icons 	System error	Wait 20 seconds until the thermometer turns off automatically, then turn on again. If error persists, reset the thermometer by removing the batteries and putting them back in. If error still persists, batteries are dead. Insert new batteries. If error still persists, contact local Welch Allyn Service Center or representative.
Braun displays Alert icon with "1" in lower right corner 	Technique Compensation (PerfecTemp) technology is not functioning or disabled	Open the temperature tab in Advanced settings to configure PerfecTemp*.
Braun displays Alert icon with "U" in lower right corner 	Unadjusted Operating Mode is enabled	Open the temperature tab in Advanced settings to configure Unadjusted Operating Mode*.
C/F button is not functional	Celsius only enabled	Open the temperature tab in Advanced settings to disable Celsius only selection*.
Pulse timer button is not functional	Pulse timer disabled	Open the temperature tab in Advanced settings to enable pulse timer*.
Braun displays lock icon and is unresponsive	Security mode enabled and anti-theft timer has expired	Return Braun thermometer to dock to unlock. Security mode is set on temperature tab in Advanced settings.
Braun display is blank after performing upgrade	Software upgrade was interrupted	Remove and replace the battery while holding the C/F button or return to the dock while holding the C/F button. Retry upgrade.

*Host device Braun 6000 settings override configuration settings from Welch Allyn Service Tool.

Note For additional troubleshooting tips for the thermometer, see the manufacturer's product documentation.

Manual parameters

Symptom	Possible cause	Suggested action
The manual parameter frame does not appear on the Home tab	No manual parameters are selected in Advanced settings	Select the desired manual parameters in Advanced settings (**Settings**>**Advanced**; enter **6345** and touch **OK**>**Parameters**> **Manual**). **Note**: You can select only four manual parameters.
BMI is not displayed	The BMI parameter is not selected	Select the BMI parameter in the advanced settings.
	Height or weight was changed	Adjusting the height or weight clears BMI.
	Weight scale not connected	BMI is available only from a weight scale with height.

Barcode reader

Symptom	Possible cause	Suggested action
The barcode reader powers on but does not transfer data	No license is installed	Purchase a license and install the license using the service tool.
	The barcode reader is not programmed to use USB Com Port Emulation mode	Refer to the manufacturer's documentation to program the barcode reader to USB COM Port Emulation mode.
	The barcode reader is not supported	For Honeywell model 4600g barcode readers, verify that the PID is set to 020A.
	The barcode scanner did not enumerate properly	Power cycle the Connex device.
The patient ID or clinician ID do not match	The barcode scanner is not programmed to properly interpret the barcode	Program the barcode scanner to turn on required symbology and to also add or delete characters to form correct ID.

Handles

Symptom	Possible cause	Suggested action
The lamp does not illuminate	There is no lamp in the handle head	Install a lamp in the handle head.
	The lamp is burned out	Install a new lamp.

Symptom	Possible cause	Suggested action
	The other handle is off the cradle	Place the other handle in the cradle.
	The system is not powered up	Power up the system.
	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The lamp is too dim	The rheostat setting is too low	Increase the rheostat setting.
	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The lamp is too bright	The rheostat setting is too high	Decrease the rheostat setting.
	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The lamp brightness does not adjust	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The handle becomes very hot to the touch	The lamp has been on for an extended period of time	Return the handle to the cradle.

Note The GS 777 Wall Transformer will accommodate instrument heads of the Welch Allyn approved Halogen and LED type bulbs without any manual adjustment. For information about instrument heads, follow the instructions provided in their directions for use.

Errors

Symptom	Possible cause	Suggested action
#000000001	An internal software error	Power down and restart. If the error persists, call Welch Allyn Technical Support for service.
#000000002	An unclassified hardware error	
#000000003	Graphics RAM POST	
#000000004	System RAM POST	
#000000005	Watchdog POST	
#000000006	FLASH initiation failed	
#000000007	A display system error	
#000000008	A real-time clock error	

Symptom	Possible cause	Suggested action
#000000009	An audio system error	
#000000010	An Ethernet system error	
#000000011	The touchscreen controller failed	
#000000012	Five or more SMBUS errors over a 1-minute period occurred	
#000000013	The communications module or main board failed	
#000000014	Main board USB hub failure	
#000000015	Software watchdog timer reset	

Technical alarm messages

This section presents tables of technical alarm and information messages to help you troubleshoot issues on the device. For information about physiological, dialog, or informational messages, see the device's directions for use.

When the device detects certain events, a message appears in the Device Status area at the top of the screen. Message types include the following:

- **Information messages** appear on a blue background.
- **Very low-priority alarms** appear on a cyan background.
- **Low- or medium-priority alarms** appear on an amber background.
- **High-priority alarms** appear on a red background.

Technical alarm messages are low priority or very low priority unless noted in the Message column.

You can dismiss a message by touching the message on the screen, or, for some messages, you can wait for the message to time out.

To use these tables, locate the message that appears on the device in the left column of the table. The remainder of the row explains possible causes and suggests actions that can resolve the issue.

If you cannot resolve the issue, use the service tool to read the error log files or use the service tool to perform a functional test[1] on the module reporting the message.

NIBP messages

Message	Possible cause	Suggested action
Alarm		
NIBP air leak; check cuff and tubing connections.	The NIBP module has an air leak	Check the cuff, tubing, and connections for leaks. If no leaks are found, retake the measurement. If the message

[1] Requires the service tool, Gold licensed edition.

Message	Possible cause	Suggested action
		reappears, replace the NIBP module.
NIBP not functional. Call for service.	Internal errors or messaging errors occurred	Check the error logs for NIBP errors. See the service tool help files for details on specific errors and suggested actions.
		Check with Welch Allyn for software updates.
	The ambient temperature is out of range	Use the monitor in the specified temperature range.
Unable to determine NIBP; check connections; limit patient movement.	Pressure exceeded the maximum limit for this patient mode	Check connections; limit patient movement. Clear the alarm and retry NIBP.
Unable to determine NIBP; check connections and tubing for kinks.	NIBP tubing on the outside of the device is kinked	Check the connections and tubing for kinks. Clear the alarm and retry NIBP.
	The NIBP module needs to be calibrated	Perform NIBP calibration.
	Tubing inside the NIBP module is kinked	Replace the NIBP module.
Incorrect NIBP cuff size; check patient type.	A neonate cuff is in use with the monitor in adult or pediatric mode	Check the patient type and cuff size. Clear the alarm and retry NIBP.
Inflation too quick; check NIBP cuff and tubing connections.	NIBP inflation was too quick	Check the connections and tubing for kinks. Clear the alarm and retry NIBP.
Unable to determine NIBP; check inflation settings.	Target pressure was too low	Check inflation settings and change as necessary. Clear the alarm and retry NIBP.
		Change the inflation setting.
	Too many attempts	Change the inflation setting.
Information		
User cancelled NIBP reading.	Blood pressure reading cancelled by user	Touch **OK** to dismiss. Touch NIBP Start button to dismiss and restart the NIBP reading.
Tube type does not match device configuration. (NIBP measurement is available)	The tube type connected to the monitor does not match the NIBP configuration.	Touch **OK** to dismiss. Configure the NIBP advanced settings to match the tube type, patient type, and algorithm.

Message	Possible cause	Suggested action
	The single lumen switch on the NIBP connection is stuck	Use a small screw driver to press the switch in and release until the spring returns the switch to the dual-lumen position.
Excessive patient movement.	The NIBP reading was deemed not precise	Touch **OK** to dismiss. Limit patient movement and restart the NIBP measurement.

SpO2 and SpHb messages

Message	Possible cause	Suggested action
Alarm		
SpO2 not functional. Call for service.	The sensor is defective	Replace the SpO2 sensor with a known good sensor.
	An internal error occurred	Update the host software to the current version.
		Check the error logs for SpO2 errors. See the service tool help files for details on specific errors and suggested actions.
		Check with Welch Allyn for software updates.
Attach SpO2 sensor to monitor.	The sensor was not detected	Check the sensor connection.
		Replace the sensor.
Replace the SpO2 sensor.	The sensor is faulty	Replace the sensor.
	The sensor expired (applies only to SpO2/SpHb sensors)	Replace the sensor.
	No sensor is connected	Connect the sensor.
	The patient cable is faulty	Replace the cable.
	The SpO2 module is faulty	Verify module functionality by replacing the sensor with the applicable SpO2 tester. If the message persists after you have installed the SpO2 tester, replace the module.
Searching for SpO2. (High-priority alarm)	The SpO2 sensor is not attached to the patient's finger	Touch the alarm icon or the SpO2 frame to dismiss the alarm.
		Set the SpO2 Alarm limits to off.

Message	Possible cause	Suggested action
		Reattach the SpO2 sensor to the patient's finger.
Low SpO2 signal quality. Check sensor. Low SpHb signal quality. Check sensor. Low perfusion. Check sensor.	Poor sensor placement on the patient.	Remove the sensor from the patient and reapply.
	The patient cable or sensor is defective	Replace the patient cable or sensor.
	The SpO2 module is faulty	Verify module functionality by replacing the sensor with the applicable SpO2 tester. If the message persists after you have installed the SpO2 tester, replace the module.
SpO2 mode only. Check sensor or cable.	The sensor is operating as an SpO2-only sensor because it failed to calibrate properly	Reattach the cable to the monitor.
		Remove the sensor from the patient and reapply.
SpO2 sensor expires in... **Note** This message appears only on devices configured with SpHb.	The sensor will expire soon	Replace the sensor.
Replace the SpO2 cable.	The cable is not functioning properly	Replace the cable.
	The SpO2 module is faulty	Verify module functionality by replacing the sensor with the applicable SpO2 tester. If the message persists after you have installed the SpO2 tester, replace the module.

Temperature messages (SureTemp)

Message	Possible cause	Suggested action
Alarm		
Connect temperature probe.	No probe is connected	Connect a temperature probe and retry.
	The probe is faulty	Replace the temperature probe.
	The temperature module returned a connect probe message	Connect a temperature probe and try again. If a probe is already connected, replace the probe.
	The SureTemp temperature module is faulty	Verify module functionality by replacing the temperature probe with the CAL-KEY assembly. If the message persists after you

Message	Possible cause	Suggested action
		have installed the CAL-KEY assembly, replace the module.
Insert correct color-coded probe well.	The probe well is missing	Insert a temperature probe well.
	The SureTemp temperature module is faulty	Verify that the lever arm on the back of the probe well housing is engaging switch SW1 on the temperature PCBA. If the problem persists, replace the module.
Replace temperature probe.	The probe is faulty	Replace the temperature probe.
	The SureTemp temperature module is faulty	Verify module functionality by replacing the temperature probe with the CAL-KEY assembly. If the message persists after you have installed the CAL-KEY assembly, replace the module.
Retry temperature measurement. **Note** This message often accompanies other temperature messages.	A probe heater or data error occurred	Retry the temperature measurement. If the problem persists, replace the probe.
	User settings require adjustment	Adjust the user settings and retry.
	The ambient temperature is out of range	Operate the monitor within the specified temperature range. Retry patient temperature measurement.
	The SureTemp temperature module is faulty	Verify module functionality by replacing the temperature probe with the CAL-KEY assembly. If the message persists after you have installed the CAL-KEY assembly, replace the module.
Temperature time limit exceeded. Retry temperature measurement.	The direct mode timed out	Return the temperature probe to the probe well and retry measurement.
Information		
Tissue contact lost.	Lost tissue contact while attempting to acquire temperature reading or acquired reading was performed with limited tissue contact	Touch **OK** to dismiss the message. Start a new temperature reading.

Temperature messages (Braun ThermoScan PRO)

Message	Possible cause	Suggested action
Alarm		
Unable to detect temperature. Retry measurement.	Measurement was not taken Measurement recalled from memory	Retry measurement.
	Loose or broken USB cable	Check USB connection and cable. Replace as necessary.
	Dead battery Braun display is blank or battery icon shows one bar	Recharge or replace battery.
	Braun displays “POS” error	Change the probe cover to reset. Restrict patient movement and ensure that the positioning of the probe is correct and remains stable while taking new temperature.
	Braun displays “Err” error Ambient temperature is outside the allowed operating range (50–104°F or 10–40°C) or changes too rapidly	Wait 20 seconds until thermometer turns off automatically, then turn on again. Ensure thermometer and patient are in an environment for 30 minutes where the temperature is between 50 °F and 104 °F or 10 °C and 40 °C.
Thermometer might be docked improperly.	Thermometer is not properly docked	Re-dock thermometer.
	Thermometer has dirty contacts	Clean dock and thermometer contacts with 70 percent isopropyl alcohol. See Cleaning Instructions for Braun ThermoScan PRO 6000.
Braun temperature not functional. Call for service.	Communication timeout BDD transfer took longer than expected POST did not complete or failed within the expected time period	Remove and replace battery to reset, then return thermometer to dock. If error persists, return for service.
	POST failure Braun display is all icons or blank	
	Unsupported parameter Sensor data definition error (occurs when the proxy is unable to set parameters to the sensor using local DDS)	

Message	Possible cause	Suggested action
	WACP serialization failure	
	Braun maximum battery voltage exceeded Battery voltage is too high	
	Braun BDD compatibility	
	Braun BDD unexpected compatibility	
	Braun send message failure	
	Braun bridge failure	
Temperature is not functional. Call for service.	An internal error occurred	Check the error logs for temperature errors. See the service tool help files for details on specific errors and suggested actions.
		Check with Welch Allyn for software updates.
	The USB cable is disconnected	Check the USB cable.
	The battery is depleted or missing	Replace the batteries.

Weight scale messages

Message	Possible cause	Suggested action
Weight scale not functional. Call for service.	The weight scale is not operating properly	Check the scale.
		Use the service tool to check connectivity with adapter.
		Replace cables.
		Replace adapter.

Communications module messages

Message	Possible cause	Suggested action
Communications module did not power on properly. Power down the device. (High-priority alarm)	The communications board is not connected properly to the main board	Check the USB connection at J4. Check the Power connection at J50. Check the voltage from J49 on the main board for +5.0V ±0.5V DC. Replace the main board if necessary.

Message	Possible cause	Suggested action
	The communications board malfunctioned	Replace the communications board.

Radio messages

Message	Possible cause	Suggested action
Alarm		
Radio not functional. Call for service.	A hardware failure occurred	Replace the radio.
	The radio has the wrong software	Update the radio software.
Radio error. Power down and restart.	The monitor and the radio failed to establish communication with each other	Power down and restart the monitor. If the problem persists, check the following: • The USB and power connections from the main board to the communications board. • The connection from the radio board to the communications board. • Monitor and radio software compatibility. Replace the radio if necessary.
Unable to establish network communications. Radio out of network range.	The radio is no longer communicating with the access point	Verify that the monitor is within the radio coverage area. Verify that the radio is correctly configured to the network. If this message appears intermittently, check the RSSI value.
Unable to establish network communications. Call for service.	Unable to get an IP address from the DHCP server	Verify that a DHCP sever is available on the network. The monitor requires an IP address from a DHCP server.
Radio Software upgrade failed.	The connection with the host was broken	Re-establish the connection and try again.
	The radio was not provisioned correctly	Reset radio to factory defaults and try again.
	Hardware error	Replace the radio.
Information		
Radio software upgrade in progress. Do not shut down.	Radio software is being written to the radio	Do not interrupt the upgrade until complete.

Message	Possible cause	Suggested action
Radio card rebooting; please wait.	The radio is restarting as part of the software upgrade	Do not interrupt the upgrade until complete.

Ethernet messages

Message	Possible cause	Suggested action
Alarm		
Network not found; check network cable connection.	A network cable is unplugged	Check the network cable connection.
	A network connection is broken elsewhere	Check network wiring.

USB messages

Message	Possible cause	Suggested action
Alarm		
External device not recognized.	An unrecognized external device is connected	Reconfigure the external device.
		Replace the external device.
		Disconnect the unsupported device.
USB Communication failure. Call for service	An internal or external device is connected but failed enumeration	Power down and restart.
		Check the external device.
		Check external and internal USB connections.
Information		
External device not licensed for use.	A device requiring a license has been connected to the USB connection	Obtain an authorization code from Welch Allyn to activate the license.
Unable to save configuration to USB.	There was a problem writing the configuration file to the USB flash drive	Use a Welch Allyn approved flash drive.
		Verify that the flash drive is not locked.
		Verify that there is space available on the flash drive.
Unable to read configuration from USB.	There was a problem reading the configuration file to the USB flash drive	Restart and try again.

Message	Possible cause	Suggested action
USB accessory disconnected.	The USB cable between an external device and the monitor is disconnected	Confirm that the USB cable is connected to the device and the monitor.

System messages

Message	Possible cause	Suggested action
Alarm		
Set date and time.	The date or time is not set	Set the date and time.
	The date or time is not set properly	Reset the date or time.
Incompatible Welch Allyn device.	A known USB device enumerates, but fails	The device may be faulty. Test a known good device.
Unexpected restart occurred. Call for service.	A system error caused the monitor to restart	Check Event and Error logs. Run service tool verification test.
Information		
Device shutdown is not available at this time.	The device cannot perform an immediate shutdown	Touch **OK** to dismiss message. If any process is active, wait for it to complete before attempting shutdown.
		If the device is unresponsive, hold down the power button until device shuts down. **Note** Any configuration changes not saved as default are lost.

Battery power manager messages

Message	Possible cause	Suggested action
Alarm		
Low battery 5 minutes or less remaining. (High-priority alarm)	Battery power is extremely low	Plug the monitor into AC power. If not plugged in, the monitor automatically powers off.
Battery is absent or faulty.	There is no battery in the monitor	Insert a battery.
Battery is absent or faulty. Call for service.	The battery is faulty	Replace the battery.
Low battery 30 minutes or less remaining.	The battery power is low	Touch the alarm icon to dismiss or plug the monitor to AC power.

Message	Possible cause	Suggested action
Information		
Device is operating in battery mode.	The AC power cord has been disconnected	Touch the alarm icon to dismiss or plug the monitor to AC power.

Configuration Manager messages

Message	Possible cause	Suggested action
Alarm		
Unable to load configuration; using factory defaults.	A configuration load error occurred	Restore factory defaults. If the error persists, replace the main board.
Functional error. Call for service.	A critical configuration load error occurred	Replace the main board.
Information		
No connection for send.	The monitor is not configured to the network	Change advanced setting to disable **Automatically send on manual save** control. Configure the monitor to the network.

Patient data management messages

Message	Possible cause	Suggested action
Alarm		
Maximum number of patient records saved. Oldest record overwritten.	The maximum number of patient records has been exceeded	Go to the Review tab and delete old records to prevent the alarm from appearing when new records are saved.
Information		
No data saved.	No patient data is available	Take or enter vital signs before saving.
Patient ID required to save data.	The configuration requires a patient ID to save data	Disable **Require patient ID to save readings** on the **Patient** tab, available from the **Data management** tab in Advanced settings.
Clinician ID required to save data.	The configuration requires a clinician ID to save data	Disable **Require clinician ID to save readings** on the **Clinician** tab, available from the **Data**

Message	Possible cause	Suggested action
		management tab in Advanced settings.
Patient ID required to send data.	The configuration requires a patient ID to send data	Add a patient ID.
Patient list is full. Delete some patients to add more.	The maximum number of patients was exceeded	Delete a patient from the list to add a new patient.
Stop intervals to select new patient.	The device is set to take interval readings	Stop intervals before changing the patient.
No connection for send.	No connectivity is available to support sending data manually or automatically sending data on manual save	Check network connection.
		Check Radio Configuration settings.
Unable to identify clinician.	The clinician ID or password is incorrect	Confirm the clinician ID and password (if applicable), and retry.
Unable to retrieve list.	The device is unable to retrieve a patient list from the network	Check the network connection.
		Check the Radio Configuration settings.
		Verify that the server is available.

Network messages

Message	Possible cause	Suggested action
Lost connectivity with host.	The central station or other host application has stopped running or is not operating properly	Confirm that the host application is running properly.

Disassembly and repair

These procedures provide instructions for system disassembly and board removal. Except where otherwise noted, the assembly procedure is the reverse of the disassembly procedure.

An exploded view of the assembly precedes disassembly instructions, with callouts referencing the parts. In the instructions, numbers in parenthesis refer to callouts in the exploded drawings.

Each procedure may include one or both of the following:

- **Reassembly notes**: This contains information specific to reassembly not addressed in the disassembly instructions.
- **When replacing the *component***: This contains information specific to installing a new option or replacement part.

For information about screws or connectors used in the system, see "Screws" and "Connectors" in the appendices.

Note After completing any of these procedures and before returning the system to service, you must use the service tool, Gold edition, to complete the full suite of functional tests to ensure that all systems are operating within the design specifications. For more information about these tests and the service tool, see "Functional verification and calibration."
If you do not have the service tool, contact Welch Allyn Technical Support.

WARNING Electrical shock hazard. Disconnect AC power before opening the system. Disconnect and remove the battery before proceeding with disassembly. Failure to do this can cause serious personal injury and damage to the system.

WARNING Risk of fire, explosion and burns. Do not short-circuit, crush, incinerate, or disassemble the battery pack.

WARNING Safety risk. Do not attempt to service the system when the system is connected to a patient.

CAUTION Before disassembling the system, disconnect the AC power cord and any attached accessories (SpO2 sensors, blood pressure hoses and cuffs, temperature probes, and accessories).

CAUTION Before disassembly, remove the probe well in the temperature module.

CAUTION Perform all repair procedures at a static-protected station.

CAUTION When the system case is opened, regard all parts as extremely fragile. Execute all procedure steps with care and precision.

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

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

Required tools and equipment

- #1 Phillips bit
- #2 Phillips bit
- #10 Torx bit
- 5/16-inch socket
- Torque driver calibrated for 6.0 in-lb ±1.0 in-lb
- Torque driver calibrated for 7.5 in-lb ±0.5 in-lb
- Torque driver calibrated for 12.0 in-lb ±1.0 in-lb
- Slotted screwdriver
- Tweezers
- Needle-nose pliers
- Spudger
- Tie-wrap tool calibrated for torque specification 5 INT
- Tie-wrap cutter
- Soft lens wipes
- Scissors or other cutting device
- Use canned air to remove dust and debris.
- A coin to open the battery door. Select a size that comfortably fits the slot.
- Pro Gaff tape

Power down the device

You can power down the device as follows: 1) by briefly pressing the power button on the housing and then following the onscreen prompts, or 2) by using onscreen controls alone. These methods help prevent the inadvertent clearing of patient information and configuration settings you have changed and saved so that they are available at the next startup.

CAUTION Avoid using a long press of ⏻ to power down the device when it is functioning normally. You will lose patient data and configuration settings.

Key term

Patient context	Condition in which a patient ID and patient type have been selected on a device.

Option 1. After the device is powered up, a brief press of the power button opens an onscreen dialog with the following options:

- **Power down**. Device behavior varies based on the active profile, whether or not patient trend data is stored, and whether or not patient context is established. See the Notes in Option 2, step 3.
- **Sleep**. The Sleep button clears the display and puts the device into Display power-saving mode.
- **Cancel**. The Cancel button dismisses the dialog.

Touch **Power down** and complete the power-down procedure as described in Option 2, steps 3 and 4.

Option 2. To use onscreen controls alone to power down the device, follow these steps:

1. Touch the **Settings** tab.
2. Touch the **Device** tab.
3. Touch **Power down**.

   A Power-down options dialog appears.

   Note If the device is in the Continuous Monitoring profile and continuous patient measurement data has been stored **with** patient context, the Power-down options dialog displays the following options:

   - Save patient data on the device
   - Remove patient data from the device

   Note If the device is in the Continuous Monitoring profile and continuous measurement patient data has been stored **without** patient context, the Power-down options dialog displays the following options:

   - Save patient data on the device with a temporary Patient ID
   - Remove patient data from the device

4. Select the desired option and then touch **Power down**.

The Power-down options dialog

The buttons in this dialog produce varied effects, as noted below:

- **Power down**.
  - When the Continuous Monitoring profile is not active: The device performs a complete software shutdown, and any patient context and patient measurement data displayed onscreen are cleared.
  - When the Continuous Monitoring profile is active, but no trend data has been stored: The device performs a complete software shutdown.
  - When the Continuous Monitoring profile is active and trend data has been stored:
    - If you opted to save patient data, existing patient context (if established) and trend data are stored and can be re-established on the next power up.
    - If you opted to save patient data but no patient context was established, trend data is stored under a temporary ID and can be re-established on the next power up.

  - If you opted to remove patient data from the device, monitoring and patient assignment end, and trend data on the device is deleted.

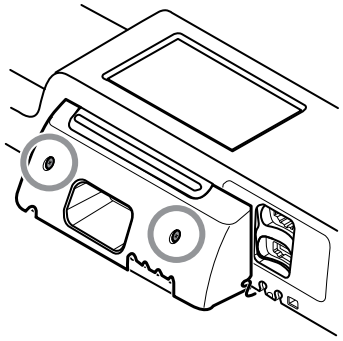
- **Cancel**. This button dismisses the dialog and returns you to the previous screen.

Note If your device is configured with a Braun thermometer, avoid powering down the device between patient measurements to help maintain an adequate charge to the Braun dock.

Module replacement — bottom housing

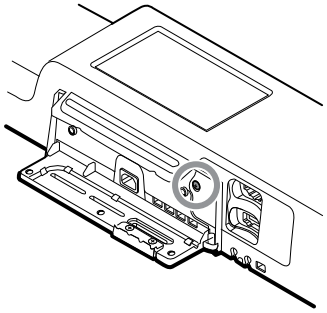
1. Power down the system.
2. Disconnect the NIBP hose and the SpO2 cable if present.
3. Disconnect the AC power cord.
4. Remove the comms connection cover.

   Loosen the two captive screws, using a #2 Phillips screwdriver, until the cover is free from the housing.



5. Remove the module cover.

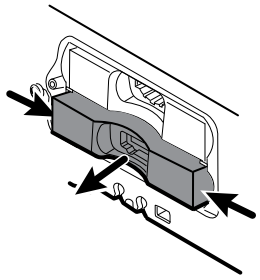
   Loosen the captive screw using a #2 Phillips screwdriver, until the cover is free from the housing.



   Note The modules fit tightly in the housing, but can become loose over time. Support the modules to prevent them from falling out as you remove the module cover.

6. Remove the module you want to replace.

   Slide the module out of the housing by inserting a finger in the slot at each end of the module and gently pull the module away from the housing until it is out.



7. Disconnect the USB cable from the rear of the module.

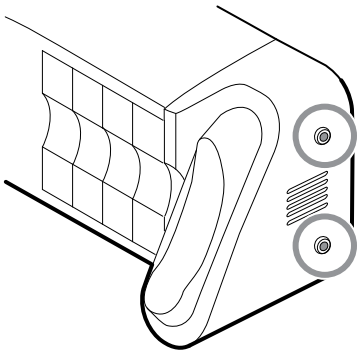
Reassembly notes

- When aligning the module with the housing, the USB connection is on the left.
- The NIBP module must always be in the front-most slot.

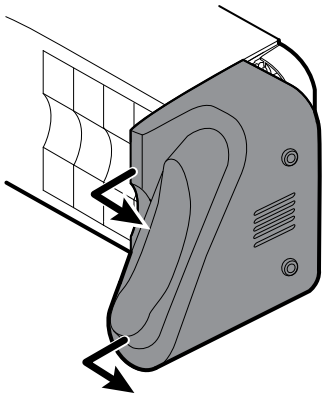
Module replacement — main housing

Note Check how the end cap or Braun thermometer housing are attached to the device. If bushings with captive screws attach the end cap or Braun thermometer housing to the side of the main housing as shown in step 1, proceed with the instructions as presented. If you don't see bushings with captive screws on the end cap or the Braun thermometer housing, then these parts are attached to the back of the chassis, not the right side. To remove these parts and access any front-facing modules, first remove the device from the wall.

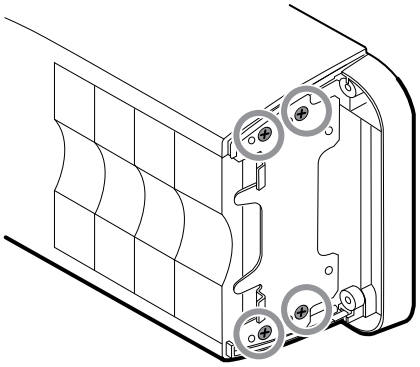
1. Loosen the two captive #2 Phillips screws that hold the end cap or the Braun thermometer housing in place.



2. Remove the end cap or thermometer housing by sliding the piece away from the wall and then to the right.



3. For systems with the Braun thermometer option, disconnect the USB cable from the rear of the Braun housing.
4. Locate and remove the module retaining plate by removing the four #2 Phillips screws.



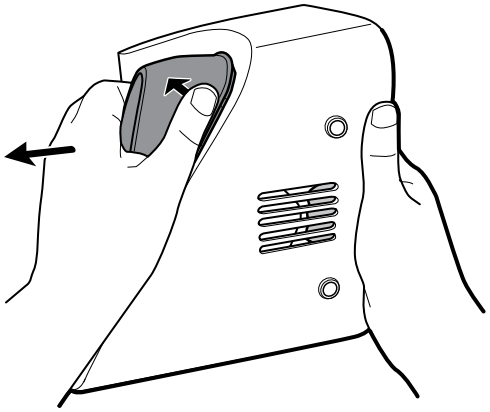
5. Slide any blank face plates or modules to be removed toward the open end.

Note When removing any connected modules, disconnect the USB cables before you remove the module.

Note If you are replacing a Braun 4000 thermometer with a Braun 6000 thermometer, you must also replace the dock.

Remove the Braun dock from the housing

Hold the Braun housing with your right hand and the dock with your left hand as shown. With your right-hand fingers inside the housing, gently press the housing toward you and away from the dock. At the same time, gently push the dock away from you until the dock unsnaps from the housing. When the dock is completely loose, remove it from the housing.

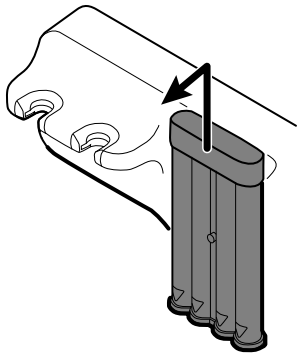


Reassembly notes

- When aligning the module with the housing, the USB connection is on the bottom.
- The temperature module must always take up the last two spots closest to the end.
- The blank cover's beveled edge must be on the right when facing the device for proper alignment.
- When replacing the Braun dock, insert the bottom of the dock into the housing, align the molded ridges in the top of the dock with the slots in the top of the housing, and snap the dock into the housing.

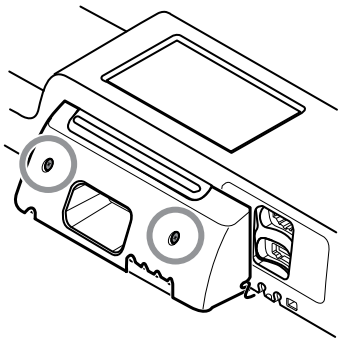
Remove the system from the wall and remove the battery

1. Power down the system.
2. Disconnect any detachable sensors and cables including:
   - Blood pressure cuffs and hoses
   - Temperature probes and cables
   - Braun thermometer
   - SpO2 sensors and cables
   - 3.5V instrument heads
3. Remove any items in the storage area and any other loose items before attempting to remove the system from the wall.
4. Close the storage area door and seal it with a piece of adhesive tape to prevent the door from opening.
5. Remove the speculum holder by lifting it up and away from the handle housing.

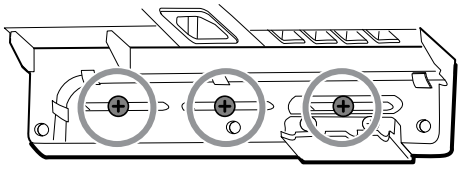


6. Remove the AC power cord.
7. Remove the comms connection cover.

   Loosen the two captive screws, using a number 2 Phillips screwdriver, until the cover is free from the housing.



8. Remove the wall anchor screws using a number 2 Phillips screwdriver.



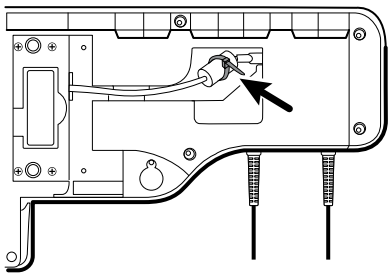
9. Hold the bottom and top of the system and push it up to remove the system from the wall mounting bracket.
10. Set the system upside down on a large, flat surface. Make sure that the display is protected from pressure or getting scratched.
11. Remove the battery.

Remove the handle module assembly

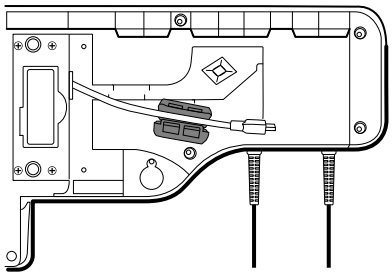
- Remove the system from the wall and remove the battery as described.

1. Place the device on a large, flat surface with the display facing down.

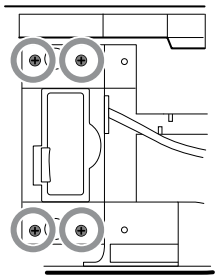
   Ensure that the display is protected from pressure or getting scratched.
2. Cut and remove the cable tie that holds the USB ferrite in place.



3. Remove the ferrite from the USB cable by pulling apart the two clips and lifting up.



4. Remove the four large Phillips screws while supporting the end of the handle module assembly.

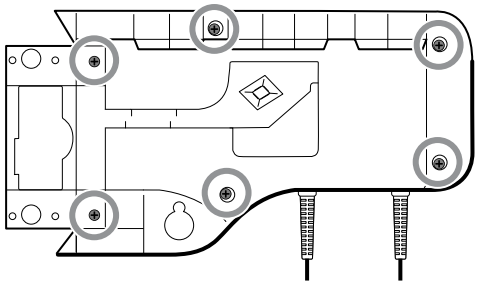


5. Lift the handle module assembly up and away from the main assembly while guiding the USB cable through the slotted opening.

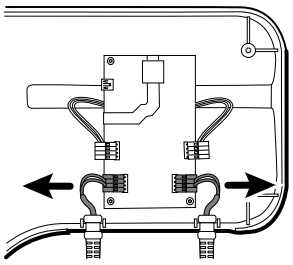
Remove the handles

- Remove the handle module assembly from the main assembly as described.

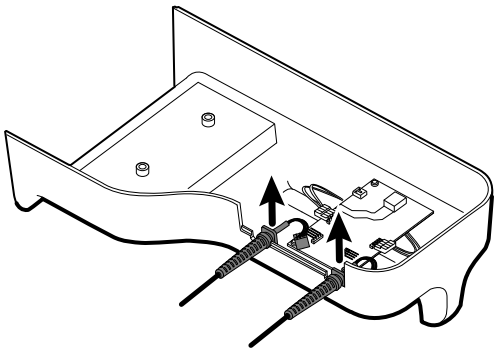
1. Remove the six large Phillips screws on the back of the assembly, then lift and remove the rear handle housing.



2. Disconnect the handle connector wires from the 767 Controller PCBA.



3. Lift and remove the handle cables from the front handle housing.

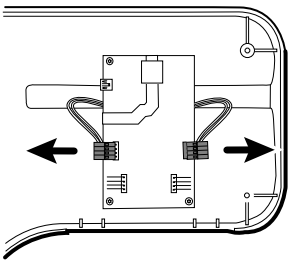


Reassembly note
When reconnecting the handle connection wires to the handle PCBA, the connecting wires must be facing up and away from the PCBA.

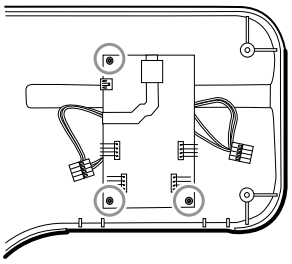
Remove the 767 controller PCBA

- Remove the handles as described.

1. Disconnect the two IR wire connectors from the handle PCBA.



2. Remove the three torx screws.



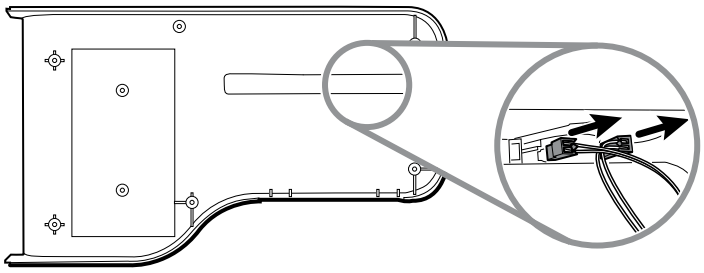
3. Lift and remove the PCBA.

Reassembly note
When reconnecting the IR wire connectors to the handle PCBA, the connecting wires must be facing down and toward the cradle assemblies.

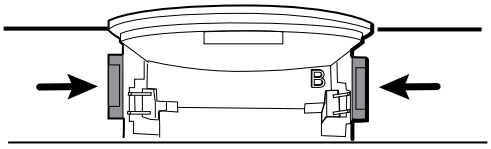
Remove the handle cradle and optical assemblies

- Remove the handles as described.
- Remove the 767 Controller PCBA as described.

1. On the rear of the assembly, disconnect both IR wires from the optical sensors.

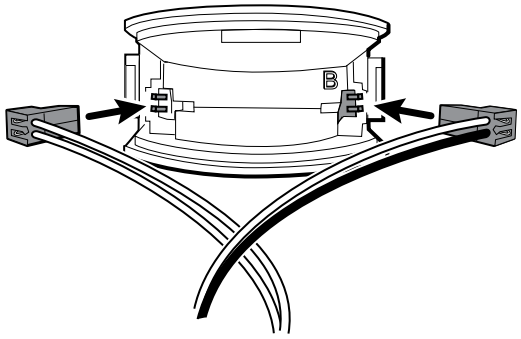


2. Push in the snap tabs and remove the cradle assembly by pushing outward.

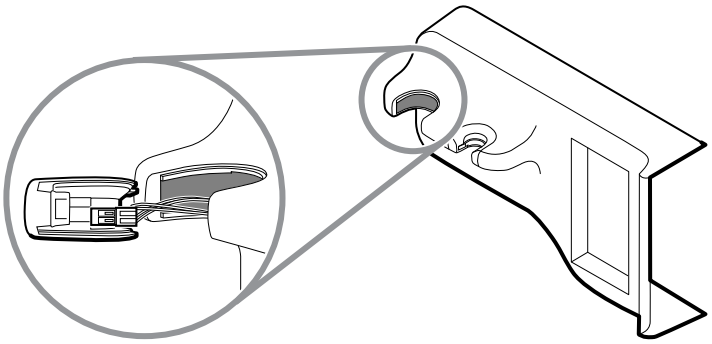


Reassembly notes

- For ease of assembly, connect the IR wire assemblies to the optical sensors before attaching the handle cradle to the handle assembly housing.
- Attach the connector with the black and white wires to the optical detector (indicated by the letter "B" molded into the cradle plastic). Attach the connector with the red and white wires to the optical emitter. The wires should face inward once the handle cradle is assembled.



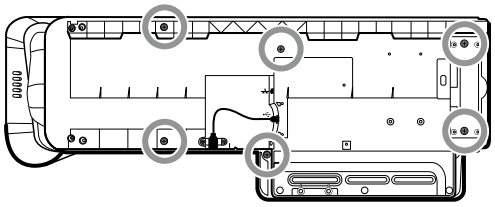
- Snap the handle cradle assembly into the front housing. Make sure that the cradle assembly tab and the beveled edge are at the top of the housing.



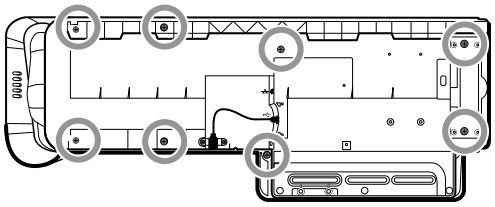
Open the chassis

- Remove the system from the wall and remove the battery as described.
- Remove the handle module assembly from the main assembly as described.
- If the Braun thermometer housing is accessible from the side, remove it as described in "Module replacement — main housing."

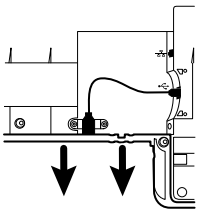
1. Complete one of the two substeps below based on your system details.
   - For systems built before July 15, 2011 with the Braun thermometer housing or end cap mounted to the rear chassis:
     a. Remove the 6 screws as shown.



     b. Disconnect the USB cable from the rear of the Braun housing.
     c. Remove the two large Phillips screws that hold the end cap or the thermometer housing in place, and remove the end cap or thermometer housing.
   - For systems built after July 15, 2011 with the Braun thermometer housing or end cap mounted to the side mounting bracket:
     a. Follow the instructions in the section "Module replacement — main housing" to remove the Braun housing, if present.
     b. Remove the 8 screws as shown.



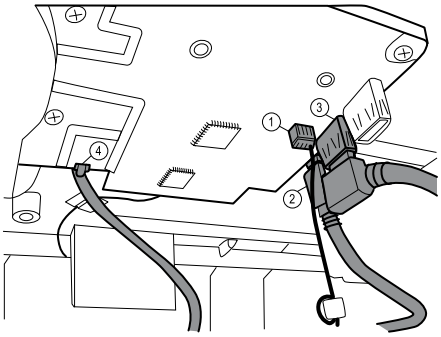
2. Gently pry the housing plastic away from the USB port (enough to clear) and lift the chassis slightly away from the front housing.



CAUTION Multiple wire connections are still connected between the front housing and the chassis. These must be disconnected before it is safe to completely separate the two pieces.

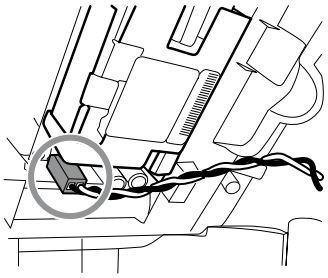
3. Carefully lift the chassis away from the front housing while leaving slack in all cable connections.

   From the communications board, disconnect the following:



Number	Item
1	Small 4-pin connector
2	Mini USB cable
3	USB cable
4	Ethernet cable

4. Disconnect the power supply cable from the power supply.

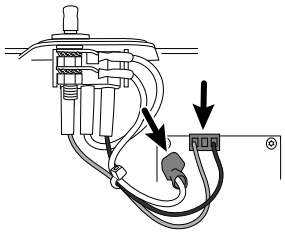


5. Separate the chassis from the front housing.

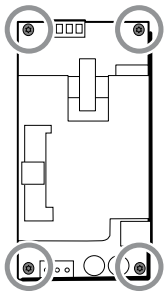
Remove the power supply

- Open the chassis as described.

1. Disconnect the green ground cable and the AC power harness from the power supply.



2. Remove the four torx screws.



3. Remove the power supply.

Reassembly notes

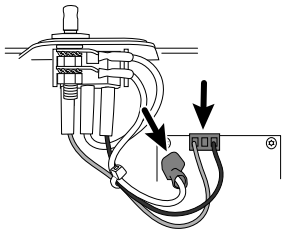
- When reinstalling the power supply, orient the board so that the end of the board with the AC to power supply (J1) connection is closest to the IEC connector.

Remove the ground lug, AC power harness assembly, and IEC connector

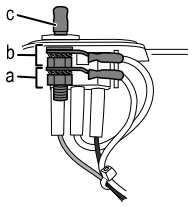
- Open the chassis as described.

CAUTION Do not disconnect the AC power harness from the IEC connector unless you are replacing it. Once disconnected, the AC power harness cannot be reused.

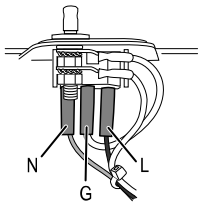
1. Disconnect the AC power supply harness power and ground from the power supply.



2. To remove the ground lug:

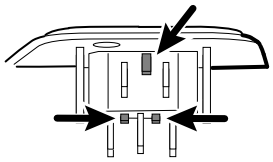


   a. Remove the 10mm hex nut and slide out the star lock washer and the ground wire (power supply) ring terminal.
   b. Remove the next 10 mm hex nut and slide out the star lock washer, the ground wire (mains) ring terminal, and the flat washer.
   c. Remove the bare ground lug by pulling it out from the outside of the chassis.
3. To remove the IEC connector:
   a. Disconnect the three power wires: neutral (N), ground (G), and line (L).



Note You must now replace the AC power harness. It cannot be reused.

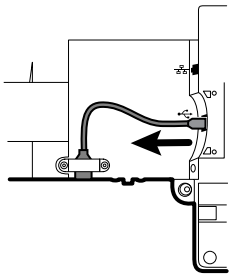
b. Push in on the three plastic release tabs to release the IEC connector.



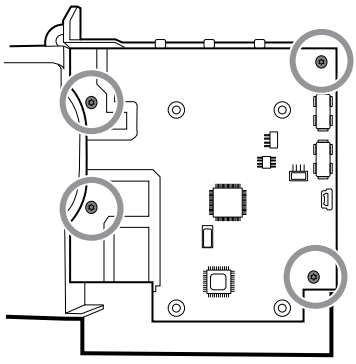
Remove the communications board

- Open the chassis as described.

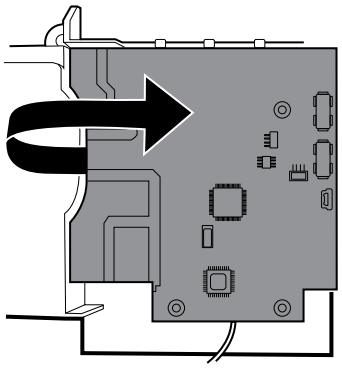
1. Disconnect the mini-USB connection on the outside of the chassis.



2. Turn over the chassis to access the communications board.
3. Remove the four torx screws.



4. Lift the communications board from the chassis.
5. For systems with the radio option, rotate the communications board counter-clockwise. Make sure not to pull on the antenna cable. Turn the board over and place it inside the chassis.



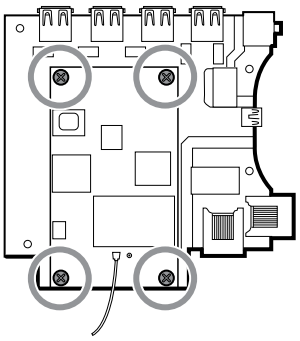
6. If replacing the communications board, remove the radio board as described in "Remove the radio board and antenna."

Remove the radio board and antenna

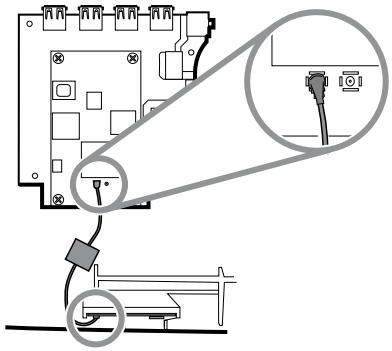
CAUTION Do not remove the radio antenna from the chassis unless you are replacing the radio and antenna or the chassis.

- Open the chassis as described.
- Remove the communications board as described.

1. Remove the radio board:
   a. Turn the communications board over to access the radio board, taking care to avoid straining the antenna cable.
   b. Remove the four small machine screws securing the radio board to the communications board.



   c. Hold the communications board with one hand while grasping the radio board at the opposite end from the antenna connection and pull the radio board away from the communications board.
2. Remove the antenna and antenna cable.



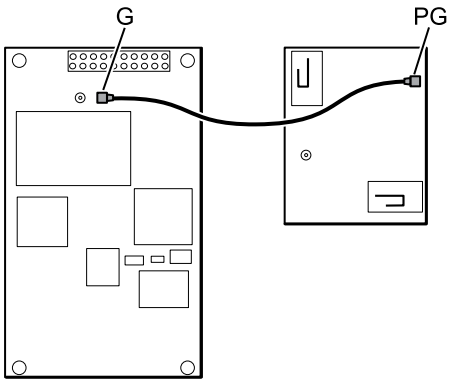
a. Remove the Pro Gaff tape securing the antenna cable to the housing.
b. Carefully disconnect the antenna cable by lifting up on the wire neck just before the connection point.
c. Use a soft tool such as a spudger to separate the adhesive from the inside of the chassis of the antenna plate.

Reassembly notes
If the antenna is removed:

1. Clean the chassis and mounting surface with 70 percent isopropyl alcohol.
2. Peel the backing off the double-stick tape and affix it to the chassis antenna plate.
3. Mount the antenna to the antenna plate. Make sure the PG terminal on the antenna board is facing outwards.

Antenna cable connection:

1. Attach the antenna cable to terminal G on the radio board. Attach the other end of the cable to the antenna on terminal PG.

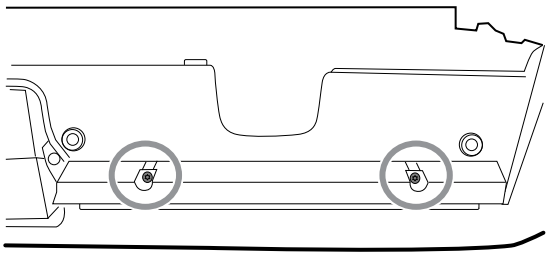


2. Once the antenna, radio, and communications board are mounted and secure, secure the antenna cable to the housing with Pro Gaff tape.

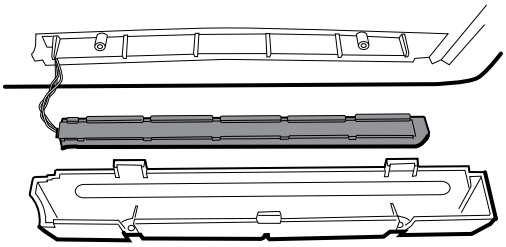
Remove the light bar

- Remove the comms connection cover as described.

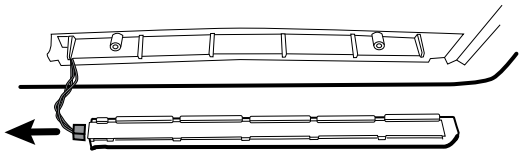
1. Remove the two torx screws from the light bar cover.



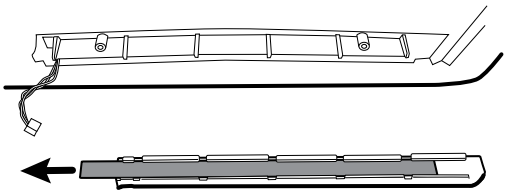
2. Remove the light bar and cover.



3. Remove the light bar from the light-bar cover.
4. Disconnect the light-bar harness from the light-bar board.



5. Remove the light-bar board from the light bar by sliding the board out from the connector end.



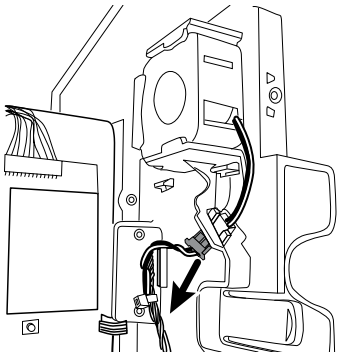
Reassembly notes

- Insert the light-bar board by placing the end without the connector into the open end of the light bar.
- Make sure that you slide the light-bar board into the light bar until the connector end is flush with the end of the light bar.
- Make sure that you feed the light-bar harness wires through the slot so they do not get pinched during reassembly.

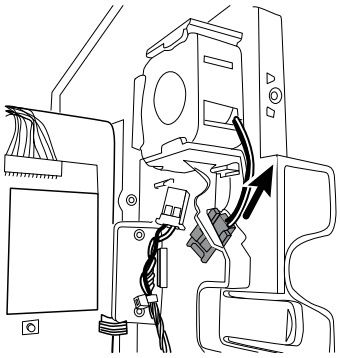
Remove the fan

- Open the chassis as described.

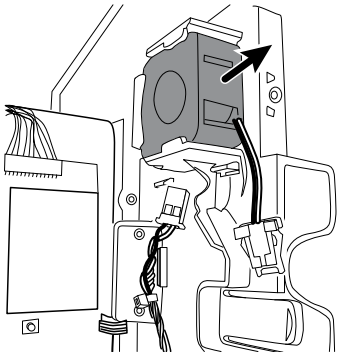
1. Disconnect the power cable from the fan harness connector.



2. Press the flanges on the sides of the fan harness connector and separate the fan connector from the power panel.



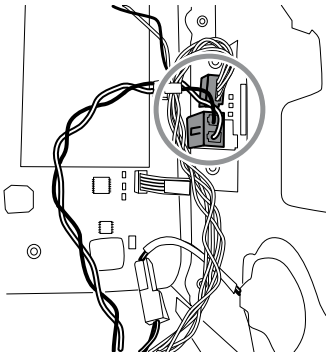
3. Slide the fan up and remove.



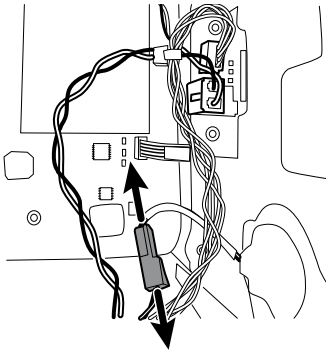
Remove the power panel

- Open the chassis as described.
- Remove the fan as described.

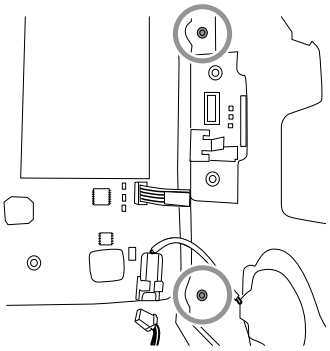
1. Remove the two harness connectors from the battery board.



2. Disconnect the speaker connector wire.



3. Remove the two torx screws that attach the power panel to the front housing and slide the power panel out of the housing.



Remove the speaker

Before you begin, remove the following as described in the manual:

- Power Panel

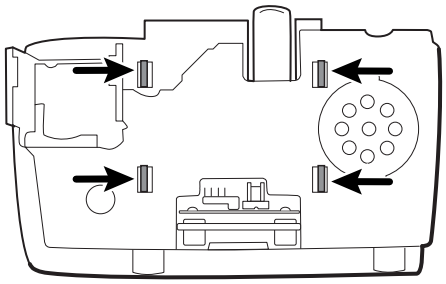
1. Carefully pry the speaker and adhesive away from the power panel.
2. Remove any remaining gasket material and clean the surface with 70 percent isopropyl alcohol.
3. Remove the paper on the speaker to expose the adhesive on the gasket.
4. Apply pressure to the outer radius of the speaker assembly to assure good adhesion with the power panel.

Remove the battery board

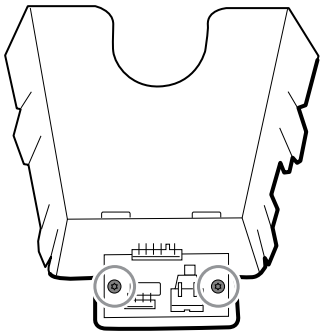
Before you begin, remove the following as described in the manual:

- Power Panel

1. Remove the battery compartment from the power panel by pushing in on the four plastic tabs.



2. Remove the two torx screws from the battery compartment and remove the battery board.



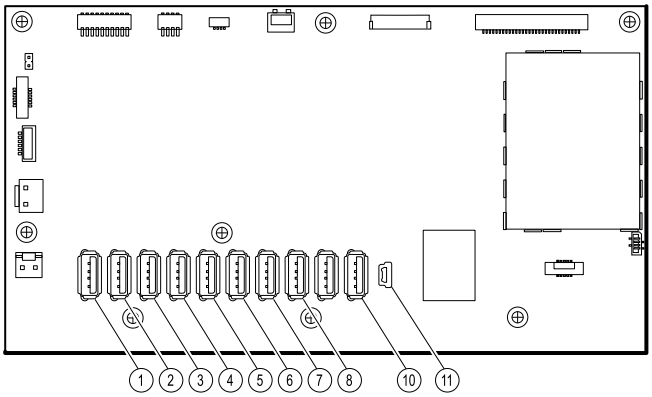
3. Secure the new battery board to the battery compartment with two Torx screws.

Remove the power wire harness and main wire harness

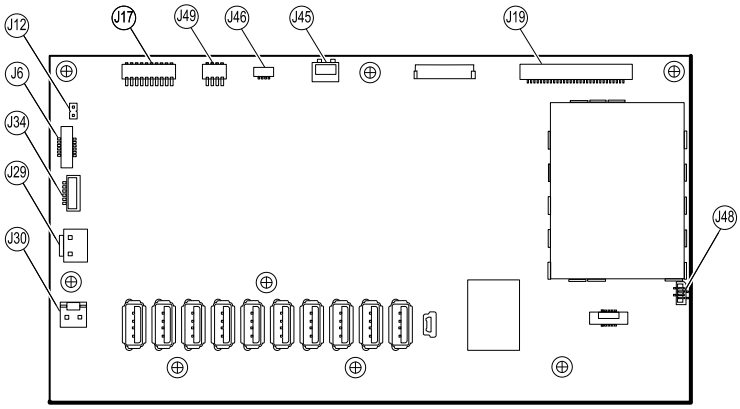
Note If removing the main board or LCD, disconnect the harness from the main board as described in this section. It is not necessary to cut wire ties attaching the harness to the housing unless you are replacing the harness.

- Open the chassis as described.
- Remove the power panel as described.

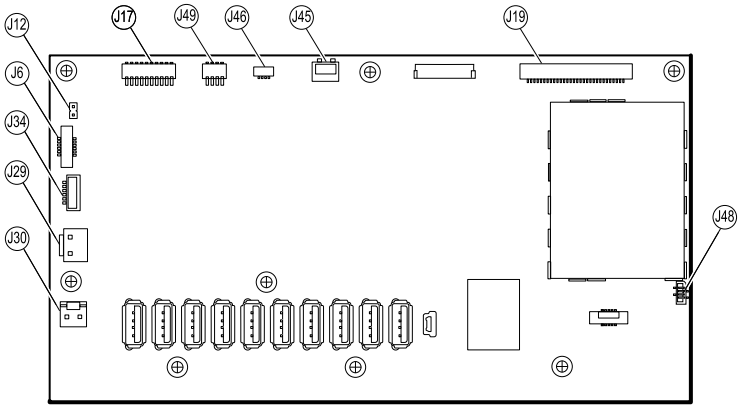
1. Disconnect the USB connections from the main board in positions 1 through 8 and 10 and 11. Remove the USB cables from the cable separator to clear the work area.



2. Disconnect the connectors at J29 and J30 to disconnect the power harness.



3. Disconnect the connectors at J34, J12, J49, J46, and J45 to disconnect the main harness.

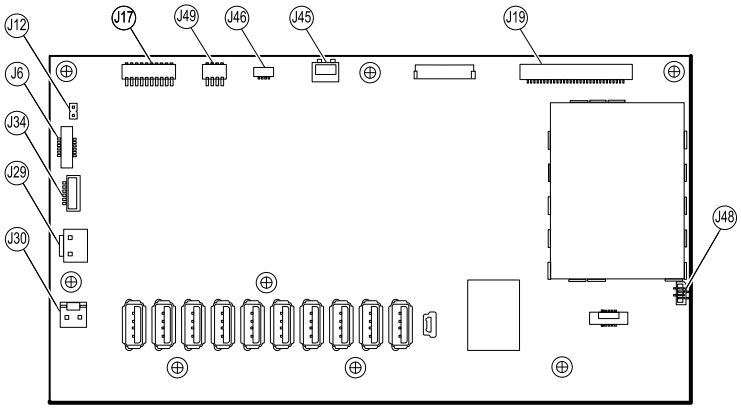


4. If you are replacing the power harness, carefully cut the two wire ties and remove the harness.
5. If you are replacing the main harness, cut the two wire ties and remove the harness.

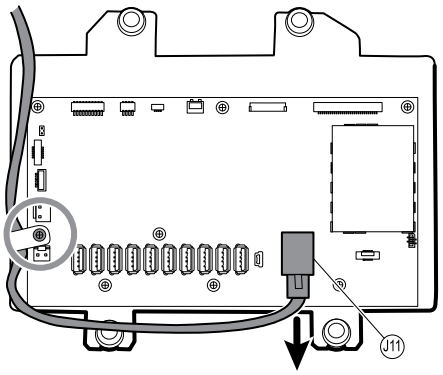
Remove the main board

- Open the chassis as described.
- Remove the power panel as described.
- Disconnect the power harness and main harness from the main board as described.

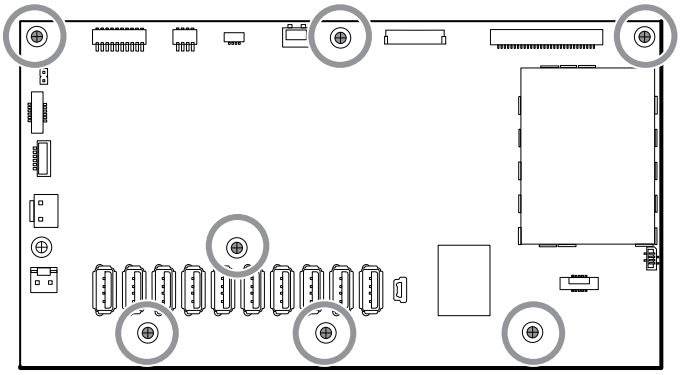
1. Disconnect the following on the main board:
   a. The power button flex cable at J6.
   b. The LCD harness at J19.
   c. The LCD flex cable at J48.



2. Remove the Ethernet cable:
   a. Disconnect the Ethernet cable from the Ethernet cable connector at J11 on the main board.
   b. Remove the screw that secures the Ethernet cable P-clamp to the main board.
   c. Remove the Ethernet cable.



3. Remove the seven small Phillips screws that secure the main board to the LCD frame.



4. Remove the main board.

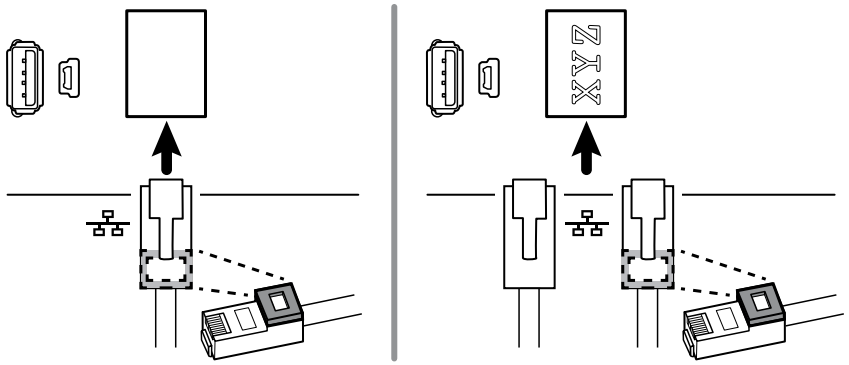
Reassembly notes

- Ensure that the LCD flex cable is not under the main board.

  CAUTION The solder joint of the LCD connector (J48) is fragile. When inserting or removing the flex cable, do not stress the solder joint.

- Route the Ethernet cable outside the PEM stud and not underneath the main board.
- Connect the Ethernet cable to the main board:
  - Verify whether your model contains PCBA 407574 revision B, C, or D. Revisions B and C have no logo on the top surface of the Ethernet port. Revision D has a logo on the top surface of the Ethernet port. See the figure below.
  - For PCBA 407574 revisions B and C, confirm that the Ethernet cable has a shim on one connector. Insert the connector with the shim into the Ethernet port.
  - For PCBA 407574 revision D, you can use either an Ethernet cable with a shim or an Ethernet cable without a shim. Insert the connector into the Ethernet port.

Revisions B and C **Revision D**



- When securing the main board, install the screw near J30 *after* you install the Ethernet cable.
- If the light bar is not installed, install the light-bar harness into the housing, positioning the ferrite bead near the main board.

When replacing the main board

- When ordering the replacement main board, order the standard license for the model being serviced. You will receive an authorization code to enter in the service tool to reactivate the licenses included with the original configuration.
- Before installing the main board, record the serial number of the main board.
- After reassembling the system, use the service tool to provision the system as follows:
  - Enter the device's serial number. This can be found on the bottom of the device.
  - Enter the main board (host controller) serial number.
  - Select the device model number from the Connex Integrated Wall System dropdown menu.
  - Restore any previously licensed features by entering the authorization code in the service tool. Use the authorization codes that accompanied the replacement board, along with any additional license authorization codes previously installed.

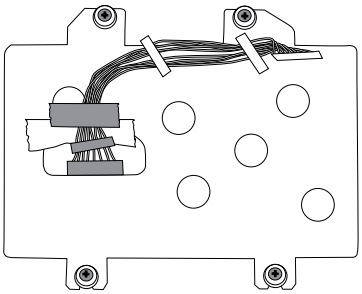
Record the device serial number on the license authorization code cards received with the replacement board and retain for future use. If the license is lost, you can reuse the authorization code on the same device.

- Update the host controller software to the current version or version in use at your facility. If the required version of the host software is not available after connecting the device to the service tool, contact Welch Allyn Technical Support.

Remove the LCD

Before you begin, remove the main board as described.

1. Remove the tape and disconnect the LCD harness from the LCD. For easier access to the connector, you can slide the ferrite bead closest to the connector up the harness.



2. Remove the four shoulder screws that secure the LCD frame.
3. Remove the LCD frame.

   Note Be sure to support the LCD if you are removing it with the frame. The foam strips on the LCD might cause the LCD to stick to the frame.

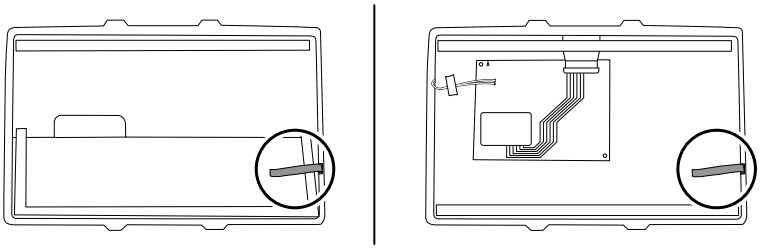
4. Remove the LCD.

Reassembly notes

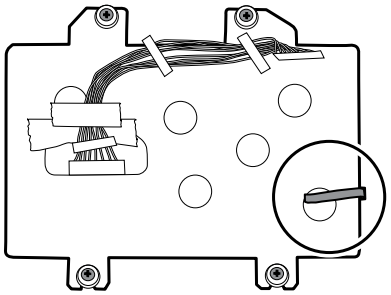
- Ensure that the LCD flex cable is not under the LCD frame.

  CAUTION The solder joint of the LCD connector (J48) is fragile. When inserting or removing the flex cable, do not stress the solder joint. Do not cause creases that may break the connections.

- Insert the display into the bezel in the front housing with the LCD flex cable on the lower right as shown. Verify that the LCD flex cable feeds through the bezel's clearance feature. (The image on the left applies to older displays while the one on the right applies to newer displays.)



- Place the LCD frame over the LCD. Verify that the LCD frame does not cover the LCD flex cable.



- Replace the Pro gaff tape in the frame opening under the display harness as shown.
- After connecting the display harness to the LCD, secure the harness to the LCD frame with Pro gaff tape as shown.

When replacing the LCD frame

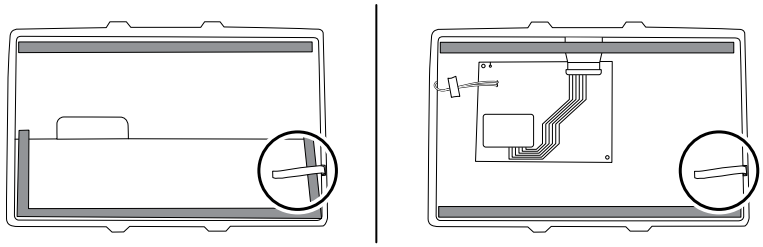
- Install a 3-inch strip of Pro Gaff tape over the top part of the LCD harness cutout to protect the LCD harness from abrasion.
- Install the LCD harness. Use isopropyl alcohol to clean the area in the scribed boxes where you will mount the harness's ferrite beads. Expose the sticky backing on the ferrite beads and mount them in the scribed rectangles.

  Note If you don't place the ferrites correctly in marked areas, they will obstruct the placement of other components like the MCE board.

- Replace the Pro Gaff tape in the frame opening under the display harness.
- After connecting the display harness to the LCD, secure it to the LCD frame with Pro Gaff tape as shown.

When replacing the LCD

- Peel the protective sheet from the LCD.
- Verify that the foam strips are installed on the back of the LCD near the top and bottom edges. On older displays (see image on the left), the foam strip extends halfway up from the bottom on both sides of the LCD. On newer displays, the foam strips are only on the top and bottom of the LCD (see image on the right).



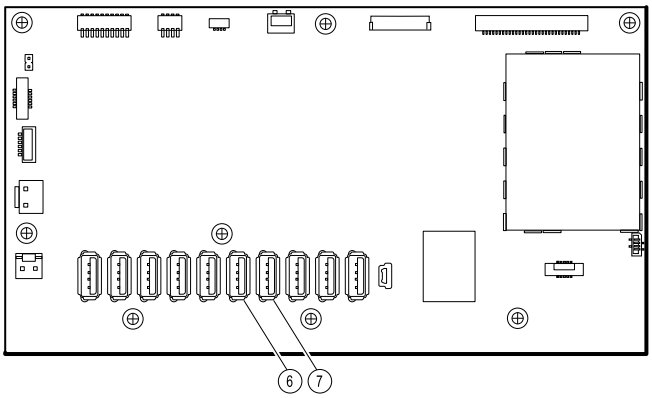
- Verify that the LCD flex cable feeds through the bezel's clearance feature.
- Insert the LCD into the bezel in the front housing with the LCD flex cable on the lower right.
- Add Pro Gaff tape to the edge of the LCD frame, where the harness passes through to connect to the LCD, to prevent abrasion to the LCD harness.

- When adding the ferrite beads, align the beads with the marks on the LCD frame.
- Add Pro Gaff tape to secure the harness to the LCD frame where the harness passes through.

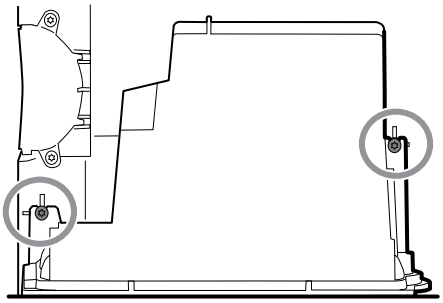
Remove the module well

- Remove the modules from the chassis as described.
- Open the chassis as described.

1. Disconnect the USB cables from the connectors on the main board in positions 6 and 7.



2. Remove the torx screws on both sides of the module well.

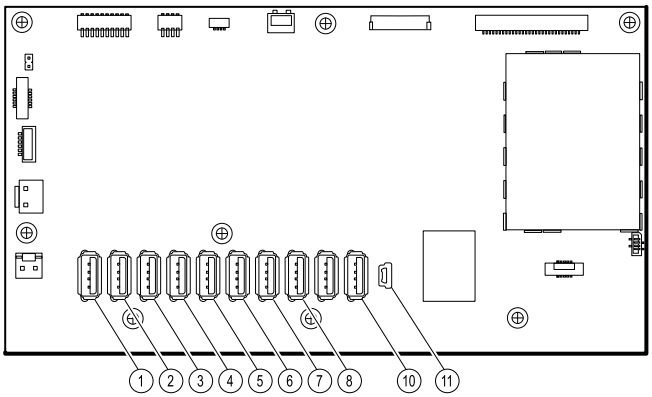


3. Remove the module well from the front housing. Remove the attached USB cables if necessary.

Reassembly notes

- When aligning the module with the housing, the USB connection is on the left.
- The NIBP module must always be in the front slot.
- Make sure that the USB cables are routed through the module well to the correct corresponding module.
  - The NIBP module must be connected to USB position 7 on the main board.
  - The SpO2 module must be connected to USB position 6 on the main board.

Module USB connectors

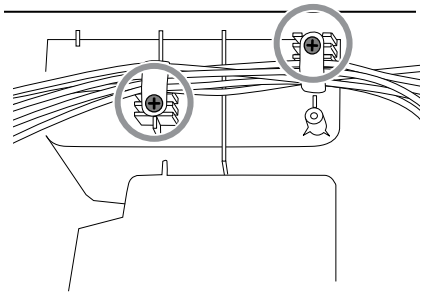


USB slot	Material number	Connection
1	715891	MCE to modules—Braun if installed
2	715891	MCE to modules
3	715891	MCE to modules
4	715891	MCE to modules
5	715891	MCE to modules
6	715891	MCE to SpO2
7	715891	MCE to NIBP
8	712980	MCE to communication board
9	n/a	none
10	715891	MCE to handle module PCBA
11	713282	MCE to comms

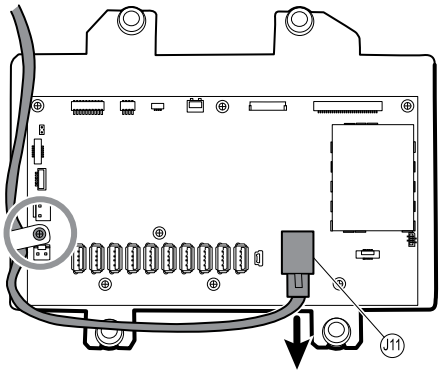
Remove the front housing

- Remove the modules from the chassis as described.
- Remove any modules or blank face plates from the main housing as described.
- Open the chassis as described.
- Remove the light bar as described.
- Remove the power panel as described.
- Remove the power harness and main harness from the main board as described.

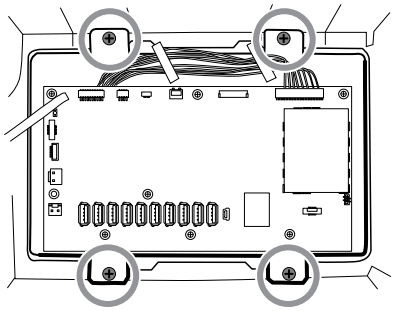
1. Disconnect all USB connections from the main board.
2. Remove the bundled USB cables from the housing by removing the two large Phillips screws.



3. Disconnect the power button cable from the main board at J6.
4. Disconnect and remove the Ethernet cable.



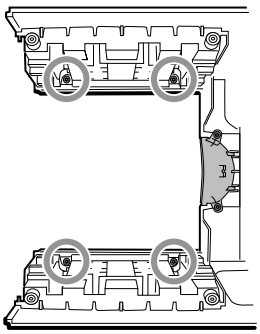
5. Remove the four large Phillips screws that mount the LCD to the housing.



6. Carefully lift the LCD and the attached main board from the housing.

CAUTION Support the LCD as you lift the assembly from the housing. The LCD is not secured to the assembly.

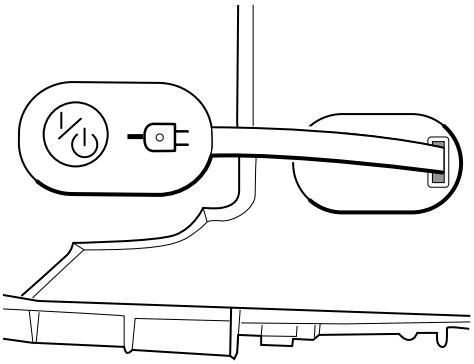
7. Remove the module well as described.
8. Remove the two module tracks by removing the four torx screws.



Replace the power button

- Open the chassis as described.
- Remove the module well as described.

1. Disconnect the power button flex cable from the main board at J6.
2. Peel off and discard the power button from the front housing.
3. Thoroughly clean the housing surface with isopropyl alcohol before applying the new power button.
4. Completely remove the adhesive from the rear of the new power button.
5. Route the power button flex cable through the slot on the front of the system and firmly press the power button in the recessed well of the front housing.

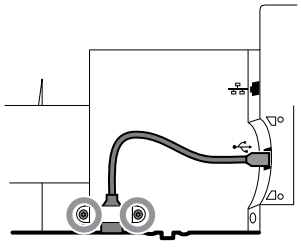


6. Connect the power button flex cable to J6 on the main board.

Remove the chassis

- Open the chassis as described.
- Remove the power supply as described.
- Remove the communication board as described.
- For systems with the radio option, remove the radio board and antenna as described.

Remove the USB client cable from the outer side of the chassis by removing the two torx screws.



Functional verification and calibration

Functional verification tests

The functional verification tests help to confirm the proper operation of the device and its options. The tests may also be useful as a diagnostic tool to help isolate a malfunction. It is not necessary to disassemble the device to perform these tests.

For periodic service, you can—at a minimum—perform the basic functional verification tests described in this manual. These tests are for customers who have the Standard unlicensed edition of the Welch Allyn Service Tool. If you have the Gold licensed edition of the service tool, use the tool to perform a complete functional verification and calibration of the device in lieu of performing the basic tests.

Note To document basic functional verification tests, print out the "Service record" sheets at the end of this manual and record the test results.

Any time you open the case, you must use the service tool, Gold licensed edition, to perform a complete functional verification and calibration of the device before returning the device to service.

Note For instructions on using the Gold licensed edition, see the service tool help files.

About the Welch Allyn Service Tool

The service tool is required to complete functional verification and calibration tests. The service tool is available in the following editions:

- **Standard unlicensed edition**: Enables NIBP functional verification tests to satisfy the recommended annual service. If any Standard unlicensed edition testing shows an out-of-specification result, use the Gold licensed edition to perform a full calibration.
- **Gold licensed edition**: Checks the functionality and calibration of the device. As it checks the device, the Gold licensed edition also performs any needed calibration to bring the device within specifications. This full suite of tests is required to complete a repair. Each time you open the case, you must use the Gold licensed edition to test the device before returning the device to normal use.

For information about the service tool, see the following:

- For instructions on installing and using the service tool, see the *Welch Allyn Service Tool Installation and Configuration Guide.*

- To use the Standard unlicensed edition to test the NIBP module, follow the instructions in this service manual.
- For instructions on using the Gold licensed edition, see the service tool help files.

Standard unlicensed edition service tool tests performed

The service tool performs the following functions on the host device and installed options.

Test	Description	NIBP	Temp	SpO2	SpHb	Host
Reads firmware	Displays the firmware version	✓	✓	✓	✓	✓
Firmware upgrade	Loads the latest firmware into the module	✓	✓	✓	✓	✓
Leak test	Verifies leaks using 100 cc volume	✓				
Accuracy test (NIBP)	Checks the accuracy of transducers across the pressure range	✓				
Overpressure test	Verifies the maximum cuff pressure for adults and neonates	✓				

Gold licensed edition service tool tests performed

The service tool tests the host device and installed options as listed in the following table.

Test	Description	NIBP	Temp	SpO2	SpHb	Host
POST	Performs the power-on self test (POST)[1]	✓	✓	✓		✓
Firmware version	Checks the firmware version	✓	✓	✓		✓
Firmware upgrade	Loads the latest firmware into the module	✓	✓	✓		✓
Leak	Verifies leaks using 100 cc volume	✓				
AD noise	Checks noise on the pressure channel	✓				
Calibration	Calibrates pressure transducers	✓				
Accuracy (NIBP)	Checks the accuracy of transducers across the pressure range	✓				
Dump	Checks dump valves	✓				
Inflation	Verifies the pneumatic pump	✓				

Test	Description	NIBP	Temp	SpO2	SpHb	Host
Valve control	Verifies control of the system valve	✓				
Overpressure	Verifies pump limits	✓				
Probe detect	Verifies the operation of the probe detect switch[2]		✓			
Accuracy (Temp)	Verifies the accuracy of the thermometer across range		✓			
Functional check	Verifies module operation with cal-key[2]		✓			
Masimo SpO2 and SpHb functional check	Verifies module operation with rainbow SET tester			✓	✓	
Display	Verifies video output					✓
Back light interface	Verifies display LED back light					✓
Touchscreen interface	Verifies touchscreen calibration					✓
LED	Verifies the light bar amber and red LED strings					✓
Fan interface	Verifies fan operation					✓
Beeper	Verifies the buzzer					✓
Nurse call relay	Verifies the nurse call relay					✓
Battery operation	Verifies the internal battery					✓
Speaker	Verifies the speaker					✓
USB host port communication	Verifies the USB ports					✓
Ethernet communication	Verifies the Ethernet port					✓

[1] POST testing checks the following:

- **NIBP**: ROM, RAM, A/D channels, calibration, and user configuration.
- **Temperature**: ROM, RAM, calibration, and heater.
- **SpO2**: ROM and RAM, and connection to the SpO2 board.

[2] SureTemp Plus only.

[3] Normal mode.

Basic functional verification checks

Note Calibration is available only with the service tool, Gold licensed edition.

The basic functional verification test using the Welch Allyn Service Tool Standard edition meets the minimum requirements for routine preventive maintenance. These tests verify basic functionality of the NIBP, SpO2, SpHb, and thermometry parameters. Welch Allyn recommends using the service tool, Gold licensed edition, to perform verification of the device when completing a repair.

Basic functional verification check tools

Listed below are the all the tools required to perform the basic functional test.

Material no.	Description	Qty	Component
407672	BP test volume repair fixture 113670	1	NIBP
N/A	Masimo Rainbow SET tester (Masimo part number 2368)	1	Masimo SpO2
DOC-10	Cable, SpO2 extension, Nellcor	1	Nellcor SpO2
06138-000	Cal-key, assembly, M690/692	1	SureTemp Plus Thermometry Module
01802-110	Tester, calibration, 9600 Plus	3	Braun ear and SureTemp Thermometry Probe
411690	PRO 6000 calibration fixture* *Use with older models have a dust cover screw that rises above the O-ring washer. Newer models have a dust cover screw that is recessed into the washer.	3	Braun ear
N/A	Pressure meter (must include at least one decimal point and be accurate to within ±0.5 mmHg)	1	NIBP
N/A	Nellcor SpO2 simulator (SRC-MAX)	1	Nellcor SpO2
4500-925	USB 2.0/5-pin Mini-B cable, gold, 6 ft.	1	NIBP, Software updates
6000-30	Single tube blood pressure hose, 5 ft.	1	NIBP
N/A	PC running Windows XP SP3, Windows 7, or Windows 8	1	ALL
web download	Welch Allyn Service Tool Click this link.	1	NIBP, Software updates and calibration
N/A	Blood pressure Y-tube	1	NIBP
4500-30	Blood pressure hose, 5 ft.	1	NIBP
620216	Fitting "Y" 1/8 X 1/8 X 1/8	1	NIBP

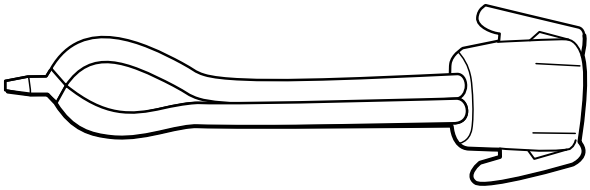
Full functional verification check and calibration tools

The list of tools below is what is required to perform a full device functionality check and calibration. The tools are used in conjunction with the Welch Allyn service tool, Gold licensed edition, to perform a device calibration.

Material no.	Description	Qty	Component
01802-110	Tester, calibration, 9600 Plus	3	Braun ear and SureTemp Thermometry Probe
407672	BP test volume repair fixture 113670	1	NIBP
411690	PRO 6000 calibration fixture* *Use with older models have a dust cover screw that rises above the O-ring washer. Newer models have a dust cover screw that is recessed into the washer.	3	Braun ear
N/A	Masimo Rainbow SET tester (Masimo part number 2368)	1	Masimo SPO2
DOC-10	Cable, SpO2 extension, Nellcor	1	Nellcor SPO2
06138-000	Cal-key, assembly, M690/692	1	SureTemp Thermometry Module
N/A	Pressure meter (must include at least one decimal point and be accurate to within ±0.5 mmHg)	1	NIBP
N/A	Nellcor portable oximetry tester (SRC-MAX)	1	Nellcor SPO2
4500-925	USB 2.0/5-pin Mini-B cable, gold, 6 ft.	1	NIBP
106270	Service test box	1	Nurse Call, Voltage & Current,USB ports
660-0138-00	Cable, patch 5 feet RJ45, T568B	1	Ethernet Test
407022	Assy, MMF Nurse call cable - service	1	Nurse Call (Service Test Box Required)
N/A	USB cable Type A to Type B (3 ft.)	1	USB Ports (Service Test Box Required)
6000-30	Single tube blood pressure hose, 5 ft.	1	NIBP
N/A	Netgear wireless router, a/b/g or equivalent	1	Wired & Wireless Test
N/A	PC running Windows XP SP3, Windows 7, or Windows 8	1	All
web download	Welch Allyn Service Tool (version 1.8 or later) Click this link	1	NIBP, Software updates
N/A	Blood pressure Y-tube	1	NIBP

Material no.	Description	Qty	Component
4500-30	Blood pressure hose, 5 ft.	1	NIBP
620216	Fitting "Y" 1/8 X 1/8 X 1/8	1	NIBP

Create a blood pressure Y-tube

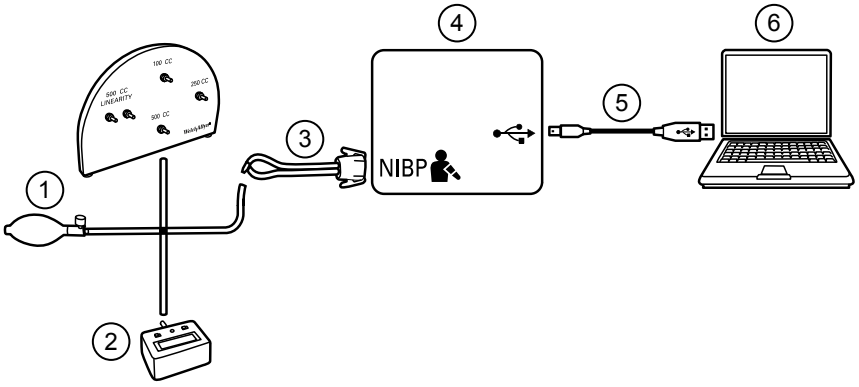


The blood pressure Y-tube is a piece of custom test equipment that connects the device to the test setup. The Y-tube is composed of a modified blood pressure hose and a Y-type fitting. Follow these instructions to create a Y-tube.

1. Cut a 4500-30 blood pressure hose approximately 6 inches from the connector that connects to the device.
2. Split the end of the dual-lumen hose to create two separate hoses. Make sure not to puncture either hose.
3. Insert one end of the Y-type fitting into each end of the hose.

NIBP test setup

For the NIBP leak test, overpressure test, or accuracy check, connect the test equipment shown below. Connect the manifold to the volume repair fixture as indicated by the service tool or the test procedure.



No.	Item	No.	Item
1	Test volume repair fixture with test manifold, bulb, and valve	4	Device
2	Pressure meter	5	USB 2.0/5-pin type A to mini-B cable

No.	Item	No.	Item
3	Blood pressure Y-tube	6	PC

NIBP leak test (Standard unlicensed edition)

The NIBP leak test is performed automatically using the service tool. The leak test pressurizes the system with a start pressure (P_s) of 250 mmHg ± 10 mmHg. After 15 seconds (T_t) the end pressure (P_e) is measured. The leak rate is calculated using the formula $L = (P_s – P_e)/ T_t$. The test fails if the leak rate exceeds 5 mmHg in 15 seconds.

Perform an NIBP leak test

1. Set up the test equipment.
2. Launch the service tool on the PC.
3. If the simplified interface is active, choose the Service option.
4. Log on with your user ID and password or with ADMIN as the user ID and leave the password field blank.
5. Power on the device.
6. Select the device you want to test from the device list.
7. Click **NIBP Sensor** under the Device Information tab.
8. Click **Leak Test** in the NIBP Sensor pane on the right side of the window.
9. Follow the prompts until the test completes.
10. Click **Close**.
11. To view the results, open the active log file by selecting **File** > **View Log File** > **Active log file** > **Ok**.
12. To record the results of your test, go to "Service record."

NIBP overpressure test (Standard unlicensed edition)

The NIBP overpressure test is performed automatically using the service tool. The overpressure test verifies that the NIBP system will prevent the pressure from exceeding 329 mmHg in adult mode and 164 mmHg in neonate mode. To pass this test, the device must shut down the pump and open the valves when the pressure is between 280 mmHg and 329 mmHg in adult mode, or 130 mmHg to 164 mmHg in Neonate mode.

Perform an NIBP overpressure test

Note If you are performing this test after performing the NIBP leak test, skip to step 7.

1. Set up the test equipment.
2. Launch the service tool on the PC.
3. If the simplified interface is active, choose the Service option.
4. Log on with your user ID and password or with ADMIN as the user ID and leave the password field blank.
5. Power on the device.

6. Select the device you want to test from the device list.
7. Click **NIBP Sensor** under the **Device Information** tab.
8. In the NIBP Sensor pane on the right side of the window, click **Over Pressure Test**.
9. Follow the prompts until the test completes.
10. Click **Close**.
11. To view the results, open the active log file by selecting **File** > **View Log File** > **Active log file** > **Ok**.
12. To record the results of your test, go to "Service record."

NIBP accuracy check (Standard unlicensed edition)

The NIBP accuracy check is performed manually using the service tool to control the valves. The accuracy check compares the reading from the primary transducer pressure shown in the service tool window with the reading from an external calibrated digital pressure meter. The results of this check are not recorded in the service tool log file. To record the results for your records, copy the table in the service record section of the service manual. If a calibration is required, run the NIBP calibration included with the Gold licensed edition of the service tool.

WARNING Patient safety risk. If the primary transducer fails, the system might not identify an overpressure condition at the right limit, causing injury when the device is re-connected to a patient. To ensure patient safety, Welch Allyn recommends that a qualified service technician perform a full functional verification and calibration on an annual basis.

CAUTION Equipment calibration error can occur. This accuracy check verifies only the accuracy of the primary transducer. If the safety transducer is out of calibration, a calibration error can occur due to the pressure difference between the primary transducer and the safety transducer. To avoid equipment calibration errors, Welch Allyn recommends that a qualified service technician perform a full functional verification and calibration on an annual basis.

Perform an NIBP accuracy check

Note If you are performing this test after performing a previous NIBP check, skip to step 7.

1. Set up the test equipment.
2. Launch the service tool on the PC.
3. If the simplified interface is active, choose the Service option.
4. Log on with your user ID and password or with ADMIN as the user ID and leave the password field blank.
5. Power on the device.
6. Select the device you want to test from the device list.
7. Click **NIBP Sensor** under the **Device Information** tab.
8. Click **Accuracy Check** in the NIBP Sensor pane on the right side of the window.
9. Connect the 500cc volume.
10. Turn on the pressure meter and zero if necessary.
11. Check the accuracy at 0 mmHg.

12. Record the reading on the pressure meter and the service tool and compare the results.
13. Using the hand bulb, pressurize the NIBP system to 50 mmHg ± 5 mmHg and allow 10 seconds for the pressure to stabilize.
14. Record the reading on the pressure meter and the service tool and compare the results.
15. Using the hand bulb, pressurize the NIBP system to 150 mmHg ± 5 mmHg and allow 10 seconds for the pressure to stabilize.
16. Record the reading on the pressure meter and the service tool and compare the results.
17. Using the hand bulb, pressurize the NIBP system to 250 mmHg ± 5 mmHg and allow 10 seconds for the pressure to stabilize.
18. Compare the reading on the pressure meter to the service tool reading and record the results.
19. Click **Open valve** to open the NIBP valves. Verify that the pressure on the meter and service tool change to zero.
20. Click **Done** to complete the check.
21. To record the results of your test, go to "Service record."

SpO2 and SpHb tests

Use this procedure to test the device's SpO2 and SpHb functions, if included.

Perform a Masimo SpO2 and SpHb test

1. Power on the device.
2. Touch the **Settings** tab.
3. Touch the **Device** tab.
4. Touch **Intervals Monitoring**.
5. Touch the **Home** tab.
6. Connect the Masimo rainbow SET tester to the device.
7. Give the device up to 30 seconds to stabilize and then verify a displayed pulse rate of 61 bpm ± 1 bpm and a displayed SpO2 of 81% ± 3%.
8. If the SpHb option is active, verify that the parameter is displayed with a reading of 14 g/dL ± 1 g/dL.

Perform a Nellcor SpO2 test

Use this procedure to test only the device SpO2 function.

1. Power on the device.
2. Connect the Nellcor SRC-MAX SpO2 functional tester to the SpO2 input connector through a Nellcor DOC-10 extension cable.

   Note In the following tests, if the SRC-MAX defaults are outside the device alarm limits, readjust the limits or silence the alarms.

3. Verify the following on the SRC-MAX:
   - All of the device LEDs flash: left panel, center panel, and right panel.

- The SRC-MAX initializes to default condition where the four test parameter LEDs are lit closest to their selector buttons.
- The default pulse rate is 60 bpm and the default SpO2 is 75%.

4. Give the device up to 30 seconds to stabilize, and verify a displayed pulse rate of 60 ±1 bpm and a displayed SpO2 of 75% ±1 sat point.
5. Set the SRC-MAX pulse rate to 200 bpm.
6. Give the device up to 30 seconds to stabilize, and verify a displayed pulse rate of 200 ±2 bpm.
7. Set the SRC-MAX SpO2 saturation percentage to 90.
8. Give the device up to 30 seconds to stabilize, and verify a displayed SpO2 saturation level of 90% ±1 sat point.
9. Disconnect the SRC-MAX.

SureTemp temperature system test

The SureTemp temperature system test is performed using a calibration key (cal-key). The calibration key tests the system using a fixed resistance to display a temperature of 97.3 ± 0.3 °F (36.3 ± 0.2 °C).

Perform a SureTemp temperature system test

1. With the system power on and the temperature probe in the well, disconnect the probe cable from the temperature input connector on the front of the device.
2. Connect the calibration key to the temperature input connector.
3. Remove the probe from the well.
4. Verify that the displayed temperature is 97.3 ± 0.3 °F (36.3 ±0.2 °C).

SureTemp temperature probe and system test

Use this procedure to test the temperature function while verifying the temperature probe. To achieve accurate results, you must perform this test with the device in Direct mode.

Test each probe at the low, medium, and high set points on the tester. Repeat the procedure for each thermometer and temperature to test.

Set up the 9600 Plus calibration tester

Place the tester on a level surface away from sunlight, drafts, and other sources of heat or cold.

The tester takes approximately 20 minutes to heat to the lowest set point.

To expedite testing, Welch Allyn recommends the following practices:

- To eliminate waiting for the tester to heat to the next set point, use three testers, each set to one of three different set points.
- When using only one tester to test several thermometers at all three temperatures, test all thermometers at one set point before proceeding to the next set point.
- To eliminate waiting for the tester to cool down, start at the lowest set point. Because the tester does not have an internal fan, it requires more time to cool down than to heat up.

Change the 9600 Plus set point

To scroll from one set point to the next, press and hold the Temperature Selection button until a beep sounds.

The new set point appears in the upper left corner of the display. The device's current temperature appears, flashes, and continues flashing until the cavity reaches equilibrium at the new set point. The 9600 Plus beeps when the set point is reached.

Perform a SureTemp temperature probe and system test

1. Set the 9600 Plus to the desired set point and wait for the display to stop flashing.
2. Insert the temperature probe, without a probe cover, into the thermistor device port on the tester.
3. When  appears on the display, touch it to switch to Direct mode.
4. Wait for up to two minutes for the temperature reading to stabilize.
5. Record the results in the temperature service record.
6. Return the temperature probe to the probe well on the device.
7. Repeat the procedure as necessary until all thermometers are tested at each temperature.

To record the results of your test, go to "Service record."

Braun ThermoScan PRO thermometer tests

This explains how to perform a functional verification on the Braun ThermoScan PRO 4000 and Braun ThermoScan PRO 6000 thermometers using the 9600 Plus Calibration Tester.

Note Use this procedure in place of the verification and calibration test for the Braun PRO 4000 and Braun PRO 6000 in the Welch Allyn Service Tool version 1.0.2.0 and earlier.

CAUTION Before the test, place thermometers and tester in the same room for approximately 30 minutes so that they adjust to the ambient temperature.

CAUTION Set the temperature scales on the 9600 Plus to match the Braun Thermoscan PRO's default temperature scale.

CAUTION Set up the 9600 Plus away from sunlight, drafts, and other sources of heat or cold. Fluctuations will impact the calibration check.

CAUTION The ambient temperature must be stable and within the range of 18.3°C (65.0°F) to 26.7°C (80.0°F).

For more information, see the *Welch Allyn 9600 Plus Calibration Tester Directions for use*.

Perform a Braun ThermoScan PRO 4000 functional verification test

Test each thermometer at the low, medium, and high set points on the tester. After placing the thermometer in calibration mode, repeat the procedure from step 4 for each thermometer and temperature to be tested.

1. Complete the following pre-check steps:
   a. Check the probe tip lens window with a magnifying glass for signs of displacement. Any gaps in the seam between bezel and the lens window indicate a displaced lens window. If you see a gap, the unit is damaged and must be replaced.
   b. Gently wipe the probe tip with a cotton swab slightly moistened with 70 percent isopropyl or ethyl alcohol, taking care not to displace the lens window. Remove excess alcohol with a clean cotton swab, and let air dry for 5 minutes. Do not use any chemical other than alcohol to clean the probe window.
   c. Verify that the thermometer is fully charged.
2. Place the thermometer in calibration mode:
   a. Make sure that the thermometer displays the OFF symbol.
   b. Turn on the thermometer by pushing and releasing **I/O mem**.

      Symbols and functions appear as the thermometer performs an automatic self check.
   c. Wait for two dashes and °C or °F to appear on the display.
   d. Push and hold **I/O mem**.

      After approximately 3 seconds, a short beep sounds, and the OFF symbol flashes on the display. Then a long beep sounds.
   e. Release the button immediately.

      The display flashes and shows the CAL symbol.

   The thermometer is now in calibration check mode.
3. Apply a new probe cover. Place the probe firmly into the Ear Device Port.
4. Wait approximately 3 seconds, and then press the **Start** button.

   The ExacTemp light flashes.
5. Leave the thermometer in the tester until a beep sounds.
6. Remove the thermometer from the tester and read the temperature in the thermometer's display. If the temperatures are within ±0.2 °C (±0.4 °F) of the tester's set point, the thermometer is within calibration.
7. Record the results in the thermometer service record.
8. Press the **Start** button once to clear the previous reading.
9. Wait 1 minute, and then take another reading with the same thermometer.

   Note Repeated measurements in short sequence might cause higher readings.

   Note If using only one tester, test all available thermometers for calibration verification at the current set point before raising the set point.
10. Repeat the procedure from step 4 as necessary until all thermometers are tested at each temperature.
11. Exit CAL mode using one of the following methods:
    - Press and hold the **I/O mem** button until the OFF symbol flashes.
    - Wait for 4 minutes. The thermometer automatically exits CAL mode.

To record the results of your test, go to "Service record."

Perform a Braun ThermoScan PRO 6000 functional verification test

1. Complete the following pre-check steps:
   a. Check the probe tip lens window with a magnifying glass for signs of displacement. Any gaps in the seam between bezel and the lens window indicate a displaced lens window. If you see a gap, the unit is damaged and must be replaced.
   b. Gently wipe the probe tip with a cotton swab slightly moistened with 70 percent isopropyl or ethyl alcohol taking care not to displace the lens window. Remove excess alcohol with a clean cotton swab, and let air dry for 5 minutes. Do not use any chemical other than alcohol to clean the probe window.
   c. Verify that the thermometer is fully charged.
2. Place the thermometer in calibration mode:
   a. With the thermometer in sleep mode, press and release the **C/F** button.
   b. Immediately (while all segments of the LCD are illuminated during self-test), press and hold the **C/F** button and the **Mem** button.

      After 5 seconds the thermometer begins a long beep.
   c. During the beep, release the **Mem** button and the **C/F** button.

   The thermometer is now in Calibration check mode. ("CAL" flashes on the screen for 0.25 seconds every second.)
3. Return the thermometer to the dock or a flat surface and wait for 1 minute before taking the first temperature.

   Note Holding the thermometer could raise the temperature of the thermometer. Put the thermometer down while waiting so that the thermometer remains at ambient room temperature.
4. Apply a new probe cover.

   When the probe cover is applied properly, the flashing probe cover icon disappears from the display and a short beep sounds.
5. Wait for the screen to flash three dashes (---) alternating with "CAL."
6. Place the probe firmly into the ear device port or Braun 6000 test fixture. Firmly push the device down into the well to ensure perpendicularity and that the probe is fully seated in the device port. Visually check the thermometer and fixture to ensure proper alignment.

   Note When using the Braun 6000 test fixture, follow the instructions provided with the fixture to position the PRO 6000 in the test fixture.

   Note If you are not using the Braun 6000 test fixture, ensure that the device is perpendicular in the port, directly aligned with the calibration tester sensor, and not at an angle or tilted.

   Note Once the device is firmly seated, do not apply additional pressure. Doing so may cause your hand to waver and tilt or move the device during testing.
7. Wait 5 seconds, press the thermometer measure button, and watch for the green ExacTemp light to flash.
8. Leave the thermometer in the 9600 Plus Calibration Tester until the ExacTemp light stops flashing and you hear a beep.

9. Remove the Braun PRO 6000 thermometer from the 9600 Plus Calibration Tester and compare the temperature displayed on the tester with the temperature on the thermometer's display.

   If the temperatures are within ±0.2 ºC (±0.4 ºF), the thermometer is within calibration.

10. Replace the probe cover to reset, and wait for the thermometer screen to flash three dashes (---) alternating with "CAL."

    Note Replace the probe cover before each reading to remove any residual heat absorbed from the 9600 Plus Calibration Tester.

11. Return the thermometer to the dock or a flat surface and wait 1 full minute before taking another reading with the same thermometer.

    Note Repeated measurements in short sequence might cause higher readings.

    Note Holding the thermometer could raise the temperature of the thermometer. Put the thermometer down while waiting so that the thermometer remains at ambient room temperature.

12. Test all available thermometers for calibration verification at the current calibration set point temperature before proceeding to the next calibration set point temperature.
13. See the 9600 Plus Calibration Tester DFU to change the set point temperature.

Note The device will exit CAL mode after 10 minutes of inactivity or can be forced to exit by holding both **C/F** and **Mem** for 5 seconds. After exiting Calibration Check Mode, the thermometer returns to Sleep Mode.

To record the results of your test, go to "Service record."

Electrical safety testing

Welch Allyn recommends performing ground continuity and leakage current tests after all open-case repairs and dielectric strength testing [1] when replacing the power supply or primary wiring according to EN/IEC 60601-1 - Medical Electrical Equipment – Part 1: General Requirements for Basic Safety and Essential Performance or EN/IEC 62353 - Medical Electrical Equipment - Recurrent Test and Test After Repair of Medical Electrical Equipment.

Due to the variability of test equipment in the field, Welch Allyn does not include specific instructions to perform electrical safety tests. When performing electrical safety tests, refer to your test equipment manuals for detailed instruction. The following table provides connections and test limits to assist you in performing these tests.

Test	Limits
Ground continuity	Ground continuity from EP stud* (equipotential terminal) to the Gnd pin of the IEC power connector shall be no greater than 0.1 ohms.
Leakage current	Leakage current shall be less than 500 µA from EP stud* to mains (Line and Neutral pins of the IEC power connector).
Insulation resistance	Dielectric strength shall be 500 V (DC) EP stud* to IEC mains (Line and Neutral pins of the IEC power connector), and insulation resistance is measured.

* To locate the equipotential terminal, see "Controls, indicators, and connectors."

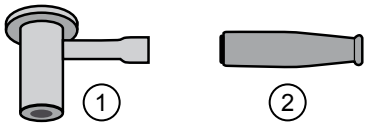
Ground stud connector

This device is equipped with a ground stud (equipotential terminal) for electrical safety testing, and to connect a potential equalization conductor. To ensure use of the proper connector for safety testing, the ground stud is recessed into the system's housing. Do not use "alligator" style clamps or connectors. The mating electrical connector requires self assembly by crimping it to appropriate connecting leads.

The mating connector (Type POAG-KBT6DIN, order number 15.0010) consists of the right-angled socket and insulator, as shown in the next figure. You can purchase the mating connector and the crimping pliers from the manufacturer, Multi-Contact:

http://www.multi-contact.com.

[1] Perform this test only if there is a reason to doubt the integrity of the electrical insulation (e.g. multiple trips of a residual-current device or liquid ingress of a saline solution). If you determine this test should be performed, return the device to Welch Allyn for service.



Item	Description	Type	Order no.
①	The mating electrical connector, a right-angled socket made of nickel-plated brass with Multilam™ made of gold-plated, hard-drawn copper alloy.	POAG-WB6DIN	01.0404
②	Insulator	T-POAG6	15.5004-24
	Crimping pliers with mandrel crimp for 4 mm^2 and 6mm^2 flexible conductors.	POAG-PZ-N	14.5009

Options, upgrades, and licenses

Welch Allyn supports option, software, and license upgrades for all models.

Option upgrades for devices still under warranty that require any installation inside the device must be performed by a Welch Allyn service center unless you participate in the Partners in Care Biomed Partnership Program. If you want to install internal options, we recommend you attend either the classroom or online technical training course for the device. The training is required to be eligible to receive the Welch Allyn Service Tool Gold licensed edition. The Gold licensed edition is required to verify that the device is functioning correctly after it has been serviced. Although all of the option upgrades are calibrated and tested before leaving the factory, Welch Allyn recommends performing a complete functional test whenever the device is serviced.

Software upgrades, when available, can be purchased or provided at no charge if your device is covered by a Welch Allyn Service Agreement. The upgrades can be installed by either a Welch Allyn service center or by using the service tool, Standard unlicensed edition or Gold licensed edition.

If you choose to install software upgrades on your own, you will receive the software through the internet. When ordering software, provide the serial number of the device you want to install the software on.

Licenses are available for purchase to turn on additional software features or communication options. If you want to install licenses, you will need the service tool, Standard unlicensed edition or Gold licensed edition, and an internet connection. If you purchase a license, you will receive a code to enter in the service tool running on a PC connected to the internet that will contact a server and download the license file. The service tool connects with the device to install the license to turn on the advanced feature. A more detailed description of the license process can be found in the service tool help files.

Note When a license authorization code is used to activate the license, the authorization code is tied to the device's serial number. Save the license authorization code with the serial number for future use. If the main board is replaced, you will need the authorization code to reactivate the license files.

Available options, upgrades, and licenses

The following options, upgrades, and licenses can be added to each model's base configuration.

CAUTION Before installing any option, disconnect the patient from the wall system and power down the device.

Options

Model	8400	8500
Masimo	○	○
Nellcor	○	○
SureTemp Plus	○	○
Braun ThermoScan PRO 4000 [1,2]	X	X
Braun ThermoScan PRO 6000 [3]	○	○
Masimo with SpHb enabled [4, 5]	○	○
Radio	○	●

[1] Upgrades no longer available. Service replacement only.

[2,] Requires host software version 1.50.01 or higher.

[3] Requires host software version 2.30.00 or higher.

[4] Requires host software version 1.70.03 or higher.

[5] Requires applicable UI license.

● Standard with this model.

○ Available hardware/software upgrade for this model.

Licensed features

Model	8400	8500
Vitals communication	●	●
Barcode scanner	●	●
Weight scale [1]	○	○
Total hemoglobin (Masimo SpHb) [2]	○	○

Model	8400	8500
Profiles		
Spot Check	●	●
Office [3]	●	●
Intervals Monitoring (Monitor in host software versions 1.X)	●	●
Continuous Monitoring [4]	○	○

[1] Requires host software version 1.70.00 or higher.

[2] Requires host software version 1.70.03 or higher.

[3]Requires host software version 1.71.00 or 2.30.00 or higher.

[4] Requires host software version 2.20.00 or higher.

● Standard with this model.

○ Available hardware/software upgrade for this model.

Install options

All internal option installations entail opening the device case and performing some disassembly. Because this process requires disconnecting internal components, Welch Allyn requires that the device undergo a full functional test after reassembly and before placing the device back in service.

Before installing a new option, read information about removing the option in "Disassembly and repair." After familiarizing yourself with the process, follow the instructions in the disassembly section to remove the empty housing or, in the case of the radio, access the space.

Note The Masimo SpHb option does not require disassembly because it is a software upgrade.

Host firmware requirements

This section lists the host firmware requirements for each parameter. If your device does not meet the minimum requirements, you can upgrade the host firmware online through the Welch Allyn Service Tool.

- SpHb requirement: host firmware version 1.70.03 or later
- Braun ThermoScan PRO 6000 requirement: host firmware version 2.30.00 or later.

Masimo parameter upgrades

A Hemoglobin parameter upgrade is available for models 8400 and 8500 with Masimo SpO2.

Upgrading devices configured without Masimo SpO2

You can upgrade devices configured without Masimo SpO2 by adding Masimo SpO2 or by replacing the Nellcor SpO2 module with a Masimo SpO2 module.

If you participate in a Partners in Care Biomed program, you can purchase an upgrade kit and complete the installation on your own. Upgrade kits contain a Masimo module with the desired parameters, a user interface license authorization code, and instructions for installing and licensing the upgrade. To complete the installation, you also need the tools listed in the "Disassembly and repair" section of this manual.

If you do not participate in a Partners in Care Biomed program, contact Welch Allyn to order a Masimo hardware upgrade and arrange for Welch Allyn to perform the upgrade. Customers performing hardware upgrades without participating in a Partners in Care Biomed program void the device warranty.

Upgrading devices configured with Masimo SpO2

If your device has a Masimo SpO2 module, you can enable new parameters by upgrading the module firmware. All customers can perform firmware upgrades on their own by using the service tool. To upgrade your module, purchase a firmware upgrade kit and follow the instructions provided with the kit.

Each parameter firmware upgrade is custom-built for a specific device and cannot be transferred to another device.

Configure options

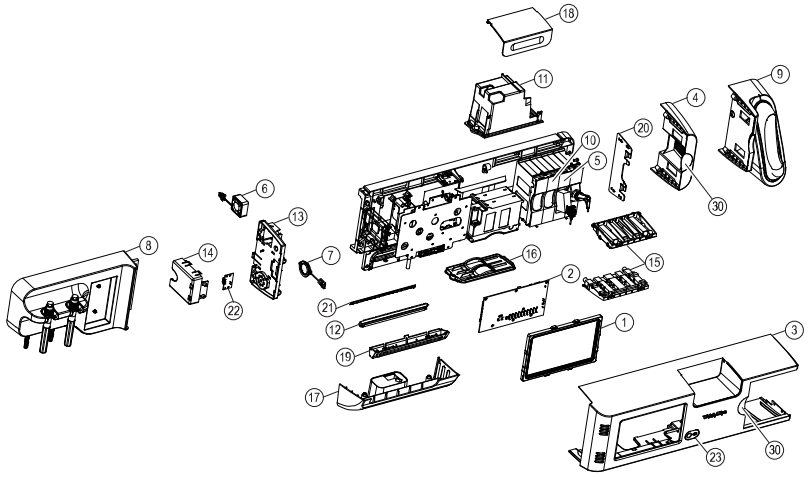
When connected and powered on, the monitor recognizes all options. When the option successfully passes the POST, all software controls in the monitor's user interface are activated, enabling you to configure option settings.

Option parameters are initially set at factory default values. To change these settings go to Advanced Settings. The configuration screens for SpO2, SpHb, Pulse rate, NIBP, Temperature, and Manual parameters are on the Parameters tab. The configuration screens for the radio are on the Network tab. For more information about the Advanced Settings menu, see the device's directions for use.

Field replaceable units

This listing includes only field-replaceable service parts. Product accessories—including 3.5V instrument heads and other consumable items—are listed separately in the accessories list in the device's directions for use, which is available from Welch Allyn Customer Service.

Front housing



Serv Kit, PLFM, LCD display (material no. 103351)

No.	Item	Qty
1	LCD display bezel	1 ea
1	LCD display with touchscreen	1 ea
1	Foam pad, top	1 ea
1	Foam pad, bottom	1 ea
1	LCD harness	1 ea

Serv Kit, PLFM, MCE PCBA (material no. 103352)

Note When replacing the main board, all licenses are lost. If you did not retain authorization codes to restore those licenses, you must order replacement licenses.

No.	Item	Qty
2	Main board (P3)	1 ea

Serv kit, Connex Integrated Wall System, main housing assembly (material no. 104244)

No.	Item	Qty
3	Main housing	1 ea
23	Platform power button, flex pattern B	1 ea
30	Blue insert	1 ea

Serv Kit, Side housing (material no. 104584)

No.	Item	Qty
4	Side housing	1 ea
30	Blue insert	1 ea

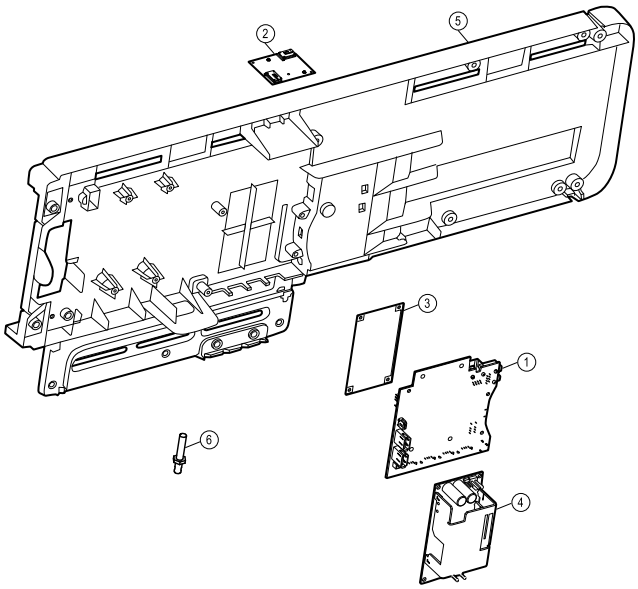
Serv Kit, Braun assembly (Braun 6000) (material no. 107010)

No.	Item	Qty
9	Braun housing	1 ea
9	Braun 6000 dock	1 ea
9	Bushing, side access PW, Braun	2 ea
9	Screw, M4 pan head , PHD, shoulder	2 ea
9	E-ring	2 ea

Individual parts

No.	Material no.	Item	Qty
6	103552	Platform fan assembly	1 ea
7	103554	Platform speaker assembly	1 ea
8	104250	CIWS handle module assembly	1 ea
n/a	103578	Platform LCD harness	1 ea
10	103564	Platform module, blank	1 ea
n/a	103563	Platform USB cable mini B RT-type A RT	1 ea
11	104252	Module well assembly	1 ea
n/a	104255	Main wire harness	1 ea
n/a	104256	Main power harness	1 ea
12	104260	Light bar alarm	1 ea
13	104264	Power panel	1 ea
14	104265	Battery housing	1 ea
15	104267	Module track	1 ea
16	104268	Module cover	1 ea
17	104271	Comms cover housing	1 ea
18	104273	Cubby door	1 ea
19	104275	Light bar cover	1 ea
20	104276	Side mounting bracket	1 ea
21	103550	LED light bar	1 ea
22	104285	Battery connector	1 ea
23	104286	Power button	1 ea
n/a	104289	Ethernet cable, 18 in	1 ea
n/a	53020-0000	Rechargeable battery for Braun PRO 4000	1 ea
n/a	104894	Rechargeable battery for Braun PRO 6000	1 ea

Chassis



Serv Kit, PLFM, Standard comms PCBA (material no. 103355)

No.	Item	Qty
1	Communications board	1 ea

Serv Kit, CIWS, Radio (material no. 107011)

No.	Item	Qty
2	Antenna board	1 ea
3	Radio board, 802.11a/b/g	1 ea
3	Screw, M3 X 0.5, Phillips pan head	4 ea
2	Antenna mounting foam tape	1 ea
3	Antenna cable	1 ea
3	Radio label	1 ea

Serv Kit, CIWS, Antenna (material no. 107012)

No.	Item	Qty
2	Antenna board	1 ea

No.	Item	Qty
2	Antenna mounting foam tape	1 ea
2	Antenna cable	1 ea

Serv Kit, Cable, USB client (material no. 104251)

No.	Item	Qty
n/a	Cable, USB client	1 ea

Serv Kit, Wire Harness, AC to Power supply (material no. 104254)

No.	Item	Qty
n/a	Wire harness, AC to power supply	1 ea

Serv Kit, Power supply, 60W (material no. 104283)

No.	Item	Qty
4	Power supply, 60W	1 ea

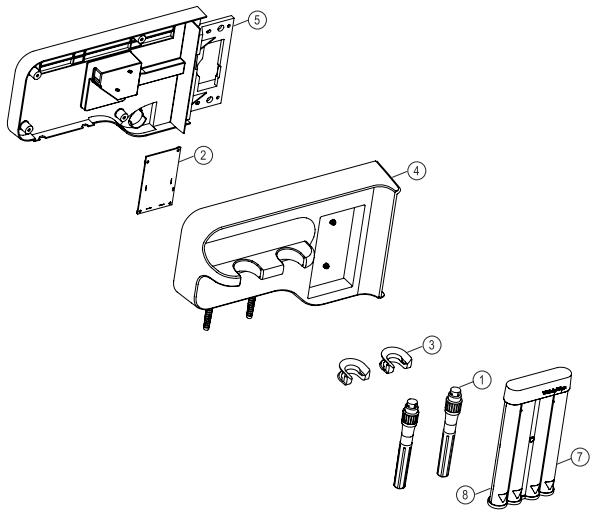
Serv Kit, Chassis (material no. 104269)

No.	Item	Qty
5	Chassis	1 ea

Miscellaneous

No.	Material no.	Item	Qty
6	104280	Plug, 6/25	1 ea
n/a	104288	Connector, IEC, 1.5 mm panel	1 ea
n/a	4500-925	Cable, USB 2.0, 5-pin, mini-B, Gold, 6 ft.	1 ea

Handles



Serv Kit, Handle assembly (material no. 104299)

No.	Item	Qty
1	Handle assembly	1 ea

Serv Kit, Platform 767 controller PCBA (material no. 104247)

No.	Item	Qty
2	PCBA: Platform 767 controller, pattern E	1 ea

Serv Kit, Handle, cradle, and opticals assembly (material no. 104253)

No.	Item	Qty
3	Handle, cradle, and opticals assembly, cool blue	1 ea

Serv Kit, Housing, front handle (material no. 104262)

No.	Item	Qty
4	Housing, front handle	1 ea

Serv Kit, Housing, rear handle (material no. 104263)

No.	Item	Qty
5	Housing, rear handle	1 ea

Serv Kit, Handle holder (material no. 104278)

No.	Item	Qty
n/a	Handle holder	1 ea

Serv Kit, IR connector and wire assembly (material no. 104281)

No.	Item	Qty
n/a	IR connector and wire assembly	1 ea

3.5V coaxial ophthalmoscope assembly (material no. 11720)

No.	Item	Qty
n/a	3.5V coaxial opthalmoscope assembly	1 ea

Diagnostic otoscope with throat illuminator assembly (material no. 23820)

No.	Item	Qty
n/a	Diagnostic otoscope with throat illuminator assembly	1 ea

Panoptic assembly without blue filter (material no. 11810)

No.	Item	Qty
n/a	Panoptic assembly without blue filter	1 ea

Dispenser, Large ear speculum, Connex IWS, Full (material no. 52100-PF)

No.	Item	Qty
7	Ear speculum dispenser, large	1 ea

Dispenser, Small ear speculum, Connex IWS, Full (material no. 52400-PF)

No.	Item	Qty
8	Ear speculum dispenser, small	1 ea

Modules

Serv Kit, Module assembly, MODPG NIBP (material no. 104248)

Item	Qty
Module assembly, MODPG	1 ea

Serv Kit, Module assembly, SpO2, Nellcor (material no. 104282)

Item	Qty
Module assembly, SpO2, Nellcor	1 ea

Serv Kit, Module assembly, SpO2, Masimo MX (material no. 104290)

Item	Qty
Module assembly, SpO2, Masimo MX	1 ea

Serv Kit, SureTemp module, CIWS (material no. 104292)

Item	Qty
Module assembly, SureTemp	1 ea

Upgd Kit, PW, Masimo MX with SpO2, SpHb Mod (material no. 104591)

Item	Qty
Module assembly SpO2-SpHb Masimo	1 ea
Authorization code for SpHb UI license	1 ea
Installation instructions	1 ea

Masimo SpHb SW upgrade - sold by WA (material no. 104361)

Item	Qty
Masimo software license	1 ea
Welch Allyn SpHb user interface license	1 ea
Authorization code for online upgrade	1 ea

Serv Kit, PW, Masimo MX SpO2, SpHb repair (replacement only) (material no. 104573)

Item	Qty
Module assembly SpO2-SpHb Masimo	1 ea

* This service kit can be used only to replace an existing SpHb-enabled module.

Serv Kit, Braun PRO 6000 thermometer (material no. 105948)

Item	Qty
Braun ThermoScan PRO 6000 thermometer	1 ea
Braun ThermoScan PRO 6000 rechargeable battery	1 ea

Braun PRO 6000 rechargeable battery (material no. 104894)

Item	Qty
Braun ThermoScan PRO 6000 rechargeable battery	1 ea

Miscellaneous parts

Serv Kit, CIWS screw and hardware (material no. 104241)

Item	Qty
Cable tie mount	6 ea
Cable tie, 6 inch	6 ea
Ferrite, Snap, 0.788 OD, 0.26 ID, 1.55 LG, black	1 ea
Screw, M4 x 10 Pan head with nyloc	10 ea

Item	Qty
Screw, M3 x 0.5, Pan phillips	10 ea
Screw, Pastite #4-20 x .500 Pan head	10 ea
Nut hex	1 ea
Shoulder screw M4 PHD	5 ea
Standoff, harness	1 ea
Washer lock serrated	4 ea
Washer, flat	4 ea
Washer, M3	4 ea
Strain relief, comms, PW	1 ea
Tape, mirrors, 0.94 x 0.94	1 ea
CCH44-S10 P-clamp, 0.437	4 ea
Clamp, cable 3/16 x 3/8 wide 3/4 long	4 ea
Foam strip, 0.75 Square	6 ea

Licenses

Material no.	Item	Notes
103371	Bar code reader	
103372	Spot profile	
105294	Office profile	Requires host software version 1.71.00 or 2.30.00 or higher.
105363	Continuous Monitoring profile	
105364	Standard license	CIWS 8400/8500
104197	Weight scale	

Partners in Care service and support agreements

Material no.	Item	Material no.	Item
S1-CIWS	Connex Integrated Wall System, Comprehensive partnership program 1 year	S1-CIWS-2	Connex Integrated Wall System, Comprehensive, Comprehensive partnership program 2 years

Material no.	Item	Material no.	Item
S2-CIWS	Connex Integrated Wall System, Bio-med partnership program 1 year	S2-CIWS-2	Connex Integrated Wall System, Bio-med partnership program 2 years
S4-CIWS (International only)	Connex Integrated Wall System, extended warranty, 1 year	S4-CIWS-2 (International only)	Connex Integrated Wall System, extended warranty, 2 years

Service and repair training

Note Required to be eligible to receive the service tool, Gold edition.

Material no.	Item
CIWSREP-TRN	Connex Integrated Wall System repair training
CIWSREPW-TRN	Connex Integrated Wall System repair web training

Appendices

Decontamination and cleaning requirements

As a safety precaution, the system must undergo decontamination before being returned to Welch Allyn for service, repair, inspection, or disposal.

Note Contaminated items must not be returned without prior, written agreement.

Note Decontaminate the system according to your facility's procedures and local regulations.

Cleaning is an essential prerequisite for effective disinfection or decontamination.

Note The following guidelines apply to the system only. For cables, sensors, cuffs, and other peripheral items, follow the cleaning instructions in the directions for use that accompany these accessories.

WARNING Electric shock hazard. Before cleaning the system, disconnect the AC power cord from the power outlet and the system.

WARNING Electric shock hazard. DO NOT autoclave the system or accessories. The system and the accessories are not heat-resistant.

WARNING Liquids can damage electronics inside the system. Take care to prevent water or other liquids from spilling on the system.
If liquids are spilled on the system:

1. Power down the system.
2. Disconnect the power plug.
3. Remove the battery pack from the system.
4. Dry off excess liquid from the system.

   Note If liquids possibly entered the system, remove the system from use until it has been properly dried, inspected, and tested by qualified service personnel.

5. Reinstall the battery pack.
6. Power on the system and verify that the system functions normally before using it.

CAUTION DO NOT use steam, heat, or gas sterilization on the system.

CAUTION DO NOT use harsh solvents such as acetone on the system.

The following agents are compatible with the system. Follow the cleaning agent manufacturer's guidelines:

- CaviWipes™
- Sani-Cloth® Plus
- 70 percent isopropyl alcohol
- 10 percent chlorine bleach solution

Note Disinfect according to your facility's protocols and standards or local regulations.

Configuration options

The wall system is available in multiple configurations. Use the following to determine available configurations:

[Model number][SpO2][Thermistor temp][Cord management][IR temp][Head pair]-[Power cord]

Note For approved accessories, see the accessories list in the device's directions for use.

Note If options were added to the device after production, the product label will not match the current configuration.

Position	Description
[Model number]	Two numbers that indicate the model: • **84**: The 8400 model. Does not include a radio. • **85**: The 8500 model. Includes an internal 802.11 a/b/g radio.
[SpO2]	One character that indicates the oximeter type: • **H**: Includes Masimo with Hemoglobin • **M**: Includes Masimo. • **N**: Includes Nellcor. • **X**: Does not include oximetry (8400 model only).
[Thermistor temp]	One character that indicates whether a SureTemp Plus thermometer is included: • **T**: Includes SureTemp Plus thermometer. • **X**: Does not include SureTemp Plus thermometer.
[Cord management]	One character that indicates the storage type: • **V**: SCS
[IR temp]	One character that indicates whether a Braun ThermoScan PRO thermometer and docking station are included: • **E**: Includes a Braun ThermoScan PRO and docking station. • **X**: Does not include a Braun ThermoScan PRO and docking station.

Position	Description
[Head pair]	One character that indicates whether 3.5V instrument heads are included: • **C**: Includes MacroView (23820) and Coaxial Ophthalmoscope (11720) heads. • **P**: Includes MacroView (23820) and PanOptic (11810) heads. • **X**: Does not include instrument heads.
[Power cord]	The suffix, characters or numbers that follow the hyphen, indicates the power cord packaged with the device. Country codes include the following:

Suffix	Description
B	North America
2	Europe
4	United Kingdom
6	Australia/New Zealand
7	South Africa
Z	Brazil

Factory defaults

General alarm

Settings		Default value
General		
	Display alarm limits	Enabled
	Alarm audio on	Enabled
	Alarm audio off	Disabled
	Volume	Medium
	Patient rest mode on	Off
Advanced		
	General	
	Allow user to disable alarms	Enabled
	Nurse call threshold	Medium
	Audio	
	Allow user to turn off general audio	Enabled
	Minimum alarm volume	Low
	Audio pause time	2 minutes
	Allow user to enable patient rest mode	Enabled
	Allow host to enable patient rest mode	Enabled
	Delays	
	SpO2 alarm condition delay	10 seconds
	SpO2 pulse rate alarm condition delay	3 seconds
	Respiration alarm condition delay	10 seconds
	No breath detected alarm delay	Adult: 30 seconds Pediatric: 20 seconds Neonate: 15 seconds
	SpHb alarm condition delay	10 seconds

NIBP

Settings	Default value
Alarms	
Systolic and diastolic alarm limits on/off control	On
Systolic: Upper limit	Adult: 220 mmHg (29.3 kPa) Pediatric: 145 mmHg (19.3 kPa) Neonate: 100 mmHg (13.3 kPa)
Systolic: Lower limit	Adult: 75 mmHg (10.0 kPa) Pediatric: 75 mmHg (10.0 kPa) Neonate: 50 mmHg (6.7 kPa)
Diastolic: Upper limit	Adult: 110 mmHg (14.7 kPa) Pediatric: 100 mmHg (13.3 kPa) Neonate: 70 mmHg (9.3 kPa)
Diastolic: Lower limit	Adult: 35 mmHg (4.7 kPa) Pediatric: 35 mmHg (4.7 kPa) Neonate: 30 mmHg (4.0 kPa)
MAP alarm limits on/off control	Off
MAP: Upper limit	Adult: 120 mmHg (16 kPa) Pediatric: 110 mmHg (14.7 kPa) Neonate: 80 mmHg (10.7 kPa)
MAP: Lower limit	Adult: 50 mmHg (6. 7 kPa) Pediatric: 50 mmHg (6.7 kPa) Neonate: 35 mmHg (4.7 kPa)
Intervals	
Interval	Automatic
Minutes	15 minutes
Automatic print on interval	Disabled
Advanced	
Display MAP	Enabled
SYS/DIA as primary	Enabled
MAP as primary	Disabled
Tube type	2 tubes
Unit of measure	mmHg

Settings	Default value
Algorithm default	SureBP
Cuff inflation target (step algorithm)	
Adult	160 mmHg (21.3 kPa)
Pediatric	140 mmHg (18.7 kPa)
Neonate	90 mmHg (12.0 kPa)
Allow interval program changes	Enabled
Programs (NIBP Averaging)	Programs 1 to 6 (default settings are empty)

SpO2

Settings	Default value
Alarms	
Alarm limits on/off control	On
Upper limit	Adult: 100% Pediatric: 100% Neonate: 100%
Lower limit	Adult: 90% Pediatric: 90% Neonate: 90%
SatSeconds™ (Nellcor only)	0
Advanced	
Default view	% SpO2
Default response	Normal
Sweep speed default	25 mm/s
Allow low perfusion alarm	Enabled

SpHb

Settings	Default value
Alarms	
Alarm limits on/off control	On
Upper limit	17.0 g/dL (11.0 mmol/L)
Lower limit	7.0 g/dL (4.0 mmol/L)
Setup	
Trend period	1 hr
Advanced	
Default view	Numeric
Reference	Venous
Unit of measure	g/dL
Default averaging	Medium

Temperature

Settings	Default value
Alarms	
Alarm limits on/off control	Off
Upper limit	101 °F (38.3 °C)
Lower limit	94 °F (34.4 °C)
Advanced	
Unit of measure	°F (Fahrenheit)
Display temperature conversion	Enabled
Default SureTemp Plus site	Oral
Braun 6000	
Anti-theft return time out	Disabled
Mode	Technique compensation

Settings	Default value
Enable pulse timer	Enabled
Enable Celsius only selection	Disabled

Pulse rate

Settings	Default value
Alarms	
Alarm limits on/off control	On
Upper limit	Adult: 120 bpm Pediatric: 150 bpm Neonate: 200 bpm
Lower limit	Adult: 50 bpm Pediatric: 50 bpm Neonate: 100 bpm
Setup	
Tone volume	Off
Advanced	
Display source	Enabled

RR

Settings	Default value
Alarms	
Alarm limits on/off control	On
No breath alarm	Adult: 30 seconds Pediatric: 20 seconds Neo: 15 seconds

Patient manual parameters

Note In software versions 2.30.00 and higher, the manual parameter fields are blank (no defaults set).

Settings	Default value
Height	
Weight	
Pain	
Respiration	
Temperature	
Advanced[1]	
Display height	Enabled
Display weight	Enabled
Display pain	Enabled
Display respiration	Enabled
Display temperature[2]	Disabled
Display BMI	Disabled
Height units	in
Weight units	lb
Enable manual override NIBP Default value	Enabled
Enable manual override Pulse rate	Enabled
Enable manual override Temperature Default	Enabled
Enable manual override RR Default	Enabled
Enable manual override SpO2 Default	Enabled

[1] You can enable only four manual parameters.

[2] If a temperature module is available, manual temperature selection is not available.

Device

Settings	Default value
Temporarily pause patient monitoring[1]	10 minutes
Display brightness	6
Allow display lock timeout	Enabled
Profiles	Spot Check
Advanced	
Language	English
Date/time	
Date format	mm/dd/yyyy
Time zone	UTC
Automatically adjust clock for daylight saving time, reported by host	Disabled
Allow users to change date and time	Enabled
Display date and time	Enabled
Display	
Display lock	Never
Display power saver	2 minutes
Device power down	20 minutes
Device	
Enable save as default	Enabled
Standby Mode timeout	10 minutes
Allow profile change	Enabled
Power line frequency	60 Hz
Demo	
Type	Normal values

[1]Continuous mode only

Data management

Settings	Default value
Advanced	
Patient	
Default patient type	Adult
Name format	Full name
Primary label	Name
Secondary label	Patient ID
Require patient ID to save readings	Disabled
Search by patient ID	Disabled
Clear patient information on manual save	Enabled
Retrieve list	Disabled
Clinician	
Label	Clinician ID
Require clinician ID to save readings	Disabled
Search by clinician ID	Disabled
Require password	Disabled
Clear clinician information on manual save	Disabled
Clinical data	
Automatically send on manual save	Disabled
Delete readings after successful send	Disabled
Emulate Spot Vital Signs LXi	Enabled
Connect to Connex CS	Enabled

Network

Settings	Options	Selections	Default value
Radio			
SSID [1]			com.welchallyn
Radio band			b/g
Authentication type			WPA2-PSK
Authentication method			Network key
Enable radio			Enabled
Enable radio network alarms			Disabled
Network key			1234567890ABCDEF1234567890ABCDEF1234567890ABCDEF1234567890ABCDEF
Server			
Connectivity			
	Broadcast	Port	7711
	VM IP	Vitals Management server IP address	0-0-0-0
		Port	281
	NRS IP	Network rendezvous service (NRS) IP address	0-0-0-0
		Port	7711
	DNS Name	Network rendezvous service DNS name	WANRS
		Port	7711
	DHCP	DHCP vendor class identifier	welchallyn-nrs
		Port	7711
		NRS IP addresses	Those network rendezvous service (NRS) IP addresses used by your organization

[1]Software version 2.0 supports up to 16 characters. Software versions 2.1 and later support up to 32 characters.

Disassembly and repair reference

Screws

Quantity	Location	Type	Size/length	Torque	Bit type
2	Comms connection cover	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
1	Module cover	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
2	Braun housing or end cap	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
4	Module retaining plate	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
10	Handle module assembly housing	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
3	767 controller PCBA	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
6	Main housing	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
4	Power supply	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
4	Comms PCBA	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
4	Radio board	Pan head machine	M3x8	6.0 in-lb ± 0.5 in-lb	#1 Phillips
2	Light bar cover	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
2	Power panel	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
2	Battery board	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
1	P-clamp, Ethernet cable	Pan head machine	M3x8	6.0 in-lb ± 0.5 in-lb	#1 Phillips
7	Main board	Pan head machine	M3x8	6.0 in-lb ± 0.5 in-lb	#1 Phillips
4	LCD frame	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
2	Module well	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
2	P-clamp, USB cable bundle	Pan head machine	M4x10	7.5 in-lb ± 0.5 in-lb	#2 Phillips
4	Module tracks	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
2	Blue insert	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10
2	USB client cable	Plastite	#4-20 x 0.500	7.5 in-lb ± 0.5 in-lb	Torx T10

Connectors

Connector types

Disassembly and repair procedures require that you disconnect and reconnect the following connector types:

- **Locking (squeeze-release)**: Locking connectors use a latching mechanism to prevent accidental disconnection during assembly and use. The latch is located on one end of a tab so it may flex and lock into place when coupled with its matching connector. The tab provides a lever to release the latch. When disconnecting, squeeze to provide pressure on the tab to unlatch. Some connectors have multiple latches that require you to press multiple tabs to release.
  To remove a locking connector, squeeze the release lever and remove the cable.

  To connect a locking connector, push the mating pieces together until the latch locks in place.
- **Pressure**: Pressure connectors use friction to prevent accidental disconnects.
  To remove a pressure connector, grasp each connector mating half and pull the halves apart.

  CAUTION Do not use excessive force to disconnect the connector. Excessive force may result in pulling the mounted connector off the circuit board.

  To connect a pressure connector, grasp each connector mating half and insert one half into the other.
- **USB**: USB connectors provide communications and power connectivity between the main board and any sub-systems and external devices. USB connectors use friction to maintain the connection, but rarely require much force to connect or disconnect. The USB cable can safely be removed from the mounted connector by simply pulling it out of the connector. Two types of USB connectors are used: USB A-type and USB mini-B.
  To remove a USB connector, grasp the connector and pull.

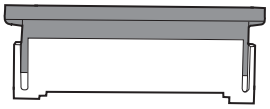
  To connect a USB connector, grasp the connector and insert.
- **ZIF (zero insertion force)**: The device uses flex cables and ZIF flex cable connectors. Flex cables and ZIF connectors require special care when handling. ZIF connectors use a sliding outer piece that latches and unlatches to secure and release the flex cable. ZIF cables cannot be successfully connected or disconnected without properly unlatching and latching the sliding outer piece.

  CAUTION Do not use excessive force when releasing pressure on the connector. Excessive force may result in breaking the sliding outer piece.

  To remove a ZIF connector

  CAUTION Remove a flex cable only *after* the ZIF latch is open.

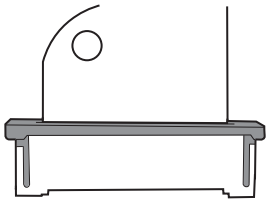
  1. Using a suitable tool (for example, a paper clip, small flat-head screwdriver, or needle-nose pliers), slide the latching piece of the connector away from the connector body.



2. Remove the cable.

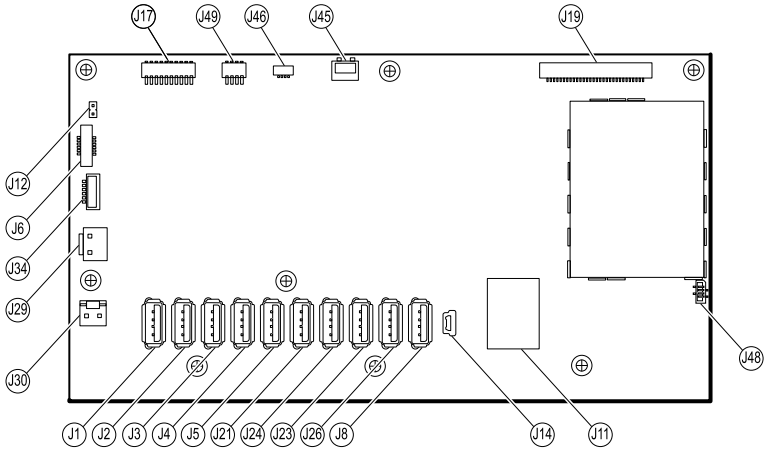
To connect a ZIF connector

1. Slide the latching piece of the connector away from the connector body.
2. Insert the flex cable into the connector. This may require using a suitable tool to keep the latching piece elevated.
3. Slide the latching piece toward the connector body until it locks into place.



Connectors

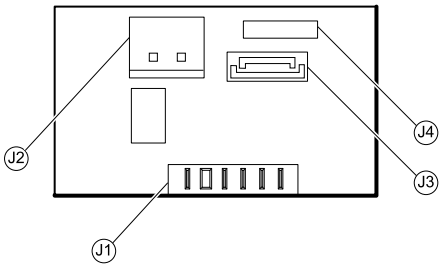
Main board connectors



Connector	Wiring harness	Connects with	Connector
J1	USB	MCE to modules—Braun if required	USB
J2	USB	MCE to modules	USB
J3	USB	MCE to modules	USB
J4	USB	MCE to modules	USB
J5	USB	MCE to modules	USB

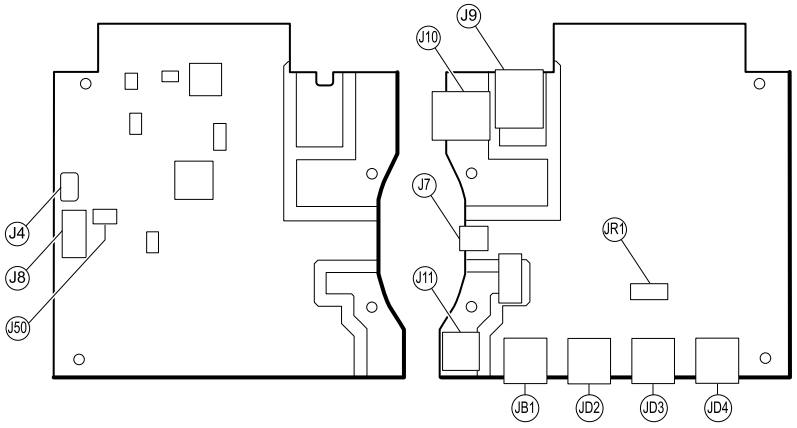
Connector	Wiring harness	Connects with	Connector
J6	Power button	Power button and LED status	ZIF
J8	USB	MCE to handle module PCBA	USB
J11	Ethernet	Communications board	Locking
J12	Main harness	Speaker	Pressure
J14	Client USB	Communications board J8	Mini USB
J17	Not used	Not used	Pressure
J19	LCD	LCD board	Pressure
J21	USB	MCE to SpO2	USB
J23	USB	Communications board J4	USB
J24	USB	MCE to NIBP	USB
J26	USB	Reserved for future use	USB
J29	Battery power	Battery connector board J2	Locking
J30	Main harness	Power supply board J2	Pressure
J34	Battery	Battery connector board J3	Locking
J45	Main harness	Fan connector on the power-supply cover	Locking
J46	Light bar	Light bar board J1	Pressure
J48	LCD flex cable	LCD	Pressure
J49	Main harness	Communications board power	Pressure

Battery connector board connectors



Connector	Wiring harness	Connects with	Connector
J1	N/A	Battery	Pressure
J2	Battery power	Main board J29	Locking
J3	Battery	Main board J34	Locking
J4	N/A	Internal use only	N/A

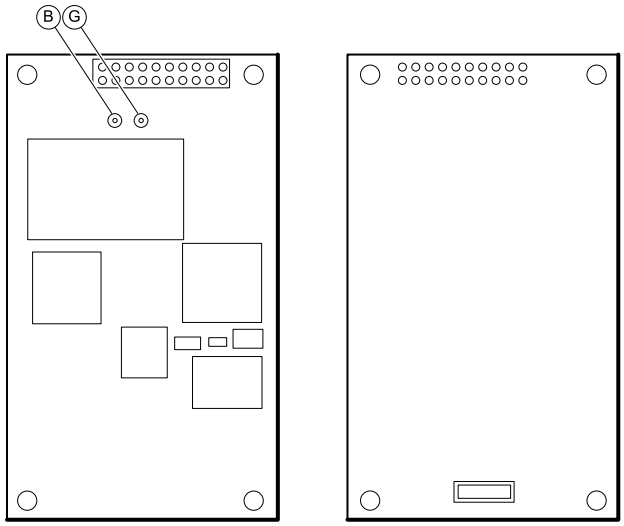
Communications board connectors



Connector	Wiring harness	Connects with	Connector
J4	USB	Main board J23	Mini USB
J7	USB	External (client)	Mini USB
J8	USB	Main board J14	USB
J9	Ethernet	Main board J11	Locking (RJ45)
J10	Ethernet	External	Locking (RJ45)
J11 *	Nurse call	External	Mini stereo
J50	Main	Main board J49	Pressure
JB1	USB	External	USB
JD2 *	USB	External	USB
JD3 *	USB	External	USB
JD4 *	USB	External	USB
JR1 *	N/A	Radio	Pressure

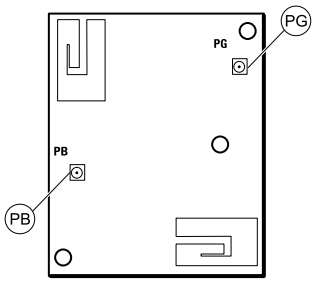
* Not available on the Basic communications board.

Radio board connectors



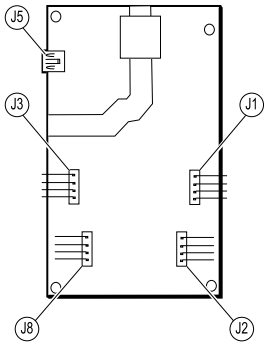
Connector	Wiring harness	Connects with	Connector
B	Not used	Not used	Pressure
G	Antenna cable	Antenna board PG	Pressure
A (not labeled)	N/A	Standard communications board JR1	Pressure

Antenna board connectors



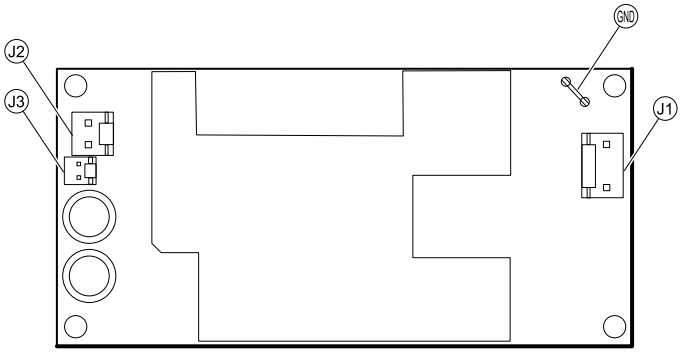
Connector	Wiring harness	Connects with	Connector
PG	Antenna cable	Radio board G	Pressure
PB	Not used	Not used	Pressure

767 controller board connectors



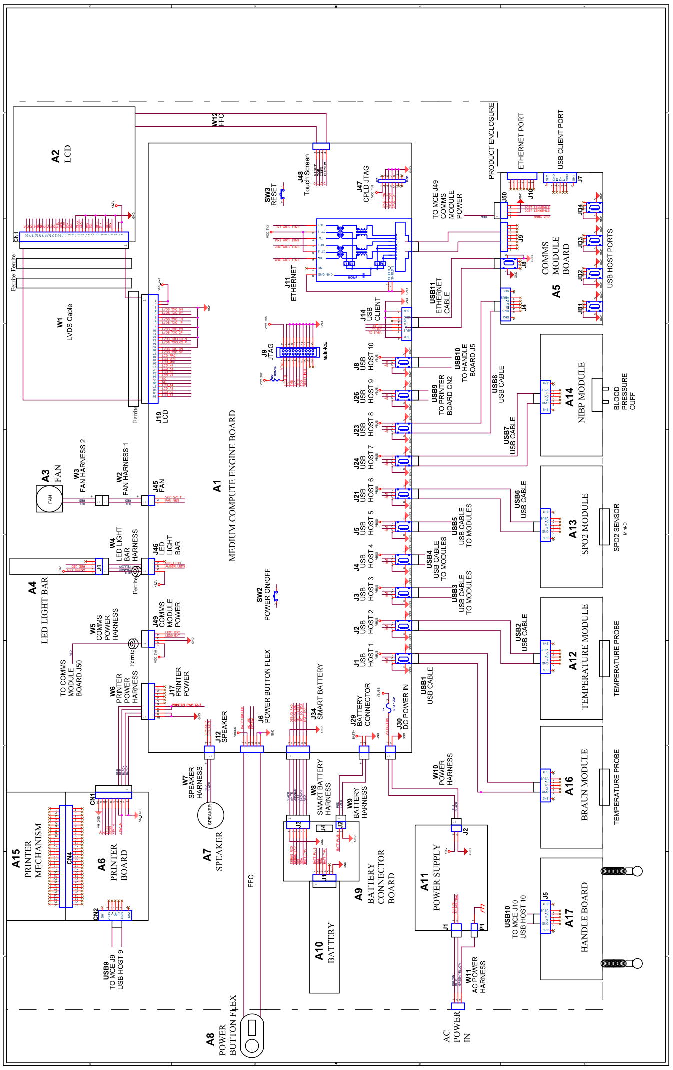
Connector	Wiring harness	Connects with	Connector
J1	Optical assembly	Handle cradle	Pressure
J2	Handle assembly	Handle	Pressure
J3	Optical assembly	Handle cradle	Pressure
J5	USB	Main board J8	USB (mini)
J8	Handle assembly	Handle	Pressure

Power supply board connectors



Connector	Wiring harness	Connects with	Connector
J1	AC to power supply	IEC connector (blue: line-in, brown: neutral)	Pressure
J2	Main harness	Main board J30	Pressure
J3	N/A	Internal use only	N/A
GND	AC to power supply	IEC connector (green: ground) via ground stud	Pressure

Connex Integrated Wall System interconnect diagram



Service record

Print the *Service record* pages to enter and save the results of your tests.

Date:	**Time**:
Device name:	**Serial number**:
Technician:	**Service tool version**:

Leak test

Leak test	**Specification**	**Actual reading**	**Pass**	**Fail**
Leak test:	Max: 5			

Overpressure test

Overpressure test		**Specification**	**Actual reading**
Over Pressure Test:	Adult mode:	280 329	
	Neonate mode:	130 164	

NIBP accuracy check

Target pressure ± 5 mmHg	**Pressure meter**	**Service tool**	**Specification**	**Pass**	**Fail**
0 mmHg	mmHg	mmHg	± 1 mmHg		
50 mmHg	mmHg	mmHg	± 3 mmHg		
150 mmHg	mmHg	mmHg	± 3 mmHg		
250 mmHg	mmHg	mmHg	± 3 mmHg		

Masimo SpO2, SpHb, and heart rate tests

Test	Specification	Actual reading	Pass	Fail
SpO2 heart rate 61 bpm	Pulse rate 61 ±1 bpm 60 to 62 bpm	bpm		
SpO2 saturation 81%	Saturation 81% ±3% 78 to 84%	%		
SpHb g/dL 14 g/dL	SpHb 14 g/dL ±1 g/dL 13 g/dL to 15 g/dL	g/dL		

Nellcor SpO2 and heart rate test

Test	Specification	Actual reading	Pass	Fail
SpO2 heart rate 60 bpm	Pulse rate 60 ±1 bpm 59 to 61 bpm	bpm		
SpO2 saturation 75%	Saturation 75% ±1 sat point 74 to 76%	%		
SpO2 heart rate 200 bpm	Pulse rate 200 ±2 bpm 198 to 202 bpm	bpm		
SpO2 saturation 90%	Saturation 90% ±1 sat point 89 to 91%	%		

Calibration key temperature test for SureTemp Plus

Temperature test	Specification ± 0.2°F (± 0.1°C)		Actual reading	Pass	Fail
97.3 °F (36.3°C)	97.1 to 97.5°F	36.2 to 36.4°C	°F or °C		

SureTemp Plus test

9600 Plus Calibration Tester ID number	Calibration Date	Next Calibration Due Date

Temperature tested	Specification	Range		Actual reading	Pass	Fail
96.8 °F (36.0 °C)	± 0.3 °F (± 0.2 °C)	96.5 °F to 97.1 °F	35.8 °C to 36.2 °C	°F or °C		
101.3 °F (38.5 °C)	± 0.2 °F (± 0.1 °C)	101.1 °F to 101.5 °F	38.4 °C to 38.6 °C	°F or °C		
105.8 °F (41.0 °C)	± 0.3 °F (± 0.2 °C)	105.5 °F to 106.1 °F	40.8 °C to 41.2 °C	°F or °C		

Braun ThermoScan PRO 4000 or PRO 6000 test

9600 Plus Calibration Tester ID number	Calibration Date	Next Calibration Due Date

Temperature tested	Specification ± 0.4 °F (± 0.2 °C)		Actual reading	Pass	Fail
96.8 °F (36.0 °C)	96.4 °F to 97.2 °F	35.8 °C to 36.2 °C	°F or °C		
101.3 °F (38.5 °C)	100.9 °F to 101.7 °F	38.3 °C to 38.7 °C	°F or °C		
105.8 °F (41.0 °C)	105.4 °F to 106.2 °F	40.8 °C to 41.2 °C	°F or °C		