# Welch Allyn Connex® Integrated Wall System


## Directions for use

Software versions 1.5X–1.7X

Welch Allyn®

Advancing Frontline Care™

For information about any Welch Allyn product, call Welch Allyn Technical Support:


| | |
|---|---|
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# Contents

# Introduction

The Welch Allyn Connex® Integrated Wall System combines the advanced, easy-to-use monitor capabilities of the Welch Allyn Connex® Vital Signs Monitor 6000 Series with the Welch Allyn 767 Power Handles. This manual (directions for use) is designed to help you understand the capabilities and operation of the wall system. The information in this manual, including the illustrations, is based on a wall system configured with non-invasive blood pressure (NIBP), body temperature, pulse oximetry (SpO2), total hemoglobin concentration (SpHb), pulse rate, weight scale, and two power handles. If your wall system configuration lacks any of these options, some information in this manual may not apply.

Before using the wall system, read the sections of the manual that pertain to your use of the system.

**Note** Throughout this directions for use, the Integrated Wall System may be referred to as a wall system or monitor.

**Note** Some product features described in this publication might not be available in your country. For the latest information about products and features, please call Welch Allyn Customer Care.

# Intended use

## Handle module assembly

Handles supply power to Welch Allyn 3.5V instruments.

## Connex® Vital Signs Monitor patient monitor

The VSM 6000 Series of monitors is intended to be used by clinicians and medically qualified personnel for monitoring of neonatal, pediatric, and adult patients for

- noninvasive blood pressure,
- pulse rate,
- noninvasive functional oxygen saturation of arteriolar hemoglobin (SpO2), and
- body temperature in normal and axillary modes

The most likely locations for patients to be monitored are general medical and surgical floors, general hospital, and alternate care environments.

The optional Masimo Rainbow SET® and accessories are indicated for the continuous noninvasive monitoring of total hemoglobin concentration of adult, pediatric, and neonatal patients during both

motion and no motion conditions, and for patients who are well or poorly perfused in hospitals and hospital-type facilities.

Optional compatible weight scales (e.g., Health o meter®) can be used for height, weight, and BMI input.

This product is available for sale only upon the order of a physician or licensed health care professional.

# Contraindications

This system is not intended to be used:

- on patients connected to heart/lung machines
- on patients being transported outside a healthcare facility
- near an MRI machine
- in a hyperbaric chamber
- near flammable anesthetics
- near electro-cauterization devices

For contraindications of SpO2 and SpHb sensors, consult the sensor manufacturer's directions for use.

# Symbols

## 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. |
|  | Consult operating instructions. |

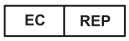
## Power symbols

| | | | |
|---|---|---|---|
|  | Power on/standby |  | Equipotential terminal |
|  | (on the display) monitor is plugged into Alternating Current power |  | Battery absent or faulty |
|  | (on the monitor, green indicator) Alternating Current power present, battery fully charged |  | Battery charge level |
|  | (on the monitor, 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<br>• Best (4 bars)<br>• Good (3 bars)<br>• Fair (2 bars)<br>• Weak (1 bar)<br>• No signal (no bars)<br>• No connection (blank) |  | Nurse call |

# Miscellaneous symbols

| | | | |
|---|---|---|---|
|  | Meets essential requirements of European Medical Device Directive 93/42/EEC |  | Authorized Representative in the European Community |
|  | Call for maintenance |  | Defibrillation-proof Type BF applied parts |
|  | Manufacturer |  | Recycle |
|  | 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. | | |

# Screen elements

## Global navigation


Select option

## NIBP


NIBP start


NIBP stop


Intervals status indicators


NIBP view toggle

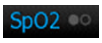
## Temperature

Temperature site control

Process indicator

Direct mode selector

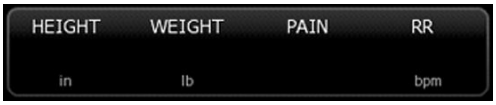
## SpO2 and Pulse rate

| | | | |
|---|---|---|---|
|  | Pulse amplitude bar |  | SatSeconds timer (Nellcor feature only) |
|  | SpO2 view toggle |  | Response mode selector (touch for Fast mode) |
|  | Heart rate (in beats per minute) | | |

## Total hemoglobin (SpHb)

| | | | |
|---|---|---|---|
|  | SpHb view toggle |  | Averaging selector |

## Manual parameters

| | | | |
|---|---|---|---|
|  | | | Manual parameter selector |

## Alarm and information messages

| | | | |
|---|---|---|---|
|  | Alarm limit button |  | Alarm On/Off toggle |
|  | Multiple alarms toggle |  | Alarm audio paused |
|  | Alarm active | | |

## Patients list and review


| | | | |
|---|---|---|---|
|  | Diacritical marks key (available for languages that use diacritical marks; appearance differs based on language) |  | Symbols key |
|  | Send patient test reports |  | Print patient test reports |
|  | Cancel print request (Not available) |  | Add patient identifiers |
|  | Retrieve the patient list from the network | | |

## Settings

| | |
|---|---|
|  | Save configuration settings |

## Advanced settings


| | | | |
|---|---|---|---|
|  | Save to USB flash drive |  | Configure from USB flash drive |
|  | Restore factory default settings | | |

# About warnings and cautions

Warning and caution statements can appear on the monitor, on the packaging, on the shipping container, or in this document.

The monitor is safe for patients and clinicians when used in accordance with the instructions and the warning and caution statements presented in this manual.

Before using the monitor, familiarize yourself with the sections of this directions for use that pertain to your use of the monitor.

- Failure to understand and observe any warning statement in this manual could lead to patient injury, illness, or death.
- Failure to understand and observe any caution statement in this manual could lead to damage to the equipment or other property, or loss of patient data.

## General warnings and cautions

**WARNING** Many environmental variables, including patient physiology and clinical application, can affect the accuracy and performance of the monitor. The clinician must verify all vital signs information before treating the patient. If there is any question about the accuracy of a measurement, verify the measurement using another clinically accepted method.

**WARNING** Alarm limits are patient- or facility-specific. The clinician must set or verify alarm limits appropriate for each patient. Each time the monitor is powered on, you must check that the alarm settings are appropriate for your patient before you start monitoring.

**WARNING** Use only Welch Allyn approved accessories, and use them according to the manufacturer’s directions for use. Using unapproved accessories with the monitor can affect patient and operator safety and can compromise product performance and accuracy.

**WARNING** Inaccurate measurement risk. Do not connect more than one patient to a monitor.

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

**WARNING** Liquids can damage electronics inside the Connex IWS. Prevent liquids from spilling on the wall system.

If liquids are spilled on the wall system:

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

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

6. Reinstall battery pack.
7. Mount the wall system on the wall.
8. Power on the wall system and verify that it functions normally before using it.

**WARNING** Safety risk. Damaged cords, cables, and accessories can affect patient and operator safety. Routinely inspect the AC power cord, blood pressure cuff, SpO2 cable, and other accessories for strain relief wear, fraying, or other damage. Replace as necessary.

**WARNING** Fire and explosion hazard. Do not operate the monitor 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** Fire and shock hazard. Only connect LAN cables contained within the perimeter of a single building. Conductive LAN cables spanning multiple buildings may introduce fire or shock hazards unless they are fitted with fiber optic cables, lightning arrestors, or other applicable safety features.

**WARNING** The monitor may not function properly if dropped or damaged. Protect it from severe impact and shock. Do not use the monitor if you notice any signs of damage. Qualified service personnel must check any monitor that is dropped or damaged for proper operation before putting the monitor back into use.

**WARNING** Defective batteries can damage the monitor. If the battery shows any signs of damage or cracking, it must be replaced immediately and only with a battery approved by Welch Allyn.

**WARNING** Improper disposal of batteries may create an explosion or contamination hazard. Never dispose of batteries in refuse containers. Always recycle batteries according to local regulations.

**WARNING** Electric shock hazard. Do not open the monitor or attempt repairs. The monitor has no user-serviceable internal parts. Only perform routine cleaning and maintenance procedures specifically described in this manual. Inspection and servicing of internal parts shall only be performed by qualified service personnel.

**WARNING** Inaccurate measurement risk. Do not expose to temperatures higher than 122º F (50º C).

**WARNING** Inaccurate measurement risk. Do not use the monitor on patients who are on heart-lung machines.

**WARNING** Use the monitor only as described in this directions for use. Do not use the monitor on patients as described in the Contraindications.

**WARNING** Inaccurate measurement risk. Do not use the monitor on patients who are experiencing convulsions or tremors.

**WARNING** Do not place the monitor in any position that might cause it to fall on the patient.

**WARNING** Welch Allyn is not responsible for the integrity of a facility's power. If the integrity of a facility's power or protective earth conductor is in doubt, always operate the monitor on battery power alone when it is attached to a patient.

**WARNING** For operator and patient safety, peripheral equipment and accessories that can come in direct patient contact must comply with all applicable safety, EMC, and regulatory requirements.

**WARNING** All signal input and output (I/O) connectors are intended for connection of only devices complying with IEC 60601-1, or other IEC standards (for example, IEC 60950), as applicable to the monitor. Connecting additional devices to the monitor may increase chassis or patient leakage currents. To maintain operator and patient safety, consider the requirements of IEC 60601-1-1. Measure the leakage currents to confirm that no electric shock hazard exists.

**WARNING** Equipment failure and patient harm risk. Do not cover the air intake vents on the right or exhaust vents on the front of the Connex IWS. Covering these vents could cause overheating or muffling of alarms.

**WARNING** This equipment is not suitable for use in the presence of electro-surgery.

**WARNING** Cross-contamination or nosocomial infection risk. Clean and disinfect the monitor on a routine basis according to your facility's protocols and standards or local regulations. Thorough hand-washing before and after contact with patients greatly reduces the risk of cross-contamination and nosocomial infection.

**WARNING** The physical assessment instruments (handles) are designed for intermittent use. On-time should not exceed 2 minutes. Allow at least 10 minutes off-time between patients.

**CAUTION** United States Federal law restricts this monitor to sale, distribution, or use by or on the order of a physician or licensed healthcare professional.

**CAUTION** Welch Allyn is not responsible for the integrity of any wall mounting interface. Welch Allyn recommends that you contact your Biomedical Engineering Department or maintenance service to ensure professional installation, safety, and reliability of any mounting accessory.

**CAUTION** Electromagnetic interference risk. The monitor complies with applicable domestic and international standards for electromagnetic interference. These standards are intended to minimize medical equipment electromagnetic interference. Although this monitor is not expected to present problems to other compliant equipment or be affected by other compliant devices, interference issues still may occur. As a precaution, avoid using the monitor in close proximity to other equipment. In the event that equipment interference is observed, relocate the equipment as necessary or consult manufacturer's directions for use.

**CAUTION** Use only a Class I (grounded) AC power supply cord for powering this monitor.

**CAUTION** Do not use a long press of ⏻ to power down the monitor when it is functioning normally. You will lose patient data and configuration settings.

**CAUTION** Never pull on the power cord when removing it from the power outlet. When disconnecting the power cord, always grasp the attachment plug and not the cord. Keep the cord away from liquids, heat, and sharp edges. Replace the power cord if the strain relief or cord insulation is damaged or begins to separate from the attachment plug.

**CAUTION** Use only the Welch Allyn USB client cable to connect a laptop computer to the USB client port. Any laptop connected to the monitor must be running on a battery, a 60601-1 compliant power supply, or a 60601-1 compliant isolation transformer.

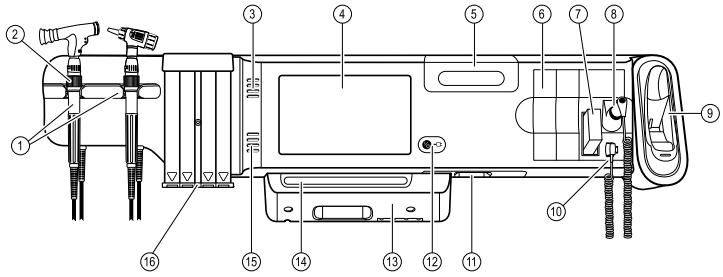
**CAUTION** If the touchscreen is not responding properly, refer to the troubleshooting section. If the problem cannot be resolved, discontinue use of the monitor and contact an authorized Welch Allyn service center or qualified service personnel.

**CAUTION** Verify patient identity on the monitor after manual or barcode entry and before printing or transferring patient records.

# Controls, indicators, and connectors

**Note** Your model might not contain all of these features.

### Front view

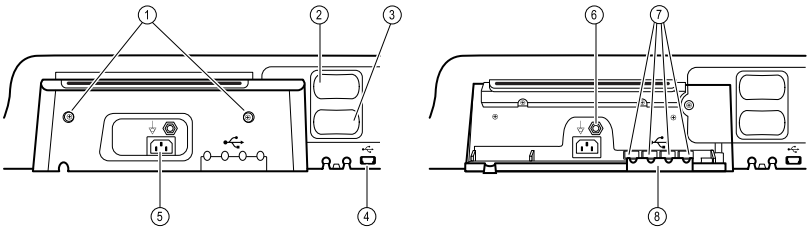



| No. | Feature | Description |
|---|---|---|
| 1 | Physical assessment instruments - Handles and handle cradles | Handles will accept any 3.5V Welch Allyn instrument head. The handle cradles support using one handle at a time. A handle turns on automatically when you remove it from a cradle and turns off when you return it. |
| 2 | Rheostat | Located on each handle. Turn clockwise to increase light output; turn counterclockwise to decrease light output. |
| 3 | Exhaust vents | Exhaust vents cool the monitor. |
| 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 covers | Support temperature measurements from oral, axillary, and rectal sites. |
| 8 | SureTemp® Plus thermometer probe | Supports temperature measurements from oral, axillary, and rectal sites. |

| No. | Feature | Description |
|---|---|---|
| 9 | Braun ThermoScan® PRO 4000 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.<br>The LED indicates the charging status when connected to AC power:<br>• Green: The battery is charged.<br>• Amber: The battery is charging. |
| 13 | USB/Comms cover | Houses light bar.<br>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**

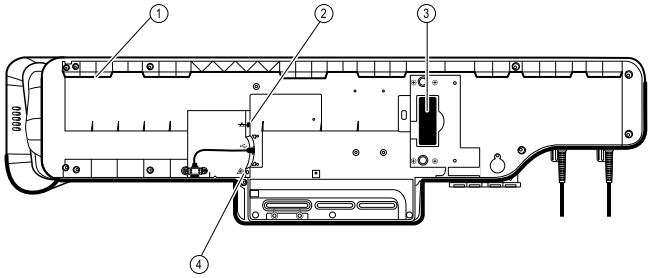
**(Left: USB/Comms cover attached; Right: USB/Comms cover removed)**




| | | |
|---|---|---|
| 1 | Retention screws | Supports removing and attaching 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. |

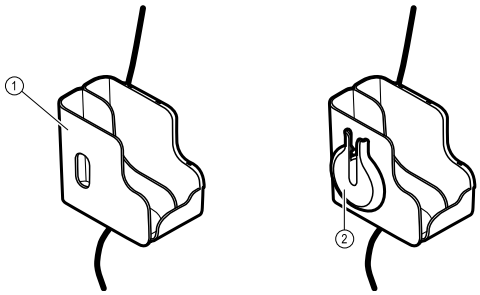
| No. | Feature | Description |
|---|---|---|
| 6 | Ground lug (equipotential terminal) | Supports electrical safety testing; terminal for connecting a potential equalization conductor. |
| 7 | USB connectors | Provides access to host USB connections for optional accessories. |
| 8 | USB cable retainer | Reduces strain on USB cables and connectors; helps prevent cables from disconnecting. |

**Back view**

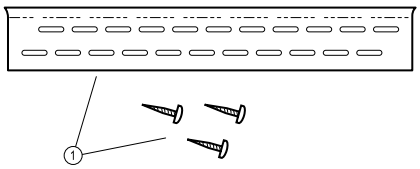
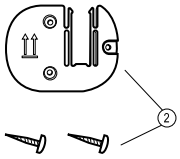



| | | |
|---|---|---|
| 1 | Recess for mounting bracket | Secures the monitor when mounted on the wall. |
| 2 | Ethernet RJ-45 | Provides a hardwired connection to the computer network. |
| 3 | Li-ion battery | Provides backup power to wall system. |
| 4 | Nurse call | Provides a connection to the hospital 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 | Secures accessory bin to the wall and provides routing and strain relief for power cord. |

# Setup

**CAUTION** Welch Allyn is not responsible for the integrity of any wall mounting interface. Welch Allyn recommends that you contact your Biomedical Engineering Department or maintenance service to ensure professional installation, safety, and reliability of any mounting accessory.

## Supplies and accessories

For a list of all approved supplies and accessories, see *Approved Accessories* in the Appendix.

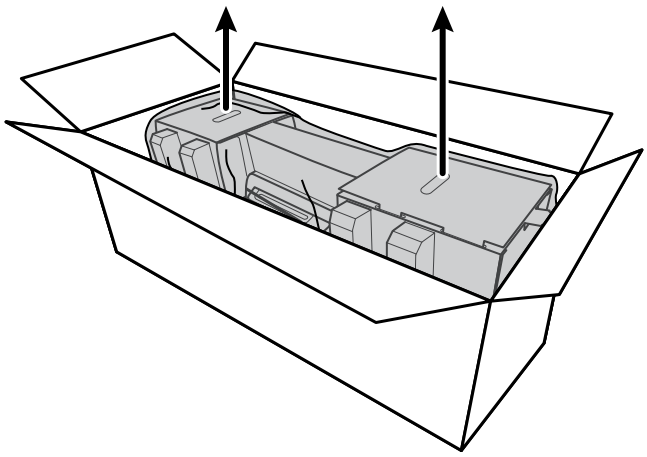
## Unpack the wall system

This procedure applies to first-time setup of the wall system.

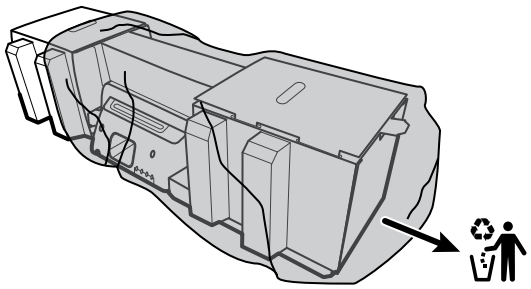
**CAUTION** You must follow these instructions exactly to ensure safety and ease of assembly.

**CAUTION** Do not remove any packing materials around the wall system until the instructions tell you to do so.

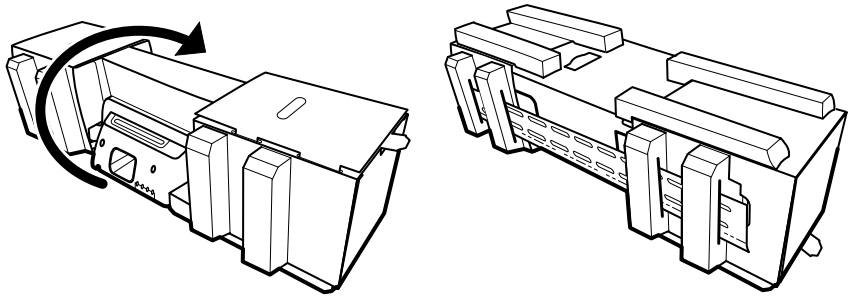
1. Lift the wall system out of the box by the cardboard handles.



2. With the wall system still in its packing material, place it onto a table or flat work surface and remove it from the plastic bag.



3. Turn the wall system over so that back of the wall system faces up.

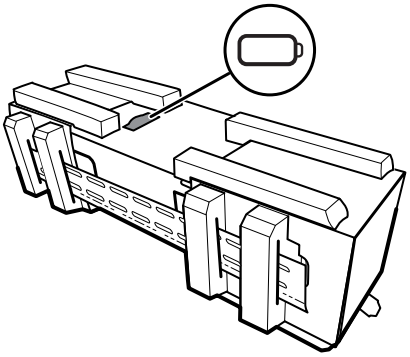


# Insert the battery

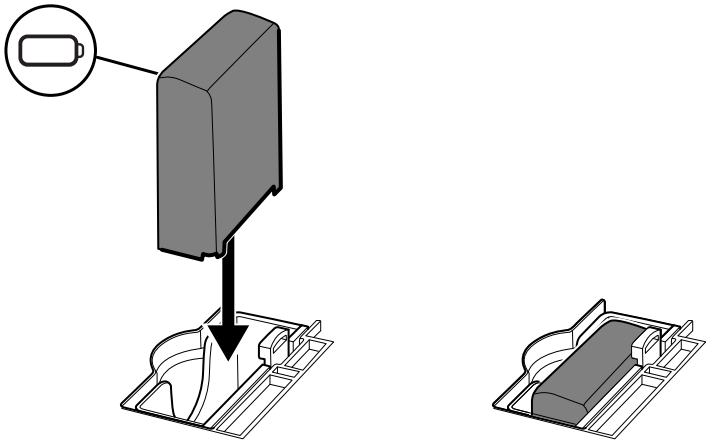
This procedure applies to first-time setup of the wall system. Therefore, the wall system is assumed to be shut down.

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

1. Locate the battery compartment, indicated by .

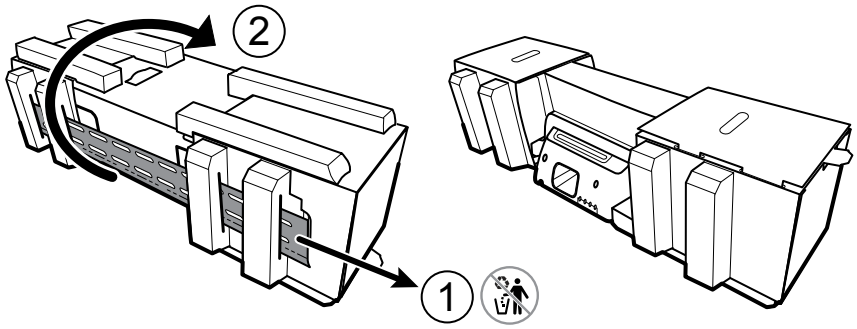


2. Insert the battery. (The battery is in a pink anti-static bag in the accessory box.)

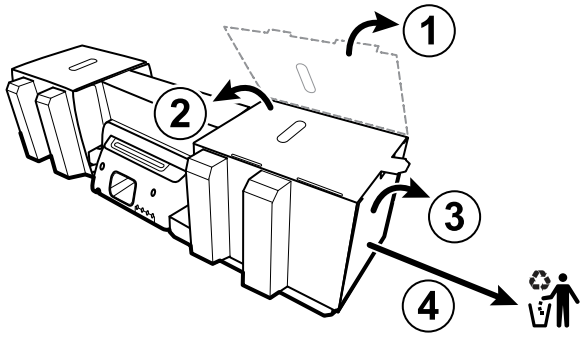


# Prepare for mounting

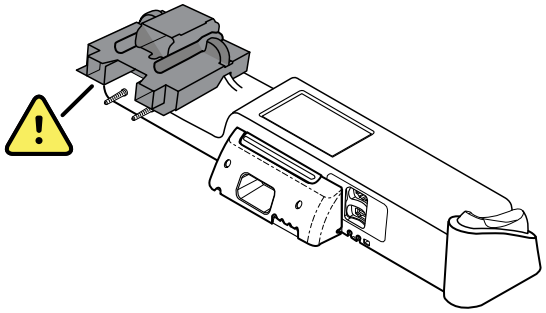
1. Slide the mounting rail bracket out of the packing material and put it aside. Do not discard. Then flip the wall system onto its back.




2. Remove the cardboard end caps and all foam as shown and put aside for recycling.

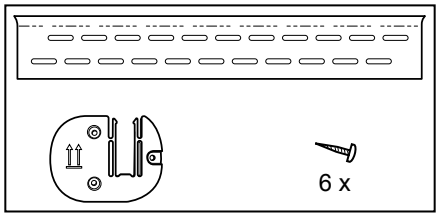


**CAUTION** Do not remove the cardboard securing the handles on the left side of the wall system at this time. The cardboard prevents damage to those instruments during the mounting process.



## Mounting hardware inventory

Use these items to mount the wall system.




- Mounting rail bracket
- Accessory bin bracket
- Screws

## Tools list

Use these tools to mount the wall system.

- #2 Phillips screwdriver
- level
- tape measure
- stud finder
- drill
- 1/8-inch (3.17 mm) diameter drill bit

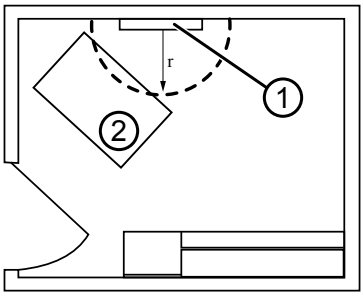
# Mounting location

Before mounting the wall system, consider the following recommendations to determine the best mounting location:

- Mount the wall system to studs.
- Mount the wall system within reach of the AC power outlet. The power cord is 8 ft. (2.44 m) long.
- Avoid brightly lit areas.
- Blood pressure tubing is 8 ft. (2.44 m) long.

- Position the wall system so that all instruments are accessible and in a location that allows for ergonomic examinations.

**Sample room layout**



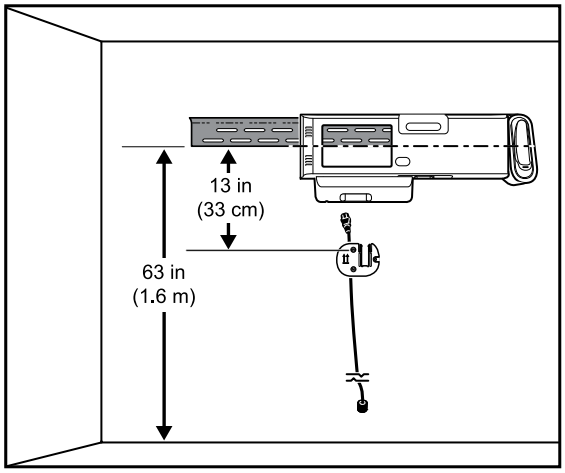

1. Connex Integrated Wall System
2. Examination table

# Mount the wall system

1. On the selected wall, find and mark the studs, and choose the system height and corresponding height for the mounting rail bracket.

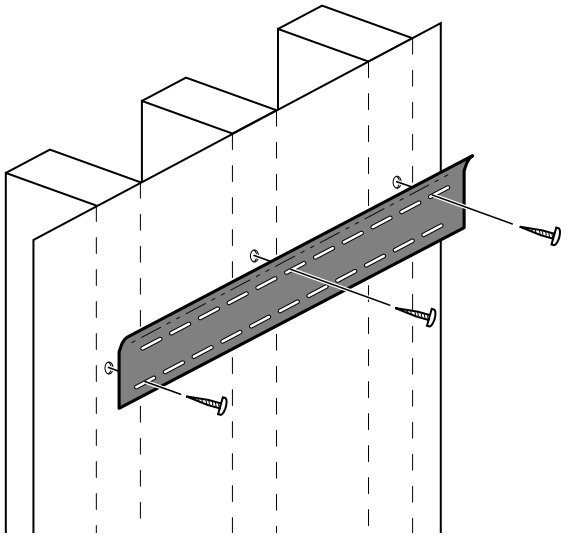
   **Recommendation:** Place the mounting rail bracket 63 in. (1.6 m) from the floor, which places screen center height at approximately 63 in. (1.6 m) from the floor.

   **CAUTION** This drawing shows the physical relationships of the mounting brackets to each other and to the wall system **after** you complete the mounting instructions. Do not place the wall system on the wall until you have completed all preliminary steps.

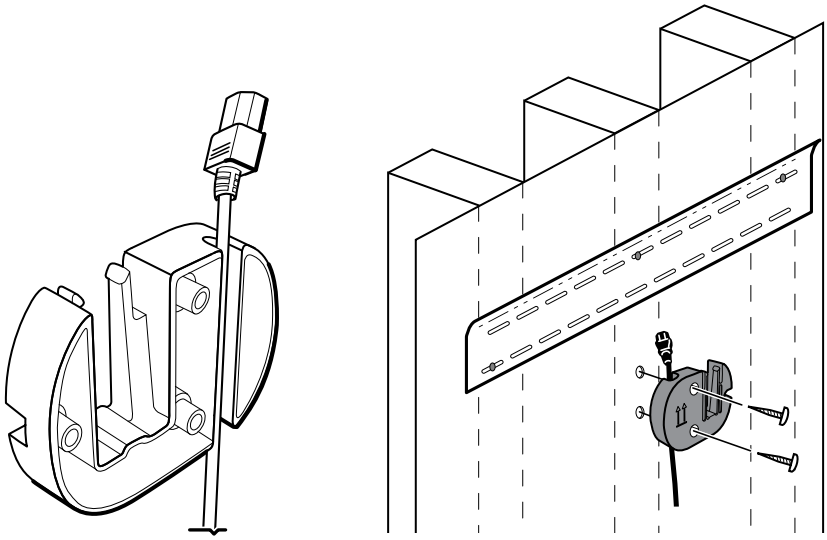



2. Affix the mounting rail bracket to three studs at the selected height using the available screws (anchors are provided for additional support).

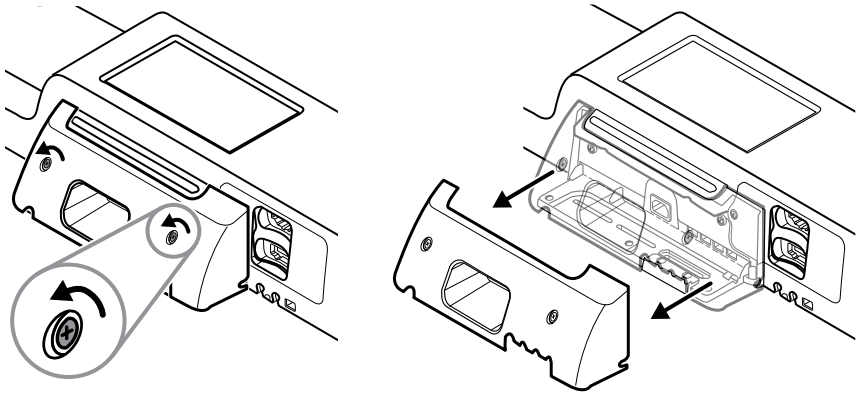
   **CAUTION** Ensure that the upper "lip" of the bracket sticks out from the wall and that the bracket is level.



3. Route the power cord through the channel in the back of the accessory bin bracket, then mount the bracket on the center stud at least 13 in. (33 cm) below the mounting rail bracket.

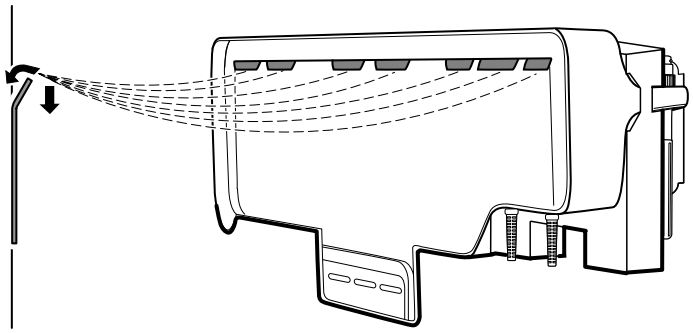


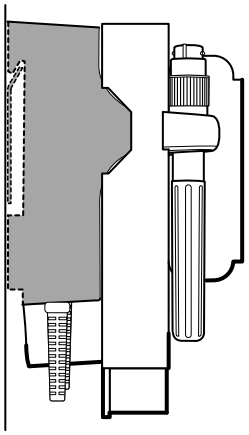
4. Before mounting the wall system, remove the cover by loosening the captive retention screws.



5. Hang wall system on the mounting rail bracket.

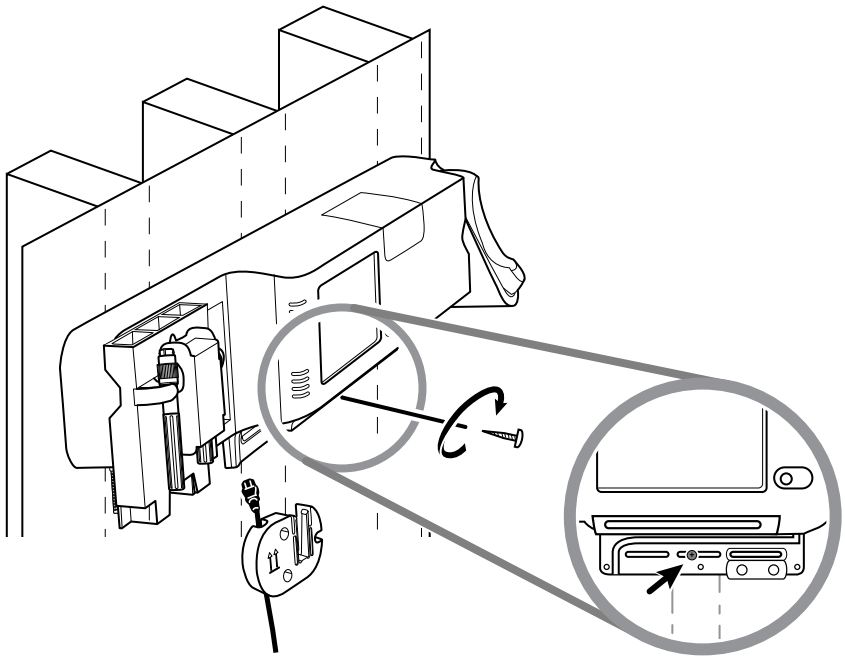
**WARNING** Ensure that the ribs on the back of the wall system fully engage the mounting rail bracket. The wall system should be level and flush to the wall.



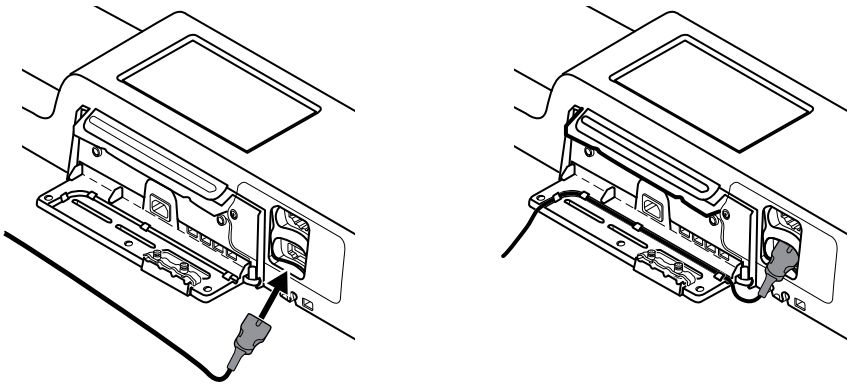


6. Select one of the three available slots at the bottom of the unit that overlaps a stud, and secure the unit to the stud with the remaining screw.

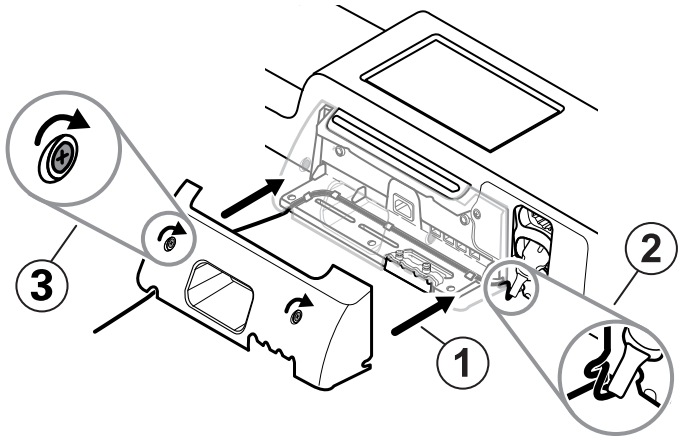
**WARNING** Failure to install this security screw may result in personal injury and equipment damage.



7. If the wall unit is configured for SpO2 or SpHb, connect the sensor cable and route it through the channel above the security screw you just installed.

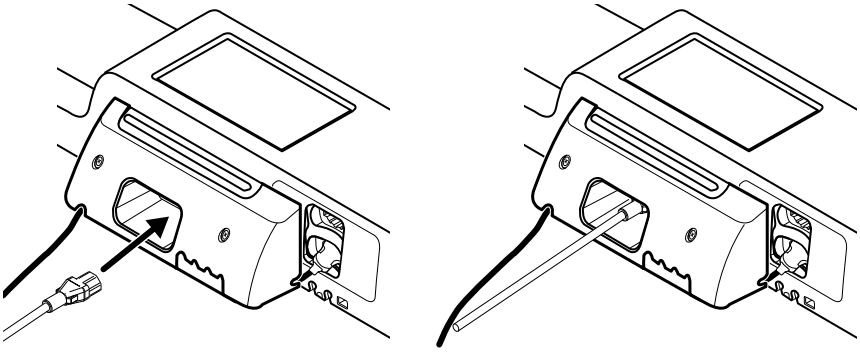


8. Re-attach the cover.
   a. Thread the sensor cable through the cutouts on the top right and bottom left of the cover.



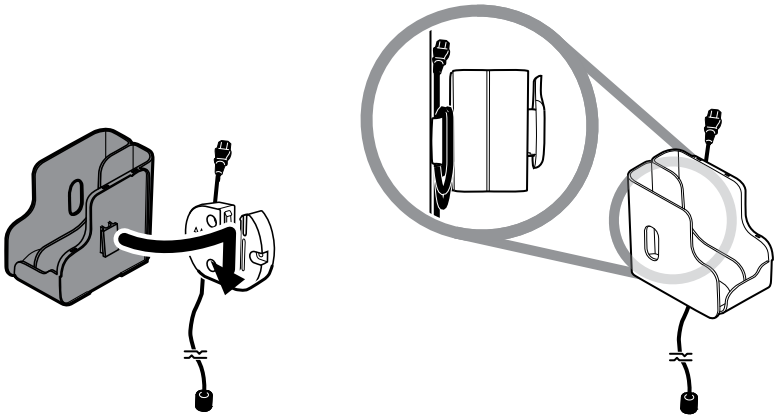

b. Tighten the two retention screws.

9. Attach the system power cord to the wall unit. Do not plug the cord into an outlet at this time.

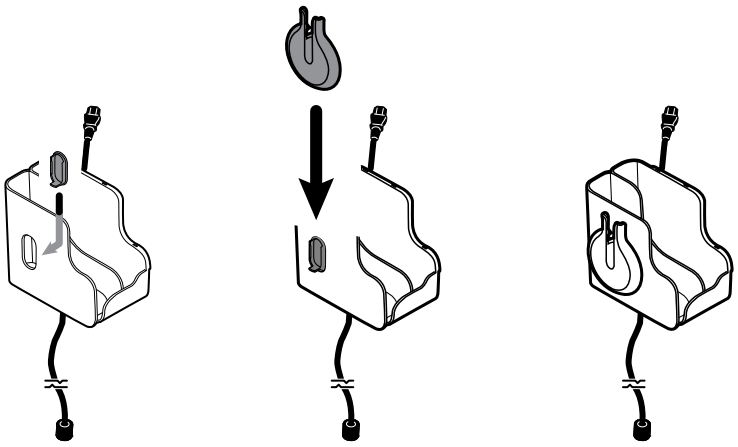


# Mount the accessory bin

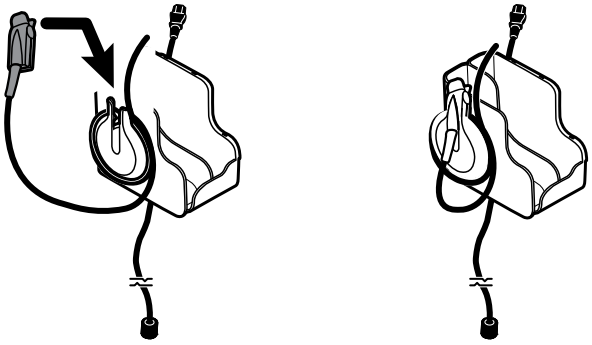
1. Mount the accessory bin on the accessory bin bracket, then loosely wrap the excess power cord around the accessory bin bracket.



2. If your wall system is configured for SpO2 (or SpHb), attach the spool to the accessory bin by sliding the spool onto the retention clip.

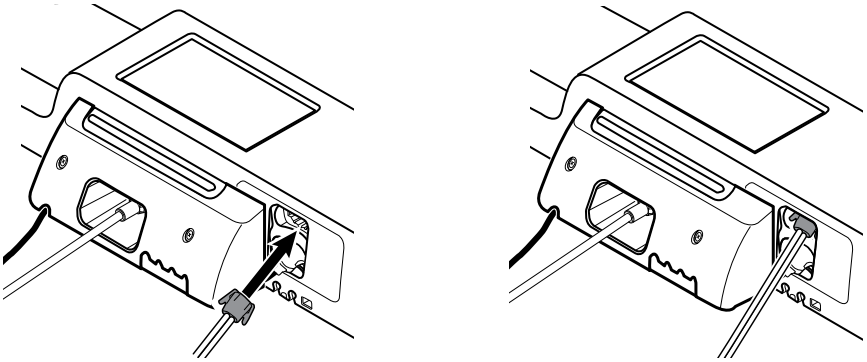


3. Properly orient and insert the sensor cable into the patient cable connector. (You just connected the opposite end of the sensor cable to the wall system.) Ensure the sensor cable is inserted completely, then close the protective cover. (See the sensor manufacturer's directions for use.)
4. Wrap the excess patient cable around the spool, and place the finger clip in the holder.



# Connect the blood pressure (NIBP) hose

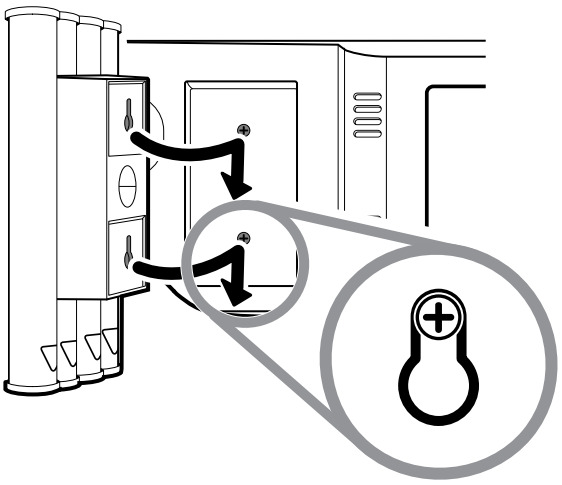
1. Align the hose connector with the hose connector port on the bottom of the monitor.
2. Insert the hose connector, pressing firmly until it clicks into place.



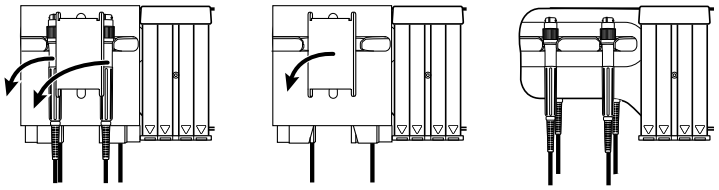
3. Attach a blood pressure cuff to the tubing (see the cuff manufacturer's directions for use), then store the cuff in the accessory bin.

# Set up the physical assessment instrument handles and specula dispenser

1. Attach the specula dispenser. Ensure that the keyhole locking slots on the back of the dispenser engage the locking screws on the wall system, then push down firmly.



2. Remove cardboard securing instrument handles.



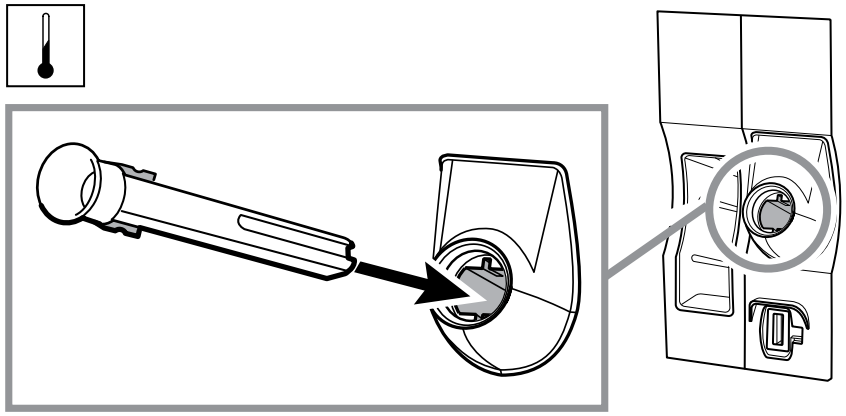
3. Attach Welch Allyn 3.5V instrument heads of your choice to the handles. See the directions for use for each instrument head.

# Set up the SureTemp® Plus thermometer

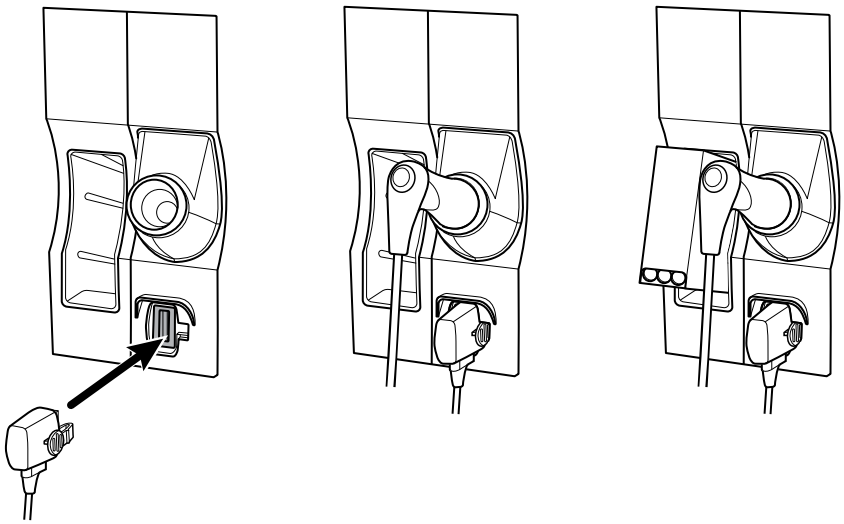
If your wall system is configured for a SureTemp Plus thermometer, follow these setup instructions.

1. Align the probe well with the tabs facing up and down and insert the probe well into the temperature module.

   The probe well snaps into place when it is fully seated.



2. Hold the temperature probe cable connector with the spring tab on the right and insert it into the probe port of the temperature module. Push it into place until it clicks.
3. Insert the temperature probe into the probe well.
4. Open a box of probe covers and place it in the probe cover box holder.

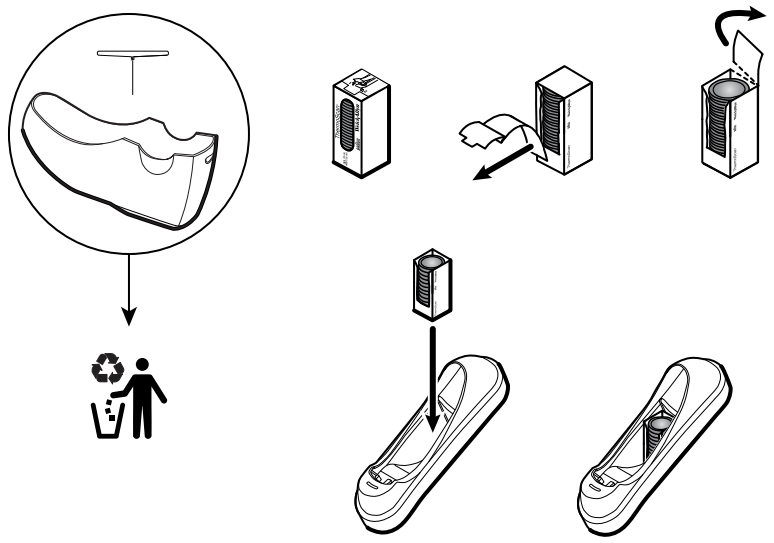


**Note** Spare boxes of probe covers can be stored in the compartment on the top of the wall system.

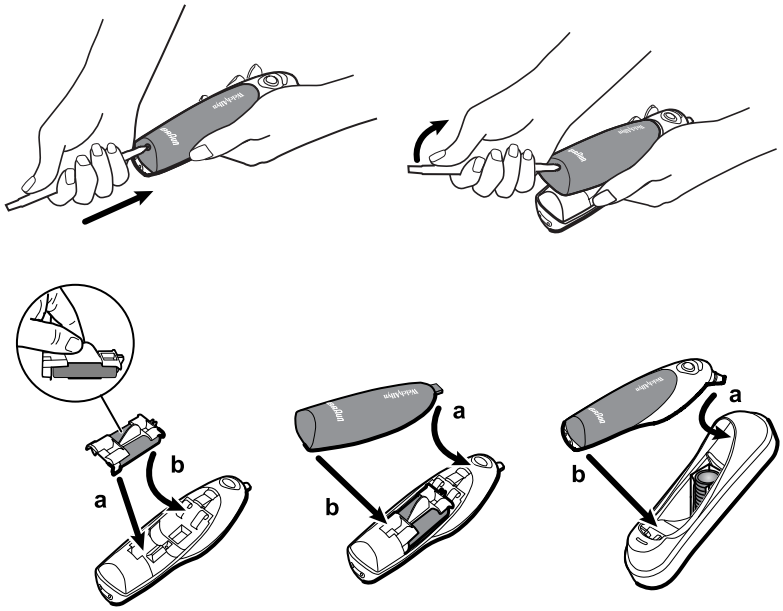
# Set up the Braun ThermoScan® PRO 4000 thermometer

If your system is configured for the Braun ThermoScan thermometer, follow these setup instructions.

1. Remove the thermometer from the package and discard the protective casing. Then open a box of probe covers and place it in the dock.



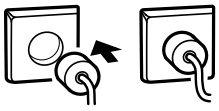
2. Remove the thermometer cover, insert the battery, replace the thermometer cover, then place the thermometer in the dock.




# Connect AC power

The wall system uses both battery and AC power. After completing all other setup activities, you can apply power to the wall system.

1. Insert the power plug into an outlet to power the monitor and to charge the battery.

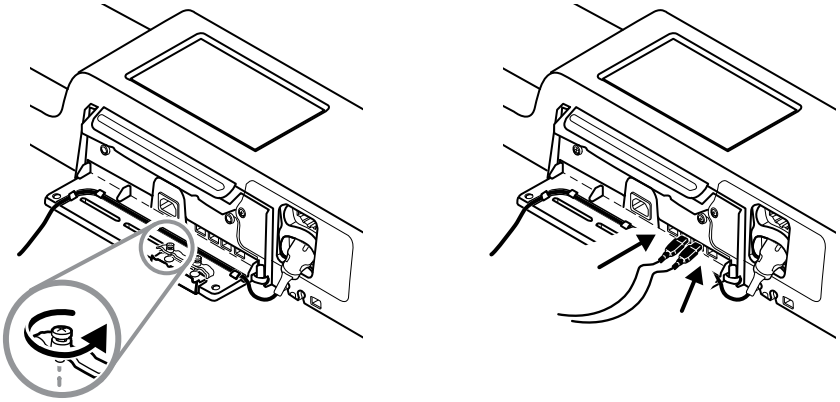


**Note** New batteries are only 30 percent charged. You must plug the wall system into AC power to fully charge the battery. Do not plug in the power cord until completing all preliminary steps.

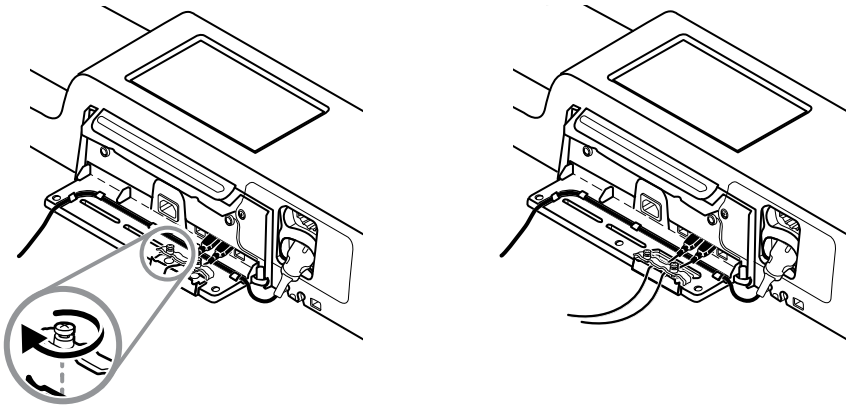
2. Proceed to Startup.

# Attach an accessory

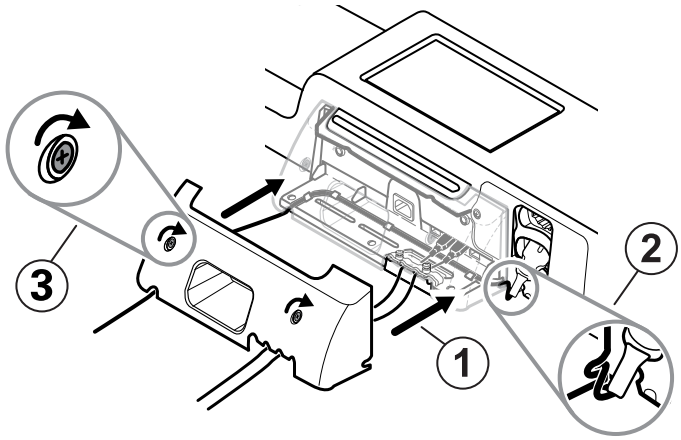
1. Shut down the wall system and detach the power cord. Then remove the cover from the wall system by loosening the captive retention screws.
2. Loosen the two screws on the cable retention clamp and remove it. Then connect the USB cable(s) to an available connector and thread the cable(s) through the cable guide(s).



3. Replace the cable retention clamp and tighten the two screws.



4. Re-attach the cover.
   a. Thread the SpO2 (or SpHb) cable through the cutouts on the top right and bottom left of the cover.




b. Tighten the two retention screws.

5. Re-attach the system power cord and power up the wall system.

**Note** Some accessories require a license to enable them for use. These accessories are packaged with an authorization code and instructions for activating the license using the Welch Allyn Service Tool. For more information, refer to the instructions and the service tool installation guide.

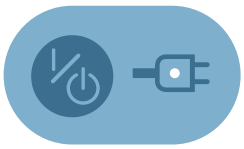
# Startup

## Power

The power button, located on the front of the monitor, performs the following functions:

- Powers up the monitor
- Sets the monitor into Display power saving mode, except when an alarm condition is active (brief press)
- Resets the monitor and sets the monitor into Standby mode (press and hold for 6 seconds)

**CAUTION** Do not use a long press of ⏻ to power down the monitor when it is functioning normally. You will lose patient data and configuration settings.



The LED in the center of the power plug symbol indicates the battery charging status:

- Green indicates that AC power is present and that the battery is fully charged.
- Amber indicates that AC power is present and that the battery is charging.

The monitor has distinct power states.

### Monitor on

The monitor is operating on battery power or AC power. You can utilize the monitor's features, and the display is active.

### Display power saving

The monitor is operating on battery or AC power, but the display is off to conserve power. A brief press of the power button sets the monitor into Display power saving mode from the active state. Settings for this mode can be changed in the Advanced Settings Display tab.

Battery-powered accessories connected to the monitor continue to charge while the monitor is in this mode and connected to AC power.

**Note** The monitor will not enter the Display power saving mode while an alarm condition is active. In addition, the monitor will exit this mode if an alarm occurs.

The following actions will return the monitor display to the active state:

- Touch the screen
- Remove the temperature probe from the probe well
- Attach the SpO2 sensor to a patient
- Press ⏻

### Standby

The monitor is plugged into a power outlet, but the sensors and the display do not operate.

**Note** Because power is still available to charge the battery and power the monitor, the monitor is in Standby mode.

The monitor remains in Standby mode until you press ⏻. Settings for this mode can be changed in the Advanced Settings Display tab.

# Power up the monitor

The monitor runs a brief diagnostic self-test each time it powers up.

⚠ **WARNING** Equipment failure risk. The monitor 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 monitor until the problem is corrected.

⚠ **WARNING** To ensure patient safety, listen for two audible indicators (a piezo beeper and a speaker tone) and watch for visual alerts at power-up. Correct any system errors before using the monitor. In addition to the audible indicators, the monitor LED light bar illuminates to alert you of alarms. Amber indicates a low-level alarm. Flashing amber indicates a medium-level alarm. Flashing red indicates a high-level alarm.

⚠ **WARNING** Always observe the monitor during power-up. If any display fails to illuminate properly, or if an error code displays, inform qualified service personnel immediately, or call your nearest Welch Allyn Customer Service or Technical Support facility. Do not use the monitor until the problem is corrected.

⚠ **CAUTION** Always use the monitor with an adequately charged and properly functioning battery. For continuous monitoring, always connect to AC power.

⚠ **CAUTION** Use only a Class I (grounded) AC power cord for powering this monitor.

Press ⏻ to power up the monitor.

Following a successful self-test, the monitor displays the Welch Allyn logo, the LED light bar (located on the handle) flashes, and a power-up tone sounds. The startup screen then appears with the following banner across the bottom.


If a system error is detected, the monitor becomes inactive until you press ⏻ or until the monitor shuts down automatically. The monitor 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.

# Power down the monitor

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

   This power-down method, which places the monitor into Standby mode, ensures that patient measurements are retained in the monitor memory for a maximum of 24 hours. (These saved measurements are available for recall, printing, or to send electronically to the network.) This method also ensures that any configuration settings you have changed and saved will be maintained at the next startup.

**Note** Because power is still available to charge the battery and power the monitor, the monitor is in Standby mode.

# Reset the wall system

If the wall system stops functioning, you can press and hold for approximately 6 seconds to allow the hardware to completely cycle off and to reset the wall system configuration settings to the last saved default power-up configuration. The button is located on the front of the wall system.

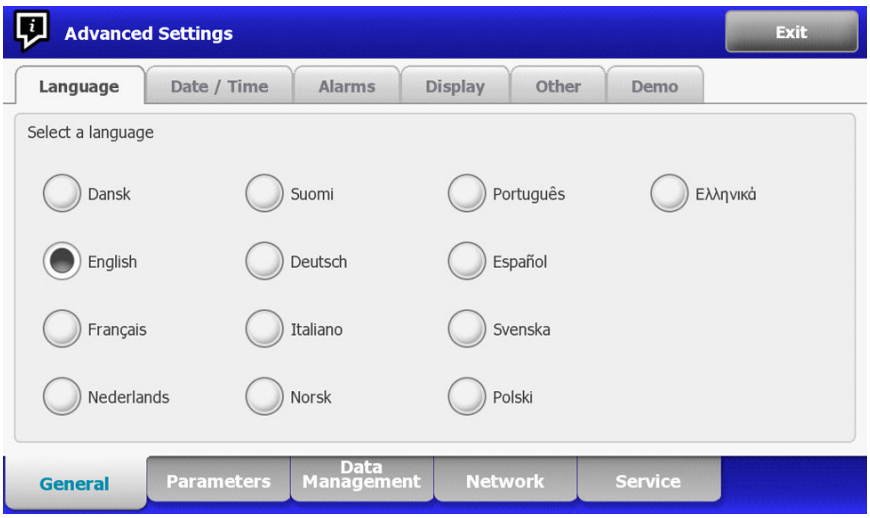
**CAUTION** Do not use a long press of to power down the wall system when it is functioning normally. You will lose patient data and configuration settings.

**Note** Because power is still available to charge the battery and power the wall system, the wall system is in Standby mode.

# Select a language

When you power up the wall system for the first time, the language selection screen appears.

1. Select your language.




2. Touch **Exit**.

   The Home tab appears.

# Set the date and time

1. Touch the **Settings** tab.
2. Touch the **Device** tab.
3. Touch the **Date/Time** vertical tab.
4. To change the date and time values: Touch the up and down arrow keys or touch  and enter a value.

   Repeat for each value you want to change.

   **Note** The date and time stamps on saved patient measurements will adjust in response to new date and time settings.

# Enter clinician information

1. Go to the Clinician tab using one of these methods:
   - Touch the Clinician ID section (left edge) of the Device Status area on the Home tab.
   - Touch the **Settings** tab and then touch the **Clinician** tab.
2. To enter the clinician name, touch  , located at the right of the text field, and enter characters.

   You can enter up to 32 characters for the clinician's first and last name. Enter only 1 character for the middle initial.
3. To enter the clinician ID, use one of these methods:

- Touch  and enter the ID.
- Scan the clinician's barcode with a barcode scanner. The scanned ID appears in the field.

4. If prompted, enter your system password in the Authentication pane.
5. Touch **OK** to save your entries and return to the Home tab.

# Set the default configuration

1. Touch the **Settings** tab.
2. Touch the **Device** tab.
3. Enter or adjust the desired settings you want to add or change.

   **Note** The new settings appear as they are completed but are temporary until they are saved.

4. Touch **Save as default**.
5. Touch **OK** to confirm that you want to overwrite your previous settings and replace them with your current settings in the startup default configuration. Or touch **Cancel** to retain the previous settings.

The new settings are stored as the default startup settings once you restart the monitor.

**Note** If your monitor is connected to the network, the date and time settings are synchronized with the network settings.

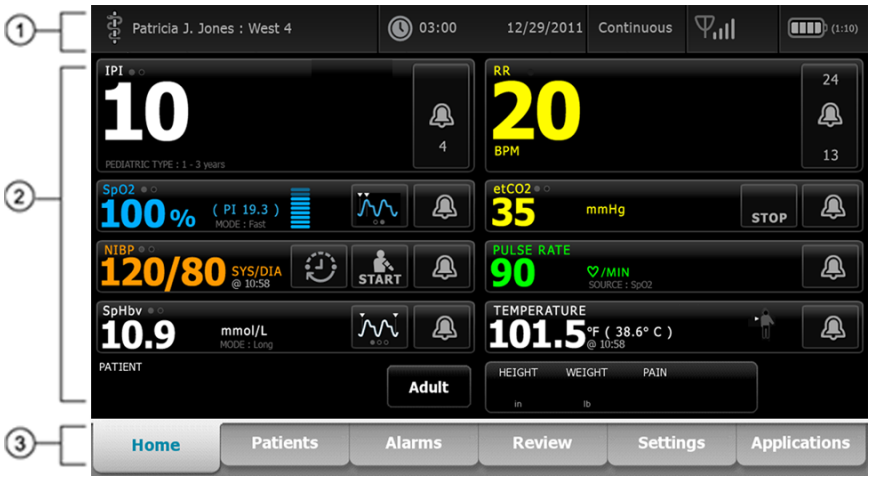
**Note** The date and time stamps on saved patient measurements will adjust in response to new date and time settings.

# Navigation

The monitor screen provides the interface that you use to complete your workflow. You access the monitor's features by touching the screen.

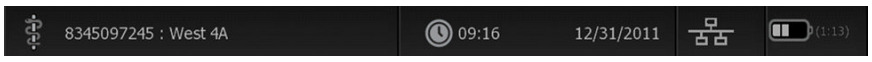
## Home tab

The Home tab includes the following areas:




| Item | Area |
|---|---|
| 1 | Device Status |
| 2 | Content |
| 3 | Navigation |

## Device Status area




The Device Status area, located at the top of the Home screen, displays the following monitor information, from left to right:

- Clinician identification. The format can be a name, ID number, or icon. Touch this area to navigate to the Clinician login.

- Device location.
- Time and date. Touch this area to navigate to date and time settings.
- Connection status (wired or wireless). The icons indicate which connection type, if any, is currently active.

| Icon | Connection type |
|---|---|
|  | Ethernet |
|  | USB |
|  | Wireless |
| Blank | No connection |

- Process indicator. This indicator appears when system or patient data is transferred between the monitor and the network.
- Battery condition. Estimated battery capacity is displayed in hour(s):minute(s) format.

This area also provides:

- Interactive alarm and information messages.
- Shortcuts to some setting controls. For example, touching the Alarm icon displays the Alarms tab.

## Battery status

The battery status indicator displays the state of the battery.

The battery status is represented by icons in the right corner of the Device Status area:

- The monitor is connected to a power outlet and the battery is charging or is fully charged. The estimated charge rate is displayed as a percentage of capacity.


- The monitor is not connected to a power outlet and is running on battery power. The estimated charge time remaining is displayed in the hour(s):minute(s) format. Each section of the battery status indicator represents a percentage of remaining charge.


- The monitor is connected to a power outlet but the battery does not maintain a charge (or has been removed).

When the battery is not being recharged and power becomes low, an information message displays in the Device Status area.


**Note** Observe the remaining battery charge in the battery status indicator and plug the monitor into a power outlet as soon as you are able.

If the information message is dismissed or you do not take any action to charge the battery, a low battery alarm condition results. An error message displays in the Device Status area to prompt you to take action to help prevent the monitor from shutting down due to a critically low battery.

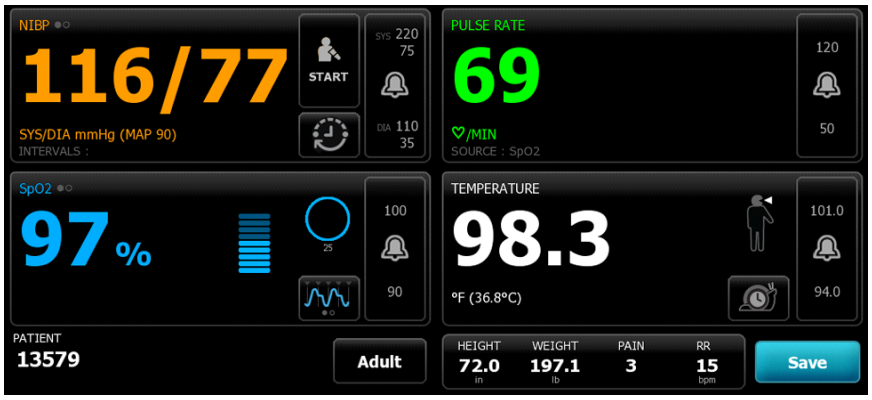

## Alarm and information messages

The Device Status area provides alarm and information messages that are either temporary or exist as long as the condition to which the message applies remains. Alarm or information messages may also include controls and/or behavior that you can use to manage alarm and information messages.

When the monitor detects an alarm condition, an alarm message appears. When multiple alarms occur, the highest priority message appears. You can cycle through each alarm message by touching the multiple alarm toggle.

Information messages instruct you to interact with the monitor in a specific way or provide information that does not require action. You can dismiss an information message by selecting the control associated with the message or waiting for the message to time out.

# Content area




The Content area displays vital sign measurements. It also provides shortcuts to several controls.

The Content area includes the following frames:

- NIBP
- SpO2 with optional SpHb
- Pulse rate
- Temperature
- Patient
- Manual parameters (height, weight, pain, temperature, respiration, and BMI, depending on configuration)

The Content area also includes a **Save** button, which you use to manually save current measurements.

## Save patient data

Patient data can be saved to the monitor.

After taking a patient reading, touch **Save**.

A message will appear indicating a successful or failed save.

**Note** You can configure some profiles and settings to automatically save measurements.

# Navigation area


The Navigation area includes the following tabs:

- **Home**: Displays vital-sign measurements and provides shortcuts to several controls.
- **Patients**: Accesses the patient list, patient summary, patient modifiers, and manual parameters.
- **Alarms**: Accesses global alarm response and settings controls, plus alarm limits settings (available only in Monitor mode).
- **Review**: Prints, deletes, and sends patient data.
- **Settings**: Accesses device configuration settings.

To navigate to a tab, touch the tab in the Navigation area with the corresponding name. The active tab is highlighted.

## Display lock

The display lock prevents clinician input, which may be useful when cleaning the display.

**Note** The lock feature is not a security mechanism.

The display locks when any of the following occur:

- You touch **Lock display now**.
- No interaction with the monitor occurs for the period specified in the Display tab. Use the Advanced tab to set or change the time it takes for the display to lock. (This requires the Advanced settings access code.)

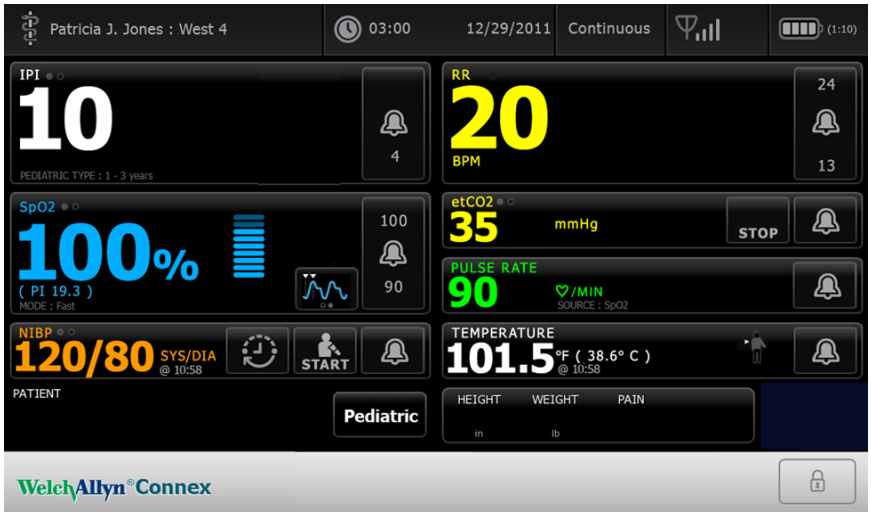
### Lock the display

Follow these steps to touch the screen without activating the controls.

1. Touch the **Settings** tab.
2. Touch the **Device** tab.
3. Touch **Lock display now**.

   The following occurs:

   - The Home screen appears.




- A title bar with a lock icon (🔒) replaces the Navigation area at the bottom of the screen.
- Patient information no longer appears at the bottom left of the screen.
- All controls on the screen are locked, except for 🔒 on the title bar. If you select any area of the screen other than 🔒, a message appears.

## Unlock the display

On the locked screen, touch and move **Slide to unlock** (located at the bottom right) to the rightmost position on the slidebar.

The following occurs:

- Patient information appears in the Patient frame.
- The Navigation area appears.
- Home tab controls are available for use.

The display also unlocks when any of the following occur:

- An alarm condition.
- An externally initiated action, such as taking or stopping an NIBP measurement or upgrading software.
- The monitor powers up.

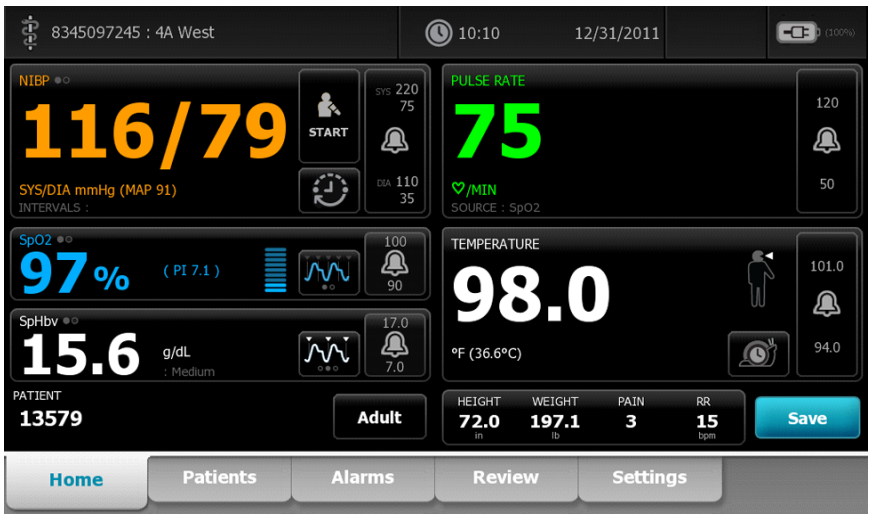
# Profiles

Profiles are variations of the Home tab. Each profile gives you access to a different set of features. Choose the profile that best suits your needs.

The monitor offers multiple profiles—including Monitor, Spot Check, and Triage—based on the model and any upgrade licenses you purchase.

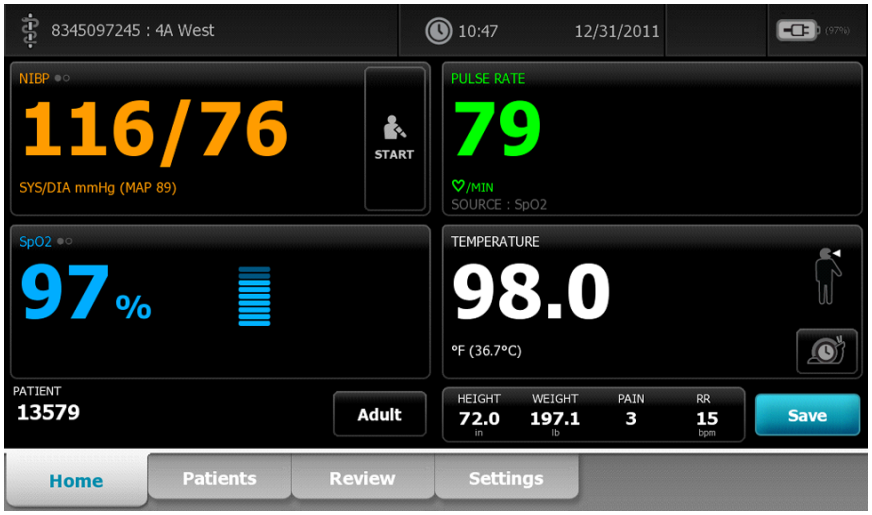
## Monitor profile

The Monitor profile enables you to use alarms and timed intervals. It is designed for continuous patient monitoring.



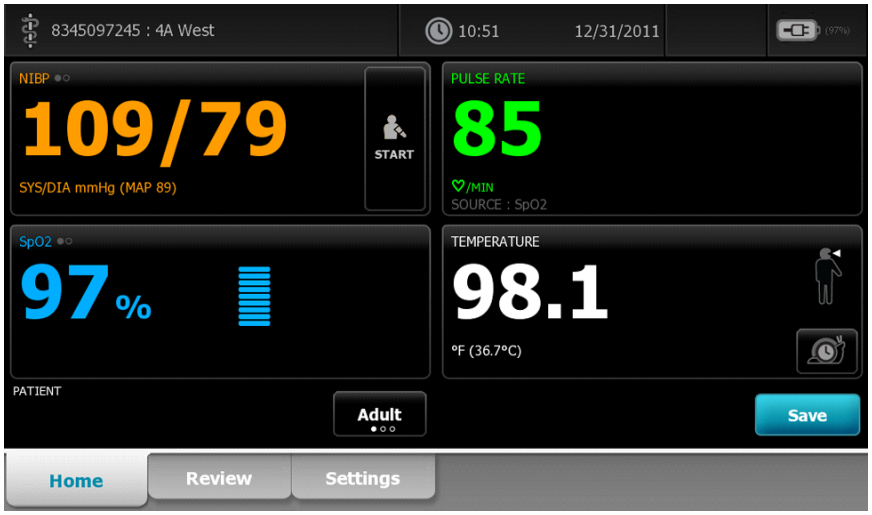
# Spot Check profile

The Spot Check profile is optimized for clinicians who take spot-check vitals readings and do not need automatic reading or alarm features.




# Triage profile

The Triage profile allows for vital signs capture without alarms or access to the Patients tab.



# Profile feature comparison

The following table compares the features of the profiles.

| Feature | Monitor | Spot Check | Triage |
|---|---|---|---|
| Take NIBP, SpO2, temperature, and pulse rate readings | X | X | X |
| Take SpHb readings (Masimo only) | X | | |
| Configure and use interval timing setting | X | | |
| Observe and configure alarm limits | X | | |
| Observe and respond to physiological alarms | X | | |
| Change patient type (adult, pediatric, neonate) | X | X | X |
| View and enter manual parameters (height, weight, pain, respiration, temperature*, BMI**) | X | X | |
| Save currently displayed data to device memory | X | X | X |
| Save and review patient data | X | X | X |
| Access Patients tab | X | X | |
| Access Alarms tab | X | | |
| Access Review tab | X | X | X |
| Access Settings tab | X | X | X |

* Braun IR thermometers configured to work with the monitor transfer temperature data automatically to the Temperature frame. You can enter temperature manually if you take a patient temperature with a thermometer that is not connected to the monitor, and you have selected temperature as one of the four manual parameters to display.

** Body Mass Index (BMI) is calculated and transferred to the monitor only by an attached weight scale. You cannot enter or adjust BMI values. BMI displays on the Manual tab and in the Manual parameters frame if you have selected it as one of the four parameters to display.

# Select a profile

Follow these steps to select a profile, which controls the appearance and functionality of the device.

1. Touch **Settings**.
2. Touch **Profiles**.
3. Touch the desired profile.
4. Touch **Home** to return to the Home tab.

**Note** Profiles cannot be changed while acquiring patient measurements or while unsaved patient measurements are on the display.

# Using the keypad, keyboard, and barcode scanner

## Open the numeric keypad

Touch any field that includes the numeric keypad icon .

The numeric keypad appears.

## Numeric keypad


The numeric keypad includes the following components:

| Component | Name | Description |
|---|---|---|
| | Data field | Displays the numbers you enter. The field name appears above and the range of values you can enter appears below this field. |
| | Backspace key | When touched, removes the rightmost number from the data field. |

| Component | Name | Description |
|---|---|---|
| Cancel | Cancel button | When touched, the numeric keypad disappears and the selected number does not change. |
| OK | OK button | When touched, the numeric keypad disappears and the entered number appears in the associated frame or data field. |

# Enter a number

1. With the numeric keypad open, touch a number or numbers.

   The value must be within the range that appears below the data field.
2. Touch **OK**.
   - If the value is within the required range and format, the numeric keypad disappears and the entered numbers replace the previous numbers.
   - If the number is not within the required range and format, **OK** remains inactive until you enter a valid number.

# Close the numeric keypad

Touch one of the following:

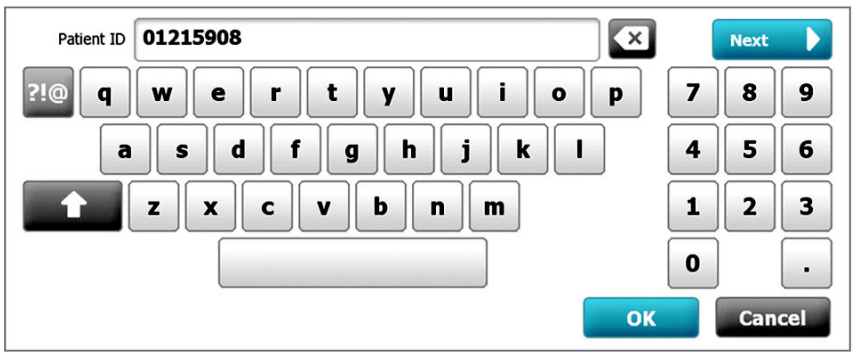
- **OK**: Exits the numeric keypad and inserts the number.
- **Cancel**: Exits the numeric keypad without saving entered numbers.

# Open the keyboard

Touch any field that includes the keyboard icon  .

The keyboard appears.

# Keyboard




The keyboard includes the following components:

| Component | Name | Description |
|---|---|---|
|   | Data field | Displays the characters you enter. |
|  | Backspace key | When touched, removes the rightmost character from the data field. |
|  | Space bar | When touched, enters a space in the data field. |
|  | Shift key | When touched, enters the next letter as uppercase. |
|   | Letters key | When touched, returns to the primary keyboard layout. The keyboard changes from normal layout when you touch one of these:<br>• The symbols key<br>• The diacritical marks key |
|   | Symbols key | When touched, the keyboard displays symbols. The keyboard returns to its normal layout when you touch one of these:<br>• Any symbol<br>• The letters key<br>• The symbols key<br>**Note** The symbols that display match the selected language. |
|   | Diacritical marks key (appearance varies in some languages) | When touched, the keyboard displays letters with diacritical marks. The keyboard returns to its normal layout when you touch one of these:<br>• Any letter<br>• The letters key<br>• The diacritical marks key<br>**Note** This key appears only when the selected language uses diacritical marks. |
|   | Next button | When touched, accepts the entry for the current field, then clears the field to allow data entry for the next field. |
|   | Cancel button | When touched, the keyboard disappears and the content of the data field remains the same. |

| Component | Name | Description |
|---|---|---|
|  | OK button | When touched, the keyboard disappears and the entered characters appear in the data field. |

# Enter a letter or number

1. With the keyboard open, touch letters or numbers.
2. Do one of the following:
   - Touch **Next**. This control accepts the entry for the current field, then clears the data field to allow data entry in the next field.
   - Touch **OK**. The keyboard disappears and the entered characters appear in the data field.

# Enter a symbol or special character

**Note** To return to the keyboard's normal layout, touch  .

1. With the keyboard open, touch  .

   Symbols and special characters for the selected language appear.


2. Touch the appropriate symbol or special character.

   The keyboard returns to its normal layout.

# Enter a diacritical mark

**Note** Keyboards with diacritical marks are available only for languages that use diacritical marks.

**Note** To return to the keyboard's normal layout without saving changes, touch  .

| Diacritical marks key | Language(s) |
|---|---|
| None (Not applicable) | Danish, English, Dutch, German, Italian |
|  | French |

| Diacritical marks key | Language(s) |
|---|---|
|  | Finnish, Norwegian, Spanish, Swedish |
|  | Portuguese |
|  | Polish |
|  | Greek |

1. With the keyboard open, touch the diacritical marks key. This key varies based on the language, as noted above.

   The keyboard displays diacritical marks for the selected language and therefore varies from one language to another. On each diacritical marks keyboard, the letters key in the top left corner returns you to the standard keyboard.
2. Touch a diacritical mark.

   The keyboard returns to its normal layout.

# Close the keyboard

Touch one of the following:

- **Next**: Accepts the entry for the current field, then clears the field to allow data entry for the next field.
- **OK**: Exits the keyboard and inserts the data.
- **Cancel**: Exits the keyboard without saving entered data.

# Use a barcode scanner

The monitor enables the scanning of patients' and clinicians' barcodes to enter ID information. The barcode scanner supports linear and two-dimensional barcodes.

If you haven't done so already, attach the barcode scanner to the monitor. Use the instructions to attach an accessory.

**Note** Refer to the manufacturer's directions for use to ensure that the scanner is set to USB Com Emulation mode.

1. Remove the barcode scanner from its holder.
2. Hold the scanner approximately 6 inches (15.4 cm) from the barcode and squeeze the trigger so that the light from the scanner appears on the barcode.

   Once the scanner completes a successful barcode reading, the ID appears in the targeted area (Patient frame, data field, or Device Status area). See additional notes below.
   If the scanner has difficulty reading the barcode, slowly adjust the distance and the angle between the scanner and the barcode while squeezing the scanner trigger. If it continues to have difficulty, verify that the barcode is as flat as possible.

**Note** You can scan a patient's barcode from the Home tab or the Summary tab. The scanned ID appears in the Patient frame on the Home tab and in the Patient ID field on the Summary tab.

Before you scan a barcode on the Summary tab, touch the keyboard icon in the Patient ID field. To return to the Home tab and begin taking patient measurements, touch **OK**.

**Note** Scanning a clinician ID while the Clinician ID pane is open places the scanned ID into the Clinician ID section of the Device Status area. Touch **OK** to return to the Home tab and to begin taking patient measurements.

**Note** Use the Advanced settings Data Management tab to change the appearance of the Clinician ID if you do not want your ID to appear in the Device Status area. (This requires the Advanced settings access code.) However, this information is still retained in the monitor memory for recall, printing, or to send measurements electronically to the network.

# Patient data management

Patient data is managed through the Patients tab.

From this tab, you can do the following:

- Retrieve a patient list from the network or manually create a patient list.
- Select a patient from the list.
- Scan a patient ID with the barcode scanner and return an Admit/Discharge/Transfer (ADT) patient name match.
- Enter additional patient information such as modifiers and manual parameters.

**CAUTION** Verify patient identity on the monitor after manual or barcode entry and before printing or transferring patient records.

## Add a patient to the patient list

**Note** If the monitor is configured to retrieve the patient list from the network, you cannot manually add a patient to the patient list.

1. Touch the **Patients** tab.
2. Touch **Add**.
3. Touch  and then enter patient information. Touch 

to cycle through the patient data fields.

   **Note** You can use a barcode scanner to enter a patient ID in the Patient ID field. Touch  in the Patient ID field, scan the barcode, and touch **OK**.

4. Touch **OK** to return to the Home tab.

   The information is saved.

**CAUTION** Verify patient identity on the monitor after manual or barcode entry and before printing or transferring patient records.

## Load patient data with the barcode scanner

You can use a barcode scanner to query existing patient records and perform an ADT patient name match.

**Note** If the monitor is connected to the network, the monitor can receive a patient name from patient records associated with a scanned ID number.

1. Ensure that you are on the Home tab.
2. Scan the patient's barcode with the barcode scanner.

   The Patient ID appears in the Patient frame.

   **CAUTION** Verify patient identity on the monitor after manual or barcode entry and before printing or transferring patient records.

# Select a patient

1. Touch the **Patients** tab.
2. If the monitor is connected to the network, touch **Retrieve list** on the List tab.

   The monitor retrieves the patient list from the network.
3. From the patient list, touch the patient's identifier (name, ID number, or location).

   The patient's identifier is determined in Advanced settings.
4. Touch **Select**.

   **Note** In the Spot Check and Triage profiles, previous patient data will be overwritten by a new save. In the Monitor profile, selecting a new patient will clear the current patient data and readings.

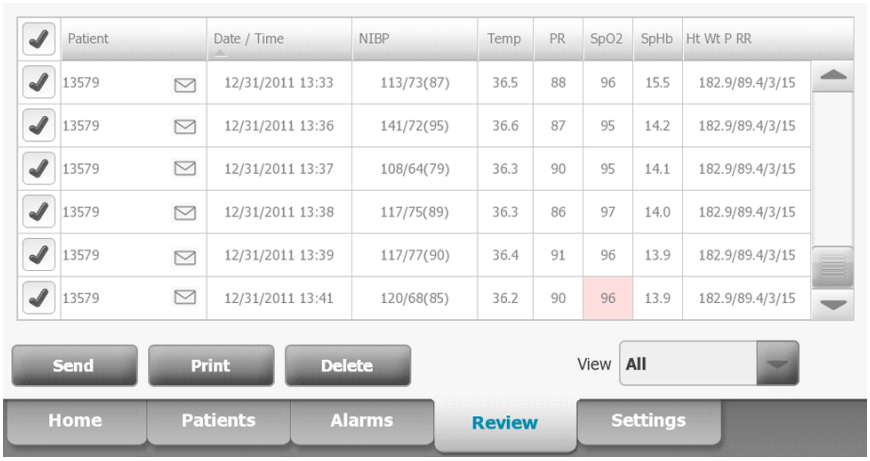
   Patient data can be sorted in ascending or descending order by selecting the heading row and touching ▲ or ▼.

# Manage patient records

Patient records can be sent to the network, printed, or deleted.

1. Touch the **Review** tab.

   **Note** Measurements that triggered a physiological alarm are highlighted on this tab.




2. Select patients by touching the check box next to their names.
3. Touch **Send** to transmit the records to the network, **Print** to print the records, or **Delete** to permanently remove the records as desired.

**CAUTION** Verify patient identity on the monitor after manual or barcode entry and before printing or transferring patient records.

**CAUTION** Always visually verify the printed patient records.

**Note** The icon indicates the records have been sent to the network.

**Note** You can configure some profiles and settings to automatically send measurements to the network.

**Note** Patient measurements older than 24 hours are automatically deleted from the patient records list on the Review tab.

**Note** The date and time stamps on saved patient measurements will adjust in response to new date and time settings.

# Delete a patient from the list

1. Touch the **Patients** tab.
2. From the List tab, touch the patient record you want to delete.
3. Touch **Delete**.

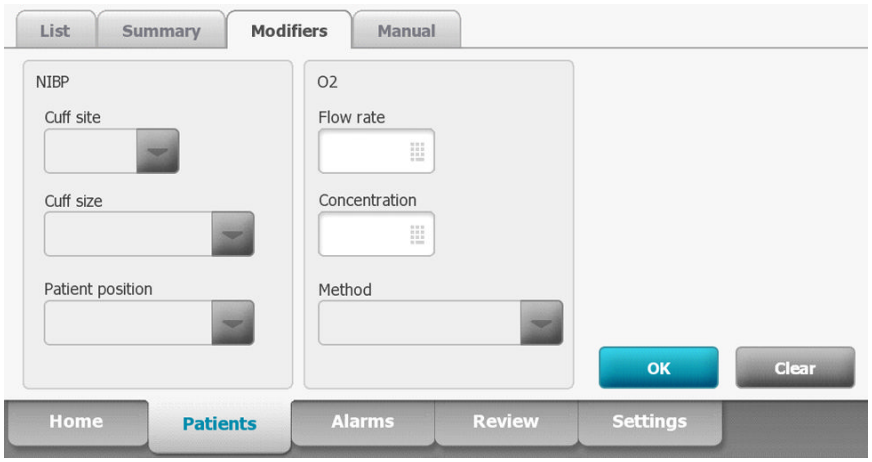
   At the Delete Confirmation window, touch **OK** to permanently delete the selected patient. Touch **Cancel** to cancel the deletion.

**Note** Deleting a patient from the Patients List does not delete saved records. Touch **Review** to see or delete saved records.

**Note** For monitors connected to the network, deleting a patient on the monitor does not affect data on the network.

# Modifiers

The Modifiers tab enables you to enter additional information for current measurements.



# Set modifiers

1. Touch the **Patients** tab.
2. Touch the **Modifiers** tab.
3. Adjust the NIBP, O2, and Temperature settings as required.
4. Touch **OK** to accept the changes and return to the home screen, or touch **Clear** to delete all entries.

   The Modifier settings clear after a power cycle, after you clear the Home tab, or after you select a new patient.

# Alarms

The monitor presents physiological alarms and technical alarms. Physiological alarms occur when vital sign measurements fall outside of set alarm limits, but they occur only in the Monitor profile. Technical alarms occur in all profiles.

**Note** The three modes of data communication—USB, Ethernet, and IEEE 802.11—are not intended for real-time alarms.

## Alarm types

| Type | Priority | Color | Alarm audio tone |
|---|---|---|---|
| • NIBP, SpO2, or SpHb limit exceeded<br>• Some technical alarms | High | Red | 10-pulse tone |
| • Pulse rate limit exceeded<br>• Some technical alarms | Medium | Amber | 3-pulse tone |
| • Temperature limit exceeded<br>• Some technical alarms | Low | Amber | 2-pulse tone or 1-pulse tone |

## Alarm notification locations

**WARNING** If you are relying on visual alarm notifications, maintain a clear line of sight with the monitor and/or Nurse Call. If you are relying on audio alarm notifications, ensure that you can hear audio alarms from where you are. Set the volume as needed considering the environment and ambient noise levels.

### Nurse Call

When the Nurse Call cable is connected and Nurse Call has been enabled, the monitor immediately notifies the Nurse Call system when an alarm occurs. Nurse Call notification settings are specified in the Advanced settings.

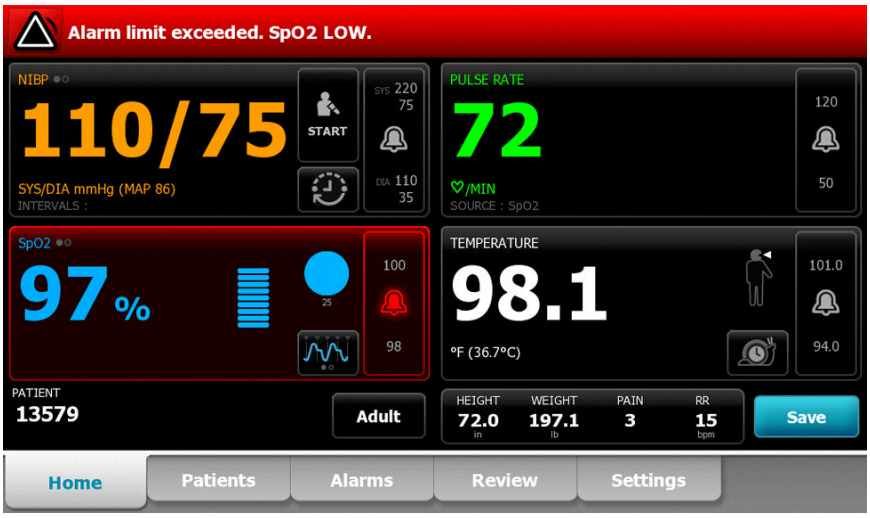
### LED light bar

The light bar on the handle of the monitor illuminates as follows:

- Flashing red for high priority alarms
- Flashing amber for medium priority alarms

- Constant amber for low priority alarms

### Home tab




### Home tab notifications

| Notification | Description |
|---|---|
| Device Status area | The area changes color and displays a message with an accompanying status icon or button. If the alarm tone is in a pause interval, a timer countdown appears.<br>If multiple alarms and information messages are active, the Device Status area shows the highest priority alarm. If the alarms are equal in priority, the most recent alarm message appears. You can cycle through the messages for each active alarm. |
| Parameter frame | The background color changes. Touch this area to pause or turn off an alarm audio tone. Visual indicators and Nurse Call notification will persist during an audio paused condition. |
| Alarm Limit control | The icon in this control indicates the status of the alarm limit settings. Red and amber icons indicate measurements that have exceeded alarm limits.<br>Touch this control to navigate to a parameter-specific tab where you can modify alarm limit settings. |

# Icons on the Home tab

### Icons in parameter frames

The icons in the parameter frames indicate alarm notification settings. When alarm limits are on, the icons will be black and white until an alarm occurs. Then, the icons will change color to indicate the priority of the alarm. Red icons represent high priority alarms, and amber icons represent medium or low priority alarms.

**Icons in parameter frames**

| Icon | Name and status |
|---|---|
|  | Alarm off.<br>No visual or audio alarms or Nurse Call notification will occur for this parameter. |
|  | Alarm on.<br>Audio and visual notifications and Nurse Call are enabled. |
|  | Alarm audio off.<br>Only visual notifications, including Nurse Call, will occur. |
|  | Alarm audio paused.<br>The audio tone is paused for a period ranging from 90 seconds to 15 minutes. The icon remains until the paused time counts down to 0. |

**Icons in the Device Status area**

The icons in the Device Status area are black and white, but the background area changes colors to indicate the alarm priority. Messages accompany these icons. These icons can be controls or status indicators.

**Icons in the Device Status area**

| Icon | Name and status |
|---|---|
|  | Alarm active.<br>One or more alarms are active. Touch this icon to pause or turn off the audio tone. |
|  | Alarm audio off.<br>Audio signals are disabled, but alarm limits and visual alarm signals remain active. |
|  | Multiple alarms toggle.<br>Touch this icon to cycle through the messages for each active alarm. |
|  | Alarm audio paused.<br>The audio tone is paused for a period ranging from 90 seconds to 15 minutes. The icon remains until the paused time counts down to 0. Touch this icon to reset the pause interval. The pause interval is determined by settings in the Advanced tab. |

# Reset (pause or turn off) audio alarms

### Audio alarm characteristics

- After you reset an audio alarm, some tones do not return, but others return after a pause interval if the condition that caused the alarm persists. Settings in the Advanced tab determine the length of the pause interval.
- If a new alarm condition occurs during a pause interval, a new audio tone occurs.
- If an audio alarm is not paused or turned off after a period of time, a buzzer accompanies the tone.

### Pause or turn off an audio alarm

1. In the Device Status area, touch  .
   - Visual indications remain in the parameter frame until the condition is corrected or until the next measurement is taken.
   - In the Device Status area, if the icon changes to  and the message remains, the timer counts down and the audio tone returns after a pause interval. You can touch  again to restart the timer.
     If you responded to an NIBP alarm and multiple NIBP limits have been exceeded, the first audio tone and message go away, but another NIBP limit message shows with a countdown timer. A new NIBP audio tone sounds after the countdown unless you touch  to dismiss each remaining NIBP limit message.
2. If multiple alarms are active, a multiple alarm toggle will appear in the Device Status area. Respond to multiple alarms as follows:
   a. Touch  in the Device Status area. (See note below.)
   b. Read the alarm message for the second alarm.
   c. Touch  .
   d. Continue to touch multiple alarm toggle buttons and to reset tones until you have read all of the messages.

   **Note** The multiple alarm toggle button will display the number of active alarms inside the alarm icon. A set of dots indicating the display order of alarms from highest (left) to lowest (right) priority (as well as the most recent in the case of multiple alarms of the same priority) will appear below it.

# Adjust vital sign alarm limits

You can adjust vital sign alarm limits or turn off alarm limit checking for individual parameters.

**WARNING** Alarm limits are user adjustable. All alarm limit settings should take into account the patient's condition and acute care needs. Appropriate alarm limits should be set accordingly for each patient.

**CAUTION** Loss of power will cause the monitor to return to default settings. Each time you power up the monitor, you must set alarm limits appropriate for your patient.

1. On the Home tab, touch the alarm limits control in the selected parameter frame. For example, to adjust the NIBP alarm limits, touch 

.
2. Adjust vital sign alarm limits.
   - To adjust a limit: Enter the desired upper and lower alarm limits using the up/down arrow keys or the keypad.
   - To turn alarm limits off or on for the vital sign: Touch 

or 

. This button toggles to display the current alarm state.
     If you turn off alarm limit checking for a vital sign, no visual or audio alarm signals will occur for those limits. If alarm limit checking is off, the icon changes to  on the Home tab in the parameter frame.

# Modify audio alarm notification

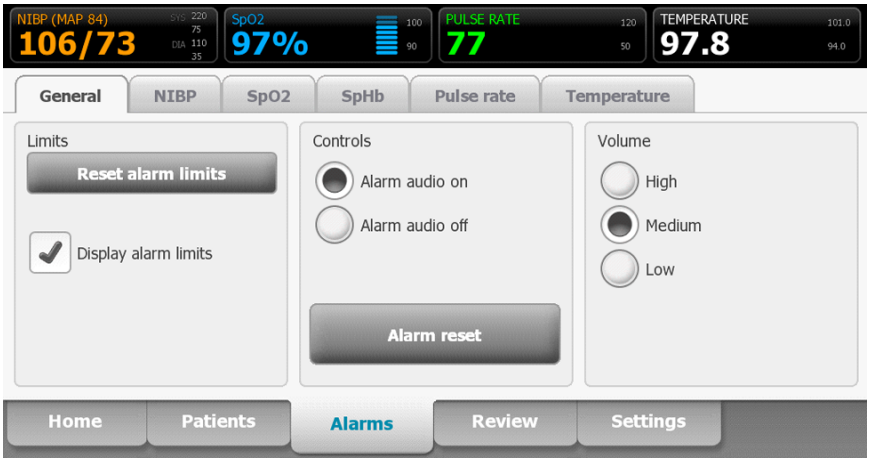
You can modify the volume of all audio alarms.

**Note** If the *Allow user to turn off general audio* option has been selected in Advanced settings, you can turn off audio alarms, but turning off alarms is not recommended in some circumstances, such as unattended monitoring.

**WARNING** The alarm volume should be loud enough for you to hear it from where you are. Set the volume considering the environment and ambient noise levels.

As you are working in the Alarms tab, parameter measurements appear across the top of the tab.

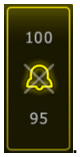
1. Touch the **Alarms** tab.




2. On the **General** tab, modify audio alarm notification.
   - To enable or disable audio alarms, select **Alarm audio on** or **Alarm audio off**.
     If you turn off audio alarms, visual alarm signals still occur in the LED light bar, Device Status area, and on the Home tab in parameter frames.

     The  in the Device Status area indicates alarm audio turned off, and a similar bell will appear in the parameter frames 

. If an alarm condition occurs, the bell will be red or amber in the alarming frame, according to the priority of the alarm, as shown here:
     

or 

.
   - To modify the volume of audio alarms: Select a volume level.
     An audio tone sounds briefly to indicate the volume level.

     **Note** Periodically test the speaker by selecting different speaker volumes and listening for the different tones.

# Alarm messages and priorities

The following tables list the physiological and technical alarm messages and their priority.

## Physiological alarms

| Alarm messages | Priority |
|---|---|
| Alarm limit exceeded. NIBP systolic HIGH. | High |
| Alarm limit exceeded. NIBP systolic LOW. | High |

| Alarm messages | Priority |
|---|---|
| Alarm limit exceeded. NIBP diastolic HIGH. | High |
| Alarm limit exceeded. NIBP diastolic LOW. | High |
| Alarm limit exceeded. NIBP MAP HIGH. | High |
| Alarm limit exceeded. NIBP MAP LOW. | High |
| Alarm limit exceeded. Pulse rate HIGH. | Medium |
| Alarm limit exceeded. Pulse rate LOW. | Medium |
| Alarm limit exceeded. SpO2 HIGH. | High |
| Alarm limit exceeded. SpO2 LOW. | High |
| Alarm limit exceeded. SpHb HIGH. | High |
| Alarm limit exceeded. SpHb LOW. | High |
| Alarm limit exceeded. Temperature HIGH. | Low |
| Alarm limit exceeded. Temperature LOW. | Low |

# Technical alarms

| Alarm messages | Priority |
|---|---|
| Low battery 5 minutes or less remaining. | High |
| Searching for pulse signal. | High |
| Communications module did not power on properly. Power down the device. | High |
| Network not found; check network cable connections. | Low |
| Powering down. Call for service. | Low |
| Battery is absent or faulty. Call for service. | Low |
| NIBP air leak; check cuff and tubing connections. | Low |
| NIBP not functional. Call for service. | Low |
| Unable to determine NIBP; check connections and tubing for kinks. | Low |
| Incorrect NIBP cuff size; check patient type. | Low |
| Inflation too quick; check NIBP cuff and tubing connections. | Low |
| Unable to determine NIBP; check inflation settings. | Low |

| Alarm messages | Priority |
|---|---|
| SpO2 not functional. | Low |
| Attach SpO2 sensor to monitor. | Low |
| Replace the SpO2 sensor. | Low |
| Set date and time. | Low |
| Maximum number of patient records saved. Oldest record overwritten. | Low |
| Unable to access patient information. | Low |
| Connect temperature probe. | Low |
| Insert correct color coded probe well. | Low |
| Replace temperature probe. | Low |
| Temperature not functional. Call for service. | Low |
| Retry temperature measurement. | Low |
| Temperature time limit exceeded. Retry temperature measurement. | Low |
| Low battery; plug into outlet. | Low |
| Radio not functional. Call for service. | Low |
| Radio error. Power down and restart. | Low |
| Unable to establish network communications. Radio out of network range. | Low |
| Unable to establish network communications. Call for Service. | Low |
| Radio software upgrade failed. | Low |
| Unable to load configuration; using factory defaults. | Low |
| Functional error. Call for service. | Low |
| External device not recognized. | Low |
| Incompatible Welch Allyn device. | Low |
| USB Communication failure. | Low |
| Low battery 30 minutes or less remaining. | Low |
| Low SpHb signal quality. Check sensor. | Low |
| Low SpO2 signal quality. Check sensor. | Low |
| Low perfusion. Check sensor. | Low |

| Alarm messages | Priority |
|---|---|
| Replace the SpO2 cable. | Low |
| SpO2 mode only. Check sensor or cable. | Low |
| SpO2 sensor expires in…. | Low |
| Unexpected restart occurred. Call for service. | Low |
| Weight scale not functional. Call for service. | Low |

# Nurse call

The monitor can be connected to a Nurse Call system through a cable that connects to the Nurse Call connector.

When the Nurse Call cable is connected and Nurse Call is enabled, the monitor immediately notifies the Nurse Call system when a physiological alarm that exceeds the preset threshold occurs. The Nurse Call system is also synchronized with the flashing LED lightbar and audible alerts on the monitor.

Nurse Call thresholds are set in the Advanced Settings.

To connect the monitor to a Nurse Call system, you must have a cable that has been adapted to your Nurse Call system (REF 6000-NC), rated 25V AC or 60V DC maximum at 1A maximum. For ordering information, see *Approved Accessories* in the Appendix.

**WARNING** Do not rely exclusively on Nurse Call for patient monitoring. Although the Nurse Call option enables remote notification of an alarm condition, it is not intended to replace appropriate bedside patient monitoring by trained clinicians.

**Note** When a patient alarm occurs, touching the alarm icon in the Device Status area pauses the alarm tone for a period ranging from 90 seconds to 15 minutes, as specified in Advanced settings, but the visual alarm indicator(s) on the monitor and Nurse Call continue.

# Patient monitoring

## NIBP

### Noninvasive Blood Pressure (NIBP) frame

From the NIBP frame, you can measure blood pressure.

Located in the upper left corner of the Home tab, the NIBP frame contains data and features relevant to noninvasive blood pressure measurement. The frame provides different features based on the profile you are using.

#### NIBP frame in Monitor profile


#### NIBP frame in Spot Check and Triage profiles


#### NIBP measurement display

In all profiles, the frame can display systolic and diastolic measurements, and MAP calculations. You can configure the default view in Advanced settings.

#### View indicator

Touch the NIBP frame to toggle between views.

- NIBP view 1 

displays the SYS/DIA measurements as the primary content and the MAP calculation as secondary content.

- NIBP view 2  displays the MAP calculation as the primary content and the SYS/DIA as secondary content.

## Buttons

The buttons on the right side of the frame enable you to do different tasks depending on the profile you are using. The availability of functions depends on which profile is selected. See the Profiles section for more information.

| Button name | Button image | Description |
|---|---|---|
| Start/Stop | The appearance and function of this button dynamically changes. | |
| |  | Touch to start a manual measurement or a cycle of automatic measurements. |
| |  | Touch to stop a measurement that is in progress. |
| Interval | This button shows the status of automatic measurements.<br>Touch the button to display the Intervals tab, where you can configure automatic measurements. | |
| |  | Automatic measurements are off. |
| |  | Automatic measurements are on. |
| Alarm Limit control | This button displays alarm limits and status. | |
| |  | Touch the button to display the Alarms tab. |

# Select a cuff

**WARNING** Use only blood pressure cuffs and hoses listed as approved accessories to ensure safe and accurate NIBP measurements.

**WARNING** Never use an adult or pediatric monitor setting or cuff for an NIBP measurement on a neonatal patient. Adult and pediatric inflation limits can be excessive for neonatal patients, even if a neonatal cuff is used. Neonates are defined in the AAMI SP10:2002 standard as children 28 days or less of age if born at term (37 weeks gestation or more); otherwise, up to 44 gestational weeks.

**CAUTION** Correct sizing of the blood pressure cuff is important for accurate blood pressure readings. A cuff that is too small might provide false high readings, while a cuff that is too large might provide false low readings.

The monitor uses the oscillometric method to determine blood pressure; therefore, if the cuff extends to the antecubital fossa (bend in the elbow), you can still acquire an accurate blood pressure reading.

Before taking an NIBP measurement, follow these steps to select the appropriate cuff for the patient.

1. Measure the circumference of the patient's bare upper arm, midway between the elbow and shoulder.
2. Choose the appropriate cuff size based on the circumference measurement. If the circumference of the patient's arm falls between two cuff sizes, use the larger cuff size.
3. Wrap the cuff around the patient's bare upper arm and verify that the artery index marker lies somewhere between the two range markings on the cuff.

## Cuff measurements

The following tables provide measurements for Welch Allyn blood pressure cuffs.

## One-piece cuff measurements

| Cuff Size | Circumference (cm) | Circumference (in) |
|---|---|---|
| Infant | 9.0 – 13.0 | 3.5 – 5.1 |
| Small child | 12.0 – 16.0 | 4.7 – 6.3 |
| Child | 15.0 – 21.0 | 5.9 – 8.3 |
| Small adult | 20.0 – 26.0 | 7.9 – 10.2 |
| Adult | 25.0 – 34.0 | 9.8 – 13.4 |
| Large adult | 32.0 – 43.0 | 12.6 – 16.9 |
| Thigh | 40.0 – 55.0 | 15.7 – 21.7 |

## Neonatal soft disposable cuffs with male Luer slips

| Cuff Size | Circumference (cm) | Circumference (in) |
|---|---|---|
| NEO 1 | 3.3 – 5.6 | 1.3 – 2.2 |
| NEO 2 | 4.2 – 7.1 | 1.6 – 2.8 |

| Cuff Size | Circumference (cm) | Circumference (in) |
|---|---|---|
| NEO 3 | 5.4 – 9.1 | 2.1 – 3.6 |
| NEO 4 | 6.9 – 11.7 | 2.4 – 4.6 |
| NEO 5 | 8.9 – 15.0 | 3.5 – 5.9 |
| Multi-pack | 1 of each | 1 of each |

For ordering information, see *Approved Accessories* in the Appendix.

## Position the cuff

**Note** The monitor and cuffs were validated using the bare upper arm site.

**WARNING** Patient injury risk. Do not use the NIBP for continuous monitoring without frequently checking the patient's limb. When a patient is being monitored frequently or for a prolonged period, regularly remove the cuff to inspect it and to check the cuff site for ischemia, purpura, or neuropathy.

**WARNING** Inaccurate measurement risk. Do not place the cuff where it can disturb proper circulation. Do not place the cuff on any area where circulation is compromised or on any extremity used for intravenous infusions. Do not use an SpO2 finger clip sensor and a blood pressure cuff simultaneously on the same limb. Doing so may cause a temporary loss of pulsatile flow, resulting in either no reading or an inaccurate SpO2 or pulse rate until the flow returns.

**WARNING** The blood pressure cuff must be properly positioned to ensure blood pressure accuracy and patient safety. Wrapping the cuff too loosely (preventing proper inflation) may result in inaccurate NIBP readings.

**CAUTION** If a site other than the bare upper arm is used, the blood pressure measurements may be different. It is important to document the alternate site on the patient record.

**CAUTION** To minimize inaccurate measurement, limit patient movement during an NIBP measurement cycle.

Before taking an NIBP measurement, follow these steps to properly attach the cuff to the patient.

1. Position the cuff on the patient's bare upper arm midway between the shoulder and the elbow.
2. Wrap the cuff snugly so that there is room for no more than two fingers between the cuff and the patient's bare upper arm.
3. Position the alignment mark on the cuff directly over the brachial artery.
4. Ensure that the blood pressure tubing has no kinks or twists.

**Note** In situations where you cannot position the cuff level with the heart, you should adjust the measurements as follows for greater accuracy. For each inch (2.54 cm) that the cuff is above the level of the heart, add 1.8 mmHg to the displayed reading. For each inch (2.54 cm) that the cuff is below the level of the heart, subtract 1.8 mmHg from the displayed reading. It is important to document the adjustment on the patient record.

# NIBP measurement

The monitor enables you to take manual and automatic NIBP measurements.

**WARNING** NIBP readings may be inaccurate for patients experiencing moderate to severe arrhythmia.

**WARNING** Do not allow a blood pressure cuff to remain on neonatal patients more than 90 seconds when inflated above 5 mmHg. Do not allow a blood pressure cuff to remain on the adult patients more than 3 minutes when inflated above 15 mmHg. Excessive cuff tightness may cause venous congestion, peripheral nerve injury, discoloration of the limb, and patient distress.

**WARNING** Inaccurate measurement risk. Pulse rate measurements generated through the blood pressure cuff or through SpO2 are subject to artifact and might not be as accurate as heart rate measurements generated through ECG or through manual palpation.

**WARNING** Use caution when measuring blood pressure using oscillometric blood pressure devices in severely ill neonates and pre-term infants because these devices tend to measure high in this patient population.

**CAUTION** Inaccurate measurement risk. Any external compression of the blood pressure hose or cuff may cause system errors or inaccurate measurements.

At the start of a measurement, the monitor inflates the cuff to the appropriate level. In the NIBP frame, the systolic display shows the cuff inflation pressure while the blood pressure measurement is in progress.

The monitor measures blood pressure as the cuff is inflating. If patient movement, excessive noise, or an arrhythmia prevent the monitor from determining the blood pressure while the cuff is inflating, the monitor attempts to measure the blood pressure while deflating the cuff.

When the measurement is complete, the NIBP frame displays the measurement until you save it to the patient's record or you start another NIBP measurement.

**Note** The Pediatric and Adult blood pressure modes are supported on patients 29 days and older. The Pediatric mode gives you the option of setting a lower initial inflation pressure when using the StepBP deflation and not SureBP.

**Note** Use dual-lumen tubes for adult and pediatric blood pressure measurements and single-lumen tubes for neonate blood pressure measurements. Mismatching tube types, patient types, and algorithms causes an information message to appear in the Device Status area. For neonate patients, set the NIBP settings as follows: Patient = Neonate, Tube type = 1 tube, Algorithm = Step.

**Note** Welch Allyn uses the following definition of Neonate: Children 28 days or less of age if born at term (37 gestation or more); otherwise, up to 44 gestational weeks.

## Take a manual NIBP measurement

**WARNING** Patient injury risk. Never install Luer Lock connectors on Welch Allyn blood pressure cuff tubing. Using these connectors on blood pressure cuff tubing creates the risk of mistakenly connecting this tubing to a patient's intravenous line and introducing air into the patient's circulatory system.

**CAUTION** Inaccurate measurement risk. Any external compression of the blood pressure hose or cuff may cause system errors or inaccurate measurements.

1. Properly size the blood pressure cuff and position it around the patient's bare upper arm.
2. Touch **Start** to take a measurement.

## Interval NIBP measurement

The monitor can take NIBP measurements automatically based on intervals you choose.

The Intervals tab provides all interval features.

From this tab, you can do the following:

- Configure intervals
- Turn off intervals
- Configure the monitor to print automatic measurements as they are completed

When the measurement is complete, the NIBP frame displays the measurement until the next measurement is complete.

**Note** During intervals, each automatic and manual save of patient measurements clears all measurements from Manual parameters frame.

The  button changes to a timer ( 

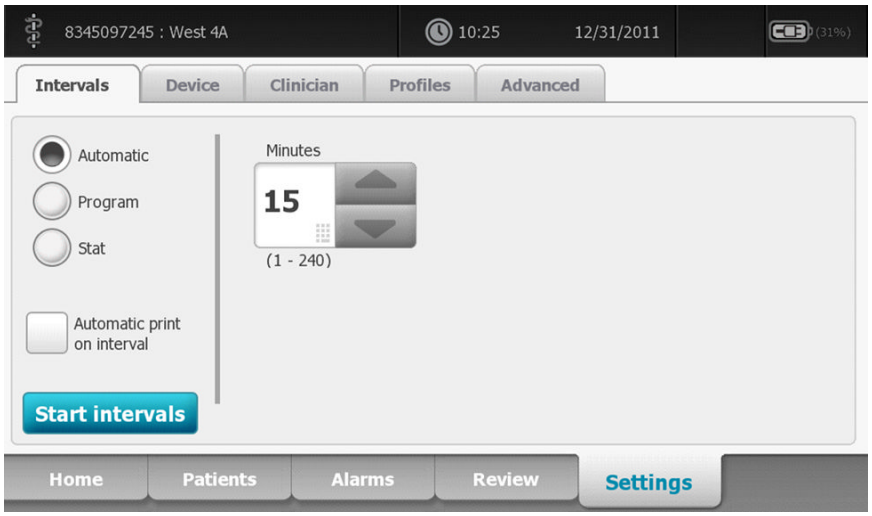
), which counts down to the next automatic measurement.

Automatic measurements continue until you turn off intervals.

**WARNING** Patient harm risk. Do not use intervals on neonates out of earshot. Verify that audio can be heard from where you intend to be.

## Automatic intervals

You can configure the monitor to take automatic NIBP measurements at consistent intervals.




**Note** An alarm does not turn off intervals. Subsequent automatic measurements continue to occur as scheduled.

## Start automatic intervals

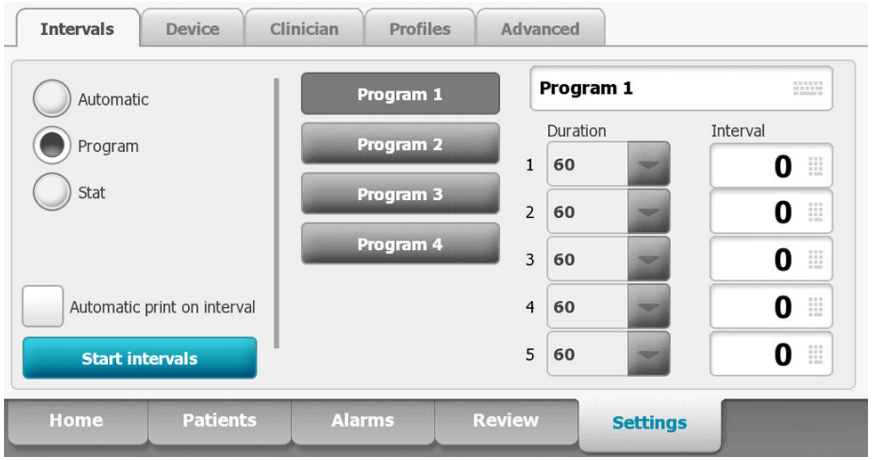
Follow these steps to configure the monitor to take NIBP measurements at consistent intervals.

1. Properly size the blood pressure cuff and position it around the patient's bare upper arm.
2. On the Home tab, touch  .
3. Select **Automatic**.
4. Use the numeric keypad to enter the length of time between NIBP measurements.
5. Touch **Start intervals**.

**Note** Intervals are not available in all profiles. See the Profiles section for more information.

## Program intervals

You can configure the monitor to take automatic NIBP measurements at variable intervals. The monitor comes with preset interval programs that can be edited to meet your needs. The numbers below the program name indicate the length of time between each interval in the cycle.




## Start program intervals

Follow these steps to configure the monitor to take automatic NIBP measurements at variable intervals.

1. Properly size the blood pressure cuff and position it around the patient's bare upper arm.
2. On the Home tab, touch  .
3. Select **Program**.
4. Touch the desired program.
5. Touch **Start intervals**.

## Create a new program interval or edit an existing program

Follow these steps to create or edit a program interval.

1. On the Home tab, touch the interval button (  or 

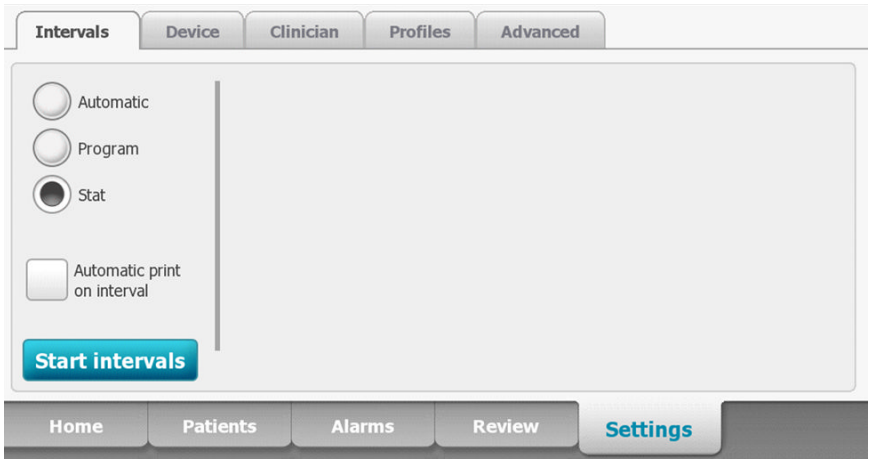
).
2. Select **Program**.
3. Touch the desired program.

4. Touch the keyboard icon and enter the desired program name.
5. Enter the desired duration and interval settings.
6. Touch **Start Intervals**.

   The new intervals take effect at the start of the next NIBP measurement.

## Stat intervals

You can configure the monitor to take NIBP measurements continuously.




When you select the Stat option in the Intervals tab, the monitor takes repeated NIBP measurements for 5 minutes, starting a new cycle each time the cuff deflates below safe venous return pressure (SVRP) for 2 seconds.

**WARNING** Patient injury risk. If you use Stat mode repeatedly, periodically observe the patient's limb to ensure that circulation is not impaired and that the cuff remains in place. Prolonged impairment of circulation or improper cuff position can cause bruising.

Current cuff pressures are not dynamically displayed during a Stat reading. The Home tab displays the NIBP reading from the previous cycle until the current cycle finishes.

**Note** If you are in Stat intervals, you can stop intervals by touching 

. If you touch the button twice, you will restart Stat intervals. The control toggles between STOP and START with each touch.

## Start Stat intervals

Follow these steps to start Stat intervals.

1. Properly size the blood pressure cuff and position it around the patient's bare upper arm.
2. Select **Stat**.
3. Touch **Start intervals**.

## Stop automatic measurements

Follow these steps to turn off intervals.

1. On the Home tab, touch the interval timer button ( 

).
2. Touch **Stop intervals**.

### Cancel a measurement that is in progress

Follow these steps to cancel any NIBP measurement that is in progress.

On the Home tab, touch 

.

The monitor rapidly deflates the cuff, and the screen displays the NIBP cancellation message.

If intervals are turned on, the  button changes to a timer ( 

), which counts down to the next automatic measurement.

## Configure NIBP alarms

Follow these steps to set alarm limits for systolic and diastolic measurements, and MAP calculation.

1. Verify that you are using the Monitor profile, which contains the Alarms tab.
2. Touch the **Alarms** tab.
3. Touch the **NIBP** tab.
4. Enter the desired upper and lower alarm limits for systolic and diastolic measurements, and MAP calculation using the up/down arrow keys or the keypad.
5. Touch the **Home** tab.

   The new alarm settings display in the Alarm Limit control button.

# Temperature

## Temperature frame

From the temperature frame you can measure patient temperature.

Located in the lower right corner of the Home tab, the temperature frame contains data and features relevant to temperature measurement. The frame provides different features based on the profile you are using.

### Temperature frame in Monitor profile

## Temperature frame in Spot Check and Triage profiles


## Temperature measurement display

In all profiles, the frame can display temperature in Celsius or Fahrenheit. You can configure the default view in Advanced settings.

## Site selection

Remove the temperature probe and touch the **Temperature site control**  to toggle between sites.

**Pediatric axillary**

**Adult axillary**

**Oral**

**Note** Monitors configured with the temperature module and the red rectal probe well and probe default to the rectal mode.

**Rectal**

**Note** The monitor displays the ear mode when it receives a temperature measurement from the ear thermometer.

**Ear**

### Temperature buttons

The buttons on the right side of the frame enable you to do different tasks depending on the profile you are using. The availability of functions depends on which profile is selected.

| Button name | Button image | Description |
|---|---|---|
| Temperature alarm |   | This button displays alarm limits and status. Touch the button to display the Alarms tab. |
| Direct mode |  | Touch the button to enter Direct mode. |

## Configure temperature alarms

Follow these steps to set alarm limits for temperature measurement.

1. Verify that you are using the Monitor profile, which contains the Alarms tab.
2. Touch the **Alarms** tab.
3. Touch the **Temperature** tab.
4. Enter the desired upper and lower alarm limits for temperature using the up/down arrow keys or the keypad.
5. Touch the **Home** tab.

   The new alarm settings display in the Alarm Limit control button.

## SureTemp® Plus temperature module

The temperature module uses a thermistor thermometer design and a predictive algorithm to calculate patient temperatures in the Predictive mode.

**WARNING** Patient injury risk. Prior to taking a temperature, instruct the patient not to bite down on the probe as patient injury and damage to the probe may result.

**WARNING** Patient injury risk. Do not exceed the recommended temperature measurement durations in Direct mode. Continuous measurement durations of 3 minutes at the oral and rectal sites and 5 minutes at the axillary site are recommended for accurate measurement. Do not continuously measure beyond 10 minutes in any mode.

**WARNING** Probe covers are single-use only. Re-use of a probe cover may result in spread of bacteria and cross-contamination.

**WARNING** Patient injury risk. Use only Welch Allyn single-use disposable probe covers. Never take a temperature measurement without a single-use probe cover securely attached. Failure to use a probe cover can cause patient discomfort from a heated probe, patient cross-contamination, and inaccurate temperature readings.

**WARNING** Patient illness may result from improper use of oral and rectal temperature probes. Using the incorrect probe may also produce inaccurate measurements.

- Use only oral probes, identified by a blue ejection button at the top of the probe, to take oral and axillary temperatures.
- Use only rectal probes, identified by a red ejection button at the top of the probe, to take rectal temperatures.

**WARNING** Patient illness or cross-contamination may result from improper placement of oral and rectal temperature probes in the probe wells.

- Place only oral probes, identified by a blue ejection button at the top of the probe, in the blue probe wells.
- Place only rectal probes, identified by a red ejection button at the top of the probe, in the red probe wells.

**WARNING** Inaccurate measurement risk. Never take an axillary temperature through the patient's clothing. Carefully place the probe in the axilla, avoiding contact with other objects or material. Always verify direct contact between the probe cover and skin.

**WARNING** Patient injury risk. When taking rectal temperatures, insert the probe tip only 5/8 inch (approximately 1.5 cm) inside the rectum of adults and only 3/8 inch (approximately 1 cm) inside the rectum of children to avoid the risk of bowel perforation.

**WARNING** Never use a damaged temperature probe. The thermometer consists of high-quality precision parts and should be protected from severe impact or shock. Do not use the thermometer if you notice any signs of damage to the probe or monitor. If the thermometer probe is dropped or damaged, remove it from use and have it inspected by qualified service personnel.

**CAUTION** Inaccurate measurement risk. Patient activities such as strenuous exercise, ingesting hot or cold liquids, eating, chewing gum or mints, brushing teeth, or smoking may affect oral temperature measurements for up to 20 minutes.

**CAUTION** Inaccurate measurement risk. Always use new probe covers taken from the monitor's probe cover box holder to ensure accurate temperature measurements. Probe covers taken from other places or that haven't stabilized in temperature may result in inaccurate temperature measurements.

## Temperature mode selection

The monitor with the temperature module takes a patient temperature in either Predictive (Normal) or Direct mode. The default setting is the Predictive mode.

**WARNING** Inaccurate measurement risk. To ensure optimal accuracy, always confirm that the correct mode and site are selected.

**WARNING** Patient injury risk. Do not exceed the recommended temperature measurement durations in Direct mode. Continuous measurement durations of 3 minutes at the oral and rectal sites and 5 minutes at the axillary site are recommended for accurate measurement. Do not continuously measure beyond 10 minutes in any mode.

### Predictive mode

Is a one-time measurement that takes a temperature in approximately 6 to 15 seconds. Removing the probe from the probe well, loading a probe cover, and holding the probe tip in place at the measurement site initiates a Predictive mode measurement. The monitor sounds a tone to indicate the end of a predictive measurement.

### Direct mode

Provides continual temperature measurements. For oral and rectal measurements, it is recommended to measure temperature until the temperature stabilizes or for 3 minutes. For axillary measurements, it is recommended to measure temperature until the temperature stabilizes or for 5 minutes. The monitor changes to Direct mode approximately 60 seconds after the probe is removed from the probe well.

**CAUTION** The monitor does not retain Direct mode temperatures in memory. Therefore, it is important to note the temperature before removing the thermometer probe from the measurement site and then manually record it in the patient record.

After 10 minutes of using the Direct mode, the monitor generates a technical alarm condition and clears the measurement.

## Take a temperature in the Predictive mode

**WARNING** Inaccurate measurement risk. To ensure optimal accuracy, always confirm that the correct mode and site are selected.

**WARNING** Patient injury risk. Prior to taking a temperature, instruct the patient not to bite down on the probe as patient injury and damage to the probe may result.

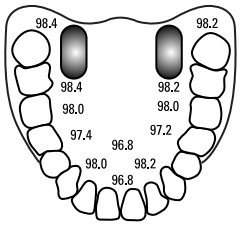
**CAUTION** Probe covers are disposable, nonsterilized, and single-use. Probes are also nonsterilized. Do not autoclave probes and probe covers. Ensure that probe covers are disposed of according to facility requirements or local regulations.

1. Remove the temperature probe from the probe well.

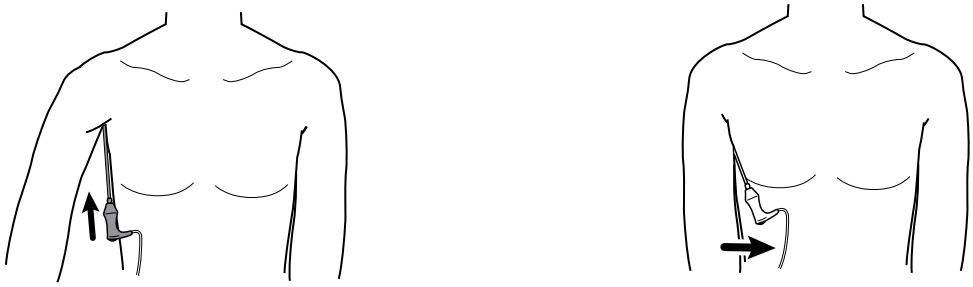
   The monitor sounds a tone as it enters the ready state.
2. Insert the probe into a new probe cover and press the probe handle down firmly.
3. Touch the **Temperature site control**  to choose from these measurement sites: oral, pediatric axillary, or adult axillary.
4. Hold the probe tip in place at the measurement site.

   For oral temperatures, place the probe tip under the patient's tongue on either side of the mouth to reach the sublingual pocket and ask the patient to close his/her lips.

   **Note** Do not hand the probe to patients to place in their mouth.



For axillary temperatures, lift the patient's arm so that the entire axilla is easily seen and place the probe tip as high as possible in the mid-axilla. Verify that axillary tissue completely surrounds the probe tip and place the arm snugly at the patient's side.



While the measurement is taking place, the temperature frame displays the process indicator.

5. The monitor sounds a tone when the final temperature is reached (in approximately 6 to 15 seconds). The temperature frame continues to display the temperature in degrees Fahrenheit and degrees Celsius even after the probe is returned to the probe well.


**Note** To switch to the Direct mode, touch  after you acquire the Predictive mode measurement. The temperature frame (in the lower-left corner) changes to "MODE: Direct..." as it switches to the Direct mode.

The monitor sounds a tone at the start of a Direct mode measurement.

6. Remove the probe after the temperature measurement is complete and firmly press the eject button on the top of the probe to release the probe cover.

**WARNING** Patient injury risk. Do not exceed the recommended temperature measurement durations in Direct mode. Continuous measurement durations of 3 minutes at the oral and rectal sites and 5 minutes at the axillary site are recommended for accurate measurement. Do not continuously measure beyond 10 minutes in any mode.

Ensure that probe covers are disposed of according to facility requirements or local regulations.

7. Return the probe to the probe well.
8. Wash your hands to reduce the risk of cross-contamination.

## Take a temperature in the Direct mode

Direct mode displays the temperature of the probe as long as the probe tip remains in place at the measurement site and remains within the operating patient temperature range. The patient's temperature will reach final equilibrium in approximately 3 minutes at the oral and rectal measurement sites and approximately 5 minutes at the axillary site.

The monitor enters Direct mode by the following methods.

- After you complete a Predictive mode measurement, touch  to switch from Predictive to Direct mode. The temperature frame (in the lower-left corner) changes to "MODE: Direct..." as it switches to the Direct mode.
- Remove the probe from the probe well, load a probe cover, select a temperature site, and expose the probe to ambient air for more than 60 seconds to switch the monitor to Direct mode. The temperature frame changes to "MODE: Direct...".
- If you have a patient whose body temperature is below the normal temperature range and you follow the previous step, the probe sensor identifies this condition and turns off the probe preheater in order to accommodate the lower body temperature measurement.

**WARNING** Patient injury risk. Do not exceed the recommended temperature measurement durations in Direct mode. Continuous measurement durations of 3 minutes at the oral and rectal sites and 5 minutes at the axillary site are recommended for accurate measurement. Do not continuously measure beyond 10 minutes in any mode.

**WARNING** Inaccurate measurement risk. To ensure optimal accuracy, always confirm that the correct mode and site are selected.

**WARNING** Patient injury risk. Prior to taking a temperature, instruct the patient not to bite down on the probe as patient injury and damage to the probe may result.

**CAUTION** Probe covers are disposable, nonsterilized, and single-use. Probes are also nonsterilized. Do not autoclave probes and probe covers. Ensure that probe covers are disposed of according to facility requirements or local regulations.

1. Remove the temperature probe from the probe well.

   The monitor sounds a tone as it enters the ready state.
2. Insert the probe into a new probe cover and press the probe handle down firmly.
3. Touch the **Temperature site control**  to choose from these measurement sites: oral, pediatric axillary, or adult axillary.

   The temperature frame changes to Direct mode approximately 60 seconds after the probe is removed from the probe well.

   The monitor sounds a tone to indicate the start of a Direct mode measurement.
4. Hold the probe tip in place at the oral or rectal measurement site for a total of 3 minutes and for 5 minutes at the axillary site.
5. While the measurements are taking place, the temperature frame displays the patient's continuous temperature measurements in degrees Fahrenheit and degrees Celsius.


**Note** The monitor does not retain Direct mode temperatures in memory. Therefore, it is important to note the temperature before removing the probe from the measurement site and then manually record it in the patient record.

6. Remove the probe after the temperature measurement is complete and firmly press the eject button on the top of the probe to release the probe cover.
7. Return the probe to the probe well to continue taking temperatures in the Predictive mode.
8. Wash your hands to reduce the risk of cross-contamination.

## Take a temperature at the rectal site

**WARNING** Patient injury risk. When taking rectal temperatures, insert the probe tip only 5/8 inch (approximately 1.5 cm) inside the rectum of adults and only 3/8 inch (approximately 1 cm) inside the rectum of children to avoid the risk of bowel perforation.

**WARNING** Cross-contamination or nosocomial infection risk. Thorough hand-washing greatly reduces the risk of cross-contamination and nosocomial infection.

**WARNING** Patient injury risk. Do not exceed the recommended temperature measurement durations in Direct mode. Continuous measurement durations of 3 minutes at the oral and rectal sites and 5 minutes at the axillary site are recommended for accurate measurement. Do not continuously measure beyond 10 minutes in any mode.

**WARNING** Inaccurate measurement risk. To ensure optimal accuracy, always confirm that the correct mode and site are selected.

**CAUTION** Probe covers are disposable, nonsterilized, and single-use. Probes are also nonsterilized. Do not autoclave probes and probe covers. Ensure that probe covers are disposed of according to facility requirements or local regulations.

1. Remove the rectal temperature probe from the rectal probe well.

   The monitor sounds a tone as it enters the ready state. The Temperature Site Control defaults to the rectal site.

2. Insert the rectal probe into a new probe cover and press the probe handle down firmly.
3. Separate the patient's buttocks with one hand. Use the other hand to gently insert the probe tip only 5/8 inch (1.5 cm) inside the rectum of adults and only 3/8 inch (approximately 1 cm) inside the rectum of children. The use of a lubricant is optional.
4. Insert the probe so that the tip is in contact with tissue. Continue to separate the buttocks and hold the probe in place throughout the measurement process. While the measurement is taking place, the temperature frame displays the process indicator.

5. The monitor sounds a tone when the final temperature is reached (in approximately 10 to 13 seconds). The temperature frame continues to display the temperature in degrees Fahrenheit and degrees Celsius even after the probe is returned to the probe well.


**Note** To switch to the Direct mode, touch  after the Predictive mode measurement is acquired. The temperature frame (in the lower-left corner) changes to "MODE: Direct..." as it switches to the Direct mode. The monitor sounds a tone to indicate the start of a Direct measurement. Once you are in the Direct mode, continue to separate the buttocks and hold the probe in place throughout the measurement process.

**Note** The monitor does not retain Direct mode temperatures in memory. Therefore, it is important to note the temperature before removing the probe from the measurement site and then manually record it in the patient record.

6. Remove the probe after the temperature measurement is complete and firmly press the eject button on the top of the probe to release the probe cover.
7. Return the probe to the probe well.
8. Wash your hands to reduce the risk of cross-contamination.

## Braun ThermoScan® PRO 4000 thermometer and dock

The thermometer and dock enable you to transfer an ear temperature measurement to the monitor. The dock also charges the thermometer battery.

Read the thermometer manufacturer's directions for use before attempting to configure, use, troubleshoot, or maintain the thermometer.

**WARNING** Liquids can damage electronics inside the thermometer. Prevent liquids from spilling on the thermometer. If liquids are spilled on the thermometer, dry off the thermometer with a clean cloth. Check for proper operation and accuracy. If liquids possibly entered the thermometer, remove the thermometer from use until it has been properly dried, inspected, and tested by qualified service personnel.

**CAUTION** Probe covers are disposable, nonsterilized, and single-use. The thermometer is also nonsterilized. Do not autoclave the thermometer and probe covers. Ensure that probe covers are disposed of according to facility requirements or local regulations.

**CAUTION** The thermometer has no user-serviceable parts. If service is required, call your nearest Welch Allyn Customer Service or Technical Support facility.

**CAUTION** Store the thermometer and probe covers in a dry location, free from dust and contamination and away from direct sunlight. Keep the ambient temperature at the storage location fairly constant and within the range of 50°F to 104°F (10°C to 40°C).

## Take a temperature at the ear site

**WARNING** Probe covers are single-use only. Re-use of a probe cover may result in spread of bacteria and cross-contamination.

**WARNING** Inaccurate measurement risk. Use only Braun ThermoScan probe covers with this thermometer.

**WARNING** Inaccurate measurement risk. Frequently inspect the probe window and keep it clean, dry, and undamaged. Fingerprints, cerumen, dust, and other contaminants reduce the transparency of the window and result in lower temperature measurements. To protect the window, always keep the thermometer in the dock when the thermometer is not in use.

**CAUTION** Inaccurate measurement risk. Before taking a temperature measurement, make sure that the ear is free from obstructions and excess cerumen build-up.

**CAUTION** Inaccurate measurement risk. The following factors can affect ear temperature measurements for up to 20 minutes:

- The patient was lying on his or her ear.
- The patient's ear was covered.
- The patient was exposed to very hot or very cold temperatures.
- The patient was swimming or bathing.
- The patient was wearing a hearing aid or an ear plug.

**CAUTION** Inaccurate measurement risk. If ear drops or other ear medications have been placed in one ear canal, take the temperature in the untreated ear.

**Note** A temperature measurement taken in the right ear might differ from a measurement taken in the left ear. Therefore, always take the temperature in the same ear.

**Note** When the monitor receives an ear temperature measurement, it displays the measurement on the Home tab. If the Home tab already contains a temperature measurement, the new measurement overwrites it.

To take a measurement and transfer it to the monitor:

1. Make sure that the monitor is powered on.
2. Remove the ear thermometer from the dock.
3. Locate the probe cover box in the dock.
4. Firmly push the probe tip into the probe cover box.

   When the probe cover is in place, the thermometer turns on automatically.
5. Wait for the ready beep and three dashes to appear on the thermometer display.
6. Fit the probe snugly into the ear canal and then push and release the **Start** button.

- If the probe is positioned correctly in the ear canal the ExacTemp light flashes. When the thermometer detects an accurate measurement, the ExacTemp light is continuously on, a long beep signals the end of the measurement, and the display shows the result.
- If the probe is positioned incorrectly in the ear canal or is moved during the measuring process, the ExacTemp light goes out, a sequence of short beeps sounds, and the error message POS (position error) appears.

7. When you are finished taking the temperature, press the ejector button to eject the used probe cover.
8. Return the thermometer to the dock.

   The LED on the dock flashes while the measurement is being transferred.

   After the transfer is complete, the temperature and the temperature scale appear on the Home tab according to the monitor settings.

   **Note** Only the latest measurement is transferred to the monitor.

   **Note** Measurements that have already been transferred to the monitor cannot be transferred again.

For more information about thermometer functionality, refer to the thermometer manufacturer's directions for use.

### Change the temperature scale on the ear thermometer

To switch from Celsius to Fahrenheit, refer to the thermometer manufacturer's directions for use.

### Charge the ear thermometer battery

To charge the battery pack:

- Place the thermometer in the dock.
- Make sure that the monitor is connected to AC power.
- Make sure that the monitor is powered on.

The LED on the dock indicates the charging status of the battery pack:

- Orange: The battery pack is charging.
- Green: The battery pack is charged.
- Not illuminated: The battery pack is not charging.

**Note** The battery pack continues to charge while the monitor is in Display power saving mode.

**Note** It is strongly recommended that you use only the Welch Allyn rechargeable battery pack in the thermometer because the dock cannot charge other batteries.

# SpO2

SpO2 and pulse rate monitoring continuously measures saturation level of oxygen in hemoglobin as well as the pulse rate in a patient through a pulse oximeter.

## SpO2 frame

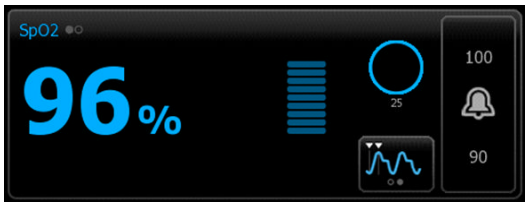
The SpO2 frame displays data and controls used in pulse oximetry measurements.

The frame provides a numeric view and a waveform view of SpO2 data. You can toggle between views by touching the left side of the frame.

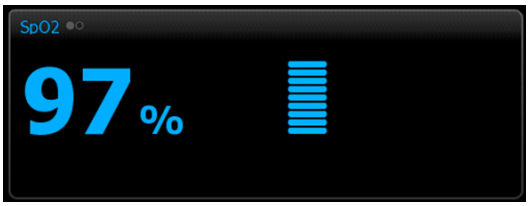
## SpO2 numeric view

The numeric view indicates the SpO2 saturation percentage and the pulse amplitude. Features of this view differ based on the type of sensor enabled and the profile selected.

### Nellcor sensor

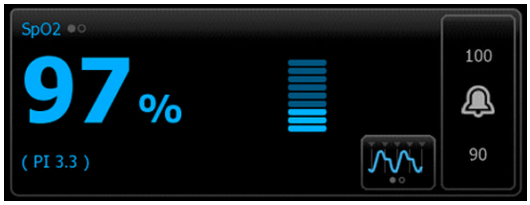



Monitor profile

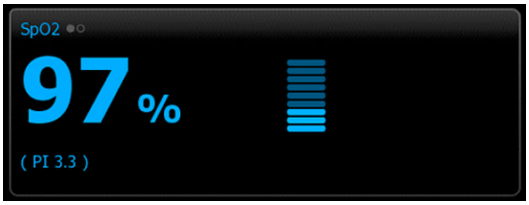



Spot Check and Triage profiles

### Masimo sensor




Monitor profile



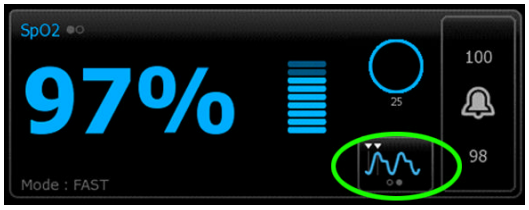

Spot Check and Triage profiles

## Pulse amplitude

The pulse amplitude bar indicates the pulse beat and shows the relative pulse strength. More bars illuminate as the detected pulse gets stronger.

## Response Mode Control

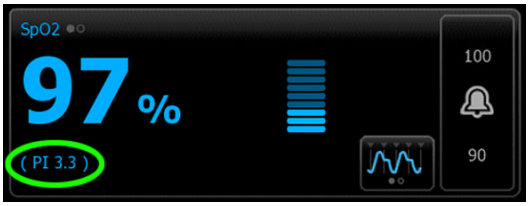
The Response Mode Control allows you to set the SpO2 measurement time to either Normal or Fast.




## Perfusion index

Perfusion Index (PI) is an SpO2 feature available only with Masimo-equipped monitors.

PI is a relative reading of pulse strength at the monitoring site. PI is a numerical value that indicates the strength of the IR (infrared) signal returning from the monitoring site. PI display ranges from .02 percent (very weak pulse strength) to 20 percent (very strong pulse strength). PI is a relative number and varies between monitoring sites and from patient to patient, as physiological conditions vary.




During sensor placement, the PI can be used to evaluate the appropriateness of an application site, looking for the site with the highest PI number. Placing the sensor at the site with the strongest pulse amplitude (highest PI number) improves performance during motion. Monitor the trend of the PI for changes in physiological conditions.

## SatSeconds™ alarm management

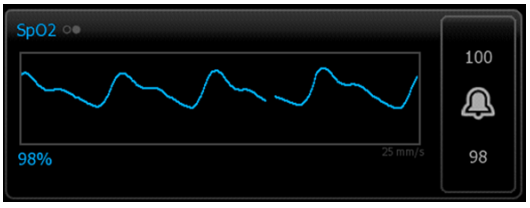
The SatSeconds feature is an SpO2 alarm management system available only with monitors that are equipped with Nellcor OxiMax Technology.

The SatSeconds feature is the product of the time and magnitude that a patient falls outside of the SpO2 alarm limits. For example, three points below the alarm limit for 10 seconds equals 30 SatSeconds. An alarm is triggered only when a desaturation event reaches the SatSeconds limit. The SatSeconds feature is clinician controlled and can be set to 0, 10, 25, 50, or 100 SatSeconds. If a desaturation event resolves on its own within the preset time, the clock will automatically reset and the monitor will not alarm.


**Note** The SatSeconds feature has a built-in safety protocol that sounds an alarm whenever three SpO2 violations of any amount or duration occur within a 1-minute period.

## SpO2 waveform view

The waveform view shows the real-time SpO2 plethysmograph waveform. You can select the waveform sweep speed in Advanced settings.




# Measure SpO2 and pulse rate

**WARNING** Inaccurate measurement risk. Use only Masimo Rainbow SET sensors and accessories on Masimo-equipped monitors.

**WARNING** Inaccurate measurement risk. Use only Nellcor sensors and accessories on Nellcor-equipped monitors.

**WARNING** The pulsations from intra-aortic balloon support can increase the pulse rate displayed on the monitor. Verify the patient's pulse rate against the ECG heart rate.

**WARNING** Patient injury risk. Do not attempt to reprocess, recondition, or recycle any sensors or patient cables. Doing so might damage electrical components.

**WARNING** Pulse rate measurement might not detect certain arrhythmias because it is based on the optical detection of a peripheral flow pulse. Do not use the pulse oximeter as a replacement or substitute for ECG-based arrhythmia analysis.

**WARNING** Use the pulse co-oximeter as an early warning device. As you observe a trend toward patient hypoxemia, use laboratory instruments to analyze blood samples to better understand the patient's condition.

**WARNING** The accuracy of SpO2 measurements can be affected by any of the following:

- elevated levels of total bilirubin
- elevated levels of Methemoglobin (MetHb)
- elevated levels of Carboxyhemoglobin (COHb)
- hemoglobin synthesis disorders
- low perfusion at the monitored site
- the presence of concentrations of some intravascular dyes, sufficient to change the patient's usual arterial pigmentation
- patient movement
- patient conditions such as shivering and smoke inhalation
- motion artifact
- painted nails
- poor oxygen perfusion
- hypotension or hypertension
- severe vasoconstriction
- shock or cardiac arrest
- venous pulsations or sudden and significant changes in pulse rate
- proximity to an MRI environment
- moisture in the sensor
- excessive ambient light, especially fluorescent
- the use of the wrong sensor
- a sensor applied too tightly

1. Verify that the sensor cable is connected to the monitor.

**WARNING** Patient injury risk. The sensor and extension cable are intended only for connection to pulse co-oximetry equipment. Do not attempt to connect these cables to a PC or any similar device. Always follow the sensor manufacturer's directions for care and use of the sensor.

2. Clean the application site. Remove anything, such as nail polish, that could interfere with sensor operation.

   **Note** Do not use disposable sensors on patients who have allergic reactions to the adhesive.

3. Attach the sensor to the patient according to the manufacturer's directions for use, observing all warnings and cautions.

   **Note** If a sterile sensor is required, select a sensor that has been validated for sterilization, and follow the sensor manufacturer's directions for sterilizing the sensor.

   Place the sensor and the NIBP cuff on different limbs to reduce unnecessary alarms when you monitor these parameters at the same time.

   **Note** A range of sensors is available for different patient sizes and measurement sites. Consult the sensor manufacturer's instructions for selecting the correct sensor.

4. Confirm that the monitor displays SpO2 and pulse rate data within 15 seconds of connection to the patient.

   **WARNING** Patient injury risk. Incorrect sensor application or excessive duration of sensor use can cause tissue damage. Inspect the sensor site periodically as directed in the sensor manufacturer's instructions.

While SpO2 is being measured, the displayed pulse rate is derived from the sensor. If SpO2 is not available, the pulse rate is derived from NIBP.

Detaching the sensor during a measurement in Monitor mode triggers an alarm.

If SpO2 is being measured continuously on a patient for an extended period, change the sensor location at least every three hours or as indicated by the sensor manufacturer's instructions.

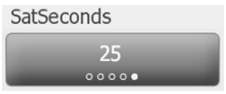
## Configure SpO2 alarms

Follow these steps to set alarm limits for SpO2 measurements.

1. Verify that you are using the Monitor profile, which contains the Alarms tab.
2. Touch the **Alarms** tab.
3. Touch the **SpO2** tab.
4. Enter the desired upper and lower alarms limits for SpO2 using the up/down arrow keys or the keypad.
5. Touch the **Home** tab.

   The new alarm settings display in the Alarm Limit control button.

## Set SatSeconds limits

1. Touch the **Alarm limit control** of the SpO2 frame .
2. Touch the **Alarms** tab.
3. Touch 

to select a SatSeconds setting.
4. Touch **Home** to save your settings and return to the Home tab.

## Set Response Mode

To set the Response Mode from the Home tab, the monitor must be in the Monitor profile.

Touch  in the SpO2 frame.

The SpO2 frame displays **MODE: Fast** when Fast mode is selected.

# SpHb

Monitors configured with Masimo total hemoglobin can measure hemoglobin (SpHb), SpO2, and pulse rate. SpHb monitoring continuously measures blood constituents and anemic status in a patient through a noninvasive SpHb pulse co-oximeter.

## SpHb frame

The SpHb frame displays data and controls used in total hemoglobin measurements.

**Note** SpHb is available only in the Monitor profile.

In this frame, one of two labels appears:

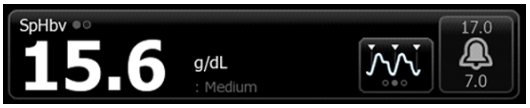
- **SpHbv** indicates the venous calibrated reference for total hemoglobin measurement.
- **SpHb** indicates the arterial calibrated reference for total hemoglobin measurement.

You can specify the reference source in Advanced settings.

The frame provides a numeric view and a graphical trend view of total hemoglobin data. You can toggle between views by touching the left side of the frame.

### SpHb numeric view

The numeric view indicates the total hemoglobin level in either grams per deciliter (g/dL) or millimoles per liter (mmol/L). You can select the unit of measure in Advanced settings.




### Averaging

The averaging button enables you to select the moving window of time used by the parameter to calculate the SpHb value and update the display: short (approximately 1 minute), medium (approximately 3 minutes), or long (approximately 6 minutes).

## SpHb graphical trend view

The graphical trend view presents a trend of the real-time measurements over a user-selected period. In Advanced settings, you can select the period displayed.


The graph shows total hemoglobin level on the y-axis and time on the x-axis (oldest measurements on the left to newest measurements on the right). The entire graph updates every 10 seconds.

To the right of the graph, the frame displays the current measurement in numeric format.

# Measure SpHb

**WARNING** Inaccurate measurement risk. Use only Masimo Rainbow SET sensors and accessories on Masimo-equipped monitors.

**WARNING** The pulsations from intra-aortic balloon support can increase the pulse rate displayed on the monitor. Verify the patient's pulse rate against the ECG heart rate.

**WARNING** Patient injury risk. Do not attempt to reprocess, recondition, or recycle any sensors or patient cables. Doing so might damage electrical components.

**WARNING** Pulse rate measurement might not detect certain arrhythmias because it is based on the optical detection of a peripheral flow pulse. Do not use the pulse oximeter as a replacement or substitute for ECG-based arrhythmia analysis.

**WARNING** Use the pulse co-oximeter as an early warning device. As you observe a trend toward patient hypoxemia, use laboratory instruments to analyze blood samples to better understand the patient's condition.

**WARNING** The accuracy of SpHb measurements can be affected by any of the following:

- elevated levels of total bilirubin
- elevated levels of Methemoglobin (MetHb)
- elevated levels of Carboxyhemoglobin (COHb)
- hemoglobin synthesis disorders
- low perfusion at the monitored site
- the presence of concentrations of some intravascular dyes, sufficient to change the patient's usual arterial pigmentation
- patient movement
- patient conditions such as shivering and smoke inhalation
- motion artifact
- painted nails
- poor oxygen perfusion
- hypotension or hypertension
- severe vasoconstriction
- shock or cardiac arrest
- venous pulsations or sudden and significant changes in pulse rate
- proximity to an MRI environment
- moisture in the sensor
- excessive ambient light, especially fluorescent
- the use of the wrong sensor
- a sensor applied too tightly

1. Verify that the sensor cable is connected to the monitor.

   **WARNING** Patient injury risk. The sensor and extension cable are intended only for connection to pulse co-oximetry equipment. Do not attempt to connect these cables to a PC or any similar device. Always follow the sensor manufacturer's directions for care and use of the sensor.

2. Verify that you are using the Monitor profile.
3. Clean the application site. Remove anything, such as nail polish, that could interfere with sensor operation.

   **Note** Do not use disposable sensors on patients who have allergic reactions to the adhesive.

4. Attach the sensor to the patient according to the manufacturer's directions for use, observing all warnings and cautions.

   **Note** If a sterile sensor is required, select a sensor that has been validated for sterilization, and follow the sensor manufacturer's directions for sterilizing the sensor.

   Place the sensor and the NIBP cuff on different limbs to reduce unnecessary alarms when you monitor these parameters at the same time.

**Note** A range of sensors is available for different patient sizes and measurement sites. Consult the sensor manufacturer's instructions for selecting the correct sensor.

5. Confirm that the monitor displays SpHb or SpHbv data within 160 seconds of connection to the patient.

**WARNING** Patient injury risk. Incorrect sensor application or excessive duration of sensor use can cause tissue damage. Inspect the sensor site periodically as directed in the sensor manufacturer's instructions.

While SpHb is being measured, the displayed SpO2 and pulse rate are derived from the same sensor. If SpO2 is not available, the pulse rate is derived from NIBP.

Detaching the sensor during a measurement triggers an alarm.

If SpHb is being measured continuously on a patient for an extended period, change the sensor location at least every three hours or as indicated by the sensor manufacturer's instructions.

## Configure SpHb alarms

Follow these steps to set alarm limits for SpHb measurements.

1. Verify that you are using the Monitor profile, which contains the Alarms tab.
2. Touch the **Alarms** tab.
3. Touch the **SpHb** tab.
4. Enter the desired upper and lower alarm limits for SpHb using the up/down arrow keys or the keypad.
5. Touch the **Home** tab.

   The new alarm settings appear in the Alarm Limit control button.

## Set SpHb averaging mode

Touch  in the SpHb frame.

The SpHb frame displays the current mode.

# Pulse rate frame

The pulse rate frame, located in the upper right of the Home tab, displays data, information, and controls used in reading pulse rates.

Typically, the displayed pulse rate is derived from the SpO2 sensor. If SpO2 is not available, the pulse rate is derived from NIBP.

**WARNING** Inaccurate measurement risk. Pulse rate measurements generated through the blood pressure cuff or through SpO2 are subject to artifact and might not be as accurate as heart rate measurements generated through ECG or through manual palpation.

**Note** You can specify pulse tone volume in the Pulse rate tab (located in the Alarms tab).

## Monitor profile


## Spot Check and Triage profiles


## Configure pulse rate alarms

Follow these steps to set alarm limits for pulse rate.

1. Verify that you are using the Monitor profile, which contains the Alarms tab.
2. Touch the **Alarms** tab.
3. Touch the **Pulse rate** tab.
4. Enter the desired upper and lower alarm limits for pulse rate using the up/down arrow keys or the keypad.
5. Touch the **Home** tab.

   The new alarm settings display in the Alarm Limit control button.

# Manual parameters frame

The Manual parameters frame, located in the lower right of the Home tab, supports manual entry of parameters and displays measurements taken by some accessories.

**Note** Manual parameters are not available in the Triage profile.

**Note** Body mass index (BMI) is only available with an attached weight scale that calculates BMI.

**Note** When a measurement is transferred from an attached weight scale to the monitor, the measurement displayed on the monitor is within one decimal place (0.1) of the measurement displayed by the weight scale.

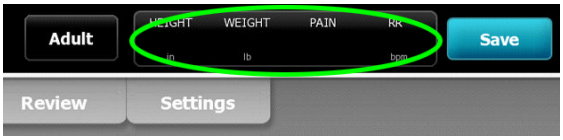
**Note** You cannot manually enter temperature on a monitor configured with a SureTemp Plus temperature module.

# Enter manual parameters

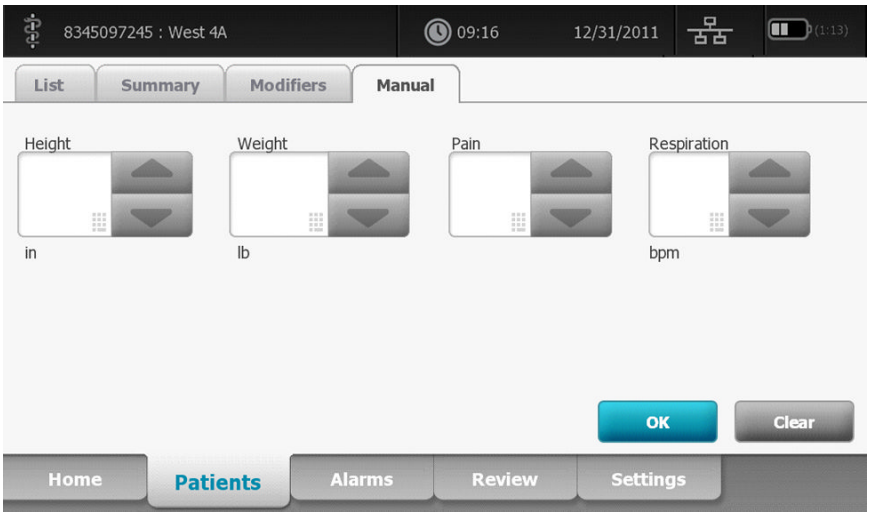
**Note** The Manual parameters frame enables you to enter measurements taken manually and displays measurements taken by some accessories. You can select and configure the parameters in Advanced settings. Only four parameters appear in the Manual parameters frame.

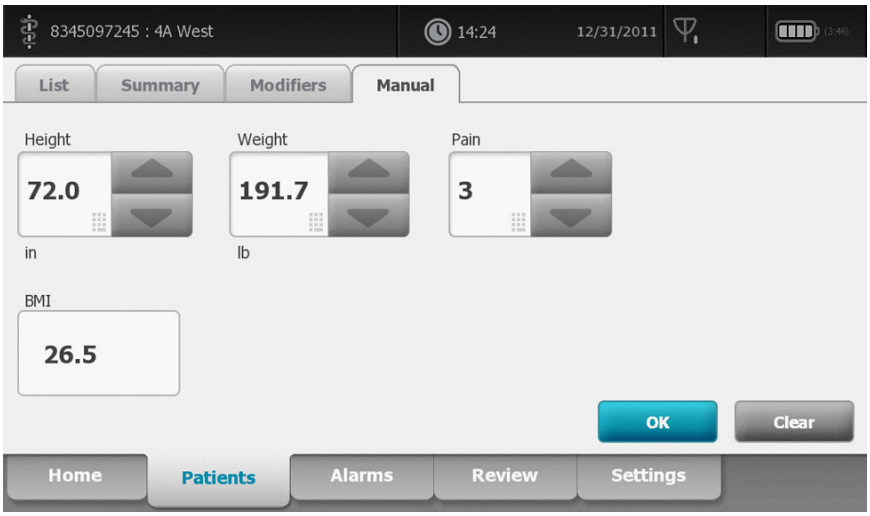
**CAUTION** Weight scales attached to this monitor must be running on battery power (battery type is specified in the weight scale manufacturer's directions for use). Do not use the weight scale's external power supply.

1. From the Home tab, touch anywhere within the Manual parameters frame.




The Manual tab appears. Two examples appear below.




2. Touch the up/down arrow keys or the keypad to manually adjust height, weight, pain level, temperature, respiration rate, or other parameters.

**Note** If an approved, battery-powered weight scale is attached to the monitor, measurements from the weight scale populate fields in the Manual tab. You can adjust weight and height measurements on this tab, but if you do, the read-only BMI field will clear.

**Note** Ensure that the current patient ID is correct before saving.

3. Touch OK to confirm settings and return to the Home tab.

**Note** During intervals, each automatic and manual save of patient measurements clears all measurements from the Manual parameters frame.

# Physical assessment instrument handles

## Use the physical assessment instrument handles

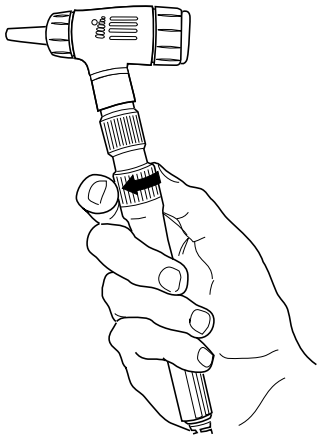
The handles supply power to Welch Allyn 3.5V instruments. This section focuses on operation of the handles only. Refer to the directions for use for each instrument head to use it properly.

**Note** Handle modules are available only in the 84- and 85-series models.

Ensure the wall system is plugged in.

1. Lift the handle you want to use from the handle cradle.

   The instrument will automatically power on when you remove it from the handle cradle. Only one handle is powered at a time.
2. Attach a specula to the end of the instrument head if appropriate.
3. Adjust light output by turning the rheostat on the handle.
   - Turning the rheostat clockwise increases the light output.



   - Turning the rheostat counterclockwise decreases the light output.

   **Note** The rheostat does not power down the instrument when you turn it counterclockwise as far as it will go.

4. Follow the directions for use for the instrument head when examining a patient.

   **CAUTION** Do not overstretch the cords on these handles to prevent damage. Always examine patients within a comfortable reach of the wall system to protect the cords.

**CAUTION** To minimize the external housing temperature of the diagnostic instrument heads, on-time should not exceed 2 minutes, and off-time should be a minimum of 10 minutes.

5. Return the handle to the handle cradle.

   Placing the handle in the cradle disengages the OptiSense™ optical sensor and powers down the instrument.

**Note** The handles continue to receive power as long as the wall system is plugged in, has a charged and functioning battery, and is powered on. You can power down the handles by powering down the entire wall system. See the Startup section for details.

# Maintenance and service

## Perform periodic checks

Welch Allyn recommends that each facility conduct periodic checks of each monitor.

1. Check the following at least daily:
   - Audio (speaker and piezo beeper tones), especially at startup
   - Fan, especially at startup
   - Touchscreen alignment
   - Date
   - Time
2. Visually inspect the following at least weekly:
   - the monitor for any damage or contamination
   - all cables, cords, and connector ends for damage or contamination
   - all mechanical parts, including covers, for integrity
   - all safety-related labeling for legibility and adhesion to the monitor
   - all accessories (cuffs, tubing, probes, sensors) for wear or damage
   - documentation for current revision of the monitor
3. Visually inspect the following at least monthly:
   - Mounting screws on wall for looseness and wear

Update settings, replace items, or call for service as necessary based on results of visual inspection. Do not use the monitor if you see any signs of damage. Qualified service personnel must check any monitor that is damaged for proper operation before putting the monitor back into use.

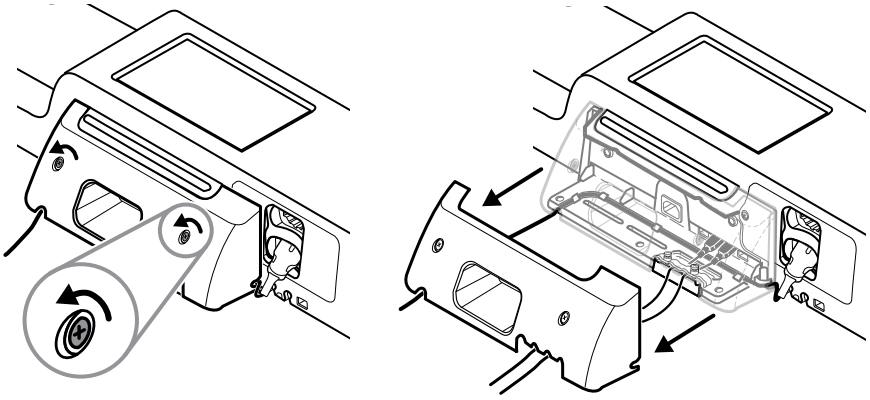
**CAUTION** Wall system components shall be replaced by Welch Allyn service centers or qualified service personnel.

## Remove the wall system from the wall

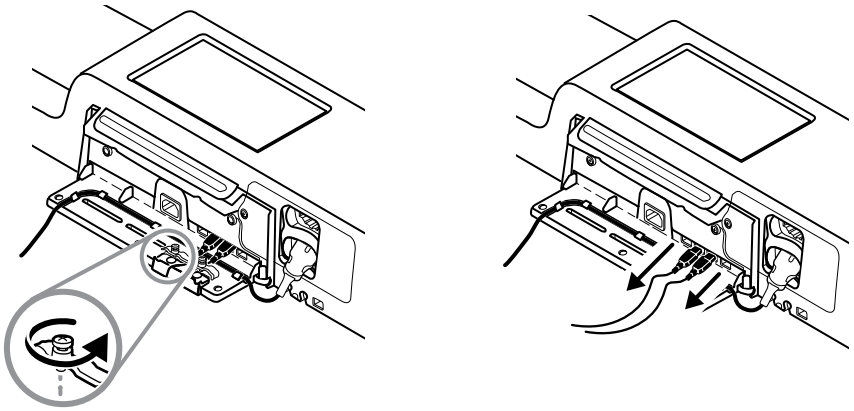
For maintenance or service activities that require access to the back of the wall system, follow these steps to remove the wall system from the wall.

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

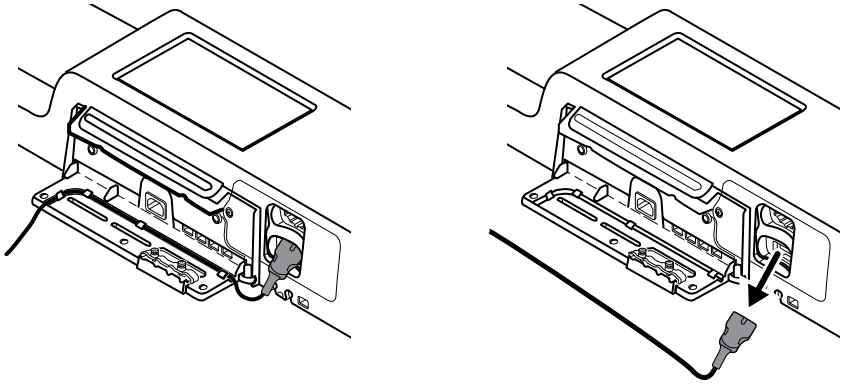
4. Remove all instrument heads, detach all accessible cords and cables, and unplug the power cord from the outlet.
5. Remove the cover by loosening the captive retention screws.



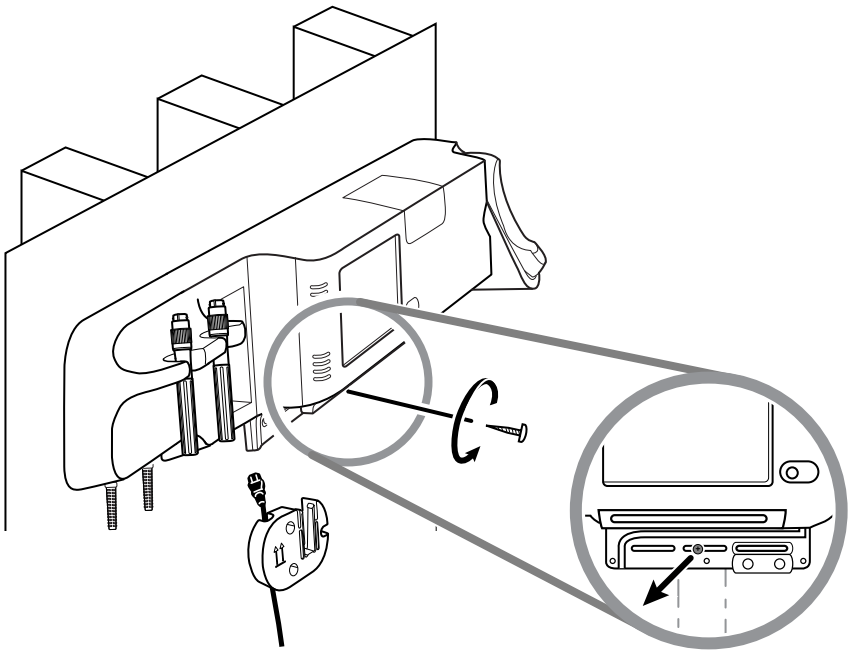
6. If USB accessories are connected, loosen the two screws on the cable retention clamp and remove it, then disconnect all USB cables.



7. If the wall system is configured with SpO2, disconnect the SpO2 cable and remove it from the channel on the bottom of the wall system.



8. Remove the security screw at the bottom of the wall system.



9. Carefully lift the wall system off the mounting rail bracket and place it onto a table or flat work surface.

# Change the battery

Before removing the battery, follow the instructions to remove the wall system from the wall.

1. Place the wall system on a table or flat work surface so that the back of the wall system faces up.
2. Locate the battery, indicated by  .
3. Remove the battery.
4. Insert the new battery. Ensure that you insert the new battery in the same orientation as the old battery.
5. Mount the wall system on the wall using the instructions presented in the Setup section of this directions for use.

**WARNING** Risk of fire, explosion, and burns. Do not short-circuit, crush, incinerate, or disassemble the battery pack. Never dispose of batteries in refuse containers. Always recycle batteries according to local regulations.

**Note** New batteries are approximately 30 percent charged. Therefore, connect the battery to AC power immediately after inserting a new a battery.

# Clean the wall system (excluding handle cradles and accessories)

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

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

**WARNING** Liquids can damage electronics inside the wall system. Prevent liquids from spilling on or dripping into the wall system.
If liquids are spilled on or drip into the wall system:

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

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

6. Reinstall battery pack.
7. Mount the wall system on the wall. (See the Setup section of this directions for use.)
8. Power on the wall system and verify that the wall system functions normally before using it.

Clean on a routine basis according to your facility's protocols and standards or local regulations. If the monitor is on, lock the display and disconnect the AC power cord.

The following agents are compatible with the wall system:

- CaviWipes™ (see Caution below)
- Sani-Cloth® Plus
- 70 percent isopropyl alcohol
- 10 percent chlorine bleach solution

**CAUTION** Some components and accessories of the wall system require special care during cleaning. To ensure optimal functioning and availability of specific components and accessories, use only the cleaning agents noted and the processes described for these items presented later in this section.

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

## CaviWipes™ or Sani-Cloth® Plus

1. Using CaviWipes™ or Sani-Cloth® Plus, wipe the surface of the monitor to remove all debris.
2. Allow the monitor surface to dry for a minimum of 10 minutes before using the monitor.

### 70 percent isopropyl alcohol

Wipe the monitor with a clean cloth slightly dampened with 70 percent isopropyl alcohol.

### 10 percent chlorine bleach solution

1. Wipe the monitor with a clean cloth slightly dampened with a 10 percent bleach and water solution. Follow the cleaning agent manufacturer's guidelines.
2. Rinse with a clean cloth slightly dampened with water that meets EP and USP quality standards.
3. Allow the monitor surface to dry for a minimum of 10 minutes before using the monitor.

## Clean the handle cradles

The blue handle cradles in the wall system require special attention.

**CAUTION** Do not use CaviWipes™ to clean the blue handle cradles. This cleaning agent produces bubbles and liquid during the cleaning process that can enter openings in the cradles and limit handle performance for as long as 30 minutes after cleaning.

Clean the handle cradles on a routine basis according to your facility's protocols and standards or local regulations.

The following agents are compatible with the handle cradles:

- 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.

## Clean the wall system accessories

The cleaning procedures for wall system accessories vary from the procedure to clean the wall system itself.

1. Wipe the NIBP hose and any reusable cuffs with a damp cloth moistened in a mild detergent solution.
2. Wipe the temperature probe with a cloth dampened with alcohol, warm water, or an appropriately diluted, nonstaining disinfectant solution.
3. Clean the pulse oximetry sensors with a cloth dampened with 70 percent isopropyl alcohol or 10 percent chlorine bleach solution.

   **CAUTION** Never immerse any wall system accessories.

4. Clean the ear themometer according to the manufacturer's directions for use.
5. Clean the physical assessment instrument handles and cords using the same cleaning agents used on the wall system. Clean on a routine basis according to your facility's protocols and standards, or local regulations.
6. To clean Welch Allyn 3.5V instrument heads attached to the physical assessment handles, follow instructions provided in their directions for use.

# Specifications

## Physical specifications

**Protection classifications, Wall system configurations**

| Characteristic | Specification |
|---|---|
| Electrical rating | 100 – 240 V AC, 50 – 60 Hz, 1.5 – 0.8 A |
| Duty cycle - monitor | Continuous operation |
| Duty cycle - physical assessment handles | 2 minutes on, 10 minutes off |
| Type of protection against electric shock | Class I equipment (protectively earthed) with double insulation |
| Degree of protection against electric shock, for parts applied to patients | Type BF defibrillator proof<br>IEC EN 60601-1 |
| Recovery time following defibrillator discharge | Less than or equal to 10 seconds |
| Flammable anesthetics | **WARNING** Not suitable for use with flammable anesthetics. |
| Degree of protection provided by the enclosure with respect to harmful ingress of liquids | IPX0<br>Non-protected according to EN/IEC 60529; Pulse oximeter equipment complies with ISO 9919 Cl. 44.6 Ingress of liquids tests and EN/IEC 60601-1, 60601-2-30, 60601-2-49 Cl. 44.3 Spillage tests |
| Height | 10.56 in. (268.26 mm ) |
| Width | 39.92 in. (1014 mm) |
| Depth | 7.51 in. (190.8 mm) |
| Weight (including battery) | 14.1 lb. (6 kg) |

## Protection classifications, Wall system configurations

| **Graphical display resolution** | |
|---|---|
| Display area | 8 in. (H) x 4 in. (V) (19.5 [H] cm x 11.3 [V] cm) |
| Pixels | 1024 (H) x 600 (V) |
| Pixel arrangement | RGB (red, green, blue) |
| Color depth | 16 bits per pixel |
| **Speaker volume** | |
| Output sound pressure | 57 dB at 1.0 meter |
| Measured sound range | 46 – 66 dB(A) |
| **Alarm and pulse tones** | per IEC 60601-1-8 |
| Pulse frequency ($f_0$) | 150 – 1000 Hz |
| Number of harmonic components in the range 300 Hz to 4000 Hz | minimum of 4 |
| Effective pulse duration ($t_d$) | high priority: 75 –200 ms<br>medium and low priority: 125 – 250 ms |
| Rise time ($t_r$) | 10 – 20% of $t_d$ |
| Fall time[a] ($t_f$) | $t_f \leq t_s - t_r$ |

**Note** The relative sound pressure level of the harmonic components should be within 15 dB above or below the amplitude at the pulse frequency.

[a] Prevents overlap of pulses.

## Battery specifications

| | |
|---|---|
| Rating | 10.8V 1.9 Ah (20Wh) |
| Composition | Lithium-ion |

## Nurse Call connection specifications

| | |
|---|---|
| Nurse Call | 25 V AC or 60 V DC maximum at 1A maximum |

## Handle specifications

| | |
|---|---|
| Handle output | 3.00 - 3.90v, .700 - 1.5A |

Leakage current is less than 10 microamps from any exposed metal part.

## NIBP specifications

| | |
|---|---|
| Cuff pressure range | Meets or exceeds ANSI/AAMI SP10:2002 standards for cuff pressure range |
| Systolic range | Adult: 30 to 260 mmHg<br>Pediatric: 30 to 260 mmHg<br>Neonate: 20 to 120 mmHg |
| Diastolic range | Adult: 20 to 220 mmHg<br>Pediatric: 20 to 220 mmHg<br>Neonate: 10 to 110 mmHg |
| Cuff Inflation Target | Adult: 160 mmHg (StepBP)<br>Pediatric: 120 mmHg (StepBP)<br>Neonate: 90 mmHg (StepBP) |
| Maximum Target Pressure | Adult: 280 mmHg (StepBP, SureBP)<br>Pediatric: 280 mmHg (StepBP, SureBP)<br>Neonate: 130 mmHg (StepBP) |
| Blood pressure determination time | Typical: 15 seconds<br>Maximum: 150 seconds |
| Blood pressure accuracy | Meets or exceeds ANSI.AAMI SP10:2002 standards for noninvasive blood pressure accuracy (±5 mmHg mean error, 8 mmHg standard deviation) |
| Mean Arterial Pressure (MAP) range<br>The formula used to calculate MAP yields an approximate value. | Adult: 23 to 230 mmHg<br>Pediatric: 23 to 230 mmHg<br>Neonate: 13 to 110 mmHg |
| Pulse rate range (using blood pressure determination) | Adult: 30 to 200 bpm<br>Pediatric: 30 to 200 bpm<br>Neonate: 35 to 220 bpm |
| Pulse rate accuracy (using blood pressure determination) | ±5.0% (±3 bpm) |
| Overpressure cutoff | Adult: 300 mmHg ±15 mmHg<br>Pediatric: 300 mmHg ±15 mmHg<br>Neonate: 150 mmHg maximum |

## SureTemp Plus temperature module specifications

| | |
|---|---|
| Temperature range | 80°F to 110°F (26.7°C to 43.3°C) |
| Calibration accuracy | ±0.2°F (±0.1°C) (Direct mode) |

| **Braun ThermoScan PRO 4000 thermometer specifications (refer to manufacturer's directions for use for additional information)** | |
|---|---|
| Temperature range | 68°F to 108°F (20°C to 42.2°C) |
| Calibration accuracy | • ±0.4°F (±0.2°C) for temperatures ranging from 95.9°F to 107.6°F (35.5°C to 42°C)<br>• ±0.5°F (±0.3°C) for temperatures outside of this range |
| Display resolution | 0.1°F or °C |

| **SpO2 specifications (refer to sensor manufacturer's directions for use for additional information)** | | |
|---|---|---|
| SpO2 performance measurement range | | 1 to 100% |
| **Masimo sensor accuracy guide** | | Accuracy specified when used with Masimo SET pulse oximetry monitors or with licensed Masimo SET pulse oximetry modules using PC series patient cables, during no motion. Numbers present ± 1 standard deviation. Plus or minus one standard deviation represents 68% of the population. |
| Perfusion | | 0.02 % to 20 % |
| Pulse rate | | 25 to 240 beats per minute (bpm)<br>No motion: ± 3 digits<br>Motion: ± 5 digits |
| Saturation<br>**Note** | Saturation accuracy varies by sensor type. | 70% to 100%<br>Adults, Pediatrics (No motion): ± 2 digits<br>Neonates (No motion): ± 3 digits<br>Adults, Pediatrics, Neonates (Motion): ± 3 digits<br>Low Perfusion: 0.02 % to 20 % ± 2 digits |
| **Nellcor sensor accuracy guide** | | SpO2 measurement accuracy can only be evaluated in vivo by comparing pulse oximeter readings with SaO2 measurements obtained from simultaneously sampled arterial blood made using a laboratory CO-oximeter. SpO2 accuracy was validated through breathe-down-equivalent testing by Covidien using electronic measurements to prove equivalence to the Nellcor N600x predicate device. The Nellcor N600x predicate device was validated by performing human-subject, “breathe-down” clinical trials. |
| Perfusion | | 0.03 % to 20 % |
| Pulse rate | | 20 to 250 beats per minute (bpm) ± 3 digits |
| Saturation<br>**Note** | Saturation accuracy varies by sensor type. | 70% to 100%<br>Adult, Pediatrics: ± 2 digits<br>Neonate: ± 3 digits<br>Low Perfusion: 0.02 % to 20 % ± 2 digits |

### SpO2 specifications (refer to sensor manufacturer's directions for use for additional information)

| | |
|---|---|
| Functional tester | **WARNING** A functional tester cannot be used to assess the accuracy of a pulse oximeter monitor. [1] |

[1] Some models of commercially available bench top functional testers and patient simulators can be used to verify the proper functionality of Nellcor pulse oximeter sensors, cables and monitors. See the individual testing device's operator's manual for the procedures specific to the model of tester being used.

While such devices may be useful for verifying that the pulse oximeter sensor, cabling, and monitor are functional, they are incapable of providing the data required to properly evaluate the accuracy of a system's SpO2 measurements. Fully evaluating the accuracy of the SpO2 measurements requires, at a minimum, accommodating the wavelength characteristics of the sensor and reproducing the complex optical interaction of the sensor and the patient's tissue. These capabilities are beyond the scope of known bench top testers. SpO2 measurement accuracy can only be evaluated in vivo by comparing pulse oximeter readings with SaO2 measurements obtained from simultaneously sampled arterial blood made using a laboratory CO-oximeter.

Many functional testers and patient simulators have been designed to interface with the pulse oximeter's expected calibration curves and may be suitable for use with Nellcor monitors and/or sensors. Not all such devices, however, are adapted for use with the Nellcor OXIMAX digital calibration system. While this will not affect use of the simulator for verifying system functionality, displayed SpO2 measurement values may differ from the setting of the test device. For a properly functioning monitor, this difference will be reproducible over time and from monitor to monitor within the performance specifications of the test device.

### SpHb specifications (refer to sensor manufacturer's directions for use for additional information)

| | |
|---|---|
| SpHb saturation range | 0 to 25 g/dL |
| Masimo SpHb sensor accuracy guide | Adults, Pediatrics (no motion): 8 to 17 g/dL ± 1 g/dL. SpHb accuracy has been validated on healthy adult male and female volunteers and on surgical patients with light to dark skin pigmentation in the range of 8 to 17 g/dL SpHb against a laboratory co-oximeter. This variation equals ± 1 standard deviation which encompasses 68% of the population. The SpHb accuracy has not been validated with motion or low perfusion. |

# Environmental specifications

| | |
|---|---|
| Operating temperature | 50°F to 104°F (10°C to 40°C) |
| Storage temperature | -4°F to 122°F (-20°C to 50°C) |
| Operating altitude | -557 to 10,000 ft. (-170 m to 3,048 m) |
| Operating humidity | 15 to 95% noncondensing |
| Storage humidity | 15% to 95% noncondensing |

# Monitor radio

The monitor's radio operates on Welch Allyn FlexNet™ or other 802.11 networks.

| | |
|---|---|
| **Wireless network interface** | IEEE 802.11 b/g, 802.11a |
| **Frequency** | 802.11 b/g: 2.402 GHz to 2.4835 GHz |
| | 802.11a: 5.125 GHz to 5.875 GHz |
| **Channels** | Up to 14 in 802.11b/g, up to 24 in 802.11a; country-dependent |
| **Security/encryption/ authentication** | WPA2/AES (either EAP or PSK authentication) |
| **Antenna** | Internal multiband PIFA |
| **Wireless data rates** | 802.11b: 1Mbps or higher during vitals transmission only |
| | 802.11a/g: 6Mbps or higher during vitals transmission only |
| | (approximately 2 seconds per reading) |
| **Agency approvals** | US: FCC Part 15, Class B; C/UL; CE; 47 CFR Part 2.1093, 15.207, 15.209, 15.247, 15.407; FCC OET Bulletin 65C |
| | Europe: CE; EN 50371; EN/ETSI 300 328 V1.7.1, 301 489-1 V1.6.1, 301 489-17 V1.2.1, 301 893 V1.4.1 |
| | Canada: RSS-210; RSS-GEN; RSS-102 |
| | Hong Kong: HKTA 1039 |
| **Protocols** | UDP, DHCP, TCP/IP |
| **Data transfer protocols** | UDP/TCP/IP |
| **Modulation** | OFDM (802.11a/g), DSSS/CCK (802.11b) |
| **Output power** | 40mW typical, country-dependent |
| **Ancillary IEEE standards** | 802.11e, 802.11h, 802.11i, 802.11X |

Channel restrictions in the 5-GHz band are determined by country.
Marking by the symbol ( ! ) indicates that usage restrictions apply. To ensure compliance with local regulations, be sure the correct country in which the access point is installed is selected. This product can be used with the following restriction(s):

France - Outdoor use is limited to 10 mW EIRP within the band 2454 to 2483.5 MHz.

**Note** Effective Isotropic Radiated Power (EIRP).

**Note** Some countries restrict the use of 5-GHz bands. The 802.11a radio in the monitor uses only the channels indicated by the access point with which the radio associates. The hospital IT department must configure access points to operate with approved domains.

# Configuration options

The wall system is available in the following configurations.

| Model Prefix | Description |
|---|---|
| 84 series | Standard. Includes nurse call, Ethernet, and USB connectivity. |
| 85 series | Wireless. Includes all Standard features plus an internal 802.11 a/b/g radio. |

# Patents

The monitor is covered under the following patents:

6,000,846; 6,036,361; 7,255,475; 7,429,245; D480,977; D632,397; and other patents pending.

For SureTemp Plus configured monitors, US patent 6,971,790 applies.

For Nellcor-equipped monitors, the following Nellcor US patents and foreign equivalents apply:

5,485,847; 5,676,141; 5,743,263; 6,035,223; 6,226,539; 6,411,833; 6,463,310; 6,591,123; 6,708,049; 7,016,715; 7,039,538; 7,120,479; 7,120,480; 7,142,142; 7,162,288; 7,190,985; 7,194,293; 7,209,774; 7,212,847; 7,400,919.

For Masimo-equipped monitors, the following Masimo US patents and foreign equivalents apply:

5,758,644; 5,823,950; 6,011,986; 6,157,850; 6,263,222; 6,501,975; 7,469,157; and others listed at www.masimo.com/patents.htm.

# Standards and compliance

## General compliance and standards

The monitor complies with the following standards:

21 CFR Subchapter H – Medical Devices – US Food and Drug Administration
2002 No. 236 – Australian Therapeutic Goods Act
93/42/EEC – European Economic Community Medical Devices Directive
2007/47/EC – European Economic Community Medical Devices Directive 2007 Amendment
94/62/EC – European Economic Community Packaging Directive
2002/96/EC – European Economic Community Waste Electrical and Electronic Equipment Directive
2006/66/EC – European Economic Community Batteries and Accumulators Directive
SOR/98-282 – Canadian Medical Devices Regulation
IATA DGR – International Air Transport Association Dangerous Goods Regulation
United Nations ST/SG/AC.10/11 – Manual of Tests and Criteria, Part III, Sub-Section 38.3

ANSI/AAMI SP10
AS/NZS 3200.1.0[1]
ASTM D 4332, E 1104
CAN/CSA C22.2 NO.601.1[1] CAN/CSA-C22.2 NO.60601-1-2, CSA Z9919
EN 1060-1, 1060-3, 1060-4[2]
EN/IEC 60601-1, 60601-1-2, 60601-1-4, 60601-1-6, 60601-1-8, 60601-2-30, 60601-2-49, 62304, 62366
EN/ISO 9919, 13485, 14971, 21647
ISTA 2A
UL 60601-1[1]

**Directive 2002/96/EC-WEEE:**
**Disposal of noncontaminated electrical and electronic equipment**

This product and its accessories must be disposed of according to local laws and regulations. Do not dispose of this product as unsorted municipal waste. Prepare this product for reuse or separate collection as specified by Directive 2002/96/EC of the European Parliament and the Council of the European Union on Waste Electronic and Electrical Equipment (WEEE). If this product is contaminated, this directive does not apply.

[1] Standard is essentially the IEC 60601-1 General standard plus the listed country's National Deviations.

[2] Non-Invasive Sphygmomanometers – Part 1: General Requirements, Part 3. Supplementary Requirements for Electro-Mechanical Blood Pressure Measuring Systems, Part 4: Test Procedures to Determine the Overall System Accuracy of Automated Non-Invasive Sphygmomanometers.

For more specific disposal or compliance information, see www.welchallyn.com/weee, or contact Welch Allyn Customer Service at +44 207 365 6780.

# General radio compliance

The wireless features of this monitor must be used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

This device complies with Part 15 of the FCC rules and with the rules of the Canadian ICES-003 as described below.

## Federal Communications Commission (FCC)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the distance between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

The user may find the following booklet prepared by the Federal Communications Commission helpful:

*The Interference Handbook*

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-0034504.

Welch Allyn is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this Welch Allyn product, or the substitution or attachment of connecting cables and equipment other than specified by Welch Allyn.

The correction of interference caused by such unauthorized modification, substitution, or attachment will be the responsibility of the user.

# Industry Canada (IC) emissions

This device complies with RSS 210 of Industry Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.

L'utilisation de ce dispositif est autorisée seulement aux conditions suivantes: (1) il ne doit pas produire de brouillage et (2) l' utilisateur du dispositif doit étre prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

# European Union

| | |
|---|---|
| Czech | Welch Allyn tímto prohlašuje, ze tento RLAN device je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES. |
| Danish | Undertegnede Welch Allyn erklærer herved, at følgende udstyr RLAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF |
| Dutch | Bij deze verklaart Welch Allyn dat deze RLAN device voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC. |
| English | Hereby, Welch Allyn, declares that this RLAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. |
| Estonian | Käesolevaga kinnitab Welch Allyn seadme RLAN device vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele. |
| Finnish | Welch Allyn vakuuttaa täten että RLAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen. |
| French | Par la présente, Welch Allyn déclare que ce RLAN device est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables |
| German | Hiermit erklärt Welch Allyn die Übereinstimmung des Gerätes RLAN device mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien) |
| Greek | ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Welch Allyn ΔΗΛΩΝΕΙ ΟΤΙ RLAN device ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ |
| Hungarian | Alulírott, Welch Allyn nyilatkozom, hogy a RLAN device megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak. |
| Italian | Con la presente Welch Allyn dichiara che questo RLAN device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE. |
| Latvian | Ar šo Welch Allyn deklarē, ka RLAN device atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem. |

| | |
|---|---|
| Lithuanian | Šiuo Welch Allyn deklaruoja, kad šis RLAN device atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas. |
| Malti | Hawnhekk, Welch Allyn, jiddikjara li dan RLAN device jikkonforma mal-htigijiet essenzjali u ma provvedimenti ohrajn relevanti li hemm fid-Dirrettiva 1999/5/EC |
| Portuguese | Welch Allyn declara que este RLAN device está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE. |
| Slovak | Welch Allyn týmto vyhlasuje, ze RLAN device spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES. |
| Slovene | Šiuo Welch Allyn deklaruoja, kad šis RLAN device atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas. |
| Spanish | Por medio de la presente Welch Allyn declara que el RLAN device cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE |
| Swedish | Härmed intygar Welch Allyn att denna RLAN device står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG. |

# Guidance and manufacturer's declaration

## EMC compliance

Special precautions concerning electromagnetic compatibility (EMC) must be taken for all medical electrical equipment. This device complies with IEC EN 60601-1-2.

- All medical electrical equipment must be installed and put into service in accordance with the EMC information provided in this document.
- Portable and mobile RF communications equipment can affect the behavior of medical electrical equipment.

The Connex Integrated Wall System complies with all applicable and required standards for electromagnetic interference.

- It does not normally affect nearby equipment and devices.
- It is not normally affected by nearby equipment and devices.
- It is not safe to operate the monitor in the presence of high-frequency surgical equipment.
- However, it is good practice to avoid using the monitor in extremely close proximity to other equipment.

## Emissions and immunity information

**Electromagnetic emissions**

The monitor is intended for use in the electromagnetic environment specified below. The customer or user of the monitor should assure that it is used in such an environment.

| Emissions test | Compliance | Electromagnetic environment - guidance |
|---|---|---|
| RF emissions<br>CISPR 11 | Group 1 | The monitor uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. |
| RF emissions<br>CISPR 11 | Class A | The monitor is suitable for use in all establishments other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: |
| Harmonic emissions<br>IEC 61000-3-2 | Class A | |

## Electromagnetic emissions

| | | | |
|---|---|---|---|
| Voltage fluctuations/flicker emissions<br>IEC 61000-3-3 | Complies |  | **WARNING** This equipment/system is intended for use by healthcare professionals only. This equipment/ system may cause radio interference or may disrupt the operation of nearby equipment [a]. It may be necessary to take mitigation measures, such as re-orienting or relocating the monitor or shielding the location. |

[a] The monitor contains a 5-GHz orthogonal frequency-division multiplexing transmitter or a 2.4-GHz frequency hopping spread-spectrum transmitter for the purpose of wireless communication. The radio is operated according to the requirements of various agencies, including FCC 47 CFR 15.247 and R&TTE Directive (1995/5/EC). The transmitter is excluded from the EMC requirements of 60601-1-2, but should be considered when addressing possible interference issues between this and other devices.

## Electromagnetic immunity

The monitor is intended for use in the electromagnetic environment specified below. The customer or the user of the monitor should assure that it is used in such an environment.

| Immunity test | IEC 60601 test level | Compliance level | Electromagnetic environment - guidance |
|---|---|---|---|
| Electrostatic discharge (ESD)<br>IEC 61000-4-2 | ±6 kV contact<br>± 8 kV air | ± 6 kV contact<br>± 8 kV air | Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%. |
| Electrical fast transient/burst<br>IEC 61000-4-4 | ±2 kV for power supply lines<br>±1 kV for input/ output lines | ±2 kV for power supply lines<br>±1 kV for input/ output lines | Mains power quality should be that of a typical commercial or hospital environment. |
| Surge<br>IEC 61000-4-5 | ± 1 kV differential mode<br>± 2 kV common mode | ± 1 kV differential mode<br>± 2 kV common mode | Mains power quality should be that of a typical commercial or hospital environment. |
| Voltage dips, short interruptions and voltage variations on power supply input lines<br>IEC 61000-4-11 | >95% dip in 0.5 cycle<br>60% dip in 5 cycles<br>30% dip for 25 cycles<br>>95% dip in 5 seconds | >95% dip in 0.5 cycle<br>60% dip in 5 cycles<br>30% dip for 25 cycles<br>>95% dip in 5 seconds | Mains power quality should be that of a typical commercial or hospital environment. If the user of the monitor requires continued operation during power mains interruptions, it is recommended that the monitor be powered from an uninterruptible power supply or a battery. |

**Electromagnetic immunity**

The monitor is intended for use in the electromagnetic environment specified below. The customer or the user of the monitor should assure that it is used in such an environment.

| Immunity test | IEC 60601 test level | Compliance level | Electromagnetic environment - guidance |
|---|---|---|---|
| | | | Portable and mobile RF communications equipment should be used no closer to any part of the monitor, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. |
| | | | **Recommended separation distance** |
| Conducted RF<br>IEC 61000-4-6 | 3 Vrms<br>150 kHz to 80 MHz | 3 Vrms | $d = (1.17)\sqrt{P}$ |
| Radiated RF<br>IEC 61000-4-3 | 3 V/m 80 MHz to 1 GHz | 3 V/m | $d = (1.17)\sqrt{P}$ 80 to 800 MHz |
| | | | $d = (2.33)\sqrt{P}$ 800 MHz to 2,5 GHz<br>where *P* is the maximum output power rating of the transmitter in watts (W) and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:<br>  |

Note1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

[a]Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the monitor is used exceeds the applicable RF compliance level above, the monitor should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the monitor.

[b]Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

## Recommended separation distances between portable and mobile RF communications equipment and the monitor

The monitor is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the monitor can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the monitor as recommended below, according to the maximum output power of the communications equipment.

| | Separation distance according to frequency of transmitter (m) | | |
|---|---|---|---|
| **Rated max. output power of transmitter (W)** | **150 kHz to 80 MHz** $d = (1.17)\sqrt{P}$ | **80 MHz to 800 MHz** $d = (1.17)\sqrt{P}$ | **800 MHz to 2.5 GHz** $d = (2.23)\sqrt{P}$ |
| 0.01 | 0.11667 | 0.11667 | 0.23333 |
| 0.1 | 0.36894 | 0.36894 | 0.73785 |
| 1 | 1.1667 | 1.1667 | 2.3333 |
| 10 | 3.6894 | 3.6894 | 7.3785 |
| 100 | 11.667 | 11.667 | 23.3333 |

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

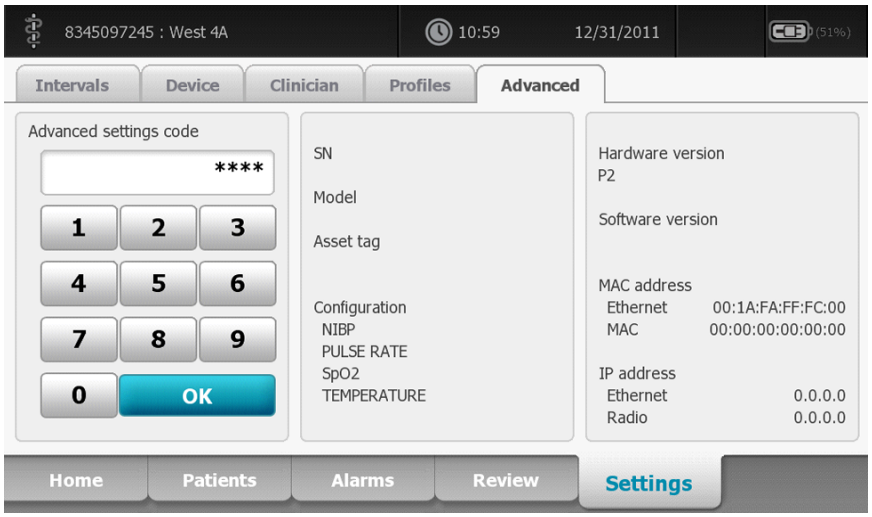
Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

# Advanced settings

The Advanced tab provides password-protected access to the monitor's Advanced settings (or Admin mode), enabling nurse administrators, biomedical engineers, and/or service engineers to configure specific features. The Advanced tab also presents read-only information about the monitor.

**Note** You cannot enter the Advanced settings if sensors or physiological alarms are active or if vital sign measurements are displayed.




# General

## Specify the language

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears, displaying the Language tab.
2. Select a language.
3. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.

- To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify date and time settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. On the General tab, touch the **Date / Time** tab.
3. Specify settings.

| Setting | Action/Description |
|---|---|
| Date format | Select a date format for display. |
| Time zone | Select your time zone offset from Coordinated Universal Time (UTC). |
| Automatically adjust clock for daylight saving time, reported by host | Select this to adjust the displayed time by +/- one hour when the connected host reports daylight savings time. |
| Allow users to change date and time | Select this to allow clinicians to set the date and time from the Settings tab. |
| Display date and time | Select this to display the date and time on the Home tab in the Device Status area. |

4. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify advanced alarm settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Alarms** tab.
3. Specify settings.

| Setting | Action/Description |
|---|---|
| Allow user to disable alarms | Select to allow clinicians to turn off or turn on all alarm limits for each vital sign. The control is on each parameter-specific tab on the Alarms tab. |
| Allow user to turn off general audio | Select to allow clinicians to turn off all audio notification for alarms. This control is on the Alarms tab (on the General tab). |

| | |
|---|---|
| Minimum alarm volume | Select the minimum alarm volume available. If you select **High**, then **Medium** and **Low** are not available to the clinician.<br>These controls are on the Alarms tab (on the General tab). |
| Nurse call threshold | Select the minimum priority alarm that activates a nurse call relay. If you select **High**, only high-level alarms activate a nurse call relay. |
| Audio pause time | Specify the amount of pause time that is added to the 60-second pause time. When a clinician pauses an audio alarm tone, the tone is paused for the combined amount of time. |
| SpO2 alarm condition delay | Specify the minimum amount of time that an SpO2 alarm condition must be active before audio and visual signals occur.<br>SatSeconds is available with Nellcor SpO2 sensors. If you select 0 seconds or 10 seconds, SatSeconds is disabled, and it is removed from the SpO2 tab in the Alarms tab. |
| SpHb alarm condition delay | Specify the minimum amount of time that an SpHb alarm condition must be active before audio and visual signals occur. |

4. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify advanced display settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Display** tab.
3. Specify settings.

| Setting | Action/Description |
|---|---|
| Display lock | Specify the required period of clinician inactivity before the touchscreen locks. |
| Display power saver | Specify the required period of monitor inactivity before the display turns off.<br>Clinician interactions, new vital sign measurements, or alarm conditions automatically turn on the display. |
| Device power down | Specify the required period of monitor inactivity before the monitor turns off. |

4. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Specify a monitor location

You can associate the monitor with a specific location. The location appears in the Device Status area.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Other** tab.
3. In the **Location ID** box, touch  and enter up to 20 alphanumeric characters.
4. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Enable monitor profile changes

You can allow clinicians to change the active profile on the monitor. Available profiles are **Monitor**, **Spot Check**, and **Triage**. When this option is enabled, clinicians can change the name of the profile as well.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Other** tab.
3. Select **Allow profile change**.
4. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Specify power line frequency

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Other** tab.

3. Select the power line frequency for AC power supplied to the monitor.
4. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Set and start the demo mode

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **General** tab.
3. Touch the **Demo** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Type | Select a type of demonstration mode. |
| Start | Touch **Start** to put the monitor in demonstration mode. Navigate to the Home tab to begin Demo mode. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Demo mode, touch **Exit** on the Home tab. The monitor restarts automatically.

# Parameters

## Specify advanced NIBP settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Parameters** tab.
3. Touch the **NIBP** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Default view | Select primary and secondary views.<br>Select **Display MAP** to display mean arterial pressure (MAP) in the NIBP frame on the Home tab. |

| | |
|---|---|
| | If **Display MAP** is selected, specify which numerics are primary in the NIBP frame. On the Home tab, clinicians can touch the NIBP frame to toggle between views. |
| Default patient type | Select a default patient type for this monitor. The patient type shows in the Patient frame on the Home tab.<br><br>In the Patients tab on the Summary tab, clinicians can change the displayed patient type from the default patient type that you set here. |
| Tube type | Select the number of tubes that are connected to the NIBP cuff that is used with this monitor. If you select **1 tube**, the only algorithm available for selection is **Step**. |
| Unit of measure | Select the NIBP unit of measure for display. |
| Allow interval program changes | Enable clinicians to modify interval program settings from the Intervals tab. |
| Algorithm and Cuff inflation target (CIT) | Select the default algorithm used to determine NIBP measurements.<br><br>If you select the **Step** algorithm, touch  and enter a default cuff inflation target for each type of patient. In the Patients tab on the Summary tab, clinicians can change the CITs from the default CITs that you set here. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Specify advanced temperature settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab will appear.
2. Touch the **Parameters** tab.
3. Touch the **Temperature** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Unit of measure | Select primary units of measure for the temperature display on the Home tab |
| Display temperature conversion | Select this to display primary units of measure and secondary units of measure for the temperature display on the Home tab. |
| Default SureTemp Plus site | Select the default site for SureTemp measurements. The default site applies when clinicians power up the monitor and each time |

| | |
|---|---|
| | clinicians remove the temperature probe from the well.<br>Select **Last Site** to set the default to the site selected for the last measurement. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify advanced SpO2 settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Parameters** tab.
3. Touch the **SpO2** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Default view | Select a numeric view or a waveform view as the primary SpO2 display on the Home tab. |
| Default response | Select the default speed of response to changes in SpO2 measurements. |
| Sweep speed | Select the waveform sweep speed for the SpO2 display in the Home tab. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced tabs and return to the Home tab, touch **Exit**.

## Specify advanced SpHb settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Parameters** tab.
3. Touch the **SpHb** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Reference | Select arterial or venous as the calibrated reference source. |

| | |
|---|---|
| Unit of measure | Select the primary unit of measure for the SpHb display on the Home tab. |
| Default averaging | Select the default moving window of time used by the parameter to calculate the SpHb value and update the display: short (approximately 1 minute), medium (approximately 3 minutes), or long (approximately 6 minutes). |
| Trend view time | Select the period displayed in the SpHb trend graphic on the Home tab. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced tabs and return to the Home tab, touch **Exit**.

## Specify advanced pulse rate settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Parameters** tab.
3. Touch the **Pulse rate** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Display source | Select this to show the source of pulse rate measurements (NIBP or SpO2) on the Home tab. |

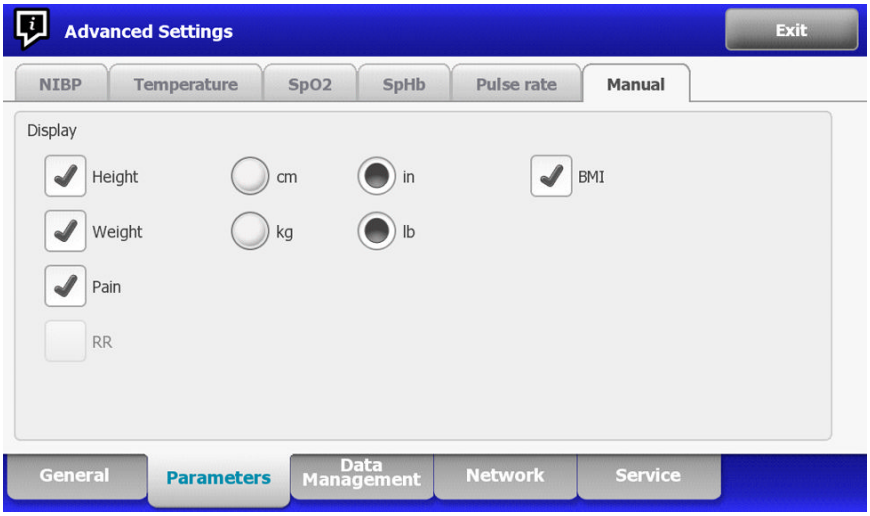
5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify the manual parameters

The Manual Parameters frame is in the lower right corner of the Home tab. You can manually enter values for parameters in the frame. You also can specify which parameters appear in the frame.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Parameters** tab.
3. Touch the **Manual** tab.




4. Select up to four parameters and associated units of measure for display in the Manual Parameters frame.

   If the monitor has the SureTemp Plus temperature module, the **Temperature** parameter is not available here or in the Manual Parameters frame.
5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Data management

## Specify patient ID settings

Patient identification appears on the Home tab in the Patient frame, and it is listed in various tabs, such as the Patient tab and the Review tab.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Data Management** tab.
3. Touch the **Patient IDs** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Name format | Select a format for all displayed patient names: **Full name** or **Abbreviation**. |
| Primary label | Select the primary identification label for all displayed patients. |
| Secondary label | Select a secondary identification label for patients. A secondary label displays only on the Home tab, after the primary label. |

| | |
|---|---|
| Require patient ID to save readings | Make entering a patient ID a prerequisite for saving measurements. If they fail to enter an identifier, the monitor prompts them when they try to save. |
| Search by patient ID | Enable clinicians to enter a patient ID to query for the patient's information. If clinicians scan the ID onto the Home tab or the Summary tab, the monitor queries the patient list and the network. Returned patient information populates the Patient frame on the Home tab and fields on the Summary tab. |
| Clear patient information on manual save | Specify that the monitor clears the selected patient after a clinician manually saves measurements from the Home tab. Patient information clears from the Patient frame and the Summary tab.<br>Note: This setting does not take effect when intervals are in progress. |
| Retrieve list | Enable the monitor to retrieve the patient list from the network. When this option is selected, a **Retrieve list** button replaces the **Add** button on the List tab. Information from the network populates the List tab when clinicians touch the **Retrieve list** button. Since the **Add** button is not available, clinicians cannot add a patient to the patient list. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Specify clinician ID settings

Clinician identification appears next to the medicine symbol in the Device Status area on the Home tab.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Data Management** tab.
3. Touch the **Clinician IDs** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Label | Select a type of clinician identification label for display on the Home tab: **Full name**, **Abbreviation**, **Clinician ID**, or **Symbol only**. |
| Require clinician ID to save readings | Make entering a clinician ID a prerequisite for saving measurements. If they fail to enter identification, the monitor prompts them when they try to save measurements. Clinicians can enter clinician identification on the Clinician tab. |
| Search by clinician ID | Enable the monitor to query the network for clinician information based on ID. The monitor |

| | |
|---|---|
| | initiates the search when the clinician enters or scans the ID from the Clinician tab. Returned clinician information populates the Device Status area and fields on the Clinician tab.<br><br>Select **Require password** to require clinicians to enter their password, in addition to ID, on the Clinician tab. The monitor uses the ID and password combination to query the network for clinician information. |
| Clear clinician information on manual save | Specify that the monitor clears the selected clinician after a clinician manually saves measurements from the Home tab. Clinician information clears from the Clinician tab and the Device Status area. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Specify clinical data settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Data Management** tab.
3. Touch the **Clinical Data** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Automatically send on manual save | Select this option to specify that measurements are sent to the network when a clinician saves measurements on the Home tab. |
| Delete readings after successful send | Select this option to specify that measurements are deleted from the monitor after they are successfully sent to the network. Sent measurements do not appear in the Review tab. |
| Emulate Spot Vital Signs LXi | Select this option to specify that clinical data sent to the network appears as Spot Vital Signs LXi data at the network. |

5. Do one of the following:
   - To continue in Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Network

## View advanced monitor information

The Status tab shows the monitor's software version, MAC and IP addresses, network, server and access point information, session information, and more.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Network** tab.
3. Touch the **Status** tab.
4. View the information.
5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify radio settings

This task is applicable only to monitors that have a radio installed.

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Network** tab.
3. Touch the **Radio** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Enable radio | Enable the radio for device communications. When disabled, the radio is not available. |
| Enable radio network alarms | Activate radio network alarms when an alarm condition occurs. When disabled, radio network alarms are not available. |
| SSID | Touch  and enter the service set identifier (SSID). Enter a maximum of 16 characters. |
| Radio band | Select the radio band. |
| Authentication type | Select an authentication scheme. Then specify any additional settings that appear. |

| | |
|---|---|
| Method | Select a method. Then touch  and enter characters: **Network key** (64 characters), or **Passphrase** (8 to 63 characters). |
| Security protocol | Select the security protocol. |
| EAP type | Select the EAP type. |
| Identity | Enter the EAP identity (maximum of 32 characters). |
| Password | Enter the EAP password (maximum of 32 characters). |
| Key number | Select the WEP key number. |
| Key | Enter the WEP key (10 characters for WEP 64, or 26 characters for WEP 128). |
| Configure radio | Touch **Configure radio** to activate all new radio settings not selected previously.<br>Touch **OK** in the confirmation popup telling you to power down the monitor.<br>Touch the **Settings** tab. Touch the **Device** tab. Touch **Power down**.<br>The radio will reboot.<br>**Note** If you do not touch **Configure radio**, none of the changed radio settings will take effect. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

## Specify server settings

1. Access the Advanced Settings.
   a. Touch the **Settings** tab.
   b. Touch the **Advanced** tab.
   c. Enter the **Advanced settings code**.
   d. Touch **OK**.

   The General tab appears.
2. Touch the **Network** tab.
3. Touch the **Server** tab.
4. Specify settings.

| Setting | Action/Description |
|---|---|
| Obtain server IP information automatically | Enable the monitor to automatically obtain the server IP information via the network.<br>**UDP broadcast port**: Touch  and enter the port number that is used to automatically obtain server IP information. The range of entry is 0 to 65535. |

| | |
|---|---|
| IP address | Touch  and enter the IP address of the server that is used for patient data communication. The range of entry for each field is 0 to 255. |
| Port | Touch  and enter the port number associated with the server IP address. The range of entry is 0 to 65535. |
| Test | Touch **Test** to test the connection to the configured server. |

5. Do one of the following:
   - To continue in the Advanced Settings, touch another tab.
   - To exit the Advanced Settings and return to the Home tab, touch **Exit**.

# Service

For service-related advanced settings, see the service manual for this product.

# Troubleshooting

This section presents tables of technical alarm and information messages, as well as problem descriptions that do not generate messages, to help you troubleshoot issues on the monitor.

**Note** Problem descriptions without messages appear at the end of this section.

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

- Information messages, which appear on a blue background.
- Low- and medium-priority alarms, which appear on an amber background.
- High-priority alarms, which appear on a red background.

Technical alarm messages are 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 displays on the monitor in the left column of the table. The remainder of the row explains possible causes and suggests actions that can resolve the issue.

**Note** Instructions to "Call for service" in the following tables mean that you should contact qualified service personnel in your facility to investigate the issue.

## NIBP messages

| Message | Possible cause | Suggested action |
|---|---|---|
| NIBP air leak; check cuff and tubing connections. | The NIBP module has an air leak | Check the cuff and tubing connections.<br>Clear the alarm and retry NIBP. |
| NIBP not functional. Call for service. | A module error occurred | Call for service. |
| Unable to determine NIBP; check connections; limit patient movement. | The NIBP module experienced a motion artifact | Check connections; limit patient movement.<br>Clear the alarm and retry NIBP. |
| Unable to determine NIBP; check connections and tubing. | The NIBP tubing has a kink | Check the connections and tubing for kinks. |

| Message | Possible cause | Suggested action |
|---|---|---|
| | | Clear the alarm and retry NIBP. |
| Incorrect NIBP cuff size; check patient type. | The cuff size is not correct | Check the patient type.<br>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.<br>Clear the alarm and retry NIBP. |
| Unable to determine NIBP; check inflation settings. | NIBP check inflation settings message | Check inflation settings and change as necessary.<br>Clear the alarm and retry NIBP. |
| | | Change the cuff inflation target (CIT). |
| Excessive patient movement. | NIBP measurements are not accurate because of artifact | Limit patient movement during blood pressure measurement. |
| Tube type does not match device configuration.<br>(NIBP measurement is available) | The tube connected to the NIBP sensor does not match the monitor's configuration | Use the tube specified for the monitor. |
| Tube type does not match device configuration.<br>(NIBP measurement is not available) | User is using a single-lumen tube with the following Advanced settings:<br>1. Patient type is Pediatric or Adult<br>2. Tube type is 2<br>3. Algorithm is SureBP | Clear message. Modify settings or tube use to match patient type. |

# SpO2 and SpHb messages

| Message | Possible cause | Suggested action |
|---|---|---|
| SpO2 not functional. Call for service. | A module error has occurred | Try a new cable/sensor pair.<br>Call for service. |
| Searching for pulse signal. (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 SpO2 alarm limits to OFF. |
| | | Reattach the SpO2 sensor to the patient's finger. |
| Attach SpO2 sensor to monitor. | The sensor was not detected | Check the sensor connection. |
| | | Replace the SpO2 sensor. |

| Message | Possible cause | Suggested action |
|---|---|---|
| Replace the SpO2 sensor. | The SpO2 sensor is faulty or expired | Replace the SpO2 sensor. |
| | No SpO2 sensor is connected | Connect an SpO2 sensor. |
| | The cable is faulty or expired | Replace the cable. |
| Replace the SpO2 cable. | The cable is faulty or expired | Replace the cable. |
| Low SpO2 signal quality. Check sensor. | Poor sensor placement on the patient | Remove the sensor from the patient and reapply. |
| Low SpHb signal quality. Check sensor. | Poor sensor placement on the patient | Remove the sensor from the patient and reapply. |
| Low perfusion. Check sensor. | Poor sensor placement on the patient | Remove the sensor from the patient and reapply. |
| 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…. | The SpO2 sensor will expire soon | Replace the SpO2 sensor. |

# Temperature messages

| Message | Possible cause | Suggested action |
|---|---|---|
| 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 retry. If a probe is already connected, replace the probe. |
| Insert correct color-coded probe well. | The probe well is missing | Insert a temperature probe well. |
| Replace temperature probe. | The probe is faulty | Replace the temperature probe. |
| Temperature not functional. Call for service. | A module error occurred | Call for service. |
| Temperature time limit exceeded. | The 10-minute timeout for temperature measurement has occurred | Remove the probe from the measurement site. |
| Tissue contact lost | The probe has lost contact with the patient's tissue | Reposition the probe to restore proper contact with the patient's tissue. |

| Message | Possible cause | Suggested action |
|---|---|---|
| Retry temperature measurement.<br>**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. |

# Weight scale messages

| Message | Possible cause | Suggested action |
|---|---|---|
| Weight scale not functional. Call for service. | The weight scale is not operating properly. | Call for service. |

# Physical assessment instrument 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. |
| | 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 platform handle controller PCBA is defective | Call service. |
| | The handle assembly is defective | Call service. |
| The lamp is too dim | The rheostat setting is too low | Increase the rheostat setting. |
| | The platform handle controller PCBA is defective | Call service. |
| | The handle assembly is defective | Call service. |
| The lamp is too bright | The rheostat setting is too high | Decrease the rheostat setting. |
| | The platform handle controller PCBA is defective | Call service. |
| | The handle assembly is defective | Call service. |
| The lamp brightness does not adjust | The platform handle controller PCBA is defective | Call service. |
| | The handle assembly is defective | Call service. |
| 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. |

# Patient data management messages

| Message | Possible cause | Suggested action |
|---|---|---|
| Maximum number of patient records saved. Oldest record overwritten. | The maximum number of patient records in the monitor's memory has been exceeded | On the Review tab, delete old records to prevent the alarm from appearing when new records are saved. |
| Unable to access patient information. | An error occurred when reading the patient list or patient record during startup | Power down and restart the monitor. If the error persists, call for service. |
| No data to save. | 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 | Call for service. |
| Clinician ID required to save data. | The configuration requires a clinician ID to save data | Call for service. |
| 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 monitor 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 | Call for service. |
| Unable to retrieve list. | The monitor is unable to retrieve a patient list from the network | Call for service. |
| Unable to identify clinician. | The clinician ID or password is incorrect | Confirm the clinician ID and password (if applicable), and retry. |

# Radio messages

| Message | Possible cause | Suggested action |
|---|---|---|
| Radio not functional. Call for service. | A hardware failure occurred (not currently used) | Call for service. |
| | The radio has the wrong software | |
| | The radio is not connected | |
| Radio error. Power down and restart. | The monitor and the radio failed to establish communication with each other | Power down and restart. If problem persists, call for service. |

| Message | Possible cause | Suggested action |
|---|---|---|
| Unable to establish network communications. Radio out of network range. | The radio is no longer communicating with the access point | Call for service. |
| Unable to establish network communications. Call for service. | Unable to get an IP address from the DHCP server | Call for service. |
| Communications module did not power on properly. Power down the device. (High-priority alarm) | Communication failure. | Call for service. |

# Ethernet messages

| Message | Possible cause | Suggested action |
|---|---|---|
| Network not found; check network cable connection. | A network cable is unplugged | Check the network cable connection. If problem persists, call for service. |
| | A network connection is broken elsewhere | |

# USB messages

| Message | Possible cause | Suggested action |
|---|---|---|
| USB Communication failure. Call for service. | An internal or external device is connected but failed enumeration | Call for service. |
| External device not licensed for use. | A license for an external device (e.g., barcode scanner) has not been activated | Disconnect the unlicensed device. |
| External device not recognized. | An unrecognized external device is connected | Disconnect the unrecognized device. |
| Incompatible Welch Allyn device. | A communication protocol failure has occurred | Call for service. |
| 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 |
|---|---|---|
| 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. |
| Ambient temperature outside operating range. Retry measurement. | The ambient temperature is out of range | Operate the monitor within the specified temperature range.<br>Retry patient temperature measurement. If the message |

| Message | Possible cause | Suggested action |
|---|---|---|
| | | persists, move the patient and the monitor to a cooler location. |
| Device shutdown is not available at this time. | Device cannot perform an immediate shutdown | Touch **OK**, wait, and retry. |
| Advanced settings unavailable | Sensors are taking measurements | Stop continuous measurements. |
| | A physiological alarm condition is active | Respond to or reset the alarm. |
| | Spot Check measurements have not been saved | Save the measurements. |
| Unable to load language. | Chinese did not load | Power down and restart the monitor. |
| Unexpected restart occurred. Call for service. | A system error caused the monitor to restart. | Call for service. |

# Battery power manager messages

| Message | Possible cause | Suggested action |
|---|---|---|
| Low battery 5 minutes or less remaining. (High-priority alarm) | Battery power is extremely low | Connect the monitor to AC power. (If not connected to AC power, the monitor powers down when AC power is depleted.) |
| Low battery 30 minutes or less remaining. | Battery power is low | Touch the alarm icon to dismiss or connect the monitor to AC power. |
| Powering down. Call for service. | Power manager or battery faults have occurred | Call for service. |
| Battery is absent or faulty. | There is no battery in the monitor | Insert a battery. |
| | The battery is faulty | Replace the battery. |
| Device is operating in battery mode. | The AC power cord has been disconnected | Touch **OK** to dismiss or connect the monitor to AC power. |

# Configuration Manager messages

| Message | Possible cause | Suggested action |
|---|---|---|
| Unable to load configuration; using factory defaults. | A configuration load error occurred | Call for service. |

| Message | Possible cause | Suggested action |
|---|---|---|
| Functional error. Call for service. | A critical configuration load error occurred | Call for service. |
| No connection for send. | The monitor is not configured to the network | Call for service. |

# Problems and solutions

The problems addressed in this table do not generate alarm or information messages on the monitor.

| Problem | Possible cause | Suggested action |
|---|---|---|
| No SpHb value is displayed | An SpO2-only cable is connected to the monitor | Replace the SpO2-only cable with an SpO2/SpHb (Masimo Rainbow) cable. |
| | The SpHb cable has expired<br>**Note** A technical alarm appears. | Replace the SpHb cable. |
| | Poor sensor placement on the patient | Remove the sensor from the patient and reapply. |
| | The monitor may have the SpHb license, but the SpO2 module does not | Contact Welch Allyn to verify that the SpO2 module contains the SpHb license. |
| No weight measurement is transferred from the scale to the monitor | The scale is not connected | Inspect the USB cables from the device to the adapter to the scale to ensure that they are connected properly. |
| | The scale setting is incorrect | Ensure that the scale settings are enabled for transfer. |

# Appendix

## Approved accessories

The following tables list approved wall system accessories and documentation. For information about options, upgrades, and licenses, refer to the service manual.

### FlexiPort® cuffs (Latex free)

| Part Number | Model | Description |
|---|---|---|
| Reuse-08 | Reusable | Cuff, reuse, SM CHILD, 2-tube |
| Reuse-09 | Reusable | Cuff, reuse, CHILD, 2-tube |
| Reuse-10 | Reusable | Cuff, reuse, SM AD, 2-tube |
| Reuse-11 | Reusable | Cuff, reuse, ADULT, 2-tube |
| Reuse-11L | Reusable | Cuff, reuse, AD LONG, 2-tube |
| Reuse-12 | Reusable | Cuff, reuse, LG AD, 2-tube |
| Reuse-12L | Reusable | Cuff, reuse, LG AD LONG, 2-tube |
| Reuse-13 | Reusable | Cuff, reuse, THIGH, 2-tube |
| Soft-08 | Disposable | Cuff, soft, SM CHILD, 2-tube (box of 20) |
| Soft-09 | Disposable | Cuff, soft, CHILD, 2-tube (box of 20) |
| Soft-10 | Disposable | Cuff, soft, SM AD, 2-tube (box of 20) |
| Soft-11 | Disposable | Cuff, soft, ADULT, 2-tube (box of 20) |
| Soft-11L | Disposable | Cuff, soft, AD LONG, 2-tube (box of 20) |
| Soft-12 | Disposable | Cuff, soft, LG AD, 2-tube (box of 20) |
| Soft-12L | Disposable | Cuff, soft, LG AD LONG, 2-tube (box of 20) |
| Soft-13 | Disposable | Cuff, soft, THIGH, 2-tube (box of 20) |
| 5082-101-1 | Disposable | Neo-1 disposable cuff, male luer connector (box of 10 cuffs) |

| Part Number | Model | Description |
|---|---|---|
| 5082-102-1 | Disposable | Neo-2 disposable cuff, male luer connector (box of 10 cuffs) |
| 5082-103-1 | Disposable | Neo-3 disposable cuff, male luer connector (box of 10 cuffs) |
| 5082-104-1 | Disposable | Neo-4 disposable cuff, male luer connector (box of 10 cuffs) |
| 5082-105-1 | Disposable | Neo-5 disposable cuff, male luer connector (box of 10 cuffs) |
| 008-0851-00 | Disposable | Neonatal Cuff Kit, (1 each neo #1 — 5, reusable infant cuff, NIBP hose) |

## Blood pressure accessories (Latex free)

| Part Number | Model | Description |
|---|---|---|
| 4500-30 | SureBP | Double tube blood pressure hose (5 ft) |
| 4500-31 | SureBP | Double tube blood pressure hose (10 ft) |
| 4500-32 | SureBP | Double tube blood pressure hose (8 ft) |
| 6000-30 | BP | Single tube blood pressure hose (5 ft) |
| 6000-31 | BP | Single tube blood pressure hose (10 ft) |
| 6000-33 | BP | Neonatal blood pressure hose (10 ft) |
| 5200-08 | | Calibration "T" connector |

## Masimo pulse oximetry (for use with devices with SpO2)

| Part Number | Model | Description |
|---|---|---|
| LNOP-DCI | LNOP | Reusable finger sensor - Adult |
| LNOP-DCIP | LNOP | Reusable finger sensor - Pediatric |
| PC-04 | LNOP | 4-foot cable with sensor connector |
| PC-08 | LNOP | 8-foot cable with sensor connector |
| LNCS-DCI | LNCS | Reusable finger sensor - Adult |
| LNCS-DCIP | LNCS | Reusable finger sensor - Pediatric |
| LNCS-ADTX | LNCS | Disposable adhesive finger sensor - Adult (20 per case) |
| LNCS-PDTX | LNCS | Disposable adhesive finger sensor - Pediatric (20 per case) |
| RED LNC-10 | LNCS | 10-foot cable with sensor connector |
| LNCS-YI | LNCS | Multisite reusable sensor (1 sensor, 6 adhesive wraps) |

| Part Number | Model | Description |
|---|---|---|
| LNCS-TC-I | LNCS | Reusable ear sensor |
| LNCS-Neo-L-3 | LNCS | Disposable adhesive finger sensor - Neonate/Adult (20 per case) |
| Neo-Wrap-RP | LNCS | Replacement wrap for neonatal adhesives (100 per case) |
| LNCS-Inf-3 | LNCS | Disposable adhesive finger sensor - Infant (20 per case) |
| Inf-Wrap-RP | LNCS | Replacement wrap for infant adhesives (100 per case) |
| YI-AD | LNCS | Multisite adhesive wrap adult/pediatric/neonatal for YI sensor (100 per case) |
| YI-FM | LNCS | Multisite foam wrap adult/pediatric/neonatal for YI sensor (12 per case) |

## Masimo Rainbow SET (for use with devices with SpO2 and SpHb)

| Part Number | Model | Description |
|---|---|---|
| 104220 | Rainbow | Adult reusable sensor and 3-foot cable |
| 104360 | Rainbow | ReSposable R2-25 sample pack |
| 104149 | Rainbow | Extension cable, 20 pin, 12 feet |

## Nellcor pulse oximetry

| Part Number | Model | Description |
|---|---|---|
| DS-100A | OxiMax | Durasensor adult oxygen transducer |
| DOC-10 | OxiMax | Extension cable (10 feet) |
| DOC-8 | OxiMax | Extension cable (8 feet) |
| DOC-4 | OxiMax | Extension cable (4 feet) |
| D-YS | OxiMax | Dura-Y oxygen transducer (1 sensor, 40 wraps) |
| D-YSE | OxiMax | Ear clip (use with Dura-Y sensor) |
| D-YSPD | OxiMax | PediCheck pediatric spot check (use with Dura-Y sensor) |
| MAX-AI | OxiMax | OxiMax adult sensor (single use, case of 24) |
| MAX-PI | OxiMax | OxiMax pediatric sensor (single use, case of 24) |
| MAX-II | OxiMax | OxiMax infant sensor (single use, case of 24) |
| OXI-A/N | OxiMax | Oxiband adult/neonatal transducer (1 sensor, 50 wraps) |

| Part Number | Model | Description |
|---|---|---|
| OXI-P/I | OxiMax | Oxiband pediatric/infant transducer (1 sensor, 50 wraps) |

## SureTemp® Plus thermometry

| Part Number | Description |
|---|---|
| 02895-000 | Oral probe and well kit (9ft., 2.7M) |
| 02895-100 | Rectal probe and well kit (9ft., 2.7M) |
| 02894-0000 | Oral probe well (blue) |
| 02894-1000 | Rectal probe well (red) |
| 05031-101 | Disposable probe covers (1,000 covers, packaged 25/box) |
| 05031-110 | Disposable probe covers (10,000 covers, packaged 25/box) |
| 06138-000 | Temperature calibration key |

## Braun ThermoScan® PRO 4000 thermometry

| Part Number | Description |
|---|---|
| 53020-0000 | Rechargeable battery pack for the thermometer |
| 05075-005 | Disposable probe covers (5,000 covers, packaged 20/box) |
| 05075-800 | Disposable probe covers (800 covers, packaged 20/box) |

## Physical assessment instruments

| Part Number | Description |
|---|---|
| **Otoscopes** | |
| 23810 | MacroView™ otoscope |
| 23820 | MacroView™ otoscope with throat illuminator |
| 23814 | MacroView™ otoscope with insufflation bulb |
| 23824 | MacroView™ otoscope with throat illuminator and insufflation bulb |
| 25020 | Diagnostic otoscope with specula |
| 25021 | Diagnostic otoscope with insufflation bulb |

| Part Number | Description |
|---|---|
| 20201 | Pneumatic otoscope without specula |
| 20200 | 3.5V pneumatic otoscope with specula |
| 20250 | 3.5V pneumatic otoscope with 12-diopter lens and specula |
| 20251 | Pneumatic otoscope with 12-diopter lens |
| 21700 | 3.5V operating otoscope with specula |
| 21701 | 3.5V operating otoscope without specula |
| **Specula and specula dispensers** | |
| 52432-U | 2.75 mm Universal KleenSpec® disposable ear specula (case of 10 bags, 850/bag) |
| 52434-U | 4.25 mm Universal KleenSpec® disposable ear specula (case of 10 bags, 850/bag) |
| 52100-PF | Dispenser (full), large ear specula |
| 52400-PF | Dispenser (full), small ear specula |
| **Ophthalmoscopes** | |
| 11810 | Panoptic ophthalmoscope |
| 11820 | Panoptic ophthalmoscope with cobalt blue filter and add-on corneal viewing lens |
| 11710 | Standard ophthalmoscope |
| 11720 | Coaxial ophthalmoscope |
| 11730 | AutoStep® coaxial ophthalmoscope |
| 11735 | Prestige coaxial-plus ophthalmoscope |
| **Illuminators** | |
| 41100 | Finnoff ocular transilluminator |
| 41101 | Finnoff ocular transilluminator with cobalt blue filter |
| 43300 | Curved all-purpose transilluminator |
| 26535 | Nasal illuminator (section only) |
| 26538 | Complete nasal illuminator |
| 26035 | Bivalve nasal speculum |
| 26038 | Bivalve nasal speculum with illuminator |
| 27000 | Larynx illuminator |

| Part Number | Description |
|---|---|
| 27050 | Nasopharynx illuminator |
| 28100 | Tongue blade holder |
| **Lamps** | |
| 03100-LED | LED replacement lamp |
| 06500-LED | LED replacement lamp |
| 04900-LED | LED replacement lamp |
| 03800-LED | LED replacement lamp |
| 03100-U | Halogen replacement lamp |
| 06500-U | Halogen replacement lamp |
| 04900-U | Halogen replacement lamp |
| 03800-U | Halogen replacement lamp |

## Weight scales and connectivity kits

For a list of approved weight scales and connectivity kits, go to www.welchallyn.com.

## Miscellaneous accessories

| Part Number | Description |
|---|---|
| BATT33 | Replacement battery |
| PWCD-B | Line cord B, North America, 8' |
| PWCD-2 | Line cord 2, Europe, 8' |
| PWCD-4 | Line cord 4, United Kingdom, 8' |
| PWCD-6 | Line cord 6, Australia/New Zealand,8' |
| PWCD-7 | Line cord 7, South Africa, 8' |
| 6000-NC | Nurse Call Cable |
| 6000-915 | 2D barcode scanner kit --scanner, mounting bracket, hardware |
| 6000-915HS | HS1-M 2D barcode scanner with coiled USB |
| 4500-925 | USB cable for wired connectivity |
| 660-0321-00 | Patch cable, 50' |

| Part Number | Description |
|---|---|
| 660-0320-00 | Patch cable, 100' |
| 660-0138-00 | Patch cable, 5' |
| 104279 | Connex IWS shipping box |
| 6000-50 | USB memory stick |

## Service

| Part Number | Description |
|---|---|
| 103371 | Barcode license |
| **Partnership Programs for Global Use** | |
| S1-CIWS | One-year Comprehensive Partnership Program |
| S1-CIWS-2 | Two-year Comprehensive Partnership Program |
| S2-CIWS | One-year Biomed Partnership Program |
| S2-CIWS-2 | Two-year Biomed Partnership Program |
| **Technical Training** | |
| CIWSSERREPW-TRN | Technical online training for Biomeds |
| CIWSSERREP-TRN | Technical onsite training for Biomeds |
| **International Only** | |
| PRV-001 | Preventive SVC WA bench per unit |
| PRV-002 | Preventive SVC planned onsite per unit |
| S4-CIWS | One-year Extended Warranty |
| S4-CIWS-2 | Two-year Extended Warranty |

## Literature/Documentation

| Part Number | Description |
|---|---|
| 104066 | CD, Directions for Use (Multi-lingual), Service Manual (English only) |
| 4600-90E | Blood Pressure Accuracy and Variability Card-English |
| **Directions for Use** | |

| Part Number | Description |
|---|---|
| 104069 | Directions for Use, Connex Integrated Wall System, Printed Copy, English |
| 104091 | Directions for Use, Connex Integrated Wall System, Printed Copy, Spanish |
| 104492 | Directions for Use, Connex Integrated Wall System, Printed Copy, French |
| 105030 | Directions for Use, Connex Integrated Wall System, Printed Copy, German |
| 105031 | Directions for Use, Connex Integrated Wall System, Printed Copy, Swedish |
| 105032 | Directions for Use, Connex Integrated Wall System, Printed Copy, Polish |
| 105033 | Directions for Use, Connex Integrated Wall System, Printed Copy, Dutch |
| 105034 | Directions for Use, Connex Integrated Wall System, Printed Copy, Italian |
| 105035 | Directions for Use, Connex Integrated Wall System, Printed Copy, Danish |
| 105036 | Directions for Use, Connex Integrated Wall System, Printed Copy, Portuguese |
| 105037 | Directions for Use, Connex Integrated Wall System, Printed Copy, Greek |
| 105038 | Directions for Use, Connex Integrated Wall System, Printed Copy, Norwegian |
| 105039 | Directions for Use, Connex Integrated Wall System, Printed Copy, Finnish |
| **Quick Reference Card** | |
| 104067 | Quick Reference Card, Connex Integrated Wall System, English |
| 104068 | Quick Reference Card, Connex Integrated Wall System, Spanish |
| 104491 | Quick Reference Card, Connex Integrated Wall System, French |
| 105028 | Quick Reference Card, Connex Integrated Wall System, German |
| 105040 | Quick Reference Card, Connex Integrated Wall System, Swedish |
| 105041 | Quick Reference Card, Connex Integrated Wall System, Polish |

| Part Number | Description |
|---|---|
| 105042 | Quick Reference Card, Connex Integrated Wall System, Dutch |
| 105043 | Quick Reference Card, Connex Integrated Wall System, Italian |
| 105044 | Quick Reference Card, Connex Integrated Wall System, Danish |
| 105045 | Quick Reference Card, Connex Integrated Wall System, Portuguese |
| 105046 | Quick Reference Card, Connex Integrated Wall System, Greek |
| 105047 | Quick Reference Card, Connex Integrated Wall System, Norwegian |
| 105048 | Quick Reference Card, Connex Integrated Wall System, Finnish |
| **Service Manual (English only)** | |
| 104092 | Service Manual, Connex Integrated Wall System, English |

# Warranty

Welch Allyn warrants the product to be free of defects in material and workmanship and to perform in accordance with manufacturer's specifications for the period of one year from the date of purchase from Welch Allyn or its authorized distributors or agents. The coiled cords carry a special 10-year warranty against breakage during normal usage.

The warranty period shall start on the date of purchase. The date of purchase is: 1) the invoiced ship date if the device was purchased directly from Welch Allyn, 2) the date specified during product registration, 3) the date of purchase of the product from a Welch Allyn authorized distributor as documented from a receipt from said distributor.

This warranty does not cover damage caused by: 1) handling during shipping, 2) use or maintenance contrary to labeled instructions, 3) alteration or repair by anyone not authorized by Welch Allyn, and 4) accidents.

The product warranty is also subject to the following terms and limitations: Accessories are not covered by the warranty. Refer to the directions for use provided with individual accessories for warranty information.

A service notification number must be obtained from Welch Allyn prior to returning any products or accessories to Welch Allyn's designated service centers for repair. To obtain a service notification number, contact Welch Allyn Technical Support.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. WELCH ALLYN'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF PRODUCTS CONTAINING A DEFECT. WELCH ALLYN IS NOT RESPONSIBLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM A PRODUCT DEFECT COVERED BY THE WARRANTY.