SPACELABS HEALTHCARE
An OSI Systems Company

Ultraview® DM3 Monitor

91330

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OPERATIONS MANUAL

Spacelabs Healthcare considers itself responsible for the effects on safety, reliability and performance of the equipment only if:

- *assembly operations, re-adjustments, modifications or repairs are carried out by persons authorized by Spacelabs Healthcare, and*
- *the electrical installation of the relevant room complies with the requirements of the standard in force, and*
- *the equipment is used in accordance with the operations manual.*

Spacelabs Healthcare will make available, on request, such circuit diagrams, component part lists, descriptions, calibration instructions or other information which will assist appropriately qualified technical personnel to repair those parts of the equipment which are classified by Spacelabs Healthcare as field repairable.

Spacelabs Healthcare is committed to providing comprehensive customer support beginning with your initial inquiry through purchase, training, and service for the life of your Spacelabs Healthcare equipment.

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- **Rx Only** U.S. Federal law restricts the devices documented herein to sale by or on the order of a physician.
- Before use, carefully read the instructions, including all warnings and cautions.

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Introduction

Overview

The Ultraview® DM3 monitor is a lightweight, compact dual-mode monitor with a 17.78 cm (7 inch) touchscreen display. Designed for bedside and portable usage, it monitors SpO_2, pulse rate, NIBP, and temperature. You can use the monitor to perform a spot check of these parameters or to provide continuous monitoring.

Before using the monitor, be sure to read carefully and understand all sections of this Ultraview DM3 Operations Manual. Failure to read and understand the instructions may lead to misuse of the monitor, which could result in harm to patients.

This guide contains warnings, cautions, and notes to help call your attention to the most important safety and operational aspects of the system. To help identify these items when they occur in the text, they are shown using the following typographical conventions:

	***Statements that call attention to the possibility of injury, death, or other serious adverse reactions associated with the use or misuse of the device.***

	**Statements that call attention to the possibility of a problem with the device associated with its use or misuse. Such problems include device malfunction, device failure, damage to the device or damage to other property.**

Note:

Statements that provide supplemental information.

Indications for Use

The Ultraview DM3 monitor is indicated for use by healthcare professionals for monitoring patient vital signs in a healthcare facility.

Intended Use

The Ultraview DM3 monitor is intended for monitoring, recording, and alarming basic vital signs on adult and pediatric patients. Monitored parameters include SpO_2, pulse rate, NIBP, and temperature. Manually entered parameters include respiration rate and temperature.

Patient Preparation

To prepare a patient for monitoring, attach the sensors to the patient and connect the sensor cables to the monitor. Refer to the parameter chapters for additional information on patient preparation.

Warnings and Cautions

- ***Visually inspect all patient cables or sensors each time the unit is used. Check for worn or damaged plastic covering, frayed or broken wires, cracked connections, or any other signs of damage. Do not use cables or sensors that exhibit obvious damage.***
- ***If the equipment is dropped, abused, or damaged in any way (if the monitor becomes wet, for example), a qualified field service engineer or biomedical engineer must verify that the unit is working correctly and that all safety features are intact.***
- ***Because of the potential for electromagnetic interference (EMI), electronic devices (for example, portable communication transmitters, cellular telephones, personal computers, electronic toys, and other medical devices) should not be operated within 3.5 feet (1.07 m) of the patient and associated monitoring equipment until the devices can be evaluated by the biomedical engineering staff.***
- ***The Ultraview DM3 monitor is not intended for use in the following cases:***
  - ***Neonates and infants less than one year of age***
  - ***in an MRI environment***

- *ELECTROSURGERY. The Ultraview DM3 monitor is suitable for use in the presence of electrosurgical (ESU) equipment. The following precautions should be taken:*
  - *To minimize the risk of patient burns, only use ESU equipment that monitors the impedance of the ESU return wires.*
  - *Users should be properly trained in the operation of the ESU equipment.*
  - *Keep patient-applied cables off earth ground and away from the ESU knife and return wires.*
  - *Only use Spacelabs Healthcare approved accessories.*
- *FLAMMABLE ANESTHETICS. An explosion hazard exists if the monitor is used in the presence of flammable anesthetics.*
- *ANESTHESIA PATIENTS. Constant attention by a clinician is required whenever a patient is under anesthesia or connected to a ventilator.*
- *ALARM MONITORING. Failure to respond to alarms that are annunciated may result in delayed care and treatment as well as possible harm.*
- *BATTERY HANDLING. The Ultraview DM3 monitor contains a lithium ion coin cell battery and transport battery pack. The following precautions should be taken regarding these batteries:*
  - *Do not immerse in water.*
  - *Do not heat or throw in fire.*
  - *Do not leave in conditions over 60°C or in a heated car.*
  - *Do not attempt to crush or drop.*
  - *Only use the battery pack with the Ultraview DM3 monitor.*
  - *Follow the instructions in the Ultraview DM3 Service Manual when the Ultraview DM3 monitor is taken out of service or when the battery reaches the end of its useful life and must be replaced.*
- *AUDIBLE TONES. The Ultraview DM3 monitor will sound startup tones whenever it is powered ON. If the unit does not sound the startup tones when it is powered ON, remove the unit from service and contact Spacelabs Healthcare Technical Support.*
- *DEFIBRILLATION. Remove the temperature probe from the patient before applying defibrillation energy.*

⚠	• **For continued operation, always connect the monitor to a wall outlet when a Low Battery alarm indication occurs. Failure to do this can lead to an interruption of monitoring.** • **Do not operate the Ultraview DM3 monitor near high frequency emissions.** • **The Ultraview DM3 monitor is for indoor use only.** • **No modification of this equipment is allowed.** • **The Ultraview DM3 monitor is designed to function on the facility's Ethernet network. If the network includes non-Spacelabs equipment, please consider the risks that can be introduced when there is heavy network traffic or changes in network configuration, such as the inability of the Ultraview DM3 monitor to communicate with the Spacelabs Gateway.**

Notes:

- *The battery may need to be recharged if the Ultraview DM3 monitor has been powered OFF for an extended period of time.*
- *Single Use devices should not be reused.*
- *The Ultraview DM3 monitor complies with IEC 60601-1. Please refer to this standard for the requirements of medical electronic systems.*

Monitor and System Connections

Physical Connections (Front)

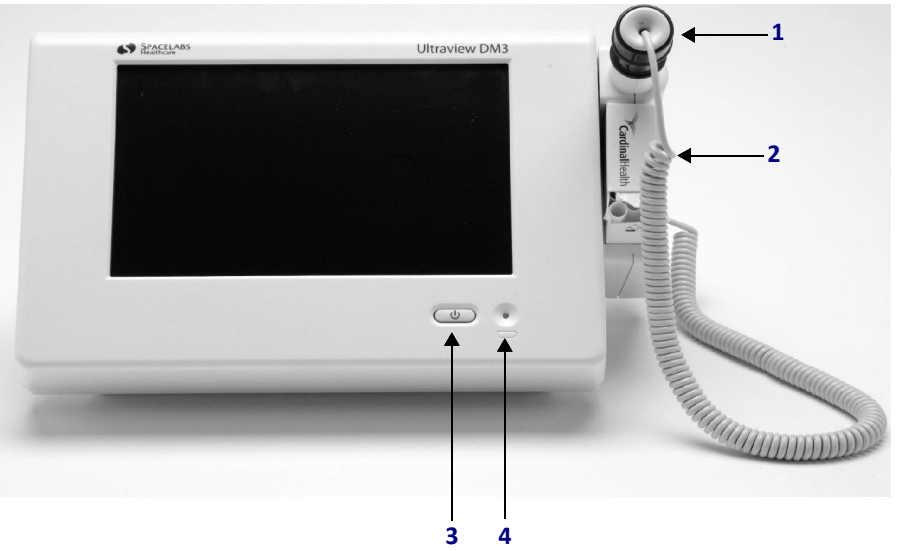


Figure 1-1 Ultraview DM3 Monitor (Front View)

1 Temperature probe well (for storage). Applies only to units configured with Temperature (91330-T).

2 Receptacle for box of temperature probe covers. Applies only to units configured with Temperature. (91330-T)

3 Power button

4 Battery charging indicator

Physical Connections (Back)

Figure 1-2 Ultraview DM3 Monitor (Back View)

1 Cable retention channel for temperature probe. Applies only to units configured with Temperature (91330-T). (During initial installation, thread the temperature probe cable through the channel. This will help provide strain relief.)

2 Temperature probe connector. Applies only to units configured with Temperature (91330-T).

3 Power supply connector

4 USB connector

5 Strip chart recorder connector

6 Carrying handle

7 SpO_2 adapter cable connector

8 Ethernet connector. Allows patient data transmission (wired or wireless using DM3 Wireless Adapter) for viewing in Intesys Clinical Suite (ICS) G2 Clinical Access Trends, or in a hospital EMR through the ICS HL7 interface (Requires DM3 version 1.5 or newer, and ICS G2 version 4.02.02 or newer).

Physical Connections (Left Side)

Figure 1-3 Ultraview DM3 Monitor (Left View)

1 SpO_2 adapter cable connector. A specific adapter cable must be used for each respective SpO_2 option: Spacelabs (91330-S), Masimo SET (91330-M), and Nellcor OxiMax (91330-N) SpO_2. Refer to the Accessories chapter for a complete list.

2 NIBP hose connector

Main Screen

Figure 1-4 shows the components of the monitor main screen in SPOT mode.
Figure 1-5 shows the components of the monitor main screen in MON mode.

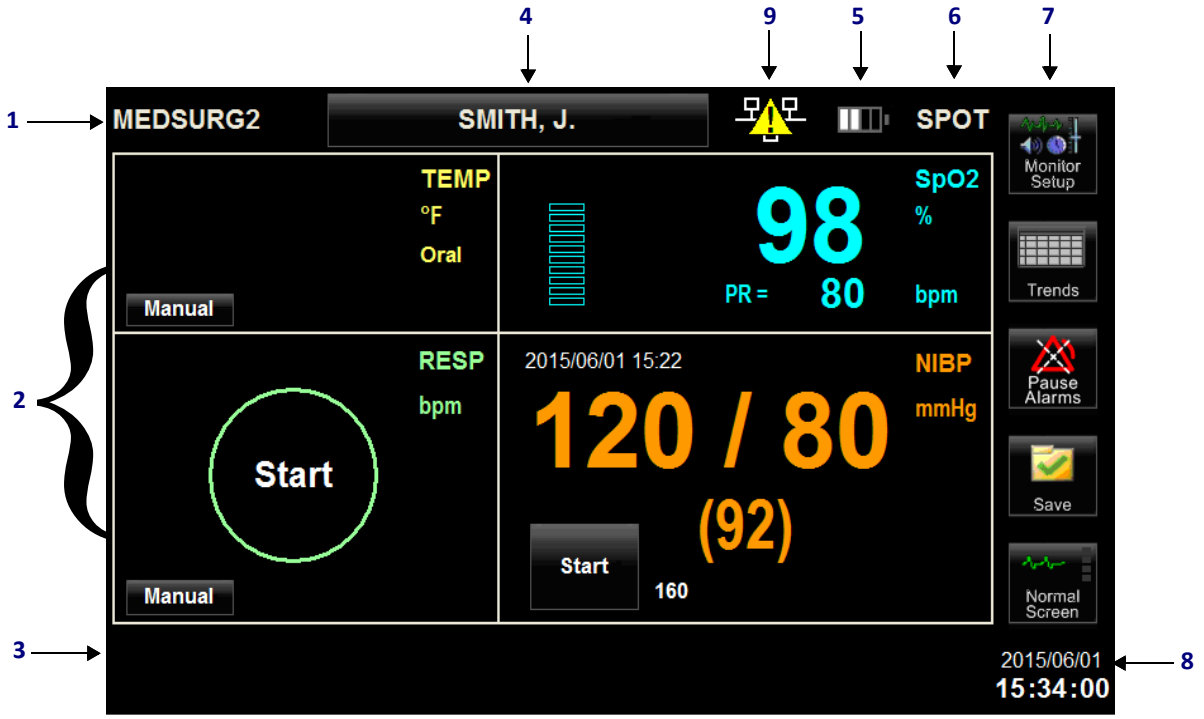


Figure 1-4 Ultraview DM3 Monitor Main Screen (SPOT Mode)

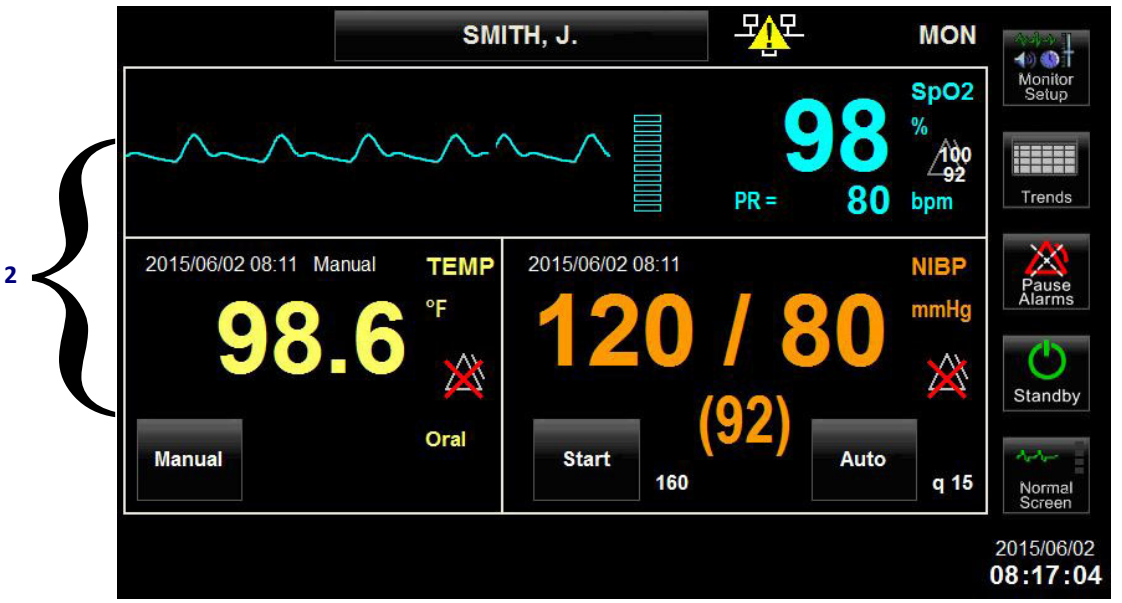


Figure 1-5 Ultraview DM3 Monitor Main Screen (MON Mode)

1 Device ID. Using the **Biomedical** menu, this field can be configured to display up to 10 alphanumeric characters. (For more information on the **Biomedical** menu, refer to the Ultraview DM3 Service Manual.)

2 Display areas for parameter zones. In SPOT mode, clockwise from upper left are Temperature, SpO_2, NIBP, and Respiration. In MON mode, clockwise from upper left are SpO_2, NIBP, and Temperature.

3 Message area. Alarm and technical condition messages are displayed here, and one message is displayed at a time. If multiple messages are active, each message is displayed for approximately 3 seconds at a time. (For more information on alarm messages, refer to *Alerts and Alarms* on page 3-1.)

4 Patient ID area. Using the **Clinical** menu, the Ultraview DM3 monitor can be configured to display the patient identification as: Patient ID; last name, first initial; first name, last initial; blank. (For more information on the **Clinical** menu, refer to the Ultraview DM3 Service Manual.)

Note:

If configured to be left blank, the Patient ID key will not appear. Patient demographics and the Discharge key must then be accessed through the Patient Demographic Data key in the Monitor Setup menu.

5 Gauge showing approximate battery capacity. This is always present when the monitor is operating on battery power (powered ON and not operating on AC power).

6 Current Ultraview DM3 monitor operating mode: SPOT (Spot Check) or MON (Monitoring).

7 Monitor function keys, as described in *Touchscreen Keys* on page 1-9

8 Current date and time. The date format can be configured in the **Biomedical** menu. Time is always displayed in 24-hour format. (For more information on the **Biomedical** menu, refer to the *Ultraview DM3 Service Manual*.)

9 Network connection status. This indicates if the DM3 has a network connection and whether it is connected to ICS G2 for data transmission.

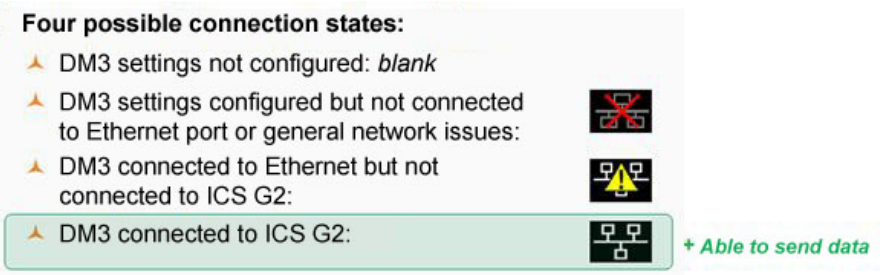


Figure 1-6 Network Connection Status Icons

Note:

You must manually update the system clock time on DM3 monitors to reflect time changes resulting from Daylight Saving Time (DST). However, if your DM3 monitors are connected to ICS G2 (v4.02.02 or newer) on a network, the DM3 system clock is automatically synchronized to network time, which updates to DST automatically.

Touchscreen Keys

Spacelabs Healthcare monitors use touchscreen keys to execute monitoring functions. They are located in a vertical row along the right side of the monitor's display. Touchscreen keys are always visible and perform specific functions regardless of the parameter being monitored.

	Provides protected access to the **Clinical**, **Biomedical**, and **Service** menus. Operating mode can also be changed within this menu. In MON mode only, the screen saver can be activated.
	Displays trend data. For more information, refer to *Trends* on page 8-1.
	Pauses all alarms temporarily (tones and messages) for three minutes. After it is touched, the key updates to **Resume Alarms**, and no alarms are presented for three minutes. For more information, refer to *Alerts and Alarms* on page 3-1.
	Restores alarm presentation capabilities before the three-minute Pause Alarm period has expired.
	Stores the current patient's physiologic measurements as well as supplemental data, such as demographics and modifiers (SPOT mode only).
	Places the monitor into a standby mode where the monitor suspends all monitoring for the current patient, including alarm presentation and data storage (MON mode only). For more information, refer to *Standby Mode (MON Mode Only)* on page 2-8.
	Returns the monitor at any time to the normal screen.

Basic Operations

Overview

This chapter gives basic information on how to use the Ultraview DM3 monitor. It describes the basic components, how to power the monitor on and off, and how to use the monitor to collect patient vital signs.

Components

Each Ultraview DM3 monitor is packaged to include the following:

- Ultraview DM3 monitor
- External AC power supply with integrated power cable
- Oral/Axillary temperature probe and two boxes of disposable probe covers (20 pieces per box). Applies only to units configured with Temperature (91330-T).
- SpO_2 adapter cable and finger sensor
- NIBP hose and reusable cuff
- Product documentation CD
- Launch Card

Additional accessories are available for separate ordering. For more information, see *Accessories* on page 12-1.

Default Settings

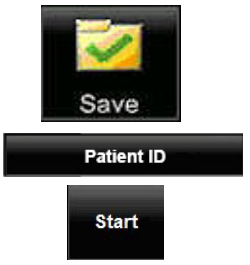
The Ultraview DM3 monitor is shipped with factory defaults for various settings, which can be adjusted to meet certain patient needs.

Departments can customize the factory default settings in the **Clinical** menu and save these as the user defaults, as described in the *Ultraview DM3 Service Manual*. The monitor will then subsequently power ON with the user defaults instead of the factory defaults. If any settings are adjusted for a particular patient or need (for example, NIBP initial inflation pressure is adjusted from a default of 160 mmHg to 210 mmHg), the Ultraview DM3 monitor will revert back to default settings upon discharge of that patient or admission of a new patient (which causes the current patient to be discharged).

Touchscreen Controls

With the exception of the power button on the front of the monitor, all monitor controls are achieved using touchscreen interaction with the various display controls as shown in *Table 2-1*.

Table 2-1 Touchscreen Controls

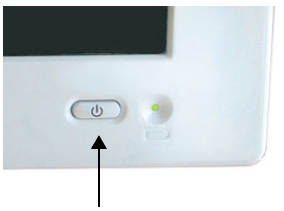
Description	Example	Explanation
Action keys		• Black keys, typically with text displayed, but can also be without text (for example, Patient ID key). • May produce an immediate action as described (such as **Start**), or may cause a window to appear (such as **First Name**) or disappear (such as **OK** or **Cancel**).
Drop-down selection keys		• These keys typically appear within a **Setup** menu. • Touching the key causes a drop-down list to display. Touch the desired choice to enable that setting.
No/Yes settings keys		• Touch the selection you want to highlight that setting.
Numeric settings adjustment keys		• Touch the up/down keys to increase/decrease the displayed numeric setting until you reach the setting you want. • Touch and hold either key to increase the setting more quickly.
Parameter zone menus		• With the exception of any black action keys that are displayed, touch any other area within a parameter zone to get access to the **Setup** menu for that parameter.

Powering the Monitor On and Off

- **Before powering on, make sure that the Ultraview DM3 monitor is placed in a location that does not interfere with patient care.**
- **If connecting the Ultraview DM3 monitor to a new patient, clean the unit according to the instructions in *7*.**
- **Use only the power supply approved for use with the Ultraview DM3 monitor.**

To power ON the monitor

1. (If not running on battery power) Plug the power supply into a live outlet. Plug the power cable into the power connector on the back of the device.
2. Power ON the device: Press the power button located on the lower-right corner on the front of the monitor. You will hear startup tones.



The monitor main screen displays, as shown in *Figure 2-1*.

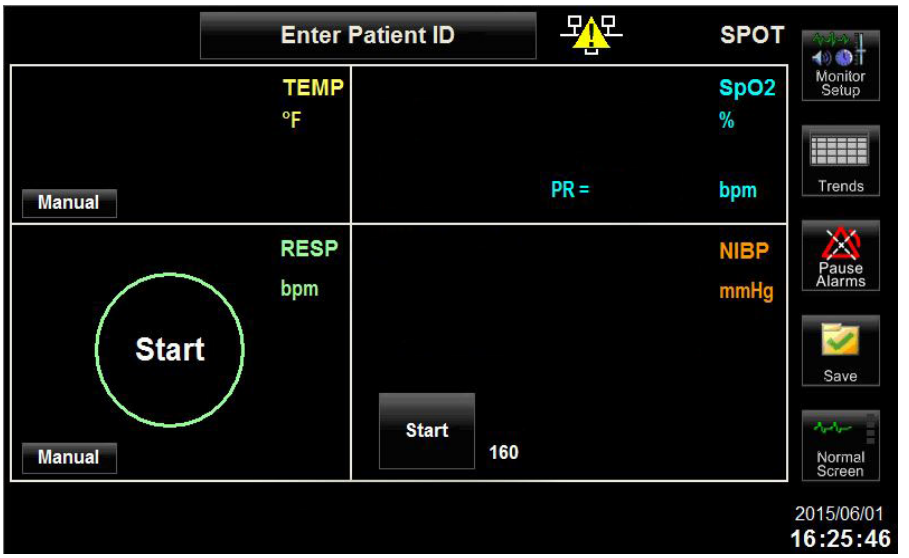


Figure 2-1 Main Screen upon Startup

To power OFF the monitor

1. Press and hold the power button located on the lower-right corner of the front of the monitor (the same one used to power on the device). Keep the button pressed down until you see this message: **Monitor is shutting down now. Please wait...**

   The monitor will then shut down shortly.

2. Keep the power supply connected to a wall outlet even when the monitor is not in use to allow the battery to maintain a full charge.

Checklist Before Connecting to Patient

The following is a general checklist. Connections from the monitor to the patient vary by parameter. Refer to the appropriate parameter chapter for instructions.

Inspect the monitor and connectors each time the unit is used. Check all patient cables and sensors for worn or damaged plastic covering, frayed or broken wires, cracked connections, or any other signs of damage. Do not use any equipment that shows obvious damage.

Before connecting the monitor to a patient

1. Power ON the unit and make sure that you hear startup tones.
2. Confirm that the display comes up, showing the Ultraview DM3 monitor main screen.

If you see any problems while you perform the previous steps, take the monitor out of service and contact Spacelabs Healthcare Technical Support.

Before leaving the patient, make sure that the monitor, the power supply, and all the cables are secure and not hanging in a way that would be hazardous to the patient or to someone caring for the patient.

Entering Patient Demographics

You can enter patient demographics either before or after you take measurements.

Note:

If you attach a patient to both a DM3 device and telemetry transmitter, admit the patient to the telemetry transmitter and bed first. This prevents the hospital database from detecting the patient as a duplicate.

To enter patient demographics

1 From the main screen, touch the **Enter Patient ID** key at the top of the window.

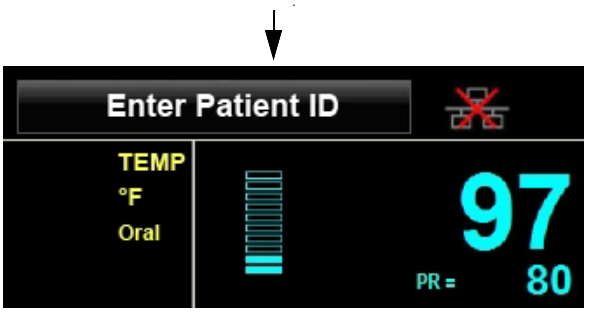


Figure 2-2 Patient ID Key on Main Screen

The **Patient Demographic Data** window shows. Use this window to enter basic information about the patient.

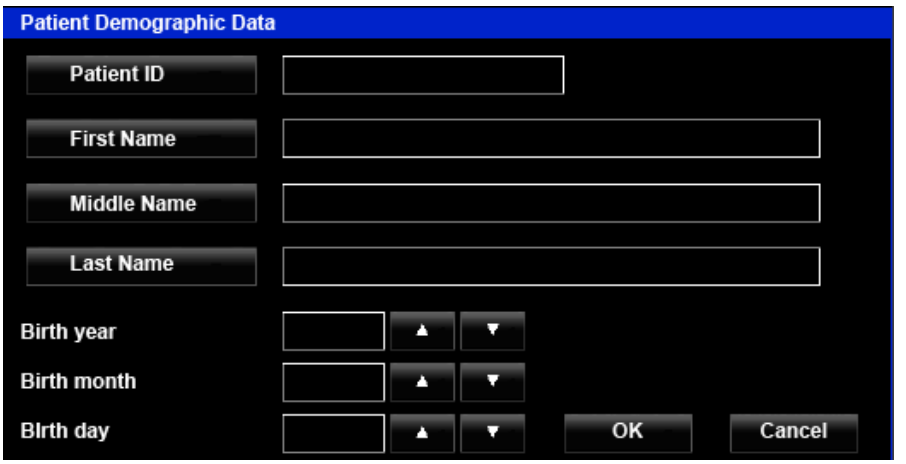


Figure 2-3 Demographics Window for Patient Information

2 To enter the patient identification number, touch the **Patient ID** key. An onscreen keyboard shows.

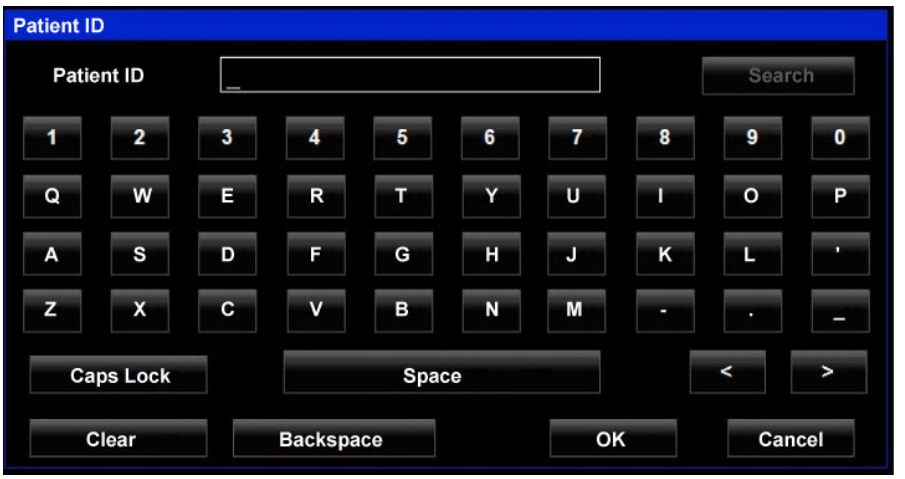


Figure 2-4 Patient ID Window

Notes:

- *In SPOT mode, entry of patient demographic data can also be done as part of the process for saving a spot-check record. Touch Save to begin. If no Patient ID has been entered prior to the patient record being saved (when the Patient ID modifier is set to Optional in the Clinical menu), the Ultraview DM3 monitor can create an automatic ID.*
- *In MON mode, the Ultraview DM3 monitor creates an automatic ID upon exiting the Discharge Mode screen following discharge of the previous patient. This can be edited by accessing the **Patient Demographic Data** window.*

3 Touch the appropriate keys to enter the patient's identification number. Touch **OK** when done.

The **Patient ID** field supports user entry of up to 20 characters, which can be fully displayed in the **Patient ID** key when the Patient ID format is set to Patient ID within the **Clinical** menu, as described in the *Ultraview DM3 Service Manual*.

Patient identification can be entered using either the onscreen keyboard or an approved, properly configured USB barcode scanner to scan the patient's identification number from a printed barcode strip, such as on a patient bracelet.

If a networked hospital database recognizes the **Patient ID**, the DM3 monitor automatically populates the remaining patient identification fields.

4 To enter the patient first name, middle name, and last name, repeat steps 2 and 3 using the corresponding keys.

5 To enter the patient's date of birth, use the up/down adjustment keys that correspond with the displayed settings for **Birth year**, **Birth month**, and **Birth day**.

6 After you are done, touch **OK**.

Setting Operating Modes

The Ultraview DM3 monitor has two operating modes: **Spot check** and **Monitoring**. The current operating mode appears in the upper-right device status area of the main screen. **SPOT** indicates spot check mode, and **MON** indicates monitoring mode.

Note:

Throughout this manual, spot check mode is called SPOT mode, and monitoring mode is called MON mode.

Upon changing from SPOT to MON mode, the monitor automatically creates a new patient record and clears any previous MON patient data, including demographics and trended measurements.

Upon changing from MON to SPOT mode, all previously saved SPOT measurements (up to 1,000) are retained for review in SPOT Trends.

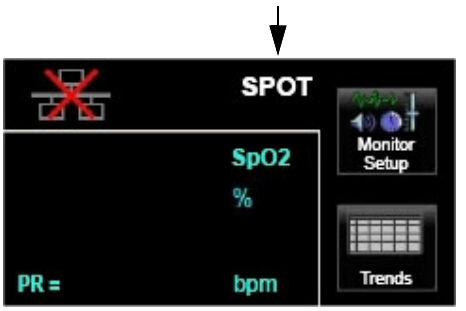


Figure 2-5 Operating Mode on Main Screen

To change the monitor operating mode

1. Touch the **Monitor Setup** key. The **Monitor Setup** window displays.
2. Touch the drop-down selection key for the operating mode. A list displays, showing both modes.
3. Touch the mode you want to use.
4. Touch **OK**.

SPOT Mode Features

SPOT mode has the following features:

- Measurements that exceed predefined limits can trigger alerts. For more information on alerts and alarms, refer to *Alerts and Alarms* on page 3-1.
- Measurements can be saved and printed on a strip chart recorder. As part of measurement records, users are able to enter supplemental patient data (modifiers) such as **Pain Level** and **Patient Position.**
- You can view and print up to 1,000 measurements on the **Trends** display. For more information on the **Trends** display, refer to *Trends* on page 8-1.

MON Mode Features

MON mode has the following features:

- Measurements that exceed predefined, user-adjustable limits can trigger *alarms*. For more information on alerts and alarms, refer to *Alerts and Alarms* on page 3-1.
- Respiration rate cannot be specified in MON mode.
- When monitoring SpO_2, a waveform displays along with numeric values.
- When you must temporarily suspend the monitoring of a patient, you can put the monitor in Standby mode. For more information on Standby mode, refer to *Standby Mode (MON Mode Only)* on page 2-8.
- If you want to turn OFF the monitor display but continue monitoring the patient, from the **Monitor Setup** window, touch **Enter Screen Saver**.
- When connected to a network or an ICS G2 database (version 4.02.02 or newer), physiologic measurements are automatically transmitted over the network for viewing in ICS G2 Clinical Access Trends, or to the hospital EMR (through the ICS G2 HL7 interface).

Standby Mode (MON Mode Only)

You can place the monitor in Standby mode if you want to temporarily suspend all monitoring for the patient. All alarms are suspended during standby as well.

To place the monitor in Standby mode

1 Touch the **Standby** key. 

The **Standby** menu shows.

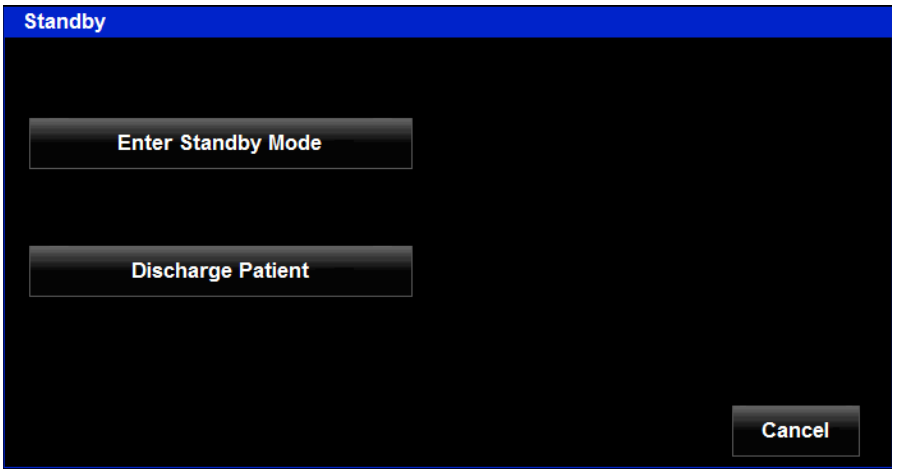


Figure 2-6 Standby menu

2 Select one of the options that follow:
- **Enter Standby Mode** — to place the monitor in standby mode
- **Discharge Patient** — to discharge the patient and go to standby mode
- **Cancel** — to return the monitor to the normal screen

To exit Standby mode and resume monitoring, touch anywhere on the screen.

Saving SPOT Measurements

After you take measurements in SPOT mode, you can save the measurements for storage and view in Trends.

1. After you have taken the measurements you want to save, as described in the parameter chapters, touch the **Save** key on the right side of the screen.

2. The **Save Spot Check Data** window appears for you to enter or confirm the patient demographic data (if already entered). If you did not previously enter patient data, refer to *Entering Patient Demographics* on page 2-4 for information on how to use this window.

Note:

White display boxes marked with an asterisk (*) indicate required information. In the Clinical menu, a Clinical Administrator can define certain fields as required, optional, or disabled by using the Modifiers window, as described in the Ultraview DM3 Service Manual.

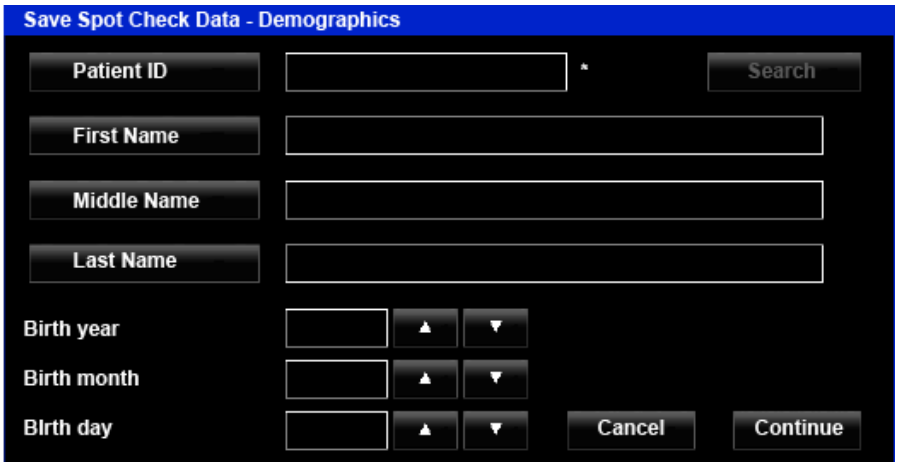


Figure 2-7 Save Spot Check Data—Demographics Screen

3 After you have entered basic information, touch **Continue**. Enter any supplemental information required. The **Save Spot Check Data - Supplemental** window appears.

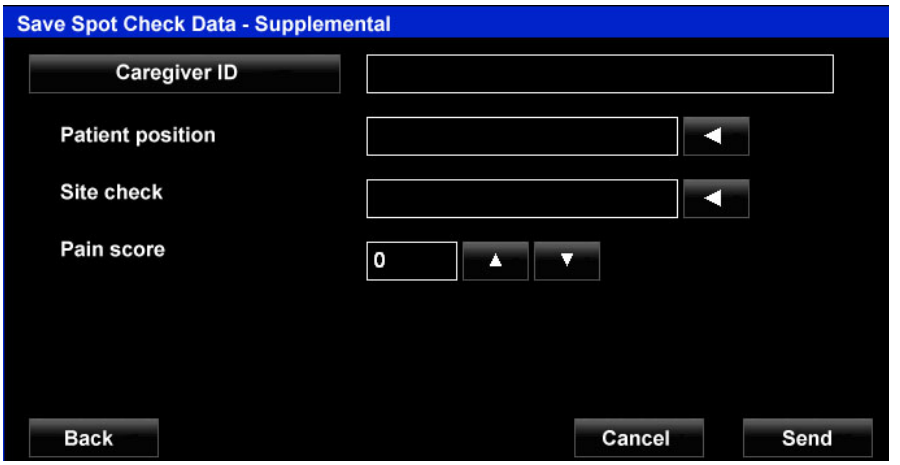


Figure 2-8 Save Spot Check Data — Supplemental Screen

4 To enter the caregiver ID, touch the **Caregiver ID** key. An onscreen keyboard shows. Touch the keys to enter the caregiver ID. Touch **OK** when done.

Caregiver identification can be entered using either the onscreen keyboard or an approved, properly configured USB barcode scanner to scan the identification from a printed barcode strip such as on an employee badge.

5 Specify remaining information using the arrows and drop-down menus provided. When you are finished, touch **Send**.

The SPOT record is now stored in Trends. The **Trends** window appears and displays all historic records for that Patient ID.

Sending SPOT Measurements

In order for SPOT measurements to be sent to ICS G2 (version 4.02.02 or newer) for viewing in G2 Clinical Access Trends or in a hospital EMR (via ICS G2 HL7 Interface), each record must first be saved and stored into SPOT Trends.

1 Make sure the DM3 is connected to the ICS G2.

2 In **SPOT** mode, press **Trends**. The **Trends-Spot Check** window shows.

3 Press **Send** to begin transmitting records. The DM3 begins to automatically transmit all unsent records that are shown in the trends window. As the first step in transmitting each patient record, the DM queries the Patient ID. If the ID is found, the DM3 transmits the patient record and moves onto the next one until all records have been sent.

Notes:

- *The DM3 is capable of transmitting a single record or multiple records in a single batch collected offline. Actual capabilities may be limited for each facility based on the type of EMR being used.*
- *For any record where the entered Patient ID is not found in the database, the DM3 shows an advisory screen that requires the user to specify a disposition option for the specific record. Options include:*
  - *Send this record anyway (which creates a new Patient ID in the ICS G2 database only)*
  - *Delete this record (which deletes the specific record and continues on sending any other records)*
  - *Stop sending spot check data (which cancels any further attempts to transmit patient records)*

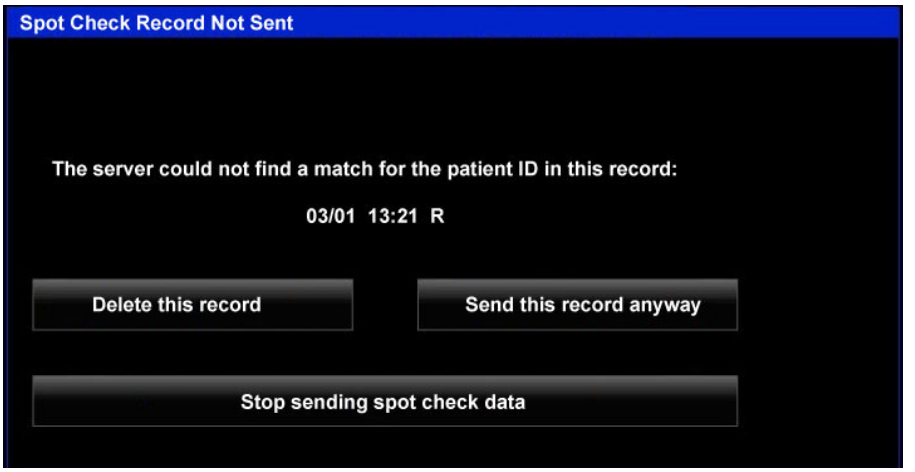


Figure 2-9 SPOT Check Record Not Sent Dialog

Battery Operation

Rechargeable lithium-ion batteries are widely used in technology today due to their high energy density and efficiency, but they do come with certain risks that require caution.

- ***Risk of overheating and fire: Lithium-ion batteries can overheat and catch fire if they are damaged, improperly charged, or used beyond their use life.***
- ***Toxic and flammable gases: When lithium-ion batteries overheat, they can release toxic and flammable gases, which pose a risk of inhalation and combustion.***
- ***Expired batteries have a fire hazard associated with them when they are used. Check battery age, replace battery pack every two (2) years.***
- ***Replace batteries that no longer hold a charge.***
- ***Do not short circuit, crush, or expose the battery to high temperature, incinerate or disassemble the battery.***
- ***Do not use any damaged battery.***

Safety Tips:

- Purchase: Only buy batteries listed by a nationally recognized testing laboratory and the manufacturer.
- Charging: Use the correct charging equipment and avoid charging at extreme temperatures.
- Storage: Store batteries at room temperature, away from direct sunlight and anything that can burn.
- Handling: Be careful with batteries to prevent physical damage.

The Ultraview DM3 monitor contains a lithium-ion rechargeable battery that allows you to disconnect the monitor from AC power and use it for applications where mobility is required.

When the Ultraview DM3 battery is fully charged, it provides a minimum of eight hours of normal operation. When the monitor is operating on battery power, a battery icon appears in the device status area, located in the upper-right corner of the monitor screen. The battery icon is designed to give an approximate sense of how much battery charge remains.

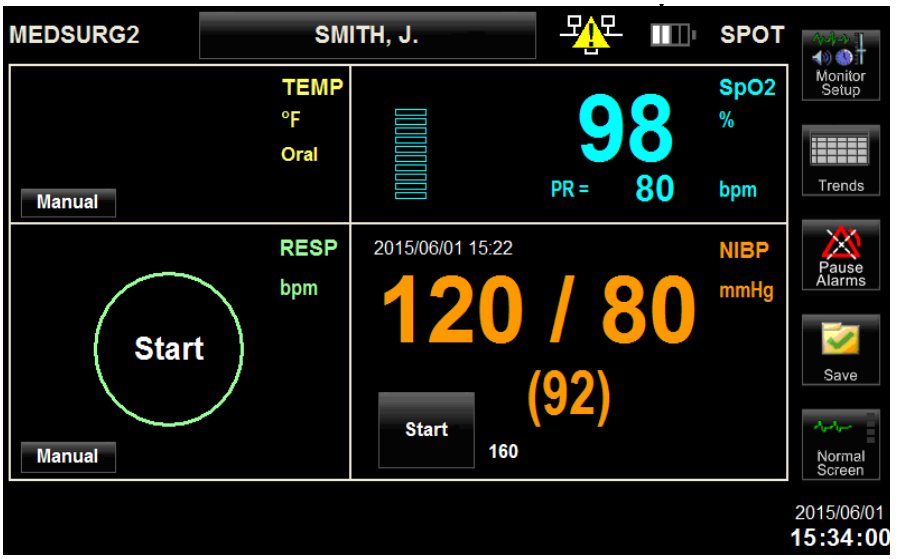


Figure 2-10 Main Screen Showing Battery Icon

When the monitor reaches the point where 5 to 10 minutes of battery power remain, the following occurs:

- The battery icon starts to blink, and the following alarm message is displayed: **Battery - Low**.
- An alarm tone annunciates.

When this happens, you should connect the monitor to a wall outlet as soon as possible. If battery power goes too low for normal operation, the following occurs:

- All monitoring functionality stops and the monitor displays the following alarm message: **Battery - Nearly Depleted**.
- A constant tone sounds.
- The monitor automatically shuts down after 60 seconds.

Recharging the Battery

To recharge the battery, plug the monitor into a live outlet and make sure the power supply cord is plugged into the AC power supply port on the back of the monitor. The battery will recharge, regardless of whether the monitor is powered ON or OFF. The battery will recharge from fully depleted to 90% of fully charged in approximately three hours, and 100% fully charged in four hours.

When the battery is recharging, the green LED on the front of the monitor illuminates.

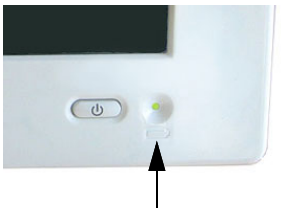


Figure 2-11 Battery Charging LED

The battery charging LED provides the following information about the battery charge status.

Table 2-2 Battery Charge Status

LED Condition	Battery Charge Status
Off	Battery is not charging.
Green, blinking	Battery is charging.
Green, steady	Battery is charged.
Green, strobing	Battery charging circuit failure.

Note:

Used batteries must be properly disposed of or recycled according to national and/or local regulations.

Alerts and Alarms

Overview

The Ultraview DM3 monitor can notify users when it detects physiological conditions based on a patient's vital sign measurements.

In SPOT mode, the monitor can provide clinical alerts to tell the user that one or more measured vital sign values has exceeded a defined high or low clinical threshold limit. These limits are typically defined by the care area in which the monitors will be used.

In MON mode, the monitor can provide alarms when one or more measured vital sign values have exceeded the high or low alarm limit settings. For example, you can configure the system to sound an alarm when the patient's SpO_2 goes below 92%. Alarm monitoring can be individually configured for each physiological parameter.

In addition to vital sign alerts and alarms, the monitor provides technical-level advisories for indicating conditions affecting general monitor performance. For example, advisories are presented for low battery conditions, recorder and print error conditions, and network communications failure.

The audio and visual presentation of clinical alerts (in SPOT mode) and patient alarms (in MON mode) are identical, and annunciations will vary. Characteristics for alerts and alarms will also vary based on parameter and condition. For further information, refer to *Alarm Conditions* on page 3-6.

Display Detail

When the Ultraview DM3 monitor issues an alert or alarm, the monitor screen looks like the example shown in *Figure 3-1*.

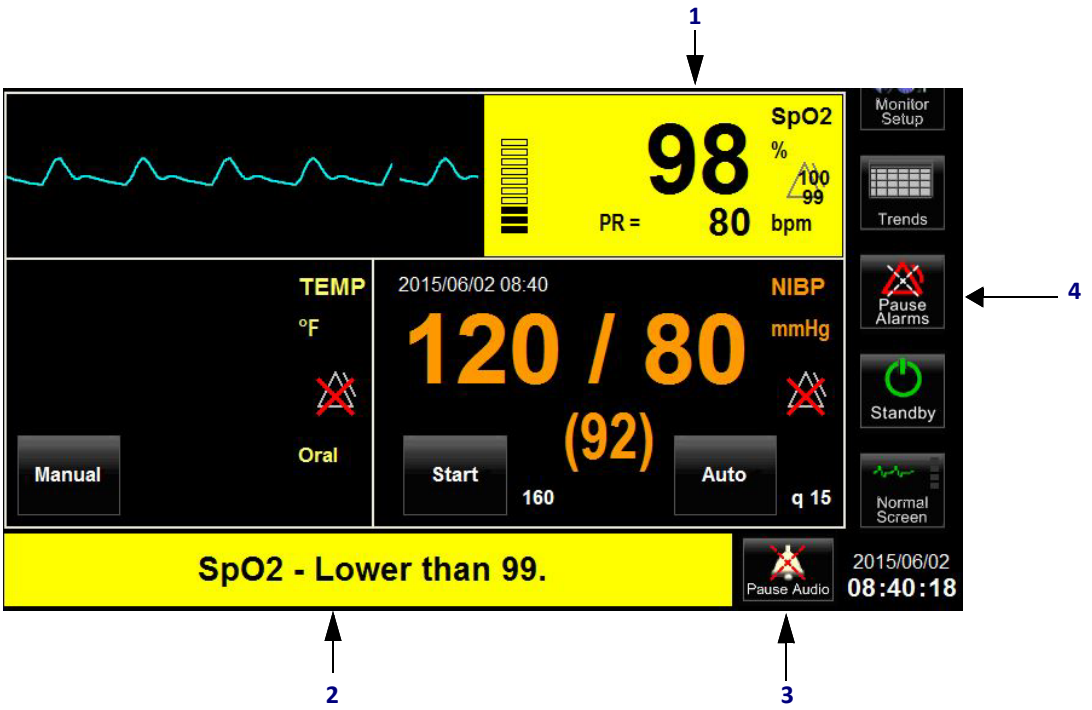


Figure 3-1 Alarm Condition on Monitor Screen

1. Parameter zone of measurement that is currently in alarm.
2. Alarm text in message area.
3. **Pause Audio** key to silence the alarm tone.
4. **Pause Alarms** key. When touched, this key changes to display **Resume Alarms**. The message **All alarms are paused** appears at the bottom of the screen in the message area.

Alarm Messages

When an alarm condition is active, a text message is displayed in the message area at the bottom of the display (for example: **SpO_2 — Lower than 92.**). If more than one alarm condition is active at a given time, the message for each condition rotates in and out of the message area on the monitor screen. Each of the messages appears for approximately three seconds, and then the next message is displayed. Refer to *Alarm Conditions* on page 3-6 for information on specific messages.

Alert Tones and Visual Cues (SPOT Mode)

Table 3-1 shows the meanings of the tones generated by alerts.

Table 3-1 Meanings of Alert Tones

Alert Tones	Meaning
A recurring series of three medium-pitch chime tones separated by half-second intervals	A measured vital sign has exceeded the high or low threshold limit set for that parameter.
A recurring series of single lower-pitch chime tones separated by 1-second intervals	A condition exists that affects general operation of the monitor. For example, the battery may be running out of power or the recorder is out of paper.
A recurring series of single high-pitch and three medium-pitch chime tones alarming continuously	A condition exists that affects monitor operation and may affect patient safety.

Table 3-2 shows the meanings of the visual cues generated by alerts.

Table 3-2 Meanings of Alert Visual Cues

Visual Cue	Meaning
A parameter box with a flashing red, yellow, or white background	An alert is currently active for that parameter.
A parameter box with a solid yellow or white background	An alert is currently active for that parameter, but the audio tone has already been silenced.

Alarm Tones and Visual Cues (MON Mode)

Table 3-3 shows the meanings of the tones generated by alarms.

Table 3-3 Meanings of Alarm Tones

Alarm Tones	Meaning
Three medium-pitch chime tones separated by half-second intervals	A “medium grade” alarm indicating a physiological condition that may be serious (for example: physiological parameter limit violations).
A single lower-pitch chime tone separated by 1-second intervals	A "low grade" alarm indicating a technical condition that prevents monitoring (for example: artifact, low battery).
A recurring series of single high-pitch and three medium-pitch chime tones alarming continuously.	A "high grade" alarm indicating a condition that may affect patient safety.

Table 3-4 shows the meanings of the visual cues generated by alarms.

Table 3-4 Meanings of Alarm Visual Cues

Visual Cues	Meaning
A parameter box with a flashing red, yellow, or white background	An alarm is currently active for that parameter.
A parameter box with a solid yellow or white background	An alarm is currently active for that parameter, but it has already been silenced.

Note:

If more than one message is active at a given time, the alarm tone reflects that of the highest grade alarm that is currently active.

Alarm Handling at Startup

When the Ultraview DM3 monitor is initially powered on or brought out of standby mode, SpO_2/Pulse Rate (PR) alarms will not be annunciated until the SpO_2 sensor has been applied to the patient. This prevents nuisance alarms for parameters that are not being monitored on a given patient.

Responding to Alerts and Alarms

When you hear an alarm tone, look immediately at the message area of the monitor display to see why the tone is sounding. The action you should take depends on the message that displays.

Each alarm condition has an associated "annunciation type". The annunciation type is one of the following:

- “One-time” — the annunciation will be done only once (annunciation ends after you silence the condition, even if the condition is still true).
- “Persistent”— the annunciation will continue as long as the alarm condition continues. Touching the **Pause Audio** key during presentation of a persistent alarm causes the audio to be temporarily silenced for one minute, after which time the alarm annunciation (audio and visual) resumes.

To see the annunciation type for specific messages, refer to *Alarm Conditions* on page 3-6.

To silence one-time alarm conditions or temporarily silence persistent alarm conditions, touch the **Pause Audio** key to the right of the alarm text in the monitor's message area. If the alarm condition that you are silencing is still true when you silence it, the audio is temporarily silenced for one minute and the flashing background of the parameter box changes to a solid yellow or white background, depending on the alarm condition. For all other alarm conditions, touching the **Pause Audio** key clears the message.

Suspending Alarms

To temporarily disable alarm presentation for all parameter conditions, touch the **Pause Alarms** key on the right side of the monitor main screen when an alarm is annunciating. When selected, all parameter alarms are temporarily suspended for three minutes. During this time, the following message is displayed with a solid yellow background in the message area: **All alarms are paused**.

After the three-minute Pause Alarm period has expired, alarm presentation capabilities are fully restored. You can restore alarm presentation capabilities before the three-minute period expires by touching the key again, which now displays **Resume Alarms**. The key acts as a toggle.

Alert and Alarm Setup

Several options are available for alert and alarm setup on the Ultraview DM3 monitor.

Enabling Alerts (SPOT Mode)

Alert conditions are not annunciated unless alerts are enabled for a given parameter. Alerts are set up in the **Clinical** menu by the Clinical Administrator and cannot be viewed or changed by the user.

Enabling Alarms and Setting Alarm Limits (MON Mode)

Alarm conditions are not annunciated unless alarms are enabled for a given parameter. Use the **Alarms Setup** screen in the **Clinical** menu to configure user defaults for alarm settings. (For information on the **Clinical** menu, refer to the *Ultraview DM3 Service Manual.*) In addition, in each parameter's setup menu, individual alarm settings can be adjusted as needed based on the current patient needs. After the patient has been discharged, the Ultraview DM3 monitor reverts back to default settings for the next patient.

Alarm Delay

The Ultraview DM3 monitor provides specific SpO_2 limit alarm delay capabilities available within the SpO_2 Setup menu. For more information, refer to *SpO_2/Pulse Rate* on page 4-1.

Alarm Reports

You can set up the monitor to automatically print a report about any active alarm condition on a strip chart recorder. For more information, refer to *Printing* on page 9-1.

Second Speaker Alarm Tones

The second speaker feature of the monitor supplements the alarm tone functionality by providing a completely independent backup to the monitor's main speaker. Because the second speaker has a slightly different sound than the main speaker, it provides a signal that a given alarm has been sounding for longer than the pre-set delay time.

Whenever the monitor starts sounding an audible tone for an alarm condition, it starts a timer. If the alarm tone is still sounding after a specified period of time, the second speaker also starts sounding. When an alarm is silenced, both the main speaker and the second speaker (if it was sounding) are silenced.

Alarm Conditions

This section shows the general conditions the monitor can detect. Alarm conditions for each parameter are included in the parameter chapters. Columns in these tables have the following meaning:

- Display value — the value displayed for the parameter when the condition is true (applies only to physiological parameters)
- Alarm grade — as defined earlier in this chapter
- Message — the text of a message displayed in the message area when the condition is true
- Annunciation type — as defined earlier in this chapter

General Monitor Conditions

Table 3-5 Alarms for General Monitor Conditions

Message	Display Value	Alarm Grade	Annunciation Type
Monitor - Problem detected. Restart monitor.	N/A	Low	One Time

Battery Conditions

Table 3-6 Alarms for Battery Conditions

Message	Display Value	Alarm Grade	Annunciation Type
Battery - Low.	Blinking battery icon	Low	One Time
Battery - Nearly Depleted.	N/A	Low	Persistent

SpO_2 Conditions—SPOT Mode

Table 3-7 Alerts for SpO_2 Conditions—SPOT Mode

Message	Display Value	Alert Grade	Condition	Annunciation Type
SpO2 - Lower than [low limit].	<Number>	Medium	SpO_2 is lower than the lower limit.	One Time
SpO2 - Higher than [high limit].	<Number>	Medium	SpO_2 measurement is higher than the upper limit.	One Time
SpO2 - Replace sensor.	???	Low	SpO_2 bad sensor.	One Time
SpO2 - Check sensor placement.	???	Low	SpO_2 cannot regulate LED intensity (after finger in sensor).	One Time
SpO2 - Low perfusion.	<Number>	Low	SpO_2 pulsations insufficient.	One Time
SpO2 - Signal is weak.	???	Low	SpO_2 pulsations too weak.	One Time
SpO2 - No sensor connected.	<Blank>	Low	SpO_2 sensor is disconnected (after finger in sensor).	One Time
SpO2 - Artifact detected.	???	Low	SpO_2 motion artifact.	One Time
SpO2 - Problem detected. Restart monitor.	???	Low	Abnormal start up during initial power-on sequence. Restart monitor to clear message.	One Time

PR Conditions—SPOT Mode

Table 3-8 Alerts for PR Conditions

Message	Display Value	Alarm Grade	Condition	Annunciation Type
PR - Lower than [low limit].	<Number>	Medium	PR measurement is lower than the lower limit.	One Time
PR - Higher than [high limit].	<Number>	Medium	PR measurement is higher than the upper limit.	One Time

SpO_2 Conditions—MON Mode

Table 3-9 Alerts for SpO_2 Conditions—MON Mode

Message	Display Value	Alarm Grade	Condition	Annunciation Type
SpO2 - Lower than [low limit].	<Number>	Medium	SpO_2 is lower than the lower limit.	Persistent
SpO2 - Higher than [high limit].	<Number>	Medium	SpO_2 measurement is higher than the upper limit.	Persistent
SpO2 - Replace sensor.	???	Low	SpO_2 bad probe.	One Time

Table 3-9 Alerts for SpO_2 Conditions—MON Mode

Message	Display Value	Alarm Grade	Condition	Annunciation Type
SpO2 - Check sensor placement.	???	Low	SpO_2 cannot regulate LED intensity (after finger in probe).	One Time
SpO2 - Low perfusion.	<Number>	Low	SpO_2 pulsations insufficient.	One Time
SpO2 - Signal is weak.	???	Low	SpO_2 pulsations too weak.	One Time
SpO2 - No sensor connected.	<Blank>	Low	SpO_2 probe is disconnected (after finger in probe).	One Time
SpO2 - Artifact detected.	???	Low	SpO_2 motion artifact.	Persistent
SpO2 - Problem detected. Restart monitor.	???	Low	Abnormal start up during initial power-on sequence. Restart monitor to clear message.	Persistent

PR Conditions—MON Mode

Table 3-10 Alarms for PR Conditions

Message	Display Value	Alarm Grade	Condition	Annunciation Type
PR - Lower than [low limit].	<Number>	Medium	PR measurement is lower than the lower limit.	Persistent
PR - Higher than [high limit].	<Number>	Medium	PR measurement is higher than the upper limit.	Persistent

NIBP Conditions—SPOT and MON

Table 3-11 Alarms for NIBP Conditions

Message	Display Value	Alarm Grade	Condition	Annunciation Type
NIBPs - Lower than [low limit].	<Number>	Medium	Systolic NIBP measurement is lower than the lower limit.	One Time
NIBPs - Higher than [high limit].	<Number>	Medium	Systolic NIBP is higher than the upper limit.	One Time
NIBPd - Lower than [low limit].	<Number>	Medium	Diastolic NIBP is lower than lower limit.	One Time
NIBPd - Higher than [high limit].	<Number>	Medium	Diastolic NIBP is higher than the upper limit.	One Time
NIBPm - Lower than [low limit].	<Number>	Medium	Mean NIBP is lower than lower limit.	One Time
NIBPm - Higher than [high limit].	<Number>	Medium	Mean NIBP is higher than the upper limit.	One Time
NIBP - Signal is weak.	???	Low	NIBP pulsations too small.	One Time
NIBP - Artifact detected.	???	Low	NIBP too much motion.	One Time
NIBP - Cuff leak.	???	Low	NIBP leaky cuff or hose.	One Time
NIBP - Blocked hose. Check patient.	???	High	NIBP pinched hose.	One Time
NIBP - Measurement time exceeded.	???	Low	NIBP measurement time-out (2 minutes and 15 seconds).	One Time
NIBP - Problem detected. Restart monitor.	???	Medium	NIBP pump or valve failure or NIBP safety timer expired or other hardware-related problem.	One Time
NIBP - Cannot measure.	???	Low	NIBP bad profile shape.	One Time
NIBP - Cuff pressure is too high.	???	Low	NIBP cuff pressure has become too high.	One Time

TEMP Conditions—SPOT and MON

Table 3-12 Alarms for Temperature Conditions

Message	Display Value	Alarm Grade	Condition	Annunciation Type
TEMP - Lower than [low limit].	<Number>	Medium	TEMP is lower than the lower limit.	One Time
TEMP - Higher than [high limit].	<Number>	Medium	TEMP is higher than the upper limit.	One Time
TEMP - Out of range (high).	???	Low	TEMP too high.	One Time
TEMP - Out of range (low).	???	Low	TEMP too low.	One Time
TEMP - Cannot measure.	???	Low	TEMP unstable.	One Time
TEMP - No sensor connected.	<Blank>	Low	TEMP probe disconnected.	One Time
TEMP - Problem detected. Restart monitor.	???	Low	TEMP bad calibration resistor.	One Time
TEMP - Replace sensor.	???	Low	Temperature probe fault.	One Time

RESP Conditions—SPOT Only

Table 3-13 Alarms for RESP Conditions

Message	Display Value	Alarm Grade	Condition	Annunciation Type
RESP - Higher than high limit.	<Number>	Medium	RESP is higher than the high limit.	One Time
RESP - Lower than low limit.	<Number>	Medium	RESP is lower than the low limit.	One Time

SpO_2/Pulse Rate

Overview

The pulse oximetry monitoring capabilities of the Ultraview DM3 monitor include:

- Measuring and displaying the percentage of functional oxygen saturation of the patient's arterial hemoglobin (SpO_2).
- Indicating signal strength (in units with Spacelabs or Nellcor OxiMax SpO_2)
- Indicating perfusion index (PI) and signal quality (in units with Masimo SET SpO_2) Calculating and displaying the patient's pulse rate (PR)
- Displaying the pulse oximetry waveform (plethysmograph) continuously (MON mode only)
- Generating an audible pulse tone for each detected pulse

	***The Ultraview DM3 monitor is not intended for use on neonatal or infant patients less than one year of age.***

SpO_2/PR Setup

To begin pulse oximetry monitoring

1 Select an SpO_2 sensor that is approved for use with the monitor. For a list of approved sensors, refer to *Accessories* on page 12-1.

Note:

Clean reusable sensors in accordance with hospital infection control policies. For recommended cleaning methods, refer to Cleaning on page 11-1.

2 Apply the sensor to the patient. Use the instructions that come with the sensor. For SpO_2 sensor compatibility, refer to the product data sheet.

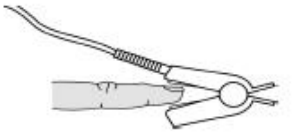


Figure 4-1 Sensor Connected to Patient

3 Connect the sensor to the SpO_2 adapter cable and connect the adapter cable to the SpO_2 connector on the back of the monitor, as shown in *Figure 4-2*. Make sure the colored latch on the adapter cable is closed. This will secure the sensor and prevent accidental disconnection.

Figure 4-2 SpO_2 Adapter Cable Connected to Ultraview DM3 Monitor

⚠	• ***A pulse oximeter should be considered an early warning device and should NOT be used as an apnea monitor. If a trend toward patient deoxygenation is indicated, blood samples should be analyzed by a laboratory co-oximeter to completely understand the patient's condition.*** • ***Pulse rate measurement is based on the optical detection of a peripheral flow pulse and therefore may not detect certain arrhythmias. The pulse oximeter should not be used as a replacement or substitute for ECG-based arrhythmia analysis.*** • ***Carboxyhemoglobin may erroneously increase readings. The level of increase is approximately equal to the amount of carboxyhemoglobin present. Dyes or any substance containing dyes that change usual arterial pigmentation may cause erroneous readings.***

- *Inaccurate measurements may be caused by:*
  - *Significant levels of dysfunctional hemoglobins (e.g., carboxyhemoglobin or methmoglobin)*
  - *Intravascular dyes such as indocyanine green or methylene blue*
  - *Exposure to exccessive illumination, such as surgical lamps (especially ones with a xenon light source), bilirubin lamps, fluorescent lights, infrared heating lamps, or direct sunlight (exposure to excessive illumination can be corrected by covering the sensor with a dark or opaque material)*
  - *Venous pulsations*
  - *Placement of a sensor on an extremity with a blood pressure cuff, arterial catheter, or intravascular line*
- *Do not use the oximetry sensors during magnetic resonance imaging (MRI) scanning. Induced current could potentially cause burns.*
- *SpO_2 functional test fixtures cannot be used to assess accuracy of a pulse oximeter sensor or monitor.*
- *Sensors have no adverse effect on tissues when used according to the directions for use provided by the sensor manufacturer.*
- *Applying an oximetry sensor incorrectly or leaving the sensor in place for too long may cause tissue damage.*
- *Check the sensor site frequently, and do not allow the sensor to remain on one site for too long. Refer to the instructions from the sensor manufacturer for more information.*
- *Do not use a sensor with exposed optical components.*
- *The SpO_2 adapter cable is a reusable item and should not be discarded. If using disposable oximetry sensors, disconnect the sensor from the adapter cable before discarding the sensor.*

- **Use only patient sensors specified by Spacelabs Healthcare. If you use sensors other than those specified, it may degrade SpO_2 performance and could damage the monitor during defibrillation.**
- **Spacelabs Healthcare recommends the use of sensors repaired or remanufactured by the original manufacturer only.**
- **Never attach an SpO_2 sensor to a limb being monitored with a blood pressure cuff or a limb with restricted blood flow.**
- **A poorly applied sensor may give incorrect saturation values. The signal strength indicator (signal quality bar and real-time PI value in units with Masimo SpO_2) is used to identify a poorly applied sensor or a site with insufficient perfusion.**
- **Choose a site with sufficient perfusion to ensure accurate oximetry values.**

Display Detail

Figure 4-3 and *Figure 4-4* show the display elements available within the SpO_2 parameter zone. In SPOT mode, SpO_2 and PR are displayed in the upper-right display zone. In MON mode, SpO_2 and PR are displayed across the entire upper display zone.

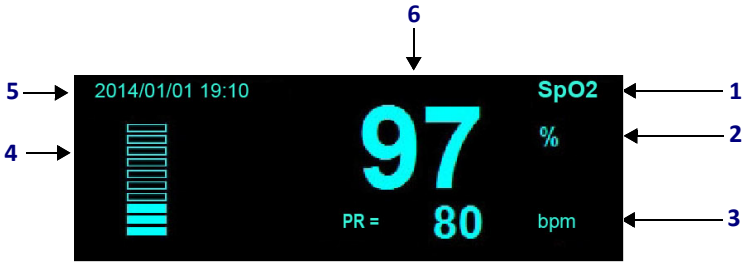


Figure 4-3 SpO_2/PR Display Detail (SPOT Mode)

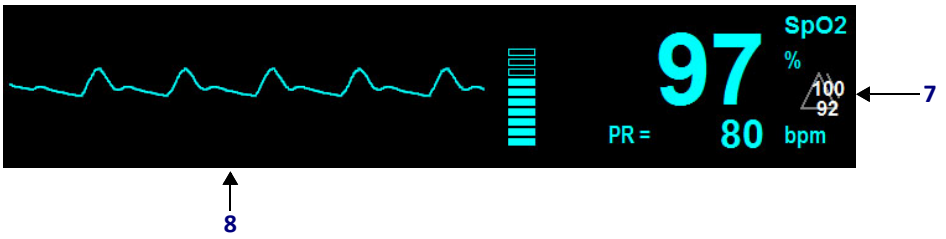


Figure 4-4 Spacelabs Healthcare SpO_2 (Option S)/ PR Display Detail (MON Mode)

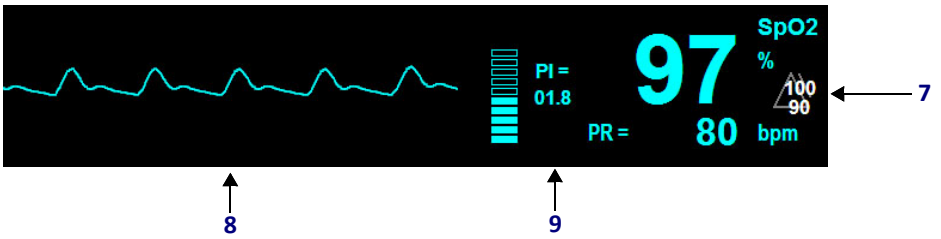


Figure 4-5 Masimo SET SpO_2 (Option M)/ PR Display Detail (MON Mode)

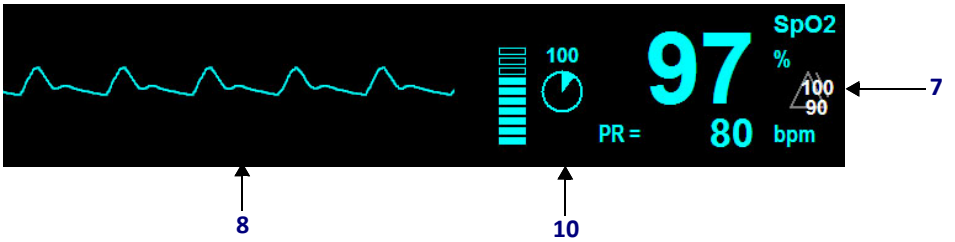


Figure 4-6 Nellcor OxiMax SpO_2 (Option N)/ PR Display Detail (MON Mode)

1 Label for parameter zone.

2 SpO_2 unit of measure label. Displays as **%**.

3 PR display area. Displays **PR=** to denote pulse rate value. Also includes unit of measure label, which displays as **bpm** to denote beats per minute.

Note:

The PR source is SpO_2 when SpO_2 is being monitored and the PR area is displayed in cyan. When SpO_2 is not being monitored, the PR source is NIBP and the PR area is displayed in orange. PR values obtained from NIBP readings are episodic values based on NIBP reading completion.

4 Signal strength bar (signal quality bar in units with Masimo SpO_2). Represents relative quality of the SpO_2 value based on the measurement site where the sensor is applied.

5 Datestamp and timestamp for measurement completion.

Note:

The monitor displays a stamped measurement for 15 minutes if no subsequent measurements are started. Afterward, the reading is cleared from the display.

6 SpO_2 value.

7 SpO_2 alarm status indicator. Displays high limit setting above low limit setting and denotes alarms are active. Applies only to MON mode

8 SpO_2 waveform (plethysmograph). Applies only to MON mode.

If alarms are disabled for SpO_2, the symbol on the left displays instead of the alarm limits.

9 Perfusion index (Masimo SET SpO_2 (Option M) only). If the displayed value is less than 1.00, reposition the sensor or relocate it to an alternate measurement site.

10 SatSeconds indicator (Nellcor OxiMax SpO_2 (Option N) only). When the SatSeconds algorithm detects an SpO_2 value outside the alarm limit, the SatSeconds indicator “fills” clockwise. When the indicator is completely filled (the SatSeconds setting is reached), an SpO_2 high or low limit alarm begins. When the SpO_2 value returns to a value within the set limits, this indicator “empties” counterclockwise.

Adjusting Settings (SPOT Mode)

The **SpO2 Setup** window allows for adjustment of pulse tone volume. The monitor's default SpO_2 and PR settings are set in the **Clinical** menu by your Clinical Administrator.

In SPOT mode, the only available setting is pulse tone volume, which can be set to **Off** (default), **High**, **Medium**, or **Low**. When enabled, the monitor emits an audible tone for each pulse detected. The pitch varies according to the SpO_2 value. The higher the SpO_2 value, the higher the pitch.

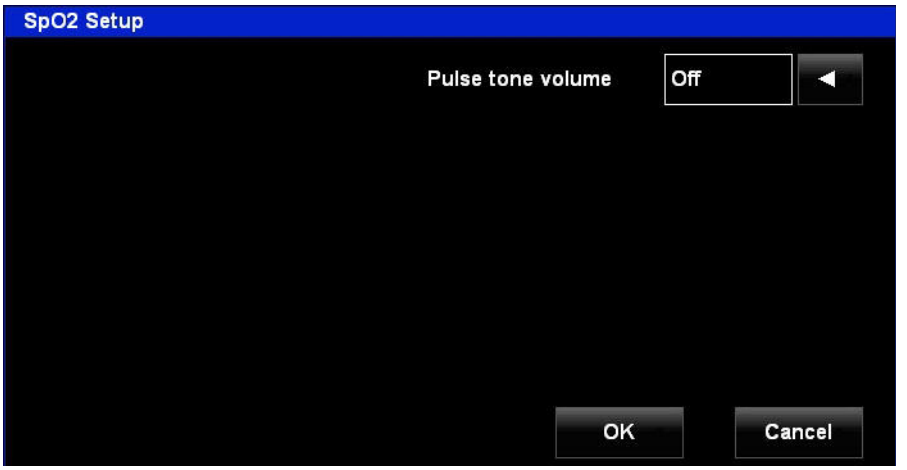


Figure 4-7 SpO2 Setup Window (SPOT Mode)

Adjusting Settings (MON Mode)

The **SpO2 Setup** window allows for adjustment of the monitor's default SpO_2 and PR settings.

In MON mode, in addition to pulse tone volume, settings are available for enabling/disabling alarms as well as adjusting High and Low alarm limits for both SpO_2 and PR.

Sensitivity Settings (Masimo SET SpO_2 (Option M) Only)

Choices for **Sensitivity** are **Normal**, **Maximum**, and **APOD** (Adaptive Probe Off Detection). The three sensitivity settings allow the clinician to adapt to the patient's situation.

The **APOD** sensitivity setting uses processing algorithms to analyze the incoming signal. This setting is used to protect against erroneous pulse rate and SpO_2 readings that can occur when a sensor becomes detached from the patient. The **APOD** setting is the least effective setting for measuring SpO_2 on patients with low perfusion.

The **Normal** sensitivity setting recommended for the majority of patients. This setting provides a combination of sensitivity and detached sensor detection.

Maximum sensitivity is used in instances where SpO_2 measurements are the most difficult, and when the signal is the weakest (such as with the sickest patients). This setting is recommended during procedures and when clinician and patient contact is continuous.

SatSeconds Settings (Nellcor OxiMax SpO_2 (Option N) Only)

With traditional alarm management, upper and lower alarm limits are set for monitoring oxygen saturation. If a patient's SpO_2 level fluctuates near an alarm limit, frequent short SpO_2 alarms can occur.

If the Nellcor SatSeconds feature is enabled, then the alarm limit threshold must be continuously violated for a specified number of SatSeconds before an alarm occurs.

When the SpO_2 level violates a limit threshold, SatSeconds will begin to be counted, and the SatSeconds indicator begins to fill clockwise. Each second the number of percentage points that the saturation value is in violation of the threshold is added to the SatSeconds count. When the SatSeconds count meets or exceeds the SatSeconds setting, the SatSeconds indicator is completely filled, and the alarm sounds.

When the saturation value is no longer in violation of the limit, the alarm will stop and the SatSeconds indicator begins to empty. If the patient's oxygen saturation violates the limit again, then the SatSeconds indicator begins to fill again. Another alarm sounds if the indicator becomes completely filled.

Notes:

- *If an alarm threshold is crossed three or more times in a 60-second period, an alarm is triggered, even if the SatSeconds limit has not been attained.*
- *For units with Nellcor SpO_2, when changing alarm limits, if SatSeconds is full from previously measured data, there will be a brief, temporary alarm that is automatically corrected.*

Signal Averaging Time (Nellcor OxiMax SpO_2 (Option N) Only)

The data averaging feature smooths the oximetry saturation value by averaging patient input values over several seconds. Nellcor data averaging is controlled by the RESPONSE MODE setting.

When Averaging time is set to Normal, the averaging interval is six to seven seconds. When Averaging time is set to Fast, the averaging interval is two to four seconds. The averaging interval can be automatically extended by the OxiMax algorithm during challenging measurement conditions. Such conditions include low perfusion, motion, external interference, or any combination of these conditions.

Signal Averaging Time (Masimo SET SpO_2 (Option M) Only)

The data averaging feature smooths the oximetry saturation value by averaging patient input values over

several seconds. You can set a data averaging interval of **2–4 s**, **4–6 s**, **8 s**, **10 s**, **12 s**, **14 s**, or **16 s**.

Note:

Whenever averaging is set to 2–4 s or 4–6 s, the Masimo FastSat algorithm is automatically run. FastSat enables rapid tracking of arterial oxygen saturation changes that are typically "smoothed out" by pulse oximeter averaging algorithms.

To change SpO_2 or PR settings

1. Touch anywhere in the SpO_2/PR parameter zone (other than the waveform display area in MON mode). The **SPO2 Setup** window displays.
2. Touch the appropriate arrow key next to the setting you want to change until the new setting is displayed.
3. Touch **OK** to save the settings and display the normal screen.

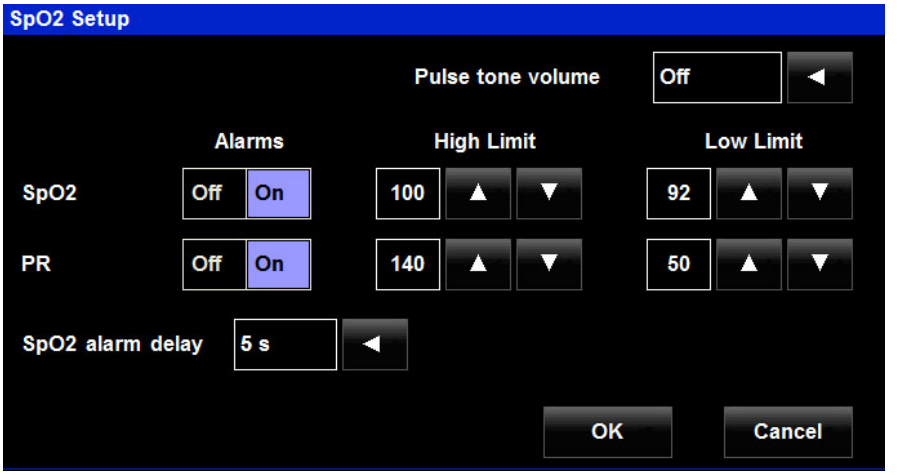


Figure 4-8 Spacelabs Healthcare SpO2 (Option S) Setup Window (MON Mode)

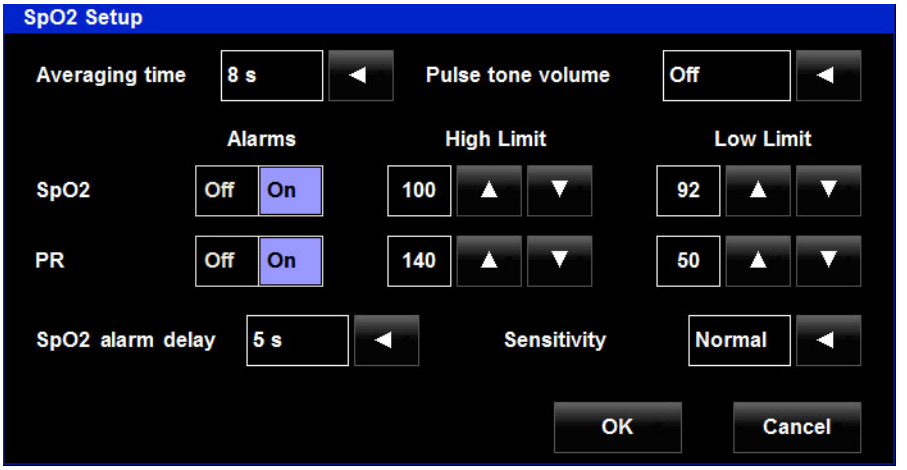


Figure 4-9 Masimo SET SpO2 (Option M) Setup Window (MON Mode)

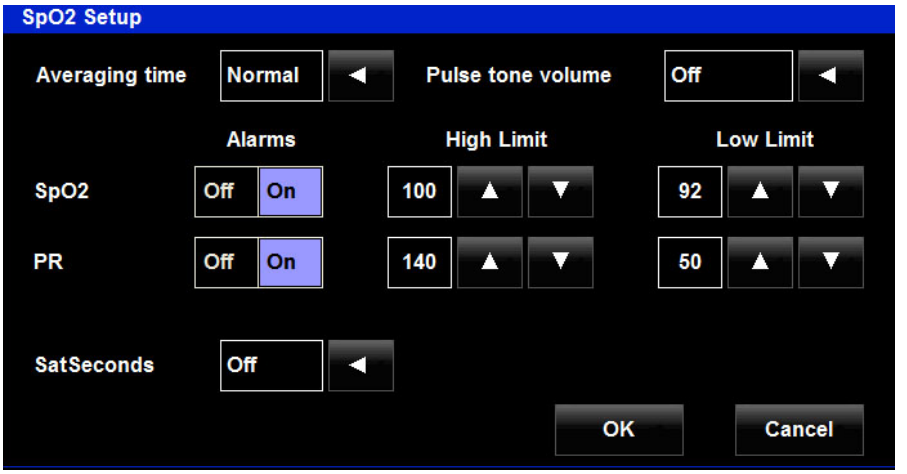


Figure 4-10 Nellcor OxiMax SpO2 (Option N) Setup Window (MON Mode)

Monitoring SpO_2/PR (SPOT Mode)

To start an SpO_2 / PR measurement

1. Apply the appropriate SpO_2 sensor to the measurement site.
2. Connect the sensor to the SpO_2 adapter cable and make sure the colored latch on the adapter cable is closed.
3. Confirm SpO_2 and PR values based on the signal strength bar (signal quality bar in units with Masimo SpO_2). An alert sounds and appears in the message box at the bottom of the screen when SpO_2 and PR alerts are on.
   If you touch **Pause Audio**, the alert is silenced permanently for that patient's SpO_2 alert. To reset the alert, remove and reapply the sensor.
4. Remove the sensor (to display a completion stamp and lock in the values for 15 minutes) and/or touch **Save** to save the patient's data into SPOT trends.

Monitoring SpO_2/PR (MON Mode)

To start an SpO_2 / PR measurement

1. Apply the appropriate SpO_2 sensor to the measurement site.
2. Connect the sensor to the SpO_2 adapter cable and make sure the colored latch on the adapter cable is closed.
3. Confirm SpO_2 and PR values based on the signal strength bar (signal quality bar in units with Masimo SpO_2).

Pediatric Considerations

It is important to select a SpO_2 sensor that is appropriate for the weight of the patient. For example, a clean pulse oximetry waveform may not be obtainable when an adult sensor is used on a small child.

Weight-range information can be found in the packaging that comes with the SpO_2 sensor.

Troubleshooting Guide: SpO_2/PR

Table 4-1 SpO_2 Messages

Message	Parameter Value	Possible Cause	Suggested Action
SpO2 - Replace sensor.	???	• Bad SpO_2 sensor. • Incorrect setup within the Ultraview DM3 monitor.	• Replace the SpO_2 sensor. • Contact Spacelabs Healthcare Technical Support.
SpO2 - Check sensor placement.	???	• Sensor has become detached from patient. • Sensor not fully attached to patient's finger. • Too much ambient light. • Bad sensor (no red light coming from sensor).	• Make sure the sensor is attached fully and securely to the patient. • Cover the sensor with opaque material, such as a towel, to reduce ambient light. • Reattach the sensor, possibly on a smaller or larger finger. • Replace sensor if there is no red light coming from it.
SpO2 - Signal is weak.	???	• Poor perfusion. • Large tissue mass. • Nail polish. • Bad SpO_2 sensor.	• Check the patient and provide any necessary care. • Warm the patient's extremities if needed. • Reattach the sensor on a smaller finger. • Remove any nail polish that may be interfering with the red light. • Replace the SpO_2 sensor.
SpO2 - Low perfusion.	<Number>	• Poor perfusion • Large tissue mass • Sensor not fully attached to patient's finger	• Check the patient and provide any necessary care. • Make sure the sensor is attached fully and securely to the patient. • Warm the patient's extremities if needed. • Reattach the sensor on a smaller finger.
SpO2 - No sensor connected.	[blank]	• SpO_2 sensor not connected to SpO_2 cable.	• Check to make sure the SpO_2 sensor is securely connected to the SpO_2 cable on the monitor.
SpO2 - Artifact detected.	???	• Patient movement or coughing. • Hemodynamic interference. • Small tissue mass.	• Calm the patient. • Reattach the sensor on another finger with less movement. • Reattach the sensor on a larger finger.
SpO2 - Lower than [low limit].	[number]	• The patient's oxygen saturation has fallen below the current low alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
SpO2 - Higher than [high limit].	[number]	• The patient's oxygen saturation has risen above the current upper alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
Problem detected. Restart monitor.	[number]	• The monitor has detected a hardware problem.	• Turn the monitor OFF, then ON. If the problem persists, contact Spacelabs Healthcare Technical Support.

Table 4-2 PR Messages

Message	Parameter Value	Possible Cause	Suggested Action
PR - Higher than [high limit].	[number]	• Patient pulse rate has risen above the upper alarm.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.

Table 4-2 PR Messages

Message	Parameter Value	Possible Cause	Suggested Action
PR - Lower than [low limit].	[number]	• Patient pulse rate has fallen below the lower alarm.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.

NIBP

Overview

The NIBP monitoring capabilities of the Ultraview DM3 monitor include:

- Measuring and displaying systolic, mean, and diastolic blood pressure of adult and pediatric patients greater than one year of age.
- Measuring PR derived from the NIBP measurement (when SpO_2 is not being monitored).
- Taking automatic blood pressure measurements at predefined intervals (MON mode only).

Note:

Blood pressure measurements determined with this monitor are equivalent to those obtained by a trained observer using the cuff/stethoscope auscultatory method, within the limits prescribed by the American National Standards Institute, with electronic or automated sphygmomanometers.

NIBP Setup

To set up NIBP monitoring

1. Connect the NIBP hose to the NIBP port on the left side of the monitor.
2. Connect an appropriate NIBP cuff to the NIBP hose. For a list of approved NIBP cuffs, refer to *Accessories* on page 12-1.

Notes:

- *Clean reusable cuffs in accordance with hospital infection control policies. For recommended cleaning methods, refer to Cleaning on page 11-1.*
- *Actual connection steps may vary by facility. For instances where disposable NIBP cuffs are used for infection control, you can connect the NIBP hose to the cuff after the cuff has been attached to the patient.*

Display Detail

Figure 5-1 and *Figure 5-2* show the display elements and controls available within the NIBP parameter zone, which appears in the lower-right display area.

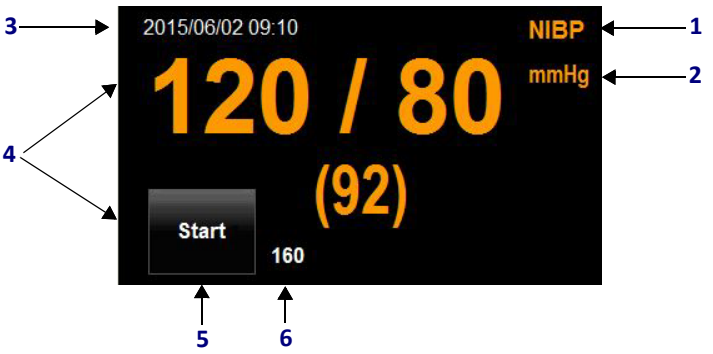


Figure 5-1 NIBP Display Detail (SPOT Mode)

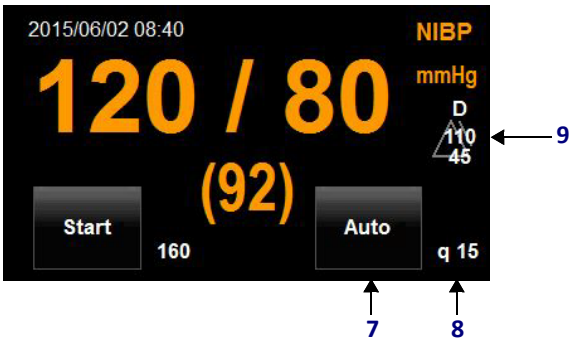


Figure 5-2 NIBP Display Detail (MON Mode)

1 Label for parameter zone.

2 Unit of measure label. Displays as **mmHg**.

3 Datestamp and timestamp for measurement completion.

Note:

The monitor displays a stamped reading for 15 minutes if no subsequent measurements are started. Afterward, the reading is cleared from the display.

4 NIBP reading. Displays as Systolic/Diastolic with (Mean) displayed below.

5 Action key used to initiate an immediate NIBP measurement. After you touch **Start**, the key updates to **Stop**. Touch **Stop** to stop the current in-progress measurement.

6 Inflation pressure indicator. Indicates the initial inflation pressure that will be used for a new patient based on the Inflation setting.

7 Action key used to start a series of automatic measurements based on the Mode setting. After you touch **Auto**, the key updates to **Cancel** and an immediate measurement begins. In addition, the **Start** key updates to **Stop**. Touch **Stop** to stop only the current in-progress measurement. Touch **Cancel** to stop the current in-progress measurement as well as the specified automatic measurement mode.

8 NIBP automatic measurement indicator based on the Mode setting. Indicates the automatic measurement mode that will be used when the user touches the **Auto** key.

Note:

If an automatic measurement mode has been started, the message Next at hh:mm appears above the displayed automatic measurement mode.

9 Alarm status indicator. Displays high limit setting above low limit setting for systolic (S), mean (M) or diastolic (D) based on which alarms are enabled/disabled, and denotes alarms are active (applies only to MON mode).

If alarms are disabled, the symbol at left is displayed instead.

Note:

If more than one alarm (systolic, mean, diastolic) is enabled, the diastolic (D) limit settings are displayed. If only systolic and mean alarms are enabled, then the systolic (S) limit settings are displayed.

Adjusting Settings

The **NIBP Setup** window allows for adjustment of the monitor's default NIBP settings.

- In SPOT mode, the only available setting is Inflation, which can be used to set initial inflation pressure to 110, 160 (default), or 210 mmHg based on the current patient.
- In MON mode, in addition to Inflation, settings are also available for:
  - Enabling/disabling alarms as well as adjusting high and low alarm limits for systolic (NIBPs), mean (NIBPm), and diastolic (NIBPd) pressure.
  - **Mode**, which can be used to specify the automatic NIBP measurement mode that will initiate when the AUTO key is touched.

In MON mode, you can choose from these NIBP measurement modes:

- **STAT**: Initiates as many NIBP measurements as safely possible in an immediate five-minute timeframe.
- **Interval**: Initiates automatic NIBP measurements at a specified q time interval. When initiated, an immediate measurement starts and the automatic NIBP readings continue at the charting time closest to the next interval. Automatic readings will continue indefinitely until the mode is cancelled or the patient is discharged. (The factory default is **Interval** at q15 minutes.)
- **Protocol** (**Proto 1**, **Proto 2**, or **Proto 3**): Initiates automatic measurement of specified quantities of NIBP measurements to be completed sequentially for multiple, specified q time intervals (for example, blood administration, post-anesthesia recovery, conscious sedation). When initiated, an immediate

measurement is taken. At the next even five-minute increment, a second measurement is taken which serves as the baseline measurement for the protocol. The first reading in the protocol then starts at the first specified q-time in the protocol. For example, Protocol 1 is set to run at **q 15 min x 4** then **q 30 min x 4** followed by **q 60 min x 1**. At 13:02, Protocol 1 is initiated and the following measurements are attempted:

- Immediate measurement at 13:02, when protocol is initiated
- Baseline measurement at 13:05
- First reading at 13:20

Notes:

- *Protocol settings can be set only in the Clinical settings menu by an authorized Clinical Administrator. For more information, refer to the Ultraview DM3 Service Manual. Within the NIBP Setup menu, touching the Protocol Settings key provides a view-only screen to help the user determine which of the three protocols should be specified.*
- *The Interval key is inactive and appears dithered unless Mode is set to Interval.*

To change NIBP settings

1 Touch anywhere in the NIBP parameter zone (other than the **Start** key, or **Auto** key if in MON mode). The **NIBP Setup** window displays.

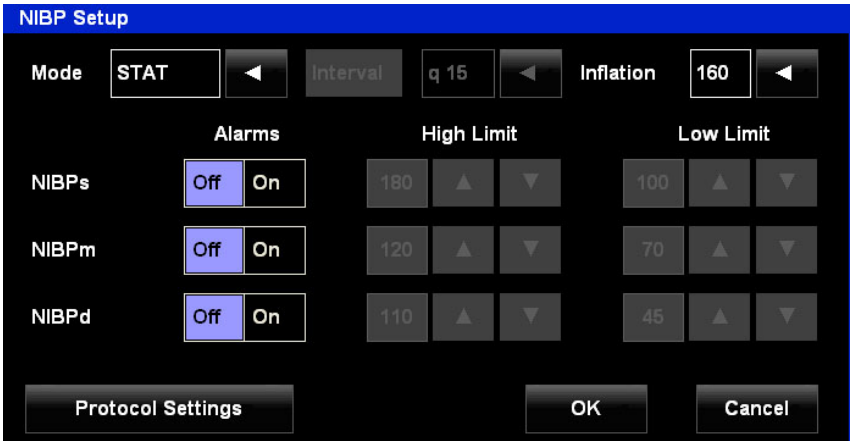


Figure 5-3 NIBP Setup Window (MON Mode)

2 Touch the appropriate arrow key next to the setting you want to change until the new setting is displayed.

3 Touch **OK** to save the settings and display the normal screen.

Monitoring NIBP

To initiate an episodic NIBP measurement (in either SPOT or MON mode)

1. Confirm the NIBP hose is connected to the NIBP port on the left side of the monitor.
2. Attach the NIBP cuff to the patient.
   - To generate good quality NIBP measurements, use a cuff that is the appropriate size for the patient. Measure the circumference of the patient's limb and compare this to the size marked on the NIBP cuff.
   - The patient should be sitting or lying down, and the patient's arm or leg should be relaxed, extended, and resting on a stationary support.
   - Wrap the deflated cuff snugly around the patient's arm or leg according to current AHA guidelines, taking care not to restrict blood circulation.

     If wrapping around the arm, wrap the cuff at 2 to 5 cm above the elbow crease, and place the artery mark (shown at left) over the patient's brachial artery, pointing to the patient's hand.

     If wrapping around the leg, wrap the cuff around the middle of the thigh, and place the artery mark (shown at left) over the patient's femoral artery, pointing to the patient's foot.
   - Tell the patient to remain still during the measurement.
3. Connect the NIBP cuff to the NIBP hose.
4. Confirm the initial inflation pressure by looking at the setting displayed to the right of the **Start** key at the bottom of the parameter zone. Adjust the **Inflation** setting within the **NIBP Setup** menu if necessary.
5. Touch **Start**.

To initiate an automatic series of NIBP measurements (in MON mode only)

1. Confirm the NIBP hose is connected to the NIBP port on the left side of the monitor.
2. Attach the NIBP cuff to the patient.
   - To generate good quality NIBP measurements, use a cuff that is the appropriate size for the patient. Measure the circumference of the patient's limb and compare this to the size marked on the NIBP cuff.
   - The patient should be sitting or lying down, and the patient's arm or leg should be relaxed, extended, and resting on a stationary support.
   - Wrap the deflated cuff snugly around the patient's arm or leg according to current AHA guidelines, taking care not to restrict blood circulation.

     If wrapping around the arm, wrap the cuff at 2 to 5 cm above the elbow crease, and place the artery mark (shown at left) over the patient's brachial artery, pointing to the patient's hand.

     If wrapping around the leg, wrap the cuff around the middle of the thigh, and place the artery mark (shown at left) over the patient's femoral artery, pointing to the patient's foot.

- Tell the patient to remain still during the measurement.

3 Connect the NIBP cuff to the NIBP hose.

4 Confirm the Auto mode by looking at the setting displayed to the right of the **Auto** key at the bottom of the parameter zone. Adjust the **Mode** setting within the **NIBP Setup** menu, if necessary.

5 Touch **Auto**.

- ***Do not use on neonates or infants less than one year of age.***
- ***During NIBP readings, the inflated cuff reduces blood flow to the limb to which it is applied. Consider this when taking frequent manual NIBP readings or when short time intervals for automatic NIBP readings are used (as described in Adjusting Settings on page 5-3). Check the patient periodically to ensure that the cuff does not impair limb circulation.***
- ***Do not apply a cuff to a limb with restricted blood flow, such as a patient with a dialysis shunt or history of mastectomy.***
- ***Do not apply the cuff to any extremity being used for intravenous infusion or catheterization.***
- ***Do not apply the cuff to any area of breached or injured skin.***

Avoid compression or restriction of pressure in the NIBP hose tubing.

Notes:

- *During a measurement, a variety of safety checks are performed. These checks can cause the measurement to be cancelled and pressure to be released from the cuff. The safety checks include an overpressure check (to make sure the cuff pressure is not greater than 270 mmHg), a check to make sure the measurement does not take longer than 135 seconds, and other checks for technical problems such as a blocked line.*
- *If the monitor fails to complete the NIBP measurement, the NIBP zone displays question marks as values. A corresponding message is displayed in the message zone at the bottom of the screen.*
- *This device functions according to specifications in the presence of common arrhythmias such as atrial or ventricular premature beats or atrial fibrillation.*
- *This device can be used to determine blood pressure over a heart rate range of 30 bpm to 240 bpm.*
- *NIBP function is indicated for use with pregnant, including pre-eclamptic, patients.*

Pediatric Considerations

The Ultraview DM3 monitor provides three initial inflation pressure settings (110, 160, or 210 mmHg) within the **NIBP Setup** menu. The factory default selection is 160 mmHg, but 110 can be set as the default for pediatrics, thereby reducing measurement time and increasing patient comfort. After the initial measurement, the monitor uses the previous systolic pressure value to determine cuff inflation pressure for subsequent readings.

In addition, the three inflation pressure settings are default values, which can be set in the **Clinical** menu by an authorized Clinical Administrator. (For information on the **Clinical** menu, refer to the Ultraview DM3 Service Manual.) The lowest configurable initial inflation pressure setting is 100 mmHg. The monitor automatically senses when a pediatric cuff is attached and limits the maximum cuff pressure to 180 mmHg, as opposed to 270 mmHg for larger cuffs.

Do not use on neonates or infants less than one year of age.

Hypertensive Considerations

For hypertensive patients (systolic pressure greater than 220 mmHg), it may be necessary to repeat an NIBP measurement if the first attempt is unsuccessful. The monitor will “learn” the patient’s blood pressure profile from the first attempt, even if it is unsuccessful, and use a higher inflation pressure on a subsequent measurement attempt.

Factors that Affect NIBP Measurement Accuracy

The following conditions can affect the accuracy of NIBP measurement:

- Cuff too small
- Measurement taken over clothing
- Arm above or below heart level
- Patient not rested before measurement
- Patient discomfort
- Renal disease
- Persistent arm motion of patient, including severe tremors

Troubleshooting Guide: NIBP

Table 5-1 NIBP Messages

Message	Parameter Value	Possible Cause	Suggested Action
NIBP - Signal is weak.	???	• Poor limb perfusion. • Improper cuff placement. • Cuff size too large for the patient.	• Check the patient and provide any necessary care. • Ensure the cuff is wrapped properly, with the artery mark lined up over the brachial artery. • Check the limb circumference against the recommended range as printed on the cuff, to ensure the cuff is not too big.
NIBP - Artifact detected.	???	• Persistent patient movement or coughing. • Hemodynamic interference (varying pulse amplitudes due to breathing or valvular problem). • Hose is clogged or leaking.	• Check the patient and provide any necessary care. • Calm the patient. • Move the cuff to another limb with less movement. • If no obvious patient motion, switching to the other limb may still help in the case of hemodynamic interference. • Check the cuff and hose for signs of damage.
NIBP - Cuff leak.	???	• Leaky cuff or hose. • Cuff not applied to patient.	• Check for leaks in the cuff or hose and replace if necessary. • Check that cuff and hose are connected to the monitor. • Check that cuff is applied to patient.
NIBP - Blocked hose. Check patient.	???	• Pinched hose.	• Check the patient and ensure that the cuff is deflated. • Check for kinks or obstructions in the hose. • Replace hose if necessary.
NIBP - Measurement time exceeded.	???	• The measurement time limit (2 minutes and 15 seconds) was exceeded, usually due to motion artifact.	• Repeat the measurement.
NIBP - Problem detected. Restart monitor.	???	• Monitor has detected a hardware problem.	• Check the patient and ensure that the cuff is deflated. • Turn the monitor OFF, then ON. • If message persists, contact Spacelabs Healthcare Technical Support.
NIBP - Cannot measure.	???	• Initial inflation pressure may not have been high enough (if patient's systolic pressure is above 200 mmHg). • Patient movement.	• Repeat the measurement (monitor will automatically adjust to using a higher initial inflation pressure if needed).
NIBPs - Lower than [low limit].	[number]	• The patient's systolic pressure has fallen below the current lower alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
NIBPs - Higher than [high limit].	[number]	• The patient's systolic pressure has risen above the current upper alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.

Table 5-1 NIBP Messages (continued)

Message	Parameter Value	Possible Cause	Suggested Action
NIBPd - Lower than [low limit].	[number]	• The patient's diastolic pressure has fallen below the current lower alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
NIBPd - Higher than [high limit].	[number]	• The patient's diastolic pressure has risen above the current upper alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
NIBPm - Lower than [low limit].	[number]	• The patient's mean pressure has fallen below the current lower alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
NIBPm - Higher than [high limit].	[number]	• The patient's mean pressure has risen above the current upper alarm limit	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
NIBP - Cuff pressure is too high.	???	• NIBP cuff pressure has become too high.	• Tell patient to remain still. Retry measurement. • If message persists, contact Spacelabs Healthcare Technical Support.

Temperature

Overview

The temperature monitoring capabilities of the Ultraview DM3 monitor include:

- Predictive or continuous measurement of the patient's temperature from either an oral or axillary site.

Notes:

- *The continuous measurement capability is only supported in DM3 version 1.5 or newer.*
- *Applies only to units configured with Temperature (91330-T).*

- User entry of the patient's temperature if a device other than the Ultraview DM3 monitor was used to measure it.

Temperature Setup

Note:

Applies only to units configured with Temperature (91330-T).

To set up temperature monitoring

1. Connect the temperature probe to the corresponding connection at the back of the monitor.

Note:

To use the temperature probe extender cable, connect the extender cable to the back of the monitor. Then connect the temperature probe to the extender cable.

2. Insert probe into the probe well.
3. Make sure that the temperature probe cable is threaded into cable retention channel for proper strain relief.

4 Open a box of disposable probe covers and insert the box into the probe cover receptacle.

Display Detail

Figure 6-1 and *Figure 6-2* show the display elements and controls you can use within the temperature parameter zone. In SPOT mode, temperature appears in the upper-left display zone. In MON mode, temperature appears in the lower-left display zone.

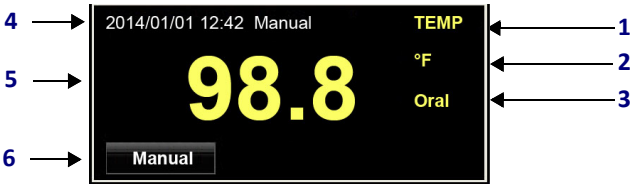


Figure 6-1 Temperature Display Detail (SPOT Mode)

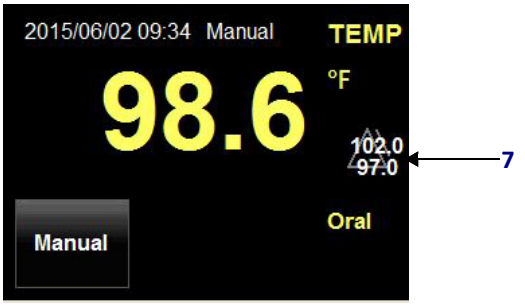


Figure 6-2 Temperature Display Detail (MON Mode)

1 Label for parameter zone.

2 Unit of measure. Displays as **°F** (default) or **°C**.

3 Measurement mode indicator. Displays as **Oral**, **Axil** (axillary), or **Cont** (continuous) based on menu setting.

Note:

In DM3 (version 1.6 and newer) predictive oral temperature measurements are performed in either Standard (default) or Fast mode based on Clinical administrative settings. When set to Fast, the measurement mode will indicate Oral along the right margin of the TEMP parameter zone. Refer to the Administrative Settings section of the DM3 Service Manual for more information.*

4 Datestamp, timestamp, and measurement mode (**Oral**, **Axil**, or **Manual**) for measurement completion. Units without Temperature option (91330-T) will always indicate **Manual** (never **Oral** or **Axil**).

Note:

The monitor displays a stamped measurement for 15 minutes if no subsequent measurements are started. Afterward, the reading is cleared from the display.

5 Temperature reading.

6 Action key used to manually enter the patient's temperature if measured from an alternate device.

7 Alarm status indicator, which shows that alarms are active. The high limit setting appears above the low limit setting. Applies only to MON mode, and only to units configured with Temperature (91330-T).

If alarms are disabled, the symbol to the left appears instead.

Adjusting Settings

Note:

Applies only to units configured with Temperature (91330-T).

To change the monitor's default temperature settings, use the **TEMP Setup** window.

- In SPOT mode, there are three Temp **Mode** settings available: **Oral** (default), **Axillary,** and **Continuous**. If the Temp **Mode** is set to **Oral**, then **Oral predict mode** shows for the user to set to **Standard** (default) or **Fast***.
- In MON mode, in addition to Temp Mode settings, there are settings available for enabling and disabling alarms as well as adjusting High and Low alarm limits.

Note:

The default Mode is Oral. In the event the setting is changed to Axillary, the Mode setting will revert back to Oral upon completion of the Axillary measurement.

To change a temperature setting

1 Touch anywhere in the temperature parameter zone other than the **Manual** key. The **TEMP Setup** window displays.

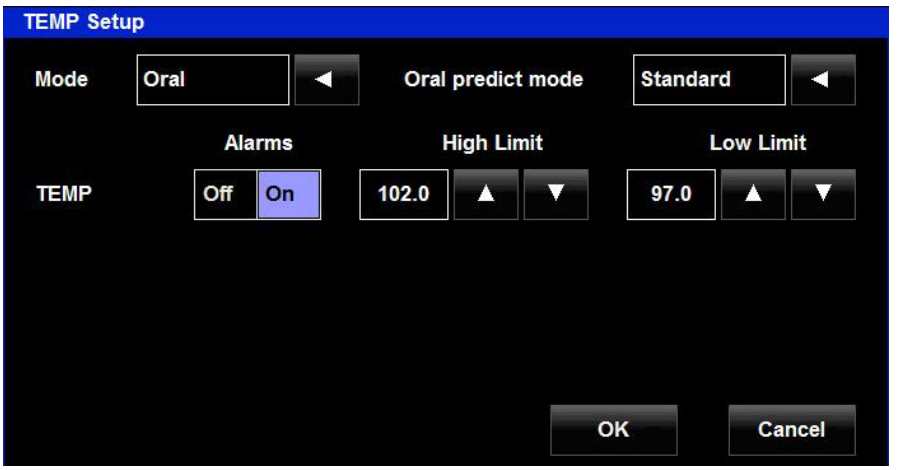


Figure 6-3 TEMP Setup Window (MON Mode)

2 Touch the appropriate arrow key next to the setting you want to change until the new setting is displayed.

3 Touch **OK** to save the settings and display the normal screen.

Monitoring Temperature

Notes:

- *Applies only to units configured with Temperature (91330-T)*
- *The temperature measurement process is valid only when the room temperature is between 60°F and 80°F. Otherwise, a "TEMP - Cannot measure" condition is reported.*

Before starting a temperature measurement, make sure the monitor is set for the measurement mode you want to use—**Oral**, **Axillary**, or **Continuous**. If it is not, use the **TEMP Setup** window to change the **Mode** setting.

Monitoring Temperature (Oral)

To start an oral temperature measurement

1 Make sure **Mode** is set to **Oral**.

Note:

*When **Oral predict mode** is set to **Fast***, **Oral*** (rather than **Oral**) shows in the TEMP parameter zone.*

2 Take the temperature probe out of the probe well. The monitor makes two rapid beeps, a real-time changing value appears, and the **Manual** key disappears.

Notes:

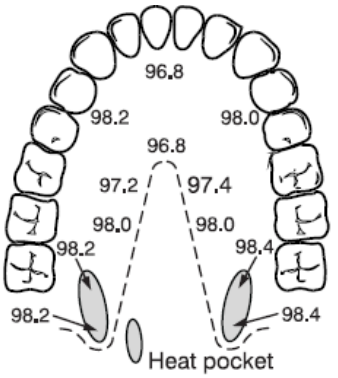
- *If any of the three indications described do not occur, or if a problem appears while you start a new measurement, put the temperature probe back into the well to reset the system, and then start the measurement steps again.*
- *If the parameter zone showed a stamped measurement before you started a new measurement, make sure no completion stamp is displayed when you take the temperature probe out of the well.*

3 Insert the probe into a probe cover from the box of disposable probe covers.

4 Put the temperature probe into the patient's mouth.

Note:

Make sure you place the probe into the sublingual pocket at the base of the tongue shown in Figure 6-4.



Temperatures in the mouth can vary as much as 1.66° C (3° F) from the relatively cool hard palate to the warm sublingual area. To take an accurate oral temperature reading, place the thermometer tip in either the right or left posterior pocket at the base of the tongue.

Figure 6-4 Taking an Accurate Oral Temperature Reading

The monitor continues to show updated values until the reading is finished. After the reading is finished, the monitor makes two rapid beeps and displays a Date/Time completion stamp.

5 Take the probe out of the patient's mouth and press the ring on the top of the probe to eject the cover off the temperature probe.

6 Put the temperature probe back into the probe well.

Monitoring Temperature (Axillary)

To start an axillary temperature measurement

1 Make sure **Mode** is set to **Axil**.

2 Take the temperature probe out of the probe well. The monitor makes two rapid beeps, a real-time changing value appears, and the **Manual** key disappears.

Notes:

- *If any of the three indications described do not occur, or if a problem appears while you start a new measurement, put the temperature probe back into the well to reset the system, and then start the measurement steps again.*
- *If the parameter zone showed a stamped measurement before you started a new measurement, make sure no completion stamp is displayed when you take the temperature probe out of the well.*

3 Insert the probe into a probe cover from the box of disposable probe covers.

4 Put the temperature probe into the patient's axilla area.
The monitor continues to show updated values until the reading is finished. After the reading is finished, the monitor makes two rapid beeps and displays a Date/Time completion stamp.

5 Take the probe out of the patient's axilla area and press the ring on the top of the probe to eject the cover off the temperature probe.

6 Put the temperature probe back into the probe well.

Monitoring Temperature (Continuous)

To start continuous oral or axillary temperature measurement

1 Make sure **Mode** is set to **Continuous** in the **TEMP Setup** menu and that **Cont** is displayed in the TEMP zone.

2 Take the temperature probe out of the probe well. The monitor makes two rapid beeps, a real-time changing value appears, and the **Manual** key disappears.

Notes:

- *If any of the three indications described do not occur, or if a problem appears while you start a new measurement, put the temperature probe back into the well to reset the system, and then start the measurement steps again.*
- *If the parameter zone showed a stamped measurement before you started a new measurement, make sure no completion stamp is displayed when you take the temperature probe out of the well.*

3 Insert the probe into a probe cover from the box of disposable probe covers.

4 Put the temperature probe into the patient's mouth (sublingual pocket at the base of the tongue) or axilla area.

5 Wait at least three minutes and then note the displayed temperature value.

Notes:

- *In Continuous mode, the displayed numeric value is continuously updated to reflect changes in temperature.*
- *The Date/Time completion stamp will not be displayed and the monitor will not beep to indicate auto-complete.*
- *Continuous measurements cannot be stored in the monitor's Trends.*
- *A correct, final temperature reading may require three minutes or longer to complete.*

6 Take the probe out of the patient's mouth or axilla area and press the ring on the top of the probe to eject the cover off the temperature probe.

7 Put the temperature probe back into the probe well.

Note:

The monitor will continue to display a real-time temperature value until the probe is removed from the measurement site and returned to the storage well.

Manually Entering a Measurement Taken from an Alternate Device

To manually enter a temperature measurement that was taken from an alternate device

1 Touch the **Manual** key to change the mode to manual entry mode. The parameter zone shows a default starting value, and a row of control keys appears at the bottom of the parameter zone.

2 Touch the up or down arrow keys until the measured value appears.

3 Touch **OK**.

4 Make sure that the datestamp and timestamp appear.

Troubleshooting Guide: Temperature

Table 6-1 Temperature Messages

Message	Parameter Value	Possible Cause	Suggested Action
TEMP - Cannot measure.	???	• Probe movement during measurement. • Probe temperature higher than 92°F at start of measurement.	• Check the patient and provide any necessary care. • Check to make sure the temperature probe is operational and at an appropriate room temperature.
TEMP - No sensor connected.	[blank]	• Temperature probe disconnected.	• Check to make sure the temperature probe is connected to the temperature cable. • Check to make sure the temperature cable is connected to the Ultraview DM3 monitor.
TEMP - Out of range (High).	???	• The patient's temperature has risen above the maximum value that the monitor can accurately detect. • There is a problem with the connections or with the hardware.	• Check the patient and provide any necessary care. • Check the temperature cable connections. • Turn the monitor OFF, then ON. • If message persists, contact Spacelabs Healthcare Technical Support.
TEMP - Out of range (Low).	???	• The patient's temperature has fallen below the minimum value that the monitor can accurately detect. • There is a problem with the connections or with the hardware.	• Check the patient and provide any necessary care. • Check the temperature cable connections. • Turn the monitor OFF, then ON. • If message persists, contact Spacelabs Healthcare Technical Support.
TEMP - Problem detected. Restart monitor.	???	• Monitor has detected a hardware problem.	• Turn the monitor OFF, then ON. • If message persists, contact Spacelabs Healthcare Technical Support.
TEMP - Replace sensor.	???	• Probe not heating properly.	• Check to make sure the temperature probe is operational.
TEMP - Lower than [low limit].	[number]	• The patient's temperature has fallen below the current lower alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.
TEMP - Higher than [high limit].	[number]	• The patient's temperature has risen above the current upper alarm limit.	• Check the patient and provide any necessary care. • Change the alarm limit if appropriate.

Respiration

Overview

The respiration monitoring capabilities of the Ultraview DM3 monitor include:

- Automatic calculation and display of the patient's minute respiration rate based on real-time manual entry of the patient's breaths over a 15-second period, as determined by the user.
- User entry of the patient's minute respiration rate, as determined by the user.

The respiration monitoring capabilities are available only in SPOT mode to facilitate determination of the patient's minute respiration rate for inclusion to the patient record. The Respiration parameter zone appears in the lower-left corner of the monitor screen.

Display Detail

The following figure shows the display elements and controls you can use within the respiration parameter zone.

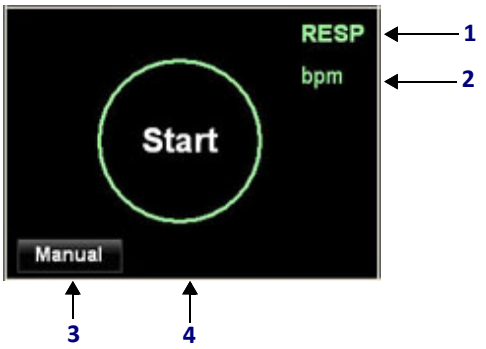


Figure 7-1 Respiration Display Detail (Initial Setup)

1. Label for parameter zone.
2. Unit of measure label. Appears as **bpm** to denote breaths per minute.
3. Action key used to manually enter the patient's respiration rate.
4. Respiration tap pad used to keep a real-time count of patient breaths as they occur. Prior to initial start, the tap pad displays **Start**. After you touch **Start**, the tap pad updates to display the touch target indicated by a plus sign (+). After completion, the tap pad updates to display the minute respiration rate.

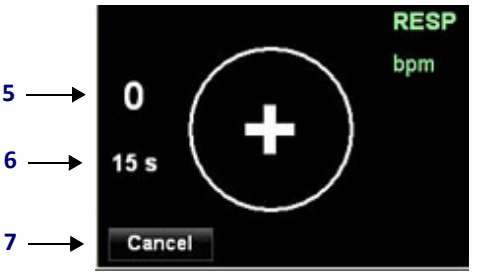


Figure 7-2 Respiration Display Detail (During Tap Pad Entry of Breaths)

5. Tap counter. Displays the current number of times the user has touched the tap pad. Touch the tap pad when you see the patient take a breath.
6. Countdown timer for the Respiration tap pad. Before the first tap entry, this shows **15 s** to denote 15 seconds. Upon initial tap entry, the countdown timer starts to display a real-time countdown to zero seconds.
7. Action key to cancel the current tap pad entry. After you touch **Cancel**, the monitor shows the initial start screen.

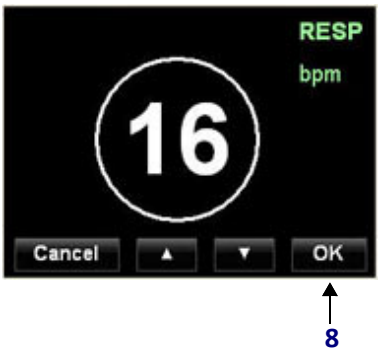


Figure 7-3 Respiration Display Detail (Before Accepting Calculated Value)

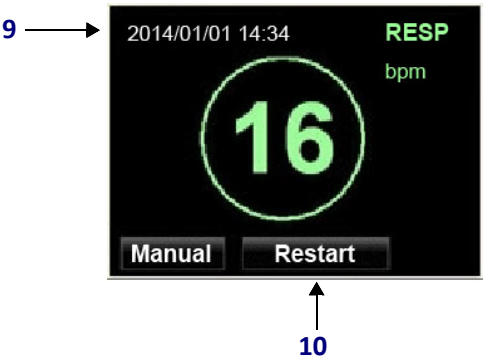


Figure 7-4 Respiration Display d=Detail (Completion)

8 Action key to accept calculated respiration value.

9 Datestamp and timestamp for measurement completion.

Note:

The monitor shows a stamped reading for 15 minutes if no subsequent measurements are started. Afterward, the reading is cleared from the display.

10 Action key to start a new respiration calculation using the tap pad.

Determining Respiration

To determine respiration using the Respiration tap pad

1. Touch **Start** at the center of the tap pad. The monitor makes two rapid beeps. The **Start** label changes to a plus sign (+), and the tap counter and countdown timer appear in the parameter zone.
2. While you observe the patient, touch within the tap pad after each detected breath. The countdown timer starts counting down after the first breath.
3. After the 15-second countdown has elapsed, the monitor emits two more rapid beeps to indicate entry completion. The calculated minute respiration rate is displayed in the tap pad. A row of control keys is displayed at the bottom of the parameter zone.
4. Review the calculated value. If necessary, adjust the value using the arrow keys.
5. Touch **OK** to accept the value. The monitor will emit two more rapid beeps to indicate the value is finalized.
6. Confirm the datestamp and timestamp appear and that the minute respiration rate is displayed in green within the tap pad.
7. If you want to determine a subsequent respiration rate, touch **Restart**. This key disappears along with the respiration value 15 minutes after the datestamp and timestamp appear. The monitor will then revert to the intiial start screen.

To manually enter the patient's respiration rate as determined by the user

1. Touch the **Manual** key to enter manual entry mode.
2. A default starting value of 15 displays within the tap pad and a row of control keys appears at the bottom of the parameter zone.
3. Touch the up or down arrow keys until the measured value appears.

4. Touch **OK**.
5. Make sure that the datestamp and timestamp appear.

Troubleshooting Guide: RESP

Table 7-1 RESP Messages

Message	Parameter Value	Possible Cause	Suggested Action
RESP - Higher than 30.	[number]	• Patient respiration rate has risen above the upper alert limit.	• Check the patient and provide any necessary care. • Change the alert limit if appropriate.
RESP - Lower than 10	[number]	• Patient respiration rate has fallen below the lower alert limit.	• Check the patient and provide any necessary care. • Change the alert limit if appropriate.

Table 7-1 RESP Messages

Message	Parameter Value	Possible Cause	Suggested Action
Three dashes (- - -) in tap pad circle	---	• The patient's calculated respiration rate is below the minimum value that the monitor accepts.	• Check the patient and provide any necessary care. • Retry and/or reenter respiration rate if necessary.
Three plus symbols (+ + +) in tap pad circle	+++	• The patient's calculated respiration rate is above the maximum value that the monitor accepts.	• Check the patient and provide any necessary care. • Retry and/or reenter respiration rate if necessary.

Trends

Overview

The Ultraview DM3 monitor collects measurements of physiologic parameters and stores this data along with the current date and time. The monitor can keep up to 1,000 multi-patient measurement records in SPOT mode and up to 72 hours of continuous, single-patient trend data in MON mode. When the monitor exceeds these limits, the monitor automatically deletes the oldest records first.

To view trends, touch the **Trends** key.

Trends (SPOT Mode)

In SPOT mode, **Trends** shows a list of all physiologic measurement records that have been stored in the monitor using the **Save** key.

Figure 8-1 Trends Display (SPOT Mode)

The **Spot Check Trends** window shows these nine columns of data:

Table 8-1 Columns in Spot Check Trends Window

Column label	Information Shown
Date	• Displays the date when the record was saved. • The first record at the top always shows a date. • Subsequent records that show no date indicate the same date as the most recent record.
Time	• Displays the time, relative to the date, when the record was saved. • Always displays in 24-hour time format. • The column header is a button that, when touched, sorts the records in chronological or reverse-chronological order by Date/Time.
Patient ID	• Displays the patient's ID number as entered by the user in the Demographic window. • If the user has not entered a Patient ID at the time the record is saved, the monitor automatically uses a unique patient ID formatted as: DM_<2-digit day>_<random 9-digit number> • ID numbers that are too long to fully display are displayed as: <...><Last 8 digits of ID> • The column header is a button that, when touched, sorts the records in chronological or reverse-chronological order by Patient ID first and Date/Time second.
SpO2	• Displays the patient's measured SpO_2 saturation percentage.
PR	• Displays the patient's measured pulse rate as the number of beats per minute (bpm). • When SpO_2 is being measured, the PR source is always SpO_2. Otherwise, the PR source is NIBP.
NIBP	• Displays the patient's measured blood pressure in mmHg, which is displayed as: Systolic/Diastolic (Mean)
RESP	• Displays the patient's measured respiration rate as the number of breaths per minute (bpm).
TEMP	• Displays the patient's measured temperature value as °F or °C based on default setting.

At the bottom of the **Spot Check Trends** window is a row of buttons that provide various controls.

Table 8-2 Keys in Spot Check Trends Window

Control Button	Function
	• Up arrow key and down arrow key for moving through the pages of measurement records.
Send	• Initiates network transmission of saved spot-check vital signs records. When the button is pressed, the DM3 attempts to transmit all unsent records to the ICS G2 database. *Note:* *This button is only shown when the DM3 is connected to the ICS G2 database (as indicated by the network connection status icon).*
Delete	• Allows an individual record to be deleted from the **Trends** window. • Touch the record you want to delete. The selected record is highlighted, and the **Delete** key appears active (undithered). Touch the **Delete** key. The selected record disappears.
Filter/Unfilter	• This is a toggle key that you can use to apply a filter to the **Trends** window to show all records for a single patient, or to remove a filter to show all records for all patients. • To apply a filter to the **Trends** window for a single patient, select any of the individual records for that patient. The selected record is highlighted, and the **Filter** key appears active (undithered). Touch the **Filter** key. The monitor shows measurement records only for that patient. The key changes to **Unfilter**.
Print	• When the monitor's optional external 50-mm thermal recorder module is connected, this button can be used to make strip printouts of the trend records. • Touch the **Print** key when the recorder is connected to make a printout for the current page being viewed. To print other pages, use the arrow keys to find the page you want to print, and then touch the **Print** key. • For more information on printing, refer to *Printing* on page 9-1.
Close	• Closes the **Trends** window and returns the monitor to a normal screen state.

Trends (MON Mode)

In MON mode, the **Trends** window keeps physiologic values for a single patient. These values are automatically saved upon completion of the specific measurement.

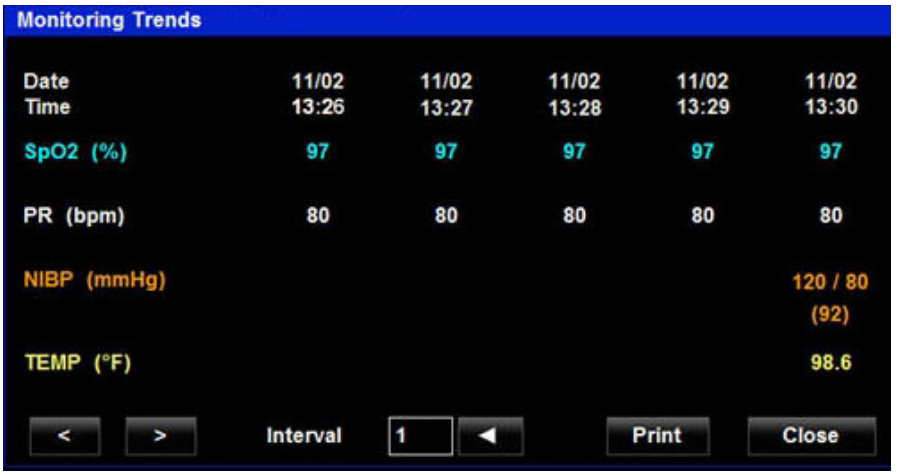


Figure 8-2 Trends Display (MON Mode)

The **Monitoring Trends** window shows these five rows of chronologic data.

Table 8-3 Rows in Monitoring Trends Window

Row Label	Information Shown
Date/Time	• Displays the date and time for the physiological values. • The most recent value or values appear in the last column on the right.
SpO2 (%)	• Displays the patient's measured SpO_2 saturation percentage.
PR (bpm)	• Displays the patient's measured pulse rate as the number of beats per minute (bpm). • When SpO_2 is being measured, the PR source is always SpO_2. Otherwise, the PR source is NIBP.
NIBP (mmHg)	• Displays the patient's measured blood pressure in mmHg, which is displayed as: **Systolic / Diastolic** placed above (**Mean**).
TEMP (°F)/TEMP (°C)	• Displays the patient's measured temperature value as °F or °C based on default setting.

At the bottom of the **Monitoring Trends** window is a row of keys that provide various controls.

Table 8-4 Keys in Monitoring Trends Window

Control Button	Function
	• Left arrow key and right arrow key for moving to older or newer trended measurements.
Interval	• Allows the time resolution of the five trend columns to be changed. • Available choices are **1**, **5**, **10**, **15**, **30**, **60**, or **120** minutes.
Print	• When the monitor's optional external 50-mm thermal recorder module is connected, this button can be used to make strip printouts of the trend records. • Touch the **Print** key when the recorder is connected to make a printout for the current page being viewed. To print other pages, use the arrow keys to find the page you want to print, and then touch the **Print** key. • For more information on printing, refer to *Printing* on page 9-1.
Close	• Closes the **Trends** window and returns the monitor to a normal screen state.

Printing

Overview

The Ultraview DM3 monitor enables the use of an optional 50-mm strip chart recorder to produce spot measurement records, trend data, and alarm-generated recordings. The monitor can generate three types of strip chart recordings:

- Spot Check Parameter Snapshot
- Alarm Condition Report
- Trend Report

Recorder Setup

To connect the recorder to the monitor

1 Plug the recorder cable into the connector at the far right on the back of the monitor.

Figure 9-1 Connector for Strip Chart Recorder

2 Make sure the strip chart recorder is loaded with a roll of paper.

	**Replace the existing roll as soon as the paper begins to show a red line on it. Failure to do so may affect printouts.**

To load or replace paper

1. Press down on the recorder door latch to open the door.
2. Remove the old spool.
3. Insert the new roll of paper. Refer to the diagram on the inside of the recorder door for proper insertion.
4. Close the recorder door latch.

Spot Check Parameter Snapshots

If the monitor is set up to generate Spot Check Parameter Snapshots, these reports print out automatically after spot check measurement records are saved. Spot check recordings contain a header with the current time and date, the patient ID, and a list of all parameters (label, value, and units of measure) that are currently on display.

Alarm Condition Reports

If the monitor is set up to generate Alarm Condition Reports, these reports print out automatically after a monitored parameter exceeds an alarm limit. Alarm-generated strip chart recordings contain a header with an “Alarm Condition” banner, a list of the parameters (label, value, and units of measure) that are currently in alarm, and a list of other monitored parameters.

Trend Reports

When trend data displays on the screen, you can print a hardcopy of the data.

To print a trend report

1. Touch the **Trends** key to display the trend window.
2. Touch **Print**.

Troubleshooting Guide: Printing

Table 9-1 shows the messages issued as a result of conditions related to the strip chart recorder

Table 9-1 Strip Chart Recorder Messages

Message	Possible Cause	Suggested Action
Recorder - Door is open.	• Recorder door is open or not closed completely.	• Close the recorder door.
Recorder - Out of paper.	• No paper installed, or paper roll is empty.	• Add a new roll of paper.
Recorder - Disconnected.	• An attempt was made to print, but the recorder is not connected to the monitor. • If the **Print Setup** settings are enabled, the Ultraview DM3 monitor may automatically attempt to print alarm conditions and spot check measurement records.	• Connect the recorder to the monitor. • One of these events has occurred, but the recorder is not connected.

Troubleshooting

Messages

If you find a problem when you use the Ultraview DM3 monitor, use the information in the following table to help you fix the problem. If you use the information and still cannot fix the problem, turn the monitor off, and then turn it back on. If you still see the problem, contact Spacelabs Healthcare Technical Support.

Condition	Possible Causes	Things to Try
The Ultraview DM3 monitor is plugged in but it does not start up.	No power to outlet.	• Verify that the power outlet is working. • Verify that the green LED on the monitor power supply is illuminated.
	The monitor power supply is not working.	• Verify that the green LED on the monitor power supply is illuminated. • If possible, try using a different monitor power supply to see if that is the problem.
	The monitor is powered OFF.	• Set the power switch to the ON position.
	Internal system error.	• Contact Spacelabs Healthcare Technical Support.
The Ultraview DM3 monitor won't run on battery power.	Battery needs recharging.	• Connect the monitor to mains power. • Verify that the green LED on the monitor power supply is illuminated.
	Battery will not hold a charge.	• Contact Spacelabs Healthcare Technical Support.
The Ultraview DM3 monitor display is not working correctly.	Display failure.	• Stop using the monitor. Contact Spacelabs Healthcare Technical Support to re-check the system installation.

Condition	Possible Causes	Things to Try
The Ultraview DM3 monitor is not working right and displays an error message.	Operating system failure.	• Turn the monitor OFF, then ON. If the condition persists, stop using the monitor, and contact Spacelabs Healthcare Technical Support.
The Ultraview DM3 monitor displays a message stating that the disk is too full.	The monitor disk is too full and needs to be cleaned up.	• Stop using the monitor. Contact Spacelabs Healthcare Technical Support to re-check the system installation.
The Ultraview DM3 monitor displays a message stating that the CPU is too busy.	Internal system failure.	• Stop using the monitor. Contact Spacelabs Healthcare Technical Support to re-check the system installation.
Touch panel does not operate properly.	Display or operational failure.	• Turn the monitor OFF, then ON. If the condition persists, stop using the Ultraview DM3 monitor, and contact Spacelabs Healthcare Technical Support.
Strip chart recorder does not print.	Recorder failure or operational failure.	• Connect a new recorder to the monitor. If a new recorder also does not print, contact Spacelabs Healthcare Technical Support.

Cleaning

Monitors, Cables, and Printers

Cleaning/Disinfecting

- ***Use only recommended cleaning solutions, or you may void the manufacturer's warranty.***
- ***Harsh chemical agents degrade plastics and will compromise the safety of the device. Some germicidal and other harsh cleaning compounds are known to damage some plastics by weakening the structural integrity and compromising the electrical insulating properties.***
- ***Disconnect the equipment from the patient and the electrical supply before cleaning.***
- ***Do not allow liquid to enter the interior of the monitoring equipment.***
- ***Do not immerse the equipment or cables in water or cleaning solutions.***
- ***Do not autoclave.***

Use caution when cleaning cable connectors so that liquid is not permitted to collect around the electrical contacts or seep inside the connector. Trapped liquids and surface residues provide an unintentional electrical path, which may cause noisy signals and false alarms.

To clean the exterior of monitors and cables

1. Prepare the cleaning solution according to the manufacturer's instructions.
2. Wet a clean cloth with the selected cleaning solution.
3. Remove excess liquid from the cloth and squeeze dry.

4 Wipe exposed surfaces of the equipment and cables.

5 Remove any soap residue by gently wiping with a clean damp cloth.

6 Wipe dry with a clean dry cloth.

Use only the following recommended cleaning solutions:

- Mild soap and water solution
- U.S. Pharmacopoeia (USP) green soap
- Sodium hypochlorite solution (1:10 dilution of household chlorine bleach in water)
- Glutaraldehyde (2.4%) (Cidex)
- Isopropyl alcohol (70% solution)

Note:

Over time, repeated use of a chlorine bleach solution may cause some colors to fade.

Tape adhesive can be removed with Spacelabs Healthcare adhesive tape remover pads (P/N 392196-001).

Questions and concerns about cleaning issues should be directed to a Spacelabs Healthcare field service engineer.

Touchscreen Cleaning

Clean the touchscreen with a soft cloth moistened with either 70% isopropyl alcohol solution or soapy water.

Notes:

- *Follow your hospital protocol for the handling of blood and body fluids.*
- *Do not allow liquid to enter the monitor.*

Cleaning Products Not Recommended for Use

- ***Accelerated Hydrogen Peroxide (AHP) and quaternary ammonia-based products ARE NOT RECOMMENDED for cleaning monitors and cables. These chemicals attack the plastics used in patient monitors and cables, and will cause serious safety hazards as the electrical insulating properties and structural integrity of the equipment break down.***
- ***Cavicide, Virex, Virex 256, SaniCloth, and Sanicloth Plus are common quaternary ammonia germicidal products. The manufacturers of these solutions advertise that these germicidal products are safe for use on hard, non-porous surfaces, such as linoleum floors, formica countertops, and stainless steel. The manufacturers discourage the use of quaternary ammonia germicidal products on computer-grade plastics and on data, patient, and power cables, which are classified as porous materials.***

Accessories

- Where provided, follow the manufacturers' instructions concerning disposable and reusable supplies.
- As applicable, follow your hospital protocol concerning cleaning, disinfection, and/or sterilization of reusable supplies.
- Use of patient cables, sensors, or supplies other than those specified by Spacelabs Healthcare may adversely affect monitor performance.

TruLink Reusable and Disposable NIBP Cuffs

The disposable cuff wrap is designed for single patient use. It is packaged non-sterile and cannot be soaked, rinsed, or sterilized.

The reusable cuff is also packaged non-sterile. It may be cleaned and disinfected with an enzymatic detergent and 10% solution of household bleach (5.25% sodium hypochlorite).

Figure 11-1 TruLink reusable and disposable cuffs

Materials

- Enzymatic detergent such as ENZOL (US) or CEDEZYME (UK)
- 10% solution of household bleach (5.25% sodium hypochlorite) in distilled water
- Soft cloths or bristle brushes
- Spray bottles

Procedure

1. Prepare the enzymatic detergent and bleach solutions in separate bottles according to the manufacturer's instructions.
2. Spray detergent liberally on cuff, allowing it to sit for one minute.
3. Remove detergent with a soft cloth. For persistent contamination, scrub with a soft bristled brush.
4. Rinse the cuff thoroughly with distilled water.
5. Spray bleach solution on the affected area until saturated. Allow the cuff to sit for five minutes.
6. Remove any excess solution with a soft cloth and rinse again with distilled water. Allow two hours for air drying at ambient temperature.

Note:

Make sure that water does not enter the hose connector.

UltraCheck NIBP Cuffs

For cleaning instructions, refer to the package insert for the cuffs.

Accessories

Overview

This chapter shows the accessories approved by Spacelabs Healthcare for use with the Ultraview DM3 monitor.

Use only approved accessories with the Ultraview DM3 monitor. Using non-approved accessories may result in damage to the monitoring equipment or in harm to the patient, and may void warranty coverage.

NIBP Monitoring Accessories

Description	Part Number
NIBP Hoses	
Adult Hose, Single Tube, EA, 275 cm (9 ft)	714-0018-00
Adult Hose, Single Tube, EA, 366 cm (12 ft)	714-0060-00
TruLink Reusable Cuffs, Single Tube, Nylon	
Child, 12 to 19 cm (each)	714-0020-00
Child Long, 12 to 19 cm (each)	714-0070-00
Small Adult, 17 to 25 cm (each)	714-0021-00
Small Adult Long, 17 to 25 cm (each)	714-0071-00
Adult, 23 to 33 cm (each)	714-0023-00
Adult Long, 23 to 33 cm (each)	714-0073-00

Description	Part Number
Large Adult, 31 to 40 cm (each)	714-0025-00
Large Adult Long, 31 to 40 cm (each)	714-0075-00
Thigh, 38 to 50 cm (each)	714-0027-00
TruLink Single Patient Use Cuffs, Single Tube, Vinyl	
Child, 12 to 19 cm (5/pkg)	714-1020-00
Small Adult, 17 to 25 cm (5/pkg)	714-1021-00
Adult, 23 to 33 cm (5/pkg)	714-1023-00
Adult Long, 23 to 33 cm (5/pkg)	714-1073-00
Large Adult, 31 to 40 cm (5/pkg)	714-1025-00
Large Adult Long, 31 to 40 cm (5/pkg)	714-1075-00
Thigh, 38 to 50 cm (5/pkg)	714-1027-00
UltraCheck Reusable Cuffs, Single Tube, Antimicrobial Treated	
Child, 13 to 20 cm (5/pkg)	714-4001-00
Small Adult, 18 to 26 cm (5/pkg)	714-4002-00
Adult, 26 to 35 cm (5/pkg)	714-4003-00
Adult Long, 29 to 38 cm (5/pkg)	714-4004-00
Large Adult, 32 to 42 cm (5/pkg)	714-4005-00
Large Adult Long, 35 to 44 cm (5/pkg)	714-4006-00
Thigh, 42 to 50 cm (each)	714-4007-00

Spacelabs Healthcare SpO_2 (Option S) Monitoring Accessories

Description	Part Number
TruLink SpO_2 Adapter Cables	
TruLink SpO_2, 91330-S, 305 cm (10 ft.)	700-0030-00
Spacelabs SpO_2 (91330-S) Reusable Sensors	
TruLink finger sensor	015-0660-00
TruLink multi-site Y sensor, Universal	015-0661-00
Spacelabs SpO_2 (91330-S) Single-Use Sensors	
Foam Sensor, Adult (24/box)	015-0662-00
Vinyl Sensor, Adult (24/box)	015-0663-00
Foam Sensor, Pediatric (24/box)	015-0664-00
Vinyl Sensor, Pediatric (24/box)	015-0665-00

Masimo SET SpO_2 (Option M) Monitoring Accessories

Description	Part Number	
TruLink SpO_2 Adapter Cables		
Masimo SET SpO_2, 91330-M, LNCS Cable, 305 cm (10 ft.)	700-0906-01	
Masimo SET SpO_2, 91330-M, LNOP Cable, 244 cm (8 ft.)	700-0789-01	
Masimo SET SpO_2 (91330-M) Reusable Sensors	**LNCS**	**LNOP**
DCI finger sensor, Adult	690-0247-00	690-0230-00
C-195 finger sensor, Adult	—	690-0235-00
TC-I ear sensor, Adult	690-0249-00	690-0233-00
TF-I transflectance forehead sensor, Adult	690-0250-00	690-0234-00
DCIP finger sensor, Pediatric	690-0248-00	690-0231-00
YI multi-site sensor, Universal	—	690-0232-00

Description	Part Number	
Masimo SET SpO_2 (91330-M) Single-Use Sensors	LNCS	LNOP
Adt adhesive sensor, 20/box, Adult	—	690-0217-00
Adtx adhesive sensor, transparent tape, 20/box, Adult	690-0251-00	690-0218-00
Trauma adhesive sensor, 20/box, Adult	—	690-0265-00
Pdt adhesive sensor, 20/box, Pediatric	—	690-0219-00
Pdtx adhesive sensor, transparent tape, 20/box, Pediatric	690-0252-00	690-0220-00

Nellcor OxiMax SpO_2 Monitoring Accessories

Description	Part Number
TruLink SpO_2 Adapter Cables	
Nellcor OxiMax SpO_2, 91330-N, 305 cm (10 ft.)	700-0792-00
Nellcor OxiMax SpO_2 (91330-N) Reusable Sensors	
DS-100A, Durasensor finger sensor, Adult	690-0003-01
OXI-A/N, Oxiband finger sensor, Adult, 50 adhesive wraps	690-0004-01
OXI-P/I, Oxiband finger sensor, Pediatric, 50 adhesive wraps	690-0039-01
D-YS, Dura-Y multi-site sensor, Universal	690-0215-01

Temperature Monitoring Accessories

Description	Part Number
Replacement Temperature Probe, Oral/Axillary	019-0539-00
Temperature Probe Extender Cable	019-0869-00
Disposable Temperature Probe Covers (200/Carton)	701-0122-00

Printing Accessories

Description	Part Number
External 50 mm Strip Chart Recorder, 91330	010-1852-00
Blank Thermal Paper, 50 mm roll x 304.8 meters (1,000 feet) (10/pk)	307438-001

Mounting Accessories

Description	Part Number
Universal Components	
Mounting Adapter Kit, 91330	016-0825-00
Mounting Kit, 91330 External Recorder	016-0824-00
Rollstand Components	
Rollstand Mount, 91330	016-0823-00
Rollstand Mounting Kit, 91330 Power Supply Holster	016-0827-00
Wall Mount Components	
Wall Mount Arm, 91330	016-0841-00
Mounting Arm Downpost for Recorder Mount, 91330	016-0842-00
Universal Power Supply Holster for Wall Channels	016-0732-00
19” (48.3 cm) Wall Channel	016-0506-00
13” (33.0 cm) Wall Channel	016-0463-00

Other Accessories

Description	Part Number
Wireless Adapter Kit	040-1644-00

Maintenance and Storage

Maintenance

Table 13-1 shows the recommended maintenance procedures for the Ultraview DM3 monitor and its accessories. The monitor does not require periodic recalibration. However, it is a good idea to check that the monitor is in good working order, as described in the table. These checks should be done every 12 months, and can be performed by clinicians or qualified service personnel.

Table 13-1 Recommended Maintenance Procedures

Function	Procedure
Mechanical integrity	Check for cracks, abrasive edges and other signs of damage.
Touch panel	Verify that menu keys respond.
Power LED	Verify that the green LED is illuminated on the Ultraview DM3 power supply.
Battery charging LED	Verify that the LED blinks green when the battery is charging or is on solid when the battery is charged. When not connected to a power supply (battery is not charging), the LED should be off.
Speaker	Turn the monitor off, then on. Verify that the power-ON speaker test tones are generated.
Second speaker	Turn the monitor off, then on. Verify that the power-ON second speaker test tones are generated.
SpO_2	Apply the pulse oximeter probe to your finger. Verify that the reported pulse rate matches your pulse rate as measured on your wrist and that the SpO_2 value seems reasonable (about 95% for a healthy non-smoker).
NIBP	Apply the appropriate-sized blood pressure cuff to your arm. Measure your blood pressure, and verify that the reported blood pressure is reasonably close to your typical blood pressure.

Table 13-1 Recommended Maintenance Procedures (continued)

Function	Procedure
Alarm	Set the monitor to MON mode. Apply the pulse oximeter probe to your finger. Wait for an SpO_2 value to be displayed. Touch the SpO_2 parameter box to enter the SpO_2 menu. Adjust the SpO_2 low limit to be above the current SpO_2 value. Exit the menu. Verify that the SpO_2 parameter box flashes yellow, a medium grade alarm is annunicated, and a flashing yellow message is displayed (SpO_2 - Lower than <low limit>.).
Temperature	Take an oral measurement. The result should be between 97.5°F and 98.6°F for a healthy adult.

If there is a failure in one of the checks, please contact Spacelabs Healthcare Technical Support. If an Ultraview DM3 unit needs to be returned to the factory for repair, Technical Support will provide a return authorization number.

Troubleshooting

Before returning a unit for repair, the procedures shown in the following table may be used to help diagnose problems. The following equipment is needed to perform these diagnostic procedures:

- SpO_2 Simulator (for example, Bio-tek Instruments Index-2)
- Blood Pressure Simulator (for example, Bio-tek Instruments BP-Pump)
- Safety Analyzer (for example, Bio-tek Instruments 505 Series)

Function	Procedure
SpO_2	*Note:* *SpO_2 simulators are not calibration equipment. They can measure only how accurately a particular Ultraview DM3 monitor reproduces a particular SpO_2 calibration curve within the simulator.* To place the monitor back in service after maintenance has been performed, connect the device to a wall outlet. Make sure that cables do not present a tripping hazard. • Connect to Patient Simulator (select appropriate sensor type). • Verify proper SpO_2 value at 84% and 96% (± 2 0_2%). • Verify proper PR value at 30 and 240 bpm (± 5%).

Function	Procedure
NIBP	• Connect to Patient Simulator and take a NIBP measurement. • Verify proper NIBP value at 120/80 (±5 bpm). • Enter **NIBP Calibration Mode**: (**Monitor Setup>Service>Password> NIBP Cal. Mode>On>OK>Close**). • Set the Patient Simulator to read as a pressure gauge. • Inflate the cuff to 250 ±5 mmHg. • Verify that the NIBP parameter value is within ±2 mmHg of the simulator. • Release pressure. *Notes:* • *The NIBP algorithm is modeled on the Bio-tek NIBP simulator. Diastolic pressures may appear marginally low (no more than 6%) if the performance is checked with other patient simulators.* • *Do not allow system to remain pressurized and stable below 20 mmHg. The monitor will remove this pressure as a zero offset and this will affect the validity of the calibration check.* • Inflate cuff to 300 mmHg. • Verify that the pressure is automatically dumped at 300 ±30 mmHg. • Inflate the cuff to 150 mmHg. Allow cuff pressure to settle (thermal effect). • Verify that the pressure drops less than 4 mmHg in 1 minute. • Release pressure. • Inflate cuff to 50 mmHg. • Verify that the pressure is automatically dumped after 180 seconds. • Turn the monitor OFF then ON.
Leakage current	• Connect to Safety Analyzer. • Verify Leakage to ground (normal): lower than 500 µA. • Verify Leakage to ground (reversed polarity): lower than 1000µA. • Verify Leakage to ground (neutral opened): lower than 1000 µA.

Follow safety instructions as indicated in the manual for the analyzer.

Battery Replacement

Rechargeable lithium-ion batteries are widely used in technology today due to their high energy density and efficiency, but they do come with certain risks that require caution.

- ***Risk of overheating and fire: Lithium-ion batteries can overheat and catch fire if they are damaged, improperly charged, or used beyond their use life.***
- ***Toxic and flammable gases: When lithium-ion batteries overheat, they can release toxic and flammable gases, which pose a risk of inhalation and combustion.***
- ***Expired batteries have a fire hazard associated with them when they are used. Check battery age, replace battery pack every two (2) years.***
- ***Replace batteries that no longer hold a charge.***
- ***Do not short circuit, crush, or expose the battery to high temperature, incinerate or disassemble the battery.***
- ***Do not use any damaged battery.***

Safety Tips:

- Purchase: Only buy batteries listed by a nationally recognized testing laboratory and the manufacturer.
- Charging: Use the correct charging equipment and avoid charging at extreme temperatures.
- Storage: Store batteries at room temperature, away from direct sunlight and anything that can burn.
- Handling: Be careful with batteries to prevent physical damage.

If the battery is no longer holding a charge, it may need to be replaced. Under normal conditions of use, the battery lifetime is around two years. Replacing the battery should only be done by qualified service personnel. For more details on this procedure, contact Spacelabs Healthcare Technical Support.

Storage

Table 13-2 Storage Requirements

Storage Temperature	-20°C to 60°C
Storage Humidity	>15% to <95% non-condensing
Storage Altitude	0 to +12,200m

The monitor may not conform to all of its performance specifications if stored outside these environmental specifications or used outside of the environmental specifications in the Technical Data section of this manual.

Disposal

The disposal of accessories such as blood pressure cuffs, temperature probes, and SpO2 sensors should be carried out according to the manufacturer's recommendations.

At the end of its useful life, the Ultraview DM3 monitor should be properly disposed of as well. In particular, the monitor contains a lithium coin battery, a lithium ion battery, and electronic circuit boards which should not be incinerated or exposed to extreme heat.

Contact your local waste disposal agency for guidance on the proper recycling or disposal of these components.

Technical Data

Specifications

General	
Dimensions	10.0 inches W × 6.0 inches H × 5.9 inches D (25.4 cm W × 15.2 cm H × 15 cm D)
Weight	4.0 pounds (1.81 kg)
Power requirements	100 to 240 VAC 0.7 A max
Mains frequency range	50 to 60 Hz
Power consumption	9 W nominal, 25 W (when charging battery)
Standards conformance	IEC 60601-1:2005 CSA C22.2#60601-1:2008 IEC 60601-1-2 (Class B):2004 FCC Part 15 (Class B):1997 IEC 60601-2-30:1999 IEC 60068-2-27:2008 IEC 60068-2-64:2008 ISO 9919:2005 EN 60601-1:2006 EN 60601-1-2:2007 EN 60601-1-4:1997 EN 60601-2-49:2001 EN 1060-1:1996 EN 1060-2:1996 EN 1060-3:1997 EN 1060-4:2004 EN ISO 9919:2005 ANSI/AAMI SP10:2002; SP10/A1:2003; and SP10/A2:2006

Patient risk current (AAMI ES1-1993)	Electromedical Apparatus with Isolated Patient Connection. Meets the following limits: • Enclosure risk current lower than 100 µA • Patient-applied risk current lower than 10 µA • Patient isolation risk current lower than 50 µA • Earth risk current lower than 500 µA
Type of protection (electrical)	Class II
Degree of protection (electrical)	Type BF (SpO_2 Type CF)
Degree of protection (water)	IPX1 (drip proof)
Disinfecting method	Per the instructions in *Cleaning* on page 11-1
Degree of safety (flammable anesthetic mixture)	Not suitable for use in the presence of a flammable anesthetic mixture
Mode of operation	SPOT (spot check) or MON (continuous monitoring)
Battery	
Type	Lithium-ion rechargeable
Operating time	8 hours (minimum)
Charging time	From fully depleted, three hours to 90 percent of full charge. Four hours to full charge.
Environmental	
Cooling	Convection (no fan)
Operating temperature	0° to 40°C
Storage temperature	–20° to 60°C
Operating humidity	15 to 90%, non-condensing
Storage humidity	15 to 95%, non-condensing
Operating altitude	0 to 4,572 m
Storage altitude	0 to 12,200 m
Display	
Type	Active matrix LCD
Display resolution	800 × 480 pixels
Screen size	7 in. (17.8 cm)

SpO_2	
Method	Absorption – Spectrophotometric (dual wavelength) (functional oxygen saturation of arterial hemoglobin)
Resolution	SpO_2 (functional): 1% PR (bpm): 1 bpm
Measurement range	Spacelabs Healthcare SpO_2 (Option S) SpO_2: 20 to 100% PR (bpm): 30 to 240 bpm Masimo SET SpO_2 (Option M) SpO_2: 1% to 100% PR (bpm): 25 to 240 bpm Nellcor OxiMax SpO_2 (Option N) SpO_2: 1% to 100% PR (bpm): 25 to 300 bpm
Measurement accuracy	Spacelabs Healthcare SpO_2 (Option S) SpO_2: from 70 to 100%: ± 2% (O_2%), <70%: unspecified PR: ± 3 bpm Masimo SET SpO_2 (Option M) See product data sheet Nellcor OxiMax SpO_2 (Option N) See product data sheet
Measurement test method	Per ISO 9919, Clause 50
Patents	Units with Masimo SET SpO2 are covered under one or more of the following U.S.A. patents: 5,758,644, 5,823,950, 6,011,986, 6,157,850, 6,263,222, 6,501,975 and other applicable patents listed at http://www.masimo.com/patents.htm Units with Nellcor OxiMax SpO2 are covered by one or more of the following US Patents: 4,802,486; 4,869,254; 4,928,692; 4,934,372; 5,078,136; 5,351,685; 5,485,847; 5,533,507; 5,577,500; 5,803,910; 5,853,364; 5,865,736; 6,083,172; 6,708,049; Re. 35,122 and foreign equivalents.
Temperature	
Probe type	IVAC oral/axillary temperature probe
Display units	° F or ° C (user-selectable)
Measurement resolution	0.1° F (0.1° C)
Measurement range	95.0° F to 106° F
Measurement accuracy	±0.2° F (± 0.1° C) (Continuous mode)

NIBP	
Method	Oscillometric
Resolution	1 mmHg
Measurement range	Systolic: 30 to 250 mmHg Mean: 20 to 230 mmHg Diastolic: 10 to 210 mmHg
Measurement accuracy	Systolic: ±5 mmHg (*s* lower than 8 mmHg) Mean: ±5 mmHg (*s* lower than 8 mmHg) Diastolic: ±5 mmHg (*s* lower than 8 mmHg)
Pulse rate range	30 to 240 bpm
Pulse rate accuracy	±5% or ±2 bpm, whichever is greater
Measurement time	30 seconds (typical) 135 seconds (maximum)
Initial cuff pressure	160 mmHg (user-selectable)
Repeated cuff pressure	Previous systolic + 40 mmHg
Static cuff pressure accuracy	±3 mmHg
Overpressure cutoff	290 ±3 mmHg (normal means), 300 ± 10 mmHg (backup)
Measurement modes	Single, Interval, STAT, Proto 1 (Protocol 1), Proto 2 (Protocol 2), Proto 3 (Protocol 3)
Interval mode measurement settings	Off, 2, 5, 10, 15, 30, 60, 120 minutes

Electromagnetic Compatibility (EMC) Information

Medical electrical equipment requires special precautions regarding Electromagnetic Compatibility (EMC). Portable and mobile Radio Frequency (RF) communications equipment can affect devices such as the Ultraview DM3. As such, the Ultraview DM3 should not be used adjacent to other equipment. If this is not practical, then observe the Ultraview DM3 to make sure it is operating properly after installation.

The use of accessories other than those provided by Spacelabs Healthcare or its distributors may result in increased EMC emissions or decreased EMC immunity of the DM Monitor.

Guidance and Manufacturer's Declaration: Electromagnetic Emissions		
The Ultraview DM3 is intended for use in the electromagnetic environment specified below. The user of the Ultraview DM3 should assure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment/Guidance**
RF emissions CISPR 11	Group 1	The Ultraview DM3 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 CISPR 11	Class B	The Ultraview DM3 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class B	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and Manufacturer's Declaration: Electromagnetic Immunity

The Ultraview DM3 is intended for use in the electromagnetic environment specified below. The user of the Ultraview DM3 should assure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment/ Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±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 percent.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/ output lines	±2 kV for power supply lines ±1 kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV ±2 kV	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 IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 s	<5 % U_T (>95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Ultraview DM3 requires continued operation during power mains interruptions, it is recommended that the Ultraview DM3 be powered from an uninterruptible power supply or a fully charged battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note:

U_T is the a.c. mains voltage prior to application of the test level.

Guidance and Manufacturer's Declaration: Electromagnetic Immunity

The Ultraview DM3 is intended for use in the electromagnetic environment specified below. The user of the Ultraview DM3 should assure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment/Guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 Vrms 3 V/m	Interference may occur in the vicinity of equipment marked with the following symbol: 

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the **Ultraview DM3**

The Ultraview DM3 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the Ultraview DM3 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Ultraview DM3 as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (W)	Separation Distance According to Frequency of Transmitter(m)		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (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.

Notes:

- *At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.*
- *These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.*

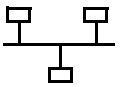
Appendix A — Symbols

The following list of international and safety symbols describes all symbols used on Spacelabs Healthcare products. No one product contains every symbol.

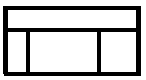
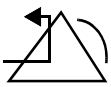
Note:

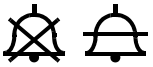
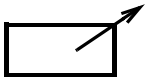
Graphic elements of certain keys and symbols may vary between product lines.

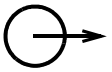
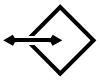
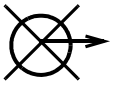
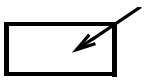
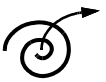
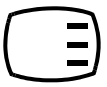
 	HELP Key
?	HELP (Explain Prior Screen) Key
 	MONITOR SETUP Key
	REMOTE Key
 	TRENDS Key

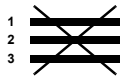
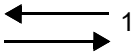
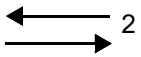
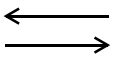
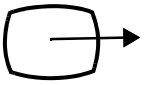
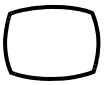
 	RECORD Key
	Dynamic Network Access (DNA) Key
	SPECIAL FUNCTIONS Key
	NORMAL SCREEN Key
	SAVE Key
	No Network Connection
	Network Connection
	Do Not Connect to Network
	No Connection to Intesys® Clinical Suite (ICS)
	Compression
	Magnifying Glass
	File Cabinet
	List of Rooms
	Printer

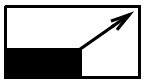
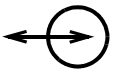
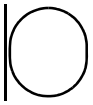
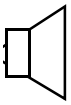
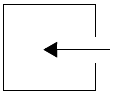
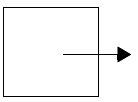
	Service Message
 	PREVIOUS MENU Key
	HOME Key
 	Arrows
	On Direction
	ON — Power Connection to Mains
	ON — Part of the Instrument Only
	ON Position for Push Button Power Switch
	OFF — Power Disconnection from Mains
	OFF Position for Push Button Power Switch
	OFF — Part of the Instrument Only
	Partial ON/OFF
	ON/OFF
	Standby

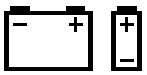
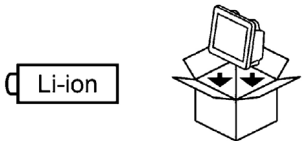
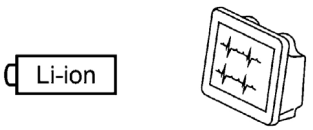
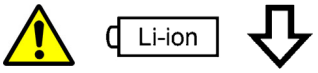
	STANDBY Key Power ON/OFF Key
	Keyboard Connection
	Mouse Connection
	PAUSE or INTERRUPT
	START/STOP Key
	START/STOP
	STOP or CANCEL Key
	CONTINUE Key
	ENTER Key
	Delete
	Nurse Alert Interface
	ALARM SUSPEND/TONE RESET Key
	ALARMS Key
	Alarm, General
	Alarm Reset

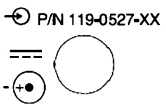
	Alarm Audio ON
	Alarm Audio OFF
	Alarm Audio Paused
	Low Priority Alarm
	Medium Priority Alarm
	High Priority Alarm
	Alarms Paused
	Alarm OFF
---	Parameter below measurement range
+++	Parameter above measurement range
???	Parameter measurement indeterminate
	Indicator — Remote Control
	PRINT REPORT Key
	Normal Screen
	Clock/Time Setting Key
	Slow Run

	Activate Recorder for Graphics
	Reset
	START (NIBP) Key
	Power Indicator LED
	Activate Telemetry Recorder
	Output (Non-terminated)
	Data Input/Output
	Input
	No Output (Terminated)
	Indicator — Local Control
	Indicator — Out of Paper
	Recorder Paper
	Menu Keys
	Waveform/Parameter Keys
	Return to Prior Menu

	Monitor Setup Select Program Options
	Set Initial Conditions Menu
	Access Special Function Menu
	Return Unit to Monitor Mode
	Keypad
	Serial Port 1
	Serial Port 2
	Serial Port
	Auto Mode (NIBP)
	External Marker Push Button Connection
	Arterial Pulse
	Gas Exhaust
	Video Output
	Television; Video Display
	Video Output, Primary
	Video Output, Secondary

	Enlarge, Zoom
	Input/Output
	PCMCIA Card
	Touchscreen, External
	Universal Serial Bus
	SDLC Port
	Hard Drive
	Antenna
	Electrocardiograph or Defibrillator Synchronization
	Microphone
	Foot Switch
	Audio Output, Speaker
	Event
	Gas Sampling Port
	Gas Return Port

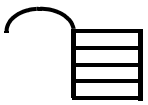
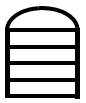
	Battery Replace only with the appropriate battery.
	Battery Status
	Battery Replace only with the appropriate battery.
	Low Battery
	Replace only with the appropriate battery. (+ / - signs may be reversed)
	Battery off. Shipping and service mode.
	Battery on. Regular operating mode.
	Check battery switch on bottom of unit.
	All batteries should be disposed of properly to protect the environment. Lithium batteries should be fully discharged before disposal. Batteries such as lead-acid (Pb) and nickel-cadmium (Ni-Cd) must be recycled. Please follow your internal procedures and or local (provincial) laws regarding disposal or recycling.
	This symbol indicates that the waste of electrical and electronic equipment *must not* be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.
	Caution - hazardous voltages. To reduce risk of electric shock, do not remove the cover or back. Refer servicing to a qualified field service engineer (U.S.A.). DANGER - High Voltage (International)
	Protective Earth Ground
	Replace Fuse Only as Marked
	Power supply jack polarity. (+ / - signs may be reversed)

	Alternating Current
	Both Direct and Alternating Current
	Functional Earth Ground
	Fuse
	Equipotentiality Terminal
	Direct Current
	Input Power. Use only Spacelabs Power Supply (P/N 119-0527-xx).
	AC/DC Input
	Loop Filter
	Audio Output, Speaker
	IEC 60601-1 Type B equipment. The unit displaying this symbol contains an adequate degree of protection against electric shock.
	IEC 60601-1 Type BF equipment which is defibrillator-proof. The unit displaying this symbol is an F-type isolated (floating) patient-applied part which contains an adequate degree of protection against electric shock, and is defibrillator-proof.
	IEC 60601-1 Type BF equipment. The unit displaying this symbol is an F-type isolated (floating) patient-applied part providing an adequate degree of protection against electric shock.
	IEC 60601-1 Type CF equipment. The unit displaying this symbol is an F-type isolated (floating) patient-applied part providing a high degree of protection against electric shock, and is defibrillator-proof.
	IEC 60601-1 Type CF equipment. The unit displaying this symbol is an F-type isolated (floating) patient-applied part providing a high degree of protection against electric shock.

	IEC 60601-1 Class II equipment, double-isolated. The unit displaying this symbol does not require a grounded outlet.
	Warning: Do not modify this equipment without authorization of the manufacturer.
	Operates on Non-Harmonized Radio Frequencies in Europe
	Adult Noninvasive Blood Pressure (NIBP)
	Fetal Monitor Connection (Analog)
	Fetal Monitor Connection RS-232 (Digital)
	Physiological Monitor Connection RS-232 (Digital)
	Noninvasive Blood Pressure (NIBP), Neonate
	Symbol Set, Adult/Pediatric Cuff Sizes
	Symbol Set, Neonatal Cuff Sizes
	NIBP Cuff, Neonatal 1
	NIBP Cuff, Neonatal 2
	NIBP Cuff, Neonatal 3
	NIBP Cuff, Neonatal 4
	NIBP Cuff, Neonatal 5

	NIBP Cuff, Single Hose
	NIBP Cuff, Dual Hose
THIS SIDE TO PATIENT	NIBP Cuff, Surface Applied to Patient
CHILD	NIBP Cuff, Child Size (12 to 19 cm)
CHILD, LONG	NIBP Cuff, Child Size, Long (12 to 19 cm)
SMALL ADULT, LONG	NIBP Cuff, Small Adult Size, Long (17 to 25 cm)
SMALL ADULT	NIBP Cuff, Small Adult Size (17 to 25 cm)
ADULT, LONG	NIBP Cuff, Adult Size, Long (23 to 33 cm)
LARGE ADULT, LONG	NIBP Cuff, Large Adult Size, Long (31 to 40 cm)
LARGE ADULT	NIBP Cuff, Large Adult Size (31 to 40 cm)
ADULT	NIBP Cuff, Adult Size (23 to 33 cm)
INFANT	NIBP Cuff, Infant Size (8 to 13 cm)
NEONATAL 1	NIBP Cuff, Neonatal 1 Size (3 to 6 cm)
NEONATAL 2	NIBP Cuff, Neonatal 2 Size (4 to 8 cm)
NEONATAL 3	NIBP Cuff, Neonatal 3 Size (6 to 11 cm)
NEONATAL 4	NIBP Cuff, Neonatal 4 Size (7 to 13 cm)

NEONATAL 5	NIBP Cuff, Neonatal 5 Size (8 to 15 cm)
THIGH	NIBP Cuff, Thigh Size (38-50 cm)
NYLON	NIBP Cuff, Nylon Material
SOFT	NIBP Cuff, Soft Material
VINYL	NIBP Cuff, Vinyl Material
QTY	Quantity
ARTERY	Place Artery Symbol and Arrow over Brachial or Femoral Artery
	eIFU = electronic Instructions for Use (CD-ROM or website) is available
	Consult Instructions For Use
	Follow Instructions For Use
	Warning About Potential Danger to Human Beings (Consult Accompanying Documents)
	Caution About Potential Danger to a Device (Consult Accompanying Documents)
Note	Note
	Keep Dry
	Indoor Use Only

	Environmental Shipping/Storage Altitude Limitations
	Environmental Shipping/Storage Temperature Limitations
	Fragile
	Handle with Care
	This Way Up
	Up Arrow
	Down Arrow
	Environmental Shipping/Storage Humidity Limitations
	Humidity limitation
	Atmospheric pressure limitation
	Open Padlock
	Closed Padlock
	Happy Face
	Sad Face
	PVC-Free (Polyvinyl Chloride)

	Do Not Reuse; Single Use Only
	Reusable
IPX1	Drip-Proof
IPX7	Unit can withstand accidental immersion in one meter of water for up to 30 minutes
	Reference Number or Order Number
	Use by date [YYYY-MM-DD]
	Recycle
	Non Sterile
	Latex-Free
	Date of Manufacture
	Manufacturer
	Radio transmitting device; elevated levels of non-ionizing radiation
	A CE mark certifies that a product has met EU health, safety, and environmental requirements, which ensure consumer safety.
	XXXX is the European Notified Body number. 0123 is the number for TÜV SÜD Product Service GmbH, München, Germany.
	Canadian Standards Association Approved

RoHS2 2011/65/EU	Does not contain hazardous substances — Europe
	Does not contain hazardous substances — China
LOT	Batch Code
NE 2	Nellcor Oxisensor II Compatible
NV X	Novametrix Compatible
TruLink®	Spacelabs TruLink Compatible
OxiMax	Nellcor OxiMax Compatible
	Spacelabs Compatible
c UL us	UL recognized component in Canada and United States
Nellcor OxiMax Works Here	Nellcor OxiMax Compatible
Masimo SET	Masimo SET Compatible

ABBREVIATIONS USED AS SYMBOLS ARE SHOWN BELOW.

1 - 32	Access Codes 1 Through 32
AIR	Air
A	Amperes
ANT 1 ANT 2	Diversity Antenna System 1 Diversity Antenna System 2
Arr1 ArrNet2	Arrhythmia Net 1 Arrhythmia Net 2
$avDO_2$	Arterial/Venous Oxygen Difference
CaO_2	Arterial Oxygen
CH ch	EEG, EMG, or ECG Channel EEG Channels - CH1, CH2, CH3, CH4 EMG Channel - CH5
cmH_2O	Centimeters of Water
C.O. CO	Cardiac Output
CvO_2	Venous Oxygen
CO2 CO_2	Carbon Dioxide
DIA dia	Diastolic
ECG ecg	Electrocardiogram
EEG eeg	Electroencephalogram
EMG emg	Electromyogram
ESIS	Electrosurgical Interference Suppression
EXT	External
FECG	Fetal Electrocardiogram
FHR1 FHR2	Fetal Heart Rate, Channel 1 Fetal Heart Rate, Channel 2
GND gnd	Ground
Hz	Hertz
Hgb	Hemoglobin
HLO hlo	High-Level Output
Multiview	Multi-Lead Electrocardiogram

N_2O	Nitrous Oxide
NIBP nibp	Noninvasive Blood Pressure
O_2AV	Oxygen Availability
O_2	Oxygen
PaO_2	Partial Pressure of Arterial Oxygen
PRESS press PRS	Pressure
PvO_2	Partial Pressure of Mixed Venous Oxygen
Ref.	Oxygen reference gas port
RESP resp	Respiration
SDLC	Synchronous Data Link Control
SN	Serial number
MDL	Model number
OPT	Option
SPO2 SpO2 SpO_2 SaO_2	Arterial Oxygen Saturation as Measured by Pulse Oximetry
SVO2 $S\bar{v}O2$ $S\bar{v}O_2$	Mixed Venous Oxygen Saturation
SYS sys	Systolic
T1 T2 T3 T4	Temperature 1 Temperature 2 Temperature 3 Temperature 4
TEMP temp	Temperature
UA	Uterine Activity or Umbilical Artery
UV	Umbilical Venous
VAC	Vacuum Connection
VO_2	Oxygen Consumption
V	Volts
W	Watts