COVIDIEN

Home Use Guide

Nellcor™

OxiMax N-560
Pulse Oximeter

Important: Read this manual before using the monitor

If you need help, call the 24-hour hotline of the medical equipment dealer listed below:

OxiMax™
Technology

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Important Information

Introduction

This manual is for the home caregiver — the person who provides care for a patient monitored by the N-560™ pulse oximeter in the home. As the home caregiver, it is important that you read this entire manual before you use the N-560.

This manual contains important safety information and N-560 instructions. If you do not understand any part of this information, ask the clinician who will be monitoring and tracking the patient's results to explain it to you.

Definitions

Clinician

In this manual, the term "clinician" means the trained healthcare professional who assists you with monitoring the patient and using the N-560 in your home. This person can be the doctor or nurse who is treating the patient, or some other trained healthcare professional.

Normal Monitoring Mode

Normal monitoring mode means that:

• the N-560 is turned on

• a sensor is connected to the N-560

• the sensor is applied to the patient

- the patient's %SpO$_2$ (oxygen saturation percentage) and pulse rate readings (BPM) are being reported on the monitor

- no error conditions exist

Oxygen Saturation

A measurement of the percentage of oxygen circulating in the patient's blood. Oxygen saturation is also identified as %SpO$_2$.

Pulse Amplitude

The relative strength of the patient's pulse. A higher pulse amplitude indicates a stronger pulse. A lower pulse amplitude indicates a weaker pulse.

Pulse Oximeter

A medical device that measures a patient's pulse rate and percent of oxygen saturation in the blood. The N-560 is a pulse oximeter.

Pulse Rate

A measurement of the number of times the patient's heart beats per minute. Pulse rate is also called beats per minute or BPM.

Sensor

A sensor is an accessory used to collect and send patient information to the N-560. One end of the sensor is attached to the patient's finger, toe, ear lobe, or forehead and the other end of the sensor connects to the monitor cable. The sensor provides

measurement signals from which the pulse rate and percentage of oxygen in the blood are determined.

Site or Sensor Site

The place on the patient where the sensor is attached.

If You Need Help

Contact the clinician if you have any questions or concerns about using the N-560. If you believe the N-560 is not functioning properly, always notify the clinician, who may be able to correct the problem.

If you require assistance in operating the equipment, and are unable to contact the clinician, call the **24-hour hotline** of your medical equipment dealer. Keep the dealer's business card with this manual. That card identifies the hotline number.

Safety Information

Warnings

Warnings in this manual are identified by the WARNING symbol shown above.

Warnings alert you to potential serious outcomes (death, injury, or adverse events) to you or the patient. Contact the clinician if you have any questions regarding the warnings in this manual.

WARNING: Explosion hazard. Do not use the N-560 pulse oximeter in the presence of flammable anesthetics or gases.

WARNING: Pulse oximetry readings and pulse signals can be affected by certain environmental conditions, oximetry sensor application errors, and certain patient conditions. Refer to the appropriate chapters of this manual, including this chapter, for specific information:

> • *Oximetry Sensors* **on page 27**
> • *Sensor Performance Considerations* **on page 49**
> • *EMI (Electromagnetic Interference)* **on page 61**

WARNING: The use of accessories, oximetry sensors, and cables other than those specified in this manual may result in inaccurate readings of the N-560.

WARNING: Do not lift the N-560 by the oximetry cable or power cord because the cable or cord could disconnect from the N-560, causing the N-560 to drop on the patient.

WARNING: Make sure that the N-560 speaker is clear of any obstruction. Failure to do so could result in an inaudible alarm tone. See Figure 1.
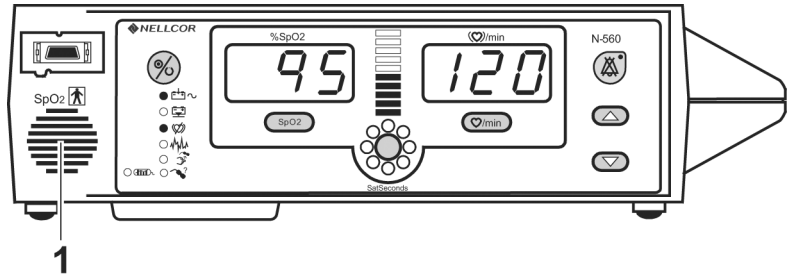
1 — Speaker

Figure 1: N-560 Speaker

WARNING: Make sure that you can hear an audible alarm from other rooms in the home, and when you are using noisy appliances, such as a dishwasher, clothes dryer, television, or radio. Failure to ensure that the alarm volume is appropriate for the environment may place the patient in danger. If you need assistance adjusting the volume, immediately contact the clinician for help.

Cautions

Cautions are identified by the CAUTION symbol shown above.

Cautions alert you to exercise care necessary for the safe and effective use of the N-560.

Caution: Federal law (U.S.A.) restricts this device to sale by or on the order of a physician.

Caution: The oximetry sensor off alarm indicates that the sensor is either disconnected or the wiring is faulty. Check the sensor connection and, if necessary, replace the sensor, pulse oximetry cable, or both. If necessary, contact the clinician for assistance.

Notes

Notes are identified by the Note symbol shown above.

Notes provide additional useful information.

Note: Sensor LED light emissions fall within Class I level, according to IEC 60825-1:2001. No special safety precautions are required.

Purpose of the N-560

> ⚠ **WARNING: The N-560 is only a warning device. You must take action, as directed by the clinician, when an alarm occurs. The N-560 cannot act for you.**

> ⚠ **WARNING: The N-560 and the oximetry sensor are prescription devices. Use only on the patient for whom prescribed and only as directed by the clinician.**

Purpose of the N-560

The N-560 can be used for patients of all ages — infants, children, and adults. The clinician will assist you with the selection and use of the appropriate *OxIMAX* oximetry sensor, based on the size of the patient. (See *Oximetry Sensors* on page 27.) With active patients, single-patient-use sensors are a better choice for monitoring than reusable sensors. (See *Patient Activity Level* on page 28 for more information.)

The N-560 continuously measures the patient's pulse rate and the percentage of oxygen circulating in the blood. When either the patient's pulse rate or the percentage of oxygen goes below or above a pre-set alarm limit, the N-560 warns you by sounding an alarm, lighting an indicator, or changing the number display from green to red.

Role of the Clinician

The clinician is a trained health care professional who will:

- order the N-560 for use in your home
- set up the N-560 for you
- assist you with monitoring the patient
- review the monitored results and the patient's condition
- show you how to use the N-560
- select a sensor for use with the N-560
- show you how to respond to alarms
- show you how to set the alarm limits
- answer your questions about the N-560
- ensure that the N-560 is working correctly
- check with you on a regular basis to make sure the N-560 is meeting your needs

Buttons, Indicators, and Alarms

This section introduces you to the control buttons, status indicators, and symbols on the front and rear panels of your N-560. Audible tones and alarms are also described. Familiarize yourself with this section before using the N-560.

Front Panel Control Buttons
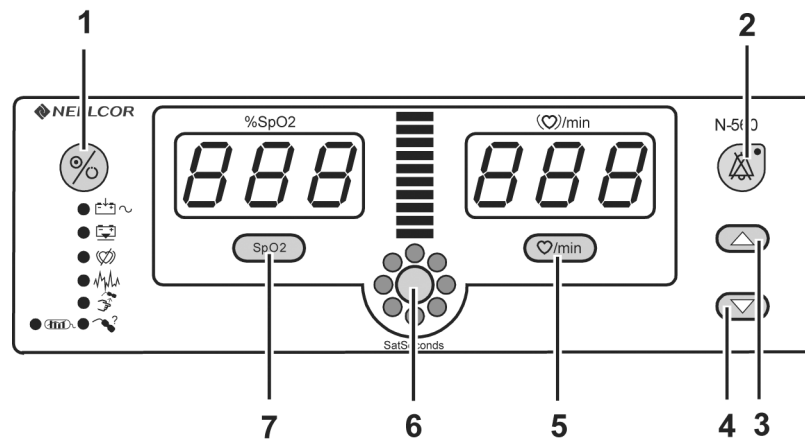
1		Power On/Off Button	5		Pulse Rate Alarm Limit Button
2		Alarm Silence Button	6		*SatSeconds* Alarm Limit Button
3		Adjust Up Button	7		SpO$_2$ Alarm Limit Button
4		Adjust Down Button			

Figure 2: Front Panel Control Buttons

Function of Front Panel Control Buttons

This section identifies and describes the function of each control button located on the front panel. Refer to Figure 2 on page 11 for the location of each button.

Note: Each button press, except the Power On/Off button, should result in either a valid or an invalid button tone. If the button pressed fails to emit a tone, contact the clinician or your medical equipment dealer immediately.

The Power On/off button is used to turn the N-560 on or off. The Power On/Off button must be pressed and held for approximately one second in order to turn the N-560 on or off.

The Alarm Silence button is used to silence current audible alarms for the alarm silence duration period. When an alarm has been silenced, pressing the button again reactivates, or "unsilences" the alarm.

The Adjust Up button is used to increase variable settings of the N-560.

The Adjust Down button is used to decrease variable settings of the N-560.

The Pulse Rate Alarm Limit button is used to view the pulse rate alarm limit. The Adjust Up and Adjust Down buttons are used to increase or decrease the alarm limit setting. The clinician will determine if these settings need to be changed.

The *SatSeconds*™ Alarm Limit button is used to view the *SatSeconds* alarm limit. *SatSeconds* is an alarm management system. The clinician will determine if this feature is appropriate for the patient. The Adjust Up and Adjust Down buttons are used to change the *SatSeconds* limit settings.

SpO2   The SpO2 Alarm Limit button is used to view the SpO2 alarm limit. The Adjust Up and Adjust Down buttons are used to increase or decrease the alarm limit setting. The clinician will determine if these settings need to be changed.

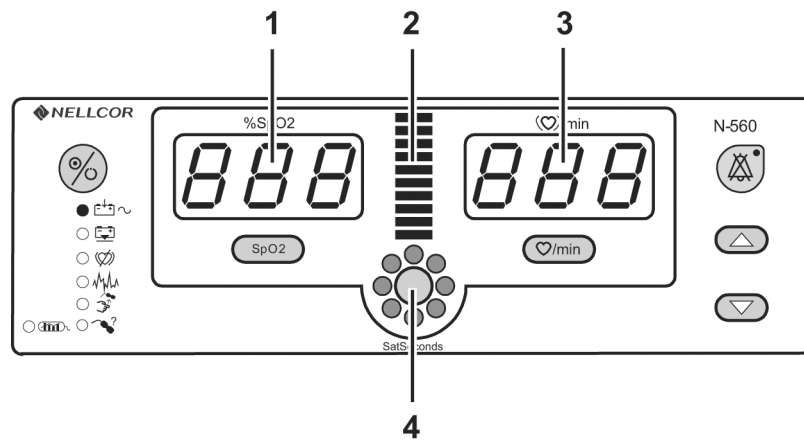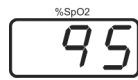## Display Information

1	%SpO2 Display (OXYGEN SATURATION PERCENTAGE)
2	Pulse Amplitude Indicator (Blip bar)
3	Pulse Rate Display (Beats Per Minute – BPM)
4	*SatSeconds* Display

Figure 3: Display Information

Description of Display Information

This section describes the display components, shown in Figure 3.

The **%SpO2** (OXYGEN SATURATION PERCENTAGE) reports the percentage of oxygen circulating in the patient's blood system. You will see a decimal point after this value if the upper and/or lower alarm limit has been changed since the N-560 was last powered on.
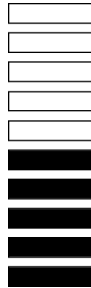
The **Pulse Amplitude** Indicator (BLIP BAR) displays the pulse beat and the relative strength or amplitude of each beat. As the detected pulse becomes stronger, more bars light with each pulse.

The **Pulse Rate** Display (BPM) represents the number of times per minute that the patient's heart beats. You will see a decimal point after this value if the upper and/or the lower alarm limit has been changed since the N-560 was last powered on.
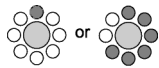
SatSeconds™ is an alarm management system. The clinician will determine if this feature is appropriate for the patient in the home. The *SatSeconds* display only lights if the *SatSeconds* feature is turned on.

Front Panel Status Indicators and Components
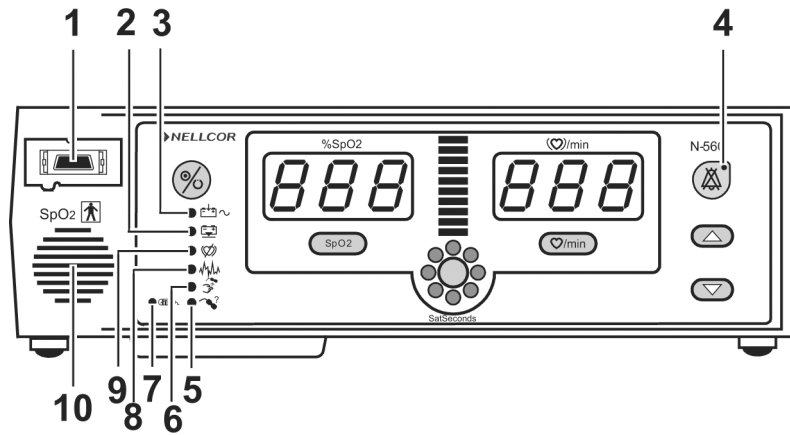
1		SpO2 Port (DOC-10 Cable Connection)
2	● 🔋	Low Battery Indicator
3	● ⎓~	AC Power Indicator
4	🔕	Alarm Silence Indicator
5	● ⌒?	Sensor Message Indicator
6	● ✋	Sensor Off Indicator
7	● ▦	Data In Sensor Indicator
8	● ⋀⋀⋀	Interference Indicator
9	● ⊘	Pulse Search Indicator
10		Speaker (Audible Alarms)

Figure 4: Front Panel Status Indicators and Components

Description of Status Indicators

This section identifies and describes the function of the status indicators located on the front panel. Refer to Figure 4 on page 15 for the location of each indicator.

The **AC Power** Indicator lights continuously when the N-560 is connected to AC power. It also indicates that the battery is charging. The indicator is off when the N-560 is being powered by the internal battery.

The **Low Battery** Indicator lights continuously when 15 or fewer minutes of battery life remains. The indicator flashes when the battery life reaches critical condition. (See *Low Battery Indicator* on page 54.)

The **Alarm Silence** Indicator lights continuously when an audible alarm has been silenced by pressing the **Alarm Silence** button. The indicator flashes when the alarm silence duration has been set to Off.

The **Pulse Search** Indicator lights continuously prior to initial acquisition of a pulse signal and during Pulse Search. If the acquired pulse is lost during monitoring, the N-560 enters the Pulse Search mode. During Pulse Search, the N-560 attempts to detect a pulse from which to take a measurement. The **Pulse Search** Indicator flashes during a loss-of-pulse condition.

The **Sensor Message** Indicator lights when the N-560 cannot determine an SpO2 level or a pulse rate. See *Sensor Message* on page 41 for more information.

The **Sensor Off** Indicator lights when the sensor is no longer on the patient.

The Interference Indicator lights whenever the *OXIMAX* software detects that the incoming signal quality is degraded due to interference. Degradation can be caused by ambient light, electrical noise, electrosurgical interference, patient movement, or other causes.

An intermittently lit Interference indicator is common during patient monitoring, and indicates that the *OXIMAX* software is dynamically adjusting the amount of data required for measuring SpO_2 and Pulse Rate. When lit continuously, it indicates the *OXIMAX* algorithm has extended the amount of data required for measuring SpO_2 and Pulse Rate, and, consequently, fidelity in tracking rapid changes in these values may be reduced (see *Description of Display Information* on page 14).

The **Data In Sensor** Indicator blinks for approximately one minute when a sensor is initially connected to the N-560 to indicate that the attached *OXIMAX* sensor contains a patient alarm event record. The indicator lights continuously to indicate that the attached sensor memory is full.

Front Panel Symbol

This symbol means the N-560 is type BF equipment and is not defibrillator proof.
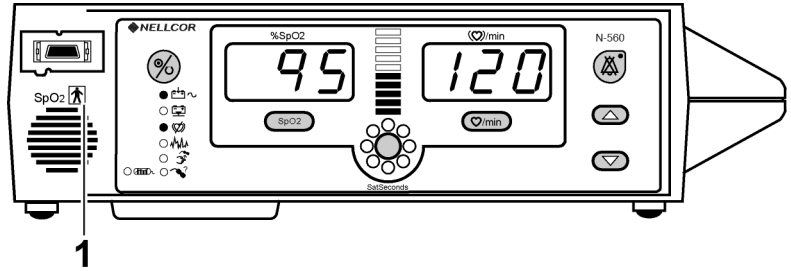
1 — N-560 not defibrillator proof symbol

Rear Panel Components
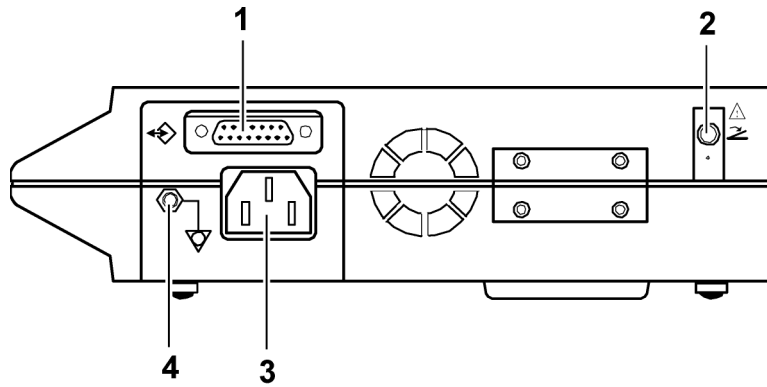
1	Data Port Connector
2	Visual Alarm Connector
3	AC Power Connector
4	Ground (Equipotential Connector)

Figure 5: Rear Panel Components

Rear Panel Symbols

This section describes the symbols located on the rear panel of the N-560.

1		Data port symbol
2		Read the N-560 documentation before using the N-560.
3		Ground symbol

Figure 6: Rear Panel Symbols

Description of Audible Tones and Alarms

Table 1 identifies the audible tones and alarms of the N-560.

Table 1: Audible Tones and Alarms

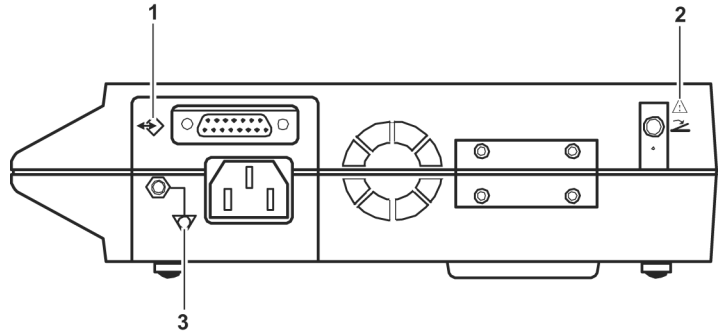| Function	Description
Power-On Self-Test Pass	A one-second tone indicating that the N-560 has been turned on and has successfully completed the power-on self-test.
Valid Button Press	A short, medium-pitched tone indicating that an appropriate button has been pressed.
Invalid Button Press	A short, low-pitched tone indicating that a button has been pressed that is not appropriate for the current state of the N-560.
High Priority Alarm	A high-pitched, fast-pulsing tone indicating loss-of-pulse
Medium Priority Alarm	A medium-pitched, normal-pulsing tone indicating an SpO_2 or pulse rate limit violation.
Low Priority Alarm	A low-pitched, slow-pulsing tone indicating a sensor disconnect, low battery, or system failure.
Alarm Silence Reminder	Three beeps that sound approximately every three minutes.
Pulse Beep	A single beep sounds for each detected pulse. The pulse beep tone changes in pitch with changes in the patient's oxygen saturation.

Table 1: Audible Tones and Alarms (Cont.)

Function	Description
Volume Setting Tone	A continuous tone that sounds as the alarm volume is adjusted.
Confirmation Tone	Three beeps sound to indicate that default settings have been saved or reset to factory defaults or trend data has been deleted.

Setting Up the N-560

This section contains important information regarding the setup of the N-560. Be sure to read and follow all of the warnings and cautions in this section and elsewhere in this manual.

Warnings inform you of situations and events you must avoid to prevent serious or fatal injury to either the patient or yourself.

Cautions alert you to exercise care necessary for the safe and effective use of the N-560.

WARNING: Locate the N-560 near the patient in a position that ensures it cannot accidently fall on the patient. Failure to do so could result in patient injury.

WARNING: Carefully route the oximetry cable between the patient and the N-560 to reduce the possibility of patient entanglement or strangulation.

WARNING: Ensure that the speaker is clear of any obstruction. Failure to do so could result in an inaudible alarm tone.

WARNING: Make sure that you can hear an audible alarm from other rooms in the home, and when you are using noisy appliances, such as a dishwasher, clothes dryer, television, or radio. Failure to ensure that the alarm volume is appropriate for the environment may place the patient in danger. If you need assistance adjusting the volume, immediately contact the clinician for help.

WARNING: Do not connect the N-560 to an electrical outlet controlled by a wall switch, because the N-560 may be accidentally turned off.

WARNING: To ensure accurate performance and prevent device failure, do not place the N-560 in extreme moisture environments, such as direct exposure to rain. Such exposure may cause inaccurate performance or device failure.

WARNING: Inspect the N-560, sensor, cables, and connectors before each use. Do not use any equipment that appears damaged.

WARNING: Do not lift the N-560 by the oximetry cable or power cord because the cable or cord could disconnect from the N-560, causing the N-560 to drop on the patient.

WARNING: Use only the Nellcor pulse oximetry cable DOC-10 with the N-560. Use of another pulse oximetry cable will have an adverse effect on performance. Do not attach any cable that is intended for computer use to the oximetry sensor port. Do not connect any device other than a Nellcor-approved sensor to the DOC-10 cable.

WARNING: The N-560 should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the N-560 should be observed to verify normal operation.

Connecting the N-560 to AC Power

Caution: Use only the hospital-grade power cord provided with the N-560.

1. Plug the power cord into the N-560 power connector on the rear of the N-560. See Figure 7, item 1.
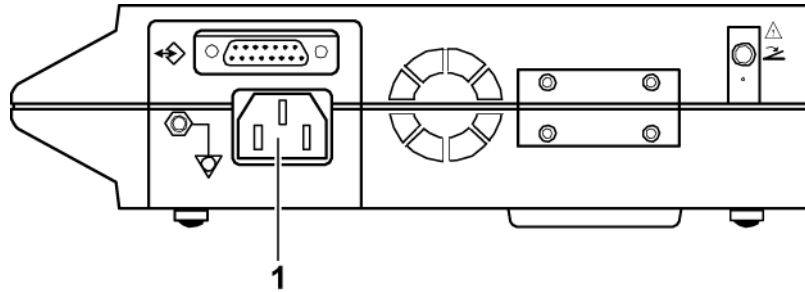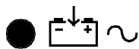

Figure 7: AC Power Connection

WARNING: Do not plug the N-560 into an electrical outlet controlled by a wall switch, because the N-560 may be accidentally turned off.

2. Plug the other end of the power cord into a properly grounded AC outlet.

3. Verify that the N-560's AC Power indicator is lit.

Note: If the AC Power indicator is not lit, do the following:

- Ensure that the power cord is fully seated in the power connector on the rear of the N-560

- Ensure that the AC power outlet is functioning

If the **AC Power** indicator is still not lit, contact the clinician for further assistance.

Oximetry Sensors

Selecting an Oximetry Sensor

WARNING: Before use, carefully read the directions for use that accompany the Nellcor *OxiMax* oximetry sensor, including all warnings, cautions, and instructions.

WARNING: Do not use a damaged sensor or pulse oximetry cable. Do not use a sensor with exposed optical components.

WARNING: Use only Nellcor-approved *OxiMax* sensors and pulse oximetry cable with this N-560. Use of other sensors or pulse oximetry cables may adversely affect N-560 performance.

WARNING: Do not attach any cable that is intended for computer use to the sensor port.

WARNING: Tissue damage can be caused by incorrect application or duration of use of an oximetry sensor. Inspect the sensor site periodically as directed in the sensor directions for use.

WARNING: Do not immerse the sensor in water or wet the sensor.

WARNING: Do not lift the N-560 by the sensor cable or power cord because the cable or cord could disconnect from the N-560, causing the N-560 to drop on the patient.

WARNING: Pulse oximetry readings and pulse signals can be affected by certain environmental conditions, oximetry sensor application errors, and certain patient conditions. Refer to the appropriate chapters of this manual, including this chapter, for specific information:

- *Oximetry Sensors* **on page 27**
- *Sensor Performance Considerations* **on page 49**
- *EMI (Electromagnetic Interference)* **on page 61**

Caution: The sensor off alarm indicates that the sensor is either disconnected or the wiring is faulty. If this error occurs, you should immediately check the sensor connection and, if necessary, replace the sensor, the pulse oximetry cable (DOC-10), or both. If necessary, contact the clinician for assistance.

Contact your clinician before throwing away a used *OXIMAX* adhesive sensor as patient data is recorded in some sensor models.

The clinician will assist in the selection of a Nellcor sensor model that is appropriate for the patient, based in part on patient weight and activity level (See *Patient Activity Level*, below). Table 2 lists the available sensor models and the patient weight ranges for each sensor.

Patient Activity Level

With active patients, *single-patient-use sensors* are a better choice for monitoring than *reusable sensors*. Single-patient-use sensors have a "second-skin" fit that provides more stability, more secure positioning of the LEDs and improved patient comfort.

In general, reusable sensors are less secure on active patients than single-patient-use sensors and are recommended only for spot checking. Some models of reusable sensors are held in place with a wrap; therefore, they may provide a more secure fit on active patients than reusable sensors with a finger-clip design. However, the wraps tend to make the sensor more bulky, which effects patient comfort.

Table 2: Nellcor Oximetry Sensor Models and Patient Weights

OxiMax Sensor	Model	Patient Size >=greater than <=less than
OxiMax MAX-FAST adhesive forehead sensor, single-patient-use	MAX-FAST	>10 kg (>22 lbs)
OxiMax Softcare nonadhesive sensor, single-patient-use, preterm infant	SC-PR	<1.5 kg (<3.3 lbs)
OxiMax Softcare nonadhesive sensor, single-patient-use, neonate	SC-NEO	1.5 to 5 kg (3.3 to 11 lbs)
OxiMax Softcare nonadhesive sensor, single-patient-use, adult	SC-A	>40 kg (>88 lbs)
OxiMax adhesive sensor, single-patient-use, adult	MAX-A	>30 kg (>66 lbs)
OxiMax adhesive sensor, single-patient-use, adult, longer cable 36 inches (91.44 cm)	MAX-AL	>30 kg (>66 lbs)
OxiMax adhesive sensor, single-patient-use, neonatal/adult	MAX-N	<3 kg or >40 kg (<6.6 lbs or >88 lbs)
OxiMax adhesive sensor, single-patient-use, pediatric	MAX-P	10 to 50 kg (22 to 110 lbs)

Table 2: Nellcor Oximetry Sensor Models and Patient Weights (Cont.)

OxiMax Sensor	Model	Patient Size >=greater than <=less than
OxiMax adhesive sensor, single-patient-use, infant	MAX-I	3 to 20 kg (6.6 to 44 lbs)
OxiMax adhesive sensor, single-patient-use, adult nasal	MAX-R	>50 kg (>110 lbs)
OxiMax OxiCliq® nonadhesive sensor, single-patient-use, adult, reusable cable	OxiCliq A	>30 kg (>66 lbs)
OxiMax OxiCliq nonadhesive sensor, single-patient-use, neonatal/adult, reusable cable	OxiCliq N	<3 kg or >40 kg (<6.6 lbs or >88 lbs)
OxiMax OxiCliq nonadhesive sensor, single-patient-use, pediatric, reusable cable	OxiCliq P	10 to 50 kg (22 to 110 lbs)
OxiMax OxiCliq nonadhesive sensor, single-patient-use, infant, reusable cable	OxiCliq I	3 to 20 kg (6.6 to 44 lbs)
OxiMax Durasensor® finger-clip sensor, reusable, adult	DS-100A	>40 kg (>88 lbs)
OxiMax Oxiband® sensor, reusable, neonatal/adult	OXI-A/N	<3 kg or >40 kg (<6.6 lbs or >88 lbs)
OxiMax Oxiband sensor, reusable, pediatric/infant	OXI-P/I	3 kg to 40 kg (6.6 lbs to 88 lbs)

Table 2: Nellcor Oximetry Sensor Models and Patient Weights (Cont.)

OXIMAX Sensor	Model	Patient Size >=greater than <=less than
OXIMAX Dura-Y® multisite sensor, reusable	D-YS	>1 kg (>2.2 lbs)
For use with the Dura-Y sensor:		
Ear clip (Reusable, nonsterile)	D-YSE	>30 kg (>66 lbs)
Pedi-Check™ pediatric spot-check clip (Reusable, nonsterile)	D-YSPD	3 kg to 40 kg (6.6 lbs to 88 lbs)

Using the N-560

Introduction

This chapter contains the instructions for the routine operation of the N-560 in a home-use environment. If you have any questions, or are unsure how to proceed, always contact the clinician for clarification.

Note: Many instructions indicate that the N-560 should be in the "normal monitoring mode." Normal monitoring mode means that:

- the N-560 is turned on

- a sensor is connected to the N-560

- the sensor is applied to the patient

- the patient's %SpO2 (oxygen saturation percentage) and pulse rate readings (BPM) are being reported

- no error conditions exist

Factory Default Settings

Unless otherwise instructed by the clinician, you will use the preset factory default settings for the N-560 parameters. If needed, the clinician can program the N-560 to override the default limits, using instead the settings appropriate for the patient's needs. You can discuss this option with the clinician. Refer to Table 3 on page 34 for the factory default limit settings.

The table below lists each parameter, its range in value or setting, and the factory default setting. The parameters may be set on an individual basis, as instructed by the clinician, and these altered

settings remain in effect until the N-560 is turned off (see following Note).

Note: If you turn off your N-560, you must reenter the values provided by the clinician when the N-560 is turned on again.

Caution: Each time the N-560 is used, check the alarm limits to ensure that they are appropriate for the patient you are monitoring.

Table 3: Parameter Factory Defaults and Ranges

Parameter	Ranges	Factory Default Settings
%SpO$_2$ Upper Alarm Limit	Lower Alarm Limit setting plus 1 to 100%	100%
%SpO$_2$ Lower Alarm Limit	20% to Upper Alarm Limit setting minus 1	85%
Pulse Rate Upper Alarm Limit	Lower Alarm Limit setting plus 1 to 250 beats per minute (BPM)	170 beats per minute (BPM)
Pulse Rate Lower Alarm Limit	30 beats per minute (BPM) to Upper Alarm Limit setting minus 1	40 beats per minute (BPM)
Alarm Silence Reminder	On or Off	On
Alarm Silence Duration	Off, 30, 60, 90, or 120 seconds	60 seconds
Alarm Silence Restrictions	Audible reminder No audible reminder Do not allow alarms off	Audible reminder
Alarm Sound Selector	1, 2, 3	1

Table 3: Parameter Factory Defaults and Ranges (Cont.)

Parameter	Ranges	Factory Default Settings
Alarm Volume	1 to 10	4
Data Port Baud Rate	2400, 9600, 19200	19200
Data Port Protocol	1, 2	1(ASCII)
Display	0, 1	1 (On)
In-Sensor Trend Mode	0, 1, 2	0 (Event SpO_2)
Language	English	English
Pulse Beep Volume	0 to 10	4
RS-232 Nurse Call Priority	Normally high, Normally low	Normally low
SatSeconds	Off, 10, 25, 50, 100	Off
Silence Alarms	0, 1	1 (Off)

Turning On the N-560

Before using the N-560 to monitor the patient, verify that the N-560 is working properly and is safe to use. Each time the N-560 is turned on, it conducts a series of internal checks to verify proper operation, as described in the following section.

Caution: If any indicator or display element does not light during the power-on self test when the N-560 is turned on, do not use the N-560. Instead, contact the clinician to report the problem.

Caution: If the N-560 speaker does not sound a one-second tone shortly after the power comes on, do not use the N-560. Instead, contact the clinician to report the problem.

1. Turn on the N-560 by pressing and holding the Power On/Off button for more than one second.

2. The N-560 displays/sounds:

Display	Sound
5 (in pulse rate left window)	beep tone
6 (in pulse rate center window)	beep tone
0 (in pulse rate right window)	beep tone
n (in SpO2 left window)	none
n (in SpO2 center window)	none
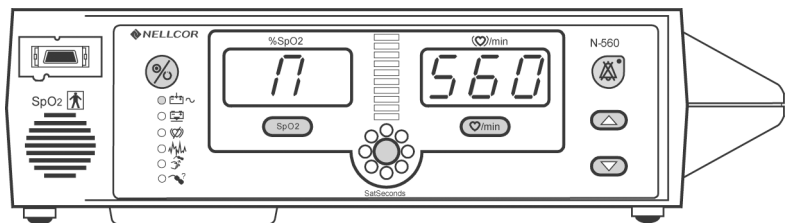
3. The N-560 automatically starts the Power-On Self Test (POST) which tests the N-560 circuitry and functions.

4. While performing the Power-On Self Test (POST), the self-test display appears for approximately 2 to 4 seconds. During this time:

   • All indicators light

   • All numeric digits light and change from red to green

- All segments of the **Pulse Amplitude** Indicator (BLIP BAR) display light

- All segments of the *SatSeconds* indicator light
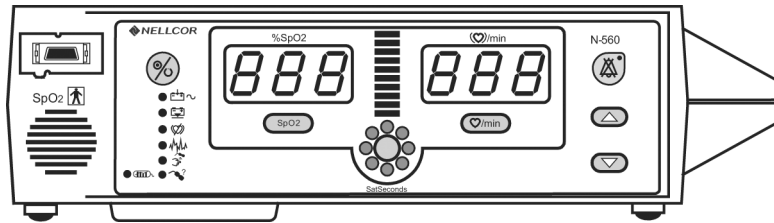
5. Once the display test portion of the Power-On Self Test (POST) is complete, the N-560 software version is displayed for approximately 2 seconds.
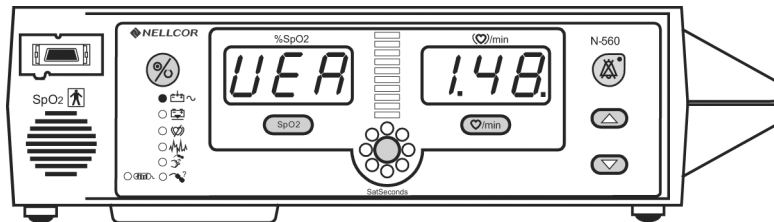
Note: The illustration shown is only a sample. The hardware configuration and software configuration for your N-560 may display a different code than shown in the illustration.

6. If the N-560 detects a problem during the self test, an alarm tone sounds and the N-560 displays the letters "EEE" followed by an error code number, similar to the example shown below. If an error code is displayed, contact the clinician immediately to report that the N-560 is malfunctioning.
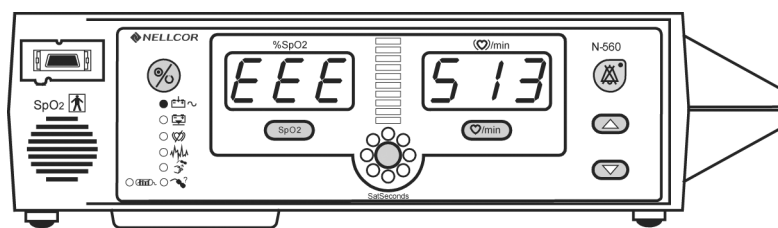
7. Upon successful completion of the self test, the N-560 sounds a one-second tone indicating that the N-560 has passed the test.

Caution: If you do not hear the one-second POST pass tone, do not use the N-560. Instead, contact the clinician to report the problem.

Caution: Do not place objects in front of the N-560's speaker. Doing so could prevent you from hearing an audible alarm while monitoring the patient.

Following successful completion of the self test, the N-560 will immediately move into the patient monitoring mode. If there is no sensor connected to the N-560, or if the connected sensor is not applied to the patient, the N-560 will not display readings for %SPO2 (oxygen saturation percentage) or pulse rate (BPM).

If you have a sensor connected to the N-560 and properly applied to the patient before the completion of the internal check, the N-560 will begin searching for the pulse. Upon successfully detecting a pulse, the N-560 will begin displaying the %SPO2 (Oxygen saturation percentage) and pulse rate (BPM).

Connecting a Sensor to the N-560

A Nellcor pulse oximetry cable, model DOC-10, must always be used to connect a sensor to the N-560. Refer to the directions for use accompanying the DOC-10 cable for additional information. Connect the DOC-10 cable to the N-560 and plug the sensor into the DOC-10 cable, as instructed below.
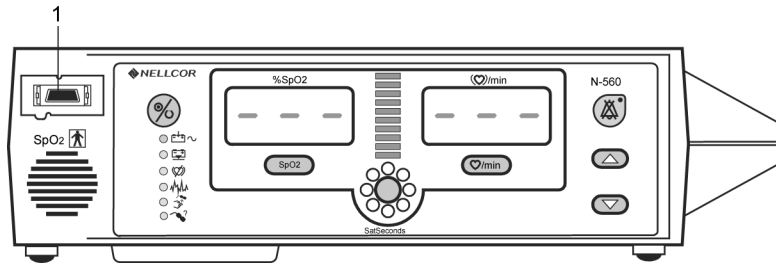
1. Connect the DOC-10 pulse oximetry cable to the pulse oximetry cable connection port (item 1 above) located on the front panel of the N-560.

2. Open the plastic latch at the opposite end of the DOC-10 cable and, with NELLCOR facing up on the sensor connector, plug the sensor and the DOC-10 cable together. Snap the plastic latch down over the connectors.
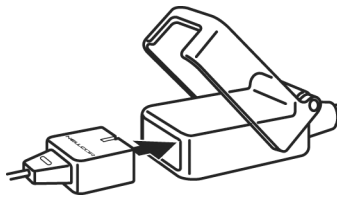

Figure 8: Connecting Sensor and DOC-10 Cable

3. Apply the sensor to the patient, as instructed by the clinician. Be sure to also read the directions for use accompanying the sensor.

4. The N-560 searches for a valid pulse, indicated by the lighted **Pulse Search** indicator. (See item 1 below.) The N-560 displays dashes in the **%SpO2** and **Pulse Rate** displays while the N-560 is searching for a valid pulse.
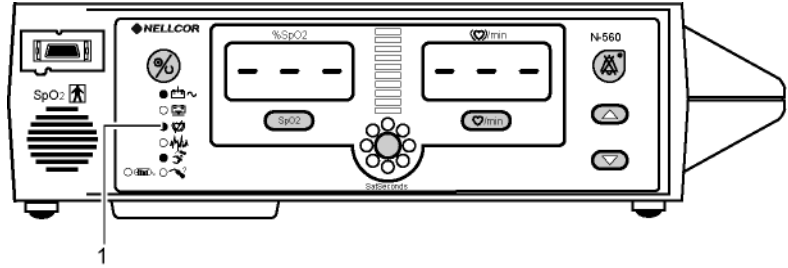
5. When a valid pulse is detected, the N-560 enters the monitoring mode and displays the patient's readings (%SPO2 and pulse rate).
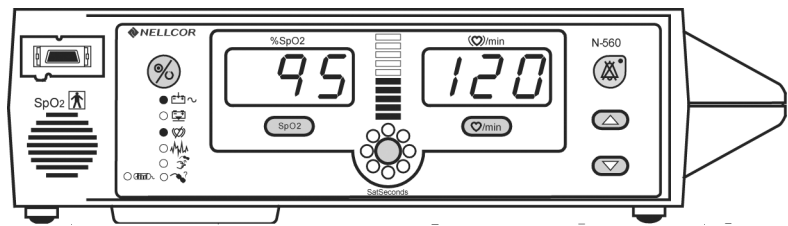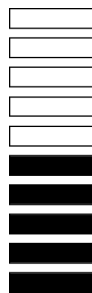
6. Look for movement of the **Pulse Amplitude** Indicator (BLIP BAR) as an indication that the N-560 is displaying real-time data. Listen for the pulse beep tone.

   If the pulse tone does not sound with each pulse, it is an indication that the pulse beep volume is set to zero, that the speaker is malfunctioning, or that the pulse signal is corrupted. See *Setting the Pulse Beep Volume* on page 42.

No Sensor Attached

When a sensor is not attached, the N-560 will display dashes (---) and the Pulse Search indicator will not be lit indicating that the N-560 has failed to detect a sensor.
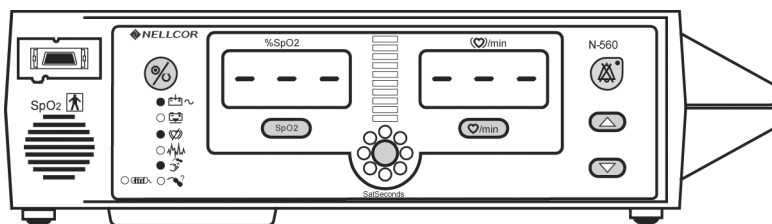
Sensor Message

The **Sensor Message** indicator is displayed when the sensor position or site needs to be checked. (The sensor site is the place on the patient where the sensor is attached.) The **Sensor Message** indicator lights when the N-560 cannot determine an %SPO_2 or pulse rate value. If the **Sensor Message** indicator remains lit, check the following to improve the signal:

- Reposition the sensor

- Check or change the adhesive wrap

- Choose an alternate site

- Warm the site

- Cover the sensor

- Use a forehead (>10 kg), nasal (>50 kg), or ear sensor (>30 kg)

- Use an *OXIMAX* adhesive sensor

- Secure the cable

- Secure the sensor with a headband (*MAX-FAST*)

- Remove any nail polish

- Loosen the sensor (too tight)

- Isolate any external interference (cell phone, high-definition television, another medical device etc.)

- Clean the site (*MAX-FAST* and *MAX-R*)

Contact the clinician for assistance if the Sensor Message indicator continues to light.

Setting the Pulse Beep Volume

After the N-560 begins reporting valid %SPO2 and pulse rate readings, you may adjust the pulse beep volume up or down.

Press and hold the Adjust Up or Adjust Down button to increase or to decrease pulse beep volume.

Setting the Alarm Volume

If the volume of the audible alarm function is too soft or too loud, contact the clinician for assistance.

WARNING: Make sure that you can hear an audible alarm from other rooms in the home, and when you are using noisy appliances, such as a dishwasher, clothes dryer, television, or radio. Failure to ensure that the alarm volume is appropriate for the environment may place the patient in danger. If you need assistance adjusting the volume, immediately contact the clinician for help.

Verify Patient Settings

With the N-560 in normal operating mode:

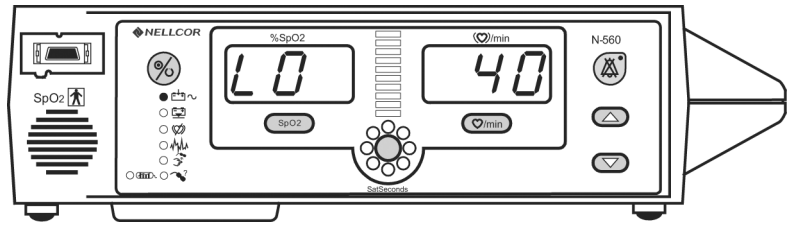SpO2 1. Press the SpO₂ Alarm Limit button to view the current %SpO₂ upper alarm limit.
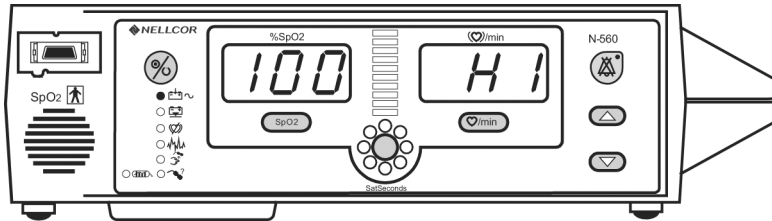
SpO2 2. Press the SpO₂ Alarm Limit a second time to view the current %SpO₂ lower alarm limit.
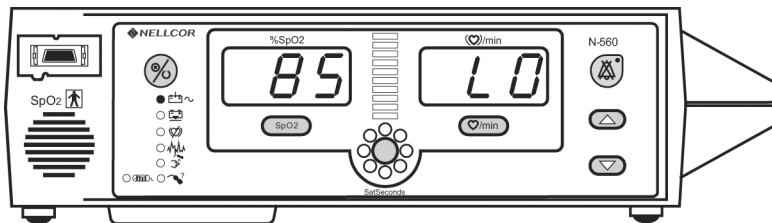
♡/min 3. Press the Pulse Rate Alarm Limit button to view the current Pulse Rate upper alarm limit.
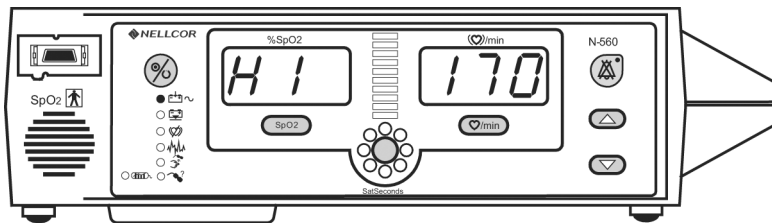
♡/min 4. Press the Pulse Rate Alarm Limit button a second time to view the current Pulse Rate lower alarm limit.

5. Press the *SatSeconds* Alarm Limit button to view the current *SatSeconds* setting.
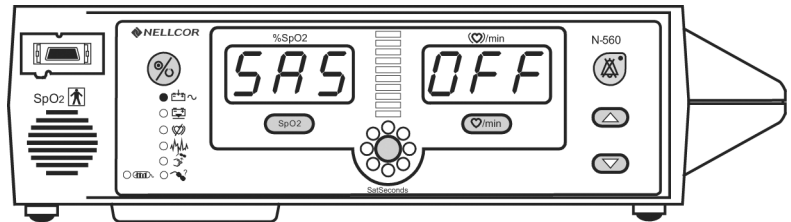
Note: The *SatSeconds* (12 o'clock) indicator lights, indicating that *SatSeconds* have been engaged or you have arrowed up to 10, 25, 50, or 100. The *SatSeconds* (12 o'clock) indicator lights for all *SatSeconds* settings except off. The factory default setting for *SatSeconds* is off.

Note: After a few seconds, the display will return to normal monitoring mode if no buttons are pressed.

Setting Alarm Limits

Alarm limits set the upper and lower range of monitoring. These data points determine when the N-560 will sound an alarm.

The clinician will advise you as to whether or not you should use alarm limits other than the default values when monitoring the patient. If needed, the clinician can program the N-560 to override the default limits, using instead the settings appropriate for the

patient's needs. You can discuss this option with the clinician.
Refer to Table 3 on page 34 for the factory default limit settings.
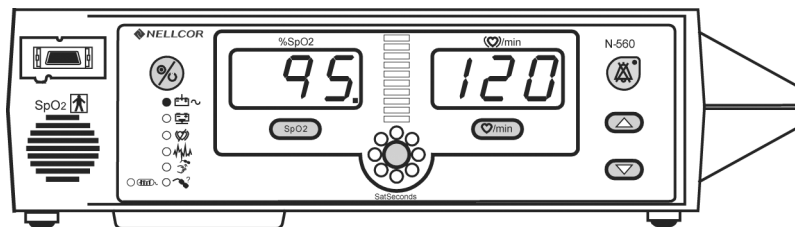
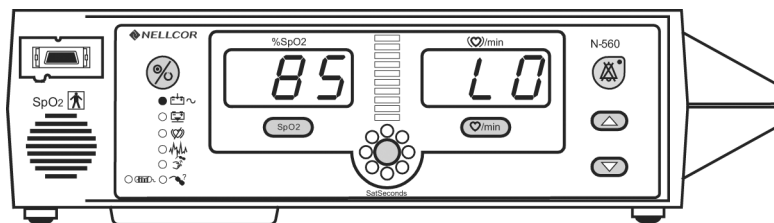1. Press the **SpO2 Alarm Limit** button to view the current %SpO2 upper alarm limit.
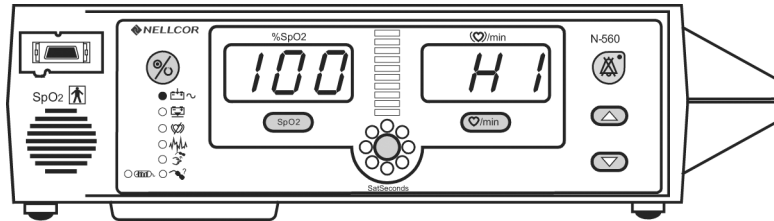
2. Press the **Adjust Up** button or **Adjust Down** button to increase or decrease the alarm limit setting.
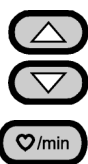
**Note:** When an alarm limit is changed, the N-560 displays a decimal point (.) after the changed value.

3. Press the **SpO2 Alarm Limit** button a second time to view the current %SpO2 lower alarm limit.
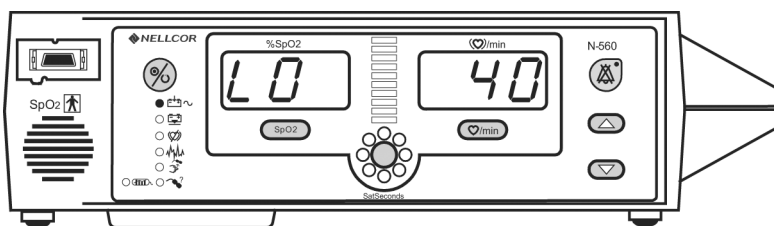
4. Press the **Adjust Up** button or **Adjust Down** button to increase or decrease the alarm limit setting.

5. Press the **Pulse Rate Alarm Limit** button to view the current pulse rate upper alarm limit.
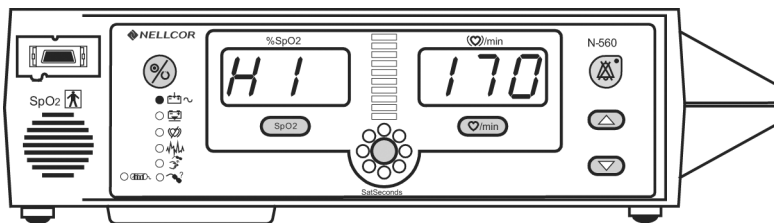
6. Press the **Adjust Up** button or **Adjust down** button to increase or decrease the alarm limit setting.

7. Press the **Pulse Rate Alarm Limit** button a second time to view the current pulse rate lower alarm limit.

8. Press the **Adjust Up** button or **Adjust down** button to increase or decrease the alarm limit setting.

The factory default alarm limits are typically appropriate for adult and pediatric patients. If you are monitoring a neonate or infant, contact the clinician for assistance in changing the upper and lower limits.

If you modify the default value(s) of alarm limits, the change will remain in effect only until the N-560 is turned off. You will need to reenter your limit changes each time you turn on the N-560.
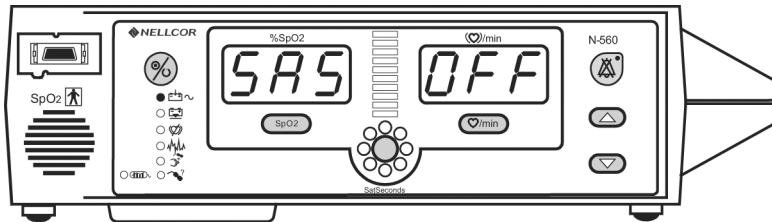
> **Caution: Each time the N-560 is used, check the alarm limits to ensure that they are appropriate for the patient you are monitoring as advised by the clinician.**

Setting *SatSeconds* Duration

1. Press the *SatSeconds* Alarm Limit button to view the current *SatSeconds* setting.

2. Press the Adjust Up button or Adjust down button to increase or decrease the alarm limit setting.

   The available *SatSecond* settings are off, 10, 25, 50, and 100 seconds.

> **Note:** The indicators at 12 o'clock will light when SatSeconds is turned on (engaged) to 10, 25, 50, 100.

Alarm Limit Changed Indicator

Alarm limits that have been changed from the factory default settings are identified by a decimal point after the displayed reading (%SpO2 or Pulse Rate).
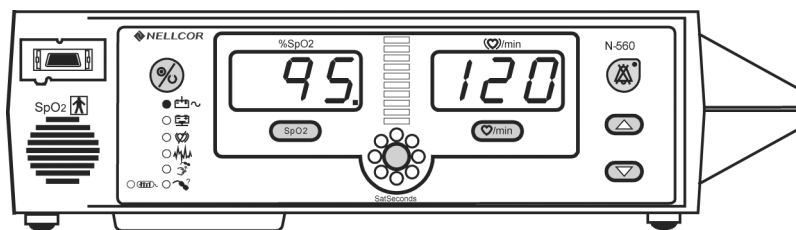
Patient Trend Data

The N-560 stores patient pulse rate and %SpO$_2$ readings in memory, creating a patient trend data history file that can be reviewed at any time by the clinician.

Caution: Contact your clinician before throwing away a used adhesive *OXIMAX* sensor as patient data is recorded by some sensor models.

If it is necessary for you to access the patient data stored in the N-560, the clinician will provide instructions for accessing and viewing this data.

Performance Considerations

Sensor Performance Considerations

Certain patient conditions and environmental factors can adversely affect the quality of the patient's readings, and may result in loss-of-pulse signal. The clinician will assess the patient for these conditions.

WARNING: Pulse oximetry readings and pulse signals can be affected by certain environmental conditions, sensor application errors, and certain patient conditions. Refer to the appropriate chapters of this manual, including this chapter, for specific information:

- *Oximetry Sensors* **on page 27**
- *Sensor Performance Considerations* **on page 49**
- *EMI (Electromagnetic Interference)* **on page 61**

WARNING: Tissue damage can be caused by incorrect application or inappropriate duration of use of an oximetry sensor. Inspect the sensor site as directed in the sensor directions for use.

WARNING: Make sure that you can hear an audible alarm from other rooms in the home, and when you are using noisy appliances, such as a dishwasher, clothes dryer, television, or radio. Failure to ensure that the alarm volume is appropriate for the environment may place the patient in danger. If you need assistance adjusting the volume, immediately contact the clinician for help.

WARNING: Ensure that the speaker is clear of any obstruction. Failure to do so could result in an inaudible alarm tone.

Caution: Use only Nellcor-approved *OxiMax* oximetry sensors and pulse oximetry cables.

The clinician will assist in the selection of a sensor appropriate to the patient, and the monitoring environment. Apply the sensor to the patient, as directed, and observe all warnings and cautions presented in the directions for use accompanying the sensor. Clean and remove any substances such as nail polish from the application site. Periodically check to ensure that the sensor remains properly positioned on the patient.

High ambient light sources such as a bedside lamp, bilirubin lamps, fluorescent lights, infrared heating lamps, and direct sunlight can interfere with the performance of an oximetry sensor. To prevent interference from ambient light, ensure that the sensor is properly applied, and cover the sensor site with opaque material, such as a blanket.

One or more of the following environmental factors or patient conditions can cause inaccurate measurements:

*   incorrect application of the sensor
*   placement of the sensor on an extremity with a blood pressure cuff, arterial catheter, or intravascular line
*   ambient light, such as a lamp at the patient's bedside
*   excessive patient movement
*   intravascular dyes or externally applied coloring, such as nail polish or pigmented cream
*   failure to cover the sensor site with opaque material in high ambient light conditions

One or more of the following environmental factors or patient conditions can cause loss-of-pulse signal:

- sensor is too tightly wrapped around the patient's digit or other extremity
- an inflated blood pressure cuff on the same extremity as the one with the sensor attached
- an arterial occlusion (blocked artery) proximal to the sensor
- poor peripheral profusion (circulation)

If patient movement presents a problem, under the guidance of the clinician, you may try one or more of the following remedies to correct the problem:

- verify that the sensor is properly and securely applied
- move the sensor to a less active site
- use an adhesive *OxiMax* sensor that improves patient skin contact
- use a new sensor with fresh adhesive backing
- keep the patient still, if possible

Battery Operation

Operating on Battery Power

The N-560 has an internal battery that may be used to power the N-560 during transport or when AC power is not available. A fully charged battery will provide at least 8 hours of monitoring time under the following conditions:

• no audible alarms sound

• no serial output devices are attached to the N-560

The N-560 cannot operate with a fully discharged battery. Plug the N-560 into an electrical outlet (AC power) and operate using AC power, while the battery charges.

Automatic Shutdown to Conserve Battery

If you operate the N-560 using the battery, the N-560 will automatically shut down to conserve the battery when all of the three following conditions are present for 15 minutes:

• no buttons have been pressed

• no pulse has been detected (for example, no patient is connected to the sensor or the sensor is disconnected from the N-560)

• no alarms are present (other than low battery or a non-correctable error)

Caution: Do not use the N-560 with battery power unless instructed to do so by the clinician. It is recommended that the N-560 remain plugged into an AC power outlet.

WARNING: Do not connect the N-560 to an electrical outlet controlled by a wall switch, because the N-560 may be accidentally turned off.

Caution: Protect the environment by following local governing ordinances and recycling instructions regarding disposal or recycling of the N-560, components, or battery.

Note: Whenever the N-560 is connected to AC power, the battery is being charged. Therefore, it is recommended that the N-560 remain connected to AC power when not in use. This will ensure a fully charged battery whenever it is needed.

Recharging the Battery

To charge a low or dead battery, connect the N-560 to an electrical outlet (AC power). Six hours of charging are required to fully charge a dead battery.

Note: As the battery is used and recharged over a period of time, the amount of time between the onset of the low battery alarm and the N-560 shut-off may become shorter.

Low Battery Indicator

The Low Battery indicator lights and a low priority alarm begins to sound when approximately 15 minutes of monitoring time remain on the existing battery charge. This alarm cannot be silenced when running on battery power. Connecting the N-560 to AC power will silence the alarm. If the N-560 is not connected to AC power within approximately 15 minutes, the N-560 will shut down.

Caution: If the N-560 is to be stored for a period of two months or longer, contact the clinician for storage instructions. Recharge the battery when the battery has not been charged for two or more months.

T r o u b l e s h o o t i n g

WARNING: The cover should be removed only by qualified service personnel. There are no user-serviceable parts inside.

Caution: Do not spray, pour, or spill any liquid on the N-560, its accessories, connectors, switches, or openings in the covers.

Error Codes

When the N-560 detects an error condition, it will display three letters, "EEE", followed by an error code.
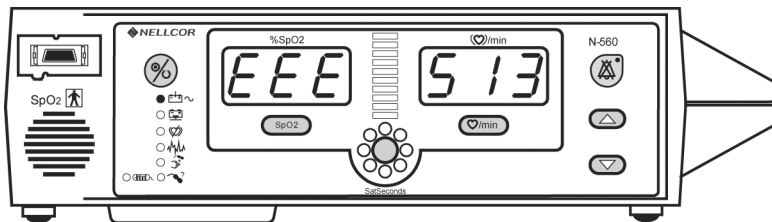
When an error code is displayed, turn the N-560 off, wait 10 seconds, and turn the N-560 on. If the error code is listed in Table 4, follow the action(s) listed. If the action does not correct the error condition, notify the clinician. If the error code is not listed in Table 4, notify the clinician.

When the N-560 detects a defective sensor connected to the N-560 the N-560 displays an error code of "Sen Err." The sensor should be replaced and the N-560 power should be cycled (turn off and then turn on again).
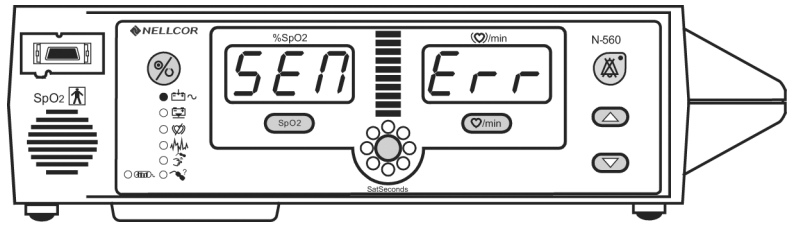
Table 4: Error Codes

Error Code	Action
513	1 — Charge battery. 2 — Notify clinician.
514	1 — Restart the N-560. 2 — Notify clinician.
525	1 — Restart the N-560. 2 — Notify clinician.
526	1 — Restart the N-560. 2 — Notify clinician.
528	1 — Restart the N-560. 2 — Notify clinician.

Solving Problems

Following is a list of possible problems and suggestions for correcting them. If you cannot correct a problem, immediately contact the clinician for further instructions. Do not attempt to monitor the patient using a N-560 that fails the power-on test or is otherwise not operating properly.

1. **There is no response to the Power On/Off button.**

    •   Verify that the electrical wall outlet you are using to power the N-560 is functioning.

- If you are operating on battery power, check for a lighted **Low Battery** indicator. If the **Low Battery** indicator is lit, this indicates that the battery is discharged. To recharge the battery, see *Recharging the Battery* on page 54.

- A fuse in the N-560 may be blown. Notify the clinician.

2. **One or more display segments or front panel indicators does not light during the power-on self test.**

- Do **not** use the N-560. Contact the clinician for further instructions.

3. **The Pulse Search indicator is lit for more than 10 seconds after you begin monitoring the patient. (No readings are reported.)**

- Check the sensor site. The sensor may be applied too tightly to the patient's digit. Reapply the sensor, as necessary.

- The sensor may be on an extremity with a blood pressure cuff, an arterial catheter, or intravascular (I.V.) line. Contact the clinician for further guidance.

- Excessive ambient light, such as a bedside lamp or direct sunlight, may interfere with measurements. Cover the site with an opaque blanket or towel.

- Interference may be preventing the N-560 from tracking the patient's pulse. Keep the patient still, if possible. Verify that the sensor is securely applied, and replace it if necessary.

Note: If interference is an ongoing issue, contact the clinician, who may be able to suggest the use of an alternate sensor site or a different sensor model.

- Contact the clinician to ensure you are using a sensor model appropriate for the patient you are monitoring.

- Electromagnetic interference may be preventing the N-560 from tracking the pulse. Remove the source of the interference. See *EMI (Electromagnetic Interference)* on page 61 for more information.

4. **The Pulse Search indicator lights after some patient readings have been reported.**

- Check the patient. Verify that the patient has a regular pulse rate. If you suspect any problems, contact the clinician immediately.

- Check the sensor site. The sensor may be applied too tightly to the patient's digit. Reapply the sensor, as necessary.

- The sensor may be on an extremity with a blood pressure cuff, an arterial catheter, or intravascular (I.V.) line. Contact the clinician for further guidance.

- Interference may be preventing the N-560 from tracking the patient's pulse. Keep the patient still, if possible. Verify that the sensor is securely applied, and replace it if necessary. See *EMI (Electromagnetic Interference)* on page 61 for more information.

Note: If interference is an ongoing issue, contact the clinician, who may be able to suggest the use of an alternate sensor site or a different sensor model.

- Contact the clinician to ensure you are using a sensor appropriate for the patient you are monitoring.

5. **The N-560 displays three letters, "EEE", followed by a number.**

- This is an error code. Refer to *Error Codes* on page 57.

- Turn the N-560 off and back on again. If the error code occurs again, record the number and provide that

information to the clinician or your medical equipment dealer.

6. **The Low Battery indicator lights.**

- The Low Battery indicator lights when the battery is discharged to a critically low level. Recharge the battery. (See *Recharging the Battery* on page 54.)

- If you have recharged the battery for about ten minutes after the Low Battery indicator was displayed, turn on the N-560. If the Low Battery indicator is still present, turn the N-560 off and allow it continue recharging for another twenty minutes. Check for the Low Battery indicator again by turning on the N-560. If the condition persists, notify the clinician immediately. Do not use the N-560 on the patient.

EMI (Electromagnetic Interference)

Caution: This device has been tested and found to comply with the established limits for medical devices. These limits are designed to provide reasonable protection against harmful interference in a typical home-use environment.

Because of the number of radio-frequency transmitting equipment and other sources of electrical noise in the home-use environment (for example, cellular phones, mobile two-way radios, electrical appliances, and high-definition television), it is possible that high levels of such interference, due to proximity or strength of a source, may result in disruption of the performance of this device.

Disruption by EMI may be evidenced by erratic readings, cessation of operation, or other incorrect functioning of your N-560. If this occurs, the area around the N-560 should be surveyed to determine the source of this disruption, and the following actions taken to eliminate the source:

- Turn the equipment off and on in the vicinity of the N-560 to isolate the offending equipment.

- Reorient or relocate the interfering equipment.

- Increase the separation between the interfering equipment and the N-560.

The N-560 generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this manual, may cause interference with other devices in the vicinity.

If assistance is required, contact the clinician.

Maintenance

Service

WARNING: Do not remove the cover on the N-560. You may cause the N-560 to malfunction and/or void any warranty.

The N-560 requires no routine service or calibration other than changing the battery at least every 24 months. (The clinician will provide assistance if the battery requires replacement.)

If service is necessary, inform the clinician, or contact your medical equipment dealer.

Periodic Safety Checks

It is recommended that the following checks be performed every 24 months.

- Inspect the equipment for mechanical and functional damage.

- Inspect the safety-related labels for legibility.

Cleaning

Caution: Do not spray, pour, or spill any liquid on the N-560, its accessories, connectors, switches, or openings in the chassis.

For surface-cleaning and disinfecting the N-560, follow the clinician's instructions or:

- The N-560 may be surface-cleaned by using a soft cloth dampened with either a commercial, nonabrasive cleaner or a solution of 70% alcohol in water, and lightly wiping the surfaces of the N-560.
- The N-560 may be disinfected using a soft cloth saturated with a 10% chlorine bleach solution, diluted in tap water.

Before you clean an oximetry sensor, check the directions for use enclosed with the sensor for applicable cleaning instructions. If no cleaning instructions are present, the sensor is an adhesive sensor and should be replaced rather than cleaned.

The pulse oximetry cable may be surface-cleaned. Refer to the directions for use, enclosed with the cable, for applicable cleaning instructions.

Specifications

Performance

Measurement Range

SpO2	1% to 100%
Pulse Rate	0 and 20 beats per minute (bpm) to 250 bpm
Perfusion Range	0.03% to 20%

Accuracy and Interference Tolerance

Saturation

Adults[1]	70 to 100% ±2 digits
Neonate	70 to 100% ±3 digits
Low Perfusion[2]	70 to 100% ±2 digits

Pulse Rate

Adult and Neonate[1]	20 to 250 bpm ±3 digits
Low Perfusion[2]	20 to 250 bpm ±3 digits

[1] Adult specifications are shown for *OXIMAX* MAX-A and MAX-N sensors with the N-560. Neonate specifications are shown for *OXIMAX* MAX-N sensors with the N-560. Saturation accuracy will vary by sensor type. Refer to the Sensor Accuracy Grid. The Sensory Accuracy Grid is available on the Internet at:

http://www.mallinckrodt.com/respiratory/resp/Serv_Supp/ProductManuals.html

[2] Specification applies to N-560 performance. Reading accuracy in the presence of low perfusion (detected IR pulse modulation amplitude <1.5%) was validated using signals supplied by a patient simulator. SpO2 and pusle rate values were varied across the monitoring range including weak signal conditions and compared to the known true saturation and pulse rate of the input signals.

Table 5: Tone Definition

Audible Indicator	Parameter	Value
Alarm Silence Reminder	Volume level	Not changeable
	Pitch (±30 Hz)	784 Hz
	Pulse width (±20 msec)	150 msec
	Pulse repetition interval (±20 msec) (double burst)	150 msec
	Repetitions	3
Confirmation of Button Pressed	Volume level	Not changeable
	Pitch (±30 Hz)	784 Hz
	Pulse width (±20 msec)	150 msec
	Pulse repetition interval (±20 msec) (double burst)	150 msec
	Repetitions	3
High Priority Alarm	Volume level	Adjustable alarm volume
	Pitch (±30 Hz)	932 Hz
	Pulse width (±20 msec)	Nellcor = 255 msec
		IAW IEC 60601-1-8 = 120 msec
		IAW EN 475 = 150 msec
	Pulse repetition interval (±20 msec) (double burst)	Nellcor = 320 msec
		IAW IEC 60601-1-8 = 6940 msec
		IAW EN 475 = 7500 msec
	Repetitions	Continually

Table 5: Tone Definition (Cont.)

Audible Indicator	Parameter	Value
Invalid Button Press	Volume level	Not changeable
	Pitch (±30 Hz)	180 Hz
	Pulse width (±20 msec)	70 msec
	Pulse repetition interval (±20 msec) (double burst)	N/A
	Repetitions	1
Low Priority Alarm	Volume level	Adjustable alarm volume
	Pitch (±30 Hz)	500 Hz
	Pulse width (±20 msec)	200 msec
	Pulse repetition interval (±20 msec) (double burst)	15000 msec
	Repetitions	Continually
Medium Priority Alarm	Volume level	Adjustable alarm volume
	Pitch (±30 Hz)	752 Hz
	Pulse width (±20 msec)	Nellcor = N/A
		IAW IEC 60601-1-8 = 160 msec
		IAW EN 475 = 200 msec
	Pulse repetition interval (±20 msec) (double burst)	Nellcor = N/A
		IAW IEC 60601-1-8 = 7600 msec
		IAW EN 475 = 20000 msec
	Repetitions	Continually

Table 5: Tone Definition (Cont.)

Audible Indicator	Parameter	Value
POST Pass	Volume level	Not changeable
	Pitch (±30 Hz)	784 Hz
	Pulse width (±20 msec)	1000 msec
	Pulse repetition interval (±20 msec) (double burst)	N/A
	Repetitions	1
Pulse Beep	Volume level	Adjustable
	Pitch (±30 Hz)	296 Hz to 662 Hz (varies with saturation)
	Pulse width (±20 msec)	40 msec
	Pulse repetition interval (msec ±20 msec) (double burst)	N/A
	Repetitions	1
Valid Button Press	Volume level	Not changeable
	Pitch (±30 Hz)	784 Hz
	Pulse width (±20 msec)	30 msec
	Pulse repetition interval (±20 msec) (double burst)	N/A
	Repetitions	1
Volume Setting	Volume level	Adjustable alarm volume
	Pitch (±30 Hz)	752 Hz
	Pulse width (±20 msec)	Infinite
	Pulse repetition interval (±20 msec) (double burst)	N/A
	Repetitions	N/A

Electrical

Instrument

Power Requirements	100 to 240 volts AC, 25 to 39 volt/amps to be compliant with IEC 60601-1 sub-clause 10.2.2
Fuses	qty 2, 2 A, 250 volts, slow-blow, IEC (5 x 20 mm)

Battery

The battery provides at least eight hours of battery life when new and fully charged with no alarms, no serial data, while using a pulse simulator set for 60 bpm, high light and low modulation.

Type	Nickel metal hydride
Voltage	9.6 Volts DC, 3.8 AH
Recharge	6 hours
Shelf Life	2 months, new, fully charged battery After 2 months storage the N-560 will run for 50% of stated battery life
Complies With	91/157/EEC

Sensors

Electrical/ Optical Specifications	Nellcor Pulse oximetry sensors contain light emitting diodes (LEDs) that emit red (~660 nm) and infrared (~900 nm) light, with a total optical output power of less than 15 mW. This information of sensor wavelength range can be especially useful to clinicians, for example, those performing photodynamic therapy.

Environmental Conditions

Operation

Temperature	50 ºF to 113 ºF (10 ºC to 45 ºC)
Altitude/Barometric Pressure	-390 m to 3,012 m (-1,280 ft. to 9,882 ft.) 70 kPa to 106 kPa (20.6 in. Hg to 31.3 in. Hg)
Relative Humidity	15% to 95% non-condensing to be compliant with IEC 60601-1, sub-clause 44.5

Transport and Storage (not in shipping container)

Temperature	-4 ºF to 140 ºF (-20 ºC to 60 ºC)
Altitude/Barometric Pressure	-390 m to 5,574 m (-1,280 ft. to 18,288 ft.) 50 kPa to 106 kPa (14 in. Hg to 31.3 in. Hg)
Relative Humidity	15% to 95% non-condensing over temperature range of -4 ºF to 140 ºF (-20 ºC to 60 ºC)

Transport and Storage (in shipping container)

Temperature	-4 ºF to 158 ºF (-20 ºC to 70 ºC)
Altitude/Barometric Pressure	-390 m to 5,574 m (-1,280 ft. to 18,288 ft.) 50 kPa to 106 kPa (14 in. Hg to 31.3 in. Hg)
Relative Humidity	15% to 95% non-condensing

Sensor Power Dissipation

Sensor	Dissipation
OXIMAX MAX-N	52.5 mW
OXIMAX MAX-I	52.5 mW
OXIMAX MAX-P	52.5 mW
OXIMAX MAX-A	52.5 mW
OXIMAX MAX-AL	52.5 mW
OXIMAX MAX-R	52.5 mW
OXIMAX Oxiband OXI-A/N	52.5 mW
OXIMAX Oxiband OXI-P/I	52.5 mW
OXIMAX Durasensor DS-100A	52.5 mW
OXIMAX OxiCliq P	52.5 mW
OXIMAX OxiCliq N	52.5 mW
OXIMAX OxiCliq I	52.5 mW
OXIMAX OxiCliq A	52.5 mW
OXIMAX Dura-Y D-YS	52.5 mW
OXIMAX MAX-FAST	52.5 mW
OXIMAX Softcare SC-PR	52.5 mW
OXIMAX Softcare SC-NEO	52.5 mW
OXIMAX Softcare SC-A	52.5 mW

Physical Characteristics

Weight	3.07 lbs. (1.39 kg) without pole mount
Dimensions	2.95 " (H) × 9.06 " (W) × 5.04" (D) (75 mm (H) × 230 mm (W) × 128 mm (D))

Compliance

Item	Compliant With
Equipment classification	Safety Standards: EN 60601-1: 1988 (A1 + A2), CSA C22.2 No. 601.1, UL 60601-1, EN 475, EN 865, EN 60601-1-2: 2001
Type of protection	Class I (on AC power) Internally powered (on battery power)
Degree of protection	Type BF – Applied part
Mode of operation	Continuous
Safety	ISO 9919: 2005(E) Particular requirements for the basic safety and essential performance of pulse oximeter equipment for medical use.

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