NONIN

Operator's Manual

Model 2500C

Charger Stand

English

Consult Instructions for Use.

Nonin reserves the right to make changes and improvements to this manual and the products it describes at any time, without notice or obligation.

Nonin Medical, Inc.
13700 1st Avenue North
Plymouth, MN 55441, USA

Phone: + 1 (763) 553-9968
800-356-8874 (USA and Canada)
E-mail: info@nonin.com

Nonin Medical B.V.
Doctor Paul Janssenweg 150
5026 RH Tilburg, Netherlands

Phone: +31 (0)13 - 45 87 130 (Europe)
E-mail: infointl@nonin.com

www.nonin.com

References to “Nonin” in this manual shall imply Nonin Medical, Inc.

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Indications for Use

The Nonin Model 2500C Charger Stand is intended for use with the PalmSAT Models 2500 and 2500A Pulse Oximeters and the Model 2500B Rechargeable NiMH (Nickel Metal Hydride) Battery Pack.

Warnings

Do not use this product in an MR environment.
Do not use this product in an explosive atmosphere.
This product is not defibrillation proof per IEC 60601-1.
As with all medical equipment, carefully route patient cabling to reduce the possibility of patient entanglement, strangulation, or injury to the patient.
This product should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the product should be observed carefully to verify normal operation.
The use of accessories, sensors, cables, and power supplies other than those listed in the Parts and Accessories List may result in increased electromagnetic emission and/or decreased immunity of this product.
To prevent improper performance and/or patient injury, verify compatibility of the monitor, sensor(s), and accessories before use.
No modifications to this device are allowed as it may affect device performance.
Portable RF communications equipment such as cell phones or radios (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the ME system, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

⚠ *Cautions*

This equipment complies with International Standard 60601-1-2 for electromagnetic compatibility for medical electrical equipment and/or systems. This standard is designed to provide reasonable protection against harmful interference in a typical medical installation. However, because of the proliferation of radio-frequency transmitting equipment and other sources of electrical noise in healthcare and other environments, it is possible that high levels of such interference due to close proximity or strength of a source might disrupt the performance of this product. Medical electrical equipment needs special precautions regarding EMC, and all equipment must be installed and put into service according to the EMC information specified in this manual.
Do not connect this product to an AC outlet controlled by a wall switch. If the switch is accidentally turned off before the battery pack is recharged, the pulse oximeter may not function.
Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked “Hospital Only” or “Hospital Grade”.
This product contains sensitive electronic components and must be repaired by trained Nonin personnel only.
Do not immerse this product in liquid.

⚠ *Cautions (Continued)*

Do not place liquids on top of this product.
Do not use caustic or abrasive cleaning agents on this product.
Do not remove any covers from the product. There are no user-serviceable parts inside the unit.
Do not attempt to charge disposable batteries. Disposable batteries may leak or explode if used improperly.
Follow local, state and national governing ordinances and recycling instructions regarding disposal or recycling of the product and product components, including batteries. Use only Nonin-approved battery packs.
In compliance with the European Directive on Waste Electrical and Electronic Equipment (WEEE) 2002/96/EC, do not dispose of this product as unsorted municipal waste. This product contains WEEE materials; please contact your distributor regarding take-back or recycling of the product. If you are unsure how to reach your distributor, please call Nonin for your distributor's contact information.

Guide to Symbols

This table describes the symbols that are found on the Model 2500C and in this manual.

Table 1: Labeling Symbols

Symbol	Description
	Caution!
	Consult Instructions for Use.
	Follow Instructions for Use.
	UL Mark for Canada and the United States with respect to electric shock, fire, and mechanical hazards only in accordance with UL 60601-1 and CAN/CSA-C22.2 No. 601.1.
	MR Unsafe
	Type BF Applied Part (Patient isolation from electrical shock).
	Direct Current
SN	Serial Number
	Indicates separate collection for electrical and electronic equipment (WEEE).
	Manufacturer
	Date of Manufacturing
	Country of Manufacturer
	Class II, double insulated
	Keep dry
	Handle With Care
	Unique Device Identifier
	Importer

Table 1: Labeling Symbols

Symbol	Description
	Distributor
	Humidity Limitation
	Use By
	Do Not Reuse

Using the Model 2500C

General Description

To use, place a PalmSAT Pulse Oximeter containing a rechargeable battery pack into the charger stand. Next, connect the charger power supply to the charger, then plug the power supply into an appropriate AC power source (wall outlet).

The fast charge feature will fully charge a depleted battery pack in approximately 180 minutes. The charge indicator shows a steady green light when charging, and a flashing green light when the battery pack is fully charged.

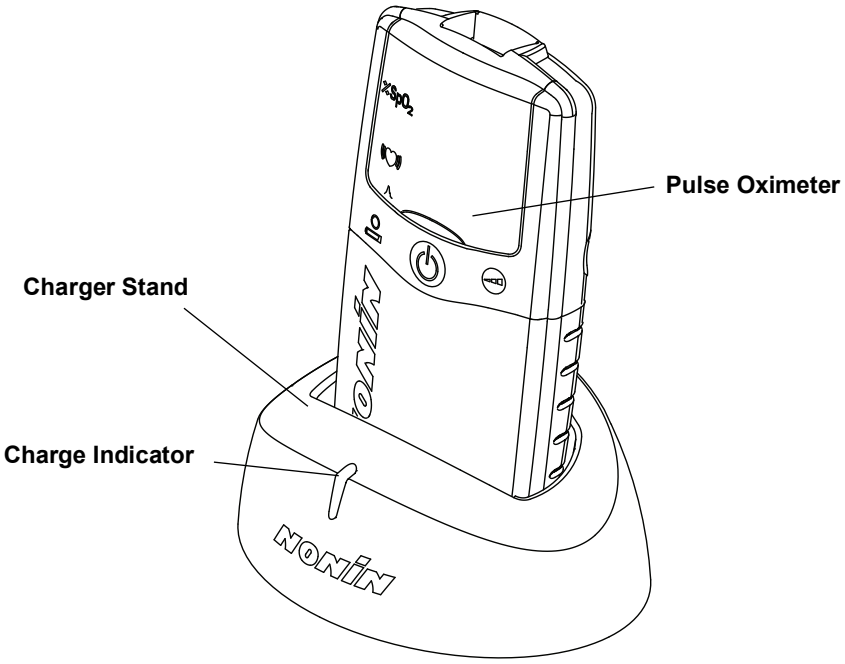

Figure 1: Charger Stand and Pulse Oximeter

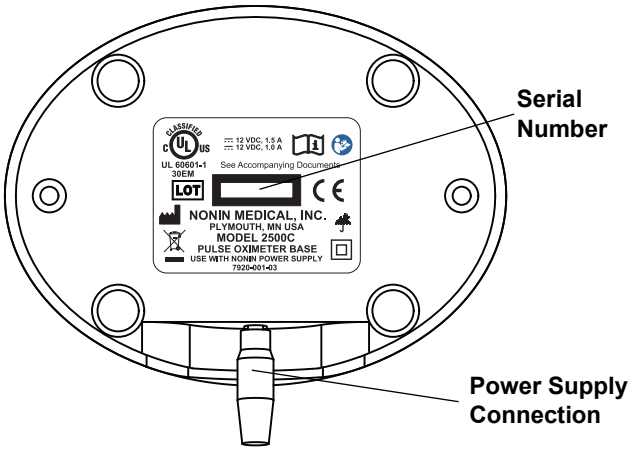

Figure 2: Bottom View Showing the Serial Number, Power Supply Connection, and Symbols

Unpacking the Model 2500C

The complete package includes the following items:

- 1 Model 2500C Charger Stand
- 1 Model 2500B Rechargeable NiMH Battery Pack
- 1 Power Supply*
- 1 Model 2500C Instructions for Use

Confirm that the items listed are included in the package. If any item on this list is missing or damaged, contact your distributor. Contact the carrier immediately if the shipping carton is damaged.

*Certain power supply models will be provided with a separate power cord.

Operation

Follow the steps below to recharge the Model 2500B NiMH Battery Pack.

NOTES:

- The NiMH battery pack must be fully charged before the first use.
- Various Nonin-specified power cords are available for use with certain power supplies. See “Accessories” on page 11 or contact your distributor.
- It is normal for the battery pack and charger to become warm during the charge cycle.

To Charge the Battery Pack Using the Charger Stand

1. Insert the battery pack into the PalmSAT Pulse Oximeter. (See the PalmSAT Operator’s Manual for battery pack placement instructions.)
2. Place the pulse oximeter into the charger stand.
3. Plug the power supply into the back of the charger stand.
4. Connect the appropriate power cord into the power supply, when necessary.
5. Plug the power cord assembly into an appropriate AC power outlet.
6. The battery pack will be fully charged in approximately 90 minutes. Refer to Table 2 for a description of the charging conditions.

Table 2: Charging Conditions

Charge Indicator	Status
GREEN constant	Charging up to full capacity.
GREEN alternating ON 1/8 sec, OFF 1/8 sec	Fully charged (and trickle charging to prevent battery pack self-discharge).
GREEN alternating ON 1/8 sec, OFF 1 3/8 sec	Preparing for charge (adjusting the minimum voltage).
AMBER ON 1 3/8 sec alternating with AMBER/GREEN ON 1/8 sec	ERROR. See “Troubleshooting Guide” on page 12.
OFF (not illuminated)	Not in use.

NOTES:

- You can maintain a full charge in the battery pack by charging the PalmSAT Pulse Oximeter in the charger stand until needed. (NiMH battery packs will self-discharge approximately 20% over a 30-day period when removed from the charger.)
- You can use the PalmSAT Pulse Oximeter while it is charging in the stand. For added stability, route the sensor cable under the charger stand as shown in Figure 3.

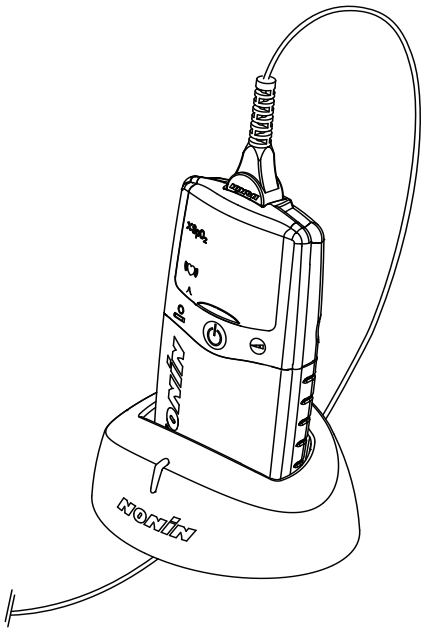

Figure 3: Using the PalmSAT Pulse Oximeter while Charging the Battery Pack

Cleaning

To Clean the Charger Stand

1. Unplug the power supply from the AC power outlet.
2. Clean the product with a soft cloth dampened with isopropyl alcohol. Do not pour or spray any liquids onto the product, and do not allow any liquid to enter any openings in the product. Allow the product to dry thoroughly before reusing.

⚠ **CAUTION:** Do not immerse this product in liquid.

⚠ **CAUTION:** Do not use caustic or abrasive cleaning agents on this product.

⚠ **CAUTION:** Do not place liquids on top of this product.

Service

> ⚠ **CAUTION:** This product contains sensitive electronic components and must be repaired by trained Nonin personnel only.

> ⚠ **CAUTION:** Do not remove any covers from the product. There are no user-serviceable parts inside the unit.

NOTE: Any sign or evidence of opening the system, field service by non-Nonin personnel, tampering, or any kind of misuse or abuse of the system, shall void the warranty in its entirety.

Nonin does not recommend field repair of this product. The circuit board in the Model 2500C is a multi-layer board using very narrow traces. Due to the very small trace size, extreme care must be used when replacing components to prevent permanent, non-repairable damage to the circuit board. Most components are surface-mounted and require special hot-air jet soldering and desoldering equipment. After any repairs are made, the product must be tested to ensure correct operation. The device's expected service life is 3 years.

Users and/or patients should report adverse events involving their Nonin device to Nonin Medical, Inc. and the competent authority of the EU Member State in which the user and/or patient is established, if applicable.

For additional technical information, contact Nonin's Technical Service department at:

Nonin Medical, Inc.
13700 1st Avenue North
Plymouth, Minnesota 55441 USA
(800) 356-8874 (USA and Canada)
+1 (763) 553-9968
E-mail: technicalservice@nonin.com

Nonin Medical B.V.
Doctor Paul Janssenweg 150
5026 RH Tilburg, Netherlands
+31 (0)13 - 45 87 130 (Europe)
E-mail: technicalserviceintl@nonin.com

www.nonin.com

All non-warranty work shall be done according to Nonin standard rates and charges in effect at the time of delivery to Nonin. All repairs include a complete retest of the Model 2500C using factory test fixtures.

Warranty

For warranty information go to: **http://www.nonin.com/warranty/**

Accessories

For more information about Nonin parts and accessories:

- Contact your distributor or Nonin at (800) 356-8874 (USA and Canada), +1 (763) 553-9968, or +31 (0)13 - 45 87 130 (Europe).
- Visit www.nonin.com

Troubleshooting Guide

Problem	Possible Cause	Possible Solution
The product will not turn on.	The power supply/power cord assembly is not properly connected to the charger and an appropriate AC outlet.	Check all connections. Check that the AC outlet is not turned off via a wall switch.
	The pulse oximeter is improperly inserted into the charger.	Insert the pulse oximeter into the charger correctly.
	The battery pack is improperly inserted into the pulse oximeter.	Insert the battery pack into the pulse oximeter correctly.
The charge indicator is flashing amber alternating with amber/green (an error condition).	The battery pack is stored or used outside of specified environmental conditions.	Warm the battery pack to room temperature, place it into the pulse oximeter, and then reinsert into the charger.
	Either disposable batteries, a faulty battery pack, or a non-specified pack is in the pulse oximeter.	Place a new Nonin-specified rechargeable battery pack into the pulse oximeter and then reinsert into the charger.
	The charge connections are faulty.	Check all connections and reinsert the pulse oximeter into the charger, or contact Nonin Technical Service.

If these solutions do not correct the problem with your product, please contact Nonin Technical Service at (800) 356-8874 (USA and Canada), +1 (763) 553-9968, or +31 (0)13 - 45 87 130 (Europe).

Technical Information

NOTE: This product complies with ISO 10993-1, Biological Evaluation of Medical Devices Part 1: Evaluation and Testing.

WARNING: Portable RF communications equipment such as cell phones or radios (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the ME system, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Manufacturer's Declaration

Essential Performance

Essential performance of the 2500C, when used in conjunction with the Model 2500 or Model 2500A, is defined as SpO2 accuracy and pulse rate accuracy or an indication of abnormal operation. Accuracies may be affected as a result of exposure to electromagnetic disturbances that are outside of the environments listed in the Indications For Use. If issues are experienced, move the Nonin system away from the source of electromagnetic disturbances.

Refer to the following table for specific information regarding this device's compliance to IEC 60601-1-2.

Table 3. Electromagnetic Emissions

Emissions Test	Compliance
This device is intended for use in the electromagnetic environment specified in the Indications For Use.	
RF Emissions CISPR 11	Group 1, Class B
Harmonic Emissions IEC 61000-3-2	Class A
Voltage Fluctuations/Flicker Emissions IEC 61000-3-3	Within limits of IEC 61000-3-3

Table 4. Electromagnetic Immunity

Immunity Test	Compliance Level	
This device is intended for use in the electromagnetic environment specified in the Indications For Use.		
Electrostatic Discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	
Electrical Fast Transient/Burst IEC 61000-4-4	±2 kV for power supply lines ±2 kV for input/output lines	
Surge IEC 61000-4-5	±0.5kV, ±1kV, ±2kV for Line-to-Ground ±0.5kV, ±1kV for Line-to-Line	
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	0% UT for 0.5 Cycles at 50 Hz at 0, 45, 90, 135, 180, 225, and 315° Phase 0% UT for 1 Cycle at 50 at 0°Phase 70% UT for 25 Cycles at 50 Hz at 0°Phase 0% UT for 250 cycles at 50 Hz at 0°Phase	
Power Frequency (50/60 Hz) Magnetic Field IEC 61000-4-8	30 A/m	
Conducted RF IEC 61000-4-6	150 kHz to 80 MHz	3 Vrms
	ISM and Amateur radio bands between 150 kHz to 80 MHz	6 Vrms
Radiated RF IEC 61000-4-3	80 MHz – 2.7 GHz	10 V/m
	380 – 390 MHz	27 V/m
	430 – 470 MHz	28 V/m
	704 – 787 MHz	9 V/m
	800 – 960 MHz	28 V/m
	1.7 – 1.99 GHz	28 V/m
	2.4 – 2.57 GHz	28 V/m
	5.1 – 5.8 GHz	9 V/m
Note: U_T is the AC mains voltage before application of the test level.		

Specifications

Charge Time	180 minutes
Power Requirements	12 VDC / 1.5 A
Charge Indicator	Bicolor LED (green, amber)
Temperature (Operating)	-20 to +40 °C (-4 to +104 °F)
Temperature (Storage/Transportation):	-40 to +70 °C (-40 to +158 °F)
Humidity (Operating)	10 to 90% noncondensing
Humidity (Storage/Transportation):	10 to 95% noncondensing
Transition time (from storage) to device ready for its intended use:	Within 2 minutes to warm from -40 °C to -20 °C Within 3 minutes to cool from 70 °C to 40 °C
Dimensions	5.5 cm H x 11.6 cm W x 8.6 cm D (2.2 in H x 4.6 in W x 3.4 in D)
Weight	90.3 g (3.2 oz)
Patient Isolation	Not applicable
Leakage Current	<0.5 mA at 265 VAC, 50 Hz