

## Introduction

This chapter covers how to test the operation of the Rad-5/5v how to properly clean the Rad-5/5v pulse oximeter, how to replace the batteries and how to obtain service.

Under normal operation, no internal adjustment or recalibration is required.

**WARNING:** BEFORE CLEANING THE OXIMETER, ALWAYS TURN IT OFF AND REMOVE THE BATTERIES.

## Cleaning

To clean the display panel, use a cotton swab moistened with 70% isopropyl alcohol and gently wipe the panel.

To clean the outer surface of the oximeter, use a soft cloth dampened with a mild soap and water. Do not allow liquids to enter the interior of the instrument.

### CAUTIONS:

- DO NOT AUTOCLAVE, PRESSURE STERILIZE, OR GAS STERILIZE THIS OXIMETER.
- DO NOT SOAK OR IMMERSE THE MONITOR IN ANY LIQUID.
- USE THE CLEANING SOLUTION SPARINGLY. EXCESSIVE SOLUTION CAN FLOW INTO THE MONITOR AND CAUSE DAMAGE TO INTERNAL COMPONENTS.
- DO NOT TOUCH, PRESS, OR RUB THE DISPLAY PANELS WITH ABRASIVE CLEANING COMPOUNDS, INSTRUMENTS, BRUSHES, ROUGH-SURFACE MATERIALS, OR BRING THEM INTO CONTACT WITH ANYTHING THAT COULD SCRATCH THE PANEL.
- DO NOT USE PETROLEUM-BASED OR ACETONE SOLUTIONS, OR OTHER HARSH SOLVENTS, TO CLEAN THE OXIMETER. THESE SUBSTANCES ATTACK THE DEVICE'S MATERIALS AND DEVICE FAILURE CAN RESULT.

Refer to Section 8, *Cleaning and Reuse of Masimo LNOP Sensors* for cleaning instructions of the sensor.

### BATTERY REPLACEMENT

The Rad-5 and Rad-5v are powered by 4 "AA" alkaline batteries. Do not use any other type of batteries or power source to run the device. The battery compartment is accessed from the back of the device. To replace the batteries first remove the battery cover by depressing the small rectangular button at the bottom of the cover, and sliding the cover down off the bottom of the device. Remove the batteries and install new batteries in the directions indicated by the battery icons inside the battery compartment. Replace the battery cover

by sliding it back up from the bottom of the device until the rectangular locking button snaps back into position.

**WARNING:** USE ONLY ALKALINE BATTERIES. USE OF NON ALKALINE BATTERIES MAY AFFECT THE ACCURACY OF THE BATTERY LEVEL METER.

**WARNING:** USE OF BATTERIES WITH A CELL VOLTAGE OF MORE THAN 1.5V COULD CAUSE DAMAGE TO THE DEVICE.

Battery charge level is indicated by four LED indicators at the bottom of the front panel. All four indicators will be lit when the batteries are full, with fewer indicators being lit as the batteries lose their charge. When less than ten (10) percent battery life remains, the final battery indicator will begin to flash and an audible alarm will sound.

### Performance verification

To test the performance of the Rad-5/5v pulse oximeter following repairs or during routine maintenance, follow the procedure outlined in this section. If the Rad-5/5v fails any of the described tests, discontinue its use and correct the problem before returning the unit back to the user.

Before performing the following tests verify or install new batteries into the Rad-5/5v Handheld. Also disconnect any patient cables or pulse oximetry probes or serial cables from the instrument.

Power-On Self-Test:

1. Turn the monitor on by depressing the Power Button. For about 5 seconds all available LEDs are illuminated and a brief beep tone sounds.
2. The oximeter begins normal operation.

Key Press Button Test:

1. With the exception of the Power Button, press each button and verify that the oximeter acknowledges each key-press with an audible beep tone or by indicating a change on the display.

Alarm Limit Test (Rad-5 only):

1. With the monitor turned on, select the Menu Access key and enter the Alarm menu. Change the High Saturation Alarm parameter to a value two points below the currently selected value, and accept the change.
2. Verify that the newly set parameter is shown on the Saturation Alarm Limit Display, next to the SpO<sub>2</sub> or pulse rate measurement display.
3. Return the High Saturation Alarm parameter to its original setting.

4. Repeat steps 1 to 3 with the Low Saturation Alarm parameter.
5. Repeat steps 1 to 3 with the High Pulse Rate Alarm parameter.
6. Repeat steps 1 to 3 with the Low Pulse Rate Alarm parameter.
7. Reset the alarm limits again to the original settings.

LED Brightness:

1. Rad-5: with the monitor turned on, select menu level 3 (see Section 4, *Setup Menu Level 3 - LED Brightness and Factory Defaults*) and use the Up and Down Arrow keys to cycle through all 4 brightness levels.
2. Rad-5v: push the Display Brightness key several times to cycle through all four brightness levels
3. Exit the Menu system by pressing the Mode/Enter key or waiting for the normal time-out.

Testing Rad-5 with Masimo SET Tester (Optional):

1. Turn the Oximeter off and then on again.
2. Connect the Masimo SET Tester to the Patient Cable Connector.
3. Verify that within 20 seconds a Signal IQ/pulsebar is displayed.
4. Verify that the SpO<sub>2</sub> measurement is between 79% and 84%.
5. Verify that the pulse rate measurement is between 55 bpm and 65 bpm.
6. Set the SpO<sub>2</sub> low alarm limit to 90 (see Section 4, *Setup Menu Level 1 - Alarm Limits and Alarm Volume*).
7. Verify that an audible alarm occurs and the SpO<sub>2</sub> measurement and the Alarm indicator are both flashing.
8. Press the Alarm Silence button once and verify that the alarm is silenced and the Alarm Silence Indicator is flashing.
9. Wait 120 seconds and verify that the alarm silence times out and the audible alarm is activated again and the Alarm Silence Indicator is off.
10. Press the up arrow button several times and verify that the loudness of the pulse beep tone increases.
11. Press the down arrow button and verify that the loudness of the pulse beep tone decreases until the pulse beep tone is turned off.

Testing Rad-5v with Masimo SET Tester (Optional):

1. Turn the Oximeter off and then on again.
2. Connect the Masimo SET Tester to the Patient Cable Connector.
3. Verify that within 20 seconds a Signal IQ/pulsebar is displayed.

4. Verify that the SpO<sub>2</sub> measurement is between 79% and 84%.
5. Verify that the pulse rate measurement is between 55 bpm and 65 bpm.
6. Press the Pulse Tone Volume button several times and verify that the loudness of the pulse beep tone increases, then is turned off, then repeats the cycle
7. Disconnect the Masimo Set Tester from the Rad-5v.
8. Verify that an audible alarm occurs, that the front panel displays "nO SEn" and the Alarm indicator is flashing.
8. Press the Alarm Silence button once and verify that the alarm is silenced and the Alarm Silence Indicator is off.

## Service and repair

### REPAIR POLICY

Masimo or an authorized Service Department must perform warranty repair and service. Do not use malfunctioning equipment. Have the unit repaired.

Please clean contaminated/dirty equipment before returning, following the cleaning procedure described in Section 9, Cleaning. Make sure it is fully dry before packing the equipment.

To return the Rad-5/5v unit for service, please follow the Return Procedure.

**WARNING:** DO NOT REMOVE THE COVER OF THE MONITOR EXCEPT FOR BATTERY REPLACEMENT. AN OPERATOR MAY ONLY PERFORM MAINTENANCE PROCEDURES SPECIFICALLY DESCRIBED IN THIS MANUAL. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL TRAINED IN THE REPAIR OF THIS EQUIPMENT.

### RETURN PROCEDURE

Please clean contaminated/dirty equipment before returning and make sure it is fully dry before packing the equipment. Package the equipment securely – in the original shipping container if possible – and enclose the following information and items:

- Call Masimo at 800-326-4890 and ask for Technical Support. Ask for an RMA number.
- A letter describing in detail any difficulties experienced with the pulse oximeter. Please include the RMA number in the letter.
- Warranty information – a copy of the invoice or other applicable documentation must be included.
- Purchase order number to cover repair if the oximeter is not under warranty, or for tracking purposes if it is.
- Ship-to and bill-to information.
- Person (name, telephone/Telex/fax number, and country) to contact for any questions about the repairs.
- A certificate stating the oximeter has been decontaminated for bloodborne pathogens.

Return Rad-5/5v pulse oximeter to the following shipping address:

Masimo Corporation  
40 Parker  
Irvine, California 92618  
949-297-7000  
FAX 949-297-7001

## Warranty

Masimo warrants to the initial purchaser that each new pulse oximeter will be free from defects in workmanship or materials for a period of one (1) year from the date of purchase. Masimo's sole obligation under this warranty is to repair or replace any product that Masimo deems to be covered under warranty with a repaired or a replacement pulse oximeter.

Batteries are not warranted.

To request a replacement under warranty, contact Masimo for a returned goods authorization. If Masimo determines that a product must be replaced or repaired under warranty, it will be replaced or repaired and the cost of shipment covered. All other shipping costs shall be the responsibility of the purchaser.

## Exclusions

This warranty does not extend to any product that has been subject to misuse, neglect or accident; that has been damaged by causes external to the product; that has been used in violation of the operating instructions supplied with the product. The warranty does not extend to any product that has been connected to an unlicensed instrument system, modified accessories or any unit that has been disassembled or reassembled by anyone but an authorized Masimo agent.

THIS WARRANTY, TOGETHER WITH ANY OTHER EXPRESS WRITTEN WARRANTY THAT MAY BE ISSUED BY MASIMO IS THE SOLE AND EXCLUSIVE WARRANTY AS TO MASIMO'S PRODUCTS. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY ORAL OR IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. MASIMO SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL LOSS, DAMAGE OR EXPENSE DIRECTLY OR INDIRECTLY ARISING FROM THE USE OR LOSS OF USE OF ANY PRODUCTS.

## End-user license agreement

THIS DOCUMENT IS A LEGAL AGREEMENT BETWEEN YOU, THE "PURCHASER," AND Masimo Corporation ("MASIMO"). IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN THE ENTIRE PACKAGE, INCLUDING ALL ACCESSORIES, IN THEIR ORIGINAL PACKAGE, WITH YOUR SALES RECEIPT TO MASIMO FOR A FULL REFUND.

1. Grant of License: In consideration of payment of the license fee, which is part of the price paid for this product, MASIMO grants to Purchaser a nonexclusive, nontransferable license, without right to sublicense, to use the copy of the incorporated software/firmware and documentation in connection with Purchaser's use of the Masimo Products for their labeled purpose. MASIMO reserves all rights not expressly granted to Purchaser.
2. Ownership of Software/Firmware: Title to, ownership of, and all rights and interests

in, any MASIMO software and/or firmware and the documentation, and all copies thereof, remain at all times vested in MASIMO Corporation, licensor to MASIMO, and they do not pass to Purchaser.

3. Assignment: Purchaser shall not assign or transfer this License, in whole or in part, by operation of law or otherwise, without MASIMO's prior written consent; any attempt without such consent, to assign any rights, duties or obligations arising hereunder shall be void.
4. Copy Restrictions: The software/firmware and the accompanying written materials are copyrighted. Unauthorized copying of the software, including software that has been modified, merged, or included with other software, or other written materials is expressly forbidden. You may be held legally responsible for any copyright infringement that is caused or incurred by your failure to abide by the terms of this license. Nothing in this license provides any rights beyond those provided by 17 U.S.C. §117.
5. Use Restriction: As the Purchaser, you may physically transfer the products from one location to another provided that the software/firmware is not copied. You may not electronically transfer the software/firmware from the products to any other device. You may not disclose, publish, translate, release or distribute copies of the software/firmware or accompanying written materials to others. You may not modify, adapt, translate, reverse engineer, decompile, disassemble, or create derivative works based on the software/firmware. You may not modify, adapt, translate, or create derivative works based on the written materials without the prior written consent of MASIMO.
6. Transfer Restrictions: The software/firmware is licensed to the Purchaser, and may not be transferred to anyone, except other end-users, without the prior written consent of MASIMO. In no event may you transfer, assign, rent, lease, sell, or otherwise dispose of the software/firmware or the products on a temporary basis.
7. Beneficiary: Masimo Corporation is a Beneficiary of this Agreement and has the right to enforce its provisions.
8. U.S. Government Rights: If you are acquiring software (including the related documentation) on behalf of any part of the United States Government, the following provisions apply: the software is deemed to be "commercial software" and "commercial computer software documentation," respectively pursuant to DFAR Section 227.7202 FAR 12.212, as applicable. Any use, modification, reproduction, release, performance, display or disclosure of the software (including the related documentation) by the U.S. Government or any of its agencies shall be governed solely by the terms of this Agreement and shall be prohibited except to the extent expressly permitted by the terms of this agreement.