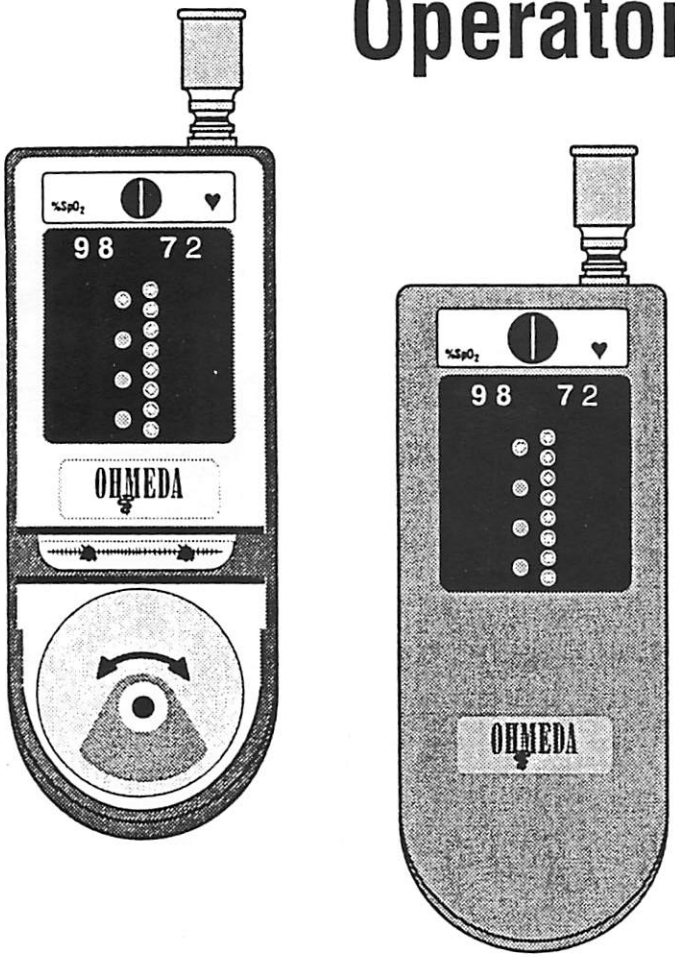
OHMEDA

THE BOC GROUP

OxySTAT™ Oximeter
Operator's Manual



6050-0002-625

Printed in USA

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OxySTAT Oximeter
Operator's Manual

L&SP No. 7264

Important

This manual is subject to periodic review, update, and revison. Customers are cautioned to verify that the manual's information applies to the software and hardware present in the equipment.

This product performs as described in this manual, and in accompanying labels and/or inserts, when assembled, operated, maintained, and repaired in accordance with the instructions provided.

This product must be cleaned and checked periodically. Do not use a defective product. Parts that are broken, missing, plainly worn, distorted, or contaminated should be replaced immediately. If repair or replacement becomes necessary, call or write to request service advice from the Ohmeda Distribution and Service Center (inside the USA) or the nearest Ohmeda representative (outside the USA)—information is listed on the back cover. Do not repair this product or any of its parts other than in accordance with written instructions provided by Ohmeda and by Ohmeda-trained personnel.

The product must not be altered without the prior written approval of Ohmeda's Safety Department. The user of this product shall have the sole responsibility for any malfunction that results from improper use, faulty maintenance, improper repair, unauthorized service, damage, or alteration by anyone other than Ohmeda. The safety, reliability, and performance of this device can only be assured under the following conditions:

- If the device has been used according to the accompanying operating instructions.
- If fittings, extensions, readjustment, changes, or repairs have been carried out by Ohmeda's authorized agents.
- Battery charger—If it is used in buildings that have ground equalization wiring that complies with relevant IEC or local standards and regulations (UL, ETL, CSA, BSI, TUV, etc.).

Text revised February 1995

4/Maintenance and Service

Appendix A/Specifications

Appendix B/Battery Pack and Charger

Appendix C/Printer

List of Figures

1/Overview

This chapter contains

- A brief description of the OxySTAT Oximetry System, its theory of operation, and its features.
- A list of the accessories available, both standard and optional, for your oximeter.
- A list of the precautions you must take when using this device.
- A list of the symbols used on the oximeter, the battery packs, and in this manual.

Product description

Two models of the oximeter are available: The OxySTAT (3770) and the OxySTAT *Plus (3775)*. Both oximeters are small, lightweight, portable units that operate on power supplied by a battery pack. In addition, either oximeter, when a nickel-cadmium (NiCad) battery pack is attached, can be positioned in the OxySTAT battery charger and operated using the charger's DC (from AC mains) power supply.

The OxySTAT model is designed specifically for spot checking SpO_2 and pulse rate. It has no alarms or user-definable parameters and is not intended for continuous monitoring.

The OxySTAT *Plus* is a full-featured model designed for spot checking in addition to short- and long-term continuous SpO_2 and pulse rate monitoring. This model can print trend data it has stored in memory, via an infrared link, to the optional OxySTAT *Plus* printer.

The OxySTAT oximeters are designed to be used in the following environments:

- Hospital
  - — Emergency room
  - — General ward/floor
  - — Operating room
  - — ICU/CCU/wards
  - — Pulmonary rehabilitation
  - — Stress/exercise testing

- Nonhospital
  - — Emergency medical services (ground and air)
  - — Home health care
  - — Physician's office
  - — IV sedation sites (podiatry, dentistry, plastic surgery)

Theory of operation

The oximeter uses a patented, two-wavelength pulsatile system—red and infrared light—to distinguish between oxygenated (HbO_2) and reduced (Hb) hemoglobin, each of which absorbs different amounts of light emitted from the oximeter probe. The system then calculates the relative percentage of these two constituents and SpO_2.

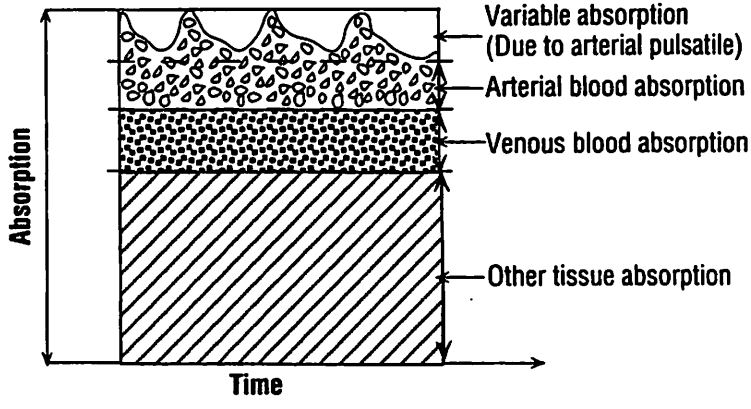


Figure 1-1. Signal composite

Arterial blood pulsation at the test site modulates the oximeter probe/sensor's light emission. Since other fluids and tissues present generally don't pulsate, they don't modulate the light passing through that location. The attenuation of light energy due to arterial blood flow is detected and isolated by using the pulsatile portion of the incoming signal.

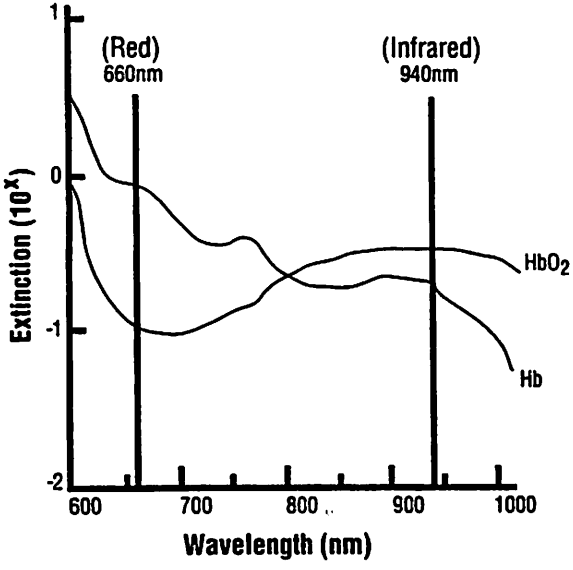


Figure 1-2. Extinction vs. wavelength

The probe/sensor's photodetector converts the light, which is partially absorbed and modulated as it passes through the tissue sample, into an electronic signal. Since HbO_2 and Hb allow different amounts of light to reach the photodetector at the selected wavelengths, the electronic signal varies according to the light source that is "on" and the oxygenation of the arterial hemoglobin. Analog and digital signal processing then converts the light-intensity information into SpO_2 and pulse rate values for display on the monitor.

Front panel

1 Power on/off button
2 FlexConnect™ connector for the probe/sensor
3 Main display
4 Pleth bar display
5 Low battery indicator
6 Signal strength indicator
7 Alarm indicator/ alarm silence bar
8 Menu select wheel
9 Selector

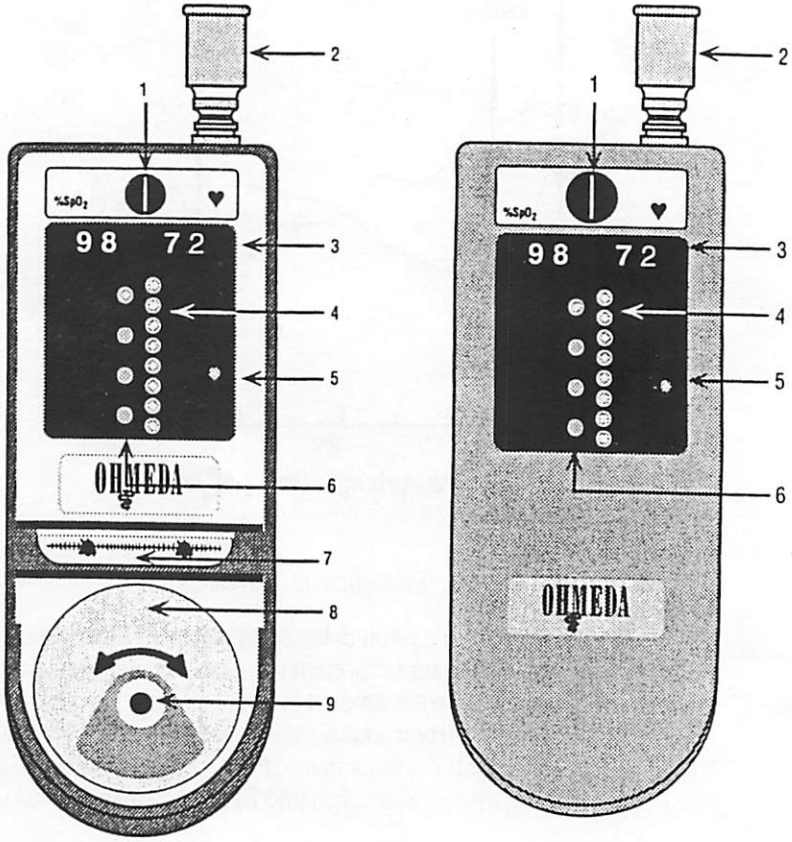


Figure 1-3. Oximeter's front panel

1 You press this button to turn the oximeter on or off.

OxySTAT *Plus*—Stored data are retained when you power the unit off, as long as the battery pack is charged.

Note:

- If a probe/sensor **has not been** attached to the unit since you powered it on, after two minutes the unit will go into power-saving mode automatically. We recommend, however, turning the unit off whenever it is not in use.
- If a probe/sensor **was attached** after poweron **and** the unit has detected and displayed monitoring data, the unit does not go into power-saving mode; the alarm sounds until you press the alarm silence bar or attach a probe.

2 You insert the probe or sensor cable connector in this receptacle, called the FlexConnect sensor connector.

3 This set of LEDs is the main display. The SpO_2 value and pulse rate appear here during monitor mode.

OXYSTAT *PLUS*—ALL MUTE and other messages appear as appropriate. When you are accessing other modes or changing settings (Setup mode), the menu names and settings appear in this main display area.

Monitor mode

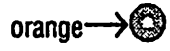
Setup mode

Message

Figure 1-4. Main display

4 This column of LEDs—the pleth bar— provides a visual representation of the plethysmographic waveform by lighting in a pattern that emulates a waveform. The highest LED lit on the pleth bar is the leading edge of the plethysmographic waveform. The LEDs trace the outline of the same pleth data found on larger Ohmeda oximeters. The height of the lighted LEDs is not proportional to pulse volume.

5 This indicator light begins flashing once every three seconds when the battery pack has approximately 15 minutes of power remaining (or up to two hours for some AA batteries). The amount of battery time left depends on the usage at the time. You will become accustomed to estimating it much like the gas gauge on your vehicle. It continues to flash until the battery pack is replaced with a new, fully charged pack, (or with new AA batteries) or until the pack has no power left, at which point the unit shuts off. A low-battery condition **does not** activate an audible alarm.



6 This set of indicators provides signal strength information; see "Data validity and signal strength" in 2/Operations for more information.

The two upper indicators are green (one dark green, one yellow green); if either is lit, signal strength is good to adequate.

The third indicator is yellow; if it is lit, signal strength is marginal. Make sure the probe/sensor is well located and fully secure on the patient and on the oximeter.

The bottom indicator is amber; if it is lit, signal strength is poor and the values displayed may be affected by signal noise. Check the probe/sensor site, make sure there is no source of interference (electronic, light).

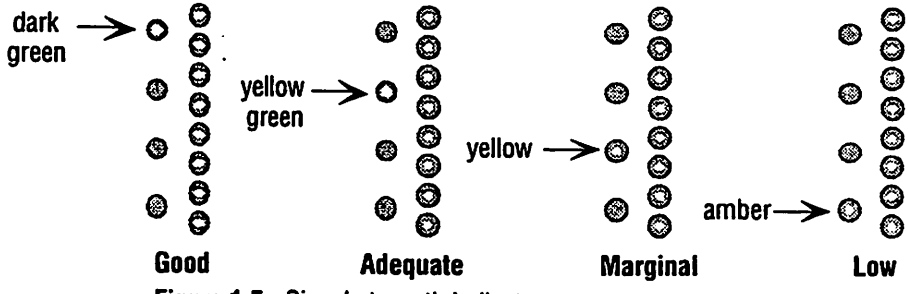
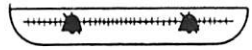


Figure 1-5. Signal strength indicators.

7 **OxySTAT *PLUS***—During an alarm condition this bar flashes red and an alarm sounds up to 12 seconds later. Pressing the bar silences the audible alarm (all mute) for two minutes; the bar continues to flash until the alarm condition is corrected. **Note:** The audible alarm feature for all alarm conditions is silenced for the first two minutes after powering on .



OxySTAT *PLUS*—You use the next two controls together to choose and then select menus and to choose and then change their settings.

8 The menu select wheel

9 The selector

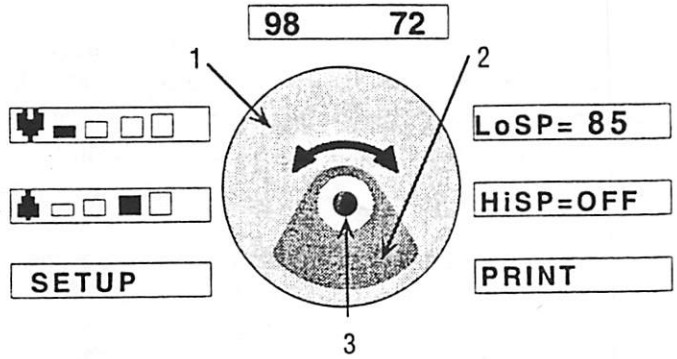


Figure 1-6. Menu select wheel and selector

1 Menu select wheel
2 Selector
3 "Bull's eye"

To access the OxySTAT *Plus* oximeter's available menus, you press the "bull's eye" ⊙ (3) on the selector (2) and then rotate the control wheel (1) clockwise (increase the setting) or counterclockwise (decrease the setting). A menu's title or graphic appears on the main display when the wheel is in that menu's positions.

When you reach the menu you want, you press ⊙—in the middle of the wheel—to select that menu.

Next, you rotate the menu wheel to the setting you want to change and press ⊙ and that setting flashes. Then you rotate the wheel to the choice you want to make for that setting and, to confirm it, you press ⊙ again—the setting now stops flashing.

It's visual—watch the main display; it's easy—rotate and press.

Important: The steps in this manual do not repeat these instructions in full. A step might be, "Access and select the alarm volume menu." This means

- To access the menus, press ⊙.
- Turn the wheel until you see the alarm volume menu graphic on the main display.
- Press ⊙.

After you've made your final change, SpO_2 and pulse rate information returns automatically to the main display within three seconds.

OxySTAT *PLUS*—Audible indicators

Alarm conditions and the patient's pulse rate activate sounds.

- You can set the alarm volume to be low, medium, or high (the default); you can also turn it off.

  To minimize a "nuisance alarm" situation, the alarm does not begin sounding until 12.5 seconds after the main display and the alarm bar indicate an alarm condition.

  If you choose to have the audible alarms off, the visual alarm continues to flash and ALL MUTE appears briefly in the main display every three seconds.

  Note: A system failure alarm (SERVICE) sounds even when the alarm volume is set to Off.

- You can press the alarm silence bar to silence audible alarms for two minutes—the alarm indicator bar continues to flash. (You will hear a tone when you have applied enough pressure to the bar—anywhere along its length—to activate alarm silence.) After two minutes, the audible alarm reactivates if the alarm condition persists or if a new alarm condition has occurred.

  An audible alarm is activated for

  — High- or low-SpO_2 limit violations.

  These alarm conditions sound the **tone at intervals** until the condition no longer exists.

  — Probe/sensor error conditions, such as when the probe/sensor is not connected to the patient or the oximeter, or is one that is not intended for use with the OxySTAT oximeter (PROBE?).

  These alarm conditions sound the **tone at intervals** until the condition no longer exists or the audible alarm is silenced.

— System or probe failure conditions (SERVICE).

These alarms sound a **continuous tone** and the alarm indicator bar is continuously illuminated.

Note: You cannot silence a SERVICE alarm. For more information, see 3/Messages and Troubleshooting.

- You can set the pulse beep volume to be low, medium, or high, or you can turn it off (the default). The pitch of the pulse rate tone corresponds to the SpO_2 saturation level. In other words, the higher the SpO_2, the higher the tone's pitch, and vice versa.

Oximeter—inside panel

1 Part number and serial number
2 Sprayproof mark
3 Anesthesia symbol
4 Patient isolation symbol
5 Warning symbol
6 Warranty label

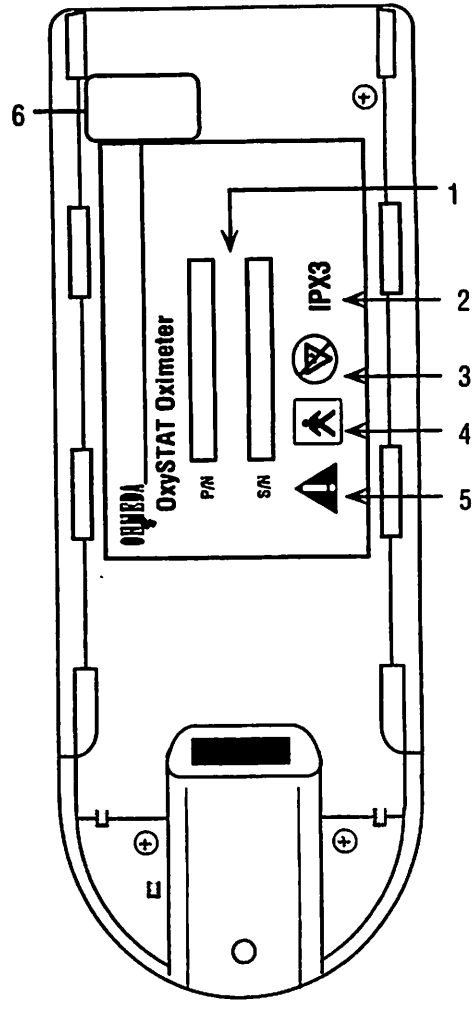


Figure 1-7. Oximeter's inside panel with label

1 The oximeter's Ohmeda part number and unique serial number for this instrument are found here.

IPX3 2 These characters indicate that the oximeter meets IEC 529 sprayproof standards.

3 This symbol means the oximeter must not be used in the presence of flammable anesthetics or other flammable substances.

4 This symbol means the oximeter conforms to the International Electrotechnical Commission Standard 601-1 (Safety of Medical Electrical Equipment) for patient-isolation type BF devices.

5 This symbol means "attention," you should refer to the documents that accompany the unit before using it.

6 Removal of this label during the warranty period voids the warranty.

Battery pack

1 Release latch
2 NiCad battery pack only recharging contacts
3 Quick Reference label location
4 Battery check button (above LED)
5 Battery pack part and serial numbers
6 Warning symbol
7 Hazard symbol
8 Anesthesia symbol
9 Sprayproof symbol
10 Recycle symbol
11 AA battery compartment access door
12 Warranty label

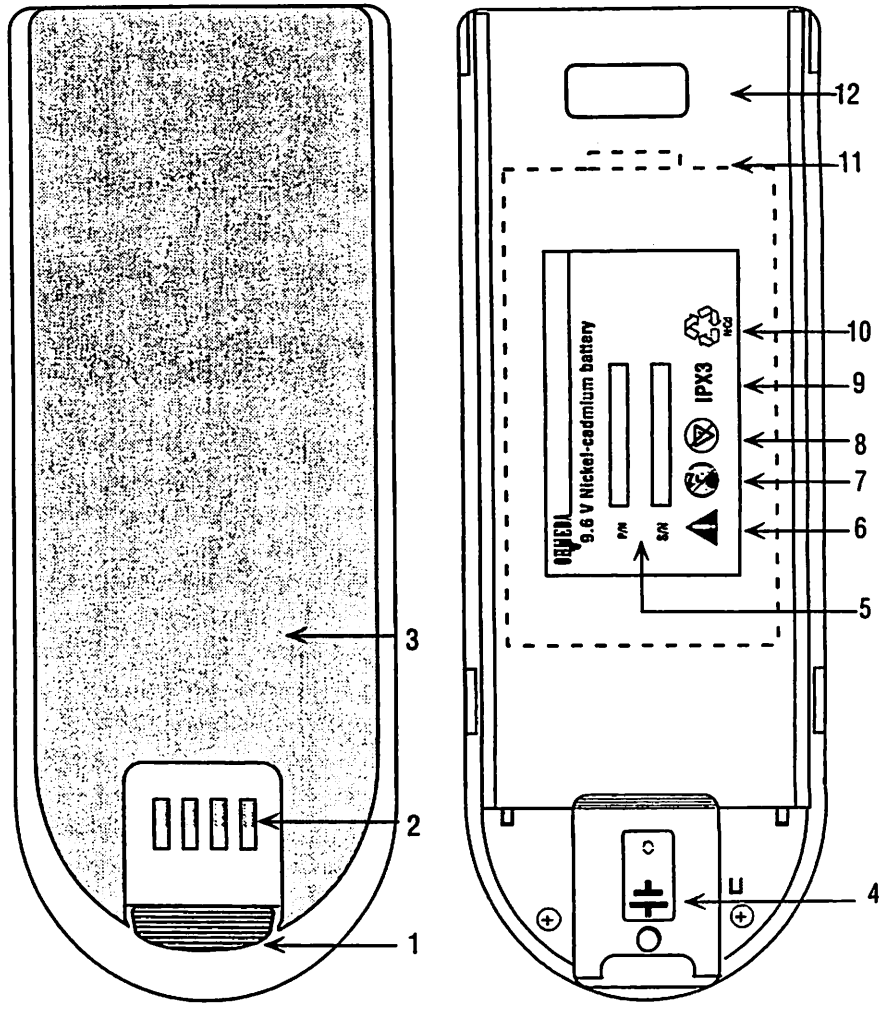


Figure 1-8. Battery pack

Two battery packs are available:

- A sealed, rechargeable pack that contains eight nickel-cadmium (NiCad) batteries.

WARNING: Electric shock hazard—Do not attempt to open the OxySTAT NiCad battery pack. Do not attempt to repair it. Refer servicing to qualified service personnel.

- A pack that houses six replaceable AA batteries. Open only the battery compartment door to replace the batteries.

1 Use this latch to release the battery pack from the oximeter.

2 The OxySTAT battery charger uses these contacts when recharging the NiCad battery pack. There are no electrical contacts on the AA battery pack.

3 You received four quick-reference labels—one each in English, Spanish, French, and German—with your battery pack. Each shows the menus and their options as they will appear in the main display. Apply the appropriate language label to your battery pack in this location.

4 Press on this check switch to verify that the battery pack is charged. If the window is
- Red, the battery pack needs recharging.
- Green, the pack is sufficiently charged for use.

5 The Ohmeda model number for this battery pack and its serial number appear here.

6 This symbol means "attention," you should refer to the documents that accompany the unit before using it.

7 This symbol means the battery pack **should never be discarded as trash or subjected to fire.** Please recycle the NiCad battery packs by returning them to Ohmeda. If that is not possible, discard them only in recognized locations designated for hazardous (cadmium) materials as prescribed by local authority for battery products. Discard the AA batteries only as directed on the manufacturer's label.

8 This symbol means the battery pack must not be used in the presence of flammable anesthetics or other flammable substances.

IPX3 9 These characters indicate that the battery pack meets IEC 529 sprayproof standards.

10 NiCad battery pack—This symbol means that this battery pack is recyclable. Please return your battery packs to Ohmeda Service (see 4/Maintenance and Service) when ordering replacements.

11 This door provides access to the AA battery compartment on that type of pack; see Appendix B for battery replacement .

12 Removal of this label during the warranty period voids the warranty.

Top panel—oximeter

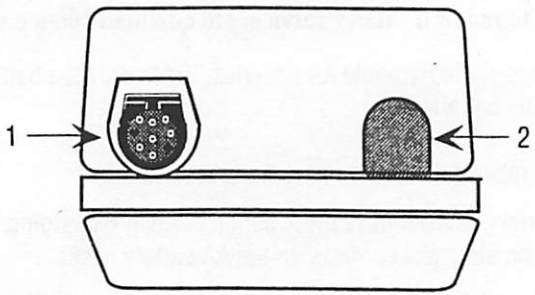


Figure 1-9. Top panel

1 FlexConnect sensor connector
2 Infrared link transmitter

1 You insert the cable connector on the Ohmeda probe or sensor you're using into this connector. You can use an OxyTip™ or ClipTip™ sensor (with the OxyLead™ cable), and the FingerClip, FingerProbe, Flex II and EarProbe Ohmeda probes with the OxySTAT oximeters.

2 **OxySTAT *Plus***—This infrared transmitter, when aligned properly with the optional OxySTAT *Plus* printer's infrared receiver (see "Print mode" in 2/Operations), transmits the trend data stored in the oximeter's memory.

For complete product specifications, see Appendix A.

Accessories

You can order standard and optional accessories. A list, including part numbers, is at the end of 4/Maintenance and Service.

Standard

Battery pack. You receive a battery pack (NiCad or AA) with each oximeter. With each battery pack you receive four quick-reference labels (English, Spanish, French, and German). Place the appropriate label on the back of the battery pack.

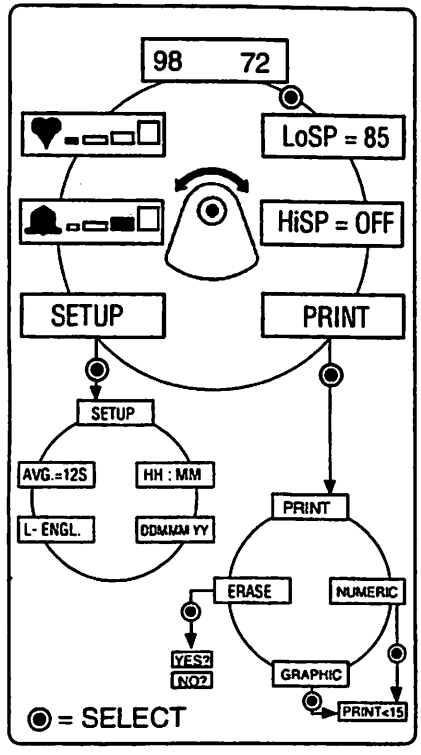


Figure 1-10. Quick Reference label

Unit carrying case. The oximeter also comes with its own carrying case.

Probe/sensor

- **OxySTAT *Plus***—Two disposable OxyTip sensors (one adult/pediatric and one neonatal/toddler), a ClipTip sensor, and the three-foot OxyLead™ cable to which they connect are included with this oximeter.
- **OxySTAT**—A ClipTip sensor and the three-foot OxyLead cable to which it connects are included with this oximeter.

You may also use the Ohmeda FingerProbe, FingerClip, EarProbe, and Flex II probes with these units.

Optional

Battery charger. The charger has two slots for recharging the NiCad battery pack, either alone or when installed on the oximeter. You can also use the battery charger to supply power to the oximeter with a NiCad battery pack for long-term monitoring (the battery pack is being recharged at the same time). See Appendix B for complete battery pack and charger information.

Printer. The OxySTAT *Plus* printer comes with its own removable protective boot, a roll of paper, and an AC adapter for accessing power for the printer; see Appendix C for complete printer information.

System carrying case. Use this case to carry oximeters, printers, extra battery packs, and/or a battery charger when necessary.

Precautions

Two types of precautions appear in this manual: warnings and cautions.

Read this section fully and carefully before using the oximeter and its accessories for patient monitoring.

A **WARNING** indicates a potentially harmful situation that may cause injury to a patient or operator.

A **CAUTION** indicates a condition that may lead to equipment damage or malfunction.

Warnings

US federal and Canadian law restrict this device to sale by or on the order of a licensed medical practitioner.

Handling

Handle the oximeter, the printer, the battery pack, and the battery charger with care. Improper handling can cause damage or inaccurate operation of these devices.

Failure of operation

If the oximeter fails to respond as described in the "Checking normal operation" section in 2/Operations, do not use it until qualified personnel have corrected the situation or the unit has been serviced.

It is possible for any device to malfunction; therefore, it is the responsibility of the operator to verify any unusual data independently by doing a formal patient assessment.

Explosion hazard

Do not use the oximeter, the printer, or the battery charger in the presence of flammable anesthetics or other flammable substances.

Use only an OxySTAT battery pack as part of the oximeter.

Cadmium is a hazardous substance. Do not incinerate or burn the NiCad battery pack.

Do not dispose of a NiCad battery pack by throwing it in the trash. Dispose of a battery pack through an approved hazardous material disposal facility or by returning it to Ohmeda for reclamation.

Do not attempt to recharge or condition a NiCad battery pack using any device other than an OxySTAT battery charger.

Do not attempt to recharge or condition any NiCad battery pack other than those made by Ohmeda in an OxySTAT battery charger

Do not expose a battery pack to any temperature that is hotter than you can tolerate to touch.

Electric shock hazard

Do not attempt to open the oximeter, the NiCad battery pack, the printer, or the battery charger. Do not attempt any repairs. Refer servicing to qualified service personnel who are trained in the repair of this equipment.

The battery charger must be properly grounded.

- Connect this equipment only to a three-wire, grounded, hospital-grade receptacle. The three-connector plug must be inserted into a properly wired three-wire receptacle; if a three-wire receptacle is not available, a qualified electrician must install one in accordance with the governing electrical code.
- Do not under any circumstances remove the grounding connector from the power plug.
- Do not use extension cords or adapters of any type. The power cord and plug must be intact and undamaged.

An operator may only perform maintenance procedures specifically described in this *OxySTAT Oximeter Operator's Manual.*

Electrical shock and flammability hazard

Before cleaning or servicing the oximeter, always turn it off. Before cleaning or servicing the battery charger or printer, always turn it off and disconnect the power cord from the AC mains power supply.

Fire hazard

To protect against fire hazard, replace only with fuses of the same type and local line voltage rating.

Patient safety

Do not, under any circumstances, perform any testing or maintenance on the oximeter when it is being used to monitor a patient.

If a probe or sensor is damaged in any way, discontinue use of that probe/sensor immediately.

Prolonged monitoring or patient condition may require periodically changing the probe/sensor test site. To reduce the risk of blistering, skin erosion, or ischemic skin necrosis, change the probe/sensor site as specified in the user instructions for the probe/sensor you are using. If any evidence of the above conditions appears before the specified period of time (for example, discoloration or reddening), change the site immediately.

To prevent patient injury or equipment damage, use only Ohmeda oximeter probes and sensors approved for use with this oximeter (OxyTip sensor, ClipTip sensor, FingerClip, FingerProbe, Flex II, EarProbe). See the user instructions for the probe or sensor you are using for complete information, including warnings, cautions, and compatible oximeter connectors for that probe or sensor.

When the unit is operating on battery power and the battery becomes depleted, be aware that no alarm tone sounds when the unit shuts off.

The correct use of the oximeter is to measure only arterial oxygen saturation (SpO_2) and pulse rate.

- A pulse oximeter does not measure respiration and under no circumstances should it be used as a substitute for an apnea monitor.
- The oximeter must not be used as the primary monitor for infants being monitored for apnea, either in the hospital or in the home setting. It measures SpO_2 and pulse rate, and only then in conjunction with other appropriate monitoring techniques.
- A pulse oximeter is often used during sleep studies with adults, but must be used only to gather information regarding SpO_2 and pulse rate during these studies.
- A pulse oximeter is to be used only by or on the order of medically trained personnel.

This device is not intended for use in a magnetic resonance imaging (MRI) environment.

Data validity

To prevent erroneous readings, do not use an inflated blood pressure cuff on the same limb as the oximeter probe/sensor.

Excessive ambient light, excessive motion, low perfusion, or electrical interference at the probe/sensor site can result in the display of invalid SpO_2 data.

Operator safety

Do not handle hot or leaking battery packs or batteries.

Cautions

Since printed trend data include the current date and time, to avoid any possibility of confusion do not change the date and/or time settings while collecting patient trend data.

To prevent battery-pack damage,

- Handle a battery pack with care.
- Never attempt to take a battery pack apart; access only the battery compartment for replacing batteries in the AA battery pack.
- Do not put a battery pack where it can be short-circuited by contact with metal objects, such as in a pocket with keys.
- Use only AA batteries recommended by Ohmeda in the OxySTAT AA battery pack.

Service diagnostic mode is to be used by Ohmeda service personnel only.

Cleaning

- Do not autoclave, pressure sterilize, or gas sterilize the oximeter, the printer, the battery pack, or the battery charger.
- Do not immerse the oximeter, the battery pack, the printer, or the battery charger in liquid. The electronic circuitry can be short circuited, causing permanent damage.
- Use the cleaning solution sparingly. Excessive solution can flow into the device and cause damage to internal components.
- Do not touch, press, or rub the main display lens with abrasive cleaning compounds, instruments, brushes, rough-surfaced materials, or bring it into contact with anything that could scratch the panel.
- Do not use petroleum-based solutions or solutions containing acetone, ethanol, freon, trichloroethylene, or harsh solvents to clean the oximeter, the printer, the battery pack, the battery charger, or any protective covering on these devices. These substances attack the devices' materials, and device failure may result.

Cleaning, continued

When cleaning oximeter probes/sensors, follow all warning and caution statements provided in the probe/sensor user instructions.

- Do not soak or immerse the probe or sensor in any liquid.
- Do not autoclave the probe or sensor.
- Do not gas sterilize the Flex II probe with ethylene oxide.
- Disposable sensors are intended for single-patient-use only; do not attempt to clean them in any way.

OxySTAT *Plus* printer: To avoid damage to the printer, use only an AC adapter recommened by and available from Ohmeda.

Symbols and their definitions

These symbols mean attention. There are precautions you must take when using the device. Refer to the documents that accompany the device before using it.

This symbol means the oximeter conforms to the International Electrotechnical Commission (IEC) Standard 601-1 (Safety of medical Electrical Equipment) for patient-isolation type BF devices.

This symbol means the device must not be used in the presence of flammable anesthetics or other flammable substances.

IPX3 These characters mean that the device meets IEC 529 sprayproof standards.

This symbol means the device should never be discarded as trash or subjected to fire.

This symbol means the device is recyclable.

This symbol represents the selector (bull's eye) portion of the oximeter's menu wheel.

2/Operations

This chapter contains

- Instructions for preparing the OxySTAT oximeter for use.
- Descriptions of the unit's modes of operation.
- Instructions for initially setting up the OxySTAT *Plus* for the correct time, date, and language.
- Instructions for selecting the OxySTAT *Plus* settings of your choice.
- Instructions for printing data stored on the oximeter to an OxySTAT *Plus* printer.
- Information to help you determine the validity of the SpO_2 and pulse rate values you see on the oximeter.
- Instructions for checking that the oximeter is operating normally.

OxySTAT and OxySTAT *Plus* oximeters Preparing for use

WARNINGS:

Explosion hazard—Use only OxySTAT battery packs in the OxySTAT oximeter.

Operator safety—Do not handle hot or leaking battery packs or batteries.

CAUTION: To prevent battery-pack damage,

- Handle a battery pack with care.
- Never attempt to take a battery pack apart.
- Do not put a battery pack where it can be short-circuited by contact with metal objects, such as in a pocket with keys.

1. If a battery pack **is already installed** on the oximeter, go directly to **step 3**. To remove and replace a battery pack, go to step 2.
2. If a battery pack **is not** on the oximeter or if the low battery indicator light is flashing, follow these steps:

To remove a battery pack,

a. Press down on (1) and pull back (2) the battery pack release latch to disengage the locking mechanism.

b. Slide (3) the battery pack toward the rear of the unit until you can lift it up and off.

Note: Removing a battery pack automatically powers off the oximeter. Inserting a new one, however, does not necessarily power the oximeter back on.

c. **NiCad battery pack**—Recharge the battery pack; see Appendix B.
AA battery pack—Replace the batteries; see Appendix B.

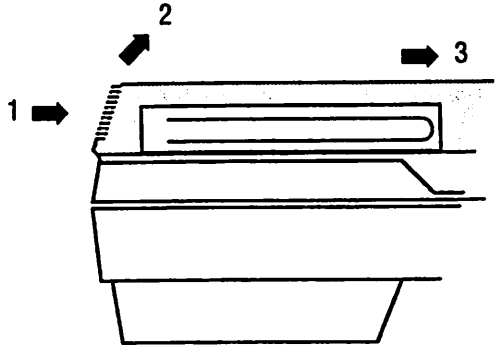


Figure 2-1. Releasing the battery pack.

To install a battery pack,

a. Before installing the battery, check to make sure it is fully charged.
   1) Press the battery pack's check switch ⏚ (not the latch button).
   2) If the LED below the switch is green, proceed to step b.
      OR
      If the LED is red, the NiCad battery pack needs recharging or the AA batteries need to be replaced; see Appendix B.

b. Position the battery pack on the oximeter as shown; make sure the ridges (1) are aligned and slide it on. When the battery pack's latch has engaged in the lock, you'll hear a click.

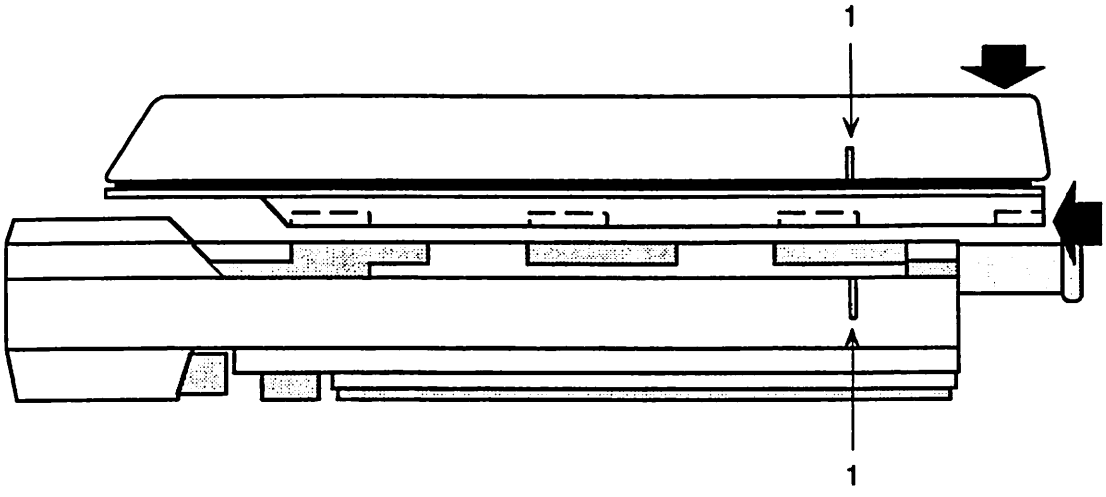


Figure 2-2. Installing a battery pack

3. To power on the unit, press the ◐ button on the front panel.
4. When the unit has completed its self-diagnostic tests and is ready to monitor, you'll see the SpO_2 and pulse rate values on the main display after those values have been detected and monitoring has begun. Both values may not appear simultaneously. The display of the pulse rate value may be delayed a bit for patients with lower heart rates, in which case "rolling" dots appear until there are sufficient pulse rate data.

Probe/sensor connected to patient

Figure 2-3. Main display

OxySTAT *Plus* oximeter only— Setup and operational modes

The OxySTAT *Plus* oximeter has two operational modes, monitor and print. **Except while printing**, pulse oximetry is active, the patient is being monitored, and data is being collected and stored in the memory. The SETUP menu, which does not disable pulse oximetry, offers a number of options for setting up the oximeter.

- Setup

  This menu provides options for

  — Setting the time and date and for choosing the language in which text appears on the main display.

  Notes:

  - Time, date, alarm settings, volume settings, and trend data are retained after you have set them as long as the oximeter is receiving power or for up to four hours when there is no power.
  - The language setting is retained indefinitely.

  — Selecting the SpO_2 averaging interval.

- Monitor

  During monitoring, you may access and select any of the setup options and you may

  — Change the low- and high-SpO_2 alarm limits.

  — Change the volume level for the pulse beep and alarms.

- Print

  This mode provides options for printing trend data to an OxySTAT *Plus* printer. While printing, pulse oximetry is disabled.

Defaults

Important: Except for the time, date, and language, the settings you may have changed **are not retained** when the oximeter is powered off. Each time you power on the oximeter the following system default settings are in effect:

Low-SpO_2 alarm limit = 85

High-SpO_2 alarm limit = Off

Pulse beat volume = Off

Alarm volume = High

SpO_2 averaging interval = 12 seconds

Note: The following instructions assume the OxySTAT *Plus* oximeter is powered on and ready to operate.

SETUP menu

The SETUP menu allows you to

- Set the time—hour and minutes.
- Set the date —day, month, and year.
- Select the display language—English, German, French, or Spanish.
- Select the SpO_2 averaging interval — 3, 6, or 12 (the default) seconds .

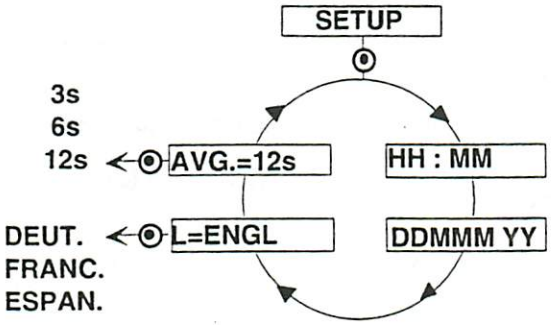


Figure 2-4. Setup menu

When you first use the OxySTAT *Plus* oximeter, you need to set the time and date. Trend data, when printed, contains this information. You'll need to reset this information if

- The battery pack ever fully discharges while on the unit or
- The unit is left without power for more than four hours (without a battery pack or with an installed battery pack that needs recharging or new batteries).

CAUTION: Since printed trend data include the current date and time, to avoid any possibility of confusion do not change the date and/or time settings while collecting patient trend data.

To set the time and date:

1. Press ⊙.
2. Turn the menu wheel until SETUP appears on the main display. To enter this menu, press ⊙.
3. The first menu item, the time, appears on the main display in this format: hh : mm (hours : minutes).

4. Press ⊙. The hour portion of the display flashes.
5. Turn the wheel to display the correct hour—clockwise increases the number, counterclockwise decreases it. When the correct hour appears, press ⊙ to select it.
6. The minutes portion flashes. Turn the wheel to display the correct number of minutes and when they appear, press ⊙.
7. With the SETUP submenu still on the display, turn the wheel to display the date option, which appears in this format: ddmmm yy (day, month, year). Press ⊙.
8. The year portion of the display flashes first. Follow the same procedure as you did for setting the time to set the date.
   a. Turn the wheel to access the correct number for the year and press ⊙.
   b. With the month portion flashing, turn the wheel to access the correct number for the month and press ⊙.
   c. With the day portion flashing, turn to the correct date and press ⊙.

If you want to change the averaging interval for SpO_2, refer to that topic under "Monitor mode" later in this chapter.

If you want to change the language setting for your OxySTAT *Plus* oximeter, follow the steps below.

To change the language setting:

1. If necessary, access and select the SETUP menu. In that menu, access and select the L= ENGL. option (the option flashes).
2. Access and select the language of your choice: DEUT., FRANC., or ESPAN. The flashing ceases.

If you have no further changes to make, wait three seconds. The monitoring display appears automatically.

Monitor mode

When the unit is actively monitoring a patient, the main display shows the SpO_2 and pulse rate values.

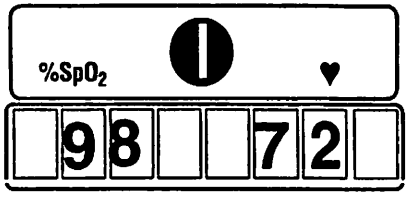


Figure 2-5 Monitor mode display

While monitoring a patient, you may

- Change the pulse beep volume and alarm volume settings.
- Change the high- and/or low-SpO_2 alarm limit settings.
- Access and select any of the setup menu options you've already read about and change the SpO_2 averaging interval—3, 6, or 12 seconds.

The only activity that disables the continuation of monitoring is printing; see "Print mode" later in this chapter.

Volume settings

Figure 2-6. Pulse beep and alarm volume menus

To change the pulse rate volume or alarm volume setting:

1. Press ⊙.
2. Access the volume menu you want to change and select it.
   The current volume setting's block flashes. Off is the smallest block; High is the largest block.
3. Choose the volume setting you want—you'll hear the volume change as you wheel through the options—and then press ⊙ .

The unit returns to the monitoring display automatically.

Alarm limits

Figure 2-7. Low- and high-SpO_2 limits

You may set the low-SpO_2 alarm limit Off or from 60 to 99% (85 is the default).
You may set the High-SpO_2 alarm limit Off (the default) or from 60 to 100%.

To view the current SpO_2 alarm limits and/or change them:

1. Press ⊙.
2. Turn the menu wheel to view the current limit for the alarm. You can view
   LoSp=85
   and/or
   HiSp=OFF
3. To select the desired limit, press ⊙.
4. Turn the wheel to select the desired value and then press ⊙.

The unit returns to the monitoring display automatically.

SpO_2 averaging interval

The system averages the SpO_2 data received at a specified interval, every 3 seconds (fast), every 6 seconds (normal), or every 12 seconds (slow, the default). The longer the averaging interval, the more data that has been used to arrive at the value, and thus, the more accurate and stable the value may be.

See "Theory of operation" in 1/Overview for more information on how the system uses this data to arrive at the SpO_2 saturation reading.

1. Press ⊙.
2. Access and select the SETUP menu.
3. Turn to the AVG.= 12 (the default) submenu item and press ⊙. The current interval flashes.
4. Turn to the interval you want to use and press ⊙.

The unit returns to the monitoring display automatically.

Erasing stored data

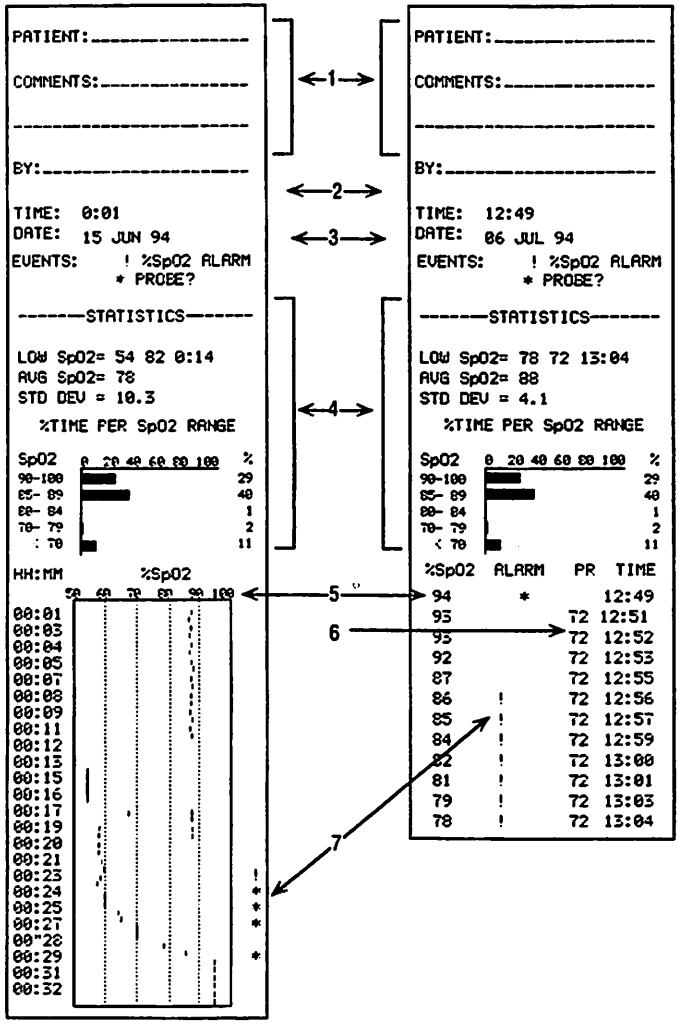
Trend data are stored in a memory area called a buffer. After printing the data, you can erase them from the buffer.

Note: You can also erase data you haven't yet printed. **Be sure you have printed stored data before you select to erase them.**

1. Press ⊙.
2. Access and select PRINT.
3. Access and select ERASE.
4. To select to erase the buffer, turn to the YES? option and select it.
   The unit returns to the monitoring display automatically and the data in the buffer are erased.

   OR

   If you decide not to erase the buffer, select the NO? option.
   The unit returns to the monitoring display automatically and the data in the buffer are retained.



Graphical trend printout **Numerical trend printout**

Figure 2-8. Trend data printouts

Trend data

The OxySTAT *Plus* automatically stores/trends data being taken, including %SpO_2, pulse rate, time markers, and alarm condition markers. The data collected are captured every 10 seconds for up to eight hours.

To accumulate trend information, simply monitor the patient(s) for the desired period(s) of time. You may turn the unit on and off and remove the probe to take short periods of trend data for one or more patients. The trend data already accumulated will remain in memory when the unit is powered off as long as the unit is receiving power (from charger or batteries), or up to four hours when there is no power.

CAUTION: Since printed trend data include the current date and time, to avoid any possibility of confusion do not change the date and/or time settings while collecting patient trend data.

If the oximeter cannot determine the date of the first "record" within the trend buffer, a line is printed next to "Date:" on the trend printout so you can write in the date/time.

You can print the accumulated data in either of two print formats, depending on your needs: numerical or graphical; see figure 2-8. The graphical format is best for showing long-term monitoring (more than four hours on one patient), while the numerical format is best for showing short-term (spot checking) monitoring on a number of patients.

Numerical and graphical formats

Time markers: Each time marker represents an 80-second interval. The printed time markers occur in the following sequence: two times at one minute apart, then one time at two minutes from the previous value (e.g., 00.01, 00.02, 00.04, 00.05, 00.06, 00.08, 00.09, 00.10, 00.12); the time printed is rounded up for each third measurement .

These printouts contain the following information:

- The time and date of the first record of data (not the time/date of the printout).
- Events of Probe? and SpO_2 alarms are noted within the trend.
- The statistics summarize the data presented.

  – The lowest SpO_2% is the lowest value detected over the monitoring interval, the corresponding pulse rate, and the time-marker for this data record. **Note:** The marker shown for a record could be up to one minute different in time from the point shown within the trend due to the round-up of the time marker.

  – The average SpO_2 is the summation of all saturation measurements over the time monitored.

  – The standard deviation is a measure of the amount of scatter or variance of the data over the monitoring interval.

Graphical format only

- A histogram shows the percent of time spent within each saturation range.
- Points within the graph represent the lowest saturation measured within that interval.

Numerical format only

- Every numeric data point printed represents the lowest saturation in the 80-second interval, the corresponding pulse rate, any alarm condition occurring within the interval, and the time marker.

  – If no pulse rate data are available, no value is printed. This could occur with a patient with a low resting pulse rate at the beginning of the monitoring interval, at which time it takes several additional seconds to sample enough beats to calculate the pulse rate accurately.

Note: Data collection ceases while you are printing.

Legend for Figure 2-8

1 You can write the patient ID(s), comments, and operator ID here.

2 The time and date of the first record print here.

3 A legend for the events that may occur prints here. An event's symbol appears on the printout at the time of occurrence: ! indicates an SpO_2 alarm occurrence; * indicates a PROBE? or SERVICE alarm occurrence.

4 A chart graph of the percentage of time the patient's SpO_2 was recorded in each of the ranges shown prints here (a histogram).

5 Percent scale for SpO_2 values.

6 (Numeric only) Pulse rate value column.

7 An event's symbol appears here across from the time of the event.

6. To start printing, press ⊙.

PRINT<XX appears on the main display. XX, the time remaining to complete printing, counts down the minutes on the display.

Do not move the oximeter or the printer until printing stops.

7. When printing stops, press (⏏) to advance the paper **before** tearing off the output. Do not tear the paper off until **after** it has stopped advancing.

If you have problems with the print head or find that characters are missing or printed incorrectly, refer to "Operating information" in Appendix C.

Once printing begins, no other operations can be performed on the oximeter. If a system failure occurs, however, the SERVICE message appears and the alarm sounds.

When printing ends, the oximeter returns automatically to monitoring and to the monitor mode display.

To stop printing before the stored data have completed printing, **you must power off the oximeter.** To resume printing, repeat the process from the beginning; all stored data will print from the beginning, not from where you stopped.

Printing does not erase the data from memory. To do that, see "Erasing stored data" earlier in this chapter.

Print mode

The OxySTAT *Plus* printer uses an AC adapter for accessing power. Refer to Appendix C, for complete information on controlling, operating, and cleaning the printer.

When the unit is in print mode, no monitoring data are collected into trend; pulse oximetry is disabled.

To make sure transmission between the oximeter and the printer works correctly, use the positioning guidelines shown below. To prevent data loss or incorrect characters on the printout, make sure nothing can block the transmission from the oximeter to the printer.

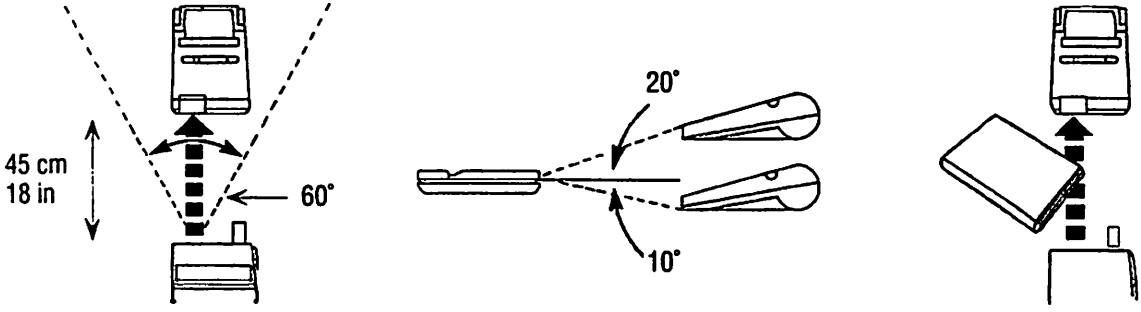


Figure 2-9. Positioning the oximeter and the printer for printing

1. Make sure the printer's AC power adapter is plugged into the printer and into the AC mains power supply; see Appendix C.

CAUTION: To avoid damage to the printer, use only an AC adapter recommened by and available from Ohmeda.

2. Make sure paper is in the printer and then turn it on.
   To put a new roll of paper in the printer, see Appendix C.
   To power on the printer, move the I/O slider to the right—to the I position.
3. With the oximeter powered on, access and select the PRINT menu.
4. Make sure the infrared transmitter on the oximeter and the infrared receiver on the printer are correctly positioned in relation to each other as shown in figure 2-9.
5. To print trend data, access and select the format you want–NUMERIC or graph.

OxySTAT and OxySTAT *Plus* Oximeters Data validity and signal strength

Both oximeters provide visual indicators to help you determine the validity of the values that appear on the main display:

- The pleth bar
- The signal strength indicator

Pleth bar

The pleth bar is a vertical column of light bars that indicates pulsatility. The height of the lighted LEDs is **not** proportional to pulse strength.

Poor probe placement, motion at the probe site, and electrical interference can cause "noise" on the plethysmographic waveform.

- Make sure the probe's detector is flush with the patient's skin.
- Have the patient remain as motionless as possible.
- If possible, remove electrical noise sources such as electrosurgery and electrical/ electronic devices.

Signal strength indicator

When one of the green indicator lights is lit, the system can clearly distinguish data from noise. If the yellow or orange indicator is lit, check the following:

- **Probe/sensor light detector**—Make sure the detector is completely covered by the patient's tissue.
- **Probe/sensor optical components**—Make sure the light source and detector are directly opposite each other.
- **Low perfusion** (EarProbe)—Massage the probe/sensor site with a 70% isopropyl alcohol pad or rubefacient cream (10-30% methyl salicylate and 2-10% menthol) for 20-30 seconds. Strong vasodilator creams, such as nitroglycerin paste, are not recommended.
- **Thick probe/sensor site**—Select a site where the distance between the light source and the detector is less.
- **Artificial nails or excessive fingernail polish**—Select another site or remove the polish/artificial nails.

Pulse rate

Compare the displayed pulse rate to the patient's palpated pulse rate. If the unit's rate varies significantly from the palpated rate, the data may be less accurate due to motion artifact or other noise.

A cough or other hemodynamic pressure disturbance can disrupt the pulse rate, which is determined from the plethysmographic waveform. The time span between the waveforms' peaks determines the pulse rate. The unit averages the pulse rate in 5- or 12-second intervals (based on, but not necessarily corresponding to, the SpO_2 averaging interval rate).

PROBE? message

This message may occur under the following conditions:

- Too much electrosurgery or other noise interference
- Too much ambient light interference
- Inadequate signal strength
- Very poor perfusion
- Too many poor data points collected in the last 10 seconds
- Probe/sensor off patient
- Probe/sensor off the oximeter
- Incompatible probe/sensor
- Probe/sensor failure

Refer to 3/Messages and Troubleshooting for more detailed information on the causes for this message and the recommended actions you might take to remedy the problem.

OxySTAT and OxySTAT *Plus* oximeters Checking normal operation

Before monitoring patients, always check that the oximeter is operating normally.

WARNINGS:

Explosion hazard

- **Use only an OxySTAT battery pack as part of the OxySTAT oximeter.**
- **Do not use the oximeter in the presence of flammable anesthetics or other flammable substances.**

Patient safety

- **Do not, under any circumstances, perform any testing or maintenance on the oximeter when it is being used to monitor a patient.**
- **If a probe or sensor is damaged in any way, discontinue use of the probe or sensor immediately.**
- **Use only compatible Ohmeda probes and sensors with the OxySTAT oximeter (ClipTip sensor, OxyTip adult/pediatric and neonatal/toddler sensors, FingerClip, FingerProbe, Flex II, and EarProbe). See the user instructions for the probe or sensor you are using for complete information, including warnings, cautions, and compatible oximeter connectors for that probe or sensor.**
- **Prolonged monitoring or patient condition may require periodically changing the probe/sensor test site. To reduce the risk of blistering, skin erosion, or ischemic skin necrosis, change the probe/sensor site as specified in the user instructions for the probe/sensor you are using. If any evidence of the above conditions appears before the specified time period (for example, discoloration or reddening), change the site immediately.**
- **The correct use of the oximeter is to measure only arterial oxygen saturation (SpO_2) and pulse rate.**
  - **A pulse oximeter does not measure respiration and under no circumstances should be used as a substitute for an apnea monitor.**
  - **The oximeter must not be used as the primary monitor for infants being monitored for apnea, either in the hospital or in the home setting. It measures SpO_2 and pulse rate, and only in conjunction with other appropriate monitoring techniques.**
  - **A pulse oximeter is often used during sleep studies with adults, but must be used only to gather information regarding SpO_2 and pulse rate during these studies.**
  - **A pulse oximeter is to be used only by or on the order of medically trained personnel.**

WARNINGS (continued)

Data validity

- **To prevent erroneous readings, do not use an inflated blood pressure cuff on the same limb as the oximeter probe/sensor.**
- **Excessive ambient light, excessive motion, low perfusion, or electrical interference at the probe/sensor site can result in the display of invalid SpO_2 data.**

1. Power on the oximeter and check that the low-battery light is not lit.

Note: No alarms sound for the first two minutes after powering on the unit.

2. Plug the OxyLead or probe cable into the FlexConnect probe/sensor cable connector on the top of the oximeter.
3. Place the probe/sensor on a finger and wait until SpO_2 and pulse rate values appear in the main display.
4. Remove the probe/sensor cable connector from the oximeter and make sure the PROBE? message appears on the main display.
5. Plug the probe/sensor back into the oximeter and wait for monitoring data to reappear on the main display. Then remove the probe/sensor from the finger. Make sure the PROBE? message appears on the main display.
6. Reattach the probe/sensor to the finger. Verify that the signal strength is adequate and that the data agrees with clinical evaluation of the patient; see the previous section, "Data validity and signal strength."

WARNING: Patient safety—When you are operating the unit on battery power and the battery becomes depleted, be aware that no alarm tone sounds when the unit shuts off.

If the oximeter does not operate exactly as described above or if a message indicating a system problem appears, do not use it for patient monitoring until the problem has been resolved or the unit is serviced by Ohmeda personnel.

For a list of messages that may appear on your oximeter, refer to 3/Messages and Troubleshooting.

3/Messages and Troubleshooting

Alarm conditions and system problems activate messages that appear on the main display. The first chart in this section lists the messages you may receive, the possible cause(s) for the message, and the recommended action(s) you should take to remedy the condition.

A second chart lists problem conditions that might occur that do not activate messages, along with the possible cause(s) and recommended action(s).

Message	Cause(s)	Recommended action(s)
PROBE? (OxySTAT *Plus* only)	The probe/sensor is not attached or not properly applied to the patient.	Attach the probe/sensor to the patient.
	The probe/sensor is not connected to the oximeter.	Check the probe/sensor site; make sure the probe/sensor is properly applied. Connect the probe/sensor cable to the FlexConnect connector on the oximeter.
	The probe/sensor is not one that is compatible with the oximeter.	Use an Ohmeda probe/sensor.
	The probe/sensor has failed.	Use another probe/sensor.
PRINT <XX (OxySTAT *Plus* only)	The OxySTAT *Plus* oximeter is printing to the printer; XX = the amount of time remaining (in minutes) to complete printing.	No action required.
SERVICE	The system or one of its components has failed.	The unit requires service. If this message occurs **during printing**, power the oximeter off and then on. If you can't restart printing and the message appears again, the unit requires service.

Condition	Cause(s)	Recommended action(s)
No display	Unit not powered on.	Press the on/off button on the front panel of the oximeter.
	NiCad battery pack needs recharging; AA pack needs new batteries.	Insert a charged battery pack.
	No battery pack is connected.	Make sure the battery pack is installed correctly on the oximeter.
	Unit with NiCad battery pack is not in contact with power contacts in the battery charger.	Make sure the oximeter is inserted correctly in the battery charger; a beep sounds when correct contact is made.
		If the condition persists, the unit requires service.
SpO_2 displayed value flashes	The low SpO_2 or high SpO_2 alarm limit has been violated.	Check the patient. Flashing ceases when the alarm condition is cleared. Make sure the alarm limit is clinically correct.
Low-battery light flashes every 3 seconds	The system is alerting you that not much full-power time remains on the batteries.	Remove the battery pack and replace it with a new fully charged NiCad pack or a AA pack with new batteries.
		NiCad pack only—Recharge the battery pack by itself or by leaving it where it is and placing it and the oximeter together into the battery charger.
Signal strength indicator and waveform bar LEDs darken and then "rolling dots" appear in the main display	Loss of signal quality has occurred: low perfusion, electrosurgery device, or other interference has been detected.	Check probe/sensor site; increase perfusion or relocate probe/sensor. Remove any other device that may be causing signal interference.

Condition	Cause(s)	Recommended action(s)
Printer won't print	Printer not powered on.	Slide the I/O on the printer button to I (on).
	Printer and oximeter are not properly aligned; transmission is not being received at the printer.	Make sure the printer and oximeter are properly positioned for infrared transmission; see "Print mode" in 2/Operations.
	AC adapter not properly connected.	Check adapter connections to the printer and to the AC power supply.
Battery charge indicator is not lit on the battery charger.	Charger is not plugged in.	Make sure the power cord is plugged into the side panel of the charger and into the AC power supply.
	Oximeter and/or NiCad battery pack is not inserted into the charger correctly.	Reinsert the oximeter and/or NiCad battery pack, aligning it so that you hear a beep from the charger and the light is lit.
	A NiCad battery pack must be in place for the oximeter to make contact in its slot in the battery charger.	Install a NiCad battery pack on the oximeter and reinsert it. If the condition persists, the charger requires service.

4/Maintenance and Service

This chapter provides routine maintenance instructions for cleaning the OxySTAT oximeter. It also contains

- Ohmeda service policy for the oximeter, battery packs, battery charger, and printer.
- A list of orderable items and their part numbers

For instructions on how to recharge the NiCad battery pack, replace batteries in the AA battery pack, set the appropriate voltage for the battery charger, and replace the fuse in the battery charger, refer to Appendix B,.

For information about the OxySTAT *Plus* printer, including replacing the paper roll, refer to Appendix C.

Cleaning the oximeter

CAUTION: Cleaning—

- Do not autoclave, pressure sterilize, or gas sterilize the oximeter.
- Do not immerse the oximeter in liquid. The electronic circuitry can be short circuited, causing permanent damage.
- Use the cleaning solution sparingly. Excessive solution can flow in the oximeter and cause damage to internal components.
- Do not touch, press, or rub the main display lens with abrasive cleaning compounds, instruments, brushes, rough-surface materials, or bring it into contact with anything that could scratch the panel.
- Do not use petroleum-based solutions or solutions containing acetone, freon, or harsh solvents to clean the oximeter. These substances attack the device's materials, and device failure may result.

To clean the oximeter, simply wipe it gently with a soft cloth dampened with any of the following cleaning agents:

Warm water	Isopropyl alcohol
Liquid soap/mild detergent	Cidex®
Mild chlorine bleach solution	Windex®
Hydrogen peroxide solution	Formula 409®
Gluteraldehyde (4% or less)	

Never use
Acetone
Butyl alcohol
Denatured ethanol
Freon
Trichloroethylene

To clean Ohmeda durable oximeter probes/sensors, follow the instructions provided with the probe or sensor you're using. Follow all warning and caution statements provided in those user instructions.

- Do not soak or immerse the probes/sensors in any liquid.
- Do not autoclave the probes/sensors.
- Do not gas sterilize the Flex II probe with ethylene oxide.
- Disposable sensors are intended for single-patient-use only; do not attempt to clean them in any way.
- Tests conducted by Ohmeda indicate that the durable probes/sensors (ClipTip sensor, FingerClip, FingerProbe, Flex II, and EarProbe) will withstand a minimum of 1000 cleaning cycles (wipe down with the solutions listed) without adverse effects.

After cleaning a durable probe/sensor, repeat the functional test "Checking normal operation" in 2/Operations.

See Appendix B for cleaning instructions for the OxySTAT battery charger and battery packs.

See Appendix C for cleaning instructions for the OxySTAT *Plus* printer.

Service

Warranty service must be performed by Ohmeda.

WARNING: Electrical Shock Hazard. Only Ohmeda service personnel should open the oximeter, the NiCad battery pack, the battery charger, or the printer. Refer servicing to Ohmeda service personnel. Do not attempt any adjustments or repairs of this equipment.

Do not use malfunctioning equipment. Have the equipment serviced by an Ohmeda Service Center. After service, test the equipment to make sure it complies with the manufacturer's published specifications.

Obtaining service

Inside the USA:
Contact the Ohmeda Service and Distribution Center, which is listed on the back cover of this manual.

Outside the USA:
Contact the nearest Ohmeda Representative or office listed on the back cover of this manual.

Packaging and return procedure

When returning equipment to Ohmeda for service:

1. **Please clean the equipment as described in the "Cleaning" section of this chapter. Allow the device to dry thoroughly.**
2. Package the device securely—in the original shipping container if possible—and enclose the following:
   a. A letter describing the problem in detail.
   b. Warranty information (a copy of the invoice or other applicable documentation must be included).
   c. Purchase order number to cover repairs if out of warranty, and for tracking purposes if within warranty.
   d. "Ship To" and "Bill To" information.
   e. Person (name and telephone/Telex/Fax number, and country) to contact for questions about necessary repairs.

When Ohmeda's warranty is not applicable, repairs are made at Ohmeda's current list price for replacement part(s) plus a reasonable labor charge.

In the Americas:

First call the Ohmeda Service and Distribution Center (OSDC) for instructions (see back cover of this manual for the phone number), and then ship it prepaid to the following address:

Ohmeda Service and Distribution Center
7750 The Bluffs NW
Austell, GA 30001

Everywhere else:

Call your local authorized service office as shown on the back cover of this manual and follow their instructions.

Recycling NiCad battery packs

Please do not discard the NiCad battery packs. Return them to Ohmeda, where they will be disposed of at a proper recycling facility, and you will receive a rebate on the price or your next NiCad battery pack purchase.

In the Americas: Return to OSDC at the address above.

Everywhere else: Return to the following address.

International Service Office
Ohmeda House
71 Great North Road
Hatfield, Hertfordshire
AL9 5EN England

Parts list

OxySTAT *Plus* oximeter with NiCad battery pack	6051-0000-040
OxySTAT *Plus* oximeter with AA battery pack	6051-0000-060
OxySTAT oximeter with NiCad battery pack	6051-0000-047
OxySTAT oximeter with AA battery pack	6051-0000-067
OxySTAT NiCad battery pack	6051-0000-036
OxySTAT AA battery pack	6051-0000-037
OxySTAT battery charger	
Australia	6051-0000-056
United Kingdom	6051-0000-057
USA/Canada/Latin America/Japan	6051-0000-058
European	6051-0000-059
Kit, charger fuses	6050-0003-475
Replacement power cords	
Australia	6030-0000-001
United Kingdom	6050-0002-259
USA/Canada/Latin America/Japan	0208-0943-300
European	6030-0000-006
OxySTAT *Plus* printer	6051-0000-038
OxySTAT *Plus* printer paper roll, 6/pkg	6050-0003-058
OxySTAT *Plus* printer AC adapter	
Australia	6051-0000-062
United Kingdom	6051-0000-065
USA/Canada/Latin America/Japan	6051-0000-066
European	6051-0000-061
Carrying case	
Unit	6050-0002-868
System	6050-0002-869
OxyLead interconnect cable	
0.91 m (3 ft)	6038-6000-022
3.66 m (12 ft)	6038-6000-002
OxySTAT Oximeter Operator's Manual, English	6050-0002-625

Refer to the Sensor Chart that accompanied the sensor for a complete list of available sensors, sensor accessories, and their reorder part numbers.

Appendix A/Specifications

Unless otherwise indicated, all specifications are nominal and are subject to change without notice. Unless otherwise indicated, the specifications below apply to both the OxySTAT and OxySTAT *Plus* oximeters.

Oximeter

General

Dimensions

Height: 18.54 cm, 7.3"
Width: 7.62 cm, 3.0"
Depth: 5.33 cm, 2.1"
Weight: 0.33 kg, 9.6 oz (without battery pack)

Power

Typical consumption: 1.6 watts
Typical current: 180 mAmps

Circuitry

Microprocessor controlled
Automatic self-test at poweron
Automatic setting of default parameters (OxySTAT *Plus* only)
Automatic alarm messages
Automatic/continuous system diagnostics

Visual displays and indicators

Main display: 8-character alpha-numeric; green; variable intensity dependent on ambient light conditions.
Waveform display: 8 LEDs (all green)
Signal strength indicator bar: 4 LEDs; 1 dark green, 1 yellow green, 1 yellow, 1 amber.
Low battery indicator LED: 1 orange.
Alarm bar (OxySTAT *Plus* only): red

Visual displays and indicators, continued
Display update interval: 0.5 seconds
Display hold interval: 12 seconds

Audio indicators (OxySTAT *Plus* only)
Alarm volume: Low, medium, high (default), and off.
Pulse rate volume: Low, medium, high, and off (default)
Pitch modulation to reflect changing SpO_2 levels
Alarm silence (120 seconds)
Low- and high-SpO_2 out-of-limits alarm
Probe condition alarms
System failure alarms

Environmental

Operating

Temperature:	0° to 50° C (32° to 122°F)
Humidity:	0 to 95% RH, noncondensing
Atmospheric pressure:	8 to 15.4 psia (700 to 1060 hPa)
Vibration:	Meets or exceeds— ASTM 4728, (Method C) MIL-STD-810E, Method 514.4, Section I.3.4.3 IEC 68-2-37
Drop/shock:	Meets or exceeds— IEC 68-2-32 (Procedure 1) MIL-STD 810E, Method 516.4, Section I-3.6 (Procedure IV)

Storage

Temperature:	-40° to 70° C (-40° to 158°F)
Humidity:	0 to 95% RH, noncondensing
Atmospheric pressure:	7.2 to 15.4 psia (500 to 1060 hPa)
Vibration:	Meets or exceeds— ASTM 4728, (Method C) MIL-STD-810E, Method 514.4, Section I.3.4.3
Drop/shock:	Meets or exceeds— IEC 68-2-32 (Procedure 1) MIL-STD 810E, Method 516.4, Section I-3.6 (Procedure IV)

International Electrotechnical Commission classifications

Type of protection against electric shock: Internally powered equipment/Class II
Degree of protection against electric shock: Type BF

Degree of protection against ingress of liquids: Sprayproof (IEC529–IPX3)

Mode of operation: Continuous

Recommended methods of sterilization or disinfection: See chapter 4/Maintenance and Service in this manual and appropriate sections of the Ohmeda probes' and sensors' user instructions for recommended procedures for cleaning this equipment

Degree of safety of application in the presence of a flammable anesthetic mixed with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

SpO_2

Alarm limits (OxySTAT *Plus* only)
Low = 60 to 99%
High = 60 to 100%

Range 0 to 100%

Accuracy (1 Standard Deviation)

90 to 100%	1.5%
80-89.9%	2.1%
60 to 100%	2.4%
Below 59.9%	unspecified

Interfering substances
Carboxyhemoglobin may erroneously increase readings. The level of increase is approximately equal to the amount of carboxyhemoglobin present. Dyes, or any substances containing dyes, that change usual arterial pigmentation may cause erroneous readings.

Pulse rate

Range 40 to 235 beats per minute

Accuracy ±1.7% of current reading (accuracy calculations assume a constant pulse rate)

Battery packs

NiCad rechargeable battery pack

Weight: 0.43 kg, (12.5 oz)
Power: 9.6V, sealed nickel-cadmium (8 cells)
Capacity: 1.4 A-hours
Operation time: 8 hours
Charge time: 2 hours
Life cycle: 1 year (500 cycles)
Low battery indicator LED lit when battery usage time is at or below ~15 minutes

AA battery pack

Weight: 0.12 kg (4.4 oz.) without cells; 0.26 kg (9.3 oz.) with cells
Capacity, operation time, charge time, and life cycle depend on the battery cell chosen.

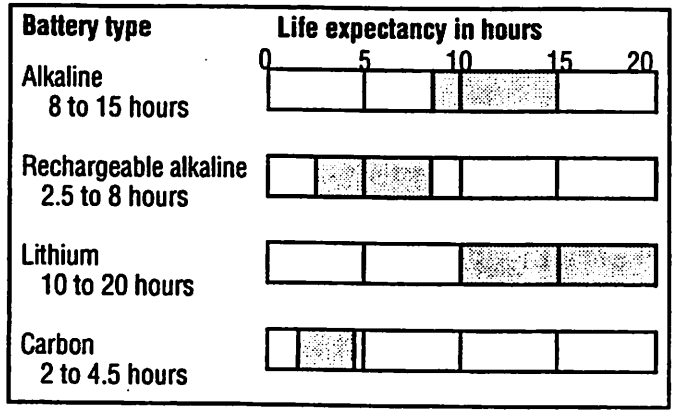


Figure A-1. AA battery life cycles

Low battery indicator LED lights depending on the battery cell, as follows:

Alkaline	< 2.5 hours
Alkaline rechargeable	< 1 hour
Lithium	< 1 hour
Carbon	< 2 hours

Recommended brands:

Alkaline	**Lithium**	**Carbon**
Duracell ™	Eveready	Eveready
Eveready™		Rayovac
Kodak™		
Panasonic™		
Rayovac®, including rechargeable "Renewal®"		
Top Crest™		

Environmental—NiCad and AA

Operating

Temperature:	0° to 50° C (32° to 122° F) 0° to 40° C (32° to 104° F)
Humidity:	0 to 95% RH, noncondensing
Atmospheric pressure:	8 to 15.4 psia (700 to 1060 hPa)
Vibration:	Meets or exceeds— ASTM 4728 (Method C) MIL-STD-810E, Method 514.4, Section I.3.4.3 IEC 68-2-37
Drop/shock:	Meets or exceeds— IEC 68-2-32 (Procedure 1) (NiCad) MIL-STD 810E, Method 516.4, Section I-3.6 (Procedure IV)

Storage

Temperature:	-40° to +50° C (-40° to +122° F)
Humidity:	0 to 65% RH (±20%) noncondensing
Atmospheric pressure:	7.2 to 15.4 psia (500 to 1060 hPa)
Vibration:	Meets or exceeds— ASTM 4728 (Method C) MIL-STD-810E, Method 514.4, Section I.3.4.3
Drop:	Meets or exceeds— IEC 68-2-32 (Procedure 1) (NiCad) MIL-STD 810E, Method 516.4, Section I-3.6 (Procedure IV)

Battery charger

General

Dimensions

Height:	11.43 cm, 7.3"
Width:	17.78 cm, 7.0"
Depth:	15.39 cm, 6.0"
Weight:	2.95 kg, 6 lbs 5 oz (without units or NiCad battery packs)

Power

Consumption:	24 watts, or less
Voltage:	100/120/220-230/240 V
Current:	< 35 Amps inrush current; < 2 Amps after three cycles
Frequency:	47 to 63 Hz

Fuses
T1.5 A, 5 x 20 mm
100/120/220/240 V
1.5 AG

Current leakage
With power on,
Patient to ground: < 10 µAmps
AC input to case: < 100 µAmps
Input to output: < 50 µAmps

Environmental

Operating

Temperature:	Not charging— 0° to 50° C (32° to 122°F) Charging—0° to 40° C (32° to 104° F)
Humidity:	0 to 95% RH, noncondensing
Atmospheric pressure:	8 to 15.4 psia (700 to 1060 hPa)
Vibration:	Meets or exceeds— ASTM 4728 (Method C) IEC 68-2-37
Drop/shock:	Meets or exceeds—IEC 68-2-32 (Procedure 1)

Storage

Temperature:	-40° to 50° C (-40° to 122°F)
Humidity:	0 to 95% RH, noncondensing
Atmospheric pressure:	7.2 to 15.4 psia (500 to 1060 hPa)
Vibration:	Meets or exceeds—ASTM 4728 (Method C)
Drop/shock:	Meets or exceeds—IEC 68-2-32 (Procedure 1)

International Electrotechnical Commission classifications

Type of protection against electric shock: Class I

Degree of protection against electric shock: Type B

Degree of protection against ingress of liquids: Ordinary

Mode of operation: Continuous

Recommended methods of sterilization or disinfection: See Appendix B in this manual for recommended procedures for cleaning this equipment

Degree of safety of application in the presence of a flammable anesthetic mixed with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

Printer

General

Dimensions

Height: 18.5 cm, 7.3"
Width: 9 cm, 3.5"
Depth: 2.5 cm to 6 cm, 1" to 2.4"
Weight: .46 kg, 13 oz (with paper)

Power

AC adapter
Voltage: 9 to 12 V, AC or DC
Current: 500 to1500 mAmps

Environmental

Operating

Temperature: 0° to 50° C (32° to 122°F)
Humidity: 15 to 95% RH, at 40°C (104°F) (paper specific)
Atmospheric pressure: 8 to 16 psia (700 to 1060 hPa)

Storage

Temperature: -40° to 60° C (-40° to 140°F)
Paper humidity: 50 to 90% RH
Printer humidity: 0 to 95% RH (printer specific)
Atmospheric pressure: 7.25 to 16 psia (500 to 1060 hPa)

International Electrotechnical Commission classifications

Type of protection against electric shock: Class II

Degree of protection against electric shock: Type B

Degree of protection against ingress of liquids: Ordinary

Mode of operation: Continuous

Recommended methods of sterilization or disinfection: See Appendix C for recommended procedures for cleaning this equipment

Degree of safety of application in the presence of a flammable anesthetic mixed with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

Appendix B/Battery Charger and Battery Packs

This appendix provides

- Instructions for setting up and using the OxySTAT battery charger.
  - — Setting the correct voltage for your local power supply.
  - — Recharging NiCad battery packs.
  - — Powering the oximeter.
  - — Conditioning NiCad battery packs.
  - — Replacing batteries in the AA battery pack
  - — Cleaning.
  - — Replacing a fuse in the charger.

Overview

The OxySTAT battery charger recharges the OxySTAT NiCad battery packs. The charger has two receptacles; each holds a NiCad battery pack or an oximeter with a NiCad battery pack attached to it.

The battery charger

- Is designed so you can insert the NiCad battery pack/oximeter into a slot easily and then know when contact is made (it beeps) and charging has begun.
- Has an LED for each slot that indicates the NiCad battery pack's charging status.
- Recharges the NiCad battery pack, individually or on the oximeter, in less than two hours.
- Will not overcharge a battery pack.
- Does not supply power to a charging slot until it has made a correct connection with the battery pack's contacts (on or off the oximeter).
- Allows conditioning of the NiCad battery packs for extended use.

Please refer to Appendix A/Specifications for complete specifications for these products.

WARNINGS:

Explosion hazard—

- **Do not use the oximeter, the OxySTAT Plus printer, or an OxySTAT battery charger in the presence of flammable anesthetics or other flammable substances.**
- **Cadmium is a hazardous substance. Do not incinerate or burn the NiCad battery packs.**
- **Do not dispose of a NiCad battery pack by throwing it in the trash. Dispose of a battery pack through an approved hazardous materials disposal facility or by returning it to Ohmeda for reclamation.**
- **Do not attempt to recharge or condition an Ohmeda NiCad battery pack using any device other than an OxySTAT battery charger.**
- **Do not attempt to recharge or condition any NiCad battery pack other than those made by Ohmeda in an OxySTAT battery charger**
- **Do not expose a battery pack to any temperature that is hotter than you can tolerate to touch.**

Proper grounding—The battery charger must be properly grounded.

- **Connect this equipment only to a three-wire, grounded, hospital-grade receptacle. The three-connector plug must be inserted into a properly wired three-wire receptacle; if a three-wire receptacle is not available, a qualified electrician must install one in accordance with the governing electrical code.**
- **Do not under any circumstances remove the grounding connector from the power plug.**
- **Do not use extension cords or adapters of any type. The power cord and plug must be intact and undamaged.**

Electrical shock and flammability hazard—Before cleaning or servicing the battery charger, always turn it off and disconnect the power cord from the AC mains power supply.

Fire hazard—To protect against fire hazard, replace only with fuses of the same type and local line voltage rating.

Operator safety—

- **Do not handle a hot or leaking battery pack or batteries.**
- **An operator may only perform maintenance procedures specifically described in this *OxySTAT Oximeter Operator's Manual*.**

In addition to recharging battery packs, an OxySTAT oximeter with an attached NiCad battery pack may be placed in this battery charger to access power during continuous, long-term patient monitoring.

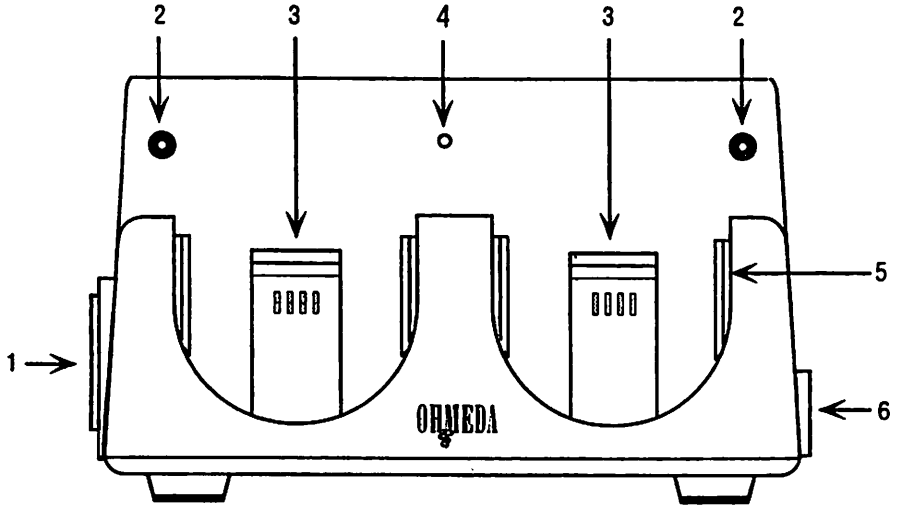


Figure B-1. Battery charger

1 Power input module
2 Status indicator LEDs
3 Recharging slots/contacts
4 Power indicator
5 Alignment ridges
6 Conditioning switch

1 After you've set up the charger, the power input module contains the voltage selection drum and two fuses. See "Setting up the charger" later in this appendix.

2 The light for each slot indicates the charging status, as follows:

- Unlighted—"idle," or the unit is not plugged into AC power, or the battery pack/oximeter is not making proper contact with the charger.
- Flashing green—actively charging.
- Solid green—charging complete; the battery is fully charged and ready for use.
- Flashing yellow—the battery pack is being conditioned.
- Yellow—charging delayed because battery pack voltage is out of charging range; when the charger has corrected the voltage, charging will begin.
- Red—charging delayed because battery pack temperature is out of charging range—0° to 40° C (32° to 104°F). When the temperature is within the allowable range, charging will begin. If you remove the pack and the LED remains red (or returns to red after a short time), the unit requires service.

3 These slots accept the oximeter with the NiCad battery pack installed or individual NiCad battery packs.

4 This LED is green when the charger is plugged into the AC mains power supply.

5 These alignment ridges fit into the alignment groove on the battery pack.

6 This switch selects the conditioning process for the slot (left and/or right) into which you're going to place a NiCad battery pack for conditioning.

Setup instructions

1. Make sure the power cord is not plugged into the charger's power module.
2. Use a small, straight-blade screwdriver to pry open the cover of the power input module on the side of the charger.

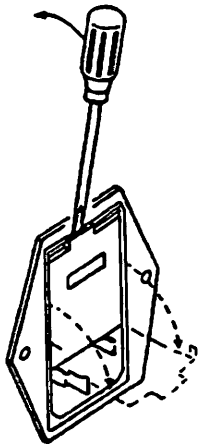


Figure B-2. Opening the power module cover

3. Locate the voltage selection drum that came with the charger. Rotate the drum so the appropriate voltage will appear through the window of the cover after it is closed.

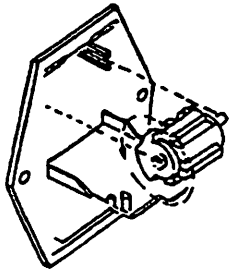


Figure B-3. Voltage selection drum position

4. Place the drum securely into the power input module.

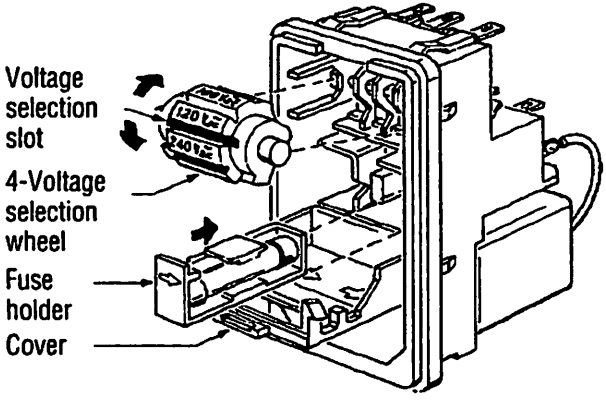


Figure B-4. Voltage drum and fuse/fuse drawer locations

5 Close the power module's cover.

6. Verify that the correct line voltage setting is visible in the cover window.

The OxySTAT battery charger is now ready to plug in and use.

Recharging NiCad battery packs

To charge a NiCad battery pack—on or off the oximeter:

1. Make sure the charger is plugged into the AC mains power supply.
2. Insert the pack/unit into the charger so that the alignment ridges in the slot fit into the grooves on the sides of the battery pack.

You'll hear a click and a beep when the contacts are seated properly.

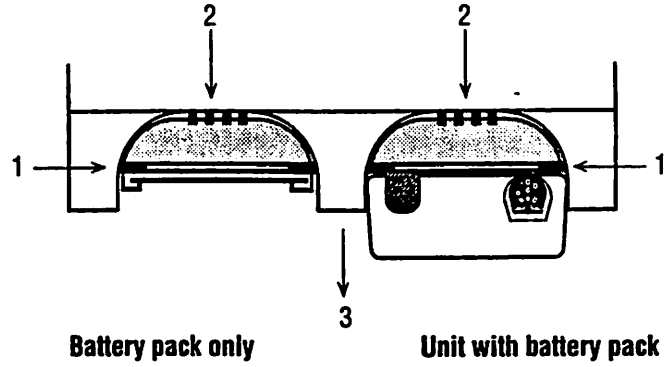


Figure B-5. Inserting the battery pack in the charger—top view

1 Alignment ridges
2 Battery pack/charger contacts
3 Front of charger

3. The flashing green light indicates the battery pack is being recharged.

   Note: If the battery pack is too cold or too hot (red light) or out of voltage range (yellow light), the unit is not yet charging. The green light will flash as soon as the battery pack is within the recharge range.

Powering the oximeter

You can use the battery charger as a power supply for the oximeter (with a NiCad battery pack only) during long-term patient monitoring (the NiCad battery pack is being recharged at the same time). When inserted in the charger, the oximeter's controls and FlexConnect connector are accessible.

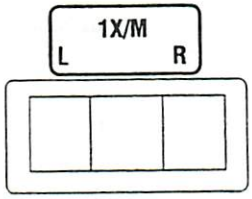
1. Make sure the charger is plugged into the AC mains power supply.
2. After placing the oximeter in the battery charger, as shown in Figure B-2, power it on.
3. Perform the "Checking normal operation" procedure in 2/Operations.

You're ready to monitor a patient.

Conditioning NiCad battery packs

An individual NiCad battery pack, or one installed on the oximeter, can be "conditioned," which first discharges the battery to 1 volt ±5% per cell and then initiates the fast-charge cycle. We recommend that you condition each NiCad battery pack at least once a month and no more frequently than three times a month.

1. On the side of the charger, press the conditioning rocker-type switch for the slot in which you've put the battery pack (left or right as you face the charger). "1X/M" is to remind you to condition each pack at least once a month.



   The status indicator LED on the front of the charger for this slot becomes yellow; it takes approximately 8 hours to condition and charge a battery pack.
2. The rocker switch returns to "neutral" and you can then press the other side to condition a battery pack in the other slot.

Note: If the status indicator is either yellow (voltage delay) or red (temperature delay or service required), the battery pack cannot be conditioned.

Replacing batteries in the AA battery pack

Ohmeda has tested and approved the following batteries for use in the AA battery pack:

Alkaline	**Lithium**	**Carbon**
Duracell	Eveready	Eveready
Eveready		Rayovac
Kodak		
Panasonic		
Rayovac, including rechargeable "Renewal"		
Top Crest		

Refer to Figure A-1 in Appendix A/Specifications for comparative life-expectancy information on the recommended AA batteries.

1. Open the battery access door on the inside of the AA battery pack and place to one side.

2. Remove the depleted batteries and replace with six new (or recharged) AA batteries. Match the + on each battery with the + shown on the grooves inside the pack.
3. Replace and latch the battery access door.

Please dispose of depleted batteries as instructed on the package by the manufacturer.

Cleaning

CAUTION: Cleaning—

- Do not autoclave, pressure sterilize, or gas sterilize the battery charger or battery pack.
- Do not immerse the battery charger or battery pack in liquid. The electronic circuitry can be short circuited, causing permanent damage.
- Use the cleaning solution sparingly. Excessive solution can flow into the charger or battery pack and cause damage to internal components.
- Do not use petroleum-based solutions or solutions containing acetone, ethanol, freon, trichloroethylene, or harsh solvents to clean the charger or battery pack. These substances attack the devices' materials and device failure may result.

WARNING: Electric shock and flammability hazard—Before cleaning the battery charger, always turn it off and disconnect the power cord from the AC mains power supply.

To clean the battery charger or battery pack, unplug it from the power supply and then wipe it gently with a soft cloth dampened with any of the following cleaning agents (do not spray the agent directly on the battery charger):

Warm water	Isopropyl alcohol	Liquid soap/mild detergent
Cidex®	Mild chlorine bleach solution	Windex®
Hydrogen peroxide solution	Formula 409®	Gluteraldehyde (4% or less)

Never use

Acetone	Butyl alcohol	Denatured ethanol
Trichloroethylene	Freon	

Replacing a fuse in the charger

You'll need a small, flat-blade screwdriver. Refer to Figures B-2, B-3, and B-4 to access the fuse holders.

Warnings:

- **Fire hazard—For continued protection against fire hazard, replace only with the same type and rating of fuse.**
- **Electrical shock and flammability hazard—Before replacing the fuse(s), always disconnect the battery charger from AC mains power.**

1. Unplug the charger from the AC mains power supply.
2. Use a small, flat-blade screwdriver to pry up and pull out the fuse cartridge assembly.
3. Replace each blown fuse with one of the same rating and reinsert the fuse cartridge assembly.
4. Verify that the voltage drum is still positioned properly, showing the correct voltage for your local AC power supply.

Service

For technical assistance, service information, and information about recycling the NiCad battery pack, please refer to "Service" in 4/Maintenance and Service.

Appendix C/OxySTAT *Plus* Printer

This appendix contains the following printer information:

- Printer controls and indicators
- Powering the printer
- Replacing the paper roll
- Operating information
- Cleaning the printer and boot

Please refer to Appendix A/Specifications for complete specifications for the printer.

Features

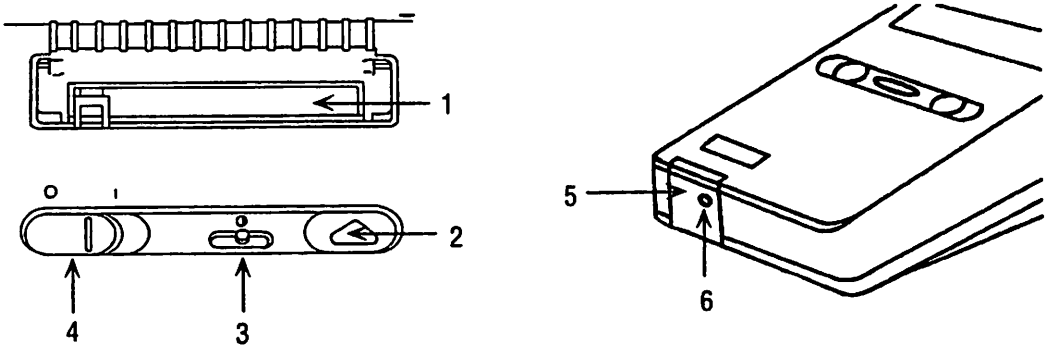


Figure C-1. Printer controls

1	Paper feed slot	4	0/1 switch (power on)
2	Paper advance button	5	Infrared link receiver
3	Contrast selector	6	Power-on indicator light

1 Paper feeds out from the printer through this slot. Use the top edge of the plastic slot cover to tear off the paper.

2 Press this button to feed the paper from the roll through the slot and to advance the printed output when printing is complete.

3 Use this sliding selector to choose the best printing contrast.

4 Use this switch to power the printer on and off.

5 The oximeter's infrared link transmitter must be pointing at this infrared link receiver during printing. For positioning guidelines, see "Print mode" in 2/Operations.

6 This red light is lit when the printer is powered on.

Powering the printer

The printer uses an AC adapter to operate from the AC power supply. Make sure you have the correct AC adapter for your local line voltage; see the Parts List in 4/Maintenance and Service.

CAUTION: To avoid damage to the printer, use only an AC adapter recommened by and available from Ohmeda.

1. Plug the connector on the AC adapter into the hole on the back of the printer (to the left of the paper roll door.
2. Plug the AC adapter into a power receptacle.

Replacing the printer paper

To assure proper operation of the OxySTAT *Plus* printer:

- Do not operate the printer without paper.
- Do not pull on the paper; press ⏏ to advance the paper.
- Never pull the paper backward through the printer mechanism.
- Do not run the paper through to the end of the roll if you're using paper that is attached to the inner core. Use only Ohmeda OxySTAT *Plus* Printer paper rolls, which do not have the paper attached to the core; reorder information is in the Parts List in 4/Maintenance and Service. **Do not use 3760 Pulse Oximeter paper in the OxySTAT printer.**
- Do not use paper with folds or uneven edges.
- Do not allow any obstruction to contact the printer mechanism.
- Before loading the new paper roll, tear or cut the end of the paper evenly.

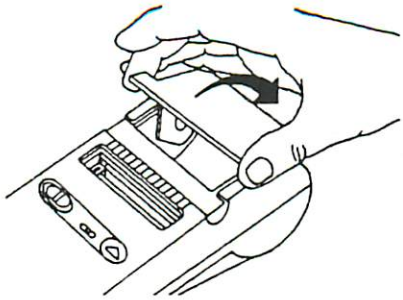


Figure C-2. Printer door

1. Remove the boot from the printer.
2. Open the paper roll door.
3. Remove the used paper roll core.

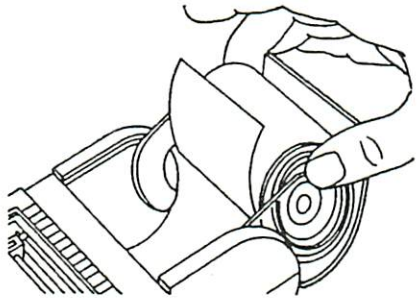


Figure C-3. Paper roll position

4. Position the paper roll in the door. **Note**: The paper spools from the bottom of the roll.

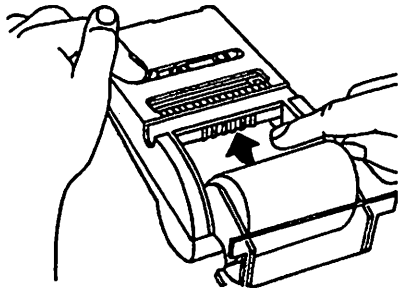


Figure C-4. Loading the paper

5. While pushing the paper into the slot, hold down the ⏏ button until the paper emerges. If the paper jams, pull back **very carefully**—just enough to free the jammed paper, not enough to pull the paper back through the mechanism.

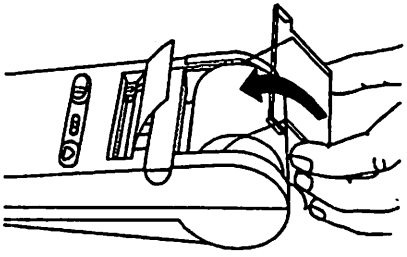


Figure C-5. Placing the paper roll.

6. Place the paper roll into the compartment and close the door.

Operating information

For instructions on printing stored data from the OxySTAT *Plus* oximeter to the printer, see "Print mode" in 2/Operations.

Controlling the print head

If you turn the printer off while it is printing, the print head may stop in the middle of the line. To return the print head to the left side of the paper, turn the printer on, then off.

Leaving the print head in the middle of a line cause temporary lightening of the characters in that column; continued printing restores the print contrast.

Incorrect or missing characters

The ▒ character is printed if the printer detects incorrect data due to interference with or interruption of the stream of incoming information. Common causes for incorrect data are improper positioning of the printer with respect to the oximeter, obstruction of the infrared beam, or interference from another infrared source. Check the AC adapter connection; do not use batteries.

The ▒ character is printed if information is lost because the printer cannot print fast enough to keep up with incoming data.

Cleaning

CAUTIONS: To avoid damage to the printer's internal components

- Do not autoclave, pressure sterilize, or gas sterilize the printer.
- Do not immerse the printer in liquid. The electronic circuitry can be permanently damaged.
- Use cleaning solutions sparingly. Excessive solution can flow into the printer and cause internal damage.
- To clean the printer, do not use petroleum-based solutions or solutions containing acetone, or other harsh solvents.
- To clean the elastomeric printer boot, do not use petroleum-based solutions or solutions containing acetone, alcohol, freon, or other harsh solvents.

To clean the printer:

1. Remove the boot.
2. Moisten a lint-free cloth with water or mild cleaning solution, such as 70% isopropyl alcohol, and wipe the surface of the printer .
3. Allow the printer to dry **thoroughly** before replacing the boot.

To clean the boot:

1. Remove the boot from the printer.
2. Wipe it gently with a soft cloth dampened with any of the following cleaning agents:

Warm water	Liquid soap/mild detergent	Gluteraldehyde
Cidex®	Mild chlorine bleach solution	Windex®
Hydrogen peroxide solution	Formula 409®	

Never use the following to clean the elastomeric boot:
Acetone, Alcohol, Denatured ethanol, Trichloroethylene, Freon

3. Allow the boot to dry **thoroughly** before placing it back on the printer.

Service

For technical assistance and service information, please refer to "Service" in 4/Maintenance and Service.

Warranty

These products are sold by Ohmeda only under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to the purchase of these products directly from Ohmeda's Authorized Dealers as new merchandise and are extended to the first Buyer thereof, other than for resale.

Limited warranty

Ohmeda warrants that these products meet its published specifications at the time of shipment from the factory.

Products not under warranty

The following items are not covered under this warranty: disposable items, service kits, and replacement parts. These items may be covered under a separate warranty. Consult Ohmeda for details.

Duration

The OxySTAT oximeter and the OxySTAT *Plus* oximeter, other than their expendable parts, are warranted against functional defects in materials and workmanship for a period of three (3) years from the date of delivery to the user (in no event for a period of more than four (4) years from the date of original delivery by Ohmeda to an Ohmeda Authorized Dealer). The OxySTAT battery packs, the OxySTAT battery charger, and the OxySTAT *Plus* printer, other than their expendable parts, are warranted against functional defects in materials and workmanship for a period of one (1) year from the date of delivery to the user (in no event for a period of more than two (2) years from the date of original delivery by Ohmeda to an Ohmeda Authorized Dealer). If any part of these products proves defective under proper and normal use within the warranty period, and the proper planned maintenance procedures have been followed, as the purchaser's exclusive remedy, Ohmeda will repair or replace, at its sole discretion, the product or any defective part provided it is returned to Ohmeda Service within 30 days.

Limitation

Ohmeda may at any time discharge its warranty obligation by repairing and returning the product to original factory performance. This may be accomplished by installing new or remanufactured assemblies or other repairs deemed appropriate by Ohmeda. Ohmeda's choice of repair or replacement shall be the sole remedy of the buyer or user.

Conditions

This warranty is valid only when Ohmeda-trained personnel have performed installation and service on these products and all recommended planned maintenance procedures have been completed during the warranty period. Damage caused by the abuse or misuse of these products is not covered by this warranty. Ohmeda shall not be liable for damage resulting from the improper installation or the misuse of these products.

Exclusion of warranties

Oral statements about these products do not constitute warranties, shall not be relied on by the buyer or user, and are not part of any warranty extended by Ohmeda.

Except as set forth in this limited warranty, Ohmeda makes no warranties, expressed or implied, including the implied warranty of merchantability and the implied warranty of fitness for a particular purpose. Except for the obligations under this limited warranty, Ohmeda shall not have any obligation or liability for any incidental or consequential damages (including those from commercial loss) or other loss, damage, or injury resulting directly or indirectly from these products.

1315 West Century Drive
Louisville CO 80027 9560 USA
303 666 7001

OHMEDA

THE BOC GROUP

Regional Service Offices

US and Canada
Eastern Region
Ohmeda
450 Raritan Center Pkwy
Raritan Center
Edison NJ 08837 USA
Tel 800 345 2755
Fax 908 225 2189

Midwestern and Southeastern Region
Ohmeda
7750 The Bluffs NW
Austell GA 30001 USA
Tel 800 345 2755
Fax 404 944 1382

Western Region
Ohmeda
616 Six Flags Dr Suite 310
Arlington TX 76011 USA
Tel 800 345 2755
Fax 817 633 6235

Service & Distribution Center
Ohmeda
7750 The Bluffs NW
Austell GA 30001 USA
Tel 800 345 2755
Tel 404 739 4774
Fax 404 739 4770

Technical Support
Ohmeda
Ohmeda Drive
PO Box 7550
Madison WI 53707 7550
USA
Tel 800 345 2755
Fax 608 222 9147

Canada Service Centre
Ohmeda
5865 McLaughlin Road
Mississauga Ont L5R 1B8
Canada
Tel 905 568 9533
Fax 905 568 9799

International Offices

UK, Europe, Africa, and Middle East
Ohmeda
Ohmeda House
71 Great North Road
Hatfield Hertfordshire
AL9 5EN England
Tel 1707 263570
UK Telex 918179
Int'l Telex 915128
UK Fax 1707 260065
Int'l Fax 1707 260191

France
Ohmeda
Parc de Pissaloup BP 10
8 Avenue Jean d'Alembert
78190 Trappes
France
Tel 33 1 30 68 60 00
Fax 33 1 30 68 60 01

Germany, Central Europe
Ohmeda GmbH & Co KG
Langemarckplatz 3
Postfach 2880
D-8520 Erlangen
Deutschland
Tel 49 91 31 81 01 0
Fax 49 91 31 81 01 11

Italy
Ohmeda Milano
Via Carpaccio 33
20090 Trezzano S/N (MI)
Italia
Tel 02 445761
Telex 314479 I
Fax 02 445 5614

Netherlands
Ohmeda BV
Rembrandtlaan 1A
3723 BG Bilthoven
Netherlands
Tel 31 30 289 399
Fax 3130 284 867

Spain
Ohmeda Madrid
C/Manuel Tovar 26
28034 Madrid
España
Tel 91 358 16 76
Telex 23795 Mameq E
Fax 91 358 12 84

Sweden & Scandanavia
BOC Ohmeda AB
Nordic
PO BOX 631
Östra Sandgatan 12
S 251 06 Helsingborg
Sweden
Tel 46 42 178800
Fax 46 42 178747

Japan
Service
Ohmeda & NEC San-ei, Ltd
Technical Center
The Second Maruya Bldg
2 16 11 Kaname-cho
Toshima-ku Tokyo
171 Japan
Tel 03 3973 4055
Fax 03 3973 9102

Sales and Marketing
Ohmeda & NEC San-ei, Ltd
Marumasu Shinjuku Bldg
6 24 20 Shinjuku
Shinjuku-ku Tokyo
160 Japan
Tel 03 5272 1881
Telex 232 3106
Fax 03 5272 0773

Asia/Pacific
Ohmeda
No 198 Yishun Avenue 7
Singapore 2776
Tel 65 753 6311
Fax 65 753 1817

Latin America and Caribbean
Ohmeda
9200 S Dadeland Blvd
Suite 610
Miami FL 33156 USA
Tel 305 670 9938
Fax 305 670 4834

For additional information or to place an order in the USA, call 800 345 2700.

Cover change 9/94