Introducing SportStat

The SportStat® Pulse Oximeter is a very small, lightweight device that measures blood oxygen saturation (%SpO_2) and pulse rate. The SportStat can be used by a variety of sports enthusiasts, including mountain climbers, hikers, skiers, bikers, and others interested in measuring blood oxygen saturation and pulse rate. It can be used outdoors in a variety of conditions, including high altitudes, at high and low temperatures, and even in the dark. SportStat displays %SpO_2 and pulse rate on light-emitting diode (LED) numeric displays. When each pulse is detected, the pulse quality display blinks. SportStat is designed for use on most fingers, but the index finger is preferred. When using SportStat, minimize finger motion as much as possible. (Excessive motion might cause erratic results.)

Two AAA-size batteries power SportStat for approximately 1,600 spot checks (calculated at 40 seconds per spot check using alkaline batteries) or 18 hours of continuous operation. When the batteries are low, the numeric displays will flash once per second. SportStat will automatically shut off (to conserve battery life) approximately 10 seconds after the finger is removed, or after a 2-minute period of inadequate pulse signals.

- ### Blood Oxygen Saturation Display
  Numeric LEDs display blood oxygen saturation in percent (indicated by the %SpO_2 icon).
- ### Pulse Rate Display
  Numeric LEDs display pulse rate in pulses per minute (indicated by the heart icon).
- ### Pulse Quality Display
  The tri-color LED display provides a visual indication of the pulse signal quality, while blinking at the corresponding pulse rate. This display changes colors to alert you to changes in pulse quality that may affect the readings.

  Green = a good pulse signal **Yellow** = a marginal pulse signal **Red** = an inadequate pulse signal
- ### Back Cover
  The back cover shows the device serial number and the correct battery position for insertion.

Precautions for Use

Warnings

- Experts in the diagnosis and treatment of altitude-related illnesses have cautioned that while potentially life-threatening medical complications may occur at lower altitudes, they become more likely above 8,000 feet (2,440 meters) and are much more frequent at altitudes above 12,000 feet (3,660 meters). This is true even for those who are physically fit and well acclimatized. Interpretation of %SpO_2 values at high altitudes should only be done in conjunction with expert medical advice.
- If you have a pre-existing medical condition, seek medical advice before participating in any activities at altitudes higher than where you live.
- SportStat Pulse Oximeter readings should be considered approximate measurements only and are not intended for medical use.
- This device *will not* detect carbon monoxide (CO) in the blood. Use separate equipment if you are concerned about elevated levels of carbon monoxide.
- *Do not* attempt to read the SportStat displays while performing any activity that requires your full attention.
- Keep SportStat away from small children. It contains small parts that may pose a choking hazard.

Cautions

- Read this entire manual carefully before using the SportStat Pulse Oximeter.
- The SportStat Pulse Oximeter is designed to determine the percentage of arterial oxygen saturation of functional hemoglobin. Significant levels of dysfunctional hemoglobin such as carboxyhemoglobin or methemoglobin may affect the accuracy of the measurement.
- This equipment complies with the International Standards IEC 601-1-2:1993 and EN 60601-1-2:1994 for electromagnetic compatibility for electrical equipment and/or systems. However, because of the proliferation of radio-frequency transmitting equipment and other sources of electrical noise, it is possible that high levels of such interference due to close proximity or strength of a source may result in disruption of performance of this device.
- Batteries may leak or explode if used or disposed of improperly.
- Remove the batteries to avoid the risk of leakage if SportStat is going to be stored for more than one month.
- Do not use different types of batteries at the same time, and do not mix fully- and partially-charged batteries at the same time. These actions may cause batteries to leak. Follow local governing ordinances and recycling instructions regarding disposal or recycling of batteries.
- SportStat may misinterpret motion as good pulse quality (as indicated by a green pulse quality display). Always hold your finger still while using SportStat.
- Nail polish or artificial nails may reduce light transmission through the finger, affecting %SpO_2 accuracy. Remove polish or artificial nails before using SportStat.
- SportStat may not work on a cold finger because of reduced circulation. Warm up or rub your finger to increase circulation, or try re-positioning SportStat.
- A flexible circuit/strain relief connects the two halves of SportStat. Do not twist or pull on the flexible circuit/strain relief.
- Do not immerse SportStat in liquid, and do not use caustic or abrasive cleaning agents on SportStat.
- The SportStat Pulse Oximeter is a precision electronic instrument and must be repaired by trained NONIN personnel only.
- It may be difficult to read the SportStat displays in very bright light. Shield the displays with your hand, or re-position SportStat.

- Indicates separate collection for electrical and electronic equipment (WEEE). In compliance with the European Directive on Waste Electrical and Electronic Equipment (WEEE) 2002/96/EC, do not dispose of this product as unsorted municipal waste. This device contains WEEE materials; please contact your distributor regarding take-back or recycling of the device. If you are unsure how to reach your distributor, please call Nonin for your distributor's contact information.

How SportStat Works

The SportStat Pulse Oximeter transmits red and infrared light through the finger and detects the fluctuating signals caused by blood flow. The pulse rate is determined from the signals received by a photodetector. (If the photodetector does not sense an adequate amount of light, SportStat will not function properly.) The ratio of the fluctuation of the red and infrared light signals is used to calculate the blood oxygen saturation (%SpO_2) of hemoglobin and is expressed as a percentage. For example, a %SpO_2 reading of 97 indicates that 97% of the hemoglobin molecules are carrying oxygen. At higher altitudes, blood oxygen saturation (%SpO_2) decreases because of reduced atmospheric pressure. In addition, pulse rate often increases as a normal compensatory mechanism.

Note: Using supplemental oxygen at higher altitudes can prevent dangerous decreases in arterial oxygen saturation. The SportStat may be used to indicate that oxygen saturation is being maintained while on supplemental oxygen.

The following table shows the %SpO_2 values that are predicted at altitude without the use of supplemental oxygen. These values are approximations and should be used for reference only. Actual %SpO_2 values may vary from the predicted values. Predicted %SpO_2 values **DO NOT** indicate safe levels of blood oxygen saturation, especially at higher altitudes.

Altitude	Barometric Pressure (mmHg)	Predicted %SpO_2 Values
Sea Level	760	97
5,000 feet (1,500 meters)	630	92
7,500 feet (2,286 meters)	570	92-93
15,000 feet (4,600 meters)	425	86
20,000 feet (6,100 meters)	352	76

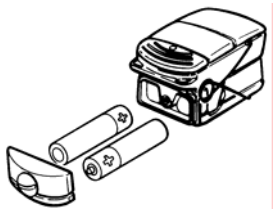
* Table adapted from *Medicine for Mountaineering,* 4th ed., edited by James A. Wilkerson, M.D. ©1992. The Mountaineers. Seattle, WA.

Using SportStat

Use two 1.5-volt AAA-size batteries to power SportStat. NONIN recommends alkaline batteries (included with each new SportStat). The numeric displays will flash once per second when the batteries are low. Replace low batteries as soon as possible.

Inserting New Batteries

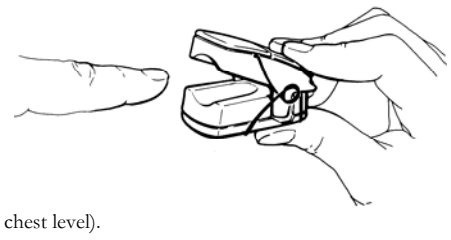
1. Loosen the screw at the end of the SportStat using a coin or a standard flat screwdriver. Remove the battery door.
2. Remove the old batteries and dispose of them properly.
3. Insert two new 1.5-volt AAA-size batteries. Follow the polarity markings (+ and -) as indicated on the back cover. *Proper positioning of the batteries is essential for SportStat to operate.*
4. Carefully re-position the battery door. *Do not force the door into place;* it fits only when properly positioned.
5. Tighten the screw firmly. However, to avoid stripping the screw threads, *do not* tighten the screw excessively.
6. Insert your finger into SportStat. If the unit does not turn on, remove your finger and wait a few seconds before reinserting your finger.
7. If SportStat still does not turn on, reinsert the batteries.



Note: Rechargeable nickel cadmium or nickel-metal hydride batteries may be used. However, rechargeable batteries need more frequent replacement.

Activating SportStat

Activate SportStat by inserting your index finger into the unit. SportStat detects the inserted finger and automatically illuminates the displays. Correct positioning of SportStat's light emitter and photodetector on the finger is critical for accurate measurements. All emitted light must pass through the fingertip before reaching the photodetector. Do not position SportStat such that some or all of the emitted light bypasses the finger—this could result in inaccurate values. While on the finger, do not press SportStat against any surface and do not squeeze or hold SportStat together. The external spring provides the correct amount of pressure on the finger. Additional pressure may cause inaccurate readings.

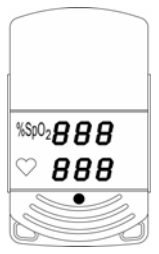


Note: SportStat performs best when used on fingers (other than the thumb) between 0.3 to 1.0 inch (0.8 to 2.5 cm) thick. The index finger is the recommended site.

1. Insert your finger, nail side up, into SportStat until your fingertip touches the built-in stop guide.
2. Make sure your finger is lying flat (not on its side) and is centered within SportStat. For best results, keep SportStat at about the same level as your heart (at chest level).
3. If SportStat does not turn on, remove your finger and wait a few seconds before reinserting it.

Note: SportStat will automatically shut off (to conserve battery life) approximately 10 seconds after the finger is removed, or after a 2-minute period of inadequate pulse signals.

Verifying SportStat Operation



1. When your finger is first inserted, SportStat performs a brief startup sequence.
2. After completing this sequence, SportStat begins sensing the pulse (indicated by the blinking pulse quality display).
3. Allow SportStat to stabilize. Observe approximately 10 seconds of continuous green-colored pulse quality display blinking before relying on the displayed values. It is common for the displayed values to fluctuate slightly over a period of several seconds.
4. If the pulse quality display blinks yellow or red, try another finger. Squeezing or putting pressure on SportStat can result in yellow or red blinking.
5. If you are unable to achieve stable readings, remove SportStat and contact NONIN Customer Support.

The following factors may degrade SportStat's performance:

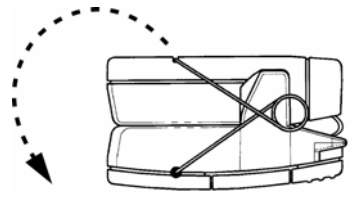
- fluctuating or very bright light
- moisture
- a finger thickness outside the 0.3 to 1.0 inch (0.8 to 2.5 cm) range
- not at heart level
- insufficient pulse signal
- anemia or a low hemoglobin count
- interference from electrical equipment

SportStat Care and Maintenance

The advanced digital circuitry within SportStat requires no adjustment (calibration) or periodic maintenance other than battery replacement. Field repair of the SportStat circuitry is not possible. Do not attempt to open the SportStat case or repair the electronics. Opening the case will damage SportStat and void the warranty. Use and store your SportStat within the stated environmental specifications.

Disengaging and Removing the Spring

The two halves of SportStat are held together by a flexible circuit and strain relief. Hold SportStat's top and bottom together when the spring is disengaged.

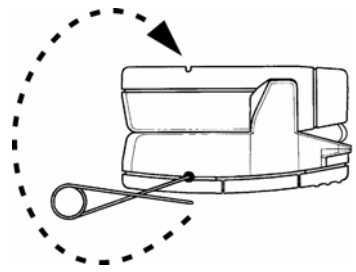


1. Turn SportStat over with the back cover facing up.
2. Disengage the spring by gently pulling it up and lifting it out of the retaining groove. Next, rotate the spring forward (as indicated by the dashed arrow), bringing it past the finger cavity.

(The next step is only required when replacing the spring:)

3. Remove the spring by carefully pulling the ends from the pivot holes on either side. If the spring is lost, bent, or over-extended, contact NONIN Customer Support for replacement.

Replacing the Spring



1. Insert the ends of the new spring into the pivot holes on both sides of SportStat. Make sure that the spring is positioned as indicated in the illustration.
2. Rotate the spring up and past the finger cavity (as indicated by the dashed arrow).
3. Seat the spring into the retaining groove.

Cleaning SportStat

1. Disengage the spring. It is not necessary to completely remove the spring.
2. Wipe the exposed surfaces with a soft cloth dampened with a mild detergent solution or an isopropyl alcohol solution.
3. Dry with a soft cloth or allow to air dry.
4. Make sure that all surfaces are completely dry, then re-engage the spring.

Replacing the Gripping Insert

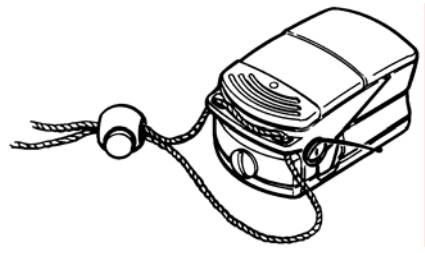
A gripping insert is adhered to the upper inner surface of SportStat to provide a more secure fit to the finger. Replace the gripping insert if it becomes torn or damaged, or if it begins to peel off. SportStat will function without the gripping insert. However, NONIN recommends using the insert during normal operation.

1. Disengage the spring. It is not necessary to completely remove the spring.
2. Carefully peel the old gripping insert away from the surface.
3. Remove any residual adhesive with a soft cloth dampened with an isopropyl alcohol solution.
4. Peel the backing paper off the new gripping insert, uncovering the adhesive back.
5. Position the new insert (with the adhesive side toward SportStat) and gently press it in place.
6. Re-engage the spring.

Using the Lanyard

A lanyard is provided for convenience. SportStat will function with or without the lanyard. *Do not* thread the lanyard through the flexible circuit/strain relief!

Attaching the Lanyard



1. If lanyard use is desired, thread the ends of the lanyard through the lanyard holes.
2. Push in the lanyard lock button. Slide the lock onto the lanyard to the desired length.
3. Release the lock button to secure its position.
4. Reverse this procedure to remove the lanyard.

Note: The lanyard must cross over the top of SportStat (it must be threaded as illustrated) to permit the full opening of the device.

Specifications

Oxygen Saturation Range (%SpO_2)	0% to 100%
Pulse Rate Range	18 to 300 pulses per minute
Displays	
Numeric Displays	Two 3-digit 7-segment LEDs (light-emitting diodes)
Pulse Quality Display	Tri-color LED
Measurement Wavelengths	
Red	660 nanometers
Infrared	910 nanometers
Accuracy	
Blood Oxygen Saturation (%SpO_2) (± 1 S.D.)*	70% to 100% ± 2 digits
Pulse Rate	± 3%
Temperature	
Operating	+32° to +122°F (0° to +50°C)
Storage/Transportation	-22° to +122°F (-30° to +50°C)
Humidity	
Operating	10% to 90% noncondensing
Storage/Transportation	10% to 95% noncondensing
Altitude	
Operating Altitude	Up to 40,000 feet (12,192 meters)
Hyperbaric Pressure	Up to 3 atmospheres
Power Requirements	Two 1.5 volt AAA-size batteries
Battery Life	
Operating	Approximately 18 hours of continuous operation, using two AAA-size alkaline batteries; based on approximately 1,600 spot checks calculated at 40 seconds per spot check.
Storage	9 months typical, using two AAA-size alkaline batteries.
Dimensions	1.3″ w. x 1.3″ h. x 2.2″ l. (3.3 x 3.3 x 5.7 cm)
Weight	2 oz (60 g) with batteries

* S.D. (Standard Deviation) is a statistical measure; up to 32% of the readings may fall outside these limits.

Service and Support

The SportStat Pulse Oximeter performs all computations from internal software stored in microprocessor chips. Thus, there are no critical parts to drift, and no re-calibration is required. For information about the SportStat and accessories, contact your local retailer or NONIN's Customer Support Department. A return authorization number is required before returning any product to NONIN. To obtain this return authorization number, contact NONIN Customer Support:

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Warranty

NONIN MEDICAL, INCORPORATED, (NONIN) warrants to the purchaser, for a period of one year from the date of purchase, each SportStat exclusive of the batteries, spring, carrying case, lanyard, and lanyard lock. NONIN shall repair or replace any SportStat found to be defective in accordance with this warranty, free of charge, for which NONIN has been notified by the purchaser by serial number that there is a defect, provided said notification occurs within the applicable warranty period. This warranty shall be the sole and exclusive remedy by the purchaser hereunder for any SportStat delivered to the purchaser which is found to be defective in any manner whether such remedies be in contract, tort or by law. This warranty excludes cost of delivery to and from NONIN. All repaired units shall be received by the purchaser at NONIN's place of business. NONIN reserves the right to charge a fee for a warranty repair request on any SportStat that is found to be within specifications.

SportStat is a precision electronic instrument and must be repaired by knowledgeable and specially trained NONIN personnel only. Accordingly, any sign or evidence of opening the SportStat, field service by non-NONIN personnel, tampering, or any kind of misuse or abuse of the SportStat, shall void the warranty in its entirety. All non-warranty work shall be done according to NONIN standard rates and charges in effect at the time of delivery to NONIN.

DISCLAIMER/EXCLUSIVITY OF WARRANTY:
THE EXPRESS WARRANTIES SET FORTH IN THIS MANUAL ARE EXCLUSIVE AND NO OTHER WARRANTIES OF ANY KIND, WHETHER STATUTORY, WRITTEN, ORAL, OR IMPLIED INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY SHALL APPLY.

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