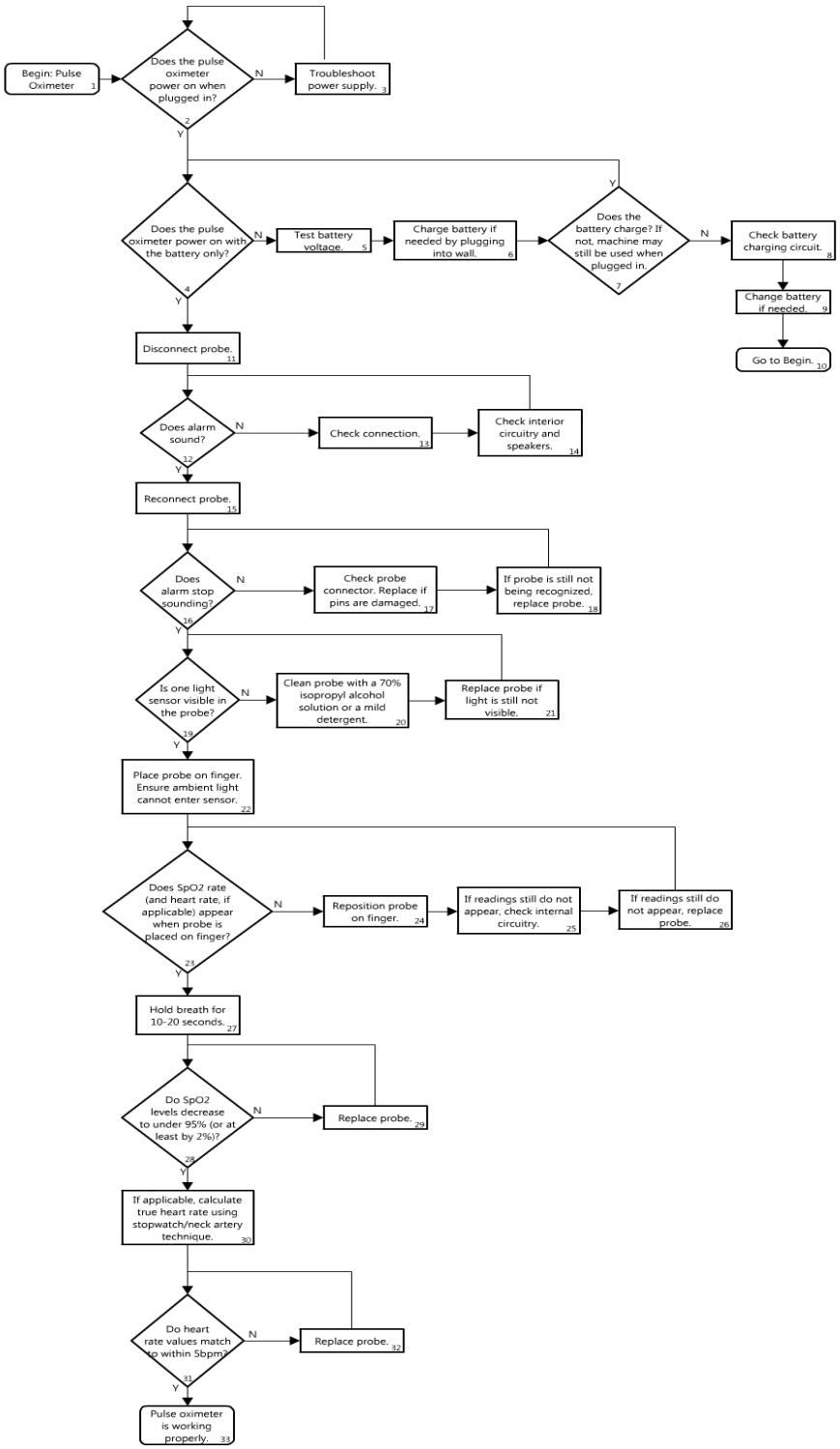
# Pulse Oximeter Repair and Troubleshooting

***Flowchart***



***Description***

| # | Text Box | Explanation or Comment |
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| 1 | Begin: Pulse Oximeter | Begin diagnostic process on a work order for pulse oximeter. Maintenance is generally requested on a pulse oximeter when it cannot read $SpO_2$ or heart rate levels. |
| 2 | Does the pulse oximeter power on? | The displays should appear on working pulse oximeter when powered on. |
| 3 | Troubleshoot power supply (separate chart). | If no power reaches the machine, there may be problems with the switch, fuse, or wiring. See flowchart for Power Supply and BTA skills on Power Supply. |
| 4 | Does the pulse oximeter power on with the battery only? | Though the machine can still be used even if the battery charging circuit is faulty, the battery should be checked for functionality. |
| 5 | Test battery voltage. | Use a multimeter to determine if proper voltage is reaching the pulse oximeter. See flowchart for Batteries and BTA skills on Power Supply. |
| 6 | Charge battery if needed by plugging into wall. | The battery needs fourteen hours to recharge completely. |
| 7 | Does the battery charge? | If the battery does not hold charge, the machine may still be used when plugged in. |
| 8 | Check battery charging circuit. | Ensure that the circuitry that charges the battery is intact. |
| 9 | Change battery if needed. | Check the battery's replacement date and change it if it is faulty or if the date has passed. |
| 10 | Go to begin. | Restart the diagnostic process to see if the corrective measures have repaired the machine. |
| 11 | Disconnect probe. | Remove probe from pulse oximeter. |
| 12 | Does the alarm sound? | The alarm should not only sound when heart rate or $SpO_2$ levels reach outside the acceptable ranges but when the probe connection with the machine is lost. |
| 13 | Check connection. | Ensure that there is nothing blocking the probe |

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| | | receptacle. Clear any debris or dirt that may interfere with probe connection. |
| 14 | Check internal circuitry and speakers. | Ensure internal circuitry and speaker connections are intact. See BTA skills for Electrical Simple. |
| 15 | Reconnect probe. | Reinsert probe into pulse oximeter. |
| 16 | Does the alarm stop sounding? | Ensure that the probe connection alarm stops when the probe is reconnected. |
| 17 | Check probe connector. Replace if pins are damaged. | If the pins on the probe connector are damaged, bent, or broken, the probe should be replaced. |
| 18 | If probe is still not being recognized, replace probe. | If the alarm continues, the problem may be with the probe itself. Replace the probe. |
| 19 | Is one light sensor visible in the probe? | There should be one red light being visibly emitted from inside the probe. |
| 20 | Clean probe with a 70% isopropyl alcohol solution or a mild detergent. | Probe can also be cleaned with warm water, liquid soap, mild chlorine bleach solution, or a hydrogen peroxide solution. Do not use acetone, butyl alcohol, denatured ethanol, Freon, trichloroethylene or any petroleum-based solutions. See BTA skills on Mechanical Cleaning. |
| 21 | Replace probe if light is still not visible. | If light is not being emitted, the photodetector cannot read the signals. The pulse oximeter cannot calculate the $SpO_2$ value or heart rate. |
| 22 | Place probe on finger. Ensure ambient light cannot enter sensor. | When not in use, the probe should be shielded from direct light. If any outside light enters the sensor, it can drastically affect readings, as they are calculated through photodetection sensors. |
| 23 | Does $SpO_2$ rate (and heart rate, if applicable) appear when probe is placed on finger? | The rate(s) should appear on the display one the probe is placed on the finger. |
| 24 | Reposition probe on finger. | The probe may be placed incorrectly on the finger. Ensure it is not too tight or loose and no outside light is entering the sensor. |

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| 25 | If readings still do not appear, check internal circuitry. | Ensure internal circuitry is intact and connections are strong. See BTA skills on Electrical Simple. |
| 26 | If readings still do not appear, replace probe. | Ensure correct probe is being used. Other probes may not connect correctly. |
| 27 | Hold breath for 10-20 seconds. | This is to manually check if the $SpO_2$ readings decrease with less oxygen supply. |
| 28 | Do $SpO_2$ levels decrease to under 95% (or at least by 2%)? | As you hold your breath longer, the rate should decrease a few percent at least. |
| 29 | Replace probe. | Attempt again with a new probe. |
| 30 | If applicable, calculate true heart rate using stopwatch/neck artery technique. | If applicable, calculate heart rate manually using a stopwatch and counting pulse rate of neck artery (or wrist). |
| 31 | Do heart rate values match to within 1bpm? | Compare manually calculated values to pulse oximeter display. |
| 32 | Replace probe. | If values are not with 1bpm, replace probe. |
| 33 | Pulse oximeter is working properly. | Return the machine to the appropriate clinical personnel. |