**General Description**

Oxygen Saturation is a percentage of Oxygenhemoglobin (HbO) capacity, compounded with oxygen, by all combinative hemoglobin (Hb) capacity in blood. In other words, it is consistency of Oxygenhemoglobin in blood. It is a very important parameter for the Respiratory Circulation System. Therefore, it is very important to know the oxygen saturation.

The fingertip pulse oximeter features low power consumption, convenient operation and portability. Place one fingertip into the photoelectric sensor for diagnosis and the pulse rate and oxygen saturation will appear on the display.

**Measurement Principle**

Principle of the oximeter is as follows: A mathematical formula is established making use of Lambert Beer Law according to Spectrum Absorption Characteristics of Reductive hemoglobin (Rb) and Oxygenhemoglobin (HbO2) in gray and near-infrared zones. Operation principle of the instrument: Photoelectric Oxygenhemoglobin Inspection Technology is adopted in accordance with Capacity Pulse Scanning and Recording Technology, so that two beams of different wavelength of lights (660nm glow and 940nm near infrared light) can be focused onto a human nail tip through a clamping finger-type sensor. A measured signal obtained by a photosensitive element, will be shown on the oximeter’s display through process in electronic circuits and microprocessor.

**Diagram of Operation Principle**

1. Red and Infrared-ray Emission Tube
2. Red and Infrared-ray Reception Tube

**Precautions For Use**

1. Before use, carefully read the manual.
2. Operation of the fingertip pulse oximeter may be affected by the use of an electrosurgical unit (ESU).
3. The fingertip pulse oximeter must be able to measure the pulse properly to obtain an accurate SpO2 measurement. Verify that nothing is hindering the pulse measurement before relying on the SpO2 measurement.
4. Do not use the fingertip pulse oximeter in an MRI or CT environment.
5. Do not use the fingertip pulse oximeter in situations where alarms are required. The device has no alarms. It is not for continuous monitoring.
6. Do not use the fingertip pulse oximeter in an explosive atmosphere.
7. The fingertip pulse oximeter is intended only as an adjunct in patient assessment. It must be used in conjunction with other methods of assessing clinical signs and symptoms.
8. Check the pulse oximeter sensor application every 4 hours to determine the positioning of the sensor and circulation and skin sensitivity of the patient.
9. Do not sterilize the device using autoclaving, ethylene oxide sterilizing, or immersing the device in liquid. The device is not intended for sterilization.
10. Follow local ordinances and recycling instructions regarding disposal or recycling of the device and device components, including batteries.
11. This equipment complies with IEC 60601-1-2:2007 for electromagnetic compatibility. However, because of the proliferation of radio-frequency transmitting equipment and other sources of electrical noise in healthcare and other environments, it is possible that high levels of such interference due to close proximity or strength of a source might disrupt the performance of this device.
12. Portable and mobile RF communications equipment can affect the equipment.

**Inaccurate measurements may be caused by**

1. Significant levels of dysfunctional hemoglobin (such as carboxy - hemoglobin or methemoglobin);  
2. Intravascular dyes such as indocyanine green or methylene blue;  
3. High ambient light. Shield the sensor area if necessary;  
4. Excessive user movement;  
5. High-frequency electrosurgical interference and defibrillators;  
6. Venous pulsations;  
7. Placement of a sensor on an extremity with a blood pressure cuff, arterial catheter, or intravascular line;  
8. The user has hypotension, severe vasoconstriction, severe anemia, or hypothermia;  
9. The user is in cardiac arrest or is in shock;  
10. Fingernail polish or false fingernails;  
11. Weak pulse quality (low perfusion);  
12. Low hemoglobin;  

**Product Properties**

1. Operation of the product is simple and convenient.
2. The product is small in volume, light in weight and convenient to carry.
3. Power consumption of the product is low and the two AAA batteries can be operated continuously for 30 hours.
4. A low voltage warning will be indicated when battery voltage is low and normal operation of the oximeter might be influenced.
5. The product will automatically power off when there is no signal for longer than 8 seconds.

**Intended Use**

Fingertip pulse oximeter is a portable non-invasive device intended for spot-checking of oxygen saturation of arterial hemoglobin (SpO2) and pulse rate.

**Operation Instructions**

1. Install two AAA batteries according to the Battery Installation instructions listed above in the right column.
2. Open the clamp as illustrated in the picture below.
3. Fully insert one fingertip into the silicone hole of the oximeter before releasing the clamp.
4. Press the switch button once on front panel.
5. Keep your finger still during measurement.
6. Read corresponding data from display screen.

**Front Panel**

The pulse bar graph displays corresponds with the user’s pulse beat. The height of the bar graph shows the user’s pulse strength.

**Battery Installation**

1. Install two AAA batteries into the battery compartment. Match the plus (+) and minus (-) signs in the compartment. If the polarities are not matched, damage may be caused to the oximeter.
2. Slide the battery door cover horizontally along the arrow shown as the picture.

**Using the Lanyard**

1. Thread thinner end of the lanyard through the loop.
2. Thread thicker end of the lanyard through the thread end before pulling it tightly.

**Maintenance and Storage**

1. Replace the batteries in a timely manner when low voltage lamp is lighted.
2. Clean Surface of the fingertip oximeter before it is used.
3. Remove the batteries if the oximeter is not operated for a long time.
4. It is best to store the product in -20°C ~ -55°C and <93% humidity.
5. Keep in a dry place. Extreme moisture may affect oximeter lifetime and may cause damage.
6. Dispose of battery properly, follow any applicable local battery disposal laws.

**Specifications**

1. Display Type  
   LED display  
2. SpO2  
   Display range: 0-99%. Measurement range: 70-99%. Accuracy: ±2%. Resolution: 1%.  
3. Pulse Rate  
   Display range: 0-254BPM. Measurement range: 30-254BPM; ±2%. Resolution: 1BPM  
4. Probe LED Specifications  
<table>
<thead>
<tr>
<th>WaveLength</th>
<th>Radiant Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>660±2nm</td>
</tr>
<tr>
<td>IR</td>
<td>940±10nm</td>
</tr>
</tbody>
</table>
5. Power Requirements  
   Two AAA alkaline Batteries  
   Power consumption: Less than 25mA  
   Low power indication: [ ]  
   Battery Life: Two AAA 1.5V, 600mAh alkaline batteries could be continuously operated as long as 30 hours. It is equipped with a function switch, through which the oximeter can be powered off in case no finger is the oximeter longer than 8 seconds.
6. Outline Dimension  
   Length: 56mm  
   Width: 32mm  
   Height: 30mm  
   Weight: 50g (including two AAA batteries)
7. Environment Requirements  
   Operation Temperature: 5 ~ 40°C  
   Storage Temperature: -20 ~ -55°C  
   Ambient Humidity: 15% ~80% in operation; <93% in storage
8. Equipment Response Time  
   As shown in the following figure.  
   Response time of slower average is 12.4s.

**Product Accessories**

1. One lanyard  
2. Two AAA batteries
Guidance and Manufacturer’s declaration – electromagnetic emissions

The MQ3000 Pulse Oximeter is intended for use in the electromagnetic environment specified below. The customer or the user of MQ3000 Pulse Oximeter should ensure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Emission test</th>
<th>Compliance Level</th>
<th>Electromagnetic Environment – guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF emissions CISPR 11</td>
<td>Group 1</td>
<td>The MQ3000 Pulse Oximeter uses RF energy only for its</td>
</tr>
<tr>
<td></td>
<td></td>
<td>internal function. Therefore, its RF emissions are very low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and are not likely to cause any interference in nearby</td>
</tr>
<tr>
<td></td>
<td></td>
<td>electronic equipment.</td>
</tr>
<tr>
<td>RF emissions CISPR 11</td>
<td>Class 6</td>
<td>The pulse Oximeter (MQ3000) is suitable for use in all</td>
</tr>
<tr>
<td></td>
<td></td>
<td>establishment, including domestic establishments and those</td>
</tr>
<tr>
<td></td>
<td></td>
<td>directly connected to the public low-voltage power supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network that supplies buildings used for domestic purposes.</td>
</tr>
</tbody>
</table>

Guidance and Manufacturer’s declaration – electromagnetic immunity

For all EQUIPMENT and SYSTEMS

The MQ3000 Pulse Oximeter is intended for use in the electromagnetic environment specified below. The customer or the user of MQ3000 Pulse Oximeter should ensure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance Level</th>
<th>Electromagnetic Environment – guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD) IEC 61000-4-2</td>
<td>+/- 6kV contact +/- 8kV air</td>
<td>Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.</td>
<td></td>
</tr>
<tr>
<td>Power frequency (5060 Hz) magnetic field IEC 61000-4-8</td>
<td>3A/m 3A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial environment.</td>
<td></td>
</tr>
</tbody>
</table>

Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEMS - For all EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter (W)</th>
<th>Separation distance according to frequency of transmitter (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 MHz to 800 MHz</td>
<td>d = \frac{3.5}{k_f}</td>
</tr>
<tr>
<td>800 MHz to 2.5 GHz</td>
<td>d = \frac{7}{k_f}</td>
</tr>
</tbody>
</table>

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection structures, objects and people.

For transmitters rated at a maximum output power not listed above, the recommended separation distance in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Recommended separation distances between portable and mobile RF communications equipment and Pulse Oximeter (MQ3000)

The Pulse Oximeter (MQ3000) is intended for use in electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Pulse Oximeter (MQ3000) can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Pulse Oximeter (MQ3000) as recommended below, according to the maximum output power of the communications equipment.

<table>
<thead>
<tr>
<th>Separation distance for the higher frequency range (m)</th>
<th>Frequency of transmitter (GHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 m</td>
<td>80 MHz to 800 MHz</td>
</tr>
<tr>
<td>10 m</td>
<td>800 MHz to 2.5 GHz</td>
</tr>
</tbody>
</table>

Possible Problems and Solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible reason</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SpO2 or PR can not be shown normally</td>
<td>1. Finger is not inserted deep enough. 2. Finger is not inserted correctly.</td>
<td>1. Try not to move</td>
</tr>
</tbody>
</table>

Note: The illustrations used in this manual may differ slightly from the appearance of the actual product.