

# EDAN Agile PLM Electronic Signature Information

--Signatures related to this document and performed in EDAN Agile PLM.

文件名称(Document Name) : H100B H100N 说明书\_英文

文件编号(Number) : 21.54.109000

版本(Version) : 3.0

产品型号(Product Model) : H100A;H100B;H100N

项目编码(Project Code) : 2075I000

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# H100B/H100N

Pulse Oximeter

Version 3.0

## User Manual

CE<sub>0123</sub>



# About this Manual

P/N: 21.54.109000

MPN: 21.54.109000030

Release Date: December, 2022

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## Statement

This manual will help you understand the operation and maintenance of the product better. It is reminded that the product shall be used strictly complying with this manual. User's operation failing to comply with this manual may result in malfunction or accident for which EDAN INSTRUMENTS, INC. (hereinafter called EDAN) cannot be held liable.

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## **Responsibility of the Manufacturer**

EDAN only considers itself responsible for any effect on safety, reliability and performance of the equipment if:

Assembly operations, extensions, re-adjustments, modifications or repairs are carried out by persons authorized by EDAN, and

The electrical installation of the relevant room complies with national standards, and

The instrument is used in accordance with the instructions for use.

## Terms Used in this Manual

This guide is designed to give key concepts on safety precautions.

### **WARNING**

A **WARNING** label advises against certain actions or situations that could result in personal injury or death.

### **CAUTION**

A **CAUTION** label advises against actions or situations that could damage equipment, produce inaccurate data, or invalidate a procedure.

### **NOTE**

A **NOTE** provides useful information regarding a function or a procedure.

## Table of Contents

<b>1 Safety Information</b> .....	<b>1</b>
1.1 Warnings .....	1
1.2 Cautions .....	16
1.2.1 Personal Information Safety .....	18
1.3 Notes .....	22
1.4 Symbols in the Oximeter .....	26
<b>2 Introduction</b> .....	<b>31</b>
2.1 General Introduction .....	31
2.2 Panel Introduction .....	33
2.2.1 Symbols on Screen .....	33
2.2.2 Front Panel Buttons .....	36
2.2.3 Rear Panel .....	39
2.3 Connecting Sensor or Cable .....	40
2.4 Powered by Battery .....	42
2.5 Accessory List .....	46
<b>3 Oximeter Operation</b> .....	<b>50</b>
3.1 Turning on the Oximeter .....	50
3.2 Measurement Procedure .....	52
3.2.1 SpO <sub>2</sub> Measurement Procedure .....	52
3.2.2 TEMP Measurement Procedure .....	56
3.3 Measurement State .....	57
3.3.1 Measurement Modes .....	57

3.3.2	Trend Graph and Trend Table .....	58
3.3.3	Abnormal Measurement State .....	59
3.3.4	Data Transfer State .....	60
3.4	System Menu .....	61
3.4.1	System Mode .....	64
3.4.2	Patient Type .....	64
3.4.3	Prompt Volume .....	64
3.4.4	Pulse Volume .....	65
3.4.5	Audio Paused (s) .....	65
3.4.6	User Maintain .....	65
3.4.7	Default Config .....	67
3.4.8	Sensitivity .....	68
3.4.9	Prompt Function .....	69
3.4.10	SpO <sub>2</sub> Prompt Limit Setup .....	70
3.4.11	PR Prompt Limit Setup .....	72
3.4.12	Temp Prompt Limit Setup .....	73
3.4.13	Patient ID No. Setup .....	75
3.4.14	Data Storage .....	75
3.4.15	Delete All Data .....	76
3.4.16	Exit (Return) .....	77
3.5	Charging the Ni-MH Rechargeable Battery Package .....	77
3.6	Oximeter Viewer Data Management Software	

Introduction .....	79
<b>4 Prompt Function .....</b>	<b>82</b>
4.1 Prompt Categories and Levels .....	82
4.2 Prompt Conditions .....	85
4.2.1 Prompt for SpO <sub>2</sub> Sensor Unconnected ....	86
4.2.2 Prompt for SpO <sub>2</sub> Sensor off .....	86
4.2.3 Prompt for Abnormal State of Temp Sensor	86
4.2.4 Prompt for Low Battery .....	87
4.2.5 Higher than High Limit .....	87
4.2.6 Lower than Low Limit .....	88
4.2.7 Prompt Silence .....	88
4.2.8 Turning off Prompt Function .....	89
4.2.9 Prompt Priority .....	89
4.2.10 Prompt Delay .....	89
4.2.11 Testing Prompts .....	90
<b>5 Performance Considerations .....</b>	<b>91</b>
5.1 Performance Verification .....	91
5.2 Oximeter Performance Considerations .....	91
5.3 SpO <sub>2</sub> Functional Test .....	96
5.4 Assessing the Validity of a SpO <sub>2</sub> Reading .....	96
<b>6 Maintenance .....</b>	<b>99</b>
<b>7 Principles of Operation .....</b>	<b>115</b>
7.1 Pulse Oximetry Measurement .....	116



7.2 Measured Versus Calculated Saturation .....	118
<b>8 Warranty and Service .....</b>	<b>119</b>
8.1 Warranty .....	119
8.2 Contact Information .....	120
<b>Appendix I Specification .....</b>	<b>121</b>
A1.1 Classification .....	121
A1.2 Specification .....	122
A1.2.1 Size and Weight .....	122
A1.2.2 Environment .....	122
A1.2.3 Display .....	123
A1.2.4 Batteries .....	123
A1.2.5 Charger Stand .....	125
A1.2.6 Data Storage .....	125
A1.3 Parameters .....	125
<b>Appendix II EMC Information .....</b>	<b>128</b>
A2.1 Electromagnetic Emissions .....	128
A2.2 Electromagnetic Immunity .....	130
A2.3 Electromagnetic Immunity .....	135
A2.4 Recommended Separation Distances .....	142
<b>Appendix III Record Table .....</b>	<b>144</b>
<b>Appendix IV Abbreviations .....</b>	<b>145</b>

# 1 Safety Information

## 1.1 Warnings

Warnings are identified by the WARNING symbol shown above.

A **WARNING** label advises against certain actions or situations that could result in personal injury or death.

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### **WARNING**

- 1 Avoid explosion hazard. Do not use the Pulse Oximeter (hereinafter called oximeter) in the presence of flammable anesthetic mixtures with air, or with oxygen or nitrous oxide.**
  - 2 Chemicals from a broken LCD display panel are toxic when ingested. Use cautions when the oximeter has a broken display panel.**
  - 3 Routinely monitor the patient to make sure the oximeter is functioning and the sensor is correctly placed.**
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**WARNING**

- 4 Oximetry measurements and pulse signals can be affected by certain environmental conditions, sensor application errors, and certain patient conditions.**
  - 5 The use of accessories, sensors, and cables other than those specified may result in increased emission of electromagnetic radiation and/or invalid readings of the oximeter.**
  - 6 Failure of covering the sensor site with opaque material in high ambient light conditions may result in inaccurate measurements.**
  - 7 Do not silence the audio prompt function, or decrease the audio prompt volume, if patient safety could be compromised.**
  - 8 The oximeter is a prescription device to be operated only by trained personnel. The oximeter is for attended measuring only.**
  - 9 Dispose of batteries in accordance with local ordinances and regulations.**
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**WARNING**

- 10** The oximeter is not defibrillator-proof. The measurements may be inaccurate throughout the defibrillation, or use of an electrosurgical unit, and shortly thereafter. To avoid shock, the caregiver should not hold the oximeter while using a defibrillator on a patient.
  - 11** Disconnect the oximeter and sensor from the patient throughout magnetic resonance imaging (MRI) scanning. Induced current could potentially cause burns.
  - 12** To ensure accurate performance and prevent device failure, do not subject the oximeter to extreme moisture, such as direct exposure to rain. Such exposure may cause inaccurate performance or device failure.
  - 13** Do not immerse or wet the sensor, as this may damage the sensor.
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**WARNING**

- 14 Do not lift the oximeter by the sensor or extension cable because the cable could disconnect from the oximeter and the oximeter may drop on the patient.**
  - 15 Do not make any clinical judgment based solely on the oximeter, it is intended only as an adjunct in patient assessment. It must be used in conjunction with clinical signs and symptoms.**
  - 16 To ensure patient safety, do not place the oximeter in any position that might cause it to fall on the patient.**
  - 17 As with all medical equipment, carefully route patient cables to reduce the possibility of patient entanglement or strangulation. It is especially important for children.**
  - 18 Please avoid inhalation or swallowing of small parts.**
  - 19 Do not monitor the patient while the battery is being charged.**
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**WARNING**

- 20** Ensure that the speaker is clear of any obstruction and that the speaker holes are not covered. Failure of doing so could result in an inaudible prompt tone.
  - 21** Use only EDAN permitted sensors and extension cables with the oximeter. Other sensors or extension cables may fail and/or cause improper monitor performance and/or minor personal injury.
  - 22** Oximeter readings and pulse signals can be affected by certain ambient environmental conditions, sensor application error, and certain patient conditions. See the appropriate sections of the manual for specific safety information.
  - 23** Don't mix new and old batteries together. Don't mix rechargeable batteries with alkaline batteries.
  - 24** This equipment is not intended for home usage.
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**WARNING**

- 25** Periodically check the battery for corrosion. Remove the batteries from the oximeter if you do not expect to use it within one month.
- 26** Do not use damaged sensor or extension cables, do not use sensor with exposed optical components.
- 27** The device enters POST (Power-On-Self-Test) immediately after power-on to confirm all the display segments and icons are shown and the speaker sounds a few seconds tone. If you do not hear the POST pass tone, it indicates the prompt function does not work well. Please do not use the oximeter and contact qualified service personnel or your local EDAN representative. Do not use the oximeter if the POST has not been finished successfully.
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**WARNING**

- 28** Before using it, the user should carefully read the applicable user manual of sensor, including warnings, cautions and instructions.
  - 29** Before cleaning the oximeter or the sensor, make sure that the equipment is switched off and disconnected from the power line.
  - 30** A potential hazard can exist if different prompt presets are used for the same or similar equipment in any single area, e.g. an intensive care unit or cardiac operating room.
  - 31** There are no user-serviceable parts inside the oximeter, the cover should only be removed by qualified service personnel.
  - 32** Do not spray, pour, spill liquid to the oximeter and its accessories, connector, switch or opening in enclosure, as this may damage the oximeter.
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**WARNING**

- 33 Do not disassemble batteries, or dispose of them in fire, or cause them to short circuit. They may ignite, explode, leak, or cause personal injury.**
  - 34 Do not service or maintain the oximeter or any accessory which is in use with the patient.**
  - 35 Do not use the charger stand when the alkaline battery is depleted or no battery is installed.**
  - 36 Incorrect replacement of batteries would result in unacceptable risk. The batteries shall be replaced by adequately trained personnel.**
  - 37 Operation of the equipment exceeding specified physiological signal or the operational specification may cause inaccurate results.**
  - 38 Patient's weak pulse or disturbed SpO<sub>2</sub> signal may affect measurement and prompt accuracy.**
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**WARNING**

- 39** The medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC Information provided in this user manual.
  - 40** Portable and mobile RF communications equipment can affect medical electrical equipment; refer to the recommended separation distances provided in Appendix A2 EMC Information.
  - 41** The use of patient cable and other accessories not supplied by the manufacturer may result in increased emissions or decreased immunity of the equipment.
  - 42** Use only Nellcor-approved OxiMax Sensors and extension cables with the H100N Pulse Oximeter. Other sensors or extension cables may cause improper monitor performance or minor personal injury.
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**WARNING**

- 43** The oximeter should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, you must check that normal operation is possible in the necessary configuration before you start measuring patients.
  - 44** Only recommended rechargeable batteries and charger stand can be used for oximeter.
  - 45** Setting the prompt limits to extreme values can cause the prompt function useless.
  - 46** The temperature sensor should be disinfected after each measurement. The probe must not be sterilized in steam. Only detergents containing no alcohol can be used for disinfection.
  - 47** The temperature sensor should not be heated above 100 °C (212 °F). It should only be subjected to temperatures from 80 °C (176 °F) to 100 °C (212 °F).
  - 48** Do not place battery in the oximeter with the (+) and (-) in the wrong way.
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**WARNING**

- 49** Verification of the temperature module is necessary as frequently as dictated by your Hospital Procedures Policy. When you need to calibrate the temperature measurement, please contact the manufacturer.
  - 50** Take the TEMP probe and cable carefully. If you do not use them for a long time, you should coil up the probe and cable into a loose circle. If the wire inside the cable is tensely pulled, it may cause mechanical damage to the probe and the cable.
  - 51** Do not touch accessible parts of medical or non-medical electrical equipment in the patient environment and the patient simultaneously.
  - 52** The device should keep away from pets, pests or children.
  - 53** When serious arrhythmia is present, the SpO<sub>2</sub> pulse rate may differ from ECG heart rate but this does not indicate an inaccurate PR (SpO<sub>2</sub>) value.
- 
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**WARNING**

- 54** Without use of data store function, the data previously measured will be cleared when the oximeter is powered off. With use of data store function, 300-hour SpO<sub>2</sub>&PR data can be stored and transmitted to the computer.
- 55** During measuring, if the power supply is off, the oximeter will be off, and only the patient information and prompt settings can be saved. After reconnecting the power supply, the user should turn on the oximeter for measuring.
- 56** If several items of medical equipment are interconnected, pay attention to the sum of the leakage currents, otherwise it may cause shock hazard. Consult your service personnel.
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**WARNING**

- 57** Before using the device, the equipment, patient cable and sensors etc. should be checked. Replacement shall be taken if there is any evident defect or signs of aging which may impair the safety or performance.
- 58** No modification of this equipment is allowed without authorization of the manufacturer. If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe operation.
- 59** Use the battery with similar performance, which can extend the service life of the battery. If one of the batteries is malfunctioning, it is recommended to change all the batteries.
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**WARNING**

**60 Correct and proper sensor application: if the sensor is too loose, it might compromise the optical alignment, and even cause the sensor to fall off. If the sensor is too tight, (such as the application site is too large or becomes too large due to edema), excessive pressure and local tissue ischemia, hypoxia and lack of nutrition may occur on the application site. Prolonged measuring may increase the risk of skin irritations or lacerations. To avoid these damages, users should periodically check surrounding skin of application site according to the patient's condition and pressure sensor, inspect if there is sign of stress-related damage in surrounding tissue, and regularly change the application site. For the patients whose fluid is easy to transfer and/or the patients with systemic or localized edema, users should inspect the skin and change application site more frequently.**

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**WARNING**

- 61** Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the oximeter, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.
- 62** EDAN rechargeable battery lifetime is 500 charge/discharge cycles if the battery is appropriately used and maintained. The service life of the battery depends on the service frequency and time. The service life of the battery is about two years if the battery is well maintained and stored. The service life of the battery may shorten if it is used inappropriately. If the battery life is exhausted and not replaced in time, it may cause damage or heat to the device.
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## 1.2 Cautions

Cautions are identified by the CAUTION symbol shown above.

Cautions alert the user to exercise care necessary for the safe and effective use of the oximeter.

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### **CAUTION**

- 1 All combinations of equipment must be in compliance with IEC/EN Standard 60601-1 systems requirements.**
  - 2 When adjusting any menu parameters, the oximeter does not display SpO<sub>2</sub> or PR or TEMP, but it is still recording.**
  - 3 Oximeter will not operate with dead batteries. Install new batteries.**
  - 4 The sensor unconnected icon and associated prompt indicate the sensor has disconnected or wire fault. So check the sensor connection and, if necessary, replace the sensor, extension cables or both.**
- 
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**CAUTION**

- 5 Do not run the oximeter when alkaline batteries of different types are used at the same time.**
  - 6 Federal (U.S.) Law restricts this device to sale by or on the order of a physician.**
  - 7 The device and accessories are to be disposed of according to local regulations after their useful lives. Alternatively, they can be returned to the dealer or the manufacturer for recycling or proper disposal. Batteries are hazardous waste. Do NOT dispose them together with house-hold garbage. At the end of their life hand the batteries over to the applicable collection points for the recycling of waste batteries. For more detailed information about recycling of this product or battery, please contact your local Civic Office, or the shop where you purchased the product.**
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**CAUTION**

- 8 The performance of the oximeter may be degraded if the following occur:**
- Operation or storage temperature and humidity outside the manufacturer's stated range;**
  - Mechanical shock (for example, it drops from the table).**
  - Patient temperature is below ambient temperature (For measurement body temperature).**
- 
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### 1.2.1 Personal Information Safety

Protecting personal health information is a major component of security strategy. To protect the personal information and ensure the proper device performance, the user should take necessary precautions in accordance with local laws and regulations and institution's policies. EDAN recommends health care organizations or medical institutions to implement a comprehensive and

multifaceted strategy to protect the information and systems from internal and external security threats.

To ensure the patients' safety and protect their personal health information, the user should implement practices or measures that include:

1. Physical safeguards - physical safety measures to ensure that unauthorized personnel do not have access to the oximeter.
2. Operational safeguards - safety measures during operation.
3. Administrative safeguards - safety measures in management.
4. Technical safeguards - safety measures in technical field.

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## **CAUTION**

- 1 The access/operation of the oximeter is restricted to authorized personnel only. Assign only staff with a specific role the right to use the oximeter.**
  - 2 Ensure that all device components maintaining personal information (other than removable media) are physically secure.**
  - 3 Ensure that the oximeter is connected only to the device authorized/approved by EDAN. Users should operate all EDAN deployed and supported oximeters within EDAN authorized specifications, including EDAN approved software, software configuration, security configuration, etc.**
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## **CAUTION**

- 4 Protect all the passwords to prevent unauthorized changes. Only the manufacturer's service personnel are allowed to modify the Factory Maintain settings.**
  - 5 When the oximeter is returned for maintenance, disposed of, or removed from the medical institution for other reasons, it is necessary to ensure that all patient data are removed from the oximeter .**
  - 6 Please protect the privacy for the information and the data displayed on the screen, and for the information and the data stored in the oximeter.**
- 
-

## 1.3 Notes

### **NOTE:**

Notes are identified by the symbol shown above. Notes contain important information that may be overlooked or missed.

### **NOTE:**

- 1 This device has been tested and found to comply with the limits for medical device in IEC/EN60601-1-2 (International standard for EMC testing of Medical Electrical Equipment, third edition). These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.**
- 2 Normal operation means:**
  - The oximeter is turned on;
  - A sensor is connected to the oximeter;
  - The sensor is applied to the patient;
  - The patient's SpO<sub>2</sub>, Pulse rate and TEMP are being reported;
  - No error conditions exist.
- 3 Wash the probe with clean water after**

disinfecting it to remove any remaining solution. The probe can only be reused after dried thoroughly.

- 4 Do not disinfect the probe with the water boiled.**
- 5 Any residue should be removed from the probe before being disinfected, and avoid contacting corrosive solvent. Dipping the cable into alcohol or alkalescent solvent for a long time may reduce the flexibility of the scarfskin of the cable. Also, the connector should not be dipped.**
- 6 After measuring, disinfect the probe according to the instruction described in the user manual.**
- 7 The pictures and interfaces in this manual are for reference only.**
- 8 A functional tester or simulator cannot be used to assess the accuracy of the pulse oximeter probe or the pulse oximeter. However, it can be used to demonstrate that a particular oximeter reproduces a calibration curve that has been independently demonstrated to meet a**








**particular accuracy.**






- 9 The operating time of the Ni-MH rechargeable battery package depends on the configuration and operation of the pulse oximeter.**
- 10 Sensor LED light emissions fall within Class 1 level, according to IEC 60825-1. No special safety precautions are required.**
- 11 If there is independent demonstration that the particular calibration curve is accurate for the combination of a pulse oximeter and a pulse oximeter probe, then a functional tester can measure the contribution of an oximeter to the total error of an oximeter/probe system. The functional tester can then measure how accurately a particular pulse oximeter is reproducing that calibration curve.**
- 12 SpO<sub>2</sub> waveform is not directly proportional to the pulse volume.**
- 13 When there's measurement beyond range, invalid measurement or no measurement value, it will display “---”.**
- 14 The reference body site temperature is the**


same as the temperature of the measuring site.





- 15** Ensure the volume is properly set up. When the sound pressure of audible prompt is below or equivalent to the ambient noise, it may be difficult for the operator to distinguish the audio prompt.
- 16** Ensure that the environment in which the oximeter is used is not subject to any sources of strong electromagnetic interference, such as radio transmitters, mobile telephones, microwaves, etc.
- 17** The oximeter can only be used on one patient at a time.
- 18** The device is calibrated to display functional oxygen saturation.
- 19** The materials with which the patient or any other person can come into contact conform to the standard of EN ISO 10993-1.







## 1.4 Symbols in the Oximeter

1		TYPE BF APPLIED PART
2		Caution
3		Warning (Background: yellow; Symbol and outline: black)
4		Operating instructions
5	P/N	Part Number
6		Refer to instruction manual/booklet (Background: blue; Symbol: white)

7		Serial Number
8		CE marking
9		AUTHORISED REPRESENTATIVE IN THE EUROPEAN COMMUNITY
10		Date of manufacture
11		Manufacturer

<p>12</p>		<p>The products marked with this symbol apply to the European WEEE directive. This symbol Indicates this equipment contains electrical or electronic components that must not be disposed of as unsorted municipal waste, but collected separately. Contact an authorized representative of the manufacturer for information for the decommissioning of your equipment.</p>
<p>13</p>	<p><b>Rx Only</b></p>	<p>Caution: Federal (U.S.) Law restricts this device to sale by or on the order of a physician.</p>

14		Input/output connector
15		General symbol for recovery/recyclable
16	<p><b>IP22</b></p>	<p>Ingress Protection IP22 (Protected against access to hazardous parts with a finger; Protected against solid foreign objects of 12.5 mm Ø and greater; Protected against vertically falling water drops when enclosure tilted up to 15°)</p>
17	<p>ETL CLASSIFIED</p>  <p>Intertek 4005997 (H100B)</p>	<p>Conforms to UL Std. 60601-1 Certified to CSA Std. C22.2 No 601.1</p>
18		No alarm system

19		This way up
20		Fragile, handle with care
21		Keep dry
22		Use-by date
23		Medical Device
24		Unique Device Identifier

**NOTE:**

**The user manual is printed in black and white.**

## 2 Introduction

### **Intended Use/Indications for Use**

The H100B Pulse oximeter is intended for spot-checking of functional arterial oxygen saturation (SpO<sub>2</sub>) and pulse rate of single adult, pediatric or neonate patient in hospitals, intra-hospital transport and hospital type facilities.

H100N Pulse Oximeter (hereinafter called oximeter) is one model of H100 series Pulse Oximeter. The oximeter is intended for spot-checking of functional arterial oxygen saturation (SpO<sub>2</sub>), pulse rate and for oral, axillary and rectal temperature measurement. It is intended to be used on adult, pediatric or neonatal patient in hospitals, intra-hospital transport and hospital type facilities.

### **Intended Purpose**

The product is intended for measuring SpO<sub>2</sub> and pulse rate.

## 2.1 General Introduction

H100B&H100N are models of H100 series Pulse Oximeter. They display SpO<sub>2</sub> value, pulse rate value,



plethysmogram, bar graph, temperature (only for H100N), etc.

H100B is installed with EDAN SpO<sub>2</sub> module inside. H100N is installed with Nellcor SpO<sub>2</sub> module and the manufacturer's TEMP module inside. They both integrate parameter module, display and data output functions. They can be powered by four 1.5 V AA batteries or four 1.2 V Rechargeable Ni-MH AA batteries. They can clearly display all the parameter information on LCD.



Figure 2-1 H100B&H100N Pulse Oximeter

For the oximeter, Oximeter Viewer Data Management Software is optional.

You may frequently use the follow functions:

SpO<sub>2</sub> measuring (Refer to *Chapter 3 Oximeter Operation* for more information.)

Prompt Function (Refer to *Chapter 4 Prompt Function* for more information.)

## 2.2 Panel Introduction

This section identifies the symbols, controls, displays, and buttons on the front panel of the oximeter and the rear panel.

### 2.2.1 Symbols on Screen















Figure 2-2 Waveform Mode



Figure 2-3 H100B&H100N Large Numeric Mode

Icons on the screen and their meanings:

SpO <sub>2</sub>	SpO <sub>2</sub> value display area
100%	Measured SpO <sub>2</sub> %
PR	Pulse Rate value display area
60 bpm	Measured Pulse rate (bpm)
TEMP	Temperature value display area
	Displays when measurement value is higher than the upper limit
	Displays when measurement value is lower than the lower limit
	SpO <sub>2</sub> waveform display
	Pulse amplitude display
	Low battery icon
	Audio prompt off icon
	Prompt function off icon

	Data storage icon
04: 59	Time display in Information area: “hour: minute”
Adu, Ped, Neo	Patient type in Information area: Adult, Pediatric or Neonate.
ID: 99	Patient ID in Information area
	SpO <sub>2</sub> sensor unconnected icon
	SpO <sub>2</sub> sensor off
	Indicates the memory space is full
	Weak signal icon

**NOTE:**

- 1** The icons for sensor unconnected, sensor off or weak signal are displayed on the right of Information area. Only one of them can be displayed at a time.
- 2** The ID icon and the icon that indicates the memory space is full are displayed in the Information Area. Only one icon can be

**displayed at a time.**

## 2.2.2 Front Panel Buttons

This section describes the buttons on the front panel of the oximeter. The controls are activated by pressing the button that corresponds to that control. For example, press the prompt silence button to control the audio prompt.



Figure 2-4 Front Panel buttons

### **On/Off Button**

Turn on or off the oximeter.

On: Press and hold the **On/Off** button for one second.

Off: Press and hold the **On/Off** button for two seconds.

When the oximeter is off, synchronously press the **On/Off** button and the **Function** button for one second, the oximeter will enter data transfer state.

In the **Menu** state, press this button to return to the measurement state.

### **Backlight Button**

During the POST, the backlight is not available.

In the normal measurement, press this button to turn on or off the backlight.

### **Prompt Silence Button**

Prompts that occur during the Power-On-Self-Test (POST) cannot be silenced.

When **Prompt Function** in menu is setup to **ON**, pressing the prompt silence button can turn off the audio prompt. The pause period can be set to 30, 60, 90 or 120 seconds. Although the audio prompt is off, the visual prompt is still active. After the pause period is over, the audio prompt is reactivated.

Set **Prompt Function** to **OFF** in the menu to turn off the prompt. A Pop-up dialog box will display to confirm prompt setting. See details in 3.4.9.

### **Up Arrow Button**

In the menu state, press the **Up Arrow** button to choose different items, and increase the value of some parameters. Press it repeatedly to make a

parameter increase by more than one. Press and hold this button for more than one second to repeat the increment continuously.

When **Trend Review** is set to **ON**, press this button to enter the latest 10-minute SpO<sub>2</sub> or PR trend graph.

### **Down Arrow Button**

In the menu state, pressing the **Down Arrow** button can choose different items, and decrease the value of some parameters. Press it repeatedly to make a parameter decrease by more than one. Press and hold the button for more than one second to repeat the decrement continuously.

When **Trend Review** is set to **ON**, press this button to enter the latest 10-minute SpO<sub>2</sub> and PR trend table.

### **Function Button**

During the POST, the **Function** button is not available;

Press this button in normal measurement state to enter function choice or setup menu;

In the menu state, this button is also used as the

**Enter** button. Choose one item in menu using the cursor button (the **Up Arrow** button and the **Down Arrow** button), and press the **Function** button to confirm, then increase or decrease the value using cursor button.

When the oximeter is off, synchronously press the **On/Off** button and the **Function** button for one second, the oximeter will enter data transfer state.

### **Button Combination**

When the oximeter is off, synchronously press the **On/Off** button and the **Function** button for one second, the oximeter will enter Data transfer state.

### 2.2.3 Rear Panel



Figure 2-5 Rear Panel



## 2.3 Connecting Sensor or Cable

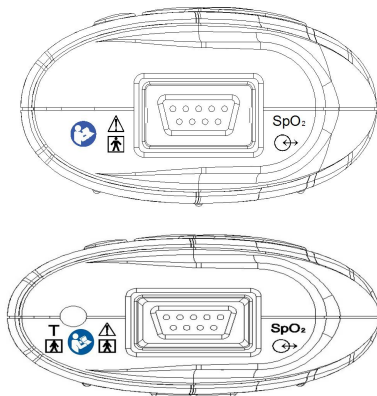


Figure 2-6 Sensor and Cable Connecting Port

SpO<sub>2</sub> Sensor and cable port is at the top of the oximeter. An extension cable can be used between the oximeter and the SpO<sub>2</sub> sensor. Use only the cable permitted by EDAN.

The cable for connecting the oximeter and PC with the Oximeter Viewer Data Management Software is also connected to this port.

The temperature sensor port is only configured for H100N.

**SIO** definition:

H100B		
PIN	Name	Description
1	RSGND	The RS232 GND
2	LED+	LED drive signal, IR Anode
3	LED-	LED drive signal, Red Anode
4	RXD	H100 RS232 RX
5	Detector Anode	Detector anode
6	Connection	Detector connection
7	AGND	Analog GND
8	TXD	H100 RS232 TX
9	Detector Cathode	Detector cathode
H100N		
PIN	Name	Description
1	GND	GND
2	LED+	LED drive signal, IR Anode
3	LED-	LED drive signal, Red Anode
4	TXD/Sensor	UART Tx/DigiCAL

	Memory Return	communication signal return signal return
5	Detector Anode	Detector anode connection
6	Inner Shield	Detector shield to GND
7	Outer Shield	Outer cable shield to GND
8	RXD / Sensor Memory Data	UART Rx /DigiCAL communication signal
9	Detector Cathode	Detector cathode connection

## 2.4 Powered by Battery

The oximeter can be powered by four 1.5 V LR6 AA alkaline batteries. It will operate for 48 hours for general operation, or about 24 hours of operation with the backlight and prompt on.

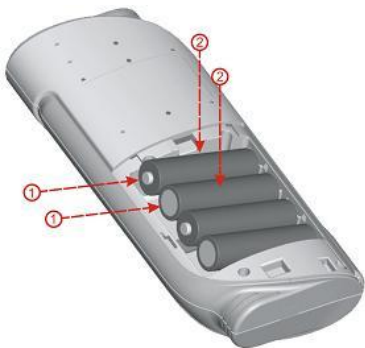
The oximeter does not support built-in recharging mode. The oximeter can also be powered by the Ni-MH rechargeable battery package.

### **Battery Installation**

To install the alkaline batteries:

1. Make sure the oximeter is turned off.

2. Press the battery compartment latch and remove the battery access door.
3. Place four AA batteries as shown in the following figure, first push it oriented as shown in ①, then press it oriented as shown in ②.
4. Install the battery compartment cover.



To install the Ni-MH rechargeable battery package:

1. Make sure the oximeter is turned off.
2. Press the battery compartment latch and remove the battery access door.
3. Place the Ni-MH rechargeable battery package as shown in the follow figure, first push it oriented as ①, then press it

oriented as ②.

4. Install the battery compartment cover.



---

### **WARNING**

**In order to avoid safety hazards, do not disassemble the battery pack or use battery pack with signs of wear, otherwise it may lead to a fire.**

---

### **Checking the Ni-MH Rechargeable Battery Package**

The performance of a Ni-MH rechargeable battery package may deteriorate. To check the performance of the battery, follow the procedures

below:

1. Disconnect the oximeter from the patient and stop all measuring procedures.
2. Place the oximeter in the charger stand and connect the AC mains. Allow the battery to be charged uninterruptedly for above 2.5 hours. For details about charging the Ni-MH rechargeable battery package, please refer to *section 3.5*.
3. Disconnect AC mains and allow the oximeter to run in the measurement state until it shuts off.

The operating time of a battery reflects its performance directly. If the operating time of a Ni-MH rechargeable battery package is noticeably shorter than that stated in the specifications, replace it or contact your service personnel.

### **Low Battery Icon**

The low battery icon displays and a prompt is given when there isn't sufficient battery energy. Replace the batteries.



Figure 2-7 Low Battery Icon

## 2.5 Accessory List

Standard configuration including:

Items	P/N
H100B Pulse Oximeter Main Unit	02.06.109006
H100N Pulse Oximeter	02.06.110185
1.5V AA alkaline batteries (IEC LR6)	01.21.064086
SH1 Adult Reusable SpO <sub>2</sub> Sensor (H100B)	02.01.210120
Nellcor Reusable Adult SpO <sub>2</sub> Sensor (DS-100A OxiMax) (Weak Perfusion Resistance) (H100N)	01.15.30043
Skin Temperature Probe (H100N)	01.15.040188
Carrying case	11.56.110165

Optional configuration including:

Items	P/N
Protective Cover	01.51.110164
Battery charger (H100N)	02.06.112410

Items	P/N
EDAN SH3 Neonate Wrap Sensor (reusable) (H100B)	02.01.210673
EDAN SH4 Adult Silicone Soft-tip SpO <sub>2</sub> Sensor (DB9, Only compatible with EDAN SpO <sub>2</sub> module and EDAN SpO <sub>2</sub> extension cable) (H100B)	02.01.210122
Nellcor Reusable Adult/Neonate SpO <sub>2</sub> Sensor (OXI-A/N OxiMax) (Weak Perfusion Resistance)	01.15.40096
Connection Cable, SHEC4	01.13.110504
Rectal/Oral Temperature Probe, HSE411	01.15.040424
Oximeter Viewer Data management software	02.05.109016
USB to series cable (For H100N)	01.13.110200
Series cable (For H100B)	01.13.109038
Charger stand, CS01	83.60.112409
Charger stand, CS01	83.60.316030



Items	P/N
Charger Stand, US, with battery, CS01	83.60.113589
Charger Stand, US, without battery, CS01	83.60.261430
Rechargeble Ni-MH Battery, 4×NR49AA1500P 4.8V	21.21.064164
MAX-FAST, Adult/Pediatric, RoHS, OxiMax	01.57.040436
OXI-P/I, Pediatric/Infant, RoHS, OxiMax	01.57.040437
D-YS, Multisite, RoHS, OxiMax	01.57.040438
MAX-A/MAX-AL, Adult, RoHS, OxiMax	01.57.040440
MAX-N, Neonatal/Adult, RoHS, OxiMax	01.57.040441
MAX-I, Infant, RoHS, OxiMax	01.57.040442
MAX-P, Pediatric, RoHS, OxiMax	01.57.040445

**NOTE:**

**The part name may vary depending on context, but the part number is constant.**

H100N is compatible with Nellcor-approved OxiMax Sensors and extension cables.

When selecting SpO<sub>2</sub> sensor, the following should be considered:

- ◆ Patient weight and activity.
- ◆ Adequacy of perfusion.
- ◆ Available sensor sites.
- ◆ Anticipated duration of measuring.

## 3 Oximeter Operation

### 3.1 Turning on the Oximeter

The oximeter is turned on by pressing the **On/Off** button, it will cycle through a POST before displaying valid data values. Verify that all the circuitry and functions of the oximeter work properly during the POST. It needs a few seconds to complete the verification procedure POST. If it functions incorrectly, do not use the oximeter.

Press the **On/Off** button for one second to turn on the oximeter.

- ◆ At first the EDAN LOGO is shown.



Figure 3-1 EDAN LOGO

- ◆ Secondly the product model is displayed.

*Pulse Oximeter*  
**H100B**

*Pulse Oximeter*  
**H100N**

**NELLCOR**  
**INSIDE**

Figure 3-2 Model

- ◆ If the POST is successfully finished, the oximeter sounds a tone and enters the waveform interface.

If there is an error during the POST, the following error codes will display on the screen:

H100B	
Error code	Indication
<b>Battery Low</b>	Indicates error for low battery
<b>Error 02</b>	Indicates error for SpO <sub>2</sub> board
<b>Error 03</b>	Indicates error for main control board
H100N	
Error code	Indication
<b>Battery Low</b>	Indicates error for Low battery
<b>Error 02</b>	Indicates error for SpO <sub>2</sub> board
<b>Error 03</b>	Indicates error for Temp board
<b>Error 04</b>	Indicates error for main control board

## 3.2 Measurement Procedure

### 3.2.1 SpO<sub>2</sub> Measurement Procedure

Select the correct patient category setting (adult/pediatric and neonatal), as this is used to optimize the calculation of the SpO<sub>2</sub> and pulse numerics.

During measurement, ensure that the application site:

- has a pulsatile flow, ideally with a good circulation perfusion.
  - has not changed in its thickness, causing an improper fit of the sensor.
1. Switch on the oximeter.
  2. Attach the sensor to the appropriate site of the patient.

#### **Before Applying the Sensor:**

Be sure to understand all warnings listed in the previous section before applying any sensor to a patient. Also, check the sensor as follows:

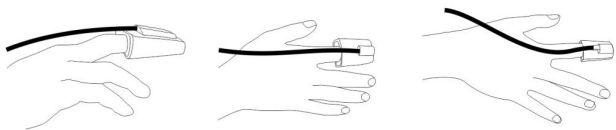
- ♦ Check the sensor outside and inside. To inspect the inside, gently open the sensor cavity and check splits on or next to the transparent silicone

that covers the optical elements.

- ◆ Any sensor showing signs of damage or alteration must not be used for further patient measuring; instead, dispose of it using proper disposal procedures.

### **Applying Finger/Soft-tip Sensors:**

- ◆ Nip the clamp, and choose a site that is well perfused and restricts a conscious patient's movements least. The ring finger of the non-dominant hand is preferred. Alternatively, the other fingers on the non-dominant hand may be used.
- ◆ The big toe or long toe (next to the big toe) may be used on restrained patients or patients whose hands are unavailable.
- ◆ Place the finger into the sensor according to the direction of the symbol on the sensor. Adjust the finger to ensure that the pad of the finger completely covers the sensor detection window.
- ◆ Orient the sensor so that the cable will be running towards the top of the patient's hand.
- ◆ Connect the sensor with the oximeter (or with the extension cable if needed).



### **Applying Neonatal Finger (or Toe) Wrap Sensors:**

- ◆ When you perform the measurement, position the sensor over the hand or foot with optical components opposite each other.
- ◆ Hold the sensor, and insert stretched strap into slot, hold it there while threading end through latch. If strap is too long, thread it through second latch.
- ◆ Connect the sensor with the oximeter (or with the extension cable if needed).



3. Plug the connector of the sensor extension cable into the SpO<sub>2</sub> socket.

---

---

**WARNING**

- 1 Inspect the application site every two to three hours to ensure skin quality and correct optical alignment. If the skin quality changes, move the sensor to another site. Change the application site at least every four hours.**
  - 2 For neonate, change the measuring site every 20 minutes.**
  - 3 Do not use the SpO<sub>2</sub> sensors if the packaging or the sensor is damaged and return them to the vendor.**
  - 4 If the SpO<sub>2</sub> sensor cannot work properly, please reconnect the sensor or change a new one.**
- 
- 

**NOTE:**

- 1 Avoid placing the sensor on extremities with an arterial catheter, intravascular venous infusion line, or inflated NIBP cuff.**
- 2 If the surrounding temperature increases, the operator should pay attention to the site of poor perfusion, and increase the**



frequency of checking the skin and changing the measurement site to prevent burns. If the initial skin temperature is less than 35°C, the temperature of all the listed sensors on the skin will not exceed 41°C during working.

- 3** When a trend toward patient deoxygenation is indicated, analyze the blood samples with a laboratory co-oximeter to completely understand the patient's condition.
- 4** Injected dyes such as methylene blue or intravascular dyshemoglobins such as methemoglobin and carboxyhemoglobin may lead to inaccurate measurements.
- 5** Inspect the sensor to ensure that the light emitter and receiver are aligned with each other and there is no gap between the sensor and the finger. All the light emitted by the light emitter must pass through the patient's tissue.

### 3.2.2 TEMP Measurement Procedure

#### TEMP Measurement Procedure

1. With a reusable TEMP probe you can plug the

probe directly into the TEMP connector.

2. Apply the TEMP probes securely to the patient.
3. Switch on the oximeter.

It takes 5 minutes for the temperature measurement to stabilize.

The patient is an intended operator. Follow the steps above for measurement.

## 3.3 Measurement State

### 3.3.1 Measurement Modes

There are two measurement modes which are waveform mode and large numeric mode. By default, H100B configuration is waveform mode and H100N configuration is large numeric mode.

#### **Waveform Mode**

In the normal measurement state, oximeter can measure arterial oxygen saturation and pulse rate, display oxygen saturation level and symbol (%SpO<sub>2</sub>) and PR on interface. Besides, it can also display pulse bar graph and Plethysmogram.



Figure 3-3 Waveform Mode

### Large Numeric Mode

The oximeter can display SpO<sub>2</sub>, oxygen saturation unit (%), PR, pulse rate unit (bpm), TEMP and temperature unit (°C) in large numeric mode.



Figure 3-4 H100B&amp;H100N Large Numeric Mode

### 3.3.2 Trend Graph and Trend Table

When **Trend Review** is set to **ON**, press the **Up Arrow** button to enter the latest SpO<sub>2</sub> or PR trend graph, and press the **Down Arrow** button to enter latest 10-minute SpO<sub>2</sub> and PR trend table. Shift the pages by pressing the **Up Arrow** or **Down Arrow** button. In trend review interface, the oximeter does not store trend data.

Trend graph:

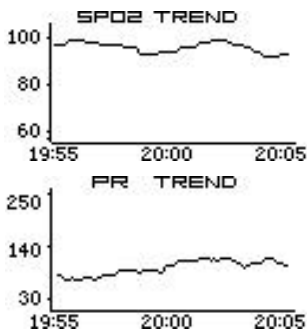



Figure 3-5 Display SpO<sub>2</sub> and PR Trend Graph


Trend table:

TREND TABLE		
TIME	SPO2	PR
20:00:06	100	66
20:00:00	99	68
19:59:54	---	---
19:59:48	---	---
19:59:42	98	62

Figure 3-6 Display SpO<sub>2</sub> and PR Trend Table

### 3.3.3 Abnormal Measurement State

If the SpO<sub>2</sub> sensor does not connect to the oximeter, it will give a medium prompt, and display  in the information area.

If the SpO<sub>2</sub> sensor falls off from the finger, it will give a medium prompt, and display  in the

information area.

If the Temp sensor is abnormal, it will give a low prompt, and display --- in TEMP parameter area.

In menu state or trend state, if there is no operation for 30 seconds, the oximeter will return to measurement state.

In measurement state, if there is no measurement data and no operation for 10 minutes, the oximeter will turn off automatically.

In data transfer state, if the oximeter does not receive any responsible signals for 10 minutes, it will turn off automatically.

### 3.3.4 Data Transfer State

Set **Data Storage** in menu to **ON**, the measurement value will be stored in the oximeter. The SpO<sub>2</sub> and PR information can be transferred from oximeter to Oximeter Viewer Data Management Software.

Data transfer procedure:

- ◆ After the measurement and storage are all finished, turn off the oximeter;
- ◆ Connect the oximeter and the computer with a cable for the communication

between the oximeter and the Oximeter Viewer Data Management Software;

- ◆ Synchronously press the **On/Off** button and the **Function** button, after POST, the oximeter enters Data Transfer State automatically. The interface displays as below:

### ***Data Transfer State***



Figure 3-7 Data Transfer State

## 3.4 System Menu

Press the **Function** button to see the following main menu of the oximeter, select items by pressing the **Up/Down** button, and confirm it by pressing the **Function** button.


**System Setup >>**

**Prompt Setup >>**

**Storage Setup >>**

**EXIT**

System Setup >>:

<b>System Mode</b>	
<b>Patient Type</b>	<b>Adu</b>
<b>Prompt Volume</b>	<b>3</b>
<b>Pulse Volume</b>	<b>3</b>
<b>Audio Paused(s)</b>	<b>60</b>
<b>User Maintain &gt;&gt;</b>	
<b>Default Config</b>	
<b>Sensitivity</b>	<b>Med</b>
<b>Return</b>	

Prompt Setup >>:

<b>Prompt Function</b>	<b>ON</b>
<b>SpO<sub>2</sub> High Limit</b>	<b>100</b>
<b>SpO<sub>2</sub> Low Limit</b>	<b>90</b>
<b>PR High Limit</b>	<b>120</b>
<b>PR Low Limit</b>	<b>50</b>
<b>Temp High Limit</b>	<b>39.0</b>
<b>Temp Low Limit</b>	<b>36.0</b>
<b>Return</b>	

Storage Setup >>:



Figure 3-8 Menus

The menus are shown above and the details for each item will be introduced in the following sections.

**NOTE:**

- 1 SpO<sub>2</sub> High Limit and SpO<sub>2</sub> Low Limit stand for the upper and lower prompt limits of SpO<sub>2</sub> respectively.**
- 2 PR High Limit and PR Low Limit stand for the upper and lower prompt limits of PR respectively.**
- 3 The Temp High Limit and Temp Low Limit stand for the upper and lower prompt limits of Body temperature respectively.**
- 4 If the user changes the default value of Low Limit or High Limit, after restarting the oximeter, the value will resume to the default value for the corresponding patient**



**type.**

### 3.4.1 System Mode

There are two items for selecting:

Waveform mode



Large numeric mode



Then confirm the selection by pressing the **Function** button.

### 3.4.2 Patient Type

**Patient Type** can be set to different measurement modes.

Set **Patient Type** to **Adu**, **Ped**, or **Neo**, and confirm it by pressing the **Function** button.

**NOTE:**

**When patient type is changed to Neo, please use the Neonate SpO<sub>2</sub> Sensor for accurate measurement.**

### 3.4.3 Prompt Volume

The **Prompt Volume** button is used to adjust prompt volume and its range is from one to five.

When **Prompt Function** is setup to **ON**, if a low

prompt, a medium prompt or a high prompt occurs, the oximeter sounds beep.

#### 3.4.4 Pulse Volume

The user can turn on or off the pulse volume by pressing **Pulse Volume**, and change volume level to 1, 2, 3, 4, 5 or OFF. Press the **Function** button to enter setup state, then use the **Up Arrow** or the **Down Arrow** button to choose, then confirm it by pressing the **Function** button.

The oximeter implements variable pulse tone and its frequency varies with the saturation. Beat frequency of pulse has positive correlation with measurement value.

#### 3.4.5 Audio Paused (s)

Set the pause period for audio prompt to 30, 60, 90 or 120 seconds.

When **Prompt Function** is **ON**, pressing the prompt silence button can turn off the audio prompt, the pause period is set by the **Audio Paused (s)**.

#### 3.4.6 User Maintain

Enter the **User Maintain** menu by inputting “819”.

### Enter Password

0 0 0

Confirm Cancel

Figure 3-9 Enter Password

If the password is wrong, the following dialog box will pop up:

**Wrong Password!!**  
**Please Retry.**

EXIT

Figure 3-10 Wrong Password

If the password is right, the following menu will display:

Language ENG  
Time Setup >>  
Return

Figure 3-11 User Maintain

- Language: the user can select language to be displayed.
- Temp Unit: the user can set the temperature unit to °C or °F.
- Time Setup >>: select this item, the following interface displays:

2008 -  - 01  
18 : 56 : 59

Confirm Cancel

Figure 3-12 Time Setup

- Trend Review: the user can choose whether to turn on or off the trend review function.

**NOTE:**

- 1** If the system is not used for a longer period of time, its system time may be inaccurate. In this case, readjust the system time after powering on.
- 2** If the system time cannot be saved and resumes the default value after restart, contact the service department of EDAN to replace the button cell in main board.

### 3.4.7 Default Config


Choose this item to resume factory default configuration. A dialog box pops up:

**Menu items will adopt  
the factory default  
configuration. Yes?**  
YES

Figure 3-13 Factory Default Config

Factory Default Configuration is shown as follows:

System Mode:  (H100B)

 (H100N)

Patient Type: Adu

Prompt Function: ON

Prompt Volume: 3

Pulse Volume: 3

Audio Paused (s): 60

SpO<sub>2</sub> High Limit: 100

SpO<sub>2</sub> Low Limit: 90

PR High Limit: 120

PR Low Limit: 50

Temp High Limit: 39

Temp Low Limit: 36

Patient ID No.: 1

Data Storage: OFF

Trend Review: OFF

### 3.4.8 Sensitivity

The SpO<sub>2</sub> reading is the average of data collected within a specific time. You can set the **Sensitivity** to **Hi** or **Low** via the menu. The higher the

sensitivity is, the quicker the pulse oximeter responds to the changes in the patient's oxygen saturation level. Contrarily, the lower the sensitivity is, the slower the pulse oximeter responds to the changes in the patient's oxygen saturation level, but the measurement accuracy will be improved. When a critical patient is monitored, selecting high sensitivity will help to understand the patient's state.

### 3.4.9 Prompt Function

Set **Prompt Function** to **ON** or **OFF** to turn on or off the prompt function.

If **Prompt Function** is set to **OFF**, a dialog box pops up as follows:

**Prompt function will be  
turned off. Please  
confirm this operation.**

**YES**

**NO**

Figure 3-14 Confirm to Turn off Prompt

If **Prompt Function** is **ON** and a prompt occurs, the oximeter will give a visual prompt and an audio prompt.

Pressing the prompt silence button can pause the

prompt function for seconds (the pause period can be set to 30, 60, 90 or 120s by the user, see section 3.4.5), the audio prompt off icon displays. But the visual prompt is still active. For example, if the measured SpO<sub>2</sub> value is higher than **SpO<sub>2</sub> High Limit** or lower than **SpO<sub>2</sub> Low Limit**, there will be ↑ or ↓ icon displayed on screen, and the SpO<sub>2</sub> or PR character will flash.

If **Prompt Function** is set to **OFF**, all audio prompts and visual prompts are turned off.

---

---

### **WARNING**

**When the Prompt Function is off, the oximeter will not give a prompt. In order to avoid endangering the patient's life, the user should use this function cautiously.**

---

---

#### 3.4.10 SpO<sub>2</sub> Prompt Limit Setup

The user can choose **SpO<sub>2</sub> High Limit** and **SpO<sub>2</sub> Low Limit** in menu to adjust SpO<sub>2</sub> prompt limit. Press the **Up Arrow** button or **Down Arrow** button to increase or decrease prompt limit.

By default, **SpO<sub>2</sub> High Limit** and **SpO<sub>2</sub> Low Limit** in **Neo** mode are set to **95** and **90** respectively; while

they are **100** and **90** in **Adu** mode respectively.

Set the SpO<sub>2</sub> prompt limits as follows:

- ◆ Choose **SpO<sub>2</sub> High Limit** in the menu, press the **Function** button to enter setup. The **SpO<sub>2</sub> High Limit** box will change from real line box to broken line box. The adjustable range for upper limit of SpO<sub>2</sub> is from “1 + the lower limit of SpO<sub>2</sub>” to 100. If the value of **SpO<sub>2</sub> High Limit** is set to less than 85, it will restore to default value after the oximeter is turned on again. In the NEO mode, if the value of **SpO<sub>2</sub> High Limit** is set to higher than 95, it will restore to 95 after the oximeter is turned on again.
- ◆ Press the **Up Arrow** or **Down Arrow** button to increase or decrease values.
- ◆ Choose **SpO<sub>2</sub> Low Limit** in the menu, press the **Function** button to set it. The **SpO<sub>2</sub> Low Limit** box will change from real line box to broken line box. The adjustable range for the lower limit of SpO<sub>2</sub> is from 0 to “the upper limit of SpO<sub>2</sub> - 1”. If the value of **SpO<sub>2</sub> Low Limit** is set to less than 85, it will restore to 85 after the oximeter is



turned on again.

- ◆ Press the **Up Arrow** or **Down Arrow** button to increase or decrease values.
- ◆ **SpO<sub>2</sub> High Limit** is always higher than **SpO<sub>2</sub> Low Limit** by at least 1%.
- ◆ Press the **Function** button, confirm the prompt range setup.
- ◆ Press the **On/Off** button to exit the menu, and return to measurement state.

---

### **WARNING**

**High oxygen levels may predispose a premature infant to retrolental fibroplasia. If this is a consideration, do NOT set the high limit to 100%, which is equivalent to switching the high limit prompt off.**

---

#### 3.4.11 PR Prompt Limit Setup

The user can use **PR High Limit** and **PR Low Limit** in menu to adjust pulse rate prompt limits.

By default, **PR High Limit** and **PR Low Limit** in **Neo** mode are 200 and 100 respectively; while they are 120 and 50 in **Adu** mode respectively.

Set the PR limits as follows:

- ◆ Choose **PR High Limit** in the menu, press the **Function** button to enter setup. The **PR High Limit** box changes from real line to broken line. The adjustable range of the upper limit of PR is from “1 + the lower limit of PR” to 300.
- ◆ Press the **Up Arrow** or **Down Arrow** button to increase or decrease values.
- ◆ Choose **PR Low Limit** in menu, press the **Function** button enter setup. The **PR Low Limit** box changes from real line to broken line. The adjustable range for the lower limit of PR is from 0 to “the upper limit of PR – 1”.
- ◆ Press the **Function** button, confirm the prompt range setup.
- ◆ **High Limit** is always higher than **Low Limit** by at least 1 bpm.
- ◆ Press the **On/Off** button to exit the menu, and return to measurement state.

### 3.4.12 Temp Prompt Limit Setup

The user can use **Temp High Limit** and **Temp Low Limit** in menu to adjust body temperature prompt

limits.

By default, the **Temp High Limit** and **Temp Low Limit** are set to **39.0 °C** and **36.0 °C** respectively in both **Neo** and **Adu** modes.

Set the Temp limits as follows:

- ◆ Choose **Temp High Limit** in the menu, press the **Function** button to enter setup. The **Temp High Limit** box changes from real line to broken line. The adjustable range of the upper limit of Temp is from “0.1 °C + the lower limit of Temp” to 50.0 °C.

- ◆ Press the **Up Arrow** or the **Down Arrow** button to increase or decrease values.

- ◆ Choose **Temp Low Limit** in menu, and press the **Function** button to enter setup. The **Temp Low Limit** box changes from real line to broken line. The adjustable range for the lower limit of Temp is from 0 to “the upper limit of Temp - 0.1 °C”.

- ◆ Press the **Function** button, and confirm the prompt range setup.

- ◆ **High Limit** is always higher than **Low Limit** by at least 1 °C.

- ◆ Press the **On/Off** button to exit the menu, and return to measurement state.

### 3.4.13 Patient ID No. Setup

The oximeter can support 100 patient IDs, and 300-hour data storage.

When entering menu, press the **Function** button to set ID (valid range is from 1 to 100). The ID display box on the interface will change from real line to broken line.

After choosing ID, press the **Function** button to confirm the setup. If the ID exists, the following confirmation dialog box will pop up.

**This ID's data will be covered. Continue ?**

**YES**

**NO**

Figure 3-15 Confirm to Cover Data

### 3.4.14 Data Storage

Choose **Data Storage**, and set it to **ON**, then the measurement data can be stored.

During the data storage, patient ID cannot be changed. If the user wants to change ID, he should change **Data Storage** to **OFF**, then set a new ID.

Data stored in the oximeter can be exported through Oximeter Viewer Data Management

Software. Please refer to *section 3.3.4* for Data transfer procedure.


When the memory space is full, an icon  will be displayed in information area. Meanwhile **Data Storage** changes to **OFF** automatically. Restart the oximeter and a dialog box pops up. The user should confirm it to delete all the data.



Figure 3-16 Memory Space Full

### 3.4.15 Delete All Data

**Delete All Data** is used to delete all the stored data. Choose this item by pressing the **Function** button, a dialog box pops up as follows:

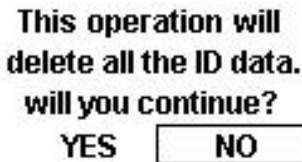


Figure 3-17 Delete All the Data

If you choose **YES** to delete all the data, the

deleting progress shows:

***All Data Deleting...***



Figure 3-18 All Data Deleting

### 3.4.16 Exit (Return)

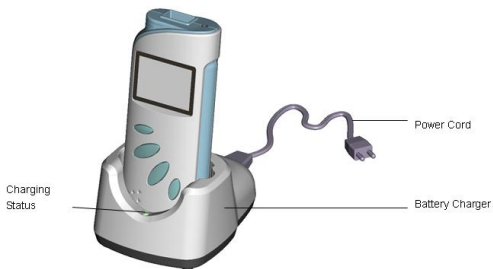
Exit menu by pressing **Exit** in the menu.

Return to the previous menu by pressing **Return** in the menu.

## 3.5 Charging the Ni-MH Rechargeable Battery Package

The charger stand is intended to be used for charging the Ni-MH rechargeable battery package. To charge the Ni-MH rechargeable battery package:

1. Turn off the device.
2. Place the pulse oximeter in the charger stand.
3. Connect the power cord.
4. Plug the power cord into the AC mains.



A tricolor LED display indicates the charging state. Red indicates no rechargeable battery package in the machine or the device isn't placed properly. Orange indicates the device is being charged. Green indicates that the charging is complete.

---

### **CAUTION**

- 1 When the device is being charged, it cannot be operated.**
  - 2 The mains plug is used as isolation means from supply mains. Position the oximeter in a location where the operator can easily access the disconnection device.**
-

## 3.6 Oximeter Viewer Data

### Management Software Introduction

Connect the oximeter to PC through the cable before running the PatientCare Viewer Data Management Software. This Software implements the following functions:

1. Query or save the oximeter's data based on the patient ID.
2. Edit and manage patient information.
3. Review each ID's data in trend graph format.
4. Print all data information via PC

Refer to the *PatientCare Viewer Data Management Software User Manual* for detailed information.

The following figures demonstrate the main interface, trend graph and print preview.



# Pulse Oximeter User Manual

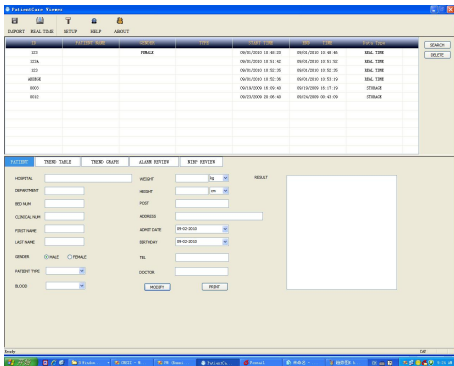


Figure 3-19 Main Interface

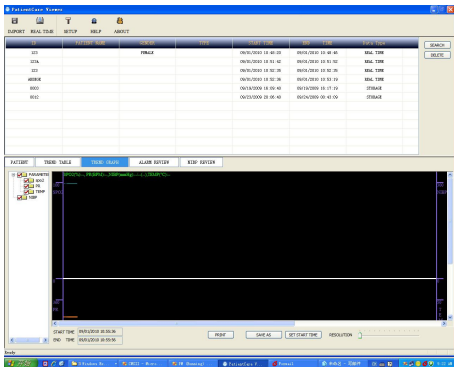


Figure 3-20 Trend Graph



## 4 Prompt Function

### 4.1 Prompt Categories and Levels

#### **Prompt Categories**

The oximeter's prompts can be classified into two categories: physiological prompts and technical prompts.

1. Physiological prompts

Physiological prompts, also called patient status prompts, are triggered by a monitored parameter value that violates setup prompt limits or an abnormal patient condition.

2. Technical prompts

Technical prompts, also called system status prompts, are triggered by a device malfunction or a patient data distortion due to improper operation or system problems.

## **Prompt Levels**

In terms of severity, the oximeter's prompts levels can be classified into two categories: high level prompts and medium level prompts.

1. High level prompts

Indicate that the patient is in a life threatening situation and an emergency treatment is demanded.

2. Medium level prompts

The patient's vital signs appear abnormal or the oximeter system status appears abnormal, indicate that prompt operator response is required.

3. Low level prompts

The patient's vital signs appear abnormal or the oximeter system status appears abnormal, indicate that operator awareness is required.

The levels for both technical prompts and physiological prompts are predefined and cannot be changed by the user.

## Prompt Categories Table

Physiological prompts	Prompt level
<b>SpO<sub>2</sub> Too High</b>	High
<b>SpO<sub>2</sub> Too Low</b>	High
<b>PR Too High</b>	High
<b>PR Too Low</b>	High
<b>Temp Too High</b>	Medium
<b>Temp Too Low</b>	Medium

Technical prompts	Prompt level	Action Taken
<b>SpO<sub>2</sub> Sensor Unconnected</b>	Medium	No SpO <sub>2</sub> sensor was connected to the oximeter.
<b>SpO<sub>2</sub> Sensor off</b>	Medium	Make sure the sensor is well connected to the patient's finger or other parts. Make sure the oximeter and cables are well connected.
<b>Low Battery</b>	Medium	Replace the batteries.

<b>Temp Sensor Abnormal</b>	Low	Make sure that the cable is properly connected.
-----------------------------	-----	---

### Prompt Indicators

When a prompt occurs, the oximeter will indicate it through the following indications:

- Character flash
- prompt tone

High level prompts: character flashes quickly and sounds triple + double + triple +double beep;

Medium level prompts: character flashes slowly and sounds triple beep;


Low level prompts: character display constantly and sounds a single beep.

The sound pressure range for auditory prompt signal is from 45 dB to 85 dB.

## 4.2 Prompt Conditions


The **Prompt Function** is **ON** by default. When the oximeter is turned on and no measurement is started, if the SpO<sub>2</sub> or TEMP sensor is unconnected or off, the oximeter will not give a prompt.

#### 4.2.1 Prompt for SpO<sub>2</sub> Sensor Unconnected

When the SpO<sub>2</sub> sensor is disconnected, the oximeter gives a medium prompt. The icon  displays in information area.

SpO<sub>2</sub> and PR value area display “---”, and give a medium prompt. (Make sure the **Prompt Function** in menu is ON.)

#### 4.2.2 Prompt for SpO<sub>2</sub> Sensor off

When the SpO<sub>2</sub> sensor falls off from the finger, the oximeter will give a medium prompt, and the icon  displays in information area.

SpO<sub>2</sub> and PR value area display “---”, and give a medium prompt. (Make sure the **Prompt Function** in menu is ON.)

#### 4.2.3 Prompt for Abnormal State of Temp Sensor

In the measurement state, if the Temp sensor falls off the oximeter, it will display --- in the TEMP display area and give a low prompt. (Make sure **Prompt Function** in menu is set to **ON**.)

If the measured value is below 0 °C or above 50 °C, the oximeter will give a low prompt.


If the Temp sensor is damaged, the oximeter will

give a low prompt.

#### 4.2.4 Prompt for Low Battery

When the battery is too low, the oximeter gives a medium prompt for low battery.

After the low battery prompt occurs, the oximeter can still be operated for a few minutes before it turns off automatically.

The low battery icon  displays on LCD, and gives a medium prompt. (Make sure the **Prompt Function** in menu is **ON**.)

#### 4.2.5 Higher than High Limit

If the measured SpO<sub>2</sub> or PR value is higher than the High Limit (upper prompt limit), the oximeter gives a high prompt for SpO<sub>2</sub> or PR, and gives a medium prompt for TEMP.

Here we take PR for example:

If the measured PR value is higher than the setup **PR High Limit**, the oximeter gives a high prompt (Make sure **Prompt Function** in menu is **ON**). A ↑ icon displays near PR, which indicates that the measured value is higher than that of **PR High Limit**, it will synchronously flash with PR value.



#### 4.2.6 Lower than Low Limit

If the measured SpO<sub>2</sub> or PR value is lower than the **Low Limit** (lower prompt limit), the oximeter gives a high prompt for SpO<sub>2</sub>, PR, and gives a medium prompt for TEMP.

Here we take SpO<sub>2</sub> for example:

If the measured SpO<sub>2</sub> value is lower than the set **SpO<sub>2</sub> Low Limit**, the oximeter gives a low SpO<sub>2</sub> prompt. (Make sure the **Prompt Function** in menu is **ON**.)

A ↓ icon displays near SpO<sub>2</sub> value, which indicates the measured value is lower than that of **SpO<sub>2</sub> Low Limit**, it will synchronously flash with SpO<sub>2</sub> value.

Likewise, when measured SpO<sub>2</sub> is lower than **SpO<sub>2</sub> Low Limit**, or measured Temp is lower than **Temp Low Limit**, it will also give a prompt.

#### 4.2.7 Prompt Silence

If **Prompt Function** in menu is **ON**, pressing the prompt silence button, the audio prompt will be off for the pause period set by the user, but the visual prompt is still active.

When the audio prompt is off, press the prompt silence button to reactivate the audio prompt

function.

#### 4.2.8 Turning off Prompt Function

After the **Prompt Function** is turned off, the oximeter cannot give a visual or an audio prompt except for low battery icon.

Set **Prompt Function** to **ON**, the prompt function will be active. It will give an audio prompt and a visual prompt if a prompt occurs.

#### 4.2.9 Prompt Priority

Only one kind of prompt can be given at once. For example, if a medium prompt and a high prompt occur at the same time, the high prompt will take priority.

If the pulse beep and audio prompt sound at the same time, the oximeter will only give a prompt sound.

#### 4.2.10 Prompt Delay

There is a delay between a physiological event at the measurement site and the corresponding prompt at the oximeter. This delay has two components:

1. The time between the occurrence of the physiological event and when this event is

represented by the displayed numerical values. This delay depends on the algorithmic processing time and the sensitivity setting. The lower the sensitivity configured, the longer the time needed until the numerical values reflect the physiological event.

2. The time between the displayed numerical values exceeding an prompt limit and the prompt indication on the oximeter. This delay is the combination of the configured prompt delay time plus the general system delay time.

#### 4.2.11 Testing Prompts

For further testing of individual measurement prompts, perform the measurement on yourself or use a simulator. Adjust prompt limits and check that appropriate prompt behavior is observed. You must check that the character flashes and beep sound can be heard. This indicates that the visible and auditory prompt indicators are functioning correctly.

## 5 Performance Considerations

### 5.1 Performance Verification

Qualified service personnel are responsible for performance verification procedures before the oximeter is used for the first time in a clinical setting.

### 5.2 Oximeter Performance Considerations

There are some patient conditions that can affect the oximeter's measurements.

#### ◆ Nonfunctional Hemoglobins

Nonfunctional hemoglobins, such as carboxyhemoglobin, methemoglobin, and sulfhemoglobin, are unable to transport oxygen for tissue, so SpO<sub>2</sub> may not be in proportion to the actual oxyhemoglobin in human body. Further assessment beyond pulse oximeter is recommended.

#### ◆ Anemia

Anemia causes decreased arterial oxygen content. Although SpO<sub>2</sub> readings may appear normal, an

anemic patient may be hypoxic. Correcting anemia can improve arterial oxygen content. The oximeter may fail to provide SpO<sub>2</sub> if hemoglobin levels fall below 5 gm/dl.

◆ Saturation

The oximeter displays saturation level between 1% and 100%.

◆ Pulse rate

H100B: The oximeter displays pulse rate between 25 and 300 beats per minute (bpm). The sensor accuracy ranges do not apply to pulse rates above 300 bpm.

H100N: The oximeter displays pulse rate between 20 and 300 beats per minute (bpm). The sensor accuracy ranges do not apply to pulse rates above 250 bpm. Detected pulse rates less than 20 are shown as 0.

◆ Temperature

The oximeter normally displays temperature from 0 °C to +50 °C, there are abnormal state if the temperature is out of the range. It takes 5 minutes for the temperature measurement to stabilize.

◆ Data update period

The data update period is one second typically, and

10 seconds in extreme conditions.

Certain patient conditions can affect the measurements or cause the loss of the pulse signal. Inaccurate measurements can be caused but not limited by:

- ◆ Incorrect application of the sensor.
- ◆ High levels of ambient light sources, such as surgical lights (especially those with a xenon light source), bilirubin lamps, fluorescent lights, infrared heating lamps, and direct sunlight.
- ◆ Placement of the sensor on an extremity with a blood pressure cuff, arterial catheter, or intravascular line.
- ◆ Excessive or violent patient movement.
- ◆ Intravascular dyes, such as indocyanine green or methylene blue.
- ◆ Externally applied coloring, such as nail polish or pigmented cream.
- ◆ Failure of covering the sensor site with opaque materials in high ambient light conditions.
- ◆ Venous pulsation.
- ◆ Dysfunctional hemoglobin.

- ◆ Low peripheral perfusion.
- ◆ Defibrillation.
- ◆ Electromagnetic interference.

Loss-of-pulse signal occurs for the following reasons:

- ◆ The sensor is applied too tightly.
- ◆ A blood pressure cuff is inflated on the same extremity as the one with the sensor attached.
- ◆ There is arterial occlusion proximal to the sensor.
- ◆ Low peripheral perfusion.

To use the sensor:

- ◆ Select an appropriate sensor.
- ◆ Apply the sensor as directed, and observe all warnings and cautions presented in the sensor user manual.
- ◆ Clean and remove any substances, such as nail polish, from the application site.
- ◆ Periodically check to ensure that the sensor remains properly positioned on the patient.

To prevent interference from ambient light, ensure that the sensor is properly applied, and cover the

sensor site with opaque material.

If interference due to patient activity presents a problem, try one or more of the following to correct the problem:

- ◆ Verify that the sensor is properly and securely applied.
- ◆ Move the sensor to a less active site.
- ◆ Use an adhesive to the sensor.
- ◆ Use a new sensor with fresh adhesive backing.
- ◆ Keep the patient still, if possible.

For H100N, if interference due to poor perfusion presents a problem, consider using the MAX-R OXIMAX sensor or the MAXFAST OXIMAX sensor. The MAX-R OXIMAX sensor obtains measurements from the nasal septal anterior ethmoid artery, an artery supplied by the internal carotid. These OXIMAX sensors may obtain measurements when peripheral perfusion is relatively poor.

**NOTE:**

**Adjacent SpO<sub>2</sub> sensors may interfere with each other (eg, multiple SpO<sub>2</sub> measurements in the same patient). Be sure to cover the sensor with opaque material to reduce cross-interference.**



## 5.3 SpO<sub>2</sub> Functional Test

This test checks the function of the SpO<sub>2</sub> measurement.

Tools required: SpO<sub>2</sub> simulator (Provided with a calibration curve approved by EDAN).

Procedure:

1. Connect the oximeter and the SpO<sub>2</sub> simulator with a SpO<sub>2</sub> cable.
2. Switch on the oximeter and the simulator.
3. Set the simulator to the following configuration:  
- SpO<sub>2</sub> = 85%.

Check the displayed SpO<sub>2</sub> value against the simulator configuration. The value should be 85% ±2%.

## 5.4 Assessing the Validity of a SpO<sub>2</sub>

### Reading

You can check the quality of the pleth wave and the stability of the SpO<sub>2</sub> values to assess whether the sensor functions properly and whether the SpO<sub>2</sub> readings are valid. Always use these two

indications simultaneously to assess the validity of a SpO<sub>2</sub> reading.

Generally, the quality of the SpO<sub>2</sub> pleth wave reflects the quality of the light signals obtained by the sensor. A wave of poor quality manifests a decline of the signal validity. On the other hand, the stability of the SpO<sub>2</sub> values also reflects the signal quality. Different from varying SpO<sub>2</sub> readings caused by physiological factors, unstable SpO<sub>2</sub> readings are resulted from the sensor's receiving signals with interference. The problems mentioned above may be caused by patient movement, wrong sensor placement or sensor malfunction. To obtain valid SpO<sub>2</sub> readings, try to limit patient movement, check the placement of the sensor, measure another site or replace the sensor.

**NOTE:**

- 1 The SpO<sub>2</sub> accuracy has been validated in controlled human studies against arterial blood sample reference measured with a CO-oximeter. SpO<sub>2</sub> measurements are statistically distributed, only about two-thirds of the measurements can be expected to fall within the specified**

**accuracy compared to CO-oximeter measurements. The volunteer population in the studies composed of healthy men and women from age 18 to 50, with various skin pigmentations. Note that the study population was healthy adults and not in the actual intended use population.**

- 2 The pulse rate accuracy is obtained by comparison to the pulse rate generated with an arterial oxygen simulator (also an electronic pulse simulator).**
- 3 During measuring, if the oximeter's reading differs significantly from the patient's physiological condition, it indicates that the signal may be disturbed, resulting in an inaccurate reading. In this case, the artifact can disguise as a similar reading, causing the oximeter to fail to send a prompt. In order to ensure reliable measuring, it is necessary to regularly check whether the sensor is wearing properly and the signal quality is good.**

## 6 Maintenance

Maintenance shall be carried out at least once every two years, or as specified by local regulations.

The oximeter does not require calibration.

If service is necessary, contact qualified service personnel or your local EDAN representative.

Before using the oximeter, do the following:

- Check if there is any mechanical damage;
- Check if all the outer cables, inserted modules and accessories are in good condition;
- Check all the functions of the oximeter to make sure that the oximeter is in good condition.

If you find any damage on the oximeter, stop using the oximeter on patient, and contact the biomedical engineer of the hospital or Customer service immediately.

### **Periodic Safety Checks**

It is recommended that the following checks should be performed every 24 months:

- ◆ Inspect the devices for mechanical and functional damage

◆ Inspect the relevant labels for legibility

All the checks that need to open the oximeter should be performed by qualified customer service technician. The safety and maintenance check can be conducted by personnel from this company. You can obtain the material about the customer service contract from the local company's office.

If the hospital or agency that is responding to using the oximeter does not follow a satisfactory maintenance schedule, the oximeter may become invalid, and the human health may be endangered.

---

**WARNING**

- 1 The maintenance operations like software upgrade of the device can only be completed by EDAN-qualified service professionals.**
  - 2 Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.**
-

## **Care and Cleaning**

Use only the EDAN-approved substances and methods listed in this chapter to clean or disinfect your equipment. Warranty does not cover damage caused by using unapproved substances or methods.

EDAN Instruments has validated the cleaning and disinfection instructions included in this User Manual. It is the responsibility of the healthcare professional to ensure that the instructions are followed so as to ensure adequate cleaning and disinfection.

## **Safety Instructions**

### Reusable products

Reusable products must be reprocessed, otherwise there is an increased risk of infection.

- ▶ Follow the infection prevention policies and reprocessing regulations of the health-care facility.
- ▶ Follow the national infection prevention policies and reprocessing regulations.
- ▶ Use validated procedures for reprocessing.
- ▶ Reprocess reusable products after every use.
- ▶ Follow the manufacturer's instructions for cleaning agents, disinfectants, and reprocessing

devices. Signs of wear, e.g., cracks, deformation, discoloration, or peeling, may occur with reprocessed products.

► Check the products for signs of wear and replace them if necessary.

Keep your oximeter and accessories free of dust and dirt. To prevent the device from damage, please follow the procedure:

- Use only recommended cleaning substances and disinfectants listed in this manual. Others may cause damage (not covered by warranty), reduce product lifetime or cause safety hazards.
- Always dilute according to the manufacturer's instructions.
- Unless otherwise specified, do not immerse any part of the equipment or any accessories in liquid.
- Do not pour liquid onto the device.
- Do not allow liquid to enter the case.
- Never use abrasive material (such as steel wool or silver polish).
- Inspect the oximeter and reusable accessories after they are cleaned and disinfected.

---

---

**CAUTION**

**If you spill liquid on the device, or accessories, or they are accidentally immersed in liquid, contact your service personnel or EDAN service engineer.**

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**NOTE:**

**Automated cleaning/disinfection to the device is prohibited.**

**Cleaning**

If the device or accessory has been in contact with the patient, then cleaning and disinfection is required after every use. If there has been no patient contact and there is no visible contamination then daily cleaning and disinfection is appropriate.

The validated cleaning agents for cleaning the oximeter and reusable accessories are:

- Mild near neutral detergent
- Ethanol (75%)
- Isopropanol (70%)

Cleaning agents should be applied and removed by using a clean cotton swab or a clean, soft,



non-abrasive cloth or paper towel each time. Refer to the cleaning agent manufacturer's instruction for use with reference to concentration, temperature and contact time.

### **Cleaning the Oximeter:**

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---

#### **WARNING**

**Before cleaning the oximeter or the sensor, make sure that the oximeter is switched off and batteries are taken out.**

---

---

To surface-clean the oximeter, follow these steps:

1. Switch off the oximeter and take out the batteries.
2. Remove all residual foreign matters from the surface of the oximeter using sterile cloth or paper towel immediately after examination until the surface is visually clean.
3. Use a clean cotton swab dampened with the cleaning solution to wipe the surface apertures of the equipment until no visible contaminants remain.
4. Use a soft clean cloth dampened with the cleaning solution to wipe the entire exterior surface of the equipment until no visible contaminants

remain.

5. After cleaning, wipe off the cleaning solution with a fresh cloth or towel dampened with tap water until no visible cleaning agent remains.
6. Dry the oximeter in a ventilated and cool place.
7. If the oximeter is not visually clean after cleaning, please repeat the cleaning steps through step 3 to step 6.
8. Inspect the oximeter to ensure that there is no damage.

### **Cleaning the SpO<sub>2</sub> Sensor:**

1. Remove SpO<sub>2</sub> sensors from the oximeter.
2. Remove all residual foreign matters from the surface of SpO<sub>2</sub> sensors, including cables, using sterile cloth or paper towel immediately after examination until the surface is visually clean.
3. Wipe the surfaces of the sensor and cable using a soft cloth dampened with the cleaning solution until no visible contaminants remain.
4. Wipe the patient contact area of the sensor with the cotton swab dampened with the cleaning solution until no visible contaminants remain.
5. After cleaning, wipe off the cleaning solution with a fresh cloth or towel dampened with tap water

until no visible cleaning agent remains.

6. Wipe off residual moisture with a dry cloth.
7. Leave the sensor to air dry.
8. If the SpO<sub>2</sub> sensors, including cables, are not visually clean after cleaning, please repeat the cleaning steps through step 3 to step 7.
9. Inspect the SpO<sub>2</sub> sensors, including cables, to ensure that there is no damage.

### **Cleaning the TEMP Sensor:**

1. Remove TEMP sensors from the oximeter.
2. Remove all residual foreign matters from the surface of TEMP sensors using sterile cloth or paper towel immediately after examination until the surface is visually clean.
3. Wipe the sensor with a soft cloth dampened with the cleaning solution until no visible contaminants remain.
4. After cleaning, wipe off the cleaning solution with a fresh cloth or towel dampened with tap water until no visible cleaning agent remains.
5. Wipe off residual moisture with a dry cloth.
6. Leave the sensor to air dry.
7. If the TEMP sensors are not visually clean after cleaning, please repeat the cleaning steps through

step 3 to step 6.

8. Inspect the TEMP sensors to ensure that there is no damage.

### **Disinfection**

For devices or accessories that have been in contact mucosal surface, High Level disinfection must occur, for all other accessories, low level disinfection is appropriate. Clean the oximeter and reusable accessories before they are disinfected. The validated disinfectants for disinfecting the oximeter and reusable accessories are:

- Ethanol (75%)
- Isopropanol (70%)
- Cidex OPA (High level disinfection of intracavitary temperature probe only)

Disinfecting agents should be applied and removed by using a clean cotton swab or a clean, soft, non-abrasive cloth or paper towel each time. Refer to the disinfecting agent manufacturer's instruction for use with reference to concentration, temperature and contact time.

**CAUTION**

- 1 Do not use any disinfectant containing additional active ingredients other than those listed, such as disinfectant didecyl dimethyl ammonium bromide which contains quaternary ammonium salt.**
- 2 Although the oximeter is chemically resistant to most common hospital cleaners, disinfectants and non-caustic detergents, unvalidated cleaners or disinfectants are not recommended and may stain the oximeter, such as disinfectant didecyl dimethyl ammonium bromide which contains quaternary ammonium salt.**
- 3 Do not use phenol disinfectants because vinyl absorbs them. Do not use strong aromatic, chlorinated, ketone, ether or ester solvents. Do not immerse the cables for any prolonged period in alcohol, mild organic solvents, or highly alkaline solutions. Never boil or autoclave the cable. Vinyl withstands temperatures up to 100 °C but begins to soften at around 90 °C. Handle gently when hot and wipe away from the tip toward the cable.**

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**WARNING**

**The oximeter and reusable accessories shall be disinfected to avoid patient cross infection.**

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**Disinfecting the Oximeter:**

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**WARNING**

**Before disinfecting the oximeter, make sure that the oximeter is switched off and batteries are taken out.**

---

---

To disinfect the oximeter, follow these steps:

1. Switch off the oximeter and take out the batteries.
2. Clean and dry the oximeter according to the methods in section *Cleaning the Oximeter* prior to disinfection.
3. Prepare the disinfectant solution.
4. Use a clean cotton swab dampened with the disinfectant solution to wipe the surface apertures of the equipment. Follow the disinfectant manufacture's recommended contact time and mode.
5. Use a soft clean cloth dampened with the

disinfectant solution to wipe the entire exterior surface of the equipment. Follow the disinfectant manufacture's recommended contact time and mode.

6. After disinfection, wipe off the disinfecting agent with a new sterile cloth dampened with sterile water.

7. Dry the oximeter for at least 30 minutes in a ventilated and cool place.

8. Inspect the oximeter to ensure that there is no damage.

### **Disinfecting the SpO<sub>2</sub> Sensor:**

1. Remove SpO<sub>2</sub> sensors from the oximeter.

2. Clean and dry the SpO<sub>2</sub> sensor according to the methods in section *Cleaning the SpO<sub>2</sub> Sensor* prior to disinfection.

3. Prepare the disinfectant solution.

4. Wipe the surfaces of the sensor and cable using a soft cloth dampened with the disinfection solution.

5. Wipe the patient contact area of the sensor with the cotton swab dampened with the disinfection solution.

6. Wipe off the disinfection solution with a dry

cloth after disinfection.

7. Leave the sensor to air dry for at least 30 minutes.
8. Inspect the SpO<sub>2</sub> sensors, including cables, to ensure that there is no damage.

### **Disinfecting the TEMP Sensor:**

The intracavitary TEMP sensors should be reprocessed by high-level disinfection before and after use on each new patient. Cidex OPA is the validated agent for high level disinfection. Refer to the instructions of the disinfectant for the methods of disinfection. High level disinfection has been validated with a 12 minute soak. Rinse and dry according to the labeled instructions of Cidex OPA. Do not dampen the sensor connector.

For the skin TEMP sensors, disinfect them as follows using ethanol or isopropanol only:

1. Remove TEMP sensors from the oximeter.
2. Clean and dry the TEMP Sensor according to the methods in section *Cleaning the TEMP Sensor* prior to disinfection.
3. Prepare the disinfectant solution.
4. Wipe the sensor with a soft cloth dampened with the disinfectant solution (ethanol or



isopropanol).

5. Wipe off the disinfectant solution with a dry cloth after disinfection.
6. Leave the sensor to air dry.
7. Inspect the TEMP sensors to ensure that there is no damage.

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### **WARNING**

**Sterilization may cause damage to the equipment and is therefore not recommended for this pulse oximeter unless otherwise indicated in your hospital's servicing schedule.**

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### **CAUTION**

**Never use EtO or formaldehyde for disinfection.**

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### **Cleaning and Disinfecting Other Accessories**

For cleaning and disinfecting other accessories, refer to the instructions delivered with the accessories. If the accessories are not accompanied by instructions, refer to this manual for the methods of cleaning and disinfecting the oximeter.

## **After Reprocessing**

- After reprocessing, the equipment, cables, sensors and other accessories should be checked to ensure there are no signs of aging, wear, cracks, deformation, discoloration or peeling, etc. Replacement should be taken or contact the service personal of the manufacturer if necessary.
- Assembling and attaching device-specific components

Prerequisite:

All components have been reprocessed and are dry.

- Preparation before next use of device  
Assembling and fitting patient-specific accessories and consumables, i.e. SpO<sub>2</sub> sensors.

## **Storage and Transport**

After reprocessing, there are no special requirements for storage and transport of the product. However, the following must be observed:

- Store dry and free of dust
- Avoid recontamination and damage during transport

All further information on storage and transport

included in the accompanying documents must be observed.

The replacement of accessories, such as cables, sensors etc., should be taken according to actual usage. It is recommended to replace accessories once a year. Please refer to installation methods in relevant chapters for replacement.

Production date can be found on labels. The service life for main machine (not including replaceable accessories or parts) is 5 years when working time is 8 hours per day.

## 7 Principles of Operation

H100 Series Oximeters adopt non-invasive double wavelength to measure SpO<sub>2</sub> and PR. They can perform spot measurement. H100N can also measure TEMP by a thermistor probe (a semiconductor whose resistance changes with temperature).

The system consists of Central Processing Unit, Signal Collection, Signal Input, Data Output, Display and User Input module, shown as follows:

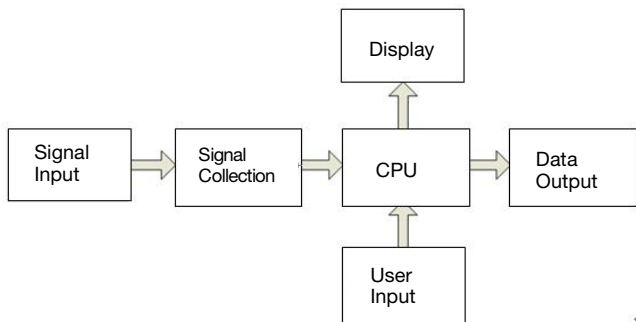


Figure 7-1 System Principle

The oximeter communicates with external devices through RS-232 interface.

## 7.1 Pulse Oximetry Measurement

The oximeter uses oximetry to measure functional oxygen saturation in the blood. Pulse oximetry works by applying the sensor to a pulsating arteriolar vascular bed, such as a finger or a toe. The sensor contains a dual light source and a photonic detector.

Bone, tissue, pigmentation, and venous vessels normally absorb a constant amount of light over time. The arteriolar bed normally pulsates and absorbs variable amounts of light during the pulsations. The ratio of light absorbed is translated into a measurement of functional oxygen saturation ( $SpO_2$ ). Because a measurement of  $SpO_2$  is dependent upon light from the sensor, excessive ambient light can interfere with this measurement.

Pulse oximetry is based on two principles:

- ◆ Oxyhemoglobin and deoxyhemoglobin differ in their absorption of red and infrared light (spectrophotometry).
- ◆ The volume of arterial blood in tissue (hence light absorption by the blood)

changes during the pulse (plethysmography).

The oximeter determines SpO<sub>2</sub> by passing red and infrared light into an arteriolar bed and measuring changes in light absorption during the pulsatile cycle. Red and infrared low-voltage light-emitting diodes (LED) serve as light sources; a photonic diode serves as the photo detector.

Because oxyhemoglobin and deoxyhemoglobin differ in light absorption, the amount of red and infrared light absorbed by blood is related to hemoglobin oxygen saturation. To identify the oxygen saturation of arterial hemoglobin, the oximeter uses the pulsatile nature of arterial flow.

During systole, a new pulse of arterial blood enters the vascular bed, and blood volume and light absorption increase. During diastole, blood volume and light absorption reach their lowest point.

The oximeter bases its SpO<sub>2</sub> measurements on the difference between maximum and minimum absorption (measurements at systole and diastole). By doing so, it focuses on light absorption by pulsatile arterial blood, eliminating the effects of non-pulsatile absorbers such as tissue, bone and

venous blood.

This oximeter measures functional saturation-oxygenated hemoglobin expressed as a percentage of the hemoglobin that can transport oxygen. It does not detect significant amounts of dysfunctional hemoglobin, such as carboxyhemoglobin or methemoglobin.

## 7.2 Measured Versus Calculated Saturation

When saturation is calculated from a blood gas partial pressure of oxygen ( $PO_2$ ), the calculated value may differ from the  $SpO_2$  measurement of a pulse oximeter. This usually occurs because the calculated saturation was not appropriately corrected for the effects of variables that shift the relationship between  $PO_2$  and pH, the partial pressure of carbon dioxide ( $PCO_2$ ), 2,3-DPG, and fetal hemoglobin.

## 8 Warranty and Service

### 8.1 Warranty

EDAN warrants that EDAN's products meet the labeled specifications of the products and will be free from defects in materials and workmanship that occur within warranty period.

The warranty is void in cases of:

- a) damage caused by mishandling during shipping.
- b) subsequent damage caused by improper use or maintenance.
- c) damage caused by alteration or repair by anyone not authorized by EDAN.
- d) damage caused by accidents.
- e) replacement or removal of serial number label and manufacture label.

If a product covered by this warranty is determined to be defective because of defective materials, components, or workmanship, and the warranty claim is made within the warranty period, EDAN will, at its discretion, repair or replace the defective



part(s) free of charge. EDAN will not provide a substitute product for use when the defective product is being repaired.

## 8.2 Contact Information

If you have any question about maintenance, technical specifications or malfunctions of devices, contact your local distributor.

Alternatively, you can send an email to EDAN service department at: [support@edan.com](mailto:support@edan.com).

## Appendix I Specification

### A1.1 Classification

Type of Protection	Internally powered equipment
Degree of Protection	Type BF-Applied part
Ingress Protection (H100B/H100N)	IP22
Mode of operation	Continuous
Degree of Safety in Presence of Flammable Gases	Not suitable for use in presence of flammable gases
Compliant with Standards:	IEC 60601-1, EN 60601-1, IEC 60601-1-2, EN 60601-1-2, ISO80601-2-56, ISO 80601-2-61

## A1.2 Specification

### NOTE:

The performance of the equipment with ☆ mark is determined to be essential performance.

#### A1.2.1 Size and Weight

Size	160 mm(L) × 70 mm(W) × 37.6 mm(H)
Weight (H100B)	165 g (without battery)
Weight (H100N)	185 g (without battery)

#### A1.2.2 Environment

##### Temperature

Working	0 °C ~ + 40 °C (32 °F ~104 °F)
Storage	-25 °C~ +70 °C (-13 °F ~158 °F)

##### Humidity

Working	15%RH~95%RH (non-condensing)
Storage	15%RH~95%RH (non-condensing)

##### Atmospheric pressure





Working	70 kPa ~ 106 kPa
Storage	70 kPa ~ 106 kPa

### A1.2.3 Display

Screen Type	128×64 dot-matrix LCD, with white LED backlight
Large Numeric Mode	SpO <sub>2</sub> , PR, TEMP and Bar graph displayed
Waveform Mode	SpO <sub>2</sub> , PR, Bar graph and Plethysmogram displayed

### A1.2.4 Batteries

Battery status symbols on screen

Battery power level	symbol
Level 1	 (Batteries are almost depleted and need to be replaced immediately. The device will turn off after 15 min when battery low symbol appears.)
Level 2	
Level 3	
Level 4	

Alkaline batteries

Quantity	4
Total rated	6 V

voltage	
Capacity	2600 mAh
Typical operation time	48 h or longer (At 25 ° C, with new fully charged batteries, SpO <sub>2</sub> measurement in use, backlight set to off, pulse volume set to 3, prompt volume set to 3 (without prompt triggered))

## Ni-MH rechargeable battery package

Charge/discharge cycle	≥500 times
Quantity	1
Total rated voltage	4.8 V
Capacity	1500 mAh
Typical battery life	30 h or longer (At 25 ° C, with new fully charged batteries, SpO <sub>2</sub> measurement in use, backlight set to off, pulse volume set to 3, prompt volume set to 3 (without prompt triggered))

Charge time	No more than 2.5 h to 80%
	No more than 4 h to 100%

### A1.2.5 Charger Stand

Model	CS-01
Input voltage	(100 to 240) VAC, 50 Hz/60 Hz, 0.4 A - 0.15 A
Output voltage	6 VDC
Output current	0.8 A
Output power	4.8 W

### A1.2.6 Data Storage

Data Storage	300 hours
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## A1.3 Parameters

### ☆Measurement Range

☆SpO <sub>2</sub>	0% ~ 100%
SpO <sub>2</sub> Resolution	1%
Bpm Resolution	1 bpm
☆PR (H100B)	25 bpm ~ 300 bpm
☆PR (H100N)	20 bpm--~ 300 bpm

### ☆SpO<sub>2</sub> Accuracy (H100B)

☆Adult and Pediatric	± 2% (70%~ 100%) Undefined (0%~ 69%)
☆Neonate	± 3% (70%~ 100%)

	Undefined (0%~ 69%)
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☆SpO<sub>2</sub> Accuracy (H100N)

☆Adult	(70%~ 100%) ± 2%
☆Neonate	(70%~ 100%) ± 3%
Low Perfusion	(70%~ 100%) ± 2%

☆Pulse Rate Accuracy (H100B)

25 bpm ~300 bpm	± 2 bpm
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☆Pulse Rate Accuracy (H100N)

20 bpm to 250 bpm	± 3 bpm
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Prompt Range (H100B)

SpO <sub>2</sub>	0% ~ 100%
PR	0 bpm ~ 300 bpm

Perfusion Range(H100N)

Measurement range	0.03% ~ 20%
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SpO<sub>2</sub> Sensor (H100B)

Red Light	(660±3) nm
Infrared Light	(905±10) nm
Emitted Light Energy	< 15 mW

SpO<sub>2</sub> Sensor (H100N)

Wave length	approximately 660 nm and 900 nm
Emitted light energy	<15 mW

**NOTE:**

**The information about wavelength range can be especially useful to clinicians (for instance, when photodynamic therapy is performed).**

## TEMP

☆Measurement range	0 °C ~ 50 °C (32 °F ~ 122 °F)
☆Accuracy	(25 °C ~ 45 °C) ± 0.1 °C (0 °C ~ 25 °C and 45 °C ~ 50 °C) ± 0.2 °C
Resolution	0.1 °C
Position	Skin, oral cavity, rectum
Measuring mode	Direct mode
Refresh time	Every 1 s to 2 s
Self-test	At an interval of (5-10) min
Transient response time	≤ 30 s



## Appendix II EMC Information

### -Guidance and Manufacturer's Declaration

Refer to the following tables for specific information regarding this device's compliance to IEC/EN 60601-1-2.

#### A2.1 Electromagnetic Emissions

##### For pulse oximeter and charger stand:

<b>Guidance and manufacturer's declaration – electromagnetic emissions</b>		
H100B&H100N and charger stand are intended for use in the electromagnetic environment specified below. The customer or the user of H100B&H100N and charger stand should assure that they are used in such an environment.		
<b>Emissions test</b>	<b>Compliance</b>	<b>Electromagnetic environment -guidance</b>
RF emissions CISPR11	Group 1	H100B&H100N and charger stand use RF energy only for their internal function. Therefore, their RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.

RF emissions CISPR11	Class A	H100B&H100N and charger stand are suitable for use in all establishments, other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC/EN61000-3-2	H100B&H100N :N/A Charger stand: N/A	
Voltage fluctuations /flicker emissions IEC/EN61000-3-3	H100B&H100N:N/A Charger stand: Complies	

**NOTE:**

The **EMISSIONS** characteristics of H100B&H100N make them suitable for use in industrial areas and hospitals (CISPR 11 class A). If they are used in a residential environment (for which CISPR 11 class B is normally required) H100B&H100N might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

## A2.2 Electromagnetic Immunity

### For pulse oximeter:

<b>Guidance and manufacturer's declaration – electromagnetic immunity</b>			
H100B&H100N are intended for use in the electromagnetic environment specified below. The customer or the user of H100B&H100N should assure that they are used in such an environment.			
Immunity test	IEC/EN 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge(ESD) IEC/EN61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient/Burst IEC/EN61000-4-4	±2kV for power supply lines ±1kV for input/output	N/A	N/A

## Pulse Oximeter User Manual

	t lines (>3m)		
Surge IEC/EN61000-4-5	±1 kV line to line ±2 kV line to ground	N/A	N/A
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC/EN61000-4-11	0 % $U_T$ ; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % $U_T$ ; 1 cycle and 70 % $U_T$ ; 25/30 cycles ) Single phase: at 0° 0 % $U_T$ ; 250/300 cycle	N/A	N/A
Power Frequency( 50/60 Hz)Magnetic Field	30 A/m	30 A/m	Power frequency magnetic

IEC/EN 61000-4-8			fields should be at levels characteristic of a typical location in a typical commercial or hospital environment
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**For charger stand:**

<b>Guidance and manufacturer's declaration – electromagnetic immunity</b>			
The CS-01 Battery Charger Stand is intended for use in the electromagnetic environment specified below. The customer or the user of CS-01 Battery Charger Stand should assure that it is used in such an environment.			
Immunity test	IEC/EN 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge(ESD) IEC/EN61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative

## Pulse Oximeter User Manual

			humidity should be at least 30%.
Electrical Fast Transient/Burst IEC/EN61000-4-4	$\pm 2$ kV for power supply lines	$\pm 2$ kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC/EN61000-4-5	$\pm 1$ kV line to line $\pm 2$ kV line to ground	$\pm 1$ kV line to line	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC/EN61000-4-11	0 % $U_T$ ; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % $U_T$ ; 1 cycle and	0 % $U_T$ ; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % $U_T$ ; 1 cycle and	Mains power quality should be that of a typical commercial or hospital environment. If the user of the CS-01 requires continued

## Pulse Oximeter User Manual

	70 % $U_T$ ; 25/30 cycles ) Single phase: at $0^\circ$  0 % $U_T$ ; 250/300 cycle	70 % $U_T$ ; 25/30 cycles ) Single phase: at $0^\circ$  0 % $U_T$ ; 250/300 cycle	operation during power mains interruptions, it is recommended that the CS-01 be powered from an uninterruptible power supply.
Power Frequency( 50/60 Hz)Magnetic Field IEC/EN 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment
<b>NOTE <math>U_T</math> is the a.c. mains voltage prior to application of the test level.</b>			

## A2.3 Electromagnetic Immunity

### For pulse oximeter and charger stand:


<b>Guidance and manufacturer's declaration – electromagnetic immunity</b>			
H100B&H100N and charger stand are intended for use in the electromagnetic environment specified below. The customer or the user of H100B&H100N and charger stand should assure that they are used in such an environment.			
Immunity test	IEC/EN 60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the H100B&H100N and charger stand, including cables, than the recommended separation distance calculated from the equation applicable to the



## Pulse Oximeter User Manual

<p>Conducted RF IEC/EN 61000-4-6</p>	<p>3 Vrms 150 kHz to 80 MHz 6Vrms<sup>c</sup> in ISM bands between 0.15 MHz and 80 MHz</p>	<p>3 Vrms 150 kHz to 80 MHz 6Vrms<sup>c</sup> in ISM bands between 0.15 MHz and 80 MHz</p>	<p>frequency of the transmitter. <b>Recommended separation distance</b> <math>d = 1.2\sqrt{P}</math> 150 kHz to 80 MHz</p>
<p>Radiated RF IEC/EN 61000-4-3</p>	<p>3 V/m 80 MHz to 2.7 GHz  See Table 1</p>	<p>3 V/m 80 MHz to 2.7 GHz  Comply with Table 1</p>	<p><math>d = 1.2\sqrt{P}</math> 80 MHz to 800 MHz <math>d = 2.3\sqrt{P}</math> 800 MHz to 2.7 GHz  <math>d = 6\sqrt{P}/E</math> at RF wireless communications equipment bands (Portable RF communications</p>

		<p>equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the oximeter, including cables specified by the manufacturer).</p> <p>where <math>p</math> is the maximum output power rating of the transmitter in watts(W) according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF</p>
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		<p>transmitters, as determined by an electromagnetic site survey, <sup>a</sup> should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
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**NOTE1 At 80 MHz and 800 MHz, the frequency range applies.**

**NOTE2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.**

- a. Field strengths from fixed transmitters, such as base stations for radio(cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be

considered. If the measured field strength in the location in which the Complies is used exceeds the applicable RF compliance level above, the H100B&H100N and charger stand should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating H100B&H100N and charger stand.

- b. The ISM (industrial, scientific and medical) bands between 0.15 MHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz. The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz to 2.0 MHz, 3.5 MHz to 4.0 MHz, 5.3 MHz to 5.4 MHz, 7 MHz to 7.3 MHz, 10.1 MHz to 10.15 MHz, 14 MHz to 14.2 MHz, 18.07 MHz to 18.17 MHz, 21.0 MHz to 21.4 MHz, 24.89 MHz to 24.99 MHz, 28.0 MHz to 29.7 MHz and 50.0 MHz to 54.0 MHz.

**Table 1 Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment**

Test frequency (MHz)	Band <sup>a)</sup> (MHz)	Service <sup>a)</sup>	Modulation <sup>b)</sup>	Maximum power (W)	Distance (m)	Immunity test level (V/m)
385	380-390	TETRA 400	Pulse modulation <sup>b)</sup> 18 Hz	1.8	0.3	27

## Pulse Oximeter User Manual

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450	430-470	GMR S 460, FRS 460	FM <sup>c)</sup> ± 5 kHz deviation on 1 kHz sine	2	0.3	28
710	704-787	LTE Band 13, 17	Pulse modulation <sup>b)</sup> 217 Hz	0.2	0.3	9
745						
780						
810	800-960	GSM 800/900, TETRA 800, iDEN 820, CDM A 850, LTE Band 5	Pulse modulation <sup>b)</sup> 18 Hz	2	0.3	28
870						
930						
1720	1700-1990	GSM 1800; CDM A 1900; GSM 1900; DECT;	Pulse modulation <sup>b)</sup> 217 Hz	2	0.3	28
1845						

## Pulse Oximeter User Manual

1970		LTE Band 1, 3, 4, 25; UMTS				
2450	2400- 2570	Bluetooth, WLAN  802.1 1 b/g/n, RFID 2450, LTE Band 7	Pulse modul ation <sup>b)</sup> 217 Hz	2	0.3	28
5240	5100- 5800	WLAN 802.1 1 a/n	Pulse modul ation <sup>b)</sup> 217 Hz	0.2	0.3	9
5500						
5785						
<p><b>NOTE</b> If necessary to achieve the <b>IMMUNITY TEST LEVEL</b>, the distance between the transmitting antenna and the <b>ME EQUIPMENT</b> or <b>ME SYSTEM</b> may be reduced to 1 m. The 1 m test distance is permitted by <b>IEC 61000-4-3</b>.</p>						
<p>a) For some services, only the uplink frequencies are included.</p> <p>b) The carrier shall be modulated using a 50 % duty cycle square wave signal.</p> <p>c) As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.</p>						

## A2.4 Recommended Separation Distances For pulse oximeter and charger stand:

<b>Recommended separation distances between portable and mobile RF communications equipment and H100B&amp;H100N and charger stand</b>			
<p>H100B&amp;H100N and charger stand are intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the H100B&amp;H100N and charger stand can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the H100B&amp;H100N and charger stand as recommended below, according to the maximum output power of the communications equipment.</p>			
Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.7 GHz $d = 2.3\sqrt{P}$
0.01	<b>0.12</b>	<b>0.12</b>	<b>0.23</b>
0.1	<b>0.38</b>	<b>0.38</b>	<b>0.73</b>
1	<b>1.2</b>	<b>1.2</b>	<b>2.3</b>
10	<b>3.8</b>	<b>3.8</b>	<b>7.3</b>

100	<b>12</b>	<b>12</b>	<b>23</b>
<p>For transmitters rated at a maximum output power not listed above, the recommended separation distance <math>d</math> in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.</p> <p><b>NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.</b></p> <p><b>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</b></p>			



## Appendix III Record Table

ID No.	Name	Time	SpO <sub>2</sub>	PR	NOTE

## Appendix IV Abbreviations

Abbr	English Full Name/Description
CISPR	International Special Committee on Radio Interference
EEC	European Economic Community
EMC	Electromagnetic Compatibility
ID	Identification
IEC	International Electrotechnical Commission
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MDD	Medical Device Directive
PC	Personal Computer
PR	Pulse Rate
RF	Radio Frequency
SpO <sub>2</sub>	Pulse Oxygen Saturation

P/N: 21.54.109000  
MPN: 21.54.109000030



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