B Specifications

This appendix describes the specifications of the ZD120 Patient Monitor.

B.1 SpO_2 Specifications

The update rate for the SpO_2 value and pulse rate is typically 1 second. Data averaging and other signal processing on the displayed and transmitted data values of SpO_2 and pulse rate is not more than 20 seconds. Depending on the magnitude of difference between the alarm limit and the displayed value, the alarm signal generation delay may be from 1 second to 20 seconds.

Because pulse oximeter measurements are statistically distributed, only approximately two-thirds of pulse oximeter equipment measurements can be expected to fall within the Arms value measured by a CO-oximeter.

Note — It is not necessary to have a SpO_2 calibration when the monitor is in use.

The following table describes the SpO_2 specifications.

Table B-1 SpO_2 Specifications

Parameter	Specification
SpO_2 measuring range	0% - 100%
SpO_2 measuring accuracy	70%-100%: 2% (non-motion) 0%-69%: No defined.
Pulse rate range	20bpm -254bpm
Pulse rate accuracy	±3bpm
Display updated period:	≤2s
SpO2 / Pulse Rate averaging processing:	8 beat exponential
Pulse sound	Non-modulated
SpO_2 speed	25.0 mm/s
Measuring site	Finger
Wavelength range	500nm - 1000nm for all specified sensors
Maximum optical output power	150mW for all specified sensors
Pulse rate display	Numeric

1. Information about wavelength ranges can be useful for clinicians performing photo dynamic therapy.

2. Sensor accuracy was obtained by performing controlled hypoxia studies on healthy, non-smoking adult volunteers (according to EN ISO 80601-2-61). The SpO_2 readings have been compared to CO-oximeter measurements on arterial blood samples. To represent the general population, data from at least 10 subjects (male and female) with a wide range of skin color was taken to validate SpO_2 accuracy. Accuracy data for Masimo sensors is included in the sensor package insert.

B.2 Non-invasive Blood Pressure Specifications

The following table describes the NIBP specifications.

Table B-2 NIBP Specifications

Parameter	Specification
Measuring method	Oscillometric method
Measuring parameter	SYS, DIA, MAP
Unit	mmHg or kPa
Work mode	Manual, Auto, Stat, rule 1, rule 2
Cycle time	2,3,4,5,10, 15, 30, 60, 90, 120 minutes
SYS range	Adult: 30mmHg -270mmHg (4.0kPa - 36.0kPa) Pediatric: 30mmHg - 200mmHg (4.0kPa - 26.7kPa) Neonate: 30mmHg - 135mmHg (4.0kPa - 18.0kPa)
DIA range	Adult: 10mmHg - 210mmHg (1.3kPa - 28.0kPa) Pediatric: 10mmHg - 150mmHg (1.3kPa - 20.0kPa) Neonate: 10mmHg -95mmHg (1.3kPa - 13.3kPa)
MAP range	Adult: 20mmHg -230mmHg (2.7kPa - 30.7kPa) Pediatric: 20mmHg -165mmHg (2.7kPa - 22.0kPa) Neonate: 20mmHg -110mmHg (2.7kPa - 14.7kPa)
NIBP accuracy	Maximum mean difference: ±0.80kPa

	（±5mmHg） Maximum standard deviation: 1.06kPa (8mmHg)
Cuff pressure range	Adult/pediatric: 0mmHg - 300mmHg (0kPa - 40.0kPa) Neonate: 0mmHg - 150mmHg (0kPa - 20.0 kPa)
Static pressure accuracy	±3mmHg（0.4kPa）
Initial inflation pressure	Adult:160mmHg (21.3kPa) Pediatric: 140mmHg (18.6kPa) Neonate: 100mmHg (13.3kPa)
Deflation pressure	30mmHg above the last measured systolic value
Deflation time	<10 seconds (typical adult cuff)
Pulse rate range	30bpm -254bpm
Pulse rate accuracy	±5bpm or ±5%
Alarm delay	<10s

B.3 Temperature Specifications

The following table describes the TEMP specifications.

Table B-3 TEMP Specifications

Parameter	Specification
Measuring range	32℃～42.2℃（90.0～108.0°F）
Unit	℃ or °F
Accuracy	±0.1℃
Resolution	0.1℃
Updating time	Approximately 1 second
Alarm delay	<10s

B.4 Power Specifications

The following table describes the power specifications.

Table B-4 Power Specifications

AC Power Parameter	Specification

Mains power input	100V-240V～, 50 Hz/60 Hz, 1.4A-0.59A
Power input	140VA
Fuse	F3.15AL 250V
Battery Power Parameter	**Specification**
Capacity	Lithium ion 8.4V/5200 mAh
Charging time	10 hours (to 90% battery capacity)
Typical operating time	No less than 8 hours (with SpO2 measurement and NIBP measured every 15 minutes)
Charge mode	Automatic (with charge protection feature) when the monitor is connected to an AC power source.
Discharge protection	When the monitor is powered by battery, the monitor powers off if the battery power is almost depleted.

B.5 Display Specifications

The following table describes the display specifications.

Table B-5 Display Specifications

Parameter	Description
Type	Color TFT LCD
Display Size	7inch

B.6 Recorder Specifications

The following table describes the recorder specifications.

Table B-6 Recorder Specifications

Parameter	Description
Type	Thermal array recorder
Mode	Real time recording
Channel	1, 2, 3 channel(s)
Speed	50.0 mm/s

B.7 Physical specifications

The following table describes the physical specifications.

Table B-7 Recorder Specifications

Model	Net weight	Size
MHSZD120	1.652kg	148 mm (L) X 120 mm (W) X 247 mm (H)

B.8 Environmental Specifications

The following table describes the environmental specifications.

Table B-8 Environmental Specifications

Parameter	Specification
Temperature	Operating: 0℃ - 40 ℃ Storage: -20 ℃ - 55 ℃for the device
Relative humidity	Operating: 15% - 80% (non-condensing) Storage: 10% - 93% (non-condensing)
Barometric pressure	Operating: 59kPa ～ 107.4kPa Storage: 22kPa ～ 107.4kPa

B.9 Interface Specifications

The following table describes the interface specifications.

Table B-9 Interface Specification

Parameter	Specification
Isolation	1.5kV
Delay time	<0.5 s
Data output	Via Ethernet port
Defib sync	0 to 5V pulse
Software upgrade	USB port

C Alarm

C.1 The physiological alarm information

Table C-1 Physiological alarm information

Source	Alarm information	Level	Reason and Solution
XX	XX Too High	HIGH or MED	XX value has exceeded the high alarm limit or below the low alarm limit. Check the patient physiological status, patient type and alarm limit setup.
	XX Too Low	HIGH or MED	
SpO_2	No Pulse	HIGH	The PR signal is too weak. The system cannot analyze the data. Check the patient, SpO_2 sensor and measure site.

Note — XX is representative of NIBP, SpO_2 and PR

Table C-2 Technical alarm information

Source	Alarm information	Level	Reason and Solution
SpO_2	SpO_2 Probe Off	LOW	The SpO_2 sensor disconnected from the patient or monitor or module. Check the sensor connection.
	SpO_2 No Sensor	LOW	
	Sensor Malfunction	LOW	
	SpO_2 Init Error	MED	There is a SpO_2 module error, or module or communication between the module and main board has failed, restart.
	SpO_2 Communication Stop	MED	
	SpO_2 Communication Error	MED	
	SpO_2 Alarm Limit	LOW	SpO_2 parameter value is over range, please contact your service representative
	SpO_2 Exceed	LOW	
	PR Alarm Limit Error	LOW	
	PR Exceed	LOW	
	PI Alarm Limit Error	LOW	
	PI Exceed	LOW	
NIBP	SYS Alarm Limit Error	LOW	NIBP parameter alarm limit is accidental modified; please contact your service representative.
	MAP Alarm Limit Error	LOW	
	DIA Alarm Limit Error	LOW	
	SYS Exceed	LOW	NIBP parameter value is over range, please contact your service representative
	MAP Exceed	LOW	
	DIA Exceed	LOW	
	NIBP Communication Stop	MED	There is a NIBP module error, or module or communication between the module and main board has failed, restart.
	NIBP Initialization Error	MED	
	NIBP Self-test Error	MED	
	NIBP Communication Error	MED	
	Cuff Loose	LOW	The blood pressure cuff is not connected or placed correctly or there is air leakage.
	Air Leak	LOW	
	Air Pressure Error	LOW	Ambient atmospheric pressure is abnormal, confirm whether the environment is fit for monitor specification, if any special cause impact

Table C-2 Technical alarm information continue)

Source	Alarm information	Level	Reason and Solution
NIBP (continue)	Low Signal	LOW	The patient PR is too weak or cuff loose, check the patient and replace the cuff site. If it fails replace the cuff.
	Range Exceeded	LOW	Probably the patient blood pressure is over range.
	Excessive Motion	LOW	Check the patient, stop movement on patient arm.
	Over pressure	LOW	Probably the air circuit is blocked, check if and try again.
	Signal Saturated	LOW	Excessive signal amplitude caused by movement or other reasons.
	NIBP Time Out	LOW	There is an error in the NIBP measurement. The system cannot analyze. Check the patient, connection or replace the cuff.
	Measurement Error	LOW	
	Cuff Type Err	LOW	The blood pressure cuff is different from patient type, check the patient type and replace.
	NIBP Illegally Reset	LOW	There is a malfunction during NIBP measurement, check whether air circuit blocked and remeasure.
	Temp Communication Error	MED	There is a communication malfunction between the monitor and thermometer has failed, restart.
	Temp Communication Stop	MED	
	Alarm Limit Error	LOW	TEMP parameter alarm limit is accidental modified, please contact your service representative.
	Exceed	LOW	TEMP parameter value is over range, please contact your service representative
Parameter's module	Module Initialization Error1	MED	There is a module error, or communication between the module and main board has failed, restart.
	Module Initialization Error2	MED	
	Module Initialization Error3	MED	
	Module Initialization Error4	MED	