ePM Series

Patient Monitor

Operator's Manual

(Applicable for ePM 10/ePM 10A/ePM 10C/ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C)

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2.3 System Components

The monitor consists of the main unit, display, input devices, and output devices.

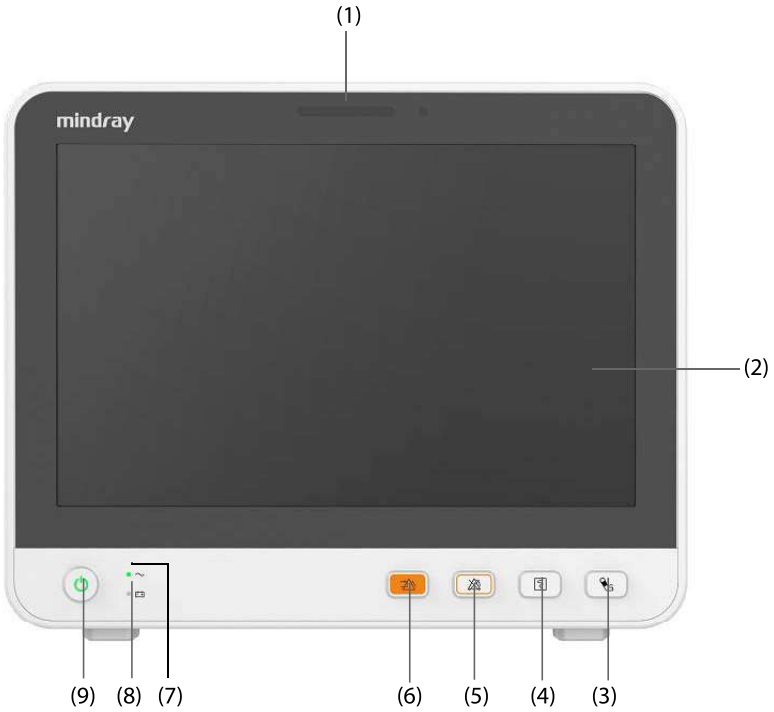
NOTE

- **Your monitor may not include all these components. Contact your local service personnel for the available components.**

2.3.1 Main Unit

The main unit processes data from modules.

2.3.1.1 Front View



(1) Alarm lamp

When a physiological alarm or technical alarm occurs, this lamp lights and flashes corresponding with the alarm priority:

- High priority alarms: the lamp quickly flashes red.
- Medium priority alarms: the lamp slowly flashes yellow.
- Low priority alarms: the lamp lights in cyan without flashing.

(2) Display

(3) NIBP Start/Stop hard key

Press to start an NIBP measurement or stops the current NIBP measurement.

(4) Record Start/Stop key

Press to start a recording or stop the current recording.

(5) Alarm Pause hard key

Press to pauses the current alarms

(6) Alarm Reset hard key

Press to acknowledge the on-going alarm.

5. If you want to use daylight saving time, switch on **Daylight Saving Time**. You can manually switch on or off the daylight saving time only when the auto daylight saving time function is disabled. For more information, see *3.8.2 Adjusting the Screen Brightness* for details.

If your monitor is connected to a central monitoring system (CMS) or hospital clinical system (HIS), the date and time are automatically taken from the CMS. In this case, you cannot change the date and time from your monitor.

CAUTION

- **Changing the date and time affects the storage of trends and events and may result in loss of data.**

3.8.2 Adjusting the Screen Brightness

To adjust the screen brightness, follow this procedure:

1. Access **Display** in either of the following ways:
   - Select the **Screen Setup** quick key → select the **Display** tab.
   - Select the **Main Menu** quick key → from the **Display** column select **Display**.
2. If you are using the external power source, set **Brightness**. If you are using the battery to run the monitor, set **Brightness On Battery**.

NOTE

- **If the monitor is configured with the auto-brightness function, the screen brightness automatically changes with ambient light level when you can set Brightness to Auto.**

3.8.3 Adjusting the Volume

Select the **Volume** quick key to set **Alarm Volume**, **QRS Volume**, and **Key Volume**.

3.9 Starting Monitoring a Patient

After turning on your monitor, follow this procedure to monitor a patient:

1. Admit the patient.
2. Check patient settings. Make sure that alarm limits, patient category and paced status, and so on, are appropriate for your patient. Change them if necessary.
3. Perform desired measurements. For more information, see corresponding measurement chapters.

3.10 Stopping a Parameter Measurement

To stop monitoring a parameter, follow this procedure:

1. Remove corresponding sensor from the patient.
2. Disconnect the sensor from the patient cable.
3. Disconnect the patient cable from the parameter module.
4. If you are using the disposable sensor, discard it.

6 Managing Configurations

6.1 Configuration Introduction

When continuously monitoring a patient, the clinical professional often needs to adjust the monitor's settings according to the patient's condition. The collection of all these settings is called a configuration. System configuration items can be classified as: parameter configuration, alarm configuration, and user maintenance. The monitor provides one general department with three different sets of configurations tailored for adult, pediatric and neonatal patients. You can change some settings from a certain set of configuration and then save the changed configuration as a user configuration.

WARNING

- **The configuration management function is password protected. The configuration management tasks must be performed by clinical professionals.**

6.2 Setting Default Patient Category

To set the default patient category when admitting a new patient, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select ↵.
2. Set **Default Patient Category**.

6.3 Setting Default Configuration

The monitor will load the pre-set default configuration in the following cases:

- A patient is admitted.
- A patient is discharged.
- Patient data is cleared.
- Patient category is changed.

To set the default configuration, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select ↵.
2. Select **Select Default Config**.
3. Select **Load the Latest Config** or **Load Specified Config**.
   - When you select **Load Specified Config**, the restored configuration is subject to the patient category (adult, pediatric or neonate). This configuration can be either factory configuration or a saved user configuration. As an example, select **Default Adult Config** and then select **Factory Default** or user configuration(s).
   - When you select **Load the Latest Config**, the latest configuration is loaded when the monitor is started or a patient is admitted.

6.4 Saving Current Settings

Current settings can be saved as a user configuration. Up to 10 user configurations can be saved.

To save current settings, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select ↵.
2. Select **Save Current Settings**.

9.8.3 Displaying ST Numerics

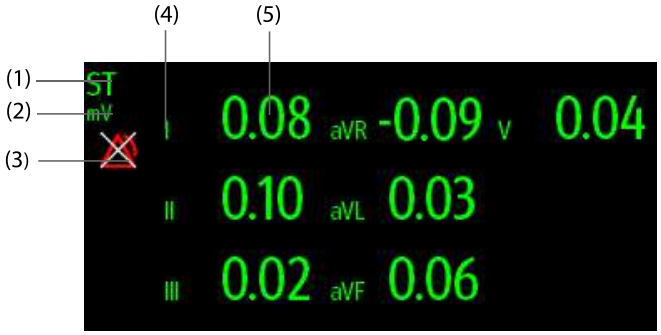
To display ST numerics and Segments, follow this procedure:

1. Access **Tile Layout** by either of the following ways:
   - Select the **Screen Setup** quick key → select the **Tile Layout** tab.
   - Select **Main Menu** quick key → from the **Display** column select **Tile Layout**.
2. Click the numeric area where you want to display the ST numerics, and then select **ECG** → **ST**.

The display of ST parameters area is different according to the lead type:

- When you are using the 3-lead ECG leadwires, the ST numeric area does not display. A ST value displays in the ECG numeric area.
- When you are using the 5-lead ECG leadwires, the ST numeric area displays 7 ST values: ST-I, ST-II, ST-III, ST-aVR, ST-aVL, ST-aVF, ST-V.
- When you are using the 6-lead ECG leadwires, the ST numeric area displays 8 ST values: ST-I, ST-II, ST-III, ST-aVR, ST-aVL, ST-aVF, ST-Va, ST-Vb.
- When you are using the 6-lead ECG placement to derive 12-lead ECG (D12L) (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C), the ST numeric area displays 12 ST values: ST-I, ST-II, ST-III, ST-aVR, ST-aVL, ST-aVF, ST-V1, ST-V2, ST-V3, ST-V4, ST-V5, ST-V6, in which two chest leads are directly measured and four are derived. The derived leads are marked with a "d" in front of the lead label, for example "dV1".
- When you are using the 12-lead ECG leadwires, the ST numeric area displays12 ST values: ST-I, ST-II, ST-III, ST-aVR, ST-aVL, ST-aVF, ST-V1, ST-V2, ST-V3, ST-V4, ST-V5, ST-V6.

This example shows the ST numeric area when 5-lead ECG cable is used. Your monitor screen may look slightly different:



(1) Parameter label. When 6-lead placement is used to derive 12-lead ECG (D12L) (for ePM 12/ePM 12A/ePM 12C/ ePM 15/ePM 15A/ePM 15C), all derived leads are marked with a "d" in front of the lead label, for example "dV1".

(2) ST unit (3) ST alarm off symbol (4) Lead labels

(5) ST numerics: a positive value indicates ST segment elevation, and a negative value indicates ST segment depression.

9.8.4 Displaying ST Segments in the Waveform Area

You can display ST segments in the waveform area. To do so, follow this procedure:

1. Access **Tile Layout** by either of the following ways:
   - Select the **Screen Setup** quick key → select the **Tile Layout** tab.
   - Select **Main Menu** quick key → from the **Display** column select **Tile Layout**.
2. Select the waveform area where you want to display the ST segments, and then select **ST**→ **ST Segment**.

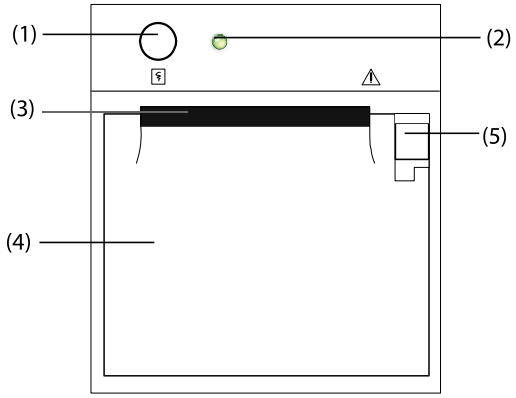
The waveform area displays the current and baseline ST segments. It also displays the current and baseline ST values. In the following picture, the current ST segment and value are in green, while the baseline ST segment and value are in white.

21 Recording

21.1 Recorder

The thermal recorder records patient information, measurement data, and up to three waveforms.

The monitor is configured with a built-in recorder.



(1) Start/Stop key: press to start a recording or stop the current recording.

(2) Module status indicator

- On: when the recorder works correctly.
- Off: when the monitor is switched off.
- Flashes: if an error occurred to the recorder.

(3) Paper outlet

(4) Recorder door

(5) Latch: pull it backward to open the recorder door.

21.2 Starting Recordings

Recordings can be started manually or automatically.

21.2.1 Manually Starting Recordings

To manually start a recording, you can either:

- Press the hardkey on the front of the recorder.
- Select on the current page.

21.2.2 Automatic Recordings

In the following conditions, you can set the recorder to automatically start recording:

- At a preset interval. For more information, see *21.5 Setting the Recorder*.
- When a parameter alarm is triggered. For more information, see *21.6 Enabling Auto Recording on Alarm*.

21.3 Stopping Recordings

Recordings can be stopped manually or automatically.

21.3.1 Stopping Recordings Manually

To manually stop a recording, choose either of the following method:

- Press the hardkey again.
- Select **Clear All Tasks** in the **Record Setup** menu.

21.3.2 Stopping Recordings Automatically

Recordings stop automatically in the following conditions:

- The recording is completed.
- The recorder runs out of paper.
- The recorder has an alarm condition.

21.4 Recording Related Flags

You can find the following flags on the recording reports:

- For automatically stopped recordings, there are two columns of asterisks "*" at the end of the report.
- For manually or abnormally stopped recordings, there is one column of asterisks "*" at the end of the report.

21.5 Setting the Recorder

To set the recorder, follow this procedure:

1. Select the **Main Menu** quick key → from the **Report** column select **Record Setup**.
2. In the **Record Setup** menu, select the desired waveform for **Waveform 1**, **Waveform 2** and **Waveform 3** in turn. The recorder can record up to 3 waveforms at a time.
3. Switch on or off **IBP Overlap** to enable or disable IBP recordings in the overlapping format.
   - When the **IBP Overlap** is enabled: If two or more waveforms in the selected waveforms for recording are IBP waveforms, the IBP waveforms will be recorded in the overlapping format.
   - When the **IBP Overlap** is disabled: IBP waveforms will be recorded normally.
4. Select **Length** to set the duration of real-time recording.
5. Select **Interval** to set the time interval for automatic recording.
6. Select **Paper Speed** to set the speed for recording waveforms.

21.6 Enabling Auto Recording on Alarm

To initiate automatic recording via recorder when a parameter alarm is triggered, follow this procedure:

1. Access the **Alarm** menu for the desired parameter in one of the following ways:
   - Select the **Alarm Setup** quick key at the bottom of the screen.
   - Select the numerics area or waveform area of the desired parameter → select the **Alarm** tab.
   - Select the **Parameters Setup** quick key → select the desired parameter → select the **Alarm** tab.
2. Switch on **Alarm Outputs**.

NOTE

- **Auto recording on alarm happens only when Print on Alarm is set to Recorder. For more information, see *24.4.6 The Other Tab*.**

21.7 Clearing Recording Tasks

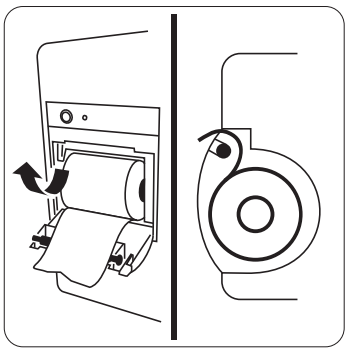
To clear recording tasks, follow this procedure:

1. Select the **Main Menu** quick key → from the **Report** column select **Record Setup**.
2. In the **Record Setup** menu, select **Clear All Tasks**. This clears all queued recording tasks and stops the current recording.

21.8 Loading Paper

To loader paper, follow this procedure:

1. Use the latch at the upper right of the recorder door to pull the door open.
2. Insert a new roll into the compartment as shown below. Feed the paper through and pull some paper out from the top of the roller.
3. Close the recorder door.



CAUTION

- **Use only specified thermal paper. Otherwise, it may cause damage to the recorder's printhead, the recorder may be unable to print, or poor print quality may result.**
- **Never pull the recorder paper with force when a recording is in process. Otherwise, it may cause damage to the recorder.**
- **Do not leave the recorder door open unless you reload paper or remove troubles.**

21.9 Removing Paper Jam

If the recorder works incorrectly or produces unusual sounds, check if there is a paper jam first. If a paper jam is detected, follow this procedure to remove it:

1. Open the recorder door.
2. Take out the paper and tear off the draped part.
3. Reload the paper and close the recorder door.

A.6 Recorder Specifications

Method	Thermal dot array
Horizontal resolution	16 dots/mm (25 mm/s paper speed)
Vertical resolution	8 dots/mm
Paper width	50 mm±1mm
Paper length	20 m
Paper speed	25 mm/s, 50 mm/s Accuracy: ±5%
Number of waveform channels	A maximum of 3

A.7 LEDs

Alarm lamp	1 or 2 (three color-coded: red, yellow, and cyan)
Power-on LED	1 (green)
AC power LED	1 (green)
Battery LED	1 (two color-coded: yellow and green)

A.8 Audio Indicator

Speaker	Give alarm tones (45 to 85 dB), reminder tones, key tones, QRS tones; support PITCH TONE and multi-level tone modulation; alarm tones comply with IEC 60601-1-8.

A.9 Monitor Interface Specifications

DC power input (for ePM 10/ePM 10A/ePM 10C)	1
AC power input	1
Network connector	1, standard RJ45 connectors, 100 Base-TX, IEEE 802.3
USB connector	2, USB 2.0
Multifunctional connector	1
Video output connector	1, 15-pin D-sub
Equipotential grounding terminal	1

A.10 Signal Outputs Specifications

Auxiliary Output	
Standard	Meets the requirements of IEC 60601-1 for short-circuit protection and leakage current
ECG Analog Output	

Testing conditions are as follows:

- Number of the monitors supported by a single AP: ≤ 16.
- Each monitor can communicate with the CMS.
- Two monitors are used to view other monitors.
- Only one monitor can transmit history data.
- The weakest strength of the AP signal where the monitor is located is not less than -65 dBm.
- The distance between the interfering devices and the monitor is greater than 20 cm. A Wi-Fi interference (no greater than -85 dBm) in the same channel and a Wi-Fi interference (no greater than -50 dBm) in an adjacent-channel are presented synchronously. The interfering devices include, but are not limited to, 2.4 G wireless devices, cellular mobile networks, microwave ovens, interphones, cordless phones, and ESU equipment. The interfering devices do not include Wi-Fi devices.

A.12.2.2 Wi-Fi Network Stability

The ratio of the communication data loss on the CMS from any monitor does not exceed 0.1% over a 24-hour period. 12 of the 16 monitors connected to the network roam for 30 times.

Testing conditions are as follows:

- Number of the monitors supported by a single AP: ≤ 16.
- Each monitor can communicate with the CMS.
- Two monitors are used to view other monitors.
- Only one monitor can transmit history data.
- The weakest strength of the AP signal where the monitor is located cannot be less than -65 dBm.

A.12.2.3 Distinct Vision Distance

The distinct vision distance between the monitor and the AP is no less than to 50 meters.

A.13 Measurement Specifications

The adjustable range of alarm limits is the same with the measurement range of signals unless otherwise specified.

A.13.1 ECG Specifications

ECG	
Standards	Meet standards of IEC 60601-2-27 and IEC 60601-2-25
Lead set	3-lead: I, II, III 5-lead: I, II, III, aVR, aVL, aVF, V 6-lead: I, II, III, aVR, aVL, aVF, Va, Vb 12-lead (for ePM 12/ ePM 12A/ePM 12C/ ePM 15/ePM 15A/ ePM 15C): I, II, III, aVR, aVL, aVF, V1 to V6
ECG standard	AHA, IEC
Display sensitivity	1.25 mm/mV (×0.125), 2.5 mm/mV (×0.25), 5 mm/mV (×0.5), 10 mm/mV (×1), 20 mm/mV (×2), 40 mm/mV (×4), Auto, less than 5% error
Sweep speed	6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s, less than 5% error
Bandwidth (-3dB)	Diagnostic mode: 0.05 to 150 Hz Monitor mode: 0.5 to 40 Hz Surgical mode: 1 to 20 Hz ST mode: 0.05 to 40 Hz High Freq Cut-off (for 12-lead ECG analysis) 350 Hz, 150 Hz, 35 Hz, or 20 Hz, selectable

A.13.3 SpO_2 Specifications

Alarm limit	Range (%)	Step (%)
SpO_2 High	(low limit + 2) to 100	1
SpO_2 Low	Mindray: (Desat+1) to (high limit - 2) Nellcor: (Desat+1) or 20 (whichever is greater) to (high limit - 2)	
SpO_2 Desat Low	0 to (high limit - 1)	

Mindray SpO_2 Module

Standards	Meet standards of ISO 80601-2-61		
*Measurement accuracy verification: The SpO_2 accuracy has been verified in human experiments by comparing with arterial blood sample reference measured with a CO-oximeter. Pulse oximeter measurement are statistically distributed and about two-thirds of the measurements are expected to come within the specified accuracy range compared to CO-oximeter measurements.			
Measurement range	0 to 100%		
Resolution	1%		
Response time	< 30 s (normal perfusion, no disturbance, SpO_2 value sudden changes from 70% to 100%)		
Accuracy	70 to 100%: ±2% (adult/pediatric mode) 70 to 100%: ±3% (neonate mode) 0% to 69%: Not specified.		
* One percent was added to the accuracies for neonatal sensors to account for accuracy variation due to properties of fetal hemoglobin. Studies were performed to validate the accuracy of Pulse Oximeter with neonatal SpO_2 sensors by contrast with a CO-Oximeter. Some neonates aged from 1 day to 30 days with a gestation age of 22 weeks to full term were involved in this study. The statistical analysis of data of this study shows the accuracy (Arms) is within the stated accuracy specification. Please see the following table.			
Sensor type	**Totally neonates**	**Data**	**Arms**
518B	97 (51 male & 46 female)	200 pairs	2.38%
520N	122 (65 male & 57 female)	200 pairs	2.88%
The Pulse Oximeter with neonatal SpO_2 sensors was also validated on adult subjects.			
Refreshing rate	≤1 s		
Sensitivity	High, Medium, Low		
Recovery time	<15 s (after defibrillation)		
PI			
Measurement range	0.05 to 20%		
Resolution	0.05%~9.99%: 0.01% 10.0%~20.0%: 0.1%		

Nellcor SpO_2 Module

Measurement range	0 to 100%
Resolution	1%
Refreshing rate	≤1 s
Response time	≤30 s (normal perfusion, no disturbance, SpO2 value sudden change from 70% to 100%)
Recovery time	<15 s (after defibrillation)

Accuracy	±0.1 °C or ±0.2 °F (excluding probe error)	
Refreshing rate	≤1 s	
Minimum time for accurate measurement	Body surface: <100 s Body cavity: <80 s	
Recovery time	<15 s (after defibrillation)	
Alarm limit	**Range**	**Step**
TXX High (XX refers to temperature site)	(low limit +1.0) to 50.0 °C (low limit +2.0) to 122.0 °F	0.1 °C 0.1 °F
TXX Low (XX refers to temperature site)	0.1 to (high limit - 1.0) °C 32.2 to (high limit - 2.0) °F	
TD High	0.1 to 50.0 °C 0.2 to 90.0 °F	

A.13.6 NIBP Specifications

Standard	Meet standard of ISO 80601-2-30			
Technique	Oscillometry			
Mode of operation	Manual, Auto, STAT, Sequence			
Auto mode repetition intervals	1, 2, 2.5, 3, 5, 10, 15, 20, 30, 60, 90, 120, 180, 240 or 480 min			
STAT mode cycle time	5 min			
Max measurement time	Adult, pediatric: 180 s Neonate: 90 s			
Heart rate range	30 to 300 bpm			
Measurement ranges (mmHg)		Adult	Pediatric	Neonate
	Systolic:	25 to 290	25 to 240	25 to 140
	Diastolic:	10 to 250	10 to 200	10 to 115
	Mean:	15 to 260	15 to 215	15 to 125
Accuracy	Max mean error: ±5 mmHg Max standard deviation: 8 mmHg			
Resolution	1mmHg			
Initial cuff inflation pressure range (mmHg)	Adult: 80 to 280 Pediatric: 80 to 210 Neonate: 60 to 140			
Default initial cuff inflation pressure (mmHg)	Adult: 160 Pediatric: 140 Neonate: 90			
Software overpressure protection	Adult: 297±3 mmHg Pediatric: 297±3 mmHg Neonate: 147±3 mmHg			
Static pressure measurement range	0 mmHg to 300 mmHg			
Static pressure measurement accuracy	±3 mmHg			
Recovery time	<15 s (after defibrillation)			
PR				
Measurement range	30 to300 bpm			

Alarm message	Default priority	Indication on alarm reset	Cause and solution
ECG Learning	Prompt	/	ECG learning is manually or automatically triggered.
Cannot Analyze QT	Prompt	/	/
D12L not available	Prompt	C	The current Va and Vb combination does not support D12L. Choose an available Va and Vb combination. For more information, see *9.5 Using 6-lead Placement to Derive 12-lead ECG (D12L) (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C)*.

Note: XX represents ECG lead name, for example RL, LL, V, Va, Vb, and so on.

D.2.3 Resp Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
Resp Interference	Prompt	/	The respiration circuit is disturbed. Check for any possible sources of signal noise.
Electrode Poor Contact	Prompt	/	Check the electrode application. Reposition or replace the electrodes if necessary.

D.2.4 SpO_2 Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
SpO2 Sensor Off	Adjustable	B	The SpO_2 sensor has become detached from the patient or the module. Check the sensor connection. If the alarm persists, replace the sensor.
SpO2 No Sensor	Low	A	The SpO_2 extension cable is detached from the SpO_2 module, or the SpO_2 sensor is detached from the SpO_2 extension cable. Check the SpO_2 cable and the sensor connection. If the alarm persists, replace the sensor.
SpO2 Excess Light	Low	C	Ambient light is too strong. Move the sensor to a place with lower level of ambient light or cover the sensor to minimize the ambient light.
SpO2 No Pulse	Low	C	The SpO_2 sensor failed to obtain pulse signal. Check the patient's condition and replace the sensor application site. If the alarm persists, replace the sensor.
SpO2 Sensor Incompatible	Low	C	Incompatible or an unspecified SpO_2 sensor is used. Use specified sensors.
SpO2 Low Signal Quality	Low	C	1. Check the sensor and sensor position. 2. Make sure the patient is not shivering or moving. 3. The patient's pulse may be too low to be measured.
SpO2 Interference	Low	C	The SpO_2 signal has been interfered. Check for any possible sources of signal noise and check the patient for excessive motion.
SpO2 Sensor Error	Low	C	Replace the sensor and measure again.

Alarm message	Default priority	Indication on alarm reset	Cause and solution
SpO2 Searching Pulse	Prompt	/	SpO_2 is searching for pulse.
SpO2 Low Perfusion	Prompt	/	The SpO_2 sensor is not properly placed or the patient's perfusion index is too low. 1. Check the sensor and sensor position. 2. Reposition the sensor if necessary.

D.2.5 Temp Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
T XX Sensor Off	Low	A	Check the sensor connection and reconnect the sensor.

Note: XX represents a temperature site, for example skin, core, axil, T1, and so on.

D.2.6 NIBP Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
NIBP Cuff Loose	Low	A	There is a leak in the cuff or air tubing. Use a cuff of correct type based on the patient size. Apply the cuff and connect the air tubing as instructed in the manual.
NIBP Cuff or Airway Leak	Low	A	Check the NIBP cuff and pump for leakages.
NIBP Airway Error	Low	A	The air tubing may be occluded. Check the air tubing for an occlusion or kinking. If the alarm persists, contact your service personnel.
NIBP Weak Signal	Low	A	The patient's pulse is weak or the cuff is loose. Check the patient's condition and replace the cuff application site.
NIBP Overrange	Low	A	The measured NIBP value exceeds the module measurement range. Check the patient's condition.
NIBP Excessive Motion	Low	A	Check the patient's condition and reduce patient motion.
NIBP Cuff Overpressure	Low	A	The NIBP airway may be occluded. Check the airway and measure again. If the alarm persists, contact your service personnel.
NIBP Timeout	Low	A	The measurement time exceeds 120 seconds in the adult or pediatric mode, or exceeds 90 seconds in the neonatal mode, and the BP value cannot be obtained. Check the patient's condition and NIBP connections, or replace the cuff and measure again.
NIBP Cuff and Patient Mismatch	Low	A	The cuff type mismatches the patient category. Verify the patient category or replace the cuff if necessary. If patient catergory is correct, check that the tubing is not bent and the airway is not occluded.
NIBP Airway Leak	Low	A	Airway leakage is found during the NIBP leakage test. Check the NIBP cuff and pump for leakages.

D.2.10 EWS Technical Alarms

Alarm message	Default priority	Indication on alarm reset	Cause and solution
EWS param XX is timeout	Low	A	The manually input parameter is timeout. Input a parameter numeric again.
EWS score needs to be confirmed	Low	A	Confirm to save or give up current score.

XX represents RR, SpO2, Supp. O2, Temp, BP, HR, Consciousness, Blood Sugar, Urine Output, Catheter, Pain Score, Pain, EtCO2, FiO2, Airway, or Customer defined parameter.

D.2.11 Power Supply Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
Low Battery	Med	C	Connect the monitor to the external power supply and allow the batteries to charge.
Critically Low Battery	High	C	Connect the monitor to the external power supply and allow the batteries to charge.
Power Board Comm Error	High	C	Restart the monitor. If the alarm persists, contact your service personnel.
Battery Error	High	C	The battery may fail. Contact your service personnel.
RT Clock Need Reset	High	C	Contact your service personnel.
RT Clock Not Exist	High	C	Contact your service personnel.
XX V Too High	High	C	There is a problem with the system power supply. Restart the monitor.
XX V Too Low	High	C	

Note: XX represents 2.5 V, 3.3 V,5 V, or 12 V.

D.2.12 Recorder Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
Recorder Init Error	Low	A	An error occurred during the recorder initialization. If the alarm persists, contact your service personnel.
Recorder Comm Error	Low	A	Restart the monitor if not solved. If the alarm persists, contact your service personnel.
Recorder Head Hot	Low	C	The recorder has been working for too long time. Stop the recording and resume the recording till the recorder's print head cools down.
Recorder Initializing	Prompt	/	Wait until the recorder initialization is completed.
Recorder out of Paper	Prompt	/	The recorder paper is not loaded or the recorder door is not closed. Check the recorder, load the recorder paper or close the recorder door.
Recorder Busy	Prompt	/	The buffer queue for recording is full.