

# Valuable and Accessible IT Solutions

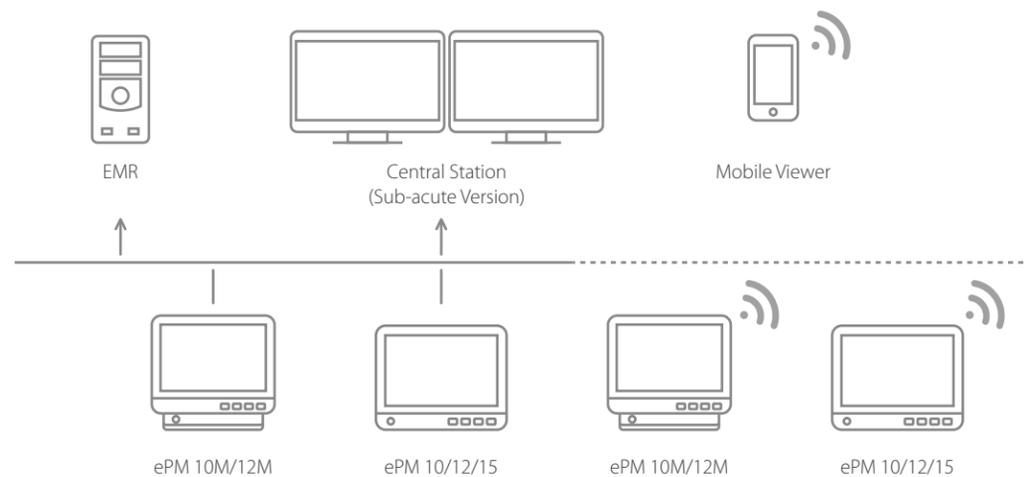
Mindray ePM devices can connect to the Central Monitoring Station (CMS) and eGateway through both wired and wireless networks, as well as interfacing with third-party electronic medical records (EMR) via HL7 output directly.

The ePM helps enhance clinical work flow and efficiency with it's flexible yet reliable connectivity capabilities.

- The View Other Patient function allows caregivers to see, in real-time, up to 12 other beds on a single ePM screen. This seamless information exchange between bedside monitors can help caregivers view all their patients at once, without the need for CMS.
- With the ePM Caregroups function caregivers can quickly find and review their assigned patients or ward when connected to the CMS.

Data from ePM devices can be easily connected to the CMS and Mobile Viewer, giving clinicians access to their patient data anytime and anywhere in the hospital.

- The CMS Early Warning Scores (EWS) dashboard provides an intuitive display of patient status, with dynamic updates pushed to the Mobile Viewer, alerting caregivers to changes in patient conditions and potential risk of deterioration.



## ePM 10/12/15

Compact Patient Monitor

# The evolution of simplicity



Inspired by the needs of customers, Mindray patient monitors adopt advanced technologies and transform them into accessible innovation. The ePM delivers excellent visual experience, intelligent operation, accurate physiological measurements, smooth workflow and comprehensive connectivity options for demanding hospital settings, such as Emergency Rooms, Recovery Units, Sub-acute Units and General Wards.



## Minimalist Design



Multi-touch capacitive screen  
Supports gestures operations



Wide viewing angle  
Makes display more visible



1280x800 pixel (10.1"/12.1")  
1366x768 pixel (15.6")  
Provides HD visual experience



Auto brightness  
Reduces light interference at night



Fanless design  
Reduces the risk of cross-contamination



Durable and robust casing  
Validated for cleaning with 49 leading disinfectants

## Extensive Data Storage at the Bedside

**2400** hrs  
Trends @ 10 minutes

**48** hrs  
Full disclosure waveforms for all parameters

**3000** sets  
NIBP measurement

**2000** sets  
Events

**400** sets  
OxyCRG events

Note: These are the Maximum storage capacity of ePM devices with 16G storage.

## Thoughtful Design for Cleaning

- Ergonomic, concealed handle without cleaning blind spot
- Streamlined design makes cleaning easier
- Screen lock for easy cleaning



## Flexible Mounting Solutions

- A wide range of mounting solutions designed for various clinical settings
- The release mechanism allows for quick removal from the wall mount or rolling stand for transport



# Accurate, Reliable Parameters

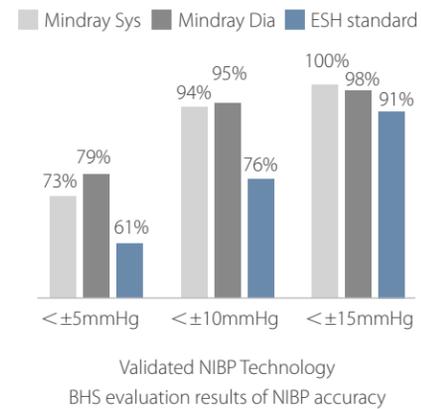
## Comprehensive Monitoring

Integrated Platinum™ MPM parameters:  
3/5/12-lead ECG, respiration, SpO<sub>2</sub>\*, temperature and NIBP.

- Multi-lead(4) ECG algorithm with ST & QT analysis
- Low perfusion SpO<sub>2</sub> algorithm
- Fast, accurate and motion tolerant NIBP algorithm, validated by British Hypertension Society (BHS)

Wide measurement range and anti-interference performance ensures excellent parameter accuracy and reliability.

The ePM also provides advanced parameter options:  
2-ch invasive blood pressure, EtCO<sub>2</sub> and cardiac output measurement, making it suitable for a wide range of clinical settings.



\* Mindray provides 3 options of SpO<sub>2</sub> measurement, Mindray, Masimo and Nellcor. For further information about the availability of Masimo and Nellcor SpO<sub>2</sub>, please contact with your local sales representatives.

## Reduce False Alarms with CrozFusion™



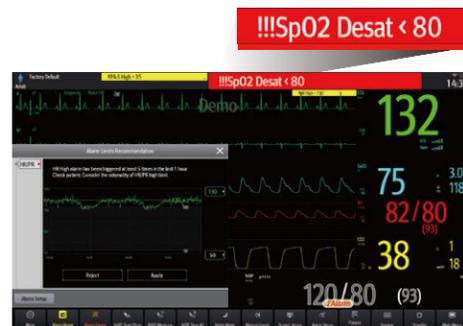
Innovative multi-parameter alarm analysis can reduce false arrhythmia alarms and promote the accuracy of heart rate and pulse rate, and help to alleviate alarm fatigue.



Note: The results are based on an evaluation by Mindray multi-parameter fusion database.

## Intelligent Alarm Strategy

- Alarm highlight: Using special fatal alarm sound. Highlight the fatal alarm
- Alarm limits recommendation: Support personalized threshold settings for different patients based on trend data
- ARR Alarm refractory period: Avoid repeated meaningless alarm



# Simplicity at Your Fingertips

## Intelligent Operation Experience

- Operate with gestures, just like a tablet PC
- Access to the most common functions in 2 steps or fewer
- Quickly identify disconnected sensors with the innovative AlarmSight technology



## Smooth Workflow

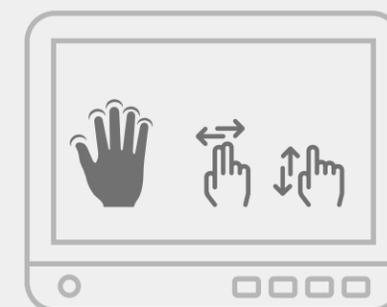
Based on clinical insight, the ePM has optimized workflows to support caregivers at the bedside, swiping the touchscreen to switch between commonly used functions and interfaces, enabling clinical tasks to be completed quickly and accurately.



View from a distance  
Intuitive big numerics



View at bedside  
Highlights abnormal readings



Ward rounds or nurses hand over  
Quickly review the patient status changes

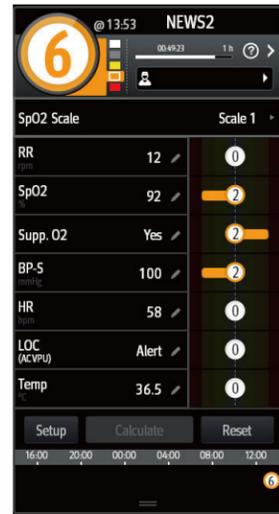


Review and analyze  
24hrs waveform review and critical alarms

## Early Warning Scoring (EWS)

Mindray ePM monitors provide a point-of-care EWS calculator to help clinicians track and document signs of patient deterioration, aiding faster and more informed patient care decisions.

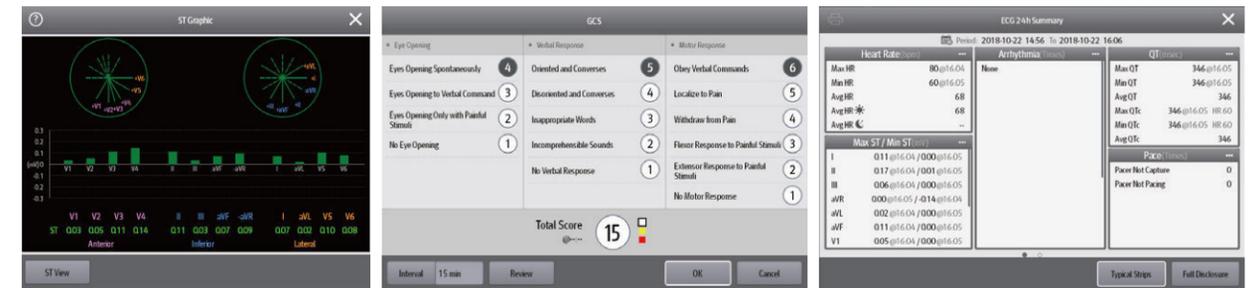
- Compliant with the National Early Warning Score (NEWS), National Early Warning Score 2 (NEWS2) and Modified Early Warning Score (MEWS) protocols
- Alternatively, create custom protocols to suit your hospital requirements
- Intuitive layout and trends review helps caregivers visualize data quicker
- Automate EWS calculations quickly at the bedside
- Display score escalation instructions on-screen to remind caregivers make rapid care decisions
- Integration to the Electronic Medical Record (EMR) for fast, accurate electronic vitals and early warning scoring documentation



The Early Warning Score tool, as displayed on ePM devices

## Clinical Assistive Applications (CAA)

The ePM provides efficient Clinical Assistive Applications (CAA) to help support safe and efficient decision making in mid-acuity and general ward areas.



ST Graphic™

Glasgow Coma Scale

24 hours ECG summary

## Supporting Safety in Neonates

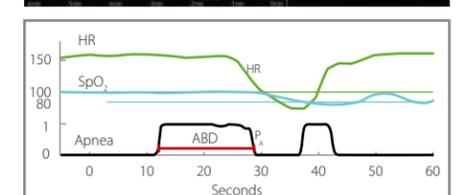
### Targeted Goal Screen

- Target parameter dashboard, visualized goal management such as oxygen therapy.
- 24 hours of target parameter statistics helps caregivers to evaluate the treatment effects
- Target parameter trend helps clinicians to identify patient situation. Highlighted part is combined with certain bar in the histogram



### OxyCRG

- Effectively identify apnea of prematurity as ABD event
- Detailed and complete records of events help caregivers quickly identify the cause



## ePM 10/12/15

Patient Monitor

Data Sheet



## Physical Specifications

Weight	ePM 10: 3.2 kg ePM 12: 3.4 kg ePM 15: 4.9 kg (Standard configuration, excluding recorder, battery and accessories.)
Size	ePM 10: 271 x 226 x 173 mm ePM 12: 312 x 258 x 174 mm ePM 15: 397 x 293 x 181 mm
Display screen	Capacitive screen, support multi-touch operation. ePM 10: 10.1-inch, 1280 x 800 pixels ePM 12: 12.1-inch, 1280 x 800 pixels ePM 15: 15.6-inch, 1366 x 768 pixels
Display channel	ePM 10: Up to 8 waveform channels ePM 12: Up to 10 waveform channels ePM 15: Up to 12 waveform channels
ePM 10 main unit complies with the requirements of 6.3.4.3, EN1789	
Drop test	0.75m for each of the 6 surfaces (ePM 10)

## ECG

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: I, II, III, aVR, aVL, aVF, V1 to V6
Automatic 3/5/6/12 - lead recognition.	
Input signal range	± 10 mV (p-p)
Electrode offset potential tolerance	± 800 mV
Sweep speed	6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s
Gain	x 0.125, x 0.25, x 0.5, x 1, x 2, x 4, auto
Waveform format	Standard, Cabrera
Bandwidth	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
CMRR	Diagnostic mode: > 90 dB Monitor, Surgical, ST mode: > 105 dB
Pace detection	Amplitude: ± 2 mV to ± 700 mV Width: 0.1 to 2 ms Rise time: 10 to 100 µs
Defib. protection	Withstand 5000V (360J) defibrillation
Recovery time	<5 s
Multi-lead(4) algorithm	Yes
Provides Glasgow resting 12-lead ECG algorithm, and 12-lead ECG is not available for ePM 10	

## Heart Rate

HR rang	Adult: 15 to 300 bpm Pediatric/Neonate: 15 to 350 bpm
HR accuracy	± 1 bpm or ± 1%, whichever is greater.
HR resolution	1 bpm

## Arrhythmia Analysis

Intended use for adult, pediatric and neonate.

Multi-lead, 27 classifications. Asystole, VFib/VTac, Vtac, Vent. Brady, Extreme Tachy, Extreme Brady, Vrrhythm, PVCs/min, Pauses/min, Couplet, Bigeminy, Trigeminy, R on T, Run PVCs, PVC, Tachy, Brady, Missed Beats, PNP, PNC, Multif. PVC, Nonsus. Vtac, Pause, Irr. Rhythm., Afib (for adult only), SVT, SVCs/min.

## ST Segment Analysis

Intended use for adult, pediatric and neonate.

ST range	- 2.5 to + 2.5 mV
ST accuracy	± 0.02 mV or ± 10%, whichever is greater (- 0.8 to + 0.8 mV)

ST resolution	0.01 mV
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## QT Analysis

Intended use for adult, pediatric, and neonate.	
Parameters	QT, QTc, ΔQTc
QTc formula	Bazett, Fridericia, Framingham, or Hodges
QT/QTc range	200 to 800 ms
QT accuracy	± 30 ms
QT resolution	4 ms
QTc resolution	1 ms
QT-HR range	Adult: 15 to 150 bpm Pediatric/Neonate: 15 to 180 bpm

## Respiration

Lead	I or II, auto
RR range	0 to 200 rpm
RR accuracy	± 1 rpm (0 to 120 rpm) ± 2 rpm (121 to 200 rpm)
RR resolution	1 rpm
Sweep speed	3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s
Apnea time	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s

## SpO<sub>2</sub>

Meet standards of ISO 80601-2-61.

Module	Mindray, Masimo, Nellcor
Range	0 to 100 %
Resolution	1%
Accuracy	Mindray/Nellcor: ± 2 % (70 to 100%, Adult/Pediatric): ± 3 % (70 to 100%, Neonate) Unspecified (0 to 69%) Masimo: ± 2 % (70 to 100%, Adult/Pediatric, non-motion) ± 3 % (70 to 100%, Neonate, non-motion) ± 3 % (70 to 100%, motion) Unspecified (1 to 69%)
Perfusion index (PI)	Yes, for Mindray/Masimo SpO <sub>2</sub>
Pitch Tone	Yes
PR Refresh Rate	1 sec

## PR

PR range	20 to 300 bpm (from Mindray/Nellcor SpO <sub>2</sub> ) 25 to 240 bpm (from Masimo SpO <sub>2</sub> ) 20 to 350 bpm (from IBP) 30 to 300 bpm (from NIBP)
PR accuracy	± 3 bpm (20 to 300 bpm, from Mindray SpO <sub>2</sub> ) ± 3 bpm (20 to 250 bpm, from Nellcor SpO <sub>2</sub> ) ± 3 bpm (non-motion, from Masimo SpO <sub>2</sub> ) ± 5 bpm (motion, from Masimo SpO <sub>2</sub> ) ± 1 bpm or ± 1 %, whichever is greater (from IBP) ± 3 bpm or ± 3 %, whichever is greater (from NIBP)
Refreshing rate	≤ 1 s

## Temperature

Meet standard of ISO 80601-2-56.

Technique	Thermal resistance
Channels	2 channels
Temp range	0 to 50 °C (32 to 122 °F)
Temp accuracy	± 0.1 °C or ± 0.2 °F (without probe)
Temp resolution	0.1 °C
Refreshing rate	≤ 1 s

## NIBP

Meet standards of ISO 80601-2-30.

Technique	Oscillometry
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Operation mode	Manual, Auto, STAT, Sequence
Parameters	Systolic, diastolic, mean
Max measurement time	Adult/Pediatric: 180 s, Neonate: 90 s
Systolic range	Adult: 25 to 290 mmHg Pediatric: 25 to 240 mmHg Neonate: 25 to 140 mmHg
Diastolic range	Adult: 10 to 250 mmHg Pediatric: 10 to 200 mmHg Neonate: 10 to 115 mmHg
Mean range	Adult: 15 to 260 mmHg Pediatric: 15 to 215 mmHg Neonate: 15 to 125 mmHg
NIBP accuracy	Max mean error: $\pm 5$ mmHg Max standard deviation: 8 mmHg
NIBP resolution	1 mmHg
Assisting venous puncture	Yes

### IBP

Meet standard of IEC 60601-2-34.	
Channels	2 channels
Sensitivity	5 $\mu\text{V/V/mmHg}$
Impedance range	300 to 3000 $\Omega$
IBP range	-50 to 360 mmHg
IBP accuracy	$\pm 1$ mmHg or $\pm 2\%$ , whichever is greater
IBP resolution	1 mmHg
PPV range	0 to 50 %
PAWP	Yes
ICP measurement	Yes
Support waveforms overlapping.	

### C.O.

Technique	Thermodilution
C.O. range	0.1 to 20 L/min
C.O. accuracy	$\pm 0.1$ L/min or $\pm 5\%$ , whichever is greater
C.O. resolution	0.1 L/min
TB range	23 to 43 $^{\circ}\text{C}$
TI range	0 to 27 $^{\circ}\text{C}$
TB, TI accuracy	$\pm 0.1$ $^{\circ}\text{C}$ (without sensor)
TB, TI resolution	0.1 $^{\circ}\text{C}$

### Artema Sidestream CO<sub>2</sub>

Meet standard of ISO 80601-2-55.	
CO <sub>2</sub> sample flow rate	120 ml/min (DRYLINE II™ watertrap for adult/pediatric) 90/70 ml/min (DRYLINE II™ watertrap for neonate)
CO <sub>2</sub> sample flow rate accuracy	$\pm 15$ ml/min or $\pm 15\%$ , whichever is greater.
CO <sub>2</sub> response time	$\leq 5.0$ s @ 120ml/min (for adult/pediatric) $\leq 4.5$ s @ 90 ml/min (for neonate) $\leq 5.0$ s @ 70 ml/min (for neonate)
Sweep speed	3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s
CO <sub>2</sub> range	0-150 mmHg
CO <sub>2</sub> accuracy	Full accuracy mode: 0 - 40 mmHg: $\pm 2$ mmHg 41 - 76 mmHg: $\pm 5\%$ of reading 77 - 150 mmHg: $\pm 10\%$ of reading ISO accuracy mode: Add $\pm 2$ mmHg to the full accuracy mode
CO <sub>2</sub> resolution	1 mmHg
awRR range	0 to 150 rpm
awRR accuracy	$\pm 1$ rpm (0 to 60 rpm) $\pm 2$ rpm (61 to 150 rpm)
Apnea time	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s

### Oridion Microstream CO<sub>2</sub>

Meet standard of ISO 80601-2-55.	
Sample flow rate	50 $^{-7.5}_{+15}$ ml/min
Initialization time	30 s (typical)
Response time	2.9 s (typical)
Sweep speed	3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s
CO <sub>2</sub> range	0 to 150 mmHg
CO <sub>2</sub> accuracy	$\pm 2$ mmHg (0 to 38 mmHg) $\pm 5\%$ of the reading (0.08 % increased in error for every 1 mmHg if the reading is more than 38 mmHg) (39 to 150 mmHg)
awRR range	0 to 150 rpm
awRR accuracy	$\pm 1$ rpm (0 to 70 rpm) $\pm 2$ rpm (71 to 120 rpm) $\pm 3$ rpm (121 to 150 rpm)
Apnea time	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s

### Capnostat Mainstream CO<sub>2</sub>

Meet standard of ISO 80601-2-55.	
Rise time	< 60 ms
Sweep speed	3 mm/s, 6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s
CO <sub>2</sub> range	0 to 150 mmHg
CO <sub>2</sub> accuracy	$\pm 2$ mmHg (0 to 40 mmHg) $\pm 5\%$ of the reading (41 to 70 mmHg) $\pm 8\%$ of the reading (71 to 100 mmHg) $\pm 10\%$ of the reading (101 to 150 mmHg)
awRR range	0 to 150 rpm
awRR accuracy	$\pm 1$ rpm

### Data Review

For 2G storage	
Trends data	Up to 120 hours @ 1min
Events	Up to 1000 events, including parameter alarms, arrhythmia events technical alarms, and so on.
NIBP	Up to 1000 sets
Full disclosure	48 hours at Maximum. The specific storage time depends on the waveforms stored and the number of stored waveforms.
For 16G storage	
Trends data	Up to 240 hours @ 1min, 2400 hours @ 10 min
Events	Up to 2000 events, including parameter alarms, arrhythmia events technical alarms, and so on.
NIBP	Up to 3000 sets
Full disclosure	48 hours for all parameter waveforms.
For 2G & 16G storage	
Interpretation of resting 20 sets of 12-lead ECG results	
OxyCRG	400 OxyCRG events
ST review	Up to 120 hours @ 1 min
Minitrend	Yes

### Alarms

Audible indicator	Yes, 3 different alarm tones, and prompt tone
Visible indicator	Red/yellow/cyan LED, and alarm message display
Provide AlarmSight infographic alarm indicator.	
Alarm limits recommendation	Yes
Alarm highlight: Support the alarm escalation. Using special fatal alarm sound. Highlight and optimize the fatal alarm display on the screen	

### Special Functions

Clinical Assistive Application (CAA): ST Graphic™, EWS, GCS, 24h ECG summary, NIBP analysis, AF Summary.  
Calculations (Drug, Hemodynamic, Oxygenation, Ventilation, Renal), and Titration table.

## Wi-Fi Communications

Protocol	IEEE 802.11a/b/g/n
Modulation mode	DSSS and OFDM
Operating frequency	IEEE 802.11b/g/n (2.4G): ETSI/FCC/KC: 2.4 to 2.483 GHz MIC: 2.4 to 2.495 GHz IEEE 802.11a/n (5G): ETSI: 5.15 to 5.35 GHz, 5.47 to 5.725 GHz FCC: 5.15 to 5.35 GHz, 5.725 to 5.82 GHz MIC: 5.15 to 5.35 GHz KC: 5.15 to 5.35 GHz, 5.47 to 5.725 GHz, 5.725 to 5.82 GHz
Channel spacing	5 MHz @ 2.4 GHz, 20 MHz @ 5 GHz
Wireless baud rate	IEEE 802.11a: 6 to 54 Mbps IEEE 802.11b: 1 to 11 Mbps IEEE 802.11g: 6 to 54 Mbps IEEE 802.11n: 6.5 to 72.2 Mbps
Output power	< 20dBm (CE requirement: detection mode- RMS) < 30dBm (FCC requirement: detection mode- peak power)
Operating mode	Infrastructure
Data security	WPA-PSK, WPA2-PSK, WPA-Enterprise, WPA2-Enterprise (EAP-FAST, EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, PEAP-TLS, LEAP) Encryption: TKIP and AES

## Interfacing

Main unit	AC power connector (1) VGA port (1) Network connector (1), RJ45 USB 2.0 connector (2) Analog output/nurse call/defib. Sync. Port (1) Equipotential grounding terminal (1) DC-in connector and docking (1) for ePM 10
Barcode scanner	Support 1D and 2D barcode
Remote control	Support
Thermal recorder	3 traces (paper 50 mm width, 20 m length)
Network printer	Support

## Power

Line voltage	100 to 240 VAC ( $\pm 10\%$ )
Maximum current	2.0A
Frequency	50/60 Hz ( $\pm 3$ Hz)
Battery	Rechargeable lithium-ion battery, 2600mAh/4500mAh Rechargeable smart lithium-ion battery 5600mAh ePM 10/12/15 $\geq 2$ hours run time (2600mAh) ePM 10/12/15 $\geq 4$ hours run time (4500mAh) ePM 10 $\geq 6$ hours run time (5600mAh x1) ePM 12/15 $\geq 6$ hours run time (5600mAh x1) ePM 12/15 $\geq 9$ hours run time (5600mAh x2)
Recharge time (power off)	2.5 hours to 90% (2600mAh) 5 hours to 90% (4500mAh) 5 hours to 90% (5600mAh x1) 10 hours to 90% (5600mAh x2)

## Environmental requirements

Temperature	Operating: 0 to 40 °C Storage: -30 to 70 °C (ePM 10) Storage: -20 to 60 °C (ePM 12/15)
Humidity	Operating: 15 to 95 % (non condensing) Storage: 10 to 95 % (non condensing)
Barometric	Operating: 427.5 to 805.5 mmHg (57 to 107.4 kPa) Storage: 120 to 805.5 mmHg (16 to 107.4 kPa)

Some of functions marked with an asterisk may not be available. Please contact your local Mindray sales representative for the most current information.

[www.mindray.com](http://www.mindray.com)

P/N:ENG- ePM 10/12/15 Datasheet-210285x4P-20221031

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**mindray**  
healthcare within reach

**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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Release time: January 2019

Revision: 3.0

## 2.3 System Components

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

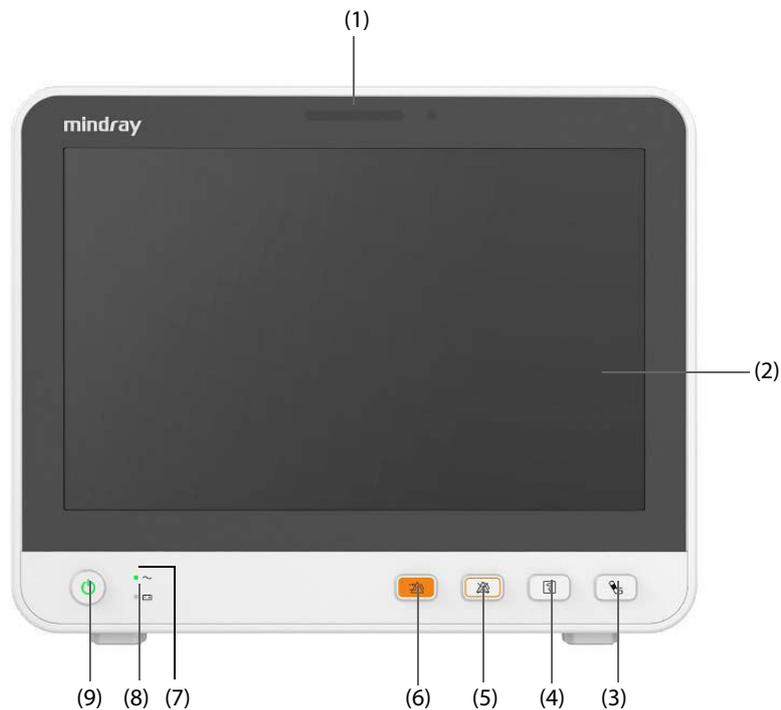
### NOTE

- **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.

- (7) Power indicator
  - ◆ On: when the power is connected.
  - ◆ Off: when the power is not connected.
- (8) Battery indicator
  - ◆ Yellow: the battery is being charged.
  - ◆ Green: the battery is fully charged.
  - ◆ Flashing green: the monitor operates on battery power.
  - ◆ Off: no battery is installed, or the battery is malfunctioning, or the monitor is powered off and no power is connected.
- (9) Power switch
  - ◆ Pressing this switch turns on the monitor.
  - ◆ When the monitor is on, pressing and holding this switch turns off the monitor.

### 2.3.1.2 Left View



- |                                      |                                    |
|--------------------------------------|------------------------------------|
| (1) Gas outlet                       | (2) CO <sub>2</sub> watertrap seat |
| (3) Temperature probe connector      | (4) C.O. cable connector           |
| (5) SpO <sub>2</sub> probe connector | (6) NIBP cuff connector            |
| (7) IBP cable connector              | (8) ECG cable connector            |

# 6 Managing Configurations

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## 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.

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### WARNING

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- **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**.

3. Input the configuration name.
4. Select **Ok** to save current settings as a user configuration.

## 6.5 Deleting a Configuration

To delete a configuration, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select .
2. Select **Delete Configuration**.
3. Select the configuration you want to delete:
  - ◆ In the **Delete Configuration** menu, selecting **Local** tab shows the existing user configurations on the monitor.
  - ◆ In the **Delete Configuration** menu, selecting **USB Drive** tab shows the existing user configurations on the USB drive.
4. Select **Delete**.
5. Select **Ok**.

## 6.6 Transferring a Configuration

When installing several monitors with identical user configurations, it is not necessary to set each unit separately. Use a USB drive to transfer the configuration from monitor to monitor.

### 6.6.1 Exporting a Configuration

To export the current monitor's configuration, follow this procedure:

1. connect the USB drive to the monitor's USB connector.
2. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select .
3. Select **Export Configuration**.
4. Select the configurations and **User Maintenance Settings** to export.
5. Select **Export**.

### 6.6.2 Importing a Configuration

To import the configuration from the USB drive to the monitor, follow this procedure:

1. Connect the USB drive to the monitor's USB port.
2. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select .
3. Select **Import Configuration**.
4. Select the configurations and **User Maintenance Settings** to import.
5. Select **Import**.

## 6.7 Printing Configurations

To print factory configurations and user configurations, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select .
2. Select **Print Configuration**.
3. Select desired configurations.
4. Select **Print**.

## 6.8 Loading a Configuration

You may make changes to some settings during operation. However, these changes or the pre-selected configuration may not be appropriate for the newly admitted patient. Therefore, the monitor allows you to load a desired configuration to ensure that all the settings are appropriate for your patient.

To load a configuration, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Load**.
2. Select the desired configuration.
  - ◆ Select the configuration on this monitor in the **Local** page.
  - ◆ Select the configuration on the USB drive in the **USB Drive** page.
3. Select **Load**.

### NOTE

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- **The monitor may configure some settings by default when you load a configuration of different software version with the current configuration.**
- 

## 6.9 Modifying Configuration Password

To modify the configuration password, follow this procedure:

1. Select the **Main Menu** quick key → from the **Configuration** column select **Manage** → input the required password → select .
2. Select **Modify Password**.
3. Respectively input the old password and new password.
4. Select **Ok**.

### 8.3.4 Alarm Status Symbols

Apart from the alarm indicators as described in **8.3.3 Alarm Indicators**, the monitor uses the following symbols to indicate the alarm status:

-  Alarm pause: indicates that all the alarms are paused.
-  Alarm off: indicates that individual measurement alarms are turned off or the system is in the alarm off status.
-  Audio pause: indicates that audible alarm tones are paused.
-  Audio off: indicates that audible alarm tones are turned off.
-  Alarm reset: indicates that alarms are acknowledged and the alarm system is reset.

## 8.4 Accessing On-screen Help for Technical Alarms (AlarmSight)

In the technical alarm list, alarm messages followed by **Detail** include help messages or pictures to help you identify the problem. This function is called AlarmSight. To access AlarmSight, follow this procedure:

1. Select the technical alarm information area to enter the **Alarms** window.
2. Select the **Technical Alarms** tab.
3. From the alarm list select the desired alarm.

## 8.5 Checking Physiological Alarm List

To check the physiological alarm list, follow this procedure:

1. Select the physiological alarm information area to enter the **Alarms** window.
2. Select the **Physiological Alarms** tab.

## 8.6 Changing Alarm Settings

Select the **Alarm Setup** quick key or from the **Alarm** column of the main menu select desired buttons to set alarm properties.

### 8.6.1 Setting Parameter Alarm Properties

To set parameter alarm properties, follow this procedure:

1. Access the **Limits** page in either of the following ways:
  - ◆ Select the **Alarm Setup** quick key.
  - ◆ Select the **Main Menu** quick key → from the **Alarm** column select **Limits**.
2. Select a parameter tab and set alarm properties as desired. Enter the password if required. For more information, refer to *7.7 Disconnecting the Wireless Network*.

You can also change the alarm properties of individual parameter from corresponding parameter menu.

### 8.6.2 Setting Alarm Tone Properties

#### 8.6.2.1 Changing the Alarm Volume

To change the alarm volume, follow this procedure:

1. Access the **Setup** page in either of the following ways:
  - ◆ Select the **Alarm Setup** quick key → select the **Setup** tab.

- ◆ Select the **Main Menu** quick key → from the **Alarm** column select **Setup**.
- 2. Set **Alarm Volume**. The optional alarm volume is between X to 10, in which X is the minimum volume, depending on the setting of minimum alarm volume, and 10 is the maximum volume.
- 3. Select **High Alarm Volume** to set the volume of the high priority alarm.
- 4. Select **Reminder Volume** to set the volume of the reminder tone.

## NOTE

---

- **When the alarm volume is set to 0, the alarm sound is turned off and the audio off symbol appears on the screen.**
  - **You cannot set the volume of high priority alarms if Alarm Volume is set to 0.**
- 

### 8.6.2.2 Password Protected Audio Alarm Settings

The following alarm settings are password protected:

- Minimum alarm volume
- Alarm sound pattern
- Alarm interval
- Alarm sound escalation switch and delay

For more information, see 24.4.1 *The Audio Tab*.

### 8.6.3 Setting the Auto Limits for New Patient Switch

If the Auto Limits for New Patient function is enabled, a dialog box pops up to ask you whether to set alarm limits basing on the latest parameter measurements for a newly admitted patient. To set the **Auto Limits for New Patient** switch, follow this procedure:

1. Enter the alarm setup page in any of the following ways:
  - ◆ Select the **Alarm Setup** quick key → select the **Setup** tab.
  - ◆ Select the **Main Menu** quick key → from the **Alarm** column select **Setup**.
2. Set the **Auto Limits for New Patient** switch.

## NOTE

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- **The Auto Limits for New Patient function is intended for newly admitted patients only.**
  - **The automatically set alarm limits take effect only after being confirmed.**
- 

### 8.6.4 Initiating Auto Alarm Limits

The monitor provides the auto alarm limits function to automatically adjust alarm limits according to the patient's vital signs using. When auto limits are selected, the monitor calculates safe auto limits based on the latest measured values. To get accurate auto alarm limits, you need to collect a set of measured vital signs as a baseline.

To initiate auto alarm limits, follow this procedure:

1. Access the **Limits** page in either of the following WAYS:
  - ◆ Select the **Alarm Setup** quick key → select the **Limits** tab.
  - ◆ Select the **Main Menu** quick key → from the **Alarm** column select **Limits**.
2. From the **Limits** page, select **Auto Limits** at the left bottom.
3. Select **Ok** from the popup dialog box.

Then the monitor will automatically calculate alarm limits basing on the latest measured values. Before applying these automatically created alarm limits, confirm if they are appropriate for your patient from the **Limits** menu. If not, you can adjust them manually. These alarm limits will remain unchanged until you select auto limits again or adjust them manually.

### 9.7.5.3 Arrhythmia Alarm Timeout Rules

The following table explains how audible and visual alarm indicate during arrhythmia alarm timeout.

Previous alarm	Current alarm	Alarm indication
Alarm in high priority chain	Alarm in high priority chain	Alarm light and alarm tone
	Alarm in medium priority chain	During timeout period, alarm light and alarm tone are disabled. When the timeout period is reached, alarm light and alarm tone are reactivated.
Alarm in medium priority chain	Alarm in high priority chain	Alarm light and alarm tone
	Alarm in the same medium priority chain, but with higher priority	Alarm light and alarm tone
	The same alarm reoccurs	During timeout period, alarm light and alarm tone are disabled. When the timeout period is reached, alarm light and alarm tone are reactivated.
	Alarm in the same medium priority chain, but with lower priority	During timeout period, alarm light and alarm tone are disabled. When the timeout period is reached, alarm light and alarm tone are reactivated.
	Alarm in other medium priority chain	Alarm light and alarm tone

## 9.8 ST Segment Monitoring

ST monitoring is intended for adult, pediatric and neonatal patient.

### 9.8.1 ST Safety Information

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#### WARNING

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- **ST values may be affected by such factors as some drugs or metabolic and conduction disturbances.**
  - **ST deviation is often calculated at a fixed offset from the J point. Changes in heart rate may affect ST.**
  - **The ST deviation measurement algorithm has been tested for accuracy. The significance of ST segment changes needs to be determined by a physician.**
  - **This monitor provides ST deviation level change information. The clinical significance of the ST level change information should be determined by a physician.**
- 
- 

### 9.8.2 Enabling ST Monitoring

The ST monitoring function is disabled by default. Before you start ST monitoring, enable the ST function. To do so, follow this procedure:

1. Select the ECG numeric area or waveform area to enter the **ECG** menu.
2. Select the **ST** tab→ select the **Setup** tab.
3. Switch on **ST Analysis**.

Reliable ST monitoring cannot be ensured under the following situations:

- You are unable to get a lead that is not noisy.
- Arrhythmias, such as atrial fib or flutter, cause irregular baseline.
- The patient is continuously ventricularly paced.
- The patient has left bundle branch block.

In these cases, you may consider switching off ST monitoring.

### 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 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.

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

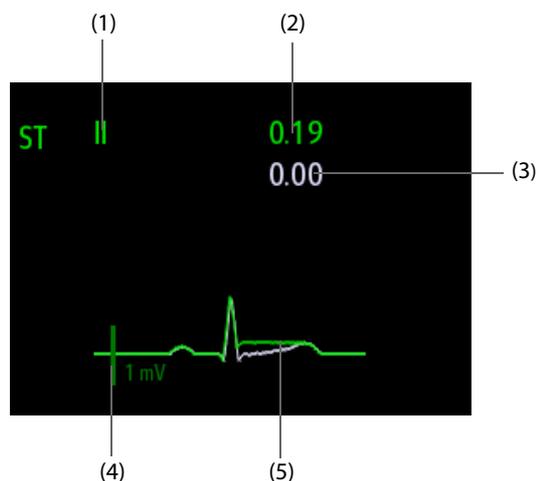
(5) ST numerics: a positive value indicates ST segment elevation, and a negative value indicates ST segment depression.

### 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.



- (1) ST lead
- (2) Current ST value
- (3) Baseline ST value
- (4) 1 mV scale
- (5) Current ST segment (green) and baseline ST segment (white)

### 9.8.5 Entering the ST View

The ST View shows a complete QRS segment for each ST lead. The color of current ST segments and ST values is consistent with the color of ECG waveforms, normally green. The color of baseline ST segments and ST values is white.

You can enter the ST view either by selecting the ST segment in the waveform area or by the following ways:

1. Select the ST numeric area, ECG numeric area, or ECG waveform area to enter the **ECG** menu.
2. Select the **ST** tab.
3. From the bottom of the menu, select **ST View**.

#### NOTE

- In the ST view, the derived leads are marked with a "d" in front of the lead label, for example "dV1".

### 9.8.6 Saving the Current ST as Baseline

ST deviation is typically monitored as a relative change from a baseline value. Set an ST baseline when ST values become stable. If you did not set the ST baseline, the monitor automatically saves the baseline when valid ST values appear for 5 minutes. To set the ST baseline, follow this procedure:

1. From the **ST View** window, select **Set Baseline**.
2. From the pop-up dialog box, select **Ok** to set the current ST segments and values as the baseline.

From the **ST View** window, you can also perform the following operations:

- Display or hide ST baseline by selecting **Display Baseline** or **Hide Baseline**.
- Display or hide the position of ISO point, J point and ST point by selecting **Display Marker** or **Hide Marker**.

#### CAUTION

- Updating ST baseline affects ST alarms.

#### NOTE

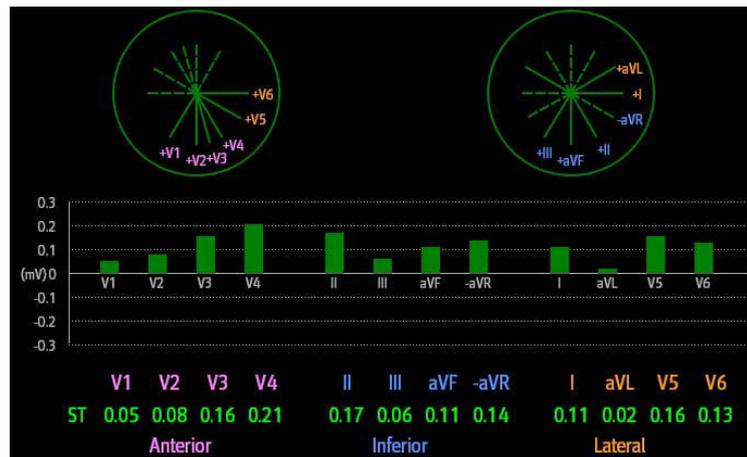
- If you set the ST baseline with D12L enabled, the baseline time is followed by "(D12L)", for example "Baseline 2017-04-06 20:30 (D12L)".

## 9.8.7 Entering the ST Graphic Window

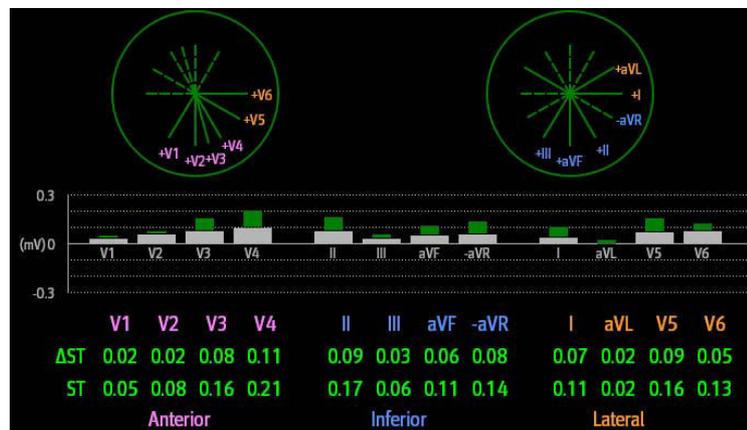
To display **ST Graphic** window, follow this procedure:

1. Select ST numeric area, ECG numeric area, or ECG waveform area to enter the **ECG** menu.
2. Select the **ST** tab.
3. From the bottom of the menu, select **ST Graphic**.

The following figure shows the ST Graphic when **ST Alarm Mode** is set to **Absolute**. The height of the bar indicates the ST value of corresponding ST lead. The color of the bar indicates ST alarm status: green indicates that corresponding ST value is within alarm limits; cyan, yellow and red indicate that the ST value exceeds the alarm limits. The color matches ST alarm priority.



The following figure shows the ST Graphic when **ST Alarm Mode** is set to **Relative**. The height of grey bar indicates the baseline ST value and the green bar (cyan, yellow or red if an alarm occurs) indicates  $\Delta$ ST.



### NOTE

- In the ST Graphic, the derived leads are marked with a "d" in front of the lead label, for example "dV1".

## 9.8.8 Changing ST Settings

### 9.8.8.1 Setting ST Alarm Properties

To set ST alarm properties, follow this procedure:

1. Select the ST numeric area, ECG numeric area, or ECG waveform area to enter the **ECG** menu.
2. Select the **ST** tab → **Alarm** tab.
3. Set **ST Alarm Mode** to **Absolute** or **Relative**.

- ◆ **Absolute:** you can separately set the alarm properties for each ST alarm.
- ◆ **Relative:** you can set the alarm properties for **ST Single** and **ST Dual** alarms.

4. Set ST alarm properties.

### 9.8.8.2 Changing Leads for ST Display

The monitor automatically selects the three most deviated leads for ST display. You can also manually select the leads. To do so, follow this procedure:

1. Select the ST numeric area, ECG numeric area, or ECG waveform area to enter the **ECG** menu.
2. Select the **ST** tab → select the **Setup** tab.
3. Set **ST Segment**. You can select up to 3 leads.

### 9.8.8.3 Showing ISO Point, J Point, and ST Point Marks

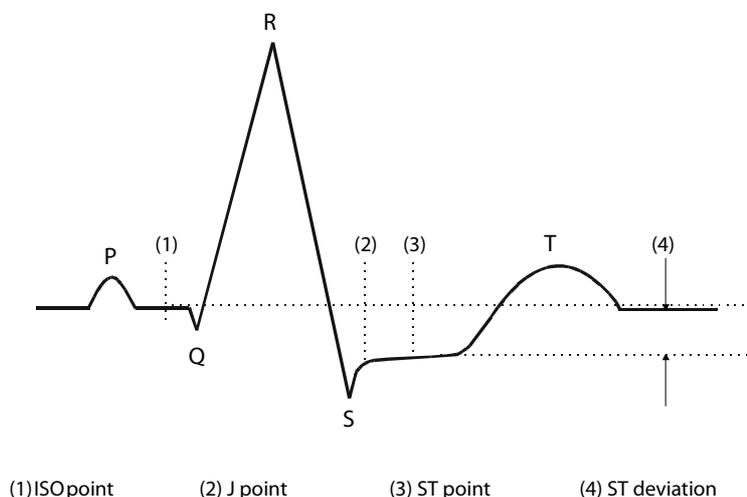
In the waveform area, the ISO point, J point, and ST point mark do not display on the ST segments by default. To show these marks, follow this procedure:

1. Select the ST numeric area, ECG numeric area, or ECG waveform area to enter the **ECG** menu.
2. Select the **ST** tab → select the **Setup** tab.
3. Switch on **Show Markers**.

## 9.8.9 Adjusting ST Measurement Points

### 9.8.9.1 About ST Point, ISO Point, and J Point

The ST deviation value for each beat is the potential difference between the isoelectric (ISO) point and the ST point. The ISO point provides the baseline. The ST point is at the midpoint of the ST segment. The J point is the end of the QRS complex. As the J point is a fixed distance away from the ST point, it can be useful to help you correctly position the ST point.



### 9.8.9.2 Setting ST Point, ISO Point, and J Point

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#### CAUTION

- You need to adjust the ST points before starting monitoring, or if the patient's heart rate or ECG morphology changes significantly, as this may affect the size of the QT interval and thus the placement of the ST point. Artfactual ST segment depression or elevation may occur if the isoelectric point or the ST point is incorrectly set.
  - Always make sure that the positions of ST points are appropriate for your patient.
-

To set ST point, ISO point, and J point, follow this procedure:

1. Select the ST numeric area, ECG numeric area, or ECG waveform area to enter the **ECG** menu.
2. Select the **ST** tab→ select the **Adjust** tab.
3. Set **ST Point**.

The setting of **Auto Adjust** defines the method of adjusting the ISO point and J point. **Auto Adjust** is enabled by default. In this case, positions of ISO point and J point are automatically adjusted accordingly. If you disable when **Auto Adjust**, you need to manually adjust the position of ISO point and J point by selecting the arrows at the right sides of **ISO** and **J**.

- The ISO point (isoelectric) position is given relative to the R-wave peak. Position the ISO point in the middle of the flattest part of the baseline (between the P and Q waves).
- The J point position is given relative to the R-wave peak and helps locating the ST point. Position the J point at the end of the QRS complex and the beginning of the ST segment.
- The ST point is positioned a fixed distance from the J point. Move the J point to position the ST point at the midpoint of the ST segment. Position the ST point relative to the J point at **J+60/80ms**, **J+40ms**, **J+60ms** or **J+80ms**. When **J+60/80ms** is selected, the ST point will be positioned 80 ms (heart rate 120 bpm or less) or 60 ms (heart rate more than 120 bpm) from the J point.

## 9.9 QT/QTc Interval Monitoring

The QT interval is defined as the time between the beginning of the Q-wave and the end of the T-wave. It measures the total duration of ventricular depolarization (QRS duration) and repolarization (ST-T). QT interval monitoring can assist in the detection of long QT syndrome.

The QT interval has an inverse relationship to heart rate. Faster heart rates shorten the QT interval and slower heart rates prolong the QT interval. Therefore, several formulas can be used to correct the QT interval for heart rate. The heart rate corrected QT interval is abbreviated as QTc.

QT/QTc interval monitoring is intended for adult, pediatric and neonatal patients.

### 9.9.1 QT/QTc Monitoring Limitations

Some conditions may make it difficult to achieve reliable QT/QTc monitoring, for example:

- R-wave amplitudes are too low
- The presence of frequent ventricular ectopic beats
- Unstable RR intervals
- P-waves tending to encroach on the end of the previous T-wave at high heart rates
- The T-wave is very flat or T-wave are not well defined
- The end of the T-wave is difficult to delineate because of the presence of U-waves
- QTc measurements are not stable
- In the presence of noise, asystole, ventricular fibrillation, atrial fibrillation, and ECG lead off

For these cases you should select a lead with good T-wave amplitude and no visible flutter activity, and without a predominant U-wave or P-wave.

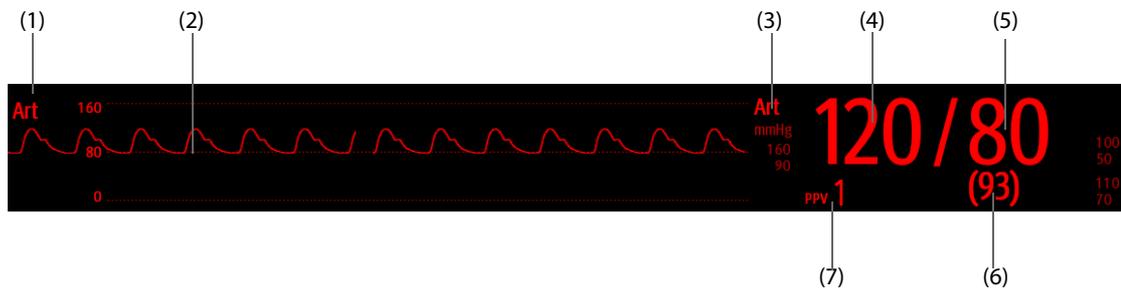
Some conditions such as left or right bundle branch block or hypertrophy can lead to a widened QRS complex. If a long QTc is observed you should verify it to ensure that it is not caused by QRS widening.

Because normal beats followed by ventricular beats are not included in the analysis, no QT measurement will be generated in the presence of a bigeminy rhythm.

If the heart rate is extremely high (over 150bpm for adults and over 180bpm for pediatrics and neonates), QT will not be measured. When the heart rate changes, it can take several minutes for the QT interval to stabilize. For reliable QTc calculation it is important to avoid measurements when the heart rate is changing.

## 15.5 IBP Display

The IBP measurement is displayed on the monitor as a waveform and numeric pressures. For arterial pressure, the IBP numeric area displays systolic pressure, diastolic pressure and mean pressure. For venous pressure, the IBP numeric area displays only the mean pressure. The figure below shows the waveform and numerics for the Art pressure.



- |                        |                       |
|------------------------|-----------------------|
| (1) Pressure label     | (2) Waveform          |
| (3) Pressure Unit      | (4) Systolic pressure |
| (5) Diastolic pressure | (6) Mean pressure     |
| (7) PPV measurement    |                       |

## 15.6 Changing IBP Settings

### 15.6.1 Changing the IBP Alarm Settings

To change the IBP alarm settings, follow this procedure:

1. Select the IBP numeric area or waveform area to enter the corresponding pressure menu.
2. Select the **Alarm** tab.
3. Enter the password if required.
4. Set the alarm properties.

### 15.6.2 Changing the Pressure Label

The pressure label is a unique identifier for each type of pressure. Therefore, you should select a proper pressure label for the source of the pressure you want to monitor.

To select the pressure label, follow this procedure:

1. Select the IBP numeric area or waveform area to enter the corresponding pressure menu.
2. Select the **Setup** tab.
3. Set **IBP1 Label** or **IBP2 Label**.

Label	Description	Label	Description
PA	Pulmonary artery pressure	CVP	Central venous pressure
Ao	Aortic pressure	LAP	Left atrial pressure
UAP	Umbilical arterial pressure	RAP	Right atrial pressure
BAP	Brachial arterial pressure	ICP	Intracranial pressure
FAP	Femoral arterial pressure	UVP	Umbilical venous pressure
Art	Arterial blood pressure	LV	Left ventricular pressure
CPP	Cerebral perfusion pressure	P1 to P4	Non-specific pressure label

## 17.3 CO<sub>2</sub> Measurement Limitations

The following factors may influence the measurement accuracy:

- Leaks or internal venting of sampled gas
- Mechanical shock
- Cyclic pressure up to 10 kPa (100 cmH<sub>2</sub>O)
- Other sources of interference, if any

Measurement accuracy of the sidestream CO<sub>2</sub> module may be affected by the breath rate and inspiration/expiration (I/E) ratio. Measurement accuracy of the microstream CO<sub>2</sub> module may be affected by the breath rate. For more information, refer to A.13.9 CO<sub>2</sub> Specifications.

## 17.4 CO<sub>2</sub> Display

The CO<sub>2</sub> numeric and waveform area provide FiCO<sub>2</sub> measurement, EtCO<sub>2</sub> measurement, awRR measurement, and a CO<sub>2</sub> waveform.



(1) CO<sub>2</sub> waveform

(2) End tidal CO<sub>2</sub> value (EtCO<sub>2</sub>)

(3) Airway respiration rate (awRR)

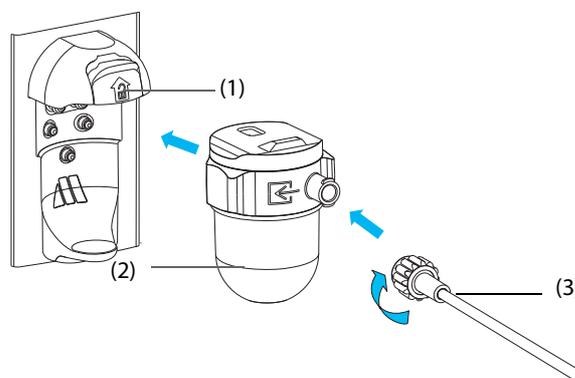
(4) Fraction of inspired CO<sub>2</sub> (FiCO<sub>2</sub>)

## 17.5 Measuring CO<sub>2</sub> Using Sidestream/Microstream CO<sub>2</sub> Module

### 17.5.1 Preparing to Measure CO<sub>2</sub> Using Sidestream CO<sub>2</sub> Module

To prepare the CO<sub>2</sub> module for measurement, follow this procedure:

1. Select the appropriate gas sample line and watertrap according to the patient category.
2. Connect the DRYLINE II watertrap to the CO<sub>2</sub> module, and connect the gas sample line to the watertrap.



(1) Watertrap receptacle

(2) DRYLINE II watertrap

(3) Gas sample line

# 18 Review

## 18.1 Review Overview

Trends are patient data collected over time and displayed in graphic, tabular, or other forms to give you a picture of how your patient's condition is developing. You can review the events, 12-lead ECG analysis results and waveforms (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C), full disclosure waveforms, and so on.

## 18.2 Review Page

The **Review** page contains tabs to display trend data in tabular, graphic, or other forms.

### NOTE

- The derived leads are marked with a "d" in front of the lead label, for example "dV1".

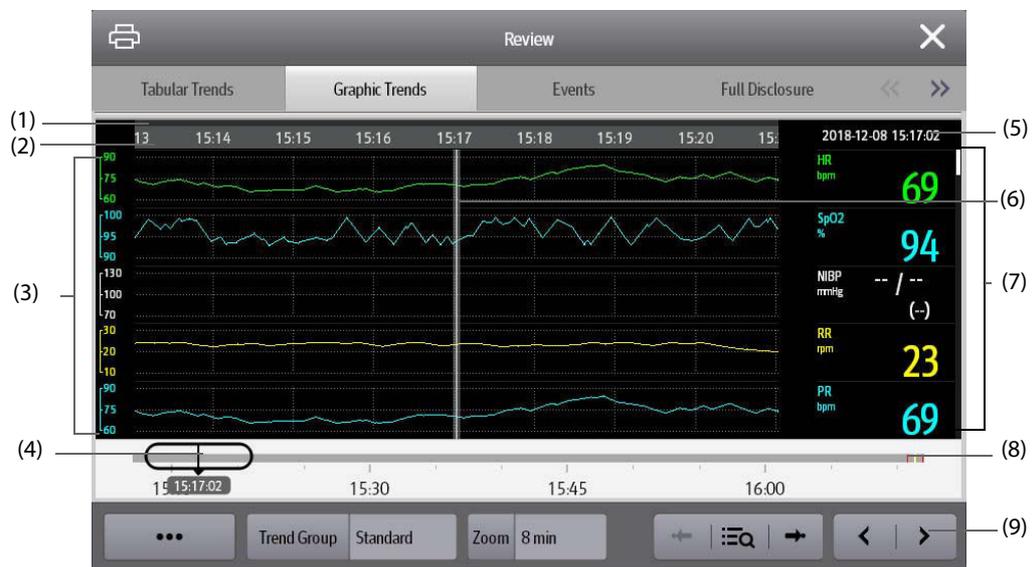
### 18.2.1 Accessing the Review Page

Choose one of the following methods to enter the review page:

- Select the **Review** quick key.
- Select the **Main Menu** quick key → from the **Review** column select the desired option.

### 18.2.2 Example Review Page

The review pages have similar structure. We take the graphic trends review page as an example.



- (1) Event type indicator: different color blocks match different types of events:
  - Red: high priority alarm event
  - Yellow: medium priority alarm event
  - Cyan: low priority alarm event
  - Green: manual event
  - White: operation-related event
- (2) Current window time line: indicates the time length of the current window. In case of system time change, the question mark "?" is displayed beside the time.

- (3) Waveform area: displays trend curves. The color of trend curves is consistent with the color of parameter labels.
- (4) Slider: indicates the position of current window time in the entire time length. Dragging this button left or right enables you to locate the trend data at a specific time and also refreshes trend data in current window accordingly.
- (5) Event area: displays the event of the cursor time. Selecting the event access the event list. If there is no event at the cursor time, the cursor time is displayed.
- (6) Cursor
- (7) Numeric area: displays numeric values at the cursor indicated time. The background color of numeric values matches the alarm priority.
- (8) Time line: indicates the entire time length.
  - : indicates the time length of reviewable trend data.  can be moved within this time length.
  - : indicates the time length of no trend data.  cannot be moved within this time length.
  - Different color blocks at the time line indicate events of different types. See the color definition for the event type indicator.
- (9) Button area.

### 18.2.3 Symbols on Review Pages

The following table lists the symbols on review pages.

Symbol	Description
	Slider: indicates the position of current window time in the entire time length. Dragging the slider left or right enables you to locate the trend data at a specific time and also refreshes data in current window accordingly.
 or 	Goes to the previous or next event.
	Event list: displays events in a chronological order. The most recent event is displayed at the top. The number of asterisk symbols before an event matches alarm priority.
	Record button: select it to output patient information and data through the recorder.
	Print button: select it to output patient information and data through the printer.

### 18.2.4 Common Operations

This section describes common operations for all review pages.

#### 18.2.4.1 Browsing Trend Data

Browse trend data in one of the following ways:

- Move the cursor.
- Move the slider .
- Slide your finger on the screen.

#### 18.2.4.2 Viewing Events

You can view the following types of events:

- Manually triggered events
- Parameter-related operation events and alarm-related events, such as starting C.O. measurement
- Operation events not related to parameters, such as system time change

View events in either of the following ways:

- Select  and select the desired event.
- Select  or  to view the previous or next event.

Events are displayed in a chronological order. The most recent event is displayed at the top. The number of asterisk symbols before and event matches alarm priorities as follows:

- \*\*\*: high priority alarm
- \*\*: medium priority alarm
- \*: low priority alarm

## 18.2.5 Tabular Trends Review Page

The tabular trends review page displays trend data in a tabular form.

### 18.2.5.1 Entering the Tabular Trends Review Page

Choose one of the following methods to enter the tabular trends review page:

- Select the **Review** quick key → select the **Tabular Trends** tab.
- Select the **Main Menu** quick key → from the **Review** column select **Tabular Trends**.

### 18.2.5.2 Changing the Trend Group

To change the trend group, follow this procedure:

1. Enter the tabular trends review page.
2. Set **Trend Group**.

### 18.2.5.3 Editing the Trend Group

The setting of the **Trend Group** defines the contents of displayed printed trends. To edit the trend group, follow this procedure:

1. Enter the tabular trends review page by either of the following ways:
  - ◆ Select the **Review** quick key → select the **Tabular Trends** tab.
  - ◆ Select the **Main Menu** quick key → from the **Review** column select **Tabular Trends**.
2. Select **Group Setup** → select the desired tab.

#### NOTE

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- **You cannot edit trend group labeled All or Standard.**
  - **ECG parameter and waveform are always displayed in the first row on the trend page. It cannot be deleted or moved.**
- 

### 18.2.5.4 Changing the Resolution of Trend Data

The interval of tabular trends defines the interval of displaying trend data. Short interval is especially suited for neonatal applications, where the clinical situation may change very quickly. In adult monitoring, where the patient's status typically changes more gradually, a longer interval may be more informative.

To change the interval of trend data, follow this procedure:

1. Enter the tabular trends review page.
2. Select **Interval**.
  - ◆ **5 sec or 30 sec**: select to view up to 4 hours of tabular trends at an interval of 5 seconds or 30 seconds.
  - ◆ **1 min, 5 min, 10 min, 15 min, 30 min, 1 hr, 2 hrs, or 3 hrs**: select to view up to 120 hours of tabular trends at selected interval.
  - ◆ Select parameters, such as NIBP, C.O. to view the tabular trends when parameter measurements are acquired.

### 18.2.5.5 Printing a Tabular Trends Report

To print a tabular trends report, follow this procedure:

1. Enter the tabular trends review page.
2. Select  at the upper left corner of the review page to enter the **Print Setup** menu.
3. Set the tabular trends report as described in 22.6.3 *Setting Tabular Trends Reports*.
4. Select  in the **Tabular Trends Report** menu to print the report.

### 18.2.6 Graphics Trends Review Page

The graphic trends review page displays trend data in a graphic form.

#### 18.2.6.1 Entering the Graphic Trends Review Page

Choose one of the following methods to enter the graphic trends review page:

- Select the **Review** quick key → select the **Graphic Trends** tab.
- Select the **Main Menu** quick key → from the **Review** column select **Graphic Trends**.

#### 18.2.6.2 Changing the Trend Group

For more information, see 18.2.5.2 *Changing the Trend Group*.

#### 18.2.6.3 Editing the Trend Group

For more information, see 18.2.5.3 *Editing the Trend Group*.

#### 18.2.6.4 Changing the Resolution of Trend Data

To change the length of trend data displayed on the current screen, follow this procedure:

1. Enter the graphic trends review page.
2. Select **Zoom**.
  - ◆ **8 min:** the screen displays eight minutes of trend data. You can view the recent one hour data.
  - ◆ **30 min, 1 hr, 2 hrs, 4 hrs:** the screen displays 30 minutes, one hour, two hours, or four hours of trend data. You can view the recent four hour data.
  - ◆ **8 hrs, 12 hrs, 24 hrs, 48 hrs:** the screen displays eight hours, 12 hours, 24 hours, or 48 hours of trend data. You can view the recent 120 hours of data.

#### 18.2.6.5 Changing the Number of Waveforms

To change the number of waveforms displayed on the trend review page, follow this procedure:

1. Enter the graphic trends review page.
2. Select **Trends**.

#### 18.2.6.6 Printing a Graphic Trends Report

To print a graphic trends report, follow this procedure:

1. Enter the graphic trends review page.
2. Select  at the upper left corner of the review page to enter the **Graphic Trends Report** menu.
3. Set the graphic trends report as described in 22.6.4 *Setting Graphic Trends Reports*.
4. Select  in the **Graphic Trends Report** menu to print the report.

## 18.2.7 Events Review Page

The monitor stores events in real time, including technical alarm events, physiological alarm events, manual events, and operational events. When an event occurs, all the measurement numerics and three event-related waveforms 16 seconds before and after the event are stored.

### NOTE

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- **A total loss of power has no impact on the events stored.**
  - **Alarms are saved as events and will be maintained if the equipment is powered down. The time of equipment power down is not recorded as an event and cannot be reviewed.**
  - **Earlier events will be overwritten by later ones if the capacity is reached.**
- 

### 18.2.7.1 Entering the Events Review Page

Choose one of the following methods to enter the events review page:

- Select the **Review** quick key → select the **Events** tab.
- Select the **Main Menu** quick key → from the **Review** column select **Events**.

The **Event** page displays event list. Events are displayed in descending chronological order. The most recent event is displayed at the top. The number of asterisk symbols before an event indicate alarm priorities.

Different color blocks are displayed on the left of each event to indicate different event types.

- Red: high priority alarm event
- Yellow: medium priority alarm event
- Cyan: low priority alarm event
- Green: manual event
- White: operation-related event

The number of currently selected events and the total number of events are displayed at the top right corner of the event list. For example, 2/4 indicates that the selected event is the second event in the filtered events and the total number of filtered events is 4. **Total** indicates the total number of events. For example: **Total: 28** means that there are a total of 28 events.

### 18.2.7.2 Configuring the Filter

You can filter events by time, alarm priority, alarm category, or parameter group. To configure the filter, follow this procedure:

1. Enter the **Events** page.
2. Switch on **Filter**.
3. Select **Filter Setup** and set the desired filter criterion.

### 18.2.7.3 Editing Events

To edit events, follow this procedure:

1. Enter the **Events** page and tick off the desired events.
2. Select ... to edit the selected events.
  - ◆ **Lock:** manually lock the event. Locked events cannot be deleted.
  - ◆ **Note:** enter comments for the event.

### 18.2.7.4 Viewing Event Details

To view waveforms and parameter values at the event time, follow this procedure:

1. Enter the **Events** page.
2. Select **Overview**.

To display beat labels on the first ECG waveform, switch on **Beat Annotation**. The white beat labels indicate heart beats classification and may explain suspected, missed, or false arrhythmia calls. Heart beats are classified as follows:

- N = Normal
- V = Ventricular ectopic
- S = Supraventricular premature
- P = Paced
- L = Learning
- ? = Insufficient information to classify beats
- I = Inoperative (for example, Lead Off)
- M = Missed beat

If you switch on **Beat Annotation** on the **Events** page, beat labels will also be displayed on the **Full Disclosure** page, and vice versa. Beat labels can be printed out.

### 18.2.7.5 Printing Event Reports

You can print event reports either via a printer or via a recorder.

To do so, follow this procedure:

1. Enter the events review page.
2. Select  to enter the **Print Setup** menu.
3. Select the desired options.
  - ◆ **Print Event List**: print the entire event list.
  - ◆ **Print List of Selected Events**: print the list of selected events.
  - ◆ **Print Detail of Selected Events**: print the details of selected events.
  - ◆ **Print Displayed Event Detail**: print the waveforms and parameters of the currently displayed event.
4. To print a report via a recorder, select .

### 18.2.8 Full Disclosure Review Page

You can review up to 48-hours' waveform data on the full disclosure review page. You can view both the compressed waveforms, full waveforms and numeric values.

#### 18.2.8.1 Entering the Full Disclosure Review Page

Choose one of the following methods to enter the full disclosure review page:

- Select the **Review** quick key → select the **Full Disclosure** tab.
- Select the **Main Menu** quick key → from the **Review** column select **Full Disclosure**.

#### 18.2.8.2 Selecting Waveforms

Before reviewing compressed waveforms, you must select waveforms you want to store and display. To store and display the desired waveforms, follow this procedure:

1. Enter the full disclosure review page.
2. Select **Setup** to enter the **Select Waveform** page.
3. Select the **Storage** tab and set the desired waveforms to be stored in the monitor. Select the **Display (Maximum: 3)** tab and set the desired waveforms to be displayed on the **Full Disclosure** page.

#### NOTE

- **The more waveforms selected in the Storage column, the shorter the waveform storage time. The waveforms may not be stored for 48 hours. Please exert caution when selecting waveforms.**

In case of alarms, the background of compressed waveform block at the alarm time is marked with a special color:

- Red: high alarm priority
- Yellow: medium alarm priority
- Cyan: low alarm priority

### 18.2.8.3 Setting Scale and Duration

To set the length and size of displayed compressed waveforms, follow this procedure:

1. Enter the full disclosure review page.
2. Select **...**, and then select **Scale** to set ECG waveform gain.
3. Select **Duration** to set the length of displayed waveforms.
4. Select parameter label to set scale for each parameter.

### 18.2.8.4 Viewing Details of Compressed Waveforms

To view the full waveforms and numeric values, follow this procedure:

1. Enter the full disclosure review page.
2. Select **Details**.

You can perform the following operations on the this page:

- Switch on **Beat Annotation**. For more information, see *18.2.7.4 Viewing Event Details*.
- Select **...** and set **Speed** and **ECG Gain**, or **Save As Event**.
- Select **Overview** to switch to the compressed waveform page.

### 18.2.8.5 Printing the Full Disclosure Waveform Report

To print a compressed waveform report, follow this procedure:

1. Enter the full disclosure review page.
2. Select  and set the time range for printing.

## 18.2.9 OxyCRG Review Page

You can review up to 48 hours' trend curves on the OxyCRG review page. The OxyCRG review functionality is applicable for neonatal monitoring only.

### 18.2.9.1 Entering the OxyCRG Review Page

Choose one of the following methods to enter the OxyCRG review page:

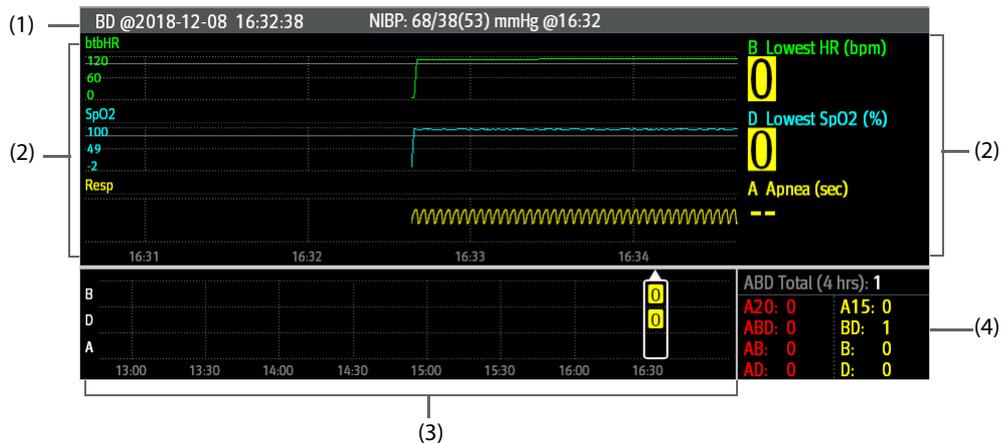
- From the OxyCRG screen, select the ABD events list area.
- Select the **Review** quick key → select the **OxyCRG** tab.
- Select the **Main Menu** quick key → from the **Review** column select **OxyCRG**.

#### NOTE

- 
- **OxyCRG Review Page is available only when Patient Category is set to Neo.**
-

### 18.2.9.2 The Display of the OxyCRG Review Page

The following figure shows the OxyCRG screen:



- (1) Event title area: displays event type, event time, the value and time of TEMP/NIBP measurement.
- (2) Event detail area: displays parameter trends, compressed waveform, and parameter values of selected event.
- (3) Event summary area: displays ABD events happened within the displayed period.
- (4) Event statistics area: displays the total number of ABD events happened within the displayed period and the numbers of each event.

### 18.2.9.3 Changing the Resolution of Trend Curves

To set the resolution of trend curves, follow this procedure:

1. Enter the OxyCRG review page.
2. Set **Zoom**.

### 18.2.9.4 Printing an OxyCRG Review Report

To print an OxyCRG review report, follow this procedure:

1. Enter the OxyCRG review page.
2. Set the desired compressed waveform and duration.
3. Select .

### 18.2.10 12-Lead ECG Review Page (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C)

When 12-lead ECG analysis is performed, you can review the most recent 20 events of 12-lead analysis. For more information, see *10 Resting 12-Lead ECG Analysis (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C)*.

#### 18.2.10.1 Entering the 12-Lead Review Page

Choose one of the following methods to enter the 12-lead ECG review page:

- Upon completion of 12-lead ECG analysis, select **Review** from the **12-Lead Interpretation** screen. For more information, see *10 Resting 12-Lead ECG Analysis (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C)*.
- Select the **Review** quick key → select **12-Lead ECG**.
- Select the **Main Menu** quick key → from the **Review** column select **12-Lead ECG**.

### 18.2.10.2 Switching to Median Complex (for Glasgow Algorithm Only)

The median complex template displays 12-lead ECG waveforms on one page in 4 columns, with 3 lines in each column, and one rhythm lead waveform at the bottom. Besides, a short vertical bar appears above each waveform, marking the start and end position of P-wave and QRS-wave and the end position of T-wave.

To view Median Complex, follow this procedure:

1. Enter the 12-lead review page.
2. Select **Median Complex**.

Selecting **Waveform** can return to the 12-lead ECG waveform page.

### 18.2.10.3 Setting 12-Lead ECG Waveforms

To set the 12-lead ECG waveforms on the review page, follow this procedure:

1. Enter the 12-lead review page.
2. Set **Speed, Gain, and Layout**.

### 18.2.10.4 Printing the 12-Lead ECG Report

To print the 12-Lead ECG report, follow this procedure:

1. Enter the 12-lead review page.
2. Select .

## 18.2.11 ST Review Page

When ST analysis is enabled, the monitor saves ST segments and values at an interval of one minute. You can review the latest 120 hours of ST data.

### 18.2.11.1 Entering the ST Review Page

Choose either of the following methods to enter the ST review page:

- Select the **Review quick key** → select the **ST** tab.
- Select the **Main Menu** quick key → from the **Review** column select **ST**.

### 18.2.11.2 Setting the ST Reference

You can set the currently displayed ST as reference. To do so, follow this procedure:

1. Enter the ST review page.
2. Select **Set Reference**.

#### NOTE

- **The ST baseline is used as ST reference by default.**

### 18.2.11.3 Displaying/Hiding the ST Reference

To display or hide ST reference, follow this procedure:

1. Enter the ST review page.
2. Select **Display Reference** or **Hide Reference**.

### 18.2.11.4 Displaying/Hiding Markers

To display or hide markers, follow this procedure:

1. Enter the ST review page.
2. Select **Display Marker** or **Hide Marker**.

### 18.2.11.5 Printing ST Data

To print ST data, follow this procedure:

1. Enter the ST review page.
2. Select .

## 18.3 Reviewing Discharged Patients

For discharged patients, you can review the trend data in the review page. You can also review the events and 12-lead ECG analysis results (for ePM 12/ePM 12A/ePM 12C/ePM 15/ePM 15A/ePM 15C).

### 18.3.1 Checking the Data of a Discharged Patient

1. Access the **Discharged Patients** dialog box by either of the following ways:
  - ◆ Select the **Discharged Patients** quick key.
  - ◆ Select the **Main Menu** quick key → from the **Patient Management** column select **Discharged Patients**.
2. From the patient list select the desired patient.
3. Select **Detail**.

### 18.3.2 Checking the Information of a Discharged Patient

1. Access the **Discharged Patients** dialog box by either of the following ways:
  - ◆ Select the **Discharged Patients** quick key.
  - ◆ Select the **Main Menu** quick key → from the **Patient Management** column select **Discharged Patients**.
2. From the patient list select the desired patient.
3. Select **Detail**.
4. Select the  icon to enter the **Patient Management** dialog box.
5. Select **OK** to exit the **Patient Management** dialog box.

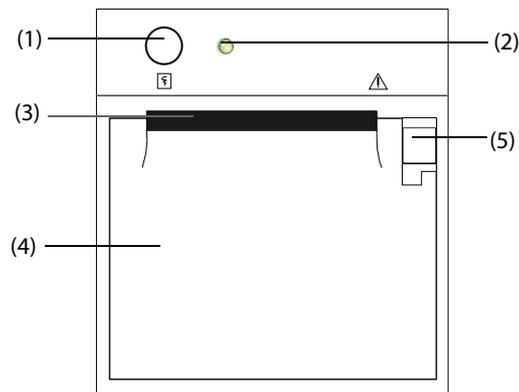
# 21 Recording

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## 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

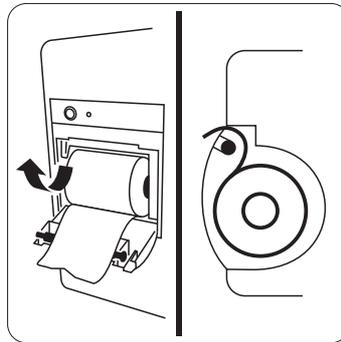
To clear recording tasks, follow this procedure:

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.



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### CAUTION

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- **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.
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## 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

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

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

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)	
<b>Alarm limit</b>	<b>Range</b>	<b>Step</b>
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)			
<b>PR</b>				
Measurement range	30 to 300 bpm			

# D Alarm Messages

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## D.1 Physiological Alarm Messages

This section lists physiological alarms, their default priority, and the actions that can be taken when an alarm occurs.

### D.1.1 General Physiological Alarm Messages

Alarm messages	Default priority	Cause and solution
XX High	Med	XX value has risen above the high alarm limit or fallen below the low alarm limit. Check the patient's condition and check if the patient category and alarm limit settings are correct.
XX Low	Med	

**Note:** XX represents a measurement or parameter label, such as HR, NIBP, PVCs, RR, SpO2, PR, and so on.

### D.1.2 Arrhythmia Alarm Messages

Alarm message	Default priority
Asystole	High
VFib/VTac	High
Vtac	High
Vent Brady	High
Extreme Tachy	High
Extreme Brady	High
PVCs/min	Med
Pauses/min	Med
R on T	Med
Bigeminy	Med
Trigeminy	Med
Tachy	Med
Brady	Med
Multiform PVC	Med
Vent. Rhythm	Med
Nonsus. Vtac	Med
Run PVCs	Low
Pause	Low
Couplet	Prompt
PVC	Prompt
Irr Rhythm	Prompt
Pacer Not Pacing	Prompt
Pacer Not Capture	Prompt

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<sub>2</sub> Technical Alarm Messages

Alarm message	Default priority	Indication on alarm reset	Cause and solution
SpO <sub>2</sub> Sensor Off	Adjustable	B	The SpO <sub>2</sub> sensor has become detached from the patient or the module. Check the sensor connection. If the alarm persists, replace the sensor.
SpO <sub>2</sub> No Sensor	Low	A	The SpO <sub>2</sub> extension cable is detached from the SpO <sub>2</sub> module, or the SpO <sub>2</sub> sensor is detached from the SpO <sub>2</sub> extension cable. Check the SpO <sub>2</sub> cable and the sensor connection. If the alarm persists, replace the sensor.
SpO <sub>2</sub> 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.
SpO <sub>2</sub> No Pulse	Low	C	The SpO <sub>2</sub> sensor failed to obtain pulse signal. Check the patient's condition and replace the sensor application site. If the alarm persists, replace the sensor.
SpO <sub>2</sub> Sensor Incompatible	Low	C	Incompatible or an unspecified SpO <sub>2</sub> sensor is used. Use specified sensors.
SpO <sub>2</sub> 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.
SpO <sub>2</sub> Interference	Low	C	The SpO <sub>2</sub> signal has been interfered. Check for any possible sources of signal noise and check the patient for excessive motion.
SpO <sub>2</sub> Sensor Error	Low	C	Replace the sensor and measure again.

Alarm message	Default priority	Indication on alarm reset	Cause and solution
SpO <sub>2</sub> Searching Pulse	Prompt	/	SpO <sub>2</sub> is searching for pulse.
SpO <sub>2</sub> Low Perfusion	Prompt	/	The SpO <sub>2</sub> 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 category 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.



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## Accessories and Consumables

CATALOGUE

2022.07

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[www.mindray.com](http://www.mindray.com)

P/N:ENG-Accessories and Consumables Catalogue-210210X142P-20220728  
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### Welcome to the Mindray Accessories Catalogue

This catalogue will provide you with the parts and accessories that connect to your Mindray Patient Monitor, Electrocardiograph, Defibrillator. Each Mindray product is the product of a special brand of patient focused, clinician-friendly design. For this reason, you can expect the same service, focus and quality with our parts and accessories.

### Finding the Right Part

This catalog has been designed to make finding the right part easy. Chapters are organized by specific parameter categories. Simply locate the type of part you are looking for under the appropriate category.

### Note:

This catalog is not an Operating Instructions Manual. This catalog will assist you in identifying the correct parts and accessories to connect to your Mindray product, please refer to the Operating Instructions Manual.

Warnings, Precautions and Notes can also be found in the Operating Instructions.

01

## Patient Monitor Accessories

ECG	2
SpO <sub>2</sub>	22
NIBP	36
TEMP	52
CO <sub>2</sub>	61
AG <sub>2</sub>	74
IBP	78
ICP	83
RM	84
C.O.	86
ICG	89
BIS	90
PiCCO <sub>2</sub>	91
CCO/ScvO <sub>2</sub>	95
EEG	96
ANI	101
NMT	102
rSO <sub>2</sub>	105
Mounting	106
Rolling stands	116
Others	118

02

## Defibrillator Accessories

122

03

## Electrocardiograph Accessories

136

## Integrated ECG Cables - AHA

For BeneVision, BeneView, ePM, iPM, uMEC, iMEC series monitors, BeneHeart defibrillator, uMED 20

Picture	Model	Part No.	No. Description	Purchasing Unit
	EA6251B	040-000961-00	ECG cable and wires (integrative): Adu/Ped, 12 Pin 5-Lead, Defib-Proof, AHA, Snap, 3.6 m	Each
	EA6231B	040-000965-00	ECG cable and wires (integrative): Adu/Ped, 12 Pin 3-Lead, Defib-Proof, AHA, Snap, 3.6 m	Each
	EA6251A	040-000960-00	ECG cable and wires (integrative): Adu/Ped, 12 Pin 5-Lead, Defib-Proof, AHA, Clip, 3.6 m	Each
	EA6231A	040-000964-00	ECG cable and wires (integrative): Adu/Ped, 12 Pin 3-Lead, Defib-Proof, AHA, Clip, 3.6 m	Each

## Trunk Cables

- Easy to replace leadwires
- Meeting the requirements of EC53
- Outstanding shielding property and anti-interference performance, protecting ECG signal from being interfered
- Excellent defibrillation-proof performance, well protecting the equipment
- ESU-proof, ensuring ECG signals not interfered during operation Flexible and durable cables
- Outstanding cable material, enduring repeated cleaning and disinfection
- Latex free

For BeneVision, BeneView, ePM, iPM, uMEC, iMEC series monitors, BeneHeart defibrillator, uMED 20

Picture	Model	Part No.	No. Description	Purchasing Unit
	EV6201	0010-30-42719 (009-004728-00)	ECG trunk cable: 3/5-lead, Adu/Ped, 12 Pin, Defib-Proof, AHA/IEC, 3 m	Each
	EV6211	0010-30-42723	ECG trunk cable: 3/5-lead, Adu/Ped, 12 Pin, ESU-Proof, AHA/IEC, 3 m	Each
	EV6202	0010-30-42720	ECG trunk cable: 3-lead, Ped/Neo, 12 Pin, Defib-Proof, AHA/IEC, 3 m	Each

## ECG Leadwires – IEC

- Easy to replace trunk cables
- Meeting the requirements of EC53
- Outstanding shielding property and anti-interference performance, protecting ECG signal from being interfered
- Flexible and durable cables
- Outstanding cable material, enduring repeated cleaning and disinfection
- Latex free

### Match with 3/5-lead cables (0010-30-42719, 0010-30-42723)

Picture	Model	Part No.	No. Description	Purchasing Unit
	EL6502A	0010-30-42728	5-Lead ECG wires, Clip, Adu, TPU, IEC, 0.6 m/1m	Each
	EL6504A	0010-30-42730	5-Lead ECG wires, Clip, Adu/Ped, TPU, IEC, long, 1m/1.4 m	Each
	EL6502B	0010-30-42736 (009-004730-00)	5-Lead ECG wires, Snap, Adu, TPU, IEC, 1m/1.4 m	Each

Picture	Model	Part No.	No. Description	Purchasing Unit
	EL6308B	0010-30-42733	3-Lead ECG wires, Snap, Adu/Ped, TPU, IEC, 1m	Each
	EL6304A	0010-30-42732	3-Lead ECG wires, Clip, Adu/Ped, TPU, IEC, 1m	Each

Match with 3-lead cables (0010-30-42720, 0010-30-42724)				
Picture	Model	Part No.	No. Description	Purchasing Unit
	EL6306A	0010-30-42897	3-Lead ECG wires, Clip, Neo, TPU, IEC, 1m	Each

## Electrode

- Latex free
- DEHP free
- Good biocompatibility, avoiding allergic reactions to patient

Picture	Model	Part No.	No. Description	Purchasing Unit
	31499224	0010-10-12304	Adult ECG Electrode (Kendall, Medi Trace 210)	10 pcs/pouch
	H124SG	900E-10-04880	Neonatal ECG Electrode (Kendall, H124SG)	50pcs/pouch
		040-002711-00	Adult ECG electrode (INTCO)	5 pcs/pouch

Picture	Model	Part No.	No. Description	Purchasing Unit
		040-002833-00	Pediatric/Neonatal ECG electrode (INTCO)	30 pcs/pouch

### Match with 3-lead Neonatal cables (040-000754-00)

Picture	Model	Part No.	No. Description	Purchasing Unit
	0406062	040-003254-00	Disposable neonatal 3-lead pre-wired electrode, radio translucent, AHA, 60 cm	50 pouch/box (3 pcs/pouch)

## SpO<sub>2</sub> Accessories

### Mindray SpO<sub>2</sub> Accessories



### Integrated SpO<sub>2</sub> Cable

For BeneVision, BeneView, ePM, iPM, uMEC, iMEC, VS series monitors, BeneHeart defibrillator

Picture	Model	Part No.	No. Description	Purchasing Unit
	512FLH	115-012807-00	Integrative reusable SpO <sub>2</sub> sensor, Adult, Finger, >30 kg, 3 m	Each
	518BLH	115-020887-00	Integrative reusable SpO <sub>2</sub> sensor, Neo, Foot (adult/pediatric, finger), <5 kg, 3 m	Each

### Mindray SpO<sub>2</sub> Cable

For BeneVision, BeneView, ePM, iPM, uMEC, iMEC, VS series monitors, BeneHeart defibrillator

- Ergonomic design, precise engineering and clinical testing guaranteeing reliable measurement
- Well anti-electromagnetic interference, suitable for complex electrical environment
- Flexible and durable cables
- Outstanding cable jacket, enduring repeated cleaning and disinfection
- Easy to change sensor, meeting clinical requirements for patient use
- Latex free

Picture	Model	Part No.	No. Description	Purchasing Unit
	562A	0010-20-42710 (009-004600-00)	Mindray SpO <sub>2</sub> extension cable, 7 Pin, 2.5 m	Each
	562B	040-001443-00	Mindray SpO <sub>2</sub> extension cable, 7 Pin, 1.2 m	Each

### For Telemetry

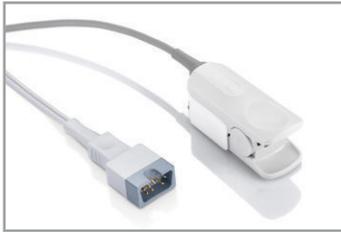
Picture	Model	Part No.	No. Description	Purchasing Unit
	SAT 10	115-029488-00	Mindray SpO <sub>2</sub> module for BeneVision TM80, 6 Pin, 0.5 m	Each

## Mindray SpO<sub>2</sub> Sensor

### Finger-Clip Sensor (Reusable)

- Ergonomic design, precise engineering and clinical testing guaranteeing reliable measurement
- High quality photoelectric element, ensuring precise measurement
- Well anti-electromagnetic interference, suitable for complex electrical environment
- Perfect performance against light interference, can be used in environment of strong light
- ESU-proof, ensuring SpO<sub>2</sub> signals not interfered during operation
- Strict electric safety specification, guaranteeing safety for use
- Few pit structure, not easily staining, convenient for cleaning
- Outstanding cable jacket, enduring repeated cleaning and disinfection
- Latex free
- Good biocompatibility, avoiding allergic reactions to patient

### For all Mindray SpO<sub>2</sub> Cables and PM-50/60 pulse oximeter

Picture	Model	Part No.	No. Description	Purchasing Unit
	512F	512F-30-28263	Reusable sensor, adult, finger-clip, 1.1 m, >30 kg	Each
	512H	512H-30-79061	Reusable sensor, pediatric, finger-clip, 1.1 m, 10-30 kg	Each

### Finger-Tip Sensor (Reusable)

- Ergonomic design, precise engineering and clinical testing guaranteeing reliable measurement
- High quality photoelectric element, ensuring precise measurement
- Well anti-electromagnetic interference, suitable for complex electrical environment
- Perfect performance against light interference, can be used in environment of strong light
- ESU-proof, ensuring SpO<sub>2</sub> signals not interfered during operation
- Strict electric safety specification, guaranteeing safety for use
- Silicone rubber sheath, not likely to break in case of drop, hardly sensor off
- Few pit structure, not likely staining, convenient for cleaning
- Outstanding cable jacket, enduring repeated cleaning and disinfection
- Latex free
- Good biocompatibility, avoiding allergic reactions to patient

### For all Mindray SpO<sub>2</sub> Cables and PM-50/60 pulse oximeter

Picture	Model	Part No.	No. Description	Purchasing Unit
	512E	512E-30-90390	Reusable sensor, adult, finger-tip, 1.1 m, >30 kg	Each
	512G	512G-30-90607	Reusable sensor, pediatric, finger-tip, 1.2 m, 10-30 kg	Each

**Adapted with the tubing (6200-30-09688, 115-012522-00, 040-002712-00)**

Picture	Model	Part No.	No. Description	Purchasing Unit
	CM1905	040-000688-00	NIBP Cuff Tubing Adapter (Adult tubing to Neonate cuff)	Each

**CM1200 Series**

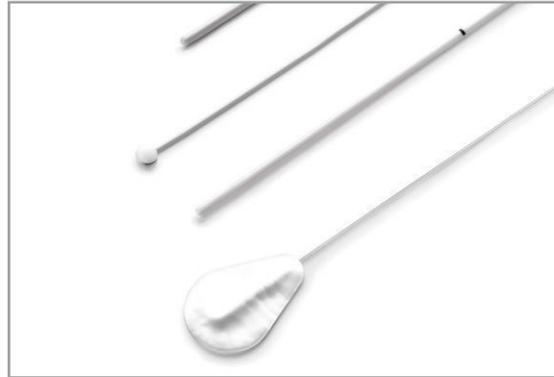
- Soft and comfortable. Low hazard to skin even if a long-term use
- Easy to clean. The cuff wrap can not be damped or stained by liquid if duly cleaned
- Pilling-proof. Not deform even if for long-term use
- TPU bladder ensures good air tightness and long life
- Latex free, PVC free
- Good biocompatibility, free from biological hazard to skin

**Connected with the tubing 6200-30-09688, 115-012522-00 and 040-002712-00**

Picture	Model	Part No.	No. Description	Purchasing Unit
	CM1200	115-002480-00	Reusable cuff, Small Inf, 7-13 cm	Each
	CM1201	0010-30-12157	Reusable cuff, Inf, 10-19 cm, with connector	Each

Picture	Model	Part No.	No. Description	Purchasing Unit
	CM1202	0010-30-12158	Reusable cuff, Child, 18-26 cm, with connector	Each
	CM1203	0010-30-12159	Reusable cuff, Adu, 25-35 cm, with connector	Each
	CM1204	0010-30-12160	Reusable cuff, Large Adu, 33-47 cm, with connector	Each
	CM1205	0010-30-12161	Reusable cuff, Thigh, 46-66 cm, with connector	Each

## Temperature Accessories



### Reusable Temperature Probes

- Available in Rectal/Esophageal and Skin Surface Styles
- Flexible and durable cables
- Outstanding cable material, enduring repeated cleaning and disinfection
- Latex free
- Good biocompatibility, avoiding allergic reactions to patient

For BeneVision, BeneView, ePM, iPM, uMEC, iMEC series monitors, BeneHeart defibrillator

Picture	Model	Part No.	No. Description	Purchasing Unit
	MR401B	0011-30-37392	Reusable Temp Probe, Adu, Esophageal/Rectal, 2 Pin, 3 m	Each
	MR402B	0011-30-37394	Reusable Temp Probe, Ped/Neo, Esophageal/Rectal, 2 Pin, 3 m	Each
	MR403B	0011-30-37393	Reusable Temp Probe, Adu, Skin, 2 Pin, 3.6 m	Each
	MR404B	0011-30-37395	Reusable Temp Probe, Ped/Neo, Skin, 2 Pin, 3.6 m	Each

For BeneVision, BeneView, ePM, uMEC series monitors, BeneHeart defibrillator

Picture	Model	Part No.	No. Description	Purchasing Unit
	EA6231B	115-043024-00 (100-000080-00)	M02C DRYLINE II water trap Adu/Ped for single-slot module	10 pcs/box
	EA6232B	115-043025-00 (100-000081-00)	M02C DRYLINE II water trap Neo for single-slot module	10 pcs/box

For BeneVision, BeneView, ePM, iPM, uMEC, iMEC series monitors, BeneHeart defibrillator

Picture	Model	Part No.	No. Description	Purchasing Unit
	60-15200-00	115-043017-00 (9200-10-10533)	Sampling line, Adu/Ped, 2.5 m	25 pcs/box
	60-15300-00	115-043018-00 (9200-10-10555)	Sampling line, Neo, 2.5 m	25 pcs/box
	60-14100-00	115-043020-00 (9000-10-07486)	Dryline airway adapter, straight	10 pcs/box
	60-14200-00	115-043021-00 (9000-10-07487)	Dryline airway adapter, elbow	10 pcs/box

# Invasive Blood Pressure (IBP) Accessories

## Invasive Blood Pressure Cables

- Compatible solution with major monitor IBP module interface and disposable pressure transducer brands in the market
- Flexible and durable cables
- Outstanding cable material, enduring repeated cleaning and disinfection
- Latex free

### For BeneVision, BeneView, ePM, iPM, uMEC, iMEC series monitors, BeneHeart defibrillator

Picture	Model	Part No.	No. Description	Purchasing Unit
	IM2201	001C-30-70759	12 Pin IBP Cable (for ICU Medical), 4 m	Each
	IM2202	001C-30-70757	12 Pin IBP Cable (for BD), 4 m	Each
	IM2207	0010-21-43082	12 Pin IBP Cable (for Memscap, SP844 82031 transducer), 4 m	Each

Picture	Model	Part No.	No. Description	Purchasing Unit
	IM2211	0010-21-12179	12 Pin IBP Cable (for Edwards), 4 m	Each
	IM2206	115-017849-00	12 Pin IBP cable (for Utah), 4 m	Each

### Y-type IBP cable: For BeneView, iPM series patient monitor

Picture	Model	Part No.	No. Description	Purchasing Unit
	IM2204	040-001029-00	Y-type IBP cable (switch one connector to two connectors)	Each

## Rolling stands

Picture	Model	Part No.	No. Description	Purchasing Unit
		045-003133-00	Roll Stand A (≤ 23kg, fixed-angle) (for N22/N19)	Each
		045-000915-00	Roll Stand B (≤15kg, fixed-angle, with two baskets) + Adapter (for N17/N15/ePM15/ePM15M)	Each
		045-003255-00	Roll Stand C (≤6kg, fixed-angle, with two brackets and barrel fix mounting) + Quick lock (for N12, ePM under 12" inch screen)	Each
		045-000924-00	Roll stand (for N12, ePM and uMEC under 12" inch screen)	Each

Picture	Model	Part No.	No. Description	Purchasing Unit
		045-003053-00	Basic rolling stand (for ePM under 12" inch screen and uMEC series in ROW market)	Each
		045-003052-00	VS series basic rolling stand (ONLY for ROW market)	Each
		045-004267-00	Rolling Stand (Standard) + common Quick lock (compact with all existing models under 12" inch screen and VS)	Each
		045-004268-00	VS 8/9 Rolling Stand (Advanced) + common Quick lock	Each
		045-004269-00	VS 8/9 Rolling Stand (Advanced, with extended battery capacity) + common Quick lock (the extended battery 115-034132-00 need to be purchased separately)	Each

## Others

Picture	Model	Part No.	No. Description	Purchasing Unit
		009-003116-00	Nurse call cable (for ePM, VS series)	Each
		8000-21-10361	Nurse call cable (for N series)	Each
		009-005391-00	Output cable for ECG, IBP analog signal and Defib. Sync, MPM with MP1 port (for N series)	Each

Picture	Model	Part No.	No. Description	Purchasing Unit
		009-003117-00	Analog output cable (for ePM, iPM, uMEC, iMEC series)	Each
		009-003118-00	Defib Sync cable (for ePM, iPM, uMEC, iMEC series)	Each
		A30-000001---	Thermal Paper (50 mmX20 m)	Each

**REFERENCE: IBP-UT**

compatible Disposable IBP transducer  
with Utah/Biosensors connector, to  
work with Utah/Biosensor compatible

Manufacture date: 2022-10

expiry date: 2025-10

Lot number: 2210

Origin: China



Shunmei Medical Co. Ltd  
No. 8 Jinlong Street, Baolong  
Industrial Zone, Longgang  
District, Shenzhen, China  
Tel: 0086-18344359973





MCAL INDICATOR

EO 68

# 15 Monitoring Invasive Blood Pressure (IBP)

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## 15.1 IBP Introduction

IBP monitoring is intended for adult, pediatric and neonatal patients. PAWP monitoring is only intended for adult and pediatric patients.

You can monitor up to 2 invasive blood pressures.

## 15.2 IBP Safety Information

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### WARNING

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- Use only pressure transducers specified in this manual. Never reuse disposable pressure transducers.
  - Make sure that the applied parts never contact other conductive parts.
  - To reduce the hazard of burns during high-frequency surgical procedure, ensure that the monitor's cables and transducers never come into contact with the high-frequency surgical units.
  - When using accessories, their operating temperature should be taken into consideration. For more information, see instructions for use of accessories.
  - All invasive procedures involve risks to the patient. Use aseptic technique. Follow catheter manufacturer's instructions.
  - Mechanical shock to the invasive blood pressure transducer may cause severe shifts in zero balance and calibration, and cause erroneous readings.
- 

## 15.3 Preparing for IBP Monitoring

### 15.3.1 IBP Equipment to Patient Connection

