mindray

mWear™

Wearable Patient Monitor

Infinite care in every step forward

mindray

healthcare within reach

73% 73% of 1855 patients who died before hospital discharge were not admitted to critical care at any stage after surgery[1].

Patient safety is a main concern to clinicians. Wearable devices provide safer and more comfortable monitoring experience. The accuracy, usability of wearable devices and the reliability and security of wireless signal transmission bring great challenges to clinical application[2].

To meet these challenges Mindray develops the mWear* wearable patient monitor to better monitor the patient safety and provide simplicity of clinical application in multiple scenarios.

Medical-grade Wearable Monitoring

Refined product design and medical-grade algorithm give mWear the ability to enhance patient safety.

Refined design
Comfortable wearing experience
Complete wireless interconnection

Reliable design
IP22 Waterproof
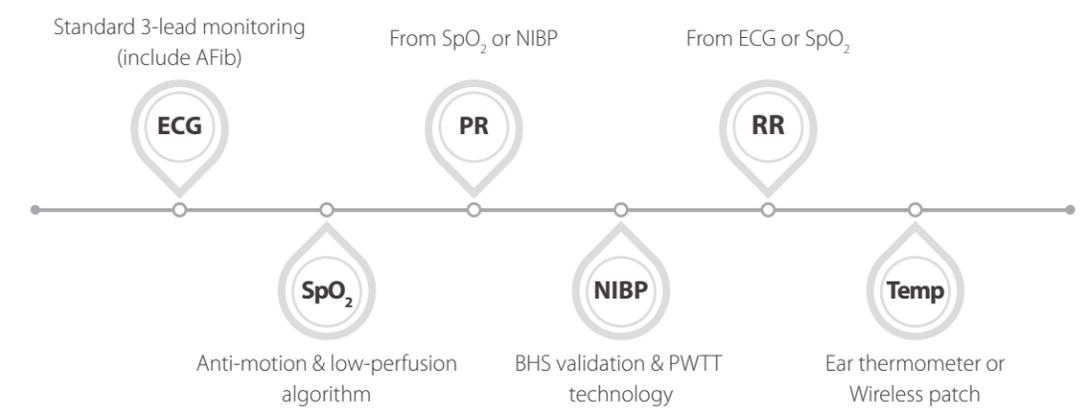Resistant to 48 kinds of disinfectants

Medical-grade monitoring
Multi-parameter monitoring
Innovative health parameters

Ring SpO$_2$ sensor
Normal hand movement with greater comfort

[1] Pearse R M, Rui P M, Bauer P, et al. Mortality after surgery in Europe: a 7 day cohort study[J]. Lancet, 2012, 380(9847): 1059-1065.
[2] Nightingale project summary. https://www.nightingale-h2020.eu/
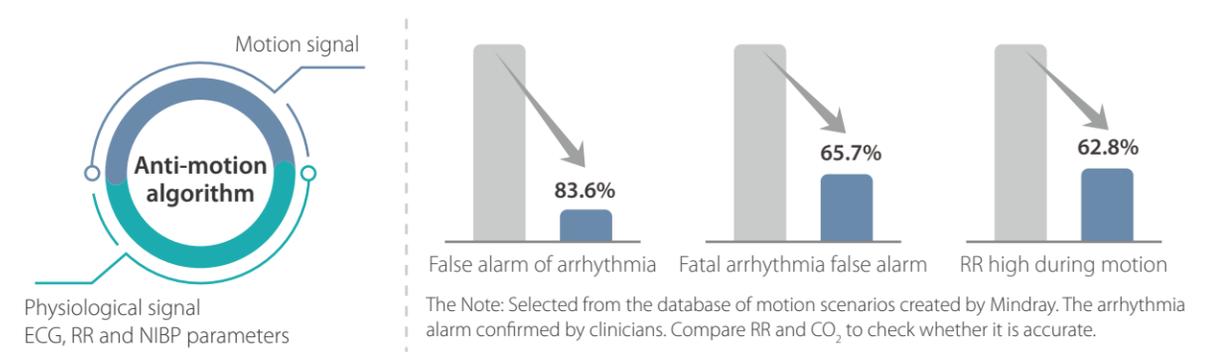 * Including EP30, ES30 and BP20.

Accurate, Reliable Multi-Parameter

Based on years of technology accumulation, Mindray provides accurate and reliable multi-parameter monitoring for clinical teams.

Standard 3-lead monitoring (include AFib) — **ECG**
From SpO$_2$ or NIBP — **PR**
From ECG or SpO$_2$ — **RR**

SpO$_2$ — Anti-motion & low-perfusion algorithm
NIBP — BHS validation & PWTT technology
Temp — Ear thermometer or Wireless patch

Anti-motion Algorithm

Motion artefact can often affect parameter accuracy. Mindray innovatively develops the patented technology[3], which significantly improve the motion artefact performance of mWear.

Motion signal

Anti-motion algorithm

Physiological signal
ECG, RR and NIBP parameters

83.6% — False alarm of arrhythmia
65.7% — Fatal arrhythmia false alarm
62.8% — RR high during motion

The Note: Selected from the database of motion scenarios created by Mindray. The arrhythmia alarm confirmed by clinicians. Compare RR and CO$_2$ to check whether it is accurate.

Health Parameter Monitoring

- Innovative health parameter. Specialized algorithm based on clinical evidence to monitor patient's exercise and sleep time
- Identify four patient statuses: Fall down, exercise, sleep, and rest
- the wearable device can be used for postoperative sleep and activity monitoring in the patients, with higher accuracy.[4]

[3] Technical algorithm patent No.: EP 18921425.7, PCT/CN2018/088982
[4] Accuracy of wearable monitoring devices for postoperative patient activity and sleep monitoring. Chinese Journal of Anesthesiology, 40(10), 1232–1236.

Neutral attitude
Wearable device was well accepted by patients, but only moderately by nurses. Acceptability of the device among nurses needs further improvement[4]

Smooth Workflow

How to make the wearable devices easier and better to use? Based on the real clinical needs, Mindray tries to solve the inconveniences from three dimensions.
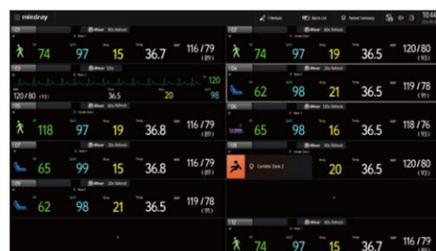
Monitoring Preparation

- Pairing through a single touch
- Patient information auto bound through PDA scanning

Patient Monitoring

- Conduct a unified management and viewing through central station
- Support two kinds of multi-bed screen

- For more detailed information, Mindray provides single-bed screen.

Innovative Wearable Mode

- Display patient status.
- Calculate and display the EWS score.
- Display health parameters
- Refresh parameters every two minutes

Fall Down detection

Displays fall detection and patient location.

Emergency Monitoring

- When patient has abnormal fatal sign* and A-Fib, or clinicians want to know the detailed signs of patient. "Wearable mode" can be switched to "Continuous mode". And the central station refreshes parameters every second.
- When serious alarms are identified, alarm escalation will be triggered, and the special fatal sound and exclusive display will be used.

Wearable Mode   Continuous Mode   Fall Down Warning

Charging&Device Management

- Long duration: at least 48 hours
- Replace the battery with a single hand
- Centralized charging design. Clear charging instruction
- Large volume storage

Intelligent Device Positioning

- Device search: Through the central station, we can find the area near the AP where the wearable device is located
- Electronic fence: When the wearable device exceeds the network range, the EP will beep
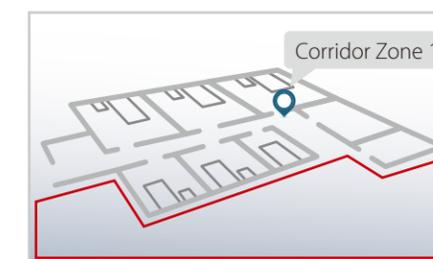
[5] Leenen JPL, Dijkman EM, van Dijk JD, et al.Feasibility of continuous monitoring of vital signs in surgical patients on a general ward: an observational cohort study. BMJ Open 2021;11:e042735.

* Including 4 types of arrhythmia: Asystole, V-Fib/V-Tach, Extreme Tachy and Extreme Brady.

Six-Minute Walk Test (6MWT)

It evaluates the global and integrated responses of all the systems involved during exercise, including the pulmonary and cardiovascular systems, systemic circulation, peripheral circulation, blood, neuromuscular units, and muscle metabolism.[6]

The mWear meets routine monitoring needs while seamlessly supporting the six-minute walk test (6MWT). Combining high-precision sensors with advanced algorithms, it empowers clinicians to conduct the 6MWT efficiently, safely, and in a standardized manner, improving healthcare workflows and ensuring patient safety.

- Accurate lap and distance measurement
- App with Built-in Tracks of Various Shapes
- Real-time monitoring of vital signs
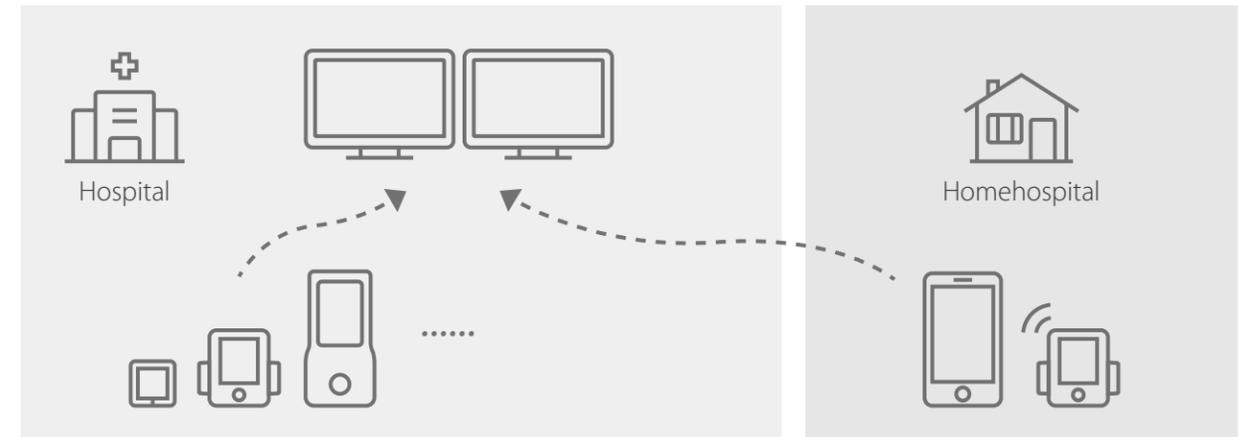- Professional reports, centralized management

Home Hospital Remote Monitoring Solution

- Dedicated app design enables transmission of patient monitoring and customized data to the hospital CMS via wearable or continuous modes
- Portable device with comprehensive parameter monitoring and disposable accessories, ideal for home care

Carrying case and Charging pod

Reusable Set

Disposable sensor and wear-band
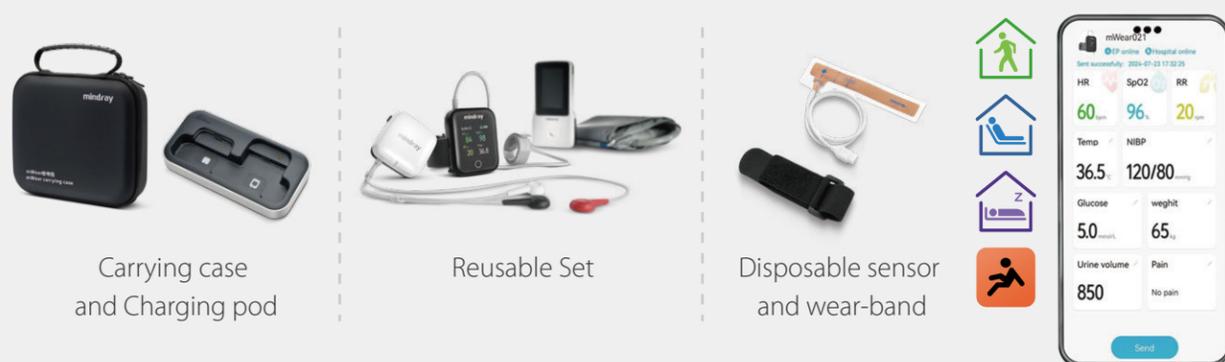
[6] ATS Statement Guidelines for the Six-Minute Walk Test

Hospital

Homehospital

Reliable Signal Transmission

- Seamless roaming technology: Ensure the seamless connection of signals when switching between different AP. Ensure the stable transmission of signals.
- Security encryption technology: Support multiple WiFi encryption technologies to ensure access to the hospital network under the hospital dedicated network environment. Adopt TKIP and AES encryption to ensure the security of signal transmission.

Accessible IT Solution

Mindray's IT solution provides patient-centric data collection. All data can be displayed, analysed, alarmed, reported and sent to the 3rd-party system by Mindray standard interface for a more comprehensive picture of patient health. This also extends to the home through the App so that patients are safely monitored at home.

EMR

MobileViewer   ViewStation   CentralStation   WorkStation/ViewStation   CMS Viewer

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mWear™

Wearable Patient Monitor

Data Sheet

Physical Specifications

Weight	EP30 Main unit: 60g
	ES30 ECG unit: 31g
	BP20 NIBP Module: 165g
Size	EP30 Main unit: 61.5*49*18 mm
	ES30 ECG unit: 46.5*46.5*12.5 mm
	BP20 NIBP Module: 119*60*19 mm
Display screen	EP30: LCD TFT screen. 1.54-inch, 240*240 pixels. Support 4 kinds of screen
	BP20: 2.4-inch. 208*360 pixels
Display channel	EP30: 1 channel ECG waveform
Degree of protection	Type CF defibrillation proof for ECG, SpO2, Resp, TEMP and NIBP
Drop test	EP30 Main unit: 1.5m
	ES30 ECG unit: 1.5m
	BP20 NIBP Module: 1.5m
Protection against	EP30 Main unit: IP24, EP30: IP22
	ES30 ECG unit: IP24
	BP20 NIBP module: IPX2
	C20 Charging station: IPX1
Disinfectants	EP30 main unit/ES30 ECG unit/BP20 NIBP module support 48 kinds of disinfectants

ECG

Lead set	3-lead: I, II, III
ECG Standard	AHA, IEC
Gain	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	Monitor mode: 0.5 to 40 Hz
Notch filter	50/60 Hz, Monitor : notch filter turns on Interference rejection: ≥20 dB
CMRR	Monitor mode: >105dB(with notch filter on)
Electrode offset potential tolerance	± 800 mV
Input signal range	± 10 mV (p-p)
Defib. Protection	Enduring 5000V (360 J) charge without data loss or corruption
Baseline recovery time	<5 s(after defibrillation)
Pace pulse rejection	Amplitude: ± 2 mV to ± 700 mV Width: 0.1 to 2 ms Rise time: 10 to 100 μs

Heart Rate

Measurement range	Adult: 15 to 300 bpm
	Pediatric: 15 to 350 bpm
HR accuracy	± 1 bpm or ± 1%, whichever is greater
HR resolution	1 bpm

Arrhythmia Analysis

mWear can detect lethal arrhythmias, including Asystole, V-Fib/V-Tach, Extreme Tachy, and Extreme Brady.
mWear can detect A-Fib.

Respiration(Sourced from ECG)

Lead	I or II
Measurement range	0 to 200 rpm
RR accuracy	± 1 rpm (0 to 120 rpm)
	± 2 rpm (121 to 200 rpm)
RR resolution	1 rpm

Respiration(Sourced from SpO2)

RR sourced from SpO2 is available only for adult patients.

Measurement range	0 to 90 rpm
Measurement precision	Arms:≤3rpm, mean difference [-1,1] rpm

Resolution	1 rpm
Time for first measurement	≤30 s

SpO₂

Measurement range	0 to 100 %
Resolution	1%
Accuracy	± 2 % (70 to 100%, without motion)
	± 3 % (70 to 100%, with motion)
	Unspecified (0 to 69%)
Refresh Rate	2 sec
PI	Yes. Measurement range: 0.05% to 20%
Ring SpO2 sensor	Yes
Disposable SpO2 sensor	Yes

PR

Measurement Range	20 to 300 bpm (from SpO₂)
	30 to 300 bpm (from NIBP)
Resolution	1 bpm
Accuracy	± 2(from SpO2, without motion)
	± 4(from SpO2, with motion)
	± 3bpm or ± 3%, whichever is greater(from NIBP)

NIBP

Technique	Oscillometry
Operation mode	Manual, Auto, STAT, Sequence
Parameters	Systolic, diastolic, mean
Auto mode repetition intervals	1, 2, 2.5, 3, 5, 10, 15, 20, 30, 60, 90, 120, 180, 240 or 480 min
Systolic measurement range	Adult: 25 to 290 mmHg
	Pediatric: 25 to 240 mmHg
Diastolic measurement range	Adult: 10 to 250 mmHg
	Pediatric: 10 to 200 mmHg
Mean measurement range	Adult: 15 to 260 mmHg
	Pediatric: 15 to 215 mmHg
Accuracy	Max mean error: ± 5 mmHg
	Max standard deviation: 8 mmHg
Resolution	1 mmHg

Temperature(Wireless Thermometer)

Range	25 to 45 °C (77 to 113 °F)
Resolution	0.1 °C (±0.2°F)
Accuracy	± 0.1 °C or ± 0.2 °F (excluding probe error ±0.1 °C or ±0.2 °F)

Data Storage

Trends	8 hours (Stored in mWear)

For more information about data storage, refer to the datasheet of central station.

Alarms

Alarms are issued on central station. All alarm related functions and messages are provided by central station. For more information about alarms, refer to the datasheet of central station.

Special Functions

PWTT	Yes
Health parameter	Exercise time, sleep time
Identify patient status	Fall down, sleep, motion, rest
Device positioning	Yes
Home hospital application	Yes. Support dedicated app.

EP30 provides QR code related to the device information.

6MWT	Yes, Automatic distance measurement, full-process monitoring, and report generation. Support dedicated app.

Working Mode

mWear support two modes: Wearable mode and continuous mode.

mWear supports usage outside the hospital. It can be connected to the central station outside the hospital through the mWear APP, supports data transmission in wearable mode and continuous mode, and supports transmission of custom field data.

Interfaces

Data transmission interfaces   Wi-Fi, Bluetooth and NFC interface

Wi-Fi

Protocol	IEEE 802.11a/b/g/n
Operating frequency	2412MHz - 2472MHz; 5180MHz - 5320MHz; 5500MHz - 5700MHz; 5745MHz - 5825MHz
Data security	Standards: WPA/WPA2-PSK, WPA/WPA2-Enterprise EAP method: EAP-TLS, PEAP-MsCHAPv2, EAP-TTLS Encryption: TKIP and AES
Modulation mode	BPSK, QPSK, 16-QAM, 64-QAM
Average output power	≤20 dBm

Bluetooth

Protocol	EP30&ES30: Bluetooth 5 BP20: Bluetooth low energy 4.0
Operating frequency	2402MHz - 2480MHz
Modulation mode	GFSK
Output power	<10 mW
Data security	Private

NFC

Protocol	EP30: ISO/IEC 14443 A; ISO/IEC 14443 B ES30 & BP20: ISO/IEC 14443 A
Working mode	EP30: READER, CARD, P2P ES30 & BP20: CARD
Operating frequency	13.56 MHz
Modulation mode	EP30: ASK
Data security	Private

Power

Battery	EP30: Rechargeable lithium-ion battery, 48 hours run time ES30: Rechargeable lithium-Ion battery, 72 hours run time BP20: Rechargeable lithium-Ion battery, 600 NIBP measurements
Charge time	EP30: 3 hours to 90% ES30: 3 hours to 90% BP20: 5 hours to 90%
C20 Charging station	Power input: 1, AC power input Input voltage: 100 to 240 VAC Input current: 1.2A to 0.6A Frequency: 50/60 Hz Charging support: 8 EP30 main units, 8 ES30 ECG units and 1 BP20 battery. Support devices and accessories storage
C25 Charging pod	Input voltage: 4.5 to 5.5 VAC Input current: 0.7 A Charging support: 1 EP30 main unit, ES30 ECG unit.

Environmental Specifications

Temperature	Operating: 0 to 40 °C Storage: -20 to 60 °C
Humidity	Operating: 15 to 95 % (non condensing)

	Storage: 10 to 95 % (non condensing)
Barometric	Operating: 57 to 107.4 kPa Storage: 16 to 107.4 kPa

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Wearable Patient Monitor

EP30

Operator's Manual

CE 0123

Release time: 2025-04

Revision: 11.0

2.3.6 Charging Station (C20)

2.3.6.1 Charging Station Front View
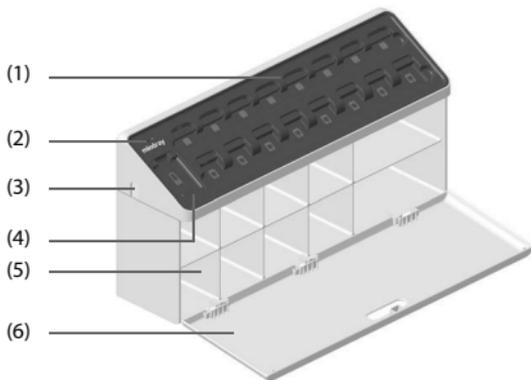
(1) Charging slot

(2) Power indicator:
  - Off: no AC power is connected
  - Green: AC power is connected

(3) Power cable outlet

(4) Status indicator for the batteries of NIBP modules
  - Flashing green: the battery is being charged
  - Green: the battery is fully charged
 - Yellow: a charging failure occurs

(5) Storage box

(6) Storage box cover

2.3.6.2 Charging Station Rear View

(1) AC power socket

3.6.2 Charging the Batteries of the EP30 Main Unit and ES30 ECG Unit with C25 Charging Pod

The C25 charging pod is powered by an external DC power supply. It has a charging slot for the EP30 main unit and a charging slot for the ES30 ECG unit, as shown in the following picture:
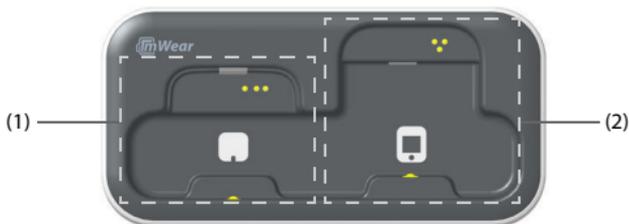
(1)   Charging slots for the ES30 ECG units

(2)   Charging slots for the EP30 main units

To charge the batteries of the EP30 main unit and ES30 ECG unit with the C25 charging pod, follow this procedure:

1. Connect a USB Type-C cable to the USB Type-C connector on the charging pod and then the external DC power.

2. Put the EP30 main unit or ES30 ECG unit onto the correct charging slot. Make sure the contacts of the EP30 main unit or ES30 ECG unit are aligned with those on the charging pod.

3. Push the EP30 main unit or ES30 ECG unit down until you hear a click.

After the EP30 main unit or ES30 ECG unit is properly installed on the charging pod, the battery starts to be charged.

CAUTION

- If you are using the EP30 monitor with mWear App, after charging, check the connection status of the EP30 monitor and the mWear App. For details, refer to *3.8.6 Managing Physiological Data with mWear App*.

3.8 Equipment Pairing and Network Connection

Through wireless network, the EP30 monitor can be paired with an ePM monitor, an ECG module and an NIBP module, and be connected with the CMS. After the connection is established, you can view the measurements on the EP30 monitor, the ePM monitor and the CMS.

CAUTION

- Wireless network design, deployment, debugging, and maintenance should be executed by Mindray service personnel or authorized technicians.
- Always deploy the wireless network according to local wireless regulations.
- Mindray takes no responsibility for controlling the radio frequency environment in a hospital. If interference for the operating frequency of telemetry equipment exists, the telemetry equipment performance will be affected. Exercise caution when selecting the operating frequency of all the wireless equipment in a hospital as this is very important to avoid mutual interference among them.
- Using 5GHz frequency band is recommended whenever possible. There are more interference sources in 2.4GHz frequency band.
- Private APs and wireless routers are not allowed. These devices may cause radio interference and result in monitor and CMS data loss.
- To ensure network security and stability, data communication must be performed within a closed network or within a virtually isolated hospital network. The hospital is responsible for ensuring the security of the virtually isolated network.
- WPA2-PSK and WPA2-Enterprise verification and encryption should be used if possible. Otherwise, the equipment may not be able to work or patient information may be leaked. WPA2-Enterprise and a long password are recommended.
- Keep network authentication information, for example password, from being accessed by unauthorized users.
- Do not connect non-medical devices to the monitor network.
- If wireless network signal is poor, there may be a risk of CMS data loss.
- A maximum of 16 EP30 monitors can be connected to a single AP, on the condition that an ECG module is paired. Too many monitors connected to the same AP may result in network disconnection.

- RF interference may result in wireless network disconnection.
- Disconnecting from the network may result in CMS data loss and function failure. Check the patient in case of network disconnection and reconnect the network as soon as possible.
- Ensure that the monitor IP address setting is correct. Changing the network settings may result in network disconnection. Contact your service personnel if you have any problems on setting the IP address.
- After replacing the EP30 docking, ES30 docking, or NIBP module, re-pair them with the EP30 main unit. Otherwise patient data loss or errors may result.

NOTE

- If pairing fails, press the touch button on the EP30 main unit to wake the screen and try pairing again.

3.8.1 Pairing the EP30 Monitor with an ECG Module

The ECG module is used to obtain and transmit ECG, Resp and Temp related data. You need to pair the EP30 monitor with an ECG module before monitoring.

Follow this procedure:

1. Align the contacts on the EP30 main unit with the contacts on the connector of the EP30 docking. Then push the bottom edge of the EP30 main unit down as indicated below.

2. Put the ES30 ECG unit onto the connector of the ES30 docking with both sides aligned. Then slide the ES30 ECG unit up as indicated blow until the two click into place.

3. Place the front of the ECG module close to the screen of the EP30 monitor until you hear a beep.

4. Check the screen of the EP30 monitor immediately. If a confirmation screen is displayed, press the touch button to confirm the pairing. Failing to do so would cancel the pairing.

3.8.2 Pairing the EP30 Monitor with an NIBP Module

The NIBP module is used to perform NIBP measurements and transmit the data. To provide continuous NIBP monitoring for the patient, you need to pair the EP30 monitor with an NIBP module.

Follow this procedure:

1. Press the Power on/off key on the NIBP module to turn the module on.

2. Place the front of the NIBP module close to the screen of the EP30 monitor until you hear a beep.

3. Check the screen of the EP30 monitor immediately. If a confirmation screen is displayed, press the touch button to confirm the pairing. Failing to do so would cancel the pairing.

If the pairing keeps failing, the NIBP module may have been set to spot check mode. Set the module to continuous mode as described in *3.7 Setting the Work Mode of the NIBP Module*.

3.8.3 Pairing the EP30 Monitor with a Wireless thermometer

To perform continuous temperature monitoring, you need to pair the EP30 monitor with a wireless thermometer. Follow this procedure:

1. Press and hold the On/off button on the wireless thermometer until the power indicator lights up.

2. Place the battery compartment part of the wireless thermometer close to the screen of the EP30 monitor until you hear a beep. This step has to be finished in 10 seconds after the indicator lights up, or the pairing will be canceled.

3. Check the screen of the EP30 monitor immediately. If a confirmation screen is displayed, press the touch button to confirm the pairing. Failing to do so would cancel the pairing.

3.8.4 Pairing the EP30 Monitor with an ePM Monitor

To provide continuous realtime monitoring of a patient, you need to pair the EP30 monitor with an ePM monitor before monitoring. For details about **Wireless Monitoring** mode, refer to *5.2.1 Work Mode Introduction*.

Follow this procedure:

1. Insert the receiver to the module rack of the ePM monitor.

2. Place the EP30 monitor close to the pairing area of the receiver until you hear a beep.

3. Check the screen of the EP30 monitor immediately. If a confirmation screen is displayed, press the touch button to confirm the pairing. Failing to do so would cancel the pairing.

If the pairing succeeds, the $\ast$ icon is displayed on the screen of the EP30 monitor.

NOTE

• Not all ePM monitors support connection with the EP30 monitor. Before pairing, contact your service personnel to check the compatibility.

3.8.5 Connecting the CMS

The EP30 monitor can connect the CMS via an ePM monitor or by itself.

If you are using the EP30 monitor with an ePM monitor, connect the ePM monitor to the CMS via Wi-Fi network as instructed in the operator's manual of the ePM monitor. After pairing, the EP30 monitor obtains Wi-Fi connection with the CMS from the ePM monitor.

If you are using the EP30 monitor directly with the CMS, after connecting the EP30 main unit with an EP30 docking, the monitor automatically connects to the CMS. If the connection fails, contact your service personnel.

NOTE

• Not all CMSs support connection with the EP30 monitor. Before connection, contact your service personnel to check the compatibility.

• When setting EP configurations on the CMS, do not select an EP30 monitor connected to the CMS via the mWear App. Otherwise

(10)　　Battery status indicator*: displays the current battery charge of the NIBP module.

(11)　　NIBP parameter area: displays the NIBP measurements, unit, alarm limits and alarm status.

*The symbols indicate the battery status as follows:

- ▭▬ : The battery works correctly. The green portion represents the remaining charge.
- ▭ : The battery has low power and needs to be charged.
- ▭ : The battery has critically low charge and needs to be charged immediately. Otherwise, the equipment will soon automatically shut down.

3.10.4 Display on the CMS

Below is an example of the display on the CMS under **Wearable** mode.

(1) Patient information area: displays patient information, including Bed No., name and so on.

(2) Patient status area: displays the current status of the patient*, including the remaining time to update physiological data, current exercising status and location. Below are symbols that indicate the patient status:

- ■ : indicates that the patient is sleeping at the set night time.
- ■ : indicates that the patient is walking.
- ■ : indicates that the patient is at rest, like sitting or lying quietly.
- ■ : indicates that the patient's ECG lead may have fallen off. Check the patient status.
- ■ : indicates that the patient may have fallen over. Check the patient status.

*: the patient status symbols display only when the ECG module is in connection with the EP30 monitor and ECG electrodes are properly applied.

(3) EWS area: displays the current EWS score. Select this area to display the EWS window. You can set whether to display this area on the main screen. For details, refer to *5.2.6 Setting the Display of EWS Score Area*.

(4) ERAS DashBoard area: displays the exercise time and sleep time. Select this area to display the ERAS DashBoard screen.

(5) **Enter 2min Continuous Mode**: select to switch to **Continuous** Mode. For more information, refer to *5.2.1 Work Mode Introduction*.

(6) ECG parameter area: displays the parameter value, unit, alarm limits and alarm status. "-M" indicates the measurement data are from the EP30 monitor.

(7) Battery status indicator*: displays the current battery charge of the ES30 ECG unit.

(8) Battery status indicator*: displays the current battery charge of the EP30 main unit.

(9) SpO$_2$ parameter area: displays the parameter values, units, alarm limits and alarm status. "-M" indicates the measurement data are from the EP30 monitor.

(10) Resp parameter area: displays the parameter value, unit, alarm limits and alarm status. The source displays as "ECG-M", in which "-M" indicates the measurement data are from the EP30 monitor.

(11) Temperature parameter area: displays the parameter value, unit, measurement site, alarm limits and alarm status.

5 Patient Monitoring

This chapter introduces operation related information needed after starting patient monitoring.

5.1 Patient Monitoring Safety Information

WARNING

- Before start monitoring, make sure the monitor is paired or connected as intended with the correct device or system, and that the patient information is correct.
- Keep close observation on the equipment connection status during patient monitoring, in case patient data loss or errors occur.

CAUTION

- The patient should be required to move in a specified area. If the patient is at the edge of or outside the network coverage range, unstable network connection may compromise the monitoring performance.

5.2 Work Modes

5.2.1 Work Mode Introduction

The EP30 monitor supports the following work modes:

■ Wireless Monitoring: the EP30 monitor provides continuous monitoring of the patient and updates patient data in real time.

◆ This mode can be provided only when the EP30 monitor is in bluetooth connection with an ePM monitor.

◆ This mode is for patients that require close observation, such as patients in critical or serious conditions or after surgery.

■ Wearable: the EP30 monitor performs continuous ECG, Resp, NIBP and Temp monitoring, and sends all physiological data to the ePM monitor or CMS at a two-minute interval. This mode can be used for patients under observation that are in stable conditions and require normal mobility.

■   **Continuous**: in **Wearable** mode, if a critical situations are detected, such as lethal arrhythmias and patient fall (configurable, see *5.2.5 Setting the Conditions to Switch to Continuous Mode*), the system switches to **Continuous** mode and resumes real-time data acquisition and transmission. If the vital signs resume as normal for over 5 minutes, the system switches back to **Wearable** mode. You can also select **Enter 2min Continuous Mode** on the screen to enter the **Continuous** mode as needed. You can check the countdown clock on the screen for the remaining time to switch back to **Wearable** mode**.**

5.2.2 Changing of Work Mode

If your EP30 monitor is in bluetooth connection with an ePM monitor, the monitors enter **Wireless Monitoring** mode automatically after they are correctly paired via Bluetooth. In the following situations, the working mode switches from **Wireless Monitoring** to **Wearable** automatically:

■   The system time has reached the set **Switch Monitor Mode Time**. For details, refer to *5.2.3 Setting the Switch Monitor Mode Time*.
■   The Bluetooth connection between EP30 monitor and the ePM monitor is disconnected.

In **Wearable** mode, if the EWS score on the ePM monitor has reached a set level, the work mode changes from **Wearable** to **Continuous** automatically. For details, refer to *5.2.4 Setting the Switch Monitoring Mode on EWS Score*.

Besides, you can also change the work mode on the ePM monitor manually. For details, refer to *5.2.7 Changing Work Mode Manually*.

5.2.3 Setting the Switch Monitor Mode Time

On the ePM monitor, you can set a time at which the working mode switches from **Wireless Monitoring** to **Wearable**. To do so, follow this procedure:

1. On the ePM monitor, select the **Main Menu** quick key → from the **System** column select **Maintenance** → input the required password → select ↵.
2. Select **Other** tab.
3. Set **Switch Monitor Mode Time** to a time appropriate for the patient. If **Off** is selected, the monitors does not switch to **Wearable** mode based on time.

5.2.4 Setting the Switch Monitoring Mode on EWS Score

On the ePM monitor, you can set an EWS score as the threshold to change the work mode. After setting, if the EWS score of the patient is higher than the set threshold, the work mode switches from **Wearable** to **Continuous**.

- Implanted devices (for example cardiac pacemakers), other patient connected equipment, and other equipment near the patient can cause interference on the waveform.

5.4.2.2 Viewing ECG Data on the EP30 Monitor

Press the touch button on the monitor and switch to the following screen:
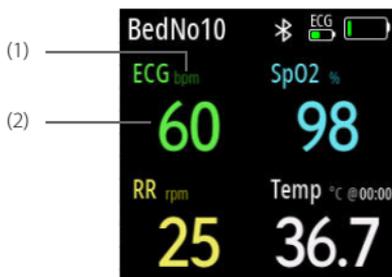
(1)   HR unit

(2)   HR value

You can also continue to press the touch button and switch to the following screen for more ECG information.

(1)   HR unit

(2)   ECG lead label of the displayed waveform

(3)   ECG waveform

(4)   HR value

5.4.2.3 Viewing ECG Data on the ePM Monitor and CMS

On the ePM monitor and CMS, the ECG parameter area displays as follows:

9 Accessories

The accessories listed in this chapter comply with the requirements of IEC 60601-1-2 when in use with the patient monitor. The accessory material that contacts the patients has undertaken the bio-compatibility test and is verified to be in compliance with ISO 10993-1. For details about the accessories, refer to the instructions for use provided with the accessory.

WARNING

- Use accessories specified in this chapter. Using other accessories may cause damage to the monitor or not meet the claimed specifications.
- The accessories listed in this chapter must be used in connection with the specified equipment only. The user shall be responsible for ensuring the compatibility between the accessories and other equipment by either referring to the instructions for using the accessory or contacting us before use. Otherwise, product performance may be compromised or personal injury may occur.
- Single use accessories are not designed to be reused. Reuse may cause a risk of contamination and affect the measurement accuracy.

CAUTION

- The accessories may not meet the performance specifications if stored or used outside the specified temperature and humidity ranges. If accessory performance is degraded due to aging or environmental conditions, contact your service personnel.
- Check the accessories and their packages for any sign of damage. Do not use them if any damage is detected.
- Use the accessories before the expiry date if their expiry date is indicated.
- The disposable accessories shall be disposed of according to hospital's regulations.

NOTE

- Use the accessories before the expiry date if their expiry date is indicated.

9.1 SpO$_2$ Accessories

Wavelength emitted by the sensors is between 600 nm and 1000 nm. The maximum photic output consumption of the sensor is less than 18 mW.

The information about the wavelength range and maximum photic output consumption can be especially useful to clinicians, for example, when photodynamic therapy is performed.

Model	Part No.	Description	Applicable patient	Application site
512RS	125-000246-00	Reusable SpO$_2$ sensor	Adult	Finger
512HS	125-000268-00		Pediatric	Finger
512ES	125-000269-00		Adult	Finger
522A	040-008763-00	EP Disposable SpO2 Sensor 522A, Adu, 20pcs	Adult	Finger

9.2 ECG Accessories

9.2.1 ECG Electrodes

Model	Part No.	Description	Applicable patient
31499224	0010-10-12304	Disposable electrode, Kendall, 10 pieces/package	Adult
SF06	040-002711-00	Disposable electrode, 5 pieces/bag	Adult
SF07	040-002833-00	Disposable electrode (Intco)	Pediatric

9.2.2 ES30 Docking

Model	Part No.	Description	Length	Applicable patient
EA6431B	125-000270-00	Reusable ECG leadwires, 3-lead, AHA, snap, defibrillation-proof	1.2 m	Adult/ Pediatric
EA6433B	125-000272-00		0.42 m	
EA6432B	125-000271-00	Reusable ECG leadwires, 3-lead, IEC, snap, defibrillation-proof	1.2 m	
EA6434B	125-000273-00		0.42 m	

9.3 NIBP Accessories

Model	Part No.	Description	Limb circumference (cm)	Bladder width (cm)	Applicable patient
CM1702	115-052296-00	Reusable NIBP cuff	18 - 26	9.8	Pediatric
CM1703	115-052297-00		25 - 35	13.1	Adult
CM1704	115-052298-00		33 - 47	16.5	Large adult
CM1702A	125-000624-00		18 - 26	9.8	Pediatric
CM1703A	125-000625-00		25 - 35	13.1	Adult
CM1704A	125-000626-00		33 - 47	16.5	Large adult
CM1707A	125-000627-00		33 - 47	16.5	Large adult

9.4 TrueTymp™ Accessories

Tympanic Thermometer and cradle

Description	Part No.
Tympanic Thermometer (M09G) and TrueTymp™ cradle Independent (MR495)	120-023001-00

Probe Cover

Model	Usage	Description	Part No.
ET-001	Disposable	Cover, 200 pcs/pack, applicable for Adult, pediatric, neonate	040-006890-00

9.5   Miscellaneous Accessories

Part No.	Description
115-092419-00	EP30 main unit
120-023169-00	ES30 ECG unit
120-013752-00	ePM BP20 NIBP module
120-023236-00	ePM BP20 NIBP module with CM1703 cuff (adult)
120-023237-00	ePM BP20 NIBP module with CM1704 cuff (large adult)
120-023238-00	ePM BP20 NIBP module with CM1702 cuff (pediatric)
115-092416-00	R20 receiver
125-000419-00	Wireless thermometer
115-062591-00	LP11I001E, Rechargeable lithium-Ion battery, 3.8 V, 1900 mAh, for NIBP module
DA8K-10-14454	Power cord, Europe
115-089345-00	C20 charging station (power cord, China)
115-089353-00	C20 charging station (power cord, Europe)
115-089356-00	C20 charging station (power cord, USA)
115-089361-00	C20 charging station (power cord, UK)
115-089362-00	C20 charging station (power cord, India)
115-089364-00	C20 charging station (power cord, Brazil)
115-089365-00	C20 charging station (power cord, South Africa)
115-089366-00	C20 charging station (power cord, Australia)
115-089367-00	C20 charging station (power cord, Switzerland)
115-092325-00	C25 charging pod
115-112408-00	EP Docking_for Disposable Sensor
115-112409-00	EP Disposable Wear-band,20pcs

Charging & Device Management

95%

Clear charging instructions

1 BP20 battery

8 EP30 Main units
8 ES30 ECG units

C20 Charging Station

Large volume storage

C10 Charging Pod
Support 4 BP20 batteries

Centralized charging and integrated storage.
Improve management efficiency

mindray