


BeneVision N Series

Patient Monitor

Operator's Manual

Volume I

(BeneVision N22/BeneVision N19/BeneVision N17/
BeneVision N15/BeneVision N12/BeneVision N12C)

You can access the same element in different ways. For example, you can enter a parameter menu by selecting corresponding numeric area or waveform area, by pressing the Menu hard key  on the parameter module, or by selecting the **Parameters Setup** quick key.


3.5.1 Using the Touchscreen

36.4.1. You can touch the screen or swipe across the screen with your fingers to operate the monitor.

3.5.1.1 Tapping the screen or Swiping across the Screen

- Tapping the screen
 - ◆ To select an item from menus or lists, tap on the item with your finger.
 - ◆ To select a quick key, tap on the key with your finger.
 - ◆ To enter a parameter menu, tap corresponding numeric area or waveform area. For example, select the ECG numeric area or waveform area to enter the **ECG** menu.
- Swiping across the screen with a single finger:
 - ◆ To scroll through a list and a menu, swipe up and down.
 - ◆ To expand the Minitrends screen or the EWS screen, swipe right across the corresponding screen.
 - ◆ To contract or hide the Minitrends screen or the EWS screen, swipe left across the corresponding screen.
- Swiping across the screen with two fingers:
 - ◆ To switch to another screen, swipe left or right across the screen. For example, on the normal screen, swipe with two fingers from left to right to switch to the Minitrends screen.
 - ◆ To discharge a patient, swipe from top to bottom.

3.5.1.2 Locking the Touchscreen

To avoid misuse, you can temporarily disable the touchscreen. To do so, hold and press the **Main Menu** quick key and slide as directed by the arrow. A padlock symbol  displays at the top of the main menu quick key if the touchscreen is disabled.

The touchscreen lock period is configurable. To do so, follow this procedure:

1. Access **Display** in either of the following ways:
 - ◆ Select the **Screen Setup** quick key → select the **Display** tab.
 - ◆ Select the **Main Menu** quick key → from the **Display** column select **Display**.
2. Set **Screen Lock Duration**.

The touchscreen is enabled when the preset time is reached. If you need to manually enable the touchscreen, hold and press the **Main Menu** quick key and slide as directed by the arrow.

CAUTION

- Check that the touchscreen is not damaged or broken. If there is any sign of damage, stop using the monitor and contact the service personnel.
 - If the touchscreen is loose, stop using the monitor and contact the service personnel.
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3.5.2 Using the Navigation Knob (for N22/N19)

You can use the navigation knob to access the main menu, pause alarms, reset alarms, and start/stop NIBP measurements.

3.5.3 Using the Barcode Reader

The monitor supports both linear (1D) barcode reader and two-dimension (2D) barcode reader. The barcode reader is connected to the monitor's MSB connector (for N22/N19) or the USB connector (N17/N15/N12/N12C).

NOTE

- You can use the Mindray custom barcode reader to scan both the 2D and 1D barcodes. Using other barcode readers can only output the patient's medical record number (MRN) and visit number.

3.5.3.1 Clearing Old Data Formats (for the Mindray Custom 2D Barcode Reader)

If you are using the Mindray custom 2D barcode reader (Model HS-1R or HS-1M), before using it for the first time, clear old data formats and configure the barcode reader.

Before configuring the Mindray custom barcode reader, clear old data formats. To do so, follow this procedure:

- Scan the engineering barcode to clear the previous data format.
- Scan the 2D engineering barcode which contains your hospital's data format.

NOTE

- Contact the scanner manufacturer or Mindray to obtain the engineering barcodes for clearing data formats and containing the hospital's data format.

3.5.3.2 Setting the Barcode Reader

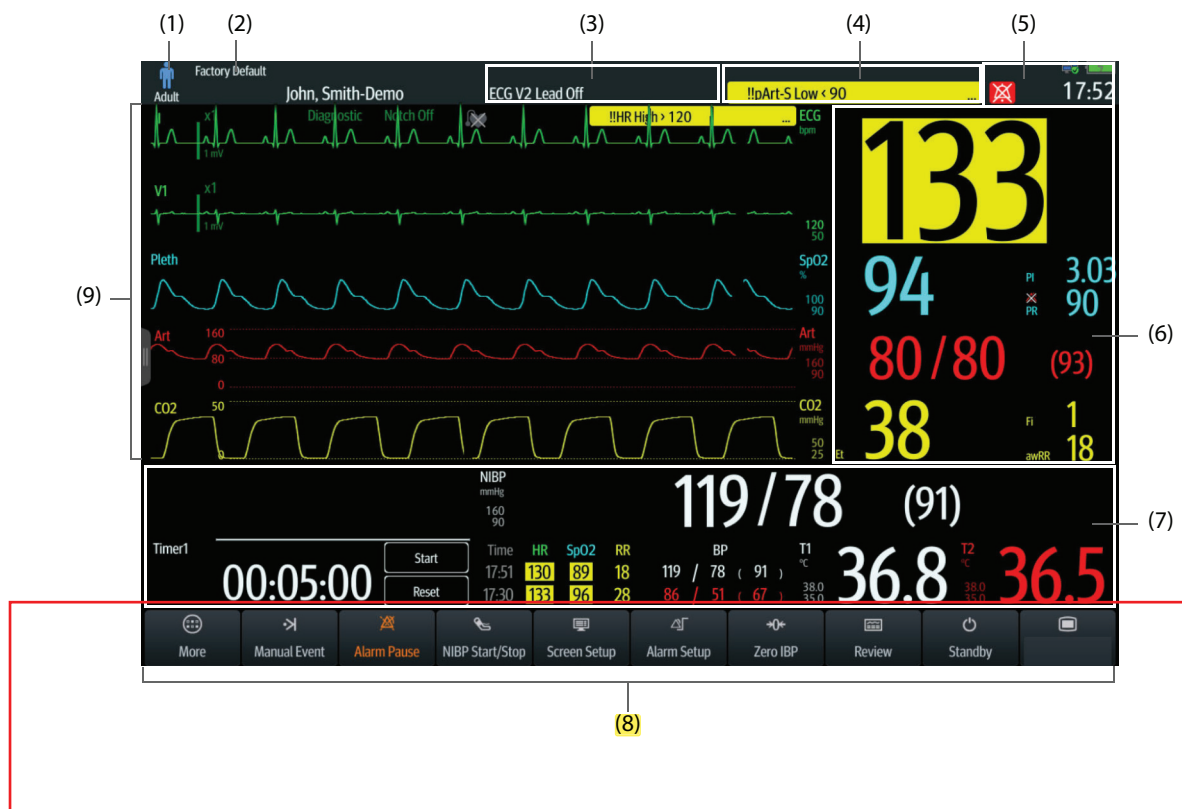
For information on setting the barcode reader, see 13.16 The Scanner Settings.

3.5.4 Using the Remote Controller

You can use the remote controller to control the monitor by connecting the receiver of the remote controller to the monitor's MSB connector (for N22/N19) or the USB connector (N17/N15/N12/N12C). For more information on how to use the remote controller, see the Instructions for Use delivered with the remote controller.

3.6 Screen Display

The following figure shows the normal screen:



















- (1) Patient information area: displays patient information, including patient category, gender, department, room number, bed number, and so on. The displayed patient information is configurable. Selecting this area enters the **Patient Management** menu. For more information, see *5.3 Managing Patient Information*.
- (2) The current configuration
- (3) Technical alarm information area: displays prompt messages on the above; displays technical alarm messages at the bottom. Selecting this area displays the list of active technical alarms.
- (4) Physiological alarm information area: displays high priority physiological alarms on the above; displays medium and low priority physiological alarms at the bottom. Selecting this area displays the list of active physical alarms.
- (5) System status information area: displays alarm symbol, battery status, network status, currently connected CMS, storage device status, and system time. For more information, see *3.6.1 On-screen Symbols*.
- (6) Parameter numerics area: displays parameter values, alarm limits, and alarm status. This area also displays parameter list. Selecting a parameter numeric block enters corresponding parameter menu. Selecting the parameter list enters tabular trend review. For more information, see *3.11.3 Displaying the Parameter List*.
- (7) Parameter waveform/numerics area: displays parameter waveforms, parameter values, alarm limits, and alarm status. Selecting a parameter numeric area or waveform area enters corresponding parameter menu. For more information, see *3.11.3 Displaying the Parameter List*.
- (8) Quick key area: displays selected quick keys.
- (9) Parameter waveform area: displays parameter waveforms and parameter alarms. Select a waveform enters corresponding parameter menu. For more information, see *3.11.3 Displaying the Parameter List*.

36.4.2.

3.6.1 On-screen Symbols

The following table lists the on-screen symbols displayed on the system status information area:

Symbol	Description	Symbol	Description
	Adult, male		Adult, female
	Pediatric, male		Pediatric, female
	Neonate, male		Neonate, female
	All the alarms are paused.		Individual physiological alarms are turned off or the monitor is in the alarm off status.
	Audible alarm tones are paused.		Audible alarm tones are turned off
	The alarm system is reset.		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 monitor will soon automatically shut down.
	The battery is being charged.		No battery is installed.

7.2.7

Reviewing Events

36.8.2.

36.8.3.

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

- 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.

7.2.7.1

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 **Events** 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

7.2.7.2


Configuring the Filter

You can filter events to facilitate event review. To configure the filter, follow this procedure:

1. Enter the **Events** page.
2. Select **Filter**. From the drop-down list, select the desired item.

You can customize two criteria. To do so, follow this procedure:


1. From the **Filter** drop-down list, select **Custom 1** or **Custom 2** to enter the **Filter Setup** menu.
2. Select the **Name** field to edit the name of the custom criterion.
3. Select desired items.

If you want to review events happened around certain time, select the  button → set the time → select **OK**. Then the cursor jumps to the event happened closest to the defined time.

7.2.7.3

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.
 - ◆ **Rename**: allow renaming an event name. Only manual events and arrhythmia events can be renamed if enabled by the hospital's settings. For more information, see 13.7.2 *The Event Tab*.

7.2.7.4

Viewing Event Details

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

- **Start:** starts timing.
- **Pause:** pauses timing.
- **Resume:** continues timing after the timer is paused.
- **Reset:** clears the timer and end this timing episode.

WARNING

- **Do not use the timers for tasks related to critical patients.**
-

3.13.3 Setting the Timer

You can set each timer independently. To set the timer, follow this procedure:

1. Select the timer area to enter the **Timer Setup** menu.
2. Set **Timer Type**:
 - ◆ **Normal:** The timer has a single and defined run time, and stops when the run time is reached.
 - ◆ **Advanced:** The timer has a single and defined run time. When the run time is reached, the timer continuously displays the time beyond the end of run time.
 - ◆ **Cycled:** The timer has a single and defined run time. When the run time is reached, the timer restarts automatically. The cycles is also displayed.
 - ◆ **Unlimited:** The timer displays the time elapsed since the timer was started.
 - ◆ **Clock:** The timer displays the system time.
3. Set **Direction**.
 - ◆ **Down:** the timer counts down.
 - ◆ **Up:** the timer counts up.
4. Set **Run Time**.
5. Set **Reminder Volume**. A progress bar is shown with the run time. When the remaining time is 10 seconds, the monitor issues a reminder tone and the timer flashes in red, prompting you that the run time is to expire.

NOTE

- **You cannot change timer settings when a timer is running.**
 - **You can set Direction, Run Time, and Reminder Volume only for normal, advanced, and cycled timers.**
-

3.14 Freezing Waveforms

During patient monitoring, the freeze feature allows you to freeze the currently displayed waveforms on the screen so that you can have a close examination of the patient's status. Besides, you can select any frozen waveform for recording.

3.14.1 Freezing Waveforms

To freeze waveforms, select the **Freeze** quick key. Except waveforms of the following screens, all displayed waveforms stop refreshing and scrolling after you select the **Freeze** quick key:

- Minitrends screen
- OxyCRG screen
- Remote View screen
- BoA Dashboard screen
- EWS screen
- CQI waveform in the Resus mode

Anesthesia accessory

CATALOGUE 2022.08

Mounting solution for patient monitor N19/N22

Picture	Part No.	Description	Apply to
	115-066025-00	GCX Bracket kit for N19/N22, fixed height	A7/A5
	115-066027-00	GCX Bracket kit for N19/N22, variable height	A7/A5
	115-069443-00	GCX bracket kit for N19/N22, fixed height	A9/A8

Mounting solution for patient monitor N17/N15/N12, ePM15

Picture	Part No.	Description	Apply to
	115-066028-00	GCX Bracket for N17/N15/N12/ePM15, fixed height	A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35/EX-30/EX-20
	115-066074-00	GCX bracket kit for N17/N15/N12/ePM15, fixed height, M series, 8"x8"	A9/A8
36.1.			
	115-066029-00	GCX Bracket for N17/N15/N12/ePM15, variable height	A9/A8/A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

BeneVision Family **NEW** members



N17

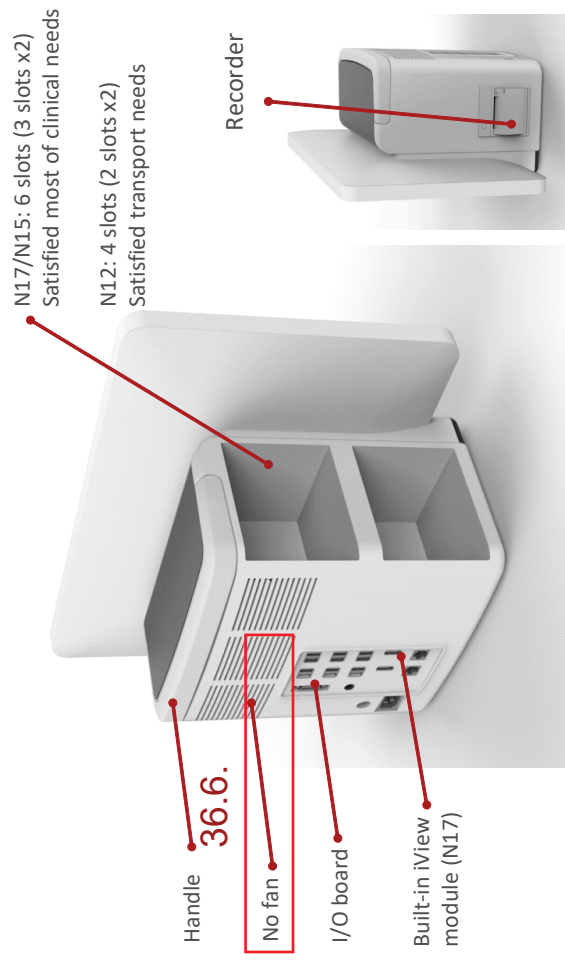


N15



N12

Elegant Compact Design



37. BeneVision N1

Transport Monitor

37.



Physical Specifications

Weight	0.95 kg (2.1 lbs)
	(Standard parameters with battery)
Size	1.17 kg (2.6 lbs)
	(Standard parameters with internal CO2 module and battery)
Size	150x103x81 mm (5.9" x 4" x 3.2")

Display

Type	37.1.1. Medical-grade color TFT LCD, capacitive
	37.1.3. touch screen, with Corning® Gorilla® Glass, support multi-touch operation.

37.1.2. Size & Resolution 5.5-inch, 1280 x 720 pixels (WXGA) 5,5 = 13.97 cm.

Waveforms	5 traces, up to 13 waveforms 37.1.4.
External display	Medical-grade color TFT LCD, capacitive touch screen,
	21.5-inch, 1920 x 1080 pixels
	Up to 8 traces

37.4.1. ECG 39.4.2.

Meet standards of IEC 60601-2-27 and IEC 60601-2-25.

Lead Sets	Automatic 3/5/6/12 - lead recognition
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
Sweep Speed	6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s
Gain Selection	x 0.125, x 0.25, x 0.5, x 1, x 2, x 4, auto
Waveform format	Standard, Cabrera
Input Signal Range	± 8 mV (p-p)
Electrode Offset Potential Tolerance	± 500 mV
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
High Freq Cut-off (for 12-lead ECG analysis):	350 Hz, 150 Hz, 35 Hz, 20 Hz selectable

CMRR

Diagnostic:	> 90 dB
Monitor, Surgical, ST mode:	> 105 dB (with notch filter on)

Pace detection

Amplitude:	± 2 mV to ± 700 mV
Width:	0.1 to 2 ms
Rise time:	10 to 100 µs (without overshoot)

Defibrillator Protection Withstand 5000VAC (360J) defibrillation

Defib. Recovery Time ≤ 5 seconds

ESU recovery time ≤ 10 s

Provides Glasgow resting 12-lead ECG algorithm.

Provides Mindray Multi(4)-lead ECG monitoring analysis algorithm.

Heart Rate 37.4.3.

Measurement Range

Adult:	15 to 300 bpm
Pediatric/Neonate:	15 to 350 bpm

Accuracy	± 1 bpm or ± 1%, whichever is greater.
Resolution	1 bpm
Arrhythmia Analysis	
Patient	Adult/Pediatric/Neonate.
Monitored Arrhythmias	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., SVT, SVTs/min

ST Segment Analysis

Patient	Adult/Pediatric.
Range	- 2.0 to + 2.0 mV (RTI)
Accuracy	± 0.02 mV or ± 10%, whichever is greater (- 0.8 to + 0.8 mV)
Resolution	0.01 mV

QT Analysis

Patient	Adult/Pediatric/Neonate.
Parameters	QT, QTc, ΔQTc
QTc Formula	Bazett, Fridericia, Framingham, or Hodges
Range	
QT/QTc:	200 to 800 ms
QT-HR:	Adult: 15 to 150 bpm Pediatric/Neonate: 15 to 180 bpm
QT Accuracy	± 30 ms
Resolution	QT 4 ms; QTc 1 ms

37.4.2. Respiration

Range	0 to 200 bpm
Resolution	1 rpm
Apnea Alarm Time	10, 15, 20, 25, 30, 35, 40 sec
Accuracy	
0 - 120 rpm:	± 1 rpm
121 - 200 rpm:	± 2 rpm
Lead	I, II, or auto (default: lead II)

37.4.6. Pulse Oximetry

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 (0 to 69%)
Perfusion indicator (PI)	Yes, for Mindray/Masimo SpO2
Pitch Tone	Yes

Dual-SpO2	Yes, SpO2, SpO2b, ΔSpO2
Pulse Rate Range	
Mindray/Nellcor:	20 to 300 bpm
Masimo:	25 to 240 bpm
Pulse Rate Accuracy	
Mindray:	± 3 bpm (20 - 300 bpm)
Nellcor:	± 3 bpm (20 - 250 bpm)
Masimo:	± 3 bpm (non-motion) ± 5 bpm (motion)
PR Refresh Rate	1 sec

Temperature 37.4.4.

Meet standard of ISO 80601-2-56.

Method	Thermal resistance
Channels	Up to 2 channels
Units of Measure	Selectable °C or °F
Range	0 to 50 °C / 32 to 122 °F
Resolution	0.1 °C, 0.1°F
Accuracy	± 0.1 °C or ± 0.2 °F (without probe)
Refresh Rate	1 sec

Non-Invasive Blood Pressure 37.4.5.

Meet standards of ISO 80601-2-30.

Method	Oscillometry
Modes	Manual, Auto, STAT, Sequence
Units of Measure	mmHg, kPa (user-selectable)
Resolution	1 mmHg
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
Accuracy	
Max Mean Error:	± 5 mmHg
Max Standard Deviation:	8 mmHg
Cuff Deflation Technique	Step bleed
Initial Cuff Inflation	
Adult:	80 to 280 mmHg (default: 160 mmHg)
Pediatric:	80 to 210 mmHg (default: 140 mmHg)
Neonate:	60 to 140 mmHg (default: 90 mmHg)
Over Pressure Protection	
Adult/ Pediatric:	297 ± 3 mmHg
Neonate:	147 ± 3 mmHg
Max Measurement time	
Adult/Pediatric:	180 sec
Neonate:	90 sec
Assisting Venous Puncture	Yes
Pulse Rate Range	30 to 300 bpm
Pulse Rate Accuracy	± 3 bpm or ± 3 %, whichever is greater

IBP 37.4.7.

Meet standard of IEC 60601-2-34.

Number	Up to 4 channels
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Measurement Range	-50 to 360 mmHg
Resolution	1 mmHg
Accuracy	± 1 mmHg or ± 2 %, whichever is greater (excluding sensor error)
Sensitivity	5 μV/V/mmHg
Impedance Range	300 to 3000 Ω
PPV Range	0 to 50 %
PAWP	Yes
ICP measurement	Support
Support waveforms overlapping.	
Pulse Rate Range	25 to 350 bpm
Pulse Rate Accuracy	± 1 bpm or ± 1 %, whichever is greater

PiCCO

Parameters	Measurement Range	Coefficient of Variation
CCO	0.25 to 25.0 L/min	≤ 2%
C.O.	0.25 to 25.0 L/min	≤ 2%
GEDV	40 to 4800 ml	≤ 3%
SV	1 to 250 ml	≤ 2%
EVLW	10 to 5000 ml	≤ 6%
ITBV	50 to 6000 ml	≤ 3%

(Coefficient of variation is measured using synthetic and/or database wave forms (laboratory testing.) Coefficient of variation= SD/mean error.)

TB Range	23 to 43 °C / 73.4 to 109.4 °F
TB, TI Accuracy	± 0.1 °C (without sensor)
TB, TI Resolution	0.1 °C
pArt/pCVP Range	-50 to 300 mmHg
pArt/pCVP Accuracy	± 1 mmHg or ± 2 %, whichever is greater

Internal Sidestream CO₂

Meet standard of ISO 80601-2-55.

Patient	Adult/Pediatric/Neonate.
Measurement Range	0 to 150 mmHg
CO ₂ Accuracy	
0 to 40 mmHg:	± 2mmHg
41 to 76 mmHg:	± 5% of reading
77 to 99 mmHg:	± 10% of reading
100 to 150 mmHg:	± (3 mmHg+8% of reading)
Sample Flow Rate	50 ml/min
Sample Flow Rate Tolerance	±15 ml/min or ±15 %, whichever is greater.
Sweep speed	3 mm/sec, 6.25 mm/sec, 12.5 mm/sec, 25 mm/sec, 50 mm/sec
awRR range	0 to 150 rpm
awRR accuracy	
0 to 60 rpm:	± 1 rpm
61 to 150 rpm:	± 2 rpm
Apnea time	10, 15, 20, 25, 30, 35, 40 sec

Artema Sidestream CO₂

Meet standard of ISO 80601-2-55.

Measurement Range	
etCO ₂ :	0 to 150 mmHg
O ₂ (optional):	0 to 100 %
CO ₂ Accuracy	
0 to 40 mmHg:	± 2mmHg
41 to 76 mmHg:	± 5% of reading
77 to 99 mmHg:	± 10% of reading
100 to 150 mmHg:	± (3 mmHg+8% of reading)
O ₂ Accuracy	

0 to 25 %:	±1 %
25.1 to 80 %:	±2 %
80.1 to 100 %	±3 %
Resolution	
etCO ₂ :	1 mmHg
O ₂ (optional):	1 %
Sample Flow Rate	
Adult/Pediatric:	120 ml/min (with or without O ₂ monitoring)
Neonate:	70 ml/min or 90 ml/min, selectable 90 ml/min (with O ₂ monitoring)
Sample Flow Rate Tolerance	
	±15 ml/min or ±15 %, whichever is greater.
Warm-up Time	90 sec (maximum), 20 sec (typically)
Measured with a neonatal watertrap and 2.5-meter neonatal sampling line, or an adult watertrap and a 2.5-meter adult sampling line:	
Rise Time	
etCO ₂ :	≤ 250 ms @ 70 ml/min (Neonate watertrap) ≤ 250 ms @ 90 ml/min (Neonate watertrap) ≤ 300 ms @ 120 ml/min (Adult watertrap)
O ₂ (optional):	≤ 800 ms @ 90 ml/min (Neonate watertrap) ≤ 750 ms @ 120 ml/min (Adult watertrap)
Sampling Delay Time	
etCO ₂ :	≤ 5.0 sec @ 70 ml/min (Neonate watertrap) ≤ 4.5 sec @ 90 ml/min (Neonate watertrap) ≤ 5.0 sec @ 120 ml/min (Adult watertrap)
O ₂ (optional):	≤ 4.5 sec @ 90 ml/min (Neonate watertrap) ≤ 5.0 sec @ 120 ml/min (Adult watertrap)
awRR Range	0 to 150 rpm
awRR Accuracy	
0 to 60 rpm:	± 1 rpm
61 to 150 rpm:	± 2 rpm
Apnea Time	10, 15, 20, 25, 30, 35, 40 sec

Oridion Microstream CO₂

Measurement Range	0 to 99 mmHg
Resolution	1 mmHg
Accuracy	
0 to 38 mmHg:	±2 mmHg
39 to 99 mmHg:	±5 % + 0.08 % of the reading – 38 mmHg
Sample Flow Rate	50 ^{-7.5} / ₊₁₅ ml/min
Start-up Time	30 sec (typical)
Response Time	2.9 s (typical)
awRR Range	0 to 150 rpm
awRR Accuracy	
0 to 70 rpm:	±1 rpm
71 to 120 rpm:	±2 rpm
121 to 150 rpm:	±3 rpm
Apnea time	10, 15, 20, 25, 30, 35, 40 sec

Capnostat Mainstream CO₂

Measurement Range	0 to 150 mmHg
Resolution	1 mmHg
Accuracy	
0 to 40 mmHg:	± 2mmHg
41 to 70 mmHg:	± 5% of reading
71 to 100 mmHg:	± 8% of reading
101 to 150 mmHg:	± 10% of reading
Rise time	< 60 msec
awRR Range	0 to 150 rpm
awRR Accuracy	±1 rpm

37.3.1. Data Storage Trends Data > 120 hrs @ 1min, 4 hrs @ 5 sec.

Events	1000 events, including parameter alarms, arrhythmia events, technical alarms, and so on.
NIBP	1000 sets
Interpretation of resting	12-lead ECG results 20 sets
Full disclosure	48 hours at maximum. The specific storage time depends on the waveforms stored and the number of stored waveforms.
OxyCRG ¹	48 hrs
Minitrend ¹	Yes

Alarms

37. Audible indicator Yes, 4 different alarm tones, and prompt tone
- Visible indicator Red/yellow/cyan LED, and alarm message
- Provide AlarmSight infographic alarm indicator.
- Support iAlarm features (alarm limits recommendations, etc.)
- Support iStatus combined alarms¹

Special Functions¹

Clinical Assistive Application (CAA):

ST Graphic™, BoA Dashboard™, SepsisSight™, NeuroSight, AF Summary, ECG 24h Summary, EWS, GCS,

Support calculations (drug, hemodynamic, Oxygenation, Ventilation, Renal), and Titration table.

Support nView remote display tool

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 (802.11 b/g/n) 20 MHz @ 5 GHz (802.11 a/n)
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

Output

Auxiliary Output

Standard Meets the requirements of ANSI/AAMI/IEC 60601-1 for short-circuit protection and leakage current

ECG Analog Output

Bandwidth (- 3 dB; reference frequency: 10 Hz)

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

QRS Delay ≤ 25 ms (in diagnostic mode, and non-paced)

Sensitivity 1 V/mV, ± 5 %

Pace Enhancement

Signal Amplitude: $V_{oh} \geq 2.5$ V

Pulse Width: 10 ms ± 5 %

Signal Rising and Falling Time:
≤ 100 μs

IBP Analog Output

Bandwidth (- 3 dB; reference frequency: 10 Hz)

0 to 40 Hz

Max. Transmission Delay 30 ms

Sensitivity 1 V/100 mmHg, ± 5 %

(* These output signals are from MP1 connector of N1.)

Interfacing

Main Unit

DC power input 1

Multifunction Connector for Defib Sync and Analog Output
1

Multi-pin connector 1

Dock

AC power connector 1

RJ45 Network Connector, 100 Base-TX, IEEE 802.3
1

VGA connector 1

USB 2.0 connector 2

Host monitor connector 1

Modular Rack Slot

N1: 2 slots

Extended module: 1 slot

Barcode Scanner Support 1D and 2D barcode via dock

Keyboard & Mouse Support wire and wireless type via dock

Network Printer Support

When powered by one new fully-charged battery at 25 °C±5 °C with 5-lead ECG, SpO₂, IBP, CO₂ sampling, and auto NIBP measurements every 15 min, and factory default screen brightness, Wi-Fi enabled.

> 3 hrs with internal CO₂

Recharge Time When the monitor is off,

6 hours to 90% Without internal CO₂ module

3 hours to 90% With internal CO₂ module

Power Requirements

N1 Main Unit

Input 12VDC (±10 %), 2A

AC adapter/Transport dock

37.2.1. Input: 100 to 240 VAC (-15%, +10 %), 50/60 Hz

Output: 12VDC (±10 %), 2.5A

Docking Station

Input 100 to 240 VAC (±10 %), 50/60 Hz

Input Current 0.65A to 0.35A

Environmental requirements

For Main unit/Transport dock/AC adapter

Temperature Operating: 0 to 40 °C (32 to 104 °F)

Storage: -30 to 70 °C (-22 to 158 °F)

Humidity Operating: 5 to 95 % (non condensing)

Storage: 5 to 95 % (non condensing)

Barometric Operating: 427.5 to 805.5 mmHg (57.0 to 107.4 kPa)

Storage: 120 to 805.5 mmHg (16.0 to 107.4 kPa) (without CO₂), 375 to 805.5 mmHg (50.0 to 107.4 kPa) (with CO₂)

For Module rack/Dock/Other extended modules

Temperature Operating: 0 to 40 °C (32 to 104 °F)

Storage: -20 to 60 °C (-4 to 140 °F)

Humidity Operating: 15 to 95 % (non condensing)

Storage: 10 to 95 % (non condensing)

Barometric Operating: 427.5 to 805.5 mmHg (57.0 to 107.4 kPa)

Storage: 120 to 805.5 mmHg (16.0 to 107.4 kPa)

Reliability

The monitor can also be used during patient transport with road, rotary and fixed-wing ambulance. Comply with standards of EN 1789, EN13718-1, IEC 60601-1-12, RTCA DO-160G, MIL-STD-810G, and MIL STD 461F.

Type of Protection Class I

Degree of Protection ECG/TEMP/SpO₂/IBP/NIBP: CF

CO₂: BF

Ingress Protection Main unit: IP44

Dock/Module rack/AC adapter: IPX1

Transport Dock: IP22

Drop Protection 1.2m for all 6 faces

1. The functions are available for independent external display only.

37.2.2. Battery

Type Rechargeable lithium-ion

Capacity 2500mAh

Number of Battery 2 without internal CO₂

1 with internal CO₂

Run Time 37.2.2.1.

When powered by two new fully-charged batteries at 25 °C±5 °C with 5-lead ECG, SpO₂, and auto NIBP measurements every 15 min, and factory default screen brightness, Wi-Fi disabled.

> 8 hrs without internal CO₂

8 val. = 480 min

www.mindray.com

P/N:ENG- BeneVision N1 Datasheet-210285x4P-20211225

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mindray
healthcare within reach

BeneVision N1
Patient Monitor

Connecting the Vision



37.



Stay informed at every point of care

Designed for the fluctuating demands of both intra and out of hospital transport, the NI's exceptional reliability and strong performance provide seamless patient care during transport.



In compliance with out-of-hospital patient transport standards such as EN1789, EN13718-1, IEC60601-1-12 and U.S. military standards, NI is a competent intra- and inter-hospital transport monitor that has passed rigorous environmental, safety and EMC tests.



Specially designed for inter-hospital transport, the NI Transport Docking Station provides stability for both air and ground transport and it's embedded AC power adapter ensures a dual source of power during transport.



The NI's robust design supports IP44 grade dust/waterproof resistance as well as a six surface 1.2m drop endurance, eliminating concerns around accidental fluid splash and drop damage during transport.



One monitor, Multiple solutions

N1 transforms patient care by adapting to your patient's needs across the hospital enterprise - from plug-and-play module, to transport, to a stand-alone bedside monitor - N1 provides maximum flexibility while maintaining continuity of patient information and speeding workflow.



37.



N1 as a Multi-Parameter Module

Slide directly into the module slot or SMR of the N-Series monitor providing an expansive set of parameter measurements. When combined with our additional advanced parameter modules, this solution fits even the highest level of critical care environments.

Companion Mode

Connect with N-Series host monitor via cable connection to N1 dock and have the ability for dual-screen monitoring and bi-directional control of the bedside monitor - expanding slot space for more advanced parameters and enhanced ICU workflow.



Independent Bedside Monitor

With a common video signal cable, N1 easily expands to a 19-inch medical-grade external touchscreen display that provides a larger screen, additional monitoring functionality, and supports two display modes.

Independent Mode

Transforms the N1 into a full bedside monitor to support additional parameters, increase functionality and expanded screen settings.

Mirror Mode

Two-way screen or remote control functionality and viewing on both the 19" external display and the N1 unit - simultaneously.



Full monitoring function that fits into your hand

With an unparalleled integrated design, the N1 seamlessly blends innovative monitoring technology with a clinically tested ease-of-use work flow, all while maintaining continuity of patient information - even on the go.



Palm Size
150x102x81mm



Wide View
Clear viewing from any angle
160°



Ultra Light
950g(2.09lbs)*



Easy Operation
Gesture-control touchscreen

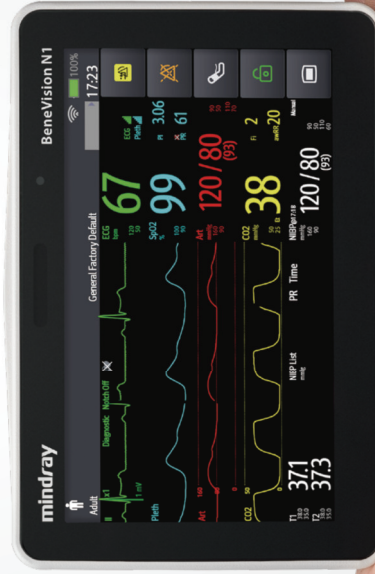


HD Display
5.5" screen with 1280x720
resolution



Auto Brightness
Adaptive to ambient light for
optimal view

**Only for standard configuration.*



Accurate and Comprehensive Measurements

With the Platinum Multi-parameter Platform, the N1 provides enhanced data analysis for ECG, respiration, SpO₂, * NIBP and temperature, thus improving significantly the accuracy and anti-interference ability of these parameters.



N1's fully integrated sidestream CO₂ module monitors the patients breathing status via the connected sample line. No need to add additional modules for transporting patients, particularly those who are intubated.

With the portable module rack, N1 can also support extended modules, including sidestream/microstream/mainstream CO₂ and PiCCO modules, thus meeting the requirements of different transport scenarios.

All-around Performer



8-hour Battery Life

Enhanced battery capacity provides flexibility, meeting the varying needs of extended patient transport.



Cross Infection Control

Fanless design reduces the risk of cross infection, while the new shell materials afford more durability when using hospital cleaners and disinfectants.

* Mindray provides 3 options of SpO₂ measurement, Mindray, Masimo and Nellcor. For further information about the availability of Masimo and Nellcor SpO₂, please contact with your local sales representatives.

Overall efficiency
for maximized value

Closing the gap of patient information



Patient-Centric Data Collection

When connected to a bedside patient monitor, advanced parameters collected from the host monitor such as AG and BIS, etc., will also be stored in N1 with trend data and alarm events reviewable even when it is disconnected.



Full trend



Event



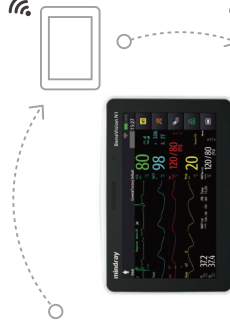
Full disclosure



12-lead ECG analysis

Strong wireless network

N1 stays connected while on transport with its dual-band WiFi module communicating real time data to the network. Supporting both multi-cast and cross-IP networking and predefined central station IP addresses to automatically switch on-line to the desired central station when reaching the preset section network coverage.



Reliable offline upload

No wireless connection? No problem. When the N1 is being used in a non-wireless environment or the network is experiencing problems, the N1 patient data can be uploaded to the bedside monitor upon return from transport and then synchronised to the central station.



Complete network connection

Whether being used as an MPM module at the bedside or as the bedside monitor with a 19" touchscreen display, all patient data collected by the N1 is easily sent to the network via LAN or WLAN connection.



Ease of use all in one hand

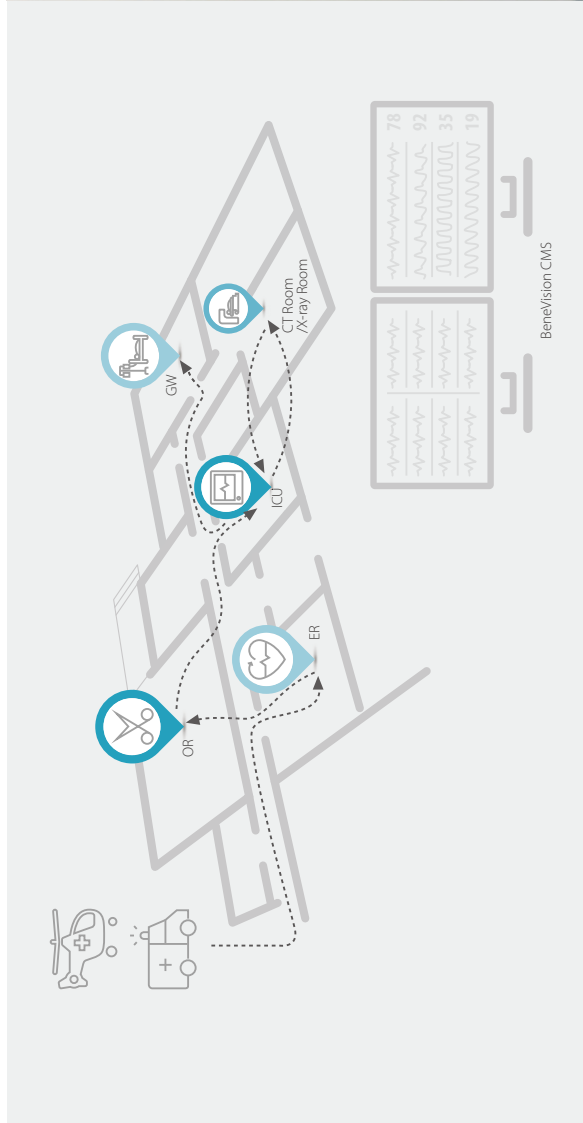
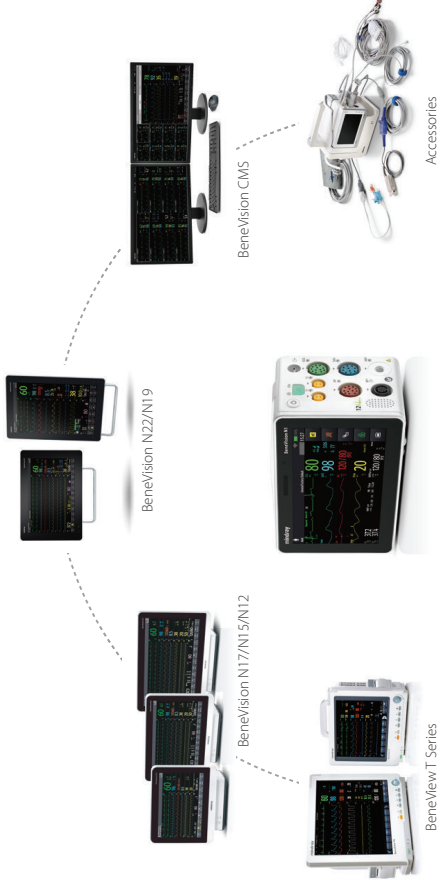
N1 follows a patient throughout the entire care process, not only ensuring the data continuity for optimal patient centric monitoring, but improving overall workflow efficiency for the hospital with its considerable usability.

- With one hand, easily insert or remove the N1 from the monitor or docked location in one fluid movement, easing transport workflow
- Capacitive touch screen supports gesture control that easily switches between normal and large font screen options
- An intuitive user interface that provides easy navigation, increased efficiency and helps ease clinical workflow



Maximised value for your investment

N1 is compatible with BeneView T Series Patient Monitors and all accessories of BeneView T1. The state-of-the-art UI design enables intuitive operation that saves hospital resources and costs in staff training.



BeneVision N1

Patient Monitor

Operator's Manual

2.2 Equipment Features

The monitor is intended to be used in a hospital environment including, but not limited to, ICU, CCU, PICU, Neonatology, RICU, emergency room, operating room, postoperative observation ward, etc.

The monitor can be used in the following ways:

37. ■ As a stand-alone patient monitor, or
- As a multi-parameter module (MPM) for the Mindray BeneVision N22, BeneVision N19, BeneVision N17, BeneVision N15, BeneVision N12, or BeneVision N12C patient monitor, hereafter referred to as “the host monitor”.
- As a multi-parameter module (MPM) for the Mindray BeneView T5, BeneView T5 OR, BeneView T6, BeneView T8, BeneView T9 or BeneView T9 OR patient monitor, hereafter referred to as “the host monitor”.
- As a multi-parameter module (MPM) for the BeneHeart DX or BeneHeart DM defibrillator/monitor.

In this manual, the N1 is generally referred to as “the monitor” except in the situation describing its use with a host monitor or the defibrillator/monitor, where it is referred to as “the N1”.

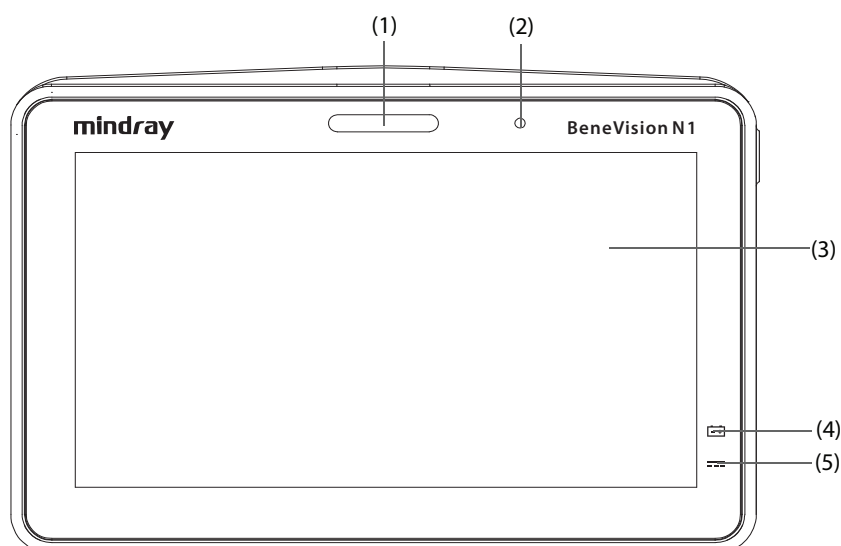
2.3 Applied Parts

The applied parts of the monitor are:

- ECG electrode and leadwire
- SpO₂ sensor
- Temp probe
- NIBP cuff
- IBP transducer
- PiCCO sensor
- CO₂ sampling line/nasal sampling cannula, water trap, and mask

2.4 Main Unit

2.4.1 Front View




2. In the **Select Bed** menu, select a desired department. All the beds under this department will be listed. To select beds in the same care group during the shift of care groups in the CMS, select **Select Beds By Care Group**.
3. Select a desired tile at the A-W1 or A-W2 areas and then select a bed from the bed list. The selected bed will appear in the alarm watch area and the alarm watch tile if configured.

NOTE

- The added bed is indicated by a check mark (✓) at the left of the bed list.
-

4.5.3 Removing a Bed

If you do not want to monitor a remote device any longer, you can remove it. To remove a remote device, follow this procedure:

1. Enter the **Select Bed** menu. Choose either of the following ways:
 - ◆ In the **Remote View** screen, select **Select Bed**. For more information, see 4.5.1 *Entering the Remote View Screen* for entering the **Remote View** screen.
 - ◆ Select the setup icon  in the alarm watch tile if the tile is configured to display on the main screen.
2. In the **Select Bed** menu, select a bed at the A-W1, A-W2 or A-W3 areas, and then select **Clear Bed**. If you want remove all beds, select **Clear All Beds**.

4.5.4 Displaying the Main Bed

To watch the real time monitoring screen of a remote bed, select the bed from the alarm watch area. This bed is called the main bed.

4.5.5 Saving a Manual Event 37.3.2.

You can initiate a manual event by selecting **Manual Event** in the **Remote View** screen.

The manual event stores in the event review of the corresponding remote device.

4.5.6 Resetting Alarms for Remote Devices

To reset remote device alarms, from the **Remote View** screen, select **Alarm Reset**.

NOTE

- You can reset remote device alarms only if the **Alarm Reset by Other Bed** switch is on at the remote devices. For more information, see 22.4.5 *The Combined Alarm Tab*.
-

4.5.7 Alarm Watch

The alarm watch function provides the alarm notification by color and sound.

- The monitor sounds the highest priority alarm tone from all the monitored remote devices.
- The moitor displays the highest priority alarm in corresponding background color for each bed in the following areas:
 - ◆ At the top of the **Remote View** screen. For more information, see 4.5.1 *Entering the Remote View Screen* for details.
 - ◆ In the Alarm Watch tile on the main screen. For more information, see 4.5.7.1 *The Alarm Watch Tile on the Main Screen* for details.

4.5.7.1 The Alarm Watch Tile on the Main Screen

The main screen can display up to three alarm watch tiles, namely A-W1 and A-W2. Each tile can accommodate up to six beds.

The following figure shows the alarm watch tiles.

DECLARATION

Date: 2022/06/22

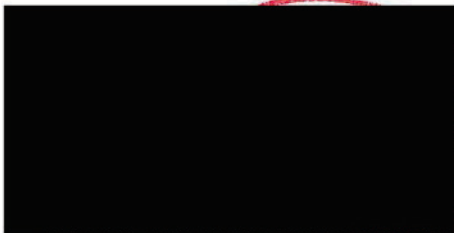
To whom it may concern,

37.2.2.1

We, **Senzhen Mindray Bio-Medical Electronics Co., Ltd. ("Mindray")**, the manufacturer of **BeneVision N series** patient monitors hereby hereby confirm that :

Patient monitor Mindray BeneVision N1 (with intenal CO2 module) maximum working time from the battery is not less than 5 hours when powered by one new fully-charged battery at 25 °C±5 °C with 5-lead ECG , SpO2, IBP, CO2 sampling, and auto NIBP measurements every 15 min, and lowest screen brightness, Wi-Fi enabled.

Best regards,



Marketing Department, Northeast Europe
Shenzhen Mindray Bio-Medical Electronics Co., Ltd.

Vertimas iš anglų kalbos į lietuvių kalbą.

EU-T-GJLA202206230011

GAMINTOJO DEKLARACIJA

2022 m. birželio 22 d.

Tiems, kurie susiję,

37.2.2.1

Mes, **Shenzhen Mindray Bio-Medical Electronics Co., Ltd**, paciento monitoriaus BeneVision N serijos gamintojas, patvirtiname, kad:

Paciento monitorius Mindray BeneVision N1 (su kapnometrijos moduliu) maksimalus baterijos veikimo laikas yra ne mažiau kaip 5 valandos, naudojant vieną pilnai pakrautą bateriją, esant 25 ± 5 °C temperatūroje, naudojant 5 EKG monitoravimą, SpO2, invazinį kraujospūdį, kapnometrijos mėginių paėmimą ir automatinį neinvazinį kraujospūdžio matavimą kas 15 minučių, kuomet nustatytas mažiausias ekrano ryškumas ir įjungtas Wi-Fi.

Pagarbiai,

/parašas/Anspaudas/

Tu Haitao

Šiaurės Rytų Europos pardavimų ir rinkodaros skyriaus generalinis direktorius

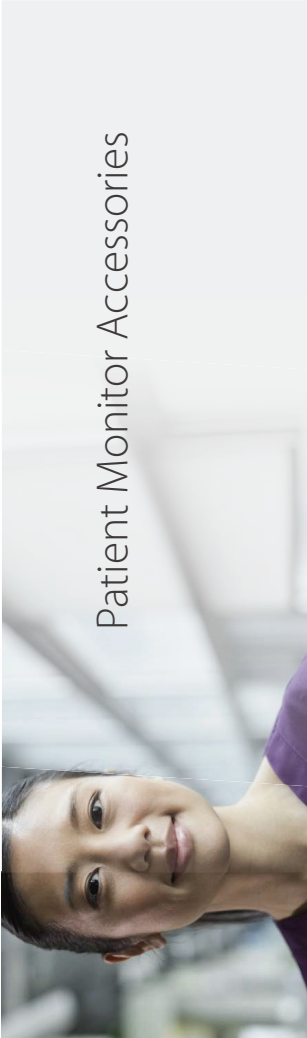
Shenzhen Mindray Bio-Medical Electronics Co., Ltd

Vertimą tvirtino UAB „MedUS Medical“ direktorius Jonas Baltruša



Accessories and
Consumables

CATALOGUE 2024.07



Patient Monitor Accessories

ECG Accessories



Integrated ECG Cable

- Integrated design, convenient for use and maintenance
- Meeting the requirements of ECG3
- Outstanding shielding property and anti-interference performance, protecting ECG signal from being interfered
- Excellent defibrillation-proof performance, well protecting the equipment
- Flexible and durable cables
- Outstanding cable material, enduring repeated cleaning and disinfection
- Latex free

Integrated ECG Cables - IEC For BeneVision, ePM, uMEC series monitors, BeneHeart defibrillator, uMED 20				
Picture	Model	Part No.	No. Description	Purchasing Unit
	EA6252B	040-000963-00	ECG cable and wires (integrative); Adu/Ped, 12 Pin 5-Lead, Defib-Proof IEC, Snap, 3.6 m	Each
	EA6232B	040-000967-00	ECG cable and wires (integrative); Adu/Ped, 12 Pin 3-Lead, Defib-Proof IEC, Snap, 3.6 m	Each
	EA6252A	040-000962-00	ECG cable and wires (integrative); Adu/Ped, 12 Pin 5-Lead, Defib-Proof IEC, Clip, 3.6 m	Each
	EA6232A	040-000966-00	ECG cable and wires (integrative); Adu/Ped, 12 Pin 3-Lead, Defib-Proof IEC, Clip, 3.6 m	Each

Mindray SpO₂ 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 SpO₂ 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 SpO₂ 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

38.2.

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 SpO₂ 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 SpO₂ 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

Non-invasive Blood Pressure Accessories



Non-invasive Blood Pressure Tubing


- Not deform even if for long-term use
- Reasonable hardness avoids severe bending, ensures the safety of deflation
- Reasonable hardness ensures well transmission of blood pressure signal
- TPU ensures good air tightness and long life
- Latex free, PVC free
- Good biocompatibility, free from biological hazard to skin

38.4.

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

Picture	Model	Part No.	No. Description	Purchasing Unit
	CM1903	6200-30-09688	NIBP Tubing, Adu/Ped/Inf, with air plug connectors, 3 m	Each
	CM1903	115-012522-00	NIBP Tubing, Adu/Ped/Inf, with air plug connectors, 3 m	Each
	CM1908	040-002712-00	NIBP Tubing, Adu/Ped/Infant, with connectors, 3 m	Each
	CM1901	6200-30-11560	NIBP Tubing, Neo, with connectors, 3 m	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, 7-13cm - ISO80369	Each
	CM1201	0010-30-12157	Reusable cuff, Inf, 10-19cm, with connector - ISO80369	Each

38.3.

Picture	Model	Part No.	No. Description	Purchasing Unit
	CM1202	0010-30-12158	Reusable cuff, Child, 18-26cm, with connector - ISO80369	Each
	CM1203	0010-30-12159	Reusable cuff, Adu, 25-35cm, with connector - ISO80369	Each
	CM1204	0010-30-12160	Reusable cuff, Large Adu, 33-47cm, with connector - ISO80369	Each
	CM1205	0010-30-12161	Reusable cuff, Thigh, 46-66cm, with connector - ISO80369	Each