Multiparameter Patient Monitor

BM 7

Advanced BM 7
with New Environmental Standards

New Design with
Durability Standard of IPX2

Convenient POP-UP Trend for ST
Analysis & NIBP Monitoring

Simplifying Workflow

Enhanced Diagnostic Data
& Review Capabilities

User-friendly Interface

Comprehensive Connectivity

bionet

BM 7

New and Improved Housing Design

- Meets IPX2 Water Ingress Standard, the most stringent drip test
- Ergonomic design, maximizing display presentation and operation

Enhanced Workflow

- Easy patient registration with barcode scanner
- Patient Admission & Discharge menu
- Direct HL7 interface to HIS / EMR
- Auto data transfer mode with HL7 period from 10 sec ~ 6 hrs interval

User-friendly Interface

- Large, remote color display HDMI Interface
- Screen Freeze for event capturing and Screen Lock for convenient cleaning
- Detachable bed-rail hook
- "One Touch" design for easy pole, rollstand and wall mounting
- On-board Drug Calculation software

Advanced Diagnosis Data and Review

- 13 types of arrhythmia detection & ST segment analysis
- Pacemaker detection
- OxyCRG monitoring for neonate patient
- 168 hrs of tabular and graphical trends

Comprehensive Connectivity

- 2 USB slots for external data transfer & barcode scanner
- Bed to Bed monitoring mode
- LAN, Wi-Fi connection to BM Central monitoring system

3.2. Matuojami parametrai:

BM Comparison Chart *

	BM3	BM5	BM7
Display size	8" Touch	10.4" Touch	12.1" Touch
Standard Parameter	ECG/Spo2/NIBP/ Resp/1CH-Temp	ECG/Spo2/NIBP/Resp/ 2CH-IBP/2CH-Temp	ECG/Spo2/NIBP/Resp/ 2CH-IBP/2CH-Temp
NIBP (SunTech)	Opt.	Opt.	Opt.
Temp	1CH Optional sensor	2CH Optional sensor	2CH Optional sensor
IBP	X	2CH Optional sensor & cable	2CH Optional sensor & cable
ETCO2	Opt.*	Opt.	Opt.
Waveforms	4	6	6
Printer	Y	Y	Y
Network	LAN, USB Wi-Fi Dongle	LAN, USB Wi-Fi Dongle	LAN, USB Wi-Fi Dongle

* BM3 ETCO2 option includes SUNTECH NIBP

BM 7

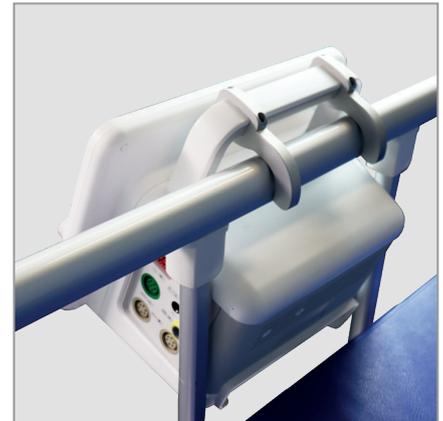2. Monitoriaus tipas

Enhanced, Robust Physical Design

With ease of use in mind

New housing design
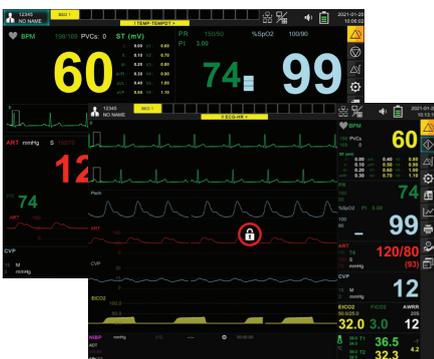supporting IPX2

"One Touch" design for easy
pole, rollstand and wall mounting

Detachable bed-rail hook

Versatile Operation
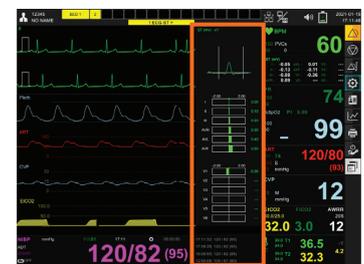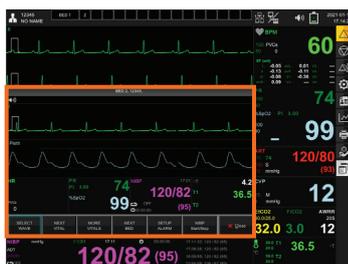
Enhancing patient monitoring experience

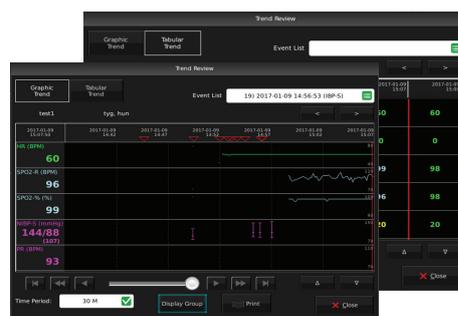Screen Freeze / Lock function
& Customizable display
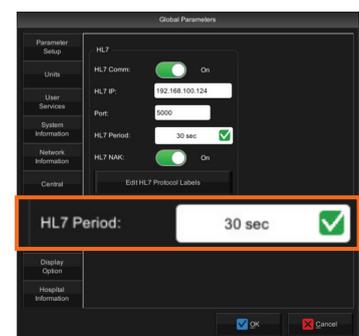

Quick review
with NIBP trend window

ST trend window for analyzing
and detecting changes in ECG

Access to a different bed with
Bed to Bed monitoring function

168 hrs of Tabular
and Graphical trends

HL7 Auto data transfer
from 10 sec ~ 6 hrs

3.4.1. Duomenų
atvaizdavimas iš atminties

Technical Specifications

BM 7

Hardware Specifications

Dimension (W x H x D) & Weight	BM7 324 x 257 x 218 / Approx 4.5 kg
Display / Resolution	BM7 12.1" / 1024 X 768
Parameters	BM7 ECG, Heart Rate, Respiration Rate, SpO2, Pulse Rate, Systolic BP, Diastolic BP, Mean BP, ETCO2, FiCO2, Airway Respiration Rate, 2CH-IBP, 2CH-Temp
Trace	BM7 6 Waveforms : 2*ECG, SpO2, RR or ETCO2, 2*IBP
Indicators	Categorized Visual alarm lamp (3 priority levels) SpO2 pulse pitch tone, Battery status, External power LED
Interfaces	DC input : 100-240 VAC 50 Hz / 18 VDC, 2.8 A LAN port for transferring data Nurse call system connection HDMI output connector ±2 m HDMI to HDMI laidas USB connector
Battery	Rechargeable BM7 : 6500 mAh 2hours (Option: using additional battery, total of 4 hours)
Data Storage	168 hrs (saving interval 1 min)
Water Resistance	IEC 60529:2013 Degress of protection provided by enclosures, IPX2

ECG

ECG lead & Waveforms	BM7 3-lead : 1 channel I, II, III 5-lead : 1 / 2 / 7 channels I, II, III, aVR, aVL, aVF, V (V1-V6)
Heart Rate Range	Adult / Pediatric : 30 ~ 300 bpm Neonate : 30 ~ 350 bpm
Heart Rate Accuracy	± 1 bpm or ± 1 %, whichever is greater
Sweep Speed	6.25, 12.5, 25, 50 mm/sec
Filter	Diagnosis : 0.05 ~ 150 Hz Monitoring : 0.5 ~ 40 Hz Moderate : 0.5 ~ 25 Hz Maximum : 5 ~ 25 Hz
ST Segment Detection Range	-2.0 ~ 2.0 mV
Arrhythmia Analysis	BM7 : Asystole, VTach, VFib Bigeminy, AccVent, Couplet, Irregular, Pause, PVC, RonT, Trigeminy, VBrady, ShortRun
Pacemaker Detection Mode	Indicator on waveform display
Protection	Against electrosurgical interference and defibrillation

Respiration Performance

Method	Thoracic impedance
Channel Selection	BM7 : RA-LL, RA-LA
Measurement Range	5 ~ 120 breaths per minute
Accuracy	±1 breath per minute
Apnea Alarm	Yes

Temperature Performance

Measurement Range	0 ~ 50 ℃ (32 ~ 122 ℉)
Accuracy	25 ~ 50 ℃ : ± 0.1 ℃ 0 ℃ to the less than 25 ℃ : ± 0.2 ℃
Compatibility	98ME04GA603 temperature probes
Temperature Range	Operating : 5 ~ 40 °C (41 ~ 104 °F) Storage : –20 ~ 60 °C (–4 ~ 140 °F)
Channels	2CH

IBP

Channels	2
Measurement Range	-50 ~ 300 mmHg
Accuracy	4 % of reading or ± 4 mmHg, whichever is greater
Pulse Rate Measurement Range	0 ~ 300 bpm
Zero Balancing	Range : ± 200 mmHg Accuracy : Drift : ± 1
Transducer Sensitivity	5 µV/V/mmHg

SpO2

Saturation Range	0 ~ 100 %
Saturation Accuracy	70 ~ 100 % : ± 2 digit 0 ~ 69 % : unspecified
Pulse Rate Range	30 ~ 254 bpm
Pulse Rate Accuracy	± 2 bpm

NIBP

Method	Oscillometric
Operation Mode	Manual / Automatic / Continuous
Measurement Range (Adult)	Systolic : 40 ~ 260 mmHg MAP : 26 ~ 220 mmHg Diastolic : 20 ~ 200 mmHg
Accuracy	Mean error : less than ± 5 mmHg Standard deviation : less than 8 mmHg Meets accuracy requirements of ANSI/AAMI SP10:2002

ETCO2 (Main / Sidestream)

Measurement Range	0 ~ 150 mmHg, 0 ~ 19 %
Accuracy	0 ~ 40 mmHg ± 2 mmHg 41 ~ 70 mmHg ± 5 % of reading 71 ~ 100 mmHg ± 8 % of reading 101 ~ 150 mmHg ± 10 % of reading
Respiration Rate	2 ~ 150 breaths per minute
Respiration Accuracy	± 1 breath per minute

* Specifications can be changed without prior notification.

Annotations (Lithuanian):
- 3.3.1. Displėjaus ekrano įstrižainė
- 3.3.2. Kreivių skaičius ekrane vienu metu
- 3.7. 3-jų lygių aliarmo signalai.
- 3.9. 1. Temperatūros matavimo diapazonas (ne siauresnis už nurodytą) 2. Matavimo paklaida
- 3.1. Elektros maitinimo šaltiniai:
- 5. Monitoriaus ekrane rodomo vaizdo perdavimas į išorinį įrenginį - telemedicinos stotelę
- 3.4.2. Atminties trukmė
- 1. Paskirtis
- 3.8.1. EKG derivacijos:
- 3.8.2. Širdies susitraukimų dažnio matavimo ribos
- 3.11.2. Matavimo paklaida diapazone nuo 70% iki 100, monitoruojant suaugusius, nesant judesio artefaktų
- 3.10.2. Kraujospūdžio matavimo metodika 3.10.3. Kraujospūdžio matuoklio darbo režimai
- 3.3. 3. Kreivių slinkimo greitis
- 3.5. Monitoriaus apsauga nuo defibriliacijos iškrovos
- 3.8.4. Yra kvėpavimo monitoringas ir Apnoe atpažinimas
- 3.8.3. Gyvybei pavojingų aritmijų analizė, ST segmento analizė
- 3.8.5. Kvėpavimo dažnio matavimo diapazonas

requirements of the applicable standards. If you have questions about this matter, please contact Bionet or its representatives.

Product configuration

Basic components

1. Main body of BM3/5/7 monitor — 1 EA
2. 3-Lead ECG patient cable (**BM3**) — 1 EA
   5-Lead ECG patient cable (**BM5, BM7**) — 1 EA
3. Disposable electrodes — 10 EA
4. NIBP extension tube — 1 EA
5. Reusable adult NIBP cuff x3 dydžiai — 1 EA

   4.3. Manžetės neinvaziniam suaugusiųjų kraujospūdžio matavimui

6. SpO2 extension cable — 1 EA
7. Reusable adult clip SpO2 probe x2 — 1 EA

   4.1. SpO2 matavimo daviklis suaugusiems su jungiamuoju kabeliu

8. DC power adaptor — 1 EA
9. Operation manual — 1 EA
10. Thermal roll paper — 2 ROLL
11. Rechargeable battery — 1 EA
12. Power Cord — 1 EA

Option components

1. Reusable temperature probe (Skin type)

   4.5. Temperatūros matavimo daviklis

2. Sidestream EtCO2 module (Respironics)
3. Mainstream EtCO2 module (Respironics)
4. Sidestream EtCO2 sample lines
5. Mainstream EtCO2 airway adapters
6. 5-Lead ECG patient cable (**BM3** only)
7. 3-Lead ECG patient Cable (**BM5, BM7** only)

   4.4. EKG paciento kabelis, 3 laidų

8. IBP transducer set (Disposable/Reusable) (**BM5, BM7** only)
9. Ethernet cable

Connecting Healthcare for Life

3.2. Matuojami parametrai:

Operating Mode		Continuous		
Display	**Type**	TFT-LCD		
	Resolution	800 x 600	800 x 600	1024 x 768
	Size	8″	10.4″	12.1″
Measurement Parameter	**Common**	ECG, Heart Rate, Respiration Rate, SpO2, Pulse Rate, Systolic BP, Diastolic BP, Mean BP, EtCO2, FiCO2, Airway Respiration Rate		
	Option	Temperature x 1	Temperature x 2 IBP x 2	Temperature x 2 IBP x 2
TRACE	**Waveforms**	4 waveforms : 2*ECG, SpO2, RR or EtCO2	6 waveforms : 2*ECG, SpO2, RR or EtCO2, 2*IBP	6 waveforms : 2*ECG, SpO2, RR or EtCO2, 2*IBP
	Sweep Speed	Sweep speed: 6.25, 12.5, 25, 50 mm/sec		
Indicator		Categorized alarms (3 priority levels), Visual alarm lamp, SpO2 pulse pitch tone, Battery status, External power LED		
Interface		DC input connector : 18VDC, 2.8A LAN port for transferring data Nurse call system connector HDMI output connector USB connector		
Battery		Rechargeable Li-ion battery		
Thermal Printer (option)		Speed : 25, 50mm/sec, Paper width : 58mm		
Data Storage		168hours trends, 20cases of 10sec alarm waveform		
Language		English, Korean, French, Bulgarian, Polish, German, Chinese, Portuguese, Hungarian, Czech, Romanian, Italian, Turkish, Spanish Russian, Greek, Japanese, Kazakh, Ukrainian		
Environments				

3.11. 3. SpO2 matavimo duomenų pateikimas

3.6. Užduotų parametrų ribų peržengimo aliarmų sistema

Connecting Healthcare for Life

6. Trend

Overview

The monitor stores trend data for all connected signals. Users can request trend recording and can also print the screen of trends displayed.

Triggered alarm events are displayed in red inverted triangles on the Event List and Timeline

3.4.1. Duomenų atvaizdavimas iš atminties

Trend setting

	Main menu	Sub menu
	A. Trend Setup	**A-1.** Popup Trend
	B. Graphic Trend	**B-1**. Graphic Trend
		B-2. Tabular Trend
	C. Tabular Trend	**C-1**. Graphic Trend
		C-2. Tabular Trend
	D. Trend Export	
	E. Full Disclosure[2]	**E-1**. Setting
	F. OxyCRG Show/Hide	

[2] : BM7 only

| Sub menu	Description	Available settings
A. Trend setup menu		
A-1. Popup trend		
A-1-1. Time period	Show time interval setting menu	30min, 60min, 90min, 3hour, 6hour
A-1-2. Configure parameters	Configure the biosignal to be shown in the popup trend window	
B. Graphic trend menu		
B-1. Graphic trend		

3.6. Užduotų parametrų ribų peržengimo aliarmų sistema

Print waveform1	LEAD II	LEAD II	LEAD II
Print waveform2	SpO2	SpO2	SpO2
Print waveform3	RESP	RESP	RESP
Alarm print	Off	Off	Off
NIBP interval	Off	Off	Off
NIBP cuff size	Adult	PEDIATRIC	NEONATE
RR(RESP) lead	II	II	II
Alarm volume	50%	50%	50%
QRS volume	Off	Off	Off
Pulse volume	Off	Off	Off
ECG lead fault	Message	Message	Message
SpO2 probe off	Low Alarm	Low Alarm	Low Alarm
Units for height	cm	cm	cm
Units for weight	Kg	kg	kg
Temperature units	℃	℃	℃
NIBP limit type	Systolic	Systolic	Systolic
ECG filter	Monitor	Monitor	Monitor
PVC	ON	ON	ON
ST	ON	ON	ON

Connecting Healthcare for Life
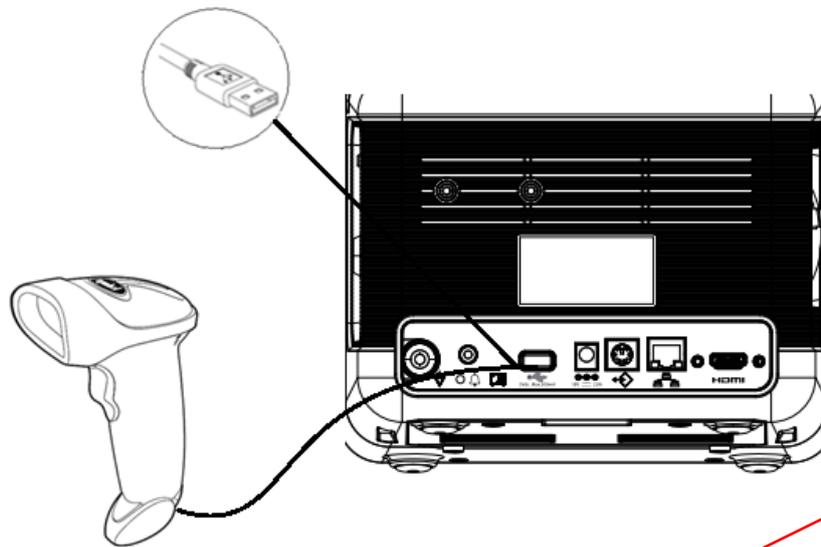
3.7. 2. Galimybė monitoriaus ekrane stebėti aliarminių pranešimų tekstą;
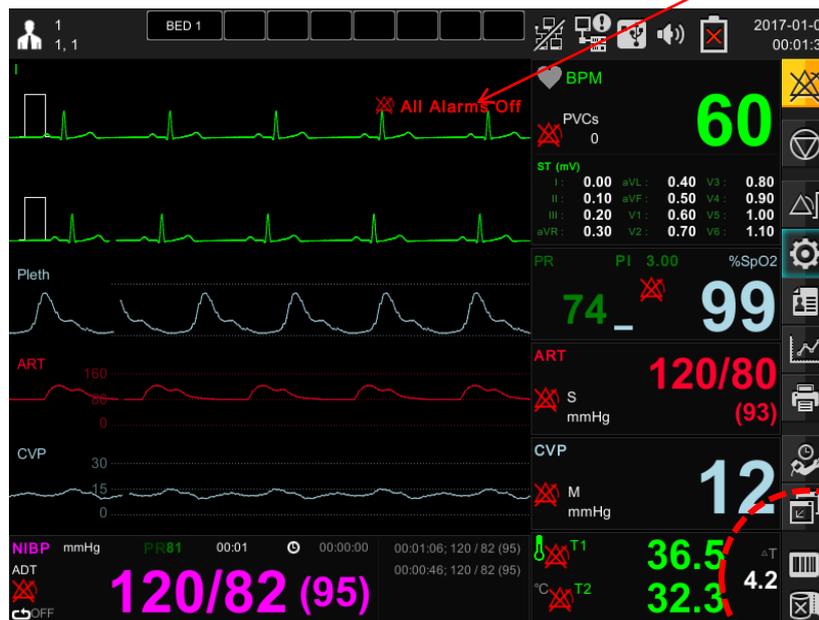
The barcode that you want to input is matched to the index LED generated by the scanner, and if you press the input button, the corresponding ID is read and sent to the equipment. The sender ID is displayed at the top center of the screen

5. Alarm

Overview

The monitor displays the alarm limit (parameter threshold) and can be configured by the user to raise an alarm if exceeded. Limits are displayed both in the alarm limits table and in the parameter box. If this limit is exceeded, a visual or audible alarm will occur.

The bedside monitor is the primary alarm device, and there may be other secondary alarm devices depending on how you configured the device / network. Depending on the alarm condition, the monitor generates an alarm using one or more of the following devices:

- Hearing sound reflecting alarm severity
- Change the color in the parameter box of the alarm parameter
- Alarm messages in the local message area
- Alarm banner indicating alarm status
- External alarm device such as nurse call system
- Activate alarm recording

The monitor generates an alarm when the parameter in the Alarm Limits table is **ON**. It is not a prerequisite that the parameter is displayed on the display or connected in the event of an alarm.

Alarm priority

The alarm type is divided into a patient status alarm and a product status alarm.

The patient status alarm sounds when the diagnostic function (ECG 13 auto diagnosis) and alarm upper and lower limits are exceeded, and there are levels of High, Medium, Low and Message, and there is a difference in the order and volume of the alarm. You can set the alarm level for each parameter and function. The patient status alarm provides the highest priority alarm.
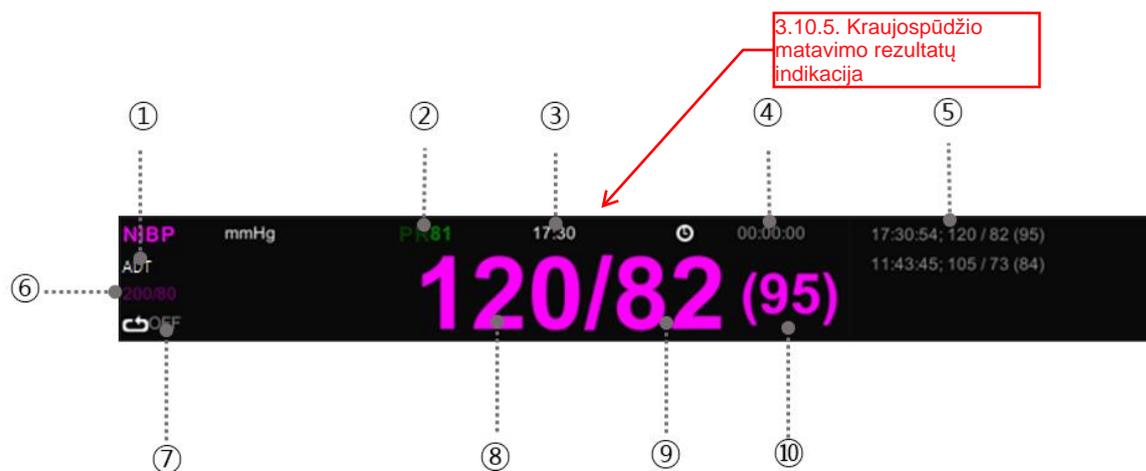
The features of each alarm are described as follows. The alarm priority is High > Medium > Low > Message. For high or medium alarms, the printer output is supported when 'Alarm print on' is set.

Note	The NIBP should be set in the menu because the measured value differs depending on the patient's age and gender.

Display

3.10.5. Kraujospūdžio matavimo rezultatų indikacija

①   Measurement cuff type.

②   Pulse rates: Indicates pulse rate.

③   Measurement time: Indicates the completion time of measuring.

④   Measure time: Indicates the schedule counter time of measuring.

⑤   Indicates recent measurement data.

⑥   Systolic alarm limit: Indicates alarm limit of blood pressure.

⑦   Interval time: Indicates interval time when measures the blood pressure periodically.

⑧   Systolic blood pressure: Indicates the maximum blood pressure.

⑨   Diastolic blood pressure: Indicates the minimum blood pressure.

⑩   Mean blood pressure: Indicates the average blood pressure.

3.10.6. Kraujo spaudimo matavimo duomenys skaitmenine forma pateikiami atskirai

Connecting Healthcare for Life

	pressure value.	
A-4. Setting time	How to apply pressure value setting. Once: When the blood pressure is measured for the first time, the pressure is set to the set pressure value, but automatically adjusted according to the patient's blood pressure value. Every time: Whenever blood pressure is measured, pressurize to the set pressure value every time	Once, Every time
A-5. Measurement Interval	A menu to set Interval time when measures the blood pressure periodically. After setting Interval, you must press NIBP Key to start NIBP Start periodically.	1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, 8
B-1. NIBP STAT	Patients with severe state changes in blood pressure are in continuous mode for 5minutes to check for changes in blood pressure continuously.	Off / On
C-1. Vital sign review	Record the 40 most recently measured blood pressure values.	

> 3.10.4. Automatiniame režime matavimai atliekami intervalais, pasirenkamais

Warning	**Check periodically to see if the circulation from the cuff to the distal part of the patient's arm is good.** **1minute and 2minute intervals When using automatic measurement, check the patient's condition frequently. It is not recommended for measuring blood pressure for a long time after the measurement time period is set to 10minutes or less.**

Connecting Healthcare for Life

BM7 User's Manual

ALARM

3.10.1. Kraujospūdžio matavimo diapazonas

The alarm provides ALARM LIMIT and ALARM SOUND.

Alarm setting Numeric Value of Systolic, Diastolic, and mean pressure is 10 ~ 360mmHg.

The menu which decide activate of warning sign and message display when the respiration alarm is on.

1. Move the ☐ mark to select one from RETURN, NIBP-S, NIBP-M, or NIBP-D, and press.

2. Press the key at NIBP-S, and move to LOW, and press again.(The user gets the same result regardless of the LOW-HIGH, or HIGH-LOW order.)

3. When the color has changed, move it again to select a target value, and press.

4. Press the key at HIGH. When the color has changed, move to the right to select a target value, and press.

5. Set up or revise the values of NIBP-M and NIBP in the same way as above.

6. With the selection of RETURN, the user can get out of the window.

NIBP		X
ALARM	NIBP-S 250 / MESSAGE 80	NIBP-M 140 / MESSAGE 40
CUFF SIZE: ADT		NIBP-D 120 / MESSAGE 20

ALARM LEVEL: MESSAGE, MESSAGE, LOW, MEDIUM, HIGH

ALARM: ON   HIGH: 50   LOW: 150

Keypad: 1 2 3 -, 4 5 6 CLR, 7 8 9, 0 . <- , SET

INFLATION: 170mmHg
INTERVAL: OFF
NIBP STAT: OFF
NIBP VITAL SIGN
UNIT SELECT: mmHg