

BeneVision N1

Transport Monitor

Multiparametru modulis



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 2.1.49.1. Spalvotas, LCD, Lietimui jautrus

Type 2.1.49.1. Medical-grade color TFT LCD, capacitive touch screen, with Corning® Gorilla® Glass, support multi-touch operation.

2.1.49.2. Size & Resolution 5.5-inch, 1280 x 720 pixels (WXGA) 13.97 cm. įstrižainė

2.1.49.3. Waveforms 5 traces, up to 13 waveforms Iki 13 kreivių

External display Medical-grade color TFT LCD, capacitive touch screen, 21.5-inch, 1920 x 1080 pixels Up to 8 traces

ECG

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

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, Vrhythm, 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

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)

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

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

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

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

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.
OxyCRG¹	48 hrs
Minitrend¹	Yes

Alarms

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 alarms ¹	

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

Battery

baterija

Type Rechargeable lithium-ion

Capacity 2500mAh

Number of Battery 2 without internal CO₂

1 with internal CO₂

2.1.50.2

Run Time

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 valandos veikimo laikas

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

2.1.50.1

Recharge Time

When the monitor is off,

6 hours to 90% Without internal CO₂ module

3 hours to 90% With internal CO₂ module

Pakrovimo laikas: 3h iki 90 proc.

Power Requirements

N1 Main Unit

Input 12VDC (±10 %), 2A

AC adapter/Transport dock

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.

www.mindray.com

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

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