



CNAP® Monitor 500
Sold as NIBP100D

Continuous and Noninvasive

Blood Pressure Control
Hemodynamic Optimization





CNAP® Monitor 500 — Distributed by BIOPAC® as NIBP100D



CNAP® IN RESEARCH

**reliable, accurate
continuous noninvasive blood pressure
for scientific purposes**

RESEARCH SYSTEM FEATURES

NBP Cuff

- > Automated scaling to brachial pressure (gold standard) at start of measurement and user programmable
- > Variety of sizes to fit pediatric thru large adult

Double finger cuffs

- > Quick and error-free application
- > System includes 3 cuff sizes (small/ medium/ large)
- > Long-term recording (24 hrs per hand)
- > User selectable rotation interval up to 60 min. per finger

Continuous waveform

- > Calibrated pulse waveform
- > Continuous tracing of hemodynamic changes without interruptions to recalibrate
- > Beat-to-beat systolic, diastolic, mean BP values

Connectivity

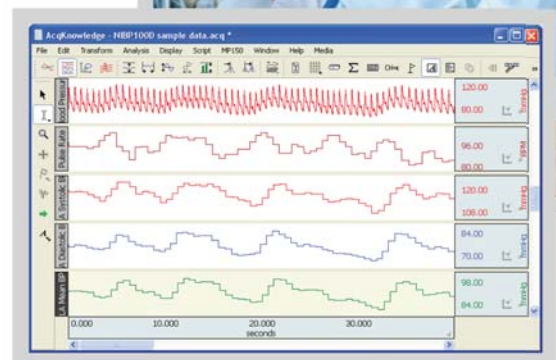
- > Plug & play integration into all common data acquisition systems and patient monitors

Data storage and analysis

- > Unlimited data storage via USB interface
- > Data format (*.csv) for import into all common data analysis software packages (e.g. AcqKnowledge®, Matlab, MS Excel, SPSS, etc.)

Accuracy

- > Reliably equivalent to invasive blood pressure (IBP) ^{1,2}



APPLICATIONS IN RESEARCH

- | | |
|----------------------|--------------------------------|
| > Physiology | > Neurology |
| > Psychophysiology | > Psychology |
| > Autonomic Function | > Sports / Exercise Physiology |
| > Cardiology | > Pharmacology |

SPECIFICATIONS

Sample rate	100 Hz
Storage data format	*.csv (BP waveform; beat values, NBP)
Interfaces	AUX (non isolated): -5V to 5 V BP Wave Out (isolated): 5µV/V/mmHg
Adult & Pediatric	~ 4 years (> 20 kg)
Language Options	multilingual display



RESEARCHERS COUNT ON CNAP® TECHNOLOGY TO...



...study the influence of slow pressure oscillations on self-paced movements.³

...study the correlation between stroke severity and autonomic dysfunction.⁴

...study the effects of mainstream media on women's physiological and psychological functioning.⁵

...study the detection of deception by use of continuous blood pressure.⁶

...develop an automated closed-loop double-vasopressor system to treat hypotension during spinal anesthesia for cesarean section.⁷

...study the relationship between cerebral perfusion during heat stress and the tolerance to a stimulated hemorrhage.⁸

"Hemo"- dynamize your research work with CNAP®!

BENEFITS FOR RESEARCH

- > **Reliable & accurate** noninvasive beat-to-beat measurements
- > Good for **short & long-term monitoring**
- > Gets running quickly: **fast set up & calibration**
- > **Consistent results** due to reliable system design
- > **Easy connection** to 3rd party data acquisition systems
- > **Reusable** CNAP® double finger sensors



Version: 03/2013, V1.5.1/Letter | www.cnsystems.at

1 Jeleazcov C et al. Precision and accuracy of a new device (CNAP®) for continuous noninvasive arterial blood pressure monitoring: assessment during general anaesthesia. BJA. 2010; 105(3):264-272

2 Blais M, et al. Continuous non-invasive arterial pressure measurement: Evaluation of CNAP® device during vascular surgery Ann Fr Anesth Reanim (2010), doi:10.1016/j.annfar.2010.05.002

3 Pfurtscheller G, Ortner R, Bauernfeind G, Linortner P, & Neuper C. (2010). Does conscious intention to perform a motor act depend on slow cardiovascular rhythms? Neuroscience letters, 468(1), 46–50.

4 Hitz M, J. Moeller S, Akhundova A., Marthol H., Pauli E., De Fina P, & Schwab S. (2011). High NIHSS values predict impairment of cardiovascular autonomic control. Stroke: a journal of cerebral circulation, 42(6), 1528–33.

5 Noble, M. L. (2012). The Effect of Mainstream Media on Body Image and Stress Reactivity in Latina Females. Pitzer Senior Theses.

6 Taylor M. K., Horning, D. S., Chandler, J. F., Phillips, J. B., Khosravi, J. Y., Bennett, J. E., Halbert, H., et al. (2011). A Comparison of Approaches To Detect Deception. Technical Report, Naval Aerospace Medical Research Laboratory

7 Sia, a T. H., Tan, H. S., & Sing, B. L. (2012). Closed-loop double-vasopressor automated system to treat hypotension during spinal anaesthesia for caesarean section: a preliminary study. Anaesthesia, 1–8.

8 Lee JF, Harrison ML, Brown SR, B. R. (2013). The magnitude of heat-stress induced reductions in cerebral perfusion does not predict heat-stress induced reductions in tolerance to a simulated hemorrhage. Journal of Applied Physiology, 114(1), 37–44.

CNAP® Monitor 500

**Continuous, noninvasive blood pressure control -
reliable and safe, quick and easy, cost efficient**

CNAP® BRIDGES THE GAP BETWEEN UPPER ARM NBP AND INVASIVE MEASUREMENT

	continuous BP control	ease of use	risk free	pain free
Arterial Line	✓	✗	✗	✗
Upper Arm NBP	✗	✓	✓	✓
CNAP®	✓	✓	✓	✓

BENEFITS

Early detection of blood pressure changes

- > Detects blood pressure changes without delay and allows for immediate response
- > Helps identifying hemodynamic instabilities
- > Direct tracking of the effects of medication and fluid
- > Useful in situations where continuous blood pressure is appreciated and an invasive method not applicable or indicated

Accuracy

- > Continuity, accuracy and waveform dynamics are equivalent to intra-arterial measurement.^{1,2}

Comfort and safety for the patient

- > Painless, stress-free and without any risk to the patient

Saves time and cost

- > Quick setup and error-free application for everyday use
- > Minimum training requirement
- > Reusable CNAP® double finger cuff



1 Jeleazcov C. et. al. Precision and accuracy of a new device (CNAP®) for continuous noninvasive arterial blood pressure monitoring: assessment during general anaesthesia. BJA. 2010; 105(3):264-272
2 Bais, M. et. al. Continuous non-invasive arterial pressure measurement: Evaluation of CNAP™ device during vascular surgery. Ann Fr Anesth Reanim (2010), doi:10.1016/j.annfar.2010.05.002

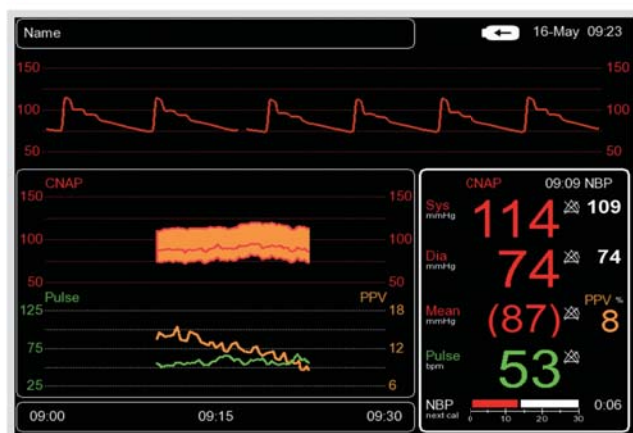


Continuous blood pressure control with CNAP®

Early detection of blood pressure changes with CNAP®-noninvasively

CNAP® MONITOR 500 KEY FEATURES

- > Stand-alone blood pressure monitor with 2 hrs battery
- > Easy interfacing with external devices:
 - > Analog output signal sharing
 - > Integration in all standard patient monitors
- > USB data recording
- > Easy menu navigation through click-wheel
- > Software/display: **Beat-to-beat readout**, trend over the time, numerical values, waveform analysis
- > **Intervention marker** (customized)
- > Integrated **printer**
- > optional **cart** for convenient operation



PARAMETERS

Hemodynamics

- > Continuous noninvasive blood pressure waveform
Sys, Dia, Mean, Pulse
- > Upper arm NBP
Sys, Dia
automatic scaling to brachial artery

Fluid-management

- > PPV
dynamic fluid status

FIELDS OF APPLICATION

- > Anesthesia Monitoring
- > Goal Directed Therapy
- > Emergency Medicine
- > PACU/ IMCU
- > Cardiology/ Electrophysiology
- > Neurology/ Psychology
- > Research

TECHNICAL SPECIFICATIONS

CNAP® – CONTINUOUS NONINVASIVE ARTERIAL PRESSURE

Measuring range	Sys: 40 - 250 mmHg
	Dia: 30 - 210 mmHg
	Mean: 35 - 230 mmHg
	Pulse rate: 30 - 200 bpm

Additional NBP – oscillometric blood pressure	automatic scaling to brachial pressure (upper arm)
Degree of protection	BF

NBP – OSCILLOMETRIC BLOOD PRESSURE

Measuring range	Sys: Adult 40 - 260 mmHg, Pediatric 40 - 160 mmHg
	Dia: Adult 20 - 200 mmHg, Pediatric 20 - 120 mmHg
Accuracy	meets ANSI/AAMI SP10:1992 and 2002
Degree of protection	BF

CNAP® PPV - FLUID RESPONSIVENESS

Measuring range	0.2 - 40 %
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ELECTRICAL

Nominal voltage	100 - 240 VAC
Supply frequency	~50/60 Hz
Battery	sealed lead-gel, operating time: 2 hours (fully charged battery)

PHYSICAL

Weight	7,5 kg (16,6 lbs) including accessories and cables
Height	280 x 270 x 250 mm (11 x 10,6 x 9,8 inch)

ENVIRONMENTAL

Temperature	operation: 10°C - 40°C (50°F - 104°F),	storage: 0°C - 40°C (32°F - 104°F)
Humidity	operation: 30% - 85%, non condensing	storage: 20% - 95%; non condensing, wrapped
Altitude	operation: 647 - 1059 hPa	storage: 500 - 1059 hPa

SCREEN

Type	TFT-LCD, 800 x 600 pixel
Size	8,4 inch diagonally

USER INTERFACE

Controls	click-wheel control, fast access keys
Indicators	visual and audible alarm indication, battery status, printer status, power LED
Trend Display	customized configuration: numeric, graphic, alarm history

ADJUSTABLE ALARMING SYSTEM

Alarms	physiological: med priority
	technical: low priority

CONNECTIVITY

BP Wave Out	easy integration in all standard patient monitoring systems (2 - 10 VDC supply voltage)
AUX Analog Out (optional)	analog output of calibrated continuous blood pressure waveform (-5V to 5V)

USB PORT

Version	USB 1.1 (bandwidth 12 MBits/s)
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PRINTER

Type	integrated thermal printer, 58 mm
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COMPLIANCE AND APPROVALS

Safety class II (IEC 60601)	> EN 60601-1	> EN 60601-1-6	> ANSI/AAMI SP10
Class II b (93/42/EEC)	> EN 60601-1-2	> EN 60601-1-8	> EN 1060-1
Patient applied part type BF	> EN 60601-1-4	> EN 60601-2-30	> EN 1060-3

INTELLECTUAL PROPERTY

Patents	> US 6,669,648	> EP 1 608 261	> US 8,343,062	> EU 2493373
	> EP 1 179 991	> US 8,114,025	> EU 2493370	
	> US 7,390,301	> EP 1 675 507	> US 2011/0105918	plus another 65 patents

The CNAP® Monitor 500 is CE and FDA approved. The parameter CNAP® PPV is currently not available for use in the U.S. or in clinical environments under FDA control.

CNAP® – Setting a new standard for continuous and noninvasive blood pressure measurement.



local distributor:



Item: NIBP100D

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