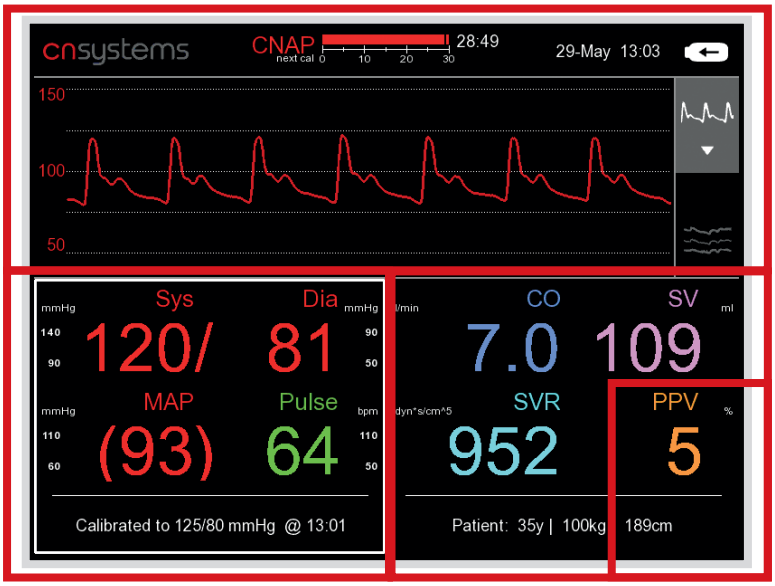
# CONTINUOUS NON-INVASIVE BLOOD PRESSURE & HEMODYNAMICS

## EASY AND SAFE HEMODYNAMIC MONITORING

cnap by cnsystems

# CONTINUOUS NON-INVASIVE HEMODYNAMIC CONTROL

## FULL HEMODYNAMIC PICTURE




### *Hemodynamics*

- Continuous non-invasive blood pressure waveform / trendview
- Cardiac Output
  CO, CI, SV, SI
- Vascular Resistance
  SVR, SVRI

### *Dynamic Fluid Management*

- PPV, SVV

> Continuous Blood Pressure: Sys, Dia, MAP, Pulse *and* Upper arm NBP: Sys, Dia

## CONVENIENT CNAP® FINGER SENSOR - NON-INVASIVE

### EASY-TO-USE AND QUICK

- Quick set-up and error-free application
- Blood pressure waveform and values immediately available

### ACCURATE AND RELIABLE

- Comparable with invasive clinical standards[1-11, 21]
- Reliable tracking (e.g. in patients with volatile blood pressure; during Goal Directed Therapy)
- Non-invasive hemodynamic monitoring can be used as an addition to arterial line

### COST EFFECTIVE

- Up to 77% cost savings through reusable CNAP® double finger sensor

# EASY-TO-USE
# QUICK START UP
# COST EFFECTIVE

cnap® hemodynamic control

## PROVEN ACCURACY IN CLINICAL SETTINGS

> CNAP® measurements are comparable to invasive arterial line measurements in terms of continuity, accuracy and waveform dynamics.[1,2,3]

> CNAP® delivers reliable results for the efficient treatment of ICU and ER patients.[4,5, 6,7]

> CNAP® provides immediate hemodynamic status and detects blood pressure drops during the induction of anesthesia.[8]

> CNAP® shows outstanding performance in monitoring pediatric patients without an arterial catheter.[9,10]

## EASY & RELIABLE TOOL FOR RESEARCH [11,12,13, 14]

> Noninvasive measurement

> Easy-to-use: all from *one* sensor

> Reliability clinically validated

## FAST & ACCURATE HEMODYNAMIC OVERVIEW [16,17]

> Early recognition[15]

> Fast intervention

> Detection of hemodynamic reactions

> ...without arterial catheter

## REDUCING RISK & IMPROVING OUTCOME THROUGH GOAL DIRECTED THERAPY

> Non-invasive CNAP® PPV / SVV is an accurate predictor of fluid responsiveness in anaesthetized patients.[18,19]

> Goal directed therapy with CNAP® HD significantly reduces postoperative infections, organ complications and number of transfusions.[20]

> Noninvasive CO with CNAP® HD performs comparably to invasive CO monitoring.[21]

"Given the fact that CNAP® is a reliable device to assess the arterial AP continuously, [...] its non-invasiveness facilitates its use for any operation with a need to assess, document, and maintain hemodynamic stability."[1]

"CNAP® can be used as an alternative to intra-arterial pressure" [4]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# TECHNICAL SPECIFICATIONS

| CNAP® – CONTINUOUS NONINVASIVE ARTERIAL PRESSURE | | | NBP – OSCILLOMETRIC BLOOD PRESSURE | | |
|---|---|---|---|---|---|
| Measuring range | Sys: | 40 - 250 mmHg | Measuring range | Sys: | Adult 40 - 260 mmHg, Pediatric 40 - 230 mmHg |
| | Dia: | 30 - 210 mmHg | | Dia: | Adult 20 - 200 mmHg, Pediatric 20 - 160 mmHg |
| | Mean: | 35 - 230 mmHg | | | |
| | Pulse rate: | 30 - 200 bpm | | | |
| Degree of protection | BF | (defibrillation proof) | Degree of protection | BF | (defibrillation proof) |
| Automatic scaling to brachial pressure (NBP) | | | | | |

| CNAP® HEMODYNAMICS: CO, CI, SV, SVR, SVI, SVRI | | | | |
|---|---|---|---|---|
| Measuring range | CO | 0.0 - 20 l/min | CI | 0.0 - 10 l/min/m$^2$ |
| | SV | 0 - 300 ml | SI | 0 - 150 ml/m$^2$ |
| | SVR | 0 - 5000 dyne*s/cm$^5$ | SVRI | 0 - 10000 dyne*s*m$^2$/cm$^5$ |

| FLUID RESPONSIVENESS: CNAP® PPV AND SVV | | |
|---|---|---|
| Measuring range | PPV: 0.2 - 40%; | SVV: 0 - 40% |

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

| 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: | 15% - 85% non condensing | storage: | 15% - 95%, non condensing, wrapped |
| Altitude | operation: | 700 - 1060 hPa | storage: | 500 - 1060 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,<br>technical: low priority |

| CONNECTIVITY | |
|---|---|
| BP Wave Out | easy integration in all standard patient monitoring systems (2 - 10 VDC supply voltage) |
| AUX Analog Out | analog output of calibrated continuous blood pressure waveform and additional configurable hemodynamic parameters (0V to 5V; -5V to 5V) |

| USB PORT | |
|---|---|
| Version | USB 1.1 (bandwidth 12 MBits/s) |

| PRINTER | |
|---|---|
| Type | integrated thermal printer, 58 mm |

| COMPLIANCE AND APPROVALS | | | |
|---|---|---|---|
| Safety class II (IEC 60601)<br>Class II b (93/42/EEC)<br>Patient applied part type BF | > IEC 60601-1<br>> IEC 60601-1-2<br>(defibrillation proof) | > IEC 60601-1-6<br>> IEC 60601-1-8<br>> IEC 80601-2-30 | > ISO 81060-2 (NBP) |

| INTELLECTUAL PROPERTY | | | |
|---|---|---|---|
| Patents | > US 6,669,648<br>> US 8,114,025<br>> EP 1 675 507<br>> US 8,343,062 | > EP 2 493 370<br>> US 8,814,800 B2<br>> EP 2 493 373 B1 | > JP 2007508872<br>> CN 102647940<br><br>plus additional 66 patents |

The CNAP® Monitor holds CE approval and FDA clearance.

**CNAP® – Setting new standards for continuous and noninvasive hemodynamic monitoring.**

cnsystems

local distributor:

CNSystems Medizintechnik GmbH
Reininghausstrasse 13, 8020 Graz/Austria
Tel.: +43 316 723456-0, Fax: +43 316 723456-2
E-Mail: office@cnsystems.com, www.cnsystems.com

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