

Welch Allyn Propaq® CS Vital Signs Monitor

- 3- or 5-lead ECG, heart rate
- Masimo SET® or Nellcor® OxiMax® pulse oximetry
- NIBP with Welch Allyn FlexiPort® technology
- Pulse rate
- Respiration
- Temperature
- Capnography (sidestream and/or mainstream)*
- Invasive blood pressure (one or two channels)*
- Full patient alarms
- Apnea alarming
- Trending on all parameters
- Programmable defaults on displayed parameters and alarm limits
- Printer
- RS 423 connectivity port

**Optimal parameters*

Continuous vital signs monitoring for procedural sedation and recovery.



WelchAllyn®

Advancing Frontline Care™



Propaq® CS | Specifications

General

- Adult/Pediatric/Neonatal factory/custom patient modes
- Electrosurgery interference suppression (ESIS): all channels except Impedance Respiration
- All channels electrically isolated
- Communications option

ECG

- Automatic 3- and 5-lead detection
- **Selectable leads:** I, II, III, aVR, aVL, aVF, V
- Lead fault detection with auto-reconfigure
- **Bandwidth:** 0.5 to 40 Hz monitor mode, 0.05 to 40 Hz extended mode (Adult); 0.5 to 120 Hz monitor mode, 0.05 to 120 Hz extended mode (Pediatric/Neonate)
- AAMI 6-pin connector
- **Heart rate measurement range:** 25 to 300 bpm (display)
- **Heart rate accuracy:** ± 3 bpm or 3% (whichever is greater)
- Pacer detection and display
- Defib sync connector
- Real-time ECG output, delay < 3 msec
- ESU and defibrillator protected when used with specific cables
- **Sweep speed:** 12.5, 25, and 50 mm/sec
- **User-selectable size (mV/cm):** 4, 2, 1, 0.5, 0.2
- **QRS tone:** high/med/low/off
- **QRS detector range:**
Adult or pediatric mode: 0.22 to 5.0 mV (RTI)
Neonatal mode: 0.1 to 5.0 mV (RTI)
Neonatal width: 40 to 120 msec (Duration)
Pediatric width: 40 to 120 msec (Duration)
Adult width: 70 to 120 msec (Duration)

Noninvasive Blood Pressure (NIBP)

- Oscillometric method
- Automatic (intervals between 1 and 60 min) and manual modes
- Quick action NIBP Start/Stop button
- TurboCuf: 5 min of repeated NIBP readings
- Systolic, diastolic, mean display
- On-screen manometer
- Store and view all data (up to 128 readings)
- Large NIBP numeric display format
- **Standard cuff sizes:** Neonate #1- #5, Infant, Child, Small Adult, Adult, Large Adult, Thigh
- Cuff overpressure protection
- **Typical measurement time:** 30 to 45 secs
- Smartcuf® NIBP technology

NIBP

Patient mode-specific operation:

Neonate mode

- Initial cuff inflation pressure: 90 mmHg
- Maximum allowable cuff pressure: 132 mmHg
- Systolic range: 25 to 120 mmHg
- Diastolic range: 10 to 105 mmHg
- Mean range: 10 to 110 mmHg

Pediatric mode

- Initial cuff inflation pressure: 120 mmHg
- Maximum allowable cuff pressure: 170 mmHg
- Systolic range: 30 to 160 mmHg
- Diastolic range: 15 to 130 mmHg
- Mean range: 15 to 140 mmHg

Adult mode

- Initial cuff inflation pressure: 160 mmHg
- Maximum allowable cuff pressure: 270 mmHg
- Systolic range: 30 to 260 mmHg
- Diastolic range: 20 to 235 mmHg
- Mean range: 20 to 255 mmHg

Temperature

- Two YSI 400/700 compatible channels
- **Range:** 0 to 50 °C
- **Display:** T1, T2 and Delta temp
- **Units:** °C or °F
- **Accuracy:** ± 0.1 °C (10 to 50 °C), ± 0.2 °C (0 to 10 °C)

IBP

- One or two channels
- **Pressure range:** -30 to 300 mmHg
- **Pulse rate measurement range:** 25 to 250 bpm
- **Display:** 5 scales or semiautomatic rescaling
- **Format:** Sys/Dia/Mean, user selectable
- **User-selectable labels:** P1, P2, ART, PA, CVP, ICP; UA, UV Neonate mode only
- **Transducer requirements:** 5 μ V/V/mmHg
- **Zero adjustment:** ± 200 mmHg including transducer offset
- **Numeric pressure accuracy:** ± 2 mmHg or 2% of reading (whichever is greater), plus transducer error

Impedance Pneumography Respiration

- Two user-selectable leads: RA-LA, RA-LL
- Automatic cardiovascular artifact (CVA) rejection
- **Respiration rate range:**
Adult/Pediatric modes: 0 (apnea), 2 to 150 bpm
Neonate mode: 0 (apnea), 3 to 150 bpm
- **Respiration detection threshold:** 140 milliohms or 2X CVA, (whichever is greater)
- **Respiration rate accuracy:** ± 2 breaths/min or $\pm 2\%$ (whichever is greater)
- **Apnea alarm delay settings:**
Adult/Pediatric modes: 6, 10, 15, 20, 25, 30 sec
Neonate mode: 6, 10, 15, 20 sec
- **Sweep speed:** 3.13, 6.25, 12.5 mm/sec

Pulse Oximetry (SpO₂)

Masimo®

- Masimo SET® sensors
- Waveform and pulse amplitude meter
- Pulse tone pitch indicator
- Saturation range: 1 to 100%

Pulse Oximetry (SpO₂)

Masimo® (con't)

- **Probe accuracy:** 25 to 41 °C
No Motion:
Adult/Pediatric: 70 to 100% ± 2 digits, 0 to 69% unspecified
Neonate: 70 to 100% ± 3 digits, 0 to 69% unspecified
During Motion:
Adult/Pediatric/Neonate: 70 to 100% ± 3 digits, 0 to 69% unspecified
- **Pulse rate measurement range (Adult Pediatric/Neonate):**
No Motion: 26 to 239 bpm
During Motion: 26 to 239 bpm
- **Pulse rate accuracy:**
No Motion: ± 3 digits
During Motion: ± 5 digits

Nellcor®

- Nellcor OxiMax® sensors
- Waveform and pulse amplitude meter
- Pulse tone pitch indicator
- **Saturation range:** 0 to 100%
- **Probe accuracy:** 70 to 100%, 28 to 42 °C, DS-100A: ± 3
- **Pulse rate measurement range:** 25 to 250 bpm
- **Pulse rate accuracy:** ± 3 bpm

CO₂ Option Display

- **Screen display:** CO₂ waveform and EtCO₂ and INCO₂ (when in alarm) numerics
- **Waveform scale:** (maximum) 0 to 100 mmHg, 0 to 14%, 0 to 14 kPa
- **Numeric range display:** EtCO₂: 0 to 99 mmHg, 0 to 13.2 kPa, 0 to 23.1%; INCO₂: 8^a to 25 mmHg, 1.1^a to 5 kPa, 1.1^a to 5%
- **Units:** mmHg, kPa, %; user-selectable
- **Sweep speed:** 3.13, 6.25, 12.5 mm/sec; user-selectable
- **Response modes:**
Fast: 15 sec sampling time period;
Normal: 30 sec sampling time period;
Slow: 45 sec sampling time period
- **Gas compensation:** **Off:** CO₂ value = calculated CO₂ value; O₂ > 50%, **No N₂O:** CO₂ value = calculated CO₂ value x 1.03; **N₂O > 50%:** CO₂ value = calculated CO₂ value x 0.952
- **Alarm limit ranges:** EtCO₂: 0 to 99 mmHg, 0 to 13.2 kPa, 0 to 13.2%; INCO₂: 2 to 25 mmHg, 0.2 to 5 kPa, % (no lower limit)
- **Resolution:** 1 mmHg
- **Accuracy:**
Mainstream^b: 0 to 30 mmHg, ± 3 mmHg
31 to 99 mmHg, $\pm 10\%$ of value
Sidestream^c: 0 to 30 mmHg, ± 3 mmHg
31 to 99 mmHg, $\pm 10\%$ of value
- **Altitude Error:** $\pm 0.4\%/1,000$ ft (304.8 m)

Breath Rate Display

- Screen display: Numeric
- **Breath rate (BR) source:** When CO₂ is active, CO₂ is the BR source. Otherwise, RESP from ECG is the RR source
- **Units:** Breaths/Minute
- **Range:**
Adult/Ped: 0 (apnea), 2 to 150 breaths/min
Neonate: 0 (apnea), 3 to 150 breaths/min
- **Resolution:** ± 1 breaths/min
- **Accuracy:** ± 1 breaths/min or ± 5%, whichever is greater^d
- **Alarm limits range:**
Adult/Ped: 2 to 150 breaths/min
Neonate: 3 to 150 breaths/min

CO₂ Performance

- Per ISO 9918:1993(E)/EN 864:1996

Apnea Alarms and Tickets

- **Apnea ticket:** Set to auto print after apnea event and after 1 minute continued apnea
- **Apnea alarm accuracy:** ± 2 sec
- **Apnea delay setting:**
Adult/Ped: 6, 10, 15, 20, 25, 30 seconds
Neonate: 6, 10, 15, 20 seconds

Barometric Pressure

- **Pressure compensation:** automatic
- **Operating range:** -2,000 to 15,000 ft, -610 to 4,572 m (817 to 429 mmHg)
- **Screen display:** Numeric (CO₂ Status Window)
- **Units:** mmHg or kPa or %
- **Accuracy:** ± 3 mmHg or 2.5% of difference from calibration pressure, whichever is greater

Sidestream CO₂ Option (SSCO₂)

- **Sensor type:** Sidestream, internal
- **Principle of operation:** Nondispersive, infrared, single-beam, single-path/wavelength, ratiometric
- **Operating ambient temperature:** 5 to 40 °C
- **Startup time:** 30 seconds typical, 3 minutes maximum
- **Rise time:** 240 ms (10% to 90%) at 175 ml/min
- **Delay time:** 1.12 seconds maximum^e
- **Total system response time:** 1.36 seconds max. (Rise Time and Delay Time)^e
- **Calibration:** Verify semiannually, calibrate only as required
- **Sampling chamber:** Internal (replaceable by service technician)
- **Pneumatic and exhaust system:** Integral
- **Barometric pressure compensation:** Automatic
- **BTPS, ATPS, STPD:** CO₂ value = calculated CO₂ value x 0.977
- **Sampling line:** 7-foot sampling line, ID 0.055 in (1.4 mm), for use with disposable single-use cannula (CO₂ only or CO₂ sampling/O₂ delivery)

Sidestream CO₂ Option (SSCO₂) (con't)

- **Flow rate:** 90 or 175 ml/min, user-selectable

^aLower if in alarm

^bBased on these airway conditions: sensor temperature = 42 °C, airway adapter temperature = 33 °C, water vapor pressure = 38 mmHg; standard gas mixture = CO₂ in balance air, fully hydrated at 33 °C; barometric pressure = 760 mmHg and flow = 60 ml/min

^cBased on the following additional airway conditions: sample line = 7 ft, 0.055 in ID (2.13 m, 1.4 mm ID); sample flow rate = 175 ml/min; respiratory rate ≥ 50 breaths/min, stable to ± 3 breaths/min; inspired/expired time ratio = 1:2; barometric pressure = 760 mmHg

^dFor Sidestream CO₂, this applies only for BR ≥ 50

^eBased on the following additional airway conditions: sample line = 7 ft, 0.055 in ID (2.13 m, 1.4 mm ID); sample flow rate = 175 ml/min

Mainstream CO₂ Option (MSCO₂)

- CO₂ waveform, EtCO₂, INCO₂ (INCO₂ when in alarm), Apnea and Breath Rate display
- **Waveform rise time:** < 120 msec (to 90% after step change)

Mainstream CO₂ Sensor

- Mainstream NDIR single-beam, single path/wavelength, ratiometric
- **Warm-up time (CO₂ sensor and monitor):** 45 sec typical, 3 minutes maximum
- Automatic zeroing
- No routine calibration
- **Operating altitude:** -2,000 to 15,000 ft (817 to 429 mmHg)
- **Dimensions:** 1.003 in (H) x 1.036 in (W) x 0.78 in (L) (2.5 x 2.6 x 2.0 cm)
- **Weight:** .53 oz (15.0 g)
- **Cable length:** 10 ft (3.05 m) nominal

CO₂ Airway Adapters

- Disposable
- **Size:** 15 mm ID (meets ISO specifications)
- **Single adult/pediatric airway adapter for patients who weigh ≥ 5 kg:**
Added deadspace: < 6 cc (0.37 cubic in)
- **Single-use low-deadspace airway adapter for patients who weigh < 5 kg:**
Added deadspace: < 0.6 cc (0.037 cubic in)

Printer Option

- Thermal sensitive dot
- **Numeric annotation:** date, time, all active parameters, patient name if connected to Acuity
- **Number of waveforms printed simultaneously:** up to 3
- **Print speeds:** 6.25, 12.5, 25.0 mm/sec

Printer Option (con't)

- **Format:** 53 mm wide print area on 60 mm wide paper
- **Operating modes:**
 - **Continuous:** start/stop real-time printouts with all active numerics and up to 3 waveforms
 - **Snapshot:** 8 sec (32 sec for CO₂/Resp) of immediate history for all active numerics and up to 3 waveforms
 - **Alarm print:** 20 seconds total/12 seconds prior to alarming parameter
 - **Auto print:** Snapshot printout every 15 or 30 min, or 1, 2 or 4 hours
 - **Trend print:** On demand or Auto Trend every 4 hours. Up to 8 hours in tabular format.
 - **OxyCRG trend print:** Print-only function (CO₂ or Resp must be installed): 2 min printout of trended HR/PR and SpO₂ numerics and compressed CO₂ or Resp waveforms (CO₂ is priority source), with annotation and MIN/MAX tabular report
 - **OxyCRG on alarm:** Set to print out 60 sec after HR/PR or SpO₂ alarm or 75 sec after BR/RR or apnea alarm
 - **Apnea ticket:** Auto print HR/PR, SpO₂ and elapsed time after apnea event and after 1 minute of continued apnea
 - **NIBP ticket:** Auto print NIBP, HR/PR, SpO₂, CO₂ and RR/BR after each NIBP reading

Alarms

- **All parameters:** upper/lower limits
- **All parameters:** Adult/Pediatric/Neonate patient mode-specific limits
- Factory default or programmable settings for all patient modes
- **Alarm indicator:** red
- **Alarm(s) off indicator:** yellow
- **Audible alarm tone:** high/med/low
- **Alarm suspend:** 90 seconds
- One-button Stat Set for all alarm limits (except Apnea Delay)
- **EQ Alert:** yellow

Trends

- Tabular numeric format
- All parameters trended/viewable
- **Resolution:** non-NIBP trends entered every 2 min
- NIBP trends entered after each reading
- **Duration:** 5 hours non-NIBP trends (up to 150 readings); 8 hours NIBP trends (up to 128 readings)
- Page up/down trend view

Inservice Mode

- Includes two sets of simulated patient data including waveforms, for training and education

Color Active Matrix Display

- **Type:** TFT (Thin Film Transistor) LCD module
- **Resolution:** 640 x 480 pixels, 1 pixel = R+G+B dots
- **Active viewing area:** 6.73 x 5.10 in (170.9 x 129.6 mm)
- **Pixel pitch:** 0.0105 in (0.267 mm)
- **Viewing angle:** U/D 40°, R/L 60° (typical), ≥ 10:1 contrast ratio
- **Contrast ratio:** 150:1 (typical); measured in dark room at center of screen
- **Display color:** 18-bit (6 bits per primary color)
- **Waveforms and matching numerics:** Predefined
- **Luminance:** 200 cd/m² (typical); measured at saturation point
- **Response time:** 40 ms (maximum); "white to black"

Environmental

- **Operating temperature:** 0 to 40 °C (monitor), 5 to 40 °C (printer)
- **Operating relative humidity:** 15% to 95%, noncondensing (MIL STD 810E), printer 35% to 85%, noncondensing (MIL STD 810E)
- **Operating altitude:** -2,000 to 15,000 ft (-610 to 4,572 m)
- **Shipping/storage temperature:** -20 to 60 °C
- **Shock:** 50 g (monitor); 30 g (expansion module/printer)
- **Random vibration:** Designed to meet RTCA DO-160D, category C (monitor)
- **Electromagnetic compatibility (EMC):** per EN60601-1-2, 1993
- Drip-proof per IEC 60529, level IPX1 (monitor) only, without expansion module

Physical

- **Monitor (including handle):**
Size: 8.2 in (H) x 9.6 in (W) x 5.6 in (D)
(20.8 x 24.4 x 14.1 cm)
Weight: 7.6 lb (3.4 kg)
- **Monitor with SpO₂ Module:**
Size: 8.2 in (H) x 9.6 in (W) x 7.7 in (D)
(20.8 x 24.4 x 19.7 cm)
Weight: 10.8 lb (4.9 kg)
- **Monitor with Expansion Module:**
(with Printer/SpO₂/CO₂)
Size: 11.4 in (H) x 9.6 in (W) x 7.7 in (D)
(28.8 x 24.4 x 19.7 cm)
Weight: 14.4 lb (6.5 kg)

Power

- Rechargeable sealed lead acid internal battery pack
- Internal recharger
- **Input voltage:** 12 to 28 VDC, 25 W
- **AC power adapter:** 100 to 120 VAC, 50 to 60 Hz (North America/Japan); 220 to 240 VAC, 50 to 60 Hz (International)
- **Operating time on battery, typical*:** Monitor with SpO₂ option: 5 hours; Monitor with Expansion Module (Printer, SpO₂/CO₂): 3 hours; Monitor only: 2 hours

- **Battery recharge time:** 6 to 8 hours (when monitor OFF)
- **Battery recharge time:** 8 to 12 hours (when monitor ON)

Certifications/Standards

- Complies with relevant AAMI, IEC, EN, CSA and UL standards. CE Marked according to the European Medical Device Directive. CSA Certificate of Compliance for use in the U.S. and Canada.
VA Contract V797P-3486k
DSCP Contract SP0200-97-D-8021

* Fully charged, new battery at 25 °C, NIBP and Snapshot (if applicable) every 15 minutes, all accessories used.



All Propaq CS vital signs monitors come standard with Smartcuf technology, a new standard in NIBP accuracy. This patented software offers industry-leading performance and accuracy in the presence of motion artifacts.



Only Masimo SET SpO₂ sensors, including LNOP durable adhesive and NR value disposable sensors, should be used with Masimo pulse oximetry. Masimo, Masimo SET, LNOP, and NR are registered trademarks of Masimo Corporation.



Only Nellcor® OxiMax® pulse oximetry sensors should be used with the Nellcor pulse oximetry option. Nellcor and OxiMax are registered trademarks of Nellcor Puritan Bennett, Inc.

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