TEMPUS PRO
More Than Just a Monitor

Tempus Pro™
The most advanced prehospital care vital signs monitor

WiFi™   Bluetooth®   GSM   GPS

Overview

Tempus Pro[i] is an advanced vital signs monitor with multiple and emerging capabilities. Providing:

- Full range of vital signs monitoring parameters in a small, highly robust package
- 2.2 lbs lighter and smaller than similar transport monitors
- 10 3/4 hour battery life, longer than similar transport monitors
- Market-leading water and solid object ingress protection with rating of IP66
- Enables the capture of all vital signs, images and electronic records such as the TCCC card in an easy to use format that can be transmitted or shared with other Tempus monitors or computers
- Fully integrated communications capability enables the transmission of all medical and vital signs data, voice and video transmission in real time using military radios [vi]
- Large colour display with multiple waveform configurations and large numeric view
- Operated through an intuitive and easy to use touch-screen interface which can be used with a gloved hand

Control Interface

- Displays ultrasound and video laryngoscopy images on the large colour display utilizing third party ultrasound probes and video laryngoscopy accessories [v]
- User interface is provided by a touch screen and simple graphically labelled buttons
- Drugs, fluids, therapies and interventions quickly added to the patient record through the Event button

Alarms

- User configurable visual and audible alarms
- Adult, paediatric and neonate settings
- Adjustable alarms ≤85 dBA at 1m
- 360° alarm visible indicator lights

Display

- Colour 6.5 " VGA screen
- 130 klux daylight readable display
- Multiple user-selectable display formats
- High-contrast mode
- NVG friendly
- Device can be set to an appropriate viewing angle with the integral foot
- Rear of the Tempus Pro houses the RapidPak™ clip which enables easy deployment and storage of sensors and cables

On-Screen Trends & Events

- Graphical and tabular format for all vital signs parameters
- Summary record of care of drugs, fluids, therapies and interventions provided

ECG Monitor

- 3/5 Lead monitoring via standard snap-on electrodes
- Automatic leadset detection
- Heart rate range: 30-300 BPM
- 12 Lead acquisition [v]
- 12 lead Interpretation
- Input impedance: >100 MΩ
- Dynamic range: ±5 mV ac
- Accuracy: ±3%
- DC offset: ±300 mV dc
- Frequency response: 0.05 Hz to 175 Hz ±3dB
- Sample rate: 500 Hz
- Common mode rejection: 95 dB minimum, additional filters include mains, muscle and low and high pass
- Arrhythmia monitoring & alarms
- ST Elevation measurement with alarms [v]
- QT duration measurement with alarms [v]

Impedance Respiration

- Range: 3 - 150 RPM
- Accuracy: ±2 RPM or ±2% whichever is greater

Pulse Oximetry

SpO$_2$

- Range: 1 – 100%
- Accuracy (adults/child): no motion or low perfusion ±2 digits 70-100%, motion ±3 digits 70-100%,
- Accuracy (neonate): motion, no motion and low perfusion ±3 digits 70-100%
- Signal strength indicator
- Perfusion index: 0.02-20%
- Response: <1 second delay
- Employs patented Masimo SET Rainbow® technology
- Uses comfortable, waterproof soft-tip sensor
- Pleth Variability Index (PVI) [v]

Pulse Rate

- Range: 25 – 239 BPM
- Accuracy (all ages): no motion ≤3 digits, motion ≤5 digits

Total Haemoglobin (SpHb g/dl) [v]

- Range 0 - 25 g/dl
- Accuracy (Adults/Infants/Paediatrics) 8 - 17 g/dL ± 1 g/dl

Methaemoglobin (SpMet) [v]

- Range 0 - 99.9%
- Accuracy (Adults/Infants/Paediatrics Neonates) 1 - 15% ± 1%

Carboxyhaemoglobin (SpCO) [v]

- Range 0 - 99.9%
- Accuracy (Adults/Infants/Paediatrics) 1 - 40% ± 3%

Total oxygen content (SpOC) [v]

- Range 0 – 35ml of O2/dl of blood

Non-Invasive Blood Pressure

- Accuracy: ±3 mmHg or ±2% (whichever is greater)
- Adult range: 20 – 260 mmHg
- Child range: 20 – 250 mmHg
- Neonate range: 20-140 mmHg
- Cuffs: Neonate disposable 1-5, Infant, Child, Child long, Adult, Adult Long, Large Adult, Large Adult Long, Thigh

Capnometry [v]

Respiration Rate

- Range: 1 - 149 BPM
- Accuracy: 0-70 BPM ±1 BPM, 71-121 BPM ±2 BPM, 122-149 BPM ±3 BPM

Microstream® ETCO$_2$

- Range: 0 – 150 mmHg
- Flow rate: 50 ml/min -7.5 + 15 ml/min
- Uses Oridion® Microstream® technology
- Accuracy: 0-38 mmHg ±2 mmHg, 39-150 mmHg ±5% of reading +0.08% per 1 mmHg over 38 mmHg

Contact Temperature

- 2 channel [viii], YSI 400 series compatible
- Measurement range: 20-45 °C
- Resolution: 0.1 ºC (0.2 °F)
- Accuracy: ±0.1 ºC

Invasive Pressure [v]

- 2 channels, 5 µV/V/mmHg
- Response: 0-20 Hz (-3 dB)
- Filters: 50/100/150 Hz & 50-60 Hz notch
- Range: -99 – 310 mmHg
- Accuracy: ±2% or ±2 mmHg
- Bridge: 180 Ω minimum
- Expandable up to 4 channels via USB module [v]

Military Trauma Record

- Electronic trauma record (TCCC, AF 3899L[ix] etc.)
- User-friendly interface
- Semi-automatic patient record completion
- Operable with a gloved hand
- Data output is compatible with military AHLTA-T records system
- Record can be passed from device to device to accompany the patient through the echelons of care
- Data can be output as .PDF for attachment into electronic patient record systems
- Record can be transmitted over military radios for real-time decision support

Integral Digital Camera

- Colour 3.2M pixel camera
- Takes still pictures or video using the H264 algorithm (bandwidth dependent)
- Images are included in the patient record

Ultrasound [v]

- Optional Interson Ultrasound Probes General Purpose 3.5 MHz and Line Placement 7.5 MHz

Video Laryngoscopy [v]

- Optional Karl Storz C-MAC® Video Laryngoscope Imager and Single Use Blades

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Battery & Power

Operating Time

- Over $10^3/_4$ hours (display brightness at 60%, ECG, SpO_2, $ETCO_2$, IP x 2, temp x 2 and NIBP every 15 minutes)
- $11^1/_2$ hours (display brightness at 30%, ECG, SpO_2, $ETCO_2$, IP x 2, temp x 2 and NIBP every 15 minutes)
- Up to 14 hours (typically 12[iii]) with battery saving mode activated

Battery

- Rechargeable, user replaceable lithium-ion battery
- 5 state battery gas gauge
- Nominal 7.4 V 10.2 Ah / 75.5 Wh
- Charge time: 3 hours to 90% and apx 4 hours to 100% [iii, iv]

Power Supply

- External power supply provided
- Small size: 133 x 60.7 x 41 mm (5.24 " x 2.39 " x 1.62 ")
- Rated 100-250 V, 50-60Hz & 115 V 400 Hz 0.5 A apx
- Battery may optionally be charged by the **Tempus Pro**™ when running on mains power
- Alternate vehicle adaptor 9-24 V dc available [v]

External Charger

- Optional external single bay battery charger
- Charger PSU 100-240 V 50-60 Hz <0.9 A
- Charge time: 4.5 hours to 97% [iv]

Environmental

- Operating temperature range: 0 ºC to 50 ºC
- Relative humidity: 15%-95% (non-condensing) operating and storage
- Altitude: -170 m - 4500 m (-557 - 14763 ft)
- Storage temperature range: -37 ºC to +73.3 ºC

Physical Dimensions

- Standalone size: 259 mm (10.1 ") wide x 214 mm (8.4 ") high x 100 mm (3.9 ") deep, cube 330 "
- Standalone weight: 2.8 kg (6.2 lb) nominal including battery and **RapidPak**™

ReachBak™ [v]

- All medical monitoring data, vital signs, ECGs, TCCC card, photos, and voice and video are transmitted in real time
- Compatible with military IP-radios and satcoms
- Low bandwidth system providing real-time medical data
- Transmits 12 Leads in real time and acquires 10 seconds of all 12 leads
- Provides 12 Lead ECG analysis and measurement tools on the transmitted ECG
- Images received from the Tempus can be annotated with text, colours, shapes and graphics which can be sent back to the **Tempus Pro**
- All wireless devices (and GPS) can be disabled by the factory and enabled by the user when required using a software update
- All voice, data and video communications are transmitted and stored using AES256 encryption

Integral Bluetooth®

- Used for communication with the device's accessories
- Version: V2 EDR class 2

Voice Communications

- Compatible with military headsets (Peltor®, Liberator® etc.)
- Voice communication provided by an optional wired or wireless Bluetooth® headset [vi]
- Voice channel is full duplex with low bandwidth utilisation (12 kbps)

Integral Ethernet

- Compatible with Inmarsat, BGAN, V-SAT and other broadband communications systems[vi]
- Low bandwidth compatible (3 kbps)
- LAN interface: 100Base-TX
- Connected via an RJ-45 connection
- Tempus can connect direct to a radio or via an access point or router

Integral USB

- 2 latched USB sockets
- USB 1.0 & 2.0
- For use in the future with Iridium 9555 satcoms handsets

Integral WiFi

- 802.11b/g
- Uses 128 bit encryption, WPA2 and WEP standards to ensure security

Integral GPS Positioning

- Provides position via **ReachBak** and allows automatic geo-tagging of drugs and therapies in the patient record
- Accuracy ±10 m

Integral 3G/GSM Cell Phone

- Able to connect over 2G GPRS networks (GSM 850, EGSM 900, DCS 1800 & PCS 1900)
- Able to connect over 3G GPRS networks (UMTS 850/ Band V, UMTS 900/ Band VIII, UMTS 1900/ Band II & UMTS 2100/ Band I)

Compliance

EMC

- EMC emissions: RTCA DO160G Section 21 Cat Q
- EMC emissions and immunity: IEC60601-1-2 Class B, 20 V/m radiated immunity
- FCC Part 15 B & C compliant

Environmental Standards

- Exceeds requirements of MIL-STD 810G 1.22 m (4') 26 drops all corners, edges and faces
- Enclosure withstands a 500 g (1.1 lb) steel ball dropped from 1.3 m (4' 3")
- Solid and liquid ingress protected to IP66 according IEC60529
- All connectors provided with dust covers for increased protection
- Temperature: DO160G Sec 4, Para 4.5.1 – 4.5.4
- Altitude: DO160G Sec 4, Para 4.6.1 and 4.6.2
- Rapid Decompression DO160G Sec 4.6.2, 8000-51000 ft in 1 second
- Temperature Variation: DO160G Sec 5 Cat C: 2° C/min
- Humidity: DO160G Sec 6 Cat A
- Crash Safety: 20 g per DO160G Sec 7.2 Type F
- Vibration: MIL-STD 810G rotary wing (UH-60 & CH-47), fixed wing (jet profile), fixed wing (turboprop profile), composite wheeled vehicle; Ground Vehicle per EN1789
- Operational shock: 45 g per MIL-STD 810G, 6 g per RTCA DO-160G
- Bump: 15 g per EN1789

ECR Authorization: 14-0062

Issue Ref: 44-2001-03

i **Tempus Pro** is 510k cleared and is CE marked in Europe.

ii Display active 50% of the time.

iii Subject to conditions of storage and use, times are approximate.

iv Tempus switched off while charging, charging takes longer when the device is active.

v Optional, additional feature.

vi Limitations apply and contract required with relevant service provider.

vii Feature pending FDA 510k clearance.

viii 1 channel fitted as standard second channel is optional.

ix Feature in development.

rdt
Your life With care Anywhere