PHILIPS

Tempus Pro Patient Monitor
Specifications

Key features

The Tempus Pro is a transportable medical device that can be used in rotary and fixed wing aircraft as well as land-based ambulances.

Long battery life - 9 hours 45 minutes of monitoring with display at 60% brightness

Water and solid object ingress protection for austere environments with rating of IP66

Enables the capture of all vital signs, images and electronic records that can be transmitted and shared with other Tempus Pro devices or upstream patient record systems via the IntelliSpace Corsium Web API

Fully integrated communications capability enables the transmission of all medical and vital signs data in near real-time[1]

Large color display with multiple waveform configurations and large numeric view

Displays ultrasound and video laryngoscopy images on the display utilizing third party ultrasound probes and video laryngoscopy accessories[2]

The Tempus Pro is a portable vital signs monitor for clinical and pre-hospital care applications. It is for the attended or unattended monitoring of single or multiple vital signs.

Control Interface

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, pediatric and neonate settings

Adjustable alarms 82 dBA

360° alarm visible indicator lights

Display

Color 165 mm (6.5") VGA screen

130 klux daylight readable display

Multiple user-selectable display formats

High-contrast mode

NVG compatible

Device can be set to an appropriate viewing angle with the integral foot

Optional extended display of vitals and waveforms on Android tablet with Corsium Crew app[2]

On-Screen Trends and Events

Graphical and tabular format for all vital signs' parameters

Summary record of care of drugs, fluids, therapies and interventions provided

ECG Monitor

3-, 4-, 5- and 12-Lead monitoring via standard Snap-On electrodes

Automatic leadset detection

Heart rate range: 30 - 300 bpm

12-Lead acquisition[2]

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 and alarms

ST elevation and depression measurement with alarms[2]

QT duration measurement with alarms[2]

Impedance Respiration

Range: 30 - 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 rainbow SET technology

Re-usable soft walled probe for use in clinical and pre-hospital applications, on fingers and toes for children/adults over 8 years old (other probe types are available from Masimo)

Pleth Variability Index (PVI)[2]

Pulse Rate

Range: 25 - 239 bpm

Accuracy (all ages): no motion ≤3 digits, motion ≤5 digits

Total Haemoglobin (SpHb g/dl)[2]

Range 0 - 25 g/dl

Accuracy (adults/infants/pediatrics) 8 - 17 g/dL ± 1 g/dl

Methaemoglobin (SpMet)[2]

Range 0 - 99.9%

Accuracy (adults/infants/pediatrics/neonates) 1 - 15% ± 1%

Carboxyhaemoglobin (SpCO)[2]

Range 0 - 99%

Accuracy (adults/infants/pediatrics) 1 - 40% ± 3%

Total Oxygen Content (SpOC)[2]

Range 0 - 35ml of O2/dL of blood

Capnometry

Respiration Rate

Range: 1 - 149 Breaths Per Minute (BPM)

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

Microstream $EtCO_2$

Range: 0 – 150 mmHg

Flow rate: 50 (42.5 ≤ flow ≤ 65) ml/min, flow measured by volume

Uses Oridion Microstream™ technology

Accuracy: 0-38 ±2 mmHg, 39-150 ±5% of reading +0.08% per 1 mmHg over 38 mmHg

Non-Invasive Blood Pressure

Accuracy: ±3 mmHg

Adult range:
- Systolic 40 – 260 mmHg
- Diastolic 20 – 200 mmHg

Pediatric range:
- Systolic 40 – 230 mmHg
- Diastolic 20 – 160 mmHg

Neonate range:
- Systolic 40 – 130 mmHg
- Diastolic 20 – 100 mmHg

Cuffs: neonate disposable sizes 1-5, infant, child, adult, large adult, thigh, cuff kit

Contact Temperature

2 channel YSI 400 series compatible[3]

Measurement range: 20 - 45 °C/68 - 113 °F

Resolution: ±0.1 °C/±0.2 °F, Accuracy: ±0.1 °C/±0.2 °F

Invasive Pressure

2 channels, 5 µV/V/mmHg, Response: 0-20 Hz (-3 dB)

Filters: 50-60 Hz notch, Range: -99 – 310 mmHg

Trauma Record

Electronic trauma record (TCCC, summary record of care)

User-friendly interface, completely configurable through separate PC application

Semi-automatic patient record completion

Operable with a gloved hand

Record can be emailed directly from Tempus or shared with an upstream ePCR system via the IntelliSpace

Corsium webAPI

Record can be passed from device to device to accompany the patient through the echelons of care

Record can be shared as an encrypted or de-identified PDF file

Record can be streamed for near real-time decision support[4]

Integral Digital Camera

Color 3.2M pixel camera

Images are included in the patient record

Ultrasound[2]

Optional Interson ultrasound probes general purpose 3.5 MHz and line placement 7.5 MHz

Video Laryngoscopy[2]

Optional Karl Storz C-MAC video laryngoscope imager and single use blades

Anaesthetic Gas Monitoring[5]

Optional Masimo ISA OR+ Anaesthetic Gas module for display of AA gas vitals

Internal Printer[2]

High resolution 110mm (4.3”) integrated thermal printer

Battery and Power

Operating Time

An average life of 9 hours 45 minutes with Wi-Fi set to off, display brightness at 60%, ECG, SpO_2, $EtCO_2$, IP x 2, temp x 2, NIBP every 15 minutes, and cannula attached but not connected to gas

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 approximately 4 hours to 100%[6,7]

Battery life:

A maximum battery life of 9 hrs 45 mins with:

Wireless settings set to OFF, Display brightness 60% (Default), ECG, SpO_2, $EtCO_2$, 2x IBP, 2x Temperature, NIBP every 15 mins, cannula attached but not connected

A maximum battery life of 11 hrs 30 mins with:

Wireless settings set to OFF, Display brightness 30% (Default), ECG, SpO_2, $EtCO_2$, 2x IBP, 2x Temperature, NIBP every 15 mins, cannula attached but not connected

A maximum battery life of 14 Hrs With:

Wireless settings set to OFF, Battery saving mode activated (display at default 60% brightness), cannula attached but not connected

Power Supply

External power supply provided

Small size: 133 x 60.7 x 41 mm (5.24" x 2.39" x 1.62")

Rated 90 – 264 Vac, 47 – 440 Hz, maximum 0.6 A

Battery may optionally be charged by the Tempus Pro when running on mains power

Alternate vehicle adaptor 11 - 27 V dc available[2]

External Charger[2]

Optional external single bay battery charger

Charger PSU 100 - 240 V 50 - 60 Hz <0.9 A

Charge time: 5 hours to recharge to 100%[6]

Environmental and Storage

Operating temperature range: 0 °C to 50 °C

Relative humidity: 15% - 95% (non-condensing) operating and storage

Altitude: -200 m to +5000 m; 104kPa to 54 kPa

Storage temperature range: -37 °C to +70 °C

Soft bag or hard transit case available

Mechanical and electromechanical mounts compliant with ground and air (fixed and rotary wing) vehicles available[2]

Physical Dimensions

Standalone size (printer model): 263 mm (10.3") wide x 216 mm (8.5") high x 100 mm (3.9") deep

Standalone weight: 2.9 kg (6.4 lbs.) nominal including battery, excluding IP module, accessories and printer (with printer 3.2 kg/7 lbs)

IntelliSpace Corsium licence options

IntelliSpace Corsium ReachBak licence:[2]

All medical monitoring data, vital signs, ECGs, Summary Record of Care and images are transmitted in near real-time

Transmits 12-Lead ECG in near real-time and acquires 10 seconds of all 12-Leads

Provides 12-Lead ECG analysis and measurement tools on the transmitted ECG

ECG review results can be sent back to the Tempus Pro

Tempus Pro operator can acknowledge ECG results and provide estimated time of arrival

IntelliSpace Corsium ECG licence:[2]

Tempus Pro user can transmit 12-Lead ECGs

Provides 12-Lead ECG analysis and measurement tools on the transmitted ECG

Also transmits basic vitals recorded at the time of the transmitted ECG

Communications

Integral Bluetooth

Indoor range: 9m (30 ft)

Data rate: V2.0 up to 1 Mb/s, EDR: 2.3 Mb/s[8]

Integral Ethernet

Compatible with Inmarsat, BGAN, V-SAT and other broadband communications systems[1]

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 and 2.0

For use with plug-in invasive pressure modules, CPR sensor, USB sticks, video laryngoscope, ultrasound probes etc

Integral Wi-Fi

802.11b/g

Supports WPA2-PSK (AES) authentication and encryption

Smart Wi-Fi management allows the user to scan and connect to available networks

Integral GPS Positioning

Accuracy ±10 m[9]

GSM communications

USB 4G dongle (Optional)

Compliance

EMC

EMC emissions: RTCA DO160G Section 21 Cat M

EMC emissions and immunity: IEC60601-1-2 Class B, 20 V/m radiated immunity

FCC Part 15 B and C compliant

Environmental Standards

Exceeds requirements of MIL-STD 810H 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 to IEC60529

All connectors provided with dust covers for increased protection

Temperature: RTCA-DO160G Sec 4, Para 4.5.1 – 4.5.4

Altitude: RTCA-DO160G Sec 4, Para 4.6.1 and 4.6.2

Rapid Decompression: RTCA-DO160G Sec 4.6.2, 2438 m to 5486 m (8000 - 18000 ft) in 15 seconds

Temperature Variation: RTCA-DO160G Sec 5 Cat C: 2° C/min

Humidity: RTCA-DO160G Sec 6 Cat A

Crash Safety: 20G per RTCA-DO160G Sec 7 Cat B

Vibration: MIL-STD 810H rotary wing (UH-60 and CH-47), fixed wing (jet profile), fixed wing (turboprop profile), composite wheeled vehicle

Operational shock: 40G per MIL-STD 810H, 6 g per RTCA-DO-160G

Shock 30G per EN1789

1. Limitations apply and contract required with relevant service provider
2. Optional, additional feature
3. One channel fitted as standard second channel is optional
4. IntelliSpace Corsium only
5. AA gas feature is not available in US, Canada and Singapore
6. Subject to conditions of storage and use, times are approximate
7. Tempus switched off while charging - charging takes longer when the device is active
8. Display active 50% of the time
9. GPS accuracy depends on the number of satellites visible to the device

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