

PHILIPS

Remote Diagnostic
Technologies

Tempus ALS, US



Capture. Connect. Decide.

**Tempus ALS monitor/defibrillator system
with IntelliSpace Corsium**



Empowering a
new approach
to military
medical response

Tempus ALS system in a modular form-factor

You are on the front lines everyday serving your country and require the highest quality products to deliver the best care for the wounded soldier. Tempus ALS is an innovative, rugged and reliable system that helps support field medics in providing the best possible care, even in the most hostile environments.

The Tempus ALS system is comprised of a Tempus Pro monitor and a Tempus LS-Manual professional defibrillator¹. Each device can be used to perform its monitoring or therapy functions separately – but devices connect wirelessly to share data. With two systems working as one, Tempus ALS provides a flexible solution for military medical providers.

The Tempus Pro can be carried on a shoulder strap, while the Tempus LS-Manual can live in a military molle bag, only taking up a small amount of space. This allows you access to the features you need to use, while helping reduce potential risks associated with carrying bulky equipment to scene.

Offering handling benefits while also keeping your critical therapy device protected and always on-hand, the Tempus ALS provides a powerful system, which can be deployed across a broad range of situations and environments.

In use, the Tempus ALS' dual-screens allow for greater visibility. In resuscitation cases one display is focused on defibrillation therapy and the other on patient monitoring, while additional data entry opportunities help capture rich event-driven data.

With reliable transmission, data can be viewed in a user-friendly format throughout the patient continuum of care, without the need for additional software on a PC, tablet or smartphone.²

Using exclusive data communication technologies, Tempus ALS allows for real-time streaming of vitals, waveforms and images to Philips IntelliSpace Corsium web-based clinical dashboards.³

Designed with powerful security protocols, Tempus ALS with IntelliSpace Corsium data management provides interactive ECG measurement, diagnosis and two-way communication. Seamless electronic Patient Care Record (ePCR) integration supports improved accuracy of records and handovers. Clinical and operational dashboards can simplify and support scalable deployment and utilization.

The Tempus ALS, although small, is extremely durable and packed with all the functionality you need.

Advanced monitoring and resuscitation in a **compact** solution

Tempus Pro **Monitor**

Compact and lightweight

Standalone size: 10.3" wide x 8.5" high x 3.9" deep
Standalone weight: 6.4 lbs. nominal including battery, excluding IP module, accessories and printer (with printer 7 lbs.)

Color Display

Color 6.5" 640x480 pixels, 130 Klux daylight readable display

On-Screen Trends & Events

Graphical and tabular format for all vital signs parameters TCCC data capture format. Summary record of care of drugs, fluids, therapies and interventions provided

Enhanced Data Service (EDS)

EDS is a proprietary and secure data transfer protocol, which is unique to Tempus Pro. It reduces risk of patient data loss caused by poor signal strength when transmitting data

Advanced features

Integrated Camera and 4.3" thermal printer, plug-in Ultrasound and Video Laryngoscopy⁸

Long-life battery

At least 10.75 hours Li-Ion battery with a display brightness of 60%

Extended secondary display

Up to 6 waveforms can be displayed to an android tablet via Corsium Crew app where available⁸

Smart Mount

Docking and charging station compliant with ground and air (fixed and rotary wing) vehicles⁸



6.4 lbs.



4.3 lbs.

Tempus LS-Manual **Defibrillator**

Compact and lightweight

Standalone size: 7.9" wide x 6.5" high x 2.8" deep (excluding rear clip)
Standalone weight: 4.3 lbs. with battery (without accessories)

Easy to Use

Connects wirelessly to Tempus Pro Monitor when in use

Data flow

All resuscitation data automatically flows in to the SRoC

Biphasic waveform

Trusted high performance BTE biphasic waveform

Long-life battery

At least 300 shocks at 200J from a fully charged battery or >12 hours ECG monitoring from a fully charged battery

Mounting solution

Docking and charging station for all types of vehicles⁸

Advanced capabilities to help support clear and **documented** decision making

A platform for growth

The Tempus ALS was designed with growth in mind to help accommodate your needs and budget. By adopting universal technology standards and connectors, the Tempus ALS is built to evolve along with your needs.

USB and wireless interfaces allow for expanded monitoring and diagnostics, without having to carry separate devices, such as a video laryngoscope or an ultrasound device and displays. Moreover, the proprietary communication technologies mean data can be stored, viewed and shared in alternative ways.

Ultrasound and vascular examinations

- An optional plug-in ultrasound transducer can be used to extend the capabilities of the Tempus Pro platform to provide basic ultrasound assessment when a detailed, high quality image is not required.
- 3.5 MHz ultrasound probe for general purpose
 - 7.5 MHz ultrasound probe for line placement and vascular examinations
 - Automatic creation of a FAST exam report for automatic inclusion in the record of care⁶
 - FAST exam report can be transmitted in real-time or post event³



Video Laryngoscopy

An optional plug in Karl Storz-C-MAC[®] video laryngoscope imager can be used to give video laryngoscopy support during airway management.

- A range of disposable Macintosh and D-blades are available to enable video laryngoscope images to be visualised on the Tempus Pro display
- View vitals, including capnography and SpO₂ while intubating the patient
- Still images can be captured and automatically included in the record of care
- Still images can be transmitted in real-time or post event

Philips IntelliSpace Corsium

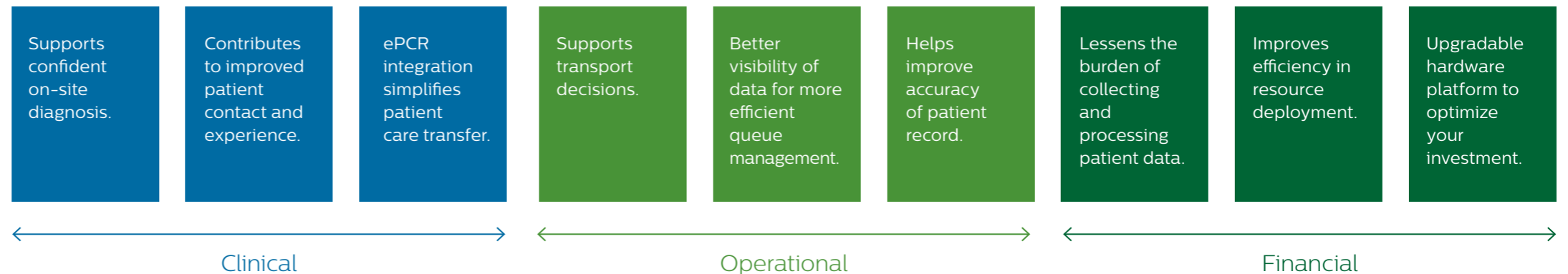
Real-time rich data transfer and two-way communication



Benefits

Philips IntelliSpace Corsium is a web-based software platform that unlocks the power of the Tempus ALS. With the ability to capture rich levels of on-scene clinical and patient data, IntelliSpace Corsium allows Tempus ALS users to quickly share data and collaborate.

Using proprietary encryption and data transmission technologies, rich event-driven clinical data, including vitals and images, can be securely shared in real-time and reviewed for two-way consultation, enabling rapid clinical and transport decision support and helping provide seamless ePCR integration.



Adding an extra layer of **confidence**

You are expected to make important decisions every day, every minute. Whether you are a field medic seeking medical guidance, a Logistics Project Manager deploying equipment across a system or a Senior Medical Officer understanding a clinical challenge, IntelliSpace Corsium is here to help support your clinical decisions with rich data and clear guidance.



Meet increasing demand



Transport to specialized or primary care



Key patient physiological and event data in real-time



Empower clinical decision making



Measure quality of care



Over the air configuration



Optimize and streamline patient care



Event synchronized physiological data



Patient care transfer and ePCR integration are seamless



Tempus ALS with IntelliSpace Corsium

Multiple benefits for different stakeholders

Challenges	Tempus ALS and IntelliSpace Corsium solution
<p>Manual handling issues - Equipment carried of field is heavy.</p>	<p>Modular system: 6.4 lbs. monitor for shoulder carry and 4.3 lbs. professional defibrillator in a military molle bag, only taking up a small amount of space.⁴</p>
<p>Clinical decision support limited data transmitted for on-scene support.</p>	<p>Rich, event-driven data collected, time-synchronized to patient physiological data. Secure two-way transmission enables quick review and decision support. Ability to extend the capabilities to plug in USB and video laryngoscopy.</p>
<p>Reliability Equipment is damaged as used in unpredictable conditions.</p>	<p>The Tempus Pro is IP66 rated and tested to high durability standards. It is the monitor of choice for a number of militaries across the globe with reputation for reliability and robustness. Tempus LS-Manual is small enough to live in a medical response bag, where it remains until required and connects wirelessly with the Tempus Pro when in use.</p>
<p>Clinical decision making A lot to do on-scene, limited time/ capacity to deliver optimal care and complete records.</p>	<p>Time-synchronized physiological data is collected automatically and augmented with manual event-driven data collected directly on the monitor. All data can be streamed directly via a web browser for quick review and in to ePCR. No double documentation needed. When deployed in resuscitation cases, one display is focused on defibrillation (Tempus LS-Manual) therapy and the other on patient monitoring (Tempus Pro), improving visualization of events – enables a caregiver to focus precisely on the care with minimal distraction. All resuscitation data is automatically captured, transmitted and easily exported in to ePCR.</p>
<p>Governance Record keeping can be inaccurate and documented post-event.</p>	<p>Tempus ALS provides automated, time-synchronized collection of events, diagnostic assessment and patient physiological data. Along with flexible manual notation, all stamped resuscitation data can be automatically streamed into IntelliSpace Corsium for immediate review and analysis.</p>
<p>Data and Connectivity Unreliable data transmission and comms.</p>	<p>Tempus ALS enables rich data transmission and encryption. Our data platform has been developed and tested in conjunction with military.</p>
<p>Workflow Patient care transfer can be a lengthy process.</p>	<p>The Summary Record of Care (SRoC) can be automatically flowed in to an ePCR with the IntelliSpace Corsium software. On-scene data and an accurate real-time view of patient status can be monitored directly in the Emergency Department.</p>
<p>Interoperability Need to have standardization of equipment for patient care transfer.</p>	<p>The Tempus ALS can be deployed in to any emergency vehicle and medical response bag. Web-based data review can minimize operational down time.</p>

Specifications

Tempus ALS is a small, fully-featured biphasic defibrillator/monitor, designed to enable military medical responders to deliver care more efficiently:

- Full range of vital signs monitoring parameters with manual, synchronized cardioversion and pacing in a small, highly robust package⁷
- Utilizes the widely used, low energy 200 J biphasic BTE waveform
- Small enough to enable new choices in transport and deployment
- Long battery life - 10 3/4 hour of monitoring with display at 60% brightness (Tempus Pro) and 300 shocks with maximum energy (Tempus LS-Manual)
- Water and solid object ingress protection for austere environments with rating of IP66 for monitor (dust and water protection with rating of IP65 for defibrillator)
- Plug-in sensor allows real-time CPR measurement and feedback³
- Enables the capture of all vital signs, images and electronic records in an easy to use format that can be easily transmitted or shared with other devices and systems
- Fully integrated communications capability enables the transmission of all medical and vital signs data in real time⁵
- Large color display with multiple waveform configurations and large numeric view
- Displays ultrasound and video laryngoscopy images on the large color display utilizing third party ultrasound probes and video laryngoscopy accessories⁸

Control Interface

Defibrillator interface is via clearly labelled buttons

Monitor 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 on monitor

Monitor Alarms

User configurable visual and audible alarms

Adult, pediatric and neonate settings

Adjustable alarms ≤ 85 dBA at 1m

360° alarm visible indicator lights

Display

Defibrillator – color 5.7" 640x480 pixels

Monitor – color 6.5" 640x480 pixels, 130 klux daylight readable display

Multiple user-selectable display formats

High-contrast mode, NVG compatible

Printer⁸

High resolution 4.3" integrated thermal printer

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

Tempus LS-Manual¹

Manual Defibrillation

Biphasic Truncated Exponential (BTE) waveform for defibrillation and synchronized cardioversion

1-200 J user configurable energy levels (1-10, 15, 20, 30, 50, 70, 90, 100, 120, 150, 170 and 200 J)

Adult and pediatric modes available

Charge time: 9 seconds to 200 J from first charge

Time to shock from cold start-up: <15 seconds to 200 J

Disposable adult and child pads

Defibrillator ECG Monitoring

ECG monitoring using pads or 3-Lead via Tempus Pro-compatible ECG cable

Speed: 12.5 mm/sec, 25 mm/sec, 50 mm/sec

Heart rate range: 15-300 beats per minute (bpm) ± 5 , Accuracy: $\pm 10\%$

50/60 Hz mains filter

Pacer

Fixed and demand modes provided

0-200 mA $\pm 10\%$ or ± 5 mA (higher value applies)

40-180 ppm $\pm 1.5\%$ range

20 ms pulse width $\pm 5\%$

Synchronized Cardioversion

Synchronizes to R wave markers displayed on-screen

<60 ms from R wave peak

Automatically reverts to asynchronous delivery after shock has been provided

CPR Feedback

Optional plug-in-sensor provides on-screen feedback of compressions, rate, depth and quality

Audible feedback and on-screen messaging is provided to ensure compliance to AHA/ERC guidelines

AHA/ERC guideline settings can be updated through USB with a manufacturer provided software update

Tempus Pro

ECG Monitoring

3-, 4-, 5- and 12-Lead monitoring via standard snap-on electrodes with automatic leadset detection

Heart rate range: 30-300 bpm

12-Lead acquisition⁸ and 12-Lead interpretation

Input impedance: >100 M Ω , Dynamic range: ± 5 mV ac

Accuracy: $\pm 3\%$, DC offset: ± 300 mV dc

Frequency response: 0.05 Hz to 175 Hz ± 3 dB

Acquisition 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 QT segment measurement with alarms⁸

Impedance Respiration

Range: 3 - 150 RPM

Accuracy: ± 2 RPM or $\pm 2\%$ whichever is greater

Pulse Oximetry

SpO₂

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

Uses comfortable, waterproof soft-tip sensor

Pleth Variability Index (PVI)⁸

Pulse Rate

Range: 25 - 239 bpm

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

Total Hemoglobin (SpHb g/dl)⁸

Range 0 - 25 g/dl

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

Methemoglobin (SpMet)⁸

Range 0 - 99%

Accuracy (adults/infants/pediatrics/neonates) 1 - 15% $\pm 1\%$

Carboxyhemoglobin (SpCO)⁸

Range 0 - 99.9%

Accuracy (adults/infants/pediatrics) 1 - 40% $\pm 3\%$

Total Oxygen Content (SpOC)⁸

Range 0 - 35ml of O₂/dL of blood

Non-Invasive Blood Pressure

Accuracy: ± 3 mmHg

Adult range: 20 - 260 mmHg

Pediatric range: 20 - 230 mmHg

Neonate range: 20-130 mmHg

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

Capnometry

Respiration Rate

Range: 1 - 149 Breaths Per Minute (BPM)

Accuracy: 0-70 BPM ± 1 BPM, 71-120 BPM ± 2 BPM, 121-149 BPM ± 3 BPM

Microstream EtCO₂

Range: 0 - 150 mmHg

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

Uses Oridion Microstream™ technology

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

Contact Temperature

2 channel YSI 400 series compatible⁹

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

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

Invasive Pressure⁸

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

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

Expandable up to 4 channels via USB module⁸

Trauma Record - Summary Record of Care

Unique, automatically-updating electronic trauma record

User-friendly interface and completely configurable through separate PC application

Semi-automatic patient record completion

Operable with a gloved hand

Record can be emailed or shared with any ePCR system through an easy to implement software development kit

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

Data can be output as a PDF report

Record can be streamed for real-time decision support

Integral Digital Camera

Color 3.2M pixel camera

Streams video using the H264 algorithm (bandwidth dependent)

Images are included in the patient record

Ultrasound and Video Laryngoscopy⁸

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

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

Anesthetic Gas Monitoring⁸

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

Battery and Power

Operating Time – Tempus LS-Manual

At least 300 shocks at 200 J from a fully charged battery

>12 hours ECG monitoring from a fully charged battery

Operating Time – Tempus Pro¹⁴

At least 10 ¾ hours (display brightness at 60%, ECG, SpO₂, EtCO₂, temp x 2 and NIBP every 15 minutes)

At least 11 ½ hours (display brightness at 30%, ECG, SpO₂, EtCO₂, temp x 2 and NIBP every 15 minutes)

Up to 14 hours with battery saving mode activated¹⁰

Battery – Tempus LS-Manual and Tempus Pro

Rechargeable, user replaceable lithium-ion battery

Charge time: 3 hours to 90%^{11,12}

Power Supply – Tempus LS-Manual and Tempus Pro

Small size: 5.24" x 2.39" x 1.62"

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

Vehicle adaptor 11-27 V dc available⁵

External Charger⁸

Optional external battery chargers

Physical Dimensions

Tempus LS-Manual

Standalone size: 7.9" wide x 6.5" high x 2.8" deep, cube 142" (excluding rear clip)

Standalone weight: 4.3 lbs. with battery (without accessories)

Tempus Pro

Standalone size (printer model): 10.3" wide x 8.5" high x 3.9" deep, cube 346"

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

Environment – Tempus LS-Manual and Tempus Pro

Operating temperature range: 0 °C to 50 °C

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

Altitude: -656' to +18000'

Storage temperature range: -37 °C to +73.3 °C

Water and solid object ingress protection for austere environments with rating of IP66 for monitor (dust and water protection with rating of IP65 for defibrillator)

Tempus LS-Manual and Tempus Pro

Medical Electrical Equipment: IEC 60601-1-12

Airborne equipment: RTCA DO-160G, 2010 section 21 cat. M

Exceeds requirements of MIL-STD 810G 1.22 m (4') 26 drops all corners, edges and faces

Crash Safety: 20 g per DO160E Sec 7 Cat B

Vibration: MIL-STD 810G rotary wing (UH-60 and CH-47), fixed wing (jet profile), fixed wing (turboprop profile), composite wheeled vehicle; Ground Vehicle per EN1789

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

Mounts and Bags⁸

Hard transit cases and saddle bags available

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

Communications

Low bandwidth system providing real-time medical data

All voice, data and video communications are transmitted and stored using AES256 encryption

Compatible with military IP-radios and satcoms

IntelliSpace Corsium licence options

IntelliSpace Corsium ReachBak licence:⁸

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

Transmits 12-Lead ECG in 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:

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

Used for communication with the device's accessories

Version: V2 EDR class 2

Voice Communications

Compatible with military headsets (Peltor, Liberator etc.)

Voice communications provided by an optional wired or wireless Bluetooth headset⁶

Voice channel is full duplex with low bandwidth utilization (12 kbps)

Voice transmitted in real time¹³

Image Communications

Images received from the Tempus can be annotated with text, colors, shapes and graphics which can be sent back to the Tempus Pro¹³

Video transmitted in real time¹³

Integral Ethernet

Compatible with Inmarsat, BGAN, V-SAT and other broadband communications systems⁵

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 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

Uses 128-bit encryption, WPA2 and WEP standards to ensure security

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

Integral GPS Positioning

Provides position via ReachBak and allows automatic geo-tagging of drugs and therapies in the patient record/ Accuracy ±10 m.¹⁵

Integral 3G/GSM Cell Phone¹⁶

Able to connect over 2G GPRS networks (GSM 850, EGSM 900, DCS 1800 and PCS 1900)

Able to connect over 3G GPRS networks (UMTS 850/ Band V, UMTS 900/Band VIII, UMTS 1900/ Band II and UMTS 2100/ Band I)



1. Tempus LS-Manual is 510(k) cleared and available for sale in the US
2. Reliable data transmission (EDS) is streamed automatically during the initial assessment and transport of the patient using Enhanced Data Service (EDS) protocol. EDS is designed to ensure effective data transfer even when the underlying connectivity is poor or of low bandwidth
3. Depending on network availability there may be a 2-3 second delay between display of the data on the Tempus Pro and display of the same data on IntelliSpace Corsium
4. Tempus Pro standalone weight: 6.4 lbs. nominal including battery, excluding IP module, accessories and printer. Tempus LS-Manual standalone weight: 4.3 lbs. with battery (without accessories)
5. Limitations apply and contract required with relevant service provider
6. Not yet available in the US
7. Tempus LS-Manual for manual defibrillation only
8. Optional, additional feature
9. One channel fitted as standard second channel is optional.
10. Display active 50% of the time.
11. Subject to conditions of storage and use, times are approximate
12. Tempus switched off while charging, charging takes longer when the device is active
13. i2i ReachBak only
14. Test done without printing.
15. GPS accuracy depends on the number of satellites visible to the device
16. If enabled



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