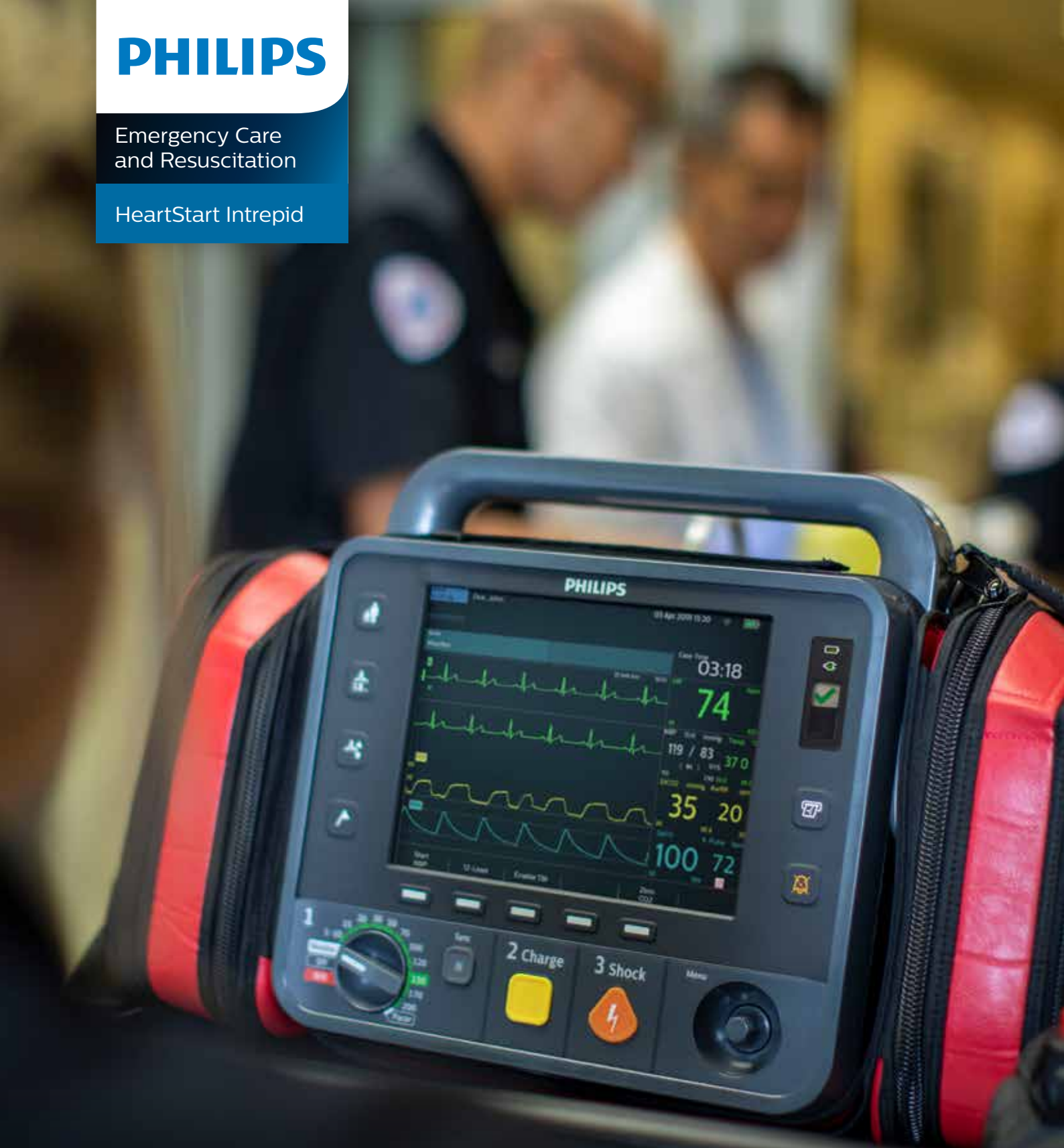
PHILIPS

Emergency Care and Resuscitation

HeartStart Intrepid



Respond quickly. Treat confidently.

Philips HeartStart Intrepid technical data sheet

Specifications

General

Parameter	Specification
Approximate dimensions	24.6 cm (H) x 29 cm (W) x 21 cm (D); 9.7 in (H) x 11.4 in (W) x 8.3 in (D)
Approximate weight (with pads cable, battery, and full roll of paper)	≤6.7kg / 14.8 lbs
Standard operator position	Within one meter (3 feet) of the device
Power	Rechargeable lithium-ion battery AC power DC power, using the DC Power Module
Alarms	The HeartStart Intrepid alarms comply with IEC 60601-1-8
Alarm tone and voice message volume range	Maximum: 85 dB(A) Minimum: 45 dB(A)
Alarm tones	Imminent shutdown: continuous tone alternating between 1000 and 2100 Hz High priority: tone of 960 Hz lasting 0.5 sec repeated every second Medium priority: tone of 480 Hz lasting 1 sec repeated every two seconds Low priority: tone of 480 Hz lasting 0.25 sec repeated every two seconds
Visual alarm characteristics	High priority (red): flashing at 2 Hz with 50% duty cycle (a 0.25-sec flash twice every second) Medium priority (yellow): flashing at 0.5 Hz with 50% duty cycle (a 1-sec flash every other second) Low priority (cyan): constant on

Defibrillator

Parameter	Specification
Waveform	Biphasic truncated exponential. Waveform parameters adjusted as a function of patient impedance.
Shock delivery	Via multifunction electrode pads or paddles
Shock series	Configurable energy escalation in a series
Leads off sensing and PCI sensing for pads/paddles	Apply 500 nA rms (571 Hz); 200 µA rms (32 kHz)

Defibrillator (continued)

Parameter	Specification

Delivered energy accuracy

Nominal delivered energy vs. load impedance

Selected energy	Load impedance (ohms) ±2% 25	50	75	100	125	150	175
1J	1.2	1.3	1.3	1.2	1.1	1.0	0.9
2J	1.7	2.0	2.1	2.0	1.9	1.7	1.6
3J	2.6	3.0	3.1	3.2	3.2	3.1	2.9
4J	3.5	4.0	4.2	4.3	4.4	4.5	4.3
5J	4.3	5.0	5.2	5.4	5.5	5.6	5.4
6J	5.2	6.0	6.3	6.5	6.6	6.7	6.5
7J	6.1	7.0	7.3	7.6	7.8	7.8	7.6
8J	6.9	8.0	8.4	8.6	8.9	8.9	8.7
9J	7.8	9.0	9.4	9.7	10	10	9.8
10J	8.7	10	10	11	11	11	11
15J	13	15	16	16	17	17	16
20J	17	20	21	22	22	22	22
30J	26	30	31	32	33	33	33
50J	43	50	52	54	55	56	54
70J	61	70	73	76	78	78	76
100J	87	100	105	108	111	111	108
120J	104	120	126	130	133	134	130
150J	130	150	157	162	166	167	163
170J	147	170	178	184	188	189	184
200J	173	200	209	216	222	223	217

The delivered energy accuracy is ±10% or ±1 J, whichever is greater, for all energy settings.

Charge times

Less than 5 seconds to the recommended adult energy level (150 J) with a new fully-charged battery installed.

Less than 6 seconds to the selected energy level (up to 200 J) with a new fully-charged battery installed, even after the delivery of 15 discharges at maximum energy.

Less than 10 seconds to the selected energy level while connected to AC/DC power only, even when operating on 90% of the rated mains voltage.

The device powers on in manual defibrillation mode ready to deliver shock in less than:
- 19 seconds with AC/DC power only and at 90% of rated mains voltage
- 15 seconds with a new, fully-charged battery even after 15 discharges of maximum energy

Time from the initiation of analysis in AED mode until ready to deliver shock is less than:
- 14 seconds with AC/DC power only and at 90% of rated mains voltage
- 12 seconds with a new, fully charged battery after 15 discharges of maximum energy

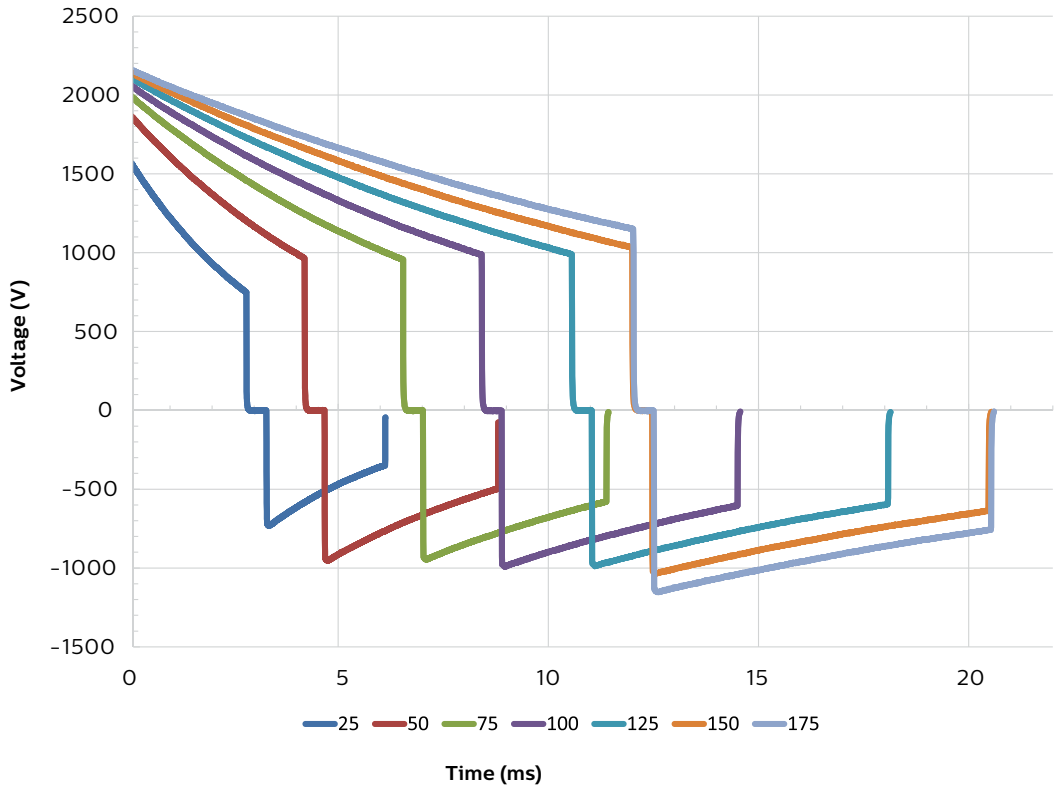
The device powers on in AED mode ready to deliver shock in less than:
- 26 seconds with AC/DC power only and at 90% of rated mains voltage
- 23 seconds with a new, fully charged battery even after 15 discharges of maximum energy

Patient impedance range

Minimum: 25 ohm (external defibrillation); 15 ohm (internal defibrillation)
Maximum: 250 ohm. Actual functional range may exceed these values

Defibrillator (continued)

SMART biphasic waveform



Manual defibrillation mode

Parameter	Specification
Manual output energy (selected)	1-10, 15, 20, 30, 50, 70, 100, 120, 150, 170, 200 Joules; maximum energy limited to 50 J with internal paddles
Controls	Therapy Knob, Sync, Charge, Shock, Smart Select knob, Patient Category, ECG Lead Select, ECG Gain Select, Mark Event, Print, Alarms
Energy selection	Front panel Therapy Knob
Charge control	Front panel button; button on external paddles
Shock control	Front panel button; buttons on external or switched internal paddles
Synchronized control	Front panel sync button
Synchronized shock timing	Maximum time from R-Wave detected to shock delivered is 25 ms, as measured with oscilloscope from peak of input QRS wave to leading edge of defibrillation discharge into a 50 ohm test load
Indicators	Text prompts, audio alerts, QRS beeper, battery status, Ready For Use (RFU), external power, sync mode
Armed indicators	Charging/charged tones, flashing shock button on front of panel and on external paddles, energy level indicated on the display

AED mode

Parameter	Specification
AED energy profile	150 Joules (factory default) for Adult / 50 J for Infant/Child nominal into a 50 ohm test load
AED controls	On/Off, shock
Text and voice prompts	Extensive text/audible messages guide user through a user-configured protocol
Indicators	Monitor display messages and prompts, voice prompts, battery status, RFU, external power
Armed indicators	Charging/charged tones, flashing shock button, energy level indicated on the display
ECG analysis	Evaluates patient ECG and signal quality to determine if a shock is appropriate and evaluates connection impedance for proper defibrillation pad contact
Shockable rhythms	SMART analysis is designed to shock ventricular fibrillation, ventricular flutter and polymorphic ventricular tachycardia. It is designed to avoid delivering a shock for rhythms that are commonly accompanied by a pulse or rhythms that would not benefit from an electrical shock.
Shock advisory algorithm sensitivity	Meets AAMI DF39 requirements and AHA recommendations; • Adult: ventricular fibrillation: 90% with lower confidence limit (LCL) of 87% • Polymorphic ventricular tachycardia and ventricular flutter: 75% with LCL of 67% • Infant/Child: ventricular fibrillation: 90% with LCL of 87%
Shock advisory algorithm specificity	Meets AAMI DF39 requirements and AHA recommendations; • Normal sinus rhythm: 99% with LCL of 97% • Asystole: 95% with LCL of 92% • Other non-shockable rhythms: 95% with LCL of 88%

ECG and arrhythmia monitoring

Parameter	Specification
Inputs	Up to four ECG waves may be viewed on the display and up to three waves printed simultaneously. Lead I, II or III is obtained through the 3-wire ECG cable and separate monitoring electrodes. With a 5-lead ECG cable, leads aVR, aVL, aVF and V can also be obtained. With a 10-lead ECG cable, leads V1 – V6 can also be obtained. Pads ECG is obtained through two multifunction electrode pads.
Lead fault	Messages and dashed lines appear on the display if an electrode or lead becomes disconnected
Pad fault	Dashed line appears on the display if a pad becomes disconnected
Heart rate display	Digital readout on the display from 16 to 300 bpm (Adult Patient Category) or 16 to 350 bpm (Infant/Child), with an accuracy of ±10% or ±5 bpm whichever is greater
Heart rate/arrhythmia alarms	HR high, HR low, asystole, VFIB/V-TACH, VTACH, extreme tachy, extreme brady, PVC rate, pacer not capture, pacer not pacing
Common mode rejection	105 dB for Leads ECG, 96 dB for pads ECG
ECG size	1/4x, 1/2x, 1x, 2x, 4x, auto gain (1x gain is 10 mm/mV on the printed strip)
ECG waveforms	Displayed at a fixed timebase: • Printer: 25 or 50 mm/sec ±5% • Display: 25 mm/sec ±10%
ECG leads off sensing	3-, 5-, and 10-lead wires apply a <35 nA DC current patient electrodes, <1.0 µA other electrodes
Maximum T-wave amplitude	Device rejects up to 80% of R-Wave amplitude for synchronized cardioversion; up to 55% of R-Wave amplitude for demand pacing; up to 34% of R-Wave amplitude for arrhythmia analysis. Maximum T-wave amplitude when a QRS test signal is 1 mV amplitude and 100 ms duration, with a heart rate of 80 bpm used: 18 mm
Frequency response	• ECG AC line filter: 50 Hz or 60 Hz • ECG for display: 0.15-40 Hz, 0.05-40 Hz (EN 60601-2-27:2011, 201.12.1.101.8 a, b), 2.0-20.0 Hz • ECG for printer: 0.05-150 Hz – Diagnostic, 0.15-40 Hz – Monitor, 0.05-40 Hz – ST Monitor (EN 60601-2-27:2011, 201.12.1.101.8 a, b), 2.0-20.0 Hz – EMS • ECG sample rate: 1000 samples/sec, Channel skew ≤100µs. Amplitude resolution: 2.12uV/LSB

ECG and arrhythmia monitoring (continued)

Parameter	Specification
Heart rate accuracy and response to irregular rhythm	Meets AAMI/IEC standard for ventricular bigeminy (HR=80 bpm); slow alternating ventricular bigeminy (HR=60 bpm); rapid alternating ventricular bigeminy (HR=120 bpm); bidirectional systoles (HR=90 bpm) as measured after a 20 sec stabilization time
Heart rate averaging	For heart rates ≥50 bpm, heart rate is determined by averaging the 12 most recent R-R intervals. Beats N, P, and V are included. When heart rate drops below 50 bpm, the four most recent R-R intervals are used in the average. Note: for ventricular tachycardia alarms, which have a user-definable PVC run length limit, the heart rate is based on the user-selected PVC length up to 9 PVCs maximum. Heart rate display update time is 1 second maximum.
Pace pulse detection sensitivity	1 mV for a width of 100 µs; 200 µV for a 500 µs width and 200 µV for widths of 500 µs to 2 ms
ECG analog output bandwidth	0.5 to 70 Hz
ECG analog output gain	1 v output per 1 mV input ±10%
ECG analog output delay	Propagation delay time is <25 ms from ECG input to ECG analog output
Pacemaker pulse rejection capability	Amplitude from ± 2 mV to ± 700 mV, width from 0.1 ms to 2.0 ms as per IEC 60601-2-27:2011 201.12.1.101.13/YY1079 4.1.4.1, except the full overshoot range of IEC60601-2-27 methods A and B
Pacer pulse detector rejection of fast ECG signals	Slew rate of 1.1 V/s
Heart rate response time	7 sec for a high heart rate alarm when the rate changes from 80 to 120 bpm, with the alarm limit set at 100 bpm; 6 sec for a low heart rate alarm when the rate changes from 80 to 40 bpm, with the alarm limit set at 60 bpm
Time to alarm for Tachycardia	4 sec for 206 bpm (1 mV, halved amplitude and double amplitude) and 195 bpm (2 mV, halved amplitude and double amplitude) as measured following a normal 80 bpm rate with upper alarm limit set at 100 and lower alarm limit set at 60 bpm
Patient isolation (Defibrillation proof)	• Lead ECG: type CF • CO_2: Type BF • Pads/paddles: type BF • Temperature: type CF • SpO_2: type CF • NBP: type CF • Internal paddles: type CF • CPR meter: type BF
Other consideration	The HeartStart Intrepid is suitable for use in the presence of electrosurgery. Burn hazard protection is provided via a 1K current-limiting resistor contained in each ECG lead wire. Proper lead placement is important to reduce burn hazards in the event of a defect in the electrosurgical equipment. Do not entangle the ECG cables with the electrosurgical equipment wires; do not place the ECG cabling near the electrosurgical equipment's grounding plate.

HeartStart Intrepid Leads ECG is not suitable for direct cardiac application.

Display

Parameter	Specification
Size	Approximately 21.3 cm (8.4 in) diagonal viewing area
Type	Color TFT LCD
Resolution	1024 x 768 pixels (XGA) with 32 brightness levels per color
Sweep speed	25 mm/s ± 10% nominal (stationary trace; sweeping erase bar) for ECG and SpO_2; capnogram wave is 6.25 mm/s ± 10%
Wave viewing time	5.0 sec ± 10%

Battery

Parameter	Specification
Type	Rechargeable, Lithium Ion; see battery label for capacity information
Approximate dimensions	28.5 mm (H) x 80 mm (W) x 145.7 mm (L); 1.1 in (H) x 3.1 in (W) x 5.7 in (L)
Approximate weight	Approximately 0.44kg (1 lb)
Capacity	With a new fully charged battery, at 20°C (68°F), one of the following: • 100 full-energy charge/shock cycles • Five hours of monitoring (ECG, $EtCO_2$, SpO_2, and temperature continuously monitored and NBP sampled every 15 minutes) followed by 20 full-energy charge/shock cycles • Three hours of pacing (180 ppm at 140 mA with 40 msec pulse) and monitoring (ECG, $EtCO_2$, SpO_2, and temperature continuously monitored and NBP sampled every 15 minutes)
Charge time with device turned off and AC power connected	With temperature at 25°C (77° F), less than 3 hours to 100% capacity; less than 2 hours to 80% capacity
Battery indicators	Battery gauge on battery, capacity indicator on display, power indicators on front of device; flashing RFU indicator, audio beep and low battery messages on the display for low battery condition. When a low battery message first appears there is still enough energy for at least 10 minutes of pacing or monitoring and six maximum energy discharges.

Temperature

Parameter	Specification
Measurement range	0°–45°C (32°–113°F)
Measurement resolution	0.1°C (0.2°F)
Measurement accuracy (excluding any adapter cable)	• ±0.1°C from 25°C to 45°C • ±0.3°C from 0°C to 24.9°C • Temperature probe adds an additional ±0.1°C
NOTE: if operating under conditions according to the EMC standard IEC 60601-1-2 (radiated immunity 3 V/m or conducted immunity 3 VRMS), the additional temperature error is ≤ ±0.1°C	
Settling time constant	<10 seconds
Alarm delay time	• High temperature alarm: 7 seconds • Low temperature alarm: 6.8 seconds
Averaging time	1 second.
Minimum measurement time	See the probe's Instructions for Use to obtain minimum measurement times for accurate readings. The HeartStart Intrepid does not add any clinically significant time to obtain accurate readings.
Mode of operation	Direct mode
Transient response time from 24°C to 27°C	<60 seconds
Transient response time from 25°C to 23°C	<60 seconds

Thermal array printer

Parameter	Specification
Continuous ECG strip	The Print key starts and stops the strip. The printer can be configured to be run real time or with a 10-second delay. The strip prints the primary ECG lead and a second wave with event annotations and measurements. This strip prints a third wave from wave sector 3 or 4.
Auto printing	The printer can be configured to automatically print on mark events, charge, shock and alarm
Reports	The following can be printed: • Event summary (Long or Short) • Operational check • Status log • 12-lead report • Vital signs trends • Configuration • Device information
Speed	• 25 or 50 mm/s with an accuracy of ±5%
Amplitude accuracy	5% for offset voltages of ± 300 mV at 5 Hz
Paper Size	75 mm (W) x 30 m (L)

Noninvasive pacing

Parameter	Specification
Waveform	Monophasic.
Current pulse amplitude	10 mA to 200 mA if the pulse width is set to 20 ms (5 mA increments); accuracy ±10% or ±5 mA whichever is greater. For a 40 ms setting, the maximum pacing current is 140 mA.
Pulse duration	20 or 40 msec with ±10% accuracy
Rate	30 ppm to 180 ppm (10 ppm increments); accuracy ±1.5%
Mode	Demand or fixed
Refractory period	340 msec (30 to 80ppm); 240 msec (90 to 180 ppm) ±10%
Universal-function electrodes (pads)	After 60 minutes of pacing with approved defibrillators, the multifunction electrodes (pads) exhibit a post-defibrillation DC Offset of less than ±800 mV at ≥4 seconds post-shock

SpO_2 pulse oximetry

Parameter	Specification
SpO_2 measurement range	0–100%
SpO_2 resolution	1%
SpO_2 update period	1–2 sec typical; maximum of ≤30 sec
SpO_2 sensor accuracy	Specified accuracy is the root-mean-square (RMS) difference between the measured values and reference values. • Accuracy +/=2%: M1132A, M1133A, M1134A, M1191B, M1191BL, M1192A • Accuracy +/=3%: M1131A, M1140A, M1194A, M1196A, M1196S • **NOTE:** accuracy outside the range specified for each sensor is not indicated. The above referenced sensors were validated for use with the HeartStart Intrepid using the Philips picoSAT II SpO_2 module with Fourier Artifact Suppression Technology (FAST). While the SpO_2 module is able to report values below 70% and alarm limits can be set below 70%, the accuracy of measurements less than 70% has not been validated. SpO_2 accuracy was validated in human studies against arterial blood sample references measured with a CO-oximeter. In a controlled desaturation study, healthy adult volunteers with saturation levels between 70–100% SpO_2 were studied. The population characteristics for those studies were approximately 50% male and 50% female, ranging in age from 19–39 with skin tone from light to dark. Pulse oximetry equipment measurements are statistically distributed, therefore only two-thirds of pulse oximeter equipment measurements can be expected to fall within ±Arms of the value measured by a CO-oximeter. Functional test equipment designed for SpO_2 testing cannot be used to assess the accuracy of the SpO_2 readings. See the sensor's Instructions for Use for the maximum temperature possible at the sensor-skin interface and other information such as intended patient population, sensor application sites and use criteria. The HeartStart Intrepid is calibrated to display functional oxygen saturation.
Ambient light sensitivity	Interference from fluorescent light is <2% SpO_2 under the following conditions: 0.3 and 1% perfusion, 50 nA/mA transmission, 10 to 1000 lx light intensity, 50/60±0.5 Hz power line frequency
SpO_2 alarm range	Low limit: 50–99% (Adult and Infant/Child) High limit: 51–100% (Adult and Infant/Child)
SpO_2 and pulse high/low alarm signal generation delay	10 seconds
SpO_2 response time (90 to 80%)	Average 18.9 seconds, standard deviation 0.88 seconds
SpO_2 and pulse averaging time	10 sec
Emitted light energy	≤15 mW
Wavelength range	500–1000 nm (Information about wavelength range can be useful to users, especially those performing photodynamic therapy)
Desat alarm signal generation delay	20 sec
Pulse rate measurement range	30–300 bpm
Pulse rate resolution	1 bpm.
Pulse rate accuracy	±2% or 1 bpm whichever is greater
Pulse rate reference method	Electronic pulse simulator
Pulse response time (90 to 120 bpm)	Average 18.0 seconds, standard deviation 0.86 seconds
Pulse alarm range	Low limit: 30–295 (Adult and Infant/Child) High limit: 35–300 (Adult and Infant/Child)

$EtCO_2$

The HeartStart Intrepid uses Respironics CapnoTrak® Sidestream CO_2 module.

Parameter	Specification
Initialization time	Capnogram available in less than 10 seconds
Range	0, 5 to 99 mmHg at sea level
Resolution	1 mmHg (0.1 kPa)
Operating atmospheric pressure	400 – 800 mmHg (533 – 1066 mbar)
Storage atmospheric pressure	375 – 800 mmHg (467 – 1066 mbar)
Measurement rate	100 samples per second
Total system response time	< 4 seconds, includes transport time and rise time with water filter assembly and airway adapter. Up to an additional 3 seconds for sidestream sampling cannulas with dehumidification and extension tubing
Rise time	< 340 ms. Up to an additional 70 ms for sidestream sampling cannulas with dehumidification and extension tubing
Time to zero	Maximum 30 seconds. Typical 15-20 seconds
$EtCO_2$ stability	Short term drift: drift over 6 hours does not exceed 0.8 mmHg Long term drift: accuracy specification maintained over a 120-hour period
$EtCO_2$ accuracy	• For values between 0 and 38 mmHg: ±2 mmHg of the actual value • For values between 39 and 99 mmHg: ±10% of the actual value • For breath rates above 80 bpm ±12% of the actual value Values read at the sea level
Sampling flow rate	The minimum sampling flow rate is 50 ml/minute ± 10 ml/minute. The flow rate may exceed 60 ml/minute if the airway pressure range is greater than + 60 cmH2O (44.1 mmHg).
Warm-up time	Warm up for 20 minutes before full specifications are met over the entire operation temperature range. Full accuracy specifications within 3 minutes at an ambient temperature of 25°C. If the $EtCO_2$ option is enabled, a low priority technical alarm is presented in clinical modes where $EtCO_2$ monitoring is available, if the $EtCO_2$ module has not warmed up to operating temperature range.
Sample gas humidity	Quantitative effects of humidity and condensation: full accuracy specifications are maintained for all non-condensing humidity levels
Airway pressure operational range	+60 cmH2O (44.1 mmHg) to -60 cmH2O (-44.1 mmHg). Exceeding the operational range may cause one or more error statuses
Airway pressure maximum allowable range	+120 cmH2O (88.27 mmHg) to -60 cmH2O (-44.1 mmHg). Exceeding the maximum allowable range may cause damage to the CO_2 module. Airway pressures above 71.4 cmH2O (52.5 mmHg) will cause an additional error. Example: at 100 cmH2O (73.6 mmHg) the additional error is 1 mmHg.
Maximum cross-sensitivity compensation error	Additional worst-case error is +/- 1mmHg over the range of 0 – 38 mmHg and an additional +1.3% of actual value when >38 mmHg
Pressure Compensation	No additional error due to barometric pressure Automatic correction on the CO_2 values is performed using internal barometric pressure and sample cell pressure measurements. CO_2 values are normalized to barometric pressure
Accuracy in the presence of interfering gases	Nitrous oxide, elevated levels of oxygen, helium, halogenated hydrocarbons can influence the CO_2 measurement
Other interference sources	There are no known other sources of interference to the gas measurement
Balance gas compensation range	Room air (N_2), nitrous oxide (N_2O), or helium (He)

$EtCO_2$ (continued)

Parameter	Specification		
Balance gas compensation default	Room air		
Anesthetic agent compensation range	0 to 20%		
Anesthetic agent compensation resolution	0.1%		
Anesthetic agent compensation default	0%		
Anesthetic agent effects, Minimum Alveolar Concentration (MAC) levels	Agents include Halothane, Enflurane, Isoflurane, Sevoflurane, and Desflurane		
	Anesthetic agent effects, Minimum Alveolar Concentration (MAC) levels	Uncompensated sensitivity	Accuracy specification maintained for halogenated anesthetic agents present at accepted MAC clinical levels, ISO 80601-2-55:2011 Table 201.107
		Compensated sensitivity	Testing at agent levels defined by accepted regulatory standards, ISO 80601-2-55:2011 Table 201.105
	NOTE: the presence of Desflurane in the exhaled breath at concentrations greater than 5% positively biases CO_2 values by up to an additional 3 mmHg at 38 mmHg. Accuracy is not affected by the presence of 0.1% ethanol, 0.1% isopropanol, 0.1% acetone or 1% methane		
Alarm range	Low limit: 10 to 95 mmHg (1.3 - 12.7 kPa) (Adult, Infant/Child) High limit: 20 to 99 mmHg (2.7 - 13.2 kPa) (Adult, Infant/Child)		

AwRR

Parameter	Specification
Range	0, 2-100 rpm
Resolution	1 rpm
Accuracy	±1 rpm
Alarm range	• Low limit: 0–99 rpm (Adult, Infant/Child) • High limit: 10–100 rpm (Adult, Infant/Child)
Alarm delay time: (after alarm condition has been met)	Less than 8 sec
Measurement method	AwRR: based on the last 8 detected breaths Apnea: based on the configured Apnea Time

NBP

Parameter	Specification				
Pressure range	Measurement	mmHg		kPa	
		Adult	Infant/Child	Adult	Infant/Child
	Systolic	35–270	30–130	4.0–36	4.0–17.3
	Diastolic	10–245	10–100	1.3–2.7	1.3–13.3
	Mean	20–255	20–120	2.7–34	2.7–16.0
Initial pressure	165 mmHg/22 kPa (Adult); 130 mmHg/17.3 kPa (Infant/Child)				
Overpressure limit	300 mmHg/40 kPa (Adult, 150 mmHg/20 kPa (Infant/Child)				
Cuff inflation time	Typical for normal adult cuff (250 ml, 160 mmHg): less than 10 seconds				
Clinical accuracy	Investigated according to the requirements of ISO 81060-2:2013				
Pressure transducer accuracy	(0 to 300 mmHG): ±3 mmHg				
Alarm range	Measurement	mmHg		kPa	
		Adult	Infant/Child	Adult	Infant/Child
	Systolic high limit	35–270	35–150	4.5–36	4.5–17
	Systolic low limit	30–265	30–125	4–35	4–17.5
	Diastolic high limit	15–245	15–100	1.5–32	1.5-12.5
	Diastolic low limit	10–240	10–95	1.5–32	1.5–12.5
	Mean high limit	25–255	25–120	3.5–34	3.5–16.0
	Mean low limit	20–250	20–115	3–33	3–15
Auto mode repetition time	1, 2.5, 5, 10, 15, 30, 60 or 120 min				
Maximum measurement time	180 seconds for Adult, 90 seconds for Infant/Child				
Alarm delay time from completion of measurement	< 2 sec				
Interconnect tube length	Sampling extension line, 1.5 m or 3.0 m				

Patient data storage

Parameter	Specification
Internal event summary	The HeartStart Intrepid can store up to 8 hours of 2 continuous ECG waves, 1 pleth wave, 1 capnogram wave, research waves (AED Mode only) events and trending data per event summary. There is a maximum capacity of approximately 80 event summaries of approximately 30 minutes in length.

Environmental

<table>
<tr><th>Parameter</th><th>Specification</th></tr>
<tr><td>Temperature</td><td>• Operating temperature range for the device: 0 °C to 45°C (32°F to 113°F)
• Operating temperature range for $EtCO_2$ monitoring: 0 °C to 40°C (32°F to 104°F)
• Optimal temperature range for charging battery: 0 °C to 30°C (32°F to 86°F)
• Storage/transport range for the device without battery: –20°C to 70°C (–4°F to 158°F)
• Storing the battery for extended periods and charging at temperatures above 35°C (95°F) reduces battery capacity and degrades battery life</td></tr>
<tr><td>Settling time to 20°C</td><td>Time required for device to warm from –20°C before use is 80 minutes; time required for device to cool from 70°C before use is 80 minutes</td></tr>
<tr><td>Humidity</td><td>15% to 95% relative humidity
• Printer paper may jam if the paper is wet
• Thermal printer may be damaged if wet paper is allowed to dry while in contact with printer elements</td></tr>
<tr><td>Atmospheric pressure range/ operation and storage</td><td>1060 mbar to 572 mbar (-380 to 4550 m; -1250 to 15,000 ft)</td></tr>
<tr><td>Shock</td><td>Operating: half-sine waveform, duration 11 ms, acceleration 30 g, 3 shocks per face.
Non-operating: trapezoidal waveform, duration: < 25 ms, acceleration 30 g, velocity change 7.42 m/s ±10%, 1 shock per face.</td></tr>
<tr><td>Vibration</td><td>
<table>
<tr><td colspan="3">Operating/non-operating random</td><td colspan="2">Non-operating swept sine</td></tr>
<tr><td>Frequency (Hz)</td><td>Slope (dB/ octave)</td><td>PSD (g^2/Hz)</td><td>Frequency (Hz)</td><td>Amplitude</td></tr>
<tr><td>10–100</td><td>—</td><td>0.052</td><td>10–57</td><td>± .15 mm</td></tr>
<tr><td>100–200</td><td>-7.0</td><td>—</td><td>57–150</td><td>2 g</td></tr>
<tr><td>200–2000</td><td>—</td><td>0.01</td><td colspan="2" rowspan="2">Test duration: 4 sweeps per axis x 3 axes; Each sweep: 10-150-10 Hz cycle at a sweep rate of 1 oct/min</td></tr>
<tr><td colspan="3">(Total RMS acceleration 5.1 g RMS)
Test duration: 30 min/axis x 3 axes = 90 minutes total</td></tr>
</table>
MIL-STD 810G 514.6: category 9, non-operating UH60 helicopter, general storage, random and sine. Test duration: 4 hours/axis (12 hours total)</td></tr>
<tr><td>Bump</td><td>Half-sine, 15 g peak, 6 ms, 1000 hits (vertical with the device in its normal mounting position)</td></tr>
<tr><td>Free fall</td><td>IEC 60068-2-32 free fall. Total 6 faces (excluding bedrail hook)
• 40 cm (16 in.) without carry bags
• 75 cm (29.5 in.) with side and rear carry bags, one time on each face
• 50 cm (20 in.) with side and rear carry bags, two times on each face</td></tr>
<tr><td>Water/solids ingress resistance</td><td>Meets ingress protection level IP54: protected against dust limited ingress (no harmful deposits) and against water sprayed from all directions (limited ingress permitted)</td></tr>
</table>

USB device

Parameter	Specification
Correct drive	Use the Philips USB Drive that came with your device or is orderable under part number 989803202611

CPR meter

Parameter	Specification
Maximum dimensions	Maximum dimensions: 160 mm x 65 mm x 30 mm (16 cm x 6.5 cm x 3 cm) with an integrated 0.91 m (3 feet) cable
Maximum weight including cable	300 g (10.6 oz.)
Input voltage	3.9–10.0VDC, max 170 mA. The CPR meter is electrically and galvanically isolated from the defibrillator power and communication sources
Temperature	Storage: -20°C to 60°C (-4°F to 140°F) Operating: 0°C to 50°C (32°F to 122°F)
Relative humidity	Storage: 5% to 75% Operating: 5% to 95%
Solids/water resistance	IP55. Meets ISO/IEC 60529
EMC	Meets IEC 60601-1-2

Security and privacy

The HeartStart Intrepid is a lightweight, portable monitor/defibrillator. It provides four clinical modes of operation: Monitor, Manual Defibrillation/Synchronized Cardioversion, AED, and Pacing. It displays ECG waveforms and provides monitoring of SpO_2 (numeric and pleth wave), $EtCO_2$ (numeric and capnogram), NBP, and Temperature. In clinical modes, the HeartStart Intrepid continually records data about the patient in an Event Summary record. The recorded data includes vital signs (such as SpO_2 and heart rate), ECG wave data, and therapy events (such as shock delivered). During a clinical event, any patient data that is entered by the operator (name, age, sex, ID number, paced status) is also captured in the Event Summary.

Parameter	Specification
Modes of operation and roles	The HeartStart Intrepid is used by trained clinicians in Clinical modes (Monitor, Manual Defibrillation/ Synchronized Cardioversion, AED, and Pacing) to monitor and provide therapy to patients, and in Data Management mode to print, export or transmit the stored Event Summary records. The Configuration Mode is used by the organization biomedical department to configure the settings and parameters used by the device, such as high and low alarm limits. Service Mode is used by authorized service personnel to service and maintain the device, including managing passwords and upgrading device options and software.
Security controls and access controls	Role base security controls are used to control access to Clinical modes, Data Management mode, Configuration Mode and Service Mode. Service Mode has the highest level of security and always requires a Service Mode password to enter. In Service Mode, the Service Mode password and the Configuration Mode password can be changed. Configuration mode can be entered to view the configuration settings without a password. To make and save any changes to the configuration settings requires the entry of the Configuration Mode password. In Configuration Mode, the choice of **Data Management Password Required** can be set to **On** or **Off**. Data Management mode access is controlled by an optional (as set in Configuration mode) Data Management mode password. The HeartStart Intrepid is used to provide patient care in emergency situations where time to therapy delivery can be critical and therefore, access to Clinical modes is available to clinical users with no password required.

Security and privacy (continued)

Parameter	Specification
Event Summary records at rest and in transit	All Event Summary records stored within the device are encrypted. The encryption method is AES-256.The Event Summary records are also encrypted when exported to an attached USB drive or when transmitted wirelessly via Wi-Fi or cellular communication. The encrypted event summary records stored within the device are automatically deleted after 30 days. To avoid loss of data, Philips recommends that customers frequently backup the Event Summary records by exporting them to a USB memory in Data Management mode. The USB memory should be securely stored to prevent loss or unauthorized access to the data or damage to the USB memory device.
Access logging	The HeartStart Intrepid maintains an Access Log file that is viewable in Service mode. This log records the date and time when configuration settings are changed and when device log files are cleared.
Physical security recommendations	To protect the device from any unauthorized operation or access, Philips recommends that the owning organization maintain the physical security of the device at all times such that it can only be accessed by authorized personnel.
Software upgrades	Software upgrades for the HeartStart Intrepid are distributed through the Philips Service organization to provide feature upgrades and security patches. All software upgrade files produced by Philips are encrypted to ensure their integrity. A software upgrade can be performed in Service mode which requires the Service mode password for entry. Philips recommends that customers always keep their HeartStart Intrepid updated with the most recent software release.
Device disposal	When disposing the device, Philips recommends that the responsible organization remove all patient information from the device by entering Data Management mode, choosing “Remove All Patient Info” and selecting ‘yes’. This action will remove all patient identifiable data from all of the Event Summary records.
Connecting to networks	The HeartStart Intrepid may be connected to a network, either a Wi-Fi or to a cellular, to allow the transmission of the Event Summary logs, 12-lead ECG analysis logs and patient vital signs logs. All information transmitted to a network is encrypted. The intended information flow through the network via an Internet or intranet is to reach a server which is authorized and configured to receive the encrypted logs from the HeartStart Intrepid. For connecting to a Wi-Fi network or to a cellular network, the characteristics, technical parameters and configuration parameters must be obtained from the operator of the network. Failure to conform to the specifications of the network operator could result in the loss of or the inability to receive and analyze the Event Summary logs, 12-lead ECG analysis logs and patient vital signs logs. Connecting the HeartStart Intrepid to any network that includes other connected equipment could result in previously unidentified risks to patients, operators or third parties. The owning organization is responsible to assess the risks that could result from changes to the network such as: network configurations, added or removed connections, updates or upgrades to connected equipment.

Safety

Parameter	Specification		
Safety and EMC meets IEC 60601	IEC 60601-1 ed. 3.1 IEC 60601-1-8 ed. 2.1 IEC 60601-2-27 ed. 3.0	IEC 60601-1-2 ed. 4.0 IEC 60601-1-2 ed. 3.0 IEC 60601-2-25 ed. 2.0	IEC 60601-1-12 ed. 1.0 IEC 60601-2-4 ed. 3.0 IEC 60601-2-49 ed. 2.0
	IEC 80601-2-30 ed. 1.1		
	(EN) ISO 80601: 80601-2-61 ed.1.0 80601-2-56 ed. 2.0	80601-2-55 ed. 1.0	
Other considerations	• The HeartStart Intrepid is not suitable for use in the presence of concentrated oxygen or a flammable anesthetic mixture with air, oxygen or nitrous oxide • Hazards arising from software errors were minimized by the product's compliance with the software requirements contained in ISO 62304		
Mode of operation	Continuous		
AC line powered	100 – 240 VAC, 50 or 60 Hz, 1.8 – 0.75 A, Class II equipment		
DC line powered	With the DC power module (Input: 10-32 VDC, 11A maximum. Output: 18 VDC, 5A)		
Battery powered	Nominal voltage 14.48 V, rechargeable Lithium Ion		
Transient operating conditions	The HeartStart Intrepid meets all specifications for 20 minutes during transient operating conditions of a temperature range of –20°C to 50°C and a relative humidity range of 15% to 90%, non-condensing, but not requiring a water vapor partial pressure greater than 50 hPa		

Hazardous waste

Pb	Hg	Cd	Cr6+	PBB	PBDE
O	O	O	O	O	O

● = more than one of the device's raw material has this harmful substances and concentration over than standard concentration limit.
O = all the raw material concentrations of the device within allowed limits.

Abbreviation definitions

Abbreviation	Definition
%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
A	Amps
AC	alternating current
bpm	beats per minute
Cd	cadmium
cm	centimeter
Cr6+	hexavalent chromium
dB	decibel
dB(A)	A-weighted decibel
DC	direct current
lb	pounds

Abbreviation	Definition
Hg	mercury
m	meter
Hz	hertz
in	inches
J	Joules
skg	kilograms
kPa	kilo pascal
µs	microseconds
µV	microVolt
mA	milliAmpere
mV	milliVolt
min	minutes
mmHg	millimeters of mercury
mW	milliwatt

Abbreviation	Definition
mW	milliwatt
ms	millisecond
nA	nanoAmpere
nM	nanometer
NSA	No Shock Advised
Pb	lead
PBB	polybrominated biphenyls
PBDE	polybrominated diphenyl ethers
PSD	Power Spectral Density
RFU	Ready For Use
rpm	respirations per minute
sec	seconds
V	Volt
VCD	Volts DC

Electromagnetic compatibility

When using the HeartStart Intrepid, electromagnetic compatibility with surrounding devices should be assessed.

A medical device can either generate or receive electromagnetic disturbances. Testing for electromagnetic compatibility EMC with the appropriate accessories has been performed according to national and international standard for EMC for medical devices.

The EMC standards describe tests for both emitted and received disturbances. Emission tests deal with electromagnetic disturbances generated by the device being tested.

WARNINGS: electromagnetic interference coming from other devices may degrade or obstruct the performance of the HeartStart Intrepid. The interference may come from signals radiated through the air or it may also come from signals conducted through wired connections such as power cord, patient connections or device to device connections such as ECG analog output. Electromagnetic compatibility with surrounding devices should be assessed prior to using the HeartStart Intrepid.

When connected to a patient, symptoms of interference may include degraded performance of ECG signals from pads/paddles or ECG lead sets, unexpected technical alarms, or critical failure status on the RFU Indicator. Electromagnetic compatibility testing should include both radiated and conducted immunity. Testing in the presence of potentially interfering surrounding devices should assess typical HeartStart Intrepid usage scenarios including powering on, monitoring and delivering therapy.

Fixed, portable, and mobile radio frequency communications equipment could affect the performance of medical equipment.

Reducing electromagnetic interference

The HeartStart Intrepid and associated accessories may be susceptible to interference from other RF energy sources and continuous, repetitive, power line bursts. Examples of other sources of RF interference are medical devices, cellular products, information technology equipment and radio/television transmission. Should interference be encountered, as demonstrated by error conditions, artifact on the ECG or dramatic variations in parameter measurement values, attempt to locate the source. Assess whether the interference intermittent or constant.

- Does the interference occur only in certain locations?
- Does the interference occur only when in close proximity to certain medical devices?
- Does the interference occur only when certain medical devices are turned on?
- Does the interference occur only when certain medical devices are connected to the same patient as the HeartStart Intrepid?
- Do parameter measurement values change dramatically when the AC line cord is unplugged?

Once the source is located, attempt to attenuate the EMC coupling path by distancing the monitor/defibrillator from the source as much as possible or by changing the location or routing of wired connections. If assistance is needed, call your local service representative.

Essential performance determinations

The following Essential Performance of the HeartStart Intrepid monitor / defibrillator was determined from the product's Safety Risk Assessment. This performance was maintained during EMC evaluation testing and disturbances per IEC 60601-1-2:

- Deliver defibrillation therapy (manual, AED and Synchronized Cardioversion)
- Deliver pacing therapy (fixed and demand)
- Monitor the patient parameters (ECG monitoring, pulse oximetry, end-tidal CO_2, noninvasive blood pressure, temperature)
- Detect and generate physiological alarms

Restrictions for use

Artifact on the ECG and parameter waveforms caused by electromagnetic disturbances should be evaluated by a physician or physician-authorized personnel to determine if it will negatively impact patient diagnosis or treatment.

Emissions and immunity

The HeartStart Intrepid is designed and tested to comply with the radiated and conducted emissions requirements of international and national standards. See Table 2 through Table 7 for detailed information regarding declaration and guidance.

WARNINGS: the use of accessories, transducers and cables other than those specified might result in increased emissions or decreased immunity of the HeartStart Intrepid.

The use of portable and mobile radio communications equipment can affect the operation of this device. Keep all portable and mobile radio communications equipment at a minimum distance of 30 cm (12 inches) from any part of the HeartStart Intrepid.

The list of cables, transducers, and other accessories with which Philips claims compliance with the emissions and immunity requirements is listed in the "Supplies and Accessories" chapter of the HeartStart Intrepid Instructions for Use.

The EMC standards state that manufacturers of patient-coupled equipment must specify immunity levels for their systems. See Table 2 and Table 7 for this detailed immunity information.

Immunity is defined in the standard as the ability of a system to perform without degradation in the presence of an electromagnetic disturbance. Degradation in ECG quality is a qualitative assessment which could be subjective.

Caution should, therefore, be taken in comparing immunity levels of different devices. The criteria used for degradation is not specified by the standard and might vary with the manufacturer.

Guidance and manufacturer's declaration

The HeartStart Intrepid is intended for use in the electromagnetic environment specified in the tables below. The customer or the user of the HeartStart Intrepid should assure that it is used in such an environment.

Table 1: Electromagnetic emissions

Emissions test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11/GB4824	Group 1	
RF emissions CISPR 11/GB4824	Class B	• Emergency medical services environment • Professional healthcare facility environment
Harmonic emissions IEC 61000-3-2/GB17625.1	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3/GB17625.2	Complies	

Table 2: Enclosure ports

Immunity test	Immunity test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±2, ±4, ±8, ±15 kV air	±8 kV contact ±2, ±4, ±8, ±15 kV air	Emergency medical services environment Professional healthcare facility environment
Radiated RF electromagnetic field IEC 61000-4-3	10 V/m 80 MHz - 2.7 GHz	10 V/m 80 MHz - 2.7 GHz	Emergency medical services environment Professional healthcare facility environment
Radiated RF electromagnetic field IEC 60601-2-4 (see Para. 202.6.2.3)	20 V/m (only defibrillation) 80 MHz to 2.7 GHz	20 V/m (only defibrillation) 80 MHz to 2.7 GHz	Emergency medical services environment Professional healthcare facility environment
Proximity fields from RF wireless communications equipment IEC 61000-4-3	Refer to table 3 below	Refer to table 3 below	Emergency medical services environment Professional healthcare facility environment
Power frequency magnetic field IEC 61000-4-8	30 A/m 50 Hz or 60 Hz	30 A/m 50 Hz or 60 Hz	Emergency medical services environment Professional healthcare facility environment

Table 3: Proximity fields from RF wireless communications equipment

Test frequency (MHz)	Band a) (MHz)	Service a)	Modulation b)	Modulation b) (W)	Distance (m)	Immunity test level (V/m)
385	380-390	TETRA 400	Pulse modulation 18 Hz	1.8	0.3	27
450	430-470	GMRS 460, FRS 460	FM ± 5 kHz deviation 1 kHz sine	2	0.3	28
710 745 780	704-787	LTE Band 13, 17	Pulse modulation 217 Hz	0.2	0.3	9
810 870 930	800-960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	2	0.3	28
1720 1845 1970	1700-1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	2	0.3	28
2450	2400-2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation 217 Hz	2	0.3	28
5240 5500 5785	5100-5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	0.2	0.3	9

Table 4: Input AC power ports

Immunity test	Immunity test level	Compliance level	Electromagnetic environment - guidance
Electrical fast transient/burst IEC 61000-4-4	±2 kV	±2 kV	Emergency medical services environment Professional healthcare facility environment
Surge Line to line IEC 61000-4-5	±0.5 kV, ±1 kV	±0.5 kV, ±1 kV	Emergency medical services environment Professional healthcare facility environment
Conducted disturbances induced by RF fields IEC 61000-4-6	3 V 0.15 MHz - 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz	3 V 0.15 MHz - 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz	Emergency medical services environment Professional healthcare facility environment
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	0% U_T ; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° 0% U_T ; 1 cycle and 70% U_T ; 25/30 cycles Single phase: at 0°	0% U_T ; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° 0% U_T ; 1 cycle and 70% U_T ; 25/30 cycles Single phase: at 0°	Emergency medical services environment Professional healthcare facility environment
Voltage interruptions IEC 61000-4-11	0% U_T ; 250/300 cycle	0% U_T ; 250/300 cycle	Emergency medical services environment Professional healthcare facility environment

Table 5: Signal input/output ports

Immunity test	Immunity test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±2, ±4, ±8, ±15 kV air	±8 kV contact ±2, ±4, ±8, ±15 kV air	Emergency medical services environment Professional healthcare facility environment
Electrical fast transient/burst IEC 61000-4-4	±1 kV	±1 kV	Emergency medical services environment Professional healthcare facility environment
Conducted disturbances induced by RF fields IEC 61000-4-6	3 V 0.15 MHz - 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz	3 V 0.15 MHz - 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz	Emergency medical services environment Professional healthcare facility environment

Table 6: Input DC power ports

Immunity test	Immunity test level	Compliance level	Electromagnetic environment - guidance
Electrical transient conduction along supply lines ISO 7637-2	Pulse 1, 2a, 2b, 3a, 3b, 4: level III	Pulse 1, 2a, 2b, 3a, 3b, 4: level III	Emergency medical services environment Professional healthcare facility environment

Table 7: Patient coupling ports

Immunity test	Immunity test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV contact ±2, ±4, ±8, ±15 kV air	±8 kV contact ±2, ±4, ±8, ±15 kV air	Emergency medical services environment Professional healthcare facility environment
Conducted disturbances induced by RF fields IEC 61000-4-6	3 V 0.15 MHz - 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz	3 V 0.15 MHz - 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz	Emergency medical services environment Professional healthcare facility environment

Table 8: Wi-Fi effective radiated power

Networking standard	Bands	Transmitter RF power levels	Antenna gain	EIRP
802.11a	UNII-1, UNII-2A, UNII-2C	17 dBm (50.1 mW)	3.9 dBi	21 dBm1
802.11a	UNII-3	15 dBm (31.6 mW)	4 dBi	19 dBm1
802.11b		17 dBm (50.1 mW)	2 dBi	19 dBm1
802.11g		17 dBm (50.1 mW)	2 dBi	19 dBm1
802.11n		17 dBm (50.1 mW)	2 dBi	19 dBm1
802.11n	UNII-1, UNII-2A, UNII-2C	17 dBm (50.1 mW)	3.9 dBi	21 dBm1
802.11n	UNII-3	15 dBm (31.6 mW)	4 dBi	19 dBm1

Table 9: Wi-Fi receiver frequency and bandwidth

Networking standard	Modulation type	TX/RX frequency (GHz)	TX/RX bandwidth
802.11a	OFDM	5*	20 MHz
802.11b	DSSS	2.4†	22 MHz
802.11g	OFDM	2.4[2]	20 MHz
802.11n	OFDM	2.4[2]	20 MHz (HT20) 40 MHz (HT40)
		5[1]	20 MHz (HT20) 40 MHz (HT40)

*See 5Ghz channel to frequency map. †See 2.4GHz channel to frequency map.

Table 10: 2.4 GHz channel to frequency map

Channel	Center frequency (MHz)	Frequency range (MHz)	Bandwidth (MHz)
1	2.412	2.401–2.423	22
2	2.417	2.406–2.428	22
3	2.422	2.411–2.433	22
4	2.427	2.416–2.438	22
5	2.432	2.421–2.443	22
6	2.437	2.426–2.448	22
7	2.442	2.431–2.453	22
8	2.447	2.436–2.458	22
9	2.452	2.441–2.463	22
10	2.457	2.446–2.468	22
11	2.462	2.451–2.473	22
12	2.467	2.456–2.478	22
13	2.472	2.461–2.483	22
14	2.484	2.473–2.495	22

Table 11: 5 GHz channel to frequency map

Channel	Center frequency (MHz)	Frequency range (MHz)	Bandwidth (MHz)
32	5160	5150–5170	20
34	5170	5150–5190	40
36	5180	5170–5190	20
38	5190	5170–5210	40
40	5200	5190–5210	20
42	5210	5170–5250	80
44	5220	5210–5230	20
46	5230	5210–5250	40
48	5240	5230–5250	20
50	5250	5170–5330	160
52	5260	5250–5270	20
54	5270	5250–5290	40
56	5280	5270–5290	20
58	5290	5250–5330	80
60	5300	5290–5310	20
62	5310	5290–5330	40
64	5320	5310–5330	20
68	5340	5330–5350	20
96	5480	5470–5490	20
100	5500	5490–5510	20

Table 12: 5 GHz channel to frequency map (continued)

Channel	Center frequency (MHz)	Frequency range (MHz)	Bandwidth (MHz)
102	5510	5490–5530	40
104	5520	5510–5530	20
106	5530	5490–5570	80
108	5540	5530–5550	20
110	5550	5530–5570	40
112	5560	5550–5570	20
114	5570	5490–5650	160
116	5580	5570–5590	20
118	5590	5570–5610	40
120	5600	5590–5610	20
122	5610	5570–5650	80
124	5620	5610–5630	20
126	5630	5610–5650	40
128	5640	5630–5650	20
132	5660	5650–5670	20
134	5670	5650–5690	40
136	5680	5670–5690	20
138	5690	5650–5730	80
140	5700	5690–5710	20
142	5710	5690–5730	40
144	5720	5710–5730	20
149	5745	5735–5755	20
151	5755	5735–5775	40
153	5765	5755–5775	20
155	5775	5735–5815	80
157	5785	5775–5795	20
159	5795	5775–5815	40
161	5805	5795–5815	20
165	5825	5815–5835	20

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