



Delivering meaningful innovations

Philips HeartStart MRx Monitor/Defibrillator for emergency care

PHILIPS

Driving the course of

More and more, EMS is driving the course of emergency care by enabling clinical decisions that determine where, when, and how your patients are treated in the field and once they reach the hospital. You are leading the way with the adoption of new technologies, such as CPR measurement and feedback tools and clinical decision support tools that help detect STEMI, as well as more sophisticated medical treatment such as hypothermia protocols. Your efforts are resulting in earlier recognition of conditions and trends, earlier use of therapeutic interventions, and earlier reporting and care in the receiving hospitals, all of which are revolutionizing patient preparation.

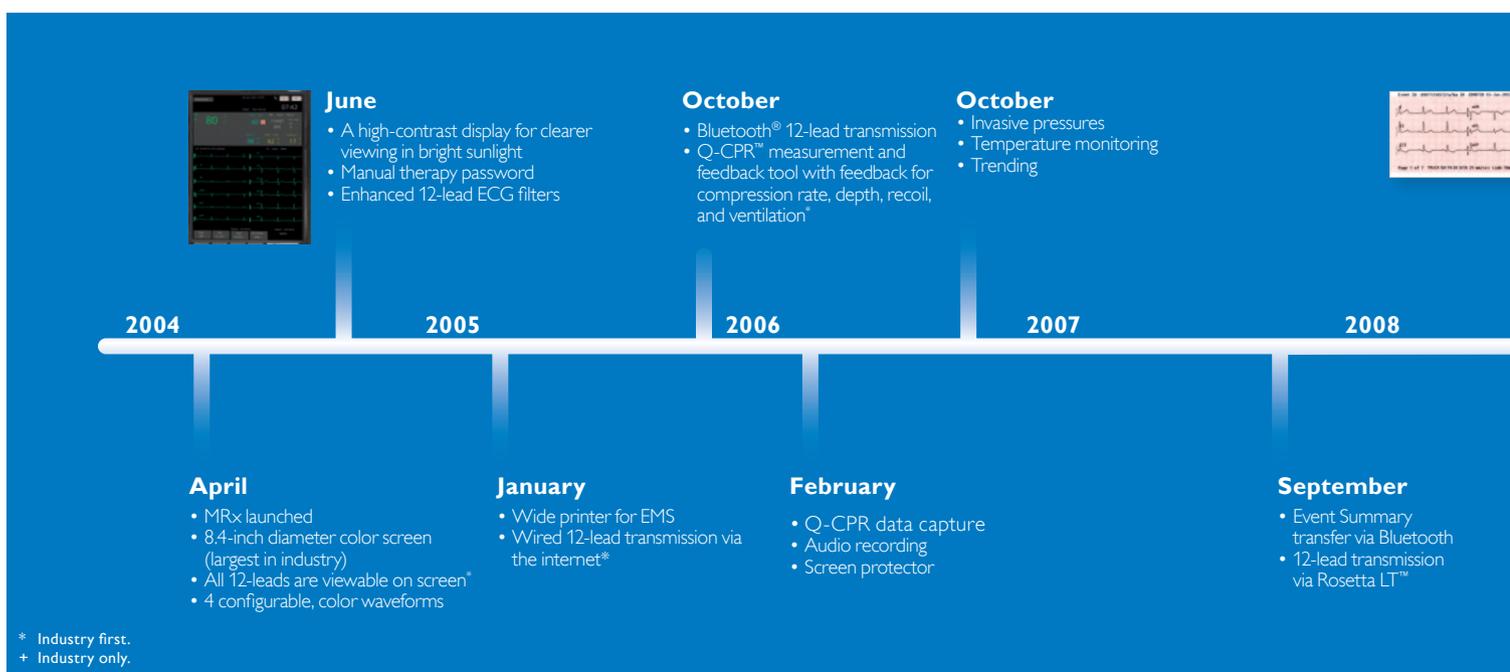
“When I first purchased the MRx monitors I knew I was getting a great piece of equipment. What I didn’t know is that Philips Healthcare would transition from a vendor to a partner in saving lives everyday. Philips has continually provided support and knowledge that put them first in class. Their willingness to work with organizations to accomplish a task is something I will always appreciate.”

Brian Rogers

EMS Training Officer, Henderson Fire Department

Chief Operating Officer/Principle, Community Ambulance

As your needs evolve, so does your MRx.



care

Leading the way with meaningful innovations

Philips is leading the way with meaningful innovations in emergency care that can help you quickly and effectively respond to your patients and influence their course of care as never before.

Built to be rugged, reliable, and easy-to-use, the Philips HeartStart MRx Monitor/Defibrillator with our advanced DXL 12-Lead ECG algorithm seamlessly provides:

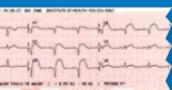
- Industry-leading patient monitoring capabilities
- Superb diagnostic measurements
- Robust and reliable STEMI clinical decision support tools
- Evidence-based, proven resuscitation therapies
- CPR guidance with the Q-CPR™ measurement and feedback tool
- Fast, seamless data transmission via Wi-Fi or cellular broadband

Our open systems approach to data management helps you streamline information so that it flows from your EMS agency to and throughout the hospital for enhanced patient care and operational efficiency.

A SMART investment

The HeartStart MRx is trusted by EMS agencies around the world. A key reason is investment protection. The MRx was built on a scalable platform from the start. As your needs evolve, so can your MRx. Once the MRx becomes part of your system, it can be easily upgraded in the field, giving you the benefits of Philips advancements while limiting additional cost or retraining.

Philips has a proven track record of listening to our customers and investing in innovations that result in valuable solutions designed specifically for your work environment to help enhance workflow and patient care.



May

- DXL 12-lead ECG algorithm
- ECG analysis statements on screen for printer independence
- ACI-TIPI and TPI

May

- Black carry bag designed to improve cable management and wear and tear
- Reinforced collar for therapy cable

August

- Enhanced Q-CPR, AHA and ERC Guidelines 2010 compatible
- Compliant vs non-compliant surface capability+
- Automatic lead switching+

2009

2010

2011

2012

2013



December

- Periodic clinical data transmission
- Batch LAN data transfer+
- 2nd generation Q-CPR

January

- One-second vitals recording
- Static IP address



March

- Tactical Grey color and enhanced user interface
- ECG signal enhancement
- Various software enhancements to help enhance patient care and workflow

May

- Enhanced data transmission via Wi-Fi or cellular broadband
- Acute MI sensitivity control

Built tough and ready



for action

For whatever situation you face in a day, the HeartStart MRx is built to be tough and ready for action. It is designed to meet stringent test requirements including spraying water, military helicopter vibration, mechanical shock, one-meter drop, electro-magnetic compatibility, and extreme environmental conditions (temperature, humidity, and altitude).

Rugged and reliable

Active ready-for-use visual indicator flashes to signal the device has power and is in good functioning order to monitor and deliver therapy.

18 hours of continuous ECG monitoring with two fully charged batteries.

Automatic lead switching to the next preferred lead when a lead falls off or is cut when in monitor or manual defibrillation mode, letting you focus on the patient, not the monitor.

Enhanced ECG performance with improved connection points, more robust cables, and rugged lead sets. The EMS lead sets also have labels that can be seen in low-light environments.

Seamless wireless data transmission of 12-lead ECGs, periodic clinical data, and event summaries over Wi-Fi or cellular broadband improves speed, reduces workflow complexity, and helps increase reliability.

Choice of color with the tactical grey color designed to show less dirt and wear and tear over time. The original white MRx is available.

Intuitive and easy to use

Intuitive design with therapy controls and connections on the right, monitoring on the left.

Easy-to-use interface with contrasting colors for sync button, printer button, and menu and soft keys around the monitor face make it easier to find what you need fast. The tactical grey MRx provides even greater contrast.

Large color display shows 4 waveforms and numerics, or view all 12 leads at once with the 12-lead acquisition option.

Normal or high-contrast view adjustable for light conditions.

Comprehensive automated hourly, daily, weekly self-test results are available on the display.

Flexible Event Summary print options allows configuration of the desired clinical data, including CO₂ waveform, in the Event Summary report.

Enhanced event markers offer the ability to enter the dose and unit of measure providing great flexibility in patient care.



Tough Enough for the US Army

The same MRx model we ship to all EMS customers is tough enough to receive an Airworthiness Certification from the United States Army. The MRx was subjected to extensive testing for the most rigorous and demanding environments faced by military personnel.

Clinical decision support

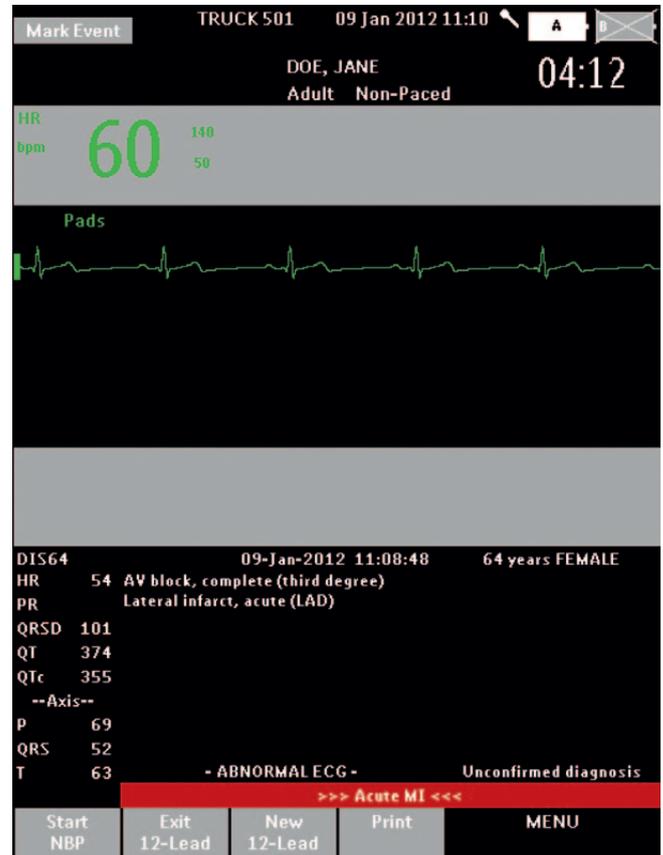
For Philips, clinical decision support means delivering actionable clinical intelligence that can have a real impact on patient care, workflow, and financial outcomes. Our smart clinical decision support solutions analyze, interpret, and present data in meaningful ways that provide valuable information about changes in a patient's status.

Only Philips has the advanced DXL 12-Lead ECG algorithm, which takes STEMI decision support to a new level by providing unique data views that enable confident decision-making to help speed triage.

- Pinpoints the **STEMI-Culprit Artery** most likely responsible for the acute symptoms, which can assist in directing care in the field and treatment in the Cath Lab.
- Generates **Critical Values** for four distinct life-threatening conditions – acute MI, acute ischemia, complete heart block, and very fast heart rate – that require immediate clinical attention. An enhancement of the DXL 12-Lead ECG algorithm makes it easy to lower the acute MI sensitivity, potentially reducing false positives.
- Provides **Gender-Specific Diagnostic Criteria** to enhance recognition and interpretation of cardiac symptoms in women.

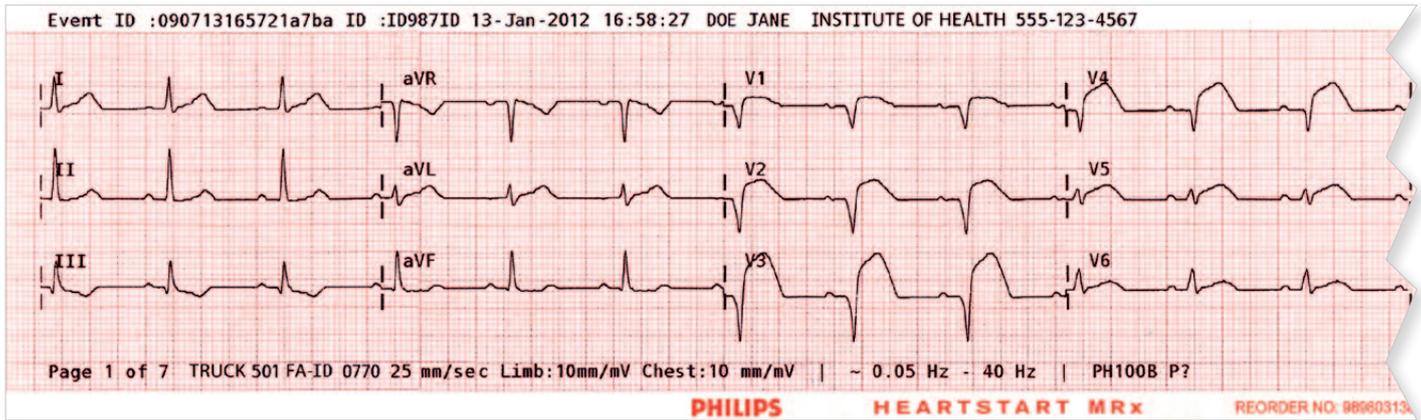
We also offer predictive instruments designed to help support confident decision-making.

- **Acute Cardiac Ischemia – Time Insensitive Predictive Instrument (ACI-TIPI)** uses the 12-lead ECG to provide a percentage score for predicted probability that the patient is experiencing acute ischemia.
- **Thrombolytic Predictive Instrument (TPI)** uses the 12-lead ECG to help predict patient outcome with and without thrombolytic therapy.

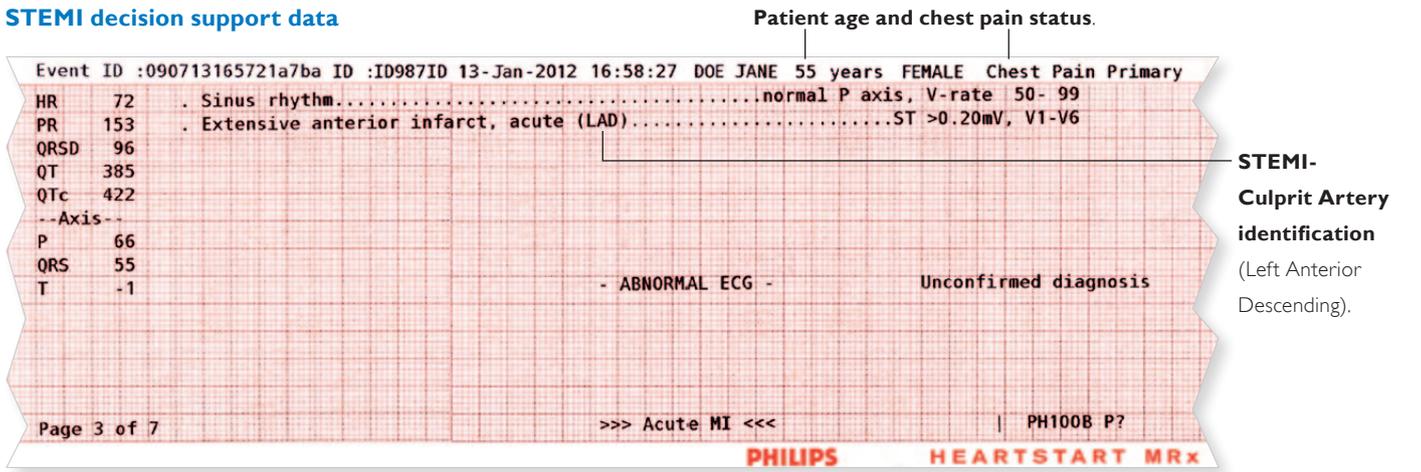


Pinpoint the STEMI-Culprit Artery most likely responsible for the patient's acute symptoms, which can assist in directing care in the field and treatment in the Cath Lab.

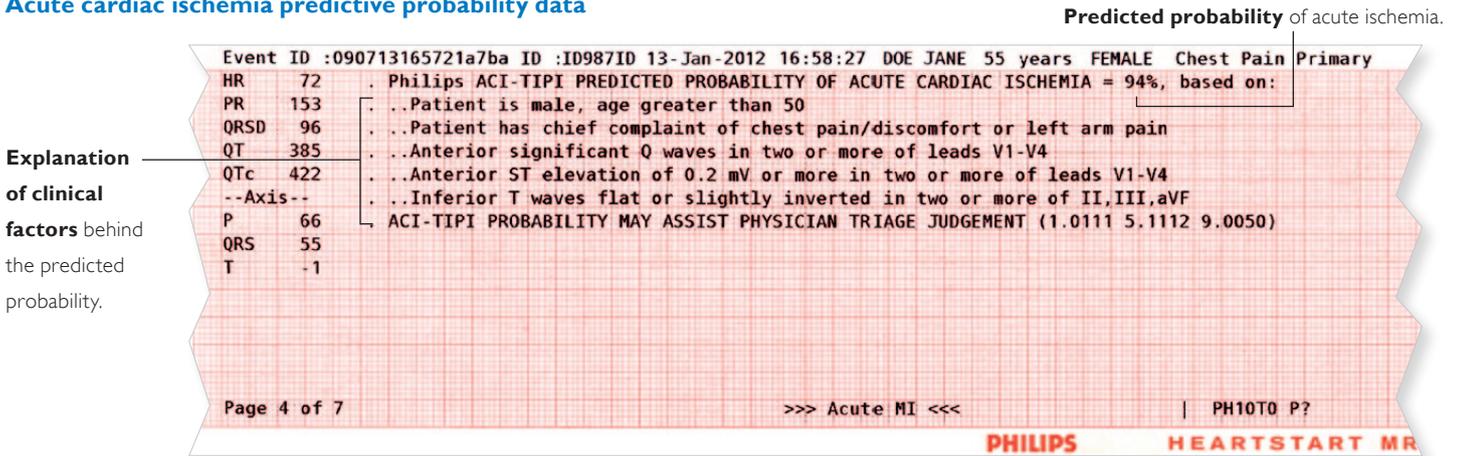
12-lead ECG strip



STEMI decision support data



Acute cardiac ischemia predictive probability data



Enhanced resuscitation

Philips continues to be a leader in developing meaningful innovations in resuscitation therapy, including the first biphasic waveform for an external defibrillator. Our evidence-based, proven resuscitation therapies are designed to work together to help you give sudden cardiac arrest (SCA) patients the best chance of surviving and returning to active living.

- **SMART Biphasic** therapy has been rigorously studied and is supported by substantial peer-reviewed, published data. It has been clinically proven to deliver high first shock efficacy for long-downtime SCA patients, as well as to effectively defibrillate across the full spectrum of patients, including those considered “difficult-to-treat.”¹⁻⁵
- **Q-CPR** measurement and feedback tool is supported by more published data than any other CPR quality improvement tool. It has been demonstrated to improve CPR delivery and patient outcomes.⁶
- **Quick Shock** enables fast time to shock. Delivering a shock quickly after chest compressions is critical as the benefits of CPR – oxygenated blood delivered to the vital organs – dissipate in seconds.^{7,8}
- **Core temperature monitoring and trending** to support cooling protocols.
- **Noninvasive Pacing** using either demand or fixed mode. Supports protocols for demand mode only or, if configured, switches to fixed mode in the event a lead is lost, which allows the patient to be continuously paced.

“Q-CPR has been an important part of our success in improving survival from cardiac arrest in the City of Pittsburgh.”

Ronald V. Romano

Division Chief

City of Pittsburgh Emergency Medical Services



therapies

Q-CPR: CPR quality improvement tool

Philips Q-CPR is supported by more published research than any other CPR quality improvement tool and is available as a fully integrated option with the HeartStart MRx.

The Q-CPR meter delivers instant audiovisual feedback so that every compression meets depth and rate, complete chest recoil, hands-off time, and ventilation rate to help improve the patient's chance of survival and increase the opportunity for a complete neurological recovery.

Q-CPR supports AHA/ERC 2010 CPR Guidelines. The HeartStart MRx can be configured to display either the AHA or ERC protocol for depth and rate.

Q-CPR at a glance

Ventilation rate	Yes
Ventilation feedback from bag valve mask (BVM) or intubation	Philips exclusive
Displays 2-minute progress bar	Philips exclusive
Chest compression depth – too shallow	Yes
Chest compression rate high	Philips exclusive
Chest compression rate low	Yes
Complete chest recoil	Yes
“Hands-off” time – provides audio feedback after 15 seconds if no compression activity	Yes
Compliant vs. non-compliant surface capability	Philips exclusive

CPR timer and compression counter:

Ventilation guidance:

Real-time feedback directly on monitor:

Delivering accurate compression depth on a compliant surface.



Q-CPR offers protocol management and enhanced visual feedback in code view or AED mode.

Turn voice prompts ON or OFF depending on your system's protocol.



Good compressions



Release pressure between compressions



Compress deeper



Compress slower

Data management

Our goal is operational efficiency, allowing you to focus more on patient care and less on moving data during treatment and transport. We do this through our open data management approach, which means timely transmission of data, interoperability with virtually any ePCR software to streamline information flow, and quality debriefing to help you and your medics continuously improve your emergency response services.

With Philips, you have many options to help enhance your operation:

- Whatever your workflow...print, display, fax, email, Wi-Fi, cellular broadband, Bluetooth, or Ethernet...we can accommodate it.
- Flexible, fast, and reliable solutions provide data to the intended recipients.
- The Wireless Link transmits 12-lead ECGs, periodic clinical data, and event summaries via Wi-Fi or cellular broadband much faster than Bluetooth, with increased reliability and fewer buttons to push.
- Reliable and trackable automated download and delivery solutions mean no files or data are left behind and medic involvement in administrative tasks is reduced so you can focus on more important activities.
- Move data at LAN speed, which enables rapid downloads and faster device return-to-service times.
- Automatic time setting when all events are transferred ensures the HeartStart MRx is in sync with the system of record from “911 call” to “device on.”

Collaborate with hospital care teams by providing critical patient data en route using Periodic Clinical Data Transmission

- Communicate/collaborate on critical care patients – stroke, trauma, respiratory, pediatric, cardiac – to help hospital care teams better prepare for arrival.
- Press “start data transmit” to automatically document critical events and vitals en route.
- Using the Wireless Link, transmit data seamlessly at fast speeds via Wi-Fi or cellular broadband without any further user interaction — so you can focus on your patients.
- Uses same low-cost infrastructure as 12-lead transmission.

Capture and store the entire code, including Q-CPR data, with HeartStart Event Review Pro to help your team reach its full potential

- A breakthrough application for post-event review that provides a robust, insightful view of a resuscitation event.
- Built-in, easy-to-use navigation to pinpoint areas in specific patient’s code event to reinforce effective techniques and motivate change where needed.



Wireless Link lets you transmit 12-lead ECGs, periodic clinical data, and event summaries via Wi-Fi or cellular broadband (2G /3G). Powered by your MRx, this small, lightweight device stores easily in the back or side pouch of your carrying case, and delivers a seamless data transmission experience that’s faster than Bluetooth with fewer buttons to push.

MRx basic specifications and optional features

Physical	
Dimensions	Without external paddles: 12.4" (W) x 8.3" (D) x 11.7" (H) (313 mm x 210 mm x 295 mm). With external paddles: 13.4" (W) x 8.3" (D) x 13.6" (H) (340 mm x 210 mm x 345 mm).
Weight	13.2 lbs. (6 kg): base unit with 1 battery, pads, and pads cable. Carrying case adds 4.1 lbs. (1.86 kg). Paddle tray and external standard paddles add less than 2.5 lbs. (1.1 kg).
Environmental	
Water Resistance	Meets IEC 60601-2-4
Solids Resistance	Solids/Water Resistance – IP24
Temperature	Operating: 32° - 113° F (0° - 45° C) Storage: -4° - 158° F (-20° - 70° C)
Humidity	Operating: 0% to 95% relative
Safety	Meets EN 60601-1, UL 2601-1, CSA C22.2 No. 601-1-M90 CSA, EN 60601-2-4
Display	
Dimensions	8.4" diagonal (128 mm x 171 mm)
Type	TFT color LCD
Resolution	640 x 480 pixels (VGA)
Wave Viewing Time	5 seconds (ECG)
Defibrillator	
Model	HeartStart MRx (M3536A)
Waveform	Biphasic Truncated Exponential. Waveform parameters adjusted as a function of patient impedance.
Output Energy	Manual (selected): 1-10, 15, 20, 30, 50, 70, 100, 120, 150, 170, 200 Joules maximum energy, limited to 50 Joules for internal defibrillation. AED Mode (single energy output): 150 Joules into a 50 ohm load.
Charge Time	Less than 5 seconds to 200 Joules with a new, fully charged lithium ion battery at 25° C
Shock Delivery	Via multifunction defib electrode pads or paddles
Quick Shock	Less than 10 seconds from cessation of CPR to shock delivery
Patient Impedance Range	Minimum: 15 ohm (internal defibrillation); 25 ohm (external defibrillation) Maximum: 180 ohm
AED Mode	Shock advisory sensitivity and specificity meet AAMI DF-39 guidelines
Strip chart printer	
Printer	Standard: 50mm (paper width) thermal array printer Optional: 75mm (paper width) thermal array printer
Continuous ECG Strip	Prints primary ECG lead with event annotations and measurements in real-time or with 10-second delay
Auto Printing	Printer can be configured to print marked events, charge, shock, and alarms
Reports	Event Summary, 12-lead, Vital Signs Trending, Operational Check, Configuration, Status Log, and Device Information
Paper Size	1.97" (W) x 100 ft. (L) (50 mm x 30 m) 2.95" (W) x 100 ft. (L) (75 mm x 30 m)

Battery	
Type	6.0 Ah, 14.8 V, rechargeable lithium ion
Dimensions	6.5" (H) x 3.8" (W) x 1.6" (D) (165 mm x 95mm x 42mm)
Weight	1.6 lb. (0.73 kg)
Charge Time	Approximately 3 hours to 100%, 2 hours to 80%
Capacity	<ul style="list-style-type: none"> Shocks: At least 50 200J charge/shocks or disarm cycles* Monitoring only: 9 hours of continuous ECG monitoring Monitoring and Shocks: At least 5 hours of monitoring ECG, SpO₂, CO₂, temperature, and 2 invasive pressures monitored continuously, NBP measured every 15 minutes, and 20 200J discharges* Monitoring and Pacing: At least 3.5 hours while pacing at 180ppm at 160mA and monitoring as described above
Battery Indicators	Battery gauge on battery, capacity indicator on display; flashing RFU indicator, chirp, and 'Low Battery' message appears on display for low battery condition, when 10 minutes of monitoring time and 6 maximum energy discharges remain (with a new battery at room temperature, 25° C)
Data storage	
Internal	12 hours of continuous ECG waveforms and events, maximum capacity of 55 event summaries
Data Card	60 event summary reports or 240 megabytes of patient data
ECG and arrhythmia monitoring	
Input	Up to 4 ECG waves displayed and up to 2 ECG waves print simultaneously. Lead I, II, or III obtained through 3-lead ECG cable and separate monitoring electrodes. With 5-lead cable, obtain leads aVR, aVL, aVF, or V. Pads ECG obtained through 2 multifunction defibrillation electrode pads.
Lead & Pads Fault	Automatically switches to a valid ECG source in wave sector 1 if existing signal becomes unavailable in Monitor or Manual Defibrillation Mode for software versions R.02 or above.
Heart Rate Display	Digital readout on display 15 to 300bpm, accuracy ±10%
Heart Rate/Arrhythmia Alarms	HR, Asystole, VFIB/VTACH, VTACH, extreme tachycardia, extreme bradycardia, PVC rate, Pacer not capture, Pacer not pacing
ECG Size	2.5, 5, 10, 20, 40 mm/mV, autogain
Available options	
Noninvasive pacing	SpO ₂ pulse oximetry
Noninvasive blood pressure	CO ₂ monitoring
Invasive blood pressure (2 lines)	Continuous temperature monitoring
12-lead acquisition	12-lead transmission
Q-CPR measurement and feedback	Audio recording
ACI-TIPI & TPI predictive instruments	Periodic clinical data transmission
Batch LAN data transfer	HeartStart MRx is available in Tactical Grey or White

*With a new fully-charged battery at room temperature, 25° C.

For detailed specifications see the HeartStart MRx product description document. Application notes are also available to describe the advanced features of the HeartStart MRx.

**Philips Healthcare is part of
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*This program is valid only in the U.S.A.

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