



# SCOPE Biphasic

## History

Originally, external defibrillators have used monophasic waveforms and were not designed to compensate for patient impedance. Instead, the devices had selectable energy levels, and a physician would provide a treatment based on the particular patient. The physician could increase the energy level if defibrillation was not initially successful. The monophasic waveforms required energy levels up to 360 Joules to defibrillate effectively.

Biphasic waveforms were initially developed for use in implantable defibrillators and have since become the standard in public access defibrillators. Biphasic waveform technology allows the waveform to be adapted for different patient impedances. Importantly, many studies have shown that biphasic waveforms defibrillate successfully at lower energies.

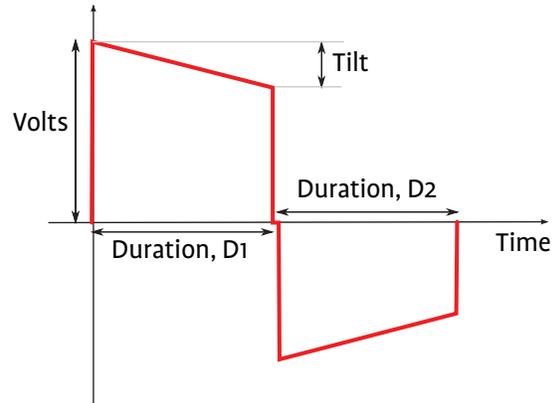
However, not all biphasic waveforms are equally effective.<sup>1</sup>

## SCOPE™ Waveform

SCOPE (Self Compensating Output Pulse Envelope) is HeartSine's proprietary biphasic waveform.

To account for different patient impedances, the biphasic wave shape is generally modified.

For any particular energy level there are three primary variables for the wave shape: voltage, tilt, and the duration of each phase.



Different manufacturers have adopted different strategies for biphasic waveforms and will adjust one or more of the main variables to compensate for patient impedance.

Waveform	D1	D2	Voltage	Tilt
HeartSine SCOPE™	Variable	Variable	Variable	Variable
Philips SMART	Variable	Variable	Fixed	Variable
Cardiac Science STAR	Variable	Fixed	Variable	Variable
Zoll RBW	Fixed	Fixed	Variable	n/a
Physio-Control	Variable	Variable	Limited	Variable

The HeartSine SCOPE waveform adjusts all four variables for all impedances in the operating range in conjunction with an escalating energy protocol to optimize the efficacy of the samaritan PAD. The HeartSine SCOPE waveform is a low energy waveform, reducing the likelihood of myocardial dysfunction.

### Impedance Range

Since the biphasic waveforms are adapted for varying patient impedance, then it is clear that the range of patient impedance over which the device operates is also very significant.

The table below shows the range of operating impedances for a number of manufacturers of AEDs.

Waveform	Min. Impedance	Max. Impedance
HeartSine SCOPE	25 ohms	230 ohms
Philips SMART	25 ohms	180 ohms
Cardiac Science STAR	25 ohms	180 ohms
Zoll RBW	25 ohms	175 ohms
Physio-Control	25 ohms	200 ohms

Please note that if the patient impedance is in excess of the maximum, the device will NOT deliver a shock.

### HeartSine Technology Advantage

Innovation in technology drives HeartSine in the design, development and manufacture of Automated External Defibrillators (AED).

The company's pedigree dates back over 50 years to the development of the world's first out-of-hospital defibrillator in the 1960s. Since then, HeartSine technologists have been at the forefront of placing life-saving technology in the hands of users of all skill levels.

At HeartSine our technology changes lives. And saves lives.

### It's Lifesaving, Pure and Simple.

### References

1. Efficacy of distinct energy delivery protocols comparing two biphasic defibrillators for cardiac arrest. Simon J Walsh, MB, BCh, Anthony J.J McClelland, MB, BChir, Colum G Owens, MB, BCh, James Allen, PhD, John McC Anderson, DPhil, Colin Turner, PhD, A.A.Jennifer Adgey, MD.

All company information used as published in literature and on web sites.

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The products described in this brochure all meet the applicable European Medical Directive requirements.

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