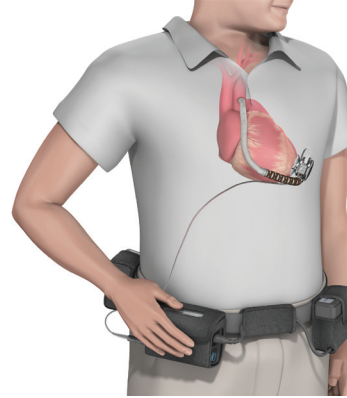
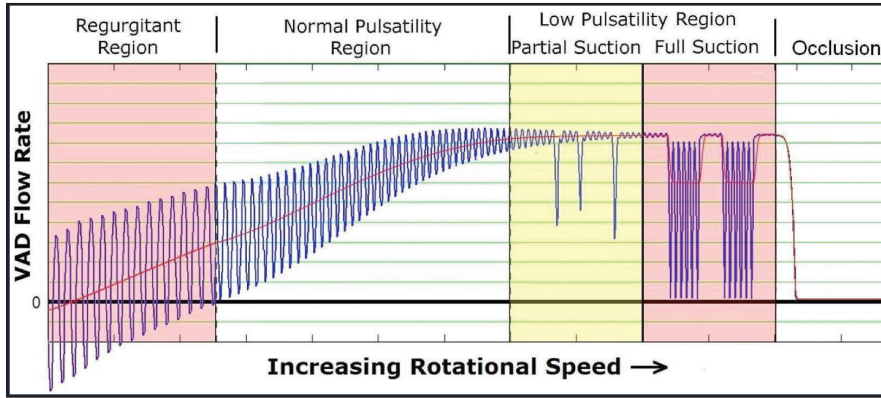


# The HeartWare® Ventricular Assist System

## Training Overview

### Flow Waveform Characteristics



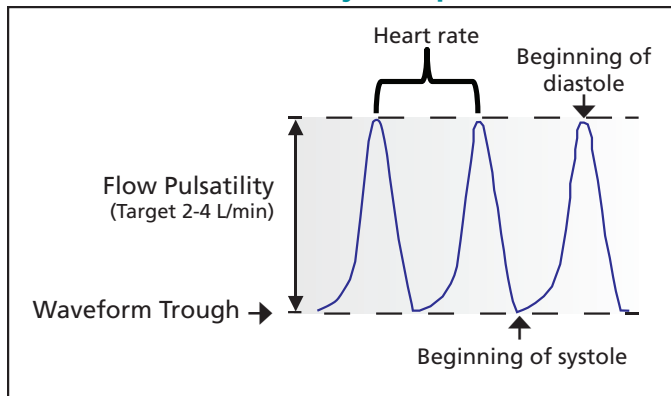
### EMERGENCY PROCEDURES

- Patients may be defibrillated without disconnecting the pump
- Anti-arrhythmic drugs, pacemakers, and ICDs are compatible with the HeartWare System
- Institute appropriate ACLS protocols
- If chest compressions have been administered, confirm function and positioning of pump

### HVAD® Pump Operating Guidelines

SPEED (RPM)	2400 - 3200
POWER (Watts)	3.0 - 7.0
FLOW (L/min)	3.5 - 7.0

### Flow Pulsatility Components



### Setting the HVAD® Pump Alarm Limits


- ▶ Set High Power alarm at 2 Watts above the average power
- ▶ Set Low Flow alarm at 2 L/min below average flow, but no lower than 2 L/min
- ▶ Enable Suction Response alarm once patient is stable

### Alarm Guide

Alarm Type	Alarm Display (line 1)	Action (line 2)
	no message*	no message*
	VAD Stopped	Connect Driveline
	VAD Stopped	Change Controller
	Critical Battery 1	Replace Battery 1
	Critical Battery 2	Replace Battery 2
	Controller Failed	Change Controller
	Controller Fault	Call
	Controller Fault	Call: ALARMS OFF
	High Watts	Call
	Electrical Fault	Call
	Low Flow	Call
	Suction	Call
	Low Battery 1	Replace Battery 1
	Low Battery 2	Replace Battery 2
	Power Disconnect	Reconnect Power 1
	Power Disconnect	Reconnect Power 2


\*When both power sources are removed, NO message will display on the controller. The "No Power" alarm (loud and continuous) will sound but the alarm indicator WILL NOT light. The pump has stopped. Immediately connect two power sources and confirm that the pump has restarted.

# HeartWare® Ventricular Assist System Components




**HVAD® Pump**

- Continuous flow VAD
- Weight = 160g
- Device design allows for pericardial placement, eliminating the need for abdominal surgery and device pockets
- Provides up to 10 L/min blood flow




**Impeller**

- Magnetically and hydrodynamically suspended
- Wide-bladed




**Driveline**

- Percutaneously connects the HVAD pump to an external controller
- Constructed with conductor wires similar to those used in pacemakers




**HeartWare® Controller**

- Provides feedback on pump operation through text, lights and sounds
- Requires 2 power sources at all times
- Contains an internal battery to run an audible “No Power” alarm




**HeartWare® Battery**

- Lithium Ion battery used to power the pump
- Each battery provides 4-6 hours of operation when fully charged



**Driveline Cover**

- Protects the pump and controller from static electricity



**Alarm Adapter**

- Silences the “No Power” alarm when power is removed from a controller no longer in use

**Notes**

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**HeartWare® Monitor**

- Used by clinicians only to set and change pump parameters
- Touch screen tablet PC
- Displays adjustable real-time and historical pump information and alarm conditions




**HeartWare® Controller AC Adapter**

- Uses power from an electrical wall outlet to power the controller




**HeartWare® Controller DC Adapter**

- Uses power from an electrical outlet in an automobile to power the controller




**HeartWare® Battery Charger**

- Charges and tests up to 4 batteries simultaneously



**Patient Pack**

- Designed to support an ambulatory lifestyle
- Patient worn controller and batteries weigh approx. 3.5 pounds (1.59 kg)



**HeartWare® Shower Bag**

- Designed to allow patients to shower with clinician approval
- Protects the controller and batteries from direct water spray and moisture

**24-Hour Clinical Support**

<p>Austria: 0800-296-574</p> <p>Denmark: 808-865-69</p> <p>France: 0800-91-6817</p>	<p>Germany: 0800-181-8743</p> <p>Israel: 180-931-5751</p> <p>Italy: 800-875-063</p>	<p>Norway: 800-16825</p> <p>Poland: 0800-141-0046</p> <p>Sweden: 020-790855</p>	<p>Switzerland: 0800-838-762</p> <p>United Kingdom: 0808-234-9223</p> <p>United States: (888) 332-6596</p>
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