

McHenry Western Lake County EMS System

VOLUME 1, ISSUE 3

NOVEMBER 2021

Why Don't I feel a Pulse? Oh Yeah, VAD

Ventricular assist devices or VADs, are devices designed to assist the heart in the presence of advanced heart failure. They can be used as a bridge to heart transplant or as a destination therapy. VADs can be implanted in the left ventricle (LVAD), but can also be placed in the right ventricle (RVAD) or both ventricles (BiVAD), although the last two are not as common. Patient care, for the most part, remains the same however if there are problems with the device contact the VAD Coordinator as soon as possible.

They will be the best resource for caring for these patients in the pre-hospital setting.

Ventricular Assist Device (VAD)

Purpose: Improve survival and minimize morbidity in patients with end stage heart failure (HF).

The current generation of VADs have a number of components in common: an inflow cannula is inserted in the right or left ventricular apex that drains blood from the ventricle to the pump; an electrically actuated continuous-flow (CF) pump with a single rotating impeller suspended within a tube propels blood forward by spinning at high speeds; and an outflow cannula carries blood back to the arterial circulation, typically by way of the ascending aorta.

The power supply for the VAD is a percutaneous lead that traverses the skin and connects the external power system with the internal pump. The external components generally consist of a power source (i.e., batteries or an alternating current power unit) and a small portable controller that controls pump speed and monitors device function.

1. **CALL VAD Coordinator listed on patient information sheet for instructions**
EMS personnel are authorized to follow directions of the VAD Coordinator
2. **Patient may or may not have a peripheral pulse or normal BP at any time;** SpO₂ registers if perfusion is present
3. **Evaluate perfusion based on mental status, skin signs**
4. **CHEST COMPRESSIONS ARE ALLOWED if patient is unconscious and non-breathing.- see below.**
Follow all other BLS and ALS protocols.
5. Patients with VADs may tolerate sustained ventricular arrhythmias with minimal hemodynamic instability because the VAD maintains cardiac output during arrhythmic events. Patient may be defibrillated, as necessary for V-fib with loss of consciousness, without disconnecting the pump.
6. Do not defibrillate over the pump; defibrillate at nipple line or above. Anterior-posterior pad placement preferred.
7. ECG waveforms may have a lot of artifact due to the device.
8. Patients will often have pacemakers and/or Internal Cardioverter Devices (ICDs).
9. Waveforms may be flat; without amplitude in spite of accurate readings – i.e. pulse ox.
10. Patient should have a binder with record of daily VAD parameters.
11. Patients will be on anticoagulation medications and are at risk for thromboembolic events.
12. **Never remove both sources of power (batteries) at the same time!**

INSIDE THIS ISSUE:

Why don't I feel a pulse?	1
Parts of an VAD	1
Common VADs	2
Jarvik Pump	3
Total Artificial Heart	3
CE Credit	4

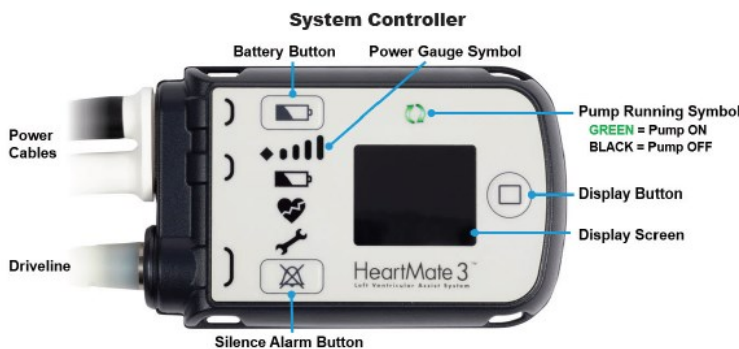
Parts of an VAD

VADs consist of Four Parts:

- 1) **Pump**– A small tube or device that connects the left ventricle to the great vessels to allow blood flow
- 2) **Power Cord**– This is the cord seen exiting the patient abdomen. Sometimes called the “driveline”, it is the connection from the pump to the controller and power source
- 3) **Controller**– This is the LVAD brain. It tells the pump to do its thing based on parameters set by the Physician and LVAD Coordinator
- 4) **Power Source**- This is what it is, power. Most common units consist of 2 batteries

HeartMate II

Pulse: Likely NO
 CPR: Yes
 Defibrillate: Yes
 Pacing: Yes
 Minimum MAP: 70-90mmHg



HeartMate 3

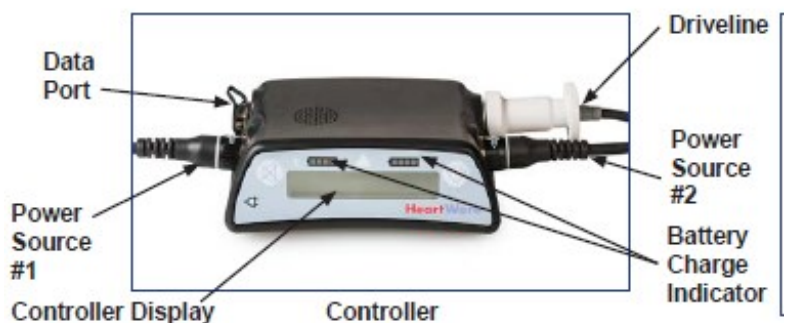
Pulse: Likely NO
 CPR: Yes
 Defibrillate: Yes
 Pacing: Yes
 Minimum BP: 70-90mmHg

All Three of these devices can receive all ACLS medications

CPR increases risk of dislodgement. Monitor to ensure LVAD is functional.

HeartWare HVAD— No longer being implanted due to malfunction But some patients may still have one implanted

Pulse: Likely NO
 CPR: Yes
 Defibrillate: Yes
 Pacing: Yes
 Minimum MAP: >85mmHg



Clinical Trial
Advocate Christ Hospital

Jarvik 2000



FlowMaker® Controller.

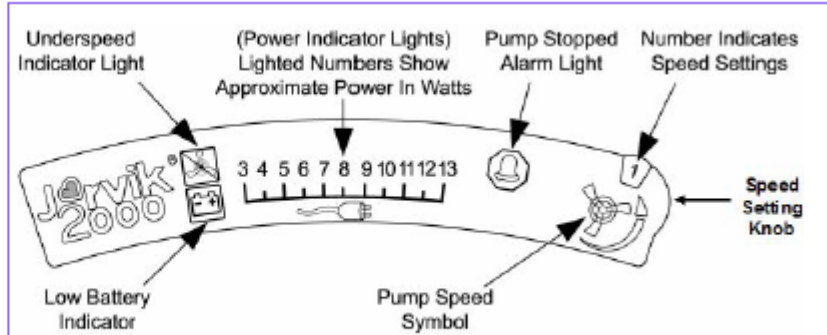


Diagram of FlowMaker® Controller Top Panel.

Pulse: Faint pulse in most patients
CPR: Yes
Defibrillate: Yes
Pacing: Yes
Minimum MAP: 65-80mmHg

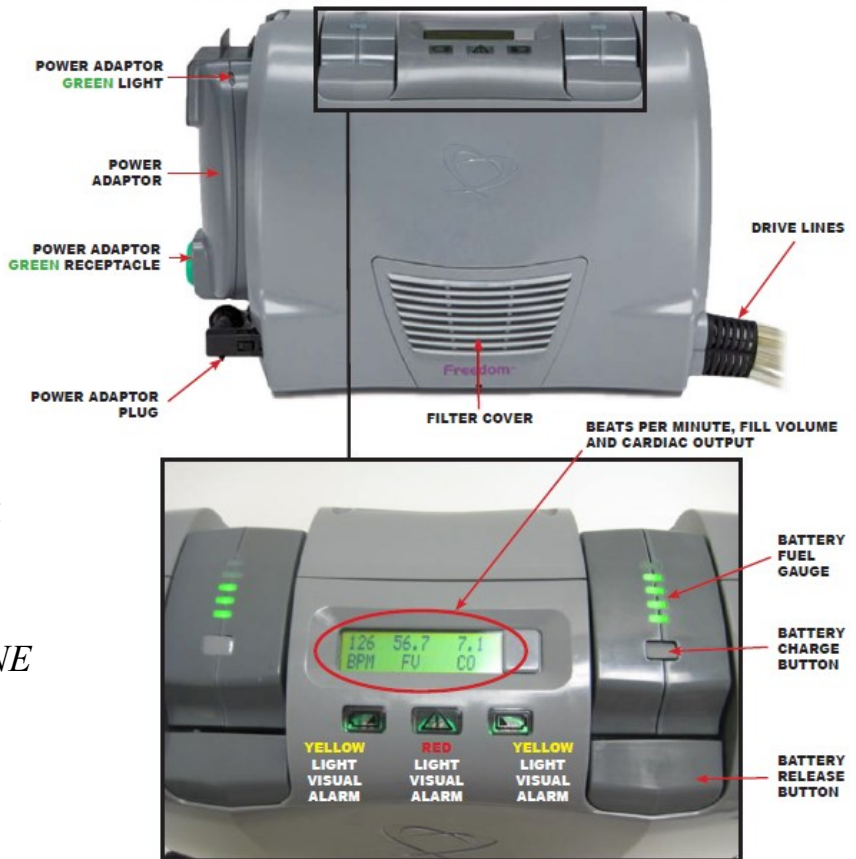
Total Artificial Heart
Freedom Driver

Pulse: Positive Pulse
CPR: No
Defibrillate: No— native rhythm is Asystole
Pacing: No
Average BP 100-130/60-90 mmHg

NO VASOPRESSORS
ESPECIALLY EPINEPHRINE

- Implant Centers:**
Lurie Children's Hospital
Advocate Christ Hospital
University of Chicago
Froedtert Hospital
Children's Hospital of WI

This Patient is on an ARTIFICIAL HEART
(not a left ventricular assist device -LVAD)



Freedom™ Driver System

Name: _____ Dept: _____ Email: _____

VAD : CE Credit

Decode the message.

**Each letter in the phrase has been replaced with a random number.
Try to decode the message.**

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
20				16																					

A A A E A
 6 7 6 20 18 20 10 6 2 22 2 26 2 20 18 21 16 20 10 6
 E A A E E
 11 16 24 6 10 2 26 14 18 20 10 20 1 1 2 1 6 4 16 11 2 28 16
 E A E A
 4 16 1 6 2 24 20 6 2 7 24 6 21 16 10 20 8 15
 E A A E
 21 16 20 10 6 12 20 6 16
 E
 26 7 24 6 10 7 18 18 16 10
 E E
 4 10 2 11 16 18 2 24 16
 A E
 5 20 6 6 16 10 15
 A
 25 20 10 11 2 3

McHenry Western Lake County EMS System
 McHenry Hospital
 4201 Medical Center Drive
 McHenry, IL 60050
 Phone: 815/759-8044
 Fax: 815/759-805



Prior to transport ensure all equipment is brought with:

- LVAD “Go” Bag (Back up controller, batteries, documents, etc.)
 - Extra Batteries (fully charged)
- Battery Charger Power Supply (Wall Charger)
- Connection Cables Portable Power Supply

For more in-depth VAD Information:
[EMS Guide - Full Document \(mylvad.com\)](http://mylvad.com)
 (Also used as reference for this newsletter)

Continuing Education Hours: Each completed newsletter will earn the provider 0.25 hours of continuing education

*For CE Credit, Please scan your quiz to Cindy Tabert by email to cynthia.tabert@nm.org.
 If you are **NOT** a provider within of the McHenry Western Lake County EMS System, please include your mailing address. You may submit by email or via mail to: Northwestern Medicine – McHenry Hospital EMS, 4201 Medical Center Drive, McHenry, Illinois 60050.
 We will forward verification of your continuing education hours to your home address.*