

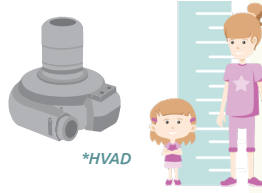
HVAD™ System vs. HeartMate 3™ LVAD



Many patients are still supported with the HVAD™ System. Review the differences between the two to keep your patients safe.

HVAD™ System*

- Volume displaced = 50 cc
- Inflow length = 32.3 mm
- Outflow graft = 10 mm
- Device settings **not stored** in pump



HeartMate 3™ LVAD*

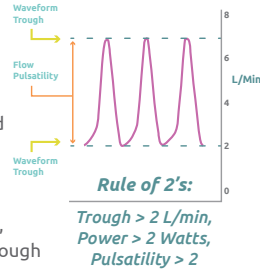
- Volume displaced = 80 cc
- Inflow length = 22 mm
- Outflow graft = 14 mm
- Device settings **stored** in pump



Waveforms

Pump waveforms are used in real-time to determine the amount of work the native heart is doing compared to the pump.

- **Trough:** During diastole, decreased blood going through the pump
- **Peak:** During systole, increased blood moving through the pump
- **Pulsatility:** Waveform's amplitude, or the peak subtracted from the trough



Pulsatility Index (PI)

PI is a calculated value indicating the amount of work the native heart is doing compared to the pump.

Typical range: 3–5 (Providers follow PI trends)

- **PI Events:** Occur when PI decreases by >45%. The pump decreases RPMs to the lower speed limit. These events could be from a suction event or patient movement. There is no alarm for PI events.

$$\frac{\text{Power}_{MAX} - \text{Power}_{MIN}}{\text{Power}_{AVG}} = PI$$

**Think of Power as Flow*



Patient Care

Anticoagulation*

Heparin Bridge
• both devices

Coumadin
• both devices
• INR goal: 2–3

Aspirin
• HVAD: ASA 325 mg
• HM3: ASA 81 mg

*Above recommendations are per the IFU, but some centers modify the drug type and/or dose.

Blood Pressure

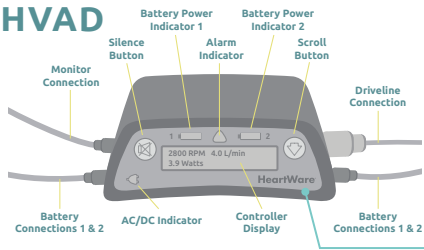
Doppler blood pressure is recommended.

HVAD
• Keep MAP <85 mmHg
• **Lavare Cycle** washes pump 1x/min

HM3
• Goals determined by VAD care team
• Doppler blood pressure may reflect either a SBP or MAP
• **Pulse mode** washes pump 30x/min, and can be seen easily on the arterial line

	Hypovolemia	Hypertension	Inflow Obstruction	Right Heart Failure	Native Heart Contractility
HVAD™ System	↓ Pulsatility	↑ Pulsatility	↓ Pulsatility	↓ Pulsatility	↑ Pulsatility
HeartMate 3™ LVAD	↓ / ↑ PI	↑ PI	↓ PI	↑ PI	↑ PI

HVAD

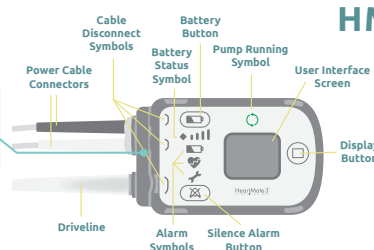


System Controllers

HM3 has a battery backup in the system controller lasting for 15 min if other power is disconnected.

HVAD does not have a battery backup in the controller. If power is disconnected the pump stops.

HM3



Requires **two** power sources* at all times.
Power source combinations include:

- **2 Batteries:** 2 batteries last 12–14 hours. Recharge time: 4–5 hours
- **1 Battery + AC Adapter**
- **1 Battery + DC Adapter**

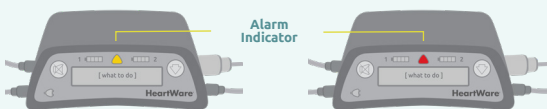
*If battery power is disconnected, the device will turn off

Requires **one** of the following power sources:

- **Batteries/Clips:** 2 batteries last 10–17 hours. Recharge time: 4 hours
- **Power Module:** Connects to System Controller through Power Cable Connectors
- **Mobile Power Unit (MPU):** Connects to System Controller through Power Cable Connectors

Power Sources

HVAD



Alarms

Alarm indicator (examples below)

- Solid Yellow (low alarms)**
 - low battery
 - battery disconnect
- Flashing Yellow (medium alarms)**
 - low flow
 - suction
 - high watts
 - controller fault
- Flashing Red (high alarms)**
 - driveline disconnect
 - power disconnect
 - critical low battery 1 or 2
 - controller failure

HM3



Alarm indicator (examples below)

- Advisory (important)**
 - low battery
 - controller fault
- Hazard (life threatening)**
 - VAD has stopped
 - low flow
 - driveline is disconnected

Differences in Alarms

Low Flow Alarms

- **HVAD:** has low flow limit of 1.0 L/min
- **HM3:** has low flow limit of 2.5 L/min or 2 L/min if changed by industry clinical support

Suction Alarms

- **HVAD:** has a flashing yellow alarm for suction
- **HM3:** does not have suction alarm. PI events do not alarm (*not all PI events are due to suction*)