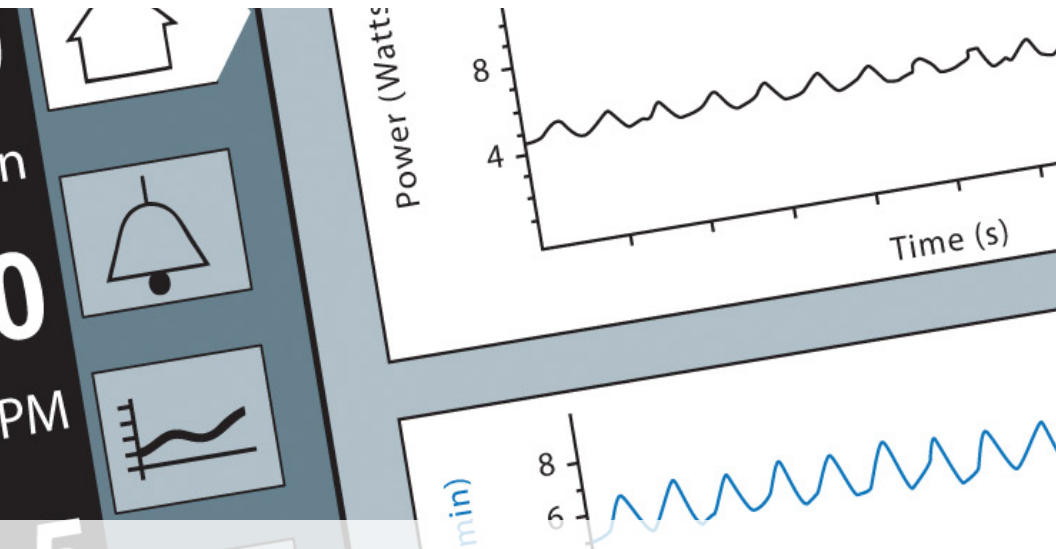


Waveforms

INTRODUCTION TO THE HEARTWARE® WAVEFORM IPAD APP



HeartWare®

www.heartware.com

hVAD[®] System



Welcome

Did you ever wonder how you can use the HeartWare[®] System waveforms? Use this app to find out.

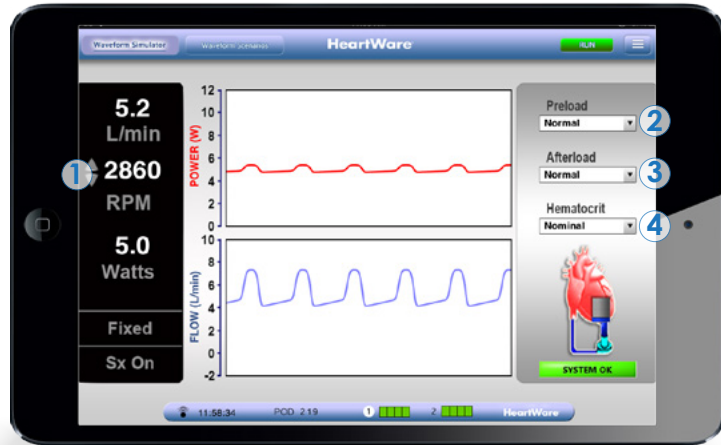
The HeartWare Waveform App will help you learn about typical waveform characteristics and discover how waveforms can help with advanced pump management and troubleshooting. Whether you use the app to practice on your own, teach new members of your VAD team, or bring in your HeartWare representatives to share their expertise, download the app to an iPad and get started today.

See the back for download instructions.

Waveform Simulator

Use this section to change settings and see how the waveform might respond. Touch **Run** and then:

1. Increase or Decrease Speed
2. Increase or Decrease Preload
3. Increase or Decrease Afterload
4. Increase or Decrease Hematocrit (related to a change in the blood's viscosity)

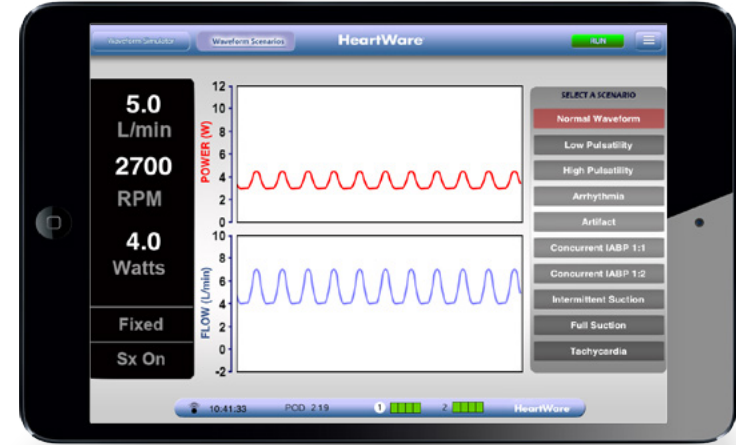


- How do the waveform amplitude and average flow change after each adjustment?
- What are some possible clinical scenarios that could have led to these changes?

Waveform Scenarios

Use this section to see how patient scenarios might appear on the HeartWare® Monitor.

Look through the examples on the next few pages and learn how the waveform on the monitor might relate to a patient's clinical condition.



1. Normal Waveform
2. Low Pulsatility
3. High Pulsatility
4. Arrhythmia
5. Artifact
6. Concurrent IABP 1:1
7. Concurrent IABP 1:2
8. Intermittent Suction
9. Full Suction
10. Tachycardia

1

Normal Waveform

68 year old female, s/p HVAD® Pump implant, post-operative day (POD) 2. Patient stable, and on morning rounds this is what the HeartWare Monitor shows.

DISCUSSION POINTS:

- Is an intervention needed?
- If yes, would it be a patient or device intervention?

2

Low Pulsatility

73 year old female, s/p HVAD Pump implant, POD 3, on milronone 0.375 mcg/kg/min and currently weaning epinephrine. This is what you see on the HeartWare Monitor.

DISCUSSION POINTS:

- Is flow impacted?
- What may contribute to the amplitude of the waveform?
- Is an intervention needed?
- If yes, would it be a patient or device intervention?

3 High Pulsatility

73 year old male, s/p HVAD Pump implant, POD 1, on milrinone, vasopressin and epinephrine infusions. Hemodynamically stable, but central venous pressure (CVP) and pulmonary artery occlusion pressure (PAOP) are slightly elevated. This is what you see on the HeartWare Monitor.

DISCUSSION POINTS:

- What may contribute to the amplitude of the waveform?
- Is an intervention needed?
- If yes, would it be a patient or device intervention?

4 Arrhythmia

68 year old male, s/p HVAD Pump implant, has been supported for 13 months with no problems. Patient arrived in clinic with complaints of dyspnea and fatigue. You connect him to the HeartWare Monitor and this is what you see.

DISCUSSION POINTS:

- Is flow impacted?
- Is an intervention needed?
- If yes, would it be a patient or device intervention?

5 Artifact

63 year old male in operating room for HVAD Pump implant. HVAD Pump was started 15 min ago and all was fine. This is what you see now on the HeartWare Monitor.

DISCUSSION POINTS:

- Is an intervention needed?
- If yes, would it be a patient or device intervention?

6 Concurrent IABP 1:1

52 year old, male, s/p HVAD Pump implant, POD 0, admitted originally with acute myocardial infarction, initially supported by IABP, but remained in shock with no recovery after 10 days. Patient was taken to operating room for HVAD Pump implantation. You were told that the case went smoothly except for some ventricular fibrillation when coming off pump. Patient was shocked x3 with success. This is what the HeartWare Monitor shows.

DISCUSSION POINTS:

- Is an intervention needed?
- If yes, would it be a patient or device intervention?

7

Concurrent IABP 1:2

33 year old female, s/p HVAD Pump implant for peripartum cardiomyopathy, POD 0, originally supported by an intra-aortic balloon pump (IABP), but continued to deteriorate which led to her HVAD Pump implant. She has just returned from the operating room. You are told the case went smoothly. This is what you see on the HeartWare Monitor.

DISCUSSION POINTS:

- Is an intervention needed?
- If yes, would it be a patient or device intervention?

8

Intermittent Suction

56 year old male, s/p HVAD Pump implant, POD 4, and patient has been doing well. All infusions have been weaned except milrinone which is being weaned and is currently at 0.25 mcg/kg/min. He has been out of bed ambulating and has been aggressively diuresed after surgery. This is what you see on the HeartWare Monitor during your morning rounds.

DISCUSSION POINTS:

- What may have contributed to a change in amplitude of the waveform?
- Is an intervention needed?
- If yes, would it be a patient or device intervention?

9 Full Suction

70 year old male, s/p HVAD Pump implant, POD 0, arrived to the ICU with increased drainage out of chest tube. He has received 3 units of packed red blood cells, 2 units of fresh frozen plasma. He continues to bleed 250 ml/hr. This is what the HeartWare Monitor is showing.

DISCUSSION POINTS:

- Is an intervention needed?
- If yes, would it be a patient or device intervention?

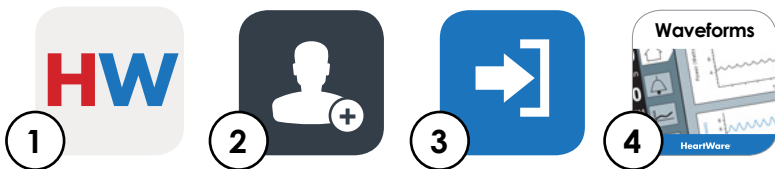
10 Tachycardia

67 year old female, s/p HVAD Pump implant, POD 0, has been in the intensive care unit (ICU) for 7 hours. Patient is stable (MAP 80 mm Hg, CVP 12), on milrinone 0.375 mcg/kg/min, vasopressin 0.04 u/hr and being weaned from ventilator. She is waking up now. You go to check on her and this is what you see on the HeartWare Monitor.

DISCUSSION POINTS:

- Is flow impacted?
- Is an intervention needed?
- If yes, would it be a patient or device intervention?

Download Instructions



-
1. Go to <https://apps.heartwareinc.com> on your iPad
 2. Register as a new user
 3. Log in using your new registration
 4. Download the HeartWare Waveform App

DISCLAIMER:

Log file analysis is based solely on data provided to the monitor from the controller without independent verification. The assessments of log files may be indicative of certain patient conditions. Waveforms should be correlated to physiological variables and clinical presentation.

HEARTWARE, HVAD and the HEARTWARE logo are registered trademarks of HeartWare, Inc.

iPad is a registered trademark of Apple Inc.

HeartWare®

HeartWare, Inc.
14400 NW 60th Ave
Miami Lakes, FL 33014 USA
www.heartware.com

© 2013 HeartWare, Inc. GL1044 Rev03 09/14