HeartWare® Ventricular Assist System

An Innovation in Mechanical Circulatory Support for Patients with Advanced Heart Failure
Full Support in a Compact Device
A unique impeller and integrated inflow cannula allow for miniaturization of the HVAD® pump. At just 50 cc and 160 g, it can accommodate adult patients with smaller body types, yet can generate enough blood flow – up to 10 liters per minute¹ – to provide life-sustaining support for patients with even the most advanced stages of heart failure.

“Contactless” Design
Designed for reduced risk of damage to blood cells, the HVAD pump impeller is suspended through a combination of passive magnetic and hydrodynamic forces, thereby eliminating the need for mechanical bearings and resulting in a contactless system.

Safe and Efficient Operation
Built with redundant motor stators, the HVAD pump will continue to run in the unlikely event a driveline wire breaks.¹ Dual motors also increase pump efficiency, which translates into less frequent battery changes, and in turn, improved patient quality of life.
Robust Driveline
Constructed with conductor wires used in pacemakers, the driveline is thin and flexible, yet maintains durability through a protective outer sheath. The multi-layer assembly separates individual conductors, thereby avoiding abrasion. Clinical experience demonstrated no driveline wire fractures.²

Natural Physiological Response
Circadian rhythm is observed in patients and becomes more pronounced in later stages of support.³ The HVAD® pump met patients needs based on activity level.

Reappearance of a Normal Circadian Rhythm after HVAD Pump Implantation

Optimized Blood Flow
The HVAD pump was hydraulically designed to actively wash all blood contacting surfaces and enhance hemocompatibility. The suspended impeller is designed to provide optimal blood flow paths through the system, and to reduce red blood cell stresses.

Primary Flow Path | Secondary Flow Path | Tertiary Flow Path

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Pericardial Implant
Designed for pericardial placement, the HVAD® pump requires no abdominal dissection. The absence of a pump pocket and a less invasive procedure may lead to decreased procedural time, reduced bleeding and infection and shorter length of hospitalization.4

“Drop In” Pump Placement
Customized surgical accessories and a novel sewing ring facilitate a simple, 3-step process for pump placement:
1. attach sewing ring,
2. core ventricle and secure pump to sewing ring, and
3. anastomose outflow graft.

Proprietary Sewing Ring
Simplifies attachment of the HVAD pump to the left ventricle and creates a primary hemostatic seal.

Pre-Clotted 10mm Outflow Graft
Increases procedural efficiency and facilitates attachment to the aorta.

Malleable Tunneler
Enables bidirectional subcutaneous tunneling of the driveline. The flexible tunneler can be inserted from either the inside or outside of the body with the reversible handle.
Safe and Proven Batteries
Sequential drain of batteries allows for at least 12 hours of patient activity and enables safe exchange of batteries without loss of power.2,4

No user calibration required – batteries reflect accurate capacity.

Minimal loss of initial battery capacity after 500 discharge and recharge cycles, which leads to longer duration of use and fewer battery replacements.1

Convenient DC (Auto) Adapter
Provides an additional convenient source of portable power when traveling and is a proven emergency backup during electrical outages.

Intuitive Controller
User-friendly controller communicates through text and sound. A 2-line LCD screen displays pump parameters, and during alarms provides recommended troubleshooting assistance and alarm type prioritization.

Easy to understand controller shortens training time and may enable patients to be discharged sooner.

Lightweight Peripherals
Designed to promote an ambulatory lifestyle and patient comfort, the controller and batteries together weigh just 1.5 kg. The waterproof design of the controller and battery pack provides protection from accidental exposure to fluids.
HeartWare, Inc. is a leading innovator and provider of less invasive, miniaturized circulatory support technologies that are revolutionizing the treatment of advanced heart failure.

Elegant design. Simple procedure.
Innovation in circulatory support.

References
1 Bench tests performed by HeartWare, Inc. Data on file.
4 Data on file at HeartWare, Inc.

CAUTION: Federal Law (USA) restricts this device to sale by or on the order of a physician. Refer to the "Instructions For Use" for complete Indications for Use, Contraindications, Warnings, Precautions, Adverse Events and Instructions prior to using this device.

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