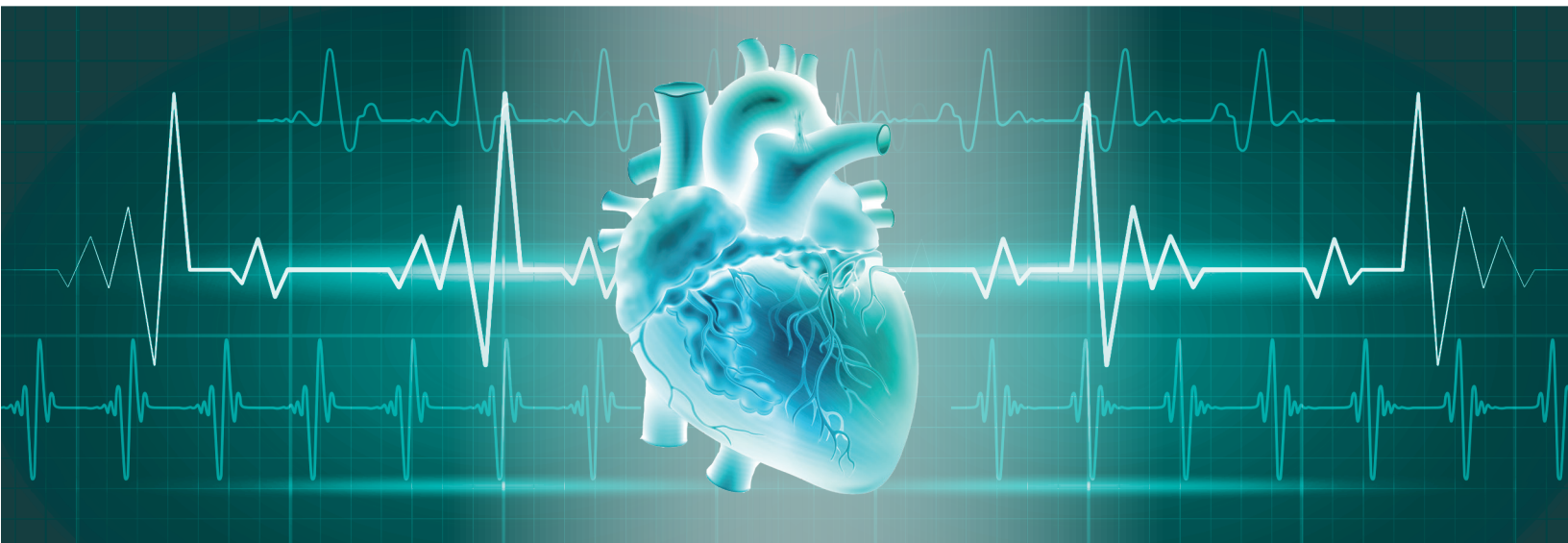


Isolated Heart Perfusion Systems



Unparalleled Accuracy

Our patented perfusion systems achieve unrivaled precision in cardiac measurements for heightened experimental control and physiological relevance.

Intuitive Data Insights

Our Ponemah™ software seamlessly acquires rich data and transforms it into discoveries through robust tools purpose-built for cardiovascular research.

Scaled to Your Science

We deliver tailored isolated heart system configurations and adaptable analytics to match unique experimental needs for acceleration of research workflows.

One-of-a-kind Technology

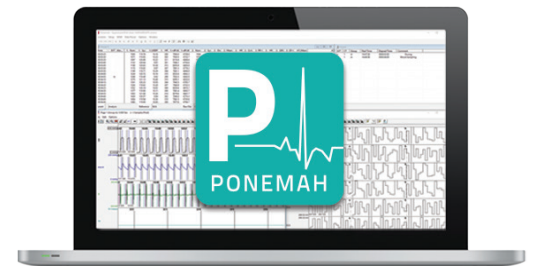
Hugo Sachs Elektronik-HARVARD APPARATUS GmbH (HSE-HA) Isolated Heart (IH) systems provide patented technology, which ensures a precise, repeatable, non-turbulent perfusion pathway for the highest fidelity pressure and flow measurement. This, combined with our Perspex construction creates a system that allows control, maintenance and monitoring of cardiovascular parameters with unsurpassed physiological relevance.

The industry standard Ponemah data acquisition and analytics software powers the full suite of DSI implantable telemetry solutions. Labs worldwide trust the performance of the Ponemah platform. Ponemah CARDIO was purpose-built to arm cardiovascular researchers with easy yet powerful tools to unlock transformative insights for *ex vivo* heart perfusion studies or *in vivo* anesthetized models.

Ponemah CARDIO Software

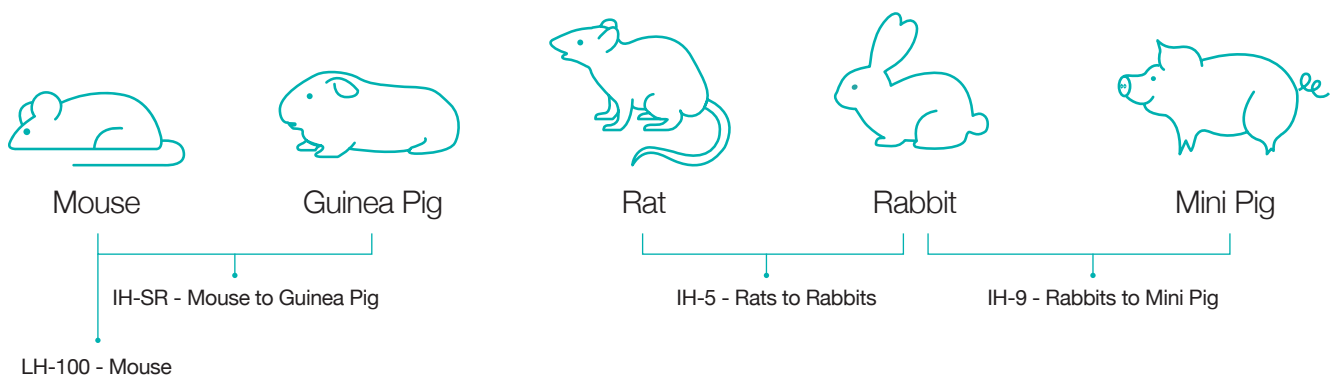
Ponemah provides the core data engine behind our portfolio of DSI implantable telemetry solutions for *in vivo* studies. Building on this proven heritage, Ponemah CARDIO offers a specialized toolkit to also streamline and empower isolated heart experiments.

This intuitive yet powerful platform enables real-time monitoring, visualization, and reporting of essential cardiovascular parameters derived from both *ex vivo* heart perfusion studies as well as *in vivo* anesthetized models.



- Data acquisition, visualization, and analysis of *in vivo* or Isolated Heart cardiovascular hemodynamic and electrophysiologic signals.
- Accurate and consistent results through industry validated algorithms.
- Acquisition of primary physiologic signals (pressure, flow, ECG...) from our DSI* ACQ-7700 signal conditioners or HSE* Plugsys Modules as well as third-party analog signals.
- Immediate results with real-time data visualization, analysis and visual validation mark insertion.

Isolated heart models for extra small, small, and medium animals





Isolated Heart Core Platforms

The IH series *ex vivo* perfused heart systems always start as a Langendorff system to maintain the viability of the heart muscle. This setup of this system is easy and the IH-SR, IH-5 and IH-9 platforms can be upgraded to ejecting working heart systems.

- **Advanced Design:** Langendorff systems offer an easy starting point for *ex vivo* heart studies. Its retrograde perfusion down the aorta preserves heart activity through the coronary circulation, making it an excellent choice for basic applications.
- **Minimal Deadspace, Optimal Flow:** Reducing the total fluid volume of the perfusion circuit, therefore reducing the amount of valuable compounds required, while allowing flow rates to be maintained with very low circuit backpressure.
- **Precise Measurements:** Featuring cannula that rotate 360 degrees to finely position the heart, ECG and pacing electrodes on articulated mini-ball connectors for easy and precise placement, species specific isovolumetric catheters & balloons and effluent catheters.
- **Additions and Upgrades:** From perfusate specific oxygenators to fiber optic perfusion solution monitoring we offer the widest range of IH system options available. Each IH system (IH-SR, IH-5 and IH-9) can be upgraded to ejecting working heart perfusion. Additionally, the IH-5 system offers Bi-Ventricular Working Heart configuration.

Powerhouse Partnership for Cardiovascular Discovery

Ponemah CARDIO software and HSE-HA isolated heart systems independently represent the pinnacle of technology in their respective domains. Together, this partnership unlocks a seamless pathway to accelerate your next cardiovascular breakthrough.

Gain confidence in transformative results backed by two gold standards working in harmony – from precise data acquisition to actionable reporting.

Expert Data Services Fuel Confidence

Our scientific team goes beyond technology to provide customer-focused data services. We offer end-to-end support, freeing you to drive innovation:

- Study consultation from experimental setup to advanced analysis
 - Custom reporting to effectively communicate key findings
 - Decades of cardiology expertise built into every service
 - With data analysis handled by trusted partners, you can focus resources on shaping future discoveries.
-

Global Leader in Cardiovascular Technologies

HSE-HA, part of Harvard Bioscience, builds on over 60 years of pushing the boundaries in physiology instrumentation and software. We lead the charge in isolated organ platforms, tissue monitoring, and cardiovascular data analytics.

Our solutions start from collaboration with pioneering researchers and veterinary cardiology experts. This front-line perspective informs HSE-HA's passion for introducing the technologies that accelerate tomorrow's discoveries in heart, vascular, and pharmacology research.



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