

# Medically-Approved Power Supplies Boost Perfusion Monitors

You know the different types of power supplies: Linear models are known for their reliability, transient response and low ripple and noise, while switch-mode units are compact with high efficiency levels and wide input voltage ranges.

Switch-mode power supplies usually have ample efficiency, but their unpredictable noise can be problematic. For medical applications, the goal is to find a power supply that exhibits both low noise and high efficiency—a rare feat. It's also important to choose one that meets both patient and operator safety requirements.

Hemedex, a maker of blood flow monitors, was able to strike this balance in its Bowman Perfusion Monitor.

The company needed a robust, medical-safe power module for their next generation perfusion monitor. They worked together with Polytron Devices to come up with the right model after several rounds of redesign and testing.

“We needed an electrically-quiet linear power supply for our patient-connected circuitry,” said Hemedex Principal Engineer Charles Welch. “This allows us to take full advantage of our delta sigma converters to precisely measure electrical power without being subjected to random noise at a multiple of the sampling frequency as the power supply load changes. Polytron’s linear power supply helped us meet our design goals.”



*Hemedex's Bowman Perfusion Monitor continuously quantifies tissue blood flow in absolute physiological units of ml/100g-min in real time at the bedside.*

## PERFUSION MONITOR

Clinicians carefully manage cerebral blood flow (CBF) levels to reduce the risk of any injury that's secondary to initial trauma. Hemedex, which was conceived at MIT in 2000 to commercialize blood flow monitoring technology, helps achieve this need with its Bowman Perfusion Monitor (BPM). The BPM continuously quantifies tissue blood flow in absolute physiological units of ml/100g-min in real time at the bedside.

In neurological applications, the machine provides absolute levels of cerebral blood flow to alert clinicians to the onset of ischemia from swelling or vasospasm. With this critical information, a clinician can react and evaluate the effectiveness of the administered therapy in real-time.

“We had been using Polytron’s power supplies in other products for years,” Welch said. “So when it came time to redesign our Bowman Perfusion Monitor, we chose Polytron—and we haven’t looked back.”



*Hemedex uses Polytron’s MHIA power supplies in their next generation perfusion monitor.*

## CAPABILITIES OF HEMEDEX’S BOWMAN PERFUSION MONITOR

- Detects changes in blood flow in real time
- Offers valuable diagnostic and prognostic information
- Helps formulate and target therapy
- Detects vasospasm in comatose patients
- Detects cardiac induced brain vessel pulsatility
- Helps guide pharmacologic interventions
- Identifies patients at risk for impending ischemic events via absolute perfusion measurements
- Assists in detecting impaired autoregulation and changes in vascular resistance
- Increases understanding of pathophysiology
- Requires no user calibration
- Prints tabular data and waveforms
- Streams measurements via RS-232 that can be collected by multimodal monitoring data systems

## MEETS MEDICAL STANDARDS

Available with either a PC mount or chassis mount with screw terminals, Polytron’s line of linear power supplies for medical applications have a typical low output noise of 1.0 RMS. They have been repeatedly tested to meet all the necessary certifications for medical applications including IEC 60601-1 Third Edition, Food and Drug Administration (FDA) and electromagnetic interference (EMI). In addition, these power supplies exhibit 4000 Vac reinforced insulation, short circuit protection and 2 Means of Patient Protection (MOPP).

The units deliver a 2  $\mu$ A patient leakage current, an optional wide operating temperature range of -40 to 85°C and a regulation line and load from 0.02 to 0.2 percent.

They also have a storage temperature between -25 and 71°C, an isolation resistance of 50 Mohms and available international input voltages including dual and switchable 115 and 220 Vac and 100 and 220 Vac input, as well as single 220, 230, 240, 100, 115 Vac and more.

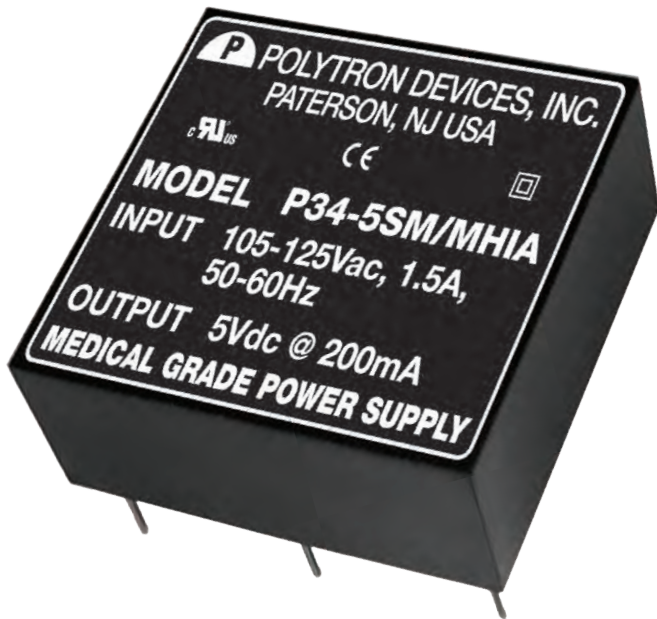
“Polytron was responsive for helping us make a component that fit all our needs and specifications,” Welch said. “Additionally, they were responsive to getting their components tested and approved for medical use.”

## OTHER APPLICATIONS

This diverse power supply works in a wide range of medical machinery. Some areas and machines that use this model include:

- **Surgical:** Dialysis equipment, anesthesia delivery, surgical devices
- **Patient Monitoring:** Infusion pumps, pulse oximeters, electrocardiographs
- **Imaging:** Ultrasound, CT/MRI/X-Rays
- **Laboratory:** Sterilizers, mass analysis, lab automation
- **Diagnostics:** Clinical chemistry testing, microbiology testing
- **Equipment:** Dental, Ophthalmology, therapeutic devices

To learn more, please visit: [www.polytrondevices.com](http://www.polytrondevices.com)



*Polytron's MHIA series of linear power supplies for medical applications have been repeatedly tested to meet IEC 60601-1 Third Edition, FDA and EMI certification.*