



Application note

Protecting patients through precise blood temperature control

Sector

Medical perfusion and transfusion systems

Application

Blood temperature monitoring

Product

Exergen non-contact Heat Balance sensors

Patient safety during blood transfusion depends on maintaining blood temperature at precisely 37°C. Donor blood arrives at varying temperatures – pre-warmed, room temperature, refrigerated, or anywhere in between. If infused blood is too cold or too hot, patients risk hypothermia or hyperthermia, potentially leading to complications or shock. Effective management requires tightly controlled heat exchange adjusted to flow rate and inlet temperature, supported by reliable temperature measurement.

Challenges

Measuring blood temperature presents unique requirements. Non-invasive measurement is preferable because it guarantees sterility – the sensor never contacts the bloodstream. Contact sensors require exposure to the blood stream creating risk of infection, blood clotting and impeding blood flow. They are disposable and must be replaced after each use, creating ongoing costs. Non-contact sensors can be reused indefinitely, delivering significant savings. Perfusion systems also need fast connection of disposable tubing, critical in trauma situations where every second matters.



Solutions

CleverIR has developed a specialized Heat Balance sensor that measures blood temperature accurately through the tubing wall. This non-contact approach provides the accuracy and reliability required for optimal heating control, while ensuring patient safety. The sensors feature patented ambient temperature compensation that minimizes environmental effects. Whether perfusion equipment operates in an ambulance, an air-conditioned operating room, or under harsh military conditions, Exergen sensors deliver accurate, continuous temperature control.

Benefits

Non-invasive measurement guarantees patient safety and sterility while enabling sensor reuse for cost effectiveness. The click-on mounting system allows very fast connection of disposable tubing, essential for rapid deployment in trauma situations. The sensors require no calibration – they are passive devices with no drift over years of use. With interchangeability error of $\pm 1\%$, replacement sensors install as drop-in replacements requiring no programming or recalibration. In short, field service costs can be cut without reducing overall performance and reliability.



Non-contact Heat Balance temperature sensors ensure patient safety in all conditions while delivering cost savings through reusable design and maintenance-free operation.

Results

Integrating Exergen sensors delivers guaranteed patient safety under all operating conditions, from controlled hospital environments to challenging field deployments. The non-invasive approach maintains complete sterility while reusable design provides superior cost effectiveness compared to disposable contact sensors. Fast system operation proves critical in trauma situations where rapid blood warming can save lives. Field reliability increases significantly because sensors require no service or calibration, reducing operational costs while ensuring consistent performance.

Conclusion

Blood perfusion systems demand absolute reliability and precision. Exergen infrared sensors provide the accuracy, environmental stability and maintenance-free operation needed to protect patients across all conditions. Their non-invasive design and reusable construction make them optimal for perfusion applications where safety and reliability cannot be compromised.