

CASE STUDY

REO Ensures Safe Blood Sampling in Clinical Research



How a REOMED Isolation transformer ensures EN 60601-1 compliance for a patient-connected blood sampling system



Initial Situation / Challenge

Medical research equipment used in clinical environments must comply with strict electrical safety standards to protect both patients and medical personnel. Particularly with bespoke or legacy equipment, achieving compliance can be challenging without a complete system redesign.

The system in question was a heated hand blood sampling device used to obtain arterialized venous blood samples. This method is widely recognized as a less invasive alternative to arterial sampling and is commonly used in clinical research.

During routine safety checks, the hospital's Electronics and Biomedical Engineering (EBME) team found that the device only had basic insulation and grounding. To continue operating as a patient-connected device, the system needed to meet the requirements of EN 60601-1, the internationally recognized standard for medical electrical equipment.

Key technical requirements were:

- Compliance with patient leakage current limits
- Safe electrical isolation from the mains supply
- Ensuring electrical safety during prolonged patient contact
- Regulatory compliance without redesigning the entire system

Without a compliant solution, the equipment risked being removed from service.



Objective

Provide a solution that:

- Meets the EN 60601-1 requirements
- Ensures the safe operation of the blood sampling system
- Protects existing devices
- Does not interrupt ongoing clinical research processes

Summary

Application: Medical research equipment / Medical technology

Country: United Kingdom

Product: REOMED Isolation Transformer for Medical Technology (600VA)

Objective: Enhance electrical safety and ensure standards-compliant operation of a patient-connected blood sampling device used in metabolic and endocrinological studies.

Result: Successful EBME safety testing and IEC 60601-1-compliant operation without requiring a complete system redesign.



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Solution

REO engineers conducted an on-site assessment to understand the device's electrical characteristics and its operational environment. Based on this analysis, a REOMED I Isolation Transformer with a power capacity of 600VA was specified and integrated into the existing system.

Why a REOMED Isolation Transformer?

The REOMED transformer meets the specific requirements for medical applications:

- Galvanic isolation between the mains supply and patient-connected equipment
- Reduction of leakage currents helping to meet IEC 60601-1 requirements
- High efficiency and low magnetic stray field
- Compact, medical-grade solution suitable for integration into existing systems

Key Benefit: Compliance with standards without a complete system redesign

The use of the REOMED Isolation Transformer enabled compliance with regulatory requirements without the need to redesign or replace the original equipment.



Results

Following installation, the upgraded system passed internal EBME electrical safety checks, allowing it to remain in clinical use. This meant that unnecessary replacement costs were avoided and ongoing research programs could continue without interruption. The enhanced electrical isolation reduced risk during patient contact and increased confidence for clinicians and researchers alike.

In summary, the following results were achieved:

- Successful completion of internal EBME safety tests
- Approval for continued clinical use
- No need for costly new purchases
- Uninterrupted continuation of ongoing research studies
- Increased patient safety and user confidence



Conclusion

Isolation Transformers as key to electrical safety in medical technology

Electrical safety and compliance with standards are essential in medical environments. By using a REOMED Isolation Transformer, the research facility could meet the EN 60601-1 requirements, enhanced patient safety and continued using valuable specialist equipment with confidence. REOMED Isolation Transformers are used worldwide in medical and healthcare technology, from patient-connected devices to complex imaging systems.

The advantages:

- High insulation strength
- Low electromagnetic interference
- Short-circuit and overload protection
- Maximum operational safety
- Energy efficiency

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FAQ's

Why are isolation transformers required in medical technology?

Isolation transformers provide safe galvanic separation between the mains supply and medical devices, as well as reducing leakage currents. This protects patients and staff in medical environments from electric shocks. They also protect sensitive medical equipment, thereby improving operational safety. Isolation transformers are essential for meeting EN 60601-1 requirements for patient-connected devices.

What is a REOMED Isolation Transformer?

REOMED is a series of isolation transformers from REO, specially developed for medical technology, which meets the highest standards for electrical safety, isolation, and EMC. The series meets worldwide standards and is characterized by the highest reliability. The use of toroidal transformers results in significant energy and cost savings compared to conventional transformers.

Can an isolation transformer retrofit existing medical devices to comply with standards?

Yes, in many cases, a medical isolation transformer enables compliance with EN/IEC 60601-1 without having to completely redesign or replace the system.

For which applications are REOMED transformers suitable?

REOMED Isolation Transformers for medical technology are specifically designed for applications where patients are directly or indirectly part of the electrical system and therefore extremely high safety requirements are necessary to protect not only patients but also carers and medical staff.

They are used worldwide in the following applications, including:

- Patient-connected medical devices
- Medical laboratory equipment
- Clinical research systems
- Diagnostic and therapeutic devices
- Medical imaging



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