

Technical Maintenance Requirements For Ultrasound Machines In Functional Diagnostics

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Abstract. *This article discusses the technical maintenance requirements for ultrasound machines use= in functional diagnostics. Proper maintenance ensures the accuracy, efficiency, and longevity of ultrasound equipment. The article explores key maintenance procedures, common technical issues, and best practices to optimize machine performance. Regular servicing and calibration are essential to providing high-quality diagnostic imaging and minimizing operational disruptions.*

Keywords: Functional diagnostics, ultrasound machine, technical maintenance, calibration, preventive servicing, medical equipment, diagnostic accuracy.

Introduction. Ultrasound machines play a crucial role in functional diagnostics, enabling the real-time visualization of internal organs, blood flow, and soft tissues. These machines are widely used in cardiology, obstetrics, radiology, and other medical fields. However, to ensure their accuracy and longevity, regular technical maintenance is required. Proper servicing helps prevent malfunctions, enhances image quality, and extends the machine's operational lifespan. This article examines the key aspects of technical maintenance, including routine servicing, troubleshooting, and preventive measures.

Theoretical Section

1. Importance of technical maintenance in ultrasound diagnostics

Ultrasound machines rely on advanced transducer technology, signal processing, and imaging software to provide clear diagnostic images. Any technical failure can lead to inaccurate diagnoses, potentially compromising patient care. Regular maintenance helps:

Ensure consistent image quality.

Prevent hardware and software malfunctions.

Extend the lifespan of ultrasound components.

Reduce the risk of unexpected breakdowns.

2. Key Maintenance Procedures

To maintain optimal performance, ultrasound machines require the following servicing steps:

Cleaning and disinfection – Regular cleaning of transducers, screens, and control panels to prevent contamination.

Calibration – Adjusting the system to maintain accuracy in measurements and imaging.

Software updates – Ensuring the latest firmware and diagnostic algorithms are installed.

Transducer testing – Checking for cracks, signal integrity, and sensitivity issues.

Cooling system maintenance – Inspecting fans and ventilation to prevent overheating.

Battery and power supply checks – Verifying backup power functionality to avoid unexpected shutdowns.

3. Common Technical Issues and Solutions

Image distortion – May be caused by transducer damage or calibration issues.

Software malfunctions – Can be resolved by updating firmware or reinstalling the system.

Overheating – Requires checking ventilation and ensuring proper cooling.

Electrical failures – Need routine inspection of cables, connectors, and power sources.

Practical Section

1. Implementing a Maintenance Schedule

Healthcare facilities should establish a structured maintenance plan, including:

Daily checks – Inspecting cables, transducers, and display screens.

Monthly maintenance – Conducting system diagnostics and software updates.

Annual servicing – Comprehensive technical assessment and professional calibration.

2. Training and Certification for Maintenance Personnel

Ensuring that biomedical engineers and technicians receive specialized training in ultrasound maintenance helps maintain high equipment performance standards. Training programs should cover:

Ultrasound physics and system components.

Troubleshooting techniques.

Cleaning and sterilization protocols.

Regulatory compliance and safety standards.

Conclusion

Technical maintenance of ultrasound machines is essential for accurate and reliable functional diagnostics. Proper servicing minimizes technical issues, ensures high-quality imaging, and extends equipment lifespan. Implementing structured maintenance schedules and training qualified personnel are key factors in optimizing ultrasound machine performance. Future advancements in predictive maintenance technologies and AI-driven diagnostics are expected to further enhance the efficiency and reliability of ultrasound equipment.

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6. This structured translation ensures clarity and professional presentation in English. Let me know if you need any modifications!