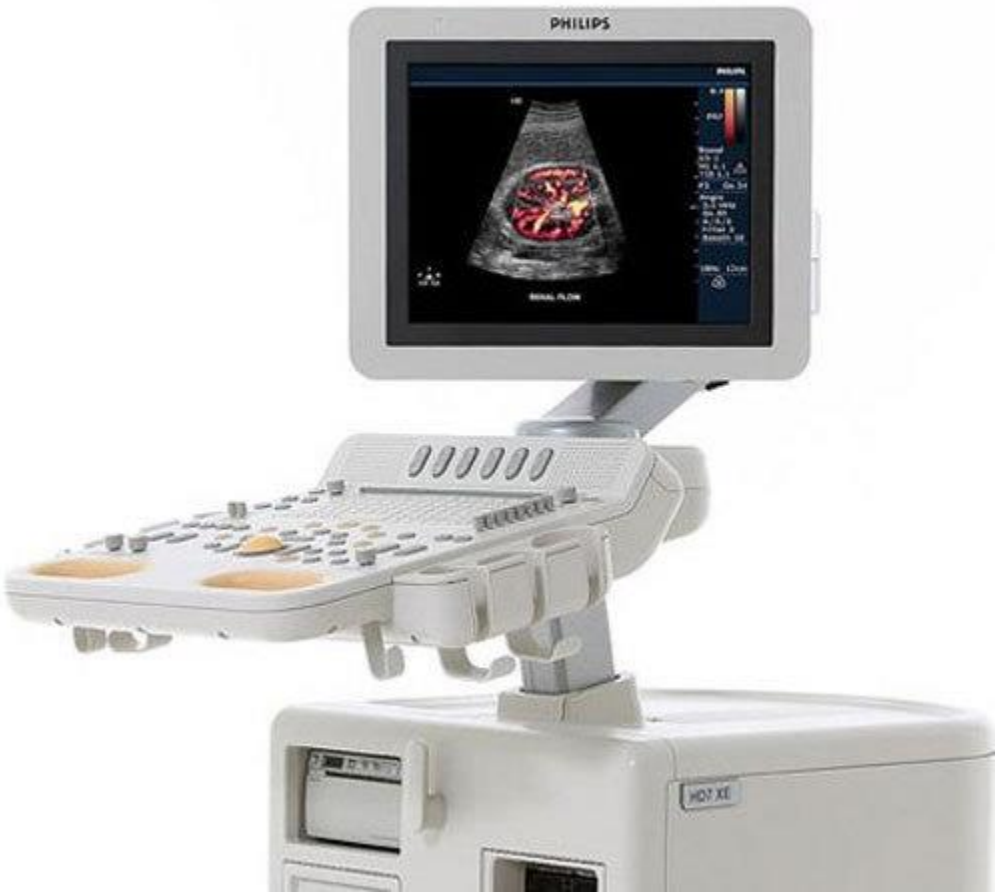
PHILIPS



MONITOR VIEWING SCREEN (MVS) SYSTEM

SERVICE MANUAL

CONTENTS

ACTIVITY: SAFETY

BASIC SAFETY

Warnings:

- Do not use the system for any application until you have read, understood, and know all the safety information, safety procedures, and emergency procedures contained in this "Safety" section. Operating the system without a proper awareness of safe use could lead to fatal or other serious personal injury.
- Do not use this system for any application until you are sure that the system's periodic maintenance is current. If any part of the system is known or suspected to be defective or incorrectly adjusted, do not use the system until it is repaired. Operating the system with defective or incorrectly adjusted components could expose you and the patient to safety hazards.
- Do not use the system for any application until you are adequately and properly trained on its safe and effective operation. If you are unsure of your ability to operate the system safely and effectively, do not use it. Operation of the system without proper and adequate training could lead to fatal or other serious personal injury.
- Do not operate the system with patients unless you have an adequate understanding of its capabilities and functions. Using the system without such understanding may compromise the system's effectiveness and the safety of the patient, you, and others.
- Never attempt to remove, modify, override, or frustrate any safety device on the system. Interfering with safety devices could lead to fatal or other serious personal injury.
- Use the system only for its intended purposes. Do not use the system with any product that Philips does not recognize as compatible with the system. Operation of the product for unintended purposes, or with incompatible products, could lead to fatal or other serious injury.

ELECTRICAL SAFETY

This equipment has been verified by a recognized third-party testing agency as a Class I device with Type BF and Type CF isolated patient-applied parts, and Type B non-isolated patient-applied parts. (The safety standards met by this system are included in the "Specifications" section.) For maximum safety observe these warnings and cautions:

Warnings:

- Shock hazards may exist if this system (when mounted on its cart or plugged directly into an AC power source), including all externally mounted recording and monitoring devices, is not properly grounded. Protection against electrical shock is provided by grounding the cart or the AC power adapter with a three-wire cable and plug, which must be plugged into a grounded outlet. The grounding wire must not be removed or defeated.
- To avoid the risk of electrical shock, never connect the system power cord to a power strip or an extension cord. When using the power cord, always connect it directly to a grounded wall outlet.
- Use only the AC adapter supplied with your system.
- Use only Type CF transducers for invasive procedures. Type B transducers are insufficiently electrically isolated for invasive use.
- Do not remove the protective covers on the system; hazardous voltages are present inside. Cabinet panels must be in place while the system is in use. All internal adjustments and replacements must be made by a qualified Philips Ultrasound field service engineer.
- Do not operate this system in the presence of flammable gases or anesthetics. Explosion can result. The system is *not* compliant in AP/APG environments as defined by IEC 60601-1.
- To avoid risk of electrical shock hazards, always inspect the transducer before use: Check the face, housing, and cable before use. Do not use if the face is cracked, chipped, or torn; the housing is damaged; or the cable is abraded.

- To avoid risk of electrical shock hazards, always turn off the system, disconnect it from the wall outlet, and remove the battery (see "Installing the Battery" on page 149) before cleaning the system.
- All patient-contact devices, such as transducers, pencil probes, and ECG leads not specifically indicated as defibrillation-proof must be removed from patient contact before application of a high-voltage defibrillation pulse. See "Defibrillators" on page 29.
- During transesophageal echocardiographic (TEE) procedures, either remove the TEE transducer from the patient or disconnect the TEE transducer from the system immediately following image acquisition.
- Ultrasound equipment in normal operation, as with other medical electronic diagnostic equipment, uses high-frequency electrical signals that can interfere with pacemaker operation. Though the possibility of interference is slight, be alert to this potential hazard and stop system operation immediately if you note interference with a pacemaker.
- When using additional peripheral equipment powered from an electrical source other than the ultrasound system, the combination is considered to be a medical system. It is your responsibility to comply with IEC 60601-1-1 and test the system to those requirements. If you have questions, contact your Philips representative.
- Do not use nonmedical peripherals, such as report printers, within 1.5 m (5 ft) of a patient, unless the nonmedical peripherals receive power from an isolated power outlet on the Philips ultrasound system, or from an isolation transformer that meets medical safety standards, as defined by standard IEC 60601-1-1.
- The system and patient-applied parts meet the standard IEC 60601-1. Applied voltages exceeding the standard, although unlikely, may result in electrical shock to the patient or operator.
- Connection of optional devices not supplied by Philips Ultrasound could result in electrical shock. When such optional devices are connected to your ultrasound system, ensure that the total system earth leakage current does not exceed 500 µA, or in the United States, 300 µA.

- To avoid risk of electrical shock, do not use any transducer that has been immersed beyond the specified cleaning or disinfection level.
- To avoid risks of electrical shock and fire hazards, inspect the system power cord and plug regularly. Ensure that they are not damaged in any way.
- Do not drape the power cord over any of the cable hooks or the handle on the system cart. Damage to the cord or power receptacle unit can occur if the cart is raised. Operating the system with physio input signals that are below the specified minimum levels may cause inaccurate results. See the "Specifications" section.
- Electrosurgical units (ESUs) and other devices intentionally introduce radio frequency electromagnetic fields or currents into patients. Because imaging ultrasound frequencies are coincidentally in the radio frequency range, ultrasound transducer circuits are susceptible to radio frequency interference. While an ESU is in use, severe noise interferes with the black-and-white image and completely obliterates the color image. Concurrent failures in an ESU or other device and in the outer layer of the TEE transducer shaft can cause electrosurgical currents to return along the transducer conductors. This could burn the patient, and the ultrasound system and the transducer could also be damaged. Be aware that a disposable transducer cover provides no protective electrical insulation at ESU frequencies.
- To avoid risk of a burn hazard, do not use transducers with high-frequency surgical equipment. A burn hazard may result from a defect in the high-frequency surgical neutral electrode connection.

Cautions:

- Although your system has been manufactured in compliance with existing EMI/EMC requirements, use of this system in the presence of an electromagnetic field can cause momentary degradation of the ultrasound image. When interference is present or intermittent, use caution when continuing to use the system. If interference occurs often, review the environment in which the system is being used, to identify possible sources of

radiated emissions. These emissions could be from other electrical devices used within the same room or an adjacent room. Communication devices such as cellular phones and pagers can cause these emissions. The existence of radio, TV, or microwave transmission equipment located nearby can cause emissions. In cases where EMI is causing disturbances, it may be necessary to relocate your system.

- For information on electromagnetic emissions and immunity as it applies to the system, see "Electromagnetic Compatibility" on page 66. Ensure that the operating environment of your system meets the conditions specified in the referenced information. Operating the system in an environment that does not meet those conditions may degrade system performance.

MECHANICAL SAFETY

A list of precautions related to mechanical safety follows; observe these precautions when using the system:

Warnings:

- Be aware of the wheels on the system cart, especially when moving the system. The system could cause injury to you or others if it rolls over feet or into shins. Use caution when going up or down ramps.
- When attempting to overcome an obstacle, do not push the system from either side with excessive force, which could cause the system to tip over.
- Position external hardcopy devices away from the system. Ensure that they are secure. Do not stack them on the system. When positioning the monitor, move it carefully to avoid pinching hands or extremities against other objects, such as a bed rail.
- Never park the system on an incline.
- The brakes are intended as a convenience. To increase cart security, use wheel chocks when the system is parked.
- If system operation is abnormal after you move or transport the system, contact Philips Ultrasound Customer Service immediately. System components are installed securely and can withstand considerable shock, but excessive shock can cause a system failure.
- To avoid injury, Philips recommends against lifting the system cart.

Cautions:

- Before moving the system, ensure that the system is secured for transport. On some systems, that may include ensuring that the monitor is latched, to prevent monitor damage during transport.
- Ensure that the cables for all patient-applied parts are secure before moving the system. Use the cable management system to ensure that transducer cables are protected from damage.

- Do not roll the system over transducer cables or power cables.
- Do not use the system handle or transducer holders to move the cart.
- Never move the cart with the system on it, unless the system is properly attached to the cart.
- To avoid the possibility of tipping the system cart when you move it over a threshold, lift the cart slightly with the handle on the rear of the cart and pull the cart over the threshold.