

**BY ORDER OF THE SECRETARY
OF THE AIR FORCE**

AIR FORCE INSTRUCTION 10-2909

23 JULY 2013



Operations

**AEROMEDICAL EVACUATION
EQUIPMENT STANDARDS**

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ACCESSIBILITY: Publications and forms are available on the e-Publishing website at www.e-Publishing.af.mil for downloading or ordering

RELEASABILITY: There are no releasability restrictions on this publication

OPR: HQ AMC/A3VM

Certified by: AF/A3O-A
(Col Steven A. Robinson)

Pages: 117

This instruction implements Air Force Policy Directive (AFPD) 10-29, *Worldwide Aeromedical Evacuation Operations*. It provides guidance on the most commonly used and approved Air Force Life Cycle Management Center (AFLCMC)/Aeromedical Test Laboratory and US Army Aeromedical Research Laboratory (USAARL) medical equipment, for use on both fixed and rotary wing aircraft. It also provides guidance on how to use the equipment identified in Table of Allowance Standard (AS) 887A, *Aeromedical Evacuation (AE) Inflight Kits*. This publication is to be used in conjunction with Air Force Instruction (AFI) 41-307, *Aeromedical Evacuation Patient Considerations and Standards of Care*, AFI 11-2AE Vol 1, *Aeromedical Evacuation Aircrew Training*, AFI 11-2AE Vol 2, *Aeromedical Evacuation Aircrew Evaluation Criteria*, AFI 11-2AE Vol 3, *Aeromedical Evacuation Operations Procedures*, and AFI 44-165, *Administering Aeromedical Staging Facilities*. This instruction is applicable to the Active Component and Air Reserve Component (ARC). It applies to all personnel within the AE enroute care system who work with AE Patient Movement Items (PMI) and equipment found in this instruction. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFMAN 33-363, *Management of Records*, and disposed of IAW the Air Force Records Disposition Schedule (RDS) located at <https://www.my.af.mil/afrims/afrims/afrims/rims.cfm>. Use AF Form 847, *Recommendation for Change of Publication*, to submit any proposed changes, clarification requests, or command supplements to this instruction through the appropriate chain of command to HQ AMC/A3V at <https://private.amc.af.mil/a3/a3v/eight47.aspx>. Unless otherwise specified, HQ AMC/A3V is the sole waiver authority for any part of this publication. The use of the name or mark of any

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SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include the addition of new Warnings, Cautions and Notes. Preflighting of equipment has been changed to include functional checks. All appendices are new and should be reviewed. The formatting of the chapters has changed. Finally there has been the removal and addition of equipment. Equipment removed includes the Overweight Patient Litter. Equipment additions include the Aircraft Wireless Intercom System, Electrical Cable Assembly System Model 1079, Next Generation Portable Therapeutic Liquid Oxygen System, Philips Heartstart Monitor/Defibrillator (MRx), Pulse Oximeter NONIN 9550 Onyx II and the North American Rescue OverSized Litter (OSL).

Chapter 1—GENERAL INFORMATION	4
1.1. Purpose.	4
1.2. Responsibilities.	4
1.3. Safety.	4
1.4. Key Words Explained.	5
1.5. Waiver Protocol.	5
1.6. Equipment Accountability.	5
1.7. Equipment Responsibility.	6
1.8. Equipment Malfunction/Failure.	7
1.9. Equipment Implementation.	7
Chapter 2—AIR AND OXYGEN EQUIPMENT	8
2.1. Bag-Valve-Mask Resuscitator (Adult/Child/Infant)	8
2.2. Minilator.	9
2.3. Oxygen Analyzer – MiniOX 3000 Oxygen Monitor.	10
2.4. Portable Therapeutic Liquid Oxygen System (PTLOX).	13
2.5. Next Generation Portable Therapeutic Liquid Oxygen System (NPTLOX)	16
2.6. Pulse Oximeter BCI 3303.	20
2.7. Pulse Oximeter NONIN 9550 Onyx II®.	21
2.8. UNI-VENT “Eagle” Model 754M Ventilator.	22
2.9. Airdyne Compressor.	28

Chapter 3—CARDIAC EQUIPMENT	30
3.1. ZOLL M-Series Critical Care Transport (CCT), Monitor/Defibrillator.	30
3.2. MRx Philips Heartstart® (MRx) Monitor/Defibrillator (M3535A/M3536A).	38
3.3. Propaq Encore 206 EL.	47
Table 3.1. Battery Voltage Effects on Operation based on a full Propaq Encore 206 EL configuration	48
Chapter 4—POWER, SUCTION AND INFUSION EQUIPMENT	53
4.1. Avionics Electrical Frequency Converter	53
4.2. Unitron Portable Power System.	54
4.3. Electrical Cable Assembly System (ECAS).	56
4.4. Electrical Cable Assembly System (ECAS) Model no.	59
4.5. IMPACT 326M Portable Suction Unit.	61
4.6. IVAC Medsystem III.	63
Chapter 5—MISCELLANEOUS EQUIPMENT	68
5.1. Chest Drainage Unit.	68
5.2. Heimlich Valve.	69
5.3. Airborne Life Support System (ALSS).	70
5.4. Litters.	73
5.5. NATO Litter Backrest.	74
5.6. The North American Rescue OverSized Litter (OSL)	75
5.7. Poltizer Bag.	75
5.8. Leather Restraints.	76
5.9. Stryker Wedge Turning Frame 965 Military Option (MO).	77
5.10. Ultrasound Stethoscope Fetal Pulse Monitor-Medasonics Model FP3A.	86
5.11. Aircraft Wireless Intercom System Operations.	86
Table 5.1. LED Indicators	88
Table 5.2. Transceiver Button Functions	89
Table 5.3. Recommended AWIS Channel Assignments	91
Attachment 1—GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION	92
Attachment 2—OXYGEN CONVERSIONS	98
Attachment 3—EQUIPMENT AMPERAGE REQUIREMENTS	101
Attachment 4—MEDICAL EQUIPMENT PREFLIGHT CHECKLISTS	102

Chapter 1

GENERAL INFORMATION

1.1. Purpose. Provides a standardized listing of available medical equipment that has completed all airworthiness testing and has safe to fly certification for use on both fixed and rotary wing aircraft. It also provides standardized methods for accomplishing the preflight and safe operation of all equipment.

1.2. Responsibilities. It is the responsibility of the AE Squadron (AES) Commander to ensure each aeromedical evacuation crewmember (AECM) and/or other medical personnel supporting AE elements assigned to their unit receives training on the applicable equipment contained within this publication.

1.2.1. The AES Commander will:

1.2.1.1. Ensure a copy of this publication is available on each AE mission, available for each supporting AE Unit Type Code (UTC) and determine further distribution as necessary.

1.2.1.2. Appoint a Non-Commissioned Officer (NCO), TSgt or above, as unit property custodian.

1.2.2. Property Custodian will:

1.2.2.1. Maintain and monitor equipment using activity cost center with the host medical equipment maintenance activity/medical treatment facility (MTF).

1.2.2.2. Be the responsible property officer for the unit as designated by the organization commander.

1.2.2.3. Maintain equipment inventory records and ensure current authorized and in-use assets are recorded on the Custody Receipt/Locator List.

1.2.2.4. Submit supply and equipment requests to the host medical equipment maintenance activity/MTF. Submit requests or coordinate on supply requests for ARC operational AE inflight kit supplies to AMC/SGXM. **NOTE:** AMC/SGXM does not support refrigerated or narcotics item requests. These must be obtained from the host MTF.

1.2.2.5. Accomplish necessary coordination with appropriate base activities such as Medical Logistics, Medical Maintenance, Base Comptroller, Base Contracting, and Base Supply as appropriate.

1.2.2.6. Submit all materiel complaints through the host medical equipment maintenance activity/MTF, according to AFI 41-209, *Medical Logistics Support*. When unusual materiel problems occur, request assistance from applicable MAJCOM. **NOTE:** Request assistance from the host medical equipment maintenance activity/MTF prior to forwarding request for assistance to the MAJCOM.

1.3. Safety. Safety is paramount to ensure crew, equipment and patients are not injured or damaged. See AFI 11-2AE Vol 3, Chapter 20.

1.4. Key Words Explained.

- 1.4.1. “*Will*” and “*shall*” indicate a mandatory requirement.
- 1.4.2. “*Should*” indicates a preferred, but not mandatory, method of accomplishment.
- 1.4.3. “*May*” indicates an acceptable or suggested means of accomplishment.
- 1.4.4. “**WARNING**” indicates operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.
- 1.4.5. “**CAUTION**” indicates operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.
- 1.4.6. “**NOTE**” indicates operating procedures, techniques, etc., that are considered essential to emphasize.

1.5. Waiver Protocol. Submit waiver requests for non-certified/non-standard medical equipment IAW AFI 11-2AE Vol 3, paragraph 4.3

- 1.5.1. For non-certified/non-standard medical equipment required for patient moves, the mission Medical Crew Director (MCD)/Critical Care Air Transport Team (CCATT) will complete DD Form 2852, *AE Event/Near Miss Report*, IAW AFI 41-307.
- 1.5.2. Due to the evolving nature of medical equipment and advancing medical technology, equipment fielded between the two-year publication reviews of AFI 10-2909 will be placed in an “Aeromedical Evacuation Medical Equipment Compendium”. The AE Medical Equipment Compendium and Equipment User’s Manual, located at <https://private.amc.af.mil/a3/a3v/publications.aspx>, provides operational guidance for newly fielded PMI medical equipment and general guidance to safely secure and monitor frequently used and approved non-standard/non-PMI medical equipment.
- 1.5.3. For a current and complete listing of approved medical equipment, refer to the “Equipment Catalog and AE Status Guide” posted on the Air Force Medical Logistics website: <https://medlog.detrick.af.mil/index.cfm?object=7CF4BC22-E135-9B4A-DBA0D1CDB1>

1.6. Equipment Accountability. Per Department of Defense Instruction (DoDI) 6000.11, *Patient Movement*, the Commander, United States Transportation Command (CDRUSTRANSCOM), serves as the DoD single manager for Patient Movement and PMI. IAW Joint Publication (JP) 4-02, *Health Service Support*, Air Mobility Command (AMC) executes the PMI program. All assigned medical equipment will be kept in a mission ready status and will be maintained on host base Defense Medical Logistics Standard Support (DMLSS) records IAW AFI 41-209, Chapter 7, to ensure proper asset accountability, quality assurance and maintenance histories. All supplies and equipment assigned to a War Reserve Material (WRM) project are owned by the Medical Dental Division (MDD) until deployed, and will be maintained on DMLSS records IAW AFI 41-209, Chapter 13. When material is required to support training, follow procedures in AFI 41-209 and contact HQ AMC/SGXM to request loan of WRM and complete a Memorandum of Agreement (MOA). While this equipment may be temporarily loaned and used for training, it will not be marked “For Training Use Only” or other similar wording. If an item is not serviceable it will be turned in for evaluation to the host medical equipment maintenance activity for investigation.

1.7. Equipment Responsibility. The host medical equipment maintenance activity/MTF provides organizational maintenance for all AE medical equipment as outlined in AFI 41-201, *Managing Clinical Engineering Programs*. This includes initial inspections, preventive maintenance inspections, calibrations, repairs, modifications, incident investigations, equipment defect reporting, and disposal.

1.7.1. All AE certified and PMI equipment will have the AF Form 4033, *PMI/AE Certification Label*, and the AF Form 4368, *Scheduled Maintenance and Certification Label*, or AFTO Form 394, *TMDE Certification*. Only safe-to-fly certified AE and PMI equipment will be used for PM. The medical equipment maintenance activity will ensure an AF Form 4033 is affixed to each AE or PMI medical equipment item. Individuals performing specific calibration or certification procedures must affix a completed AF Form 4368 or AFTO Form 394 to the equipment item.

1.7.2. Medical equipment will be furnished by the PMI Program and will be maintained on host medical equipment management office (MEMO)/MTF account records on account XX5881. Biomedical equipment maintenance services support will be provided by the host MTF, regional Medical Equipment Repair Center (MERC), or PMI Center. The unit is responsible for establishing appropriate Memorandums of Understanding (MOU) or Memorandums of Agreement (MOA) with the host medical equipment maintenance activity/MTF. An expense for normal repair and/or replacement due to loss/damage will be the responsibility of the unit. Equipment accessories not maintained on the AS will be the unit's responsibility to replace. HQ AMC/SGXM will provide the initial outfitting quantities of AE inflight kit equipment, program for replacement when a change in the make and/or model is designated, and manage system-wide modifications to equipment.

1.7.3. The unit AE medical equipment section at home station is responsible for user maintenance of assigned AE operational inflight kits. This includes establishing procedures to ensure defibrillator batteries are properly conditioned and annotated, ensuring proper operation and use of equipment, cleaning, minor operational adjustments, and replacement of consumable accessories. In addition, they ensure all mission-assigned equipment is:

1.7.3.1. Within calibration requirement dates and that this date will not be exceeded during the planned mission scenarios. These dates are recorded on the AF Form 4368, affixed to the equipment.

1.7.3.2. Made available for preventive maintenance inspections and calibration verification as required by the host medical equipment maintenance activity Biomedical Equipment Technician (BMET).

1.7.3.3. Maintained in mission-ready status. Equipment must be calibrated, charged, cleaned and have all required accessories.

1.7.3.4. Meets the precautions and guidance of the infection control program as outlined in AFI 44-108, *Infection Prevention and Control Program*.

1.7.3.5. Identified with an AMC/SGXM provided PMI bar code label, prior to use, as outlined in AFI 41-209, chapter 8.

1.7.3.5.1. AE units and other medical elements handling PMI will track PMI assets leaving and entering their facilities IAW AFI 41-209, chapter 8.

1.8. Equipment Malfunction/Failure. Notify host medical equipment maintenance activity/MTF as soon as possible of unusual or repeated equipment failure and safety incidents.

1.8.1. If equipment malfunction/failure occurs during an AE mission the MCD will ensure the following paperwork/actions are accomplished:

1.8.1.1. Complete AFTO 350, *Repairable Item Processing Tag*.

1.8.1.2. Upon arrival to home station, **immediately** send tagged equipment and all accessories to host medical equipment maintenance activity/MTF. Medical equipment maintenance will impound the equipment and conduct the investigation. **NOTE:** BMETs report equipment defects as Category I, II, or III type complaints, IAW AFI 41-201, Chapter 2. Applicable forms, with directions, are available at: <https://www.medical.dla.mil/Portal/Customer/Product>. Completion of forms alerts the Air Force Medical Operations Agency (AFMOA) of the incident. In addition, BMETs coordinate complaints involving aeromedical equipment with AMC/SGXM. AFMOA will provide disposition action direction. If additional testing is required, AFMOA/SGAL will forward authorization to the AFLCMC/Aeromedical Test Laboratory for further evaluation. AMC/SGXM will facilitate shipping arrangements.

1.8.1.3. Complete DD Form 2852 and turn into the squadron Patient Safety Monitor (PSM) who enters the event into the AE Patient Safety Database tool.

1.8.1.4. Describe the problem as accurately as possible on the above forms. Provide circumstances leading to the event and include any pertinent information such as: O₂ source, patient activity, turbulence, cabin altitude, trouble-shooting attempted, etc. Also provide names and contact information of individuals involved.

1.8.1.5. When equipment malfunction affects the aircraft, notify the Pilot-in-Command (PIC) and provide details of the incident to facilitate mishap reporting (to be forwarded to wing safety).

1.9. Equipment Implementation. All AE medical equipment will be implemented for use upon delivery from HQ AMC/SGXM and receipt of the Initial Capabilities Document and AMC/A3TM generated training plan. Upon receipt of equipment and associated Initial Capabilities Document and AMC/A3TM training plan, the implementation phase will be as follows: 90 days for Active Component and Deployed units and 180 days for Air Reserve Component units (AFRC/ANG).

Chapter 2

AIR AND OXYGEN EQUIPMENT

2.1. Bag-Valve-Mask Resuscitator (Adult/Child/Infant)

2.1.1. **Purpose.** The Bag-Valve-Mask (BVM) Resuscitators are used to administer artificial ventilation when natural inspirations are insufficient or absent. **NOTE:** BVM Resuscitator brands may be disposable or reusable depending on the manufacturer selected for AE In-Flight Kit, Packaging Guide/Allowance Standard. The following guidelines are general in description. Variances based on current brand will be identified prior to use.

2.1.2. **Parts.** The BVM kit consists of a bag valve-mask assembly, and an oxygen reservoir bag (or corrugated tubing). There are three (3) sizes:

2.1.2.1. **Adult** – The Adult unit consists of cuffed masks, a non-re-breathing patient valve, a ventilation bag, an intake/reservoir valve, and an oxygen reservoir bag (or corrugated tubing).

2.1.2.2. **Child** –The Child unit is similar to the Adult unit, but has smaller cuffed masks, a non-re-breathing patient valve with a pressure limiting device, a ventilation bag, an intake/reservoir valve and an oxygen reservoir bag (or corrugated tubing).

2.1.2.3. **Infant** – The Infant unit is similar to the Child unit, but has a one piece mask, a non-re-breathing patient valve with pressure limiting device, a ventilation bag, an intake/reservoir valve and an oxygen reservoir bag (or corrugated tubing).

2.1.3. **Pre-flight.** Ensure all components are present and in serviceable condition.

2.1.3.1. Ensure the bag is intact, and does not contain any rips, or holes.

2.1.3.2. Ensure the location of airway adjuncts is known.

2.1.4. **Performance.** Select the resuscitator based on patient size (Adult, Child, or Infant). Connect oxygen tubing from the BVM to flow meter or oxygen flow regulator outlet and set the rate to “Flush” to achieve maximum oxygen percentage available based on BVM type. Connect the appropriate sized mask to the manual resuscitator. Place an airway adjunct if necessary to maintain a patent airway. Seal the mask over the patient’s nose and mouth. Maintaining a seal, compress the ventilation bag to ventilate the patient. Observe for chest rise and fall. **WARNINGS:** If applicable, ensure proper size reservoir bag is used with each ventilation bag. Ensure non-re-breathing valve, with pressure limiting device, is in place on child and infant units. If needed, the pressure-limiting device can be overridden. Ensure a BVM with a Positive End Expiratory Pressure (PEEP) accompanies intubated patients on ventilators when PEEP is > 5 mmHg. PEEP valve is available on the Allowance Standard. **NOTES:** The pressure-limiting device restricts airway pressure to 35 centimeters H₂O pressure. The oxygen reservoir bag must inflate with oxygen to be effective. If it does not, ensure oxygen is being delivered to the unit at an adequate rate. For patients who require airborne infection control precautions, place ventilator breathing circuit filter aft of mask and forward of elbow fitting. If expired body fluids block the filter; replace filter and continue cardiopulmonary resuscitation effort. If endotracheal tube (ET) is used, place filter aft of ET and forward of BVM elbow fitting.

2.1.5. **Cleaning.** Refer to manufacturer's guidelines for reusable BVM resuscitator cleaning specifics.

2.2. Minilator.

2.2.1. **Purpose.** The Minilator is an oxygen distribution system designed to provide therapeutic oxygen for up to five (5) patients from a single oxygen hose from a given source. **WARNING:** The Minilator was not designed for and will not be used to support ventilatory devices. Connect a separate oxygen hose from an approved oxygen source to operate ventilators. **NOTE:** The oxygen flow control valve, from the PTLOX/NPTLOX system accessory kit, will not be used with the Minilator. Utilize the flow control valves or veriflow flow meters carried in the AE Inflight Kits.

2.2.2. **Parts.** The Minilator is an oxygen distribution system with one (1) inlet, which is connected to the oxygen source, and five (5) outlet valves for distributing oxygen, and (1) connector for use with a standard oxygen hose. Check valves are installed in the outlets to prevent oxygen flow from any unused outlets. Dust covers are installed to prevent debris from entering the Minilator.

2.2.3. **Preflight.** Inspect the manifold and connector for damage or obvious contamination.

2.2.4. **Performance.** Connect standard low-pressure oxygen hose to the connector, and the connector to the Minilator inlet valve. Remove the necessary dust caps from the outlet valves, and connect a flow meter or a standard low-pressure oxygen hose to the outlets. Connect the low-pressure hoses to flow meter/humidifier assemblies and purge the system with low flow oxygen, and then set the flow rates to the prescribed values.

2.2.4.1. When using the PTLOX/NPTLOX as an oxygen source, connect the PTLOX/NPTLOX low-pressure hose directly to the Minilator inlet valve. Remove the necessary dust caps from the outlet valves and connect a veriflow flow meter or a standard low-pressure oxygen hose to the outlets. Ensure veriflow flow meter setting is at zero. Then connect the PTLOX/NPTLOX low-pressure hose with Schrader end into the PTLOX/NPTLOX system. Purge system to clear the lines of any contaminants and return setting to zero. Attach humidifier assemblies as required and set the flow rates to the prescribed values. **WARNING:** Prior to connecting to an oxygen source, a flow meter with index set at zero must be attached to any oxygen hose connected to the Minilator. **NOTES:** When using a Minilator with the PTLOX/NPTLOX, the maximum oxygen flow is 60 liters per minute (LPM). Minilator outlets have a one-way valve allowing the connection/disconnection of a flow meter to the Minilator without disconnecting from the oxygen source.

2.2.4.2. **Disassembly/Storage.** Ensure patients have been disconnected from oxygen and the lines have been turned off. Discontinue the oxygen source to the Minilator. Remove the hoses from the Minilator outlets and replace the dust caps. Disconnect the hose from the Minilator inlet or connector and remove the connector (if used) from the inlet. Replace the dust cap. Store the Minilator and connector, if applicable.

2.3. Oxygen Analyzer – MiniOX 3000 Oxygen Monitor.

2.3.1. **Purpose.** The MiniOX 3000 Oxygen Monitor is designed to monitor oxygen concentrations delivered to patients supported by ventilators, high flow oxygen concentration devices or in an incubator.

2.3.2. **Parts.** The MiniOX 3000 consists of:

2.3.2.1. (1) MiniOx 3000 monitor, (2) MSA medical oxygen sensors, (1) 10-foot Sensor cable, (1) “T” adapter, (1) Sensor retaining strap, (1) Securing bracket, (2) 9 volt batteries, and (1) Carrying case.

2.3.3. **Power.** (1) Standard 9 volt battery housed in the back of the monitor.

2.3.4. **Preflight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

2.3.4.1. Inspect the system for any signs of damage.

2.3.4.2. Inventory the parts.

2.3.5. **Performance.** Insert the gasket end of the sensor into the “T” adapter. Secure in place with sensor retaining strap. Attach the sensor to the coiled cable. Firmly press the connector until it snaps into place; tighten the twist collar. Insert the opposite end of the coiled cable into the jack on the side panel of the monitor; tighten the twist collar. Calibrate the MiniOX 3000 per directions below. **NOTES:** If utilizing a new sensor, expose the sensor to ambient air for one (1) hour after removal from its package before performing calibration. DO NOT handle the sensor while performing calibrations. Body heat can cause the sensor’s thermistor to change disproportionately to the change in gas sample temperature at the sensing electrode. This may produce errors until thermal equilibrium is restored.

2.3.5.1. The MiniOX 3000 Monitor must be calibrated:

2.3.5.1.1. On the ground, prior to patient use.

2.3.5.1.2. Following sensor disconnection/reconnection.

2.3.5.1.3. When environmental conditions (temperature, pressure and humidity) change.

2.3.5.1.4. Following change of battery.

2.3.5.1.5. Before using the monitor at final cruising cabin altitude.

2.3.6. To Calibrate in Room Air:

2.3.6.1. Press I/O to turn ON the instrument. “CAL” flashes in the display. Press 21%. The following appears on the display: “CAL,” “LOCKED,” and “21% Cal.” Press UNLOCK key. The following will be displayed: “CAL,” “21% CAL,” and a 10-segment bar graph that “counts down” two seconds per bar for 20 seconds.

2.3.6.2. After 20 seconds, the calibration process is complete. The device should display 20.8% +/- 2% O₂, proceeds to the monitoring mode, and displays the current oxygen concentration as %O₂.

2.3.7. To Calibrate at 100 O₂ %:

2.3.7.1. Calibrate in room air (See 2.3.6). Then expose the sensor to 100% oxygen, via T-adaptor with O₂ at 4LPM, and allow the readings to stabilize prior to initiating the calibration. “CAL” flashes in the display. Press 100%. The following appears on the display: “CAL,” “LOCKED” and “100% Cal.” Press UNLOCK. The following appears on the display: “CAL,” “100% Cal,” and a 10-segment bar graph that “counts down” two seconds per bar for 20 seconds. After 20 seconds, the calibration process is complete and the device displays: 100% +0/-2% (98% to 100%), proceeds to the monitoring mode and displays the current oxygen concentration as % O₂. **NOTES:** The MiniOX 3000 Oxygen Monitor has a five-second “time out” following keypad functions. If you do not press UNLOCK within five seconds, the instrument returns to the flashing “CAL” mode. During calibration, if “CAL ERR” flashes in the display, visual/audible alarms activate and then “CAL” flashes, turn OFF the instrument and repeat calibration procedure. When recalibrating, be sure to select the calibration value and use the corresponding calibration gas. If “CAL” continues to display following proper calibration or “CAL ERR” reoccurs, it may be necessary to replace the sensor.

2.3.8. In-flight Calibration:

2.3.8.1. If the MiniOX 3000 has been used on the ground or the unit is initially being used in-flight, recalibrate prior to use at cruising altitude. To calibrate in-flight, use the standard 21% and 100% calibration procedures (see 2.3.6. and 2.3.7.). **WARNING:** The sensor responds to partial pressure (not percentage) of oxygen. Changes in barometric pressure alter the reading, even if the percent of oxygen in the sample remains constant. Therefore, to eliminate error due to pressure changes, the instrument shall be calibrated at altitude. **NOTE:** When calibrating the monitor at altitude the cabin pressure must remain at a constant level for at least 2-3 minutes before calibration can be accomplished. If cabin altitude changes, recalibrate the MiniOx 3000 at the new pressure.

2.3.9. Installing the Sensor in a Breathing Circuit.

2.3.9.1. Install the “T” adapter into the breathing circuit upstream from the humidifier. Make sure that the side port of the “T” adapter is facing upward. Remove the coiled cable from the sensor. Firmly insert the sensor into the “T” adaptor with the sensor pointing downward to prevent moisture from condensing onto the sensor membrane. **NOTE:** Ensure that the sensor is placed upstream of the humidifier and the sensor is mounted pointing down to prevent moisture from draining onto the sensor membrane. If moisture is allowed onto the membrane it will result in a lower oxygen concentration reading and an increased response time.

2.3.10. Alarms.

2.3.10.1. The MiniOX 3000 Oxygen Monitor has audible and visual alarms that activate when oxygen concentrations exceed preset low or high alarm settings. Default settings are 18% and 50% respectively; however, the operator may select alarm levels between 15% and 100%.

2.3.10.2. Setting the Alarms.

2.3.10.2.1. To set the Low Alarm: Press SET once. The following appears on the display: “AL,” and up/down arrows. Using the arrow keys, scroll up or down to the desired Low Alarm set point (15% to 99%). The MiniOX 3000 Oxygen Monitor

“locks” this value. After five seconds, the monitor will beep once and automatically proceed to the Monitoring Mode. **NOTE:** The Low Alarm CANNOT be disabled or set below 15%, above 99%, or higher than or equal to the High Alarm setting.

2.3.10.2.2. To set the High Alarm: Press SET twice. The following appears on the display: “AL” and up/down arrows. Using the arrows keys, scroll up or down to the desired High Alarm set point (16% to 100%). The MiniOX 3000 Oxygen Monitor “locks” this value. After five seconds, the monitor will beep once and automatically proceed to Monitoring Mode. (Press SET once after selecting set point to manually proceed to Monitoring Mode). **NOTES:** The High Alarm value CANNOT be set equal to, or less than, the Low Alarm value but CAN be disabled by increasing the alarm set point beyond 100% until “—” is displayed. In order to retain alarm settings, do not remove battery.

2.3.10.3. Low Battery Alarm. The MiniOX 3000 Oxygen Monitor features a two-stage battery alarm that warns of depleted and expired battery voltage.

2.3.10.3.1. The first alarm alerts the operator that the monitor has approximately six hours of operating time remaining; “LOW BAT” appears in the display, with an audible alarm that sounds at 30-second intervals.

2.3.10.3.2. If the operator does not replace the battery after this alarm, a second low battery alarm activates when the battery is no longer able to support monitoring. The monitor displays “LOW BAT” and the following: --- . In addition, audible/visual alarms are activated.

2.3.11. Sensor Information.

2.3.11.1. Replace the sensor if the following occurs: room air reading is greater than 20.8% +/- 2% (18.8% to 22.8%) in Two-Point Linearity Check (See Manual), the MiniOX will not calibrate, “Sensor” “OFF” display and audible/visual alarms persist when sensor and cable connections are correct and cable is viable.

2.3.11.2. To replace the sensor, verify that the monitor is turned OFF. The display should be blank. Disconnect the expired sensor from the coiled cable. Attach a new sensor to the coiled cable and firmly press the connector until the sensor snaps into place. Tighten the twist collar. Recalibrate the monitor. **WARNING:** The sensor is a sealed unit containing potassium hydroxide. If the sensor leaks, discard it immediately. The sensor contains a caustic material which can be fatal if swallowed and must be disposed of in accordance with Federal, State and Local regulations. If deployed, contact the local BMET or Base Environmental Engineer for disposal instructions. Should contact with skin or clothing occur; rinse area immediately with large quantities of water. In case of eye contact, immediately flush eyes with water for at least 15 minutes, holding eyes open. Contact a physician. **NOTE:** The sensors are warranted by the manufacturer for a useful life of 12 months. (However, the sensor is useful as long as the device calibrates to room air IAW para 2.3.6.) Sensor life starts at manufacturing. The manufacturing date appears on the side shaft of the sensor as a two-digit identifier. The first digit represents a month (A=JAN, B=FEB, C=MAR, D=APR, E=MAY, F=JUN, G=JUL, H=AUG, I=SEP, J=OCT, K=NOV, L=DEC). The second digit the year of manufacture corresponds: (0=2000; 1=2001, 2=2002, 3=2003).

2.3.12. Disassembly and Storage.

2.3.12.1. Press "OFF" to switch the MiniOX 3000 monitor off, and then disconnect the sensor cable from the monitor and sensor. Store the sensor and cable in the carrying case. Remove the securing bracket and detach the monitor from the bracket. Store both the bracket and monitor in the case.

2.3.13. **Battery Replacement.**

2.3.13.1. Verify that the monitor is turned OFF. The display should be blank. Pull out the support stand from the back of the case. Unscrew the two screws on the battery cover in back of the instrument and remove the cover. Remove the battery from the case and unsnap the battery from the battery holder. **NOTE:** To ensure proper start-up, wait at least 45 seconds before connecting a new battery to the battery connector. Snap the terminal of the new 9-volt battery into the battery holder. Install the battery cover and screw into place. Make sure that the battery cover is properly seated and flat on the back of the MiniOX 3000 Oxygen Monitor case. Recalibrate the monitor. Reset the low and high alarms, if desired.

2.4. **Portable Therapeutic Liquid Oxygen System (PTLOX).**

2.4.1. **Purpose.** The PTLOX is designed to provide controlled flow of humidified oxygen from three (3) oxygen outlets when an aircraft oxygen source is unavailable. Oxygen is delivered to the converter outlets at a pre-set pressure of 50 +/- 5 pounds per square inch (psi), and a maximum flow rate of 15 LPM per outlet due to the limiting factor of (3) integral flow control valves, located in the accessory kit, each with the peak rate of 15 LPM per flow control valve, with an overall maximum oxygen flow rate of 45 LPM for the unit. A pressure gauge continuously registers oxygen delivery pressure.

2.4.1.1. During all operational and Aeromedical Readiness Missions, the MCD will document on the AF Form 3829, or on the computer generated TRANSCOM Regulating and Command & Control Evacuation System (TRAC2ES) cover sheet: Total patient oxygen requirement; Total pre-mission PTLOX/therapeutic oxygen level; Total mid-mission PTLOX/therapeutic oxygen level; Total post-mission PTLOX/therapeutic oxygen level; Maximum cabin altitude during mission. **NOTE:** When using a Minilator and additional flow control valves or veriflow flow meters carried in the AE Inflight Kits, the maximum flow rate of 60 LPM may be achieved. **WARNING:** A dedicated PTLOX will be utilized for ventilated patients (only one ventilator will be connected to one PTLOX). Do not exceed the maximum flow rate of 60 LPM. If exceeded, ventilator(s) will not function properly.

2.4.2. **Parts.**

2.4.2.1. **Container Assembly:** The container assembly consists of three (3) gaseous oxygen outlets with dust caps, an operate button to check the level of liquid oxygen (LOX), a test button to check the battery condition, a pressure gauge to check the psi of the converter, a liquid oxygen filler port, a vent tube, four (4) securing straps, and an internal drip pan. **NOTE:** The internal drip pan is large enough to hold possible spillage and thus provides an added safety feature should a catastrophic system failure occur. Therefore no external drip pan is necessary.

2.4.2.2. **Accessory kit:** The accessory kit attaches to the top of the container assembly unit. It contains the following: three (3) 20-foot oxygen hoses, three (3) flow control valves, and three (3) humidification bottles. **WARNING:** Per AFI 21-101, *Aircraft and Equipment Maintenance Management*, maintenance and filling of LOX systems will be done only by qualified personnel. Per Technical Order (T.O.) 15X-2-8-1, *Technical Manual, Operation and Maintenance Instructions with Illustrated Parts Breakdown, Maintenance Level(s), Liquid Oxygen Converter, P/N 50C-0021-1*, only personnel fully trained and qualified in handling and servicing liquid oxygen are authorized to service the container assembly. Never allow the container assembly to be placed where the vent may be obstructed.

2.4.3. **Preflight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present. **NOTE:** The PTLOX requires both scheduled monthly and annual inspections. A qualified AECM may perform the monthly inspection IAW T.O. 15X-2-8-1. The annual inspection will be completed by the host unit's designated Biomedical Equipment Maintenance personnel or Maintenance Squadron (MXS) Electrical and Environmental specialists.

2.4.3.1. Inspect the system for any signs of damage.

2.4.4. Ensure the carrying handles and securing straps are in place and are securely attached to the unit.

2.4.5. Open the accessory case, inventory the components and inspect them for serviceability.

2.4.6. Ensure the sterile water has not expired (if present).

2.4.7. Check the structural soundness and function of the accessory case securing latches.

2.4.8. Remove the accessory case from the liquid oxygen unit.

2.4.9. Check the battery condition by depressing the TEST button. The digital display should show between 10.00 and 19.99. If not, replace the batteries with 9-volt batteries. If battery replacement does not correct the problem, complete an AFTO 350 and affix to the unit. Do not use.

2.4.10. Open the outlet cover panel and check the outlets for any indication of damage, then close the outlet cover panel.

2.4.11. Determine the liquid oxygen quantity by depressing the OPERATE button and observing the digital display for the liters of liquid oxygen present. The quantity will be between 0.00 liters and 10.00 liters. One (1) liter of liquid oxygen will equate to 804 liters of gaseous oxygen. Ensure the quantity is sufficient for the mission. **NOTE:** The PTLOX system will be filled with liquid oxygen IAW 11-2AE Vol 3, Table 4.1, for each mission. Minimum of 5 liters of liquid oxygen per PTLOX unit will be carried on all AE missions.

2.4.12. Check the pressure gauge for proper operating pressure (50 +/- 5 psi).

2.4.13. After completing the preflight inspection and when applicable, document completion of the non-scheduled inspection (last date accomplished has exceeded 30 days) on the unit's AFTO Form 244, *Industrial/Support Equipment Record*. Ensure AFTO Form 244 remains

attached to the PTLOX. **WARNING:** Ensure PTLOX does not contain Nitrogen (storage state). Indicated on the unit with a sticker or written in the AFTO Form 244.

2.4.14. **Performance. WARNING:** Protective gloves (i.e. leather work gloves/nomex flight gloves) are required when lifting the PTLOX for transport. Oil, grease, gasoline, kerosene, and other hydrocarbons are not compatible with oxygen. **DO NOT** wear leather work/nomex gloves when connecting the oxygen components. **CAUTION: DO NOT** connect Schrader adapter to outlets if PTLOX is empty or prepared with nitrogen. (Check AFTO Form 244, *Industrial/ Support Equipment Record*, for “Purged for Storage” documentation). This will bleed off pressure and/or introduce contaminants into the system and potentially ruin the unit.

2.4.14.1. Remove and open accessory case. Remove a flow control valve. Remove the dust caps from the inlet and outlet of the flow control valve and secure in the accessory case. Remove an oxygen hose storage reel from the accessory case and remove the hose from the reel. Connect the threaded end of the hose to the inlet on the side of the flow control valve, and ensure the valve is set to 0 LPM. **WARNING:** A flow control valve, with index set at zero (0) must be attached to the supply hose fitting prior to inserting the supply hose Schrader end (tapered) into the oxygen outlet of the container assembly supply receptacle. This procedure is imperative to prevent 50-psi oxygen from escaping out an open hose.

2.4.14.2. Slide the oxygen outlet cover back until it is secure. Remove the outlet cap by twisting the knurled knob at the outlet in a clockwise direction. Insert the Schrader end (tapered) of the oxygen hose into the oxygen outlet and press firmly till it attaches securely. Turn flow control valve to highest setting and allow oxygen to flow for 20 seconds to purge the system. Smell the emitted oxygen for any odors. Return setting to 0 LPM. **WARNINGS:** If any odors other than the hose smell are detected, have other personnel recheck it for odors. Contact MXS Electrical and Environmental specialists as soon as possible and report this incident. Do not use this unit! Replace it. Always connect the flow control valve fitting marked “OUTLET” to the humidifier or an oxygen wing nut adaptor. Reverse connection or use of a GAS source other than 50 ±5-psi oxygen may result in inaccurate flow rates. **NOTE:** The PTLOX system vents oxygen when the system is not being used and a low hissing sound may be heard.

2.4.14.3. Remove a humidification bottle from the accessory case, and fill bottle with sterile water, as required. Attach humidification bottle to the bottom outlet of the flow control valve. Secure the bottle to the litter support strap by wrapping the hook and pile strap on the flow control valve around the bottle and litter support strap. Set the flow control valve to the prescribed flow rate, and ensure there is flow from the humidifier. Place the delivery device on the patient.

2.4.15. **Disassembly and Storage.** Remove delivery device from the patient. Turn the flow control valve off. Remove the oxygen hose from the base assembly oxygen outlet by turning the knurled knob in a clockwise direction and pulling up on the end of the hose. Replace the outlet cap by pushing it firmly into the outlet, and then close the oxygen outlet cover. Remove and dispose of the humidifier bottle. Remove the flow control valve from the oxygen hose, replace the dust caps, and secure the valve in the accessory case. Rewind the oxygen hose on its storage reel and stow the reel in the accessory case. **NOTE:** The oxygen hose must be wound tightly, otherwise it will not fit back into the accessory case.

2.4.15.1. Close and secure the accessory case lid, and attach the case to the top of the container assembly. Release the tie down straps and secure them to the rings on the sides of the unit. **NOTE:** If the PTLOX System is not scheduled for use for a period of 30 days or more, qualified liquid oxygen personnel will prepare the unit for storage as outlined in T.O. 15X-2-8-1. PTLOX will be stored with nitrogen.

2.4.16. **Placement. WARNINGS:** Place a minimum of 50 feet from all sparking or flammable devices. Never place the system where it will come in contact with petroleum products or hydraulic reservoirs. Do not block the ventilation port on the side of the unit. The PTLOX vents off one (1) liter of liquid oxygen every 24 hours in a controlled climate area. The unit can vent off more than one (1) liter per 24 hours, depending on the temperature and humidity. Do not secure/run lines over moving parts. The loadmaster or boom operator will be consulted if oxygen lines are strung outside the litter stanchion area or above the patient support pallet (PSP). **CAUTION:** The PTLOX System is to be positioned facing upright and never on its side.

2.4.17. **Shipping.** When shipping full PTLOX containers, crews may ship up to ten 10-liter PTLOX converters on the C-21 and up to twenty-five 10-liter PT LOX converters on the C-5, C-17, C-130, KC-10, and KC-135, without establishing a means for overboard venting. When shipping more than 6 PTLOX containers as cargo, do not cover PTLOX pallet with plastic; this may cause a high concentration of oxygen. **WARNING:** Ensure cargo floor is free of oil or any other petroleum based products. (Reference: T.O. 15X-2-8-1, pg 4-8).

2.5. Next Generation Portable Therapeutic Liquid Oxygen System (NPTLOX)

2.5.1. **Purpose.** The Next-Generation Portable Therapeutic Liquid Oxygen (NPTLOX) System when filled with liquid oxygen (LOX) will provide for an uninterrupted supply of therapeutic oxygen. The system has the capacity to store twenty liters (20L) of liquid oxygen (LOX) and convert the LOX to a gaseous state. The gaseous oxygen is then humidified and delivered at a controlled flow rate to up to six (6) ambulatory or litter patients. The NPTLOX System is configured to be carried on-board and tied down to the floor of the aircraft cargo compartment.

2.5.2. **Power.** Electrical power consists of two 9V lithium batteries. **CAUTION:** Use only batteries recommended by NPTLOX Operation and Maintenance Manual.

2.5.2.1. To change the batteries, remove the battery compartment access panel on the face of the quantity indicator by removing the four panel retaining screws. Remove the wire leads from the batteries. Remove the batteries from the battery clips. Insert two new 9-volt lithium batteries (NSN 6135-01-369-9792) into the battery clips. Attach the wire leads to the new batteries. Press the "TEST" button and check the value displayed. The reading should be between "10.0" to "16.0". Reinstall the battery compartment access panel. Install the four access panel retaining screws.

2.5.3. Parts.

2.5.3.1. **Container Assembly:** The Container Assembly combines the following items into a single, portable and transportable unit: a liquid oxygen dewar, heat exchangers, relief valves, pressure regulating valves, outlet pressure gauge, LOX quantity indicator, battery "TEST" indicator, miscellaneous tubing and fittings, (6) quick disconnect outlet ports, and (4) tie down provisions. **CAUTIONS:** High Vacuum Container Handle with

Care. Keep the Container Assembly sliding door closed at all times when the Container Assembly is not in use to prevent entry of contamination around the six oxygen outlet quick disconnect receptacles. **NOTE:** Dimensions are as follows: Length 22 inches, Width 18 inches, Height 32 inches, and Weight 148lbs.

2.5.4. **Accessory Kit:** The accessory kit attaches to the top of the container assembly unit. It contains the following: three (3) 20-foot oxygen hoses, three (3) flow control valves, and three (3) humidification bottles.

2.5.5. **Preflight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present. **NOTE:** The NPTLOX requires both scheduled monthly and annual inspections. A qualified AECM may perform the monthly inspection IAW T.O. 15X2-5-22. The annual inspection will be completed by the host unit's designated Biomedical Equipment Maintenance personnel or Maintenance Squadron (MXS) Electrical and Environmental specialists. **WARNING:** Per AFI 21-101, maintenance and filling of LOX systems will be done only by qualified LOX personnel. Per T.O. 15X2-5-22, only personnel fully trained and qualified in handling and servicing liquid oxygen are authorized to service the container assembly. Never allow the container assembly to be placed where the vent may be obstructed.

2.5.5.1. Check both the Container Assembly housing and the Accessory Kit case for any damage that could possibly affect the system performance, such as: missing components, severe dents, missing fasteners, broken or damaged latches and tie downs, cracked or broken lens on the outlet pressure gauge, or any visible damage to the quantity indicator.

2.5.5.2. Check the LOX quantity by actuating the "LOX QTY" button. The quantity will be between 0.00 liters and 20.00 liters. One (1) liter of liquid oxygen will equate to 804 liters of gaseous oxygen. Ensure the quantity is sufficient for the mission. **NOTE:** Minimum of 5 liters of liquid oxygen per NPTLOX unit will be carried on all AE missions.

2.5.5.3. Check the battery power by actuating the "TEST" button. The reading should be between "10.0" to "16.0". If not, replace the batteries with 9V lithium batteries. If battery replacement does not correct the problem, complete an AFTO 350 and affix to the unit. Do not use.

2.5.5.4. Check the pressure gauge for proper operating pressure and ensure it reads (50 +/- 5 psi). **NOTE:** The pressure indicated on the outlet pressure gauge should be within the green zone (45 to 55 PSIG) during use. The pressure can indicate as high as 62 PSIG while in standby with no flow.

2.5.5.5. Check the Container Assembly sliding door, covering the outlet ports, for smooth and positive operation.

2.5.5.6. Check the Container Assembly outlet ports for general condition, for smooth and positive action and ensure the protective dust covers are installed. Ensure the outlet ports are free of contamination and the surrounding area is clean.

2.5.5.7. Check Accessory Kit contents for (3) each of the flow control valve assemblies, oxygen hoses on racks, Schrader/DISS adapter fittings, and humidification bottles.

2.5.5.8. Check the flow control valves for cleanliness and for smooth operation of the control knob through its entire setting range.

2.5.5.9. Check the oxygen hoses for end fitting condition, excessive hose wear and flexibility, obvious physical damage and cleanliness.

2.5.5.10. Check the humidification bottles for the 300 ml container and screw on cap assembly for obvious physical damage and cleanliness.

2.5.5.11. After completing the preflight inspection and when applicable, document completion of the non-scheduled inspection (last date accomplished has exceeded 30 days) on the unit's AFTO Form 244, *Industrial/Support Equipment Record*. Ensure AFTO Form 244 remains attached to the NPTLOX.

2.5.6. Performance. WARNING: Protective gloves (i.e. leather work gloves/nomex flight gloves) are required when lifting the NPTLOX for transport. Oil, grease, gasoline, kerosene, and other hydrocarbons are not compatible with oxygen. Spontaneous ignition upon contact of oxygen with these substances may result. **DO NOT** wear leather work/nomex gloves when connecting the oxygen components.

2.5.6.1. Each assembly is comprised of a flow control valve, a clip assembly and a retaining strap. **WARNING:** Prior to connecting an oxygen hose to an outlet port, a flow control valve, with the control knob set at zero (0), must be attached to the mating hose fitting. This step is imperative to prevent pressurized oxygen from escaping out an open-ended hose.

2.5.6.2. Remove and open accessory case. Remove a flow control valve. Remove the dust caps from the inlet and outlet of the flow control valve and secure in the accessory case. Remove an oxygen hose storage reel from the accessory case and remove the hose from the reel. Connect the threaded end of the hose to the inlet on the side of the flow control valve, and ensure the valve is set to 0 LPM. **WARNING:** Always connect the flow control valve fitting marked INLET to the mating fitting on the oxygen hose and the fitting marked OUTLET TO PATIENT to the humidifier bottle or oxygen tuning connector. Reversing these connections or use of a gas source other than specified may result in inaccurate flow rates and patient injury.

2.5.6.3. Slide the oxygen outlet cover back until it is secure. Remove the outlet cap by twisting the knurled knob at the outlet in a clockwise direction. Insert the Schrader end (tapered) of the oxygen hose into the oxygen outlet and press firmly until it attaches securely. Turn flow control valve to highest setting and allow oxygen to flow for 20 seconds to purge the system. Check to ensure that the oxygen delivery pressure indicated on the outlet pressure gauge does not fall below 45 PSIG. Smell the emitted oxygen for any odors. Return setting to 0 LPM. **WARNING:** If any odors other than the hose smell are detected, have other personnel recheck it for odors. Contact MXS Electrical and Environmental specialists as soon as possible and report this incident. Do not use this unit! Replace it. **CAUTION:** The oxygen flow produced by this device can be within 10 degrees F of ambient temperature. Caution should be exercised if the room temperature is warmer than 90 degrees F. **NOTE:** If more than 3 outlets are used simultaneously, ensure that the combined total flow rate does not exceed 66 LPM.

2.5.6.4. Assemble the humidification bottle by filling the 300ml container with sterile water and attaching it to the humidifier adapter. Attach the flow control valve fitting marked "OUTLET TO PATIENT" to the mating fitting on humidifier adapter. Ensure that the oxygen flow is in the proper direction. Connect patient oxygen mask or cannula to the outlet tube fitting of the humidifier adapter.

2.5.6.5. Place the mask or cannula on the patient as required. Oxygen may be administered by adjusting the flow control valve knob to the following settings: 0, 0.5, 1, 2, 3, 4, 5, 6, 8, 10, 12 and 15 liters per minute when supply pressure is at 50 +/- 5 psi (green zone on the outlet pressure gauge). **NOTES:** The Uni-Vent 754 Ventilator by Impact is authorized for use with the NPTLOX. Two ventilators can be connected to one NPTLOX System when using the following recommended settings: Tidal Volume: 550 ml (milliliters), Rate: 20 BPM (Breaths per Minute), FiO₂: 100%, and I:E Ratio of 1:2. If the ventilators are set at higher tidal volumes, it is recommended that one ventilator be used per NPTLOX System. **WARNING:** If two ventilators are used with one NPTLOX, at higher tidal volumes, pressure on the NPTLOX can drop which will not provide adequate flow needed to operate the ventilator.

2.5.7. Placement.

2.5.7.1. Placement of the NPTLOX in the aircraft is at the discretion of the MCD and CMT based on the following criteria: **WARNINGS:** Place a minimum of 50 feet from all sparking or flammable devices. Never place the system where it will come in contact with petroleum products or hydraulics. Operate and maintain the NPTLOX system only in a well-ventilated location. Never allow the unit vent port to be obstructed. The vent port must remain open at all times. The NPTLOX system should remain upright at all times when filled with LOX to avoid improper operation and excessive venting of oxygen. Do not secure/run lines over moving parts. The loadmaster or boom operator will be consulted if oxygen lines are strung outside the litter stanchion area or above the patient support pallet (PSP). Do not position NPTLOX near hydraulic reservoirs. Ensure cargo floor is free of oil or any other petroleum based products. (Reference: T.O. 15X2-5-22, pg 9). Secure the NPTLOX system in place when used inflight or transported in a ground vehicle.

2.5.8. Disassembly and storage. Disassemble the NPTLOX System in the reverse order of assembly. Remove delivery device from the patient. Turn the flow control valve off. Remove the oxygen hose Schrader end from the base assembly oxygen outlet by turning the knurled knob in a clockwise direction and pulling up on the end of the hose. Replace the outlet cap by pushing it firmly into the outlet, and then close the oxygen outlet cover. Remove and dispose of the humidifier bottle. Remove the flow control valve from the oxygen hose, replace the dust caps, and secure the valve in the accessory case. Rewind the oxygen hose on its storage reel and stow the reel in the accessory case. **NOTE:** The oxygen hose must be wound tightly, otherwise it will not fit back into the accessory case.

2.5.8.1. Close and secure the accessory case lid, and attach the case to the top of the container assembly. Release the tie down straps and secure them to the rings on the sides of the unit. **NOTE:** The NPTLOX system will be stored with nitrogen IAW T.O. 15X2-5-22.

2.6. Pulse Oximeter BCI 3303.

2.6.1. **Purpose.** Continuously monitors arterial hemoglobin oxygen saturation, pulse rate, and pulse strength on neonate through adult patients by non-invasive means.

2.6.2. **Parts.** Oximeter; Adult Probe (>45 kg), Pediatric (15-45kg) probe, Infant (3-15 kg) probe, Neonate (<3 kg) probe; 5 ft cable; battery charger; protective rubber boot with carrying strap and mounting slide. **NOTE:** Multiple reusable probes are available for each weight category. **WARNING:** BCI 3303 Oximeter probe is not interchangeable with other monitors. Use of the BCI 3303 Oximeter probe with the ZOLL M-Series CCT and Propaq Encore 206 EL will cause inaccurate readings.

2.6.3. **Power.** 105 volts alternating current (VAC) to 125 VAC/60 hertz (Hz) and a four cell rechargeable Nickel Metal Hydride battery back. Fully charged battery pack will operate for a minimum of 24 hours and requires 6 hours to charge. **WARNING:** The BCI 3303 has been approved for monitoring use on internal battery ONLY in the AE environment. DO NOT connect AC power supply to the monitor for patient use in the aircraft. Power surges or spikes will cause the monitor to display inaccurate readings.

2.6.4. **Preflight.** Ensure the calibration is complete and current on the AF Form 4368. Ensure all components are complete and in serviceable condition. Ensure AF Form 4033 is complete and present.

2.6.4.1. Connect the AC power supply to the monitor. Ensure the POWER and CHARGING lights have illuminated.

2.6.4.2. Connect the probe to the monitor.

2.6.4.3. Turn the monitor on. Place probe on finger. Measure the SpO₂, pulse rate, and pulse strength bar graph.

2.6.4.4. Remove from finger, ensuring PROBE/SENSOR alert alarm sounds and illuminates. Turn off oximeter. **NOTE:** The oximeter may be charged in flight and is fully charged when charging light turns off. The oximeter power cord cannot be connected to the ECAS due to cord design. To charge inflight, plug directly into frequency converter or approved 115V/60 Hz aircraft outlet.

2.6.4.5. Disconnect power supply, turn on to ensure monitor operates on battery power.

2.6.5. Performance.

2.6.5.1. Connect desired monitoring probe to device. Press ON key and observe cycling of pulse bar graph light, SpO₂, and pulse rate. Apply probe to patient and allow a minimum of 60 seconds for the monitor to obtain and analyze the patient's SpO₂ reading. **WARNINGS:** When SENSOR is flashing, the monitor cannot measure the patient's SpO₂ or pulse rate. Check the patient's condition. Change sensor site at least every 4 hours when using the tape on probe to ensure circulatory and skin integrity is maintained. The finger clip probe should be used for spot check monitoring or continuous monitoring of less than 30 minutes.

2.6.5.2. Front panel and Alarms:

2.6.5.2.1. The POWER light is green when power supply is attached.

2.6.5.2.2. The CHARGING light is yellow when the battery is fast charging.

2.6.5.2.3. The BATT light flashes when approximately 30 minutes of battery use remains, and will automatically turn off after the 30 minutes are up.

2.6.5.2.4. The ALARM SILENCED light (a bell with a slash through it) flashes when the alarm silence button is pressed. The alert tones are then silenced for two minutes. The ALARM SILENCED light remains on when the alarm silence button is held down for a few seconds and the alarm alert tones are silenced indefinitely until canceled or the monitor is turned off.

2.6.5.2.5. The ALARM SEL key cycles through each of the alarm limits for the settings. Use the up and down arrow keys to set high and low SPO₂ and pulse rate.

2.6.5.2.6. The VOL ALARM key changes the volume from soft to loud.

2.6.5.2.7. The VOL PULSE key changes the pulse “beep” volume and ID/Clear key is used for trending in Sleep Study Mode.

2.6.6. **Cleaning.** Clean the reusable probes with Isopropyl alcohol wipes. The oximeter may be cleaned with a mild detergent and a damp cloth. **CAUTION:** DO NOT use caustic or abrasive cleaning agents. DO NOT immerse or pour liquids on the oximeter. Equipment adjustments are not necessary and opening the case is not necessary.

2.7. Pulse Oximeter NONIN 9550 Onyx II®.

2.7.1. **Purpose.** Spot checks arterial hemoglobin oxygen saturation and pulse rate on pediatric through adult patients by non-invasive means. Do not use the NONIN 9550 Onyx II for neonatal or infant patients. A tricolor LED display provides a visual indication of the pulse signal quality, while blinking at the corresponding pulse rate. This display changes colors to alert you to changes in pulse quality that may affect the readings: green indicates a good pulse signal, yellow indicates a marginal pulse signal, and red indicates an inadequate pulse signal. **NOTE:** The Onyx II has no audible alarms and is intended only for spot-checking.

2.7.2. **Parts.** Oximeter, carrying case with clip or lanyard, and two 1.5 Volt AAA-size batteries.

2.7.3. **Power.** Two AAA-size batteries. New batteries will provide 2,500 thirty second spot checks or 21 hours of continuous operation.

2.7.4. Preflight.

2.7.4.1. Inspect the oximeter for any signs of visible damage.

2.7.4.2. Check to ensure unit turns on automatically when placed on finger. **NOTE:** When a finger is inserted, the oximeter performs a brief startup sequence. Verify that all LEDs illuminate during the startup sequence. If any LED is not lit, do not use the oximeter.

2.7.4.3. Observe five seconds of continuous LED green-colored pulse quality.

2.7.4.4. Ensure the unit turns off when removed from finger.

2.7.5. **Performance.**

2.7.5.1. Insert the patient's finger, nail side up, into the oximeter until the fingertip touches the built-in stop guide.

2.7.5.2. Make sure the finger is lying flat (not on its side) and is centered within the device. If the device does not turn on, remove the finger and wait five seconds before reinserting it.

2.7.5.3. After the startup sequence, the oximeter begins sensing the pulse. Observe five seconds of continuous LED green-colored pulse quality before relying on the displayed values. **NOTES:** If the pulse quality display continues to blink yellow or red after 5 seconds, try another finger. In some circumstances, the oximeter may interpret motion as good pulse quality. Minimize patient motion as much as possible. Moisture, blood pressure cuffs, infusion lines, anemia, arterial catheters, nail polish, and/or artificial nails may degrade the device's performance. **CAUTIONS:** A flexible circuit connects the oximeter's two halves. Do not twist or pull the flexible circuit or overextend the device's spring. Do not use different types of batteries at the same time. Do not mix fully charged and partially charged batteries at the same time. These actions may cause the batteries to leak.

2.7.6. Cleaning.

2.7.6.1. Wipe the surfaces with a soft cloth dampened with a mild detergent or isopropyl alcohol solution. If low-level disinfection is required, a cloth dampened with 10% bleach / 90% water solution may be used. **CAUTION:** Do not use undiluted bleach or any cleaning solution other than those recommended here, as permanent damage could result. Do not immerse the oximeter in liquid or use caustic or abrasive cleaning agents.

2.7.6.2. Dry with a soft cloth, or allow to air dry.

2.7.6.3. Ensure that all surfaces are completely dry before use.

2.8. UNI-VENT "Eagle" Model 754M Ventilator.

2.8.1. **Purpose.** The Uni-Vent 754M Ventilator provides or assists patients (adult, child, or infant) with ventilation when the patient's respiratory efforts are absent or inadequate. The Uni-Vent 754M Ventilator is a portable (13 lbs.), electronically controlled ventilator, compressor, and air/oxygen mixer. The ventilator does not consume gas for operating power and may be operated without attachment of external gases. It is operable in any position, upright, on its side, or lying flat and has an operating temperature range of (-) 15 to (+) 120 degrees Fahrenheit. **WARNING:** The Model 754M Ventilator is not recommended for use with neonate patients due to Tidal Volume Control being limited. Adjustment is available in 10ml increments over a range of 0-3000ml. Additionally, adult breathing circuits are not recommended for use on small children or infants due to their compressibility and dead space. Disposable pediatric and infant breathing circuits are recommended in these cases or alternatively use Impact's Child/Infant Re-useable Patient Valve Kit.

2.8.2. **Parts.** Uni-Vent 754M Ventilator, Ventilator Circuit, Compressed Air Hose (yellow) with a female dual-end adapter, Oxygen Hose (green) with female dual-end adapter, Humi-Vent™ "artificial nose" 250– 1500cc, AC power cord adapter 90-265 VAC/47-400 Hz, securing straps (2), test lung, and a Nylon Carrying Case.

2.8.2.1. OXYGEN INLET: Nominal 50 PSI input, oxygen, male-thread. Connects to output of oxygen cylinder pressure reducer, PTLOX, or on-board aircraft generated source. Use the green low-pressure hose (6 ft. long) for interconnection.

2.8.2.2. AIR INLET: Nominal 50 PSI input, air, male-thread. Connects to output of air cylinder pressure reducer, or electric compressor (oil less and filtered). Use the 6 ft. yellow high-pressure hose for interconnection.

2.8.2.3. GAS OUTLET: Low pressure, 22mm male tapered connection. Connects to disposable ventilator circuit.

2.8.2.4. TRANSDUCER: Low pressure fits 3/16 in. tubing. Connects ventilator pressure transducer to disposable ventilator circuit transducer hose (green connector).

2.8.2.5. EXHALATION VALVE: Low pressure fits ¼ in. tubing. Connects ventilator exhalation valve control port to disposable ventilator circuit exhalation valve (clear aluminum connector).

2.8.2.6. EXTERNAL POWER JACK: Connects ventilator to Universal AC Power Supply or external 11-15 volt power source via 12 volts direct current (VDC) Power Cable.

2.8.3. **Power.** Model 754M connects directly to AC outlets and is operable from 90-265 VAC, 50-400Hz (voltage and line frequency sensing is automatic) and draws 1 Ampere.

2.8.3.1. Model 754M DC operation range is 20-36 VDC (auto-sensing) and draws 5 Amperes. The converter also accepts external DC voltages, ranging from 16 to 30 volts via the secondary input leads provided (no plug attached at shipment). Attachment to a mating connector is required and polarity must be observed. The black input lead is positive; the white is negative. Do not attach the braided shield. In addition, a 12 VDC Power Cable is provided for attachment to an automotive power source, negative ground. **WARNING:** Disconnect the ventilator from aircraft power when switching from auxiliary power unit (APU) to aircraft power to prevent an inadvertent power surge to the ventilator.

2.8.3.2. Operating time on internal battery is 3-hours (maximum) using internal air compressor and 12-hours using external gas source. Recharging time ranges from 14-16 hours depending on initial state of discharge. Battery icon LOW denotes battery power remaining is less than 30 minutes.

2.8.3.3. Green charge indicator illuminates whenever sufficient battery recharging current is flowing.

2.8.3.4. A fully charged battery pack will cause the CHARGE LED to turn off when connected to external power. The LED display battery icon will indicate "OK" when the external power is disconnected. **NOTE:** Two external fuse-holders are located on the top, left side of the Uni-Vent and each contains a 2 AG, 10A fuse. The fuse closest to the battery compartment door affects external power operation and battery operation and the other fuse affects battery operation and charging. "EXT PWR" and battery icon "ON CHG" will not display if their respective fuse(s) is/are blown or missing. Return to MERC for servicing. **WARNING:** External power surges may cause the ventilator fuse to blow.

2.8.3.5. Ventilator fuse failure is evidenced by the following:

2.8.3.5.1. Ventilator automatically switches to battery power.

2.8.3.5.2. Alarm message on the screen reads: “EXT PWR FAIL/DISCONNECT—CHECK SOURCE CONNECTIONS.” Audio alarm will sound and user will note a red alarm LED.

2.8.3.5.3. If alarm mute button is pressed, user should note alarm message and be cognizant that the ventilator is running off battery power. The following occurs:

2.8.3.5.3.1. Alarm message clears.

2.8.3.5.3.2. Audio alarm stops.

2.8.3.5.3.3. Alarm LED goes blank.

2.8.3.5.3.4. A small blinking message continues to appear in the bottom right corner: “EXT CHK FUSE.” **WARNING:** This message may be easily overlooked during preflight and may be difficult to observe inflight. Audible alarm will not sound when the “EXT CHK FUSE” is displayed.

2.8.3.5.4. If user does not press alarm mute button, alarm continues to display as noted in paragraph 2.8.3.5.2. above.

2.8.3.5.5. In time, low battery alarms. System failure occurs when battery is depleted.

2.8.4. **Pre-flight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

2.8.4.1. Examine the Internal Compressor Air Filter, located on the top right side, for damage. Ensure the filter is in place and in good condition. **CAUTION:** Do not block the inlet or attempt to operate the internal compressor without filter in place. Do not attempt to clean this filter, replace if necessary.

2.8.4.2. Visually observe the GAS OUT TO PATIENT Outlet. Ensure the Anti-asphyxia Valve is seated and not missing in order to prevent a pressure loss resulting in ventilator failure. **NOTE:** If the GAS OUT TO PATIENT Outlet is blocked, the pressure of the next mechanical ventilation may displace the Anti-asphyxia Valve resulting in a malfunction (i.e. loss of pressure). The valve can be quickly resealed by pushing its “flapper” inward using the rounded tip of a retracted pen or small hemostat.

2.8.4.3. Connected to A/C power, turn Uni-Vent on. Display will show EXT PWR ON and ON CHARGE.

2.8.4.4. Verify successful completion of SELF-Check. **WARNING:** SELF-CHECK and TRANSDUCER CALIBRATION must be performed with the disposable ventilator circuit disconnected from the patient. This ensures that the TRANSDUCER connection is open to ambient atmosphere. Ignoring this requirement would allow the procedure to sense any residual airway pressure in the patient circuit (a false reading). The residual pressure becomes the new calibration reference, which will increase your patient’s work-of-breathing by the residual amount.

2.8.4.5. Verify operating power selections: AC, SIMV, or CPAP.

2.8.4.6. Check for positive indexing and operation of all switches and controls.

2.8.4.7. Disconnect external power source and verify internal battery operation.

2.8.4.8. Turn off. **NOTE:** Procedures 2.8.5.1.1 through 2.8.5.1.4.2 will be accomplished prior to departing home station if the patient will be placed on the pre-flighted ventilator.

2.8.5. **Performance.** Only the five primary controls, common to most applications, are marked. They are numbered in order of use, in a 5-step sequence on the front panel.

2.8.5.1. **Primary Controls:**

2.8.5.1.1. Select operating mode; AC, SIMV, or CPAP

2.8.5.1.2. Set VENTILATION RATE

2.8.5.1.3. Set INSPIRATION TIME. (1:2 ratio is standard)

2.8.5.1.4. Set TIDAL VOLUME. (10 ml per kilogram is standard)

2.8.5.1.5. Set AIR OXYGEN MIXER

2.8.5.1.6. For use with external oxygen, connect high-pressure green oxygen hose between OXYGEN inlet port and a 50-PSI external oxygen source. Use only medical-grade oxygen.

2.8.5.1.7. For use with external air, connect a high-pressure yellow air hose between AIR inlet port and a 50-PSI external air source. Use only medical-grade compressed air.

2.8.5.1.8. Connect a disposable ventilator circuit to its respective gas outlet, transducer, and exhalation valve connectors on the Uni-Vent Connector Panel. **WARNING:** The pressure line (blue vinyl tube) and the exhalation drive line (clear vinyl tube) must be placed on the ventilator circuit prior to utilizing the circuit on a patient. Minimal tidal volumes will be delivered if not intact.

2.8.5.1.9. Connect test lung to ventilator circuit and set “high” and “low” pressure alarms 10 cm H₂O above and below the current MAP that is shown on the unit.

2.8.5.1.9.1. If ventilator alarms “Low Pressure,” check for a disconnected circuit.

2.8.5.1.9.2. If ventilator alarms “High Pressure,” check for an occlusion/compression on the circuit.

2.8.5.1.10. After verification of ventilator function is complete, connect disposable ventilator circuit to patient. Observe patient and ventilator monitoring screen for adequacy of ventilation. Adjust alarms to specific levels required by the patients ventilating parameters. **WARNINGS:** DO NOT remove exhalation valve from inspiratory line. DO NOT place inspiratory line on patient without exhalation valve in place. Ventilator may malfunction if external oxygen or air source does not provide a pressure of 50-PSI. Impact 754M has a built in safety mechanism to turn the ventilator off and alarm when -10 cm H₂O is sensed for 1.5 seconds. Ventilator shut down may occur in the following circumstances: closed-suctioning is performed at altitude, barometer inability to keep up with rapid aircraft pressure changes and

excessive negative pressure from patient effort (forceful coughing, bronchospasm). Large patients with increased peak inspiratory flow demand are susceptible to the last occurrence. If inadvertent ventilator shut down occurs: disconnect patient from ventilator and manually ventilate patient with BVM. Turn the mode selector to "OFF." Wait 2-3 seconds. Turn ventilator back on. The ventilator runs a self-check and recalibrates the airway pressure sensor. Return to normal operation. If further suctioning is required, consider using less negative pressure. **NOTES:** Anti-asphyxia one-way valve kit (P/N: 820-0096-15) can be procured to allow a spontaneous breathing patient to pull ambient air; i.e. non-sedated and paralyzed patients. If patient peak inspiratory flow exceeds 60 LPM, the valve opens for the portion of the inspiration which requires excess flow of 60 LPM. Ventilators used on the vast majority of patients should not require this valve. When using the PTLOX as the O₂ source, if 60 LPM cannot be delivered and subsequent pressure drops are below 35 PSI, the ventilator will alarm and switch over to the internal compressor to ensure continued ventilation to the patient. For patients who require airborne infection control precautions, a HEPA filter (included in in-flight kit) will be placed inline, after the exhalation port. If expired body fluids block the filter, replace filter and continue patient ventilation.

2.8.5.1.11. Connect Universal AC Power Supply between EXTERNAL POWER JACK and external power source.

2.8.5.2. Secondary Controls.

2.8.5.2.1. EXTERNAL AIR OFF/ON Pushbutton Switch: Permits the user to manually select external compressed air as primary air source. If Air Pressure is greater than 40 PSI, operation will begin. If a lower pressure or no pressure is sensed, the LCD will display "OFF" (default value) and the internal compressor will operate.

2.8.5.2.2. SIGH OFF/ON Pushbutton Switch: Permits the Uni-Vent to operate with or without SIGH. When activated, the first ventilator generated breath will be a SIGH. Additional SIGH ventilations are delivered once every 100 ventilations or every 7 minutes, whichever comes first. Each SIGH does not exceed 3 seconds. SIGH becomes disabled in the CPAP mode, or when PRESSURE PLATEAU is "ON".

2.8.5.2.3. PEEP OFF/ON-SET Pushbutton Switch: Activates Uni-Vent's internal PEEP control. Pressing the pushbutton allows a PEEP value to be manually entered.

2.8.5.2.4. PRESSURE PLATEAU OFF/ON Pushbutton Switch: Permits ACV or SIMV operation with a pressure plateau. Pressing this pushbutton activates a PLATEAU value that is referenced 10 cm H₂O below the HIGH PRESSURE.

2.8.5.2.5. HIGH PRESSURE ALARM/PEAK INSPIRATORY PRESSURE RELIEF Control: Used to select HIGH PRESSURE ALARM and PEAK INSPIRATORY PRESSURE RELIEF set point. It has an absolute range from 15-100 cmH₂O.

2.8.5.2.6. LOW PRESSURE ALARM Control: Used to select the LOW PRESSURE ALARM set point. It has an absolute range from 0-50 cmH₂O.

2.8.5.2.7. ALARM MUTE/CANCEL Pushbutton Switch: Either mutes an audible alarm signal, or cancels a particular alarm function. OPERATING ALARM (30-

Seconds), BATTERY Alarms (5-Minutes), EXTERNAL POWER Alarm (until internal battery depletes, then, a BATTERY LOW Alarm also activates for 5-Minutes). **Muting:** This mutes the audible component of an Operating Alarm condition. Alarm muting is reset when the current alarm condition no longer applies or the mute-period is reached (alarm will resound). A new alarm condition overrides an already “muted” alarm. **Canceling:** Cancels the audible component of an Advisory Alarm condition. During APNEA alarm condition, it will cancel both the audible and visual APNEA alarms and the controlled ventilations that are automatically invoked at the onset of apnea. Cancellation of an APNEA alarm allows the Uni-Vent to resume operation at the preset ACV, SIMV or CPAP settings.

2.8.5.2.8. MANUAL BREATH/TRIGGER Pushbutton Switch: Pressing this in normal operation delivers one MANUAL BREATH. Each time a MANUAL BREATH is triggered, an audible beep is heard. MANUAL TRIGGER functions as a backup when the primary system fails. While depressed, the MANUAL TRIGGER delivers a continuous gas flow at 30 LPM, with peak inspiratory pressure not exceeding 40 cmH₂O.

2.8.5.3. Operating alarms.

2.8.5.3.1. VENTILATOR FAIL Alarm: Return the MODE Selector Switch to its OFF position and then repeat this procedure. If SELF-CHECK fails again, DO NOT ATTEMPT PATIENT USE.

2.8.5.3.2. BATTERY LOW/FAIL Alarm: Indicates when a low battery condition is sensed.

2.8.5.3.3. EXTERNAL POWER LOW Alarm: Indicates when external power is less than 10.9 VDC.

2.8.5.3.4. LOW PRESSURE Alarm: Indicates when PIP fails to exceed the LOW PRESSURE ALARM set point for two consecutive breaths and causes the LCD set point indicator to blink.

2.8.5.3.5. DISCONNECT Alarm: Indicates when a disconnect is sensed in the patient circuit.

2.8.5.3.6. HIGH PRESSURE Alarm: Indicates when (Positive Inspiratory Pressure) PIP exceeds the HIGH PRESSURE ALARM set point for four consecutive breaths, or 2-seconds continuously, and causes the LCD set point indicator to blink.

2.8.5.3.7. APNEA Alarm in ACV and SIMV: Indicates when approximately 19-seconds have elapsed and no pressure deflections have been sensed. In CPAP no spontaneous breathing is detected for 10-seconds.

2.8.5.3.8. HIGH PEEP Alarm: Indicates when the inspiratory cycle begins before end expiratory pressure plateaus.

2.8.5.3.9. O₂ LOW/FAIL Alarm: Indicates when low pressure is sensed from an external oxygen supply.

2.8.5.3.10. EXT AIR LOW/FAIL Alarm: Indicates when low pressure is sensed from an external source of compressed air.

2.8.5.3.11. FIO₂ Alarm: Indicates when the oxygen component or the air component of the AIR/OXYGEN MIXER is unable to meet its proportion of the gas mixture.

2.8.5.3.12. PRESSURE ALARM SETTINGS Alarm: Indicates when the HIGH PRESSURE ALARM and LOW PRESSURE ALARM set points are reversed.

2.8.5.3.13. VT Alarm: Indicates when delivered tidal volume does not equal set tidal volume.

2.8.5.3.14. COMP Alarm: Indicates when the internal compressor output does not produce its intended contribution to tidal volume.

2.8.6. **Cleaning.**

2.8.6.1. Disconnect accessories and discard disposable items.

2.8.6.2. Housing and pressure hose connections may be cleaned with a damp, soapy cloth and thoroughly dried with a lint-free cloth. **CAUTION:** DO NOT clean with abrasives or chlorinated hydrocarbon cleaners.

2.9. **Airdyne Compressor.**

2.9.1. **Purpose.** The Airdyne Air Compressor provides a source of dry compressed air at 50 pounds per square inch (PSI) +/- 5 PSI.

2.9.2. **Description.** The compressor has two air outlets, one air inlet, and an information control panel.

2.9.3. **Parts.** None.

2.9.4. **Power.** Operates on 115 VAC, 50-60 Hz power.

2.9.5. **Pre-Flight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present. Ensure the power cable and plug are undamaged, the inlet filter is clean, and outlets are free of debris. Plug in the compressor and switch on. The pressure gauge should operate in the GREEN ARC (50 PSI +/- 5 PSI). Switch off. **WARNINGS:** Maximum flow rate from the compressor is 45 LPM at sea level and 41 LPM at 8,000 feet. If using this compressor to power a ventilator, ensure the airflow is adequate for the ventilator. The air compressor has a cabin altitude restriction of 8,000 feet. Use of the compressor above this cabin altitude will cause inconsistent pressures. Only one ventilator may be operated with the air compressor at a time. The Airdyne 3500 Air Compressor is restricted to non-refueling, non-fuselage fuel carrying aircraft. Is not authorized for use in areas where explosive vapors may be present. The Airdyne 3500 Air Compressor® is not approved for use on the KC-135.

2.9.6. **Performance.** Plug the power cable into a 115 VAC/50-60 Hz power source. Connect a low-pressure air hose to an air outlet, and switch on to blow out any dust or debris in the hose. Switch the compressor off and connect the hose to the medical equipment which will be powered by the compressor. Switch on the compressor; the pressure gauge should read 50 PSI +/- 5 PSI. Periodically verify operation and pressure output.

2.9.7. **Placement.** Position the air compressor close to the item requiring compressed air, with the pressure gauge visible and the power switch accessible. Place one D-Ring on each

side of the compressor. Attach one end of a cargo tie-down strap to one of the D-Rings. Route the strap halfway up the side of the compressor and hold it at this point. Route the strap horizontally at this level, wrapping it around the compressor. Run the strap under the vertical section and bring it up over the top of the compressor then down the other side, and under the horizontal portion of the strap. Secure the remaining end of the strap to the second D-Ring, tighten the strap snugly. Set the brakes on the compressor wheels. **CAUTION:** DO NOT over tighten the tie-down strap. Over-tightening will damage the wheels on the compressor.

2.9.8. **Disassembly.** Switch off, disconnect the low-pressure air hose from the compressor outlet. Unplug the power cable, release the tie-down strap, and unlock the wheel brakes.

Chapter 3

CARDIAC EQUIPMENT

3.1. ZOLL M-Series Critical Care Transport (CCT), Monitor/Defibrillator.

3.1.1. **Purpose.** The ZOLL-M-series CCT device is a complete acute cardiac care response system which provides advanced monitoring capabilities to include: Biphasic defibrillation waveform, Semi-automatic external defibrillator, 3, 5 and 12-Lead ECG, Pulse oximetry (SpO₂), Noninvasive Transcutaneous Pacing (NTP), Noninvasive and Invasive Blood Pressure (NIBP/IP), End-tidal CO₂ (EtCO₂) , and Vital Sign (VS) monitoring with temperature probe. In addition, the ZOLL-M-series CCT has Fax transmission capabilities, PCMCIA Data Cards, Paddle accessories, and a color Liquid Crystal Display (LCD). The CCT is 10.2 inches high, 10.2 inches wide and 8.6 inches deep. The CCT is 34 lbs with all cables, extreme pack and a spare battery. **WARNING** : Semi-automatic external defibrillator (AED) and 12-Lead ECG capabilities are not for in-flight use. **NOTE:** This instruction provides basic direction for the following: 4-Lead ECG monitoring, pacemaker monitoring, recording, defibrillation, synchronized cardioversion, noninvasive transcutaneous pacing, NIBP monitoring and SpO₂ monitoring. AECMs are responsible only for functions outlined in this AFI. For all other advanced capabilities, user will consult the Operators Manual.

3.1.2. Parts.

3.1.2.1. **SELECTOR SWITCH (1).** The selector switch allows selection of the following modes: **OFF, MONITOR, DEFIB, and PACER.**

3.1.2.2. **DEFIB ENERGY SELECT BUTTONS.** Two sets of up-down arrow buttons control the defibrillator energy level, one set located on the front panel and the other located on the sternum paddle. Press and hold the appropriate up ▲ arrow or down ▼ arrow button until the desired energy level is indicated on the display.

3.1.2.3. **DEFIB CHARGE.** Pressing the **CHARGE** button on the front panel or, if using paddles, on the apex paddle handle, charges the defibrillator to the selected energy level.

3.1.2.4. **SHOCK.** Each paddle has a **SHOCK** button located near the forward end of the handle. Press and hold both buttons simultaneously to discharge the defibrillator. The front panel has a single **SHOCK** button that illuminates when the defibrillator is charged and ready. This button is only active when using the Multi-Function Electrodes (MFE) Pads and the pads are connected to the patient.

3.1.2.5. **CHARGE INDICATOR LIGHT .** Located on the apex paddle, this light turns on when the defibrillator is charged and ready.

3.1.2.6. **SOFTKEYS.** Five unlabeled buttons located directly beneath the display control different functions depending on the operating mode of the unit. When the monitor is on, soft key function is displayed directly above each soft key.

3.1.2.7. **PACER OUTPUT.** When pacing is selected, this control sets the milli-Amperage (mA) current delivered to the Multi-Function Electrode (MFE) Pads. For

conscious patients, it should be gradually increased until capture is recognized. Selected current setting is indicated on the display.

3.1.2.8. **PACER RATE.** When pacing is selected, this control sets the Pulse-Per-Minute (ppm) rate at which the pacemaker will operate. It must be set above the patient's intrinsic rate in order for the pacemaker to provide stimulation. The selected pace rate setting is indicated on the display.

3.1.2.9. **4: 1 BUTTON.** This control is used to test for threshold or to determine the patient's underlying rhythm. When depressed this button causes pacing stimuli to be delivered at $\frac{1}{4}$ the indicated ppm setting. Releasing the control causes the instrument to resume normal pacing operation.

3.1.2.10. **LEAD.** Selection of the ECG source is accomplished using the **LEAD** button. Pressing this button sequentially selects ECG signals derived from each of the following lead configurations; "I, II, III," aVR, aVF, aVL, PADDLES" (defibrillation paddles), or PADS (Multi-Function Electrode (MFE) Pads) for display. **NOTE:** The "PADS, or "PADDLES" Lead setting is automatically selected when the instrument powers up in the DEFIB or MONITOR mode and MFE Pads or Paddles are connected to the Multi-Function cable. Lead II is automatically selected when the instrument powers up in the PACER mode. Pads or Paddles monitoring is not available in PACER mode.

3.1.2.11. **ALARM SUSPEND.** This button is used to activate, deactivate and temporarily suspend all alarm functions. A bell symbol (🔔) appears in the top-center of the display when the alarms are enabled. When the alarms are temporarily or permanently disabled, an "X" crosses through the bell symbol (🔔). When the alarms are enabled, an alarm condition occurs, an audible tone sounds, and the bell symbol flashes. To avoid possible confusion with the defibrillator charged tone, the heart rate alarm tone sounds at a different frequency when the Selector Switch is set to DEFIB.

3.1.2.12. **SIZE.** This control allows you to change the display size of the ECG signal. Size options are 0.5, 1, 1.5, 2, 3 cm/mV and are indicated in the upper right center of the display.

3.1.2.13. **RECORDER.** This control starts and stops the strip recorder. There is a **RECORDER** button located on the unit's front panel and another located on the sternum paddle. The unit can be switched to diagnostic ECG bandwidth (0.05-150 Hz) by pressing and holding the **RECORDER** button. Diagnostic bandwidth will be maintained as long as the **RECORDER** button is held down. The unit will revert to standard monitoring bandwidth when the **RECORDER** button is released.

3.1.2.14. **BEEPER VOLUME (ECG).** This button causes a menu to appear on the display for adjusting the volume using soft keys. This control allows manual adjustment of the QRS beeper tone from maximum volume to inaudible. **NOTE:** The heart rate alarm and charge ready volumes are not adjustable.

3.1.2.15. **BRIGHTNESS/CONTRAST ADJUSTMENT.** This button causes a menu to appear on the display for adjusting the display brightness using soft keys (contrast on LCD).

3.1.2.16. **CHARGER ON.** When plugged into AC power, the CHARGER ON indicators will operate in the following manner:

3.1.2.16.1. The orange-yellow **CHARGER ON** indicator will illuminate continuously whenever the device is turned **ON** or **OFF** and the battery is charging.

3.1.2.16.2. The green **CHARGER ON** indicator will illuminate continuously whenever; the unit is turned **OFF** and the battery is installed and fully charged.

3.1.2.16.3. The green and orange-yellow **CHARGER ON** indicators will illuminate alternately when; no battery is installed in the unit or a battery charging unit fault has been detected. **NOTE:** When the device is not connected to AC power, the CHARGER ON indicators will not illuminate.

3.1.2.17. **PAPER TRAY.** Holds the paper for the recorder. Press down and pull forward to open the drawer and replace the paper.

3.1.2.18. **SUMMARY.** The monitor automatically collects critical patient ECG data, control settings, date/time and therapies administered during certain events. The information can be retrieved (printed on the recorder) by pressing the SUMMARY button.

3.1.2.19. **CODE MARKER.** The button activates a menu and soft keys that allow the unit to record in its internal memory the delivery of specific drugs or treatments.

3.1.2.20. **DEFIBRILLATOR TEST PORT.** Located on the Multi-Function Cable and is used to test the defibrillator output using the Multi-Function Cable only.

3.1.2.21. **ANALYZE.** The **ANALYZE** button initiates ECG analysis to identify AED shock able rhythms.

3.1.2.22. **PEDIATRIC PADDLES.** Pediatric-size electrode plates are built into the paddle assembly. They lie directly under the adult electrode surface and are accessed by pushing the black PEDI button at the front of each paddle and sliding the adult surface forward. When replacing the adult electrode shoes, it is important that the electrode is locked correctly into position on the paddle handle.

3.1.3. **Power.** The ZOLL M-Series CCT unit operates on 115VAC/50, 60 or 400Hz power. The unit will be plugged into an AC frequency converter or approved 400Hz aircraft power source. Additionally the unit may run on battery power (approximate life of a fully charged battery is 4 hours) and is dependent on the batteries age and level of multi-tasking. Battery recharge time is approximately 7.2 hours. The maximum amperage requirement for this device is 2.0 Amps. The primary battery will trickle charge when the unit is connected to AC power. A fully charged backup battery will be carried. **WARNING:** Do not operate ZOLL M-Series CCT on 400Hz power when using intra-cardiac monitoring catheters, internal paddles, or other internal leads. **NOTES:** When changing the battery, turn the power select switch to "OFF". The unit maintains previous settings for 10 seconds after removal of the battery. If 10 seconds is exceeded during battery replacement the unit will return to the "Default" settings. The ZOLL Base Power Charger 1x1 and 4x4 are intended for ground use only. Do not use inflight.

3.1.4. **Pre-flight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

3.1.4.1. Ensure paddles are clean and functional (not pitted) and releases from housing with use of black release switch. Replace paddles in housing unit when inspection is completed.

3.1.4.2. Inspect cables for cracks, broken wires, and connections to include: ECG electrode cable, defibrillator paddle cables, multi-function cable, and connector.

3.1.4.3. One fully charged battery will be in the unit and a fully charged spare battery placed in the accessory bag.

3.1.4.4. **Supplies In Accessory Bag:** Fully charged spare battery (1ea), Tube Electrode gel (1ea) or (3ea) gel patches, Multi-Function Electrode Pads in sealed pouches (3ea), Sets ECG electrodes (3ea), Recorder Paper in unit (1ea) and spare (2ea), Alcohol Wipes (3ea), Safety Razor (1ea), SpO₂ cable (1 ea), EKG cable (1 ea), 12-lead (1 ea), 4 lead (1 ea) and regular adult BP cuff (1 ea). **WARNING:** ZOLL SpO₂ cable is not interchangeable with other monitors. Use of the ZOLL SpO₂ cable with the BCI 3303 Pulse Oximeter and Propaq Encore 206 EL will cause inaccurate readings.

3.1.4.5. **Power On Sequence:** Connect to an approved 120 VAC/50-400 Hz power source. Turn unit to MONITOR, 4 beep tone heard "MONITOR" message on display ECG size X1 "PADDLES" or "PADS" as lead selected.

3.1.4.6. **Defibrillator Check:** Connect Multi-function cable to test connector, Turn power selector to "Defib", Set ENERGY SELECT level to 30 joules and press CHARGE button and SHOCK button on monitor will light-up, Press SHOCK button on monitor to discharge internally; Test OK should appear, Test strip will print, press "Record" button to stop.

3.1.4.7. **Transcutaneous Pacer Operation:** Disconnect Multi-function cable from Test Connector, Turn to PACER, set pacer rate to 150 ppm, press RECORDER button, Pacer pulses occur every 2 large divisions (10 small divisions), Press and hold 4:1 button, pulses occur every 8 large divisions, Set PACER OUTPUT to 0 mA (if not defaulted to 0 mA, a no "CHECK PADS" message appears), Set PACER OUTPUT to 16 mA, "CHECK PADS" message and alarm, Reconnect Multi-function cable to test connector, Press Clear Pace Alarm soft key; "CHECK PADS" message disappears, and Pace alarm stops.

3.1.4.8. **Paddles Check:** Connect Multi-function cable to APEX paddle connector, Turn power selector to "Defib", Set ENERGY SELECT level on sternum paddle to 30 joules and press CHARGE button and CHARGE button will light-up, With paddles remaining in stored position, press SHOCK button on APEX paddle only (No effect), then press SHOCK button STERNUM paddle only (No effect), then both simultaneously to discharge internally; Test OK should appear, Test strip will print, press "Record" button on the sternum paddle to stop, Inspect Recorder printing.

3.1.4.9. **SpO₂ Check:** Connect cable to unit. Turn Selector switch to MONITOR. Place finger in sensor. Ensure the SpO₂, pulse rate, and pulse strength bar graph operate on the display. Turn the monitor OFF.

3.1.5. Performance.

3.1.5.1. **Monitor.** ECG monitoring may be done through the ECG patient cable, Multi-Function Pads or through standard defibrillation paddles. Use of ECG patient cable is required, during pacing. To monitor through quick-look paddles, turn the monitor on, select paddles on LEAD SELECT, and apply conductive gel to paddles and place paddles firmly on the patient's chest. Place the APEX paddle on the patient's chest wall, left side/mid-axillary just below the nipple, and STERNUM paddle to the right of the sternum, just below the clavicle. Observe the cardioscope to see the patient's rhythm. **NOTE:** Dry chest if necessary. Excessive chest hair may require shaving to allow proper adhesion of electrodes.

3.1.5.2. The 12-LEAD patient cable with V-LEAD protective cap plugged in allows 4-LEAD monitoring of LEADS 1, 2, 3, and AVR, **AVF**, **AVL**. Attach electrodes to the ECG patient cable wires, and apply electrodes to the appropriate sites on the patient. **NOTE:** Ensure V-LEAD protective cap is plugged in V-LEAD connector.

3.1.5.2.1. Lead placement.

3.1.5.2.1.1. WHITE ("RA") - Right mid clavicular line below the clavicle.

3.1.5.2.1.2. BLACK ("LA") - Left mid clavicular line below the clavicle.

3.1.5.2.1.3. RED ("LL") - Between the 6th and 7th intercostal space left mid clavicular line.

3.1.5.2.1.4. GREEN (RL) - Between 6th and 7th intercostal space right mid clavicular line.

3.1.5.2.2. Turn selector switch to **MONITOR**, press the **LEAD** button until the desired lead configuration is selected (selected lead is indicated at the upper right of display). The manufacturer default setting is "PADDLES" or "PADS."

3.1.5.3. **Pacemaker Monitoring. WARNING:** Implanted pacemakers may cause the heart rate meter to count the pacemaker rate during episodes of cardiac arrest or arrhythmias. Pacemaker patients should be carefully observed. Check the patient's pulse; do not rely solely on the heart rate monitor. Dedicated pacemaker detection circuitry may not detect all implanted pacemaker spikes; patient history and exam are important in determining the presence of an implanted pacemaker.

3.1.5.3.1. **Spikes from Implantable Pacemakers.** The device is capable of detecting implantable pacemaker signals. The device will display a thin, solid line on the ECG trace whenever it detects a pacemaker signal. The waveform "spike" produced by the pacemaker will be displayed if the pacemaker is atrial, ventricular, or both.

3.1.5.4. **Recording.** Recording of the ECG can be accomplished in any lead. The strip recorder will document the ECG trace with a 6 second delay at all times. To start the strip recorder, press the RECORDER button switch on the main control panel. The strip

recorder will run continuously until the button is pressed again. Each time the strip recorder is started, the time, date, ECG lead, size, and heart rate are printed on the top part of the paper. If the unit is pacing, the output current will also be printed. Similarly, if the defibrillator has been discharged, the delivery energy will be printed.

3.1.5.5. Defibrillation.

3.1.5.5.1. Turn **SELECTOR SWITCH** to **DEFIB**. The CCT unit is configured to use Rectilinear “**Biphasic**” Waveform defibrillation. Upon power-up the unit will automatically select the pre-configured energy level defaults (120 joule setting, with succeeding shock settings of 150 and 200 joules). Biphasic defibrillators require significantly less energy for effective defibrillation, therefore have lower default settings. **WARNINGS:** Neonatal and pediatric energy levels should be set based on specific clinical protocols using American Heart Association (AHA) guidelines. The AHA recommends the use of energy doses 2-4 j/kg, for both Monophasic and Biphasic defibrillators. The ZOLL M-Series CCT, (Biphasic) unit can be manually regulated to deliver 1 through 10, 15, 20, 30, 50, 75, 100, 120, 150, and 200 Joules. A dry woolen or cotton blanket must be placed under the patient’s body for electrical insulation when defibrillation is performed on the aircraft floor. If any part of the patient contacts the floor, the distribution of current may be affected.

3.1.5.5.2. Apply conductive gel to the paddles or electrode gel pads to the patient’s chest wall. **WARNINGS:** Do not permit excessive gel to accumulate between the paddle electrodes on the chest wall (Gel Bridge). This could cause burns and reduce the amount of energy delivered to the heart. If using defibrillator gel pads, make sure that the size of the pad is large enough to cover the entire paddle electrode area.

3.1.5.5.3. Place **STERNUM** paddle on the patient’s right chest near the upper sternum, and the **APEX** paddle near the cardiac apex on the lower left chest.

3.1.5.5.4. Multi-Function Electrode (MFE) pads may be used and will be applied according to instructions on the electrode packaging. Connect MFE pads to multi-function cable. Ensure good contact is made with MFE pads on patient's skin. Apply one edge of the pad securely to the patient and roll pad smoothly from that edge to the other being careful not to trap any air pockets between the gel and skin. **NOTE:** The messages "CHECK PADS" and "POOR PAD CONTACT" will be alternately displayed and energy will not be delivered if pads are not making good contact with the patient. The message "DEFIB PAD SHORT" will be displayed to indicate that a short circuit between MFE pads may exist.

3.1.5.5.5. Press the **CHARGE** button on the front of the monitor or on the apex paddle handle. The charge indicator will flash, a climbing tone will be heard, and numbers will "scroll up" in the **AVAILABLE ENERGY** display until the selected energy is reached. The defibrillator will not discharge while in process of charging. **WARNING:** If both **SHOCK** buttons on the paddles are depressed when the **CHARGE** button is activated, the device will not charge and a **RELEASE SHOCK BUTTON** or other message will appear on the display. **CAUTION:** Changing the selected energy while the unit is charging or charged will cause the defibrillator to disarm. The energy display will blank while energy is being discharged internally

(limit internal discharges to no more than 4 per minute). Press **CHARGE** button again to charge unit.

3.1.5.5.6. After charging to the selected energy, the charge indicator on the apex paddle will light. A distinctive charge ready (continuous) tone sounds and the energy ready “DEFIB XXXJ READY” message will be displayed.

3.1.5.5.7. Clear all personnel from patient contact area. **WARNINGS:** Warn all persons in the area to “stand clear” prior to defibrillation discharge. Do not touch the bed, patient, or any equipment connected to the patient during defibrillation. A severe shock can result. Do not allow exposed portions of the patient’s body to come into contact with metal objects, unwanted pathways for defibrillation current may result. Potential for electrical spark hazard when defibrillating with the ZOLL M-Series CCT is low due to Biphasic technology. When utilizing external paddles press firmly against the patient's skin to maximize electrode contact and use approximately 25 lbs of pressure. This will also mitigate spark hazard.

3.1.5.5.8. Use approximately 25 lbs. of pressure on the paddles. Using your thumbs, simultaneously press and hold both **SHOCK** buttons (on each paddle handle) until energy is delivered to the patient. Once energy is delivered, the display will show “XXXJ DELIVERED and DEFIB XXXJ SEL.” **WARNING:** Failure to use thumbs could result in the inadvertent depression of the ENERGY SELECT buttons, causing the defibrillator to disarm itself. Use of thumbs will also prevent inadvertent operator shock. No portion of the hand should be near the paddle plates. **NOTE:** If the defibrillator is not discharged within 60 seconds after reaching the selected energy level, the unit will automatically disarm itself.

3.1.5.6. **Synchronized Cardioversion. WARNING:** This procedure requires direct Physician supervision.

3.1.5.6.1. Apply pads or paddles

3.1.5.6.2. Turn selector switch to **DEFIB**

3.1.5.6.3. Press **Synch On/Off** soft key

3.1.5.6.4. Verify that the (↓) display over R-waves and “SYNC” displays.

3.1.5.6.5. **WARNINGS:** Engage SYNC option for synchronized cardioversion; prior to attempting synchronized cardioversion, ensure ECG signal is good and SYNC marks (↓) are displayed above each QRS complex. The defibrillator/cardioverter will seem to pause before it shocks because it is awaiting the next QRS complex. The electrical shock is delivered a few milliseconds after the R wave so that it appears to land on the QRS complex. This avoids the delivery of an electrical shock during cardiac repolarization (or relative refractory period represented on the surface ECG as the T wave), a period of particular vulnerability during which an electrical shock can precipitate ventricular fibrillation (VF). If additional counter shocks are necessary, readjust the energy level as necessary, press the SYNC soft key and repeat. “SYNC XXX SEL” must be displayed prior to pressing the CHARGE button.

3.1.5.7. **Non-Invasive Transcutaneous Pacing. NOTE:** NTP may be accomplished in-flight with the ZOLL M-Series Monitor due to low biphasic energy and output current.

Flight Nurses may initiate pacing in-flight IAW AHA Advanced Cardiac Life Support (ACLS) protocols.

3.1.5.7.1. Apply MFE pads according to the instructions on the pouch. Apply back electrode first (to the left side mid thorax), applying one edge to patient and roll smoothly; then apply the front electrode (left side mid thorax) in similar manner.

3.1.5.7.2. Turn Selector Switch to **PACER**, press the **LEAD** button until the desired lead configuration is selected (selected lead is indicated at the upper right of display). The manufacturer default setting is "LEAD II." Pads or Paddles monitoring is not available in PACER mode.

3.1.5.7.3. Set pacer rate by turning **PACER RATE** ppm knob to a value 10-20 ppm higher than intrinsic rate. If no intrinsic rate exists, use 100 ppm.

3.1.5.7.4. Set pacer output by turning **PACER OUTPUT** mA knob clockwise slowly. The pacer output will increment or decrement by a value of 2 mA on the display when the knob is turned. When the device is switched out of pacer mode into Defib or Monitor mode and then switched back the pacer settings will remain unchanged. If unit is turned off more than 10 seconds, the pacer default settings will be restored.

3.1.5.7.5. Determination of capture will be assessed both electrically and mechanically in order to assure appropriate circulatory support of the patient. Determination of electrical capture will be performed by viewing the ECG on the screen while ECG cable is attached to patient. Use of other monitoring devices may cause pacer artifacts. Mechanical capture is assessed by palpation of peripheral pulse. In order to avoid mistaking muscular response to pacing stimuli for arterial pulsations only femoral, right brachial or radial arteries will be palpated. The ideal output current is the lowest value that will maintain capture. This is usually about 10% above threshold. Typical threshold currents are between 40 and 80 mA. Location of MFE pads will affect the current required to obtain ventricular capture. The placement that offers the most direct current pathway to the heart while avoiding large chest muscles will usually produce the lowest threshold.

3.1.5.7.6. Pressing and holding the 4:1 button can be used to temporarily withhold pacing stimuli thereby allowing the operator to observe the underlying rhythm and morphology. When depressing the 4:1 button pacing stimuli is delivered at 1/4 the indicated ppm setting. **WARNINGS:** Do not touch the gelled area of the MFE pads or place pads over the patient monitoring electrodes; electrical shock and burn hazard. MFE pads should be replaced after 8 hours of continuous pacing (2 hours for radiolucent stat pads). Pacing in excess of 30 minutes, particularly in neonates or adults with severely restricted blood flow, may cause burns. Periodic inspection of underlying tissue is required. If the unit was not turned off and less than 10 minutes have elapsed since pacing mode was last used, reactivating pacer mode causes pacing to immediately resume at recent settings.

3.1.5.8. **Pediatric Pacing. WARNING:** This procedure requires direct Physician supervision with Pediatric or Neonatal care background.

3.1.5.8.1. Non-invasive pacing of pediatric patients is done in an identical manner to adults. Smaller size pediatric MFE Pads are required for patient weighing less than 33lbs/15Kg. (See Warnings in Para 3.1.5.7.). **NOTE:** Pediatric MFE pads are not carried in the AE inflight kit and must be supplied by Pediatric or Neonatal transport teams as required.

3.1.5.9. NIBP Monitoring.

3.1.5.9.1. Connect hose to the unit and proper size cuff to patient.

3.1.5.9.2. Display NIBP menu; press Param – Select “NIBP” – Enter soft keys.

3.1.5.9.3. Check cuff Inflation soft key.

3.1.5.9.4. Take single measurement; Press NIBP button.

3.1.5.9.5. Take automatic measurement; Press **NIBP Auto** soft key (on NIBP menu). Set measurement interval; Press **Auto Interval** soft key (on NIBP menu) Stop automatic measurement; Press **NIBP Auto** soft key (on NIBP menu) Abort measurement; Press NIBP button.

3.1.5.10. SpO₂ Monitoring.

3.1.5.10.1. Connect cable to unit and sensor to patient. Turn on monitor; Turn Selector Switch to **MONITOR**.

3.1.5.10.2. Display waveform; press Wave 2 soft key until waveform displays. Display **SpO₂ menu**; Press **Param – Select “SpO₂” – Enter** soft keys. Change measurement sensitivity; Press **Sens.- Sens. – Enter** soft keys. Change measurement averaging; Press **Average – Average- Enter** soft keys.

3.1.5.11. Placement.

3.1.5.11.1. Secure the ZOLL M-Series CCT to an equipment litter using a blanket under the unit and two litter straps. (The SMEED bracket may also be utilized if available).

3.1.5.11.2. Place litter straps around each corner of the carrying handle and wrap once around the handle. Ensure the screen and front controls are accessible. Run litter straps over the sides and around litter and secure. **NOTE:** Securing straps may obstruct access to the external paddles.

3.2. MRx Philips Heartstart® (MRx) Monitor/Defibrillator (M3535A/M3536A).

3.2.1. **Purpose.** The HeartStart MRx is a lightweight, portable, monitor/defibrillator. It provides four modes of operation: Monitor, Manual Defib, AED, and Pacer capabilities. The Philips Heartstart® Monitor/Defibrillator provides advanced monitoring capabilities to include; Semi-Automated External Defibrillation, Biphasic Manual defibrillation, 3, 5, 10, and 12-lead ECG, Noninvasive External pacing, pulse oximetry (SpO₂), end tidal CO₂ (EtCO₂), Q-CPR feedback, invasive pressure monitoring, and Noninvasive blood pressure monitoring (NIBP) with temperature. In addition the HeartStart MRx has LAN, and wireless transmission capabilities. The Philips Heartstart is 12.4 in high, 11.7 in wide and 8.3 in depth. The weight with all accessories plus external paddles and additional battery is 17.5 pounds. **WARNINGS:** When transporting the HeartStart MRx, it is important to position it

with the display facing away from the body. If not, the Therapy Knob may be bumped and inadvertently moved from its current position. Semi-automatic external defibrillator (AED) and 12-Lead ECG capabilities are not for in-flight use. **NOTE:** This instruction provides basic direction for the following: 5-Lead ECG monitoring, pacemaker monitoring, recording, defibrillation, synchronized cardioversion, noninvasive transcutaneous pacing, NIBP monitoring and SpO2 monitoring. AECMs are responsible only for functions outlined in this guide. For all other advanced capabilities, user will consult the Operators Manual.

3.2.2. Parts.

3.2.2.1. **THERAPY KNOB.** The Therapy Knob selection of the following operation modes: **OFF, MONITOR, MANUAL DEFIB, and PACER.**

3.2.2.2. **CHARGE BUTTON.** The charge button charges the defibrillator to the selected Manual Defib energy setting.

3.2.2.3. **SHOCK BUTTON.** The shock button delivers a shock through multifunction electrode pads or switchless internal paddles. In AED mode a 150J shock is delivered. In Manual Defib Mode, the shock is delivered at the selected Manual Defib energy setting.

3.2.2.4. **PRINTER.**

3.2.2.5. **PRINT BUTTON.** The Print button initiates a continuous print-out of the primary ECG and other selected waveform(s) either real-time or with a 10-second delay, depending on your configuration. Pressing the button while printing is in progress stops the printing.

3.2.2.6. **PRINTER DOOR.**

3.2.2.7. **PRINTER DOOR LATCH.**

3.2.2.8. **SPEAKER.**

3.2.2.9. **MICROPHONE.**

3.2.2.10. **MENU SELECT BUTTON.** Pressing the Menu Select button either brings up the current menu or confirms a menu selection.

3.2.2.11. **NAVIGATION BUTTONS.** The navigation buttons display the current menu just as the Menu Select button does. Additionally, within any menu or list, these buttons move to the next or previous item in the list. They also increase or decrease numbers or values in a sequence.

3.2.2.12. **SOFT KEYS.** The soft keys perform the function displayed as a label appearing immediately above on the display. The labels (and, therefore, the function) change appropriately for the various modes of operation.

3.2.2.13. **SUMMARY BUTTON.** The Summary button displays a menu form which you can print the current or most recent Event Summary report or Vital Sign Trending Report.

3.2.2.14. **ALARM PAUSE BUTTON.** The Alarm Pause button pauses all visual and audible physiological alarms and audible inops for the configured time interval. At the end of the pause interval, each alarm returns to its previous setting (On or Off). Pressing

the Alarm Pause button during the pause interval also returns alarms to their previous settings.

3.2.2.15. **DISPLAY.**

3.2.2.16. **LEAD SELECT BUTTON.** The Lead Select button changes the ECG lead in Wave Sector 1. Pressing this button cycles through the available ECG waves, changing the displayed wave and label. The list of available ECG waves is based on the current lead set and device configuration, and includes pads or paddles, if the corresponding cable is connected to the device.

3.2.2.17. **MARK EVENT BUTTON.** The Mark Event button allows you to insert a time-stamped annotation in the Event Summary Report to note events as they occur, including the administration of certain drugs. A Mark Event button label appears at the top left corner of the display.

3.2.2.18. **LABEL RECESS.** A palette of colored decals is included with your HeartStart MRx. These colored decals may be applied to the label recesses located on the device handle to aid in the identification.

3.2.2.19. **EXTERNAL POWER INDICATOR.** The external power indicator is green if power is being provided by an external AC for DC power source.

3.2.2.20. **SYNCHRONIZED CARDIOVERSION.**

3.2.2.21. **NETWORKING ICON.** If the option is enabled, a network connectivity icon will appear to the right of the Mark Event Statements.

3.2.2.22. **READY FOR USE (RFU) INDICATOR.** The RFU indicator displays the status of the therapy delivery functions of the monitor/defibrillator.

3.2.3. **Power.** The Philips HeartStart MRx® unit operates on a 100 – 240 VAC, 50 – 60 Hz power. The unit will be plugged into an AC frequency converter if hospital grade 50-60Hz power is not available. Additionally the unit may run on battery power (approximate life of fully charged battery is 5 hours) and is dependent on the batteries age and level of multi-tasking. Battery recharge time is approximately 3 hours, with the unit turned off. The maximum amperage requirement for this device is 2.0 Amps. The battery will be charged in either the HeartStart MRx or in a Philips approved battery support system. **WARNINGS:** Do not operate Philips HeartStart MRx® unit on 400Hz power. Use only 3-wire AC power cords with 3-pronged grounded plugs.

3.2.4. **Pre-flight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

3.2.4.1. Supplies In Accessory Bag: Tube Electrode gel (1 ea), Multi-Function Electrode Pads (3 ea), ECG electrode Sets (3 ea), Recorder Paper in unit (1 ea) and spare (2 ea), Alcohol Wipes (3 ea), Safety Razor (1 ea), SpO2 cable (1 ea), EKG cable (1 ea), 12-lead (1 ea), 3-lead (1-each), and regular adult BP cuff (1 ea).

3.2.4.1.1. Inspect cable for cracks, broken wires, and connections to include: electrode cable and connector, defibrillator paddle cable, and multi-function cable and connector.

3.2.4.1.2. Ensure paddles are clean and not pitted and easily release from paddle tray.

3.2.4.1.3. Check the AC/DC power source (and power cord available).

3.2.4.1.4. Verify a charged battery is inserted into the HeartStart MRx. Another charged battery should be available and placed in the accessory bag. Ensure the batteries have no visible signs of damage.

3.2.4.2. **Operational Check. WARNING:** Operating the HeartStart MRx or its accessories in conditions outside the environmental specifications (-4 to 140 degrees Fahrenheit) can result in device or accessory malfunction. The HeartStart MRx should be allowed to stabilize within the operating temperature range for 30 minutes prior to operation.

3.2.4.2.1. Connect the AC/DC power module to the HeartStart MRx and plug it into a power outlet. Verify that the external power indicator on the front panel is lit. Turn the Therapy Knob to 150J.

3.2.4.2.2. Connect the 50 Ohm test load to the defibrillator cable.

3.2.4.2.3. Press the Menu Select button.

3.2.4.2.4. Using the Navigation buttons, select “Other” and press the Menu Select button.

3.2.4.2.5. Select “Operational Check” and press the Menu Select button.

3.2.4.2.6. Select “Run Op Check” and press the Menu Select button

3.2.4.2.7. Press the Menu Select button to acknowledge the message “Leaving Normal Operation Mode.” **NOTE:** Carefully read and respond to the prompts. Failure to properly follow the instructions will result in Operational Check failure.

3.2.4.2.8. At the completion of the Operational Check, a report is printed that lists the test results and prompts you to visually inspect the device and cables, and to inventory all accessories and supplies.

3.2.4.2.9. Verify the Ready For Use (RFU) Indicator: The RFU indicator is located on the upper, right corner of the unit. It indicates the status of the therapy delivery function of the monitor/defibrillator using the following definition: A blinking black hourglass symbol  indicates the shock, pacing, and ECG function of the device are ready for use. Sufficient battery is available for device operation.

3.2.4.2.10. Turn unit to OFF.

3.2.4.2.11. Re-connect cable to Multi-Function Electrode Pads or paddles.

3.2.5. **Function Check.**

3.2.5.1. Batteries; One fully charged in the unit and one fully charged spare available in the accessory bag.

3.2.5.2. Supplies located in accessory bag. a. (1) Tube Electrode Gel, b. (3) Multi-Function Electrode Pads, c. (1) Recorder Paper in unit and (2), d. (3) Alcohol Wipe, e. (1) Safety Razor, f. (1) SpO2 cable, g. (1) EKG cable, h. (1) 12-lead cable, i. (1) 3-lead cable, j. (1) BP cuff

3.2.5.3. Power On Sequence:

3.2.5.3.1. Connect to 100-240VAC 50-60 Hz electrical power source. Turn on unit to On MONITOR.

3.2.5.3.2. Observe the display screen for messages and prompts.

3.2.5.3.3. Verify the Ready For Use (RFU) Indicator: A blinking black hourglass symbol  indicates the shock, pacing, and ECG function of the device are ready for use. Sufficient battery is available for device operation.

3.2.5.3.4. Turn unit to OFF.

3.2.6. Performance:

3.2.6.1. Monitor. Monitoring View appears on the display when the Therapy Knob is in the Monitor position. The HeartStart MRx can be used for ECG and arrhythmia monitoring, allowing you to monitor through, multifunction electrode pads, or 3-, 5-, or 10-lead monitoring electrode ECG sets. If both pads and monitoring electrodes are connected, monitoring allows you to select a lead from the 3-, 5- or 10-lead monitoring electrode ECG source, or to monitor through pads. Lead II is configured as the primary ECG lead source and is displayed in Wave Sector 1. You may change this during use with the Lead Select button.

3.2.6.2. Waveforms may be acquired through the therapy port for pads,/paddles or the monitoring port for 3-, 5-, or 10-lead monitoring electrodes. Monitoring View can display up to four ECG waves. To monitor through quick-look paddles, turn the monitor on, select paddles on LEAD SELECT, and apply conductive gel to paddles and place paddles firmly on the patient's chest. Place the APEX paddle on the patient's chest wall, left side/mid-axillary just below the nipple, and STERNUM paddle to the right of the sternum, just below the clavicle. Observe the cardioscope to see the patient's rhythm. **WARNING:** Do not use the HeartStart MRx to monitor neonatal ECGs. Doing so could result in inaccurate measurements and alarms. **NOTE:** Dry chest if necessary. Excessive chest hair may require shaving to allow proper adhesion of electrodes.

3.2.7. **Electrode Lead Placement. WARNING:** Be sure that the electrodes do not come in contact with other conductive materials, especially when connecting or disconnecting the electrodes to/from the patient. Avoid touching monitoring electrodes and other measuring devices when they are applied to the patient. Doing so can degrade safety and may affect results.

3.2.7.1. WHITE (RA) - directly below the clavicle and near the right shoulder

3.2.7.2. BLACK (LA) - directly below the clavicle and near the left shoulder

3.2.7.3. RED (LL) - on the left lower abdomen

3.2.7.4. GREEN (RL) - on the right lower abdomen

3.2.7.5. BROWN (V/C) – center chest sternal border

3.2.8. **Pacemaker Monitoring. WARNING:** The AED algorithm is not designed to handle erratic spiking problems caused by a properly or improperly functioning pacemaker. Pacemaker patients should be carefully observed. Check the patient's pulse; do not rely

solely on the heart rate monitor. In patients with cardiac pacemakers, the HeartStart MRx may have reduced sensitivity and not detect all shock able rhythms.

3.2.9. Recording. The Print button initiates a continuous print-out of the primary ECG and other selected waveform(s) either real-time or with a 10-second delay, depending on your configuration. Recording of the ECG can be accomplished in any lead. To start the strip recorder, press the Print button switch on the main control panel. The strip recorder will run continuously until the button is pressed again. Each time the strip recorder is started, the time, date, ECG lead, size, and heart rate are printed on the top part of the paper. If the unit is pacing, the output current will also be printed. Similarly, if the defibrillator has been discharged, the delivery energy will be printed. Pressing the button while printing is in progress stops the printing.

3.2.10. Defibrillation:

3.2.10.1. Defibrillation is always performed through paddles or pads. Once you have performed the necessary preparation for defibrillation, perform the following steps:

3.2.10.2. Select Energy - To select the energy setting, rotate the Therapy Knob to the desired energy level. **WARNINGS:** Biphasic and Monophasic defibrillation for adult and pediatric energy levels should be set based on specific clinical protocols using American Heart Association (AHA) guidelines. The Phillips HeartStart MRx® unit can be manually regulated and range from 1 to 200, with 150J the recommended level for adult patients. A dry woolen or cotton blanket must be placed under the patient's body for electrical insulation when defibrillation is performed on the aircraft floor. If any part of the patient contacts the floor, the distribution of current may be affected.

3.2.10.3. Selecting the 1-10 (1-9) energy setting displays the Select Energy menu, with a default setting of 6J. The low energy setting can be changed using the Navigation buttons to increase or decrease the desired setting. Complete your selection by pressing the Menu Select button. Your current energy selection is shown in the Shock Status area of the display (120 joule setting, with succeeding shock settings of 150 and 200 joules). Biphasic defibrillators require significantly less energy for effective defibrillation and therefore have lower default settings.

3.2.10.4. Apply conductive gel to the paddles or electrode gel pads to the patient's chest wall. **WARNINGS:** Do not permit excessive gel to accumulate between the paddle electrodes on the chest wall (Gel Bridge). This could cause burns and reduce the amount of energy delivered to the heart. If using defibrillator gel pads, make sure that the size of the pad is large enough to cover the entire paddle electrode area.

3.2.10.5. Place STERNUM paddle on the patient's right chest near the upper sternum, and the APEX paddle near the cardiac apex on the lower left chest.

3.2.10.6. Multi-Function Electrode (MFE) pads may be used and will be applied according to instructions on the electrode packaging. Connect MFE pads to multi-function cable. Ensure good contact is made with MFE pads on patient's skin. Apply one edge of the pad securely to the Patient and roll pad smoothly from that edge to the other being careful not to trap any air pockets between the gel and skin.

3.2.10.7. Clear all personnel from patient contact area. **WARNINGS:** Warn all persons in the area to “stand clear” prior to defibrillation discharge. Do not touch the bed, patient, or any equipment connected to the patient during defibrillation. A severe shock can result. Do not allow exposed portions of the patient’s body to come into contact with metal objects, unwanted pathways for defibrillation current may result. When utilizing external paddles press firmly against the patient’s skin to maximize electrode contact and use approximately 25 lbs of pressure. This will also mitigate spark hazard.

3.2.11. **Synchronized Cardioversion. WARNINGS:** This procedure requires direct Physician supervision. Engage SYNC option for synchronized cardioversion; prior to attempting synchronized cardioversion, ensure ECG signal is good and SYNC marks (↓) are displayed above each QRS complex. The defibrillator/cardioverter will seem to pause before it shocks because it is awaiting the next QRS complex. The electrical shock is delivered a few milliseconds after the R wave so that it appears to land on the QRS complex. This avoids the delivery of an electrical shock during cardiac repolarization (or relative refractory period represented on the surface ECG as the T wave), a period of particular vulnerability during which an electrical shock can precipitate ventricular fibrillation (VF). If additional counter shocks are necessary, readjust the energy level as necessary, press the SYNC soft key and repeat. “SYNC XXX SEL” must be displayed prior to pressing the CHARGE button.

3.2.11.1. Apply pads or paddles

3.2.11.2. Turn selector switch to **DEFIB**, Press **Synch On/Off** soft key

3.2.11.3. Verify that the (↓) display over R-waves and “SYNC” displays.

3.2.12. **Non-Invasive Transcutaneous Pacing.**

3.2.12.1. Turn Selector Switch to **PACER**, press the **LEAD** button until the desired lead configuration is selected. Pacing View appears when the Pacer soft key is set to the Pacer Mode.

3.2.12.2. Non-invasive transcutaneous pacing therapy is used to deliver pace pulses to the heart. Pace pulses are delivered through MFE pads that are applied to the patient’s bare chest. While in Pacer Mode, the ECG strip and Event Summary are easily annotated with event information. Set pacer rate by turning **PACER RATE** ppm knob to a value 10-20 ppm higher than intrinsic rate. If no intrinsic rate exists, use 100 ppm. **NOTES:** Use only approved lead sets when pacing with the HeartStart MRx. Failure to do so may introduce noise and result in intermittent leads off messages. NTP may be accomplished in-flight with the HeartStart MRx due to low biphasic energy and output current. Flight Nurses may initiate pacing in-flight IAW AHA ACLS protocols.

3.2.12.3. For treatment of patients with implantable devices such as permanent pacemakers or cardiovert defibrillators, consult a physician and the instructions for use provided by the device’s manufacturer.

3.2.12.4. Waveforms, ECG monitoring, measurements, and most alarms remain active and retain their settings when you transition from Monitor or Manual Defib Mode to Pacer Mode. However, the waveform displayed in Wave Sector 4 is replaced by the pacing status bar. A white pacing marker appears on the ECG waveform in Wave Sector 1 each time a pacer pulse is delivered to the patient. If pacing in demand mode, white R-

wave markers also appear on the ECG until capture occurs. **NOTE:** R-wave markers do not appear on paced beats

3.2.12.5. The HeartStart MRx can deliver paced pulses in either demand or fixed mode.

3.2.12.6. In demand mode, the pacer only delivers paced pulses when the patient's heart rate is lower than the selected pacing rate.

3.2.12.7. In fixed mode, the pacer delivers paced pulses at the selected rate. **WARNING:** Use demand mode pacing whenever possible. Use fixed mode pacing when motion artifact or other ECG noise makes R-wave detection unreliable or when monitoring electrodes are not available.

3.2.12.8. To prepare for pacing:

3.2.12.8.1. If not pre-connected, connect the pads cable to the HeartStart MRx by aligning the white pointer on the pads cable with the white arrow on the green Therapy port. Then push until you hear it click into place.

3.2.12.8.2. Make sure the multifunction electrode pads packaging is intact and within the expiration date shown.

3.2.12.8.3. Connect the pads connector to the pads cable.

3.2.12.8.4. Apply MFE pads according to the instructions on the pouch. Apply back electrode first (to the left side mid thorax), applying one edge to patient and roll smoothly; then apply the front electrode (left side mid thorax) in similar manner. Prepare the patient's skin prior to applying the pads. Skin is a poor conductor of electricity, so skin preparation is important in achieving good contact.

3.2.12.8.4.1. If necessary, clip hair at the electrode sites (or shave sites if needed).

3.2.12.8.4.2. Clean and abrade the skin at the electrode site.

3.2.12.8.4.3. Dry the electrode sites briskly to increase capillary blood flow in the tissues and to remove oil and skin cells.

3.2.12.8.5. If pacing in demand mode, apply monitoring electrodes and connect the ECG cable to the HeartStart MRx.

3.2.12.8.6. Set pacer output soft key **PACER OUTPUT** mA. The pacer output will increment or decrement by a value of 2 mA on the display.

3.2.12.8.7. Determination of capture will be assessed both electrically and mechanically in order to assure appropriate circulatory support of the patient. Determination of electrical capture will be performed by viewing the ECG on the screen while ECG cable is attached to patient. Mechanical capture is assessed by palpation of peripheral pulse. In order to avoid mistaking muscular response to pacing stimuli for arterial pulsations only femoral, right brachial or radial arteries will be palpated. The ideal output current is the lowest value that will maintain capture. This is usually about 10% above threshold. Typical threshold currents are between 40 and 80 mA. Location of MFE pads will affect the current required to obtain ventricular capture. The placement that offers the most direct current pathway to the heart while avoiding large chest muscles will usually produce the lowest threshold.

WARNINGS: Do not touch the gelled area of the MFE pads or place pads over the patient monitoring electrodes; electrical shock and burn hazard. MFE pads should be replaced after 8 hours of continuous pacing (2 hours for radiolucent stat pads). Pacing in excess of 30 minutes, particularly in neonates or adults with severely restricted blood flow, may cause burns. Periodic inspection of underlying tissue is required. If the unit was not turned off and less than 10 minutes have elapsed since pacing mode was last used, reactivating pacemaker mode causes pacing to immediately resume at recent settings.

3.2.13. Pediatric Pacing. WARNING: This procedure requires direct Physician supervision with Pediatric or Neonatal care background.

3.2.13.1. Non-invasive pacing of pediatric patients is done in an identical manner to adults. Smaller size pediatric MFE Pads are required for patients weighing less than 33lbs/15Kg. **NOTES:** Pediatric MFE pads are not carried in the AE in-flight kit and must be supplied by Pediatric or Neonatal transport teams as required.

3.2.14. NIBP (Non-invasive Blood Pressure) Monitoring.

3.2.14.1. Insert the NIBP tubing into the NIBP port as described in “Connecting the NIBP Interconnect Tubing.

3.2.14.2. To measure NIBP, press the [Start NIBP] soft key.

3.2.14.3. Take single/manual measurement; Press NIBP button Manual. One measurement is taken each time you press [Start NIBP]. Take additional measurements by pressing [Start NIBP].

3.2.14.4. Automatic - The measurement is repeated at the configured interval of 1, 2.5, 5, 10, 15, 30, 60, or 120 minutes from the time you press the [Start NIBP] soft key. Additional manual measurements may be taken without affecting the automatic measurement schedule, by pressing [Start NIBP].

3.2.14.5. The configured NIBP schedule may be changed during use through the Measurements/Alarms menu. NIBP measurements may be taken while in Monitor, Pacer, or Manual Defib modes.

3.2.15. SpO2 Monitoring. WARNING: HeartStart MRx cables are not interchangeable with other monitors. Use of HeartStart MRx cable with BCI 3303 Pulse Oximeter or Zoll M-Series will cause inaccurate readings.

3.2.15.1. Connect the appropriate sensor cable to the HeartStart MRx.

3.2.15.2. Apply the sensor to the patient.

3.2.15.3. If the HeartStart MRx is not turned on, turn the Therapy Knob to Monitor.

3.2.15.4. Check that the patient category is appropriate for the patient. If necessary, use the Patient Info menu to access Patient Category and select the correct patient category setting (adult/pediatric). **NOTE:** This is used to optimize the calculation of the SpO2 and pulse values.

3.2.15.5. **WARNING:** Do not rely solely on SpO2 readings; assess the patient at all times. Inaccurate measurements can be caused by:

3.2.15.5.1. Incorrect sensor application or use.

3.2.15.5.2. Significant levels of dysfunctional hemoglobin's (such as carboxyhemoglobin or methemoglobin).

3.2.15.5.3. Injected dyes such as methylene blue, or intravascular dyshemoglobins such as methemoglobin or carboxyhemoglobin.

3.2.15.5.4. Exposure to excessive illumination such as surgical lamps (especially those with a xenon light source), bilirubin lamps, fluorescent lights, infrared heating lamps, or direct sunlight.

3.2.15.6. The HeartStart MRx allows you to monitor SpO₂ while in Monitor, Manual Defib, and Pacer modes. When using the Q-CPR option, SpO₂ monitoring functionality is not available. **WARNING** : Do not use disposable sensors in high humidity environments or in the presence of fluids which may contaminate sensor and electrical connections, causing unreliable or intermittent measurements. Do not use disposable sensors on patients who have allergic reactions to the adhesive. Do not use the ear transducer on patients with small ear lobes, as incorrect measurements may result.

3.2.16. **Cleaning. CAUTION:** The HeartStart MRx, along with its accessories and supplies, may not be autoclaved, steam sterilized, ultrasonically cleaned, or immersed unless otherwise indicated in the Instructions for Use that accompany the accessories and supplies.

3.2.16.1. Do not use abrasive cleaners or strong solvents such as acetone or acetone-based cleaners.

3.2.16.2. Do not mix disinfecting solutions (such as bleach and ammonia) as hazardous gases may result.

3.2.16.3. Do not clean electrical contacts or connectors with bleach.

3.2.16.4. Disinfect the device as determined by your institution's policy to avoid long-term damage to the device.

3.2.17. Placement:

3.2.17.1. Secure the Philips MRx to an equipment litter using a blanket under the unit.

3.2.17.2. Place litter straps around each corner tied down on a litter with each strap passing through the Philips MRx and both litter straps passing through the two stirrups of the litter.

3.2.18. **Battery. CAUTIONS:** Batteries should not be stored at temperatures outside the range of -20C (-4F) to 60C (140F). Excess temperatures may result in battery damage. Keep batteries away from flame and other heat sources.

3.3. Propaq Encore 206 EL.

3.3.1. **Purpose.** The Propaq Encore monitors non-invasive blood pressure, pulse oximetry (SpO₂), and EKG for neonate, pediatric and adult patients. Expired carbon dioxide level (CO₂) with breath rate, temperature and invasive pressure line monitoring is also available with additional cables. **NOTE:** The earliest versions of Propaq Encore 206EL monitors fielded do not have EtCO₂ monitoring capability. **WARNING:** The Propaq is susceptible to

aircraft electromagnetic interference. If monitoring inaccuracies occur, switch to an alternative monitoring device.

3.3.2. Parts.

3.3.2.1. The Propaq Encore has the following components: ECG Cables, Blood Pressure cuffs, NIBP hose, SpO₂ sensor, CO₂ sensor and cable, battery charger, printer, and protective case. **WARNING:** Propaq SpO₂ cable is not interchangeable with other monitors. Use of the Propaq SpO₂ cable with the ZOLL M-Series CCT and BCI 3303 Pulse Oximeter will cause inaccurate readings.

3.3.3. Power.

3.3.3.1. 100-120 VAC/50-60 Hz, or a battery pack. 3-Ampere fuse.

3.3.3.2. The battery recharges to full capacity in 8 hours with the monitor off.

3.3.3.3. Monitoring time is approximately 3 hours with all channels active, and measurement and printing taken every 15 minutes.

3.3.3.4. Current battery voltage is displayed on the initial power up screen and settings window.

3.3.3.5. 200-240 VAC/ 50-60 Hz is an additional power source if power cable box is converted. **CAUTION:** Make sure the voltage selector is indicating the proper AC mains voltage. The power adapter must be reconfigured for 120-240 VAC power sources.

Table 3.1. Battery Voltage Effects on Operation based on a full Propaq Encore 206 EL configuration

Battery Voltage	Monitor Functioning and Messages	Approximate Operating Time at 25 degrees C
≥ 7.8 V	Monitor which is fully functional and displaying no error messages	4.5 hrs
< 7.8 V	Flashing LOW BATT message	1.5 hrs
< 7.6 V	LOW BATT, NIBP DISABLED, PRINTER DISABLED Equipment alerts; NIBP channel and printer disabled	45 minutes
< 7.4 V	VERY LOW BATT, NIBP DISABLED, PRINTER DISABLED Equipment alerts	15 minutes
< 7.3 V	VERY LOW BATT, NIBP DISABLED, PRINTER DISABLED, CO ₂ HEATER disabled Equipment alerts	5 minutes
= 7.0 V	Unit Shutdown	

3.3.4. **Preflight.** . Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

3.3.4.1. Inspect Propaq and Universal Power Adapter for signs of damage.

3.3.4.2. Unplug from external power.

3.3.4.3. Turn unit on.

3.3.4.4. “Startup window” will display information about the Propaq Encore and the monitor will run a diagnostic test to ensure proper functioning.

3.3.4.5. The battery indicator must be charged to >7.8V.

3.3.4.6. Connect SpO₂ cable to unit and sensor. Assess SpO₂ capabilities by inserting a finger into sensor. A pulse and SpO₂ percentage should appear on the display. Turn off monitor.

3.3.4.7. Plug unit AC power cord into the electrical port on the right side of the unit.

3.3.4.8. Verify the AC voltage in the indicator window on the Universal Power Adapter is the same as the power source you are going to plug into.

3.3.4.9. Plug the gray power cord into the “Universal Power Adapter” and the other end into the appropriate power source.

3.3.4.10. Depress the On switch located on Universal Power Adapter. Green battery LED charging light will illuminate on the monitor and Universal Power Adapter.

3.3.4.11. Ensure the following accessories are in the carrying case.

3.3.4.12. Blood pressure cuffs: Adult standard, large, thigh, Small Adult/Child, Child, and Infant. NIBP hoses: Adult/Pediatric and Infant.

3.3.4.13. ECG Cable 3 or 5 lead, 6 ea Adult and Pediatric electrode pads (silver or silver chloride pads).

3.3.4.14. SpO₂ Sensors: Adult/Pediatric, one Finger Clip-on type, Pediatric/Infant, wrap around type and Sensor Extension Cable.

3.3.4.15. Additional features may include an Expansion Module, with the following capabilities: Printer with additional roll of paper and mainstream Capnography, with CO₂ sensor cable and airway adapters.

3.3.5. **Performance.**

3.3.5.1. **ECG Monitoring. WARNING:** The Propaq Encore monitor does not have automated arrhythmia analysis. Therefore, some ventricular tachycardias and ventricular fibrillation may not be interpreted correctly and may display an inaccurate heart rate.

3.3.5.1.1. Plug the ECG cable into the ECG connector on the Propaq’s left side panel.

3.3.5.1.2. Press the OFF/ON switch to turn it on.

3.3.5.1.3. Select patient mode (press setup, more, next to scroll, change, and yes/no to confirm patient mode).

3.3.5.1.4. Press ECG to alter the selections: ECG Size and ECG Lead.

3.3.5.1.5. Pacer display turns on/off pacer indicator in the ECG waveform (press ECG, more, next, change). **WARNING:** Pacemaker signals can differ from one pacemaker to the next. Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon rate meter alarms. All pacemaker patients should be kept under close or constant observation.

3.3.5.2. **NIBP (Non-invasive Blood Pressure).** **NOTE:** Neonatal Mode: infants up to 44 weeks gestational age. Pediatric Mode: larger infants and small children up to 9 years old. Adult Mode: full range of patient numeric and cuff pressures using the standard child cuff and larger.

3.3.5.2.1. Ensure the appropriate size cuff and patient mode. **WARNING:** If wrong mode is used on a neonate, cuff pressure can exceed 150 mm Hg and injure the neonate.

3.3.5.2.2. Screw hose into left side of panel and connect to BP cuff.

3.3.5.2.3. Press NIBP button to display the status window and menu.

3.3.5.2.4. Press Start/Stop button. Pressing Start/Stop during a reading will automatically stop the reading and vent the cuff.

3.3.5.2.5. Auto/Manual: The Manual Mode is the default, measuring a single reading initiated by the user. The Automatic Mode can be programmed to take readings at specific intervals.

3.3.5.2.6. Interval: Selects the interval at which NIBP measurements are automatically taken. The interval you select ranges from 1, 2, 3, 5, 10, 15, 30, or 60 minutes.

3.3.5.2.7. Turbo cuff: automatically starts NIBP measurements and continues to take as many measurements as possible within five minutes. **WARNING:** The Propaq Encore should never be used to monitor NIBP on one patient while simultaneously monitoring ECG on another patient.

3.3.5.3. **Pulse Oximetry (SpO₂).**

3.3.5.3.1. Plug the extension cable or the sensor directly into the SpO₂ connector, located on the left side of the Propaq. Turn the locking ring around the connector to secure the cable.

3.3.5.3.2. Place the sensor probe on the patient in the appropriate place.

3.3.5.3.3. If SEARCH is displayed in the SpO₂ numeric site, adjust sensor placement.

3.3.5.3.4. Press SpO₂ and then Size to adjust the size of the waveform.

3.3.5.3.5. Monitor patient sensor site. **WARNINGS:** Change sensor site for circulatory and skin integrity at least every 4 hours when using taped on probe. The finger clip probe should be used for spot check monitoring or continuous monitoring of less than 30 minutes. Sensors exposed to ambient light while not applied to a

patient can exhibit semi-normal saturation readings. Be sure the sensor is securely placed on the patient and check application often to ensure accurate readings.

3.3.5.4. **CO₂ Monitoring.**

3.3.5.4.1. Connect the airway adapter in-line at the endotracheal tube and ventilator circuit.

3.3.5.4.2. Connect CO₂ sensor cable to exterior portion of airway adapter.

3.3.5.4.3. Plug cable into bottom left side of the Propaq.

3.3.5.4.4. Monitor the patient.

3.3.5.5. **Alarms.**

3.3.5.5.1. A steady, high-pitched alarm tone sounds whenever a limit is violated on most patient channels.

3.3.5.5.2. The tone for the SpO₂ alarms is lower in frequency.

3.3.5.5.3. The tone for the Apnea alarm is one second on, one second off.

3.3.5.5.4. The alarm tone continues until: the patient condition changes and no longer exceeds the limit, The alarm tone is suspended by pressing the "Suspend" button, or alarm limit is adjusted so the vital signs do not exceed the alarm limit. **NOTES:** Pressing "suspend/resume button" suspends ALL alarm tones for 90 seconds. If resume button is pressed a second time, alarm tones are re-activated. Life-threatening alarms cannot be turned off (i.e. the apnea alarm). **WARNING:** Prior to use on a new patient, always turn off for a few seconds. This clears the prior patient's trend values, alarm limit settings, and NIBP cuff inflation target.

3.3.5.5.5. A full bell indicates all alarm limits are on.

3.3.5.5.6. A half bell indicates at least one alarm limit is turned off.

3.3.5.5.7. Absence of a bell indicates no alarm limits are on.

3.3.5.6. **Changing Individual Alarm Limits.**

3.3.5.6.1. From the Main Menu, press "Setup > Alarms."

3.3.5.6.2. Press Limits to display alarm Limits Menu.

3.3.5.6.3. Press "Next Page" to change to the desired alarm limit window.

3.3.5.6.4. Press the Next button to move the cursor.

3.3.5.6.5. Press "Up or Down," or "On/Off" to set the limit to the desired limit value.

3.3.5.6.6. When the limit is set, select the next limit with the Next button.

3.3.5.7. **Cleaning.**

3.3.5.7.1. The monitor and accessories should be wiped with a mild cleaning solution. Do not allow cleaning solutions or water to run into the crevices or connector openings.

3.3.5.8. **Placement.**

3.3.5.8.1. The unit may be secured by running a litter strap through its hanging bracket and then securing it to a litter brace. Do not obstruct your view by wrapping the strap over the display or buttons.

3.3.5.8.2. The unit may also be secured to an equipment litter with a litter strap over the top of the unit under the hanging bar.

Chapter 4

POWER, SUCTION AND INFUSION EQUIPMENT

4.1. Avionics Electrical Frequency Converter

4.1.1. **Purpose.** To convert 115VAC/400 Hz electrical current (aircraft power) to hospital grade 115VAC/60 Hz for use with 60 Hz medical equipment through the 3 duplex outlets. **CAUTION:** The maximum amperage the frequency converter will support is 30 amps. **WARNING:** Do not exceed the total amperage supplied by the aircraft outlet or 15 amperes for any individual frequency converter duplex outlet.

4.1.2. **Parts.** Frequency converter and (1) 25 foot input power cable.

4.1.2.1. To resolve potential shock hazards, the frequency converter and 25 foot power input cables have gone through several modifications since initial procurement. Current modifications can be identified as follows:

4.1.2.2. Fuel vapor environment (for use on KC-135 aircraft) modified frequency converters are easily identified with a large orange hood. Attached to the large orange hood is a placard which reads: "approved for use in a fuel vapor environment, contract number F41622-01-D-0001, DO 5010." **WARNING:** Frequently observe power indicator lights on the frequency converter to verify electrical flow to medical equipment. The medical device must be securely plugged in to engage the push-pin on the face of the frequency converter electrical outlet. Engagement of the push-pin prevents inadvertent sparking and electrical current flow to medical devices.

4.1.2.3. The 25 foot input power cable modifications can be identified by:

4.1.2.3.1. "Orange" and "blue" tape located at the distal end of the 25 foot power cable. **WARNING:** If orange and blue tapes are not present, cable will not be used.

4.1.3. **Power.** 115VAC/400 Hz (aircraft power).

4.1.4. **Preflight.**

4.1.4.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

4.1.4.2. Inspect 25 ft power cable assembly for cuts, frayed wires, bent pins, loose cannon receptacles, and damage to the electrical plugs.

4.1.4.3. Ensure "Orange" and "blue" tape is located at the distal end of the 25 foot power cable

4.1.4.4. If damage is noted, turn equipment into medical maintenance for repair.

4.1.4.5. For utilization on the KC-135 or KC-10: connect an adaptive electrical pigtail from the Electrical Cable Assembly System (ECAS) to integrate the Avionics Frequency converter power input cable.

4.1.5. Performance. **WARNINGS:** AECMs will wear Nomex gloves during all connecting/disconnecting procedures with the converter. When connecting to aircraft power

the Avionics Converter must be off. **NOTE:** When utilizing the frequency converter it is not necessary to check the aircraft outlet with the ECAS tester. The converter and aircraft circuit breakers serve as a protective mechanism in the event of a power surge. In addition, it is not necessary to check ECAS cords connected to the C-17 60 Hz outlets with the ECAS tester.

4.1.5.1. Connect the 25 foot input power cable straight end into the receptacle on the bottom right side of the converter. Ensure the converter receptacle is firmly seated to the converter prior to connecting the “twist lock” collar. This is best accomplished by using both hands, one hand to stabilize the extended cannon plug coupler housing and cable, while using the other hand to connect the “twist lock” collar. Do not over tighten.

4.1.5.2. Connect the elbow end of the 25 foot input power cable into an appropriate 115VAC/400 Hz aircraft electrical outlet. Ensure the converter receptacle is firmly seated to the aircraft outlet prior to connecting the “twist lock” collar. This is best accomplished by using both hands, one hand to stabilize the extended cannon plug coupler housing and cable, while using the other hand to connect the “twist lock” collar. Do not over tighten. **WARNINGS:** Excessive and repeated twisting of the 25 ft power input cable near the cannon receptacles may cause the internal wire connectors to ground out. This could result in electrical shock or serious injury. Above sequence will be followed. Connecting 25 ft input power cable directly into aircraft prior to step 4.1.5.1 could result in electrical injury.

4.1.5.3. Turn converter on.

4.1.5.4. Verify power to the converter and check the amperage draw. **NOTE:** Following a changeover from ground power to aircraft auxiliary power unit (APU), check converter and electrical loads to confirm proper operation and to ensure circuit breaker switches have not been tripped. **CAUTION:** If patient requirements permit, the converter should be turned off during aircraft power switch over.

4.1.6. Placement.

4.1.6.1. Select a location close to power requirements and electrical source. Secure the converter to the aircraft floor using D-rings and a cargo tie down strap. To secure to aircraft floor: wrap strap once around converter handle, run strap over the top of the converter, wrap once around second handle.

4.1.6.2. The converter must be secured to allow unrestricted airflow through the unit. **CAUTION:** Avoid placement near sources of liquid contamination (i.e., humidification bottles, fluids, irrigation supplies). Immediately wipe up any spills on the converter. **WARNING:** Do not secure/run lines over moving parts. The loadmaster or boom operator will be consulted if electrical lines are strung outside the litter stanchion area or above the patient support pallet (PSP).

4.2. Unitron Portable Power System.

4.2.1. **Purpose.** The portable power system changes 400 Hz, 3-phase, 115/200 VAC input power into precision 60 Hz, single-phase, 115 VAC power bus to operate electrical equipment while on board military and commercial aircraft.

4.2.2. **Parts.** Portable power system, (1) 25 foot detachable flexible cable, (3) 115 V 60 Hz, 15 Amp slow-trip circuit breakers, and (3) hospital grade, non-locking, 15 Amp duplex

receptacles. **WARNING:** Do not exceed a total of 30 amps for the unit, or 15 amps for any one duplex receptacle. **NOTES:** A digital meter is associated with each duplex receptacle that indicates the current flowing in that duplex receptacle. The power to each individual receptacle is controlled electronically to ensure the power is not turned on until the plug has been inserted into the receptacle and power is turned off before the plug has been removed from the receptacle, precluding the possibility of generating a spark.

4.2.3. **Power.** 115 VAC/400 Hz (aircraft power).

4.2.4. Preflight.

4.2.4.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

4.2.4.2. Inspect 25 foot flexible cable for cuts, frayed wires, bent pins, loose cannon receptacles, and damage to the electrical plugs.

4.2.4.3. If damage is noted, fill out an AFTO 350 tag and affix to equipment. Turn equipment into medical maintenance for repair.

4.2.4.4. For utilization on the KC-135 or KC-10: connect an adaptive electrical pigtail from the Electrical Cable Assembly System (ECAS) to integrate the 25 foot flexible cable.

4.2.5. **Performance.** **NOTE:** When utilizing the portable power unit it is not necessary to check the aircraft outlet with the ECAS tester. The unit and aircraft circuit breakers serve as a protective mechanism in the event of a power surge. In addition, it is not necessary to check ECAS cords connected to the C-17 60 Hz outlets with the ECAS tester.

4.2.5.1. With the unit control on/off switch/circuit breaker (CB1) in the off position, connect the detachable input cable's connector to the input receptacle of the unit. **WARNING:** When connecting to aircraft power the portable power system must be off. AECMs will wear Nomex gloves during all connecting/disconnecting procedures with the portable power system.

4.2.5.2. Move each of the three output circuit breakers to the off position and connect the detachable cable's connector to the aircraft receptacle.

4.2.5.3. Move the unit control on/off switch/circuit breaker (CB1) to the on position, thereby applying power to the portable power system. **NOTE:** There will be a start delay of ten seconds. During the delay, the three (3) Stoplite indicators will momentarily illuminate.

4.2.5.4. Confirm that the green lamp is illuminated (steady light). **CAUTIONS:** If the yellow lamp is illuminated (steady light), move the unit control on/off switch breaker to the off position. A steady yellow lamp indicates that voltage being applied to the input of the portable power system is improper for unit operation. A red lamp indicates an internal failure of the portable power system.

4.2.5.5. Connect electrical plug(s) to receptacle(s); ensure the plug is fully inserted. Move the appropriate output circuit breaker to the on position. **CAUTIONS:** When connecting or disconnecting an electrical plug to the portable power system, the

respective outlet circuit breaker should be turned off to reduce the risk of device failure or other unintended malfunctions to aircraft power. If the yellow lamp flashes, an overload condition is indicated. If the green lamp is extinguished and the yellow lamp continues to flash, remove overload. Move the unit control on/off switch circuit breaker to the off, then on, position.

4.2.5.6. Equipment Shutdown Procedure.

4.2.5.6.1. Turn off the equipment plugged into the portable power system.

4.2.5.6.2. Move each output circuit breaker to the off position.

4.2.5.6.3. Disconnect all loads from the receptacles.

4.2.5.6.4. Move the unit control on/off switch/circuit breaker to the off position (green light will extinguish) and disconnect the detachable power cord.

4.2.6. Placement.

4.2.6.1. Select a location close to power requirements and electrical source. Secure the portable power system to the aircraft floor using D-rings and a cargo tie down strap. To secure to aircraft floor: wrap strap once around unit's handle, run strap over the top of the unit, wrap once around second handle.

4.2.6.2. The portable power system must be secured to allow unrestricted airflow through the unit. **CAUTION:** Avoid placement near sources of liquid contamination (i.e., humidification bottles, fluids, irrigation supplies). Immediately wipe up any spills on the portable power system. **WARNING:** Do not secure/run lines over moving parts. The loadmaster or boom operator will be consulted if electrical lines are strung outside the litter stanchion area or above the patient support pallet (PSP).

4.3. Electrical Cable Assembly System (ECAS).

4.3.1. **Purpose.** The ECAS accomplishes two functions. First, its adapters connect to aircraft outlets and provide standard "household" 3-pin outlets for alternating current or "twist lock" outlets for direct current. Second, it provides extension cords to distribute electrical power from the adapter outlets or from the avionics converter. Reference T.O. 8A23-6-1, *Technical Manual, Operation and Maintenance Instructions with Parts Breakdown, Cable Assembly Set, Electrical A/C24-2*.

4.3.2. Parts.

4.3.2.1. (1) Carrying case.

4.3.2.2. (4) 25- foot AC electrical cords with (4) grounded outlets each.

4.3.2.3. (2) 30 –foot DC electrical cords with (2) "twist-lock" outlets each.

4.3.2.4. (4) AC adapters for C-130/C-141 aircraft.

4.3.2.5. (4) AC adapters for C-130 aircraft.

4.3.2.6. (2) DC adapters for C-130/C-141 aircraft.

4.3.2.7. (1) AC adapter for KC-135 aircraft.

4.3.2.8. (1) AC Frequency Converter adapter for KC-135 aircraft.

4.3.2.9. (1) AC Frequency Converter adapter for KC-10 aircraft.

4.3.2.10. (1) AC electrical tester.

4.3.2.11. (1) DC electrical tester.

4.3.3. Preflight.

4.3.3.1. Ensure AF Form 4033 is complete and present.

4.3.3.2. Open the case by rotating the (8) latches around the mid-line of the carrying case and separating the top of the case from the bottom. Invert the top of the case, exposing the inner door. Open the inner door by depressing both spring-loaded latches and lifting the door. **WARNING:** Pigtail adapters have been modified. Only AC pigtail adapters with a fixed pin inserted through the locking collar are authorized for use. This modification prevents turning of the coupler housing.

4.3.3.3. Inspect the adapters and electrical testers in the top of the case, and the extension cords in the bottom of the case. Ensure all components are present, and observe for any defects. Verify fixed pin is inserted through the locking collar of each adapter.

4.3.3.4. If any defects are found, send the defective component for repair.

4.3.4. **Performance. WARNING:** Nomex gloves will be worn when handling electrical cords. Gloves may not prevent electrical injury but may lessen the effect.

4.3.4.1. Alternating Current (AC) Outlet Setup.

4.3.4.2. Select the appropriate AC adapters. The "C-130" yellow pigtail is for the galley outlet (25A). The "C-130 and C-141" yellow pigtail is for use in the AC outlets (20A). The "KC-135" yellow pigtail is for use in the 110 VAC/400 Hz cannon plug. **WARNING:** On the KC-135E the number 3 receptacle is the only approved source for electrical power for AE equipment. On the KC-135R the galley receptacle is the only approved source for electrical power. On the KC-135R/T, Block 40 model, 3 additional approved electrical outlets are at stations 445, 645, and 745. Each outlet provides a 115 VAC 3-phase 400 Hz 45 amps. Any or all of the outlets may be utilized on AE missions; however, do not exceed the 30 amps capability of the Frequency Converter at individual outlets.

4.3.4.3. Ensure aircraft power is available prior to plugging the adapter into the aircraft outlet. Plug the adapter to the aircraft electrical outlet and tighten the collar without twisting the cord. Do not over tighten. **WARNINGS:** Electrical shocks have occurred when the pigtail adapter is connected to aircraft outlet. Primary reason appears to be twisting of the electrical cable at the cannon plug fittings, which may break the solder joints and create an arch within the aircraft outlet. Utilize two hands to facilitate safe connection. Push cable connection into outlet, and turn coupler housing. The protected metal tip of the AC test probe is live (HOT) when the tester is plugged into a live electrical outlet. Do not touch the tip while the tester is plugged in. **NOTE:** When utilizing the frequency converter it is not necessary to check the aircraft outlet with the ECAS tester. The converter and aircraft circuit breakers serve as a protective mechanism in the event of a power surge. In addition, it is not necessary to check ECAS cords connected to the C-17 60 Hz outlets with the ECAS tester.

4.3.4.4. Plug the AC tester into the adapter.

4.3.4.4.1. Touch the protected metal tip of the test probe to an aircraft metal surface other than an aluminum surface.

4.3.4.4.2. Determine the electrical status at that outlet using the following indications:

4.3.4.4.3. AC OK (115 VAC) – Green lights 1, 2, and 3 illuminated.

4.3.4.4.4. No ground – Green lights 2 and 3 illuminated. Indicates a faulty ground at that aircraft outlet.

4.3.4.4.5. Reversed Polarity – Green light 3 illuminated indicates a reversed polarity at that aircraft outlet.

4.3.4.4.6. 240 VAC – Green lights 1, 2, and 3, and red light illuminated.

4.3.4.4.7. No AC power – No lights illuminated indicating no AC power at that outlet. Check with the flight engineer to ensure that the circuit breaker is set.

4.3.4.4.8. Return the tester in the carrying case.

4.3.4.4.9. Before connecting cords/adapters to medical equipment, ensure that the medical equipment is turned off. For KC-135 operations, to ensure stability of electrical cords, secure the portion of the ECAS cord closest to the pigtail to a non-moving aircraft part. If medical equipment must be removed or plugged in during flight operations, pull the appropriate circuit breakers and ensure equipment is turned off before disconnecting or connecting any plugs from or into ECAS outlets. Re-secure all plug connections with plastic tie-straps to include AE equipment plugged into the ECAS. **WARNING:** Do not disconnect the pigtail adapter inflight (KC-135). **CAUTION:** Ensure all medical equipment is turned off prior to connecting to the AC Adapter.

4.3.4.5. Direct Current (DC) Outlet Setup.

4.3.4.5.1. Select the DC adapter, the orange “C-130/C-141.”

4.3.4.5.2. Ensure that aircraft power is available prior to plugging the adapter into the aircraft outlet. Plug the adapter to the aircraft electrical outlet and tighten the collar without twisting the cord. Do not over tighten.

4.3.4.5.3. Plug the DC tester into the adapter.

4.3.4.5.4. If indicator light illuminates, DC power with the correct polarity is present.

4.3.4.5.5. If the light is not illuminated, this indicates no power is available at the outlet (ensure circuit breaker is set) or polarity is reversed (select another outlet). **NOTE:** If reversed polarity is indicated, notify the flight crew to have the outlet repaired.

4.3.4.5.6. Return tester in the carrying case. **CAUTION:** After removing the pigtail adapter from the electrical outlet, visually inspect the adapter to ensure the contact pins are still in place. Ensure all medical equipment is turned off prior to connecting to the DC Adapter.

4.3.5. Placement.

4.3.5.1. Route the extension cord from the adapter across to a center stanchion, securing it with attached hook and pile fasteners. **WARNING:** Do not secure/run electrical lines over moving aircraft parts. The loadmaster or boom operator will be consulted if lines are strung outside the litter stanchion area or above the patient support pallet (PSP). **CAUTION:** Only when absolutely necessary will one ECAS extension cord be plugged into a second ECAS extension cord in order to increase the overall length of the cords. No more than two cords are authorized. Do not exceed 10 amps max with two cords plugged into one outlet. Ensure all medical equipment is turned off prior to connecting to the AC Adapter.

4.3.5.2. Close the ECAS case and secure it. To open the carrying case inflight, first depress the pressure relief valve on the side of the case to equalize case pressure with aircraft pressure.

4.4. Electrical Cable Assembly System (ECAS) Model no. 1079

4.4.1. **Purpose.** The ECAS is a portable unit that allows proper interconnections between medical equipment and electrical power sources on C-130, C-17, KC-10 and KC-135 aircraft used in aeromedical evacuation operations. It includes adapters required to connect various types of inflight medical equipment to aircraft power sources. It also provides a number of hospital grade extension cords and outlets to allow operation from the Unitron Portable Power System.

4.4.2. Parts.

- 4.4.2.1. (1) Carrying case.
- 4.4.2.2. (6) 25' 115 VAC 50-400 Hz Electrical Cord Assembly.
- 4.4.2.3. (2) 2' 115 VAC 50-400 Hz Electrical Cord Assembly.
- 4.4.2.4. (3) 18" 115 VAC Cord Adapter (for C-130).
- 4.4.2.5. (2) 18" 115 VAC Cord Adapter (for C-130 galley).
- 4.4.2.6. (1) 18" 115 VAC Cord Adapter (for KC-135).
- 4.4.2.7. (1) 18" Frequency Converter Adapter.
- 4.4.2.8. (1) 18" AC Adapter (for KC-10).
- 4.4.2.9. (1) 115 VAC Electrical Tester

4.4.3. Preflight.

- 4.4.3.1. Ensure that all parts listed are present.
- 4.4.3.2. Visually inspect parts for nicks or cuts in the cord insulation or wires, cracks in either tester or in the cord outlet boxes, loosening or disassembly of MS (circular) connectors, and loosening of electrical receptacle/plug hardware.
- 4.4.3.3. Ensure AF Form 4033 is complete and present.

4.4.4. **Performance. WARNING:** Nomex gloves will be worn when handling electrical cords. Gloves may not prevent electrical injury but may lessen the effect.

4.4.4.1. Select correct adapter for the medical equipment to be used and the type of aircraft. The correct adapter can be determined by examining the label on the adapter which describes the aircraft model where it is intended to be used.

4.4.4.2. Connect the appropriate adapter to the aircraft power receptacle. If an extension cord is needed for use of the medical equipment, plug the adapter into the extension cord receptacle and perform the electrical tests (IAW para 4.2.4.3.) on the other end of the cord. **WARNING:** The protected metal tip of the test probe has voltage (hot) when the tester is plugged into a live electrical outlet. Do not touch the tip of the probe while the tester is plugged in. **NOTE:** When utilizing the frequency converter it is not necessary to check the aircraft outlet with the ECAS tester. The converter and aircraft circuit breakers serve as a protective mechanism in the event of a power surge. In addition, it is not necessary to check ECAS cords connected to the C-17 60 Hz outlets with the ECAS tester.

4.4.4.3. Plug the AC Tester into the adapter; if an AC Cord is used, perform test at the cord box outlet. The protected metal tip of the ground probe must be pushed into the aircraft metal (through the paint) at any convenient place on the airframe in order to determine the aircraft's electrical status in accordance with the following indications:

4.4.4.3.1. AC OK = Green lights 1/2/3 – This indicates proper power is available and is the desired indication.

4.4.4.3.2. NO GROUND = Green lights 2/3 – This indicates a faulty ground in the circuit.

4.4.4.3.3. REVERSED POLARITY = Green light 3 – This indicates a reversed polarity in the circuit.

4.4.4.3.4. 240 VOLTS = Green lights 1/2/3 and RED LIGHT – This indicates a 240 Volt AC power source (an improper indication).

4.4.4.3.5. NO AC = No lights – This indicates no power in the circuit (check with flight crew to ensure that circuit breakers are set). **NOTE:** If a fault is indicated at the AC Cord outlet, go back up the line and test the adapter or aircraft power outlet. **WARNING:** If any indication is obtained other than green on lights 1, 2, and 3, do not use the outlet. Report it to the LM/BO for maintenance action.

4.4.4.4. Before connecting cords/adapters to medical equipment, ensure medical equipment is turned off. For KC-135 operations, to ensure stability of electrical cords, secure the portion of the ECAS cord closest to the pigtail to a non-moving aircraft part. If medical equipment must be removed or plugged in during flight operations, pull the appropriate circuit breakers and ensure equipment is turned off before disconnecting or connecting any plugs from or into ECAS outlets. Re-secure all plug connections with plastic tie-straps to include AE equipment plugged into the ECAS.

4.4.4.5. Connect Medical equipment as required.

4.4.4.6. Turn on medical equipment as required for the mission. **WARNINGS:** Do not disconnect the pigtail adapter inflight (KC-135). Do not secure/run electrical lines over moving aircraft parts. The loadmaster or boom operator will be consulted if lines are strung outside the litter stanchion area or above the patient support pallet (PSP).

CAUTIONS: Only when absolutely necessary will one ECAS extension cord be plugged into a second ECAS extension cord in order to increase the overall length of the cord. No more than two cords are authorized. Do not exceed 10 amps max with two cords plugged into one outlet. Ensure all medical equipment is turned off prior to connecting to the AC Adapter. **NOTE:** An operational check of the system should be performed every 60 days. Each item in the system should be operated IAW para. 4.2.4. The operational check will be performed by the Inflight Medical Equipment Section.

4.5. IMPACT 326M Portable Suction Unit.

4.5.1. **Purpose.** The Impact 326M is a self-contained suction apparatus designed to provide continuous suction to remove upper airway secretions or provide intermittent programmable suction.

4.5.2. Parts.

- 4.5.2.1. (1) : Auto power cable assembly.
- 4.5.2.2. (2) : Six (6) foot connective suction tubing.
- 4.5.2.3. (1) : 3/8" Clear hose PVC – 12 Inches long.
- 4.5.2.4. (1) : 1/4" Clear hose PVC – 24 Inches long.
- 4.5.2.5. (1) : 3/8" Clear hose, PVC – 18 Inches long.
- 4.5.2.6. (2) : Disposable collection canisters with lids.
- 4.5.2.7. (1) : Yankauer Catheter.
- 4.5.2.8. (1) : 14 Fr. Catheter.
- 4.5.2.9. (1) : 18 Fr. Catheter.
- 4.5.2.10. (1) : Spare fuse.
- 4.5.2.11. (2) : Universal canister attachment bracket.
- 4.5.2.12. (2) : (0.2) micron bacterial filter

4.5.3. Power.

4.5.3.1. The Impact 326M simultaneously operates and recharges the internal battery from 115/230 VAC, 50-400 Hz or 28 VDC power source.

4.5.3.2. Internal battery operates for a minimum of two (2) hours. Recharging of internal battery takes a maximum of 16 hours.

4.5.4. **Preflight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

4.5.4.1. Ensure all component parts are complete and in serviceable condition.

4.5.4.2. Secure disposable collection canister in universal canister bracket and attach to side of 326M. Ensure the canister lid is securely attached to the canister.

4.5.4.3. Connect one end of the 12 Inch or 18 Inch clear 3/8" PVC hose to the "Vacuum inlet", ensuring the .2-micron bacterial filter is placed in-line.

4.5.4.4. Connect the other end to the “Vacuum” port on the disposable collection canister.

4.5.4.5. Connect the 6 foot suction connector tubing to the “Patient” port on the disposable collection canister.

4.5.4.6. Ensure “Tandem” port is capped on the disposable collection canister.

4.5.4.7. Ensure the Power & Mode Selector switch is off, and then plug the AC line power cord to an external power source. External power lamp and charge lamp will illuminate. **NOTE:** Charge light will not illuminate if battery is fully charged.

4.5.4.8. Turn Power & Mode Selector switch to the appropriate position to verify continuous and intermittent operation. Occlude suction hose and adjust Vacuum Regulator Control clockwise to the maximum desired vacuum. Test Vacuum Regulator Control for correct operation at various vacuum settings. Turn the unit off.

4.5.4.9. Remove the electrical cord from the external power input jack and ensure the unit operates on battery power and repeat **4.5.4.8**

4.5.5. Performance. WARNING: Plugging the cord into the external power input jack allows for external operation and recharging only. In order to operate on battery power, the charger cable must be removed from the external power input jack.

4.5.5.1. Ensure all hoses are correctly attached and secured as specified in the pre-flight.

4.5.5.2. Turn the Power & Mode Selector switch to the desired suction setting, INT (intermittent) or CONT (continuous). **NOTE:** Intermittent suction intervals range from 5-40 seconds for both ON and OFF.

4.5.5.3. Select the vacuum setting by occluding the vacuum tubing. Rotate the vacuum adjust knob until the desired vacuum setting is displayed on the gauge. **NOTE:** Vacuum settings below are starting parameters. In order to clear an oral airway, suction may need to be increased for desired effect.

4.5.5.3.1. Adult –80 to –120 mm Hg.

4.5.5.3.2. Child –60 to –100 mm Hg.

4.5.5.3.3. Infant –5 to –60 mm Hg.

4.5.5.4. Attach drainage device or sterile catheter to suction tubing and follow patient suctioning guidelines IAW AFI 41-307. **NOTE:** For patients who require airborne infection control precautions, there is a filter for the 326M IMPACT® suction unit available in the inflight kit (Filter Media Device NSN #: 6515-01-509-9417). Install the AcroVent 0.2µm polytetrafluoroethylene (PTFE) membrane filter in-line between the suction canister and vacuum inlet (cut 12” or 18” clear PVC hose). If expired body fluids block the filter; replace filter and continue patient suctioning. Suction unit should be positioned upright for use.

4.5.5.5. Adding a second canister, “Tandem” Operation.

4.5.5.5.1. Secure collection canisters in universal canister brackets and attach to each side of 326M.

- 4.5.5.5.2. Connect one end of the 12 Inch or 18 Inch clear 3/8" PVC hose to the "Vacuum Inlet" on the suction device and the other end to the "Vacuum" port on the first disposable collection canister.
 - 4.5.5.5.3. Cap "Patient" port on the first disposable collection canister.
 - 4.5.5.5.4. Connect the 1/4" clear hose PVC to the "Tandem" port on both disposable collection canisters.
 - 4.5.5.5.5. Connect the 6-foot sterile suction hose to the "Patient" port on the second disposable collection canister.
 - 4.5.5.5.6. Ensure "Vacuum" port to second bottle is capped.
- 4.5.6. **Placement.** Velcro straps are available to secure the power cable box onto the back panel of the suction device. Run a litter strap through the top handle of the suction device and around the equipment litter to secure the 326M suction unit.

4.6. IVAC Medsystem III.

4.6.1. Purpose.

4.6.1.1. The IVAC MedSystem III is a three channel infusion pump designed to accurately administer intravenous solutions, blood, and continuous drug infusions. It provides full range delivery rates, from 0.1 to 999 ml/h per channel.

4.6.2. Parts.

- 4.6.2.1. MedSystem III Infusion pump.
- 4.6.2.2. A/C Charging cable.
- 4.6.2.3. IVAC/Alaris MedSystem III Administration Sets.

4.6.3. Power.

- 4.6.3.1. Operates from 110-120 VAC 60Hz.
- 4.6.3.2. Internal Battery: A fully charged battery will provide 6 to 8 hours of operating time with rates set at 125 ml/h per channel and backlighting usage of 2 minutes per hour.
- 4.6.3.3. Recharges in approximately 16 hours via A/C charging cable. **NOTE:** To plug the AC charging cord into the IVAC, ensure the red dot on the AC cord aligns with the red dot on the IVAC.

4.6.4. **Preflight.** Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

- 4.6.4.1. Inspect infusion pump for signs of damage and cleanliness.
- 4.6.4.2. Turn pump on by depressing the ON/OFF RECHARGE key. Infusion pump will automatically cycle through a "Homing Sequence." Observe the three illuminated red and green Channel Indicator lights cycle on and off. Observe the three cassette holders move down and up.
- 4.6.4.3. Turn pump off by depressing and holding the ON/OFF RECHARGE key until display disappears.

4.6.4.4. Connect to AC power source.

4.6.4.5. Verify the battery is charging by ensuring the green light on the power cord and the green light on the right panel of IVAC illuminate. **NOTE:** If a visual “Service” light illuminates, a channel requires maintenance. If the entire screen goes blank, all Channel Indicator lights remain on, and a continuous audio alarm sounds, a major pump failure is present. Fill out an AFTO 350 tag and affix to equipment. Return pump to host medical equipment maintenance activity/MTF for service.

4.6.5. Performance.

4.6.5.1. It is important to prime the set properly to eliminate air bubbles. Ensure the cassette slide clamp is pushed in completely so tubing is not occluded.

4.6.5.2. Invert the cassette so tubing is up. Slowly open the regulating clamp and establish fluid flow to fully prime the set. Gently tap the cassette and ‘Y’ sites as necessary to remove all air. Gently massage the pressure dome to ensure no air bubbles are trapped.

4.6.5.3. Close regulating clamp before inserting and removing the cassette to reduce the risk of free flow.

4.6.5.4. Press the ON/OFF RECHARGE key to turn pump on.

4.6.5.5. With tubing down, use a 45 degree, upward motion to insert cassette into channel.

4.6.5.6. Push on clear portion of cassette until completely seated. Then push in slide clamp flush with entire cassette. Pull down gently on tubing collar. Press with thumb to seat tubing collar in recess beneath cassette. **NOTE:** Pump will beep three times when cassette is properly placed.

4.6.5.7. Press “Select” to move highlighted bar on screen i.e. Primary Rate, Primary Volume Remaining, Time, or to clear Volume Infused.

4.6.5.8. Use the , , or FAST soft key pads to program settings.

4.6.5.9. Press ENTER after programming or altering settings.

4.6.5.10. Press START/STOP key to begin infusion.

4.6.5.11. Pressing STANDARD DISPLAY key will display all 3, channel settings. Verify flow of solution from the drip chamber. **NOTE:** Active infusion does not stop while rates are being changed.

4.6.5.12. **Clear Volume Infused:** Access the desired channel by pressing channel key (A, B, or C). Press SELECT until VOLUME INFUSED (VI) is highlighted. Press CLEAR to reset to zero. Press ENTER.

4.6.5.13. **Temporarily Stop Infusion:** Access desired channel by pressing channel key (A, B, or C). Press START/STOP key.

4.6.5.13.1. A two-toned “Channel Not In Use” advisory will activate in two minutes if cassette remains in channel.

4.6.5.14. **Stop Infusion Indefinitely:** Access desired channel by pressing channel key (A, B, or C). Press START/STOP key. Press STANDARD DISPLAY key. Press STDNDBY.

4.6.5.15. **Program Secondary Infusion:** Select a channel by pressing desired channel key (A, B, or C). Press MORE OPTIONS, then press 2° SEC to access Secondary programming page.

4.6.5.15.1. Press SELECT to change settings, using the , , or FAST keys.

4.6.5.15.2. Press ENTER when programming is complete and then open secondary roller clamp.

4.6.5.15.3. Press START/STOP key while on the secondary page to start the secondary infusion. Verify flow of solution from the drip chamber. **NOTE:** Ensure primary container is at least eight (8) inches below the secondary container. Fluid in the secondary set will stop when it reaches the level of the fluid in the primary container. When the Volume Remaining on the secondary infusion reaches zero, the primary rate resumes. **WARNING:** Failure to enter a correct Secondary Volume Remaining may result in the secondary solution being administered at an incorrect rate.

4.6.5.16. **To Interrupt The Secondary And Return To The Primary Infusion:** Select channel by pressing desired channel key (A, B, or C). Press MORE OPTIONS, then press the PRI soft key to access Primary Programming page. Press START/STOP key while on the secondary page to begin primary infusion.

4.6.5.17. **Programming For The Dose Rate Calculator (DRC).**

4.6.5.17.1. Select Channel by pressing desired Channel key (A, B, or C).

4.6.5.17.2. Stop infusion. Press START/STOP.

4.6.5.17.3. Press MORE OPTIONS, then press “Calc On” soft key to access DRC programming page.

4.6.5.17.4. Press SELECT and program settings using the , , or FAST keys.

4.6.5.17.5. Press ENTER when programming is completed.

4.6.5.17.6. Select Drug specific name or use Drug? To customize any dosing parameter, Press ENTER.

4.6.5.17.7. Select weight if applicable, press ENTER.

4.6.5.17.8. Select concentration, then press ENTER.

4.6.5.17.9. Select diluents volume in milliliter, press ENTER.

4.6.5.17.10. Enter desired Dose Rate, press ENTER.

4.6.5.17.11. Press START/STOP key to start or stop infusion.

4.6.5.17.12. Verify settings on Standard Display page, verify infusion status, and verify flow of solution from the drip chamber.

4.6.5.18. **Alter Preset Infusion DRC.**

- 4.6.5.18.1. Select Channel by pressing Channel Key (A, B, C).
- 4.6.5.18.2. Press SELECT until area to alter is highlighted.
- 4.6.5.18.3. Press , , or FAST keys to alter.
- 4.6.5.18.4. Press ENTER.
- 4.6.5.19. **Discontinue DRC.** Select Channel by pressing A, B, or C.
 - 4.6.5.19.1. Press START/STOP to stop infusion.
 - 4.6.5.19.2. Press MORE OPTIONS, then press CalcOff.
- 4.6.5.20. **Alarms.** Pump will sound four rapid beeps, infusion stops, and will rapidly flash red light on channel key. Pump will indicate one of the following problems:
 - 4.6.5.20.1. AIR IN LINE: Air detected in fluid pathway during infusion, or air sensor is dirty.
 - 4.6.5.20.2. AIR IN LOWER TUBING: Air bubbles detected in fluid pathway with a total volume exceeding the air in line threshold setting.
 - 4.6.5.20.3. BATTERY DEPLETED: Insufficient battery power. Pump will shut down in 5 minutes.
 - 4.6.5.20.4. CASSETTE JAMMED: Cassette piston is difficult to move or piston sleeve is loose.
 - 4.6.5.20.5. CASSETTE NOT LATCHED: Cassette is partially disengaged or latching mechanism is dirty.
 - 4.6.5.20.6. CASSETTE REMOVED: Cassette is removed from holder while channel is infusing.
 - 4.6.5.20.7. CHECK FLUID SIDE: Possible upstream restrictions to flow.
 - 4.6.5.20.8. FAULTY CASSETTE: Cassette may be damaged or inoperable. Possible dysfunction of cassette sensor located in holder.
 - 4.6.5.20.9. FLUID-SIDE OCCLUDED: Upstream restriction to flow.
 - 4.6.5.20.10. PATIENT-SIDE OCCLUDED: Downstream restriction to flow.
 - 4.6.5.20.11. PUMPING LATCH CLOSED: Pumping latch jaw located to right of air sensor is closed or broken.
 - 4.6.5.20.12. RATE/VOL SETTINGS CLEARED: Rates and/or volumes are incompatible with newly selected device type.
 - 4.6.5.20.13. BLANK SCREEN: Safety checks built into software have detected an instrument error condition. Turn pump off, then on again. Press START/STOP key to resume infusing. If blank screen recurs or pump fails to turn on, return to host medical equipment maintenance activity/MTF.
- 4.6.5.21. **Advisory Alarms.** Pump will sound two beeps, slowly flash the red light on the faulty infusing channel's channel key; the infusion will continue. Pump will indicate one of the following problems:

- 4.6.5.21.1. CHECK AIR SENSOR: During installation of the cassette one of three problems may be detected:
 - 4.6.5.21.2. Air is detected in tubing.
 - 4.6.5.21.3. Tubing collar is not properly seated.
 - 4.6.5.21.4. Air sensor is dirty or damaged.
 - 4.6.5.21.5. INFUSION COMPLETE Volume Remaining (VR)=0: VR has counted down to zero. Channel is infusing at a KVO rate (3.0 ml/h).
 - 4.6.5.21.6. LOW BATTERY: Pump has 30 minutes or less of battery power remaining.
 - 4.6.5.21.7. CHANNEL NOT IN USE: Two minutes have elapsed since cassette was installed or infusion was stopped.
- 4.6.5.22. **Fault Alarm.** A numeric message is displayed, siren sounds, red light rapidly flashes, and the infusion will stop. Unit will read CHANNEL OUT OF ORDER indicating: Safety checks built into software have detected a faulty channel. Unit requires service.
- 4.6.5.23. **Alarm Response Keys.**
- 4.6.5.23.1. QUIET: Silences advisories, alarms, and faults for two minutes. Soft key is accessible during alarm status.
 - 4.6.5.23.2. CANCEL: Clears alarm and advisory messages and stops tone.
 - 4.6.5.23.3. CLR AIR: Moves air bubbles past air-in-line sensor. Each press of the Clr Air soft key displaces 0.2 ml of air and fluid. Three beeps indicate when air bubble is no longer in front of the air-in-line sensor.
 - 4.6.5.23.4. CONFIRM: Is present during Check Fluid Side alarms. Allows infusion to continue if no upstream occlusion is found and fluid is flowing in drip chamber.
 - 4.6.5.23.5. RETRY: Resets resumable fault conditions. Used when attempting to re-establish normal operation of a channel.
 - 4.6.5.23.6. SERVICE: Disables use of affected channel. Servicing of the pump is required before channel can be used.

4.6.6. Placement.

- 4.6.6.1. An adjustable pole clamp is attached to the pump for securing. Over tightening is prevented by a torque release lock within the clamp. **CAUTION:** A litter strap may be needed in addition to the clamp.
- 4.6.6.2. A rotating latch is attached to the clamp to allow for the IV pump to spin 360 degrees and locks at any 90-degree angle to enhance monitoring of infusion pump operation.

Chapter 5

MISCELLANEOUS EQUIPMENT

5.1. Chest Drainage Unit.

5.1.1. **Purpose.** Chest drainage units evacuate air and/or fluid from the chest cavity or mediastinum of patients with chest tubes. The treatment goal is to re-establish lung expansion and restore breathing dynamics. In addition, the chest drainage unit may facilitate postoperative collection and reinfusion of autologous blood from the patient's pleural cavity or mediastinal area. Drainage may be either by "straight drainage" to gravity, or by "controlled suction."

5.1.1.1. Atrium Express 4050 Dry Seal Chest Drain is a disposable, waterless operating system with 2100 ml collection volume, dry suction regulator, dry one-way valve for seal protection, and air leak monitor with redundant water seal protection. **NOTE:** Water is not required for seal protection or drain operation. However, sterile fluid is required for air leak detection and water seal function.

5.1.2. **Preflight.** Inspect the drainage unit package for signs of damage. If the package is damaged, dispose of the item.

5.1.3. Performance.

5.1.3.1. Atrium Express Dry Seal Chest Drain set-up.

5.1.3.1.1. Connect the chest drain to the patient.

5.1.3.1.2. Connect chest drain to suction. Attach suction line to suction port on top of chest drain.

5.1.3.1.3. Turn on the suction source. Increase the suction to -80mmHg or higher. The suction regulator control dial, located on the front of the drain (upper left side), can be adjusted to any suction setting between -10cmH₂O and -40cmH₂O. Suction regulator is preset to -20cmH₂O. Dial down to lower the suction setting and dial up to increase. **CAUTION:** Suction source should be set to -80mmHg or higher for chest drain regulator settings of 20cmH₂O or greater. When additional negative suction greater than 20cmH₂O is needed, it is necessary to use the suction canister connected in-line with the suction device (i.e. Impact 326M). Failure to do so will cause inaccurate negative pressure readings. **NOTE:** The suction source vacuum should be greater than -80mmHG when multiple chest drains are connected to a single suction source.

5.1.3.1.4. To lower regulator setting from a higher level (-40cmH₂O) to a lower level (-20cmH₂O), adjust regulator down to lower setting and then temporarily depress the filtered manual high negativity vent (located on top of the drain) to reduce excess vacuum. **NOTE:** The Express incorporates an advance automatic high negativity relief valve. This filtered valve activates automatically to limit system pressure to approximately -50cmH₂O. **WARNING:** Do not use manual high negativity vent when suction is not operating or when the patient is on gravity drainage

5.1.3.1.5. To verify suction operation: check the bellows, located below the suction regulator control dial. The bellows will expand only when suction is operating. The monitor bellows will not expand when suction is not operating or disconnected. The calibrated ▲ mark allows quick and easy confirmation of vacuum operation over a wide range of continuously adjustable suction control settings.

5.1.3.1.6. If the bellows is observed to be expanded, but less than the ▲ mark, the vacuum source pressure must be increased to -80mmHg or higher. **NOTE:** When vacuum is present in the collection chamber, a  symbol will remain visible in the vacuum indicator window (located to the right of the suction regulator). When vacuum is not present (atmospheric pressure) no symbol will appear. All patient tube connections and the vacuum indicator window should be checked regularly for vacuum confirmation.

5.1.3.1.7. Fill the air leak monitor to the fill line by syringe (no needle) with 45 ml of sterile water or sterile saline via the needless injection port located on the back of the drain. **WARNING:** Do not use or puncture needless luer port with needle. **NOTE:** When bubbles are observed going from right to left, this will confirm a patient air leak. Continuous bubbling will confirm a persistent air leak. Intermittent bubbling will confirm the presence of an intermittent air leak. No bubbling will indicate no air leak is present.

5.1.3.1.8. Disconnection of unit. Do not separate the unit from the patient without clamping off the patient chest tube(s) first.

5.1.3.2. Positive Relief Protection valve. This valve is located on the top of the drain (to the left of the Manual Negativity Vent) and acts similarly to the Heimlich valve. After loss of altitude, the pressure valve opens instantly to release accumulated positive pressure. **WARNING:** Use of the Heimlich valve with the Atrium Express could cause great risk to a patient during rapid decompression. Do not obstruct the positive pressure relief valve.

5.1.3.3. **Placement.** Always place chest drain below the patient's chest in an upright position. To avoid accidentally knocking over chest drain hang the system from the litter.

5.2. Heimlich Valve.

5.2.1. **Purpose.** The Heimlich valve prevents the flow of air or fluid back into the patient's chest cavity. The Heimlich valve consists of a hard, clear plastic tube that connects inline between the patient's chest tube and the chest drainage unit or drainage collection container. Inside the plastic tube is a flutter valve that allows only one-way flow of air and fluid through the tube, even during aircraft depressurization emergencies. **NOTE:** If a one-way valve is inherent to the chest drainage unit, a Heimlich valve is not required. All chest tubes attached to straight drainage (e.g. foley bag) require a Heimlich valve. Monitor chest tube patency.

5.2.2. **Preflight.** Inspect the Heimlich valve and the sterile package for any signs of damage. If any signs of damage are present, dispose of the entire package. Ensure that two (2) large Kelly clamps with latex tubing over the clamp jaws are available.

5.2.3. **Performance.** **WARNING:** The ends of the Heimlich valve and all connections must remain sterile. Always ensure that a closed system is maintained.

- 5.2.3.1. Using the two Kelly clamps, double clamp the chest catheter close to the patient's chest wall.
- 5.2.3.2. Attach the distal end of the catheter securely to the blue end of the Heimlich valve.
- 5.2.3.3. Attach the distal end of the Heimlich valve to the tubing connected to an approved closed chest drainage unit.
- 5.2.3.4. Ensure the arrow on the Heimlich valve points away from the patient's chest.
- 5.2.3.5. Secure all connections with adhesive tape. DO NOT use masking tape.
- 5.2.3.6. Remove both clamps from the chest catheter and store them near the patient. **WARNING:** Store the clamps by the patient's side, in case emergency clamping of the chest catheter is required.
- 5.2.3.7. If the valve becomes obstructed, use sterile technique to replace the Heimlich valve.

5.3. Airborne Life Support System (ALSS).

5.3.1. **Purpose.** The ALSS Model 185 Infant Transport Incubator provides a controlled environment for supporting an infant's thermal requirement during transportation. The ALSS Incubator also has provisions for humidification and an enriched oxygen environment in the infant chamber.

5.3.2. **Parts.** Storage capability for 2 "D" or "E" size oxygen cylinders at the left front and rear. A double-walled hood with access doors covers the infant mattress and tray. The hoods are assembled one over the other and secured together by 4 hood securing knobs. An oxygen regulator for the oxygen cylinders. A non-sparking wrench for the oxygen cylinder valve and regulator. A 50 cc Luer-Lock syringe. Two (2) humidification sponges with precut notches. An extra mattress cover (pillowcase).

5.3.3. Power.

5.3.3.1. Power sources for the ALSS are 115VAC/50 – 400 Hz and an internal battery.

5.3.3.2. A fully charged battery will operate the incubator for 3 hours with an ambient temperature of 20° C (68° F) and the infant chamber at 37.0° C (98.6° F) after warming initially to 37.0° C on AC power.

5.3.3.3. Battery charging times with the incubator switched "OFF" are 10 hours to 90% capacity, and 16 hours to 100% capacity.

5.3.4. Preflight.

5.3.4.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

5.3.4.2. Inspect the incubator for any signs of damage. If either hood is cracked, do not use the incubator.

5.3.4.3. Ensure that all 4 hood-securing knobs and all 4 slide-latches are in the locked position prior to moving the incubator.

5.3.4.4. Inventory the accessory kit (listed under “Parts”) for all items and ensure they are serviceable.

5.3.4.5. Ensure the oxygen cylinders are secured and have at least 1000 (psi). Ensure a plastic washer is in place between the regulator and the oxygen cylinder valve outlet.

5.3.4.6. Connect the incubator to 115 VAC/50-400 Hz power source.

5.3.4.7. Switch the incubator “ON” and ensure the AC OP Indicator illuminates. **NOTE:** The ALSS temperature sensors detect temperatures within the normal operating range of 50° Fahrenheit and greater. When the sensors detect a temperature below normal, it displays “System Fail” or “Sensor Failure” until the temperature returns to a normal setting. This may take up to 2 hours. To preclude this from happening, after cold weather storage, remove the hoods, remove the infant support tray, and turn the incubator “ON” using AC power. This allows the incubator to warm to room air in about 15 minutes. Replace the infant support tray and hoods after the 15-minute period.

5.3.4.8. Open the porthole on the right of the front panel of the hood, and place an ungloved hand over the right end of the infant support tray and ensure airflow is present. Close the porthole.

5.3.4.9. Set the temperature control to 37.0° C and observe for a rise of temperature on the incubator temperature display. Test the observation light by switching it “ON” then “OFF.” Press and hold the test switch and ensure all LED’s illuminate and the audible alarm sounds.

5.3.4.10. Disconnect the incubator from AC power and ensure the battery operation LED illuminates. Repeat the pre-flight test from checking airflow at the right end of the infant tray to pressing the test switch to ensure proper operation on battery power. Reconnect the incubator to AC power and switch “OFF” the incubator and ensure the battery charge LED is illuminated.

5.3.4.11. Check the condition of the oxygen cylinder tank clamps and ensure IV pole is secured in its storage bracket on the rear panel of the incubator. Ensure the mounting straps are in place at the end corners of the frame, and ensure they are serviceable and not damaged.

5.3.5. Performance.

5.3.5.1. Connect the incubator to 115 VAC/50-400 Hz source.

5.3.5.2. Install a humidification sponge. Fill the humidification reservoir with 150 cc of sterile distilled water. Water for the initial wetting of the sponge may be introduced directly into the reservoir by removing the hoods and the infant support tray. Alternatively, the reservoir may be filled by syringe through the luer fitting marked fill (to the left of the control panel). In either case the filling should not exceed 150 cc of water. The fill rate through the luer fitting should not be greater than 100 cc per minute (50 cc per 30 seconds).

5.3.5.3. When the reservoir is filled with 150 cc of water, the incubator will provide a 45% humidification level for 8 hours. Should the infant require a humidification level greater than 45%, additional humidity may be introduced into the infant chamber by use of a rubber access port and an external humidification/nebulization source.

5.3.5.4. Use oxygen connector tubing connected to the humidifier/nebulizer outlet and placed through a rubber access port to deliver humidified/nebulized oxygen to the infant chamber. It takes approximately 10-15 minutes for oxygen concentrations to stabilize in the chamber.

5.3.5.5. If oxygen is required, the use of a humidifier/nebulizer is recommended. Connect a flow meter to an oxygen source, and a humidifier/nebulizer assembly.

5.3.5.6. Check the humidity sponge every 4-5 hours.

5.3.5.7. This is accomplished through the luer fitting marked drain (to the left of the control panel).

5.3.5.8. Open the drain line by disconnecting it from the male luer fitting mounted on the frame.

5.3.5.9. Use the 50 cc syringe to apply suction to the drain fitting, and measure the quantity of water drained.

5.3.5.10. If the quantity is 5cc or greater return that water through the fill port. No additional water is required.

5.3.5.11. If the quantity collected is 1 cc to 5 cc, replenish with no more than 30 cc of water.

5.3.5.12. If less than 1 cc is collected, replenish with no more than 60 cc of water.

5.3.5.13. Set the temperature selector to 37.0° C. Switch the incubator "ON." The incubator heater takes about 10 minutes to reach this temperature when the ambient temperature is 20° C.

5.3.5.14. After initial warm up, set the incubator temperature as ordered by the physician. (Normal temp order will be between 32-34° C). **NOTES:** Take the temperature of the infant every hour unless directed otherwise by the medical attendant. Document temperature on Patient Evacuation Record (DD Form 602, *Patient Evacuation Tag* or AF IMT 3899, *Patient Movement Record*). Avoid exposure to direct sunlight as this may cause significant temperature increases within the infant chamber.

5.3.5.15. If the IV pole is to be used, remove it from its storage retainer on the rear of the incubator.

5.3.5.16. Set and engage the IV pole into the pole-securing hole at the base of the lamp. Pull up on the pole to ensure it is secure.

5.3.5.17. Place the infant in the infant chamber through the front access door onto the mattress in the support tray. The infant's head may be positioned either forward or aft in the aircraft. Place the securing straps through the appropriate sets of slots in the support tray and secure the infant without over tightening the straps.

5.3.6. **Alarms.** There are 7 alarm conditions to alert the operator to possible problems. **WARNING:** The activation of any alarm indicates a need to completely assess the infant and closely monitor infant temperature.

5.3.6.1. **HIGH TEMPERATURE ALARM** illuminates when the temperature in the infant chamber exceeds 38.5°C. The incubator remains fully functional.

5.3.6.2. **SYSTEM FAIL ALARM** indicates the secondary sensor has detected an incubator temperature greater than 39.2° C. The incubator heater is disabled until the temperature is below 39.2° C.

5.3.6.3. **HIGH TEMPERATURE AND SYSTEM FAILURE ALARM** indicates that the primary temperature sensor detects a temperature over 39.0° C. The incubator's heater system will be disabled until the temperature is < 39.0° C.

5.3.6.4. **AIR FLOW ALARM** indicates an airflow blockage by some object such as a blanket. The heater system will be disabled until the incubator cools, and the obstruction is cleared.

5.3.6.5. **SENSOR FAIL ALARM** indicates a possible failure of the primary temperature sensor or control circuitry and will disable the heater. **NOTE:** The activation of any "FAIL" alarm requires BMET personnel to check the incubator.

5.3.6.6. **LOW BATTERY ALARM** indicates approximately 15 minutes of operation remains.

5.3.6.7. **POWER FAIL INDICATOR** illuminates when the battery voltage falls below a fixed point, indicating that the battery has reached its safe discharge limit. Power to maintain the temperature in the infant chamber is no longer available.

5.3.7. **Placement.**

5.3.7.1. Place the incubator on a litter. Loosen the incubator's litter mount straps by depressing the release lever on the strap buckles. Press the litter pole clips onto the litter poles directly below the end corners of the incubator and tighten the straps. It is recommended that the litter pole clips be placed straight down from the end corners of the incubator.

5.3.7.2. The ALSS should be positioned in an aircraft tier at a level that is optimum for observing the infant. Due to the height of the incubator, it may not be feasible to place a litter directly above the incubator.

5.4. **Litters.**

5.4.1. **Purpose.**

5.4.1.1. The Litter is used to provide a safe means of transporting non-ambulatory patients.

5.4.2. **Description.** There are two primary litters in the inventory.

5.4.2.1. **NATO Litter.** The patient support material is green canvas with wooden poles and lifting handles. The spreader bar allows the litter to fold or expand length-wise, in half. **NOTE:** Litters with canvas tears up to 1 inch are acceptable. Litter with canvas tears of greater than 1 inch require service and will not be used for patient transport. **WARNING:** Do not exceed a 250 lb max load on the NATO litter.

5.4.2.2. **Army Decon Litter.** The patient support material is green or black polypropylene with aluminum poles and nylon (telescoping) handles. Litter pole length can be adjusted from 90 inches to 94.4 inches to accommodate placement in helicopter. The spreader bar allows the litter to fold or expand length-wise, in half. **WARNINGS:**

Do not exceed a 350 lb max load on the Decon litter. Nylon litters are not approved for AE missions due to the slick surface which will cause patient movement during take-off and landing. In the interest of safety and to prevent a tripping hazard, AECMs / litter bearers are discouraged from walking backward when carrying weighted litters (equipment/patients/mannequins).

5.4.3. **Preflight.** Open the litter and inspect for damage. Ensure the litter handles and spreader mechanisms are intact. Inspect handle locking mechanisms for proper operation on the litter, as applicable.

5.4.4. **Performance.** Open the litter and engage spreader mechanism. Ensure adjustable handles on litter, as applicable, are secured in the extended position.

5.4.4.1. The patient is placed on the litter, covered with the sheet and blanket as necessary, and secured to the litter with 2 litter straps. The straps are placed mid-thigh and on the upper chest of the patient. Secure the litter straps so the buckles are on the aisle side of the litter, and lay the excess strap flat over the patient. DO NOT tie the excess strap in a knot. Litter straps will be visible for inspection.

5.4.4.2. A mattress pad is recommended to prevent skin breakdown.

5.4.4.3. CPR may be conducted on the litter when the shoulders are positioned above the cross-bars and patient is easily accessible.

5.5. NATO Litter Backrest.

5.5.1. **Purpose.** The NATO Litter Backrest is used to provide elevation for a patient's head while on a NATO Litter or Army Decon litter, but will not fit on the OSL. The NATO Litter Backrest is composed of a metal U-shaped frame that clamps to a NATO Litter by spring mechanism in 2 positions: 30 degrees and 90 degrees. A material cover fitting over the metal frame functions as support to the body.

5.5.2. **Pre-flight.** Check the NATO Litter Backrest Frame for any tears or damage.

5.5.3. **Performance.** Clip the backrest frame at the head end of the litter inside the stirrups of the litter in either the 30 degree or 90 degree position. The frame is reversed to produce one angle or the other. Slide the backrest cover over the frame with the cover flap to the foot end of the litter. Tuck the flap smoothly under the patient or mattress if applicable. Ensure that the patient's head does not extend above the top of the backrest frame.

5.5.3.1. Secure the patient with a minimum of 2 litter straps. Secure 1 strap across the patient and around litter at mid-thigh. Secure the other strap across the patient's chest in the auxiliary region and around the litter through the litter stirrups. **WARNINGS:** Proper placement of the litter straps is required to retain both the patient and the NATO backrest in position during deceleration after landing. The 90 degree position will not be used for takeoff, landing, enplaning or deplaning. A 3 or 4 person carry will be used when enplaning/deplaning a litter patient with a NATO backrest in place. In the interest of safety, AECMs may revert back to a 2 -person carry once inside the aircraft. Ensure that the patient can reach their emergency oxygen mask when the backrest is in place.

5.6. The North American Rescue OverSized Litter (OSL)

5.6.1. **Purpose.** The OSL is a bifold type litter designed to support non-ambulatory patients of excess weight and extreme abdominal girth. When fully extended it measures 90” x 31”x 6”. It uses a Nomex/kevlar blend material and has three seat belt type patient restraints attached at top and bottom of the litter.

5.6.2. **Preflight.** Inspect the OSL for damage and serviceability.

5.6.3. **Placement.** Use a minimum of 6 litter bearers to enplane the OSL. However, there are four attached carrying straps on each side of the litter to accommodate up to eight personnel. Place a blanket or mattress pad under the OSL to reduce vibration. The North American Rescue Products /OSL has been approved for use on board the following aircraft: C-130 E/H, C-5, KC-10, KC-135, C-17 and C-130J.

5.6.3.1. On the C-130 aircraft, secure the litter in any centerline litter tier to allow for ease of enplaning and deplaning. The stirrups should be resting on the aircraft floor.

5.6.3.2. On the KC-10/135 aircraft, patients on an OSL will not be transported in the PSP. Patient will be floor loaded or secured to a pallet. Request a Halverson Lift, Tunner, Hi-lift truck etc. for patient enplaning/deplaning. **NOTE:** To prevent damage to the KC-135 aircraft floor, appropriate shoring must be used under floor-loaded litters. Coordinate with the BO to secure appropriate shoring material. An aircraft pallet may also be used to secure the litter(s).

5.6.4. **Securing Procedures.** Ensure proper position of the litter on the aircraft floor. Insert 5,000 lb cargo tie-down strap into “D” ring on aircraft floor near litter handle at the head of the litter. Wrap the cargo strap around the handle once, then extend the strap and wrap around the handle at the head of the litter directly across from it. Insert the hook end of the cargo strap into a “D” ring near the opposite handle then tighten. Perform same procedures at the foot of the litter using the litter handles and cargo tie-down straps. **WARNING:** Do not use a NATO backrest during take-offs, landings, and emergency situations in which potential failure on the NATO backrest may occur.

5.6.4.1. On the C-17 aircraft, patients will be floor loaded or secured to a pallet. **CAUTION:** When opening and folding the OSL, the litter support brackets can be difficult to open and could create a potential pinch hazard. Strongly suggest use of two personnel when opening and closing the OSL. Gloves should be worn when handling this device. **NOTE:** When securing the patient NATO litter straps should be used in addition to the seat belt type patient restraints attached to the litter to ensure proper positioning.

5.7. Politzer Bag.

5.7.1. **Purpose.** The Politzer Bag is used to relieve altitude related ear blocks.

5.7.2. **Parts.** The Politzer Bag consists of 3 components: a rubber bulb, a tube, and a nasal tip.

5.7.3. **Pre-flight.** Ensure all 3 components are present, and that there is no damage to any of the parts.

5.7.4. **Performance.** Treat and/or manage the ear block IAW AFI 41-307, *AE Patient Considerations and Standards of Care*. If these measures fail and ear block persists, attempt to clear the blockage with the Politzer Bag.

5.7.4.1. Place the tip of the Politzer Bag in one nostril. **NOTE:** If the patient's nasal opening is too small for the Politzer Bag tip, remove the tip and insert the tube into the nasal opening. DO NOT insert the tube farther than 3/4 inch. If the rubber tubing is also too large, remove the tubing from the bulb, and use the bulb tip in the nostril. DO NOT insert the tip of the bulb farther than 1/2 to 3/4 inch into the patient's nostril.

5.7.4.2. Seal the nose by gently squeezing it and ask the patient to swallow.

5.7.4.3. Squeeze the bulb firmly, while the patient begins to swallow. The sudden increased pressure in the Nasopharyngeal Cavity should open the Eustachian Tubes, allowing the pressure in the Middle Ear to equilibrate with the ambient pressure.

5.7.4.4. Repeat as necessary.

5.8. Leather Restraints.

5.8.1. **Purpose.** Restraint sets provide physical restraint for the acute exacerbation of psychiatric or behavioral disorders inflight that may place the aircraft, crew, and other patients and passengers at risk. **WARNING:** When applying physical restraint, there is a potential to produce serious consequences, such as physical and psychological harm, loss of dignity, violation of an individual's rights, and even death. The restraints will not be used to secure the patient to the litter or any aircraft part.

5.8.2. Parts.

5.8.2.1. (2) Two ankle cuffs

5.8.2.2. (2) Two wrist cuffs

5.8.2.3. (1) One short leather strap

5.8.2.4. (1) One long leather strap

5.8.2.5. (1) One restraint key

5.8.2.6. (1) Carrying case.

5.8.3. **Preflight.** Ensure all components are present.

5.8.3.1. Inspect short and long belts, and the wrist and ankle cuffs for cuts, tears, and excessive wear.

5.8.3.2. Ensure the restraint key opens the locking device. **WARNING:** Prior to flight, ensure there are compatible/operable restraint keys available and caregivers know placement.

5.8.4. Performance.

5.8.4.1. **Applying Restraints.** At least two individuals will assist the team leader. These individuals work together to place the patient in restraints in a safe and timely manner and to reduce the patient's distress and prevent injury. Medical personnel must recognize when additional manpower is needed to protect the patient, crew and passengers.

5.8.4.2. Place a wrist cuff around each wrist with the metal loop on the inner side of the patient's wrist.

5.8.4.3. Slide one of the three slots over the metal loop to ensure a snug fit around the wrist. Use padding as necessary to prevent skin irritation and to provide a snug fit.

5.8.4.4. Thread the long strap through the metal loop on the wrist cuff by the aisle, starting on the side closer to the elbow. **NOTE:** Ensure that the locking device is placed on the aisle side of the patient.

5.8.4.5. Extend the strap across the patient's body and thread it through the metal loop on the other wrist cuff from the hand side.

5.8.4.6. Pass the strap behind the patient.

5.8.4.7. Ensure the strap is not secured to the litter and slide the end through the metal locking device. Lock the strap in place by closing the hinged latch, depressing the spring-loaded lock and sliding the locking bar.

5.8.4.8. Adjust the strap so the patient is able to touch his or her face.

5.8.4.9. The ankle restraints are placed in a similar manner with the cuffs placed around the ankles with the metal loop positioned to the inner portion of the leg. The short strap is threaded through both loops and adjusted to allow a reasonable walking step to be taken, then locked. **NOTE:** Ankle restraints may not fit over bulky material and footwear above the ankle.

5.8.4.10. **Restraint Adjustment/Removal.**

5.8.4.10.1. Release the locking device by inserting the restraint key in the key slot, and pushing the locking bar out to the open position.

5.8.4.10.2. Lift the hinged latch and slide the strap to loosen, tighten, or remove as necessary.

5.8.4.11. **Monitoring.**

5.8.4.11.1. Refer to AFI 41-307 for observation, documentation and nursing care considerations for a patient in restraints.

5.9. Stryker Wedge Turning Frame 965 Military Option (MO).

5.9.1. **Purpose.** The Stryker Wedge Turning Frame with integral Versitrack cervical traction system is used to transport patients, up to 250 lbs, who are paralyzed, have traumatic back or spinal cord injuries, or extensive soft tissue injuries. The turning frame allows the patient to be turned either from the supine to prone position or vice versa. Critical care patients may also be transported on the Stryker frame. In addition, this platform should be considered as an option to floor loading on opportune aircraft. **NOTE:** For AE transport a waiver will be obtained IAW para 1.5 of this instruction.

5.9.1.1. The Versitrack System, mounted to the head end of the frame is designed to provide constant cervical traction not affected by changes in momentum. The graduations are in 5 pound increments, accurate within ± 2 pounds. The traction force will remain constant as long as the patient does not change position on the litter relative to the traction device. The litter can be rotated freely without affecting the traction force.

5.9.2. **Parts.** The Stryker Wedge Turning Frame (*weight without patient is 277 lbs*) consists of three main subsystems:

5.9.2.1. The Litter Support Base (*162 lbs*).

5.9.2.2. The turning frame (patient litter) with litter legs (*115 lbs*).

5.9.2.3. Versitrack System.

5.9.2.4. Accessory Bag containing head harness, spreader bar, chocks, and arm boards. **NOTE:** The 12" Spreader Bar and Universal Head Harness were not procured with the Stryker 965 (MO) and must be added to the Accessory Bag. Units may utilize these items from the Collins Traction accessory bag, if available. Other option is to order Universal Head Harness and 12" Spreader Bar or like item.

5.9.3. **Preflight.** Ensure all system components are available and in serviceable condition.

5.9.3.1. Anterior/posterior frame with knurled nuts.

5.9.3.2. Turning Locking Pin.

5.9.3.3. Turning ring with pip pin locking device.

5.9.3.4. Turning Lock (*red knob*).

5.9.3.5. Thigh Clearance Adjustment.

5.9.3.6. Eight (8) Litter/base lifting handles.

5.9.3.7. Mattress and mattress bands.

5.9.3.8. Face Rest (anterior frame).

5.9.3.9. Bed Pan Tray.

5.9.3.10. Two (2) Arm boards/side rails

5.9.3.11. Versitrack System with S-hook.

5.9.3.12. Accessory Bag.

5.9.3.13. Universal Head Harness.

5.9.3.14. 12" Spreader bar.

5.9.3.15. Four (4) Chocks.

5.9.3.16. Four (4) Litter straps.

5.9.3.17. Turning Frame (patient litter)/ two (2) Litter Support Base securing straps. **NOTE:** Three litter straps are to secure the patient; additional litter strap is to secure the Turning Frame (patient litter) bed to the turning ring support bar.

5.9.4. **Operational Preflight.**

5.9.4.1. Tighten Knurled nuts for both frames.

5.9.4.2. Ensure turning ring is secured with pip pin.

5.9.4.3. Release the **Turning Locking Pin**.

5.9.4.4. Release litter strap underneath bottom frame handle and turning ring support bar.

5.9.4.5. Pull on the *Turning Lock (red knob.)*

5.9.4.6. Turn the litter, ensure a smooth “no-catch” turn and that the *Turning Lock* engages upon completion of the turn.

5.9.4.7. Return litter to the supine position and replace the *Turning Locking Pin.*

5.9.4.8. Release the Litter-Base securing straps.

5.9.4.9. Raise the unit to its maximum height; ensure an even lift from both actuator rods.

5.9.4.10. Lower the head-end; then lower the foot-end by stepping on the respective foot pedals.

5.9.4.11. Re-apply litter strap underneath bottom frame handle and turning ring support bar.

5.9.4.12. Engage the Brakes and inspect each brake ring to ensure all four rings engaged.

5.9.4.13. Engage the Fifth-Wheel option and check for wheel deployment.

5.9.4.14. Check underneath the base carriage for hydraulic fluid/leaks.

5.9.4.15. Fully decrease the traction knob; approximately six inches of traction cable will be available to allow for traction application.

5.9.4.16. Inspect the cord for kinks/frays.

5.9.4.17. While firmly holding the “S” hook increase the traction knob until ten pounds force is registered on the traction gauge. The user should feel an increase in the traction force.

5.9.5. Performance.

5.9.5.1. **Operating base controls.**

5.9.5.1.1. **Foot Pedal to raise/lower the bed.** To raise the Turning Frame (patient litter), pump the foot pedal located at the foot-end of the patient’s left side. Pump the pedal repeatedly until the desired height is achieved. To simultaneously lower both ends of the Turning Frame (patient litter), depress the center-right and center-left foot pedals located at the foot-end of the patient. Depress both pedals together using the same foot.

5.9.5.1.2. **Foot Pedal to lower head-end of bed.** The Turning Frame (patient litter) must be raised first to achieve a Trendelenberg position. To lower only the head-end of the Turning Frame (patient litter), depress the center-right foot pedal located at the foot-end of the patient.

5.9.5.1.3. **Foot Pedal to lower foot-end of bed.** The Turning Frame (patient litter) must be raised first to achieve a Reverse Trendelenberg position. To lower only the foot-end of the Turning Frame (patient litter), depress the center-left foot pedal located at the foot-end of the patient. **NOTE:** The Litter Support Base is equipped with variable descent controls. With variable descent controls, the farther you press down on the pedal, the faster the Turning Frame (patient litter) will lower. **CAUTIONS:** Be sure to remove any equipment that may be in the way before

lowering the Turning Frame (patient litter). For Reverse Trendelenberg, lower the head of the Turning Frame (patient litter) one inch or more from the maximum “up” position before lowering the foot jack to prevent lateral stress on the actuator rods.

5.9.5.1.4. Brake, Neutral and Steer functions. Located at both head and foot end of the Litter Support Base.

5.9.5.1.5. Brake. To engage the brakes at the head-end, push fully down on the left side of single pedal located at patient’s head-end. To engage the brakes on the foot-end, push fully down on the right side of the pedal located at the foot-end of the patient’s right side.

5.9.5.1.6. Neutral (horizontal). Releases brakes allowing Stryker Unit to be moved forward or backwards.

5.9.5.1.7. Steer (Fifth-Wheel). Releases brakes allowing Stryker Unit to be steered along a straight line and around corners when transporting a patient. To engage the steer function (fifth-wheel) from the head-end, push fully down on the right side of the single foot pedal located at the patient’s head-end. To engage the steer function from the foot-end, push fully down on the left side of the foot pedal located at the foot-end of the patient’s right hand side. The fifth wheel is located underneath the center of the base assembly. **WARNING:** Injury could result if the Litter Support Base moves out of position while patient on litter is transferred on to the Litter Support Base. Always apply the brakes when patient on litter is transferred to the Litter Support Base. Push on the Litter Support Base to ensure the brakes are securely locked. If the brakes do not hold properly, turn the unit into host medical equipment maintenance activity/MTF for repair.

5.9.5.2. Turning Frame (Patient Litter).

5.9.5.2.1. Posterior Frame. Prior to patient placement, ensure the posterior frame is placed on the half of the turning ring marked “posterior frame” and on the bolt marked “posterior frame” at the head end of the Turning Frame (patient litter). Secure with knurl nut. **NOTE:** There is a cutout held by a spring in the posterior frame. For bedpan use or to access the patient, remove one side of the spring from the canvas at this cutout.

5.9.5.2.2. Anterior Frame. Anterior frame must be placed on the bolt marked “anterior frame” at the head end of the Turning Frame (patient litter). Secure with knurl nut. **WARNINGS:** The knurl nut at the head end of the posterior litter frame must be kept tight when patient is on the frame and the knurl nut at the anterior frame must be kept tight when the patient is being turned. When securing the posterior or anterior frames grasp the lanyard with knurl nut to prevent the knurl nut from swinging freely during frame placement. The knurl nut could strike the patient if not controlled.

5.9.5.2.3. Securing Locking Pin. Located at the head end of the Turning Frame (patient litter). Prevents inadvertent rotation of the Turning Frame (patient litter). **WARNING:** The Securing Locking Pin should always be in its stowed position unless turning the patient. To avoid injury, all operators must be aware of its usage and purpose.

5.9.5.2.4. **Turning ring.** The turning handles on the ring should always be on the patient's left side. The turning ring can be separated into half rings. To remove the anterior half of the ring, unlock and open the ring completely and slide the ring half off the hinge pin (toward the head end of the litter). To replace the half ring, reverse the process. On the turning ring there is a turning lock (red knob) pip pin, and thigh clearance adjustment bar. **WARNING:** Never use the turning ring as a means for lifting or carrying the Stryker Frame.

5.9.5.2.5. **Turning lock (red knob).** Allows the ring to rotate on the curved track. Released by pulling the knob outward.

5.9.5.2.6. **Pip pin.** Allows the ring to be opened and secured. The ring is locked over a patient when an audible "click" is heard.

5.9.5.2.7. **Thigh Clearance Adjustment.** Can be adjusted when the anterior frame is being placed on the patient. The anterior frame should fit snugly. If there is too much pressure on a large patient or too little pressure on a small patient when the turning ring is completely closed, unlock the ring and adjust the frame by turning the knurled nuts on the ring up or down. **NOTE:** If adjusting the thigh clearance still does not allow for the turning ring to be comfortably closed around the patient, the operator can remove the black mattress, which is attached to the anterior turning frame.

5.9.5.2.8. **Turning Frame (patient litter) Lifting Handles.** A four-person carry is required to lift, transport, or remove the Turning Frame (patient litter) from the Litter Support Base. Lift handles are located at each corner of the Turning Frame (patient litter).

5.9.5.2.9. **Turning Frame (patient litter) Ball Lok Release Pins.** Release pins are located near the jack actuators and allow the Turning Frame (patient litter) to be separated from the Litter Support Base. **NOTE:** The jack actuators may raise as the Turning Frame (patient litter) is lifted up off the Litter Support Base. Keep the Turning Frame (patient litter) level and lift until the support tubes clear the jack actuators before moving forward. **WARNINGS:** The Turning Frame foot-end slide brackets (the bar underneath the bed frame, just forward of the turning ring) create a possible pinch point. Use caution when moving the Turning Frame top to avoid injury. The frame the patient is resting on is not secured to the Turning Frame or the Litter Support Base. A litter strap must be secured around the underneath bottom frame handle to the turning ring support bar for added stability.

5.9.5.2.10. **Arm Board/Side rail.** Arm boards are removable and can also be moved up and down, forward and back, tilted and locked in any one of four positions. When the arm boards are in the full up position they serve as a side rail or can be used to support the bedpan. The arm boards are adjustable forward and aft along the perimeter of the Turning Frame. **WARNING:** Arm boards must be lowered and in the down position or removed and patients arms secured with litter straps prior to turning.

5.9.5.2.11. **Bed Pan Tray.** Flat metal tray located underneath the Turning Frame (patient litter). Tray can be adjusted up and down and can also be positioned forward

and aft. **WARNING:** The bedpan tray should be in the down position prior to turning the patient.

5.9.5.2.12. **Meal Tray Holder.** Flat wooden tray located underneath the Turning Frame (patient litter). Tray can be adjusted up and down and can also be positioned forward and aft. **WARNING:** The meal tray holder should be in the down position prior to turning the patient. In addition, if the patient is large or muscular, the meal tray holder may have to be removed prior to patient turning to prevent the patient's arms/shoulders from striking the meal tray.

5.9.5.2.13. **Wheel Chocks.** Wheel chocks must be used with the Stryker Frame to protect the aircraft floor and evenly distribute the weight of the Stryker 965 over a greater surface area. The chocks can be used under the base to support the entire Stryker unit or under the litter legs to support the Turning Frame (patient litter) separately.

5.9.5.3. **Traction. WARNING:** Originating facilities are responsible for placing patients on the Stryker Frame. Traction may be applied on the flight line but will require a flight surgeon or attending physician to maintain traction on the patient while initial traction is being set.

5.9.5.3.1. To apply, place the patient's head in the traction harness. Attach the hooks at the top of the harness to the outer hooks of the spreader bar. Attach the "S" ring on the traction device cord to the mid portion of the spreader bar. **NOTES:** The traction cable must be deployed at least one inch from the "S" hook to the hub of the traction device. Turn the force adjustment knob counterclockwise, while observing the graduated scale, until the desired amount of traction force is reached. If you need to reduce the amount of traction force after the initial setting, turn the knob back clockwise to a position 5 pounds less than the required setting and then counterclockwise to the desired setting. Traction setting must be checked and documented at least every 60 minutes.

5.9.5.4. Enplaning.

5.9.5.4.1. Enplane, chock and secure the base unit prior to enplaning the patient on Turning Frame (patient litter). If the base can be rolled onto the aircraft, use a minimum of two people. **CAUTION:** To prevent damage to the fifth wheel (STEER MODE), disengage the wheel while on the aircraft, aircraft ramp, or in other situations where the majority of the units weight is concentrated on this wheel.

5.9.5.4.2. Lower the base hydraulic rods for ease of attaching the Turning Frame (patient litter).

5.9.5.4.3. Prior to enplaning the patient on the litter brief all personnel and the patient of the activity; ensure the Securing Locking Pin is engaged.

5.9.5.4.4. The patient must be on the Stryker posterior frame (in the supine position) for enplaning/deplaning.

5.9.5.4.5. Ensure the patient is secured with three litter straps placed high on the chest, at the patient's waist and mid-thigh. Apply the straps around the patient and the posterior frame.

5.9.5.4.6. If the “Half Ring” is in place, ensure pip pin is engaged and secured.

5.9.5.4.7. At a minimum, a 4-person carry must be utilized to safely transport the Turning Frame (patient litter) and when removing it from the Litter Support Base.

5.9.5.4.8. Bring the Turning Frame (patient litter) aboard and install onto the Litter Support Base unit. Align the holes on the actuator rods and litter bar by lining up the scored line on the top of the actuator rod with the hole on the support bar. Insert the Ball Lok pins.

5.9.5.5. **Securing the Base.**

5.9.5.5.1. Ensure the brakes are locked and then choose an option to secure to the aircraft floor.

5.9.5.5.2. There are three options when securing the Litter Support Base unit to the aircraft floor.

5.9.5.5.3. The **recommended (and preferred) tie-down procedure** is to use the tie-down rings secured with four CGU-1/B cargo tie-down straps to outboard aircraft floor D-rings.

5.9.5.5.3.1. Two additional CGU-1/B cargo tie-down straps will be tied from the bed frame to the aircraft floor D-rings. Cargo straps from bed frame should have slack.

5.9.5.5.4. A second tie-down option is to use the tie-down rings secured with four CGU-1/B cargo tie-down straps to inboard aircraft floor D-rings. Complete tie-down procedure with method described in 5.9.5.5.3.1.

5.9.5.5.5. A third tie-down option is to use the outboard tie-down rings secured with four CGU-1/B cargo tie-down straps to aircraft floor D-rings. This is the least preferred method. **WARNING:** Use either outboard or inboard tie-down methods only; certain combinations of methods can be ineffective.

5.9.5.6. **Securing The Turning Frame Only.**

5.9.5.6.1. To secure only the Turning Frame to the aircraft floor use the single end tie-down points located on the Turning Frame.

5.9.5.6.2. Position the Turning Frame litter legs on the chocks and secure both forward and aft points to the aircraft floor using two CGU-1/B cargo tie-down straps and tighten both cargo tie down straps at the same time. **NOTE:** Due to possible increased vibration to the patient, this option will be used only in combat situations. **WARNING:** The traction must be monitored frequently to ensure patient safety and comfort.

5.9.5.7. **Patient Positioning.**

5.9.5.7.1. The patient must be in the supine position for take-off and landing. Stryker 965 (full unit) should be in the lowest position during take-off and landing unless otherwise directed by a flight surgeon.

5.9.5.7.2. Physician orders should be obtained for a turning schedule. If no orders are given, use the standard practice of two hours supine, one hour prone

5.9.5.8. **Turning the patient.** *NOTE:* Three litter straps should be on the patient at all times. Straps should be placed around the patient's chest, waist and mid-thigh areas.

5.9.5.8.1. Only one person is required for turning the patient.

5.9.5.8.2. Brief the patient.

5.9.5.8.3. Check IV and Foley placement.

5.9.5.8.4. Turning handle will always be to the patient's left.

5.9.5.8.5. Lower arm boards and place in the down position or remove.

5.9.5.8.6. Lower meal tray and bedpan tray. *WARNING:* Remove meal tray if patient is large or muscular to ensure sufficient arm/shoulder clearance during patient turn.

5.9.5.8.7. Remove the additional litter strap which is secured around the underneath bottom frame handle to the turning ring support bar.

5.9.5.8.8. Place patient's arms at sides, inside litter straps.

5.9.5.8.9. Remove the litter straps from the mid-thigh and waist areas; maintain the strap at the chest area.

5.9.5.8.10. Attach turning ring to frame if not already in place. Open the turning ring by removing the pip pin and lifting on the top-half of the ring.

5.9.5.8.11. While maintaining control of the knurl nut with lanyard, place the anterior or posterior frame over the patient. *WARNING:* If knurl nut is not controlled, the patient could inadvertently be struck in the head.

5.9.5.8.12. Replace the mid-thigh strap that was removed earlier, securing both frames together with the strap at the mid-thigh area.

5.9.5.8.13. Place patient's arms at sides, inside litter straps.

5.9.5.8.14. Remove the litter straps from the mid-thigh and waist areas; maintain the strap at the chest area.

5.9.5.8.15. Lift slightly on the head of the frame, remove the chest strap and re-secure the strap around both frames.

5.9.5.8.16. Secure the third litter strap at waist level. This strap should also be positioned to hold the patient's arms at his/her sides. *NOTE:* Position buckles of the litter straps so they will be closest to the provider after the turn.

5.9.5.8.17. Secure the knurl nut at the head of the frame.

5.9.5.8.18. Close the turning ring and secure it with the pip pin. Adjust thigh clearance if necessary. *NOTE:* The turning ring can be removed from the litter or closed around the patient.

5.9.5.8.19. Remove the turning lock pin.

5.9.5.8.20. Inform the patient of turn.

5.9.5.8.21. Pull the red knob and "break the seal" slightly.

5.9.5.8.22. Turn the patient with one swift, smooth motion. **WARNING:** Never stop the turn part way. **NOTE:** The turning lock automatically locks when the lower frame is horizontal and level.

5.9.5.8.23. Immediately insert the turning lock pin at the head end of the frame.

5.9.5.8.24. Check on the patient.

5.9.5.8.25. Remove the knurl nut at the head of the frame.

5.9.5.8.26. Remove the waist strap and the mid-thigh strap from around both frames. Re-secure mid-thigh strap around patient and bottom litter frame.

5.9.5.8.27. Remove the chest strap from around the frames. Lift slightly on the head of litter and re-secure the chest strap around the patient and bottom litter frame.

5.9.5.8.28. Remove the frame.

5.9.5.8.29. Re-secure waist strap.

5.9.5.8.30. Re-apply the additional litter strap around the bottom frame handle to the turning ring support bar.

5.9.5.8.31. Check traction.

5.9.5.9. **Deplaning procedures.**

5.9.5.9.1. Brief all personnel on carrying procedures.

5.9.5.9.2. Patient will be in the supine position.

5.9.5.9.3. Ensure litter straps are tight.

5.9.5.9.4. Check Foley, IV tubing, and traction for security.

5.9.5.9.5. Remove securing straps from the litter unit and base unit. **WARNING:** The securing straps will not be removed from the base prior to removing the patient and/or litter unit. This will provide a stable platform for the base unit while removing the litter unit. AE crews will observe all movement to ensure tie-down straps do not interfere with litter bearer movement.

5.9.5.9.6. Remove the Ball Lok pins from the jack actuators.

5.9.5.9.7. Lift litter from the base, keeping in mind that jack actuators will raise. Make sure that you have cleared the actuators prior to moving forward.

5.9.5.9.8. Deplane patient.

5.9.5.9.9. Remove base unit straps. Deplane the base.

5.9.6. **Placement.**

5.9.6.1. The Stryker can be carried on the following transport aircraft to include: C-17, C-130, KC-10, KC-135, and Civil Reserve Air Fleet (CRAF)-Boeing 767. Consider the location of the aircraft floor securing points in reference to the unit tie-down points.

5.9.6.2. The arm boards can extend or be positioned outward. The litter length is 98.5 inches long from the traction unit to the foot pedal. The full Stryker unit should occupy a full litter tier. **NOTE:** For turning capabilities, the Stryker frame must be placed so the

patient's left side of the frame is easily accessible. Ensure the left side is clear of the fuselage or any potential blocking stanchions. **WARNING:** When the litter is fully extended, its maximum height is 46.75 inches. At this height the litter may hamper access to the patient's emergency oxygen mask. Ensure all extension tubing (catheters, IV lines, etc.) is clear of the turning frame's circular path.

5.10. Ultrasound Stethoscope Fetal Pulse Monitor-Medasonics Model FP3A.

5.10.1. **Purpose.** The Medasonics Ultrasound Stethoscope is designed for detection of the fetal heartbeat and peripheral circulation in adults.

5.10.2. Parts.

5.10.2.1. Monitor Unit (1).

5.10.2.2. Headset (1).

5.10.2.3. Bottle Ultrasound gel (1).

5.10.3. **Power.** The power source is a 9-volt Alkaline Battery. **NOTE:** The battery should be replaced at least once a year, or if no sounds are audible when the volume is up, and an adequate amount of coupling agent is used.

5.10.4. **Preflight.** Ensure annual calibration is complete and current on the AF Form 4368. Ensure all components are complete and in serviceable condition, and there is an adequate amount of Ultrasound Gel available.

5.10.5. Performance.

5.10.5.1. Spread a generous amount of Ultrasound Coupling Agent on the body surface to be examined. **CAUTION:** Do not use alcohol, K-Y jelly, or EKG gel as coupling agents. These substances may damage the monitor faceplate. Water or soap solution may be used if a commercial coupling agent (ultrasound gel) is unavailable.

5.10.5.2. Plug the headset into either output jack on the monitor, set the volume control mid-volume and put on the headset.

5.10.5.3. Place the faceplate on the area to be examined, press and hold the ON button. **NOTE:** The monitor will remain on as long as the ON button is depressed, and for a few seconds after it is released.

5.10.5.4. Search for sounds by moving the instrument over the area and trying various angles until the best sounds are obtained. Adjust the volume level as desired.

5.10.5.5. Release the ON button when the examination is complete, and remove the headset. Clean the coupling agent from the monitor with a dry tissue, and from the patient with dry or damp tissues or washcloths.

5.10.5.6. Replace all components into the carrying case.

5.11. Aircraft Wireless Intercom System Operations.

5.11.1. **Purpose.** The Aircraft Wireless Intercommunication System (AWIS) is only approved for use on the C-17, C-130, KC-135, and KC-10. The purpose of the AWIS is for wireless communication among/between AECMs and CCATT members. The system consists of a Bose® active noise reduction aviation headset and a Telephonics TruLink®

portable transceiver. This system will be maintained as part of the 887A Allowance Standard (AS). Each in-flight kit contains 7 AWIS. **NOTES:** The Bose® headset will not be plugged into the C-17 aircraft intercom system or loss of vital crew communication can occur. It is only approved to be used wirelessly in conjunction with the TruLink® system on the C-17 for communication between AECMs. At this time the flight crew cannot monitor the AWIS. The MCD must switch to the aircraft system to communicate with the flight crew.

5.11.2. Parts.

5.11.2.1. Bose® Noise Cancelling Headset.

5.11.2.2. Telephonics Trulink® Portable Transceiver.

5.11.2.3. Carrying case.

5.11.3. Power.

5.11.3.1. The headset is powered by 2 alkaline AA batteries (IEC LR6) and will generally supply 30 to 40 hours of power for the headset. Battery life varies with the ambient noise level of the aircraft, temperature, ear cushion condition, and age of the batteries.

5.11.3.2. The transceiver may be powered by 3 Nickel Metal Hydride (NiMH) or AA alkaline batteries. The transceiver battery life should be 6-10 hours depending on battery type and usage. The LED indicator on the face of the transceiver will blink RED when the batteries are getting low, along with audio warning “Battery Low”. The audio warning “Battery Low” indicates that the unit has approximately 20 minutes of battery life remaining.

5.11.3.3. Battery management will be the responsibility of the unit. The unit will have a written process in place for the management (use, disposal) of batteries. The *AE InFlight Kit, Packaging Guide/Allowance Standard* establishes the amount of AA alkaline batteries to be carried in the AE Inflight Kit. **NOTE:** It is recommended that batteries be fully charged prior to use.

5.11.4. **Preflight.** Ensure all components are present and in serviceable condition.

5.11.4.1. Inspect the system for any signs of damage.

5.11.4.2. Inventory the parts.

5.11.4.3. Ensure there is a sufficient supply of AA batteries for mission.

5.11.5. **Performance.** Remove the components from the carrying case and connect the headset to the transceiver.

5.11.5.1. Bose® Noise Cancelling Headset operations.

5.11.5.2. Insert 2 AA batteries into the control module. **CAUTION:** The battery compartment on the headset control module is designed to prevent inadvertent reverse polarity from installing the batteries incorrectly. If the batteries do not seem to fit correctly, do not force them in. Forcing an improper connection will cause permanent damage to the control module.

5.11.5.3. Use the power button to turn the headset on or off, or to change the LED brightness.

5.11.5.4. Press the power button once to turn on the Active Noise Reduction (ANR).

5.11.5.5. Press and hold the power button to turn off the ANR.

5.11.5.6. Adjust the volume control. The control module has a volume control for each ear cup. **WARNING:** Avoid setting the volume levels too high. Exposure to loud sounds may cause hearing damage. **NOTE:** An LED, located on the headset control module, changes color to indicate the power status, see Table 5.1 for LED Indicators.

Table 5.1. LED Indicators

LED COLOR	TYPE OF LIGHT	INDICATES
GREEN	Blinking	Batteries good
AMBER	Fast Blinking	Batteries Low (8hrs or Less remaining)
RED	Faster Blinking	Batteries Low (2hrs or less remaining)
OFF	None	Power off or batteries discharged

5.11.6. Trulink® Portable Transceiver operations.

5.11.6.1. Install 3 batteries in the back of the transceiver. **NOTE:** Ensure the Battery Type Switch, in the battery compartment of the transceiver, is in the proper position. The batteries recommended are NiMH chemistry. Alkaline batteries may also be used, but the Battery Type Switch must be set accordingly.

5.11.6.2. Place headset on head and use the left (L) and right (R) markings above the earcups to orient the headset properly.

5.11.6.3. Use a light grasp to adjust each earcup so its cushion is completely over your ear and you feel an even, gentle pressure all around it.

5.11.6.4. Adjust the headband so it rests gently on top of your head.

5.11.6.5. Pull the microphone in toward your lips. Position the microphone with its label side facing in. Though it will be slightly off center, the microphone should be 1/2 inch from the opening of your lips.

5.11.6.6. Ensure the broad side of the microphone is facing your lips. Do not purse your lips.

5.11.6.7. Turn on the unit by pressing the up and down button simultaneously. Unit will announce that the unit is the master or the slave.

5.11.6.8. Adjust channel to appropriate channel.

5.11.6.9. Adjust volume. **WARNING:** Avoid setting the volume levels too high. Exposure to loud sounds may cause hearing damage.

Table 5.2. Transceiver Button Functions

TPT Button	Function
 and 	Power On/Off
	Volume Up/Menu Change
	Volume Down/ Menu Change
M	Menu- Scrolls through Menu Options
*	Toggle- Toggles through Menu Options
PTT	Push-To-Talk/Enter- Use as a Push-To-Talk button and to enter/confirm Menu Selections

5.11.6.10. Use the clothing clip for attaching the control module to your clothing, a safety harness, or an aircraft door pocket. Pressing on the end of the clip allows you to reposition it along the cable. **CAUTION:** Do not attempt to place the clothing clip onto surfaces that are more than 1/4-inch thick.

5.11.7. Network and Channel setup operations.

5.11.7.1. The network consists of one Master unit per channel (0-49) and Slave units that log onto it. The transceiver automatically elects a Master when the unit becomes active on any given channel.

5.11.7.2. Complete the following steps to connect to or change the channels.

5.11.7.2.1. Push the (M) menu button.

5.11.7.2.2. Push the up or down button to select appropriate channel. The channel selected will be announced through the headset.

5.11.7.2.3. Press the Enter (PTT) button to finalize your selection. **NOTE:** The transceiver must be on the same channel to communicate with each other.

5.11.8. Voice Operated Switch (VOX) Operations.

5.11.8.1. VOX should be set to on for hands-free operation during normal conditions.

5.11.8.2. The VOX mode can be turned off during extremely noisy environments and user must push the Push-To-Talk (PTT) to transmit. The steps are as follows:

5.11.8.3. Press the menu button (**M**) twice to access the VOX menu.

5.11.8.4. Press the toggle button (*) or the up and down button to select either VOX on or off.

5.11.8.5. Press the enter button (**PTT**) to confirm selection.

5.11.9. LED Operations.

5.11.9.1. LED brightness can be changed as follows:

5.11.9.2. Press the menu button (**M**) until the LED menu is heard.

5.11.9.3. Press the toggle button (*) to select NORMAL, HIGH, NVG, TIME, OR OFF as desired.

5.11.9.4. Press the enter button (**PTT**) to confirm selection.

5.11.10. **Disassembly/Storage.** Disconnect headset from the transceiver and remove all batteries. Place both components back into the carry case. **CAUTIONS:** Do not store the headset in an unventilated area or in direct sunlight. If your headset is battery powered, remove the batteries before storing. Do not immerse the headset in water or any other liquid. **NOTE:** Gently wipe the outside surfaces of the headband, connectors, plastic parts, and headband cushion, using a soft cloth moistened with water and mild soap. Take special care when cleaning the ear cushions and the outside surfaces of the ear cups.

5.11.11. AECM AWIS Procedures.

5.11.11.1. AWIS will be carried on all operational, Aeromedical Readiness Missions (ARMs), and exercise missions.

5.11.11.2. AWIS will be worn during critical phases of flight: takeoff, landing, and flight below 18,000 feet. **NOTE:** All AECMs will be on the channel designated by the MCD during critical phases of flight. **EXCEPTION:** The MCD will be on headset with the Pilot-in-Command IAW AFI 11-2AE Vol 3.

5.11.11.3. Limit conversation to topics essential for crew coordination and mission accomplishment.

5.11.11.4. The CMT assumes responsibility for the AWIS as part of AE Inflight kit, and will use the Plexus System to scan the AWIS out prior to the mission, and scan the AWIS in during post mission duties. **NOTE:** Each Inflight kit contains 7 AWIS. Do not use the AWIS from the second AE kit to accommodate more than 7 AECMs on a mission. Squadrons may purchase supplementary AWIS at unit expense.

5.11.11.5. The MCD will designate AWIS channels for AECM usage during the aircrew briefing.

5.11.11.6. Table 5.3. outlines recommended channel assignments. Channel assignments may be modified by the MCD.

Table 5.3. Recommended AWIS Channel Assignments

CHANNEL	USED BY
0	AIRCREW/GROUND CREW
1	MCD/INSTRUCTOR/EVALUATOR
2	2FN/INSTRUCTOR/EVALUATOR
3	CMT/INSTRUCTOR/EVALUATOR
4	2AET/INSTRUCTOR/EVALUATOR
5	3AET/INSTRUCTOR/EVALUATOR
6	ALL OTHERS

5.11.11.7. The MCD or designated AECM should monitor interphone (headset) during flight. The MCD will be on headset with the PIC during critical phases of flight and during in-flight emergencies. The MCD will notify the flight crew when going off headset. **EXCEPTIONS:** Headset is not required for the C-21. If the PA is inoperative on the KC-10, the inter-phone cable will not be available for the MCD to use during take-off and landing.

5.11.11.8. AECMs will use proper radio procedures when using the AWIS. When calling to another crewmember, state the crew position you wish to speak to, then state your crew position. For example, when the MCD needs to speak to the CMT, the MCD should state "CMT" "MCD". Upon hearing this, the CMT should reply, "CMT".

5.11.11.9. AECMs will notify the MCD/FN when changing channels or signing on/off the AWIS.

5.11.11.10. AECMs may use the AWIS during ground operations. **NOTE:** Use of AWIS during aircraft configuration is not recommended.

5.11.11.11. The AWIS may be used in conjunction with the quick-don mask during aircraft emergency situations (rapid decompression, smoke and fuselage fire/smoke, fume elimination, and in-flight door warning light).

BURTON M. FIELD, Lt Gen, USAF
DCS, Operations, Plans and Requirements

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

DoDI 6000.11, *Patient Movement*, 4 May 2012

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AFI 44-165, *Administering Aeromedical Staging Facilities*, 6 Nov 2007

AFI 44-108, *Infection Prevention and Control Program*, 1 Mar 2012, Incorporating Change 1, 16 Aug 2012

AFMAN 33-363, *Management of Records*, 1 Mar 2008

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Aeromedical Evacuation In-Flight Kit --Packaging Guide

T.O. 15X-2-8-1, *Technical Manual, Operation and Maintenance Instructions with Illustrated Parts Breakdown, Maintenance Level(s), Liquid Oxygen Converter, P/N 50C-0021-1*, 15 Apr 2004, Incorporating Revision 1, Change 4, dated 12 May 2009

T.O. 15X2-5-22, *Technical Manual, Maintenance Instructions with Illustrated Parts Breakdown, Next Generation Portable Therapeutic Liquid Oxygen (NPTLOX) System, P/N 50C-0083-1*, 1 Apr 2011

T.O. 8A23-6-1, *Technical Manual, Operation and Maintenance Instructions with Parts Breakdown, Cable Assembly Set, Electrical A/C24U-2*, 30 June 1986, Incorporating Supplement SS-1, dated 15 Mar 1994

Adopted Forms

AF Form 4033, *PMI/AE Certification Label*

AF Form 4368, *Scheduled Maintenance and Certification*

AF Form 847, *Recommendation for Change of Publication*

AF IMT 3899, *Patient Movement Record*

AFTO Form 244, *Industrial/Support Equipment Record*

AFTO Form 350, *Repairable Item Processing Tag*

AFTO Form 394, *TMDE Certification*

DD Form 602, *Patient Evacuation Tag*

DD Form 2852, *Aeromedical Evacuation Event/Near Miss Report.*

SF 380, *Reporting and Processing Medical Materiel Complaints Quality Improvement Report*

Abbreviations and Acronyms

A3—Director of Operations

AC—alternating current

ACLS—Advance Cardiac Life Support

ACV—assisted continuous ventilation

AE—aeromedical evacuation

AECM—aeromedical evacuation crewmember

AETC—air education and training command

AFI—Air Force instruction

AFLCMC—Air Force Life Cycle Management Center

AFRIMS—Air Force Records Information Management System

AFMOA—Air Force Medical Operations Agency

AFRC—Air Force Reserve Command

AFTO—Air Force Technical Order

AHA—American Heart Association

ALSS—airborne life support system

AMC—Air Mobility Command

ANG—Air National Guard

APU—auxiliary power unit

ARC—Air Reserve Component

AS—allowance standard

AWIS— Aircraft Wireless Intercommunication System

BMET—biomedical equipment technician
BP—blood pressure
BVM—bag valve mask
C2—command and control
CC—commander
Cc—cubic centimeters
CCATT—critical care air transport team
CCT—critical care transport
CDRUSTRANSCOM—Commander, United States Transportation Command
Cm—centimeters
CO₂—carbon dioxide
CPAP—continuous positive airway pressure
DC—direct current
DMLSS—Defense Medical Logistics Standard Support
DoD—Department of Defense
DRC—dose rate calculator
ECAS—electrical cable assembly set
ECG—electro cardiogram
ECMO—Extracorporeal Membrane Oxygenation
ET—endotracheal tube
ETCO₂—end tidal carbon dioxide
GPMIC—Global Patient Movement Integration Center
Hz—hertz
H₂O—Water
ID—internal diameter
IV—Intravenous
Kg—kilograms
KVO—keep vein open
lbs—pounds
LCD—liquid crystal display
LED—light emitting diodes
IAW—in accordance with

LPM—liters per minute
LOX—liquid oxygen
mA—mili-amperage
MAF—Mobility Air Force
MAJCOM—major command
MCD—medical crew director
MDD—medical dental division
MFE—multi-function electrodes
MERC—medical equipment repair center
ml—milliliters
ml/hr—milliliter per hour
mm—millimeters
MTF—medical treatment facility
MSA—MSA Instrument Division
NATO—North Atlantic Treaty Organization
NIBP—non-invasive blood pressure
NPTLOX— Next-Generation Portable Therapeutic Liquid Oxygen
NSN—National stock number
NTP—non-invasive transcutaneous pacing
NTS—neonatal transport system
O₂—oxygen
NGB—National Guard Bureau
OPR—office of primary responsibility
PDO—publications distribution office
PEEP—positive end expiratory pressure
PIC—Pilot-in-Command
PIP—peak inspiratory pressure
PMI—patient movement item
PMRC—patient movement requirements center
ppm—pulse-per-minute
PSM—patient safety monitor
PSP—patient support pallet

PSI—pounds per square inch

PTFE—polytetrafluoroethylene

PTLOX—portable therapeutic liquid oxygen

RDS—Records Disposition Schedule

SIMV—spontaneous inspiratory mechanical ventilation

SPO2—saturation percentage of oxygen

TACC—tanker airlift control center

TO—technical order

TPMRC—theater patient movement requirements center

TRAC2ES—TRANSCOM Regulating and Command & Control Evacuation System

USAARL—US Army Aeromedical Research Laboratory

USTRANSCOM—United States Transportation Command

UTC—unit type code

VAC—volts alternating current

VDC—volts direct current

VFS—Validating Flight Surgeon

VI—volume infused

VS—vital sign

WRM—war reserve material

Terms

Aeromedical Evacuation (AE). **AE provides time**—sensitive en route care of regulated casualties to and between medical treatment facilities using organic and/or contracted aircraft with medical aircrew trained explicitly for the mission. AE forces can operate as far forward as aircraft are able to conduct air operations, across the full range of military operations, and in all operating environments. Specialty medical teams may be assigned to work with the AE aircrew to support patients requiring more intensive en route care. (AFPD 10-29)

Aeromedical Evacuation Control Team (AECT). **A core team assigned to a component**—numbered air force, Air Force air and space operations center, or air mobility division that provides command and control of assigned aeromedical evacuation forces. (JP 1-02)

Aeromedical Evacuation Crewmember (AECM).—Qualified Flight Nurses (FN), Aeromedical Evacuation Technicians (AET), performing AE crew duties.

Air Reserve Component (ARC).—Refers to Air National Guard and AFRC forces, both Associate and Unit Equipped.

Command and Control (C2). The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. (JP 1—02)

Global Patient Movement Integration Center (GPMIC).—A Joint activity reporting directly to the US Transportation Command Surgeon; serves as Department of Defense's single manager for the development of policy and standardization of procedures and information support systems for global patient movement. The GPMIC shall implement policy, and standardization for the regulation, clinical standards, and safe movement of uniformed services and other authorized, or designated patients. The GPMIC orchestrates, and maintains “Global oversight” of the Theater Patient Movement Requirements Centers (TPMRCs) in coordination with the Geographic COCOMS and external intergovernmental organizations as required. Responsible for the synchronization of current and future operational patient movement plans to identify available assets and validate transport to bed plans.

Joint Patient Movement Requirements Center (JPMRC). A joint activity established to coordinate the joint patient movement requirements function for a joint task force operating within a unified command area of responsibility. JPMRC coordinates intra theater patient movement and the TPMRC—Americas for inter theater patient movement. Synchronization of plans and additional guidance related to the world wide patient movement system shall be coordinated through the Global Patient Movement Integration Center (GPMIC).

Medical Crew Director (MCD).—A qualified FN responsible for supervising patient care and AECMs assigned to AE missions.

Patient Movement Item (PMI). The medical equipment and supplies required to support patients during aeromedical evacuation, which is part of a standardized list of approved safe—to-fly equipment. (JP 4-02)

618—th Air and Space Operations Center/Tanker Airlift Control Center (TACC). The Air Mobility Command direct reporting unit responsible for tasking and controlling operational missions for all activities involving forces supporting US Transportation Command’s global air mobility mission. The Tanker Airlift Control Center is comprised of the following functions: current operations, command and control, logistic operations, aerial port operations, aeromedical evacuation, flight planning, diplomatic clearances, and weather.

Theater Patient Movement Requirements Centers (TPMRCs). Located in US Northern Command (USNORTHCOM/TPMRC—A), US Pacific Command (USPACOM/TPMRC-P) and US European Command (USEUCOM/TPMRC-E), these theaters have permanent TPMRCs to manage the validation and regulation of PM within their area of responsibility (AOR). TPMRCs are responsible for theater-wide PM and coordinate with MTFs to identify the proper treatment/transportation assets required. The TPMRC communicates this transport to bed plan to the theater Service transportation component or other agencies responsible for executing the mission. TPMRCs coordinate with the GPMIC which shall provide global oversight, implement policy, and standardize regulations, clinical standards, and safe movement of uniformed services and other authorized, or designated patients.

Attachment 2

OXYGEN CONVERSIONS

Table A2.1. PT LOX Duration of Remaining Oxygen Supply in Minutes

Liters of Lox	Equivalent Liters of Gaseous Oxygen	1 Patient @15LPM	2 Patients @15LPM Each	3 Patients @15LPM Each
10.0	8040	536	268	178
9.5	7638	509	254	169
9.0	7236	482	241	160
8.5	6834	455	227	151
8.0	6432	428	214	142
7.5	6030	402	201	134
7.0	5628	375	187	125
6.5	5226	348	174	116
6.0	4824	321	160	107
5.5	4422	294	147	98
5.0	4020	268	134	89
4.5	3618	241	120	80
4.0	3216	214	107	71
3.5	2814	187	93	62
3.0	2412	160	80	53
2.5	2010	134	67	44
2.0	1608	107	53	35
1.5	1206	80	40	26
1.0	804	53	26	17
0.5	402	26	13	8

Table A2.2. PTLOX Converter Loss During Standby

Time After Filling (In Hours)	Liquid Oxygen Remaining (In Liters)
24	9.1
48	7.9
72	6.6
96	5.3

Table A2.3. PT LOX Operating Time Formula**PT LOX OPERATING TIME FORMULA:**

Total LPM X 60 X Duration of mission in hours = Mission's LOX Requirement

804

Example: You are transporting patients on a 3-hour mission with a combined flow rate of 20LPM. How much liquid oxygen will you need for the mission?

$$20 \times 60 \times 3 = 3600$$

$$3600/804 = 4.48 \text{ liters of liquid oxygen.}$$

For a 3-hour mission with a total flow rate of 20 LPM you would need 4.48 Liters of Liquid Oxygen. **NOTE:** The end result gives you the amount of liquid oxygen for the duration of the mission; however, you will need to plan ahead for unexpected ground delays and possible diversions.

Table A2.4. Oxygen/Compressed Air Cylinder Duration Formula

Tank Size	Cylinder Constant	Residual Pressure
D	0.16	200 psi
E	0.28	200 psi
M	1.56	200 psi
G	2.41	200 psi
H	3.14	200 psi
K	3.14	200 psi
MOST	4.35	200 psi

NOTES:

Oxygen/Compressed Cylinder Duration =

(Gauge psi in tank – Residual Pressure) x Cylinder Constant

Total Flow Rate in LPM

The end result gives you the amount of time remaining in minutes at that flow rate.

Example: Determine the life of an E tank with a pressure of 2000 psi and a flow rate of 15 LPM.

$$2000-200= 1800$$

$$1800 \times .28 = 504$$

$$504/15 = 33.6 \text{ minutes}$$

At 15 LPM your E tank with 2000 psi would last approximately 33.6 minutes.

Attachment 3

EQUIPMENT AMPERAGE REQUIREMENTS

A3.1. All electrical equipment, when initially turned on, will triple its amperage load for a microsecond. To preclude “popping” electrical circuit breakers, only turn ON one piece of medical equipment at a time.

A3.2. Medical equipment is made to operate from 95-120 VAC/50-60 Hz. Plugging medical equipment labeled for 110,115, 117, or 120 VAC/50-60 Hz into an outlet labeled for 110-115 VAC/50-60 Hz will not affect the operation of that piece of medical equipment.

Table A3.1. Equipment Amperage Requirements

Item	Normal Amp Load	Power Requirement	Weight
ALSS Model 20H Incubator	3.0 amps	115 VAC/50-60Hz	82.0 lbs
ALSS Model 185 Incubator	3.0 amps	110 VAC/50-400 Hz	80.0 lbs
Airdyne Air Compressor	8.5 amps	120 VAC/50-60 Hz	90 lbs
Avionic Elec Freq Converter	1.0 amps	115-200 VAC/400 Hz	81.2 lbs
BCI 3303 Pulse Oximeter	312mA	115 VAC/60 Hz	2.5 lbs
Impact 326M Suction Pump	1.0 amp	115-230 VAC/50-400 Hz	20.8 lbs
IVAC Medsystem III	0.6 amps	110-120 VAC/60 Hz	4.5 lbs
ProPaq Monitor 206EL	0.7 amps	110 VAC/60 Hz	23.0 lbs
UNITRON	1.0 amps	115-200 VAC/400 Hz	47.20 lbs
UNI-VENT “Eagle” Model 754M	1.0 amp	90-265 VAC/50-400 Hz	16.0 lbs
MRx Philips Heartstart	2.0 amps	100-240 VAC/50-60 Hz	17.5 lbs
Zoll- M Series CCT	2.0 amps	115VAC/50-400Hz	26.5 lbs

Attachment 4

MEDICAL EQUIPMENT PREFLIGHT CHECKLISTS

A4.1. Personnel preflighting medical equipment will be familiar with and exercise all warnings, cautions, and notes, as identified in the AFI 10-2909.

A4.2. Definitions.

A4.2.1. Operational Preflight: A complete and thorough assessment of the condition and status of medical equipment that will be accomplished prior to mission launch by qualified Aeromedical Evacuation personnel, in accordance with the medical equipment preflight checklist.

A4.2.2. Functional Check: An abbreviated assessment of the medical equipment on the mission's aircraft by that mission's assigned aeromedical evacuation crewmembers to ensure the equipment functions on aircraft power. Verifying presence of each piece of equipment and accomplishing (Q) denoted items listed on the medical equipment preflight checklist completes the functional check. **NOTE:** An Operational Preflight will be performed on medical equipment within 24 hours prior to mission launch or assuming alert posture by qualified Aeromedical Evacuation personnel. A Function check does not meet the requirement for an Operational Preflight of medical equipment.

A4.3. Bag-Valve-Mask Resuscitator

A4.3.1. Ensure all components are present and in serviceable condition.

A4.3.2. (Q) Ensure the bag is intact, and does not contain any rips, or holes.

A4.3.3. (Q) Ensure the location of airway adjuncts is known.

A4.4. Minilator

A4.4.1. Inspect the manifold and connector for damage or obvious contamination.

A4.5. Oxygen Analyzer MiniOx 3000

A4.5.1. Ensure annual calibration is complete and current on the DD Form 4368. Ensure all components are complete and in serviceable condition. Ensure AF Form 4033 is complete and present.

A4.5.2. Inspect the system for any signs of damage.

A4.5.3. Inventory the parts.

A4.5.3.1. (1) Oxygen monitor.

A4.5.3.2. (2) MSA medical oxygen sensor.

A4.5.3.3. (1) Sensor cable.

A4.5.3.4. (1) "T" adapter.

A4.5.3.5. (1) Sensor retaining strap.

A4.5.3.6. (1) Securing bracket.

A4.5.3.7. (2) 9 volt batteries.

A4.5.3.8. (1) Carrying case.

A4.6. Portable Therapeutic Liquid Oxygen System (PT LOX)

A4.6.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

A4.6.2. Inspect the system for any signs of damage.

A4.6.3. Ensure the carrying handles and securing straps are in place and are securely attached to the unit.

A4.6.4. (Q) Open the accessory case, inventory the components and inspect them for serviceability.

A4.6.4.1. (3) 20-foot oxygen hoses.

A4.6.4.2. (3) Flow control valves.

A4.6.4.3. (3) Humidification bottles.

A4.6.5. Ensure the sterile water has not expired (if present).

A4.6.6. Check the structural soundness and function of the accessory case securing latches.

A4.6.7. (Q) Remove the accessory case from the liquid oxygen unit.

A4.6.8. (Q) Check the battery condition by depressing the TEST button. The digital display should show between 10.00 and 19.99. If not, replace the batteries with 9-volt batteries.

A4.6.9. Open the outlet cover panel and check the outlets for any indication of damage, then close the outlet cover panel.

A4.6.10. (Q) Determine the liquid oxygen quantity by depressing the OPERATE button and observing the digital display for the liters of liquid oxygen present. The quantity will be between 0.00 liters and 10.00 liters. Ensure the quantity is sufficient for the mission.

A4.6.11. (Q) Check the pressure gauge for proper operating pressure (50 +/- 5 psi).

A4.6.12. (Q) Slide the oxygen outlet cover back until it is secure. Remove the outlet cap by twisting the knurled knob at the outlet in a clockwise direction. Insert the Schrader end (tapered) of the oxygen hose into the oxygen outlet and press firmly till it attaches securely. Turn flow control valve to highest setting and allow oxygen to flow for 20 seconds to purge the system. Smell the emitted oxygen for any odors. Return setting to 0 LPM.

A4.6.13. Document completion of inspection in the non-scheduled inspection portion of the AFTO 244, which is attached to the PT LOX.

A4.7. Pulse Oximeter BCI 3303

A4.7.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

A4.7.2. (Q) Ensure all components are present and in serviceable condition.

A4.7.3. Oximeter.

- A4.7.4. Adult Probe (>45 kg).
- A4.7.5. Pediatric (15-45kg) probe.
- A4.7.6. Infant (3-15 kg) probe.
- A4.7.7. Neonate (<3 kg) probe.
- A4.7.8. 5 ft cable.
- A4.7.9. Battery Charger.
- A4.7.10. Protective rubber boot with carrying strap and mounting slide.
- A4.7.11. Connect the AC power supply to the monitor.
- A4.7.12. Ensure the POWER and CHARGING lights have illuminated.
- A4.7.13. Connect the probe to the monitor.
- A4.7.14. **(Q)** Turn the monitor on.
- A4.7.15. **(Q)** Place probe on finger.
- A4.7.16. **(Q)** Measure the SpO₂, pulse rate, and pulse strength bar graph.
- A4.7.17. **(Q)** Remove from finger, ensuring PROBE/SENSOR alert alarm sounds and illuminates.
- A4.7.18. **(Q)** Turn off oximeter.
- A4.7.19. Disconnect power supply, turn on to ensure monitor operates on battery power.

A4.8. Uni-Vent “Eagle” Model 754M Ventilator

- A4.8.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.
- A4.8.2. **(Q)** Ensure all components are present and in serviceable condition.
 - A4.8.2.1. Uni-Vent® 754M Ventilator.
 - A4.8.2.2. Ventilator Circuit.
 - A4.8.2.3. Compressed Air Hose (yellow), female dual-end adapter.
 - A4.8.2.4. Oxygen Hose (green), female dual-end adapter.
 - A4.8.2.5. Humi-Vent™ “artificial nose” 250– 1500cc.
 - A4.8.2.6. AC power cord adapter 90-265 VAC/47-400 Hz.
 - A4.8.2.7. Securing straps (2)
 - A4.8.2.8. Test Lung
 - A4.8.2.9. **(2)** 0.2 Micron filters. (Maintained in Airway Kit)
- A4.8.3. Examine the Internal Compressor Air Filter, located on the top right side, for damage.
- A4.8.4. Ensure the filter is in place and in good condition.

A4.8.5. Visually observe the GAS OUT TO PATIENT Outlet. Ensure the Antiasphyxia valve is seated and not missing in order to prevent a pressure loss, resulting in ventilator failure.

A4.8.6. **(Q)** Connect to A/C power. Display will show EXT PWR ON and ON CHARGE.

A4.8.7. **(Q)** Turn Uni-Vent on by selecting AC, SIMV, or CPAP.

A4.8.8. **(Q)** Verify successful completion of SELF-Check.

A4.8.9. Verify operating power selections: AC, SIMV, or CPAP

A4.8.10. **(Q)** Check for positive indexing and operation of all switches and controls.

A4.8.11. **(Q)** Disconnect external power source and verify internal battery operation.

A4.8.12. **(Q)** Turn off.

A4.9. Airdyne™ Compressor

A4.9.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

A4.9.2. Inspect the power cable and plug for damage.

A4.9.3. Inspect the inlet filter for cleanliness and outlets free of debris.

A4.9.4. **(Q)** Connect the compressor to power and turn switch on.

A4.9.5. The pressure gauge should operate in the GREEN ARC (50 PSI +/- 5 PSI).

A4.9.6. **(Q)** Switch off.

A4.10. ZOLL M-Series® CCT, Monitor/Defibrillator

A4.10.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

A4.10.2. Inspect the ZOLL M-Series® CCT for signs of physical damage.

A4.10.2.1. Paddles clean and functional (not pitted), releases from housing with use of black release switches. Replace paddles in housing area after inspection is complete.

A4.10.2.2. Cables have no cracks, broken wires and connectors are intact; ECG electrode cable and connector, defibrillator paddle cables and Multi-function cable and connector.

A4.10.2.3. Recorder paper carriage is in serviceable order.

A4.10.3. **(Q)** Batteries; One fully charged in the unit and one fully charged spare available in the accessory bag.

A4.10.4. **(Q) Supplies located in accessory bag.**

A4.10.4.1. **(1ea)** Fully charged spare battery

A4.10.4.2. Electrode gel—1ea Tube or 3 ea gel patches

A4.10.4.3. Multi-Function Electrode Pads in sealed pouches—3ea

- A4.10.4.4. ECG electrodes—3ea sets
- A4.10.4.5. Recorder Paper—1ea in unit / 2ea spare
- A4.10.4.6. Alcohol Wipes—3ea
- A4.10.4.7. Safety Razor—1ea
- A4.10.4.8. SpO2 cable--1 ea
- A4.10.4.9. EKG cable--1 ea
- A4.10.4.10. 12-lead--1 ea
- A4.10.4.11. 4 lead--1 ea
- A4.10.4.12. Regular adult BP cuff--1 ea

A4.10.5. **Operational Checks.**

A4.10.5.1. **(Q) Power On Sequence:**

- A4.10.5.1.1. Connect to 120VAC/50-400 Hz electrical power source. Turn on unit to MONITOR, 4 beep tone heard.
- A4.10.5.1.2. Observe the display screen for messages and prompts.
- A4.10.5.1.3. ECG size X1 and "PADDLES" or "PADS" as lead selected.

A4.10.5.2. **Defibrillator:**

- A4.10.5.2.1. Connect Multi-function cable to test connector.
- A4.10.5.2.2. Turn power selector to “Defib”.
- A4.10.5.2.3. Set ENERGY SELECT level to 30 joules and press CHARGE button and SHOCK button on monitor will light-up, Press SHOCK button on monitor to discharge internally; Test OK should appear, Test strip will print, press “Record” button to stop.

A4.10.5.3. **Transcutaneous Pacer Operation:**

- A4.10.5.3.1. Disconnect Multi-function cable from Test Connector.
- A4.10.5.3.2. Turn to PACER, set pacer rate to 150 ppm, press RECORDER button; pacer pulses occur every 2 large divisions (10 small divisions).
- A4.10.5.3.3. Press and hold 4:1 button, pulses occur every 8 large divisions.
- A4.10.5.3.4. Set PACER OUTPUT to 0 mA (if not defaulted to 0 mA, a no “CHECK PADS” message appears).
- A4.10.5.3.5. Set PACER OUTPUT to 16 mA, “CHECK PADS” message and alarm.
- A4.10.5.3.6. Reconnect Multi-function cable to test connector.
- A4.10.5.3.7. Press Clear Pace Alarm soft key; “CHECK PADS” message disappears and pacer alarm stops.

A4.10.5.4. **Paddles:**

- A4.10.5.4.1. Connect Multi-function cable to APEX paddle connector.

A4.10.5.4.2. Turn power selector to “Defib”.

A4.10.5.4.3. Set ENERGY SELECT level on sternum paddle to 30 joules and press CHARGE button and CHARGE button on the APEX paddle will light-up.

A4.10.5.4.4. With paddles remaining in stored position, press SHOCK button on APEX paddle only (No effect), then press SHOCK button STERNUM paddle only (No effect), then both simultaneously to discharge internally; Test OK should appear.

A4.10.5.4.5. Test strip will print, press “Record” button on the sternum paddle to stop and inspect recorder printing.

A4.10.5.5. SpO2 Check:

A4.10.5.5.1. Connect cable to unit. Turn Selector switch to MONITOR.

A4.10.5.5.2. Place sensor on finger. Ensure the SpO2, pulse rate, and pulse strength is on display.

A4.10.5.5.3. (Q) Turn unit to OFF.

A4.11. Propaq® Encore 206 EL

A4.11.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

A4.11.2. Inspect Propaq® and Universal Power Adapter for signs of damage.

A4.11.3. Accomplish the following with the unit unplugged from external power:

A4.11.3.1. (Q) Turn on unit.

A4.11.3.2. (Q) “Startup window” will display information about the Propaq Encore and the monitor will run a diagnostic test to ensure proper functioning.

A4.11.3.3. (Q) Verify the battery indicator must be charged to >7.8V.

A4.11.3.4. Connect SpO2 cable to unit and sensor. Assess SpO2 capabilities by inserting a finger into sensor. A pulse and SpO2 percentage should appear on the display.

A4.11.3.5. (Q) Turn off monitor.

A4.11.4. (Q) Plug unit AC power cord into the electrical port on the right side of the unit.

A4.11.4.1. (Q) Verify the AC voltage in the indicator window on the Universal Power Adapter is the same as the power source you are going to plug into.

A4.11.4.2. (Q) Plug the gray power cord into the “Universal Power Adapter” and the other end into the appropriate power source.

A4.11.4.3. (Q) Depress the On switch located on Universal Power Adapter.

A4.11.4.4. (Q) Verify the green battery LED charging light illuminates on the monitor and Universal Power Adapter.

A4.11.5. (Q) Ensure the following accessories are in the carrying case.

A4.11.5.1. Blood pressure cuffs: Adult standard, large, thigh, Small Adult/Child, Child, Infant, and NIBP hose: Adult/Pediatric, Infant.

A4.11.5.2. ECG Cable 3 or 5 lead, (6 ea) Adult and Pediatric electrode pads (silver or silver chloride pads).

A4.11.5.3. SpO2 Sensors: Adult/Pediatric, one Finger Clip-on type, Pediatric/Infant, Wrap around type and Sensor Extension Cable.

A4.12. Avionics Electrical Frequency Converter

A4.12.1. Fuel vapor environment (for use on KC-135 aircraft) modified frequency converters are easily identified with a large orange hood. Attached to the large orange hood is a placard which reads: "approved for use in a fuel vapor environment, contract number F41622-01-D-0001, DO 5010."

A4.12.2. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

A4.12.3. Inspect 25 ft power cable assembly for cuts, frayed wires, bent pins, loose cannon receptacles, and damage to the electrical plugs.

A4.12.4. Ensure "Orange" and "blue" tape is located at the distal end of the 25 foot power cable

A4.12.5. If damage is noted, turn equipment into medical maintenance for repair.

A4.12.6. For utilization on the KC-135 or KC-10: connect an adaptive electrical pigtail from the Electrical Cable Assembly System (ECAS) to integrate the Avionics Frequency converter power input cable.

A4.12.6.1. (Q) Ensure converter is off.

A4.12.7. (Q) Connect 25 foot input power cable to converter first then to aircraft outlet.

A4.12.8. (Q) Turn converter on.

A4.12.9. (Q) Verify power to the converter and check the amperage draw.

A4.12.10. (Q) Secure the converter to the aircraft floor.

A4.13. Electrical Cable Assembly System (ECAS)

A4.13.1. Ensure AF Form 4033 is complete and present.

A4.13.2. Open the case by rotating the 8 latches around the mid-line of the carrying case and separating the top of the case from the bottom.

A4.13.3. Invert the top of the case, exposing the inner door.

A4.13.4. Open the inner door by depressing both spring-loaded latches and lifting the door.

A4.13.5. Inspect the adapters and electrical testers in the top of the case, and the extension cords in the bottom of the case. Verify adapters are second generation adapters with fixed pin inserted through the locking collar of each adapter.

A4.13.6. (Q) Ensure the following components are present, and observe for any defects:

- A4.13.6.1. (4) 25-foot AC electrical cords with four (4) grounded outlets each.
- A4.13.6.2. (2) 30-foot DC electrical cords with two (2) “twist-lock” outlets each.
- A4.13.6.3. (4) AC adapters for C-130 and C-141 aircraft.
- A4.13.6.4. (4) AC adapters for C-130 aircraft.
- A4.13.6.5. (2) DC adapters for C-130/C-141 aircraft.
- A4.13.6.6. (1) AC adapter for KC-135 aircraft.
- A4.13.6.7. (1) AC Frequency Converter adapter for KC-135 aircraft
- A4.13.6.8. (1) AC Frequency Converter adapter for KC-10 aircraft.
- A4.13.6.9. (1) AC electrical tester.
- A4.13.6.10. (1) DC electrical tester
- A4.13.6.11. If any defects are found, send the defective component for repair.

A4.14. Electrical Cable Assembly System (ECAS) Model no 1079.

- A4.14.1. Ensure AF Form 4033 is complete and present.
- A4.14.2. Visually inspect parts for nicks or cuts in the cord insulation or wires, cracks in either tester or in the cord outlet boxes, loosening or disassembly of MS (circular) connectors, and loosening of electrical receptacle/plug hardware.
- A4.14.3. (Q) Ensure the following components are present, and observe for any defects:
 - A4.14.3.1. (1) Carrying case.
 - A4.14.3.2. (6) 25’ 115 VAC 50-400 Hz Electrical Cord Assembly.
 - A4.14.3.3. (2) 2’ 115 VAC 50-400 Hz Electrical Cord Assembly.
 - A4.14.3.4. (3) 18” 115 VAC Cord Adapter (for C-130).
 - A4.14.3.5. (2) 18” 115 VAC Cord Adapter (for C-130 galley).
 - A4.14.3.6. (1) 18” 115 VAC Cord Adapter (for KC-135).
 - A4.14.3.7. (1) 18” Frequency Converter Adapter.
 - A4.14.3.8. (1) 18” AC Adapter (for KC-10).
 - A4.14.3.9. (1) 115 VAC Electrical Tester
- A4.14.4. If any defects are found, send the defective component for repair.

A4.15. IMPACT 326M Portable Suction Unit

- A4.15.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.
- A4.15.2. (Q) Ensure the following component parts are present and in serviceable condition:
 - A4.15.2.1. Auto power cable assembly.

- A4.15.2.2. (2) : 6 foot connective suction tubing
- A4.15.2.3. (1) : 3/8" Clear hose PVC – 12 Inches long.
- A4.15.2.4. (1) : 1/4" Clear hose PVC – 24 Inches long.
- A4.15.2.5. (1) : 3/8" Clear hose, PVC – 18 Inches long.
- A4.15.2.6. (2) : Disposable collection canisters with lids.
- A4.15.2.7. (1) : Yankauer Catheter.
- A4.15.2.8. (1) : 14 Fr. Catheter.
- A4.15.2.9. (1) : 18 Fr. Catheter.
- A4.15.2.10. (1) : Spare fuse
- A4.15.2.11. (2) : Universal canister attachment brackets.
- A4.15.2.12. (2) : (0.2) micron antibacterial filter

A4.15.3. Secure disposable collection canister in universal canister bracket and attach to side of 326M.

A4.15.4. Ensure the canister lid is securely attached to the canister.

A4.15.5. Connect one end of the 12 Inch or 18 Inch clear 3/8" PVC hose to the "Vacuum inlet", ensuring the .2-micron bacterial filter is placed in-line.

A4.15.6. Connect the other end to the "Vacuum" port on the disposable collection canister.

A4.15.7. Connect the 6 foot suction connector tubing to the "Patient" port on the disposable collection canister.

A4.15.8. Ensure "Tandem" port is capped on the disposable collection canister.

A4.15.9. (Q) Ensure the Power & Mode Selector switch is off, and then plug the AC line power cord to an external power source. External power lamp and charge lamp will illuminate.

A4.15.10. Turn Power & Mode Selector switch to the appropriate position to verify continuous and intermittent operation.

A4.15.11. Occlude suction hose and adjust Vacuum Regulator Control clockwise to the maximum desired vacuum.

A4.15.12. Test Vacuum Regulator Control for correct operation at various vacuum settings.

A4.15.13. Turn the unit off.

A4.15.14. (Q) Remove the electrical cord from the external power input jack and ensure the unit operates on battery power by repeating steps [A4.15.10-A4.15.13](#)

A4.16. IVAC Medsystem III

A4.16.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

- A4.16.2. Inspect infusion pump for signs of damage and cleanliness.
- A4.16.3. (Q) Turn pump on by depressing the ON/OFF RECHARGE key.
- A4.16.4. Infusion pump will automatically cycle through a “Homing Sequence.”
- A4.16.5. (Q) Observe the three, illuminated, red and green Channel Indicator lights cycle on and off.
- A4.16.6. (Q) Observe the three cassette holders move down and up.
- A4.16.7. (Q) Turn pump off by depressing and holding the ON/OFF RECHARGE key until display disappears.
- A4.16.8. (Q) Connect to an AC power source.
- A4.16.9. (Q) Verify the battery is charging by ensuring the green light on the power cord and the green light on the right panel of IVAC illuminate.

A4.17. Chest Drainage Unit

- A4.17.1. Inspect the drainage unit package for signs of damage.
- A4.17.2. If the package is damaged, dispose of the item.

A4.18. Heimlich

- A4.18.1. Inspect the Heimlich valve and the sterile package for any signs of damage.
- A4.18.2. If any signs of damage are present then, dispose of the entire package.
- A4.18.3. Ensure that 2 large Kelly clamps with latex tubing over the clamp jaws are available.

A4.19. Incubator (ALSS)

- A4.19.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.
- A4.19.2. Inspect the incubator for any signs of damage. If either hood is cracked, do not use the incubator.
- A4.19.3. Ensure that all 4 hood securing knobs and all 4 slide-latches are in the locked position prior to moving the incubator.
- A4.19.4. (Q) Inventory the following accessory kit for the following items and ensure they are serviceable:
 - A4.19.4.1. An oxygen regulator for the oxygen cylinders.
 - A4.19.4.2. A non-sparking wrench for the oxygen cylinder valve and regulator.
 - A4.19.4.3. A 50 cc Luer-Lock syringe.
 - A4.19.4.4. (2) humidification sponges with precut notches.
 - A4.19.4.5. An extra mattress cover (pillowcase).

A4.19.4.5.1. (Q) Ensure the oxygen cylinders are secured and have at least 1000 (psi). Ensure a plastic washer is in place between the regulator and the oxygen cylinder valve outlet.

A4.19.4.6. (Q) Connect the incubator to 115 VAC/50-400 Hz source.

A4.19.4.7. (Q) Switch the incubator “ON” and ensure the AC OP Indicator Illuminates.

A4.19.4.8. Open the porthole on the right of the front panel of the hood, and place an ungloved hand over the right end of the infant support tray and ensure airflow is present.

A4.19.4.9. Close the porthole.

A4.19.4.10. Set the temperature control to 37.0° C and observe for a rise of temperature on the incubator temperature display.

A4.19.4.11. Test the observation light by switching it “ON” then “OFF.”

A4.19.4.12. Press and hold the test switch and ensure all LED’s illuminate and the audible alarm sounds.

A4.19.4.13. (Q) Disconnect the incubator from AC power and ensure the battery operation LED illuminates.

A4.19.4.14. Repeat Steps [A4.19.4.7-A4.19.4.12](#) to ensure proper operation on battery power.

A4.19.4.15. (Q) Switch “OFF” the incubator

A4.19.4.16. (Q) Reconnect the incubator to AC power and ensure the battery charge LED is illuminated.

A4.19.4.17. Check the condition of the oxygen cylinder tank clamps, and that the IV pole is secured in its storage bracket on the rear panel of the incubator.

A4.19.4.18. Ensure the mounting straps are in place at the end corners of the frame, and that they are serviceable and not damaged.

A4.20. Litter

A4.20.1. Open the litter and inspect it for damage.

A4.20.2. DO NOT use if any canvas tears are greater than one inch.

A4.20.3. Ensure the litter handles and spreader mechanisms are intact.

A4.20.4. Inspect handle locking mechanisms for proper operation on the litter.

A4.21. NATO Backrest

A4.21.1. Check for any tears or damage.

A4.22. Next Generation Portable Therapeutic Liquid Oxygen System (NPTLOX)

A4.22.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.

- A4.22.2. Check both the Container Assembly housing and the Accessory Kit case for any damage.
- A4.22.3. Ensure the carrying handles and securing straps are in place and are securely attached to the unit.
- A4.22.4. **(Q)** Open the accessory case, inventory the components and inspect them for serviceability.
- A4.22.5. **(3)** 20-foot oxygen hoses on racks.
- A4.22.6. **(3)** Flow control valves.
- A4.22.7. **(3)** Humidification bottles.
- A4.22.8. Ensure the sterile water has not expired (if present).
- A4.22.9. Check the structural soundness and function of the accessory case securing latches.
- A4.22.10. **(Q)** Remove the accessory case from the liquid oxygen unit.
- A4.22.11. **(Q)** Determine the liquid oxygen quantity by depressing the OPERATE button and observing the digital display for the liters of liquid oxygen present. The quantity will be between 0.00 liters and 20.00 liters. Ensure the quantity is sufficient for the mission.
- A4.22.12. Open the outlet cover panel and check the outlets for any indication of damage, then close the outlet cover panel.
- A4.22.13. **(Q)** Check the battery power by actuating the “TEST” button. The reading should be between “10.0” to “16.0”. If not, replace the batteries with 9-volt lithium batteries.
- A4.22.14. **(Q)** Check the pressure gauge for proper operating pressure and ensure it reads (50 +/- 5 psi).
- A4.22.15. **(Q)** Slide the oxygen outlet cover back until it is secure. Remove the outlet cap by twisting the knurled knob at the outlet in a clockwise direction. Insert the Schrader end (tapered) of the oxygen hose into the oxygen outlet and press firmly till it attaches securely. Turn flow control valve to highest setting and allow oxygen to flow for 20 seconds to purge the system. Smell the emitted oxygen for any odors. Return setting to 0 LPM.
- A4.22.16. Document completion of inspection in the non-scheduled inspection portion of the AFTO 244, which is attached to the PT LOX.

A4.23. OSL Litter

- A4.23.1. Inspect for any damage.

A4.24. MRx Philips Heartstart® (MRx) Monitor/Defibrillator (M3535A/M3536A)

- A4.24.1. Ensure equipment is within calibration requirement date and that this date, recorded on the AF Form 4368, will not be exceeded during the planned mission. Ensure AF Form 4033 is complete and present.
- A4.24.2. Inspect the MRx Philips Heartstart (MRx) Monitor/Defibrillator for signs of physical damage.
- A4.24.3. Paddles clean and functional not pitted and easily release from paddle tray.

A4.24.4. Cables have no cracks, broken wires and connectors are intact; ECG electrode cable and connector, defibrillator paddle cable, and multi-function cable and connector.

A4.24.5. Recorder paper carriage is in serviceable order.

A4.24.6. **(Q)** Batteries; One fully charged in the unit and one fully charged spare available in the accessory bag.

A4.24.7. **(Q)** Ensure the following components are present, and observe for any defects:

A4.24.8. **(1)** Tube Electrode Gel

A4.24.9. **(3)** Multi-Function Electrode Pads

A4.24.10. **(1)** Recorder Paper in unit and (2) spare

A4.24.11. **(3)** Alcohol Wipes

A4.24.12. **(1)** Safety Razor

A4.24.13. **(1)** SpO2 cable

A4.24.14. **(1)** EKG cable

A4.24.15. **(1)** 12-lead cable

A4.24.16. **(1)** 3-lead cable

A4.24.17. **(1)** BP cuff

A4.24.18. **Operational Check**

A4.24.18.1. Connect the AC/DC power module to the HeartStart MRx and plug it into a power outlet. Verify that the external power indicator on the front panel is lit. Turn the Therapy Knob to 150J.

A4.24.18.2. Connect the 50 Ohm test load to the defibrillator cable.

A4.24.18.3. Press the Menu Select button.

A4.24.18.4. Using the Navigation buttons, select “Other” and press the Menu Select button.

A4.24.18.5. Select “Operational Check” and press the Menu Select button.

A4.24.18.6. Select “Run Op Check” and press the Menu Select button.

A4.24.18.7. Press the Menu Select button to acknowledge the message “Leaving Normal Operation Mode.”

A4.24.18.8. At the completion of the Operational Check, a report is printed that lists the test results and prompts you to visually inspect the device and cables, and to inventory all accessories and supplies.

A4.24.18.9. **(Q)** Verify the Ready For Use (RFU) Indicator: The RFU indicator is located on the upper, right corner of the unit. It indicates the status of the therapy delivery function of the monitor/defibrillator using the following definition: A blinking black hourglass symbol  indicates the shock, pacing, and ECG function of the device are ready for use. Sufficient battery is available for device operation.

A4.24.18.10. (Q) Turn unit to OFF.

A4.24.18.11. Re-connect cable to Multi-Function Electrode Pads or paddles.

A4.25. Politzer Bag

A4.25.1. Ensure all 3 components are present, and that there is no damage to any of the parts.

A4.25.2. A rubber bulb.

A4.25.3. A tube.

A4.25.4. A nasal tip.

A4.26. Stryker Wedge Turning Frame 965 Military Option

A4.26.1. (Q) Ensure the following system components are available and in serviceable condition:

A4.26.2. Anterior frame with knurled nuts.

A4.26.3. Posterior frame with knurled nuts.

A4.26.4. Turning Locking Pin.

A4.26.5. Turning ring with pip pin locking device.

A4.26.6. Turning Lock (**red knob**).

A4.26.7. Thigh Clearance Adjustment.

A4.26.8. (8) Litter/base lifting handles.

A4.26.9. Mattress and mattress bands.

A4.26.10. Face Rest (anterior frame).

A4.26.11. Bed Pan Tray.

A4.26.12. (2) Arm boards/side rails.

A4.26.13. Versitrack System with S-hook.

A4.26.14. (Q) Accessory Bag

A4.26.15. Universal Head Harness.

A4.26.16. 12" Spreader bar.

A4.26.17. (4) Chocks.

A4.26.18. (4) Litter straps

A4.26.19. (2) Turning Frame/Litter Support Base securing straps.

A4.26.20. Tighten Knurled nuts for both frames.

A4.26.21. Ensure turning ring is secured with pip pin.

A4.26.22. Release the Turning Locking Pin.

A4.26.23. Release litter strap underneath bottom frame handle and turning ring support bar.

- A4.26.24. Pull on the Turning Lock (red knob).
- A4.26.25. Turn the litter; ensure a smooth “no-catch” turn and that the Turning Lock engages upon completion of the turn.
- A4.26.26. Return litter to the supine position and replace the Turning Locking Pin.
- A4.26.27. Release the Litter-Base securing straps
- A4.26.28. Raise the unit to its maximum height; ensure an even lift from both actuator rods.
- A4.26.29. Lower the head-end; then lower the foot-end by stepping on the respective foot pedals.
- A4.26.30. Re-apply litter strap underneath bottom frame handle and turning ring support bar.
- A4.26.31. Engage the Brakes and inspect each brake ring to ensure all four rings engaged.
- A4.26.32. Engage the Fifth-Wheel option and check for wheel deployment.
- A4.26.33. Check underneath the base carriage for hydraulic fluid/leaks.
- A4.26.34. Fully decrease the traction knob; approximately six inches of traction cable will be available to allow for traction application.
- A4.26.35. Inspect the cord for kinks/frays.
- A4.26.36. While firmly holding the “S” hook increase the traction knob until ten pounds force is registered on the traction gauge. The user should feel an increase in the traction force.

A4.27. Leather Restraints

- A4.27.1. Ensure all components are present.
- A4.27.2. (2) Two ankle cuffs
- A4.27.3. (2) Two wrist cuffs
- A4.27.4. (1) One short leather strap
- A4.27.5. (1) One long leather strap
- A4.27.6. (1) One restraint key
- A4.27.7. (1) Carrying case.
- A4.27.8. Inspect short and long belts, and the wrist and ankle cuffs for cuts, tears, and excessive wear.
- A4.27.9. Ensure the restraint key opens the locking device.

A4.28. Unitron Portable Power System

- A4.28.1. Ensure AF Forms 4368 and 4033 are complete and present.
- A4.28.2. Inspect 25 foot flexible cable for cuts, frayed wires, bent pins, loose cannon receptacles, and damage to the electrical plugs.
- A4.28.3. For utilization on the KC-135 or KC-10: connect an adaptive electrical pigtail from the Electrical Cable Assembly System (ECAS) to integrate the 25 foot flexible cable.

- A4.28.4. If damage is noted, turn equipment into medical maintenance for repair.
- A4.28.5. **(Q)** Ensure converter is off.
- A4.28.6. **(Q)** Connect 25 foot input power cable to converter first then to aircraft outlet.
- A4.28.7. **(Q)** Turn converter on.
- A4.28.8. **(Q)** Verify power to the converter and check the amperage draw.
- A4.28.9. **(Q)** Secure the converter to the aircraft floor.