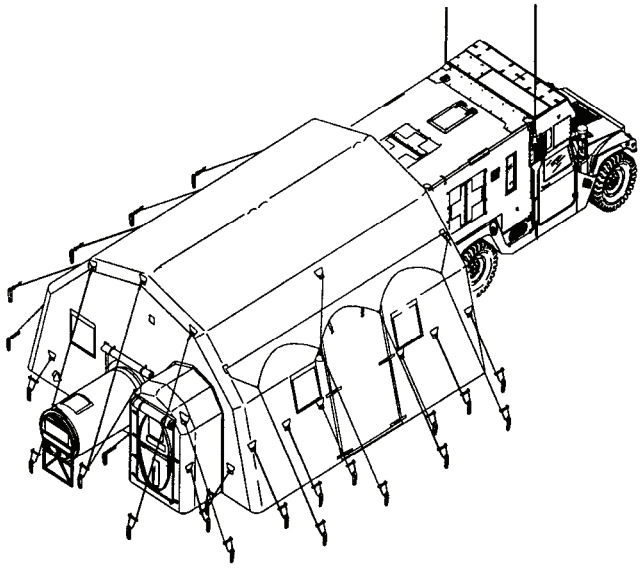
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OPERATOR'S MANUAL
FOR



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CHEMICAL BIOLOGICAL PROTECTIVE SHELTER (CBPS) SYSTEM

NSN 5410-01-441-8054 (GREEN) (EIC:5ZT)
NSN 5410-01-482-4633 (TAN)

DISTRIBUTION STATEMENT A – Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 2004

WARNING

CARBON MONOXIDE

Carbon monoxide is without color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the personnel heater, main or auxiliary engine, or any vehicle is operated for any purpose. Always obey the following:

Do not operate personnel heater or engine of Extended Capacity Vehicle (ECV) in a closed place unless there is sufficient air movement.

Do not sit in modified Lightweight Multipurpose Shelter (LMS) with idle engine for long periods without operating the ventilator blower. If tactical situation permits, open hatches.

Do not drive ECV with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

Be alert at all times during ECV operation for exhaust odors and exposure symptoms. If either is present, immediately ventilate personnel compartments. If symptoms persist, remove affected crew to fresh air; keep warm. Do not permit physical exercise. If necessary, give artificial respiration.

Be aware; the field protective masks for Chemical Biological Radiological (CBR) protection will not protect you from carbon monoxide poisoning.

For artificial respiration, refer to FM 4-25.11.

ELECTRICAL CURRENT

The Chemical Biological Protective Shelter (CBPS) System contains high electrical currents. To avoid injury during maintenance of the CBPS, adhere to the following:

Remove all jewelry.

Use electrically insulated tools where appropriate.

Take special precautions when working on or near electrical connections.

When working inside of LMS, tag power panel and ECV cab area to ensure power is not accidentally turned on.

24 Vdc from the ECV batteries is applied to specific CBPS components (e.g., rear control panel and relay box) even with the CBPS and ECV OFF, if power mode switch is in EXT position with Tactical Quiet Generator (TQG) and converter ON. Be careful not to come in contact with the battery connections or hot CBPS components when performing maintenance. If applicable, disconnect batteries and tag power cable area.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through the body.

Before applying power to the system, connect the ground cable from external 10 kW Tactical Quiet Generator (TQG) to ground rod and to LMS power panel. Do not remove the grounding system until all system power is shut off and all power cables have been disconnected.

WARNING

GENERAL

Failure to observe all warnings in the referenced procedures may result in injury or death to personnel.

Personnel riding in the LMS must have their safety belts fastened during vehicular movement.

Failure to perform all maintenance setup tasks, as directed in each maintenance paragraph, can result in serious injury or death to personnel.

Hearing protection is required for personnel riding in LMS. Noise levels produced by equipment exceed 85 dBA, which may cause injury to personnel.

ELECTRICAL SHOCK

Low voltage/high current circuits can kill. The following safety steps shall be followed if someone is the victim of electrical shock: Do not try to pull or grab the individual.

Turn off the electrical power, if possible.

Pull, push, or lift the person to safety using a dry wooden pole or a dry rope or some other insulating material if power cannot be shut off.

Give artificial respiration, refer to FM 4-25.11.

Send for help as soon as possible.

LIFTING

Improper lifting can cause injury to personnel. Use the following precautions when lifting:

Use proper number of people when called for. When in doubt, use help.

Be aware of all lifting points and follow procedures.

Obey lift restrictions and utilize mechanical aids as required.

Prevent back injury, lift with legs and not your back.

Do not attempt to lift HMT tongue alone if HMT is heavily loaded. Lifting heavy HMT tongue alone can cause back injury. Use crank on front caster to raise HMT tongue.

Do not attempt to lift High Mobility Trailer (HMT) tongue ring without first lowering rear leg since HMT could tip upwards and injure personnel.

HAZARDOUS MATERIALS

The chemicals (such as solvents, adhesives, sealants, paints, lubricants, etc.) used in maintenance procedures may present fire or chemical hazards if used without proper precautions. Observe manufacturers warning labels and the warnings and cautions contained in this manual. Ensure sufficient ventilation exists, protective clothing and equipment is used, and sources of ignition are removed.

Observe Chemical, Biological, Radiological, and Nuclear (CBRN) clothing and handling procedures in accordance with field manuals FM 3-11.5, FM 4-02.4, and FM 4-02.7.

Heat seal repairs may produce toxic fumes. All repairs should be performed in a well ventilated area. Adhesive and cleaning agents are flammable and can ignite, causing burns. Perform work in a well-ventilated area away from fire.

WARNING

ENTRY AND EXIT

The LMS height above the ground when mounted on the ECV and low door frame present potential hazards during entry and exit. Use extreme care when climbing or descending the ladder to avoid falling. Be alert to the low door frame to avoid hitting your head. Also use caution when climbing and descending from the roof of the LMS.

To prevent injury to personnel, use caution when walking through entrances to the ABS, hose assemblies and cables are on the floor of the ABS.

CIRCUIT BREAKERS

If a circuit breaker does not stay in the on position when pressed, do not attempt to close (activate) repeatedly since an overload condition probably exists which could be hazardous to personnel and equipment.

R22 REFRIGERANT

Great care must be exercised to prevent contact of liquid R22 refrigerant or R22 refrigerant gas discharged under pressure with any part of body. The extremely low temperature resulting from the rapid expansion of the liquid or gas R22 refrigerant released under pressure can cause sudden and irreversible tissue damage through freezing. As a minimum, personnel must wear thermal protective gloves and face shield or goggles when working in any situation where R22 refrigerant contact with the skin or eyes is possible. Application of excessive heat to any component in a charged system will cause extreme pressure that may result in a rupture or explosion. Exposure of R22 refrigerant to an open flame or a very hot surface will cause a chemical reaction in the gas to form carbonyl chloride (phosgene), a highly poisonous and corrosive gas. In its natural state, R22 refrigerant is a colorless odorless vapor with no toxic characteristics. It is heavier than air and in a well ventilated area will disperse rapidly. However, in an unventilated area it presents a danger of suffocation.

PRESSURIZATION

The air beams used to raise the CBPS are pressurized. When striking, the dump caps used to remove air from air beams may come off forcefully and strike face or body. When removing dump caps, grip firmly and turn face away from dump cap. Under no circumstances should air beam pressure be higher than 3 psi. Injury to personnel could result if air beam pressure is higher than 3 psi.

The hydraulic system is a pressurized system attaining pressures as high as 3,000 psi. When performing maintenance on the hydraulic system, gloves and goggles are mandatory.

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 14 May 2010

OPERATOR'S MANUAL
FOR

CHEMICAL BIOLOGICAL

PROTECTIVE SHELTER (CBPS) SYSTEM

NSN 5410-01-441-8054 (GREEN) (EIC:5ZT)

NSN 5410-01-482-4633 (TAN)

TM 10-5410-228-10, 19 March 2004, is changed as follows.

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Appendix E-29 and E-30	Appendix E-29 and E-30
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JOYCE E. MORROW
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CHEMICAL BIOLOGICAL

PROTECTIVE SHELTER (CBPS) SYSTEM

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NO. 10-5410-228-10

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WASHINGTON, D.C., 19 MARCH 2004

OPERATOR'S MANUAL
FOR
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PROTECTIVE SHELTER (CBPS) SYSTEM

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HOW TO USE THIS MANUAL

SCOPE. This manual contains four chapters, identified as follows:

- **Chapter - 1.** Introduction. This chapter is to introduce you to the Chemical Biological Protective Shelter (CBPS) System and its major assemblies and components. It also provides general information on maintenance forms, storage and shipment, warranty, and corrosion control. Since many terms may be new to you, a list of abbreviations and commonly used terms associated with the CBPS is provided.

- **Chapter - 2.** Operating Instructions. This chapter identifies the controls and indicators that you, the operator, must know to operate the system. Operator preventive maintenance checks and services are also provided in this chapter so that you can keep the CBPS mission ready. The preventive maintenance procedures are arranged numerically so that they can be performed before you leave on mission (mobile mode), after you get to the operating location and set up (static mode), and after striking the system and before you are ready to return to your unit (mobile mode). This chapter also provides step by step procedures for operating the CBPS under different modes of operation and unusual conditions such as snow, high winds, and heavy rains.

- **Chapter - 3.** Operator Maintenance Instructions. Provides lubrication instructions and explains what actions you must take when a problem occurs and what maintenance functions you must perform.

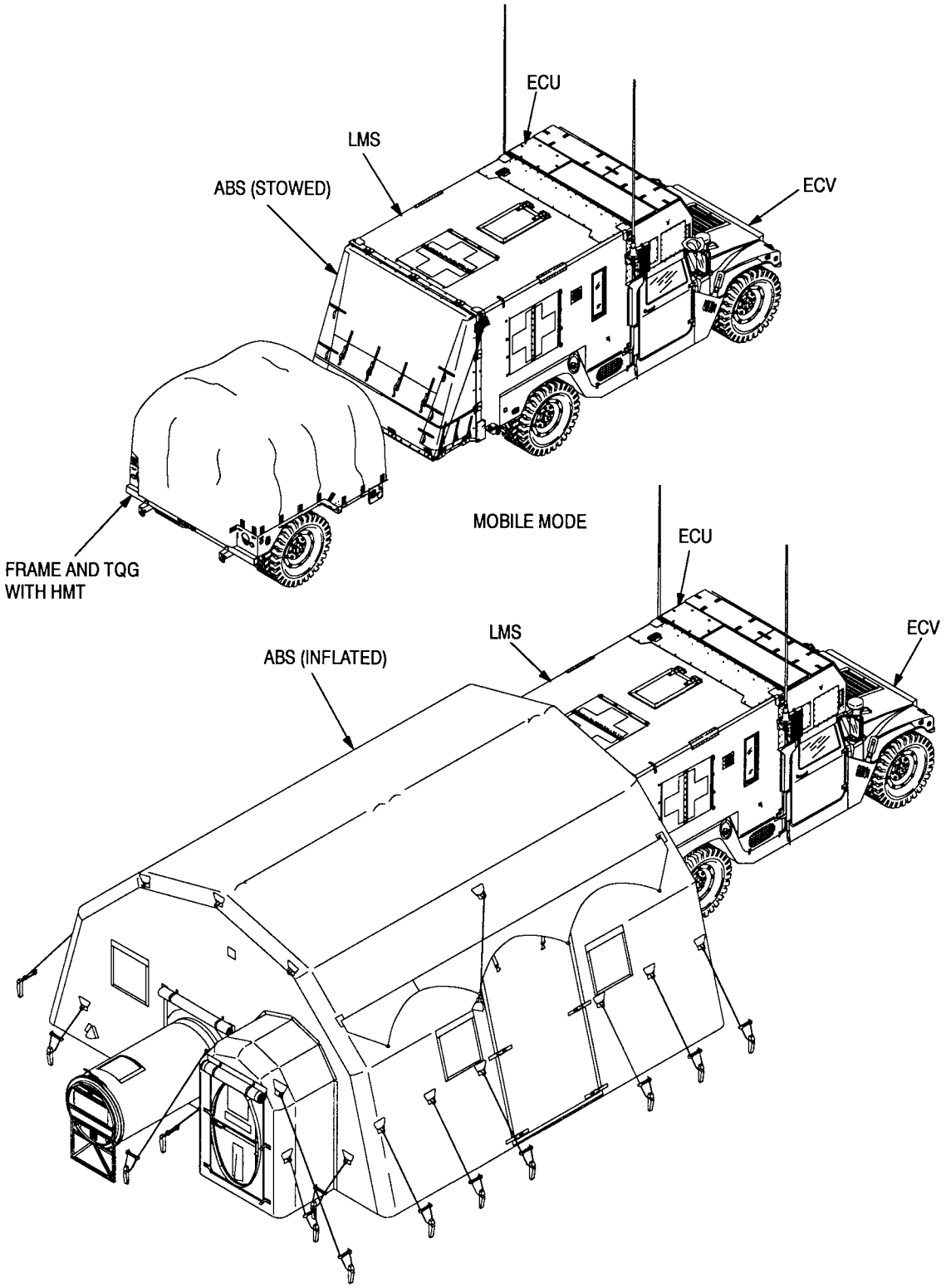
- **Chapter - 4.** Entry and Exit Procedures for the CBPS. Provides instruction on the proper entry and exit procedures to keep the inside of the CBPS free of contamination.

- **Appendixes.** The various appendixes contain supplemental information related to the CBPS.

NOTE

No general support maintenance is required in support of the CBPS.

INDEXES. This manual contains indexes to help you quickly locate the subject matter. Since it is realized that certain portions of the manual will be used more than the rest, an index of these key subject areas has been provided on the cover and includes such topics as preventive maintenance checks and services, troubleshooting procedures, and maintenance procedures for each level of repair. Subject matter may also be researched using the alphabetical index located at the rear of the manual.


ECU
LMS
ABS (STOWED)
ECV
FRAME AND TQG
WITH HMT
MOBILE MODE
ECU
LMS
ECV
ABS (INFLATED)
STATIC MODE
79-1-M

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INTRODUCTION
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Section I. GENERAL INFORMATION

1.1 SCOPE.

a. Type of Manual. Operator's.
b. Equipment Name and Model Number. Chemical Biological Protective Shelter (CBPS) System, Model CBPSS 2000.
c. Purpose of Equipment. The CBPS is a highly mobile, chemically-hardened shelter system, designed to provide medical personnel protection from chemical and biological agents.
d. Modes of Operation. The CBPS is designed to operate in two modes of operation. In the mobile mode, the Air Beam Shelter (ABS) is rolled up and secured to back of Lightweight Multipurpose Shelter (LMS) and the High Mobility Trailer (HMT) is attached to Expanded Capacity Vehicle (ECV) pintle and ready for movement. In static mode, the ABS is inflated, secured, and ready for operation.
e. Loading Plans. Reference Appendix E for HMT, LMS, and ECV loading plan.
f. Decontamination. Reference Appendix F for CBPS Decontamination procedures.

1.2 MAINTENANCE FORMS AND PROCEDURES.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8 as contained in the Maintenance Management Update.

1.3 DESTRUCTION OF ARMY EQUIPMENT TO PREVENT ENEMY USE.

Refer to TM 750-244-3 for the destruction of the CBPS to prevent enemy use.

1.4 PREPARATION FOR STORAGE AND SHIPMENT.

a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be mission ready within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

b. Before placing equipment in administrative storage, current maintenance services and Equipment Serviceable Criteria (ESC) evaluations should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO) should be applied.

c. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans and other containers may be used.

1.5 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. If you have internet access, the easiest and fastest way to report problems or suggestions in to go to https://aeps.ria.army.mil/aepspubic.cfm (scroll down and choose the "Submit Quality Deficiency Report" bar). The Internet form lets you choose to submit an Equipment Improvement Recommendation (EIR), a Product Quality Deficiency Report (PQDR) or a Warranty Claim Action (WCA). You may also submit your information using an SF 368 (Product Quality Deficiency Report). You can send your SF 368 via e-mail, regular mail, or facsimile using the addresses/facsimile (FAX) numbers specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual. We will send you a reply.

1.6 CHEMICAL BIOLOGICAL RADIOLOGICAL AND NUCLEAR INFORMATION RESOURCE CENTER (CBRN-IRC).

Do you have a problem or question about the equipment covered in this publication and need to talk to someone? There is a hotline at the CBRN-IRC that you can contact. The phone numbers are toll free from the USA and these lines are manned during our normal duty hours. If you call during our off duty hours you can leave a voice mail message and we will get back to you. Your E-mail or facsimile (FAX) message can be sent at any time and will be handled during the next business day.

The numbers are:

Toll Free	1-800-831-4408
DSN	793-7349
Commercial	(309) 782-7349
FAX (DSN)	793-1919
FAX (commercial)	(309) 782-1919
E-mail	cbrn@conus.army.mil

1.7 SAFETY CARE AND HANDLING.

Adhesives, cleaning solvents, bonding materials, lubricants, fuels, and other agents are used during operation and maintenance of the CBPS. The prolonged use of these materials without proper protection can cause skin irritation and inhalation of vapors may be toxic if inhaled in quantity. When operating or working on the CBPS, be familiar with all warnings posted in front of this manual and follow all procedural warnings and cautions found in maintenance sections. Refer to FM 4-25.11 for first aid information.

1.8 CORROSION PREVENTION AND CONTROL (CPC).

a. CPC of Army material is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent problem in future items.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as ABS fabric materials, rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

c. If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as 'corrosion', 'rust', 'deterioration', or 'cracking' will ensure that the information is identified as a CPC problem. SF 368 should be submitted to: Commander, Natick Acquisition Center, SBCCOM, U.S. Army Natick RD&E Center, ATTN: SATNC-PB/028, Natick, MA 01760-5011.

1.9 QUALITY ASSURANCE (QA) PROCEDURES.

Critical procedures or parts of procedures in this TM which require quality assurance inspections are identified by (QA) written after the applicable step.

1.10 REFERENCE INFORMATION.

This listing includes nomenclature cross-reference list, list of abbreviations, and explanations of terms (glossary) used in this manual.

a. Nomenclature Cross-Reference List.

Common Name	Official Nomenclature
CBPS	Chemical Biological Protective Shelter
LMS	Modified Lightweight Multipurpose Shelter
ECV	Truck, Utility, Expanded Capacity 4X4 W/E HMMWV M1113

b. List of Abbreviations and Acronyms.

Common Name	Official Nomenclature
ABS	Air Beam Shelter
AC	Alternating Current
AOAP	Army Oil Analysis Program
amp	ampere
AR	As Required
ATM	Advanced Trauma Management
BAS	Battalion Aid Station
BII	Basic Issue Item
BX	Box
CAGE	Commercial and Government Entity
CAM	Chemical Agent Monitor
CARC	Chemical Agent Resistant Coating
CB	Circuit Breaker
CBPS	Chemical Biological Protective Shelter
CBR	Chemical Biological Radiological
CBRN	Chemical Biological Radiological Nuclear

1.10 REFERENCE INFORMATION - Continued.

Common Name	Official Nomenclature
cfm	cubic feet per minute
CN	Can
COEI	Components of End Items
CPC	Corrosion Prevention and Control
CTA	Common Table of Allowance
DC	Direct Current
DCS	Direct Complexing Shelter
DECON	Decontamination
DS	Direct Support
DS2	Decontaminating Solution Number 2
EA	Each
ECU	Environmental Control Unit
ECV	Expanded Capacity Vehicle
EIR	Equipment Improvement Recommendations
EMT	Emergency Medical Triage
EPG	Electronically Programmed Governor
ESC	Equipment Serviceability Criteria
ESS	Environmental Support System
EXT	External
F	Fahrenheit
FEP	Fluorinated Ethylene Propylene
FST	Forward Surgical Team
GFE	Government Furnished Equipment
GL	Gallon
GPH	Gallons Per Hour
gpm	gallons per minute
GS	General Support
Hr	Hourly
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HMT	High Mobility Trailer
hp	horsepower
HRCRD	Handheld Remote Control Radio Device
Hz	Hertz
HYD	Hydraulic
IAW	In Accordance With
ICAM	Improved Chemical Agent Monitor
in.	inch
INT	Internal
iwg	inches of water, gage
kW	kilo Watts
LB	Pound
LDS	Lightweight Decontamination System
LMS	Lightweight Multipurpose Shelter
LTG	Lighting
MAC	Maintenance Allocation Chart
MOPP	Mission Oriented Protective Posture
MTF	Medical Treatment Facility
MTOE	Modified Table of Organization & Equipment
NBC	Nuclear, Biological and Chemical

Common Name	Official Nomenclature
NSN	National Stock Number
OR	Operating Room
PDDA	Power-Driven Decon Apparatus
PMCS	Preventive Maintenance Checks and Services
PN	Part Number
P/O	Part Of
psi	pounds per square inch
PT	Pint
QA	Quality Assurance
QT	Quart
RCP	Rear Control Panel
RO	Roll
RPM	Revolutions per Minute
RPSTL	Repair Parts and Special Tools List
RRA	Remote Radio Assembly
SCALP	Suit, Contamination Avoidance, Liquid-Protective
SINCGARS	Single Channel Ground and Airborne Radio Set
SFPM	Square Foot per Minute
SMR	Source, Maintenance and Recoverability
TALP	Tunnel Airlock Litter Patient
TAMMS	The Army Maintenance Management System
TQG	Tactical Quiet Generator
U/M	Unit of Measure
Vac	Volts, alternating current
Vdc	Volts, direct current

c. Glossary.

Direct Complexing	The connecting of two or more systems together.
Rib	Air beam.
Striking	Packing up ABS and stowing equipment.

Section II. EQUIPMENT DESCRIPTION AND DATA

1.11 EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES.

Characteristics.

- Integrated, self-contained system.
- Environmentally controlled.
- Transports medical and mission personnel.
- Battalion aid station for forward battle areas.
- Nuclear, Biological, and Chemical (NBC) protection provided by agent-impermeable fabric and positive over pressure.
- Capabilities and features.
- Mobile.
- Expandable.
- Rapidly deployed.
- Use not limited to a particular geographic area.
- Capable of operating in temperature ranges between -25°F and 120°F.
- Capable of operating under all types of battlefield conditions, including: Electronic Countermeasures (ECM), smoke, contaminants (chemical and biological agents, including toxins and novel compounds), fallout, and dust.
- Interior of Environmental Control Unit (ECU) and all ECU components normally exposed to contaminating ambient air or environment are completely accessible and resistant to high-pressure spraying of decontaminating solutions.
- HMT and ECV tires/wheels are interchangeable.
- Powered from the ECV or from an external power source.
- Transportable by C130, C17, C141 and C5.
- Transportable externally by CH47D helicopters.
- Transportable via rail and marine transport modes.

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

The CBPS contains the following assemblies and systems:

- ECV Modification
- LMS Modification
- Electrical System
- ECU
- TQG and HMT
- ABS
- Recirculation Filter

NOTE

Pintle assembly is located on ECV rear bumper, but is part of LMS modification.

a. ECV Modification (figure 1-1).

(1) ECV. Serves as a mobile platform and as primary power source for the CBPS.

(2) Primary Hydraulic Pump P1. Provides pressurized hydraulic fluid flow to different components in ECU when CBPS is operating in internal power mode.

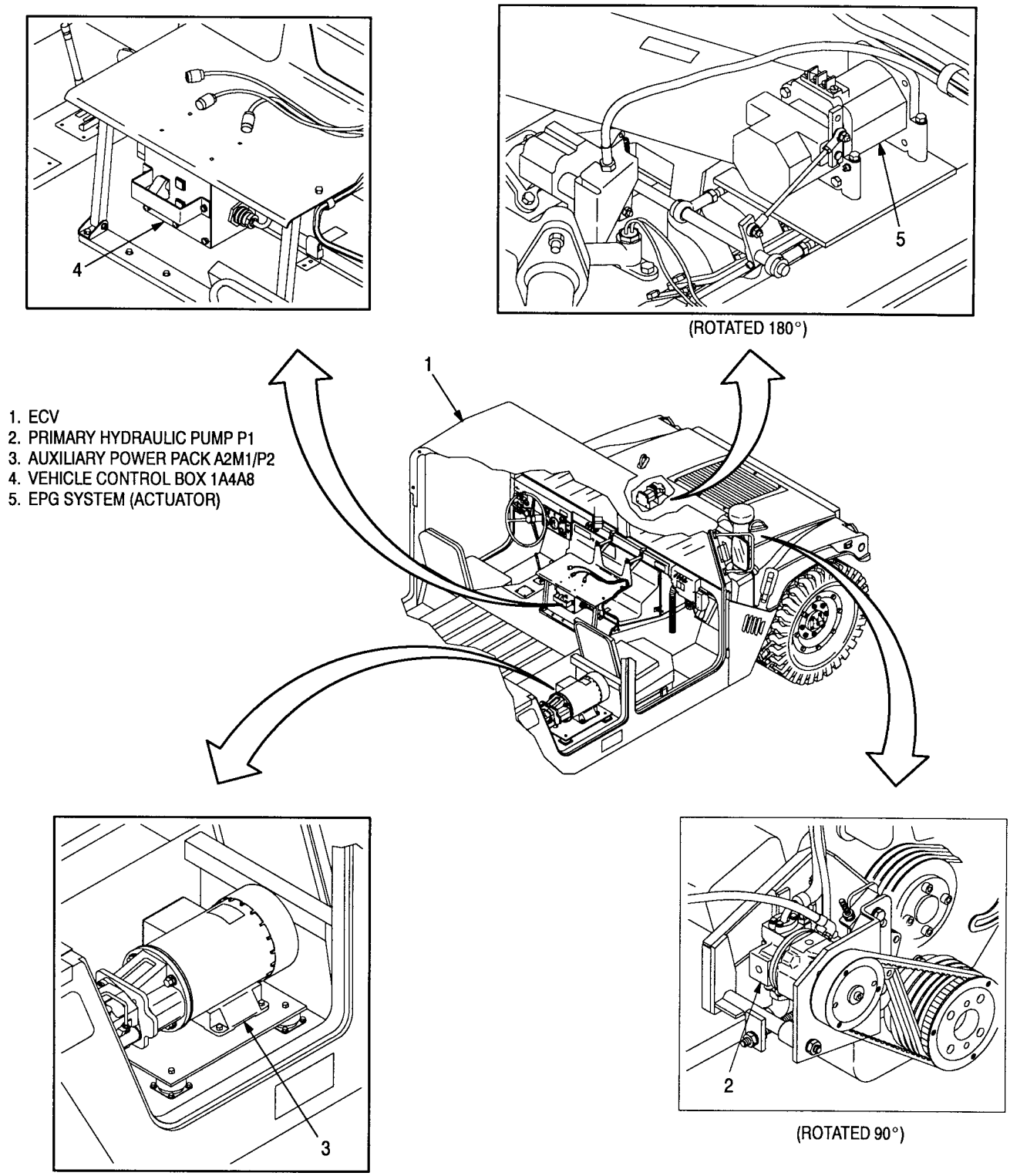


Figure 1-1. ECV Modification (Sheet 1 of 2)

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued.

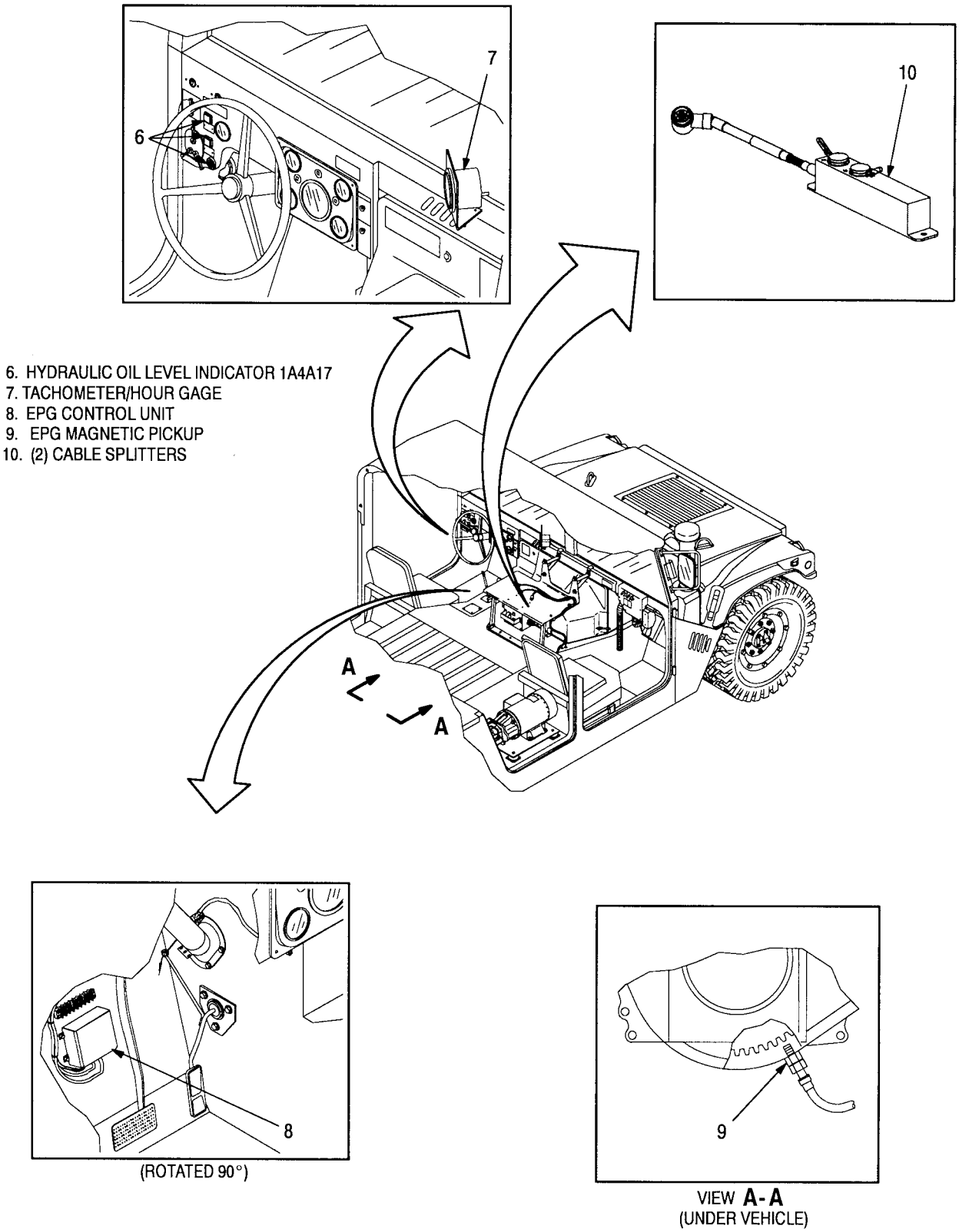


Figure 1-1. ECV Modification (Sheet 2 of 2)

(3) Auxiliary Power Pack A2M1/P2. Provides pressurized hydraulic fluid flow to different components in ECU when CBPS is operating in external power mode.

(4) Vehicle Control Box 1A4A8. Allows communication between crew members inside ECV cab and crew members inside LMS. The vehicle control box also contains the switch that enables the Electronically Programmed Governor (EPG).

(5) EPG Actuator. Part of EPG system, located in ECV engine compartment. EPG actuator receives signal from EPG control unit to increase ECV engine speed.

(6) Hydraulic Oil Level Indicators. Located on dash of ECV and on rear control panel, lights and sounds buzzer when hydraulic fluid in the ECU reservoir drops to low levels. System shuts down when ECU reservoir drops to a critical level, or hydraulic fluid has a loss rate of 2 gpm or more.

(7) Tachometer/Hour Gage. Located on dash of ECV, monitors engine RPM and number of hours ECV has run.

(8) EPG Control Unit. Part of EPG system, located in ECV cab. EPG control unit monitors ECV engine speed, via EPG magnetic pickup, and sends a signal to EPG actuator to increase ECV engine speed.

(9) EPG Magnetic Pickup. Part of EPG system, located in ECV engine flywheel housing. EPG magnetic pickup compares speed of ECV engine with changes in the load.

(10) Two Cable Splitters. Located on radio mounting bracket, enables LMS crew to monitor and operate the radios during all modes of operation.

b. LMS Modification (figure 1-2).

(1) Windows (two). Provides LMS crew visibility to outside conditions.

(2) Ladder. Provides easy entrance and exit between LMS and ABS.

(3) Chairs (two). Provides seating for LMS crew. Chairs are equipped with seat belts and shoulder harnesses.

(4) Mission Oriented Protective Posture (MOPP) Gear Storage Box (two). Provides storage for crew. Passenger's side storage box contains cable interconnection box and relay box.

(5) ABS Inflation Hose. Provides pressurized air for inflation of ABS air beams from rib fan.

(6) Relief Valves (two). Relieves air pressure in LMS during air transport.

(7) ABS Retainer. Secures ABS to LMS.

(8) Seat Belts (two). Secures LMS crew in LMS during mobile mode.

(9) Soft Air Duct. Provides filtered pressurized air to ABS and LMS. Air can also be cooled or heated.

(10) Tailgate Assembly. Holds and protects the stowed ABS.

(11) Block Wire Cable. Secures the tailgate assembly and ABS in stowed position.

(12) Emergency Exit Panel. Provides an escape route for the LMS crew.

(13) Power Panel. Provides 208 Vac, 60 Hz, 3-phase input auxiliary power connector, external chemical sensor connector, and CBPS ground terminal. The panel also contains a hose port. The hose port provides outside ambient-air input to the Nuclear, Biological, Chemical (NBC) shelter pressure gage located on rear control panel.

(14) Receptacle Panel. Provides six external 15A, 60Hz, 115 Vac power outlets. The top two outlets are dedicated to ABS light set. The bottom two outlets are dedicated to on-board NBC recirculating blowers. The ABS must be inflated to gain access to receptacle panel.

(15) Door. Provides entrance and exit to LMS during mobile operation.

(16) Block Assembly (each side). Allows lowering and raising of tailgate assembly and stowed ABS.

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued.

(17) Hydraulic Overflow Container. Receptacle for excess hydraulic fluid.

NOTE

Pintle assembly is located on the ECV rear bumper.

(18) Pintle Assembly. Provides connection for towing HMT.

(19) Red Cross Sign Assembly. Sign is hinged in middle so it can be displayed or hidden as necessary.

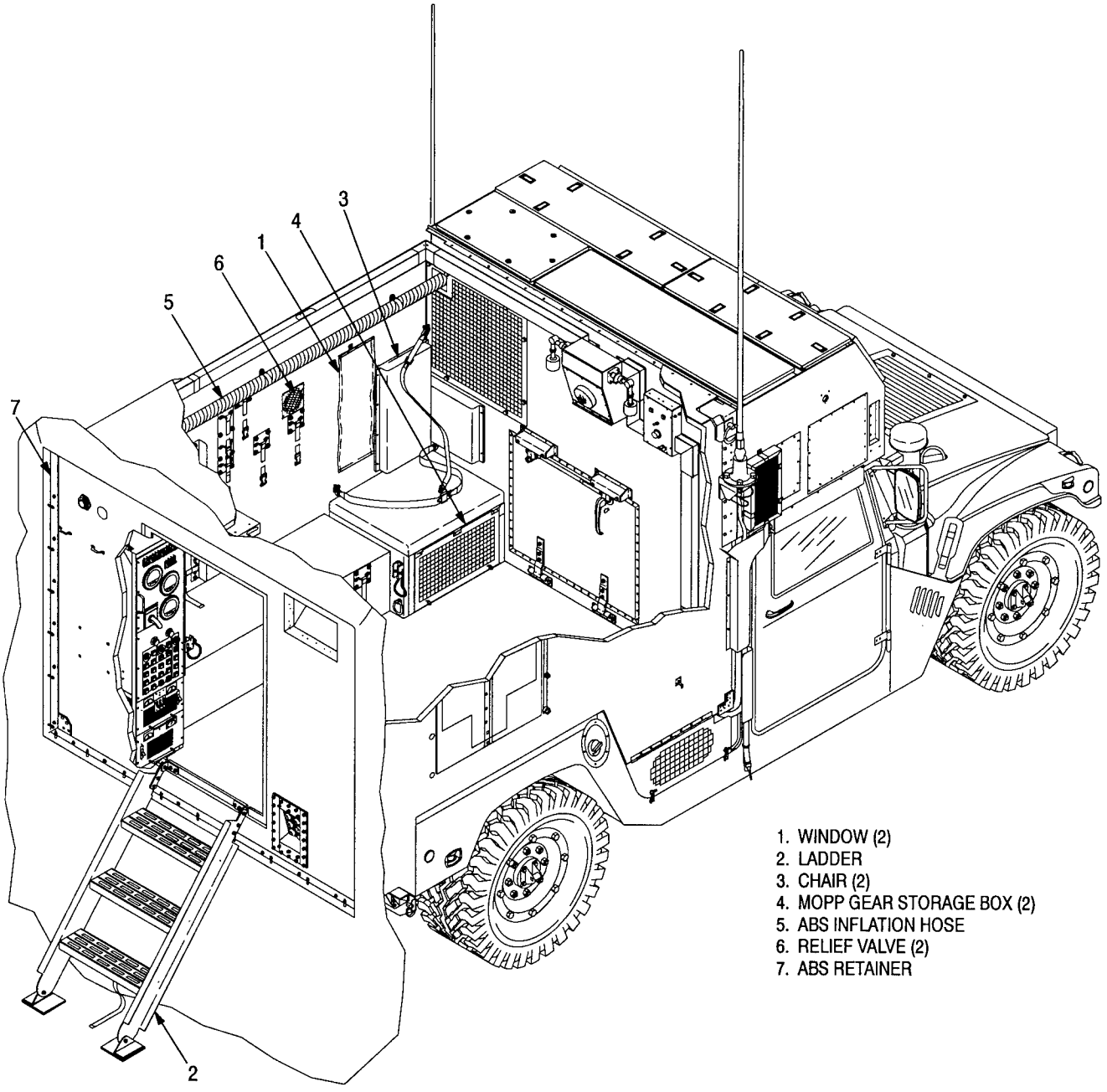
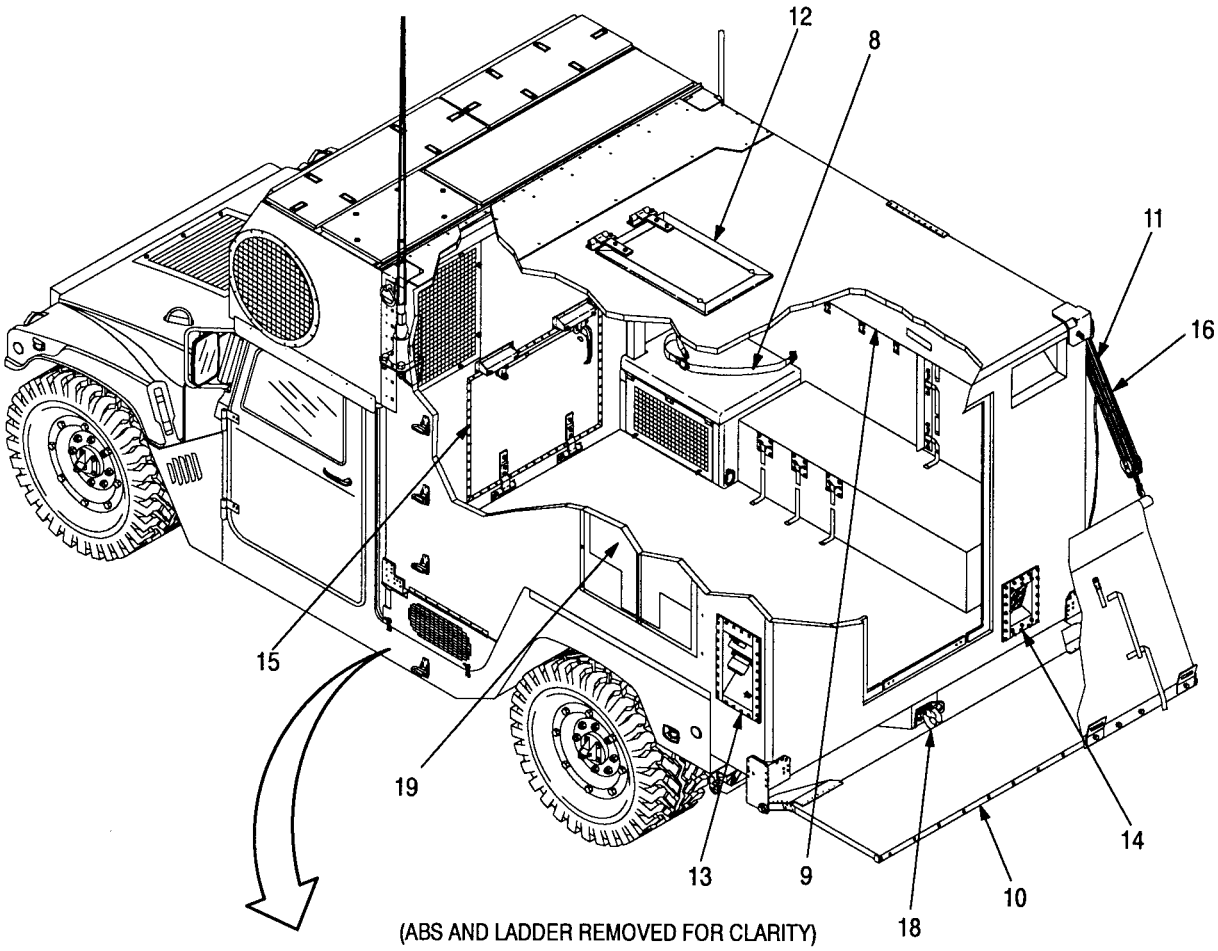
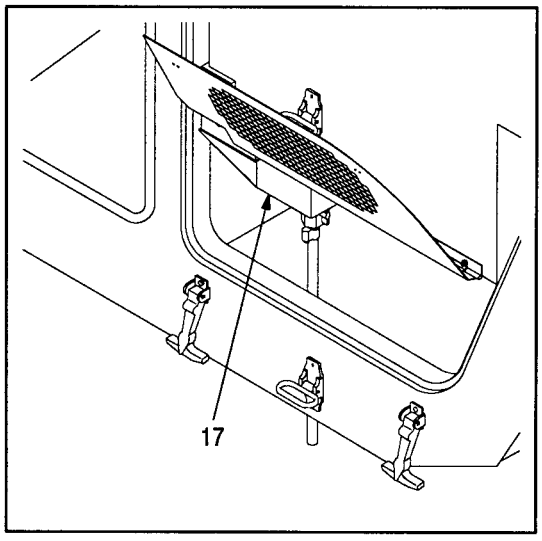


Figure 1-2. LMS Modification (Sheet 1 of 2)





8. SEAT BELT (2)
9. SOFT AIR DUCT
10. TAILGATE ASSEMBLY (ABS REMOVED FOR CLARITY)
11. BLOCK WIRE CABLE
12. EMERGENCY EXIT PANEL
13. POWER PANEL
14. RECEPTACLE PANEL
15. DOOR
16. BLOCK ASSEMBLY (EACH SIDE)
17. HYDRAULIC OVERFLOW CONTAINER
18. PINTLE ASSEMBLY
19. RED CROSS SIGN ASSEMBLY (3)

Figure 1-2. LMS Modification (Sheet 2 of 2)

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued.

c. Electrical System (figure 1-3).

(1) Raceway. Secures CBPS cable assemblies.

(2) Rear Light Box Assembly 1A4A7. Lights the aft LMS crew area.

(3) Inverter 1A4A13. Provides power to outlets on the receptacle panel. The inverter receives 24 Vdc from the ECV electrical system and outputs 115 Vac to the CBPS.

(4) Converter 1A4A14. Allows power from the 10 kW TQG to operate the CBPS. The converter receives 208 Vac from the 10 kW TQG (or other 208 Vac, 3-phase power 10 kW TQG or greater) and outputs 24 Vdc for the CBPS.

NOTE

The Electronic Control Console (ECC) comprises the rear control panel and the power mode switch.

(5) Rear Control Panel (RCP) 1A4A4. Contains controls and indicators for CBPS deployment and operation. Controls heating and cooling temperatures within the CBPS through the temperature control unit.

(6) Power Mode Switch 1A4A4S1. Selects either ECV or an external power source to operate the CBPS.

(7) Forward Light Box Assembly 1A4A5. Lights the forward LMS crew area.

(8) Control Box Assembly 1A4A18. Allows communication between the LMS crew and the cab crew. Temperature control knob allows the LMS crew control of internal temperature during mobile mode.

(9) Relay Box 1A4A17. Located in passenger side MOPP gear storage box, supplies +24 Vdc to the CBPS.

d. ECU (figure 1-4).

(1) ECU. Contains the components that provide the venting, heating, cooling, and air filtration equipment. Also provides the air needed to inflate the air beams and to generate the over pressure (positive pressure) inside the CBPS.

(2) Intake Fan (Vent/NBC). Hydraulic driven fan used to draw outside air into the ECU.

(3) Condenser Fan. Hydraulic driven fan used to cool the condenser coil and hydraulic fluid when the Environmental Support System (ESS) mode selector switch on the Electronic Control Console (ECC) is set to COOL or VENT.

(4) Recirculation Fan. Draws in air from the NBC filters and from the return vent duct on the driver side of the LMS. The air is then directed towards the cooling/heating coils.

(5) Compressor. Consists of an air conditioner compressor used to cool the CBPS when the ESS mode selector switch on the ECC is set to COOL.

(6) Rib Blower. Consists of a hydraulic driven ring compressor fan used to supply air to the air beams.

(7) Manifold. Directs and controls the pressure and flow of the hydraulic fluid through ports to the components of the ECU as selected by the controls on the ECC.

(8) Hydraulic Fluid Reservoir. Holds 13 gallons of the system's 22 gallons of hydraulic fluid. A fluid level gage on the front of the reservoir provides a visual indication of the hydraulic fluid level. The reservoir also contains a strainer in the fill cap that filters the hydraulic fluid as it enters the reservoir.

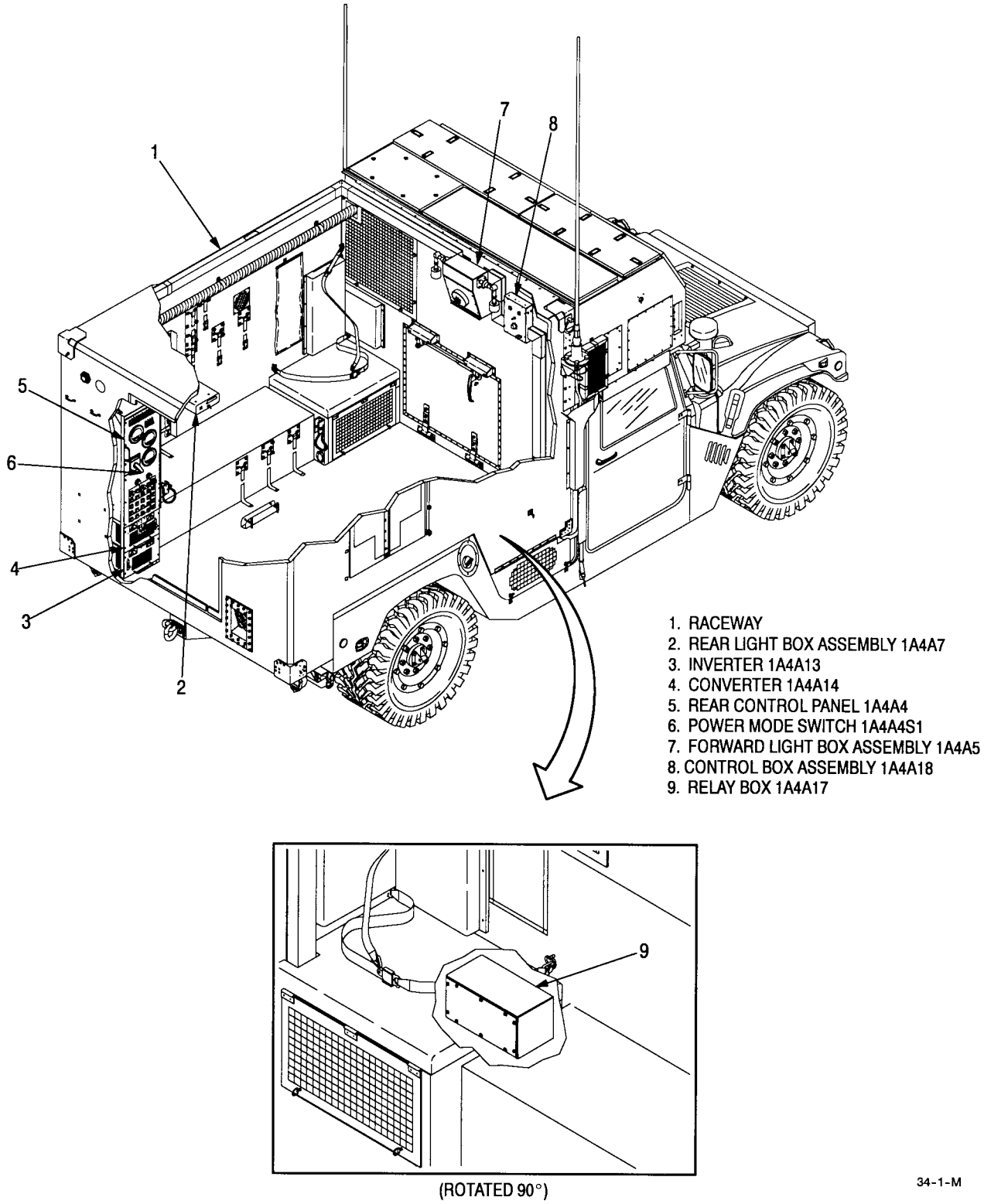


Figure 1-3. Electrical System

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued.

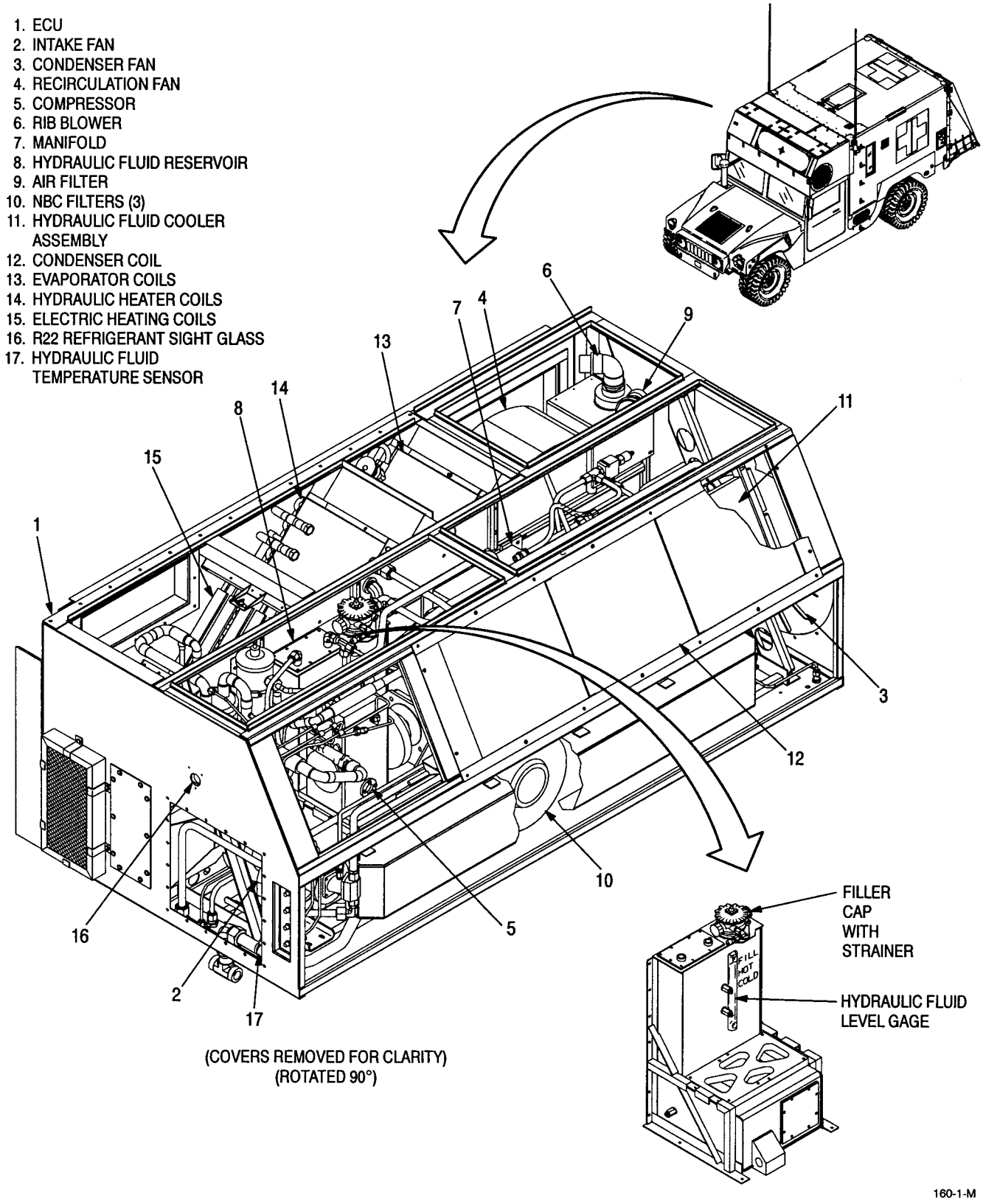


Figure 1-4. ECU

(9) Air Filter. Used to filter the air beam air flow.

(10) NBC Filters (three). Chemical agent air filters used to filter contaminants during NBC conditions.

(11) Hydraulic Fluid Cooler Assembly. Cools hydraulic fluid during operation.

(12) Evaporator Coils. Area where the R22 refrigerant absorbs heat from the surrounding air, leaving cool air to be blown into the interior of the CBPS.

(13) Condenser Coil. Area where heat is removed from the R22 refrigerant, changing the refrigerant back to a liquid.

(14) Hydraulic Heater Coils. Fin-tube exchanger which extracts heat from the hydraulic fluid passing through the coils. Air passing over the heated coils heats the interior of the CBPS.

(15) Electric Heating Coils. Externally powered AC electrical heating coils used to produce heat in the CBPS. The CBPS is capable of four heat stages, however, the 10 kW TQG only provides sufficient power to support stage 1 (2.5 kW).

(16) R22 Refrigerant Sight Glass. Provides visual indication of the refrigerant condition and level.

(17) Hydraulic Fluid Temperature Sensor. Senses when hydraulic fluid temperature is too high. Warning indicator on rear control panel lights to alert operator of this condition. If temperature increases an unmutable audible alarm on the rear control panel sounds.

e. TQG and HMT (figure 1-5).

(1) HMT. High mobility, 1/4 ton HMT, towed behind the ECV. Used to carry the TQG and store medical supplies, camouflage and support equipment, and repair kits.

(2) 10 kW TQG. Used to power the CBPS during static mode with power mode switch set to external power (EXT). The 10 kW TQG also supplies electrical power to the electrical heaters during extreme cold conditions with power mode switch set to internal power (INT).

(3) Frame. Supports the 10 kW TQG on the HMT.

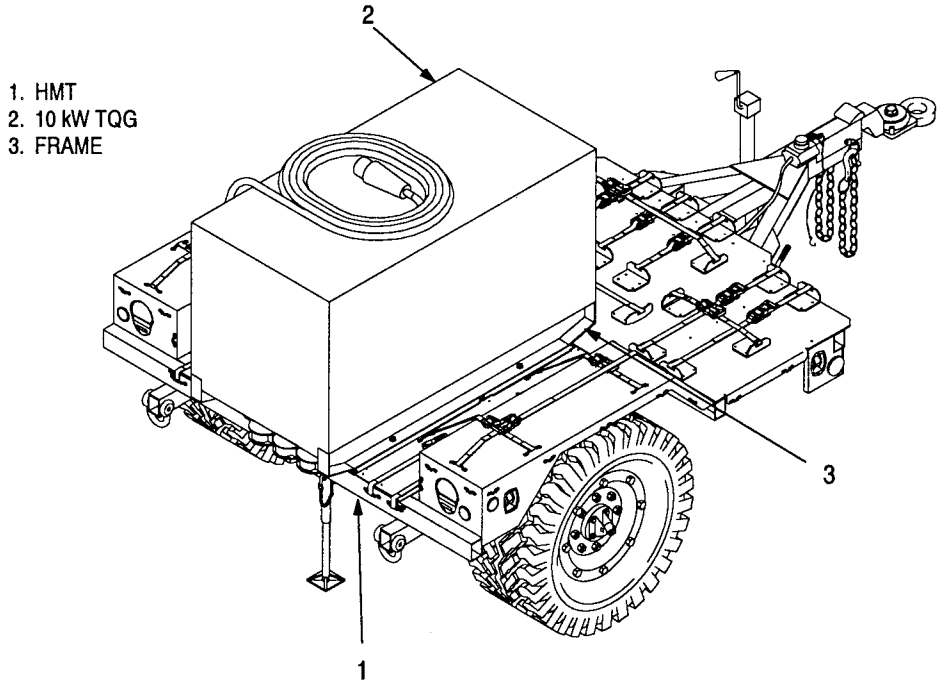


Figure 1-5. TQG and HMT

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued.

f. ABS (figure 1-6).

(1) ABS. The ABS is an 18 by 18 foot structure, made of chemical agent-resistant fabric. It is clamped to an aluminum retainer attached to the rear of the LMS.

(2) Air Beam Assembly. Inflatable air beams that support the ABS.

(3) Ambulatory Airlock Door. Airlock entrance that allows personnel access into the CBPS. Under NBC conditions, this entrance is under positive pressure to aid in personnel decontamination.

(4) Tunnel Airlock Litter Patient (TALP) Airlock Door. Airlock tunnel that allows litter patients access into the CBPS. Under NBC conditions, this entrance is under positive pressure to aid in patient decontamination.

(5) Air Inlet/Manifold. Air from ABS inflation passes through flexible hoses into air beams.

(6) Shut-Off Valves. In open position, allows air to enter the air beams.

(7) Windows. Allows visibility to outside conditions.

(8) Ambulatory Airlock Door Vents and Flaps. Used to adjust CBPS and airlock over pressure.

(9) TALP Airlock Door Vents and Flaps. Used to adjust CBPS and TALP over pressure.

(10) Pressure Gages. Measures air pressure in ambulatory door airlock and TALP compared to outside ambient air pressure.

(11) Dump Caps. When caps are removed, allows deflation of air beams.

(12) Direct Complexing Shelter (DCS) Door. Opening used when connecting to another CBPS, or for fresh air ventilation with screen installed.

(13) Insulation Blankets. Attached to four sides and roof of ABS and used to insulate the ABS.

(14) Speaker Assembly. Allows LMS crew to monitor radios and communicate with other units.

g. Recirculation Filter (figure 1-7).

(1) Recirculation filter is a portable, self-contained unit to filter any residual NBC contaminants inside the ABS. The cover (1) is attached to housing (2) by four link-lock fasteners (3). The housing contains a blower, replaceable gas filter element (4), and power switch (5). The power cord (6) provides connection to a standard 110 Vac/60 Hz socket. Air enters through air inlets (7) and is forced downward through replaceable gas filter element. Filtered air exits through air outlets (8).

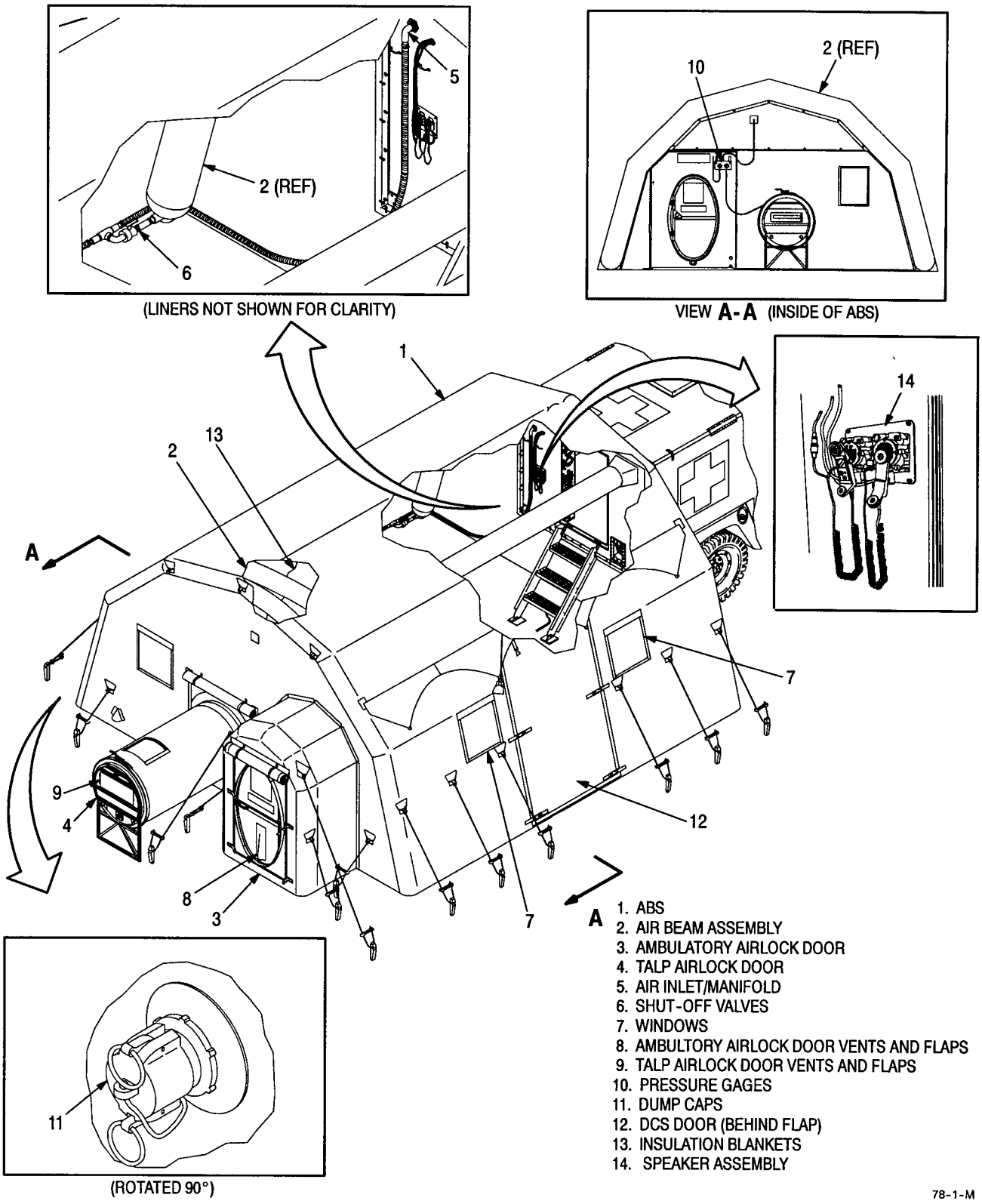


Figure 1-6. ABS

1.12 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued.

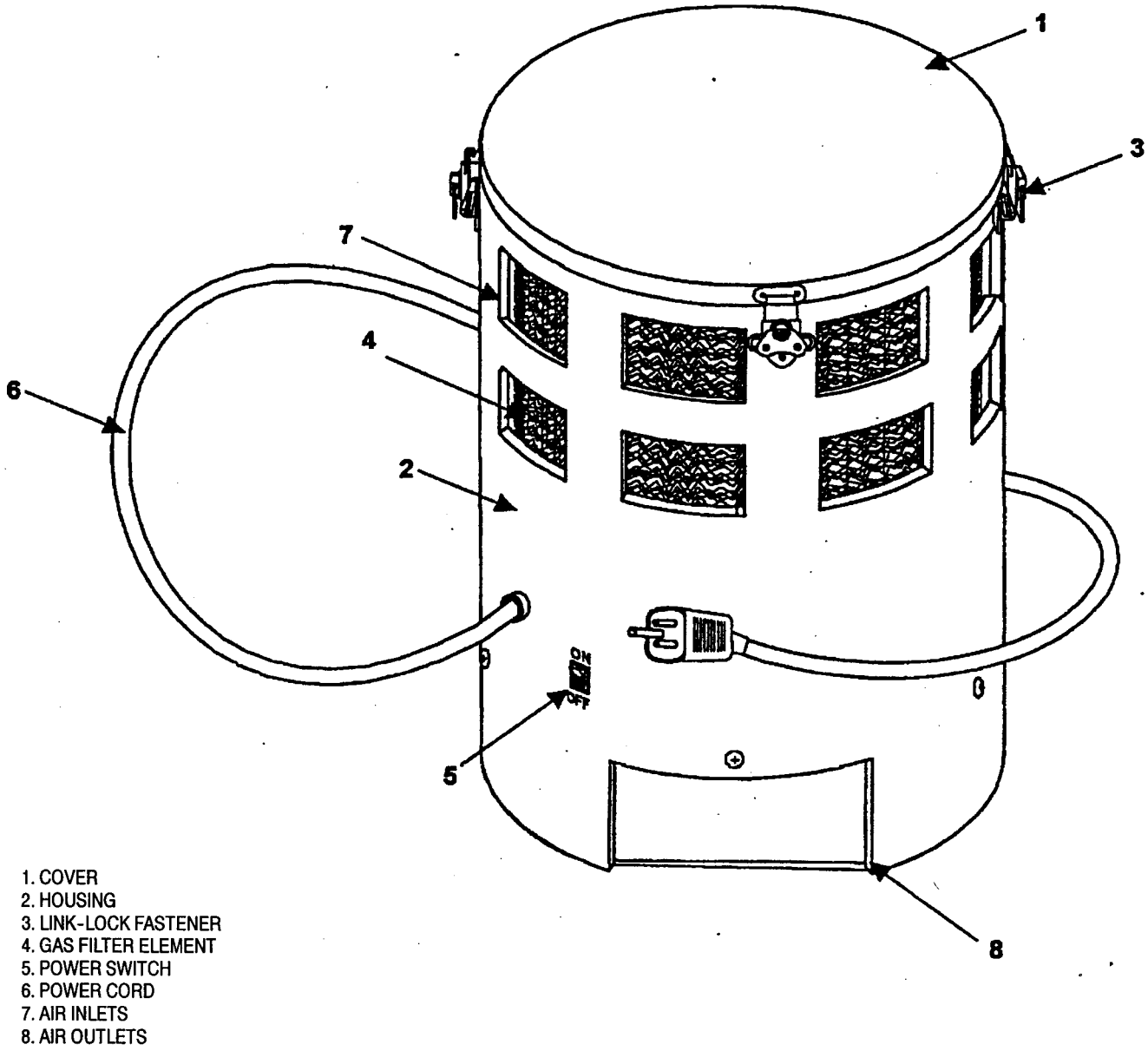


Figure 1-7. Recirculation Filter

1.13 EQUIPMENT DATA.

CBPS (includes crew gear, medical equipment and pintle weight)
(ECV total load includes crew, fighting gear, and pintle weight)

CBPS Total Weight:	15,700 lb
Curb Weight:	6,100 lb
Gross Weight:	11,500 lb
Payload:	5,098 lb
Front Axle:	5,750 lb
Rear Axle:	7,000 lb
ECV Total Load:	11,500 lb
HMT:	4,200 lb

Mobile Profile		Static Profile	
Length:	328 in.	Length:	516 in.
Width:	87 in.	Width:	226 in.
Height:	103.5 in.	Height:	126.5 in.

Bridge Class (MLC):	Empty: 2 Loaded: 4
Axle Weight Rating:	Front: 5,750 lb Rear: 7,000 lb
Ground Clearance:	16.5 in.
Fording Depth:	60 in.
Vehicle Turning Radius:	25 ft
Max Grade:	22°
Max Side Slope:	17°
Center of Gravity:	
Vehicle:	Vertical: 42.3 in. above ground Longitudinal: 51.6 in. forward of rear axle C/L Latitudinal: 0.85 in. right of C/L
HMT:	Vertical: 37.5 in. above ground Longitudinal: 6.5 in. forward of axle C/L Latitudinal: On HMT longitudinal C/L
Fuel Economy:	8 hrs per tank (estimated)
Range:	275 mi. (approximately)

INVERTER

Input Voltage:	28 Vdc (22 Vdc to 29 Vdc)
Extended Range:	18 Vdc to 32 Vdc
Output Voltage:	120 Vac (117.6 Vac to 122.4 Vac)
Output Current:	11.6 amps at 120 Vac
Output Frequency:	60 Hz
Output Power:	1.4 kW
Weight:	32 lb (approx.)

CONVERTER

Input Voltage:	208 Vac (197 Vac to 208 Vac)
Extended Range:	188 Vac to 225 Vac
Input Phase:	3 phase/4 wire
Input Frequency:	47 Hz to 63 Hz
Output Voltage:	Range - 26.6 Vdc to 29.4 Vdc (28 Vdc Nominal)
Output Power:	2 kW
Weight:	25 lb (approx.)

1.13 EQUIPMENT DATA - Continued.

AC MOTOR	
Input Voltage:	208 Vac, 3-phase
Power:	7.5 hp @ 3,450 RPM
Weight:	105 lb
ECU	
Weight:	1,035 lb (includes hydraulics, A/C, heat, air filtration)
Hydraulic Fluid:	13 GL in reservoir
Total Hydraulic Capacity:	22 GL
R22 Refrigerant Capacity:	11.5 lbs
LMS	
Weight:	1,295 lb (includes cables, wires, control boxes)
Length:	102 in.
Width:	84 in.
Height:	67 in.
ABS	
Weight:	730 lb (includes air beams, air manifold, insulation panels)
Length:	224 in.
Width:	226.2 in.
Height:	126.5 in.

Section III. PRINCIPLES OF OPERATION

1.14 GENERAL.

The CBPS is a highly mobile battalion aid station designed to be operational in a forward battle area in a quick time response (under 30 minutes). The CBPS is manned by a crew of four. Two of the crew members (LMS crew) are inside the LMS and are responsible for operating the electronic controls as well as installing the internal doors and equipment. The other two members of the crew (cab crew) are the driver and the navigator. Their responsibilities are to set the ECV for static mode, unload the HMT, connect the 10 kW TQG to the LMS power panel, install the ABS stakes, install the outside doors on the ABS and other tasks associated with inflating the ABS. The following provides a basic operational description of the CBPS, its major components and how they interface with each other.

a. Operational Power. The CBPS is operated using the ECV or the external 10 kW TQG and operates off both Direct Current (DC) and Alternating Current (AC).

NOTE

When operating under ECV power, the circuit breaker on the LMS power panel is normally set to OFF. However, the 10 kW TQG can also be used (circuit breaker ON) to power the AC electric heaters during low temperature conditions.

(1) ECV System (Internal) Power. When internal power is used (ECV operating), the DC power for the CBPS is derived directly from the vehicle's electrical system. Two warning indicators on the rear control panel are used to alert the crew if the engine's oil pressure is low or if the temperature of the engine's coolant is high (hot).

To set the ECV for static mode, the cab crew puts the vehicle in park, sets the hand brake and turns the EPG switch ON. The LMS crew turns on the circuit breakers and sets the controls on the RCP. The EPG controls the idle speed of the ECV engine under varying system load conditions by comparing the engine speed (via the magnetic pickup on the engine flywheel) with the settings on the EPG control unit.

With the engine running in high idle (EPG ON), the belt-driven primary hydraulic pump P1 in the engine area is turning and pumping hydraulic fluid throughout selected components in the ECU. The 24 Vdc, 200 amp system of the ECV provides the DC operating power for the CBPS. The 24 Vdc voltage is applied to the inverter which provides a 115 Vac output for the CBPS AC components.

NOTE

Under full CBPS load conditions, a maximum of 3,412 watts (142 amps) is possible. Since the system is powered by a 200 amp generator, the remaining 58 amps should be adequate for ECV systems and battery charging.

(2) External Power. External AC power is normally provided by connecting the 10 kW TQG on the HMT to the LMS power panel; however, any equivalent or greater 208 Vac, 3-phase external source may be used. The AC input power from the 10 kW TQG is applied to CBPS components including the AC motor A2M1 in the compartment on passenger side of ECV. The AC motor drives a hydraulic pump P2. The hydraulic pump P2 pumps hydraulic fluid through selected components of the ECU. AC is also applied to the converter 1A4A14 which provides the DC operating power for the CBPS. Because the hydraulic system in the external mode is incapable of providing the heat required by the system, AC electric heaters located in the ECU are used to heat the CBPS.

b. LMS. During the deployment of the ABS, the LMS crew operates the controls and indicators for inflating and pressurizing the ABS and sets the environmental temperature within the CBPS. The LMS crew also monitors alarm indicators on the ECC and ensures that air is supplied to ABS.

c. Environmental Control. The ECU components are powered by the hydraulic system. Venting, heating and cooling equipment housed in the ECU is controlled by ESS mode selector switch located on rear control panel. Outside air is drawn into the ECU via vent (NBC) fan, directed through the dust/water separator (vortex generator), through a plenum in ECU, to three NBC gas particulate filters. The filtered air goes into a port where it is mixed with filtered return air from the LMS. The recirculating blower motor fan directs the air across the heating coils or air conditioning fins for heating or cooling. The air is blown into the soft air duct of the LMS and through the cloth duct of the ABS. When in the cool mode, the air conditioner condenser coil is cooled by passing air over the condenser coil and blowing the air out of the ECU with the condenser fan located on the driver's side of the ECU.

Also located in the ECU is the rib fan used to inflate air beams. Air generated by the rib fan is passed through a flexible hose in the LMS to the rib manifold in the ABS. The rib manifold connects to each air beam and contains a check valve and shut-off valve. The check valve automatically stops airflow from the air beam. The shut-off valves can be used to isolate a selected air beam for maintenance purposes. A small hose from the air beam manifold to a fitting on the LMS is used for measuring air beam pressure.

d. ABS. The ECV tailgate is lowered and the ABS is unrolled, inflated and secured with lines and stakes. Before the air beams of the ABS can be inflated, it is necessary to verify that the turn-off valves on the air beams are opened and the outside air beam dump caps are properly secured. Under normal conditions, the rib blower motor will be on when the air beam pressure is 1.5 psi or lower and will turn off when the pressure reaches 2.9 psi.

For NBC operation, the entire CBPS should be decontaminated. (Refer to FM 3-11.5.) The ambulatory and TALP entry ways must be kept securely sealed to keep the contaminated outer surfaces of the ABS from contaminating the interior of the ABS or LMS. For protection against contaminants, the ABS should not be inflated lower than 0.5 inches of water, gage (iwg).

1.14 GENERAL - Continued.

NOTE

Over pressurization (positive pressure) is achieved by supplying a continuous, high volume of air into the CBPS to maintain air pressure that is slightly higher than the outside, ambient air pressure. This results in a continuous outward flow of air to the atmosphere through vents and any leaks in the ABS, thus preventing the entrance of outside contaminants.

The pressure in the enclosure is measured on the NBC shelter pressure gage. It is referenced to the atmospheric pressure by use of a pressure tap mounted on the power panel of the LMS. A momentary drop in CBPS pressure may be experienced when the door is opened. Airlock (differential) gages located at the entrance of the ABS are used to measure the pressure in the ambulatory and TALP airlocks. To pressurize the ambulatory and TALP airlocks, air must flow through the airlocks. This is accomplished by opening the outer and inner door flaps. Opening the flaps also controls over pressurization within the ABS enclosure. A connector on the power panel allows for the connection of an external Chemical Agent Monitor (CAM) for monitoring biological contaminants. If contaminants are detected, the NBC fan will automatically turn on. NBC recirculation filter fans, provided as on-board components of the CBPS, are critical to cleansing the air of contaminants in the ABS enclosure when personnel enter or exit the ABS and must be connected to the receptacle panel. A hand-held CAM/ICAM, provided with the system, will be used to detect any contamination prior to entry through either the TALP or ambulatory airlocks.

Section IV. MODES OF OPERATION

1.15 GENERAL.

The amount of fuel that is consumed by the CBPS system during operation varies according to what power source is being used as well as the load on the system. The noise level also varies. Minimum fuel is consumed when the heater and air conditioner are not being used, ECV is off and generator is used only for electrical power. CBPS fuel consumption is as follows:

Internal Power (ECV):	External Power (TQG):
NBC mode 2.0 GPH	NBC mode 1.3 GPH
Non NBC 1.6 GPH	Non NBC 0.5 GPH

Table 1-1. CBPS System Capabilities

Power Source	Mode	Heat	Air Conditioning	Reduce Noise	Conserve Fuel
ECV	Non-NBC (Good for all environmental conditions.)	Full capability (Need TQG running when temp is below 20°F.)	Full capability	Inside – No Outside – No	No
ECV	NBC (Good for all environmental conditions.)	Full capability	Full capability	Inside – No Outside – No	No
10 kW TQG	Non-NBC (Good for 50°F to 110°F.)	Low capability (2.5 kW)	Partial capability	Inside – Yes Outside – Yes	Yes
10 kW TQG	NBC (Good for comfortable environmental conditions only.)	None	None	Inside – Yes Outside – Yes	Yes

Table 1-1. CBPS System Capabilities - Continued

Power Source	Mode	Heat	Air Conditioning	Reduce Noise	Conserve Fuel
30 kW TQG	Non-NBC (Good for 20°F to 110°F.)	Partial capability (19.5 kW)	Partial capability	Inside – Yes Outside – Yes	Yes
30 kW TQG	NBC (Good for comfortable environmental conditions only.)	None	None	Inside –Yes Outside – Yes	Yes

Section V. REMOTE RADIO OPERATION

1.16 BACKGROUND.

The CBPS mission requires operators to be able to monitor and operate the AN/VRC-89A Single Channel Ground and Airborne Radio Set (SINCGARS) radios during all modes of operation. During mobile mode in both NBC and non-NBC environments, radio functions are controlled by the driver and/or passenger. However, when CBPS is deployed (static mode), the driver and passenger are required to be at the back end of the CBPS to perform airlock functions. This puts them out of hearing range of the radios. To allow radio functions to continue when CBPS is operating in static mode, communications devices have been installed in the CBPS that allow both incoming and outgoing radio traffic to continue.

1.17 DESCRIPTION.

The CBPS Remote Radio Assembly (RRA) consists of two LS-671 loudspeakers (1, figure 1-8), one Handheld Remote Control Radio Device (HRCRD) (2) and one H-250 handset (3). These items are attached to a mounting plate (4) that can be relocated within the CBPS during mobile and static operating modes.

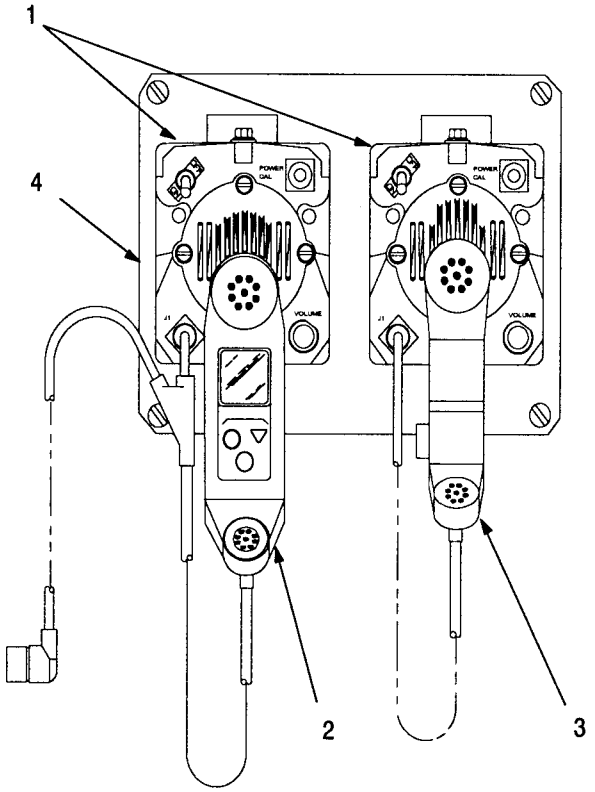


Figure 1-8. RRA

1.18 THEORY OF OPERATION.

The CBPS is supplied with communications equipment that allows the crew to maintain radio communications during operation. The radios, supplied by the gaining unit as part of its Basis of Issue, functions similar to any vehicle-mounted radios during mobile operations. The driver and/or passenger have the ability to fully control the radios. They also have the ability to activate/deactivate the RRA stored inside the LMS. The RRA allows most of the radio functions to be transferred inside CBPS during static operations which leaves driver and passenger free to perform CBPS mission-essential tasks.

a. Mobile Mode. During mobile mode, radios are operated as any vehicle-mounted radio by driver and passenger according to TM 11-5820-890-10-1.

b. Transition from Mobile Mode to Static Mode. When CBPS is parked and crew prepares to deploy CBPS, driver and/or passenger switch control of radios to LMS crew. This relieves driver and/or passenger from responsibility of monitoring radio traffic and frees them to perform other tasks.

c. Static Mode. During static operations, LMS crew is responsible for monitoring and controlling radio traffic. The RRA allows LMS crew to hear both long-range and short-range radio transmissions via two loudspeakers. The LMS crew can fully control (transmit, receive, channel select, frequency hop) long-range radio using HRCRD. The short-range radio is limited to transmit and receive functions during static mode operations.

1.19 DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.

The following identifies and describes controls and indicators the operator will use to support radio functions. Refer to Appendix A for associated manuals.

a. LS-671 Loudspeakers (figure 1-9).

(1) Power Switch (1). Turns loudspeaker on and off. Activates power indicator lamp (2) when set to ON position.

(2) Handset Connector J2 (3). Connects handset or HRCRD.

(3) POWER CAL Indicator Lamp (2). Lights when power switch (1) is set to ON position.

(4) VOLUME Control Knob (4). Adjusts volume level of loudspeaker or handset (if connected). To adjust volume level of handset, turn knob clockwise to increase volume or counterclockwise to decrease volume. To adjust volume level of loudspeaker, pull and turn knob clockwise to increase volume or counterclockwise to decrease volume.

(5) Connector J1 (5). Connects to radio mounting base with cable marked SPEAKER supplied with system.

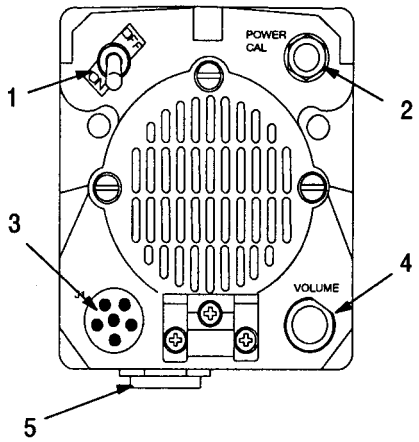


Figure 1-9. LS-671 Loudspeaker Controls

b. HRCRD (figure 1-10).

(1) Transmit Key (1). Allows operator to transmit when key depressed.

(2) Light Button (2). Turns on back light with one press of round light button. Second press of button turns back light off.

(3) Volume Wheel (3). Adjusts level of audio volume by using thumb wheel on side.

(4) Select Button (4). Pressing SEL button toggles HRCRD through CHAN, COMSEC, RF PWR, and MODE functions of HRCRD and radios. Each press of button advances one function.

(5) Down Arrow Button (5). Pressing down arrow button toggles HRCRD and radios to specific item in each category.

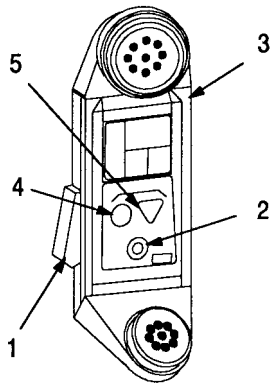


Figure 1-10. HRCRD Controls

c. H-250 Handset (figure 1-11).

Transmit Key (1). Allows operator to transmit when key depressed.

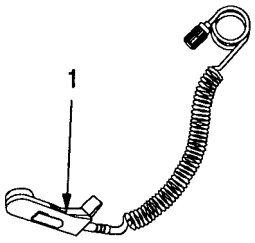


Figure 1-11. H-250 Handset Controls

1.20 OPERATION.

The following details operation of the RRA in both CBPS operational modes (mobile and static). There is no difference in operation of the RRA for NBC mode.

a. Mobile Mode. In mobile mode, driver and/or passenger are responsible for monitoring and controlling radios.

(1) RRA Setup in Mobile Mode.

(a) The RRA (1, figure 1-12) is positioned on side of rear control panel (2) for mobile mode operations. The RRA is fastened to side panel of rear control panel using four permanently attached knurled-head screws (3).

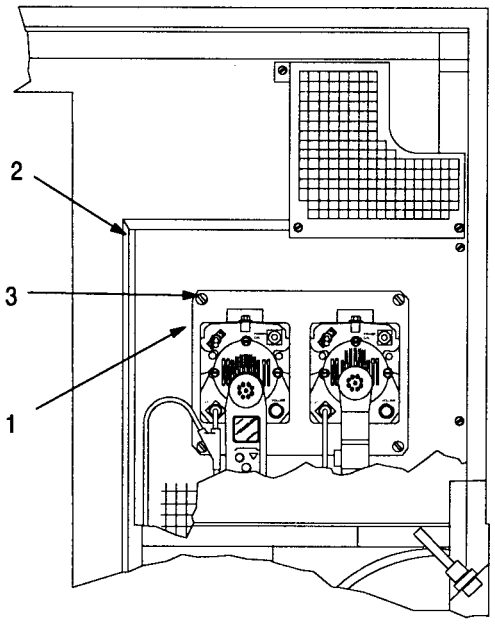


Figure 1-12. RRA Mounted on Rear Control Panel

(b) The two cables marked SPEAKER are connected to loudspeakers.

(c) The HRCRD audio cable (1, figure 1-13) is connected to handset connector J2 on loudspeaker (3, figure 1-9). The HRCRD signal cable (2, figure 1-13) is connected to cable marked HRCRD.

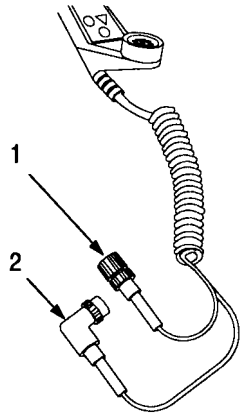


Figure 1-13. HRCRD Cable Connections

(2) Radio Operation in Mobile Mode.

(a) The RT FCTN must be set to SQ ON or SQ OFF position for radios in mobile mode. This allows driver and/or passenger to control radios while vehicle is mobile.

NOTE

Control of radio can be given to LMS crew by switching RT FCTN switch to REM position at any time.

(b) The radio can now be operated as normal. Refer to TM 11-5820-890-10-1 for operating procedures.

b. Static Mode. In static mode, LMS crew is responsible for monitoring and controlling radios.

(1) RRA Setup in Static Mode.

(a) The two cables marked SPEAKER and cable marked HRCRD are disconnected from RRA.

1.20 OPERATION - Continued.

(b) The RRA is removed from side of rear control panel by unscrewing four knurled-head screws and repositioned on rear wall of LMS as shown in figure 1-14.

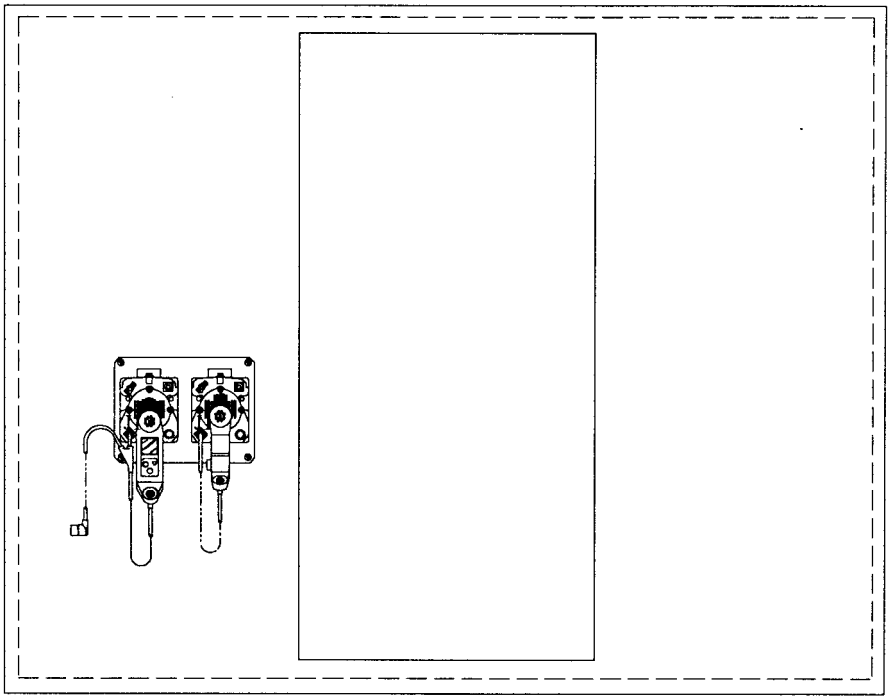


Figure 1-14. RRA Mounted on LMS Rear Wall Exterior

(c) The two cables marked SPEAKER and cable marked HRCRD (1, figure 1-15) are routed through hole in shelter rear wall (2) and reconnected to RRA. If disconnected, HRCRD audio cable (1, figure 1-13) is connected to handset connector J2 on loudspeaker.

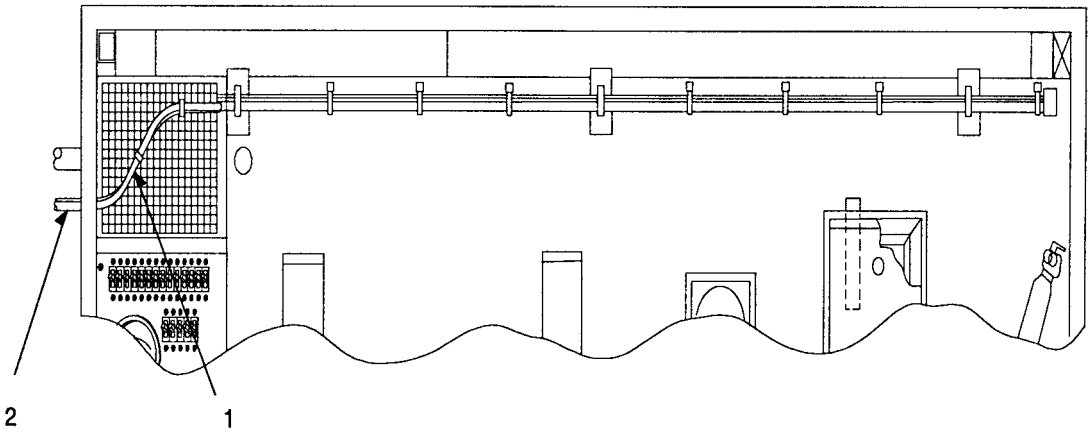


Figure 1-15. RRA Cable Routing

(2) Radio Operation in Static Mode.

(a) RT FCTN switch must be set to REM position to transfer radio functions to RRA. This allows LMS crew to control radio while vehicle is mobile.

NOTE

Control of radio can be resumed at any time by the driver and/or passenger by setting the RT FCTN switch back to SQ ON or SQ OFF position.

(b) Both loudspeakers must be activated by setting the power switch (1, figure 1-9) to ON position. The volume of each speaker can be adjusted using VOLUME control knob (4, figure 1-9) on each speaker.

(c) The radio can now be operated as normal. Refer to TM 11-5820-890-10-6 for operating procedures.

c. Preparation for Movement. The RRA must be repositioned inside LMS shelter and radio must be set up for mobile operations prior to movement. Refer to step a. for mobile mode operation.

CHAPTER 2
OPERATING INSTRUCTIONS

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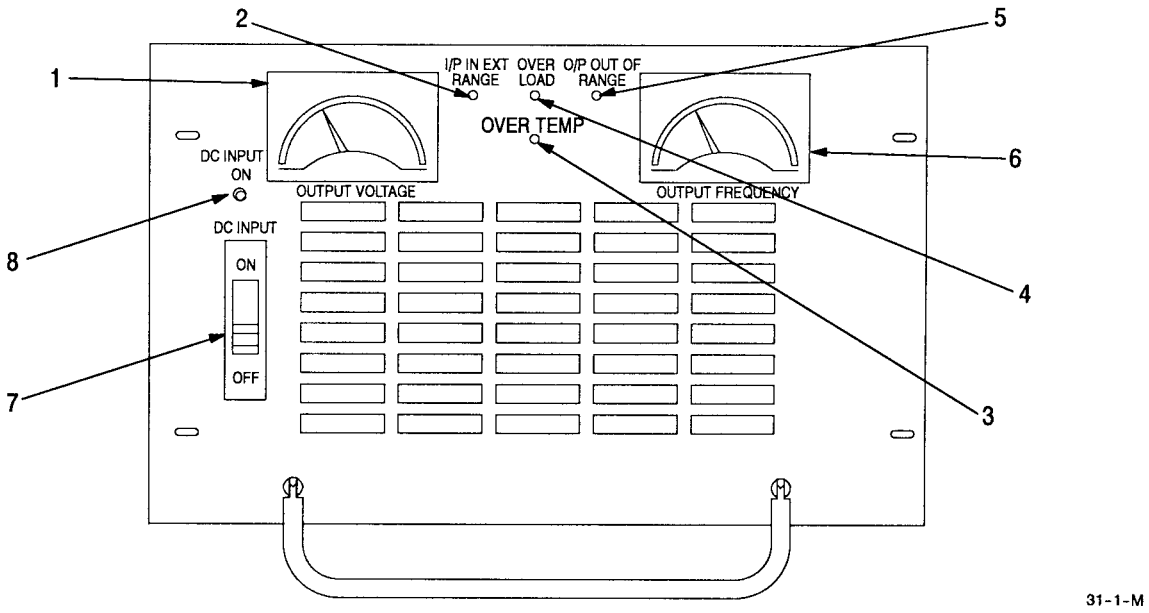
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Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2.1 GENERAL.

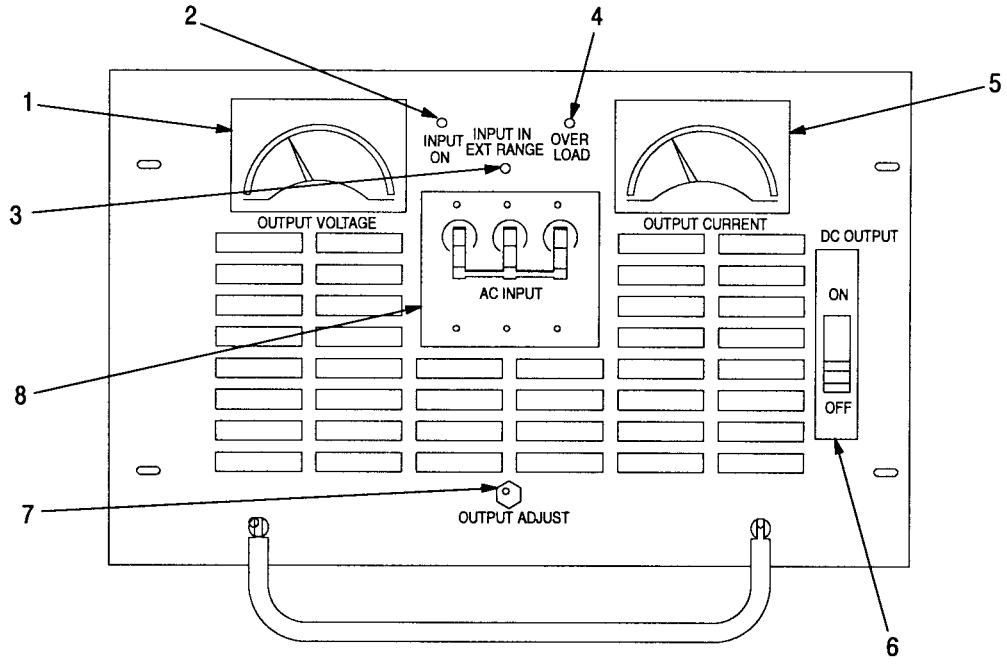
This section identifies and describes controls and indicators which operator will use to support Chemical Biological Protective Shelter (CBPS) System. Refer to referenced manuals in Appendix A for auxiliary components (e.g., 10 kW Tactical Quiet Generator [TQG] and Expanded Capacity Vehicle [ECV]).

2.2 INVERTER 1A4A13.



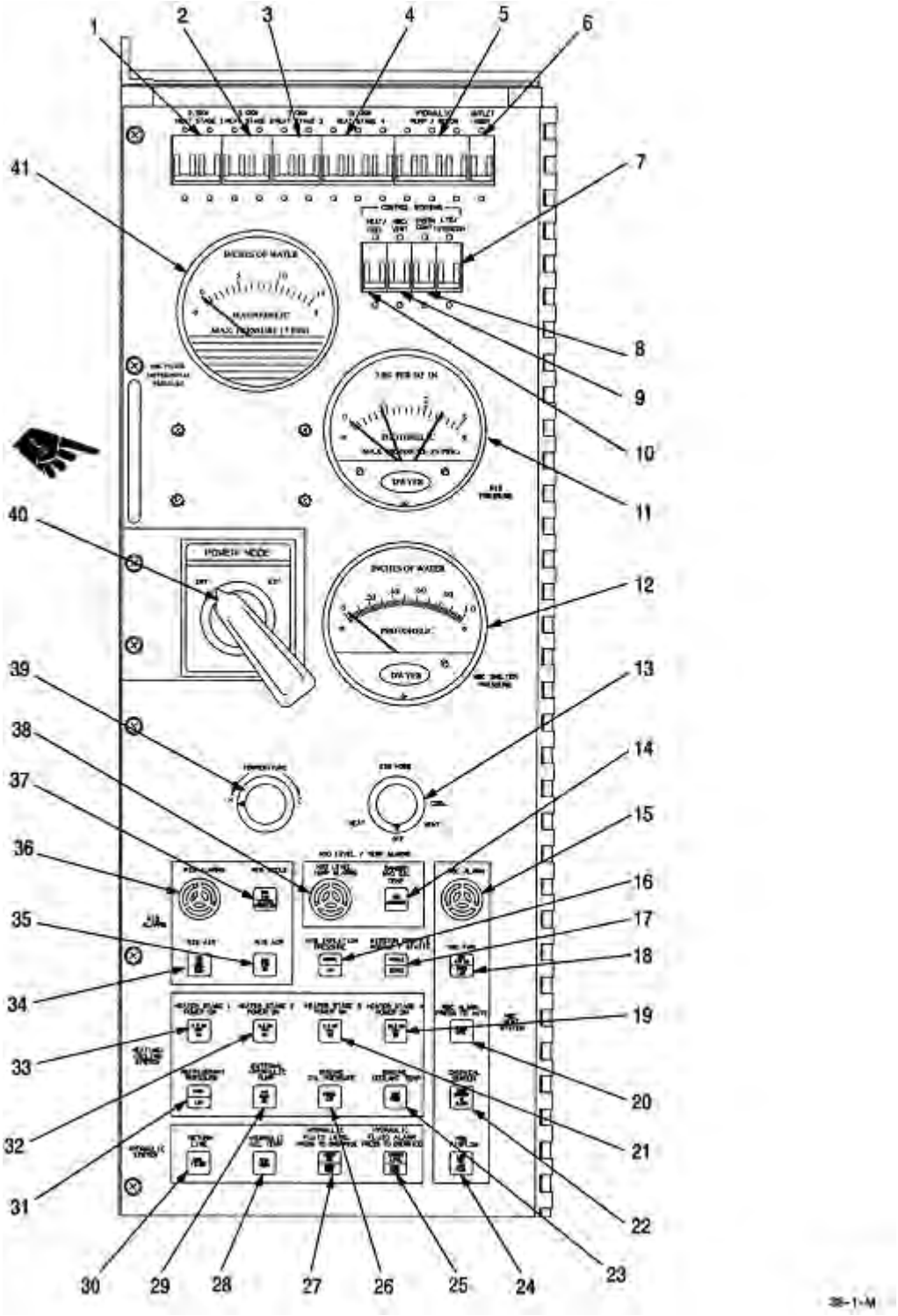
1. OUTPUT VOLTAGE Meter
   Monitors inverter AC output voltage (0 to 150 Vac).
2. I/P IN EXT RANGE Indicator
   Lights when inverter is operating in extended input range (18 to 22 Vdc and 29 to 32 Vdc) at reduced capacity and at higher distortion levels. Inverter shuts down if it falls outside extended range.
3. OVER TEMP Indicator
   Lights when inverter is in an over temperature condition (thermal shutdown).
4. OVER LOAD Indicator
   Lights when power supplied is greater than 13.3 amps.
5. O/P OUT OF RANGE Indicator
   Lights when inverter output is greater than 122.4 Vac or less than 117.6 Vac. Normal output is 13.3 amps at 120 Vac.
6. OUTPUT FREQUENCY Meter
   Monitors inverter output frequency in Hertz (55 to 65 Hz).
7. DC INPUT (Circuit Breaker/Switch)
   Provides input current protection and switches power ON or OFF.
8. DC INPUT ON Indicator
   Lights when DC input switch is in ON position.

2.3 CONVERTER 1A4A12.



1. OUTPUT VOLTAGE Meter
   Monitors converter DC output voltage (0 to 50 Vdc).
2. INPUT ON Indicator
   Lights when input power is applied to converter.
3. INPUT EXT RANGE Indicator
   Lights when converter is operating in extended input range (188 Vac to 225 Vac) at reduced capacity. Converter shuts down if it falls outside the extended range.
4. OVER LOAD Indicator
   Lights when output current is greater than 76 amps.
5. OUTPUT CURRENT
   Monitors the converter DC amps output (0 to 100 amps).
6. DC OUTPUT (Switch)
   Provides output current protection and switches power ON or OFF.
7. OUTPUT ADJUST Range Screwdriver Adjustment
   Adjusts float output to 24 Vdc.
8. AC INPUT (Circuit Breaker)
   Provides output current protection.

2.4 REAR CONTROL PANEL 1A4A4.



2.4 REAR CONTROL PANEL 1A4A4 - Continued.

1. 2.5 kW HEAT STAGE 1 Circuit Breaker 1A4A4CB5
   Provides circuit protection for stage 1 electric heater. This circuit is active only when an external power source is utilized.
2. 3.0 kW HEAT STAGE 2 Circuit Breaker 1A4A4CB6
   Provides circuit protection for stage 2 electric heater. This circuit is active only when an external power source is utilized. The 10 kW Tactical Quiet Generator (TQG) supplied with CBPS will only support this heat setting when used for supplemental power in internal power mode.
3. 3.0 kW HEAT STAGE 3 Circuit Breaker 1A4A4CB7
   Provides circuit protection for stage 3 electric heater. This circuit is active only when an external power source is utilized. The 10 kW TQG supplied with CBPS will only support this heat setting when used for supplemental power in internal power mode.
4. 10.0 kW HEAT STAGE 4 Circuit Breaker 1A4A4CB8
   Provides circuit protection for stage 4 electric heater. This circuit is active only when an external power source is utilized. The 10 kW TQG supplied with CBPS will not support this heat setting. A 30 kW power source must be used for supplemental power in internal power mode.
5. HYDRAULIC PUMP/MOTOR Circuit Breaker 1A4A4CB9
   Provides circuit protection for the 7.5 horsepower AC electric motor used to power hydraulic pump in wheel well. This circuit is active only when an external power source is utilized.

NOTE

All DC circuit breakers (items 6 through 10) are turned on whenever the system is in use, regardless of the operating mode selected.

6. OUTLET ASSY Circuit Breaker 1A4A4CB10
   Provides circuit protection for receptacle panel electrical outlets located at rear of Lightweight Multipurpose Shelter (LMS). The Air Beam Shelter (ABS) lights and Nuclear, Biological, and Chemical (NBC) recirculation filters are powered from these outlets. This circuit receives its power from ECV electrical system when POWER MODE switch (40) is in INT position and from 10 kW TQG when POWER MODE switch (40) is in EXT position.
7. LTG/INTERCOM Circuit Breaker 1A4A4CB4
   Provides circuit protection for electrical components associated with lighting and intercom control system. This circuit receives its power from ECV electrical system when POWER MODE switch (40) is in INT position and from 10 kW TQG when POWER MODE switch (40) is in EXT position.
8. INSTM CONT Circuit Breaker 1A4A4CB3
   Provides circuit protection for electrical components associated with engine coolant temperature and engine oil pressure warning system. This circuit receives its power from ECV electrical system when POWER MODE switch (40) is in INT position.
9. NBC/VENT Circuit Breaker 1A4A4CB2
   Provides circuit protection for electrical components associated with NBC/ventilation control system. This circuit receives its power from ECV electrical system when POWER MODE switch (40) is in INT position and from 10 kW TQG when POWER MODE switch (40) is in EXT position.
10. HEAT/COOL Circuit Breaker 1A4A4CB1
    Provides circuit protection for electrical components associated with heating and cooling control system. This circuit receives its power from ECV electrical system when POWER MODE switch (40) is in INT position and from 10 kW TQG when POWER MODE switch (40) is in EXT position.

11. RIB PRESSURE Gage/Switch 1A4A4PG2

    Indicates air pressure in air beams. During normal operation, rib pressure gage varies between adjustable set points of 1.5 and 2.9 psi. An internal switch causes control system to start rib fan when pressure drops to 1.5 psi and stops fan when pressure reaches 2.9 psi.

12. NBC SHELTER PRESSURE Gage/Switch 1A4A4PG1

    Indicates difference in air pressure between interior of CBPS and outside ambient air pressure in iwg. A pressure differential equal to or greater than 0.5 iwg prevents any airborne contaminants from entering the CBPS. An internal switch causes an alarm indicator (18) to light and an audible alarm (15) to sound if differential pressure falls below 0.5 iwg.

13. ESS MODE Selector Switch 1A4A4S17

    Selects CBPS HEAT, OFF, VENT or COOL positions. Must be on for Environmental Control Unit (ECU) operation. Hydraulic system will not engage and air beams will not inflate with Environmental Support System (ESS) MODE selector switch in OFF position.

14. DANGER HYD OIL TEMP Indicator 1A4A4DS32

    HYD OVERHEAT lights (red) when hydraulic fluid temperature reaches 230°F. An internal switch causes an unmutable audible alarm (38) to sound.

15. NBC ALARM 1A4A4LS1

    Mutable audible alarm whenever the differential air pressure is below minimum set point (normally 0.5 iwg) and ALARM MUTE switch (20) is disengaged.

16. RIB INFLATION PRESSURE Indicator 1A4A4DS16/DS17

    When rib fan is turned on, the LOW pressure indicator lights (red) and remains lit until pressure passes beyond low pressure set point (1.5 psi for normal conditions). At that point, NORMAL indicator lights (white), LOW indicator goes out, and air beam inflation system continues to pressurize air beams until the high set point is reached (2.9 psi). The cycle will repeat when air beam pressure drops below low pressure set point (1.5 psi normal).

17. MISSION PROFILE MOBILE/STATIC Switch/Indicator 1A4A4S8/DS11/DS12

    Selects CBPS for MOBILE or STATIC mission mode. Indicator lights (white) when either MOBILE or STATIC mode is selected during operation.

18. NBC FAN Switch/Indicator 1A4A4S15/16/DS28/29

    Manually increases speed of NBC fan for positive over pressurization within ABS. A NBC FAN ON indicator lights (green) when fan is on. Whenever differential pressure falls below 0.5 iwg, PRES LOW indicator lights (red) and alarm (15) sounds. When a chemical threat is sensed by remote M43A1 chemical sensor, the NBC fan switch automatically turns on.

19. HEATER STAGE 4 Power On Switch/Indicator 1A4A4S5/DS4

    Selects heat stage 4 when ESS MODE selector switch is in HEAT position. 10.0 kW HTR ON indicator lights (green) when switch is pressed. 10 kW TQG supplied with CBPS will not support this heat setting. Use of this heat stage is only supported utilizing a 30 kW generator or greater capacity power source.

20. NBC ALARM (PRESS TO MUTE) Switch/Indicator 1A4A4S10/DS9

    Silences audible alarm (15). ALARM MUTE indicator lights (blue) when audio alarm has been disabled.

2.4 REAR CONTROL PANEL 1A4A4 - Continued.

21. HEATER STAGE 3 Power On Switch/Indicator 1A4A4S4/DS3
    Selects heat stage 3 when ESS MODE selector switch is in HEAT position. 3.0 kW HTR ON indicator lights (green) when switch is pressed. 10 kW TQG supplied with CBPS will not support this heat setting in external power mode. Use of this heat stage is only supported utilizing a 30 kW generator in external power mode or supplemental power source (such as 10 kW TQG) in internal power mode.
22. CHEMICAL SENSOR Switch/Indicator 1A4A4S7/DS8
    CHEM SENSOR IN ALARM indicator lights (red) to show that a chemical threat has been detected by remote M43A1 chemical detector. This will also trigger NBC system to operate and NBC alarm (15) to sound.
23. ENGINE COOLANT TEMP Indicator 1A4A4DS22
    TEMP HIGH indicator lights (red) when temperature of ECV engine coolant is too high (greater than 230°F on ECV coolant gage).
24. NBC AIRFLOW Indicator 1A4A4DS24
    LOW NBC AIR FLOW indicator lights (yellow) when CBPS air pressure falls below 0.3 iwg or air flow falls below 270 cfm of air. Indicator also lights (yellow) when NBC fan switch is turned on. Light goes off when NBC SHELTER PRESSURE gage indicates 0.3 iwg.

WARNING

Running CBPS under low hydraulic fluid condition can damage hydraulic components. CBPS should only be run under low hydraulic fluid conditions in life threatening conditions.

25. HYDRAULIC FLUID ALARM (PRESS TO OVERRIDE) Switch/Indicator 1A4A4S11/DS25/DS26
    DANGER LEVEL indicator lights (red) and audible alarm (38) sounds when hydraulic fluid reservoir is too low for safe operation. OVERRIDE indicator lights (blue), disables the audible alarm (38) and allows CBPS to operate under low hydraulic fluid conditions.
26. ENGINE OIL PRESSURE Indicator 1A4A4DS23
    PRESS LOW indicator lights (red) when ECV engine oil pressure is too low (less than 6 psi on ECV oil gage).

WARNING

Running CBPS under severe hydraulic fluid leakage will cause hydraulic components to operate improperly. CBPS should only be run under severe hydraulic fluid leakage in life threatening conditions.

27. HYDRAULIC FLUID LEVEL (PRESS TO OVERRIDE) Switch/Indicator 1A4A4S12/DS18/DS19
    CHECK OIL indicator lights (yellow) when hydraulic fluid level in reservoir is low or a severe hydraulic fluid leak has occurred. OVERRIDE indicator lights (blue) when pushed and CHECK OIL indicator is disabled. Also, allows CBPS to operate under low hydraulic fluid conditions.
28. HYDRAULIC OIL TEMP Indicator 1A4A4DS10
    TEMP HIGH indicator lights (red) when temperature of fluid in hydraulic system reaches 212°F. This shuts down HEAT or COOL and allows fluid to self cool.

29. EXTERNAL HYDRAULIC PUMP Switch/Indicator 1A4A4S6/S14/DS7

    Starts AC electric motor in wheel well which drives hydraulic pump. HYD PUMP ON indicator lights (blue) when AC motor is turned on. POWER MODE switch (40) must be in EXT position to enable this system.

30. RETURN LINE Indicator 1A4A4DS21

    Hydraulic filter replacement REPL FILTER indicator lights (red) when filter in hydraulic system supply line needs to be replaced.

    The hydraulic filter replacement REPL FILTER indicator may light during cold weather operation. Do not replace hydraulic filter element unless indicator stays on after system has warmed up for at least ten minutes.

31. REFRIGERANT PRESSURE Indicators 1A4A4DS5/DS6

    Indicator lights (red) when either the HIGH LOW R22 refrigerant pressure limit is exceeded.

32. HEATER STAGE 2 Power On Switch/Indicator 1A4A4S3/DS2

    Selects heat stage 2 when ESS MODE selector switch is in HEAT position. 3.0 kW HTR ON indicator lights (green) when switch is pressed. The 10 kW TQG supplied with the CBPS will not support this heat setting in external power mode. The 10 kW TQG and ECV used together will support this heat stage.

33. HEATER STAGE 1 Power On Switch/Indicator 1A4A4S2/DS1

    Selects heat stage 1 when ESS MODE selector switch is in the HEAT position. 2.5 kW HTR ON indicator lights (green) when the switch is pressed.

34. RIB AIR Indicator 1A4A4DS30

    RIB AIR OVER TEMP lights (red) when temperature of air in ABS inflation manifold reaches 175°F. An internal switch causes an audible alarm (36) to sound.

35. RIB FAN Switch/Indicator 1A4A4S13/DS27

    Starts rib fan. The RIB FAN ON indicator lights (green) when fan is on.

36. RIB ALARMS 1A4A4LS2

    Unmutable audible alarm whenever temperature of air in ABS inflation manifold reaches 175°F or whenever rib fan has been running for ten minutes.

37. RIB CYCLE Indicator 1A4A4DS31

    RIB FAN EXTENDED OPERATION lights (red) when rib fan has been running for ten minutes. An internal switch causes an audible alarm (36) to sound.

38. HYD LEVEL/TEMP ALARM 1A4A4LS3

    Mutable audible alarm whenever the hydraulic fluid level is too low.
    Unmutable audible alarm whenever hydraulic fluid temperature reaches 230°F.

39. TEMPERATURE Control 1A4A4R1

    Sets CBPS temperature over a range of 60°F to 90°F. Used during static mode.

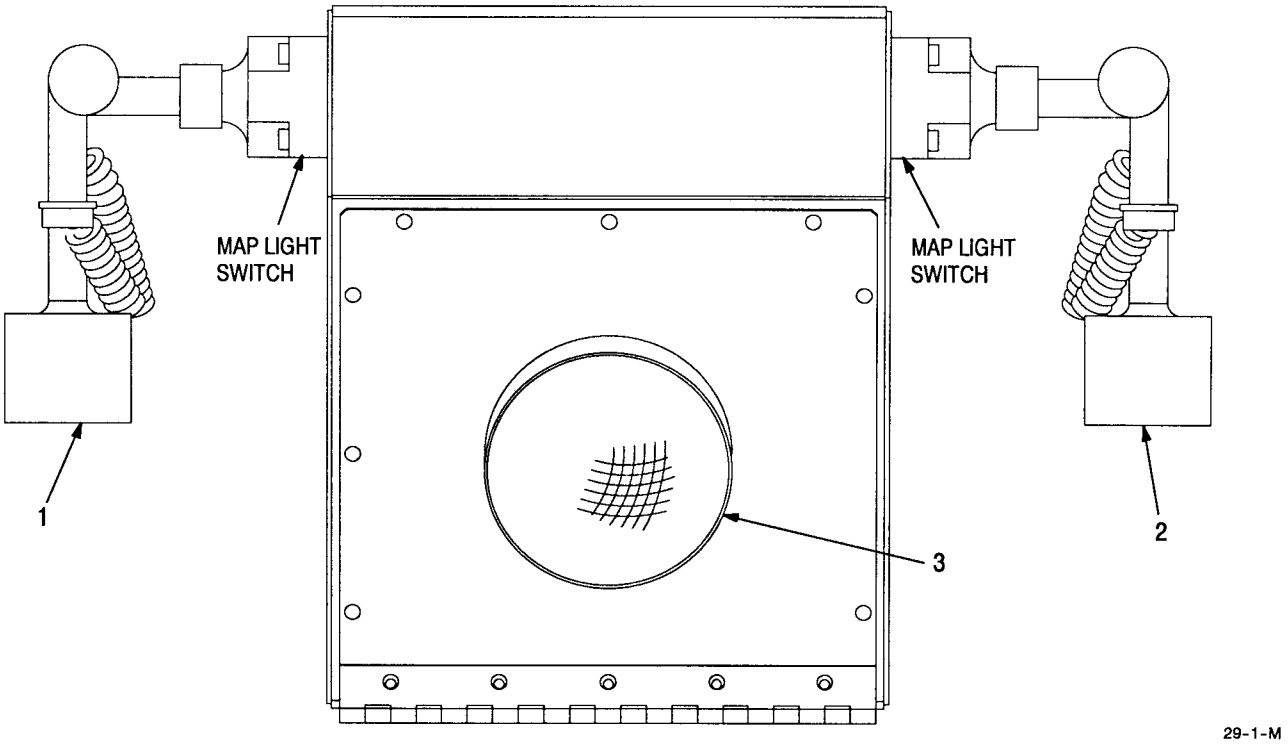
40. POWER MODE switch 1A4A4S1

    Selects CBPS power source. EXT position selects HMT mounted TQG or other external power. INT position selects ECV power.

41. NBC FILTER DIFFERENTIAL PRESSURE Gage 1A4A4PG3

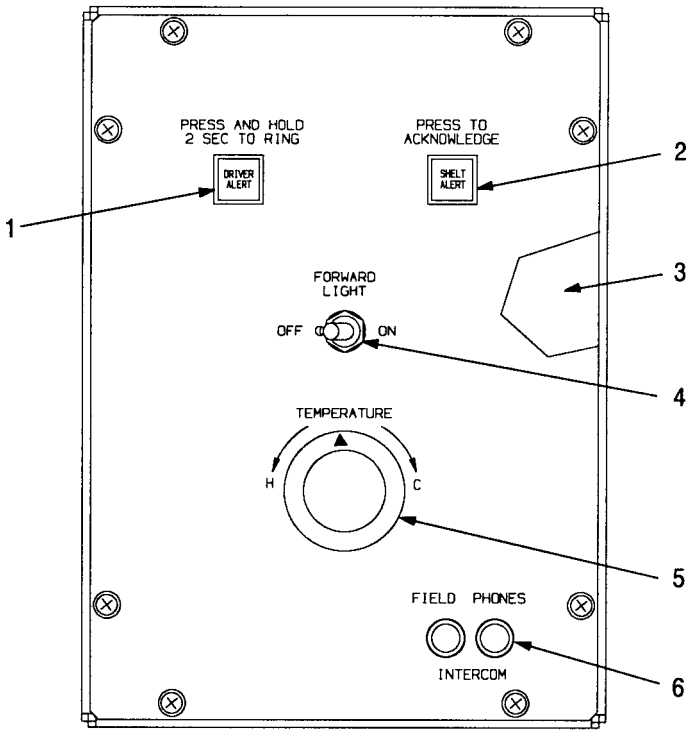
    Indicates amount of air flow passing through NBC filters located in ECU. Normal NBC pressure is 6 iwg. A reading of 9 iwg indicates NBC filters are dirty and need to be replaced. A reading of 3 to 5 iwg is normal when not in NBC mode.

2.5 FORWARD LIGHT BOX ASSEMBLY 1A4A5.



1. Map Lamp (driver side) 1A4A5DS2
   Map lamp lights (white) after pressing switch. Can be removed from holder and used as an extension lamp.
2. Map Lamp (passenger side) 1A4A5DS3
   Map lamp lights (white) after pressing switch. Can be removed from holder and used as an extension lamp.
3. Forward Light 1A4A5DS1
   Lights when FORWARD LIGHT switch on control box assembly (A18) is in ON position.

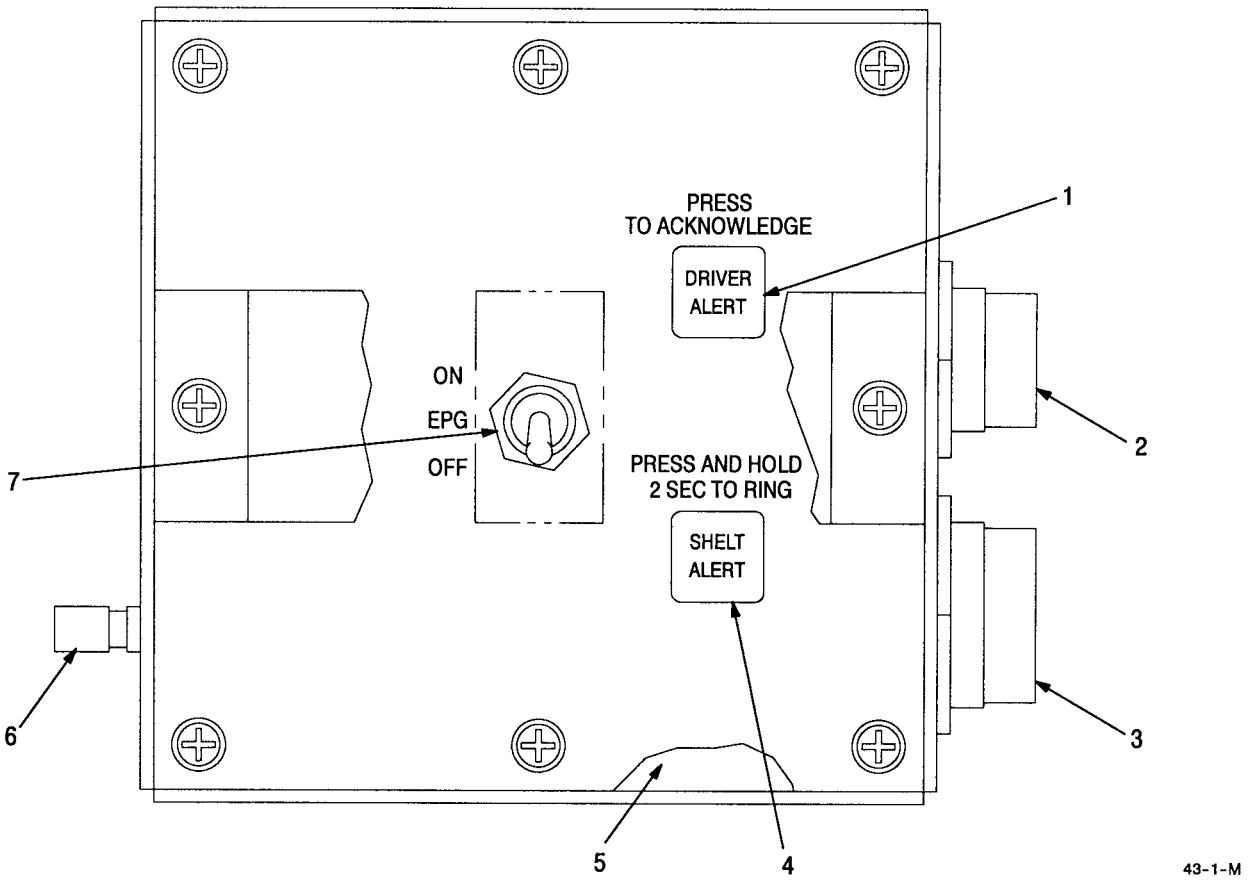
2.6 CONTROL BOX ASSEMBLY 1A4A18.



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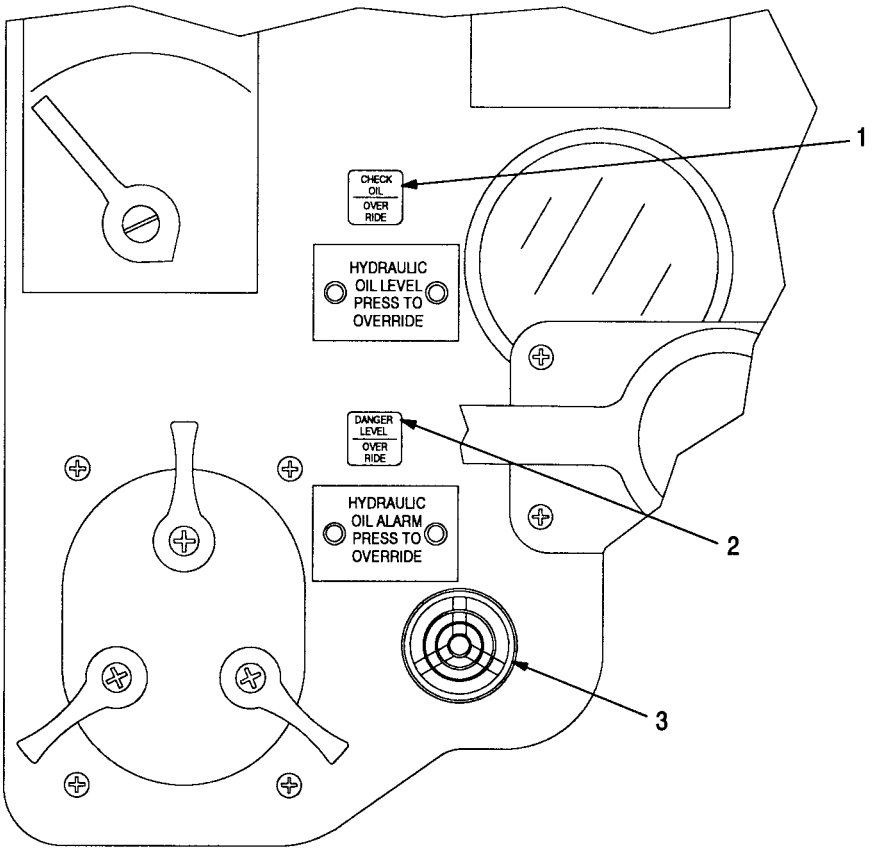
1. PRESS AND HOLD 2 SEC TO RING Switch/Indicator 1A4A18S1/DS1
   Used to alert driver to a call. Buzzer sounds and DRIVER ALERT indicator lights (white) on vehicle control box in cab and on control box assembly.
2. PRESS TO ACKNOWLEDGE Switch/Indicator 1A4A18S2/DS2
   When pressed, acknowledges call from vehicle control box by turning off SHELT ALERT indicators.
3. Audible Alarm (inside box) 1A4A18LS1
   Sounds when cab crew presses and holds SHELT ALERT switch/indicator. Audible alarm stops when switch/indicator is released.
4. FORWARD LIGHT ON/OFF Switch 1A4A18S3
   Lights forward lamp when switch is set to ON.
5. TEMPERATURE Control 1A4A18R1
   Sets LMS temperature over a range of 60°F to 90°F. Used during mobile mode.
6. FIELD PHONES INTERCOM Jacks 1A4A18E1/E2
   Provides phone connection for communicating with driver.

2.7 VEHICLE CONTROL BOX 1A4A8.



1. PRESS TO ACKNOWLEDGE Switch/Indicator 1A4A8S1/DS1
   When pressed, acknowledges call from control box assembly and turns off DRIVER ALERT indicators.
2. Connector 1A4A8J3
   Provides control and power lines for interfacing the Electronic Control Console (ECC), Electronically Programmed Governor (EPG), and ECV wiring to the vehicle control box.
3. Connector 1A4A8J1
   Provides control and power lines for interfacing the control box assembly to the vehicle control box.
4. PRESS AND HOLD 2 SEC TO RING Switch/Indicator 1A4A8S2/DS2
   Used to alert LMS crew to a call. Buzzer sounds and SHELT ALERT indicator lights (white) on vehicle control box in cab and on control box assembly.
5. Audible Alarm (inside box) 1A4A8LS1
   Sounds when LMS crew presses and holds DRIVER ALERT switch/indicator. Audible alarm stops when switch/indicator is released.
6. FIELD PHONE INTERCOM Jacks 1A4A8E1/E2
   Provides phone connection for communicating with CBPS.
7. EPG ON/OFF Switch 1A4A8S3
   Enables EPG system which controls ECV engine idle speed during static operation with internal power.

2.8 EXPANDED CAPACITY VEHICLE (ECV) CAB CONTROLS 1A4A17.



WARNING

Running CBPS under severe hydraulic fluid leakage will cause hydraulic components to operate improperly. The CBPS should only be run under severe hydraulic fluid leakage in life threatening conditions.

1. HYDRAULIC OIL LEVEL/OVERRIDE Switch/Indicator 1A4A17S1/DS1/S2

   Lights CHECK OIL indicator (yellow) when hydraulic fluid level in reservoir is low or a severe hydraulic fluid leak has occurred. OVERRIDE indicator lights (white) when pushed and CHECK OIL indicator is disabled. Allows CBPS to operate under low hydraulic fluid conditions.

WARNING

Running CBPS under low hydraulic fluid condition can damage hydraulic components. The CBPS should only be run under low hydraulic fluid conditions in life threatening conditions.

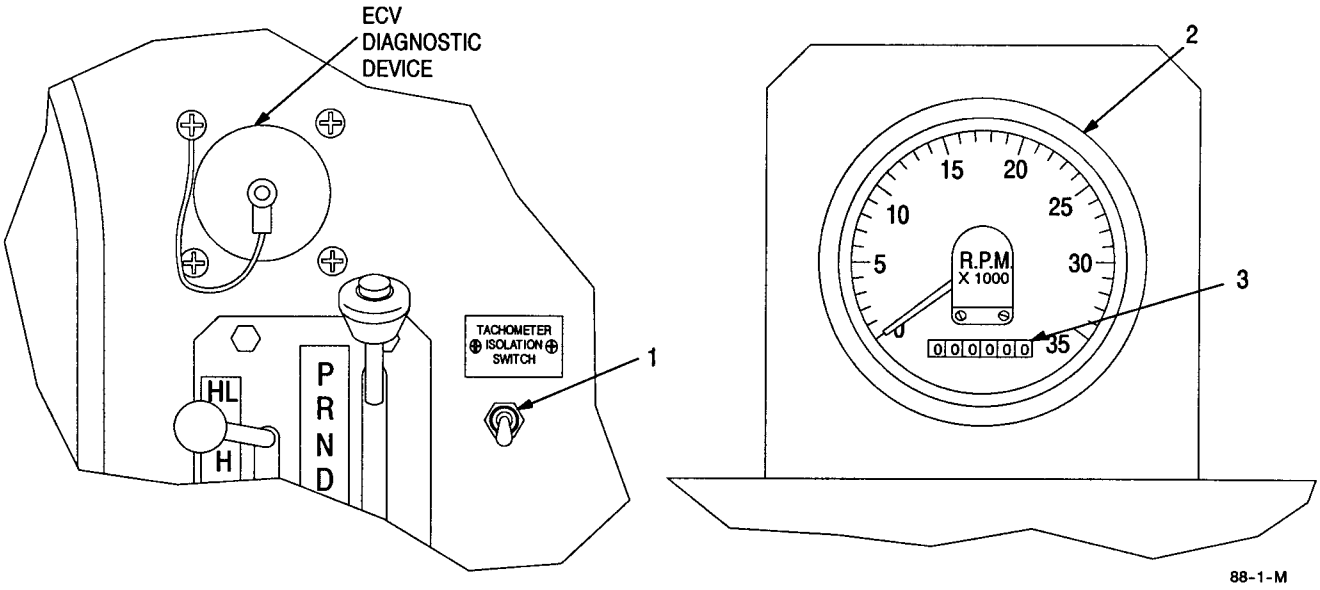
2. HYDRAULIC OIL ALARM/OVERRIDE Switch/Indicator 1A4A17S2/DS3/DS4

   DANGER LEVEL indicator lights (red), sounds alarm and shuts down CBPS when hydraulic fluid level is too low for safe operation. Press OVERRIDE to silence the alarm and allows the CBPS to operate under low hydraulic fluid conditions.

3. Audible Alarm 1A4A17LS1

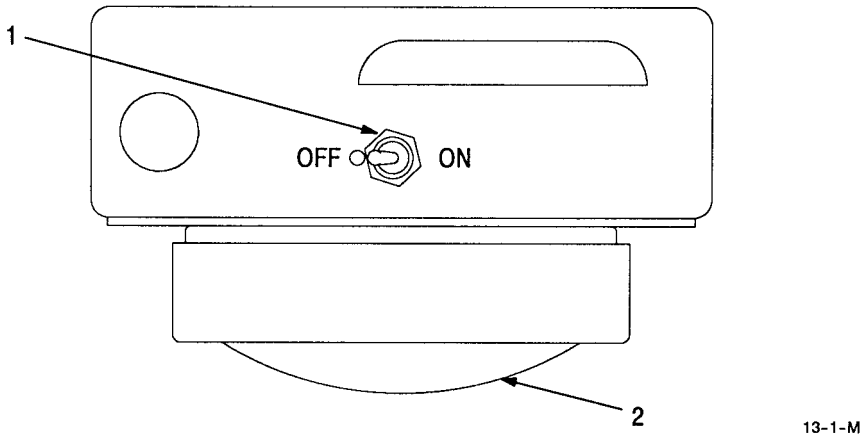
   Sounds when hydraulic fluid level is too low for safe operation. HYDRAULIC OIL ALARM indicator lights (red).

2.9 TACHOMETER.



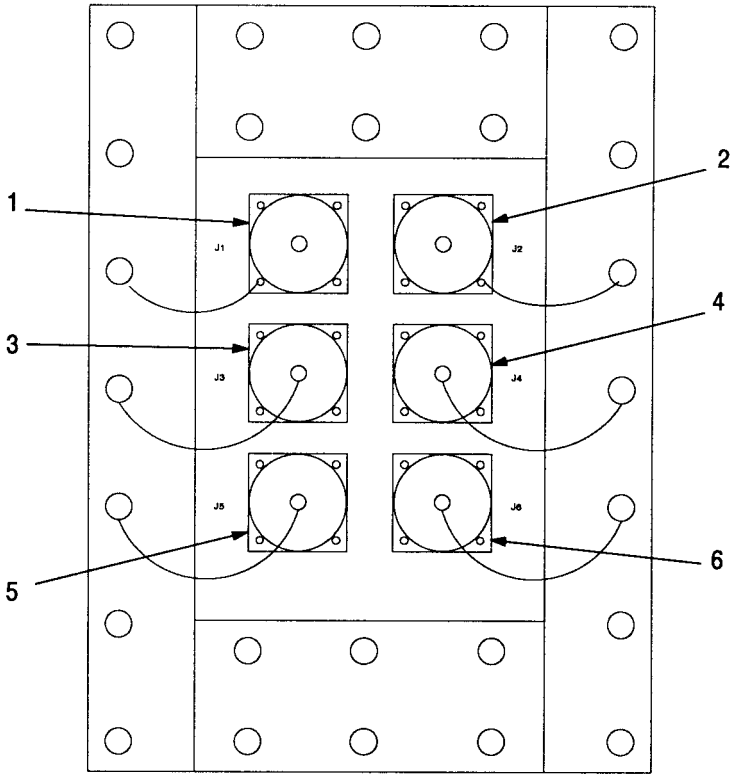
1. TACHOMETER ISOLATION Switch 1A1A17S3
   Isolates ECV tachometer. The tachometer should only be isolated when using ECV diagnostic device. ECV diagnostic device will not function properly if tachometer is not isolated.
2. Tachometer
   Monitors engine speed of ECV.
3. Hour Meter
   Displays total amount of hours ECV has run. One hour of ECV running in STATIC mode is equivalent to ECV running 30 miles in MOBILE mode. Time must be entered into log book.

2.10 REAR LIGHT BOX ASSEMBLY 1A4A7.



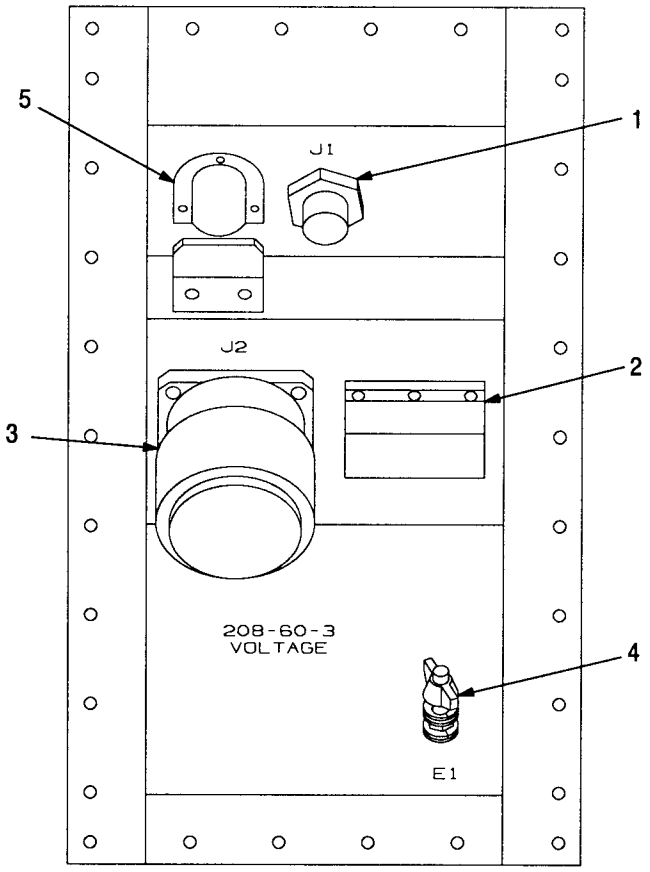
1. ON/OFF Switch 1A4A7S1
   Lights aft light when switch is set to ON.
2. Aft Light 1A4A7DS1
   Lights when ON/OFF switch is set to ON.

2.11 RECEPTACLE PANEL 1A4A10.



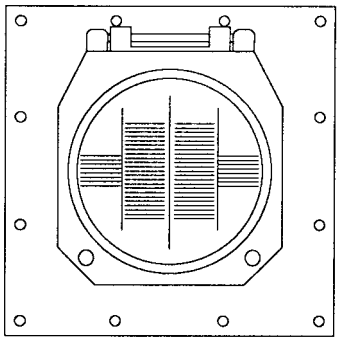
1. J1 Receptacle
   15A, 60 Hz, 120 Vac dedicated outlet used for ABS light set.
2. J2 Receptacle
   15A, 60 Hz, 120 Vac dedicated outlet used for ABS light set.
3. J3 Receptacle
   15A, 60 Hz, 120 Vac outlet used for medical equipment.
4. J4 Receptacle
   15A, 60 Hz, 120 Vac outlet used for medical equipment.
5. J5 Receptacle
   15A, 60 Hz, 120 Vac dedicated outlet used for NBC recirculation fan. Only active in NBC mode.
6. J6 Receptacle
   15A, 60 Hz, 120 Vac dedicated outlet used for NBC recirculation fan. Only active in NBC mode.

2.12 POWER PANEL 1A4A9.



1. J1 Connector
   Used for connecting remote M43A1 chemical sensor.
2. CB1 Circuit Breaker
   Provides current protection for 208 Vac, 60 Hz, 3-phase auxiliary power. Circuit breaker is 3-pole switch located behind a soft plastic protective cover.
3. J2 Connector
   Input connector for 208 Vac, 60 Hz, 3-phase auxiliary power.
4. E1 Terminal
   Ground connector for rear control panel and LMS.
5. Hose Port
   Provides outside ambient-air pressure (via hoses) to NBC shelter pressure gage and rib pressure gage on rear control panel.

2.13 PRESSURE RELIEF VALVES.

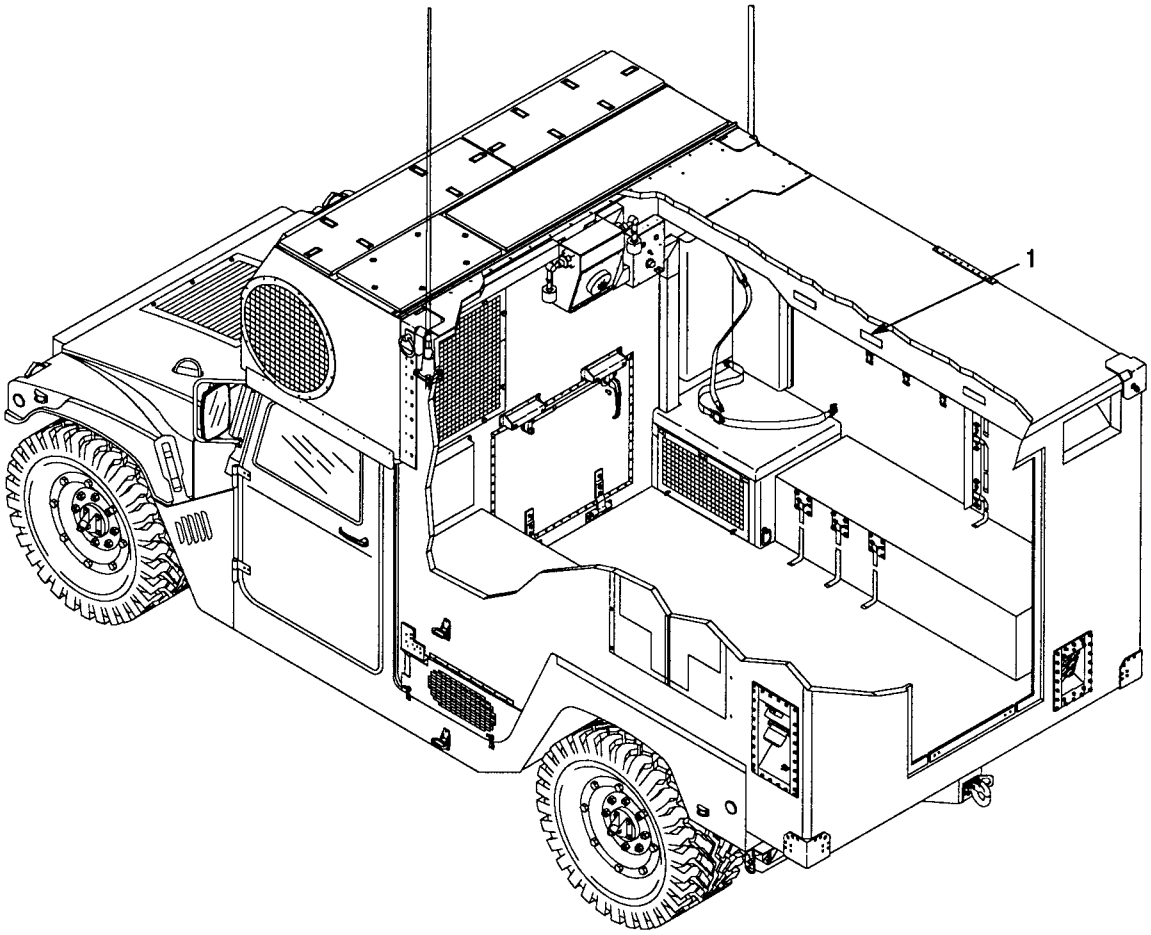


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Pressure Relief Valves

Cracks at a pressure of 1.00 iwg. Opens fully at 2.00 iwg and passes 100 cfm of air from LMS. Used to relieve pressure during air flight or NBC mode. Pressure relief valve located on each side of LMS.

2.14 AIR DUCT.

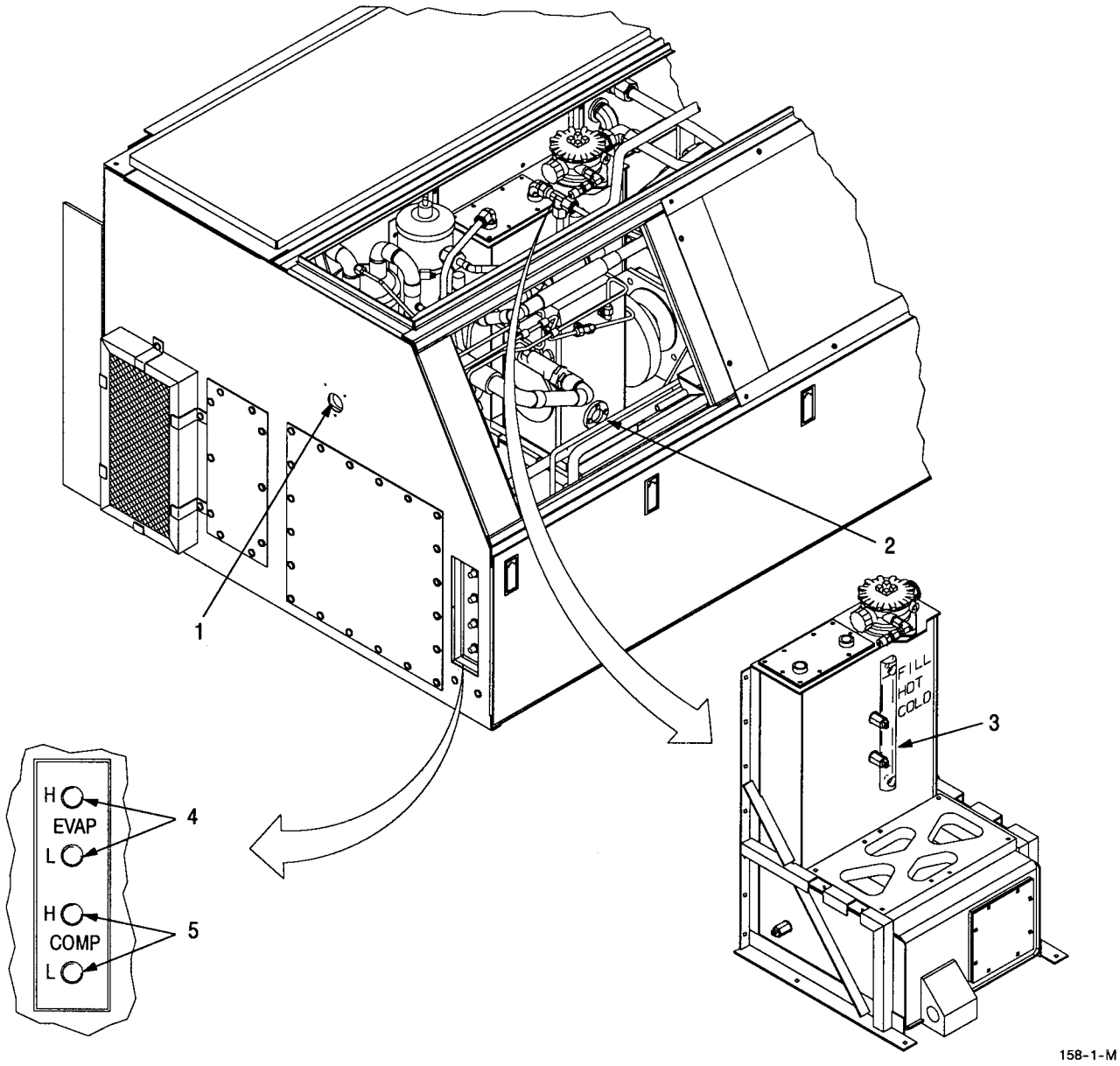


(ABS, TAILGATE AND LADDER REMOVED FOR CLARITY)

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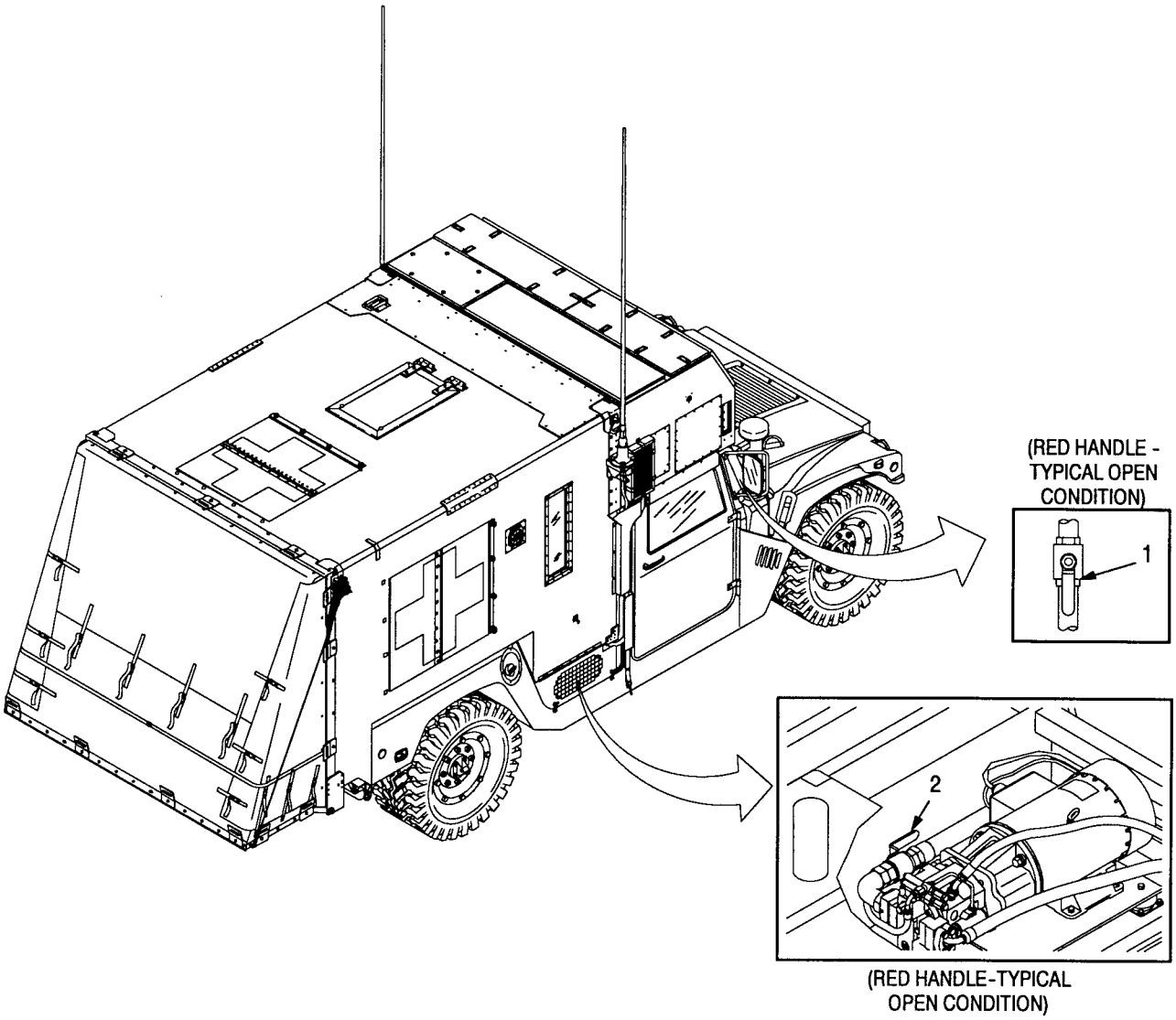
1. Air Vent
   Controls air into LMS.

2.15 ENVIRONMENTAL CONTROL UNIT (ECU) INDICATORS.



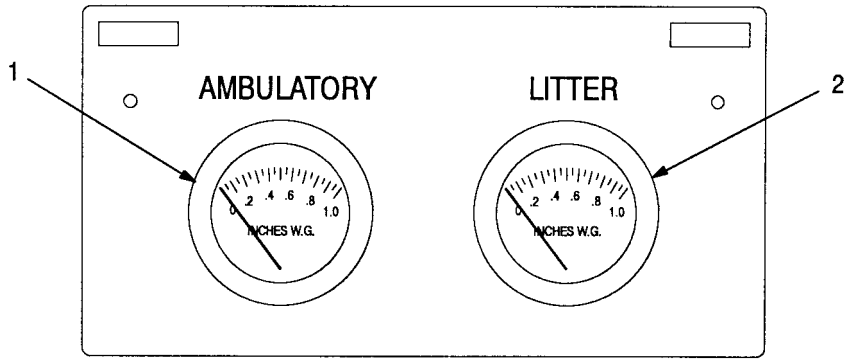
1. R22 Refrigerant Sight Glass/Drier
   Sight glass reveals shortage of R22 refrigerant. If sight glass is not clear, indicates moisture in the system.
2. Air Conditioner Compressor Sight Glass
   Used to visually inspect oil level in compressor.
3. Hydraulic Fluid Level Gage
   Used to visually inspect level of fluid in hydraulic reservoir.
4. High and Low Evaporator Service Ports
   Used to service R22 refrigerant system.
5. High and Low Compressor Service Ports
   Used to service R22 refrigerant system.

2.16 HYDRAULIC SHUT-OFF VALVES.



1. Hydraulic Pump P1 (passenger side) Shut-Off Valve (red handle)
   Shuts off hydraulic fluid from reservoir to primary hydraulic pump P1. Valve should only be shut off for maintenance purposes. CBPS not operating.
2. Auxiliary Power Pack Hydraulic Pump/Motor A2M1/P2 Shut-Off Valve
   Shuts off hydraulic fluid to secondary hydraulic pump P2 located in compartment. Valve should only be shut off for maintenance purposes. CBPS not operating.

2.17 PRESSURE GAGE ASSEMBLY.



1. AMBULATORY Gage

   Indicates difference in air pressure between ambulatory airlock and outside ambient air pressure in inches of water (iwg).

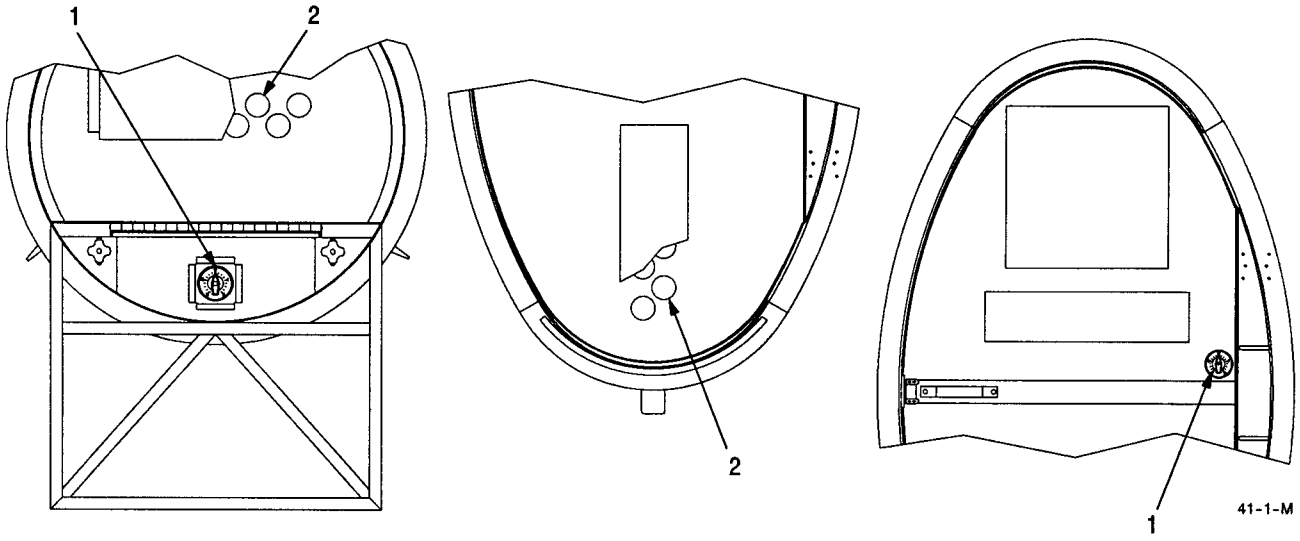
   During NBC operation, ambulatory airlock is properly adjusted (via vent holes) when AMBULATORY gage indicates 0.3 iwg.

2. LITTER Gage

   Indicates difference in air pressure between Tunnel Airlock Litter Patient (TALP) airlock and outside ambient air pressure in inches of water (iwg).

   During NBC operation, TALP airlock is properly adjusted (via vent holes) when LITTER gage indicates 0.3 iwg.

2.18 AIRLOCK TIMERS AND VENTS.



1. Airlock Timers

   Located on inner ambulatory airlock door and outer TALP airlock door. Used to set time for purging personnel and equipment of contaminants before entry into ABS during NBC conditions. Three minutes is standard time for purging.

2. Vents

   Used to properly adjust CBPS and airlock pressure during NBC operation. Set of vent holes on outer ambulatory airlock door and over inner ambulatory door on ABS (see figure 2-15, item 9). Set of vent holes on inner and outer TALP airlock doors.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2.19 INTRODUCTION.

a. The CBPS components must be inspected regularly to find and correct defects and to perform services required to keep system operational.

b. The CBPS components must be inspected in both mobile and static modes.

2.20 FLUID LEAKAGE.

Wetness around lines, seals, gaskets, fittings, or hoses indicates fluid leakage. A stain denotes leakage. If a fitting or hose is loose, try to tighten it. If broken or defective, report it to your supervisor. Use the following as a guide.

a. Class I. Leakage indicated by wetness or discoloration, not great enough to form drops.

b. Class II. Leakage great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.

c. Class III. Leakage great enough to form drops that fall from the item being checked/inspected.

CAUTION

Operation is allowed with Class I or II hydraulic leakage and/or outer rubber covering damaged or torn. Class III leaks or tears below the braided wire must be reported immediately to your supervisor or to unit maintenance. Failure to do this will result in damage to vehicle and/or components.

When unit returns from mission with Class I or II leaks, unit level maintenance personnel are responsible for tightening or replacing hoses, O-rings or adapters. Hoses with outer covering torn will be replaced.

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

a. General. Table 2-1 has been provided so you can keep your equipment in good operating condition and ready for its primary mission.

b. Warnings and Cautions. Always observe WARNINGS and CAUTIONS appearing in your Preventive Maintenance Checks and Services (PMCS) table. Warnings and cautions appear before applicable procedures. You must observe these warnings and cautions to prevent serious injury to yourself and others or prevent your equipment from being damaged.

c. Explanation of Table Entries.

(1) Item No. column. Numbers in this column are for reference. When completing DA Form 2404 (Equipment Inspection and Maintenance Worksheet), include item number for check/service indicating a fault. Item numbers also appear in order that you must do checks and services for interval listed.

(2) Interval column. This column tells you when you must do procedure in procedure column. BEFORE procedures must be done before you operate or use the equipment for its intended mission. DURING procedures must be done during the time you are operating or using equipment for its intended mission. AFTER procedures must be accomplished after striking the CBPS and after using equipment for its intended mission.

(3) Location, Item to Check/Service column. This column provides location and item to be checked or serviced. The item location is underlined.

(4) Procedure column. This column gives the procedure you must do to check or service item listed in check/service column to know if the equipment is ready or available for its intended mission or for operation. You must do the procedure at the time stated in interval column.

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

(5) Not Fully Mission Capable If: column. Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failures.

d. Other Table Entries. Be sure to observe all special information and notes that appear in your table.

WARNING

If the equipment must be kept in continuous operation, do only procedures that can be done without disturbing operation. Make complete checks and services when equipment is shut down.

e. Location Diagram. To assist you in the performance of PMCS, a PMCS location diagram (figure 2-1) depicting the order by which checks and services must be accomplished has been provided. Referenced figure items are applicable to BEFORE, DURING and AFTER intervals in table 2-1.

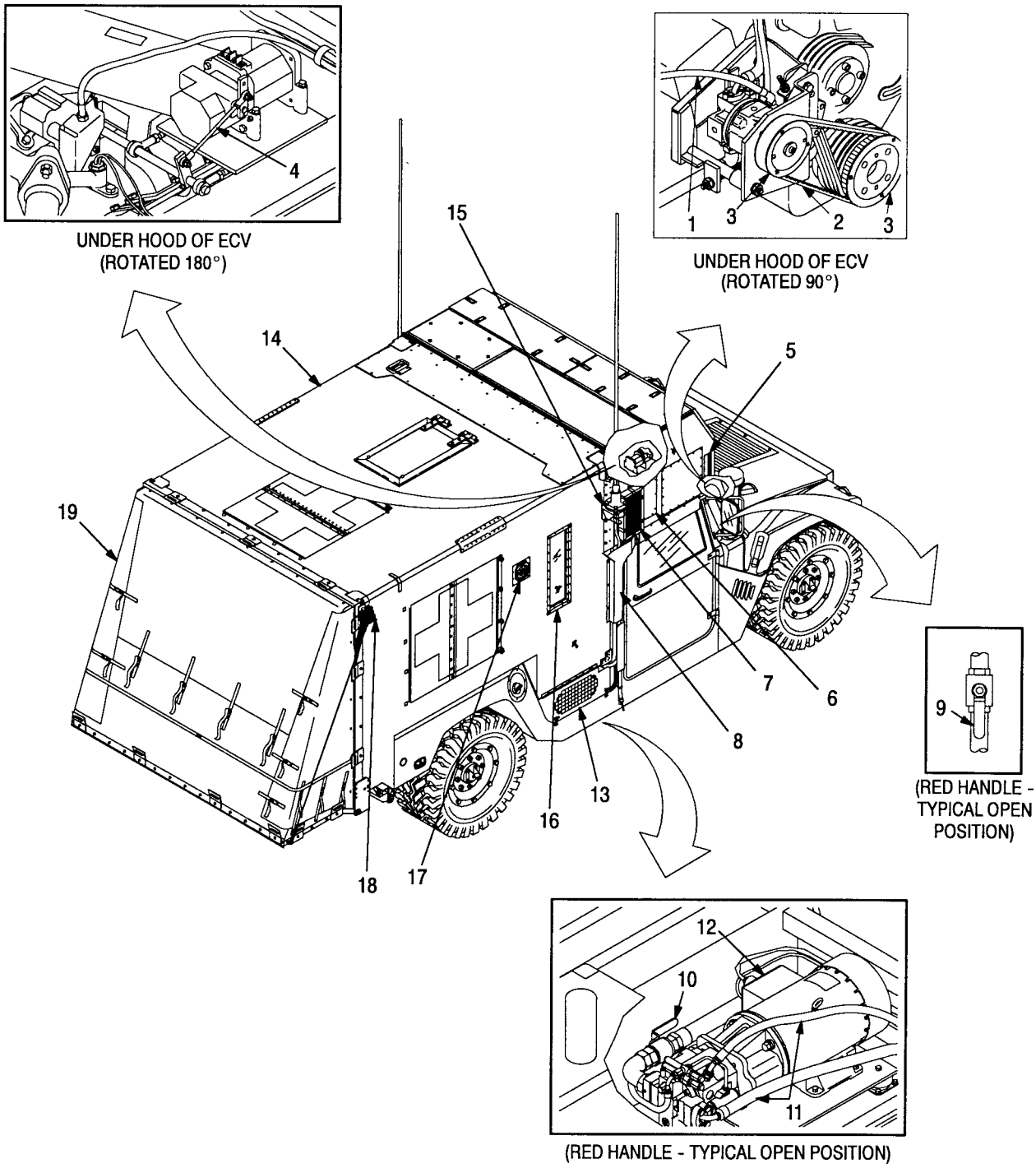


Figure 2-1. PMCS Location Diagram (Sheet 1 of 12)

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

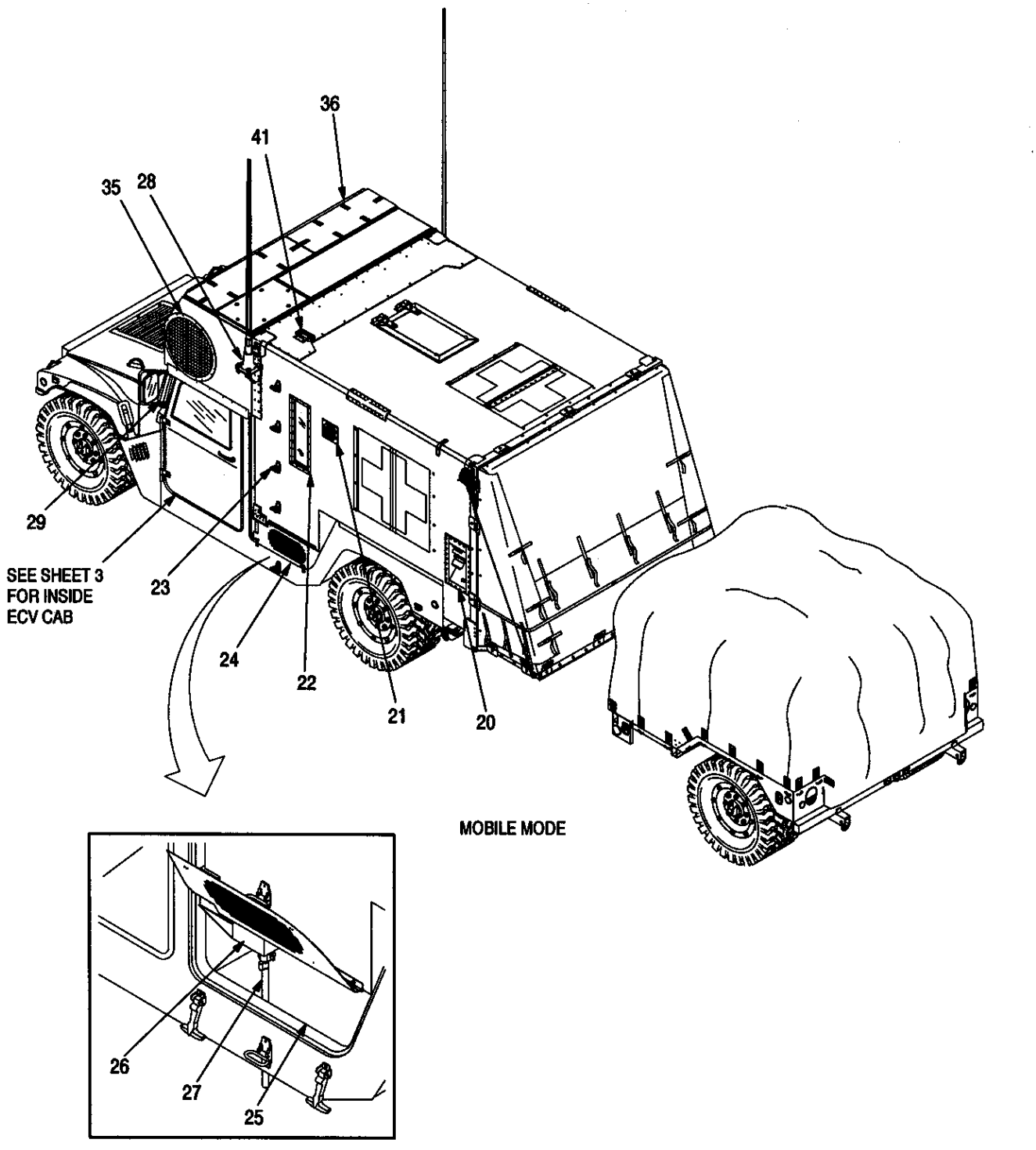


Figure 2-1. PMCS Location Diagram (Sheet 2 of 12)

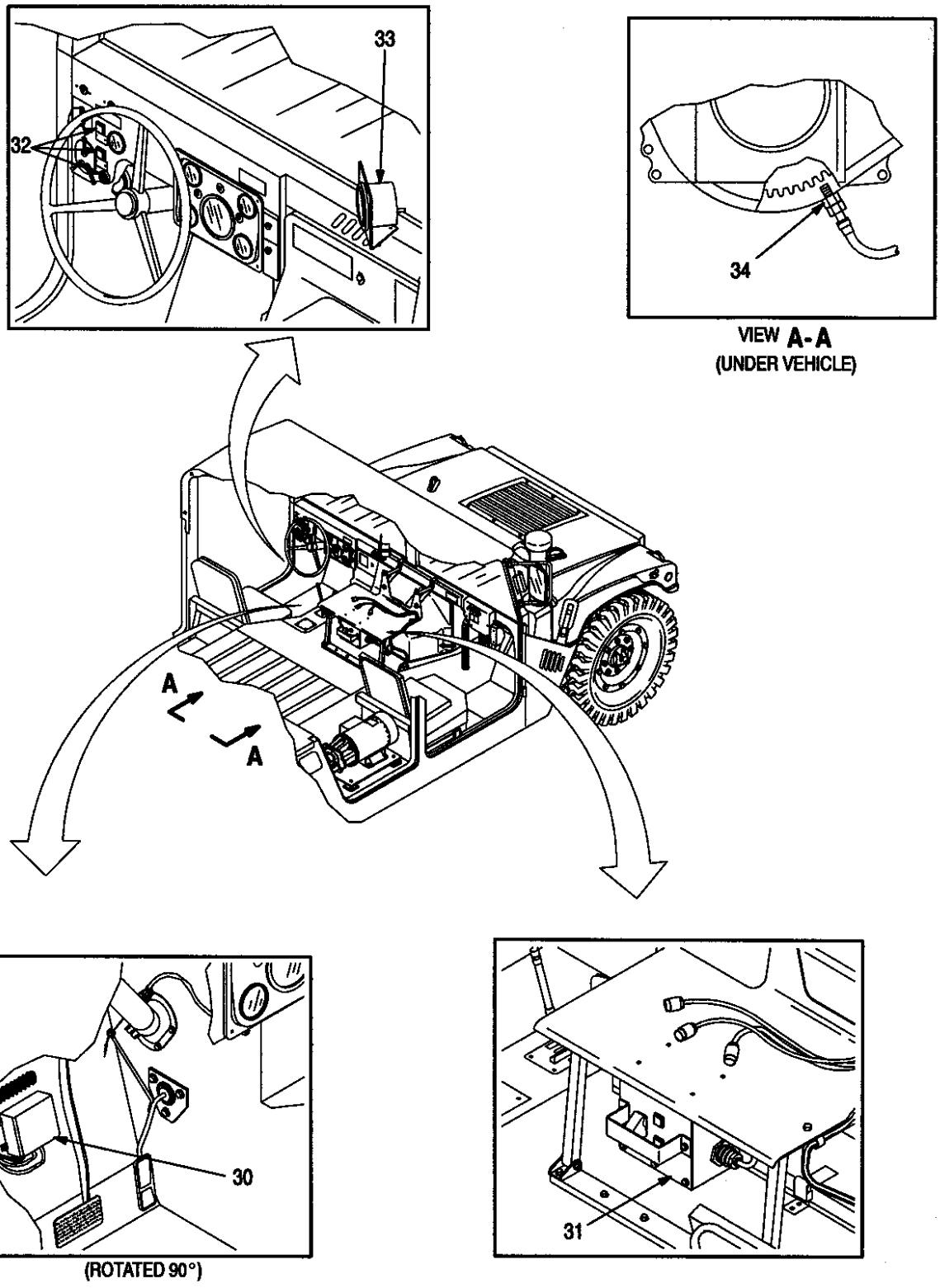


Figure 2-1. PMCS Location Diagram (Sheet 3 of 12)

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

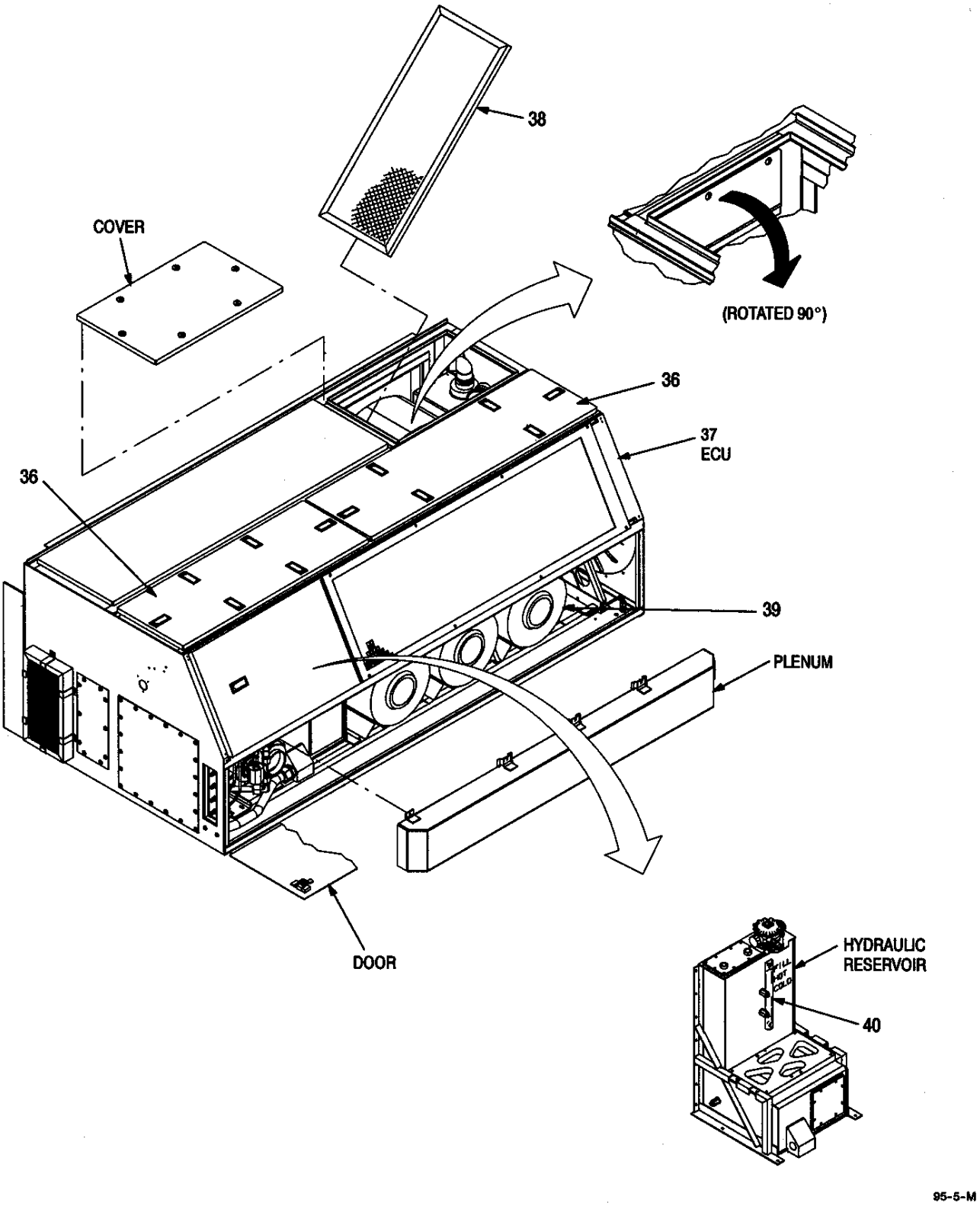


Figure 2-1. PMCS Location Diagram (Sheet 4 of 12)

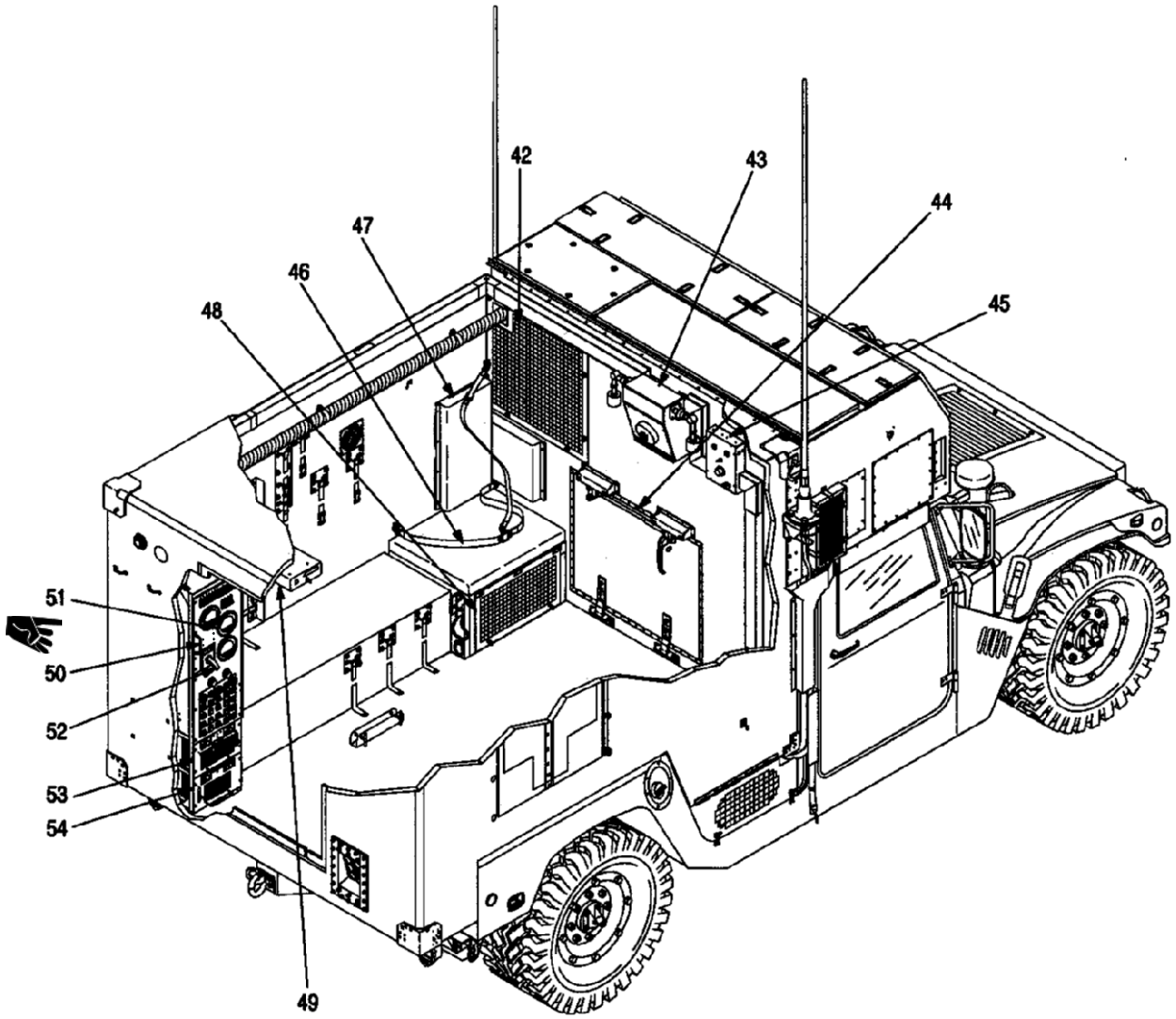


Figure 2-1. PMCS Location Diagram (Sheet 5 of 12)

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

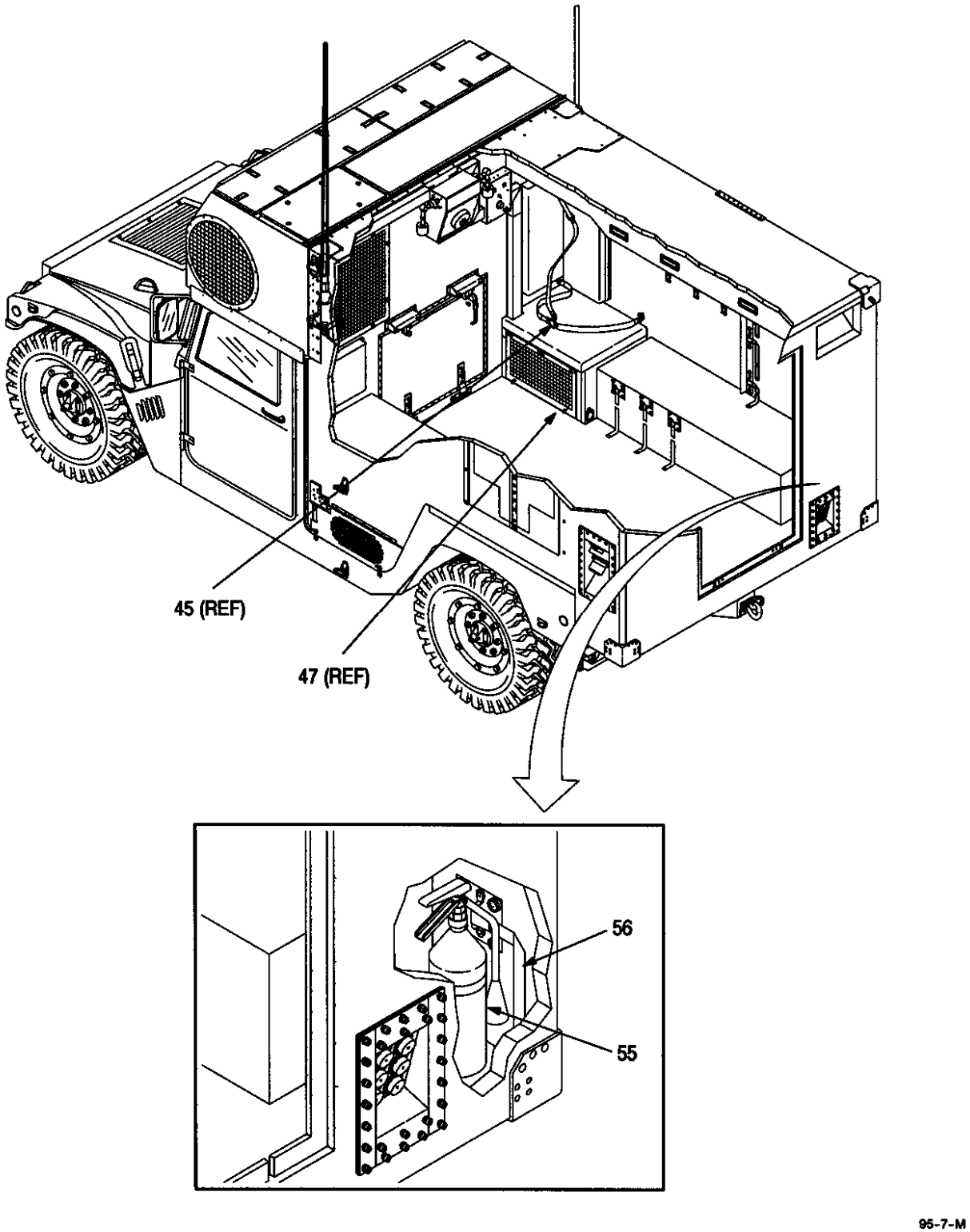


Figure 2-1. PMCS Location Diagram (Sheet 6 of 12)

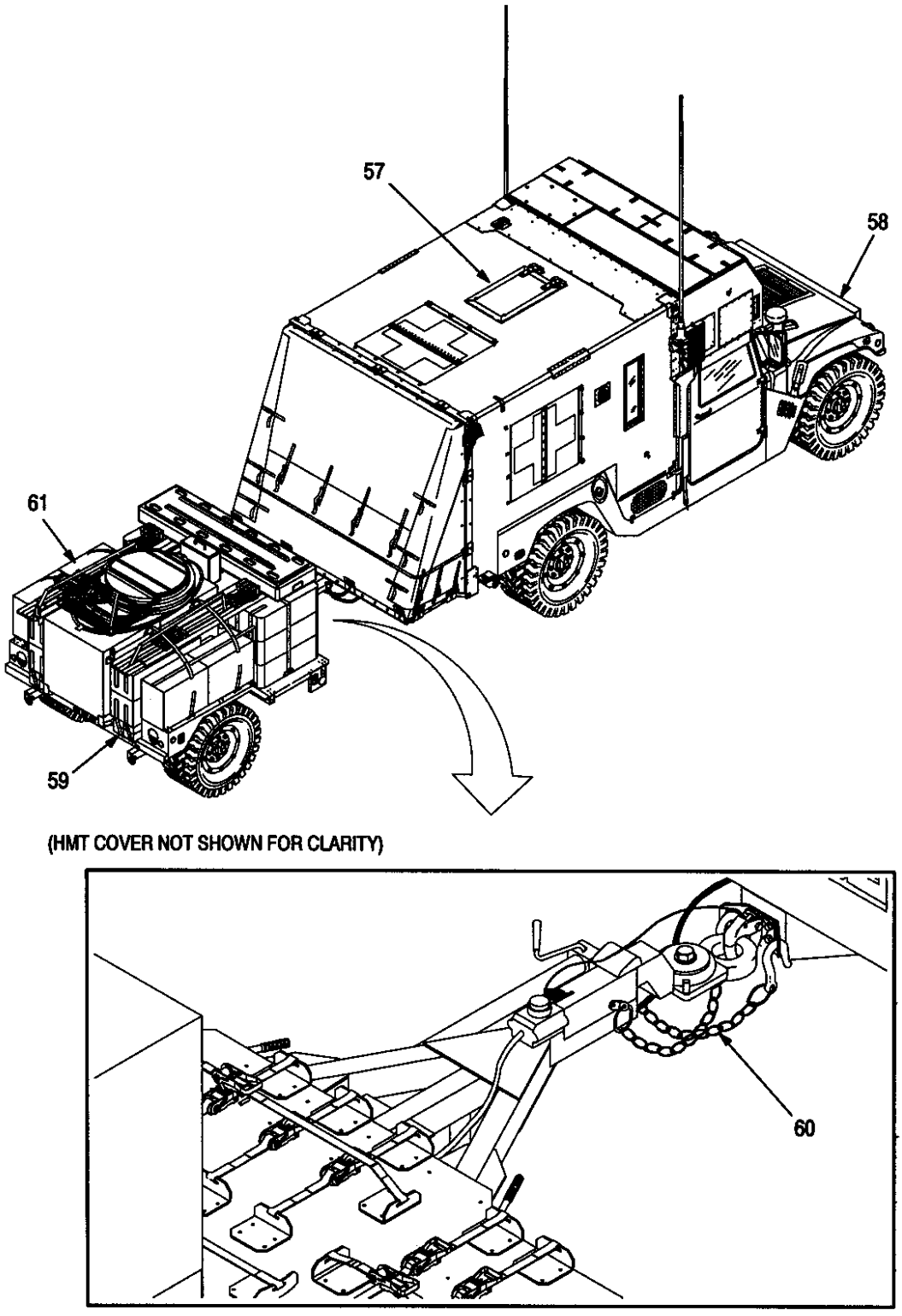


Figure 2-1. PMCS Location Diagram (Sheet 7 of 12)

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

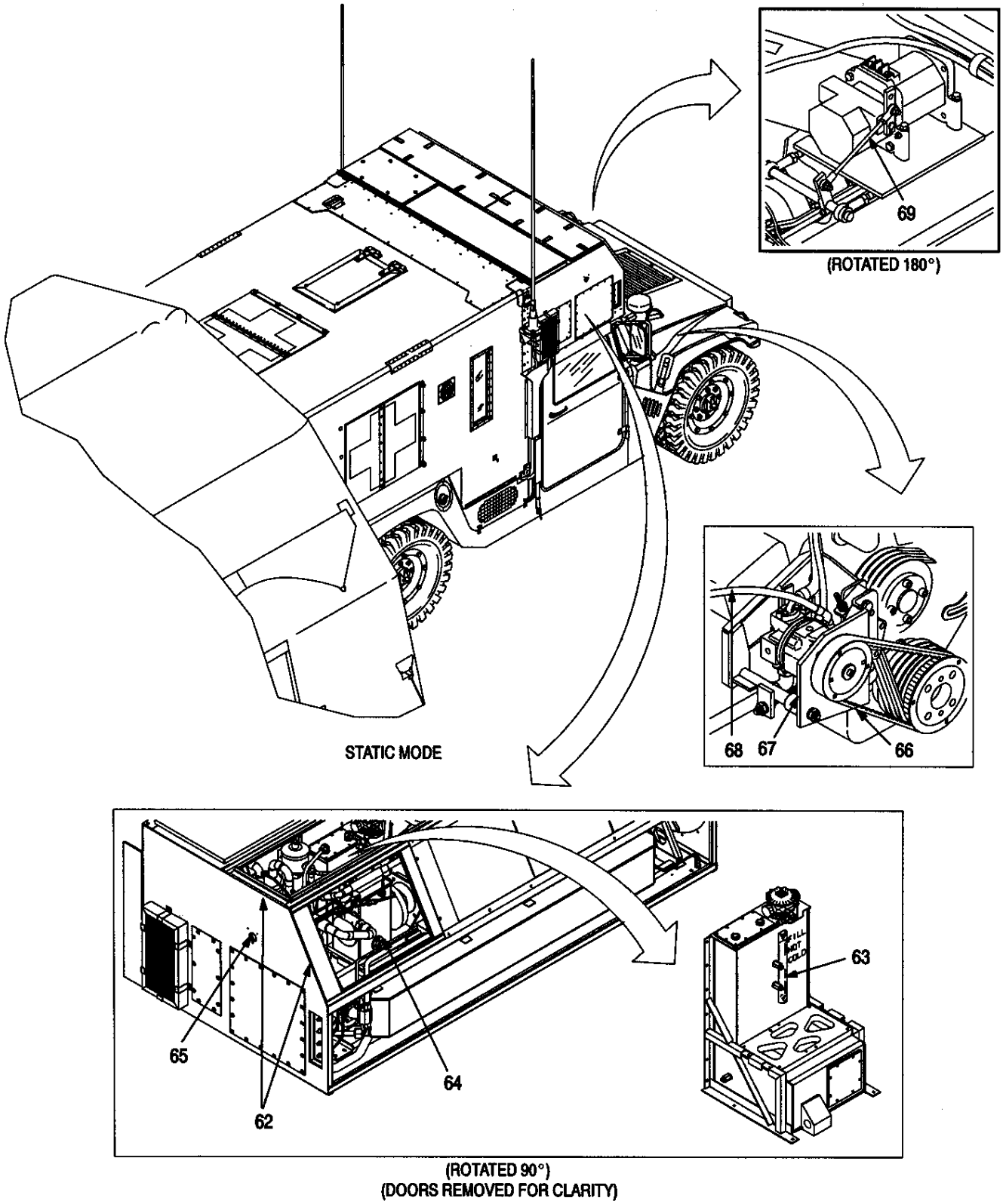


Figure 2-1. PMCS Location Diagram (Sheet 8 of 12)

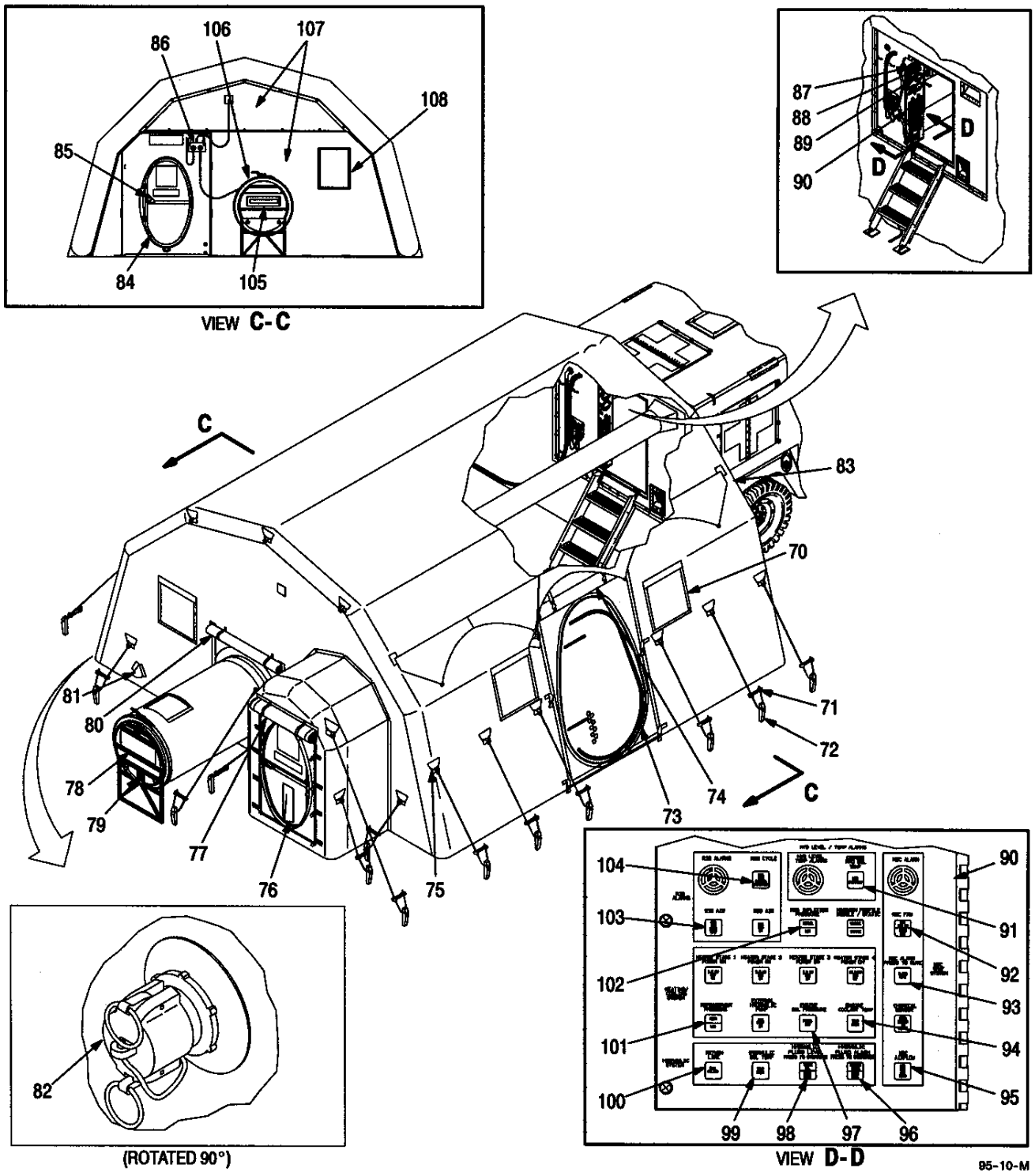


Figure 2-1. PMCS Location Diagram (Sheet 9 of 12)

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

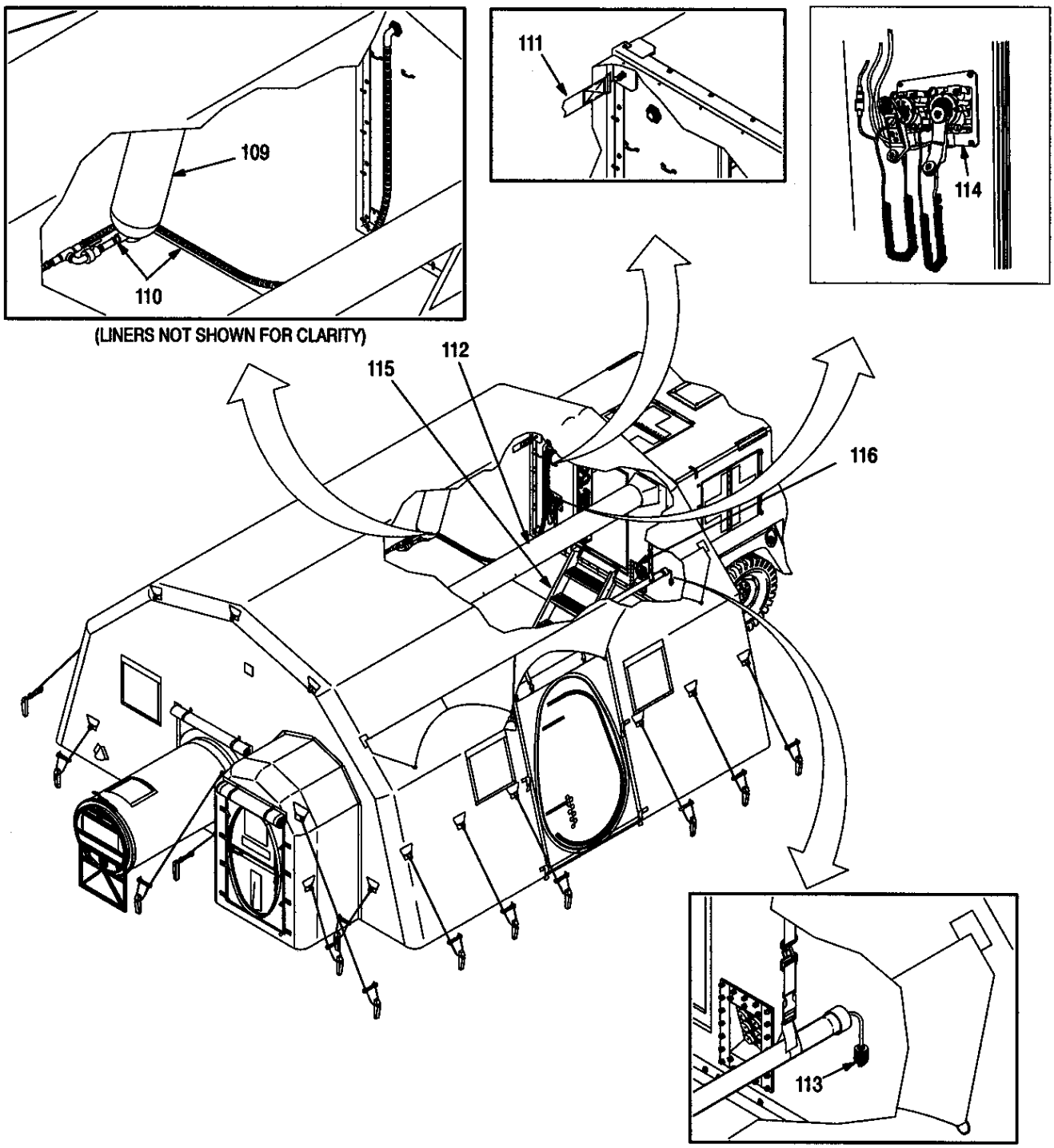


Figure 2-1. PMCS Location Diagram (Sheet 10 of 12)

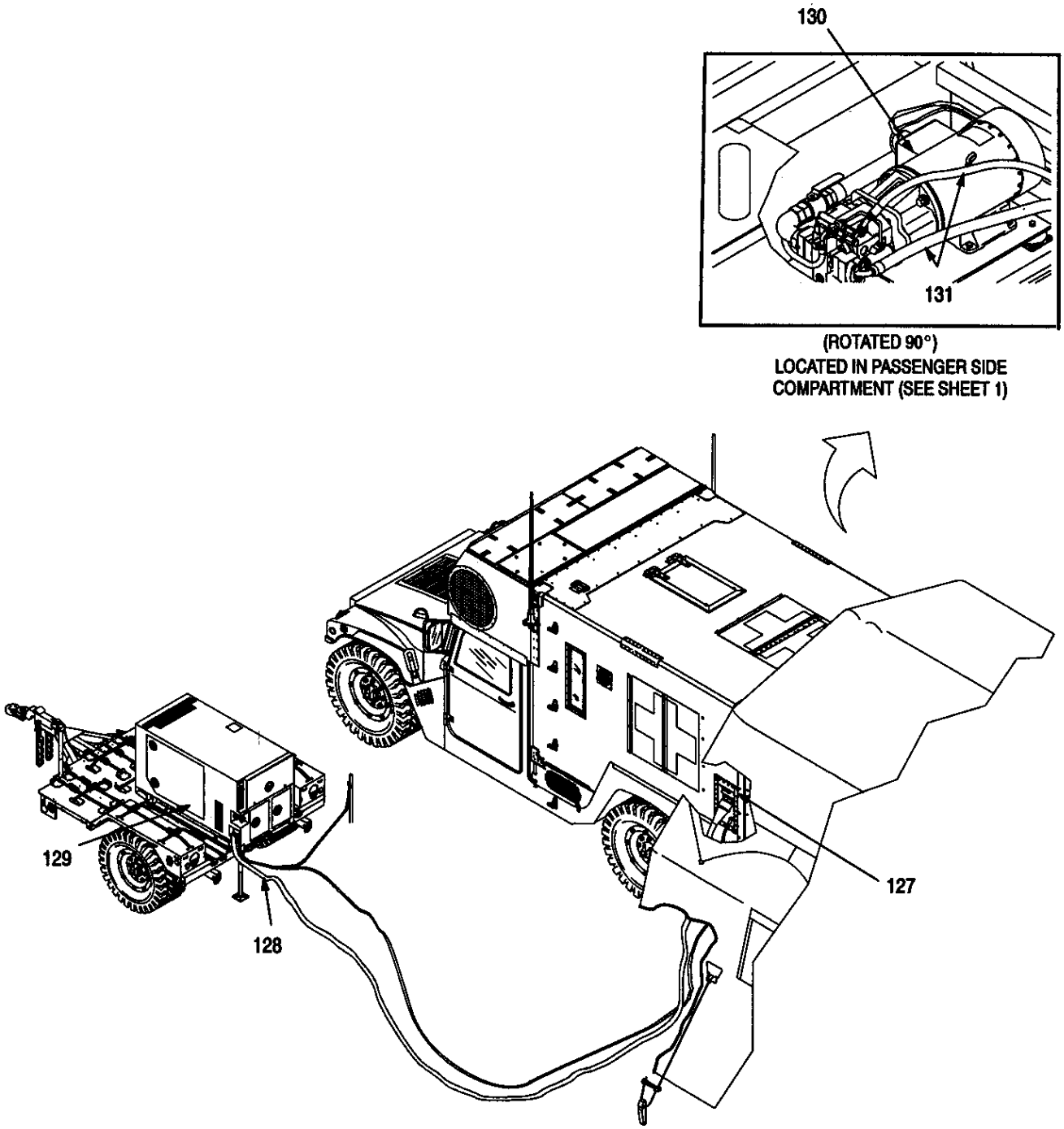


Figure 2-1. PMCS Location Diagram (Sheet 11 of 12)

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

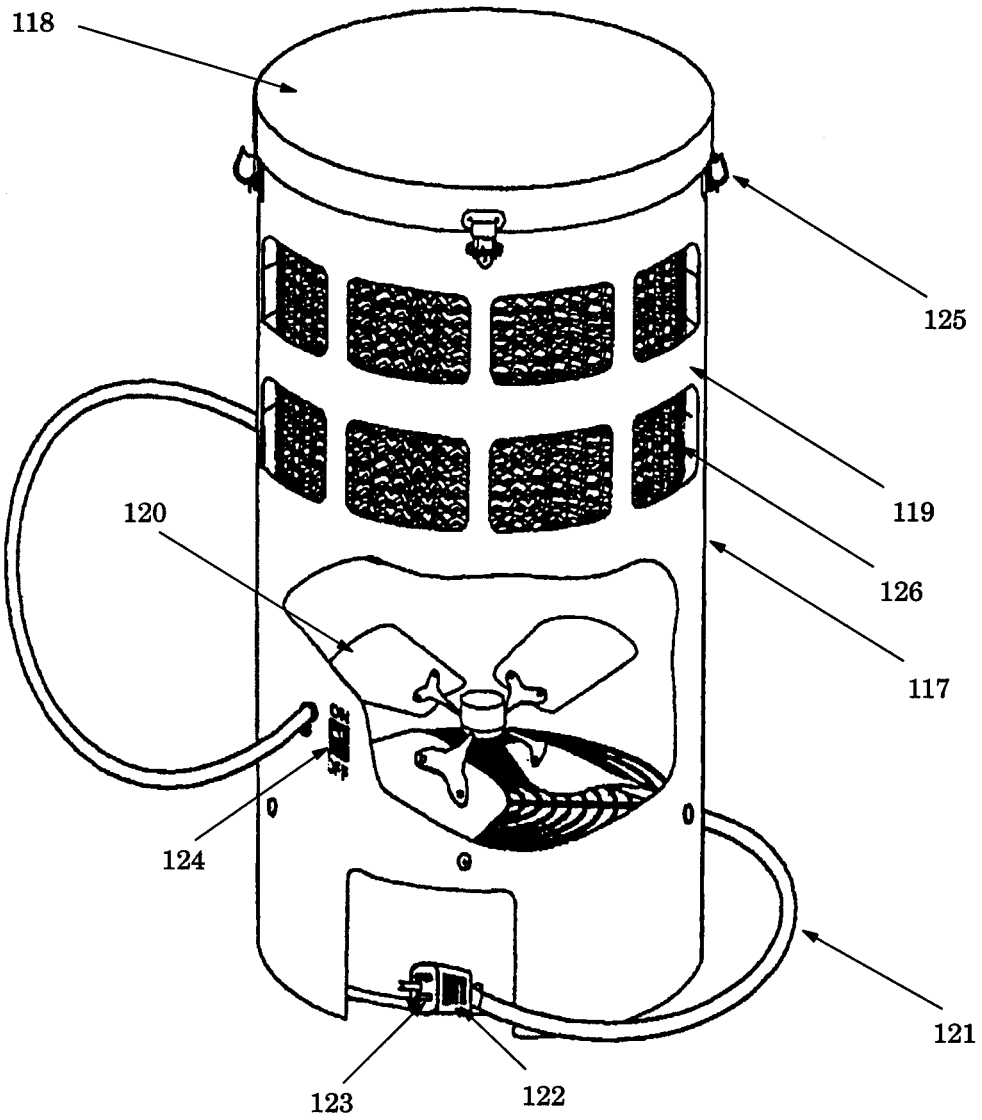


Figure 2-1. PMCS Location Diagram (Sheet 12 of 12)

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
MOBILE MODE **NOTE** Items 1 through 60 pertain to CBPS when set for mobile mode, and are accomplished before starting the mission. ECV should be OFF. Refer to Figure 2-1, sheets 1 through 7. Mobile mode inspection comprises ECV modified components, LMS, stowed ABS and packed HMT. Start at front of ECV, continue around passenger side, around rear and then around driver side of CBPS. Install ECU work platform per para 3.12.1 to check ECU. Inventory spare parts kit and ABS repair kit.				
		ECV - front with hood raised		
1, sheet 1	B	Primary hydraulic pump hoses and fittings	Check for damaged hoses, loose or missing hardware, and evidence of leaks.	Damaged hoses and loose or missing hardware which prevent normal operation. Class III leak, refer to para 2.20.
2	B	Belt	Check belt for cracks and fraying per TM 9-2320-387-10. Check for missing teeth.	Belt cracked, fraying or loose. Teeth missing.
3	B	Pulley and face plate	Check for loose or missing hardware.	Loose or missing hardware which prevents normal operation.
4	B	Electronically Programmed Governor (EPG) actuator and linkage	Check for loose or missing hardware.	Loose or missing hardware which prevents normal operation.
		ECU - passenger side		
5	B	Evaporator/ compressor test ports	Ensure dust covers are installed.	

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		NOTE Note direction of airflow arrow on filter when installing.		
6	B	Intake filter screen (passenger side)	Remove access panel and check filter for blockage. Remove all dirt and debris. Wash per para 3.12.2. Check gasket.	Filter missing. Missing or damaged gasket.
7	B	Mist eliminator	Check mist eliminator for blockage. Clean as required.	Any blockage of air flow.
8	B	Drain tubes, hoses, clamps and guards **ECV** - passenger side	Check for cracks or cuts in tubes and hoses. Check for loose or missing hardware and damaged hose guards.	
9	B	Hydraulic shut off valve (red handle)	Ensure hydraulic shut off handle is in open position (in line with hose).	Hydraulic handle in closed position.
10	B	Hydraulic shut off valve (in passenger side compartment red handle)	Ensure hydraulic shut off handle is in open position (in line with hose).	Hydraulic handle in closed position.
11	B	Compartment tubing, hoses and fittings	Check hydraulic lines for damaged hoses, loose or missing hardware, and evidence of leaks.	Damaged hoses and loose or missing hardware which prevent normal operation. Class III leak, refer to para 2.20.
12	B	Auxiliary power pack (in passenger side compartment)	Check motor for signs of overheating, discoloration, cut or frayed wiring, and loose or disconnected connectors. Check for loose or missing mounting hardware.	Damaged motor or connectors. Loose or missing hardware which prevents normal operation.
13		Compartment	Check for dirt and debris. Clean as required.	

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		LMS - outer		
14	B	LMS		
15	B	Antenna and mounting bracket (passenger side)	Check for loose or missing hardware. Check for cut or frayed wiring and loose or disconnected connector.	Loose or missing hardware which prevents normal operation.
16	B	Window (passenger side)	Check window for breaks or holes.	Window has hole or is broken.
17	B	Relief valve (passenger side)	Check for damage or obstruction.	Relief valve damaged or obstructed (air shipment only).
18	B	Tailgate/block assembly (each side)	Ensure ropes are not frayed and tailgate is raised to stowed position.	Tailgate cannot be raised or lowered.
19	B	Transport cover	Ensure transport cover is secured. Check for broken or missing buckles and torn or frayed fabric.	ABS not secured.
20, sheet 2	B	Power panel (driver side)	Check CB for serviceability; covers are on connectors. Check air inlet screen for blockage. Clean as required. Check for loose or missing hardware. Check ground stud for missing wing nut. Check connectors for broken pins or corrosion.	Loose or missing hardware which prevents normal operation.
21	B	Relief valve (driver side)	Check for damage or obstruction.	Relief valve damaged or obstructed (air shipment only).
22	B	Window (driver side)	Check window for breaks or holes.	Window has hole or is broken.
23	B	Steps (driver side)	Check for loose hardware. Ensure all steps can be positioned for climbing.	
24	B	Compartment guard (driver side)	Check for cracks and loose or missing hardware.	
25	B	Compartment (driver side)	Check for accumulation of fluids, dirt and debris. Clean as required.	

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		NOTE		
		If unit sits in rain or snow, check and drain overflow container as required.		
26	B	Hydraulic overflow container (driver side compartment)	Check container for cracks and missing or damaged fasteners. Check container and empty as required per para 3.12.3.	
27	B	Drain hose (driver side compartment)	Check hose for kinks and tears and loose or missing clamps. Verify that shut off valve is in closed (horizontal) position.	
28	B	Antenna and mounting bracket (driver side)	Check for loose or missing hardware. Check for cut or frayed wiring and loose or disconnected connector.	Loose or missing hardware which prevents normal operation.
29	B	Drain tube, clamps and guard (driver side)	Check for cracks and loose or missing hardware.	
		ECV - inside cab		
30, sheet 3	B	EPG control unit	Check wiring harness for damage.	Loose or broken wire.
31	B	Vehicle control box 1A4A8	Check for loose or missing hardware. Check connectors for security. Check that call buttons and buzzer are operational.	Loose or missing hardware which prevents normal operation.
32	B	Hydraulic fluid level and fluid alarm indicators/ alarm	Check indicators and alarm for damage.	Damaged indicators or alarm.
33	B	Tachometer/hour meter	Check for cracked lens and loose or missing hardware. Check for cut or frayed wires. Check wires are connected to tachometer/hour meter.	
		ECV - underneath		
34	B	EPG magnetic pickup (on flywheel)	Check for cut or frayed wires. Check cable is connected to EPG magnetic pickup.	Cable is disconnected or damaged.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		NOTE Install ECU work platform per para 3.12.1 to check ECU.		
		ECU		
35, sheet 2	B	Condenser fan grill	Check for blockage. Remove all dirt and debris from grill.	Any blockage of air flow.
		WARNING To prevent injury to personnel from a fall, use care when climbing on and descending from LMS roof. Always use steps and hand supports.		
36	B	Covers/doors	Check for loose or missing latches and hardware, loose or damaged gaskets and damaged covers/doors.	Covers or doors damaged jeopardizing the integrity of ECU.
37, sheet 4	B	Internal ECU	Check for hydraulic and air conditioner leaks, burnt or damaged wiring, and loose or missing clamps.	Damaged wiring or Class III leaks.
38	B	Recirculation filter	Open doors/covers on ECU. Check for blockage. Remove all dirt and debris. Wash per para 3.12.2.	
39	B	NBC filters	Check for missing or damaged NBC filters. If missing or damaged, replace per para 3.12.5.	NBC filters missing or damaged.
		CAUTION Do not mix or substitute any other hydraulic fluid with MIL-H-5606.		
40	B	Hydraulic fluid level	Check sight gage for fluid. Add fluid per para. 3.12.4.	No fluid showing in sight glass.
		NOTE Item 40 is accomplished while on top (roof) of LMS.		
		LMS - top		
41, sheet 2	B	Grab handle (driver side)	Check for excessive wear and rust; ensure handle can be raised and lowered freely.	

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		LMS - interior		
42, sheet 5	B	Return air vent	Check for moisture, damaged boot, leaks around boot.	Boot damaged or leaking.
43	B	Forward Light Box Assembly 1A4A5	Check for loose or missing hardware. Check that lights are operational.	
44	B	Exit/entry door	Check that door operates without binding. Check for loose or missing hardware. Check seals for damage.	Door does not close or open properly. Loose or missing hardware which prevents normal operation. Damaged seals.
45	B	Control box assembly 1A4A18	Check for loose or missing hardware. Check that call buttons and buzzer are operational.	Loose or missing hardware which prevents normal operation.
46	B	Passenger seat belts (each side)	Check belts for security and proper operation.	Belts not secure or do not operate properly.
47	B	Passenger chairs and back rest (each side)	Check for holes, tears or excessive wear.	
48	B	Mission Oriented Protective Posture (MOPP) gear storage boxes (each side)	Check hinges for binding and for loose or missing hardware.	
49	B	Rear light box assembly 1A4A7	Check for loose or missing hardware. Check that light is operational.	
50	B	Rear control panel 1A4A4	Check for cracked or broken gages, indicators and controls. Check for loose or missing hardware. Check gage pointers are at zero.	Loose or missing components/hardware which prevent normal operation. Gages cannot be set to zero.
51	B	Rib pressure gage 1A4A4PG1	Check that set points on gage are set to 1.5 and 2.9 psi. Adjust gage to read zero.	Set points cannot be set. Gage cannot be set to zero.
52	B	Power mode switch 1A4A4S1	Check switch for damage which prevents normal operation.	Switch does not operate properly.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
53	B	Converter 1A4A14	Check for cracked or broken gages, indicators and controls. Check for loose or missing hardware.	Loose or missing components/hardware which prevent normal operation.
54	B	Inverter 1A4A13	Check for cracked or broken gages, indicators and controls. Check for loose or missing hardware.	Loose or missing components/hardware which prevent normal operation.
55, sheet 6	B	Fire extinguisher	Check charge on fire extinguisher. If not charged, notify supervisor. **Note:** If pin has been pulled, fire extinguisher is not charged.	Fire extinguisher missing or not charged.
56	B	Straps (each side and roof)	Check for missing or damaged straps. Check all straps for security. Tighten as required.	
57, sheet 7	B	Emergency exit hatch	From inside LMS, unlock emergency exit hatch and ensure it opens and closes smoothly. Check seals for damage. Check for loose or missing hardware.	Hatch cannot be opened or closed. Damaged seals. Loose or missing hardware.
		ECV		
58	B	ECV	Perform operator's PMCS per TM 9-2320-387-10.	
		HMT		
59	B	HMT	Perform PMCS on HMT per TM 9-2330-392-14&P.	
60	B	HMT hookup	Ensure light cable, breakaway chain and safety chains are securely connected to ECV and pintle hook is secured by safety pin.	Hookup and safety components are not secured.
61	B	Stowed items	Check items are secured and ready for movement.	Items not secured.
NOTE This ends the before mission mobile mode PMCS.				

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		OPERATIONAL CHECK		
		BEFORE operational checks pertain to ECV, LMS, ABS and 10 kW TQG. Items 62 through 131 pertain to operation of CBPS and should be performed before the mission. Refer to Figure 2-1, sheets 8 through 12. Install ECU work platform per para 3.12.1 to check ECU.		
		CAUTION To prevent damage to hydraulic pump, EPG switch must be set to OFF before setting ESS MODE switch to OFF or any mode position.		
		NOTE Start ECV per TM 9-2320-387-10. Engage EPG system and perform operational procedures according to para 2.24. Deploy ABS according to para 2.24.2.2. Check operation of air beam inflation and CBPS over pressurization (NBC mode). Check heating, cooling and venting controls and indicators. Allow equipment to operate for a minimum of ten minutes. While system is operating, check items 62 through 69, sheet 9.		
		ECU		
62, sheet 8	B	ECU	Open doors on ECU and check for damaged hydraulic components and leaks.	Damaged hydraulic components. Class III leak, refer to para 2.20.
		CAUTION Do not mix or substitute any other hydraulic fluid with MIL-H-5606.		
63	B	Hydraulic fluid level	Check sight gage for fluid level between hot and cold fill marks. Add fluid per para 3.12.4.	No fluid in sight glass.
64	B	Air conditioner compressor sight glass (COOL mode)	Open door and check level of oil in sight glass.	Oil level below 'MIN' in sight glass.
65	B	Wet/dry sight glass (cool mode)	Check center of sight glass indicator. Colored stud should be blue in color (dry). Check for bubbles/streaks in fluid flowing through sight glass, indicating low R22 refrigerant.	Sight glass fluid changed color to pink. Bubbles/streaks in R22 refrigerant.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
		ECV - under hood		
66	B	Belt	Check belt for proper operation.	Improper operation.
67	B	Primary hydraulic pump	Check pump for leaks.	Class II leak: refer to para 2.20.
68	B	Primary hydraulic pump hoses and fittings	Check for leaks.	Class II leak, refer to para 2.20.
69	B	EPG system	Ensure EPG system functions properly, controlling ECV engine speed at 1,400 to 1,500 rpm.	EPG system does not function properly.
		WARNING		
		To prevent injury to personnel, use care when walking around ABS stakes and anchor lines.		
70, sheet 9	B	ABS fabric	Check for rips, punctures, pin holes, loose stitches and separated seams. Repair per para 3.13.1.	Rips, punctures, pin holes and separated seams that prevent proper operation.
71	B	Anchor lines and slips	Check for missing or damaged anchor lines and slips.	ABS unstable due to missing or damaged lines or slips.
72	B	Stakes	Ensure there are at least 22 serviceable stakes.	ABS unstable due to missing stakes.
73	B	Direct Complex Sheltering (DCS) doorways and connector	Ensure doorways are sealed. Check fabric for holes, tears or rips. Check for missing airflow strip. Check DCS connector fabric for holes, tears or rips. Check zipper functions properly.	Any tears or loose surfaces which prevent normal operation. Airflow strip missing.
74	B	DCS doorway flap	Unroll flap. Check flap for tears. Ensure flap is secured to ABS with fastener hook and fastener loop tape. Check for missing or damaged buckles.	
75	B	Tie-down ring fabric holders	Send to unit level maintenance for repair.	

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
76	B	Ambulatory airlock door (outer)	Ensure door opens and closes and can be secured. Check for loose or missing hardware. Check for missing airflow strip. Ensure self closing hinges work properly.	Door cannot be opened/closed or vent cannot be adjusted. Loose or missing hardware which prevents normal operation. Airflow strip missing.
77	B	Ambulatory door flap	Unroll flap. Check flap for tears. Ensure flap is secured to ABS with fastener hook and fastener loop tape. Check for missing or damaged buckles.	Ambulatory door flap cannot be sealed or is torn.
78	B	Tunnel Airlock Litter Patient (TALP) door (outer)	Ensure door and adjustable vents on door open and close properly and can be secured. Ensure retaining clamp and latch function properly. Check for loose or missing hardware. Check for missing airflow strip.	Door cannot be closed and vent cannot be adjusted. Loose or missing hardware which prevent normal operation. Airflow strip missing.
79	B	TALP door timer	Ensure timer works properly.	
80	B	TALP door flap	Unroll flap. Ensure flap is secured to ABS with fastener hook and fastener loop tape. Check for tears. Check for missing or damaged buckles.	TALP door flap cannot be sealed or is torn.
81	B	Cable entry	Check for damaged zipper and loose or separated seams. Verify cable entry is closed.	Cable entry port cannot be secured in closed position.
82	B	Dump valve caps (driver side only)	Ensure all dump valve caps are secured tightly.	More than one dump valve cannot be secured.
83	B	ABS mounting hardware	Check for loose or missing hardware securing ABS to LMS.	Loose or missing hardware which prevent normal operation.
84	B	Ambulatory airlock door (inner)	Ensure door opens and closes and can be secured. Check for loose, missing or damaged parts. Check for missing airflow strip.	Door cannot be closed/ opened. Loose, missing or damaged parts which prevent normal operation. Airflow strip missing.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
85	B	Ambulatory door timer	Check timer operation.	
		NOTE Allow equipment to operate for a minimum of ten minutes, then check items 85 through 103 while system is operating.		
86	B	Airlock pressure gage **LMS** - interior	Check gage and pressure lines for damage. Check gage is functioning correctly.	Gage is not functioning properly. Hose is damaged.
87	B	NBC differential pressure gage	Check reading on gage. If reading is 9 iwg or above, replace per para 3.12.5.	Gage reads 9 iwg or above.
88	B	NBC shelter pressure gage	Ensure one vent hole is visible on each airlock door. Check reading on gage.	Gage reads less than 0.5 iwg.
89	B	Rib pressure gage	Check reading on gage.	Gage does not read between 1.5 psi and 2.9 psi.
90	B	Rear control panel 1A4A4	Ensure the following indicator lights are not illuminated.	Indicator lights are illuminated.
91	B	DANGER HYD OIL TEMP indicator 1A4A4DS32	Check indicator.	HYD OVERHEAT indicator illuminated (red).
92	B	NBC FAN switch/indicator 1A4A4S15/16/DS28/29	Check indicator. If NBC shelter pressure is less than 0.5 iwg, indicator should illuminate (red).	PRES LOW indicator is illuminated (red).
93	B	NBC ALARM PRESS TO MUTE switch/indicator 1A4A4S10/DS9	With NBC shelter pressure below 0.5 iwg, press MUTE indicator to silence alarm.	Alarm does not sound when ALARM MUTE is not illuminated (blue) and NBC shelter pressure is 0.5 iwg.
94	B	ENGINE COOLANT TEMP indicator 1A4A4DS22	Check indicator.	TEMP HIGH indicator illuminated (red).
95	B	NBC AIRFLOW indicator 1A4A4DS24	Check indicator. If NBC shelter pressure is less than 0.3 iwg, indicator should illuminate (yellow).	LOW NBC AIR FLOW indicator illuminated (yellow).

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
96	B	HYDRAULIC FLUID ALARM PRESS TO OVERRIDE switch/indicator 1A4A4S11/DS25/DS26	Check indicator.	DANGER LEVEL indicator illuminated (red).
97	B	ENGINE OIL PRESSURE indicator	Check indicator.	PRESS LOW indicator illuminated (red).
98	B	HYDRAULIC FLUID LEVEL PRESS TO OVERRIDE indicator	Check indicator. Ensure OVERRIDE indicator is not illuminated (blue). Set OVERRIDE to OFF.	CHECK OIL indicator illuminated (yellow).
99	B	HYDRAULIC OIL TEMP indicator	Check indicator.	Refer to Table 3-1. System can be operated until audio alarm sounds.
100	B	RETURN LINE indicator	Check indicator.	REPL FILTER indicator illuminated (red).
101	B	REFRIGERANT PRESSURE indicator	While in COOL mode, check indicator.	HIGH or LOW indicator illuminated (red).
102	B	RIB INFLATION PRESSURE indicator	Check indicator.	LOW indicator illuminated (red).
103	B	RIB AIR indicator	Check indicator.	RIB AIR OVER TEMP indicator illuminated (red).
104	B	RIB FAN CYCLE indicator	Check indicator.	RIB FAN EXTENDED OPERATION indicator illuminated (red).
105	B	TALP airlock door (inner)	Check door and airflow strip open and close and can be secured. Check retaining clamp and latch function properly. Check for loose or missing hardware. Check for missing airflow strip.	Door cannot be opened or closed. Loose or missing hardware which prevents normal operation. Airflow strip missing.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
106	B	TALP airlock	Check window for cracks, holes and tears. Ensure flap is secure.	Window contains cracks, holes or tears greater than two inches.
107	B	Insulation panels (roof panels)	Check for rips and tears.	
108	B	Windows (6)	Check all windows for cracks, holes and tears. Ensure flaps are secure.	Windows contains cracks, holes or tears greater than two inches.
109, sheet 10	B	Air beams	Check for rips, punctures and loose or separated seams. Send to unit level maintenance for repair.	Rips, punctures or separated seams which prevent proper operation.
110	B	Air beam manifold and valves	Check for disconnected tubing or damaged valves. Listen and feel for air leaks. Hand tighten manifold valves.	Air beams unable to be inflated due to air leaks.
111	B	Tension relief strap	Ensure tension relief strap is secured to LMS.	
112	B	ABS duct	Ensure ABS duct is secured to LMS air supply port.	
113	B	Light set extension cables	Check for deep abrasions, cuts, exposed wires and damaged connectors.	Any deep abrasions, cuts, exposed wires or damaged connectors.
114	B	Speaker assembly	Check for loose or damaged hardware. Check cables for damaged wires or connector pins. Perform operation PMCS per TM 11-5820-890-10-1, TM 11-5820-890-10-3, or TM 11-5820-890-10-6.	Speaker cannot be mounted properly. Damage wires or pins.
		NOTE		
		It is vital that recirculation filter is fully serviceable. Unit maintenance should replace filter element (126) in accordance with filter change criteria required in FM 3-11.4.		
		LMS - outer		
115	B	Ladder	Check for loose or missing hardware. Ensure rubber pads are attached to feet.	

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If:
116	B	Receptacle panel (rear)	Check for loose or missing hardware. Ensure receptacle panel is functioning properly.	Loose or missing hardware which prevents normal operation.
117, sheet 12	B	Recirculation Filter	a. Check cover (118), housing (119), and fan impeller blades (120) for dents, cracks and loose fit.	Cover or housing is dented, cracked or will not mate properly; cracked or loose fan impeller blades.
			b. Checked electric cable (121) for bare wires, broken connector (122) or damaged connector pins (123).	Cable has bare wires, broken connector or damaged connector pins.
			c. Check for broken or damaged ON/OFF switch (124).	ON/OFF switch damaged or broken.
			d. Remove cover (118) by releasing four link-lock fasteners (125). Pull filter element (126) up and check for punctures or water damage.	Filter element is missing, punctured or water damaged.
		NOTE Shut off ECV and deflate ABS according to para 2.24.3. Deploy ABS using 10 kW TQG according to para 2.24.2.3. Check operation of air beam inflation and CBPS over pressurization (NBC mode). Check heating, cooling and venting controls and indicators. While system is operating, check items 127 through 131, sheet 11.		
127, sheet 11	B	Power panel (driver side, rear)	Check air inlet screen for blockage. Clean as required. Check for loose or missing hardware. Ensure power panel is functioning properly.	Loose or missing hardware which prevent normal operation. Power panel does not function properly.
		HMT		
128		10 kW TQG	Ensure power cable and ground lead are connected and connectors are secure. Check for damage.	Damaged power cable or connector.
129	B	10 kW TQG	Perform operator's PMCS per TM 9-6115-642-10.	
		ECV - outer (passenger side)		

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
130	B	Auxiliary power pack A2M1/P2 (in compartment)	Check pump and motor function properly.	Pump or motor does not function properly.
131	B	Compartment tubing, hoses and fittings	Lift cover and check for leaks and loose or missing hardware.	Loose or missing hardware which prevent normal operation. Class III leak, refer to para 2.20.
NOTE This ends the before mission operational mode checks.				
STATIC MODE The following items pertain to CBPS when operating in static mode. ABS deployed according to para 2.24.2, using power from ECV (EPG system ON) or 10 kW TQG. Refer to Figure 2-1, sheets 7 through 11. **NOTE** Check items 39, 89 through 106 and 117, sheet 9, when using internal power (ECV).				
	H (4)	Fuel tank (gage)	Check fuel gage on cab instrument panel every four hours; fill fuel tank per standard operating procedures.	Low on fuel; gage shows 1/4 tank of fuel.
39	H (72)	NBC filter	Check reading on NBC filter differential gage.	Differential pressure across the NBC filters is greater than 9 iwg (refer to para 3.12.5).
89	B	Rib pressure gage	Check reading on gage.	Gage does not read between 1.5 psi and 2.9 psi.
90	D	Rear control panel	Ensure the following indicator lights are not illuminated.	Indicators are illuminated.
91	D	DANGER HYD OIL TEMP indicator	Check indicator.	HYD OVERHEAT indicator illuminated (red).
92	D	NBC FAN indicator	Check indicator.	PRES LOW indicator illuminated (red).

2.21 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
93	D	NBC ALARM PRESS TO MUTE indicator	With NBC shelter pressure below 0.5 iwg, press MUTE indicator to silence alarm.	Alarm does not sound when ALARM MUTE is not illuminated (blue) and NBC shelter pressure is 0.5 iwg.
94	D	ENGINE COOLANT TEMP indicator	Check indicator.	TEMP HIGH indicator illuminated (red).
95	D	NBC AIRFLOW indicator	Check indicator.	LOW NBC AIR FLOW indicator illuminated (yellow).
96	D	HYDRAULIC FLUID ALARM PRESS TO OVERRIDE indicator	Check indicator.	DANGER LEVEL indicator illuminated (red).
97	D	ENGINE OIL PRESSURE indicator	Check indicator.	PRESS LOW indicator illuminated (red).
98	D	HYDRAULIC FLUID LEVEL PRESS TO OVERRIDE indicator	Check indicator. Ensure OVERRIDE indicator is not illuminated (blue). Set OVERRIDE to OFF.	CHECK OIL indicator illuminated (yellow).
99	D	HYDRAULIC OIL TEMP indicator	Check indicator.	Refer to Table 3-1. System can be operated until audio alarm sounds.
100	D	RETURN LINE indicator	Check indicator.	REPL FILTER indicator illuminated (red).
101	D	REFRIGERANT PRESSURE indicator	While in COOL mode, check indicator.	HIGH or LOW indicator illuminated (red).
102	D	RIB INFLATION PRESSURE indicator	Check indicator.	LOW indicator illuminated (red).
103	D	RIB AIR indicator	Check indicator.	RIB AIR OVER TEMP indicator illuminated (red).
104	D	RIB FAN CYCLE indicator	Check indicator.	RIB FAN EXTENDED OPERATION indicator illuminated (red).

Table 2-1. Operator Preventive Maintenance Checks and Services for CBPS - Continued

B - BEFORE D - DURING A - AFTER H - HOURLY

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If:
105	D	TALP airlock door (inner)	Ensure door and adjustable vents open and close and can be secured. Ensure retaining clamp and latch function properly. Check for loose or missing hardware.	Door cannot be opened or closed. Loose or missing hardware which prevent normal operation.
106	D	TALP airlock side	Ensure zipper is closed.	Zipper broken or jammed in open position.
		NOTE The function of recirculation filter is to filter out residual toxic gases that may have entered the ABS through entry/exits and by off-gassing from clothing.		
117	D	Recirculation Filter	Check that recirculation filter operates.	Recirculation filter does not operate.
		NOTE This ends the during mission operational (static) checks.		
		AFTER STRIKING The following is accomplished after striking (para 2.24.3) and when CBPS system is ready to return to unit. Refer to Figure 2-1, sheets 1, 6 and 7.		
		ECV - under hood		
1, sheet 1	A	Primary hydraulic pump hoses and fittings	Check for leaks and loose or missing hardware.	Class III leak; refer to para 2.20. Loose or missing hardware which prevents normal operation.
		ECU		
6	A	Intake filter screen	Check intake filter screen for blockage. Check for leaks.	Any blockage of air flow.
		LMS		
56, sheet 6	A	Straps (each side and roof)	Ensure all straps are secured.	
		HMT		
60, sheet 7	A	HMT hookup	Ensure light cable, breakaway chain and safety chains are connected securely to ECV and pintle hook is secured with safety pin.	Hookup components are not secured.
		NOTE This ends after striking checks.		

2.22 DECALS AND INSTRUCTION PLATES.

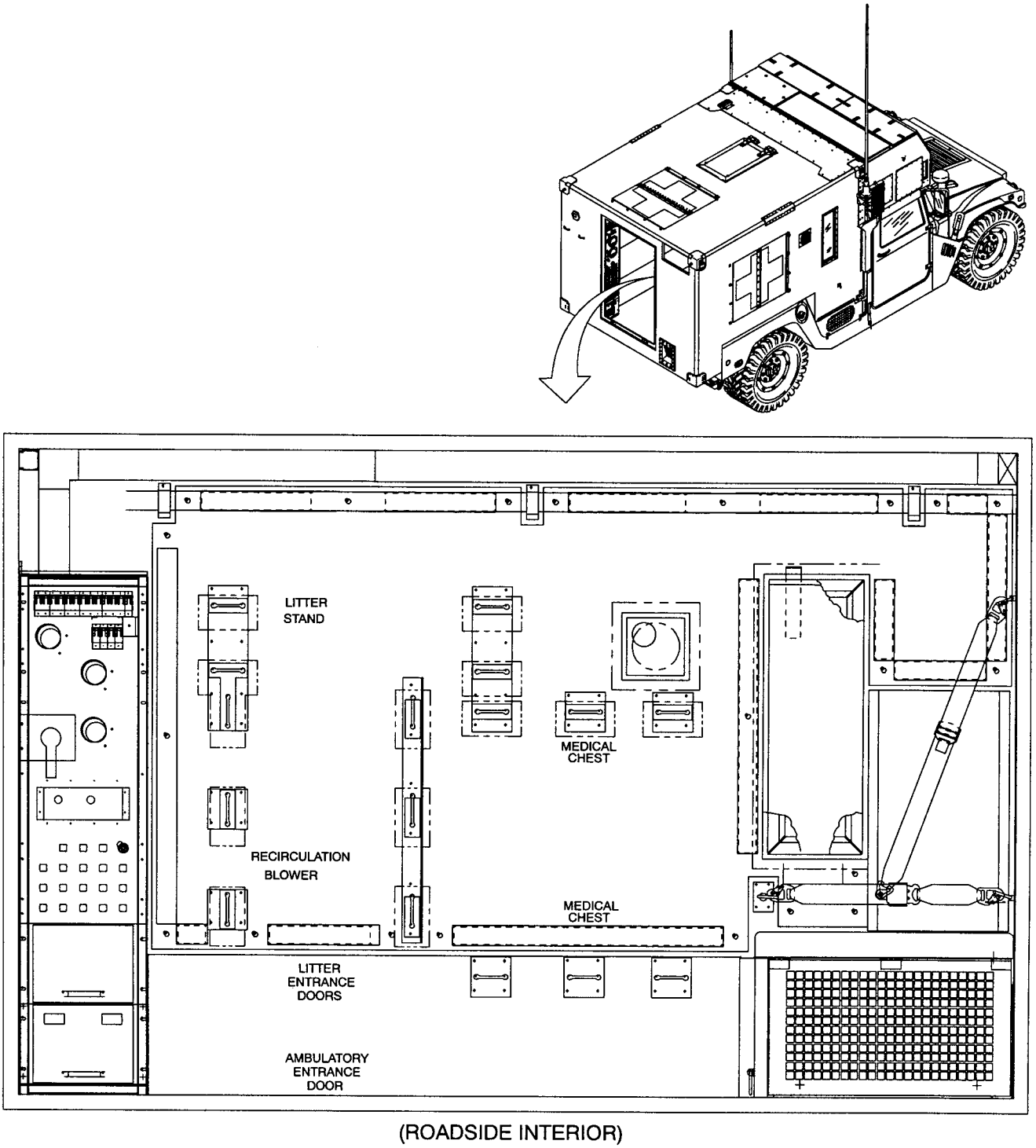
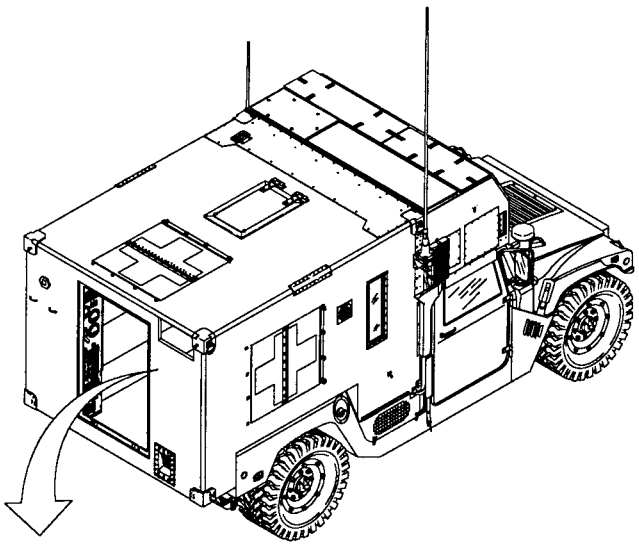
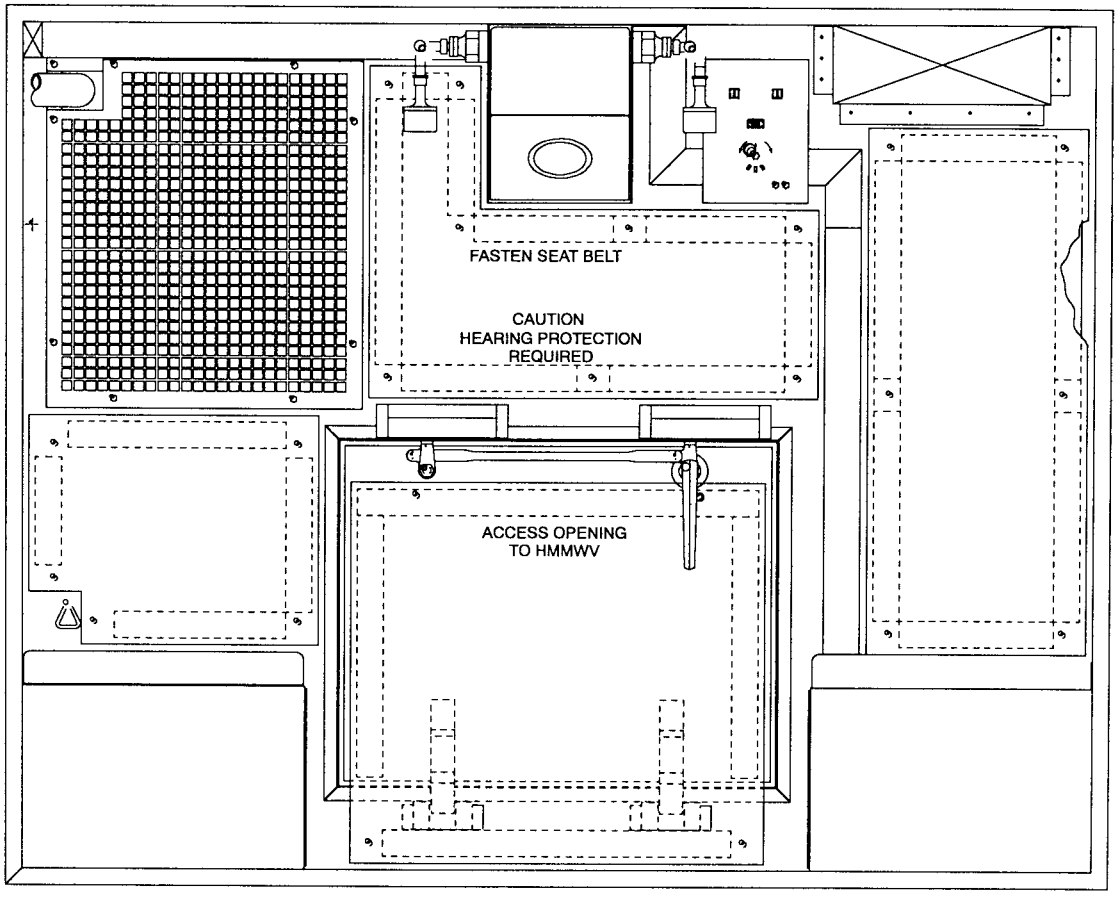


Figure 2-2. Decals and Instruction Plates (Sheet 1 of 10)





(FRONT INTERIOR)

Figure 2-2. Decals and Instruction Plates (Sheet 2 of 10)

2.22 DECALS AND INSTRUCTION PLATES - Continued.

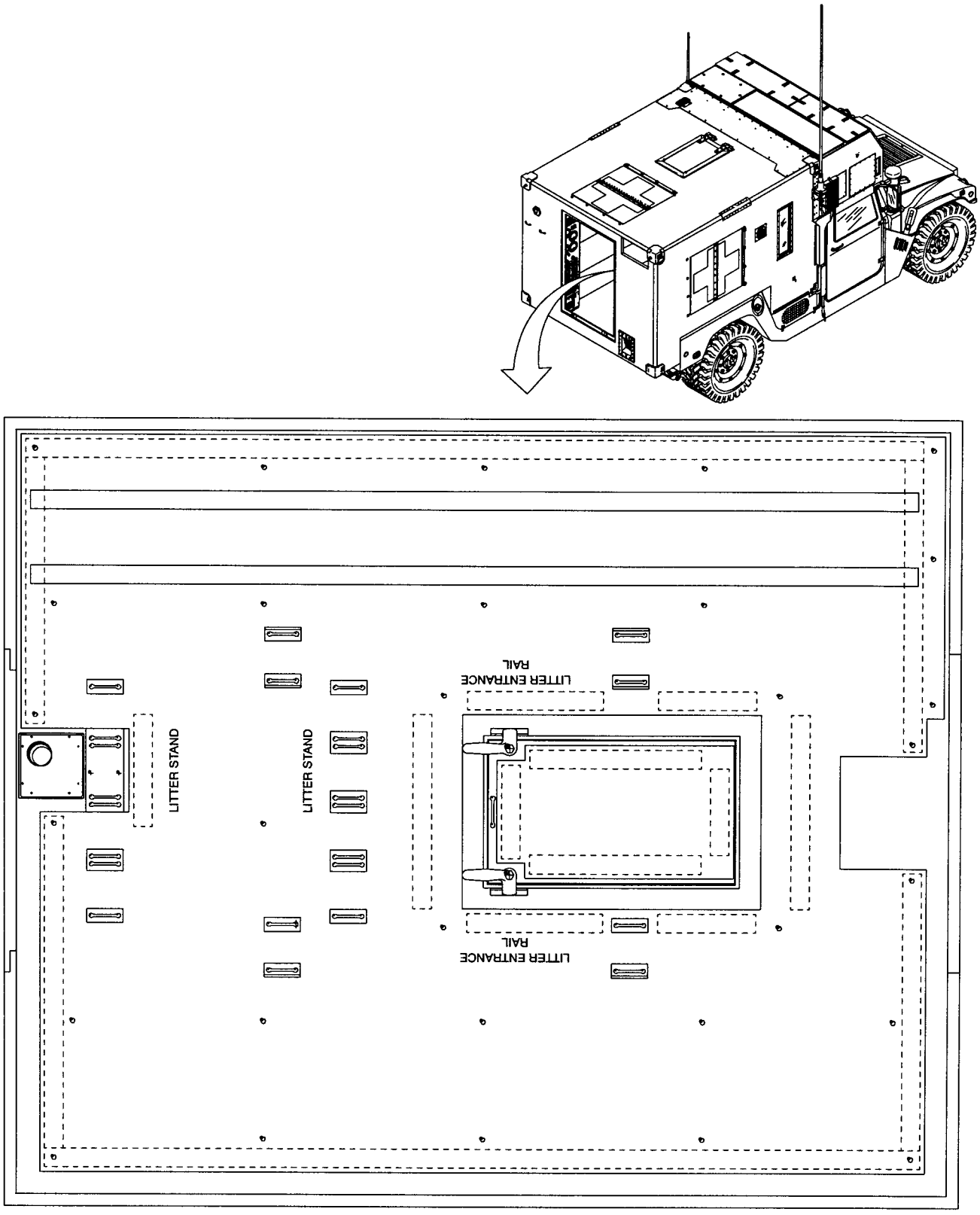
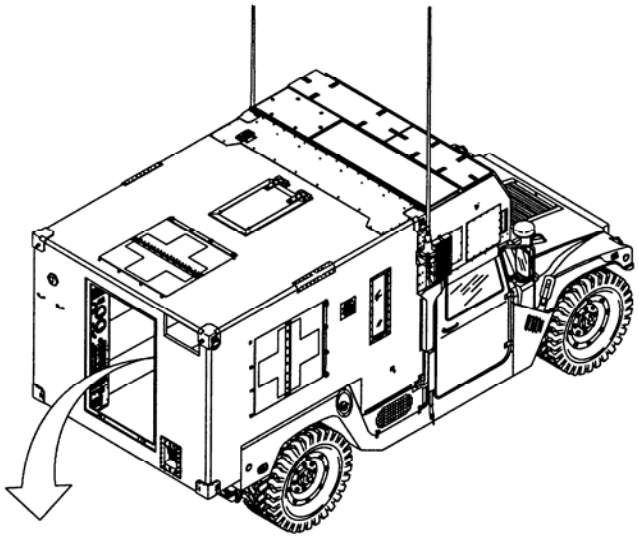
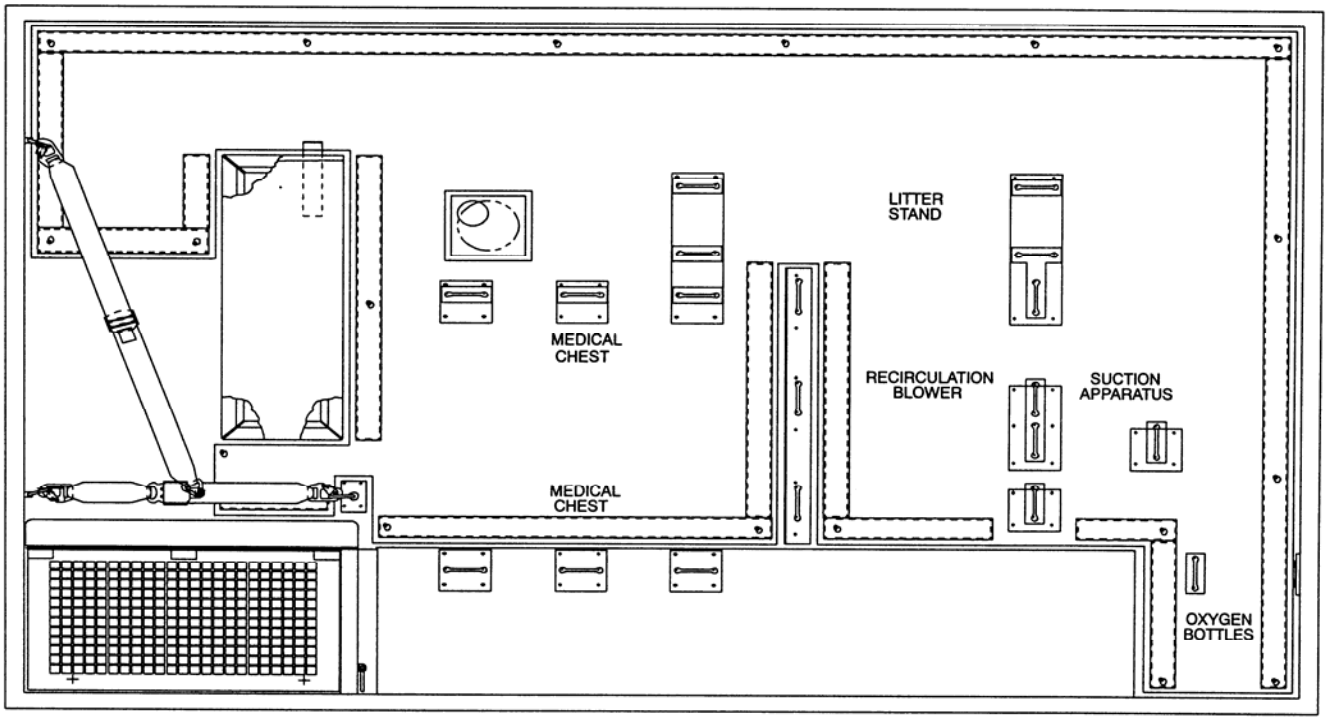


Figure 2-2. Decals and Instruction Plates (Sheet 3 of 10)





(FRONT CURBSIDE INTERIOR)

Figure 2-2. Decals and Instruction Plates (Sheet 4 of 10)

2.22 DECALS AND INSTRUCTION PLATES - Continued.

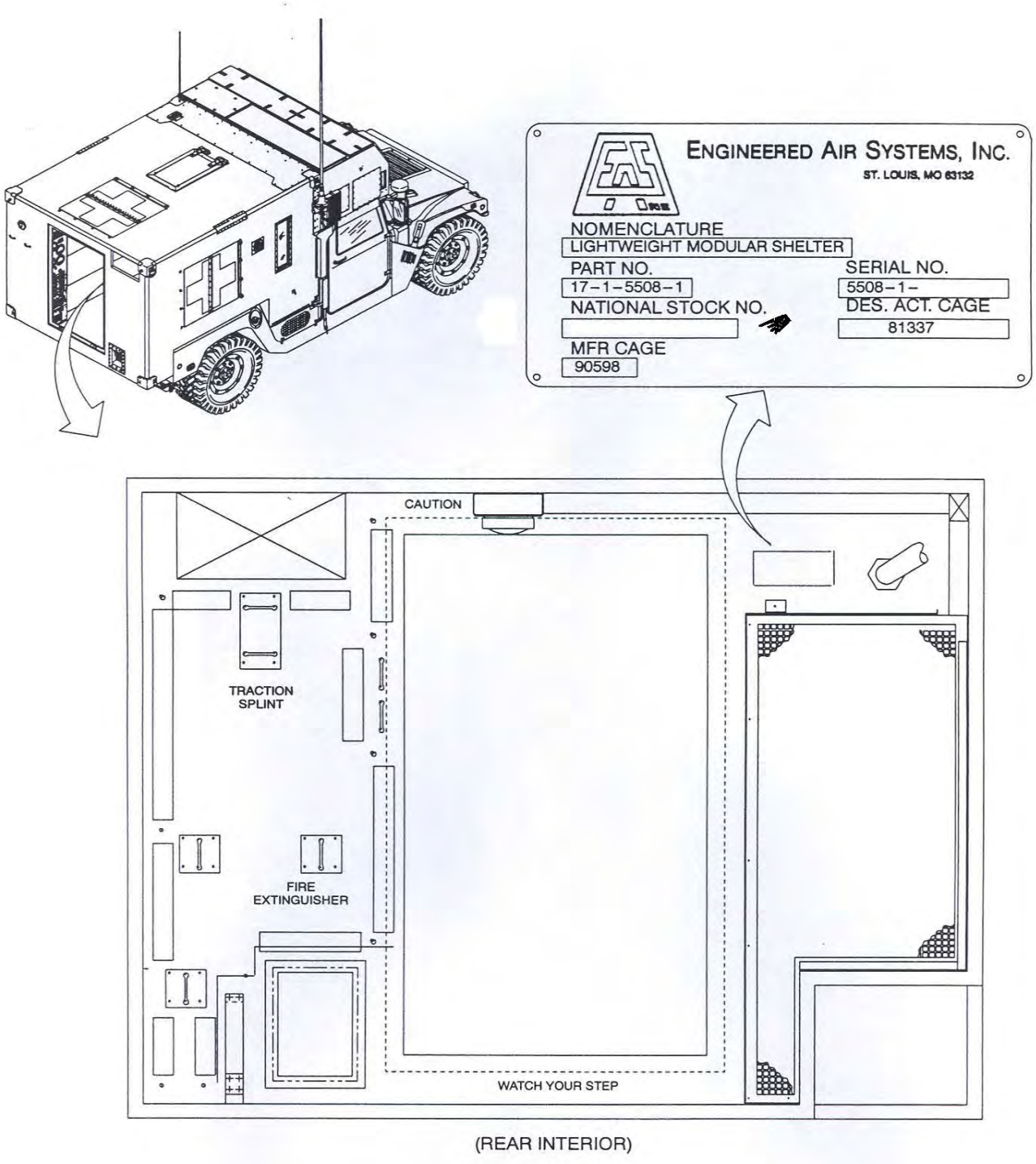
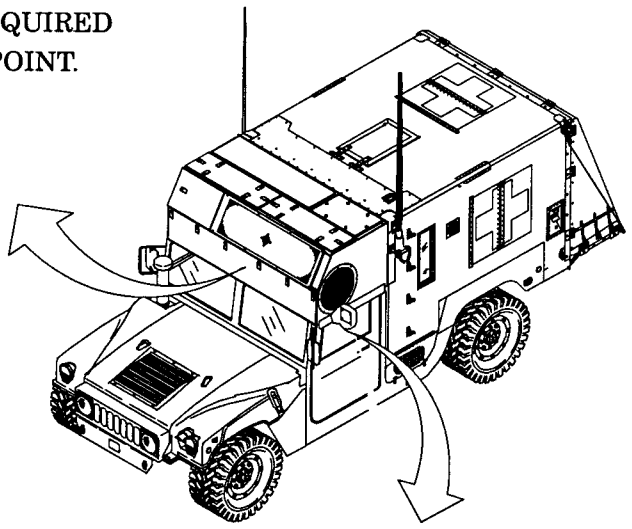


Figure 2-2. Decals and Instruction Plates (Sheet 5 of 10)

HEARING PROTECTION REQUIRED
WITHIN 25 FEET OF THIS POINT.



ENGINEERED AIR SYSTEMS, INC.
ST. LOUIS, MO 63132

NOMENCLATURE
CHEMICAL BIOLOGICAL PROTECTIVE SHELTER SYSTEM

PART NO.	MFD DATE	SERIAL NO.
17- *-*-*		9220-*-*

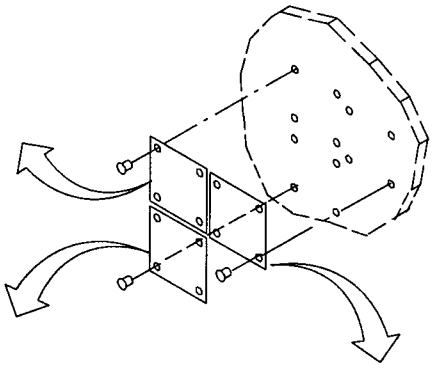
NATIONAL STOCK NO.	CONTRACT NO.
5410-01-*-*	DAAK60-96-C-3009

MFR CAGE	MODEL NO.	DES. ACT. CAGE
90598	CBPSS2000	81337

ELECTRICAL CHARACTERISTICS INPUT
208 VOLTS AC
3 PHASE, 4 WIRE WITH GROUND, 60 HZ
10 KW TQG = 32 FLA @ 0.8 PF MAX
SHOREPOWER = 63 FLA @ 0.8 PF MAX
DIESEL/GENERATOR FUEL: DF-2/JP-8
REFRIGERANT: R22, 11.5 LBS CHARGE
ENVIRONMENTAL OPERATING CONDITIONS: -25° F TO +120° F
WEIGHT: LBS

U.S.

17-2-0579-1



THE SURFACE OF THIS SHELTER
HAS BEEN PAINTED WITH

CARC
FOR TOUCH UP

EPOXY PRIMER IAW MIL-P-53022 TYPE II
EXTERIOR - USE ONLY LUSTERLESS GREEN, COLOR
NO. 34094, POLYURETHANE IAW
MIL-C-46168, TYPE IV
DATE PAINTED:

17-2-0955-1

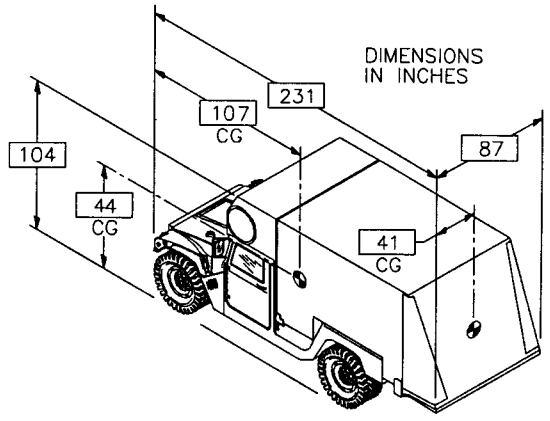
THE SURFACE OF THIS SHELTER
HAS BEEN PAINTED WITH

CARC
FOR TOUCH UP

EPOXY PRIMER IAW MIL-P-53022 TYPE II
EXTERIOR - USE ONLY LUSTERLESS TAN, COLOR
NO. 33446, POLYURETHANE IAW
MIL-C-46168, TYPE IV
DATE PAINTED:

17-2-0955-1 (TN)

CHEMICAL BIOLOGICAL PROTECTIVE SHELTER



GROSS WEIGHT:	11300 Lbs	CUBAGE:	1210 Cu FT
WEIGHT ON WHEELS LF:	1988 Lbs	RF:	2312 Lbs
LR:	3422 Lbs	RR:	3578 Lbs

17-2-0954-1

Figure 2-2. Decals and Instruction Plates (Sheet 6 of 10)

2.22 DECALS AND INSTRUCTION PLATES - Continued.

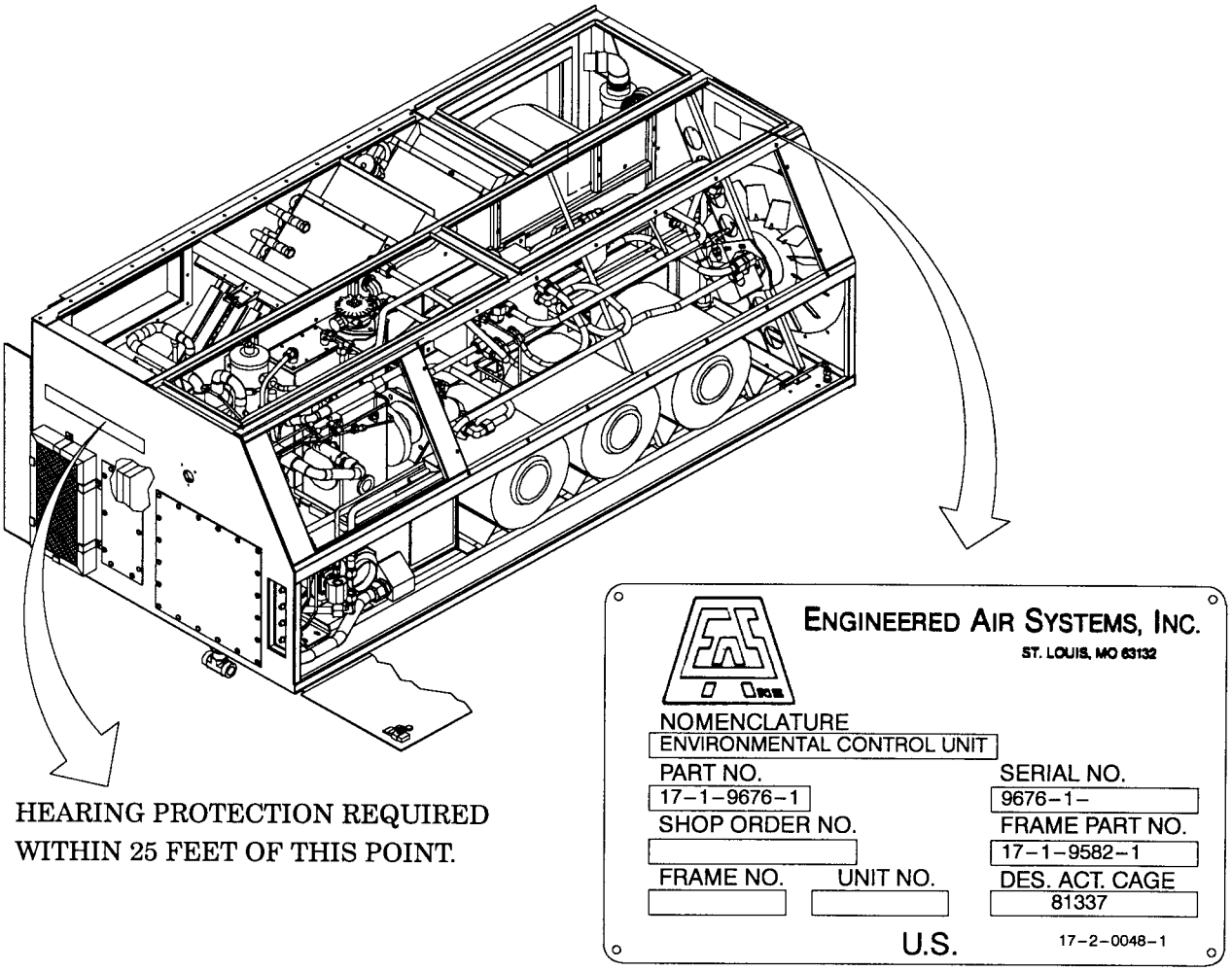


Figure 2-2. Decals and Instruction Plates (Sheet 7 of 10)

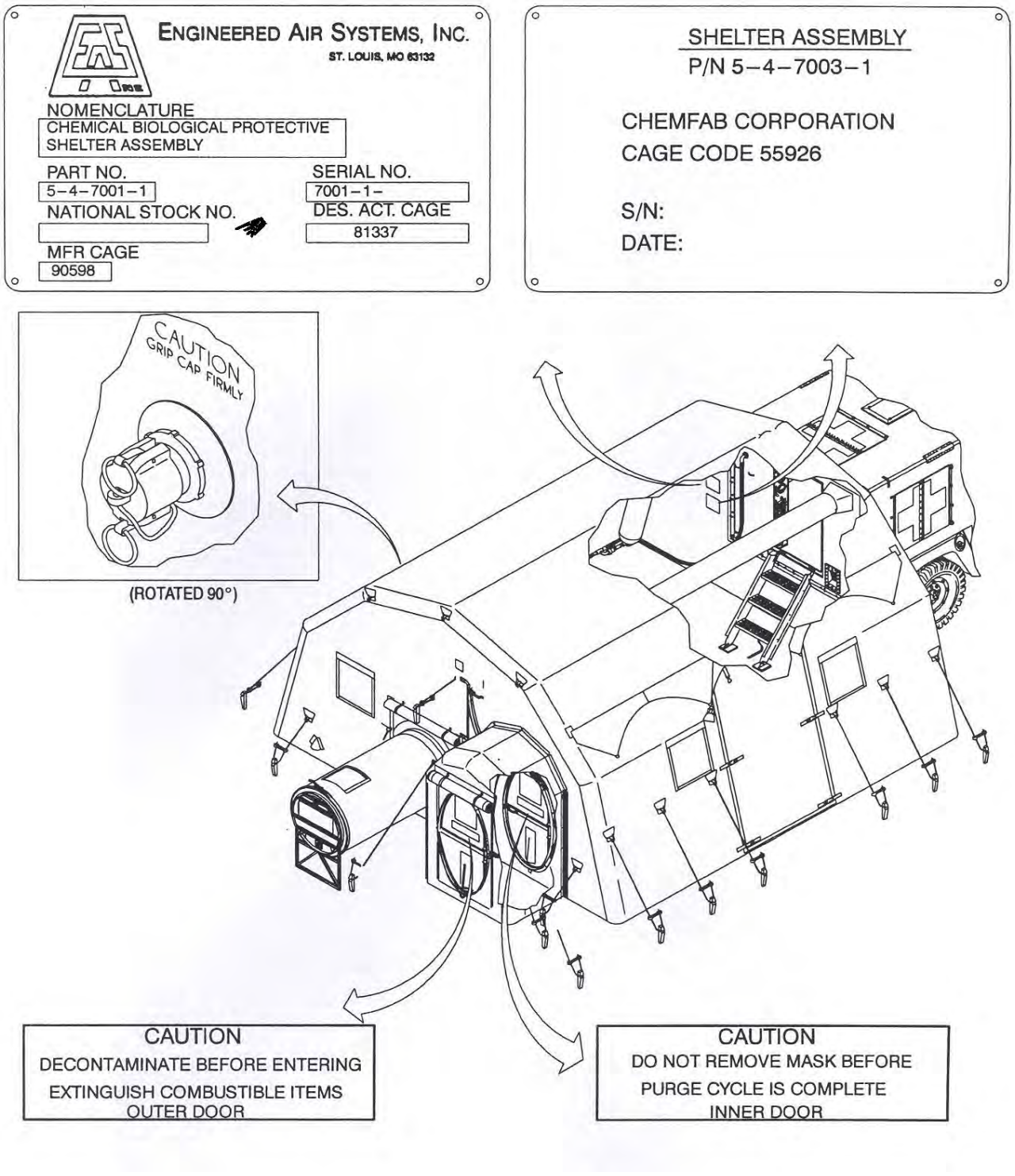
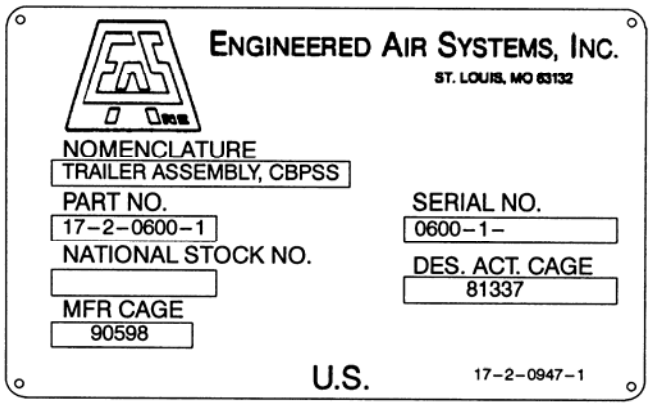


Figure 2-2. Decals and Instruction Plates (Sheet 8 of 10)

2.22 DECALS AND INSTRUCTION PLATES - Continued.



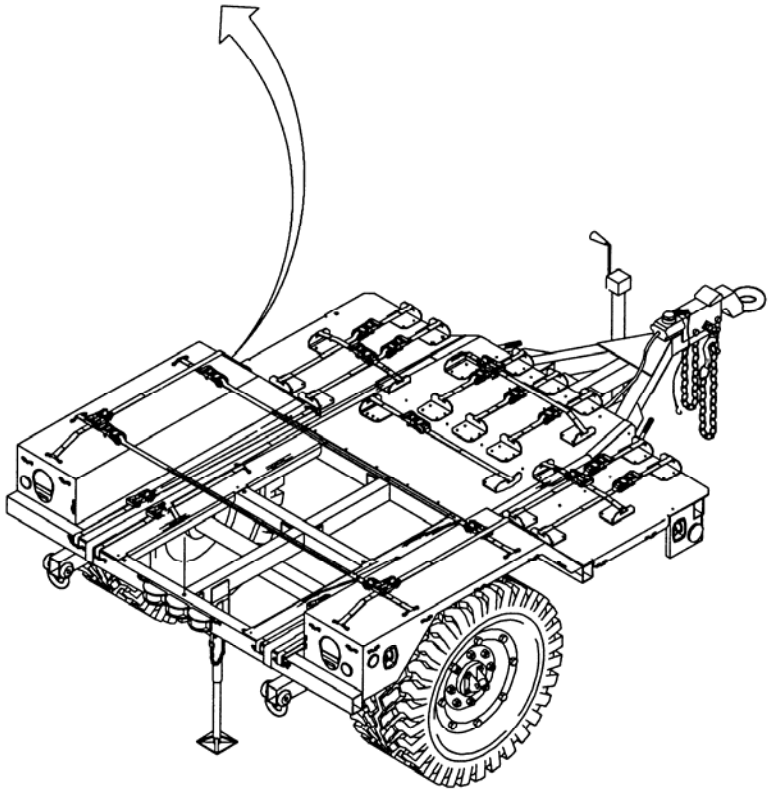


Figure 2-2. Decals and Instruction Plates (Sheet 9 of 10)

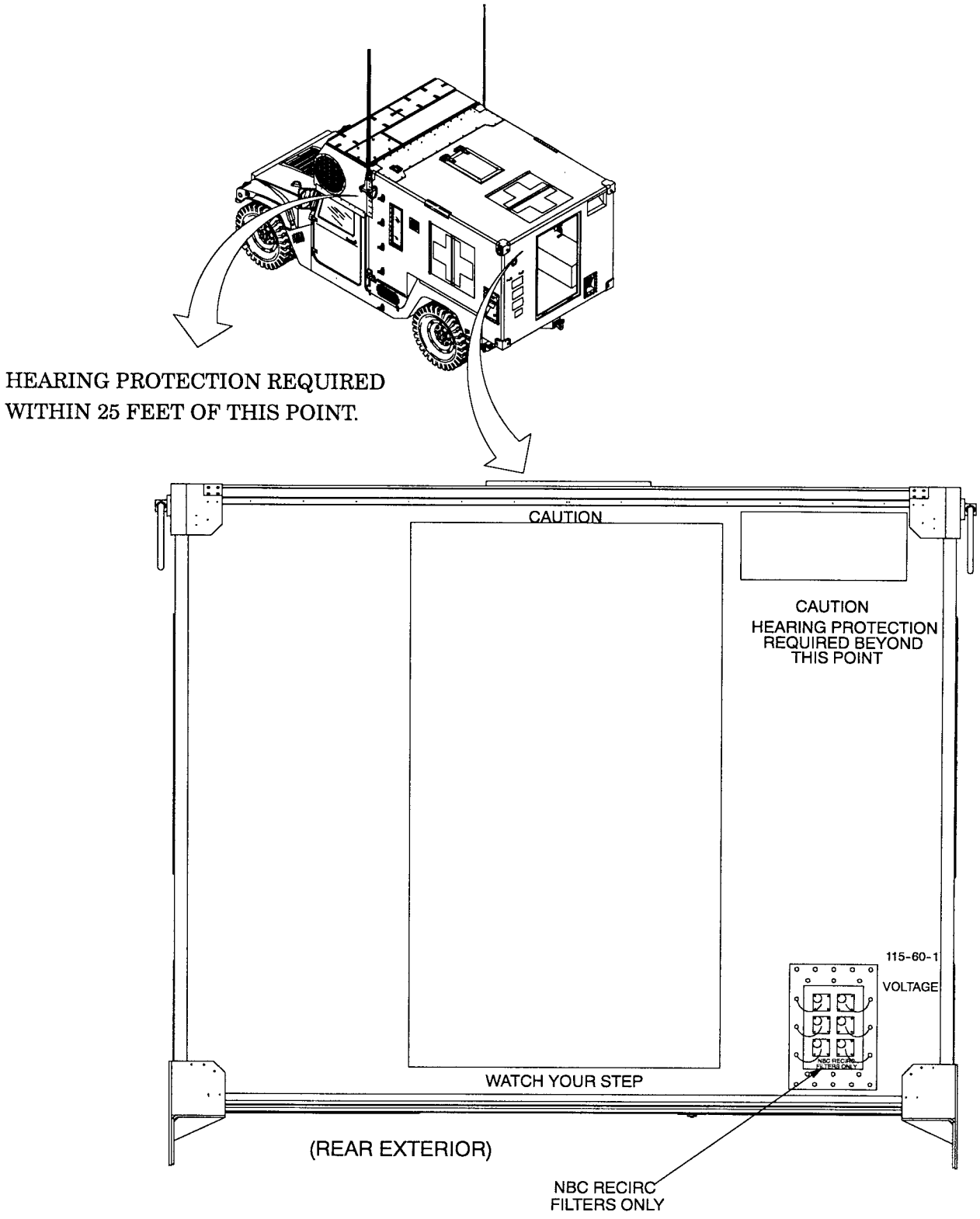


Figure 2-2. Decals and Instruction Plates (Sheet 10 of 10)

Section III. OPERATION UNDER USUAL CONDITIONS

2.23 INITIAL ADJUSTMENTS, DAILY CHECKS AND SELF-TEST.

The following procedures shall be performed before the CBPS is put into operation:

a. Perform system PMCS.

b. Check that the set points on the RIB PRESSURE gage located on the rear control panel are set to 1.5 (min.) and 2.9 (max.) psi and that the NBC SHELTER PRESSURE gage set point is set to 0.5 iwg.

c. When operating with internal power, make sure that the ECV voltmeter, oil indicator, tachometer and other gages in the vehicle cab are functioning properly and monitor gages during operation.

d. When operating CBPS with internal power (ECV running), record initial and ending readings on hour meter in log book. One hour of CBPS operation is equivalent to 30 miles of ECV normal operation.

2.24 OPERATING PROCEDURES.

WARNING

To prevent injury to ears, hearing protection is required.

CAUTION

Do not hit LMS or ABS windows. Windows may crack or break.

NOTE

Communications between the LMS crew and cab crew are essential. A method of communication should be established as early as possible (possibly prior to the mission). This can take the form of voice communications, hand signals, field phones if available, or a combination of all of these methods.

At times voice communications will be difficult due to high noise level.

See Section V on Remote Radio Operation.

CBPS can operate in the following modes:

a. Mobile. ABS stowed, power supplied by ECV engine. (Refer to para 2.24.1 for usual operation and para 2.25.1 for NBC operation.)

b. Static - Internal Power. ABS deployed, power supplied by ECV engine. (Refer to para 2.24.2 for usual operation and para 2.25.2 for full NBC operation.)

c. Static - External Power. ABS deployed, power supplied by a 10 kW TQG or larger generator. (Refer to para 2.24.2 for usual operation and para 2.25.2 for full NBC operation.)

2.24.1 Mobile Operation.

NOTE

Setup procedures that follow apply to a crew of four. Two crew members ride in the ECV cab and two crew members ride inside the LMS. For explanation purposes, the two-person crew in the cab is identified as “cab crew” and the two-person crew in the LMS is identified as “LMS crew”.

2.24.1.1 Expanded Capacity Vehicle (ECV) Setup.

a. **Cab Crew Tasks**

(1) Put ECV transmission in park, apply parking brake, and start ECV (refer to TM 9-2320-387-10).

(2) Release parking brake and operate ECV as mission requires.

b. **LMS Crew Tasks**

(1) On rear control panel (1, figure 2-3), set POWER MODE switch (2) to INT and the following circuit breakers on rear control panel to ON:

- HEAT/COOL (3)
- NBC/VENT (4)
- INSTM CONT (5)
- LTG/INTERCOM (6).

NOTE

MISSION PROFILE MOBILE indicator will not light if INSTM CONT circuit breaker is not ON.

(2) Set MISSION PROFILE switch (7) to MOBILE. MOBILE indicator lights (white).

(3) Set ESS MODE selector switch (8) on rear control panel (1) to VENT, HEAT or COOL.

(4) Set lights on as required.

NOTE

TEMPERATURE control on the control box assembly functions only in MOBILE mode.

(5) Adjust TEMPERATURE control (9) on control box assembly (10) to desired setting.

(6) This completes setup for mobile mode operation.

WARNING

Personnel riding in the LMS must remain seated with safety belts fastened during ECV movement.

(7) Operate system as mission requires.

2.24.1.2 Mobile Operation Switchover From Non-NBC To NBC Conditions.

WARNING

Cab crew must be in full MOPP gear.
LMS crew must wear chemically protective masks.
Ensure that all doors are secured.

a. **Cab Crew Tasks**

(1) Stop ECV, put transmission in park and set parking brake. ECV must remain running.

(2) Put on full chemically protective clothing and masks.

2.24.1.2 Mobile Operation Switchover From Non-NBC To NBC Conditions - Continued.

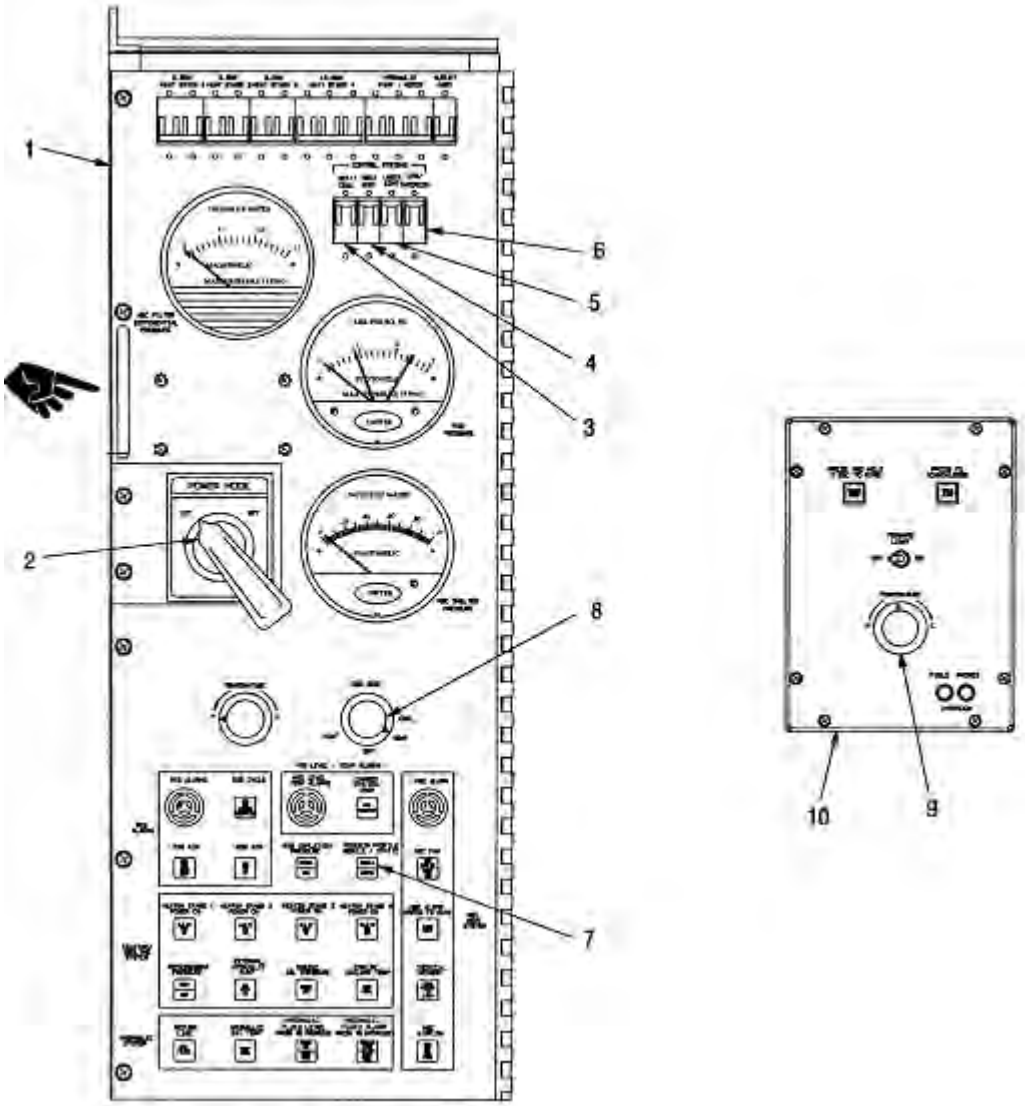


Figure 2-3. Rear Control Panel Settings in Mobile Mode

CAUTION

If any engine or hydraulic warning (red) indicator comes on during system start up or operation, proceed to troubleshooting (Chapter 3, Section II) to take corrective action. Continuing start up or operation without correcting the problem can damage system. Over ride should only be used in a life threatening situation.

(3) Monitor gages and hydraulic indicators to verify that all systems are operational.

(4) Verify with LMS crew that access door and emergency exit panel are closed and latched.

b. **LMS Crew Tasks**

(1) Put on chemically protective masks.

(2) Ensure that access door and emergency exit hatch are closed and latched.

2.24.1.3 Mobile Mode Shut Down Procedure.

a. **LMS Crew Tasks**

(1) Set ESS MODE selector switch (8, figure 2-3) to OFF.

(2) Set lights to OFF (if necessary).

(3) On rear control panel (1), set circuit breakers (3 through 6) to OFF.

b. **Cab Crew Tasks**

(1) Put transmission in park, apply parking brake and turn off ECV lights and engine (refer to TM 9-2320-387-10).

(2) This completes shut down for mobile mode operation.

2.24.2 Static Operation.

NOTE

The procedural steps for setting up the CBPS under non-NBC conditions and under NBC conditions are essentially the same, except for installing the ambulatory and TALP airlock doors. Steps and procedures, as provided herein, are for operating under non-NBC conditions.

2.24.2.1 Expanded Capacity Vehicle (ECV) and High Mobility Trailer (HMT) Setup.

a. **Cab Crew Tasks**

(1) Select CBPS site on level, dry ground in clear area approximately 50 feet by 100 feet with at least 15 feet of overhead clearance.

(2) If possible, CBPS should be set up with the ECV pointing into the wind.

(3) Determine parking area for ECV. Park HMT 4 to 6 feet from driver side of ECV with wheels of HMT in line with front wheel of ECV.

(4) Apply parking brakes (1, figure 2-4) on HMT (2).

(5) Lower front support leg (3) and lock in place with pin (4). Disconnect light cable (5), breakaway brake chain (6) and safety chains (7) from ECV.

WARNING

To prevent HMT from tilting backwards and causing injury to personnel, lower rear support leg and secure with pin.

(6) Lower rear support leg (8) and secure with pin (9).

(7) Open pintle hook (10) on ECV by removing safety pin (11) and lifting top locking latch (12).

(8) Crank down caster (13) on front support leg (3) so that tongue ring (14) is raised up to clear pintle hook (10).

2.24.2.1 Expanded Capacity Vehicle (ECV) and High Mobility Trailer (HMT) Setup - Continued.

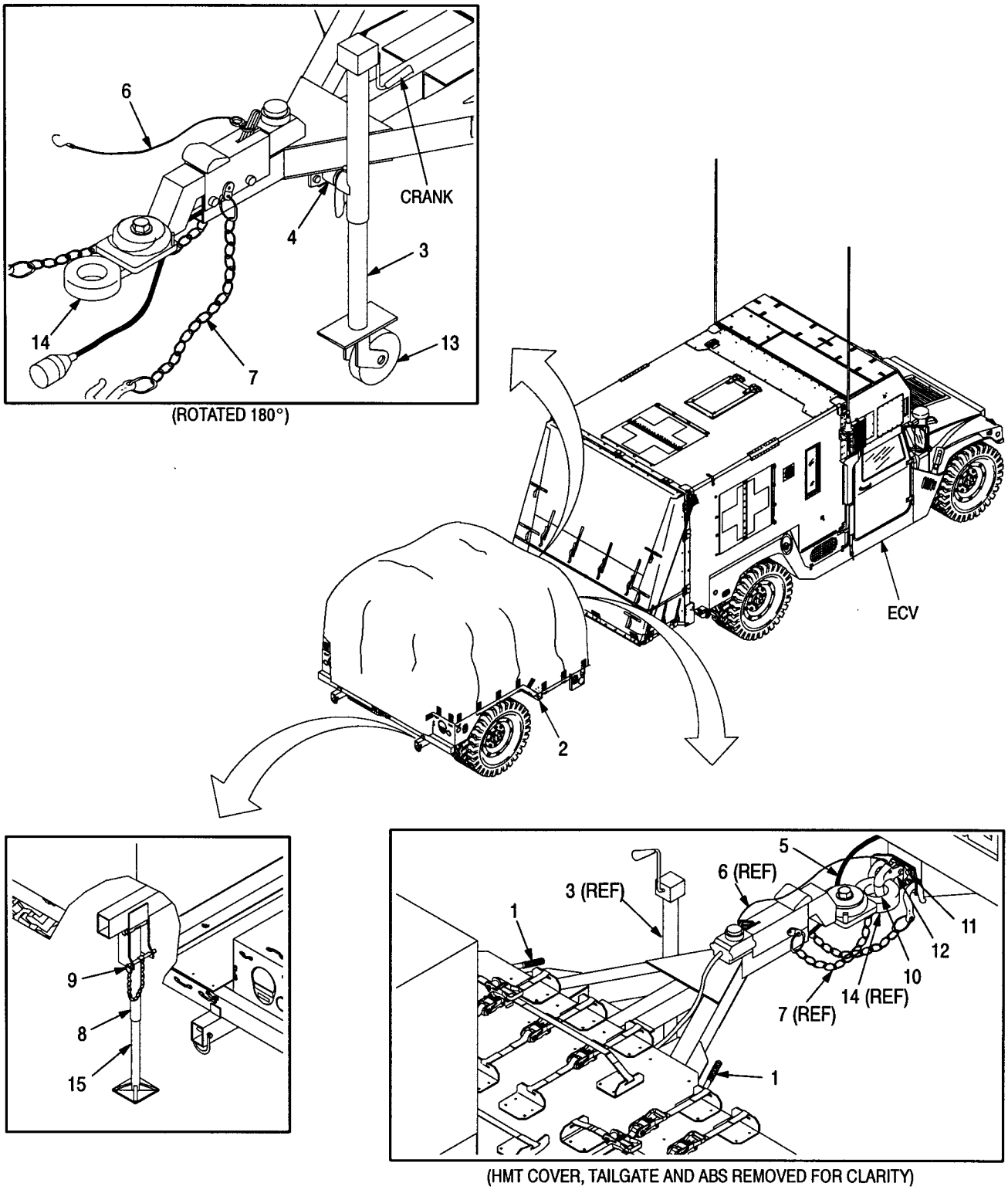


Figure 2-4. HMT Disconnection and Setup

Do not attempt to lift HMT tongue alone if HMT is heavily loaded. Lifting heavy HMT tongue alone can cause back injury. Use crank on front caster to raise HMT tongue.

(9) Use crank on front support leg (3) to level HMT (2) as needed. Adjust rear support leg (8) by turning leg extension (15) in or out.

(10) Move ECV into position and park with engine running for ABS deployment.

(11) Set parking brake.

(12) Set EPG switch (1, figure 2-7) on vehicle control box (2) to ON, when instructed by LMS crew.

(13) Listen for EPG engagement, indicated by a change in ECV engine speed.

(14) If system is to be powered by ECV (internal power), proceed to para 2.24.2.2. If system is to be powered by 10 kW TQG (external power), proceed to para 2.24.2.3.

b. **LMS Crew Tasks**

No tasks required.

2.24.2.2 Deployment Using Internal ECV Power.

a. **Cab Crew Tasks**

WARNING

ABS fabric may be slippery, especially under wet or muddy conditions. Use care when walking on ABS, as surface may be bumpy due to air beam inflation manifold or folds of fabric and may cause a tripping hazard.

(1) Police 30 foot by 30 foot area behind the ECV for branches, rocks, or anything that might puncture or tear ABS.

CAUTION

Ensure that work platform is removed from top of generator before starting generator. Remove any dry grass or material that might be ignited by hot exhaust pipe of ECV.

(2) Remove transport cover from HMT and place on ground, dirty side down, approximately 25 ft behind HMT.

(3) Deleted

(4) Unload doors, litter, light set, and maintenance stand from HMT and place on transport cover.

(5) Remove ground stake (5, figure 2-9) from HMT and drive into ground at rear driver side of ECV using slide hammer.

(6) Connect 10 kW TQG ground lead (4) to ground stake (5) and to LMS power panel (3).

NOTE

Power cable ends are keyed for proper connection.

(7) Connect power cable (1) from 10 kW TQG to power panel (3).

(8) Ensure that circuit breaker on power panel is set to OFF (refer to para 2.12).

(9) Unfasten four strap buckles (1, figure 2-5) on transport cover (2). On each side of LMS, unfasten three side and three bottom strap buckles (3) of transport cover (2).

2.24.2.2 Deployment Using Internal (ECV) Power - Continued.

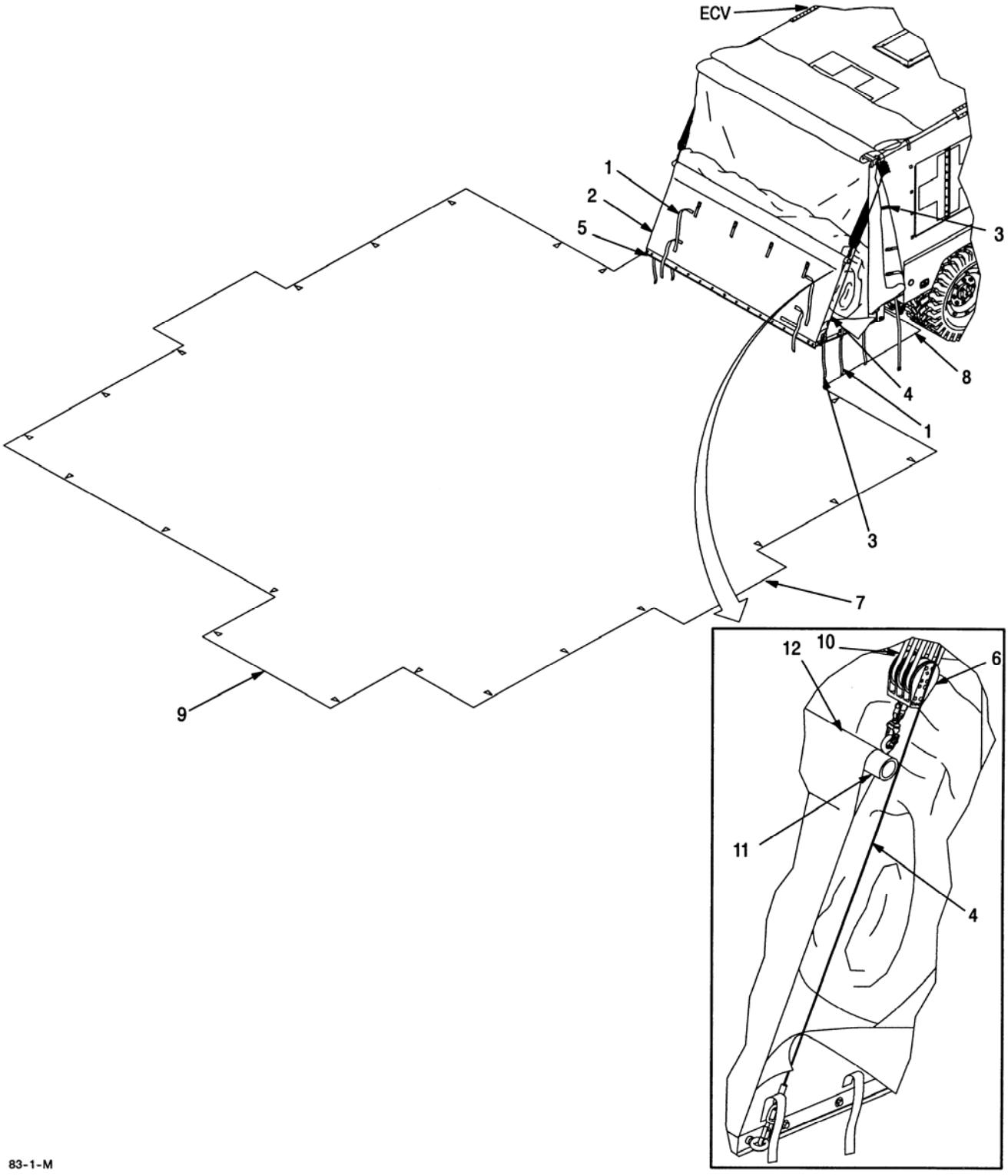


Figure 2-5. Positioning Ground Cloth

WARNING

Wear gloves when lowering ABS to ground to protect hands from injury. Do not wrap rope around hand.

(10) Disconnect safety cables (4) from tailgate (5) and, using pulleys (6), lower tailgate (5) so that it is approximately one foot above ground level.

(11) Remove and unfold ground cloth (7). Position extension (8) against rear wheels of ECV, and with extension (9) for outer ambulatory airlock door farthest from ECV. Lower tailgate (5) to ground. Loosen pulley lines (10) on both sides.

(12) Unbuckle tent retention strap (1, figure 2-6).

CAUTION

When unrolling ABS, DO NOT pull ABS by Dee Rings. ABS can be damaged.

(13) Unroll ABS (2) and pull away from LMS.

(14) Leave anchor tube (12, figure 2-5) in lower transport cover sleeve (13) and push anchor tube (12) and lower transport cover sleeve (13) back as close to tailgate (6) as possible.

(15) Unfold ABS (2, figure 2-6).

(16) Make sure all seven dump caps (3) are tightly secured to the dump valves.

NOTE

When operating under cold weather conditions or on hard ground, use steel stakes instead of wooden stakes.

(17) Drive four stakes (4) into ground approximately 18 to 24 inches from arrow marks (5) on each corner of ground cloth (6). Loosely attach slip lines to four stakes (4).

(18) Signal LMS crew to start ABS inflation procedures.

b. **LMS Crew Tasks**

(1) On rear control panel (3, figure 2-7), make sure ESS MODE selector switch (4), NBC FAN switch (5) and RIB FAN switch (6) are set to OFF and POWER MODE switch (7) is set to INT.

(2) Wait for cab crew to signal readiness for ABS inflation.

(3) Set rear control panel circuit breakers (8, 9, 10, 11 and 12) to ON.

(4) Set inverter (14) power switch (15) to ON.

2.24.2.2 Deployment Using Internal (ECV) Power - Continued.

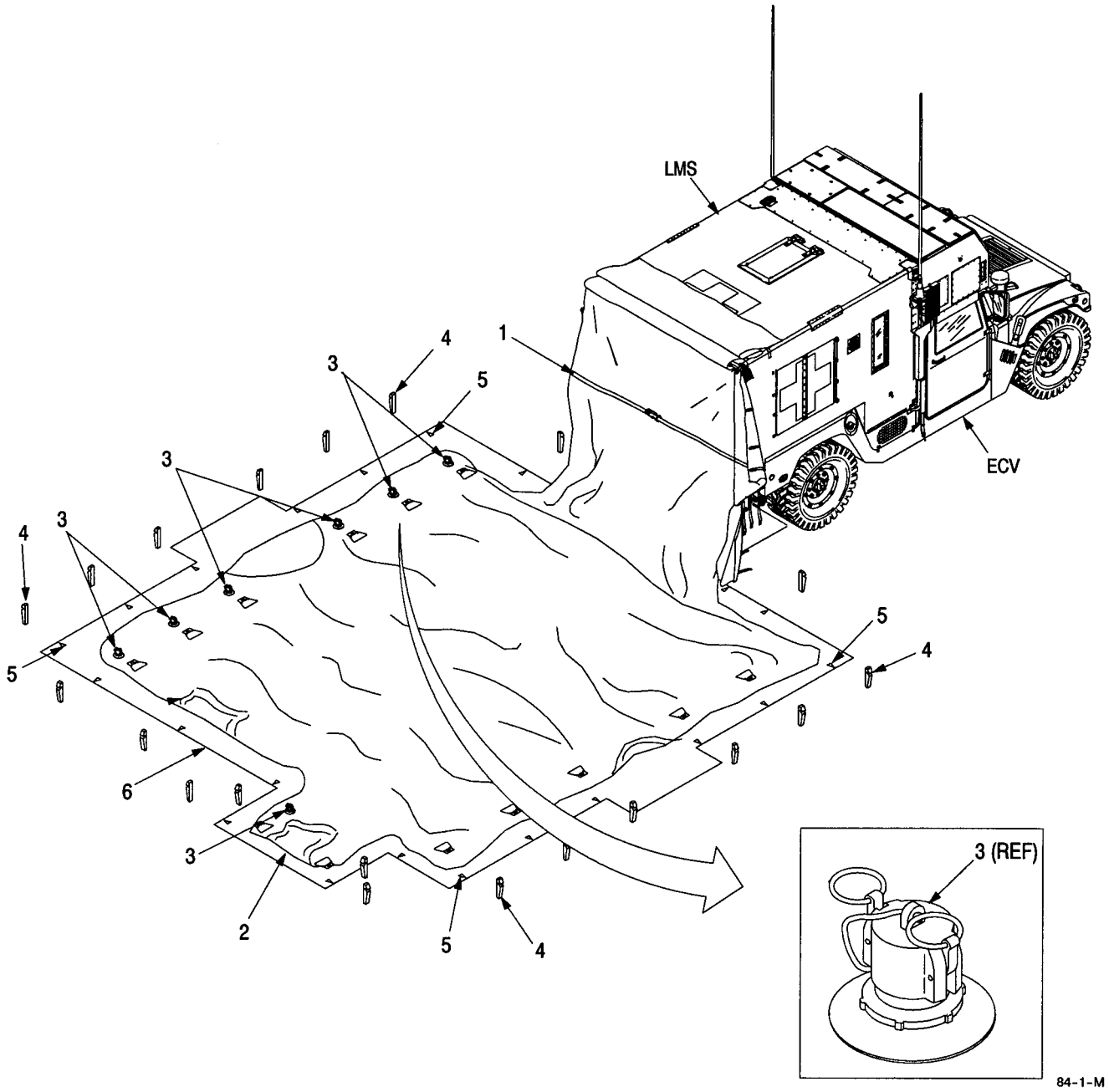


Figure 2-6. ABS Deployment

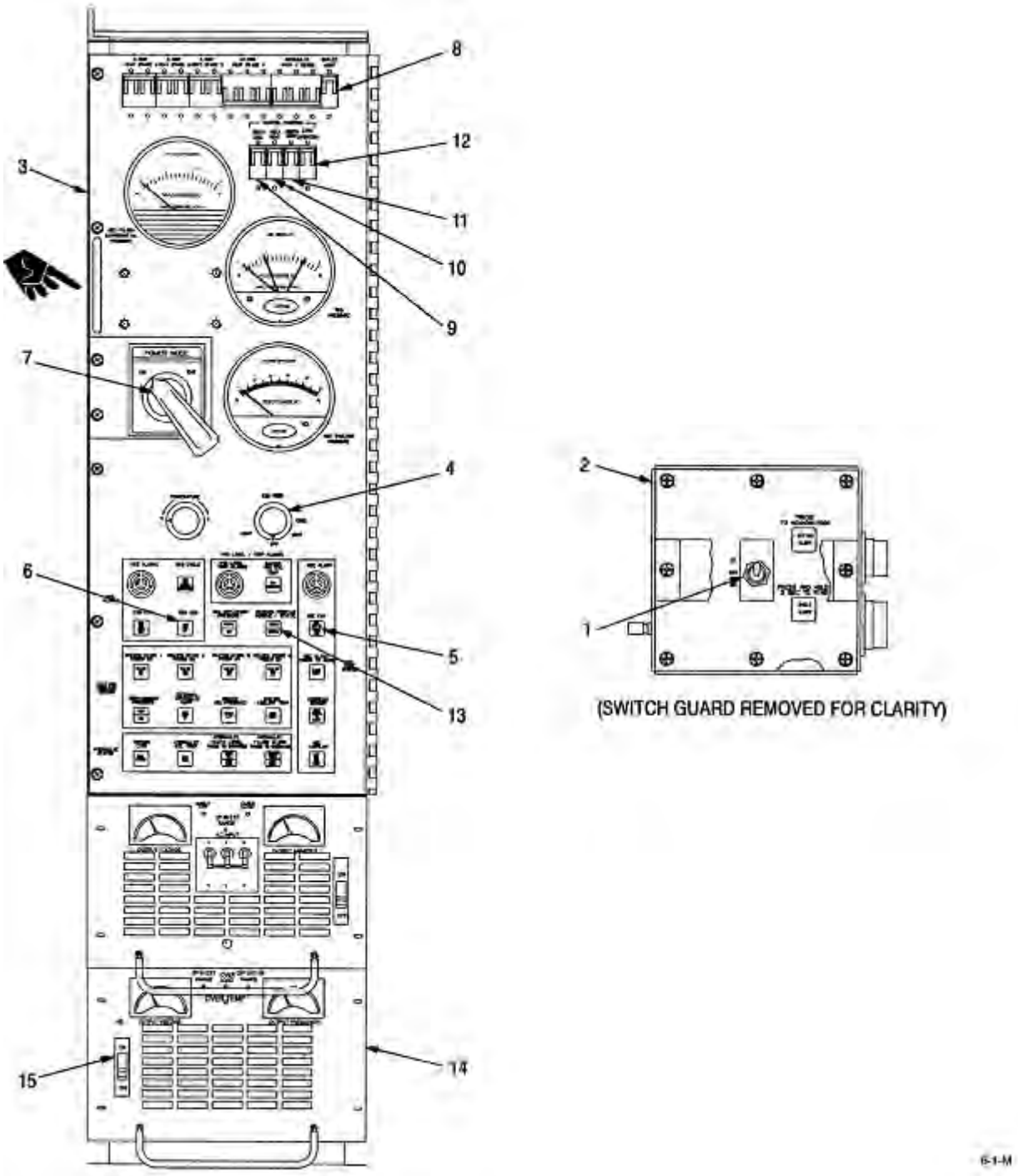


Figure 2-7. Internal Power Control Settings

2.24.2.2 Deployment Using Internal (ECV) Power - Continued.

CAUTION

If any engine indicators come on during system start up or operation, shut system down, switch to external power and proceed to troubleshooting (Chapter 3, Section II). Continuing start up or operation without correcting problem can damage system.

NOTE

MISSION PROFILE STATIC indicator will not light if INSTM CONT circuit breaker is not ON and ESS MODE selector switch is in OFF position.

(5) Set ESS MODE selector switch (1, figure 2-8) to VENT, HEAT or COOL and adjust TEMPERATURE control (2) to desired setting. Air should begin to flow into ABS.

(5.1) Signal cab crew to engage EPG.

CAUTION

Ensure ESS Mode selector switch is on Vent, Heat, or Cool; prior to EPG switch being engaged. Failure to complete this in sequence could result in damage to hydraulic pump, and belts.

(6) Set MISSION PROFILE switch (13) to STATIC. The STATIC indicator will light (white).

NOTE

ESS MODE selector switch must be set to HEAT for supplemental heat to work.

(7) If supplemental heat is required (below 20°F), signal cab crew to make sure that TQG is operating and set rear control panel circuit breakers HEAT STAGE 1 (3), HEAT STAGE 2 (4) and HEAT STAGE 3 (5) to ON. Verify that ESS MODE selector switch (1) is set to HEAT. Push HEAT STAGE 1 (6), HEAT STAGE 2 (7) and HEAT STAGE 3 (8) switches to ON to achieve desired temperature. The indicators will light (green).

(8) Proceed to para 2.24.2.4 for ABS setup procedures.

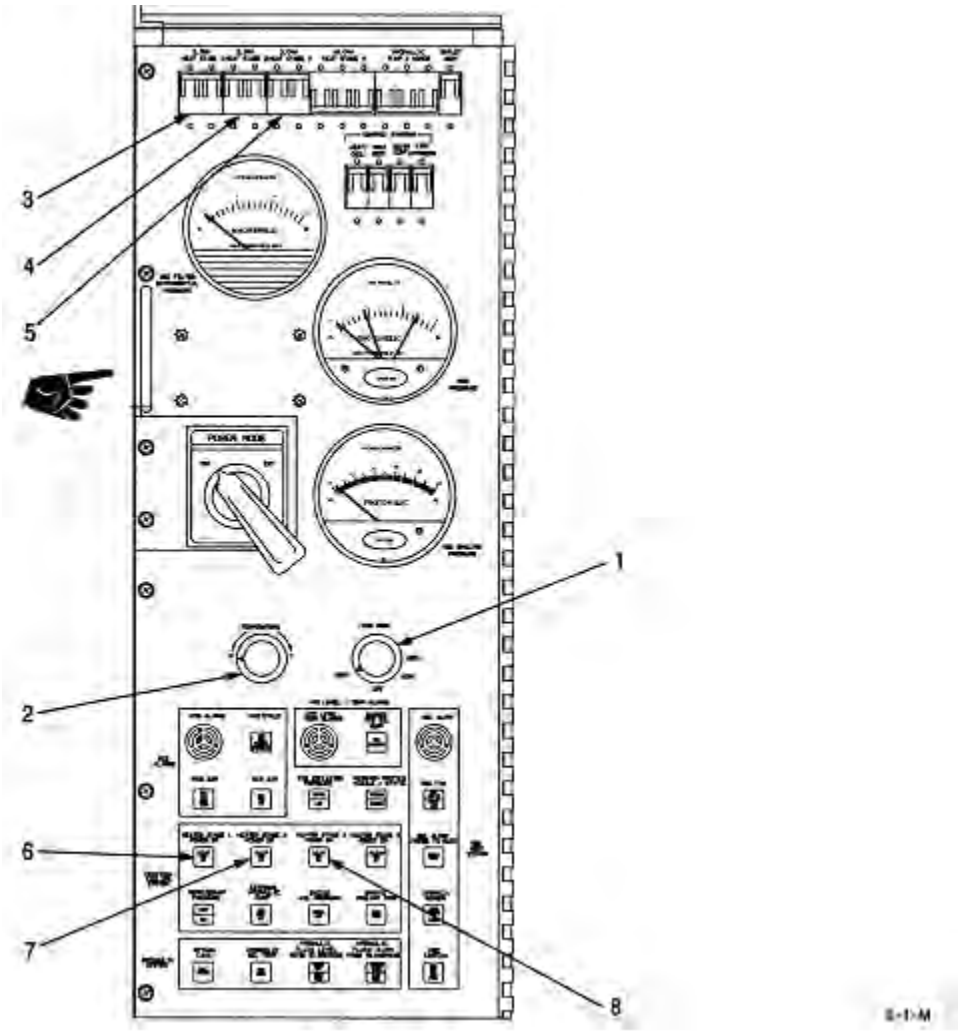
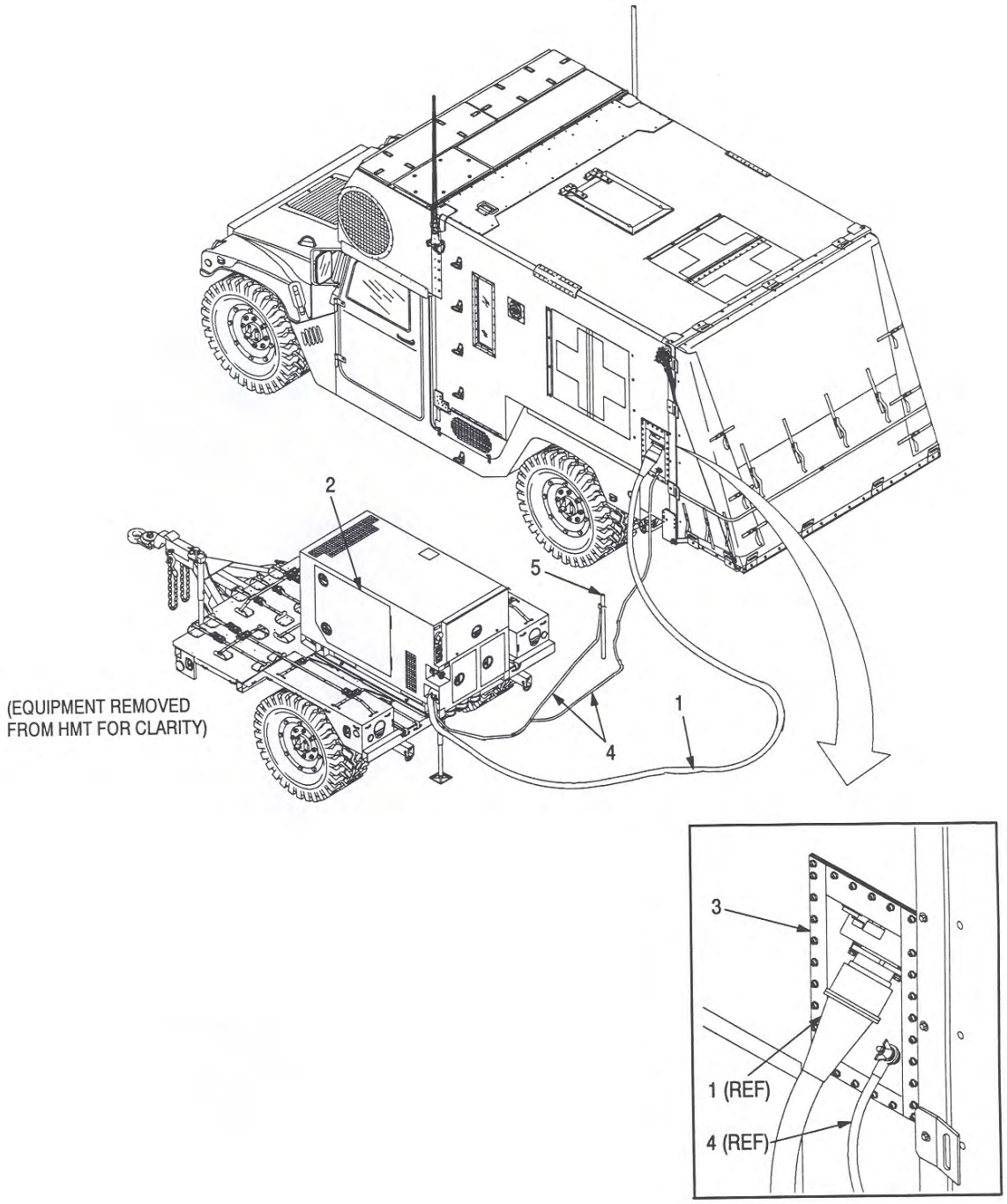


Figure 2-8. Rear Control Panel Using Internal Power - Non-NBC Conditions

2.24.2.2 Deployment Using Internal (ECV) Power - Continued.



Item 6 Deleted

Figure 2-9. Power Cable and Ground Lead

2.24.2.3 Deployment Using External (10 kW TQG) Power.

WARNING

ABS fabric may be slippery, especially under wet or muddy conditions. Use care when walking on ABS, as surface may be bumpy due to air beam inflation manifold or folds of fabric and may cause a tripping hazard.

a. **Cab Crew Tasks**

WARNING

To prevent injury to personnel, hearing protection is required when starting and operating the TQG.

NOTE

Power panel circuit breaker must be ON for CBPS to operate off of 10 kW TQG (para 2.12).

In cold weather conditions, place master switch to PREHEAT position for approximately 30 seconds prior to starting.

(1) Start TQG as follows:
   (a) Rotate master switch to START position and hold until oil pressure reaches at least 25 psi.
   (b) Release master switch to PRIME AND RUN position.
   (c) Position AC circuit interrupter switch to CLOSED position. Green light illuminates.

(2) Shut off ECV.

(3) Set power panel circuit breaker to ON (para 2.12).

(4) Signal LMS crew to start inflation procedures.

b. **LMS Crew Tasks**

(1) Ensure that converter (1, figure 2-10) ON/OFF switch (2) is set to OFF and ESS MODE selector switch (3) on rear control panel (4) is set to OFF.

CAUTION

Switching to external power prior to shutting down ECV engine will cause damage to engine.

NOTE

Perform following steps after cab crew has turned TQG on and shut ECV off.

(2) Ensure NBC fan switch and RIB fan switch are set to OFF.

(3) On rear control panel (4), set POWER MODE switch (5) to EXT.

(4) Set rear control panel circuit breakers (8, 9, 10, 11, and 12, figure 2-7) to ON.

(5) Set the following circuit breakers to ON:
   (a) Rear control panel
   HYDRAULIC PUMP/MOTOR (6)
   (b) Converter
   AC INPUT (7)

(6) Set converter ON/OFF switch (2) to ON.

2.24.2.3 Deployment Using External (10 kW TQG) Power - Continued.

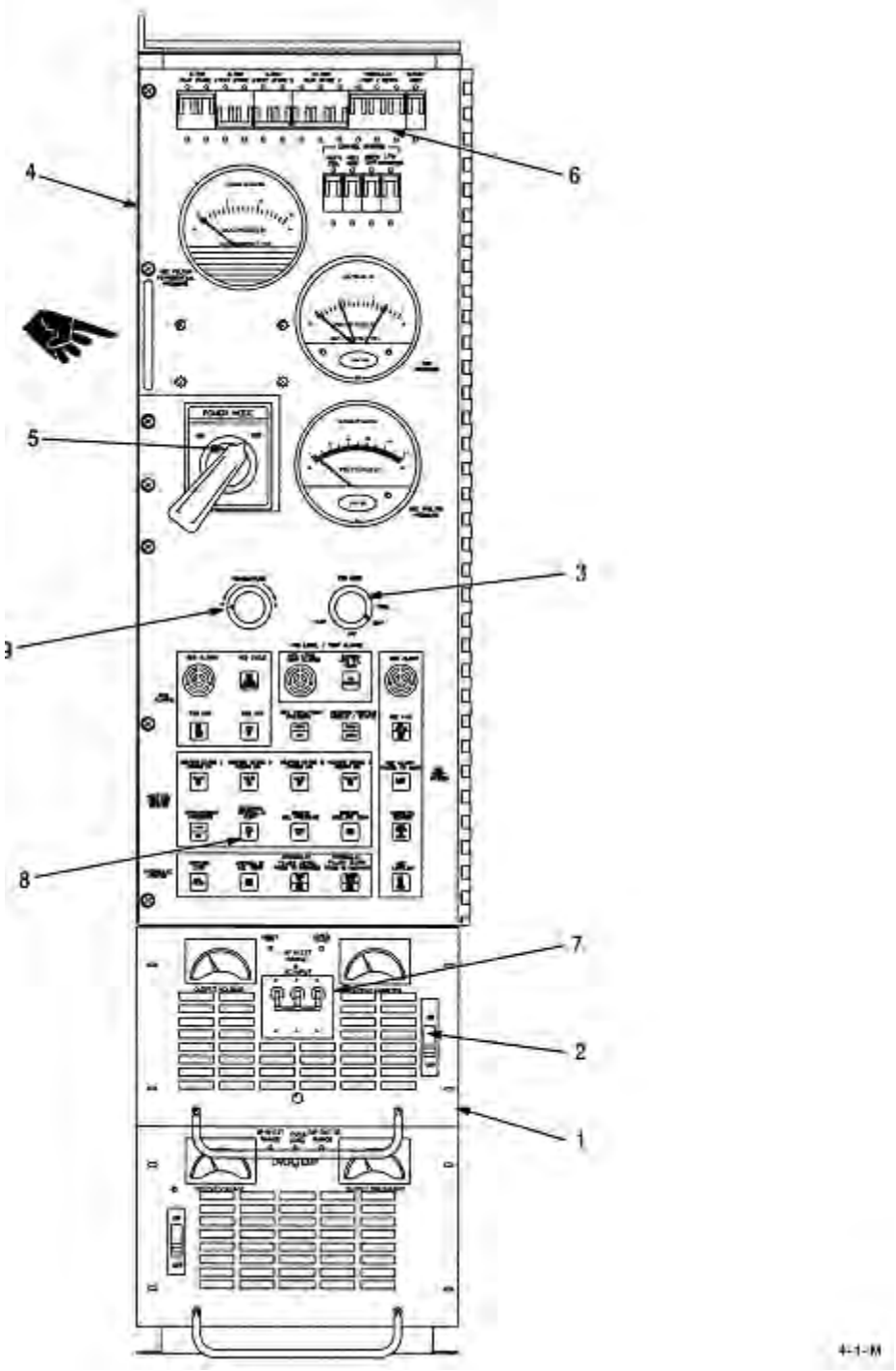


Figure 2-10. Rear Control Panel Settings Using External Power

WARNING

10 kW TQG will only support heat stage 1. Turning heaters 2 through 4 ON will shut down 10 kW TQG.

NOTE

Hydraulic system will not engage and air beams will not inflate if ESS MODE selector switch is set to OFF.

(7) Set ESS MODE selector switch (3) to VENT, HEAT or COOL and adjust TEMPERATURE control (9) to desired setting.

(8) Set MISSION PROFILE switch to STATIC. STATIC indicator light (white).

(9) Set EXTERNAL HYDRAULIC PUMP switch (8) to ON. HYD PUMP ON indicator will light (blue).

(10) Proceed to para 2.24.2.4 for ABS setup procedures.

2.24.2.4 ABS Setup Procedures.

a. **LMS Crew Tasks**

NOTE

Hydraulic system and rib fan will not operate and air beams will not inflate if ESS MODE selector switch is set to OFF.

(1) Verify that RIB PRESSURE gage (1, figure 2-11) is set to zero. If not, set RIB PRESSURE gage (1) to zero by adjusting screw on face of gage.

(2) Press RIB FAN ON switch (2) on rear control panel (3). RIB FAN ON indicator lights (green) and RIB INFLATION PRESSURE LOW indicator (4) lights (red). RIB INFLATION PRESSURE LOW indicator (4) will remain on until air beam pressure reaches low setting on RIB PRESSURE gage (1), at which time RIB INFLATION PRESSURE LOW indicator (4) will go off. Rib pressure set points should be set to 1.5 and 2.9 psi.

CAUTION

Do not lower ladder into ABS until ladder legs can clear ceiling and air beams.

(3) As ABS (1, figure 2-12) inflates, lower ladder (2) into ABS. Enter ABS (1) and support air beams (3) during inflation by pushing up on air beams.

WARNING

To prevent injury to personnel, use caution when dropping down from LMS into ABS.

NOTE

When air beams are inflated to correct pressure, rib fan will automatically stop and rib PRESSURE NORMAL indicator will light (white).

(4) Ensure that fastener hook and fastener loop connection on fabric air duct (4) is securely attached to fastener hook and fastener loop connection on transition duct assembly (5). Adjust flaps along bottom of fabric air duct (4) for desired amount of airflow.

2.24.2.4 ABS Setup Procedures - Continued.

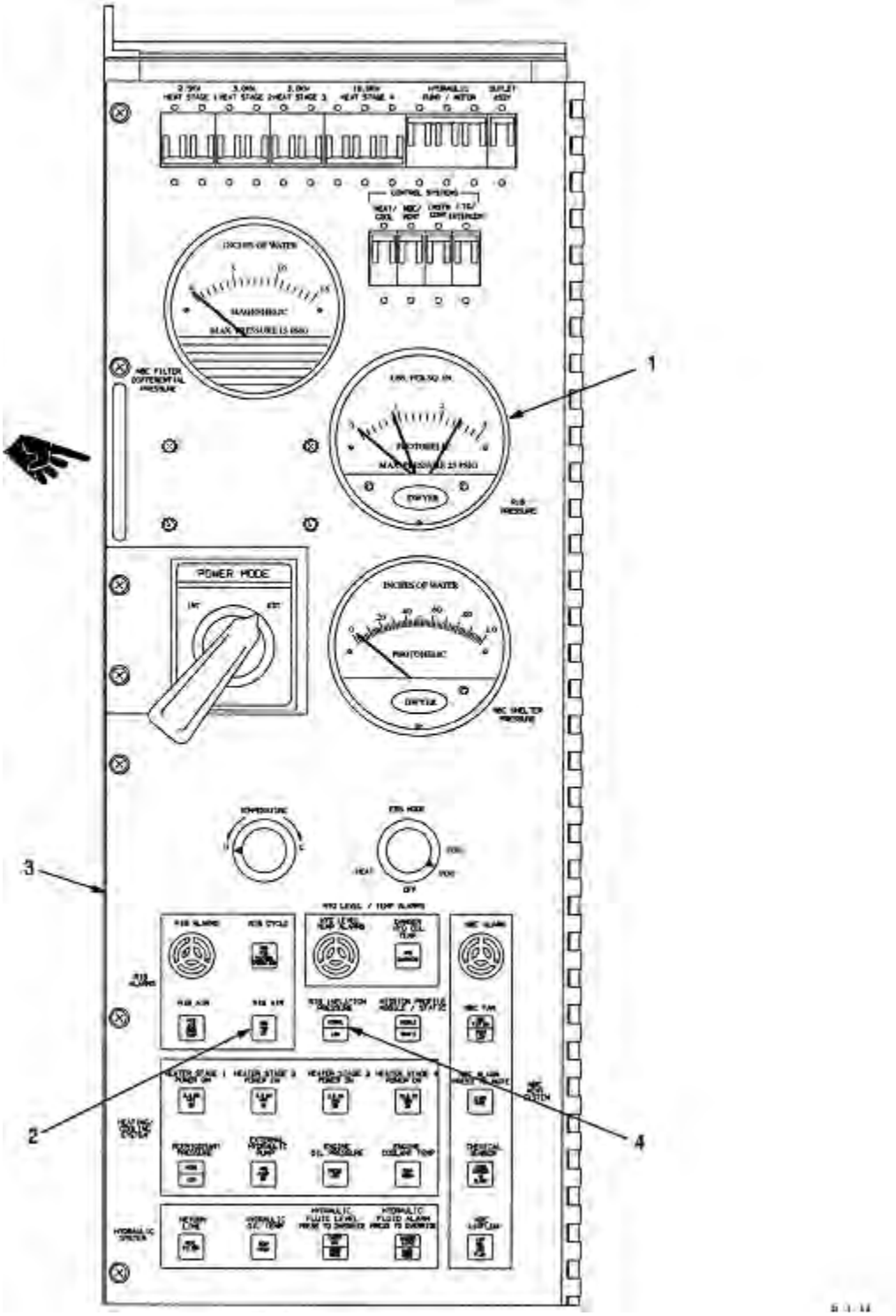


Figure 2-11. Monitoring ABS Inflation

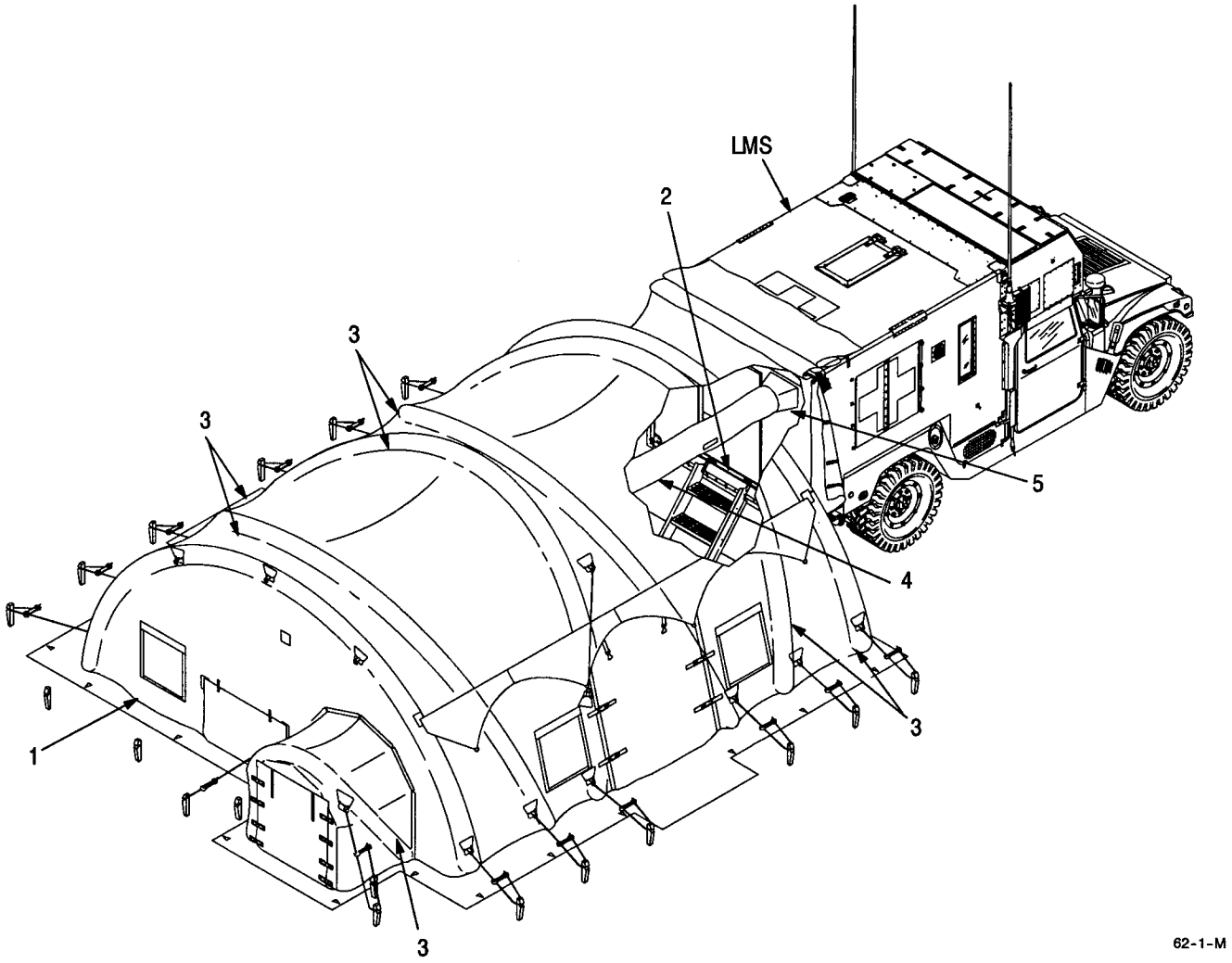


Figure 2-12. ABS Inflation

(5) Check air beam manifold (1, figure 2-13) and ensure that shut-off valves (2) on flexible hoses (3) connected to each air beam (4) are completely open (in-line with hoses).

NOTE

Outer TALP and ambulatory airlock doors are stowed on HMT.

Inner ambulatory and TALP airlock doors are stowed in LMS.

TALP rails, recirculation filters and medical chests are stowed in LMS.

(6) Locate inner TALP airlock door (1, figure 2-14) and TALP rails (2) in LMS.

NOTE

Under non-NBC conditions, inner and outer ambulatory airlock and TALP airlock doors can be installed at the same time.

As door is worked into opening, avoid pressing fastener hook and fastener loop tape in place.

Ambulatory airlock doors open inward.

(7) Attach TALP fabric tunnel (3) from bottom up to inner TALP airlock door (1) by placing fabric tunnel (3) between inner TALP airlock door (1) and retaining clamp (4), making sure grommets engage airlock door (1) posts. Engage latch clamp (5) to secure fabric tunnel (3) to inner TALP airlock door (1).

2.24.2.4 ABS Setup Procedures - Continued.

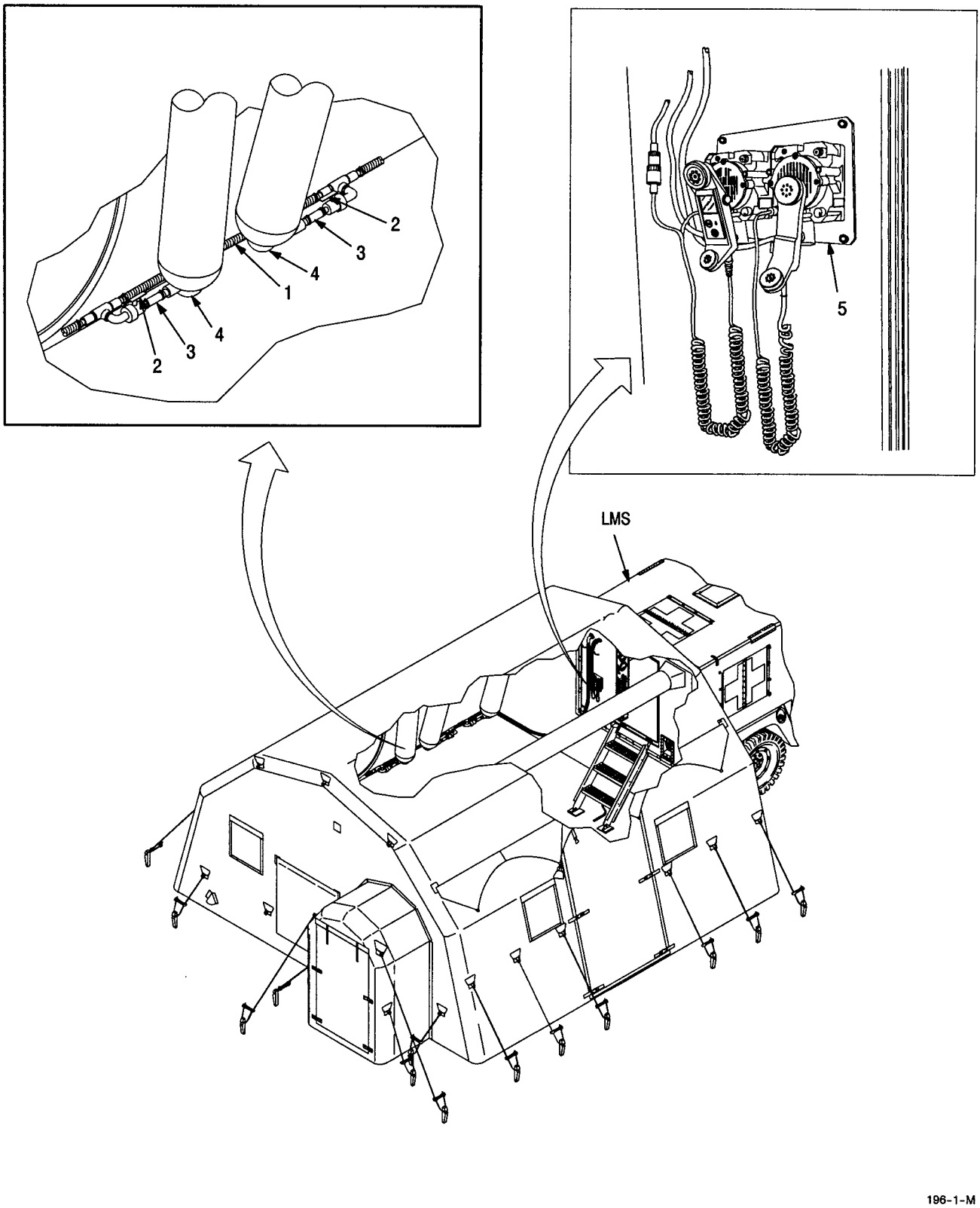


Figure 2-13. Air Beam Inflation

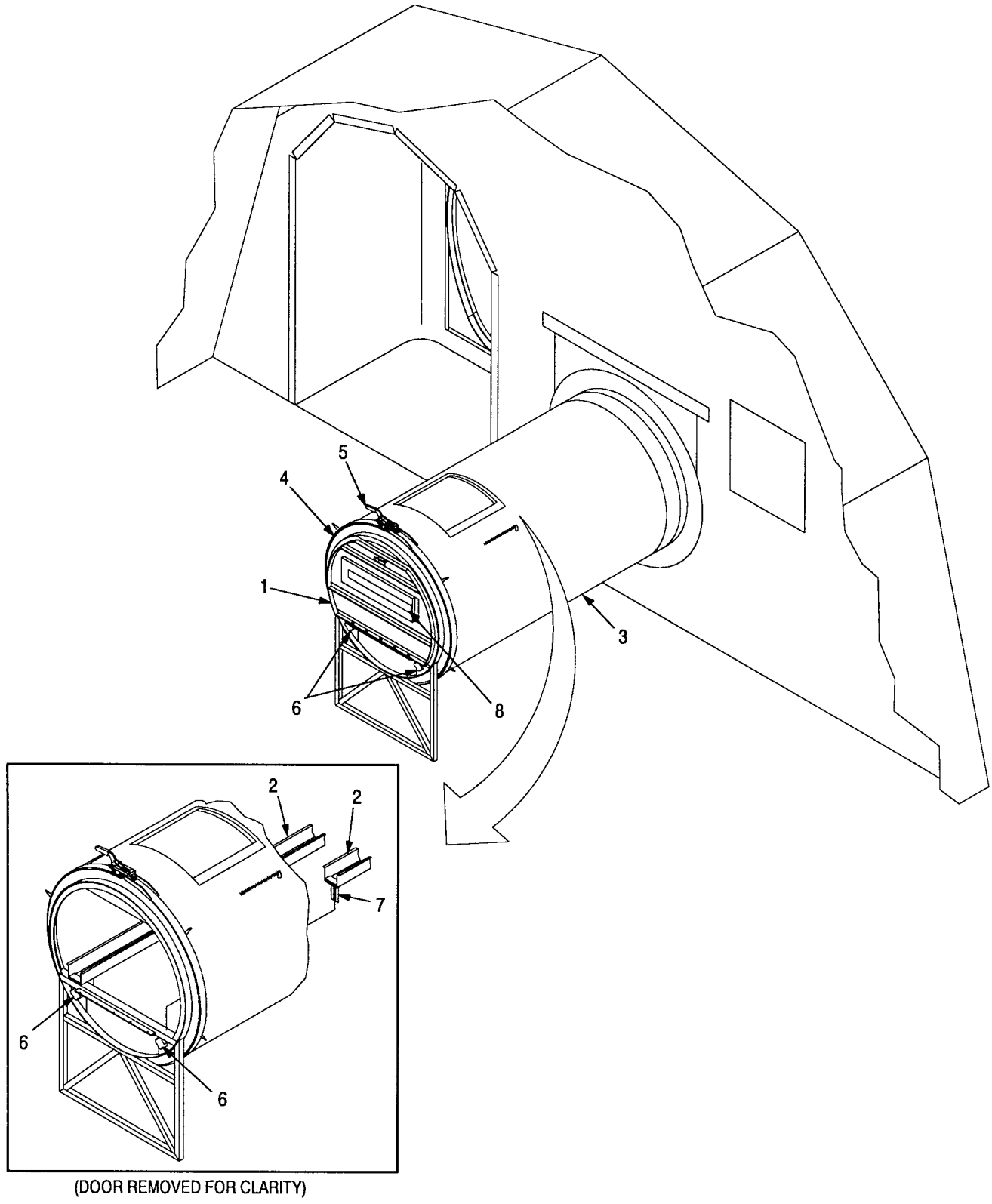


Figure 2-14. Installing Inner TALP Door

2.24.2.4 ABS Setup Procedures - Continued.

(8) Loosen two threaded knobs (6) on inner TALP airlock door (1).

(9) Carefully open TALP door (1) and insert TALP rails (2) into entrance way. Slide slotted plate (7) on TALP rails (2) into place between backing plate and inner TALP airlock door threaded knobs (6). Do not tighten knobs (6) until outer TALP door is installed.

(10) Locate inner ambulatory airlock door (1, figure 2-15) in LMS.

(11) To install inner ambulatory airlock door (1), LMS crew member no. 1 takes position inside ambulatory airlock (2).

(12) LMS crew member no. 2 stands inside ABS (3) and positions door (1) with timer (4) facing into ambulatory airlock (2).

(13) LMS crew member no. 2 places metal tab (5) on bottom of door (1) into fabric loop (6) on bottom of door opening (7) and supports door (1) for assembly from inside airlock.

(14) LMS crew member no. 1 starts fitting reinforced cable on door opening (7) around frame of door (1) behind spring clips (8) from bottom up.

(15) LMS crew member no. 1 carefully secures fastener hook and fastener loop tape on each side of door (1) working from bottom of door (1) to top until secured.

(16) Open holes on vents (8, figure 2-14) of inner TALP airlock door (1) by pulling back fastener hook and fastener loop cover. Inner ambulatory airlock door vents (9, figure 2-15) and inner TALP airlock door (1, figure 2-14) vents (8) should be opened or closed as required for ventilation.

(17) Remove speaker assembly (5, figure 2-13) from side of rear control panel and route cables through hole.

(18) Mount speaker assembly on outside of LMS and connect cables.

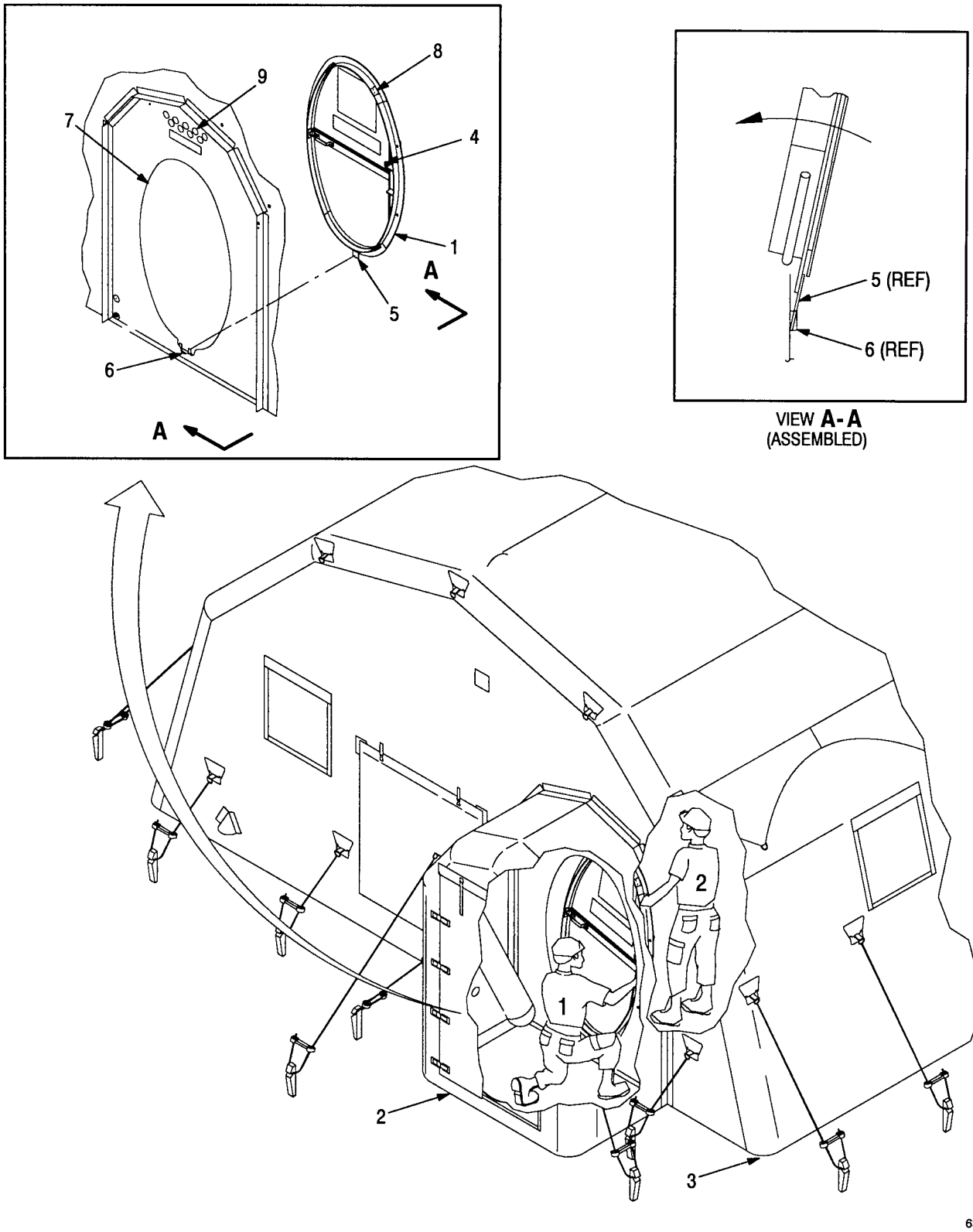


Figure 2-15. Installing Inner Ambulatory Airlock Door

2.24.2.4 ABS Setup Procedures - Continued.

NOTE

ABS is supplied with removable insulation panels. Top panels are above operator's reach and are normally left in ABS during striking. TALP, ambulatory and two side insulation panels are used only in extreme heat or cold conditions.

(19) Remove airlock pressure gage assembly (1) from rear of LMS. Install gage assembly (1, figure 2-16) between ambulatory and TALP doors using two fastener hook and fastener loop straps. Pass straps through Dee Rings on airlock wall and bring to front of gage assembly (1). Pass straps through slots and attach fastener hook and fastener loop.

(20) Attach three air lines: ABS inlet line (2) to quick disconnect at gage (1) input (top center), TALP airlock line (3) to quick disconnect at litter gage input, and ambulatory airlock line (4) to quick disconnect at ambulatory gage input.

(21) Ensure that airlock pressure gage (1) is level (front to back) and not tilted.

WARNING

To prevent injury to personnel, use caution when walking through entrances to the ABS, hose assemblies and cables are on the floor of the ABS.

CAUTION

To prevent damage to hose assemblies and cables on the floor of the ABS at the entrances, place hoses and cables up against the inside exterior wall of the ABS.

NOTE

Light set and medical chests are stowed on the HMT.

NBC recirculation filters are stowed in LMS.

(22) LMS crew obtains light set and medical chests from cab crew.

(23) Hang two lights (1 and 2, figure 2-17) with straps (3) from ceiling of passenger side of ABS. Hang two lights (4 and 5) with straps (3) from ceiling of driver side of ABS. Plug light (1) into light (2) and light (4) into light (5). Plug light (1) into extension cord (6). Plug other end of extension cord (6) into one of the top outlets on receptacle panel (7) at rear of LMS. Plug light (5) into extension cord (8). Plug other end of extension cord (8) into top outlet on receptacle panel (7). Hang extension cord (8) on bolt heads on ABS retainer.

(24) Remove NBC recirculation filters (9 and 10) from LMS.

(25) Place one NBC recirculation filter (9) on passenger side of ABS, close to rear of LMS and plug it into one of the bottom outlets in receptacle panel (7). Place second NBC recirculation filter (10) in the opposite, diagonal corner of ABS and using 32 foot extension cord (11), plug it into the other bottom outlet on receptacle panel (7). Turn both recirculation filters on. NBC recirculation filters will not operate unless under NBC mode; NBC FAN switch on rear control panel must be ON for NBC recirculation filter outlets on receptacle panel (7) to work.

(26) Remove and position medical equipment and supplies as required.

(27) Hang sound blanket from rear TALP rail straps.

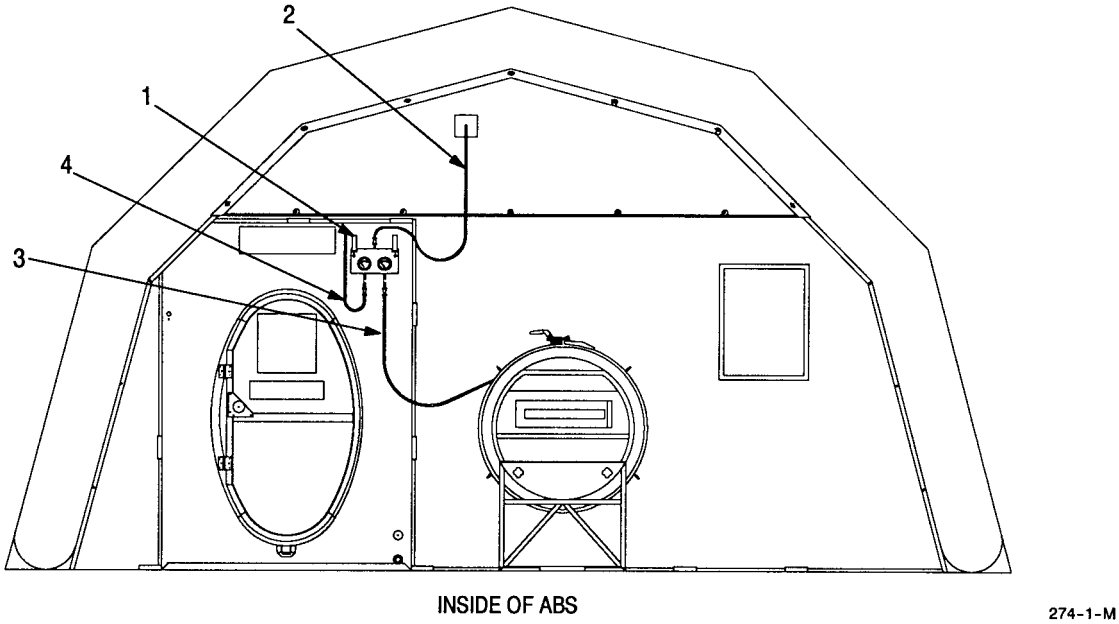


Figure 2-16. Airlock Pressure Gage Installation

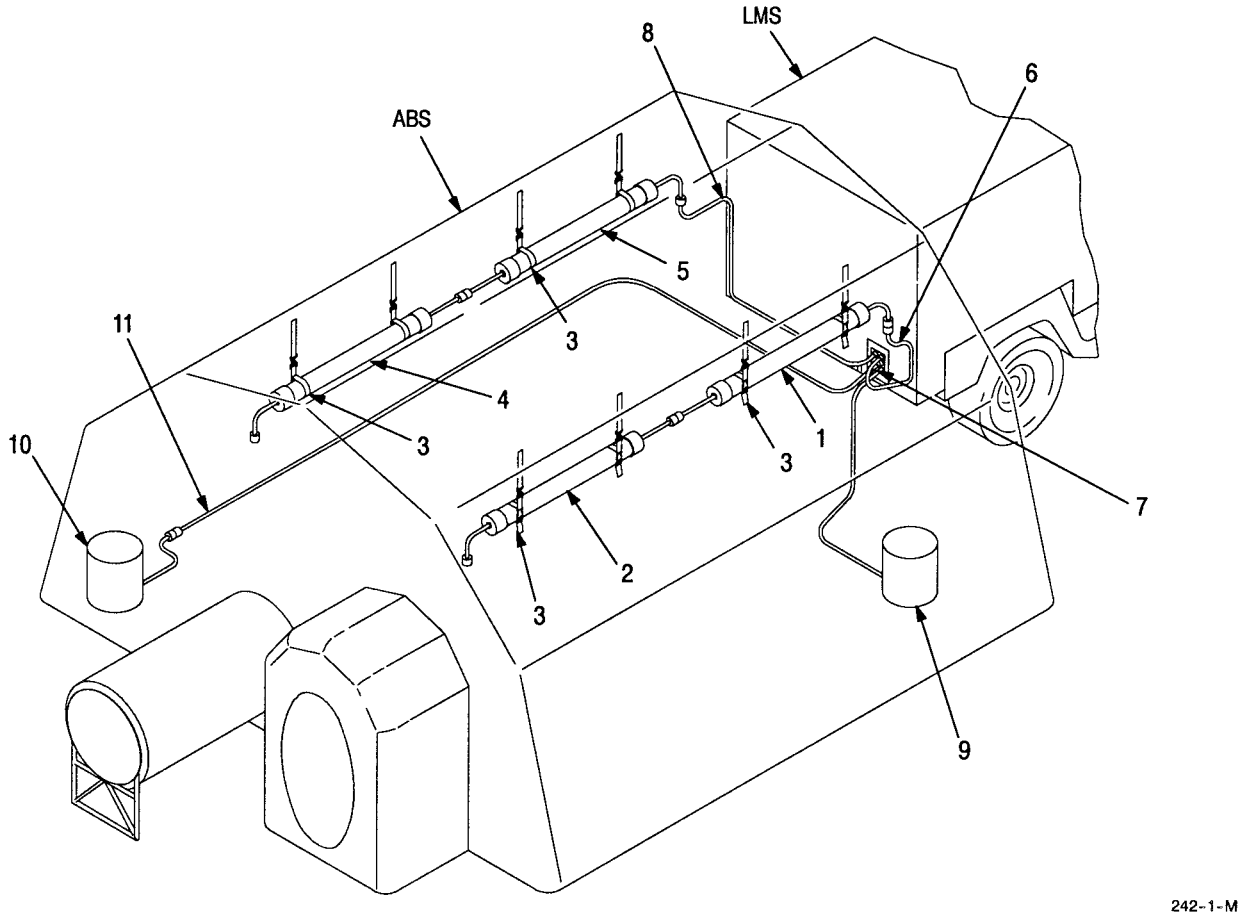


Figure 2-17. ABS Lights and NBC Recirculation Filter Installation

2.24.2.4 ABS Setup Procedures - Continued.

b. **Cab Crew Tasks**

(1) Unhook TALP door flap (1, figure 2-18) and roll flap (1) under so that green or tan material faces out, to minimize contamination and moisture retention. Secure flap (1) using buckles and straps (2). Secure straps (2) to buckles under flap (1).

NOTE

Vents are underneath rain guard.

(2) Position door (3) with timer control (4) facing outside and attach door (3) to TALP fabric tunnel (5) by placing TALP fabric tunnel (5) between door (3) and retaining clamp (6). Make sure grommets engage TALP door (3) posts. Engage latch clamp (7) to secure TALP fabric tunnel (5) to door (3). Open holes (8) on adjustable vents of door (3) to ventilate airlock as needed.

CAUTION

Use care not to rip ABS or airlock fabric when installing the rails.

(3) Loosen two threaded knobs (1, figure 2-19) on outer TALP airlock door (2). Open door (2) and carefully slide slotted plate (3) on TALP rail (4) into place between backing plate and inner TALP airlock door threaded knobs (5). Tighten two threaded knobs (1).

(4) Signal LMS crew to tighten two threaded knobs (5) on TALP inner door.

(5) Place medical chests, light set and litter stands in TALP after TALP door and rails are installed.

(6) Unhook ambulatory door flap (1, figure 2-20). Roll flap (1) under so that green or tan material faces out, to minimize moisture retention. Secure flap (1) using buckles and straps (2). Secure straps (2) to buckles under flap (1).

NOTE

Position and install door to open into ambulatory airlock.

(7) To install outer ambulatory airlock door (3), cab crew member no. 1 stands inside ABS ambulatory airlock (4), places metal tab (5) on bottom of door frame (3) into fabric loop (6) on bottom of door opening (7), and supports door (3).

(8) Cab crew member no. 2 is positioned outside ambulatory airlock (4) and starts fitting reinforced cable on door opening (7) around door frame (3), behind spring clips (8), from bottom up.

(9) Cab crew member no. 2 secures fastener hook and fastener loop tape on each side of door (3) working from bottom of door (3) to top until secured.

(10) Drive remaining stakes (2, figure 2-21) and attach lines (1) to stakes (2).

(11) When ABS (4) has inflated, tighten all slip lines (3).

(12) This completes set up for static mode operation.

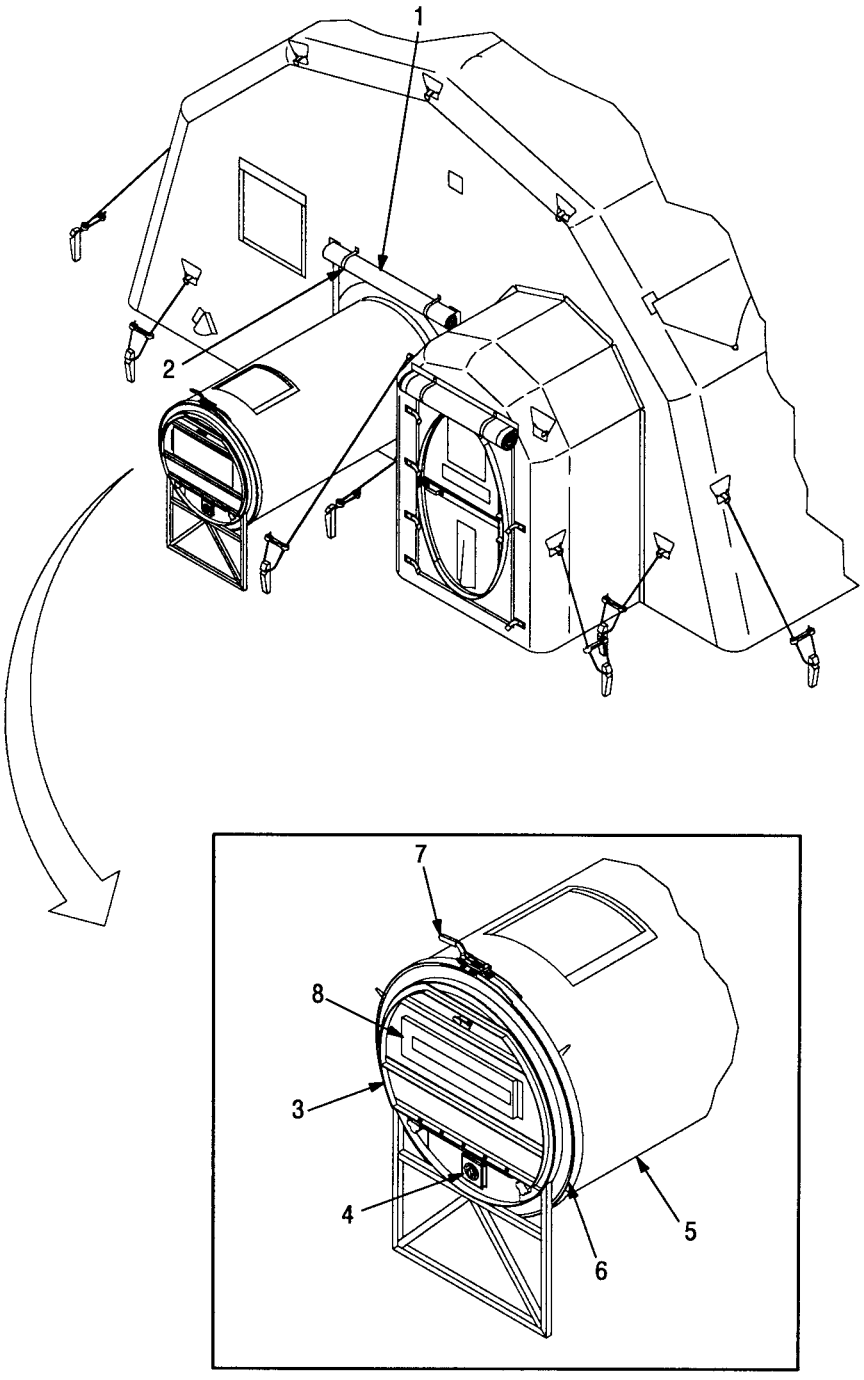


Figure 2-18. Installing Outer TALP Airlock Door

2.24.2.4 ABS Setup Procedures - Continued.

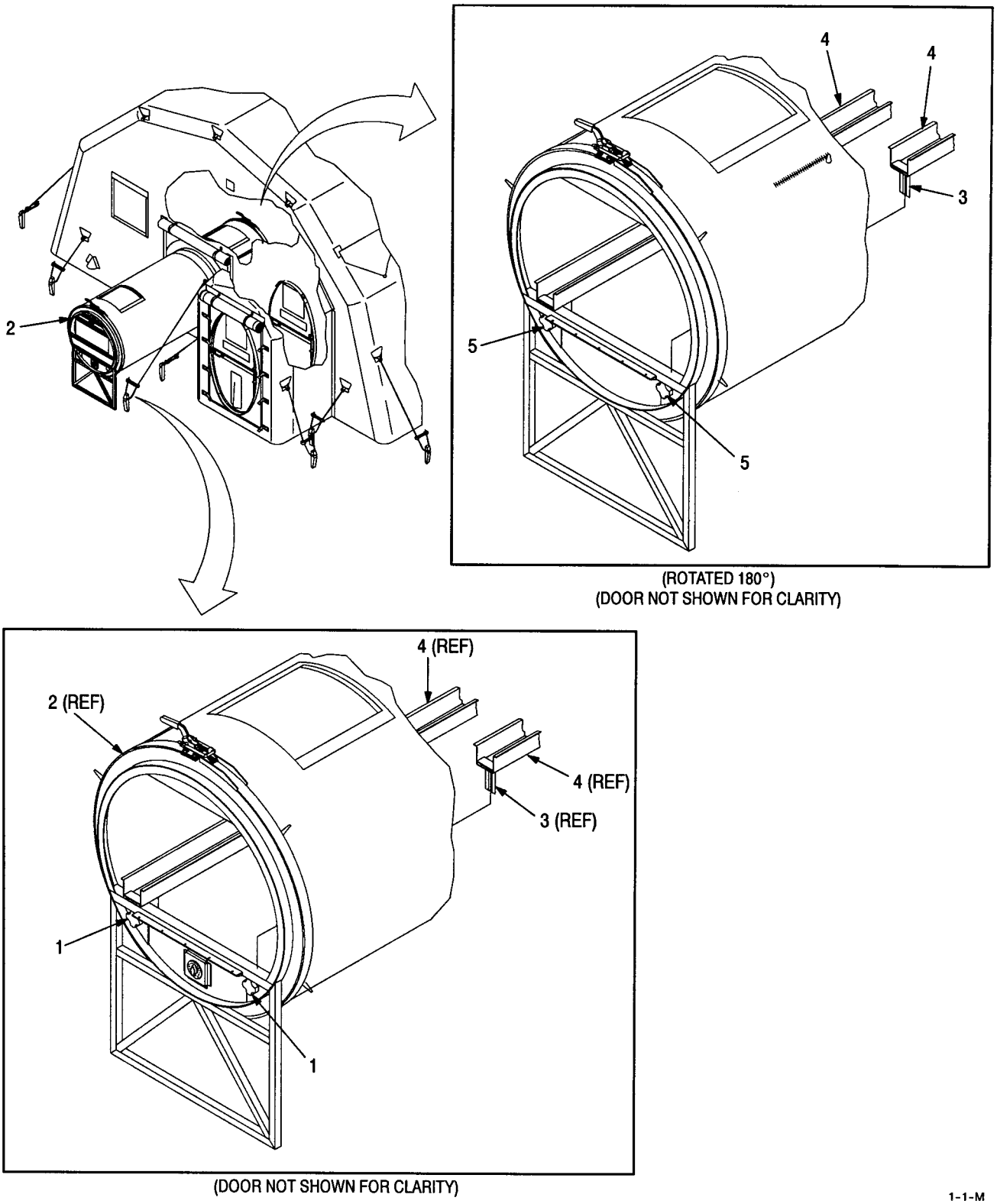


Figure 2-19. TALP Airlock Door Rails Installation

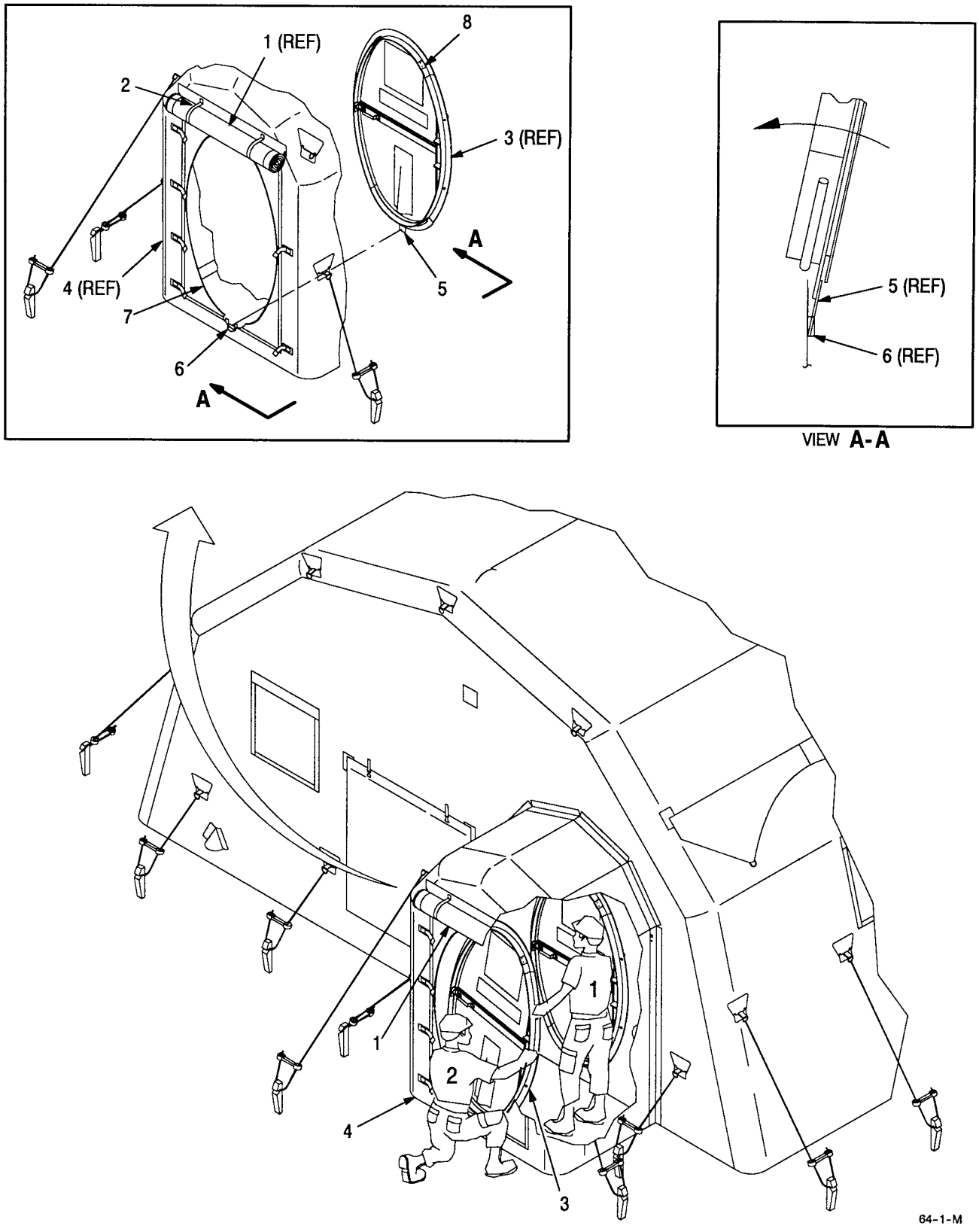


Figure 2-20. Installing Outer Ambulatory Airlock Door

2.24.2.4 ABS Setup Procedures - Continued.

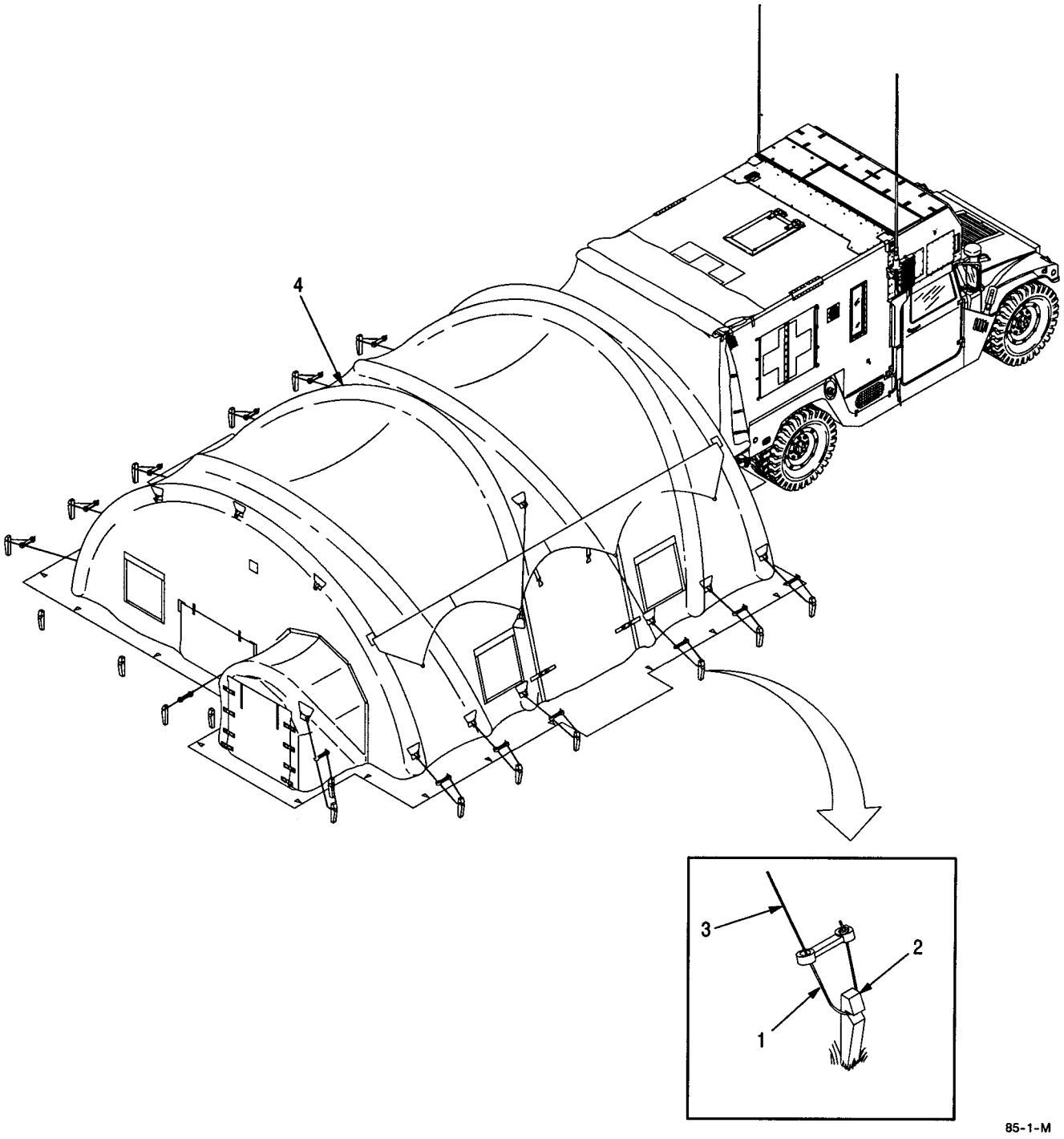


Figure 2-21. Inflating ABS

2.24.2.5 Direct Complexing Shelter (DCS).

The following steps describe procedures for connecting two or more CBPSs together in a side-by-side, DCS configuration.

a. **Cab Crew Tasks**

(1) Position ECVs and ground cloths (1, figure 2-22) facing opposite directions, side by side so that space between inflated ABSs is one to three feet. Overlap ground cloths (1) between lines (2) on ground cloth extensions (3) by about six inches.

(2) Deploy each system per para 2.24.2.1 through para 2.24.2.4.

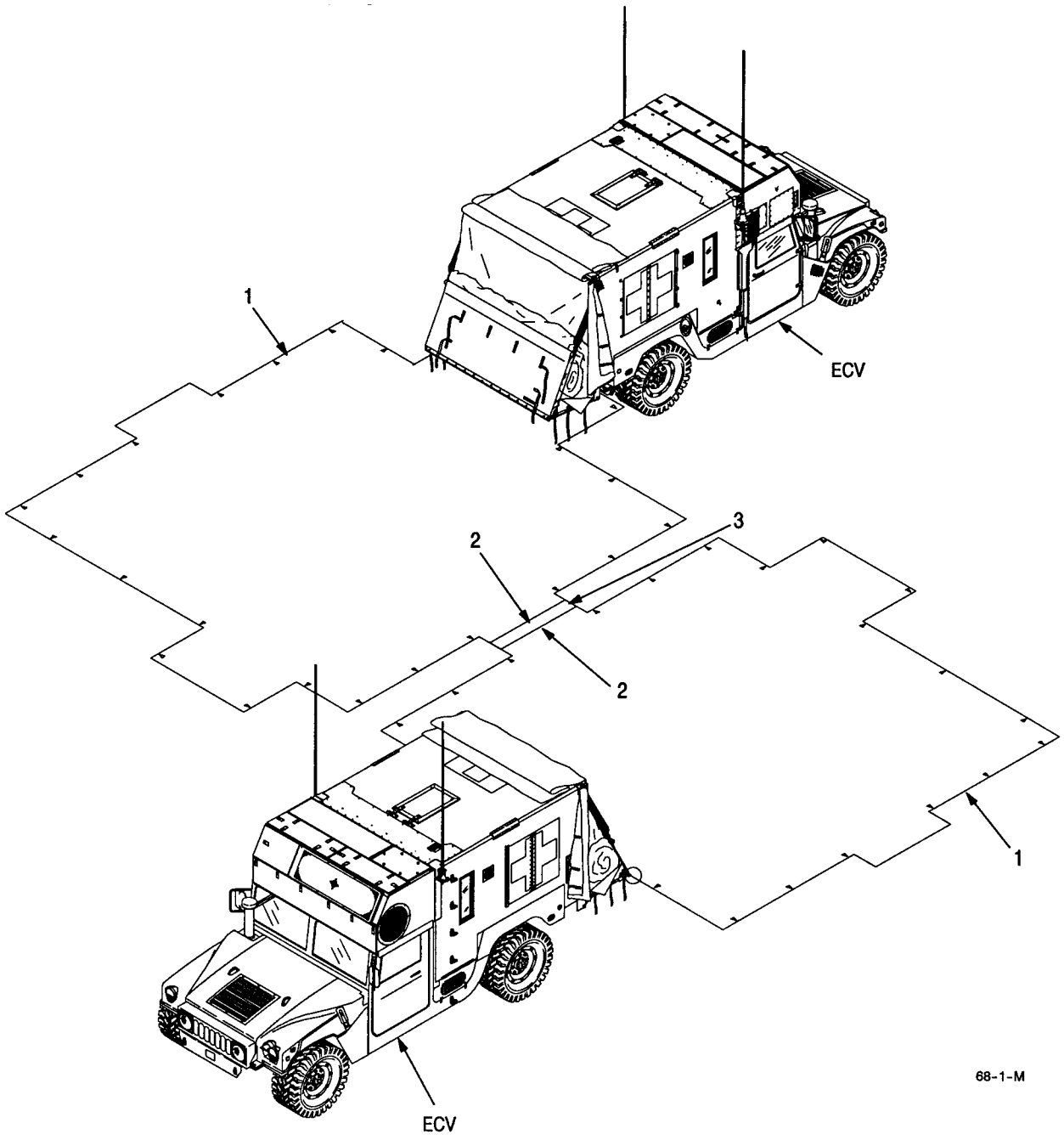


Figure 2-22. Positioning Ground Cloths for DCS

2.24.2.5 Direct Complexing Shelter (DCS) - Continued.

(3) Roll DCS entryway flaps (1, figure 2-23) under so that green or tan material faces out, to minimize contamination and moisture retention. Secure DCS entryway flaps (1) using buckles and straps (2). Secure straps (2) to buckles under flap (1).

(4) Insert door before openings (3) on both inflated ABSs (4), roll up, and use interior straps to hold covers out of way.

(5) Secure DCS connector (5) using zippers and buckle attachments (6) on both ABSs (4).

(6) Connect support lines (7) to Dee Rings (8) on DCS connector (5).

(7) Anchor DCS connector (5) to stakes at each side of connector (5) with support lines (7).

b. **LMS Crew Tasks**

WARNING

To prevent injury to personnel, use caution when walking through entrances to the ABS, hose assemblies and cables are on the floor of the ABS.

CAUTION

To prevent damage to hose assemblies and cables on the floor of the ABS at the entrances, place hoses and cables up against the inside exterior wall of the ABS.

(1) Help deploy each system per para 2.24.2.1 through para 2.24.2.4.

(2) This completes DCS set up.

(3) To prevent tripping hazards, determine routing and placement of power cables inside ABS.

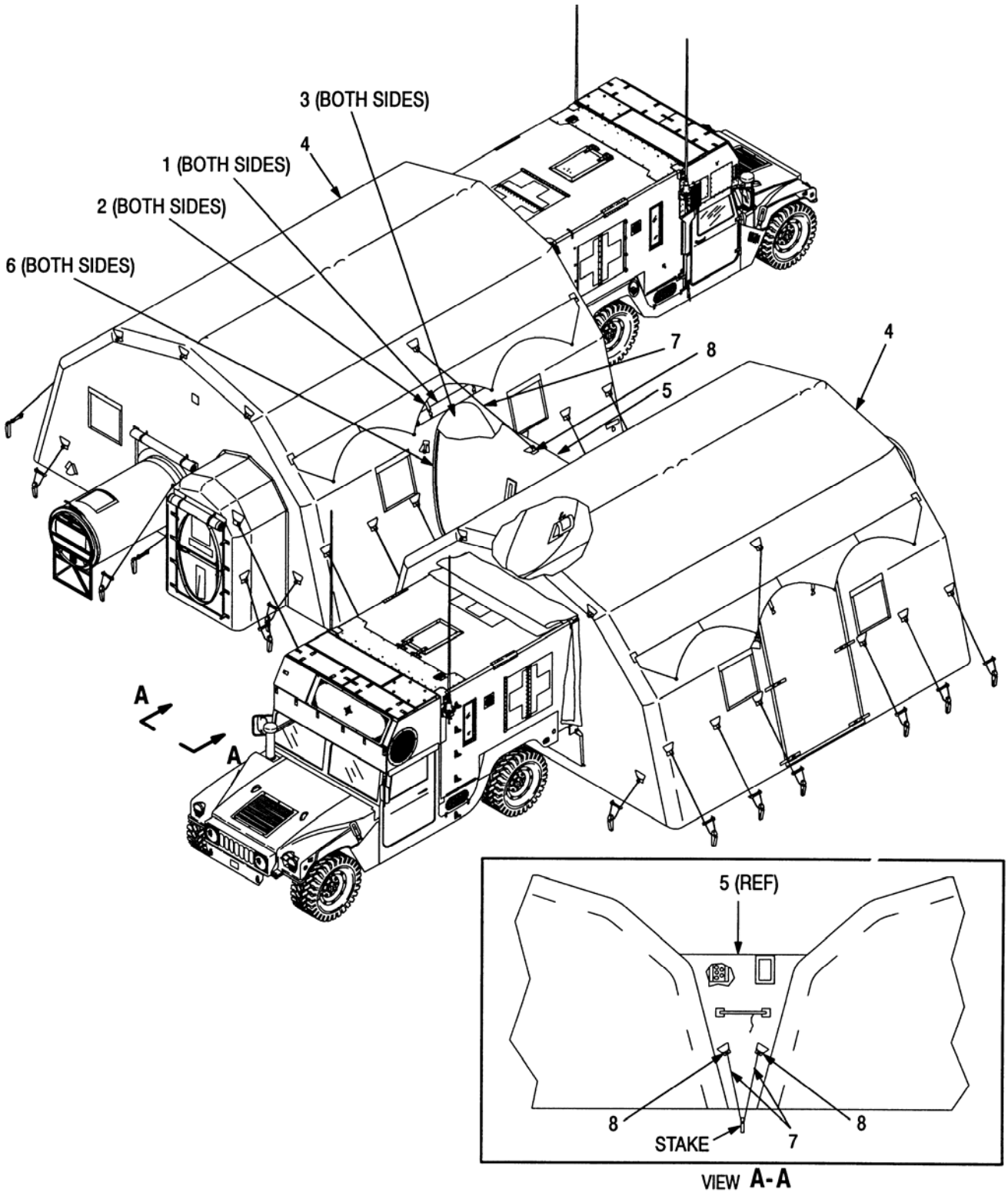


Figure 2-23. DCS Setup

2.24.2.6 Direct Complexing Forward Surgical Team (FST) and Level II Medical Treatment Facility (MTF).

a. **Cab Crew Site Selection**

(1) Select sight on level, dry ground in clear area approximately 154 feet by 52 feet with a minimum of 15 feet of overhead clearance.

NOTE

Sufficient area is required to park all support vehicles.

(2) Clear area of objects that could puncture the ABS or interfere with connecting systems together.

(3) Plan shelter placement for most efficient entrance and exit.

(4) Locate entrance in the center of complex through the Emergency Medical Triage (EMT).

(5) Locate exit from the complex through Post Op with the FST or Patient Hold with the MTF.

b. **LMS Crew Tasks**

WARNING

To prevent injury to personnel, use caution when walking through entrance to ABS, hose assemblies and cables are on the floor of ABS.

CAUTION

To prevent damage to hose assemblies and cables on floor of ABS at the entrances, place hoses and cables up against the inside exterior wall of ABS.

(1) Help deploy systems per para 2.24.2.2 through 2.24.2.4.

(2) To prevent tripping hazards, determine routing and placement of power cables inside ABS.

2.24.2.7 FST Setup.

a. **Cab Crew Tasks**

(1) Select sight on level, dry ground in clear area approximately 66 feet by 52 feet with a minimum of 15 feet of overhead clearance (figure 2-24).

NOTE

Before connecting shelters, all oversize equipment must be placed inside shelter.

Visually check DCS openings to verify that openings form a straight line. Make adjustments before all systems are connected and equipment installed.

(2) Deploy Operator Room (OR) in center of cleared area per para 2.24.2.

(3) Deploy PRE OP and POST OP per para 2.24.2.5.

b. **LMS Crew Tasks**

WARNING

To prevent injury to personnel, use caution when walking through entrance to ABS, hose assemblies and cables are on the floor of ABS.

CAUTION

To prevent damage to hose assemblies and cables on floor of ABS at the entrances, place hoses and cables up against the inside exterior wall of ABS.

(1) Help deploy systems per para 2.24.2.2 through 2.24.2.4.

(2) To prevent tripping hazards, determine routing and placement of power cables inside ABS.

2.24.2.8 MTF Setup.

a. **Cab Crew Tasks**

(1) Select sight on level, dry ground in clear area approximately 88 feet by 52 feet with a minimum of 15 feet of overhead clearance (figure 2-24).

NOTE

Before connecting shelters, all oversize equipment must be placed inside shelter. Visually check DCS openings to verify that openings form a straight line. Make adjustments before all systems are connected and equipment installed.

(2) Deploy Dental Lab and X--ray per para 2.24.2.

(3) Deploy EMT, ATM, and Patient Hold per para 2.24.2.5.

b. **LMS Crew Tasks**

WARNING

To prevent injury to personnel, use caution when walking through entrance to ABS, hose assemblies and cables are on the floor of ABS.

CAUTION

To prevent damage to hose assemblies and cables on floor of ABS at the entrances, place hoses and cables up against the inside exterior wall of ABS.

(1) Help deploy systems per para 2.24.2.2 through 2.24.2.4.

(2) To prevent tripping hazards, determine routing and placement of power cables inside ABS.

2.24.2.9 FST and MTF Combined Setup.

a. **Cab Crew Tasks**

(1) Select sight on level, dry ground in clear area approximately 154 feet by 52 feet with a minimum of 15 feet of overhead clearance (figure 2-24).

NOTE

Before connecting shelters, all oversize equipment must be placed inside shelter. Visually check DCS openings to verify that openings form a straight line. Make adjustments before all systems are connected and equipment installed.

(2) Deploy EMT in center of cleared area per para 2.24.2.

(3) Deploy the rest of systems out from EMT per para 2.24.2.2 through 2.24.2.4.

b. **LMS Crew Tasks**

WARNING

To prevent injury to personnel, use caution when walking through entrance to ABS, hose assemblies and cables are on the floor of ABS.

2.24.2.9 FST and MTF Combined Setup - Continued.

CAUTION

To prevent damage to hose assemblies and cables on floor of ABS at the entrances, place hoses and cables up against the inside exterior wall of ABS.

(1) Help deploy systems per para 2.24.2.2 through 2.24.2.4.

(2) To prevent tripping hazards, determine routing and placement of power cables inside ABS.

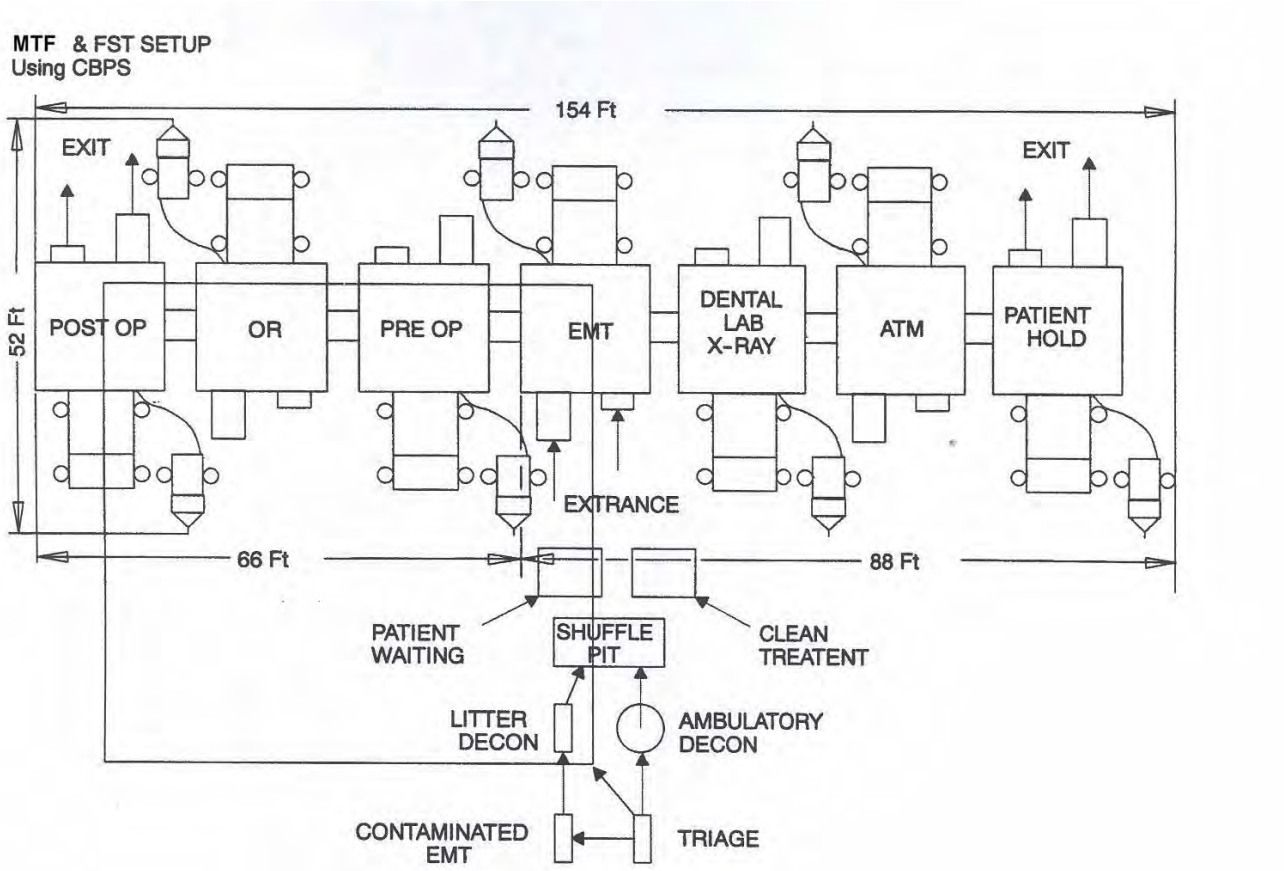


Figure 2-24. MTF & FST Setup

2.24.2.10 Disabled CBPS System Connected in MTF and/or FST Configuration in NBC Mode.

a. **Cab Crew Tasks**

(1) Switch power to TQG if running on internal power.

NOTE

It will take longer than three minutes to purge ambulatory and TALP airlocks.

(2) If receiving patients, reduce air flow through TALP and ambulatory vents to help maintain pressure in disabled system.

(3) If not receiving patients, close TALP and ambulatory air vents to help maintain air pressure.

(4) Troubleshoot disabled system.

b. **LMS Crew Tasks**

(1) Switch over to EXT power if running on internal power.

(2) If receiving patients, reduce air flow through TALP and ambulatory vents to help maintain pressure in disabled system.

(3) If not receiving patients, close TALP and ambulatory air vents to help maintain air pressure.

(4) Troubleshoot disabled system.

2.24.2.11 Static Operation With Internal Power - Switchover From Non-NBC To NBC Conditions.

WARNING

During NBC mode of operation, ensure EPG switch, power panel, circuit breakers (OUTLET ASSY, HEAT/COOL, NBC/VENT, INSTM CONT, LTG/INTERCOM) and NBC fan remain ON. ESS MODE selector switch must be on VENT, HEAT or COOL.

To prevent injury to ears, hearing protection is required.

CAUTION

Do not hit LMS or ABS windows. Windows may crack or break.

NOTE

To reach over pressure in ABS as quickly as possible and to prevent contamination, communications between LMS crew and cab crew are essential. A method of communication should be established as early as possible (possibly prior to mission). This can take the form of voice communications, hand signals, field phones if available, or a combination of any of these methods.

At times voice communications will be difficult due to high noise level.

a. **Cab Crew Tasks**

(1) Locate MOPP gear and put on full chemically protective clothing and masks.

(2) Ensure that ECV engine is running with EPG switch set to ON.

CAUTION

If any engine indicators come on during system start up or operation, use over rides as necessary and proceed to troubleshooting (Chapter 3, Section II) to take corrective action. Continuing start up or operation without correcting problem can damage system.

(3) Monitor gages and hydraulic indicators to verify that all systems are operational.

(4) Close ECV, outside TALP and outside ambulatory airlock doors.

(5) Ensure that fastener hook and fastener loop are engaged properly on outer ambulatory airlock door.

(6) Ensure that TALP tunnel fabric is properly latched to outer TALP airlock door.

(7) Verify that connectors are secured.

(8) Open vent holes on outer TALP airlock door by adjusting or pulling back fastener hook and fastener loop cover so that at least one hole is visible.

(9) Communicate with LMS crew to determine if adjustments to outer TALP door vents and, if applicable, DCS connector vents are required.

2.24.2.11 Static Operation With Internal Power - Switchover From Non-NBC To NBC Conditions - Continued.

b. **LMS Crew Tasks**

(1) Put on chemically protective masks.

(2) Ensure that access door and emergency exit hatch are closed and latched.

(3) Press NBC FAN switch (1, figure 2-25) on rear control panel (2) to turn on NBC fan (NBC FAN ON indicator lights green). NBC alarm buzzer (3) will sound and LOW PRES indicator on NBC FAN switch (1) will light (red). Pressing NBC ALARM (press to mute) switch (4) will silence NBC alarm buzzer (3) and ALARM MUTE indicator on NBC ALARM (press to mute) switch (4) will light (blue). NBC fan will run until NBC SHELTER PRESSURE gage (5) registers 0.5 iwg.

(4) When ABS has reached over pressure of 0.5 iwg on NBC SHELTER PRESSURE gage (5), press NBC ALARM (press to mute) switch (4) to turn off alarm mute. ALARM MUTE indicator (blue light) on NBC ALARM (press to mute) switch (10) will go off.

(5) Ensure that fastener hook and fastener loop fasteners are engaged properly on inner ambulatory airlock door and that side zipper is closed on inner TALP airlock door.

WARNING

To protect against death from contamination, prior to performing next step, verify that NBC SHELTER PRESSURE gage reads at least 0.5 iwg.

NOTE

Under NBC conditions, inflated ABS should always be pressurized to at least 0.5 iwg. Adjustment of over pressure inside ABS, TALP airlock and ambulatory airlock is accomplished by opening flaps on inner and outer TALP and ambulatory airlock door vents. TALP and ambulatory airlocks should be pressurized to 0.3 iwg.

(6) Open vent holes on inner TALP and ambulatory airlock doors by adjusting or pulling back fastener hook and fastener loop covers. Inner ambulatory airlock door and TALP airlock door vents should be opened or closed to achieve an ABS over pressure of 0.5 iwg on NBC SHELTER PRESSURE gage.

(7) Outer TALP and ambulatory airlock door vents should be adjusted to achieve a pressure of 0.3 iwg within TALP and ambulatory airlock. Adjust outer ambulatory door vents and communicate with cab crew to have them adjust outer TALP airlock door vents as necessary.

(8) Allow TALP and ambulatory airlock to purge for approximately three minutes. Using Chemical Agent Monitor (CAM), open side zipper on TALP airlock tunnel or fastener hook and fastener loop tape on ambulatory airlock door partially to insert CAM probe. Check if airlock has purged sufficiently. If contamination is present, remove CAM and close zipper or fastener hook and fastener loop tape, and allow another minute or so to pass before performing another CAM check.

NOTE

Both ambulatory and TALP entry areas serve as airlocks to prevent undue loss of pressure when doors are opened and to provide a place for final decontamination of individuals who are entering from a contaminated area. Most contaminants that penetrate are swept out by purging airflow from opened flaps on outer and inner doors. Contaminants which penetrate enclosure are filtered by NBC recirculation air filters powered from receptacle panel.

(9) Verify NBC recirculation filters (9 and 10, figure 2-17) are operating.

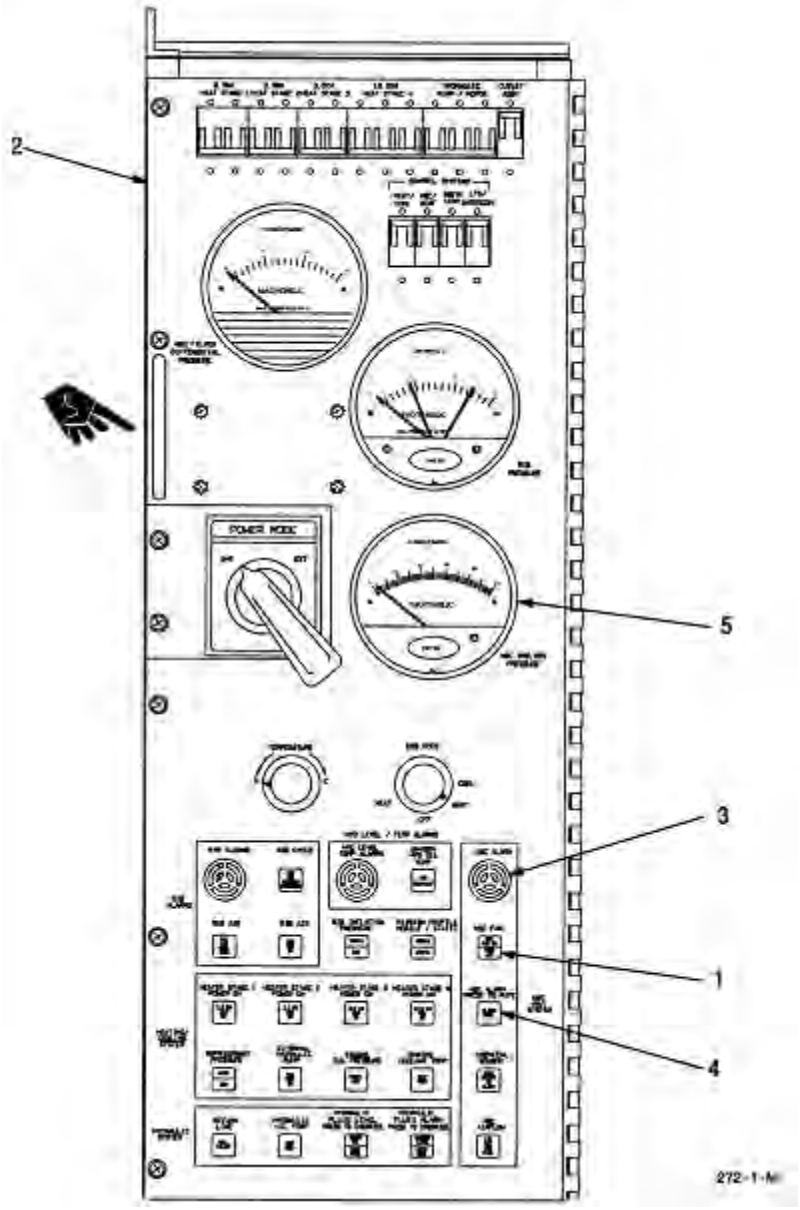


Figure 2-25. Rear Control Panel Settings, Internal Power - Switch Over From Non-NBC to NBC Conditions

NOTE

Voltage is present at outlets when system is in NBC mode or when CAM detects agent contamination.

(10) This completes switchover from non-NBC to NBC conditions in static mode with internal power. Operate system as mission requires.

2.24.2.12 Static Operation With External Power - Switchover From Non-NBC To NBC Conditions.

WARNING

During NBC mode of operation, TQG or equivalent power source must be connected and operating with the ESS functioning. Power panel circuit breaker (rear, driver side of LMS) must be ON. ESS MODE selector switch must be on VENT, HEAT or COOL for ESS to function.

To prevent injury to ears, hearing protection is required.

CAUTION

Do not hit LMS or ABS windows. Windows may crack or break.

NOTE

To reach over pressure in ABS as quickly as possible and to prevent contamination, communications between LMS crew and cab crew are essential. A method of communication should be established as early as possible (possibly prior to mission). This can take the form of voice communications, hand signals, field phones if available, or a combination of any of these methods.

At times voice communications will be difficult due to high noise level.

a. **Cab Crew Tasks**

(1) Locate MOPP gear and put on full chemically protective clothing and masks.

(2) Close ECV, outside TALP and outside ambulatory airlock doors.

NOTE

Circuit breaker on LMS power panel (rear, driver side) must be ON for TQG or equivalent external power source (para 2.12).

(3) Ensure that TQG or equivalent power source is connected and operating, ground leads are connected and circuit breaker on LMS power panel (rear, driver side) is set to ON.

CAUTION

If any engine indicators come on during system start up or operation, use over rides as necessary and proceed to troubleshooting (Chapter 3, Section II) to take corrective action. Continuing start up or operation without correcting problem can damage system.

(4) Monitor gages and hydraulic indicators to verify that all systems are operational.

(5) Ensure that fastener hook and fastener loop are engaged properly on outer ambulatory airlock door.

(6) Ensure that TALP tunnel fabric is properly latched to TALP airlock door.

(7) Verify that DCS flaps are rolled down and secured or that connectors are in place and secured.

(8) Open vent holes on outer TALP and ambulatory airlock doors by adjusting or pulling back fastener hook and fastener loop cover so that at least two holes are visible.

(9) Communicate with LMS crew to determine if adjustments to outer TALP, ambulatory airlock door and DCS connector vents are required.

b. **LMS Crew Tasks**

(1) Put on chemically protective masks.

(2) Ensure that access door and emergency exit hatch are closed and latched.

(3) On rear control panel (1, figure 2-26), verify that POWER MODE switch (2) is set to EXT. Ensure the following circuit breaker is set to ON:

HYDRAULIC PUMP/MOTOR (3)

(4) Verify that EXTERNAL HYDRAULIC PUMP switch (4) is set to ON. HYD PUMP ON indicator will light (blue).

(5) Set ESS MODE selector switch (5) to VENT only.

NOTE

Cooling system, heating system and recirculation fan are disabled in external NBC mode.

(6) Press NBC FAN switch (6) on rear control panel (1) to turn on NBC fan (NBC FAN ON indicator lights green). NBC alarm buzzer (7) will sound and PRES LOW indicator on NBC FAN switch (6) will light (red). Pressing NBC ALARM (press to mute) switch (8) will silence NBC alarm buzzer (7) and ALARM MUTE indicator on NBC ALARM (press to mute) switch (8) will light (blue).

(7) Verify converter AC INPUT circuit breaker (9) is set to ON.

(8) Verify converter power switch (10) is set to ON.

(9) Verify RIB FAN switch (11) is set to ON (indicator will light white). RIB INFLATION PRESSURE indicator (12) should show NORMAL (white).

CAUTION

During external power mode of operation, 10 kW TQG will only support heat stage 1. Turning heaters 2 through 4 ON will shut down 10 kW TQG.

(10) When ABS has reached over pressure of 0.5 iwg on NBC SHELTER PRESSURE gage (13), press NBC ALARM (press to mute) switch (8) to turn off alarm mute. ALARM MUTE indicator (blue light) on NBC ALARM (press to mute) switch (8) will go off.

(11) Ensure that fastener hook and fastener loop are engaged properly on inner ambulatory airlock door and zipper is closed on inner TALP airlock tunnel.

WARNING

To prevent death or injury to personnel from contamination, ensure NBC SHELTER PRESSURE gage reads at least 0.5 iwg.

NOTE

Under NBC conditions, inflated ABS should always be pressurized to at least 0.5 iwg. Adjustment of over pressure inside ABS, TALP airlock and ambulatory airlock is accomplished by opening flaps on inner and outer TALP and ambulatory airlock door vents. TALP and ambulatory airlocks should be pressurized to 0.3 iwg.

(12) Open vent holes on inner TALP and ambulatory airlock doors by adjusting or pulling back fastener hook and fastener loop covers. Inner ambulatory airlock door and TALP airlock door vents should be opened or closed to achieve a CBPS over pressure of 0.5 iwg on NBC SHELTER PRESSURE gage.

(13) Outer TALP and ambulatory airlock door vents should be adjusted to achieve a pressure of 0.3 iwg within TALP and ambulatory airlock. Communicate with cab crew to have them adjust outer TALP and ambulatory airlock door vents as necessary.

2.24.2.12 Static Operation With External Power - Switchover From Non-NBC To NBC Conditions - Continued.

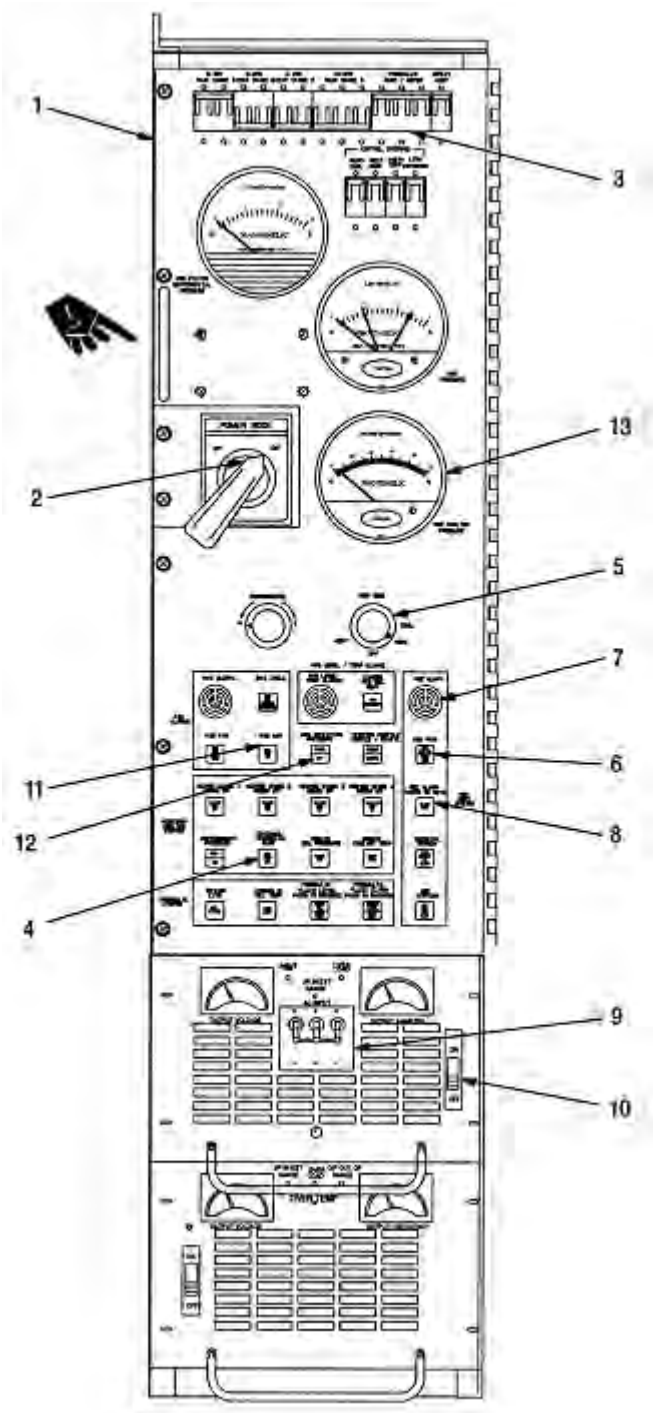


Figure 2-26. Rear Control Panel Settings Using External Power - NBC Conditions

(14) Allow TALP and ambulatory airlock to purge for approximately three minutes. Using CAM, open side zipper on TALP airlock tunnel or fastener hook and fastener loop tape on ambulatory airlock door partially to insert CAM probe. Check if airlock has purged sufficiently. If contamination is present, remove CAM, close zipper or fastener hook and fastener loop tape, and allow another minute or so to pass before performing another CAM check.

NOTE

Both ambulatory and TALP entry areas serve as airlocks to prevent undue loss of pressure when doors are opened and to provide a place for final decontamination of individuals who are entering from a contaminated area. Most contaminants that penetrate are swept out by purging airflow from opened flaps on outer and inner doors. Contaminants which penetrate enclosure are filtered by NBC recirculation air filters powered from receptacle panel.

(15) Verify NBC recirculation filters (9 and 10, figure 2-17) are operating.

(16) This completes switchover from non-NBC to NBC conditions in static mode with external power. Operate system as mission requires.

2.24.3 Striking and Shut Down Procedures.

NOTE

Procedures for striking and shutting down CBPS under non-NBC conditions and under NBC conditions are essentially the same, except for removing ambulatory airlock and TALP airlock doors. Steps and procedures as provided herein are for striking and shutting down under non-NBC conditions. For striking and shutting down under NBC conditions, refer to para 2.25.3.

Refer to Appendix E, Load Plan, for stowing equipment in LMS and on HMT.

2.24.3.1 CBPS Striking Procedures.

a. **LMS Crew Tasks**

(1) Disconnect lights and recirculation fans.

(2) Remove lights from hangers.

(3) Remove sound blanket from TALP rail straps.

(4) Pass light set, medical chests, litter stands and other items through TALP door to cab crew.

(5) Stow recirculation fans, litter stands and other items in LMS.

(6) Loosen two rail knobs (1, figure 2-27) on inner TALP airlock door (2). Wait for signal from cab crew to remove and stow rails (3).

(7) Loosen latch clamp (4).

(8) Remove retaining clamp (5).

(9) Remove inner TALP airlock door (2) and stow in LMS.

(10) Remove inner ambulatory door (6) by loosening spring clips and separating fastener hook and fastener loop, and stow in LMS.

(11) Remove ambulatory and TALP airlock gage assembly (7) and stow.

(12) Disconnect cables from speaker assembly (15) and stow.

(13) Pull cable assemblies through hole and stow.

(14) On rear control panel (1, figure 2-28) press RIB FAN switch (2) to OFF. Indicator light (green) will turn off. Ensure ALARM MUTE (3) and NBC FAN (4) switches are off (indicator lights ALARM MUTE (blue) and NBC FAN ON (green) will be off).

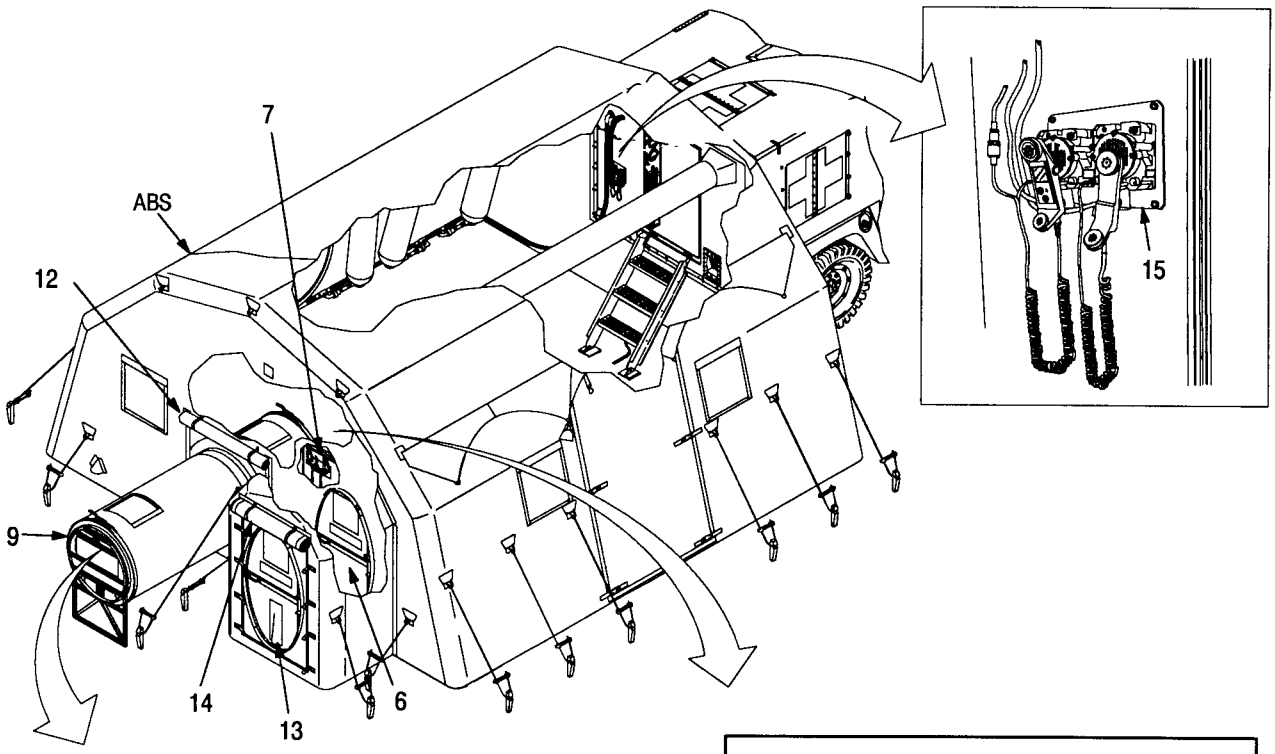
(15) Signal to cab crew to proceed with striking ABS.

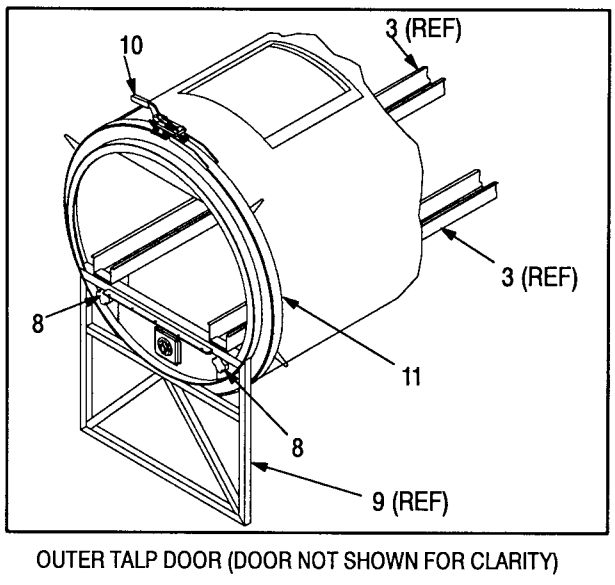
2.24.3.1 CBPS Striking Procedures - Continued.

WARNING

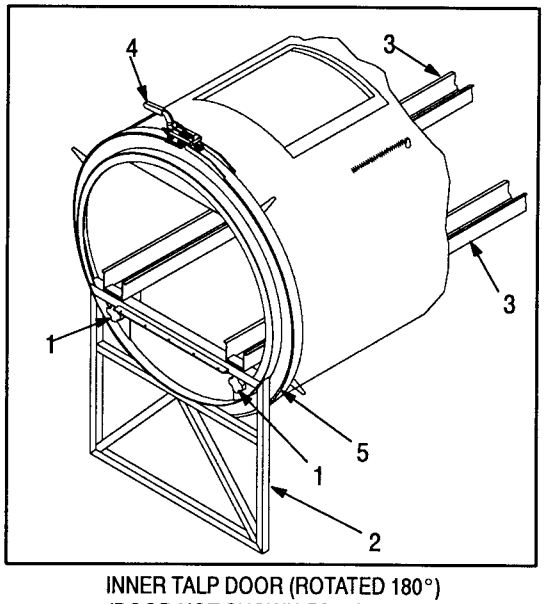
To prevent injury to personnel during striking of ABS, make sure ladder is folded up and secured in LMS after LMS crew has entered LMS.

(16) Enter LMS, fold ladder up into LMS opening and secure with straps. Open access door and emergency exit hatch as required to help deflate ABS.





OUTER TALP DOOR (DOOR NOT SHOWN FOR CLARITY)



INNER TALP DOOR (ROTATED 180°)
(DOOR NOT SHOWN FOR CLARITY)

Figure 2-27. Ambulatory Airlock Door and TALP Airlock Door Removal

(17) On rear control panel (1), verify POWER MODE switch (5) is set to INT.

NOTE

MISSION PROFILE MOBILE indicator will not light if INSTM CONT circuit breaker is not ON and ESS MODE selector switch is in OFF position.

(18) Set MISSION PROFILE switch (6) to MOBILE. MOBILE indicator will light (white).

(19) Verify inverter (7) and converter (8) power switches are OFF.

(20) Verify converter circuit breaker (9) is set to OFF.

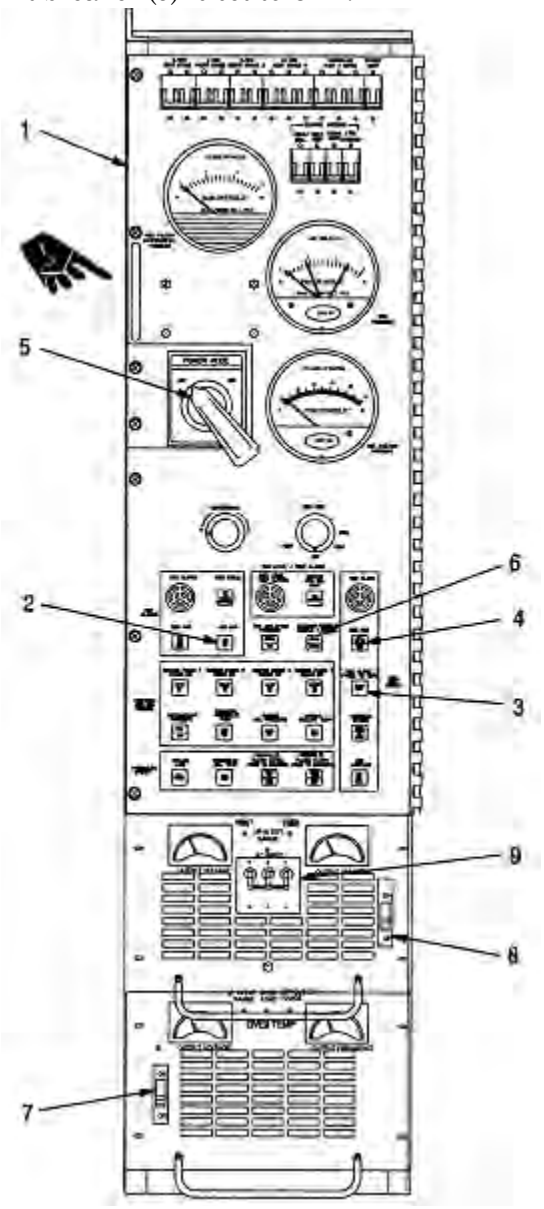


Figure 2-28. Rear Control Panel Settings Using Internal Power During Striking

2.24.3.1 CBPS Striking Procedures - Continued.

b. **Cab Crew Tasks**

(1) Cab crew member no. 1 proceeds as follows:

(a) Verify circuit breaker on power panel is set to OFF.

(b) Disconnect TQG power cable from power panel.

(c) Disconnect ground lead from power panel and ground stake.

(d) Pull ground stake from ground.

(e) Coil TQG power cable and ground lead and place on top of TQG.

(2) Remove lights, medical chests, litter stands and other items from TALP entrance and stow.

(3) Loosen two outer TALP rail knobs (8, figure 2-27). Signal LMS crew to remove rails (3).

(4) Remove outer TALP airlock door (9) by disengaging latch clamp (10) and removing retaining clamp (11). Store door (9) on HMT.

(5) Push TALP fabric into ABS.

(6) Unroll TALP door flap (12) and secure opening as tightly as possible with fastener hook and fastener loop tape.

(7) Remove outer ambulatory airlock door (13) by loosening spring clips and separating fastener hooks and fastener loops. Stow door (13) on HMT.

(8) Unroll ambulatory door flap (14) and secure outer ambulatory airlock door (13) opening as tightly as possible with fastener hook and fastener loop tape.

WARNING

To prevent injury to personnel when removing air beam dump caps, grip dump cap firmly, release latches slowly and keep face away. Pressure may cause dump caps to come off forcefully.

CAUTION

To prevent damage to dump cap lanyard, grip dump cap firmly when removing. Do not allow dump cap lanyard to forcefully pull away from ABS.

(9) Check that LMS crew has entered LMS. To deflate the air beams, unlatch six dump caps (1, figure 2-29) along driver side of ABS and one on ambulatory door entry area (1, figure 2-29).

WARNING

ABS fabric may be slippery, especially under wet or muddy conditions. Use care when walking on ABS, as surface may be bumpy due to air beam inflation manifold or folds of fabric and may cause a tripping hazard.

CAUTION

To avoid damage to ABS, DO NOT pull on Dee Rings.

(10) Fold airlock (2) back onto main part of ABS.

(11) Cab crew member no. 2 proceeds as follows:

(a) Loosen ABS lines and pull up stakes.

(b) Stow stakes.

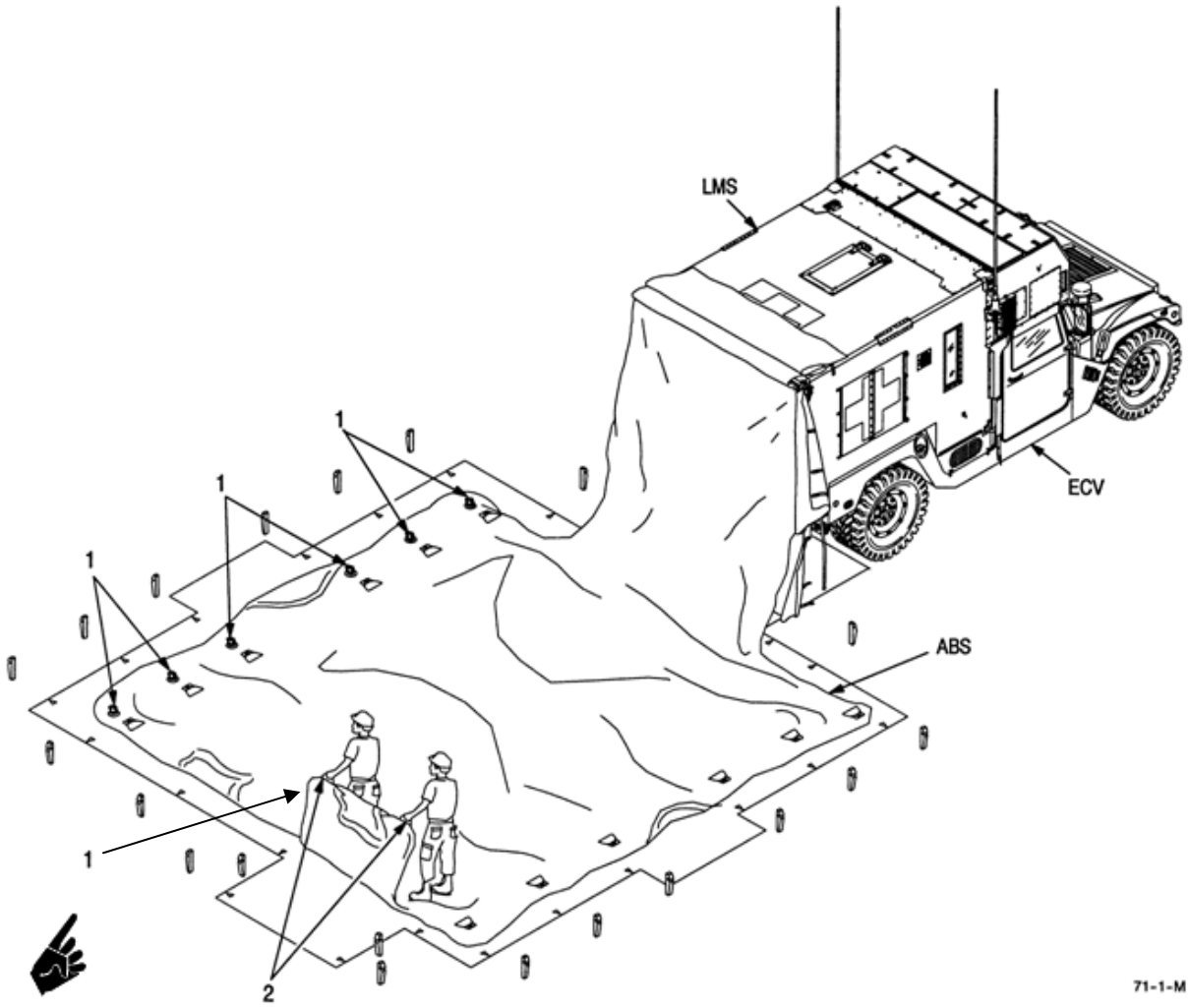


Figure 2-29. Deflating the ABS

2.24.3.1 CBPS Striking Procedures - Continued.

CAUTION

To prevent damage to manifold flexible hoses and check valves, be careful when walking on driver side of deflated ABS.

To prevent damage to ECV and attachment points, pull ABS back several feet toward ECV before walking on it.

NOTE

Under non-NBC conditions, ask LMS crew to open emergency exit hatch and/or access and cab doors to allow air from ABS to escape while cab crew is deflating ABS.

(12) Allow air to escape from dump caps.

CAUTION

To avoid damage to ABS, DO NOT pull on Dee Rings.

(13) Grip ABS (1, figure 2-30) and fold passenger side of ABS into one third.

(14) Grip ABS (1) and fold driver side of ABS into one third.

NOTE

When folded, ABS should not extend beyond anchor tube (4, figure 2-31).

(15) Pull ABS away from tailgate (5) allowing room to pull out anchor tube (4, figure 2-31) until lower transport cover (1) is fully extended. Make sure tailgate is loose, not wedged back toward LMS.

(16) Place foot behind anchor tube (4) to hold in place, lift and pull ABS onto lower transport cover (1).

(17) Fasten ABS retention strap (6).

WARNING

ABS is extremely heavy. To prevent injury to personnel, two or more people are required to roll ABS.

To prevent injury to hands, wear gloves when rolling ABS.

NOTE

If time/mission conditions permit, roll ABS, unroll it, then roll it again in order to remove any remaining air and make a tighter bundle.

(18) Roll ABS (3) toward LMS. Apply body weight to ABS (3) as you roll it to help trapped air to escape while rolling.

(19) Roll ABS (3) onto lower transport cover (1).

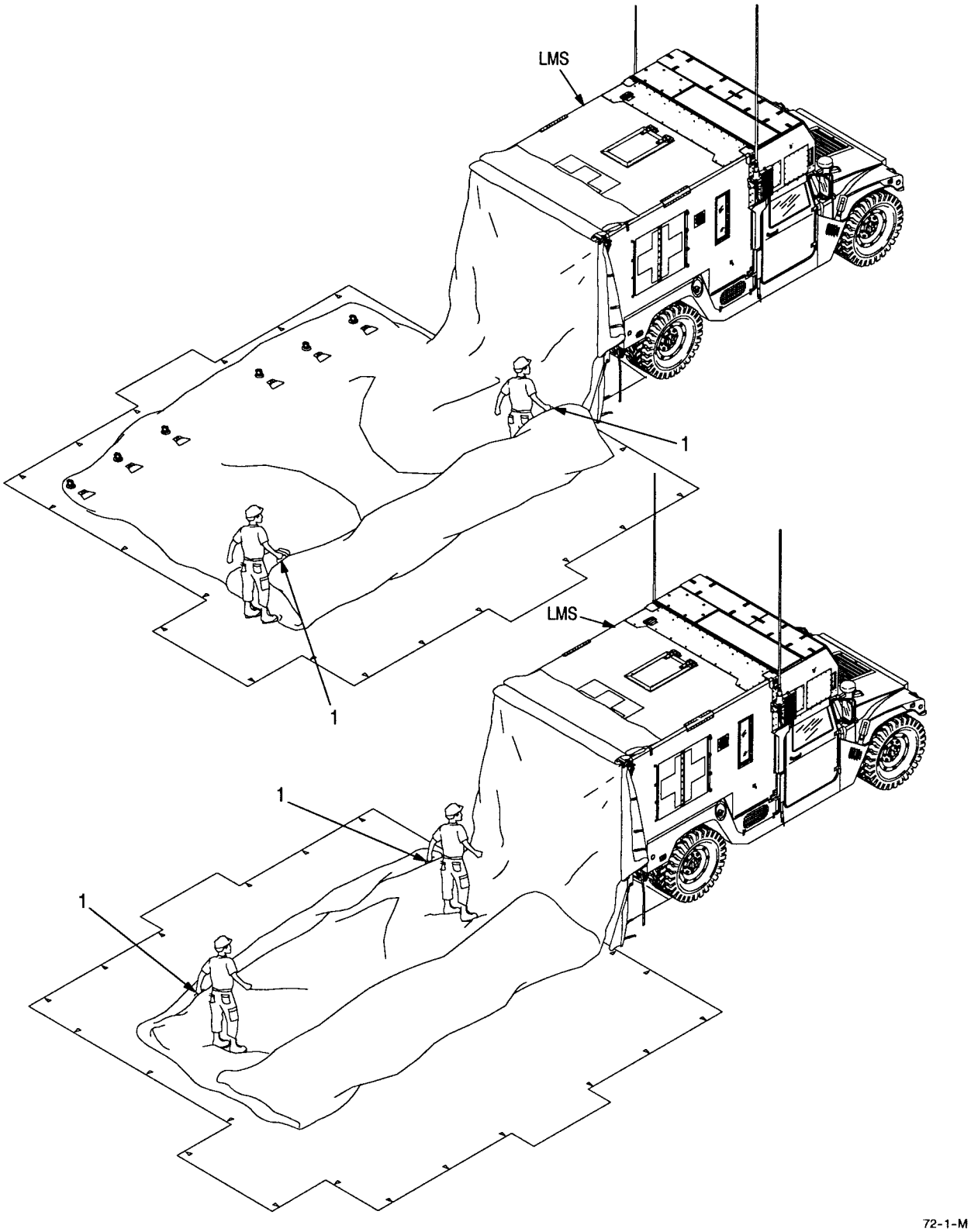


Figure 2-30. Folding the ABS

2.24.3.1 CBPS Striking Procedures - Continued.

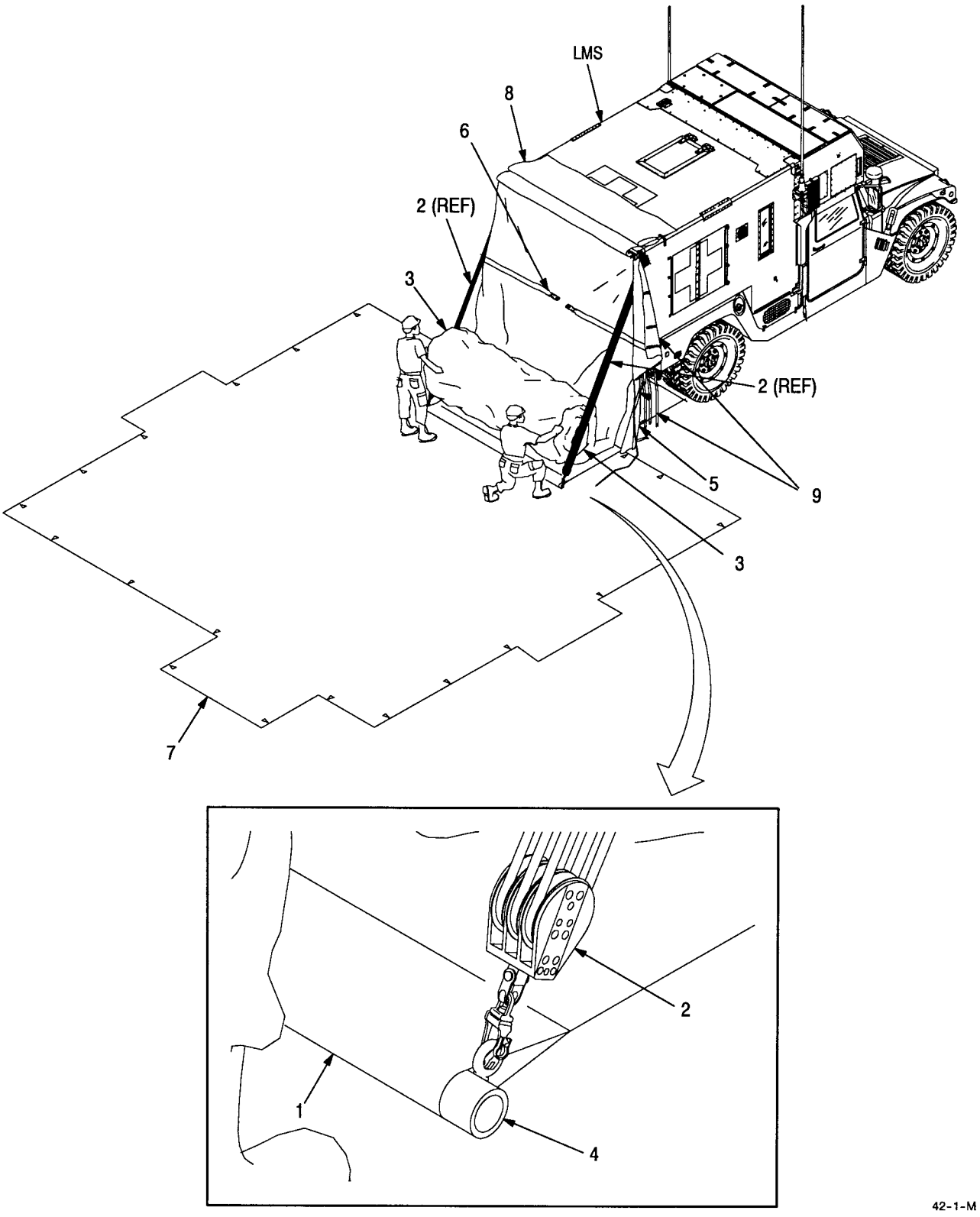


Figure 2-31. Packing the ABS

WARNING

To prevent injury to hands, wear gloves when hoisting ABS onto tailgate. Do not wrap rope around hand.

CAUTION

To protect against damage to equipment, ensure tailgate is fully raised to avoid contact with HMT during transport.

NOTE

Make sure block and tackle assemblies are straight with no twists or kinks.

(20) Using block and tackle assembly (2), raise tailgate (5) partially to lift it off ground cloth (7). Pull ground cloth (7) from under tailgate (5). Fold ground cloth (7) in same manner as ABS (3), and place on top of ABS (3).

(21) Raise tailgate (5) and secure safety cable. Pull lower transport cover (1) away from tailgate (5) to exhaust excess air. Make sure straps of upper transport cover (8) are not trapped behind rolled ABS (3).

(22) Coil rope and insert rope into roll of ABS (3).

(23) Secure both sides of ABS (3) with three side and three bottom straps (9).

(24) Secure upper transport cover (9) with four strap buckles.

(25) Deleted.

(26) This completes striking of ABS. Proceed to para 2.24.3.2 for static mode shut down with internal power. Proceed to para 2.24.3.3 for static mode shut down with external power.

2.24.3.2 Static Mode Shut Down Procedure - Internal Power.

a. **LMS Crew Tasks**

NOTE

MISSION PROFILE MOBILE indicator will not light if INSTM CONT circuit breaker is not ON.

(1) At rear control panel (1, figure 2-32) verify MISSION PROFILE switch (2) is set to MOBILE. MOBILE indicator light (white) should be on.

(2) Set inverter (3) power switch (4) to OFF.

(3) Set converter AC INPUT circuit breakers (5) and DC output switch (6) to OFF.

CAUTION

To prevent damage to hydraulic pump, EPG switch must be set to OFF before setting ESS MODE switch to OFF or any mode position.

(4) Set ESS MODE selector switch (7) on rear control panel (1) to OFF.

(5) Verify all switches on rear control panel (1) are set to OFF.

(6) Turn off forward and aft lights.

(7) Set all rear control panel circuit breakers (8) to OFF.

(8) Signal cab crew to continue shut down.

b. **Cab Crew Tasks**

(1) Set EPG switch (9) on vehicle control box (10) located in ECV cab to OFF.

(2) After EPG switch (9) has been turned off for a minimum of 15 seconds, shut off ECV.

(3) This completes shut down of static mode using internal power. Proceed to para 2.24.3.4 for HMT hookup.

2.24.3.3 Static Mode Shut Down Procedure - External (10 kW TQG) Power.

a. LMS Crew Tasks

NOTE

MISSION PROFILE MOBILE indicator will not light if INSTM CONT circuit breaker is not ON and ESS MODE selector switch is in OFF position.

(1) Set EXTERNAL HYDRAULIC PUMP switch (11, figure 2-32) to OFF. The HYD PUMP ON indicator (blue) turns off.

(2) At rear control panel (1) check MISSION PROFILE switch (2) is set to MOBILE. MOBILE indicator light (white) should be on.

(3) Set ESS MODE selector switch (7) on rear control panel (1) to OFF.

(4) Turn off lights.

(5) Set converter AC INPUT circuit breakers (5) and DC output switch (6) to OFF.

(6) Set all rear control panel circuit breakers (8) to OFF.

(7) Verify all switches on rear control panel (1) are set to OFF.

(8) Signal cab crew to shut down TQG.

(9) At rear control panel (1), set POWER MODE switch (12) to INT.

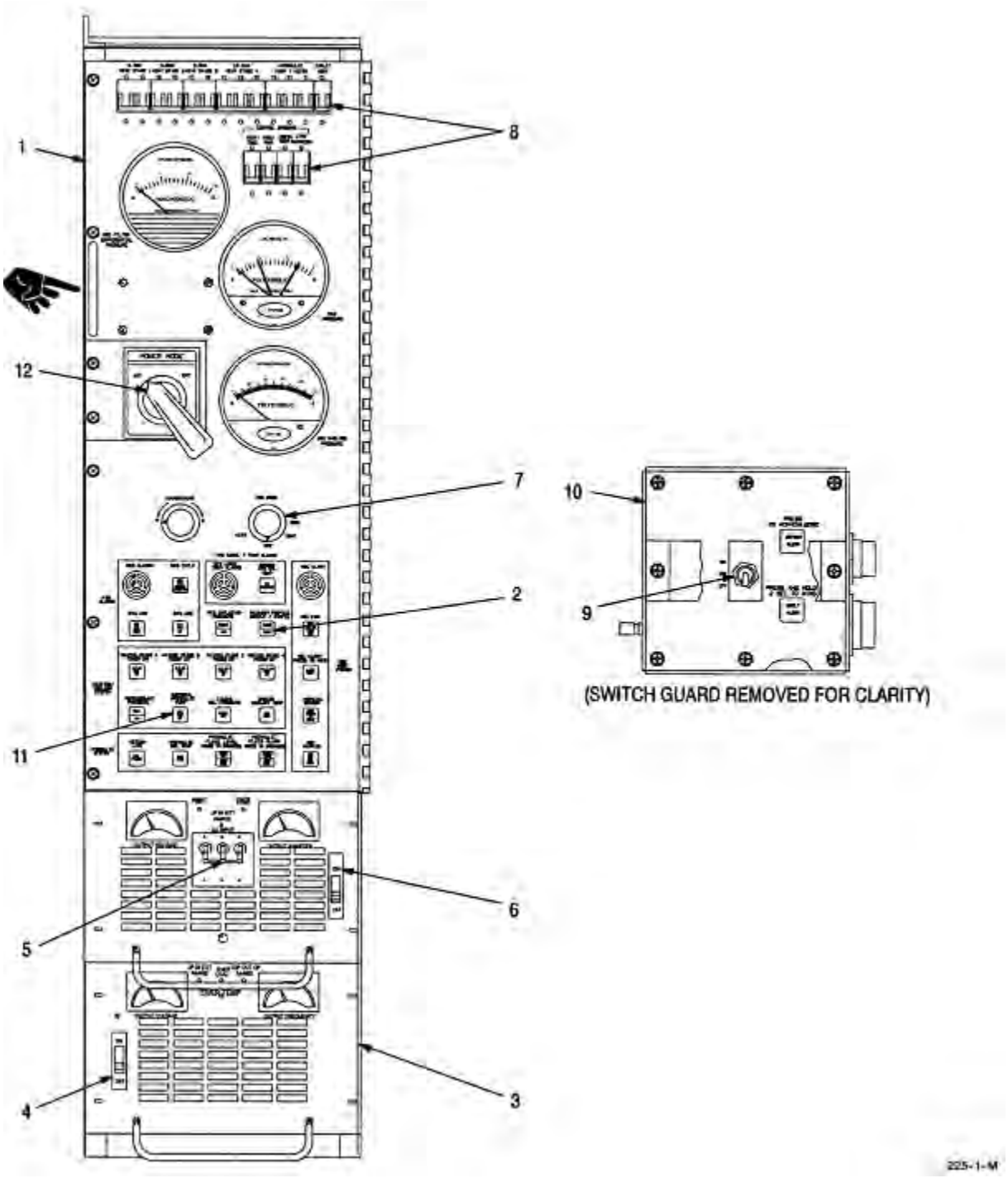


Figure 2-32. Static Mode Shut Down Settings

2.24.3.3 Static Mode Shut Down Procedure - External (10 kW TQG) Power - Continued.

b. **Cab Crew Tasks**

(1) Turn power panel (rear, driver side) circuit breaker OFF.

(2) Shut off TQG in accordance with TM 9-6115-642-10 or applicable manual.

(3) Disconnect TQG power cable from LMS power panel and ground leads to ground stake. Remove ground stake and store on HMT as required.

(4) This completes shut down in static mode using external power. Proceed to para 2.24.3.4 for HMT hookup.

2.24.3.4 High Mobility Trailer (HMT) Hookup.

a. **Cab Crew Tasks**

WARNING

Do not attempt to lift HMT tongue alone if HMT is heavily loaded. Lifting heavy HMT tongue alone can cause back injury. Use crank on front caster to raise HMT tongue.

(1) On HMT (1, figure 2-33), raise rear support leg (2) off ground by turning leg extension (3) so that it clears ground by about six inches.

(2) Crank down caster (4) on front support leg (5) so tongue ring (6) is raised up to clear pintle hook (7) on ECV.

(3) Maneuver ECV into position to hook up HMT (1).

(4) Open pintle hook (7) on ECV by removing safety pin (8) and lifting top locking latch (9).

(5) Lower HMT tongue ring (6) onto ECV pintle hook (7) by cranking up caster (4). Close locking latch (9) and insert safety pin (8).

(6) Connect light cable (10), breakaway brake chain (11) and safety chains (12) to ECV.

(7) Raise front support leg (5) and lock in place with pin (13).

(8) Raise rear support leg (2) and lock in place with pin (14).

(9) Release parking brakes (15) on HMT (1).

(10) This completes HMT (1) hookup. Operate CBPS as required.

b. **LMS Crew Tasks**

No tasks required.

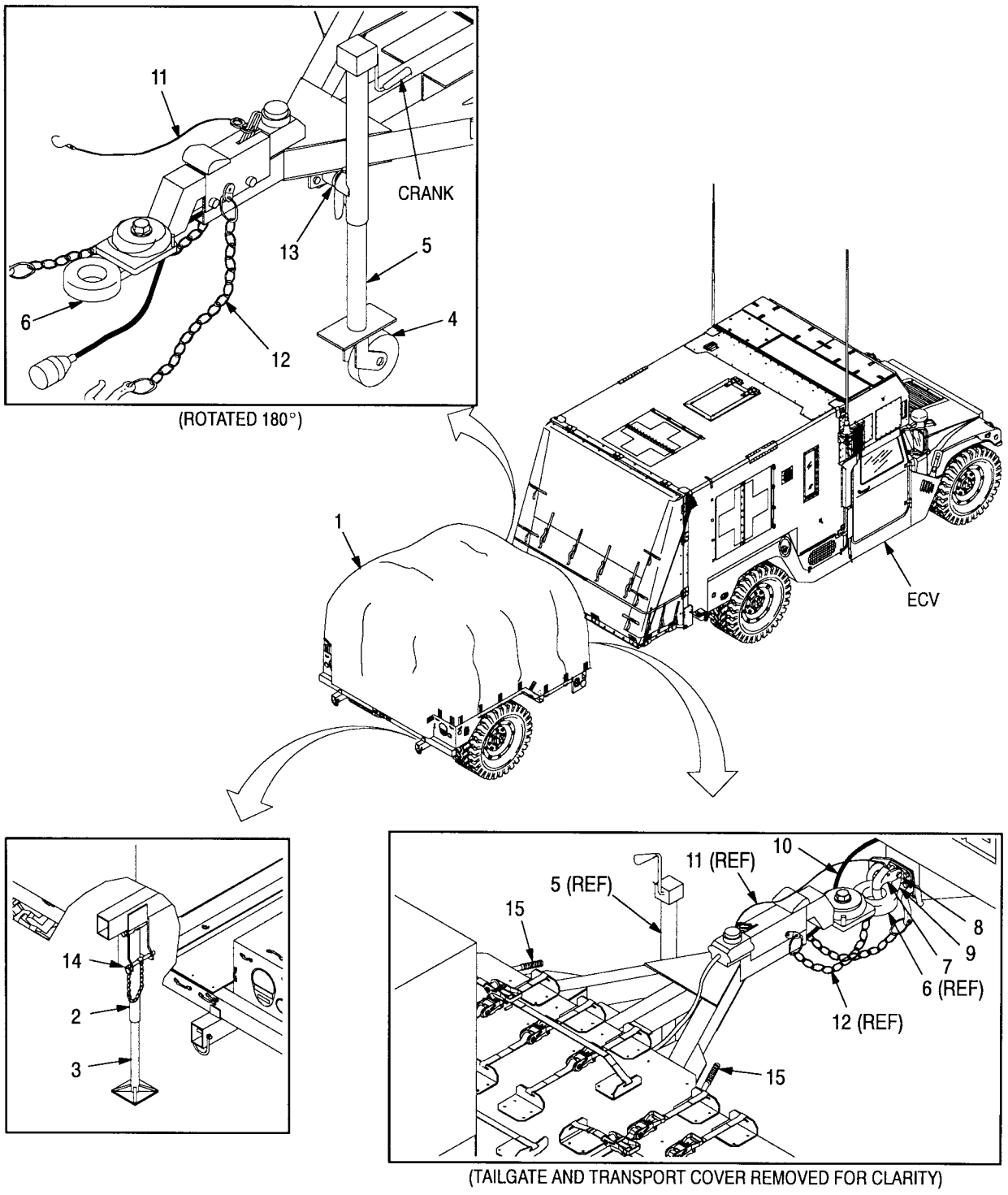


Figure 2-33. HMT Hookup

2.24.3.5 Moving Chemical Biological Protective Shelter (CBPS) System.

To move CBPS, set up for MOBILE mode operation (refer to para 2.24.1).

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2.25 OPERATING PROCEDURES UNDER NBC CONDITIONS.

CBPS can operate under NBC conditions in the following modes:

a. Mobile. ABS stowed, power supplied by ECV engine (refer to para 2.25.1).

b. Static - Internal Power. ABS deployed, power supplied by ECV engine (refer to para 2.25.2.2).

c. Static - External Power. ABS deployed, power supplied by a 10 kW TQG or larger generator (refer to para 2.25.2.3).

WARNING

To prevent injury to ears, hearing protection is required.

CAUTION

Do not hit LMS or ABS windows. Windows may crack or break.

NOTE

Communications between LMS crew and cab crew are essential. A method of communication should be established as early as possible (possibly prior to mission). This can take the form of voice communications, hand signals, field phones if available, or a combination of any of these methods.

At times voice communications will be difficult due to high noise level.

See Section V on Remote Radio Operation.

2.25.1 Mobile Operation Under NBC Conditions.

NOTE

Following setup procedures apply to a crew of four. Two crew members ride in the ECV cab and two crew members ride inside the LMS. For explanation purposes, the two-person crew in the cab is identified as “cab crew” and the two-person crew in the LMS is identified as “LMS crew”.

2.25.1.1 Expanded Capacity Vehicle (ECV) Setup.

a. **Cab Crew Tasks**

WARNING

During NBC mode of operation, ECV must remain running and ESS functioning. ESS MODE selector switch must be on VENT, HEAT or COOL for ESS to function.

Cab crew must be in full MOPP gear.

LMS crew must wear chemically protective masks.

(1) Put ECV transmission in park, set parking brake and start ECV (refer to TM 9-2320-387-10).

(2) Operate ECV as mission requires.

b. **LMS Crew Tasks**

WARNING

During NBC mode of operation, ECV must remain running and ESS functioning. ESS MODE selector switch must be on VENT, HEAT or COOL for ESS to function.

Cab crew must be in full MOPP gear.

LMS crew must wear chemically protective masks.

(1) Ensure access door and emergency exit hatch are closed and latched.

(2) On rear control panel (1, figure 2-34), set POWER MODE switch (2) to INT and the following circuit breakers on rear control panel to ON:

HEAT/COOL (3)
NBC/VENT (4)
INSTM CONT (5)
LTG/INTERCOM (6).

NOTE

MISSION PROFILE MOBILE indicator will not light if INSTM CONT circuit breaker is not ON.

(3) Set MISSION PROFILE switch (7) to MOBILE. Indicator will light (white).

NOTE

TEMPERATURE control box assembly only functions in MOBILE mode.

(4) On rear control panel (1) set ESS MODE selector switch (8) to VENT, HEAT or COOL and adjust TEMPERATURE control (9) on control box assembly (10) to desired setting.

(5) Turn lights on as required.

(6) This completes setup for mobile mode operation.

(7) Operate CBPS in mobile mode as mission requires.

2.25.1.2 Mobile Operation Switchover From NBC To Non-NBC Conditions.

WARNING

Contaminants are NBC agents that have been formulated to kill or incapacitate human beings. If CBPS has been exposed to contaminants, refer to para 2.33.

NOTE

Cab and LMS crews should perform the following operations simultaneously.

a. **Cab Crew Tasks**

(1) Stop ECV, put transmission in park and set parking brake. ECV engine may remain running (refer to TM 9-2320-387-10).

(2) Perform appropriate decontamination procedures. Remove MOPP gear.

(3) Verify LMS crew is ready for non-NBC operation.

(4) Use operating procedure for mobile operation under usual conditions (refer to para 2.24.1).

2.25.1.2 Mobile Operation Switchover From NBC To Non-NBC Conditions - Continued.

b. **LMS Crew Tasks**

(1) Perform appropriate decontamination procedures. Remove chemically protective masks.

(2) Access door and emergency exit hatch may be opened as required.

(3) Use operating procedure for mobile operation under usual conditions (refer to para 2.24.1).

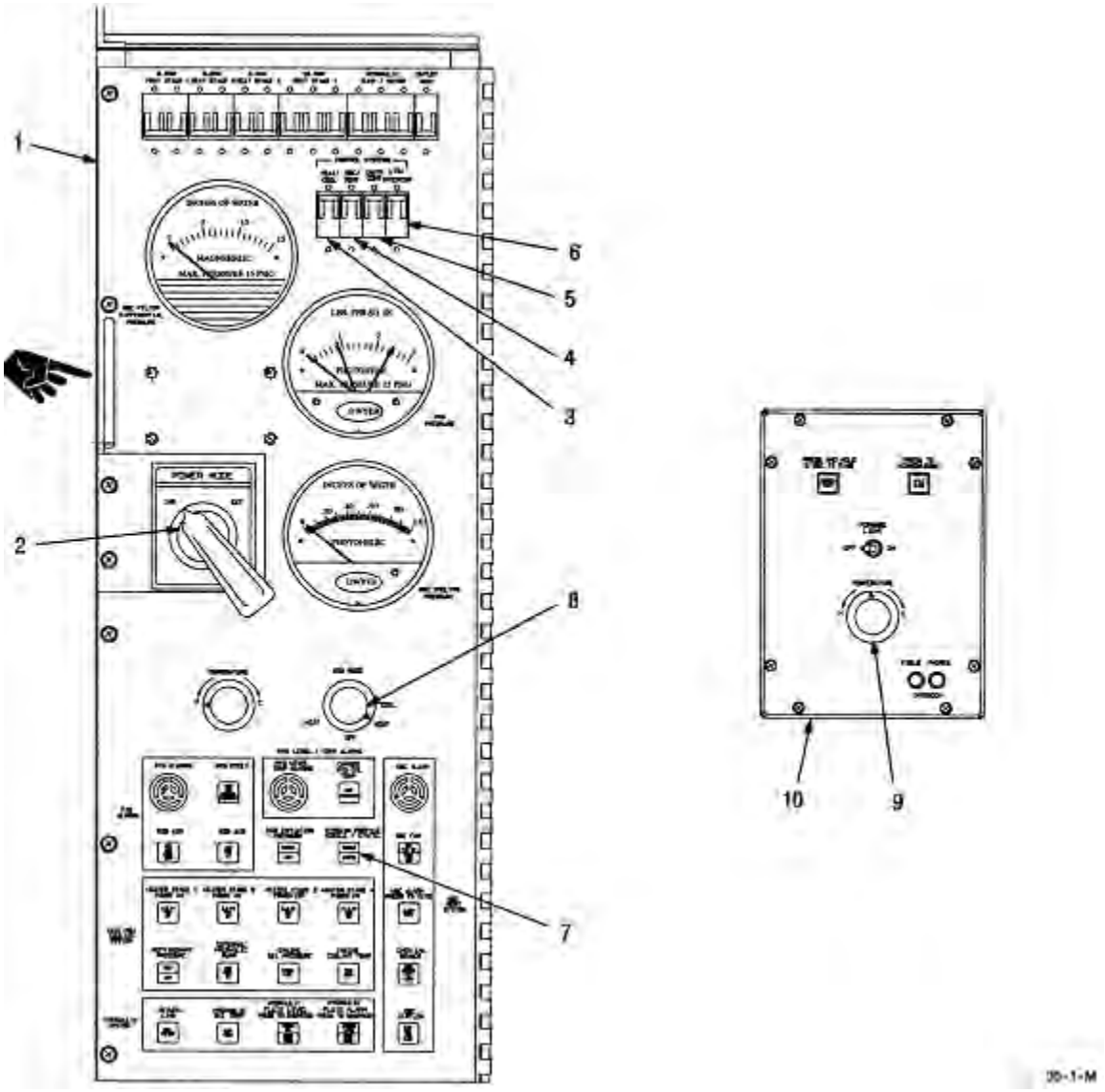


Figure 2-34. Rear Control Panel Settings in Mobile Mode - NBC Conditions

WARNING

Personnel riding in LMS must remain seated with seat belts fastened during ECV movement.

(4) This completes switchover from NBC to non-NBC conditions for mobile mode operation. Operate system as mission requires.

2.25.2 Static Operation Under NBC Conditions.

2.25.2.1 Expanded Capacity Vehicle (ECV) and High Mobility Trailer (HMT) Setup.

a. **Cab Crew Tasks**

WARNING

Cab crew must be in full MOPP gear.

Refer to section 2.24.2.1, Expanded Capacity Vehicle (ECV) and High Mobility Trailer (HMT) Setup.

b. **LMS Crew Tasks**

WARNING

ESS MODE selector switch must be on VENT, HEAT or COOL for ESS to function.

LMS crew must wear chemically protective masks.

Ensure access door and emergency exit hatch are closed and latched.

Remain in LMS with system running and wait for signal from cab crew.

2.25.2.2 Deployment Using Internal (ECV) Power.

a. **Cab Crew Tasks**

Refer to section 2.24.2.2, Deployment Using Internal (ECV) Power.

b. **LMS Crew Tasks**

WARNING

System should be running with POWER MODE switch set to INT, and HEAT/COOL, NBC/VENT, INSTM CONT and LTG/INTERCOM circuit breakers ON.

(1) Listen for EPG engagement, indicated by a change in ECV engine speed. After EPG is engaged, perform the following steps.

(2) On rear control panel (1, figure 2-35), ensure the following circuit breakers are ON:

OUTLET ASSY (2)
HEAT/COOL (3)
NBC/VENT (4)
INSTM CONT (5)
LTG/INTERCOM (6).

(3) Set inverter (7) power switch (8) to ON.

2.25.2.2 Deployment Using Internal (ECV) Power.

CAUTION

If any engine indicators come on during system start up or operation, shut system down, switch to external power, and proceed to troubleshooting (Chapter 3, Section II). Continuing start up or operation without correcting problem can damage system.

NOTE

MISSION PROFILE STATIC indicator will not light if INSTM CONT circuit breaker is not ON and ESS MODE selector switch is in OFF position.

(4) Set MISSION PROFILE switch (9) to STATIC. STATIC indicator will light (white).

(5) Ensure ESS MODE selector switch (10) is set to VENT, HEAT or COOL.

(6) Proceed to para 2.25.2.4 for ABS setup procedures.

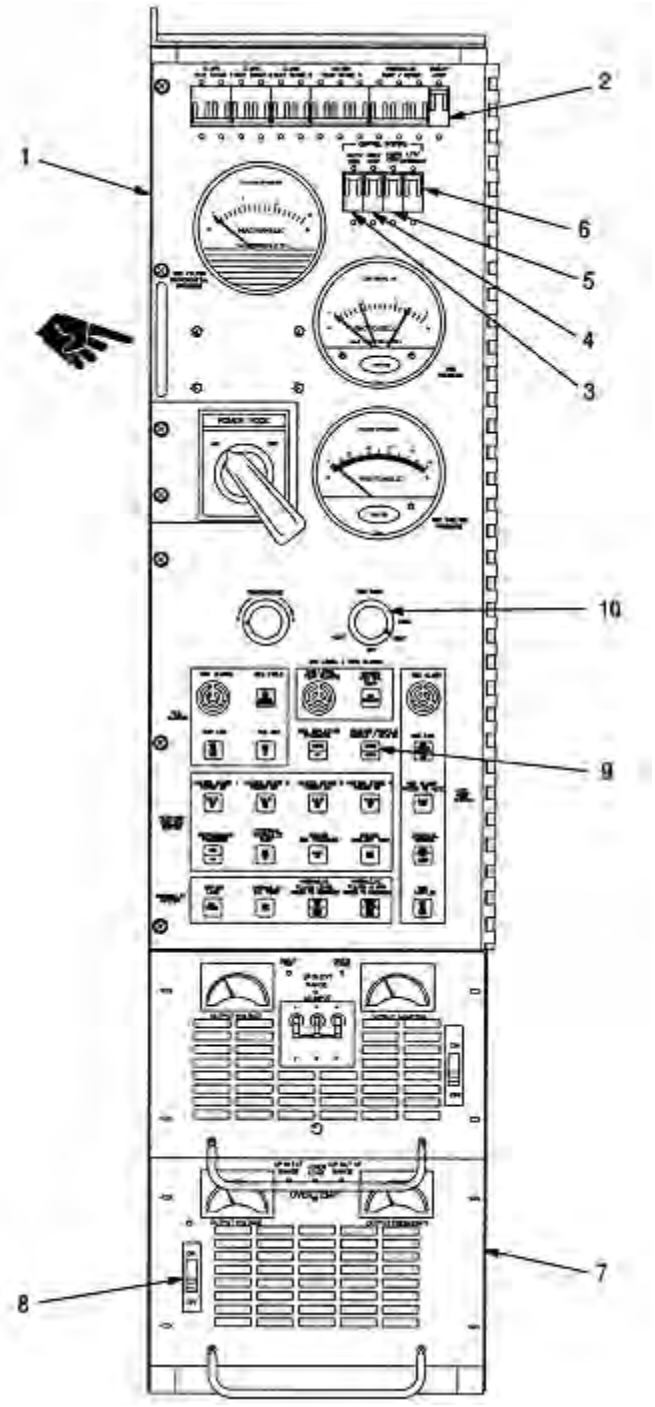


Figure 2-35. Internal Power Control Settings - NBC Conditions

2.25.2.3 Deployment Using External (10 kW TQG) Power

WARNING

To prevent death or injury to personnel from contamination, do not shut ECV off until external TQG is set up and operational.

NOTE

Communications between LMS crew and cab crew are essential. A method of communication should be established as early as possible (possibly prior to mission). This can take the form of voice communications, hand signals, field phones if available, or a combination of any of these methods.

At times voice communications will be difficult due to high noise levels.

a. **Cab Crew Tasks**

Refer to para 2.24.2.3 for deployment using external power.

b. **LMS Crew Tasks**

CAUTION

Switching to external power prior to shutting down ECV engine will cause damage to engine.

NOTE

Ensure access door and emergency exit hatch are closed and latched.

Perform the following steps after cab crew has turned TQG on.

(1) On rear control panel (1, figure 2-36), set POWER MODE switch (2) to EXT.

(2) Ensure the following circuit breakers are set to ON:

OUTLET ASSY (3)
HEAT/COOL (4)
NBC/VENT (5)
INSTM CONT (6)
LTG/INTERCOM (7)
HYDRAULIC PUMP/MOTOR (8)

(3) Set converter AC INPUT (9) circuit breaker to ON.

(4) Set converter power switch (10) to ON.

NOTE

MISSION PROFILE STATIC indicator will not light if INSTM CONT circuit breaker is not ON.

(5) Set MISSION PROFILE switch (11) to STATIC. STATIC indicator will light (white).

(6) Press EXTERNAL HYDRAULIC PUMP switch (12) to ON. HYD PUMP ON indicator will light (blue).

WARNING

10 kW TQG will only support heat stage 1. Turning heaters 2 through 4 ON will shut down 10 kW TQG.

NOTE

Cooling system, heating system and recirculation fan are disabled in external NBC mode.

(7) On rear control panel (1), set ESS MODE selector switch (13) to VENT only.

(8) Proceed to para 2.25.2.4 for ABS setup procedures.

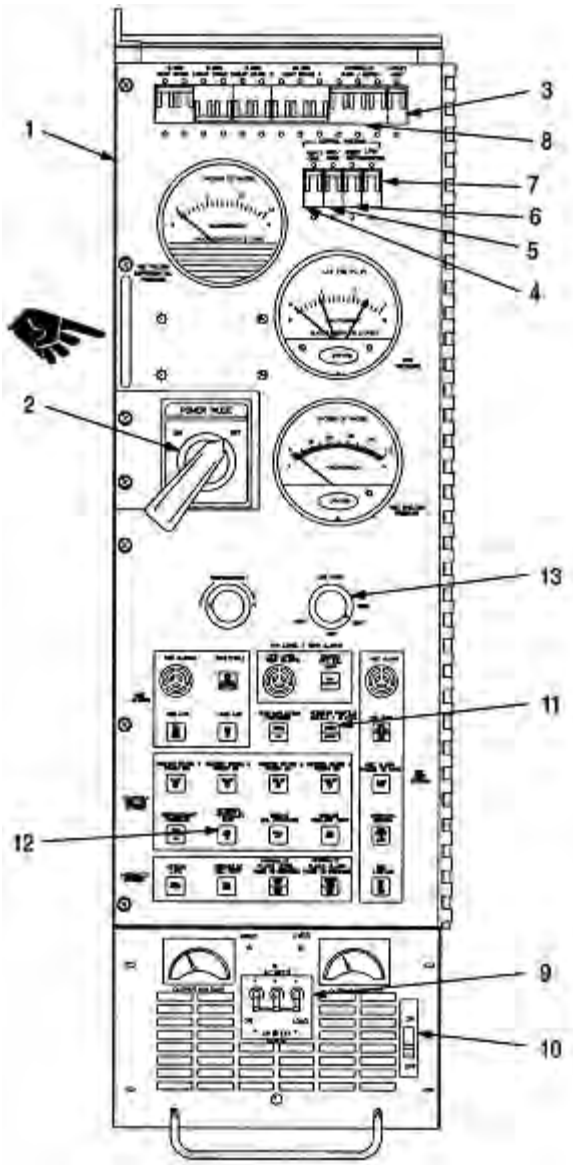


Figure 2-36. External Power Control Setting - NBC Conditions

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions.

WARNING

To prevent death or injury to personnel from contamination, do not open inner and outer TALP airlock doors and/or ambulatory airlock doors at the same time. Do not open DCS doors unless direct complexed and DCS connector is in place.

Cab crew and LMS crew must coordinate activities to prevent contamination of CBPS interior.

To prevent injury to ears, hearing protection is required.

CAUTION

Do not hit LMS or ABS windows. Windows may crack or break.

NOTE

To reach over pressure in ABS as quickly as possible and to prevent contamination, communications between LMS crew and cab crew are essential. A method of communication should be established as early as possible (possibly prior to mission). This can take the form of voice communications, hand signals, field phones if available, or a combination of any of these methods.

At times voice communications will be difficult due to high noise level.

a. **LMS Crew Tasks**

CAUTION

Wait for cab crew signal before engaging NBC fan. Damage to retention strap will occur.

NOTE

Under NBC conditions, inflated ABS should always be pressurized to at least 0.5 iwg. Adjustment of pressure inside CBPS, TALP and ambulatory airlock is accomplished by opening flaps on inner and outer ambulatory and TALP airlock doors. Airlock should be pressurized to 0.3 iwg.

(1) Press NBC fan switch (1, figure 2-37) to ON. When NBC SHELTER PRESSURE gage (2) reaches 0.2 iwg pressure, start rib fan by pressing RIB FAN ON switch (4) on rear control panel (3). RIB FAN ON switch (4) lights (red) when RIB INFLATION PRESSURE LOW indicator (5) lights (red). RIB INFLATION PRESSURE LOW indicator (5) will remain on until air beam pressure reaches low setting on RIB PRESSURE gage (6), at which time RIB INFLATION PRESSURE LOW indicator (5) will change from red to white.

CAUTION

Do not lower ladder into ABS until ladder legs can clear ceiling and air beams.

(2) As ABS inflates, lower ladder (1, figure 2-38) into ABS. Enter ABS (2) and help raise ABS (2) by supporting air beams (3).

WARNING

To prevent injury to personnel, use caution when dropping down from LMS into ABS.

NOTE

When air beams are inflated to correct pressure, rib fan will automatically stop and rib PRESSURE NORMAL indicator will light (white).

(3) Ensure fastener hook and fastener loop connection on fabric air duct (4) is securely attached to fastener hook and fastener loop connection on transition duct assembly (5). Adjust flaps along bottom of fabric air duct (4) for desired amount of air flow.

(4) Check air beam manifold (1, figure 2-39) and ensure shut-off valves (2) on flexible hoses (3) connected to each air beam (4) are completely open (in-line with hoses).

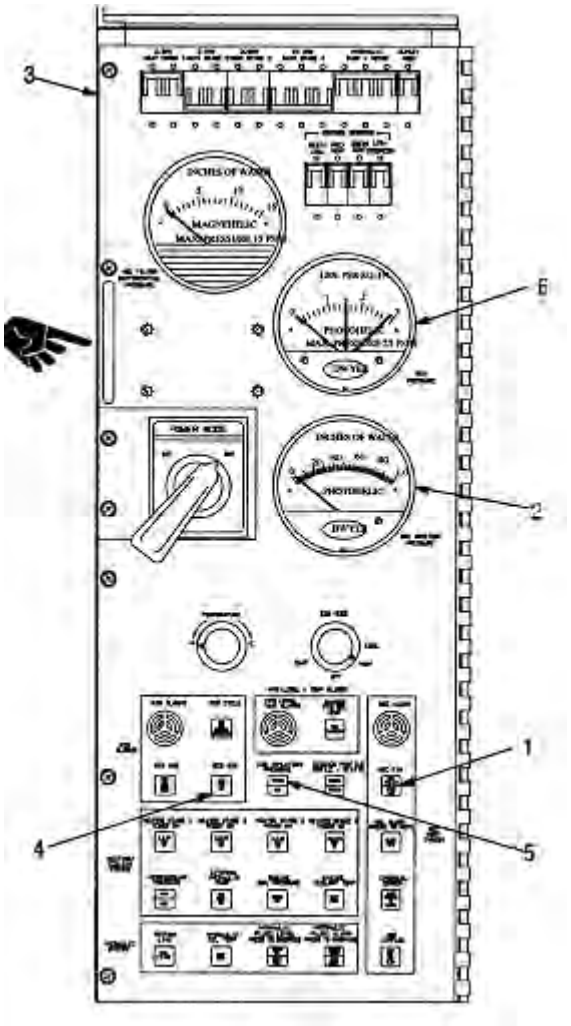


Figure 2-37. Monitoring ABS Inflation

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

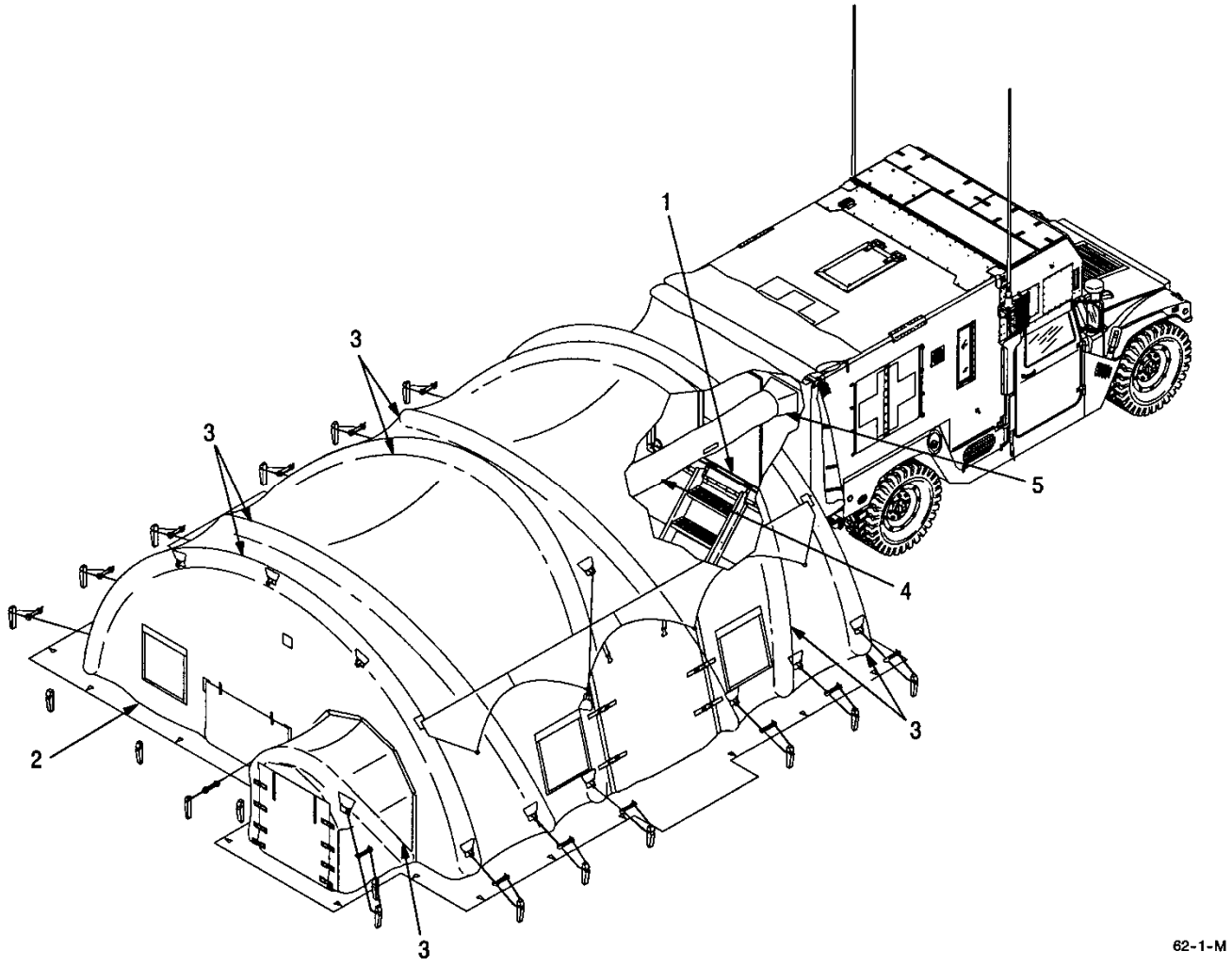


Figure 2-38. ABS Inflation

NOTE

Outer TALP and ambulatory airlock doors are stowed on HMT.

Inner ambulatory and TALP airlock doors are stowed in LMS.

TALP rails, recirculation fans and medical chests are stowed in LMS.

(5) Locate inner TALP airlock door in LMS.

NOTE

As door is worked into opening, avoid pressing fastener hook and fastener loop tape in place.

Ambulatory airlock doors open inward.

Do not roll door flaps out of the way. Leave in closed position.

(6) Attach TALP fabric tunnel (1, figure 2-40) to inner TALP airlock door (2) by placing fabric tunnel (1) between inner TALP airlock door (2) and retaining clamp (3), making sure grommets engage airlock door (2) posts. Engage latch clamp (4) to secure fabric tunnel (1) to inner TALP airlock door (2).

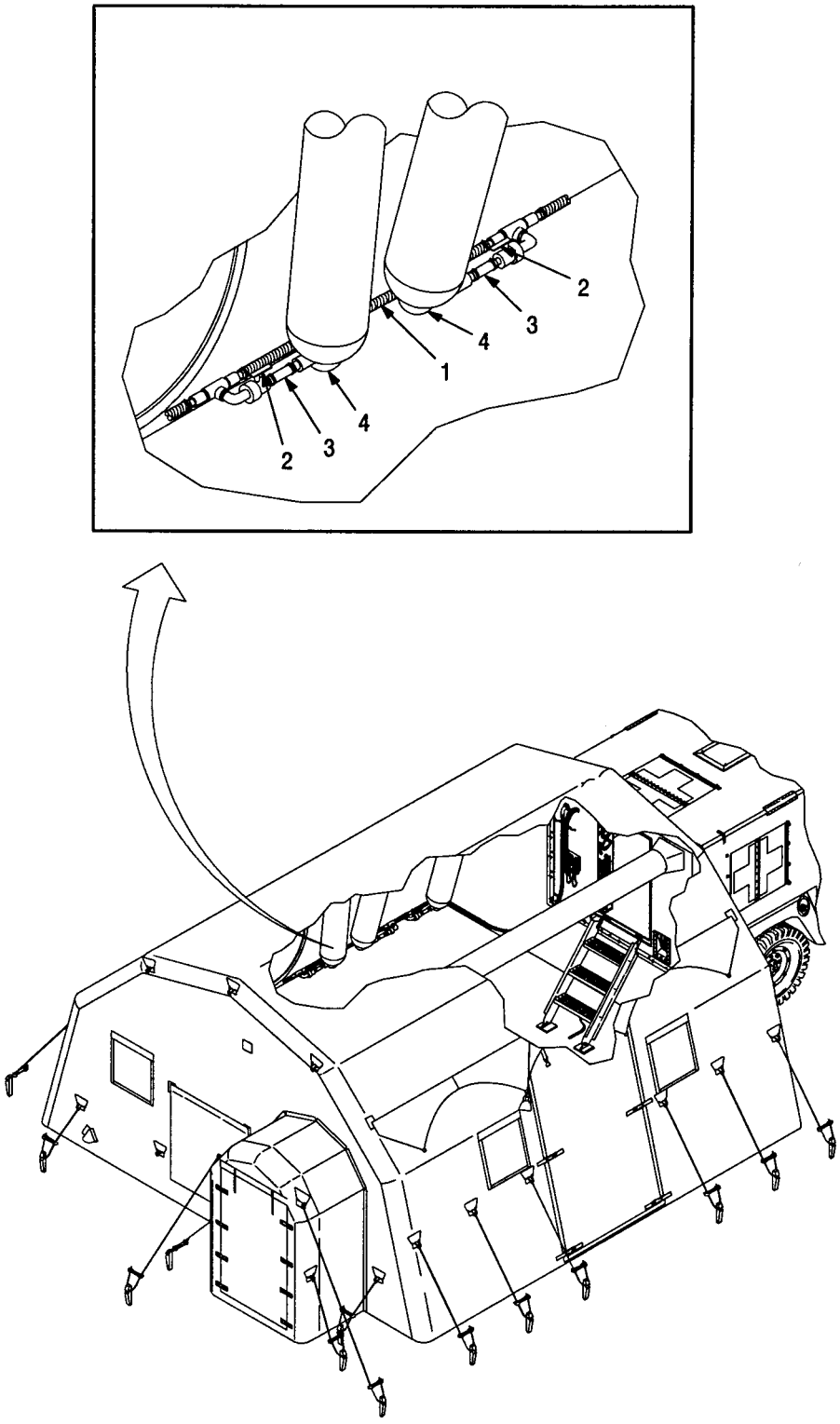


Figure 2-39. Air Beam Inflation Using Internal Power

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

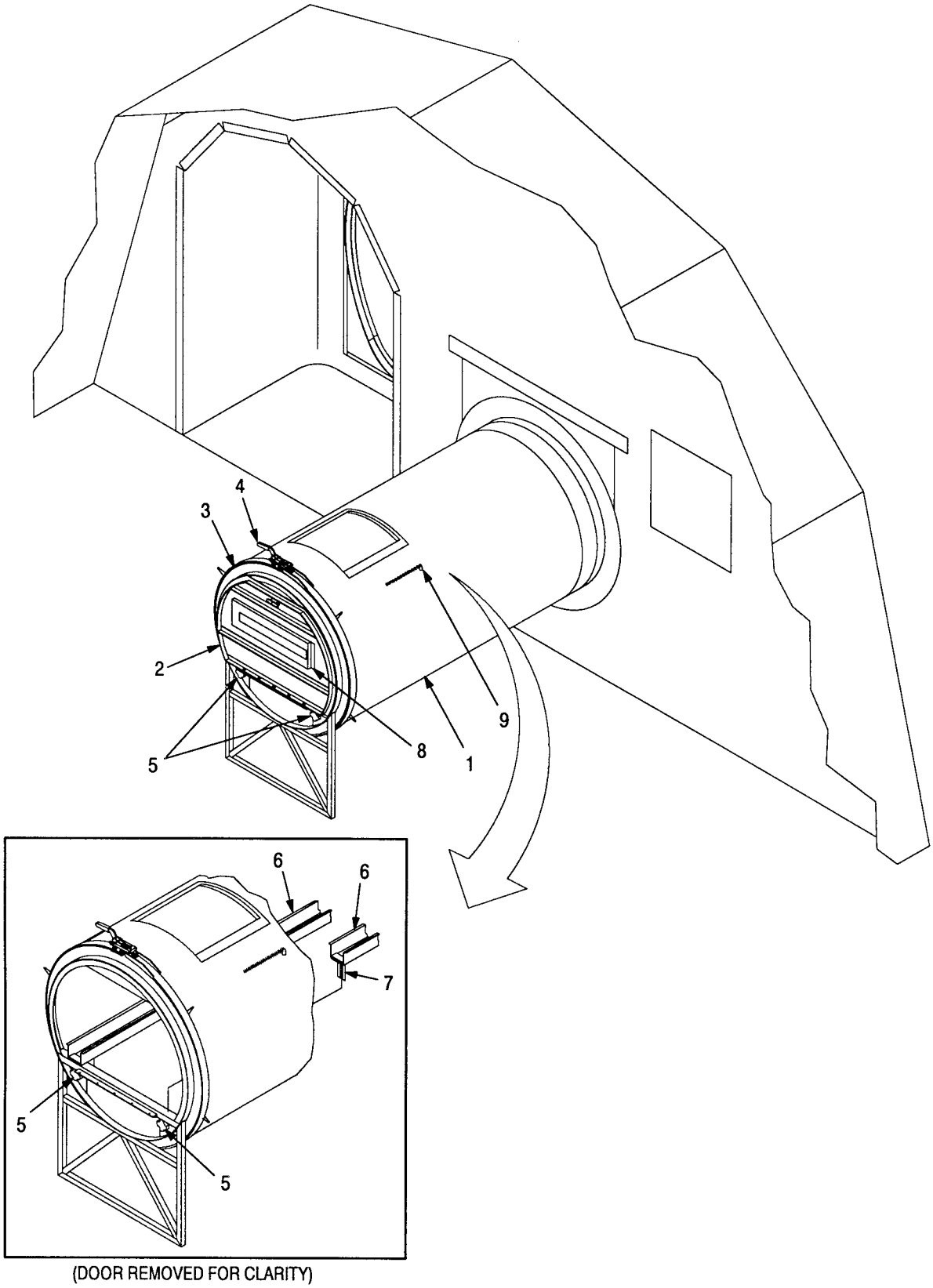


Figure 2-40. Installing Inner TALP Airlock Door

(7) Loosen two threaded knobs (5) on inner TALP airlock door (2).

WARNING

To prevent death or injury to personnel from contamination, ensure NBC SHELTER PRESSURE gage reads at least 0.5 iwg.

(8) Open holes on vents (8) of door (2) by pulling back fastener hook and fastener loop cover.

(9) Locate inner ambulatory airlock door in LMS (1, figure 2-41).

(10) To install inner ambulatory airlock door (1), LMS crew member no. 1 takes position inside ambulatory airlock (2).

(11) LMS crew member no. 2 stands inside ABS (3) and positions door (1) with timer (4) facing into ambulatory airlock (2).

(12) LMS crew member no. 2 places metal tab (5) on bottom of door (1) into fabric loop (6) on bottom of door opening (7), and positions and supports door (1) for assembly from inside ABS (3).

(13) LMS crew member no. 2 starts fitting reinforced cable on door opening (7) around frame of door (1) from bottom up.

(14) LMS crew member no. 2 carefully secures fastener hook and fastener loop tape on each side of door (1) working from bottom of door (1) to top until secured.

(15) LMS crew member no. 1 engages five spring clips (8) on door (1) to secure frame of door (1) to ambulatory airlock (2).

(16) LMS crew no. 1 enters ABS (3) through door (1), closes it, and opens holes on adjustable vent (9) of the door (1) by pulling back fastener hook and fastener loop cover until NBC SHELTER PRESSURE gage (located on rear control panel in LMS) reads 0.5 iwg.

(17) LMS crew waits for cab crew to complete installation of outer TALP airlock door.

(18) Remove airlock pressure gage (1, figure 2-42) from rear of LMS. Install gage between ambulatory and TALP doors using two fastener hook and fastener loop straps. Pass straps through D-rings on airlock wall and bring to front of gages. Pass straps through slots and attach fastener hook and fastener loop.

(19) Attach three air lines: ABS inlet line (2) to quick disconnect at gage (1) input (top center), TALP airlock line (3) to quick disconnect at litter gage input, and ambulatory airlock line (4) to quick disconnect at ambulatory gage input.

(20) Ensure airlock pressure gage (1) is level (front to back) and not tilted.

NOTE

Light set and medical chests are stowed on HMT.

NBC recirculation filters are stowed in LMS.

(21) After cab crew signals that outer TALP door is installed, begin purging airlock.

(22) Carefully open TALP door (2) and insert TALP rails (6) into entrance way. Slide slotted plate (7) on TALP rails (6) into place between backing plate and inner TALP airlock door threaded knobs (5). Do not tighten knobs (5) until outer TALP door is installed.

(23) Outer TALP airlock door vents should be adjusted to achieve a pressure of 0.3 iwg within TALP airlock. Communicate with cab crew to have them adjust outer TALP airlock door vents as necessary. Allow TALP airlock to purge for approximately three minutes. Using CAM, open side zipper (9, figure 2-40) and check if airlock has purged sufficiently. If contamination is present, remove CAM and close zipper (9). Allow another minute or so to pass before performing another CAM check. Continue to check until no presence of contamination is detected.

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

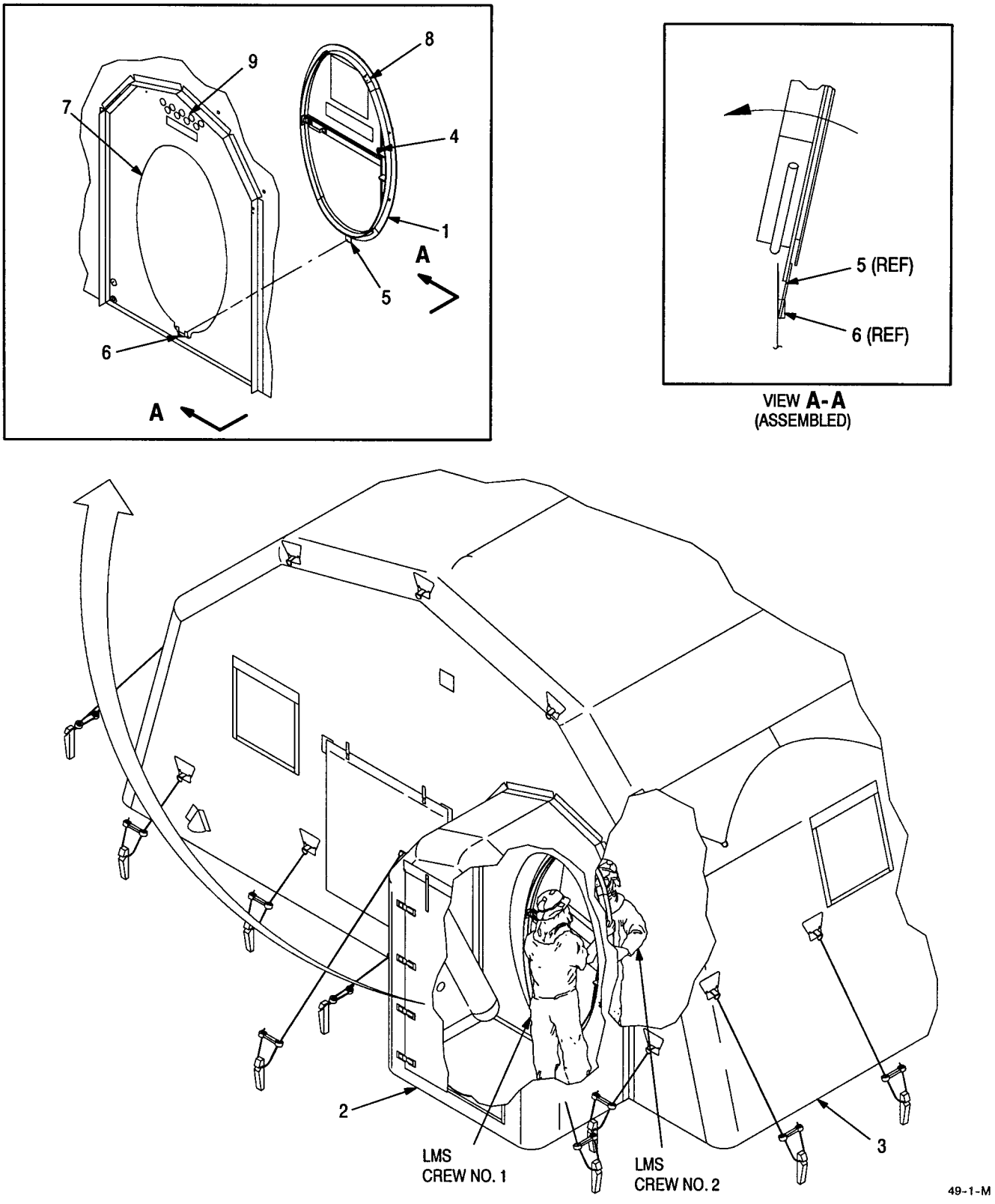


Figure 2-41. Installing Inner Ambulatory Airlock Door

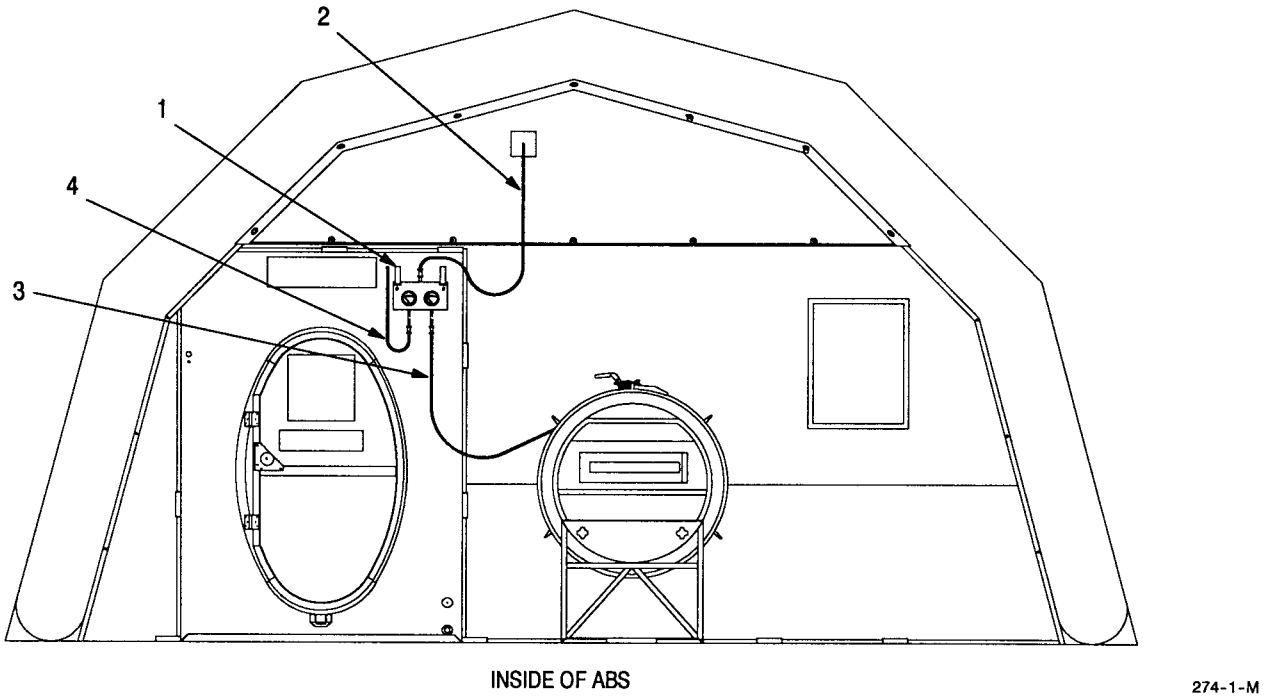


Figure 2-42. Airlock Pressure Gage Installation

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

(24) LMS crew obtains lights, medical chests and other items stowed on HMT from cab crew.

(25) After cab crew signals that outer ambulatory door is installed, begin purging airlock.

(26) Check for contamination by using CAM. Open fastener hook and fastener loop on ambulatory airlock door enough to insert CAM probe into airlock and check if airlock has purged sufficiently. If contamination is present, remove CAM and close fastener hook and loop fastener. Allow another minute or so to pass before performing another CAM check. Remove items after airlock is purged.

(27) Remove NBC recirculation filters from LMS.

(28) Place one NBC recirculation filter (9, figure 2-43) on passenger side of ABS, close to rear of LMS and plug it into one of the bottom outlets in receptacle panel (7). Place second NBC recirculation filter (10) in opposite, diagonal corner of ABS and using 32 foot extension cord (11), plug it into the other bottom outlet on the receptacle panel (7). Turn both recirculation filters on. NBC recirculation filters will not operate unless under NBC mode. NBC FAN switch on rear control panel must be ON for NBC recirculation filter outlets on receptacle panel (7) to work.

(29) Remove and position medical equipment and supplies as required.

(30) Hang two lights (1 and 2) with straps (3) from ceiling of passenger side of ABS. Hang two lights (4 and 5) with straps (3) from ceiling of driver side of ABS. Plug light (1) into light (2) and light (4) into light (5). Plug light (1) into extension cord (6). Plug other end of extension cord (6) into one of the top outlets on receptacle panel (at rear of LMS) (7). Plug light (5) into extension cord (8). Plug other end of extension cord (8) into top outlet on receptacle panel (7). Hang extension cord (8) on bolt heads on ABS retainer.

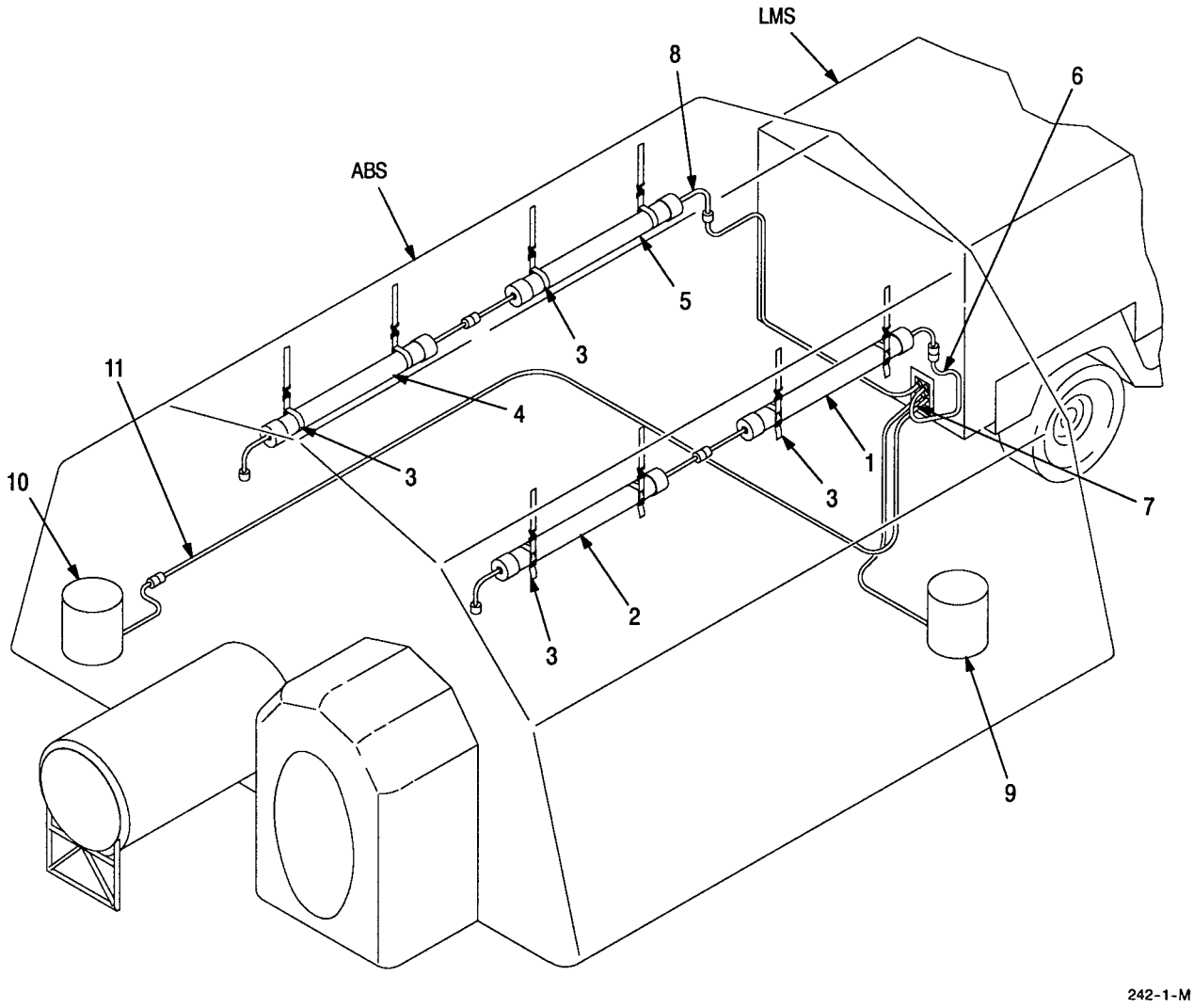


Figure 2-43. ABS Lights and NBC Recirculation Filter Installation

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

b. **Cab Crew Tasks**

(1) Check ambulatory door flap (6, figure 2-47) on outer ambulatory airlock door (7) and TALP door flap (8) on outer TALP airlock door (9) remain secured during raising of ABS (1). Verify both DCS entry way flaps (10) are secured.

(2) Cab crew waits for signal from LMS crew that inner TALP airlock door has been installed.

WARNING

To prevent death or injury to LMS crew from contamination, ensure inner ambulatory airlock door is closed.

(3) Unfasten TALP door flap (1, figure 2-44). Roll flap (1) under so that green or tan material faces out, to minimize moisture retention. Secure flap (1) using buckles and straps (2) to buckle under flap (1).

NOTE

Vents are underneath rain guard.

(4) Pick up outer TALP airlock door (3) with timer control (4) facing outside and attach door (3) to TALP fabric tunnel (5) by placing TALP fabric tunnel (5) between door (3) and retaining clamp (6). Make sure grommets engage TALP door (3) posts. Engage latch clamp (7) to secure TALP fabric tunnel (5) to door (3). Open one hole (8) on adjustable vents of door (3) to allow airlock to be purged.

CAUTION

Use care not to rip ABS or airlock fabric when installing rails.

(5) Loosen two threaded knobs (1, figure 2-45) on outer TALP airlock door (2). Open door (2) and carefully insert slotted plate (3) on TALP rail (4) into place between backing plate and door (2) and two threaded knobs (1). Tighten two threaded knobs (1).

(6) Signal LMS crew that outer TALP door is installed.

(7) Wait for LMS crew to signal that airlock has been purged.

(8) Place medical chests (when needed), light set and other items stowed on HMT on a litter and put in TALP.

(9) Unfasten ambulatory door flap (1, figure 2-46). Roll flap (1) under so that green or tan material faces out, to minimize moisture retention. Secure flap (1) using buckles and straps (2). Secure straps (2) to buckles under flap (1).

(10) To install door (3), cab crew member no. 1 stands inside ABS ambulatory airlock (4), places metal tab (5) on bottom of door (3) into fabric loop (6) on bottom of door opening (7), and supports door (3).

(11) Cab crew member no. 2 is positioned outside ambulatory airlock (4) and starts fitting reinforced cable on door opening (7) around door frame (3) from bottom up.

(12) Cab crew member no. 1 secures fastener hook and fastener loop tape on each side of door (3) working from bottom of door (3) to top until secured.

(13) Cab crew member no. 2 engages five spring clips (8) on door frame (3) to secure door (3) to ambulatory airlock (4).

NOTE

Vents are underneath rain guard.

(14) Pull back fastener hook and fastener loop vent cover on outer ambulatory airlock door (3). Leave one hole open.

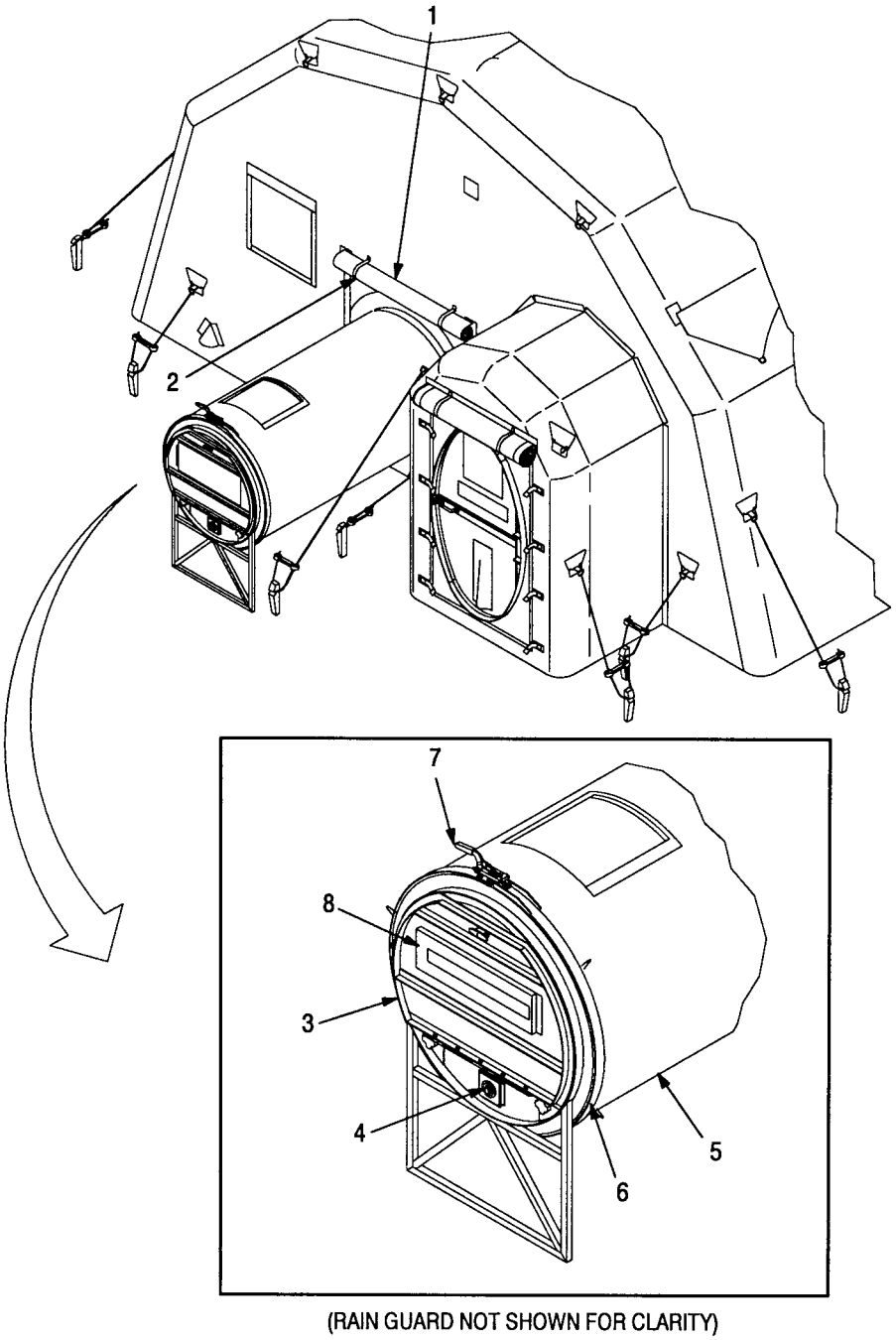


Figure 2-44. Installing Outer TALP Airlock Door

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

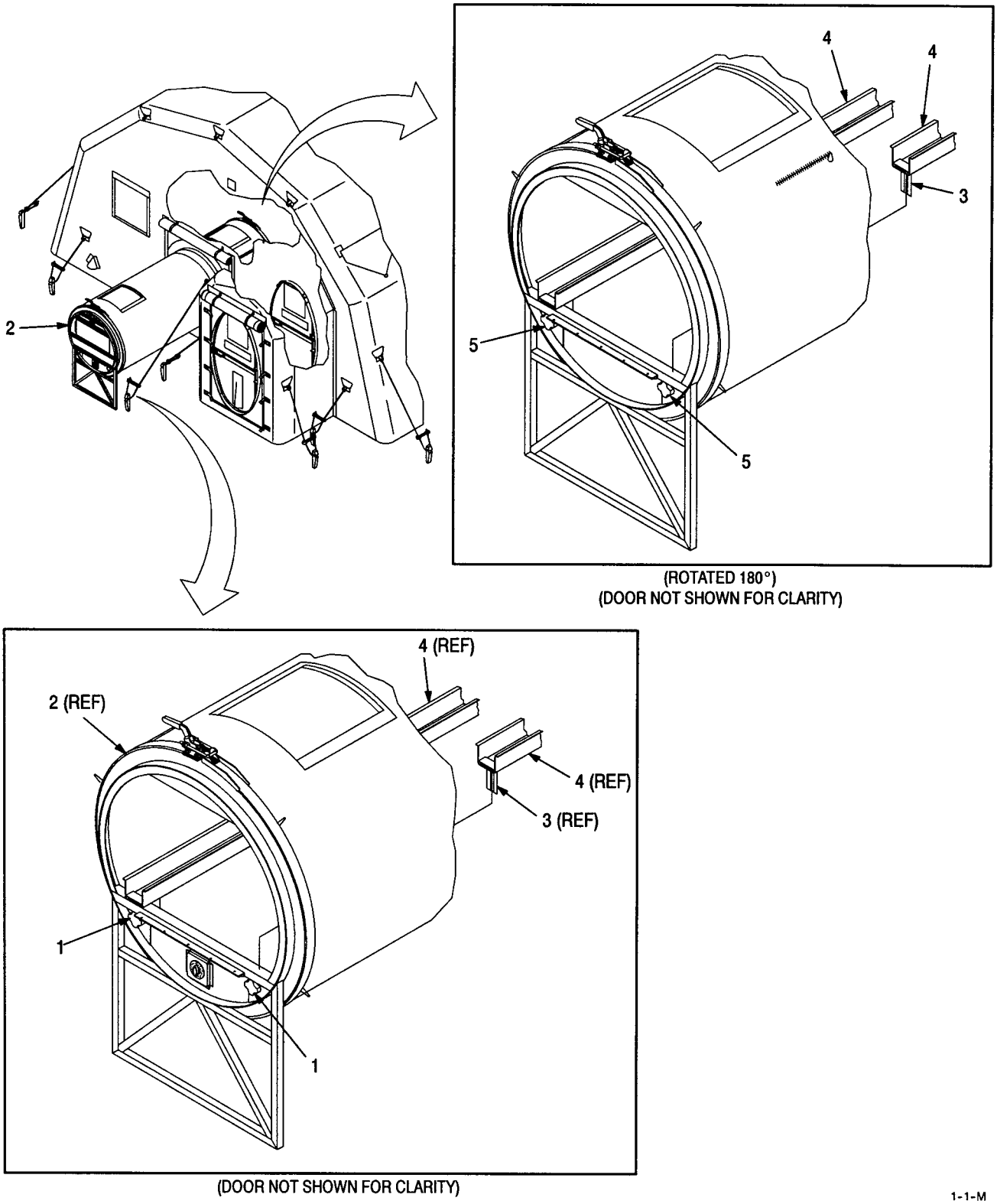


Figure 2-45. TALP Airlock Door Rails Installation - NBC Conditions

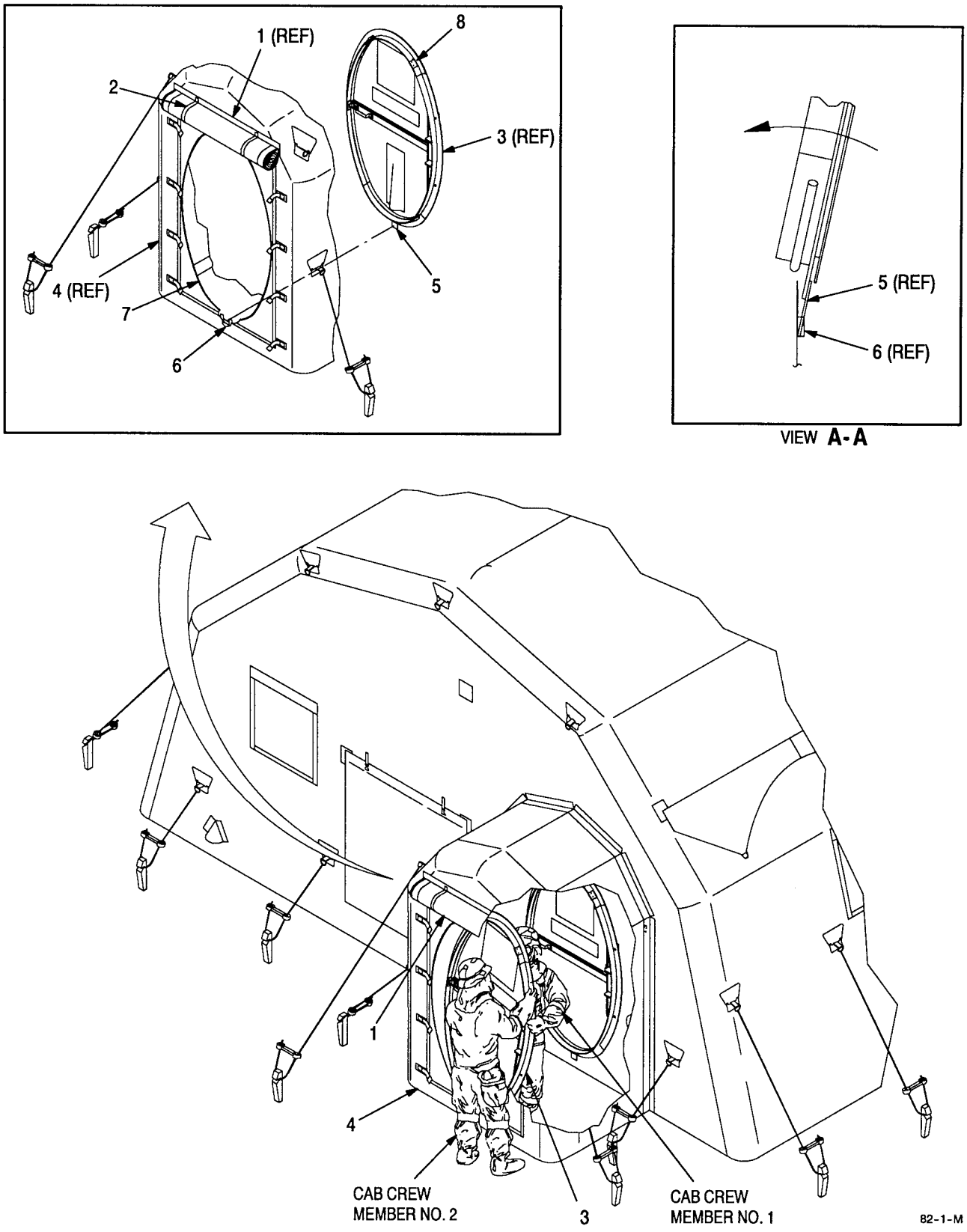


Figure 2-46. Installing Outer Ambulatory Airlock Door

2.25.2.4 Air Beam Shelter (ABS) Setup Procedures Under NBC Conditions - Continued.

(15) As ABS (1, figure 2-47) begins to inflate, attach lines (2) to stakes (3) and pull on slip lines (4) to help support air beams (5). Monitor and loosen slip lines (4) as ABS (1) inflates and before slip lines (4) get too tight.

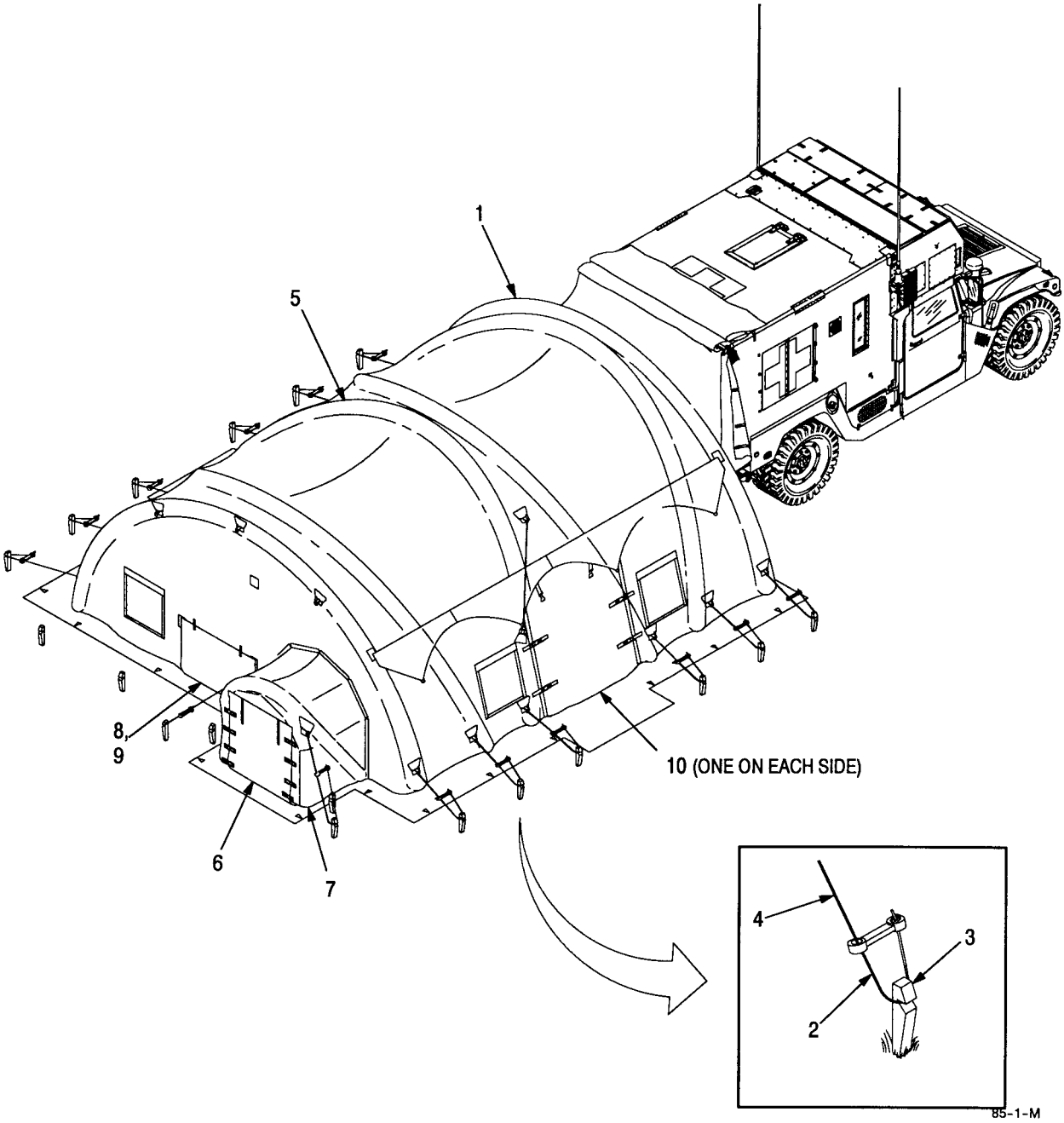


Figure 2-47. Inflating ABS

NOTE

Both ambulatory and TALP entry areas serve as airlocks to prevent undue loss of pressure when doors are opened and to provide a place for final decontamination of individuals who are entering from a contaminated area. Most contaminants that penetrate are swept out by purging airflow from opened flaps on outer and inner doors. Contaminants which penetrate enclosure are filtered by NBC recirculation air fans powered from receptacle panel.

Refer to Chapter IV for Entry and Exit Procedures.

(16) This completes set up for static mode operation under NBC conditions.

2.25.2.5 Direct Complexing Shelter (DCS) Under NBC Conditions.

WARNING

To prevent death or injury to personnel from contamination, do not open inner and outer TALP airlock doors and/or ambulatory airlock doors at the same time. Do not open DCS doors unless direct complexed and DCS connector is in place.

Cab crew and LMS crew must coordinate activities to prevent contamination of CBPS interior.

The following steps describe procedures for connecting two or more CBPSs together in a side-by-side, DCS configuration.

a. **Cab Crew Tasks**

(1) Position ECVs and ground cloths (1, figure 2-48) facing opposite directions, side by side so that space between inflated ABSs is one to three feet. Overlap ground cloths (1) between lines (2) on ground cloth extension (3) by about six inches.

(2) Deploy each system per para 2.25.2.1 through para 2.25.2.4.

(3) Unhook DCS entry way flaps (1, figure 2-49) over DCS openings (2) on both inflated ABSs (3). Roll DCS entry flaps (1) under so that green or tan material faces out, to minimize moisture retention and secure with straps (4).

(4) Secure DCS connector (5) using zippers and fastener hook and fastener loop attachments (6) on both ABSs (3).

(5) Connect support lines (7) to Dee Rings (8) on DCS connector (5).

(6) Anchor DCS connector (5) to stakes at each side of DCS connector (5) with support lines (7).

(7) Open vents (9) on DCS connector (5) by pulling back fastener hook and fastener loop cover (10) as required.

b. **LMS Crew Tasks**

(1) Help deploy each system per para 2.25.2.1 through para 2.25.2.4.

(2) Open vents (10) on inside of both DCS doors. Allow DCS connector (5) to purge for approximately three minutes. Using CAM, unzip DCS door enough to check if connector has purged sufficiently. If contamination is present, remove CAM and close zipper. Allow another minute or so to pass before performing another CAM check. Continue to check until no presence of contamination is detected.

(3) Open zippered doors. Roll up doors and stow out of way by securing with fastener hook and fastener loop straps on inside of ABS (3).

(4) This completes DCS set up under NBC conditions.

2.25.2.5 Direct Complexing Shelter (DCS) Under NBC Conditions - Continued.

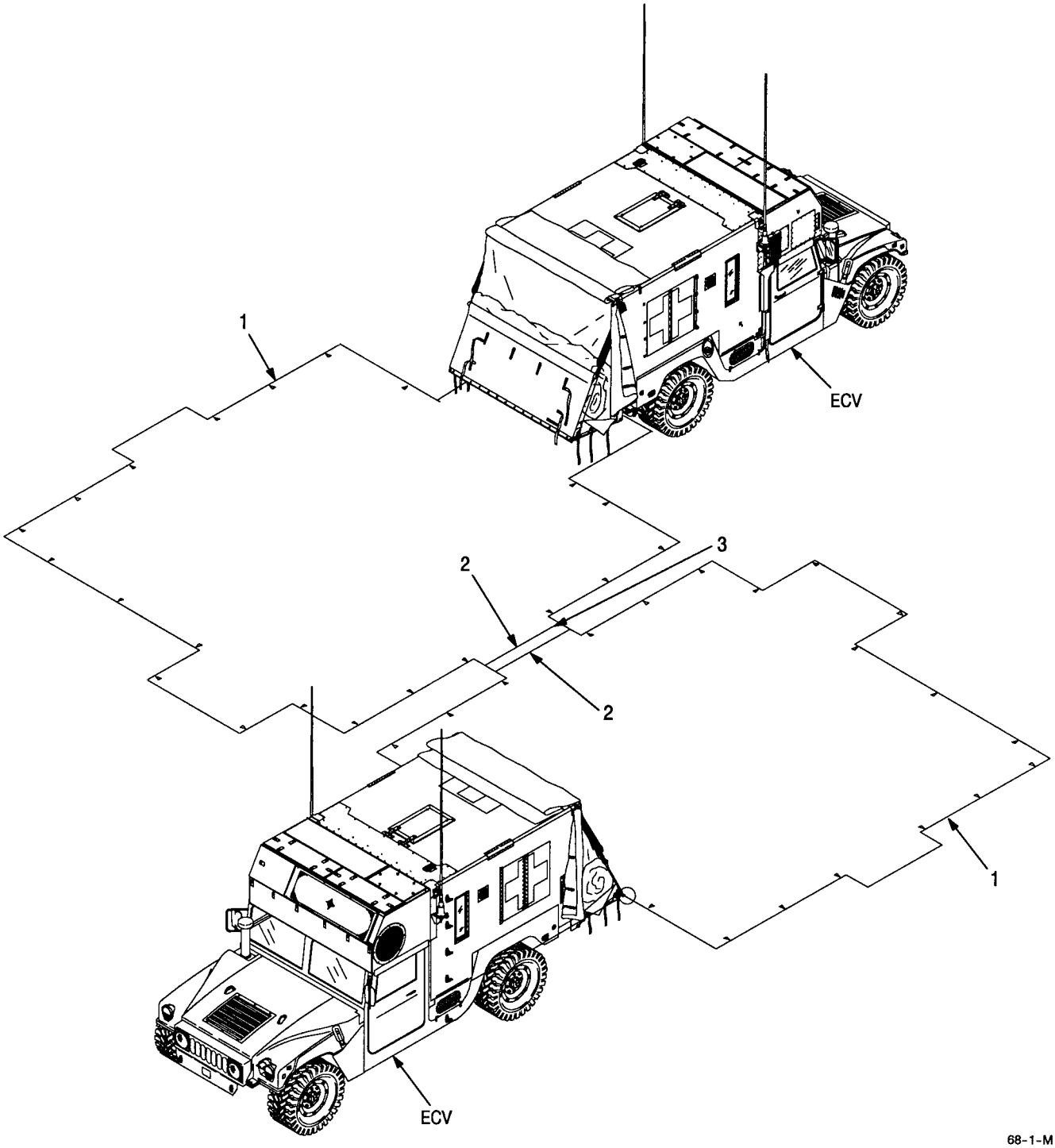


Figure 2-48. Positioning Ground Cloths for DCS

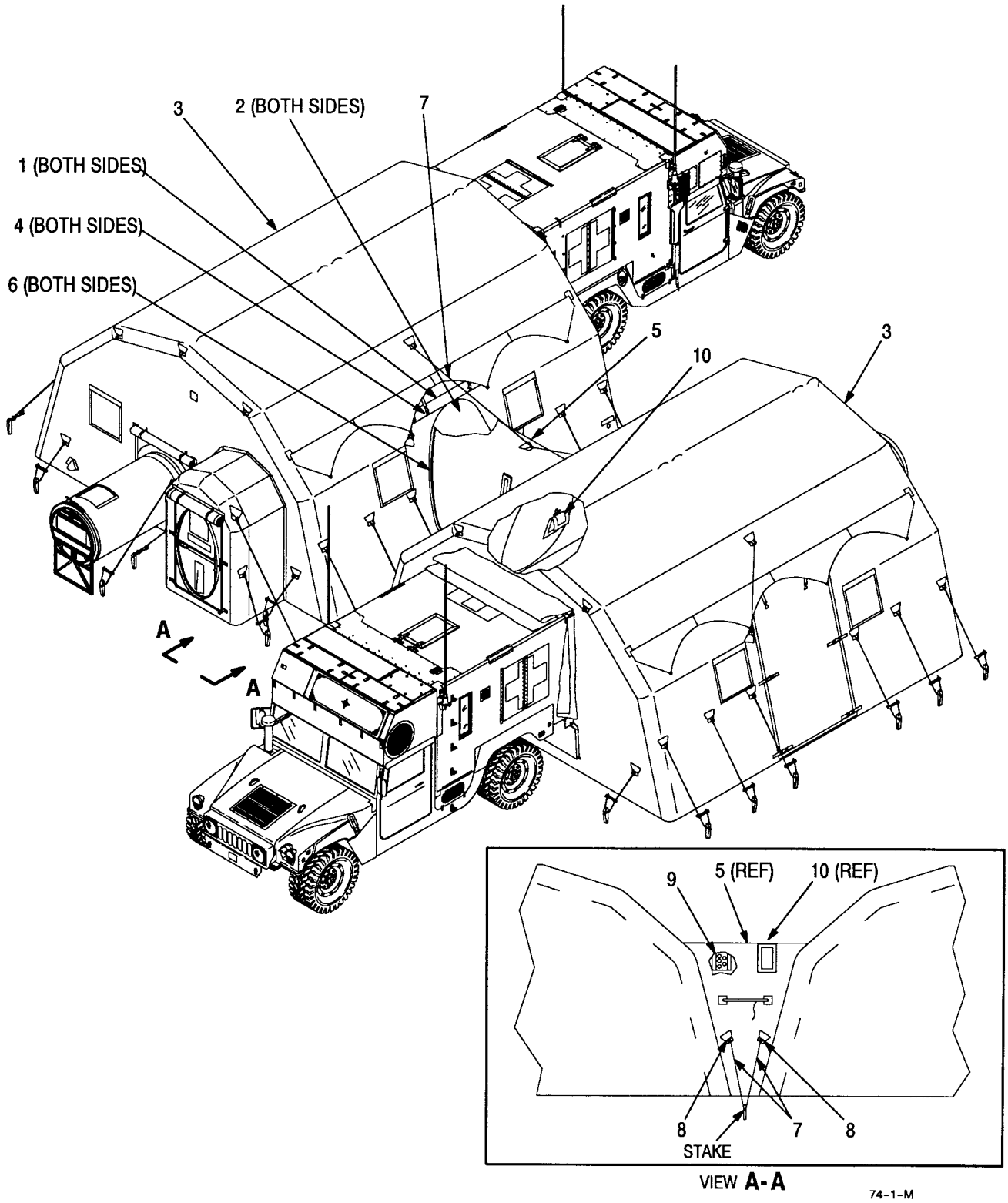


Figure 2-49. DCS Setup

2.25.2.6 Static Operation Switchover From NBC To Non-NBC Conditions.

WARNING

Contaminants are NBC agents that have been formulated to kill or incapacitate human beings. If CBPS has been exposed to contaminants, refer to para 2.33.

a. **Cab Crew Tasks**

(1) Remove chemically protective clothing and masks. Observe appropriate decontamination procedures.

(2) Open ECV, TALP, DCS and ambulatory airlock doors as mission requires.

(3) Use operating procedure for static operation under usual conditions (refer to para 2.24.2).

b. **LMS Crew Tasks**

(1) Remove chemically protective masks. Observe appropriate decontamination procedures.

(2) On rear control panel (1, figure 2-50), ensure NBC ALARM (press to mute) switch (2) has been turned off and ALARM MUTE indicator light (blue) is off.

(3) Press NBC FAN switch (3) on rear control panel (1) to turn off NBC fan. NBC FAN ON indicator light (green) will go off.

(4) Access door and the emergency exit hatch may be opened as required.

(5) TALP, DCS and ambulatory airlock doors may be opened as required.

(6) Use operating procedure for static operation under usual conditions (refer to para 2.24.2).

(7) This completes switchover from NBC to non-NBC conditions in static mode. Operate system in static mode as mission requires.

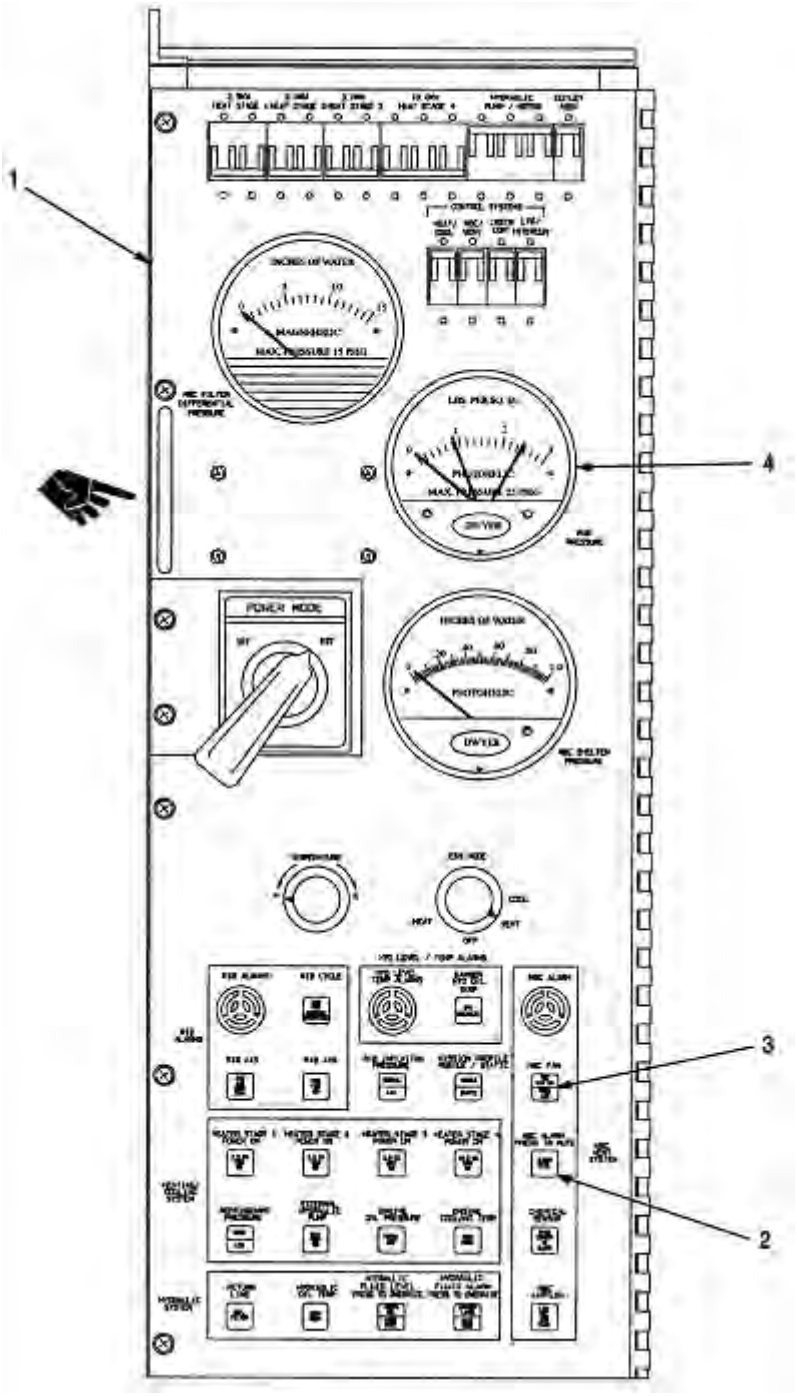


Figure 2-50. Rear Control Panel Settings Switchover

2.25.3 Striking Procedures Under NBC Conditions.

NOTE

Procedures for striking and shutting down CBPS under non-NBC conditions and under NBC conditions are essentially the same, except for removing ambulatory airlock and TALP airlock doors. The following steps and procedures are for striking and shutting down under NBC conditions.

2.25.3.1 CBPS Striking Procedures.

WARNING

During NBC mode of operation, ensure EPG switch, NBC FAN switch and ESS remain ON.

When striking during NBC mode of operation, ECV engine must be running. ESS MODE selector switch must be on VENT for ESS to function. Continuous LMS over pressure must be maintained when ABS is rolled up and stowed.

To prevent death or injury to LMS crew from contamination, LMS crew must be in full MOPP gear.

NOTE

Refer to Appendix E, Load Plan, for stowing equipment in the LMS and on the HMT.

a. **LMS Crew Tasks**

(1) Put on chemically protective clothing and masks.

(2) Turn off and remove lights. Pick up medical chests and other items to be stowed on HMT and place in airlocks. Signal to cab crew to remove equipment from airlocks.

(3) Remove recirculation fans and stow in LMS.

(4) Allow airlocks to purge for approximately three minutes.

WARNING

To prevent death or injury to LMS crew from contamination, ensure that cab crew has removed outer TALP airlock door, stowed TALP airlock fabric tunnel, and unrolled and secured TALP airlock door cover.

NOTE

To help purge TALP airlock, signal to cab crew to open TALP door flap a little by separating fastener hook and fastener loop fastener. Once TALP airlock is purged, ensure TALP opening is sealed securely.

(5) Allow TALP airlock to purge for approximately three minutes. Use CAM to check if airlock has purged sufficiently.

(6) Loosen two knobs (1, figure 2-51), carefully remove rails (2) and stow in LMS. Signal cab crew when rails are removed and inner TALP door is shut.

(7) Await notification from cab crew that outer TALP door has been removed and TALP opening is folded and sealed securely.

(8) Remove inner door (3) by disengaging latch clamp (4) and removing retaining clamp (5). Stow inner door (3) and retaining clamp (5) in LMS.

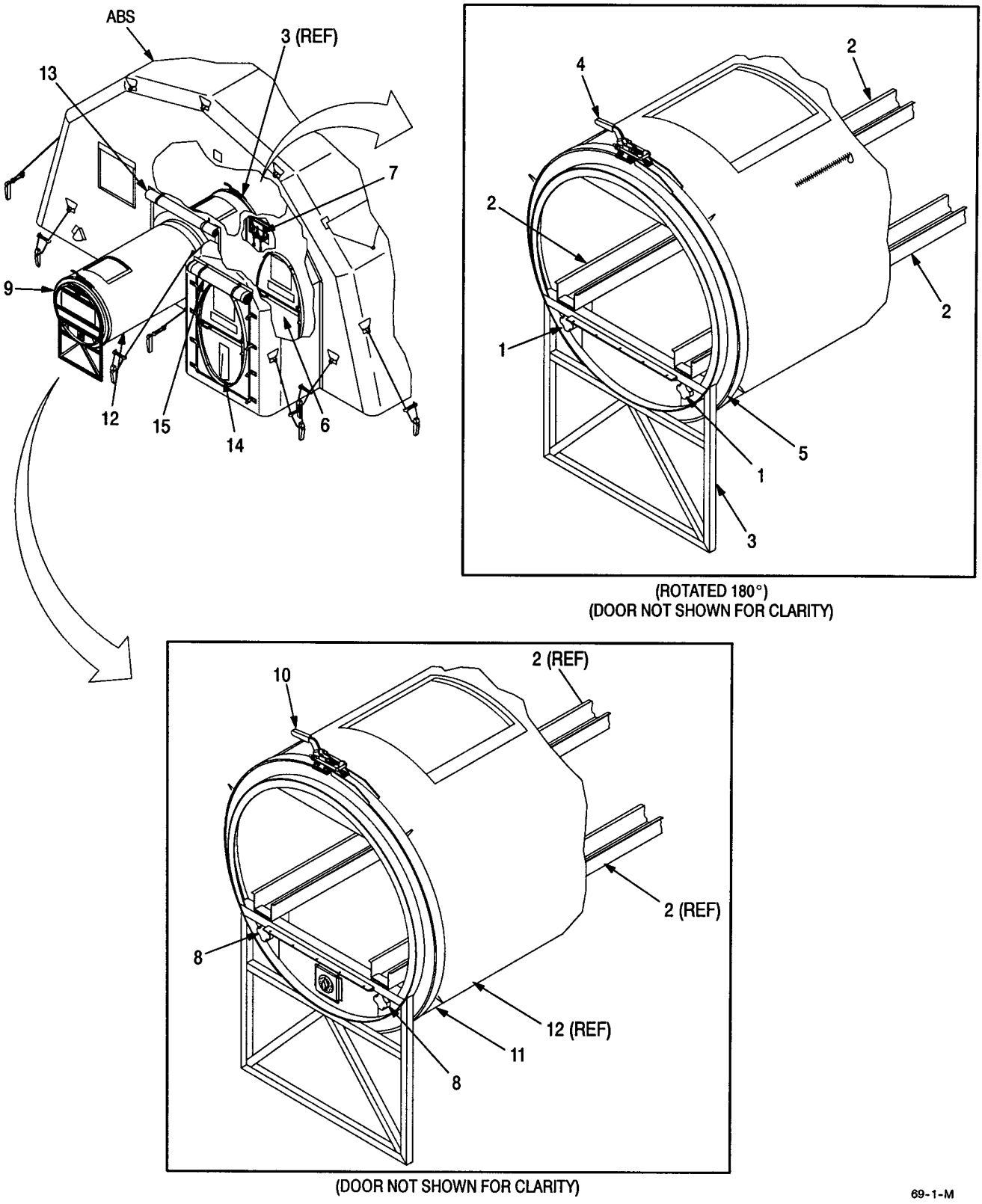


Figure 2-51. Ambulatory Airlock Door and TALP Airlock Door Removal

2.25.3.1 CBPS Striking Procedures - Continued.

WARNING

To prevent death or injury to LMS crew from contamination, ensure outer ambulatory airlock door opening has been removed and sealed before proceeding.

NOTE

To help purge ambulatory airlock, signal to cab crew to open ambulatory door flap a little by separating fastener hook and fastener loop fastener. Once ambulatory airlock is purged, ensure ambulatory airlock opening is sealed securely.

(9) Await notification from cab crew that outer ambulatory door has been removed and sealed securely.

(10) Allow ambulatory airlock to purge for approximately three minutes. Check if airlock has purged sufficiently using CAM.

(11) Remove inner ambulatory airlock door (6) by loosening spring clips, separating loop and pile fasteners, lifting it from ambulatory airlock opening. Stow in LMS.

(12) Disconnect airlock pressure gage (7) from ABS wall and stow at rear of LMS.

(13) Stow medical chests and litter stands in LMS.

(14) On rear control panel (1, figure 2-52) turn RIB FAN (2) switch to OFF. Indicator light (green) turns off.

(15) Ensure NBC ALARM (press to mute) switch (3) has been turned off and ALARM MUTE indicator light (blue) is off.

(16) Ensure ESS MODE selector switch (4) is set to HEAT, COOL or VENT.

(17) Ensure POWER MODE switch (5) is set to INT.

(18) Ensure NBC FAN switch (6) is ON. NBC FAN ON indicator lights (green).

NOTE

MISSION PROFILE indicator will not light if INSTM CONT circuit breaker is not ON.

(19) On rear control panel (1), set MISSION PROFILE switch (7) to MOBILE. MOBILE indicator will light (white).

(20) Ensure inverter power switch (8) is set to OFF.

(21) Ensure converter power switch (9) and AC INPUT circuit breaker (10) are set to OFF.

(22) Ensure the following circuit breakers are set to ON:

HEAT/COOL (11)
NBC/VENT (12)
LTG/INTERCOM (13)
INST/CONT (14).

(23) Signal to cab crew to proceed with striking ABS. Enter LMS, fold ladder up into LMS opening, and secure with straps.

(24) As ABS collapses, regulate release of air by opening and closing ECV access door.

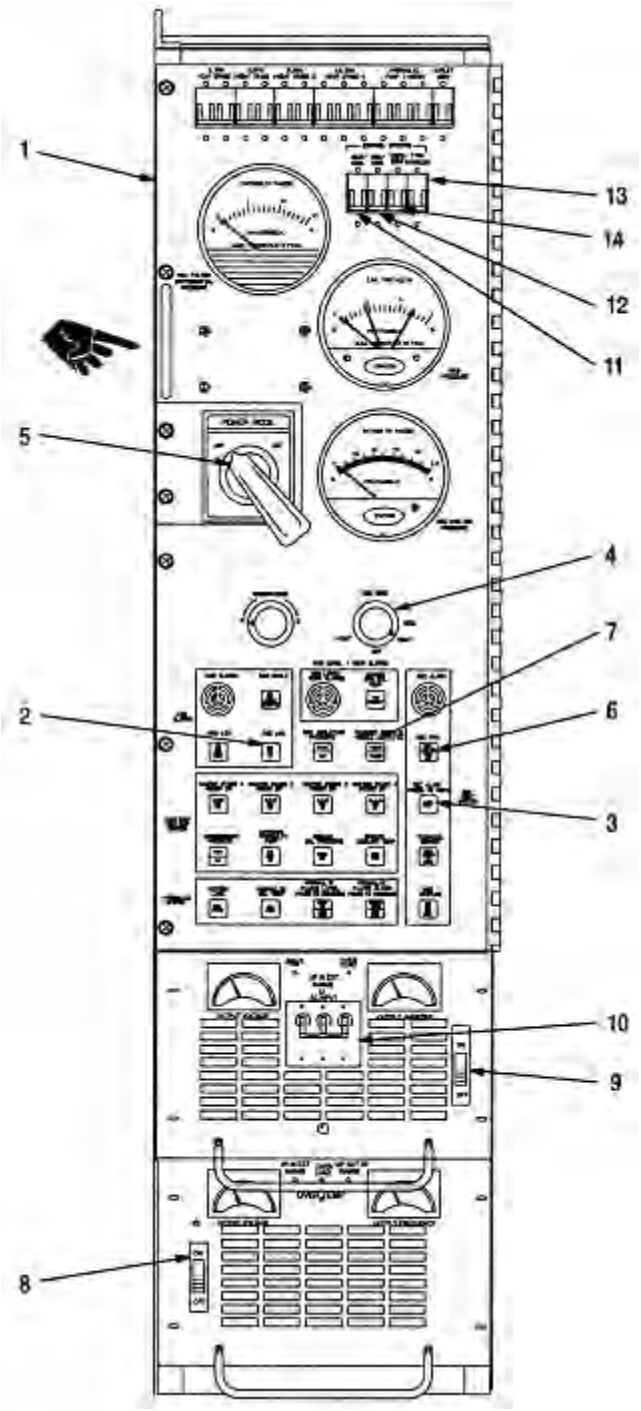


Figure 2-52. Rear Control Panel Striking Settings - NBC Conditions

2.25.3.1 CBPS Striking Procedures - Continued.

b. **Cab Crew Tasks**

WARNING

To protect against death from contamination when striking, cab crew must be in full MOPP gear.

To prevent death or injury to LMS crew from contamination, ensure that inner airlock doors are closed.

(1) Remove light set, medical chests and other items from airlocks and store on HMT per Appendix E.

(2) Allow TALP airlock to purge for approximately three minutes. Loosen two outer TALP rail knobs (8, figure 2-51), open outer TALP airlock door (9) and carefully lift rails (2) off knobs (8) and set on door frame (9). Notify LMS crew that rails can be removed.

WARNING

To prevent death or injury to LMS crew from contamination, ensure that LMS crew has closed inner TALP airlock door and the signal to proceed is given.

(3) Remove door (9) by disengaging latch clamp (10) and removing retaining clamp (11). Place door (9) and retaining clamp (11) on HMT per Appendix E.

(4) Push external TALP airlock fabric tunnel (12) through opening in wall of ABS, inverting fabric. Unroll TALP door flap (13) covering opening and secure with fastener hook and fastener loop tape. Signal to LMS crew that TALP door flap (13) is secure.

WARNING

To prevent death or injury to LMS crew from contamination, ensure that inner airlock doors are closed.

(5) Remove outer ambulatory airlock door (14) by loosening spring clips, separating loop and pile fasteners and lifting it from ambulatory airlock opening. Stow door (14) on HMT per Appx. E.

(6) Unroll ambulatory door flap (15) covering ambulatory airlock opening and secure with fastener hook and fastener loop tape and buckles. Signal to LMS crew that ambulatory door flap (15) is secure.

WARNING

To prevent injury to personnel when removing air beam dump caps, grip dump cap firmly, release latches slowly and keep face away. Pressure may cause the dump caps to come off forcefully.

CAUTION

To prevent damage to dump cap lanyard, grip dump cap firmly when removing. Do not allow dump cap lanyard to forcefully pull away from ABS.

NOTE

Under NBC conditions, ABS will be slow to collapse.

(7) Verify that LMS crew has entered LMS. Starting with dump cap (1, figure 2-53) closest to ECV, unlatch six dump caps (1) along driver side of ABS and one on ambulatory door area to deflate the air beams.

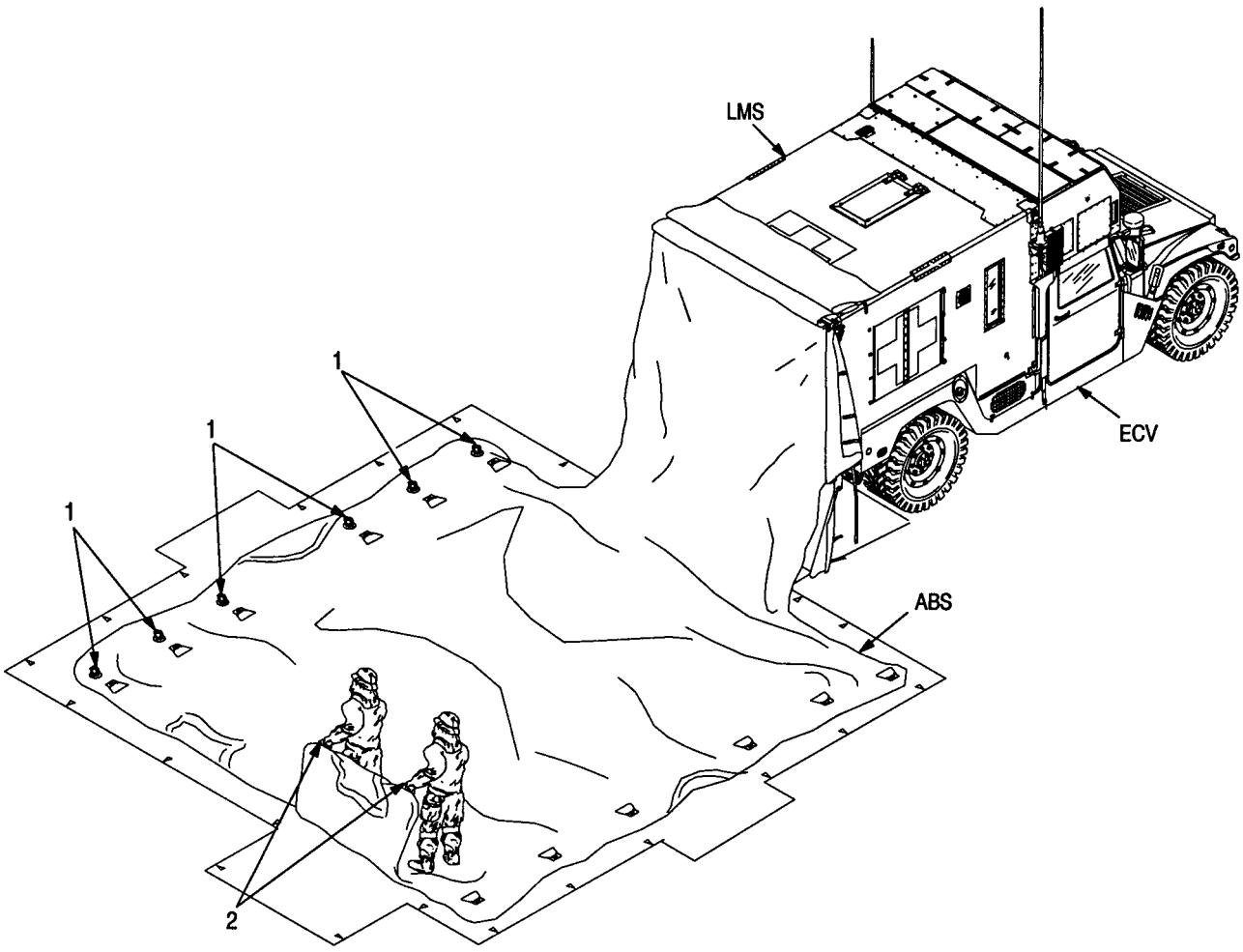


Figure 2-53. Deflating the ABS

WARNING

ABS fabric may be slippery, especially under wet or muddy conditions. Use care when walking on ABS, as surface may be bumpy due to air beam inflation manifold or folds of fabric and may cause a tripping hazard.

CAUTION

To protect against damage to ECV and ABS attachment points, pull ABS back several feet toward ECV before walking on it.

To protect against damage to manifold flexible hoses and check valves, be careful when walking on driver side of deflated ABS.

(8) Loosen slip lines and pull up twenty stakes. Stow stakes.

(9) Fold airlock (2) back onto main part of ABS.

2.25.3.1 CBPS Striking Procedures - Continued.

CAUTION

To avoid damage to ABS, only pull on loops.

(10) Grip ABS (1, figure 2-54) and fold passenger side of ABS into one third.

(11) Grip ABS (1) and fold driver side of ABS into one third.

NOTE

When folded, ABS should not extend beyond anchor tube (5, figure 2-55).

(12) Walk on ABS to remove as much air as possible.

(13) Push ABS up against tailgate.

(14) Fasten retention strap (4, figure 2-55).

(15) Verify anchor tube (5) is in lower transport cover (1). Ensure both eye bolts are outside lower transport cover (1). Pull lower transport cover (1) away from tailgate (6).

WARNING

ABS is extremely heavy. To prevent injury to personnel, two or more people are required to roll ABS.

NOTE

If time/mission conditions permit, roll ABS, unroll it, then roll it again in order to remove any remaining air and make a tighter bundle.

(16) Fully extend lower transport cover (1) with block and tackle assembly (2) under ABS (3).

(17) Roll ABS (3) toward LMS. Apply body weight to ABS (3) as you roll it to help trapped air to escape while rolling.

(18) Roll ABS (3) onto lower transport cover (1).

WARNING

Wear gloves when lowering ABS to ground to protect hands from injury. Do not wrap rope around hand.

CAUTION

To prevent damage to equipment, ensure tailgate is fully raised to avoid contact with HMT during transport.

NOTE

Make sure block and tackle assemblies are straight with no twists or kinks.

(19) Using block and tackle assembly (2), raise tailgate (6) partially to lift it off ground cloth (7), fold ground cloth (7) in same manner as ABS (3), and place on top of ABS (3).

(20) Raise tailgate (6) into transit position and secure safety cable (8). Pull lower transport cover (1) away from tailgate (6) to exhaust excess air. Make sure straps of upper transport cover (9) are not trapped behind rolled ABS (3).

(21) Coil rope and insert rope into roll of ABS (3).

(22) Secure sides of ABS (3) with three side and three bottom strap buckles (10).

(23) Secure upper transport cover (9) with four strap buckles (11).

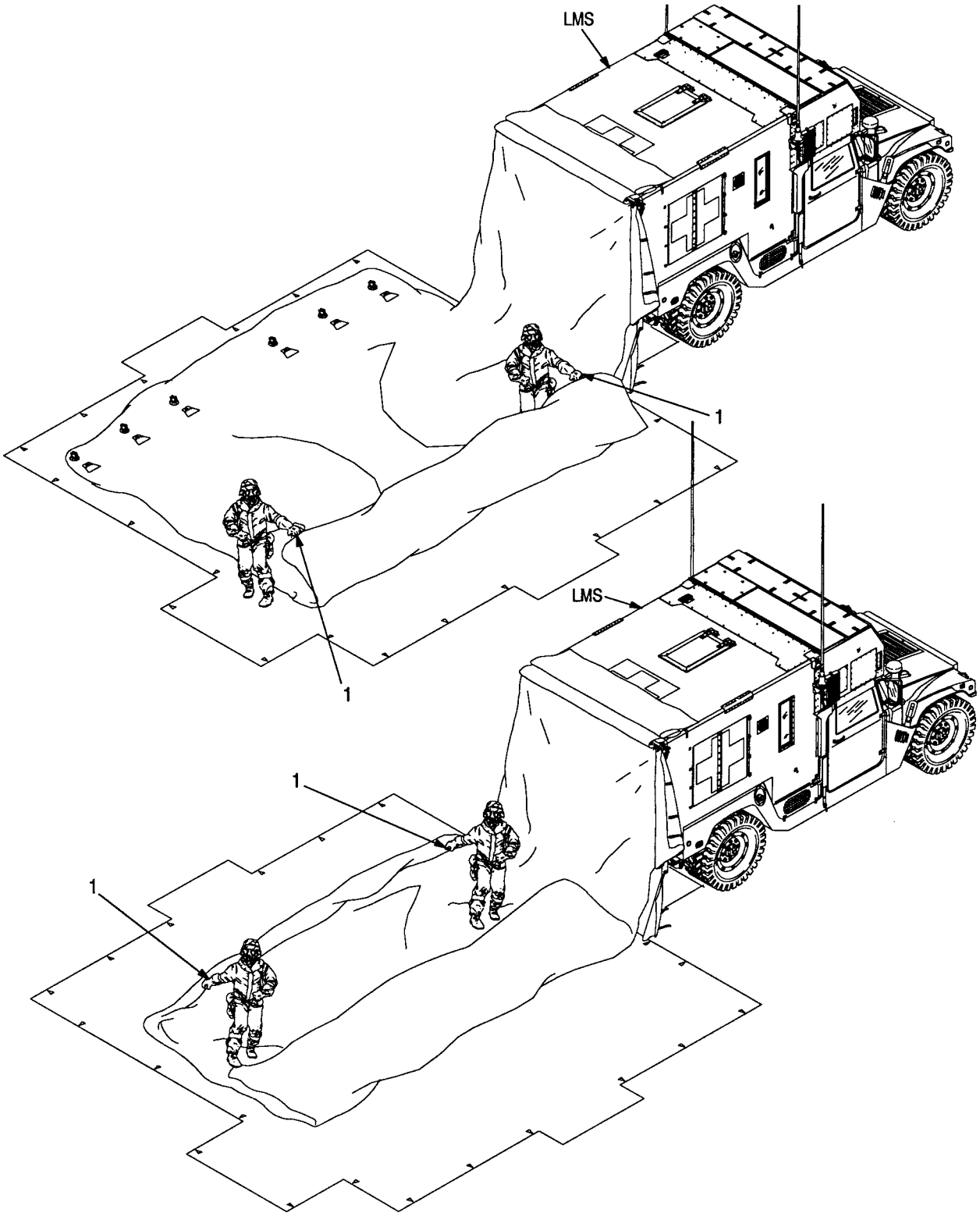


Figure 2-54. Folding the ABS

2.25.3.1 CBPS Striking Procedures - Continued.

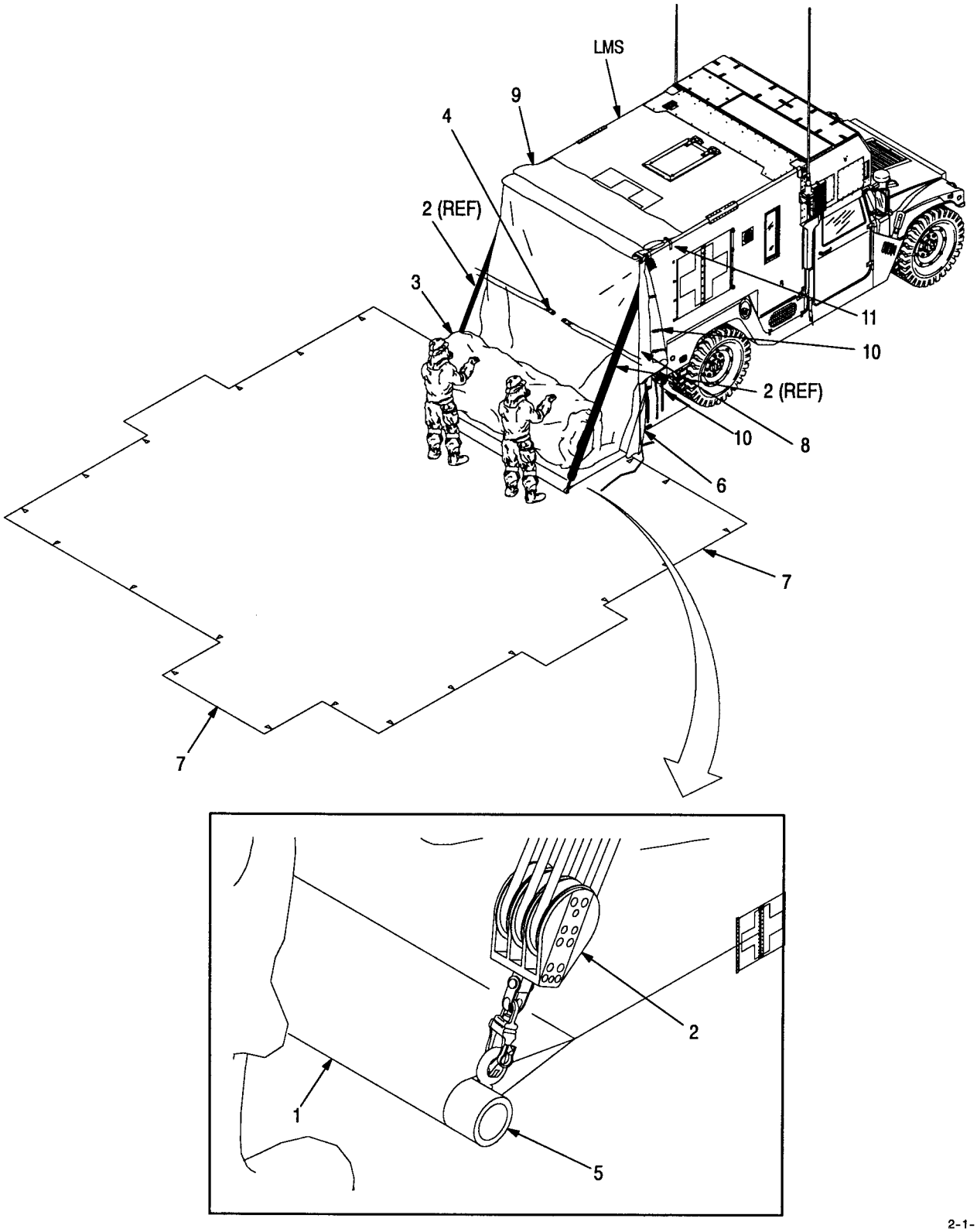


Figure 2-55. Packing the ABS

WARNING

When striking during NBC mode of operation, ECV must be in MOBILE mode, engine running, and ESS functioning. The ESS MODE selector switch must be on VENT, HEAT or COOL for ESS to function. Continuous LMS over pressure must be maintained when ABS is rolled up and stowed.

To prevent death or injury to LMS crew from contamination, LMS crew must be in full MOPP gear.

(24) This completes striking of ABS.

2.25.3.2 HMT Hookup.

a. **Cab Crew Tasks**

WARNING

Do not attempt to lift HMT tongue alone. Lifting heavy HMT tongue alone can cause back injury. Use crank on front caster to raise HMT tongue.

(1) On HMT (1, figure 2-56), raise rear support leg (2) off ground by turning leg extension (3) so it clears ground by about six inches.

(2) Crank down caster (4) on front support leg (5) so tongue ring (6) is raised up to clear pintle hook (7) on ECV.

(3) Open pintle hook (7) on ECV by removing safety pin (8) and lifting top locking latch (9).

(4) Maneuver ECV into position to hook up HMT (1).

(5) Lower HMT tongue ring (6) onto ECV pintle hook (7) by cranking up caster (4). Close locking latch (9) and insert safety pin (8).

(6) Connect light cable (10), breakaway brake chain (11) and safety chains (12) to ECV.

(7) Raise front support leg (5) and lock in place with pin (13).

(8) Raise rear support leg (2) and lock in place with pin (14).

(9) Release parking brakes (15) on HMT (1).

(10) This completes HMT (1) hookup. Operate ECV as required (refer to TM 9-2320-387-10).

b. **LMS Crew Tasks**

No tasks required.

2.25.3.2 HMT Hookup - Continued.

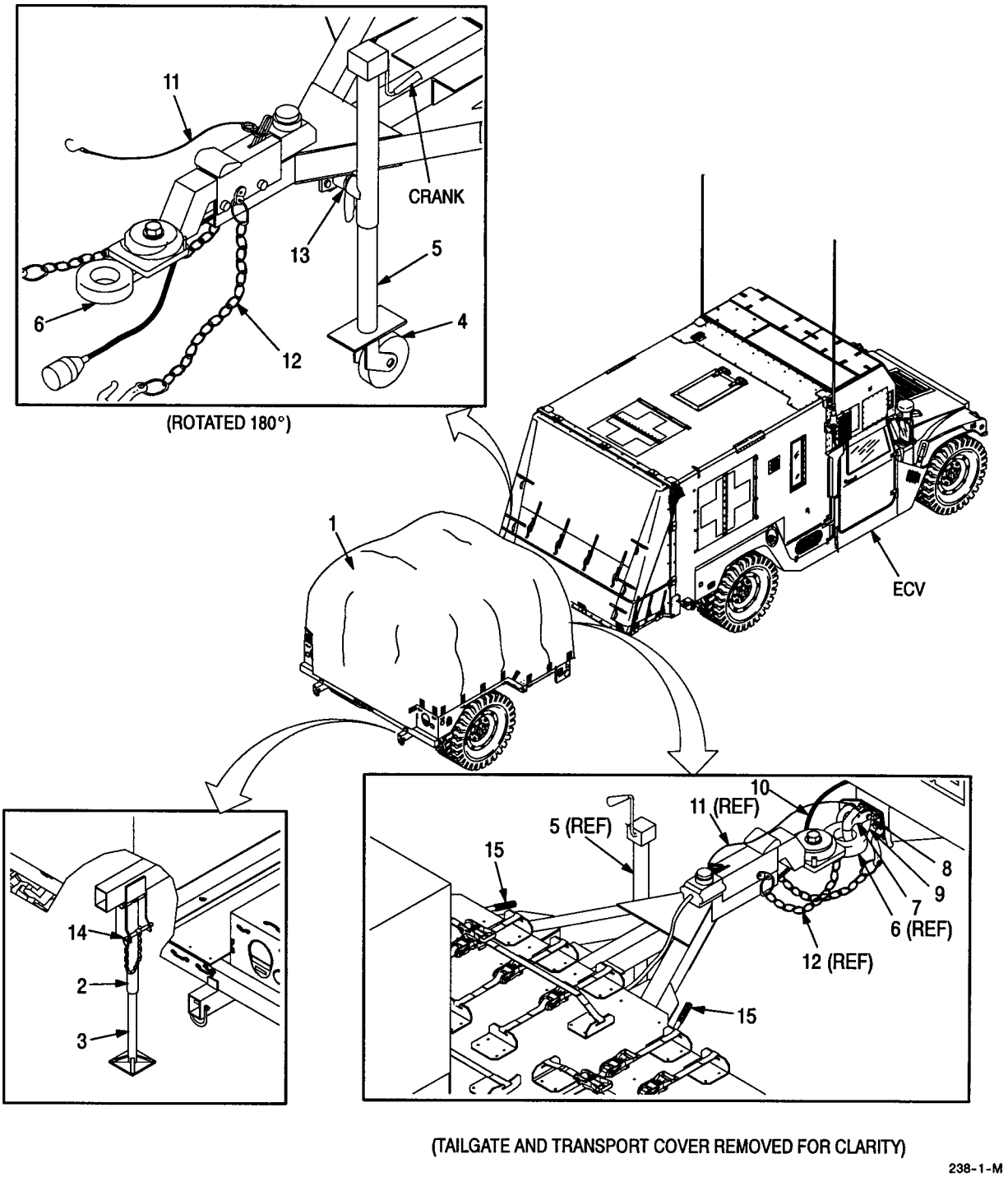


Figure 2-56. HMT Hookup

2.25.3.3 Moving Chemical Biological Protective Shelter (CBPS) System.

To move CBPS set up for MOBILE mode operation under NBC conditions (refer to para 2.25.1).

2.26 OPERATION IN HEAVY SNOW.

CAUTION

A higher air beam pressure setting should only be used during winter in locations where heavy snow is possible.

a. LMS crew sets rib pressure gage set points to 2.0 psi (min.) and 2.9 psi (max.) when heavy snow loads are expected.

b. Turn on NBC fan and maintain interior inflated ABS pressure at 0.5 iwg if heavy loads of snow are expected to accumulate on ABS. Vent openings on ambulatory and TALP airlock door can be adjusted to control over pressurization.

2.27 OPERATION IN HIGH WINDS.

High winds may cause inflated ABS to be unstable and possibly collapse. Wind stability and survivability of inflated ABS depends on the holding strength of ground stakes, the amount of weight around the edges of ABS floor, the air beam pressure, and whether the system is under NBC conditions (over pressurized). For high wind conditions:

a. **Cab Crew Tasks**

(1) Locate high wind catenary (1, figure 2-57) along each side of ABS (2).

(2) Set eleven (24 inch) stakes (3) as shown.

(3) Loop high wind lines (4) around stakes (3) and adjust with slips (5).

b. **LMS Crew Tasks**

WARNING

To prevent death or injury to personnel from contamination, ensure NBC SHELTER PRESSURE gage reads at least 0.5 iwg.

NBC over pressure must be greater than wind pressure outside ABS.

2.27 OPERATION IN HIGH WINDS - Continued.

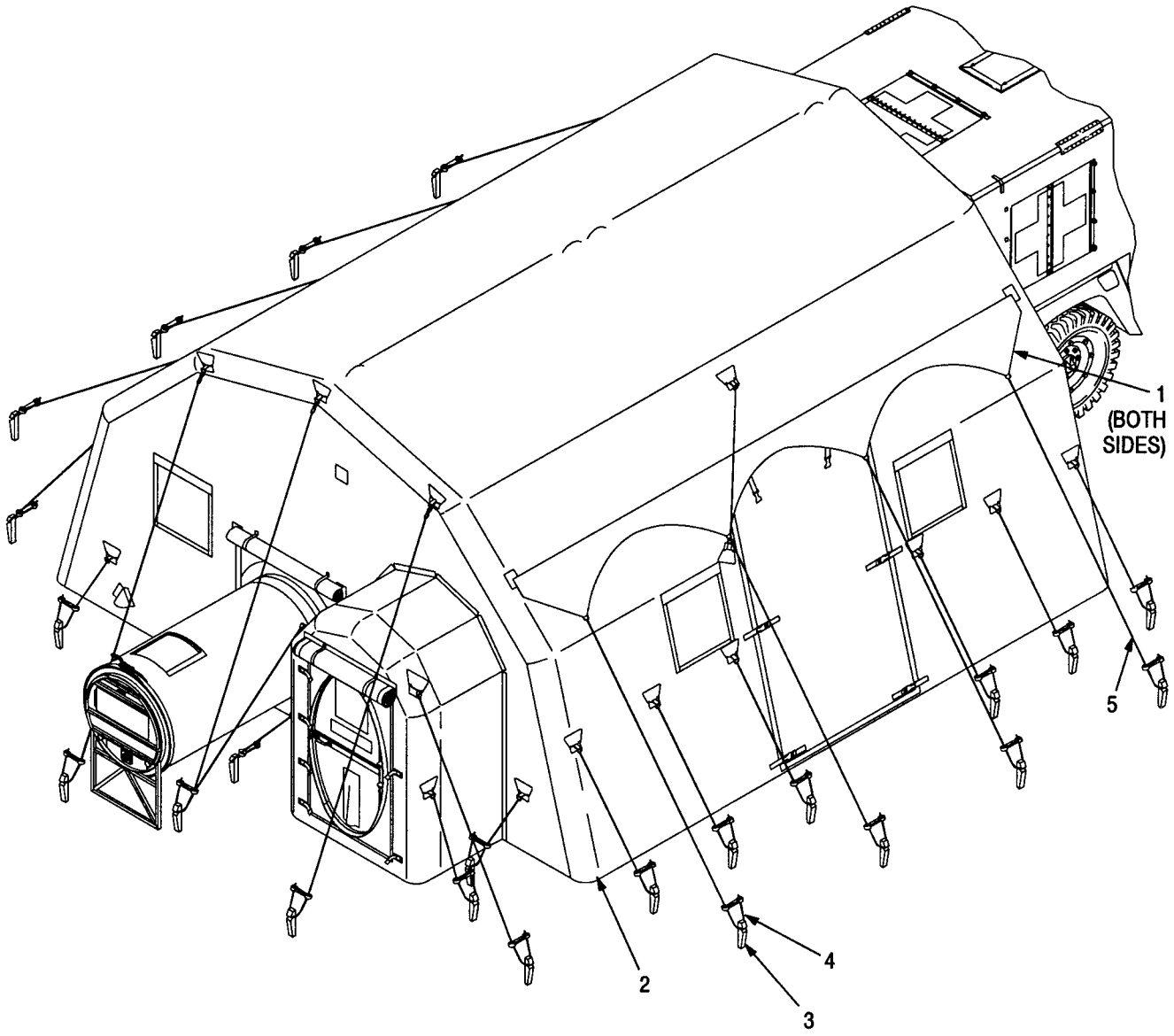


Figure 2-57. ABS in Unusual Conditions

2.28 OPERATION IN WET CLIMATE.

The following procedures should be observed when operating CBPS in a wet climate:

a. If heavy rain is expected or if system will be set up for a long period of time, cab crew digs a trench around outside of ABS between edge of ground cloth and stakes to divert runoff water away from ABS, except under DCS doorways.

b. Dry all ABS components before repacking.

2.29 OPERATION IN EXTREME COLD.

The following should be observed when operating CBPS under extremely cold conditions (-25°F):

CAUTION

Operating ECU in HEAT mode prior to warm-up will shorten the life of main hydraulic pump and drive belt.

ECU should not be run in HEAT mode until ECV engine has run for at least 15 minutes so hydraulic oil temperature can warm up.

REPLACE FILTER indicator on rear control panel may light during cold weather operation. Do not change NBC filter element unless indicator stays on after system has warmed up for at least 15 minutes.

Ensure side, ceiling, ECV end and ambulatory airlock end insulation panels are securely installed and all fastener hook and fastener loop tape closures are fastened to minimize heat loss. Adjust as required.

When operating in internal power mode, 10 kW TQG can be used for supplemental heating.

a. **Cab Crew Tasks**

(1) Ensure power cable is connected to LMS power panel.

(2) Ensure 10 kW TQG selector switch is on 208 Vac, 3-phase, 60 Hz setting (refer to TM 9-6115-642-10). Start and operate 10 kW TQG in accordance with TM 9-6115-642-10. Set power panel circuit breaker to ON.

(3) Signal to LMS crew.

b. **LMS Crew Tasks**

(1) Wait for signal from cab crew.

(2) On rear control panel, set HEAT STAGE 1, HEAT STAGE 2 and HEAT STAGE 3 circuit breakers to ON.

(3) On rear control panel, set HEAT STAGE 1, HEAT STAGE 2 and HEAT STAGE 3 switches to ON as needed for supplemental heat.

NOTE

Four roof panels must be installed before side and endwall panels.

(4) Install insulation panels per para 2.32.

2.30 OPERATION IN EXTREME HEAT.

NOTE

Four roof panels must be installed before side and endwall panels.

a. **LMS Crew Tasks**

(1) Install insulation panels per para 2.32.

2.31 OPERATION AT DIFFERENT ALTITUDES.

The setup and deployment of CBPS in higher altitudes affects the pressurization of the system (see Table 2-2). Less pressurization is required at higher altitudes to maintain the chemical protection of the system. The pressure gage in each system must be adjusted accordingly.

Table 2-2. Altitude Pressure Adjustment

Elevation (feet)	Inches Water
0	0.5
1000	0.49
2000	0.47
3000	0.45
4000	0.44
5000	0.42
6000	0.40
7000	0.39
8000	0.37
9000	0.35
10000	0.34

2.32 ABS INSULATION PANELS REMOVAL/INSTALLATION.

a. **LMS Crew Tasks**

(1) Remove side insulation panel (1, Figure 2-58) by pushing cord and barrel lock fittings (2) attached to the bottom of the four ties on each air beam through the mating grommet holes (3) on side insulation panel (1). Disengage fastener hook and fastener loop tape across top and sides of insulation panel (1). Remove insulation panel (1) from ABS.

(2) Disengage fastener hook and fastener loop tape across top and sides of end panel (4). Remove end panel (4) from ABS.

(3) Disengage fastener hook and fastener loop tape across top and sides of end panel (5). Remove end panel (5) from ABS.

CAUTION

To prevent personnel injury from falling, use care when climbing on step ladder. Do not over reach while on step ladder.

NOTE

ABS repair kit contains all the tools and materials required to repair the ABS.

Position step ladder under cord and barrel fittings. Move step ladder as required to reach all cord and barrel fittings.

(4) Remove four roof insulation panels (6) by untying knots and pushing cord and barrel lock fittings (7) through the mating grommet holes (8) on roof insulation panels (6). Remove roof insulation panels (6) from ABS.

b. Installation (Refer to Figure 2-58)

CAUTION

To prevent personnel injury from falling, use care when climbing on ladder. Do not over reach while on ladder.

NOTE

ABS repair kit contains all the tools and materials required to repair the ABS.

Position ladder under cord and barrel fittings. Move ladder as required to reach all cord and barrel fittings.

(1) Position four roof insulation panels (6). Push cord and barrel lock fittings (7) through the mating grommet holes (8) on roof insulation panels (6). Push barrel lock fittings (7) up tight against roof insulation panels (6) and tie cords to secure roof insulation panels (6) to ABS.

(2) Position ambulatory airlock end panel (5). Join fastener hook and fastener loop tape across top and sides of ambulatory airlock end panel (5).

(3) Position ECV end panel (4). Join fastener hook and fastener loop tape across top and sides of ECV end panel (4).

(4) Position side insulation panel (1). Push cord and barrel lock fittings (2) through the mating grommet holes (3) on side insulation panel (1). Push barrel lock fittings (2) up tight against side insulation panel (1) to secure to ABS. Join fastener hook and fastener loop tape across top and sides of insulation panel (1).

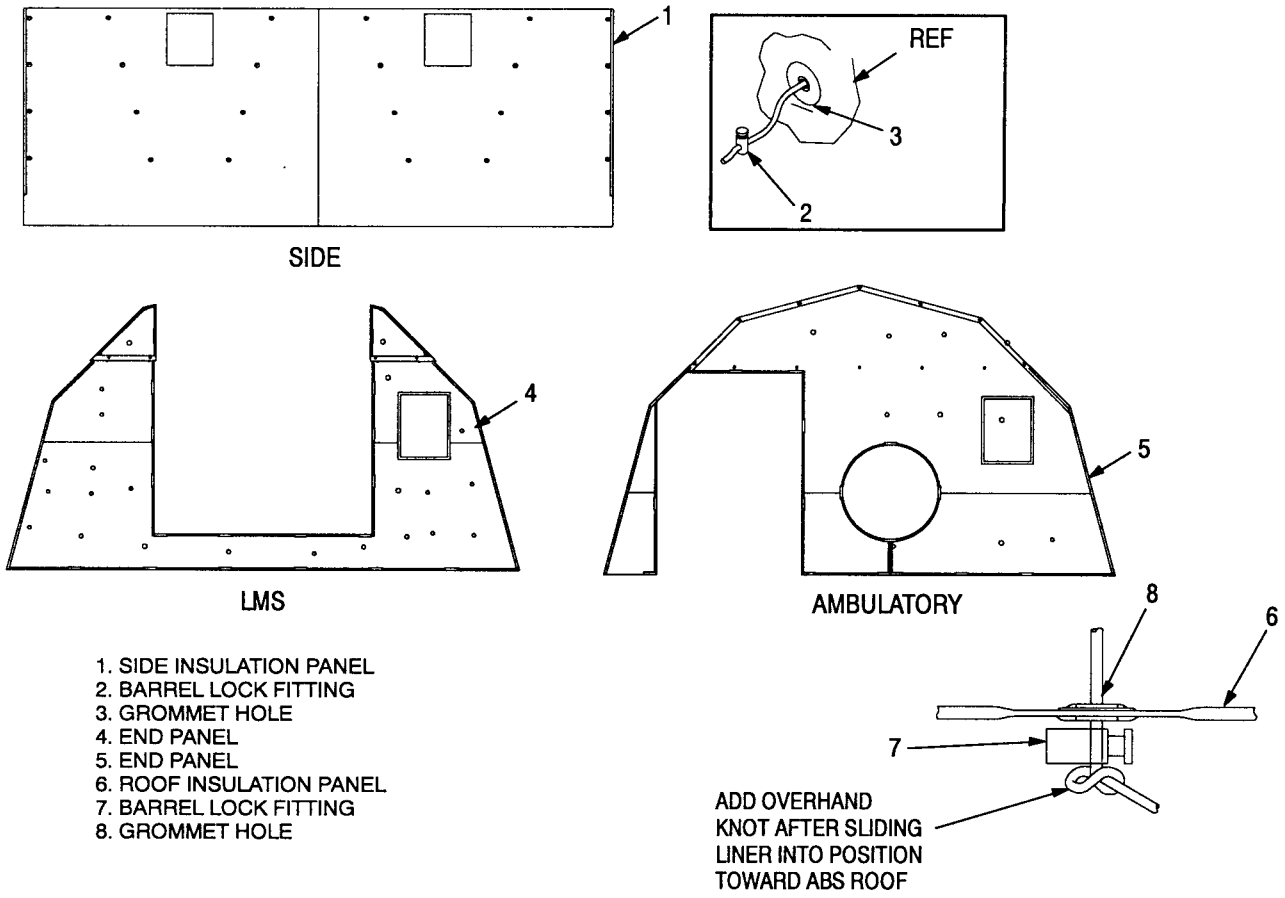


Figure 2-58. ABS Insulation Panels

2.33 OPERATION WITH FAILED AIR BEAM.

a. Inflated ABS is designed to stand even in the event of functional loss of one or more air beams. However, under severe loss of more than one air beam, inflated ABS may sag unacceptably. If more than one air beam is causing inflated ABS to sag, close all doors and vents and turn on NBC blower. NBC over pressurization should be sufficient to keep ABS inflated in order to carry out all mission requirements.

b. Should an air beam fail, close shut-off valve (1, figure 2-59) at bottom of failed air beam (2) and notify unit maintenance.

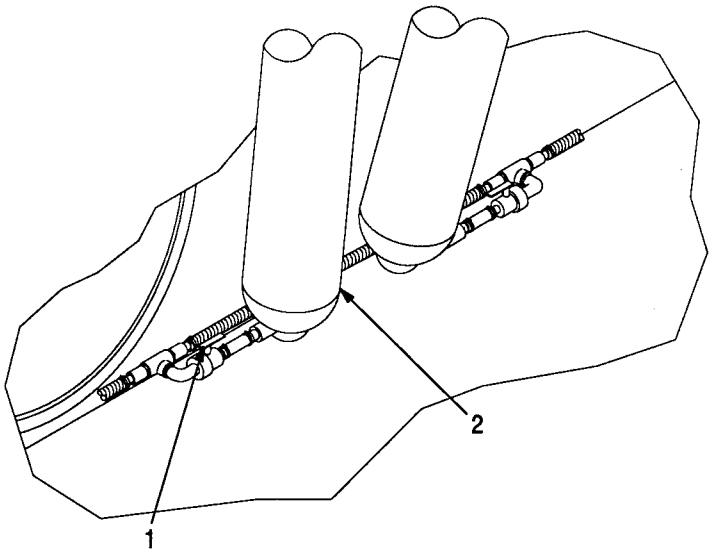


Figure 2-59. Failed Air Beam

2.34 NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION.

WARNING

Contaminants are NBC agents that have been formulated to kill or incapacitate human beings.

a. Contaminants may be absorbed on CBPS by certain materials such as paints and lubricants, on exposed surfaces, and retained in crevices, seams, concaves and even horizontal surfaces of CBPS. They may also be absorbed by dust, mud or vegetation which may adhere to ABS, LMS or ECV surfaces. They can be transferred to personnel by direct contact, through vaporization and subsequent inhalation, ingestion or infusion.

b. The actual time the CBPS remains contaminated and poses a threat to personnel depends upon the properties of the agent, the duration of exposure of CBPS to the agent, the amount of agent remaining with CBPS after exposure, and environmental conditions.

c. Decontaminants are substances whose purpose is to detoxify, physically remove, seal or otherwise make harmless a contaminant. Among the most effective decontaminants, particularly for chemical agents, are time and isolation. However, time and isolation require CBPS be removed from service for an indefinite period. Rather than rely upon natural processes, it is recommended that a decontaminant substance such as STB or DS2 be used to decontaminate CBPS. Reference FM 3-11.5 for decontamination procedures. Under all circumstances, notify supervisor before decontaminating CBPS.

CHAPTER 3
OPERATOR MAINTENANCE INSTRUCTIONS

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Section I. LUBRICATION INSTRUCTIONS

3.1 LUBRICATION INSTRUCTIONS.

These lubrication instructions are mandatory. General lubrication areas include door hinges, latches and roof access steps to prevent rust and corrosion. Lubricate these parts frequently to be sure they are adequately lubricated. Lubricate with solid film lubricant, MIL-L-23398 (Item 6, Appendix D). For lubrication of the Expanded Capacity Vehicle (ECV) refer to TM 9-2320-387-10. For lubrication of the High Mobility Trailer (HMT) refer to TM 9-2330-392-14&P. For lubrication of the Tactical Quiet Generator (TQG) refer to LO 9-6115-642-12.

3.2 LUBRICATION INTERVALS.

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied unless changed by the Army Oil Analysis Program (AOAP) laboratory. Change the hard time interval if your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer than usual operating hours. The hard time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals will be applied in the event AOAP laboratory support is not available.

3.3 MAINTENANCE LEVELS.

The lowest level of maintenance authorized to lubricate a part is indicated by one of the following symbols as appropriate: Operator/Crew (C); Unit Level (O); Direct Support (F).

3.4 LUBRICATION PROCEDURES.

WARNING

Dry cleaning fluid is flammable. Do not use near a flame or excessive heat. Use only in adequate ventilation. Avoid prolonged breathing of vapors and minimize skin contact.

a. Clean parts with dry cleaning solvent (SD), Type II or equivalent. Dry before lubricating.

b. Lubricate part, being careful not to over lubricate. Wipe any excess lubricant from part.

c. Lubricate all items found contaminated after washing.

3.5 FILTER.

a. Hydraulic Filter. Hydraulic oil filter shall be changed if:

Filter is known to be contaminated or clogged,

Filter has been operational for 500 hours,

AOAP laboratory analysis dictates need for change, or

Rear Control Panel indicator is illuminated, which indicates filter element differential pressure has reached the limit of 30 psig.

3.6 AOAP SAMPLING INTERVAL.

a. Hydraulic Fluid. The hydraulic fluid shall be sampled every 200 hours of operation or 60 days (whichever comes first) per TB 43-0106.

b. Air Conditioner Compressor Oil. The compressor oil shall be sampled only when it is suspected that it has become contaminated due to a refrigeration system component failure or the refrigeration system was allowed to remain open to atmospheric ambient.

3.7 NOTES.

1. ARMY OIL ANALYSIS PROGRAM (AOAP). Obtain samples from hydraulic fluid reservoir every 200 hours of operation. Send samples to the nearest AOAP laboratory. Refer to MIL-STD-105. If AOAP laboratory support is not available, hard time intervals will apply.

NOTE

Do not hold oil samples. Submit oil samples as soon as they have been taken.

Seasonal oil changes will be made due to expected temperatures.

2. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -15°F. Refer to FM 9-207.

3. HYDRAULIC FLUID LEVEL. Fluid level varies with temperature. Do not overfill. When filling the hydraulic reservoir, do not fill past the appropriate mark: COLD when system has not been running or has been running for less than 20 minutes; HOT when system has been running for more than 20 minutes. If

hydraulic fluid is past the COLD mark when system has not been running, hydraulic fluid can overflow through the hydraulic reservoir filler cap.

4. AIR CONDITIONER COMPRESSOR OIL LEVEL. Observe oil level on sight glass of compressor during operation. Maintain oil level at mid-point of the compressor sight glass. Add oil if the level is at bottom of sight glass.

5. HYDRAULIC FLUID. Fluid is to be changed each time a hydraulic fluid change is directed by AOAP laboratory. When AOAP laboratory support is not available, change fluid every 500 hours of operation.

6. AIR CONDITIONER COMPRESSOR OIL. Oil is to be changed each time an air conditioner compressor oil change is directed by AOAP laboratory.

7. HYDRAULIC FLUID FILTERS. Filters are to be replaced when clogged or contaminated and each time a hydraulic fluid change is directed by AOAP laboratory. When AOAP laboratory support is not available, change filters every 500 hours of operation.

8. AIR CONDITIONING FILTER/DRIER. Filter/drier is to be replaced any time a component of the air conditioning system is replaced, when clogged or contaminated and each time an air conditioner compressor oil change is directed by AOAP laboratory.

9. LUBRICANTS. The following is a list of lubricants with military symbols and applicable specification numbers.

OE/HDO	MIL-L-2104
GO	MIL-L-2105
GAA	MIL-G-10924
OEA	MIL-L-46167

Section II. OPERATOR TROUBLESHOOTING PROCEDURES

3.8 GENERAL.

Troubleshooting at operator level is limited to verifying setting of controls, inspecting Chemical and Biological Protective Shelter (CBPS) System, checking or listening for problems, and taking actions necessary to keep the system working. Specifically, this includes but is not limited to:

NOTE

These recommended actions are general in nature and were not intended to identify specific malfunctions that may occur nor all inspections and corrective actions which must be performed by the operator. If a malfunction occurs and is not corrected by following these simple steps, immediately notify support maintenance personnel.

a. Verifying that the ECV is in park and the parking brake is set (Static Mode). Problems pertaining to the ECV should be directed to TM 9-2320-387-10. Problems pertaining to the HMT should be directed to TM 9-2330-392-14&P.

b. Verifying circuit breakers and switches on control panel are set per Tables 3-2 through 3-9.

c. Verifying that the proper indicators are ON, that gages are reading properly, and that no alarm indicators are ON.

d. Inspecting filters for excess dirt or debris.

e. Inspecting the Air Beam Shelter (ABS), doors and other areas for rips and tears if there is difficulty in maintaining pressure in the ABS. Operator is responsible for repairing small rips and tears in the ABS per para 3.13.1.

f. Inspecting the air beams, flexible hoses, and check valves for leaks if it appears to take longer to inflate the air beam or that it is obvious that an air beam has a leak.

g. Listening for (normal) changes of engine speed with changes of load, fluctuations in fans/blowers, hissing sounds indicating an air leak, unusual noises, or other audible sounds of possible problems.

3.8 GENERAL - Continued.

h. Switching to the alternate power source if a problem or alarm is detected which prevents or impacts system operation such as the Environmental Control Unit (ECU) ceases to function, indicated by a reduction in noise.

i. Shutting down the system if switching the CBPS to the alternate power source does not rectify the malfunction or the malfunction is deemed to be a safety issue or detrimental to the equipment.

j. Verifying that procedures were followed correctly.

3.8.1 Rear Control Panel Alarm Indicators.

Table 3-1 shows CBPS alarm indicators, possible causes and what action is required to remedy the problem.

Table 3-1. Rear Control Panel Alarm Indicators

ALARM/INDICATOR	CAUSE	ACTION REQUIRED
DANGER HYD OIL TEMP indicator	HYD OVERHEAT lights (red) when hydraulic fluid temperature reaches 230 degrees Fahrenheit. An internal switch causes hydraulic system to self cool the fluid.	Turn NBC FAN switch to off, when possible. Ensure that ECU doors and covers are closed. Ensure that condenser coil inlet and fan outlet screens are free from debris or obstructions. Allow hydraulic system to self cool.
NBC ALARM	Audible alarm sounds whenever the shelter air pressure is below the minimum set point of 0.5 iwg.	Refer to Operator Troubleshooting Procedures, Malfunction No. 7.
RIB INFLATION PRESSURE indicator (LOW)	When air beam inflation blower fan is turned on, the LOW indicator lights (red) and remains lit until the pressure passes beyond the low pressure set point of 1.5 psi.	No action required unless the LOW indicator light remains lit. If the NORMAL indicator does not light (white) or will not remain lit, contact unit maintenance to replace air beams.
CHEMICAL SENSOR alarm	CHEM SENSOR IN ALARM lights (red) to show that a chemical threat has been detected.	Refer to para 2.25.
ENGINE COOLANT TEMP indicator	TEMP HIGH lights (red) when the temperature of the ECV engine coolant is too high.	Switch to auxiliary power supply. Shut ECV engine off. Check ECV engine coolant level per TM 9-2320-387-10.
NBC AIRFLOW	LOW NBC AIR FLOW lights (yellow) when shelter pressure falls below 0.3 iwg.	Refer to Operator Troubleshooting Procedures, Malfunction No. 7.

Table 3-1. Rear Control Panel Alarm Indicators - Continued

ALARM/INDICATOR	CAUSE	ACTION REQUIRED
HYDRAULIC FLUID ALARM indicator	DANGER LEVEL lights (red) and audible alarm sounds when hydraulic fluid level is too low for safe operation.	**WARNING** Running CBPS under severe hydraulic fluid leakage will cause hydraulic components to operate improperly. The CBPS should only be operated under severe hydraulic fluid leakage in life threatening conditions. Press OVERRIDE, indicator lights (white), disables audible alarm and allows the system to operate under low hydraulic fluid conditions. Shut system off. Check fluid level in hydraulic reservoir. Fill if necessary, contact unit level maintenance.
ENGINE OIL PRESSURE indicator	PRESS LOW indicator lights (red) when the ECV engine oil pressure is too low.	Switch to auxiliary power supply. Shut ECV engine off. Check ECV engine oil level per TM 9-2320-387-10.
HYDRAULIC FLUID LEVEL indicator	CHECK OIL lights (yellow) when hydraulic fluid level in the hydraulic reservoir is low or a severe hydraulic fluid leak has occurred. OVERRIDE indicator lights (white) when pushed and CHECK OIL indicator is disabled. This allows the CBPS to operate under low hydraulic fluid conditions.	**WARNING** Running CBPS under severe hydraulic fluid leakage will cause hydraulic components to operate improperly. The CBPS should only be operated under severe hydraulic fluid leakage in life threatening conditions. Shut system off. Check fluid level in hydraulic reservoir. Fill if necessary, contact unit level maintenance.
HYDRAULIC OIL TEMP indicator	TEMP HIGH lights (red) when temperature of the hydraulic fluid in the hydraulic system reaches 212 degrees Fahrenheit. An internal switch causes the hydraulic system to self cool.	Turn NBC fan off, if possible. Ensure that ECU doors and covers are closed. Ensure that condenser coil inlet and fan outlet screens are free from debris and obstruction. Allow hydraulic system to self cool.
RETURN LINE indicator	REPL FILTER lights (red) when the filter in the hydraulic system supply needs to be replaced. REPL FILTER may light during cold weather operation. Do not replace unless the indicator stays on after the hydraulic system has warmed up for at least ten minutes.	Notify unit maintenance.

3.8.1 Rear Control Panel Alarm Indicator - Continued.

Table 3-1. Rear Control Panel Alarm Indicators - Continued

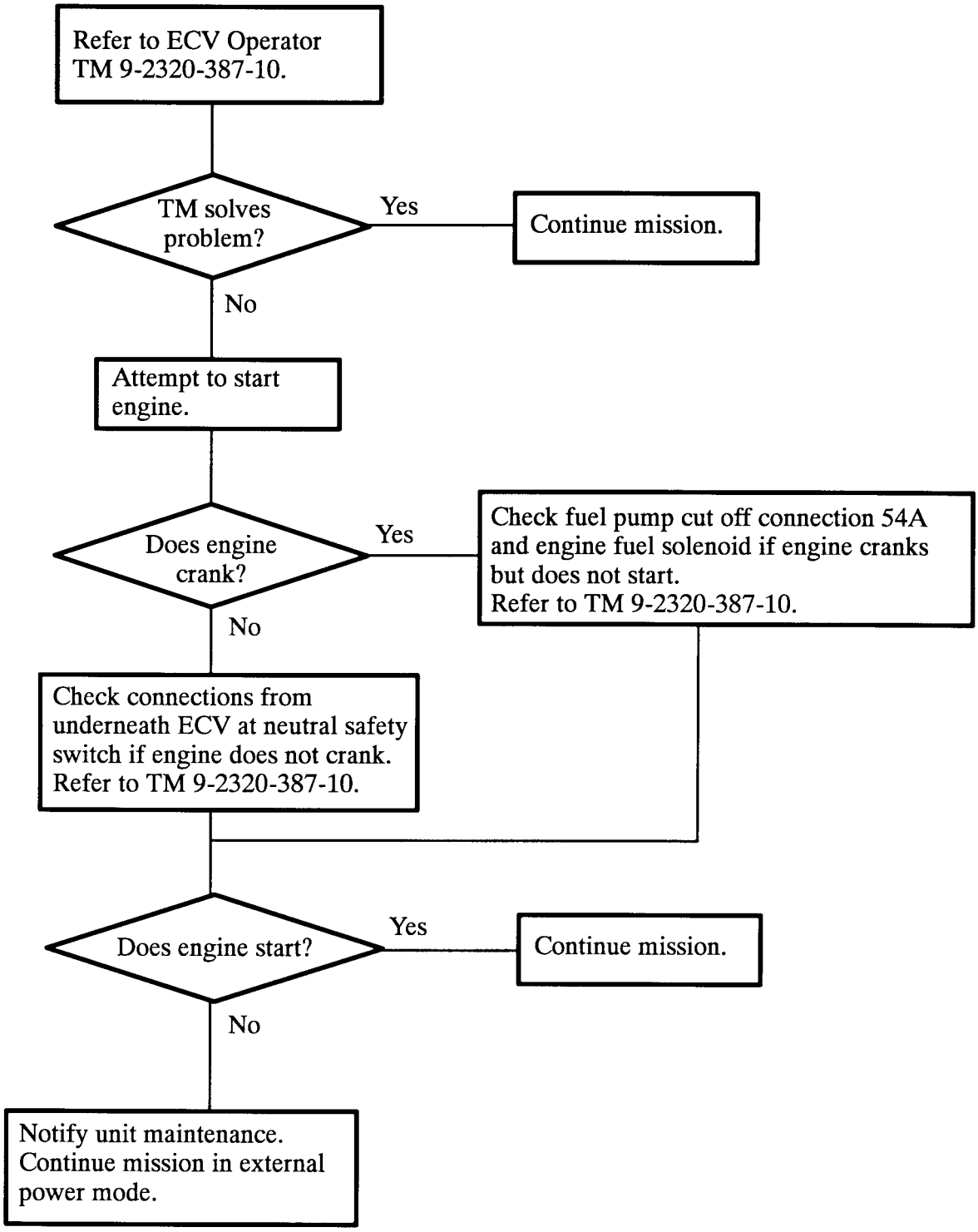
ALARM/INDICATOR	CAUSE	ACTION REQUIRED
RIB AIR indicator	RIB AIR OVER TEMP lights (red) and an audible alarm sounds when the temperature of the air in the ABS inflation manifold reaches 175 degrees Fahrenheit.	Shut rib fan off. Check ABS manifold and air beams for leaks.
RIB FAN CYCLE indicator	RIB FAN EXTENDED OPERATION lights (red) and an audible alarm sounds when the fan has been running for ten minutes.	Shut rib fan off. Check ABS manifold and air beams for leaks.

3.9 OPERATOR TROUBLESHOOTING.

The following section lists common equipment malfunctions and contains instructions to allow operator personnel to diagnose and correct each malfunction.

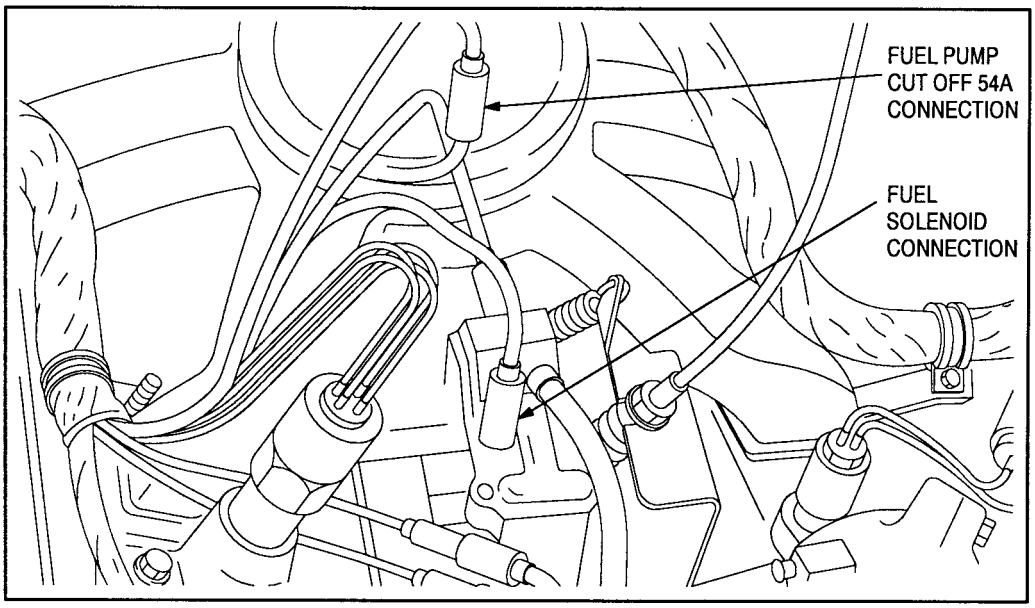
No.	Malfunction	Page
1.	No Power (ECV Shuts Down or Doesn't Start), Internal Power, Static or Mobile Mode.	3-7
2.	No Air Flow, Internal Power.	3-9
3.	Low Airflow, ESS Mode Selector Switch in "Heat", "Cool" or "Vent", Internal Power, Mobile Mode.	3-10
4.	No or Low NBC Pressure, Mobile Mode.	3-12
5.	No Lights on Forward Light Box Assembly, Light Box and Map Lights, Internal Power, Mobile or Static Mode.	3-14
6.	Low Airflow, ESS Mode Selector Switch in "Heat", "Cool" or "Vent", Internal or External Power, Static Mode.	3-15
7.	No or Low NBC Pressure, Internal or External Power, Static Mode.	3-18
8.	No Lights in ABS, Internal Power, Static Mode.	3-22
9.	No Hot Air, Internal Power, Mobile or Static Mode (No TQG Supplemental).	3-24
10.	Low Heat with TQG Supplemental, Internal Power, Static Mode.	3-26
11.	No Air Conditioning, Internal Power, Static or Mobile Mode.	3-28
12.	Rib Pressure Low, Air Beams do not inflate when Rib Fan Switch is Pressed, Internal Power, Static Mode.	3-30
13.	No Power to LMS, External Power.	3-32
14.	No Air Flow, External Power.	3-33
15.	No Air Conditioning, External Power.	3-35
16.	No Hot Air, External Power.	3-37
17.	No Lighting in ABS, External Power.	3-38
18.	No Power to System - ECV Running, Internal Power, Static or Mobile Mode.	3-41

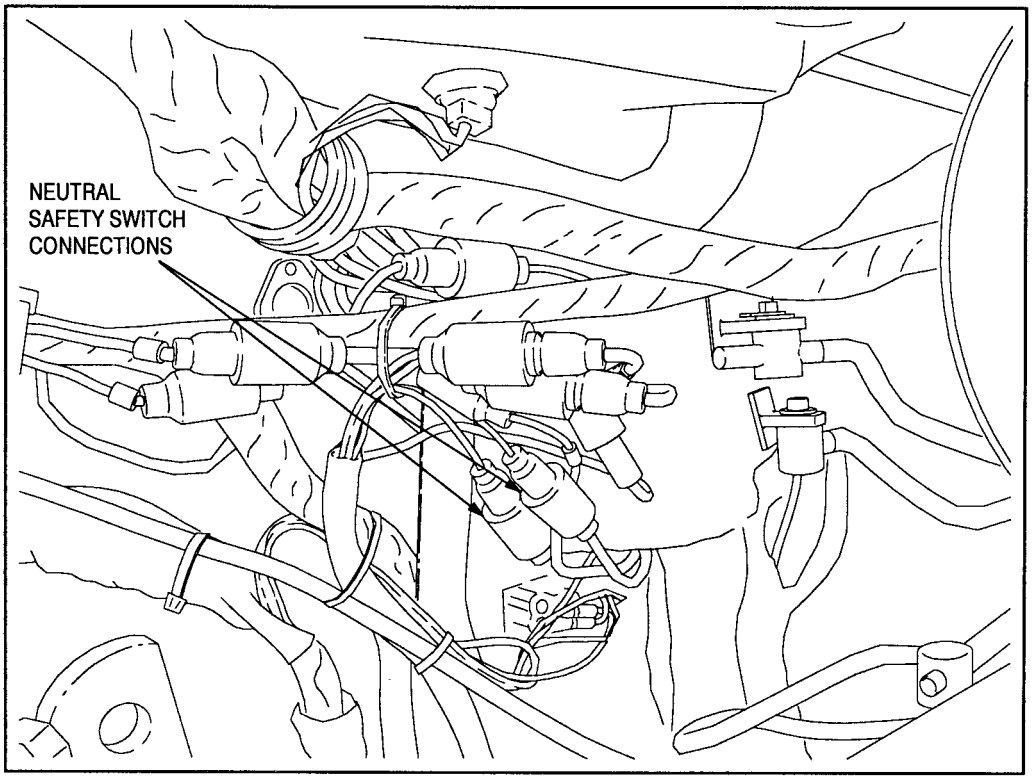
1. NO POWER (ECV SHUTS DOWN OR DOESN'T START), INTERNAL POWER, STATIC OR MOBILE MODE.



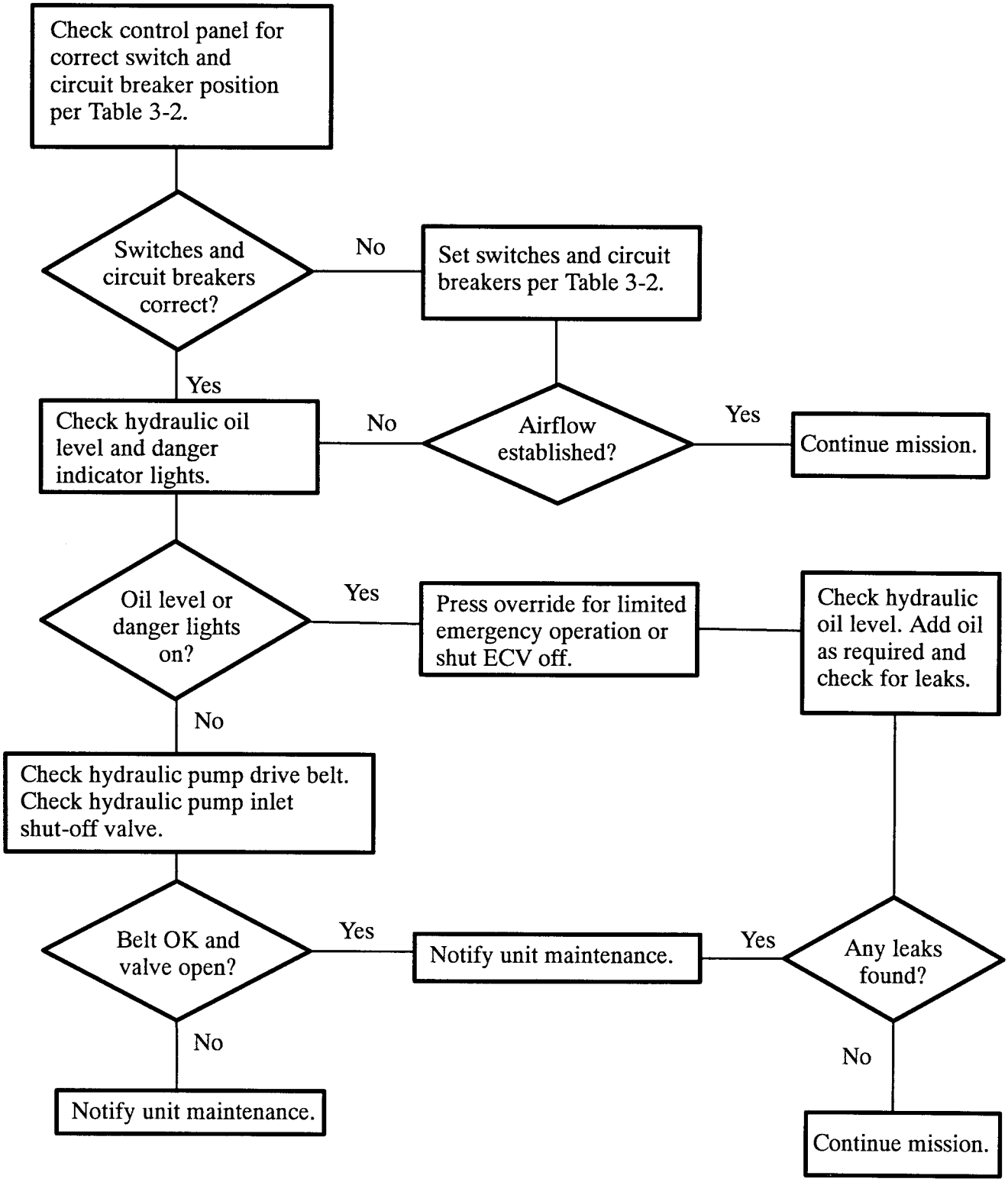
3.9 OPERATOR TROUBLESHOOTING - Continued.

1. NO POWER (ECV SHUTS DOWN OR DOESN'T START), INTERNAL POWER, STATIC OR MOBILE MODE - Continued.





2. NO AIR FLOW, INTERNAL POWER



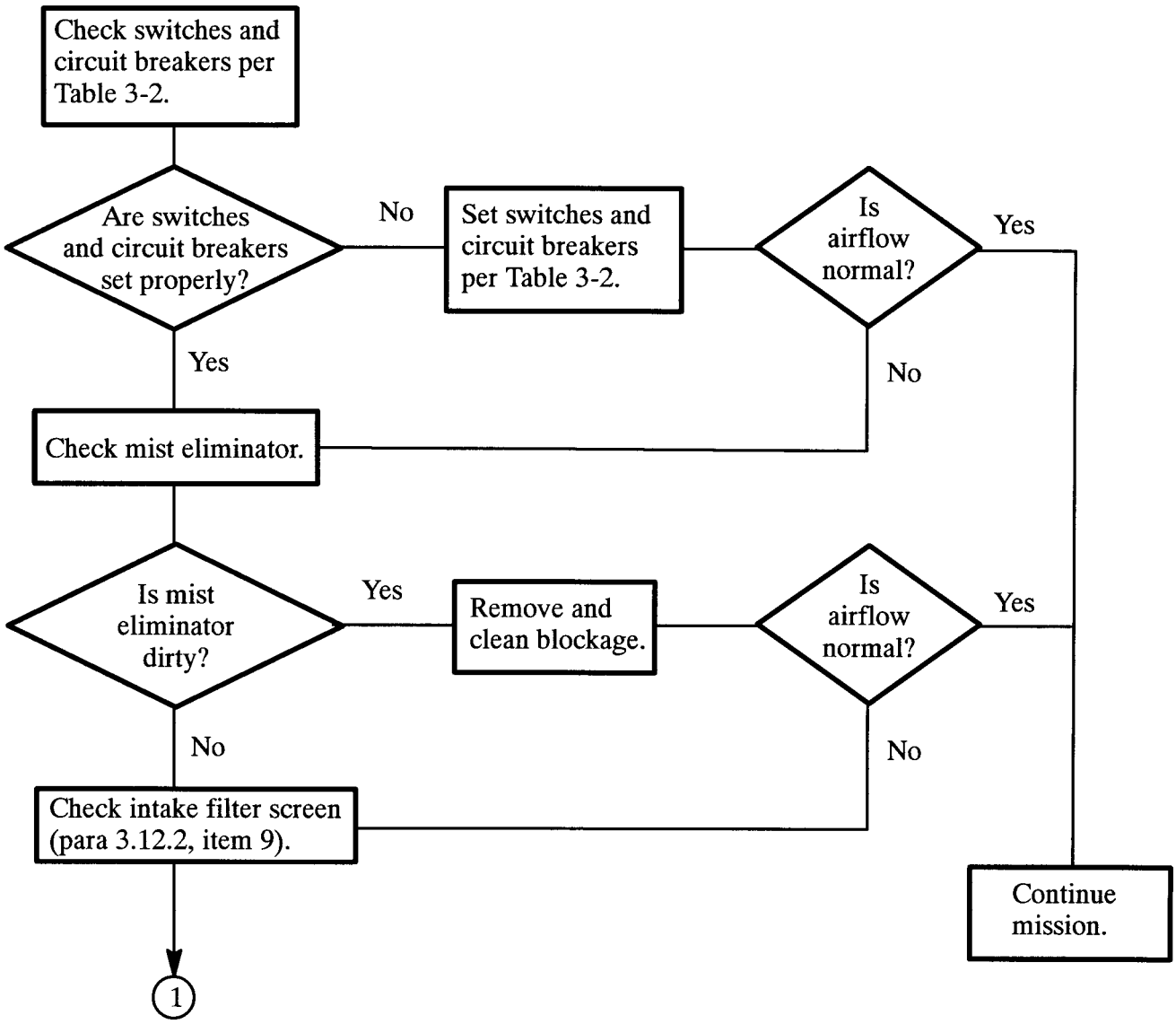
3.9 OPERATOR TROUBLESHOOTING - Continued.

3. LOW AIRFLOW, ESS MODE SELECTOR SWITCH IN "HEAT", "COOL", OR "VENT", INTERNAL POWER, MOBILE MODE.

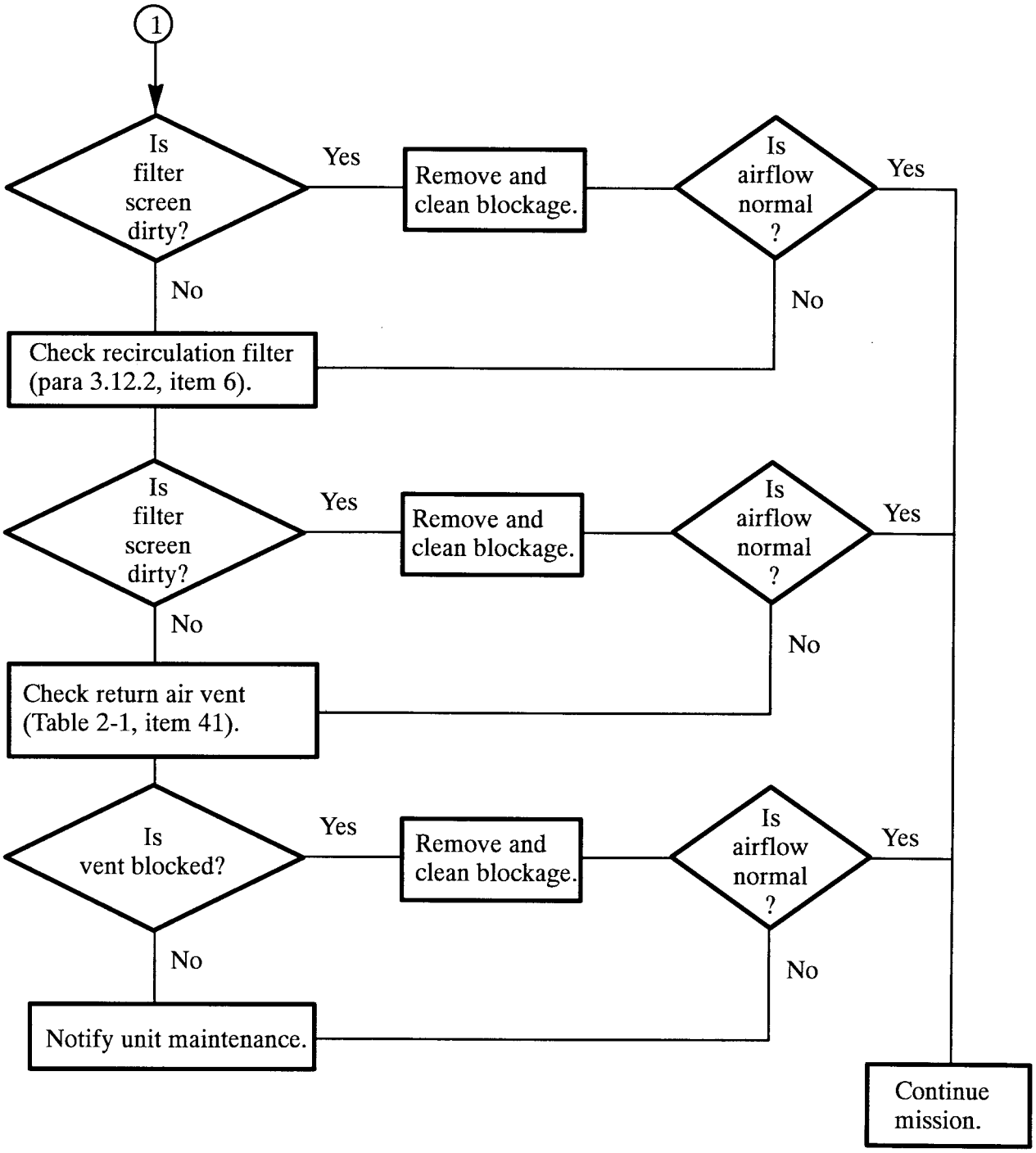
WARNING

IF THE EQUIPMENT MUST BE KEPT IN CONTINUOUS OPERATION, DO ONLY THE PROCEDURES THAT CAN BE DONE WITHOUT DISTURBING OPERATION. MAKE COMPLETE CHECKS AND SERVICES WHEN THE EQUIPMENT IS SHUT DOWN.

DO NOT OPEN COVER (PARAGRAPH 3.12.2, ITEM 2) AND INSPECT RECIRCULATION FILTER IN AN NBC ENVIRONMENT. THIS WILL RESULT IN CONTAMINATING THE INTERIOR OF THE LMS AND ENDANGERING THE LMS CREW.

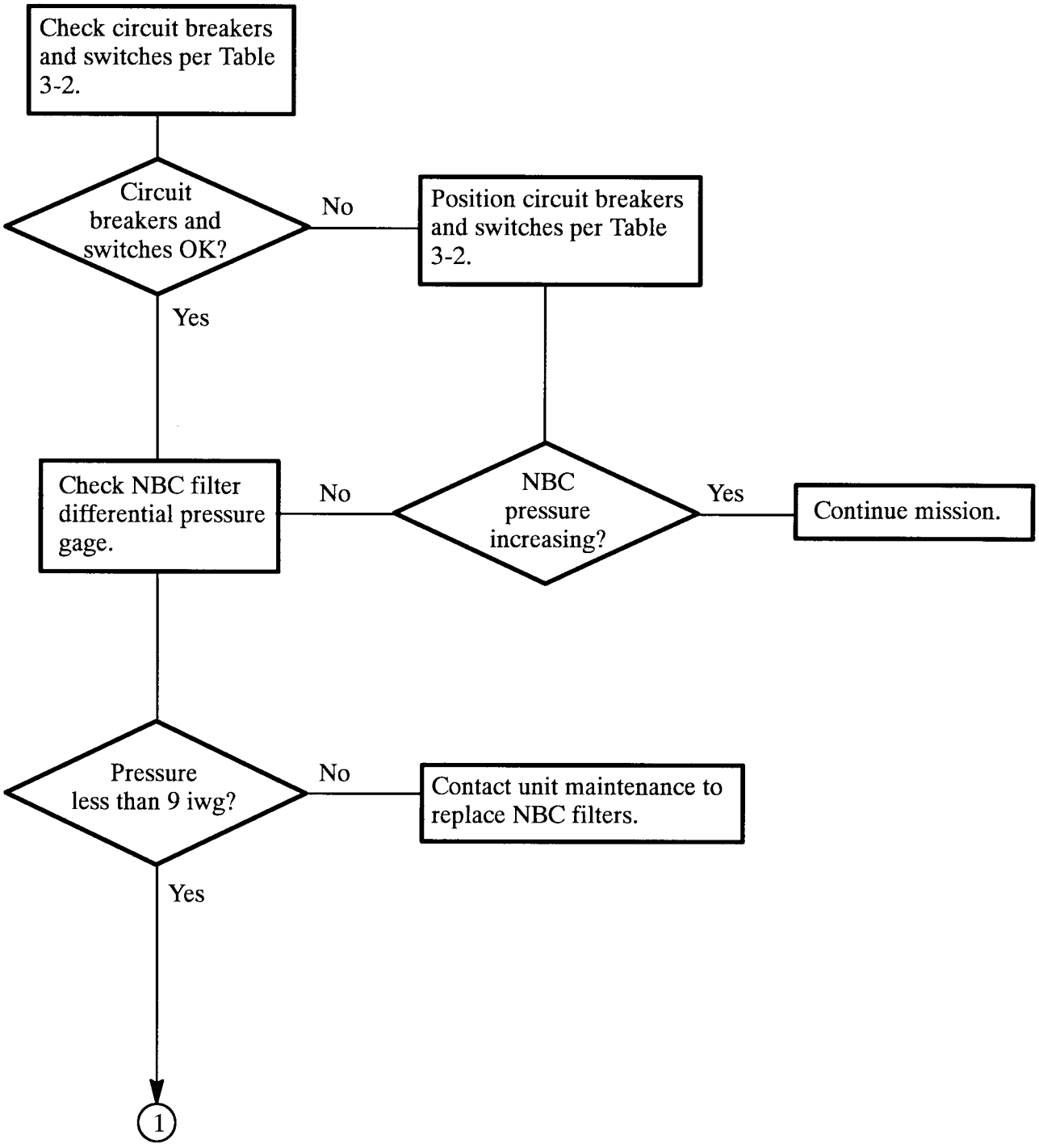


3. LOW AIRFLOW, ESS MODE SELECTOR SWITCH IN "HEAT", "COOL", OR "VENT", INTERNAL POWER, MOBILE MODE - Continued.

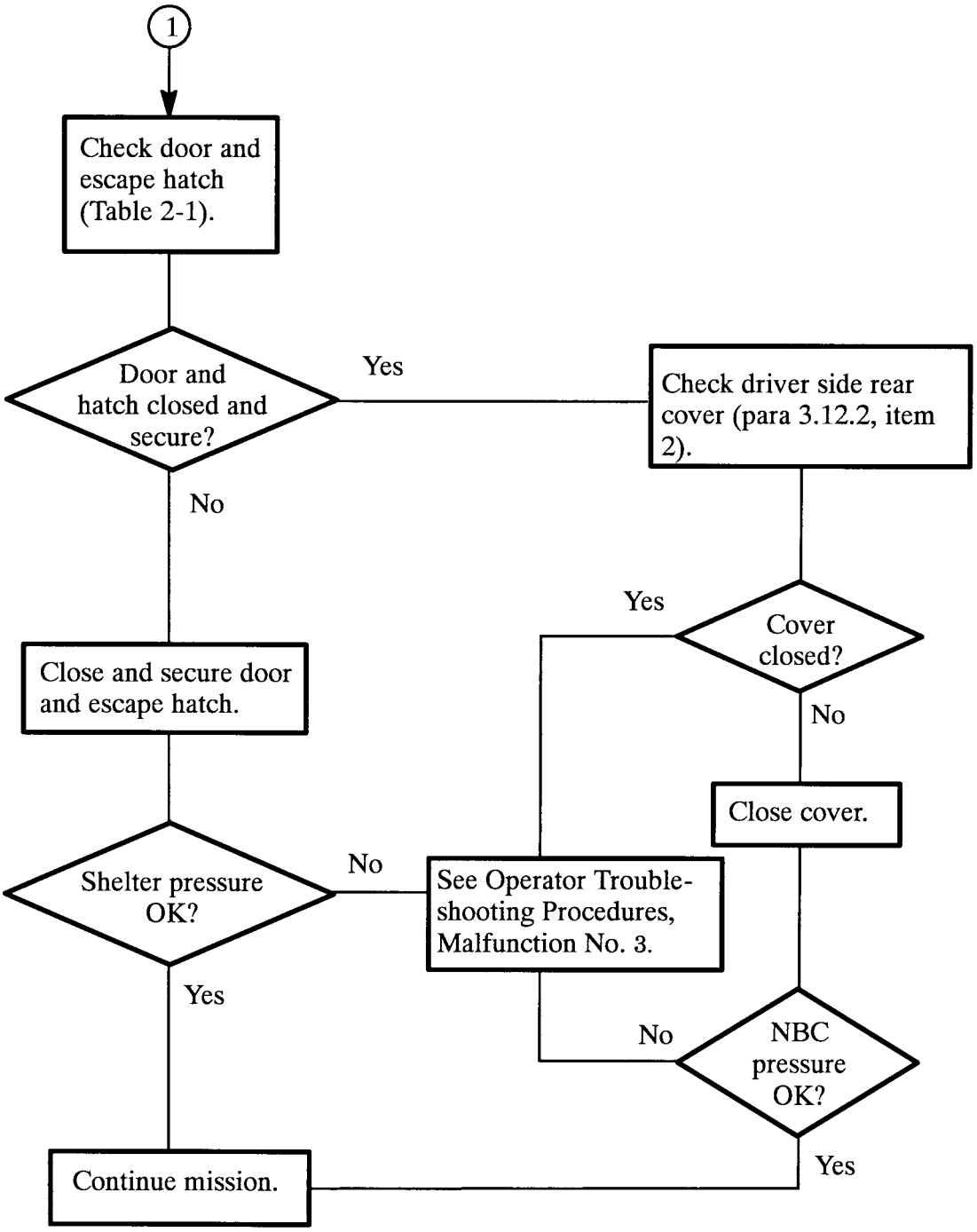


3.9 OPERATOR TROUBLESHOOTING - Continued.

4. NO OR LOW NBC PRESSURE, MOBILE MODE.

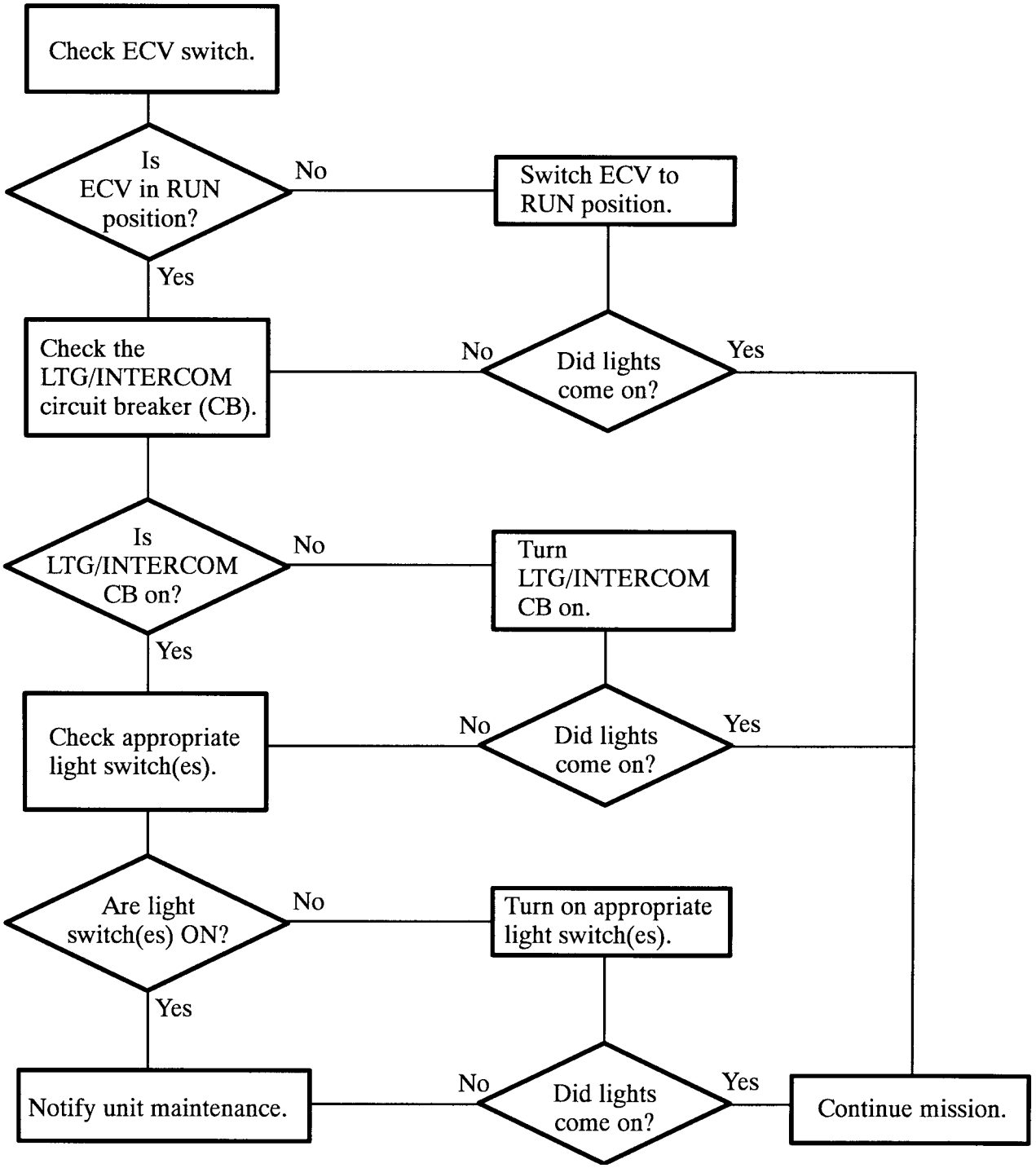


4. NO OR LOW NBC PRESSURE, MOBILE MODE - Continued.



3.9 OPERATOR TROUBLESHOOTING - Continued.

5. NO LIGHTS ON FORWARD LIGHT BOX ASSEMBLY, LIGHT BOX, AND MAP LIGHTS, INTERNAL POWER, MOBILE OR STATIC MODE.

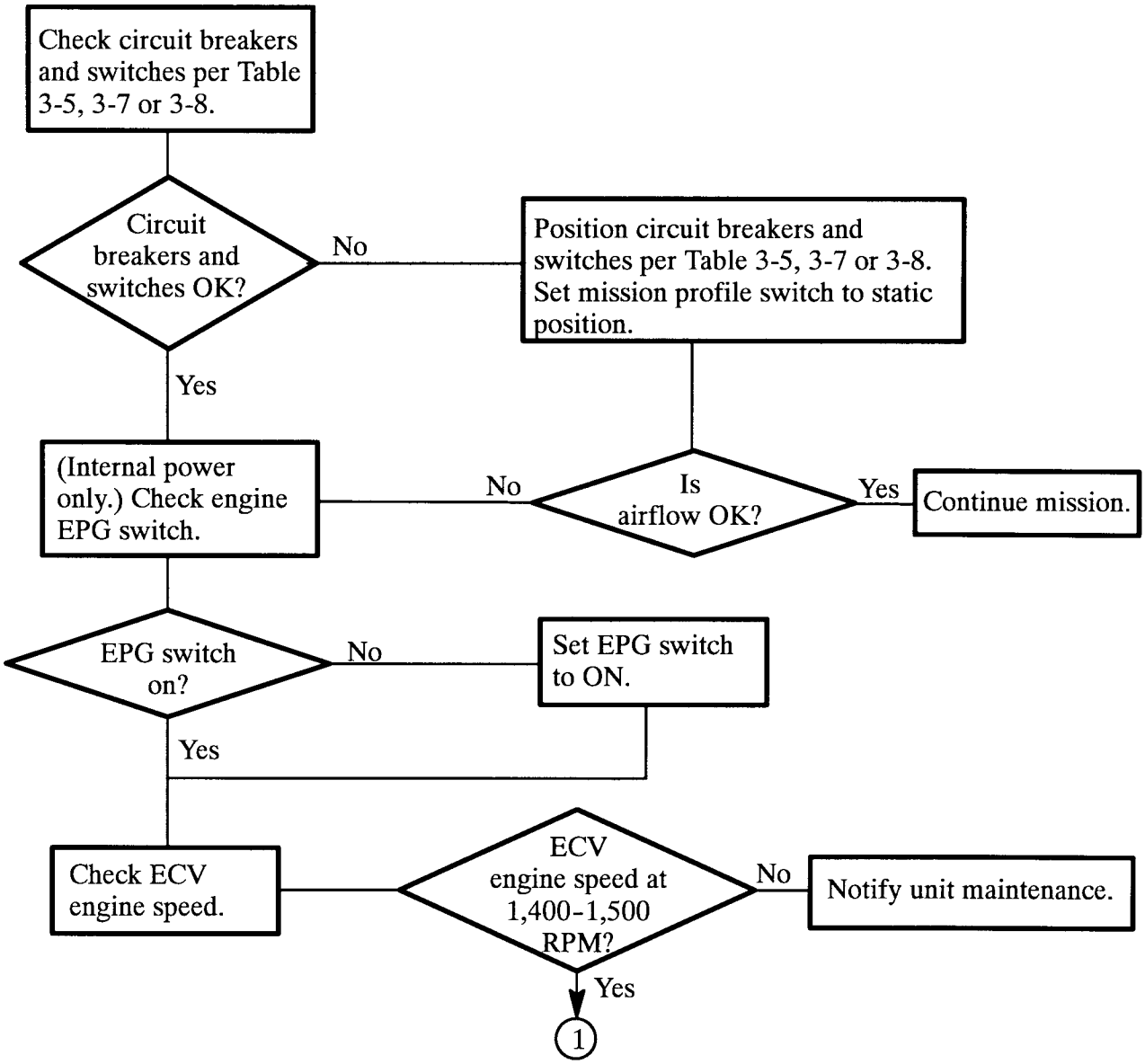


6. LOW AIRFLOW, ESS MODE SELECTOR SWITCH IN "HEAT", "COOL" OR "VENT", INTERNAL OR EXTERNAL POWER, STATIC MODE.

WARNING

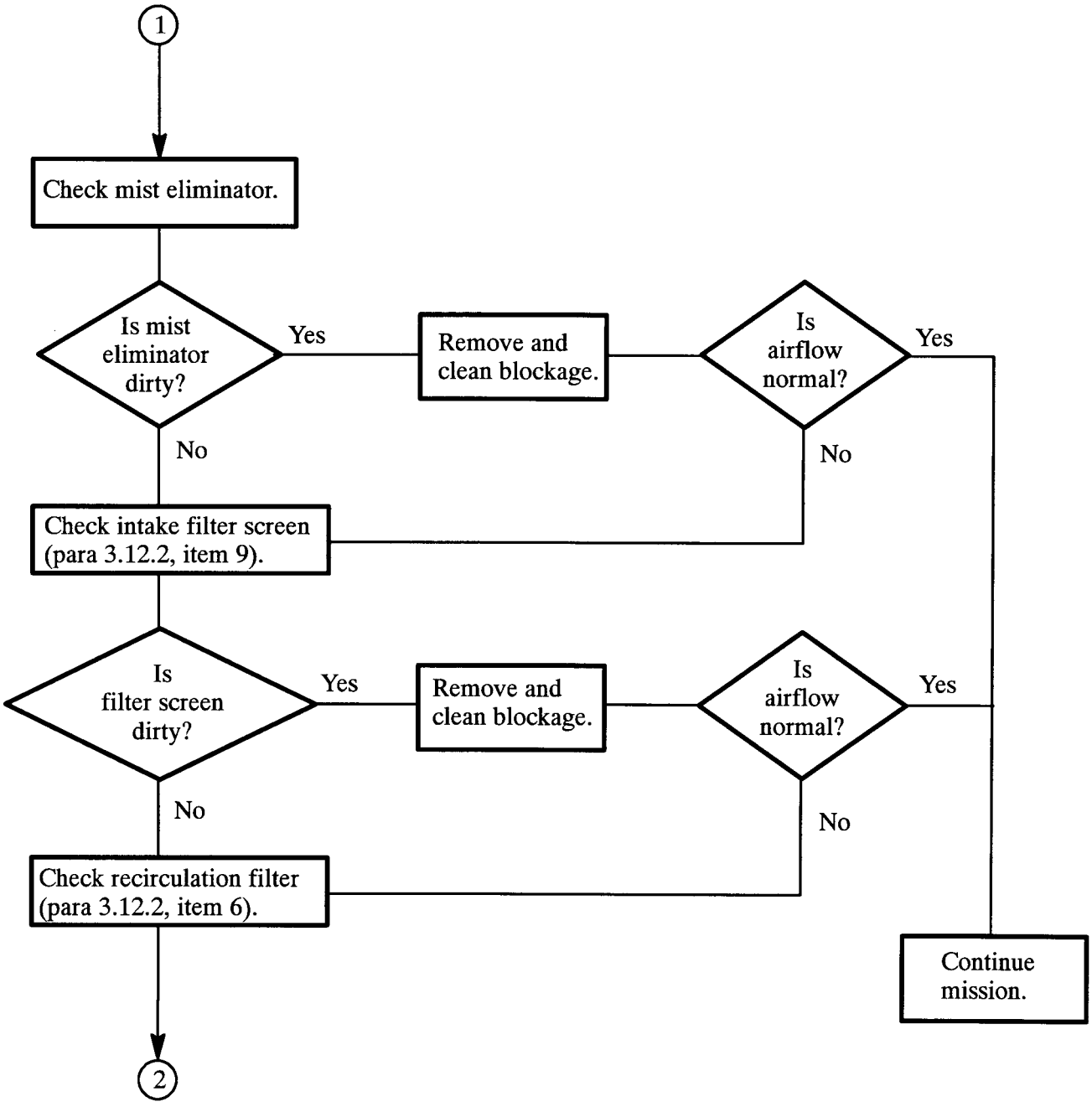
IF THE EQUIPMENT MUST BE KEPT IN CONTINUOUS OPERATION, DO ONLY THE PROCEDURES THAT CAN BE DONE WITHOUT DISTURBING OPERATION. MAKE COMPLETE CHECKS AND SERVICES WHEN THE EQUIPMENT IS SHUT DOWN.

DO NOT OPEN COVER (PARA 3.12.2, ITEM 2) AND INSPECT RECIRCULATION FILTER IN AN NBC ENVIRONMENT. THIS WILL RESULT IN CONTAMINATING THE INTERIOR OF THE LMS AND ENDANGERING THE LMS CREW.

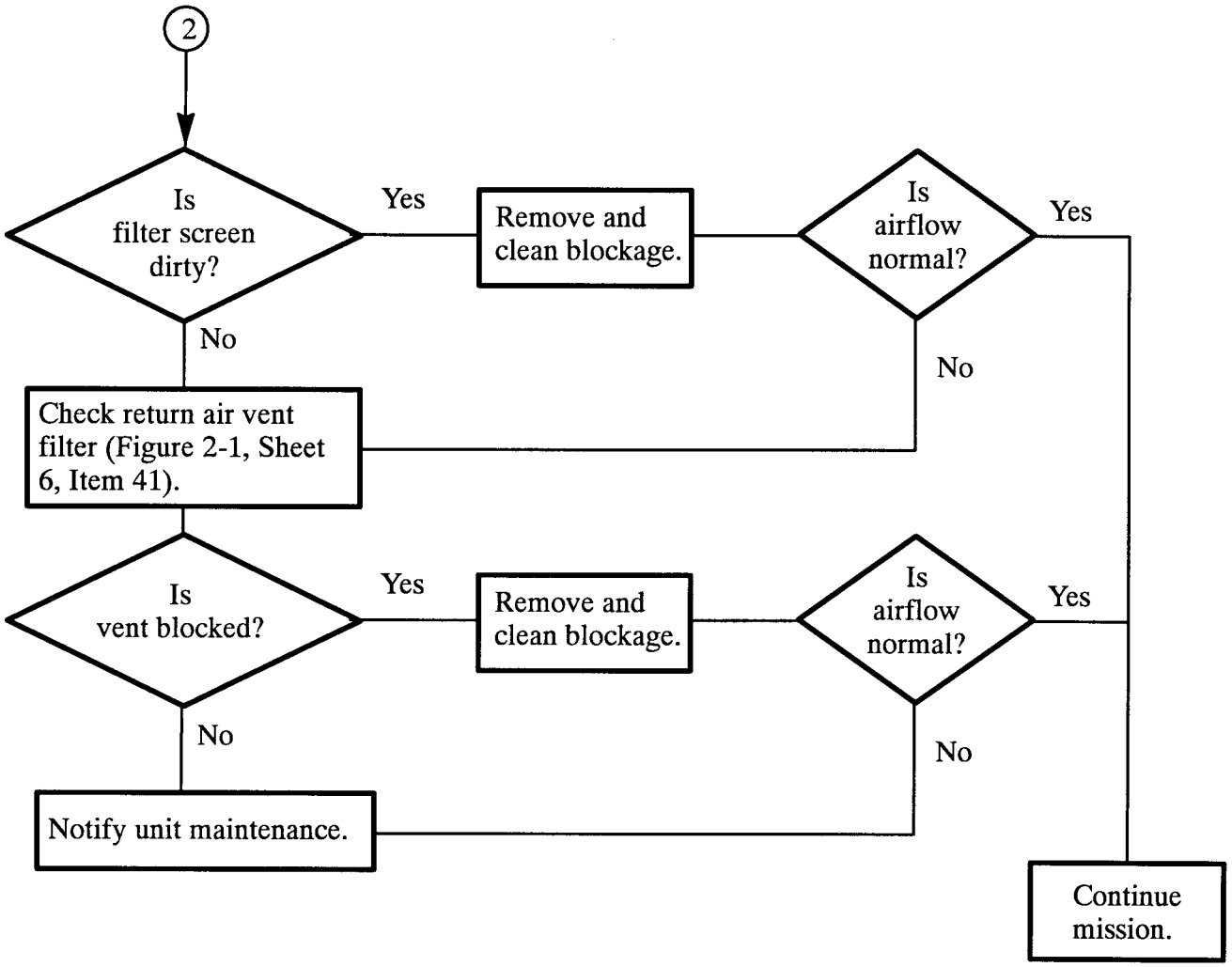


3.9 OPERATOR TROUBLESHOOTING - Continued.

6. LOW AIRFLOW, ESS MODE SELECTOR SWITCH IN "HEAT", "COOL" OR "VENT", INTERNAL OR EXTERNAL POWER, STATIC MODE - Continued.

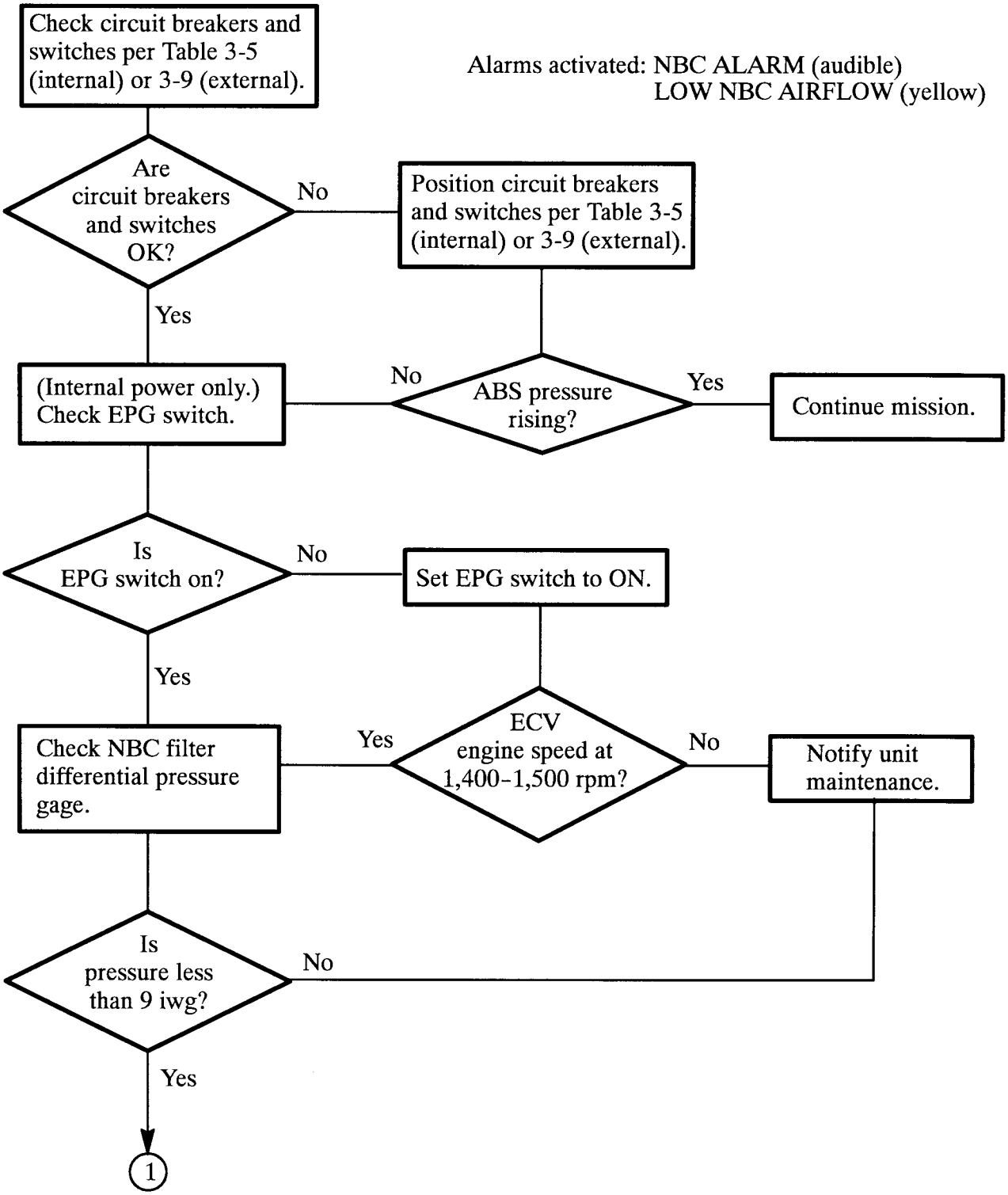


6. LOW AIRFLOW, ESS MODE SELECTOR SWITCH IN "HEAT", "COOL" OR "VENT", INTERNAL OR EXTERNAL POWER, STATIC MODE - Continued.

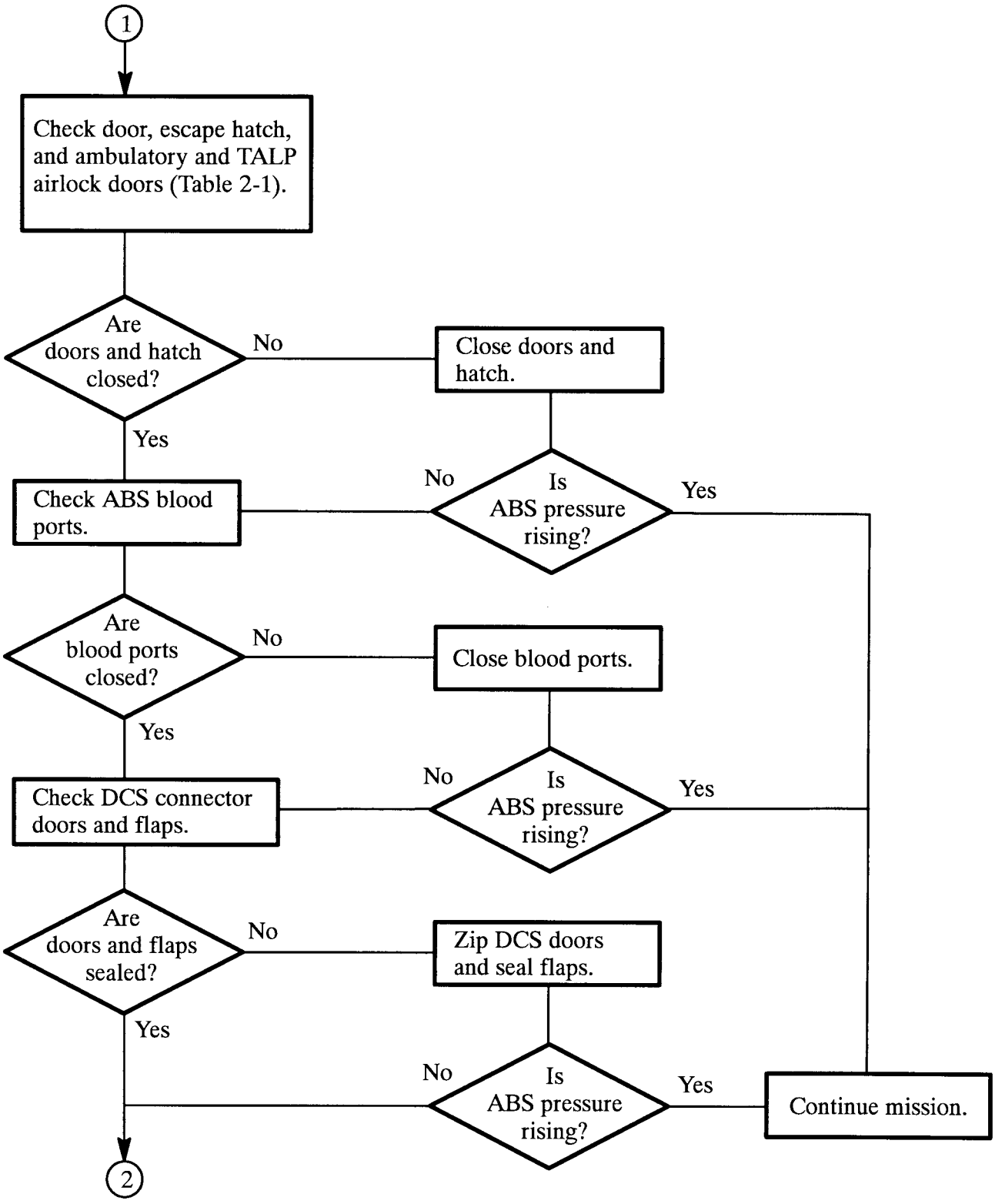


3.9 OPERATOR TROUBLESHOOTING - Continued.

7. NO OR LOW NBC PRESSURE, INTERNAL OR EXTERNAL POWER, STATIC MODE.

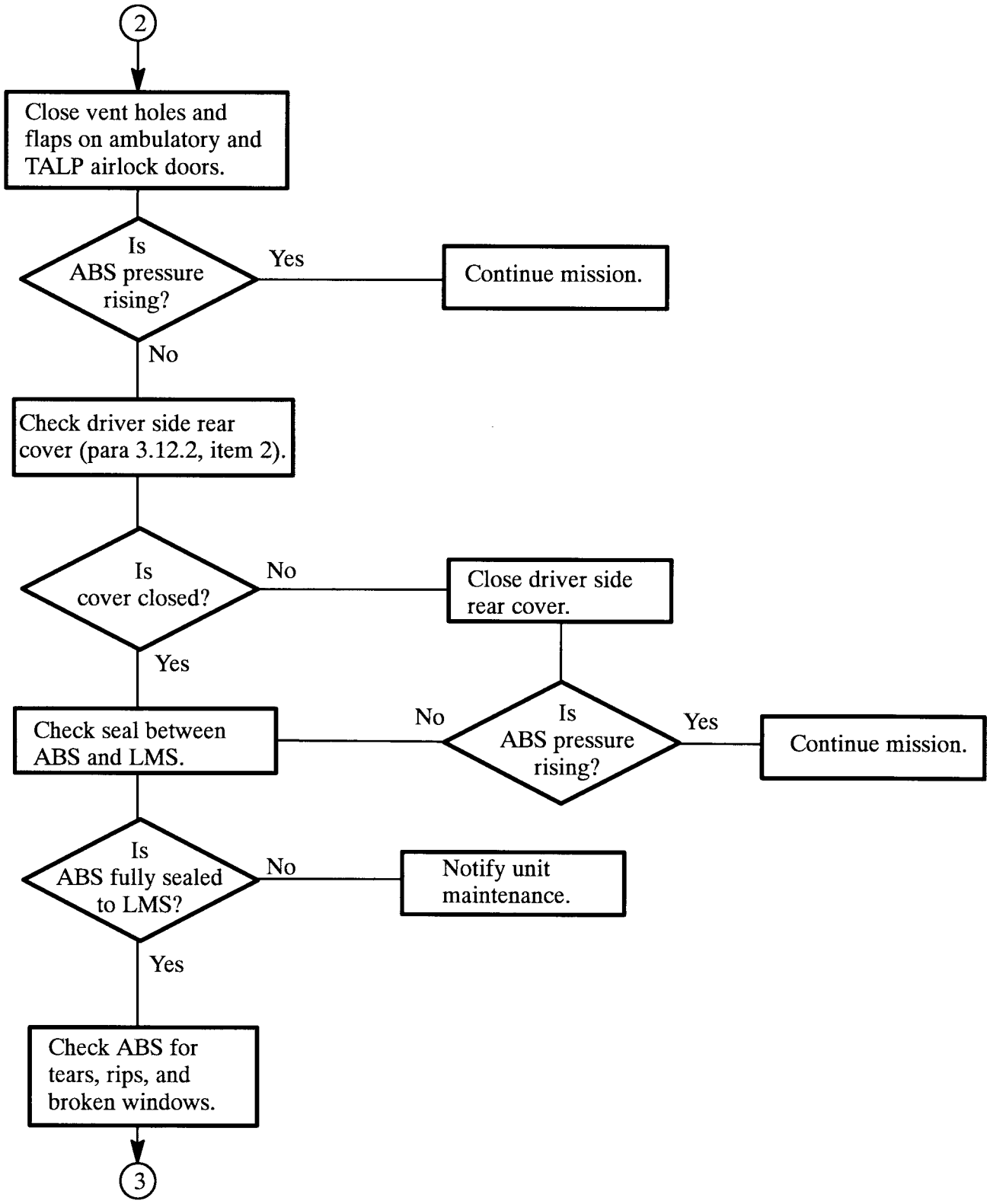


7. NO OR LOW NBC PRESSURE, INTERNAL OR EXTERNAL POWER, STATIC MODE - Continued.

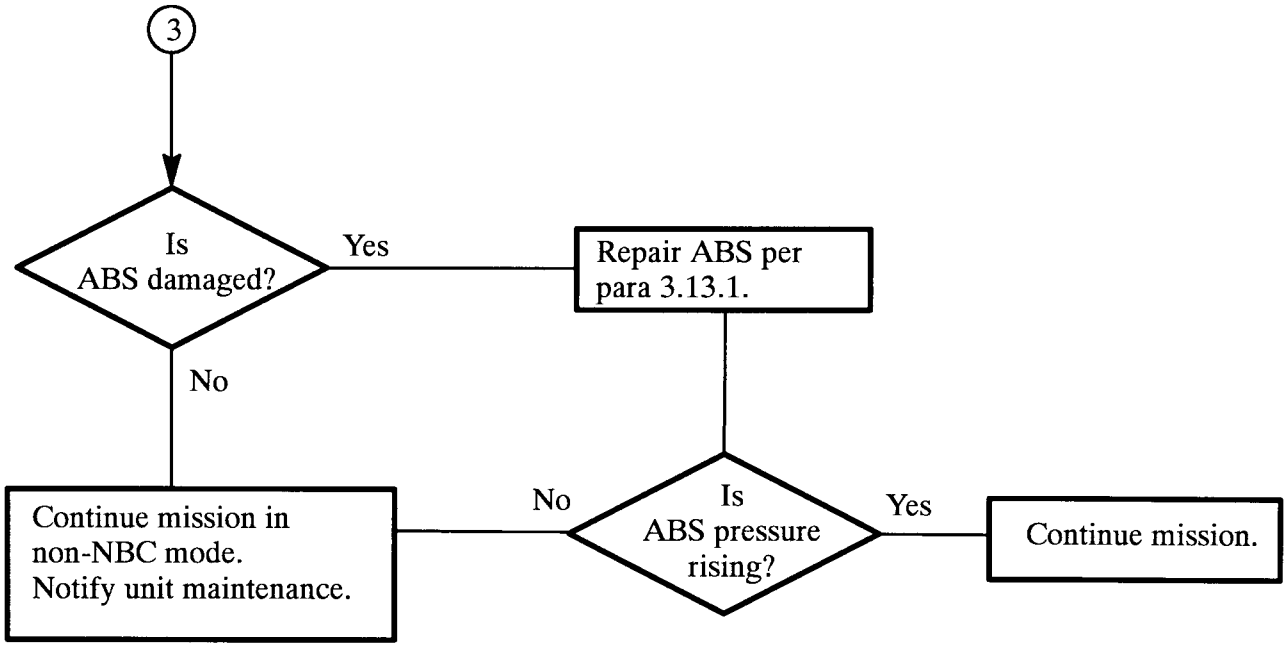


3.9 OPERATOR TROUBLESHOOTING - Continued.

7. NO OR LOW NBC PRESSURE, INTERNAL OR EXTERNAL POWER, STATIC MODE - Continued.

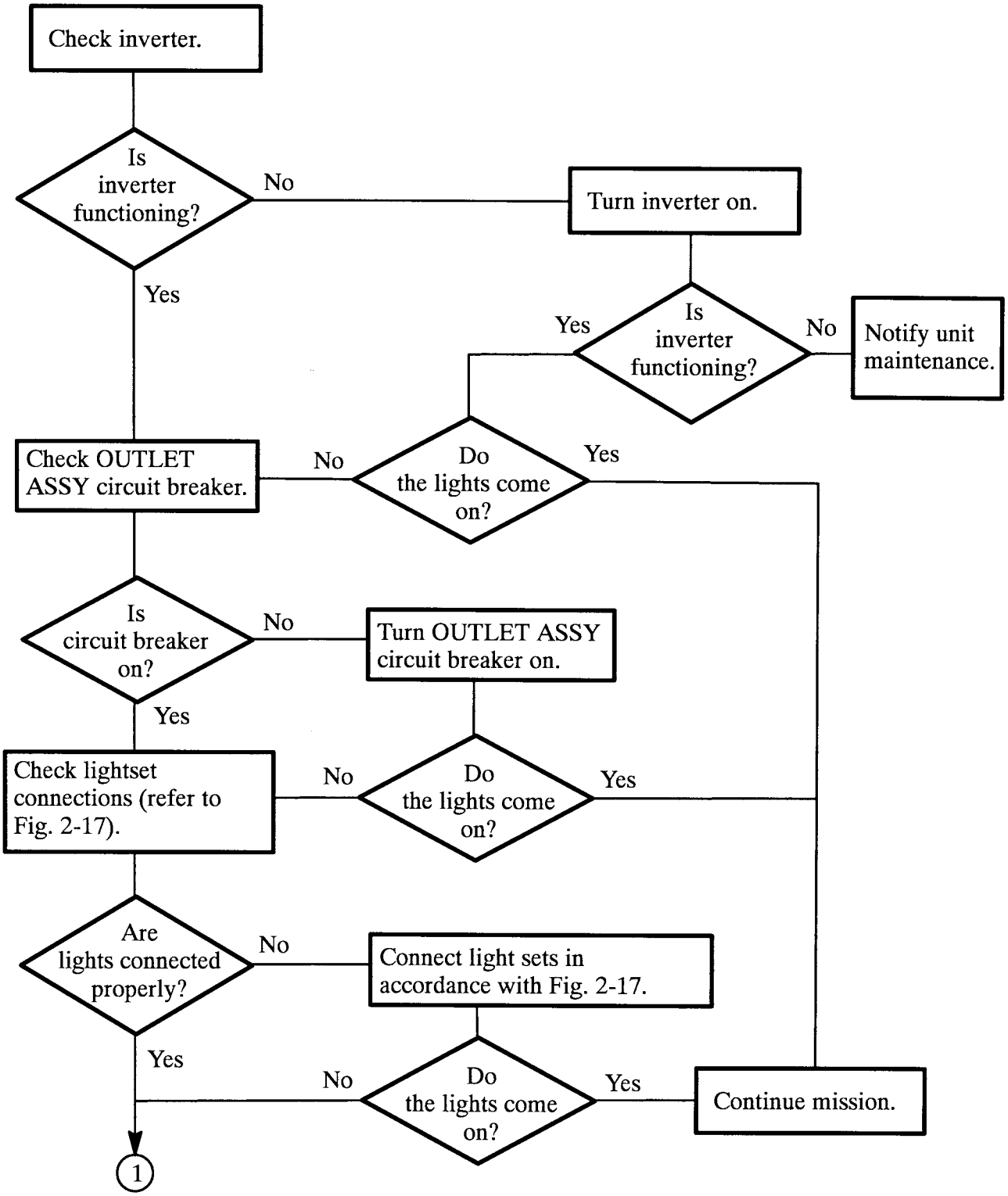


7. NO OR LOW NBC PRESSURE, INTERNAL OR EXTERNAL POWER, STATIC MODE - Continued.

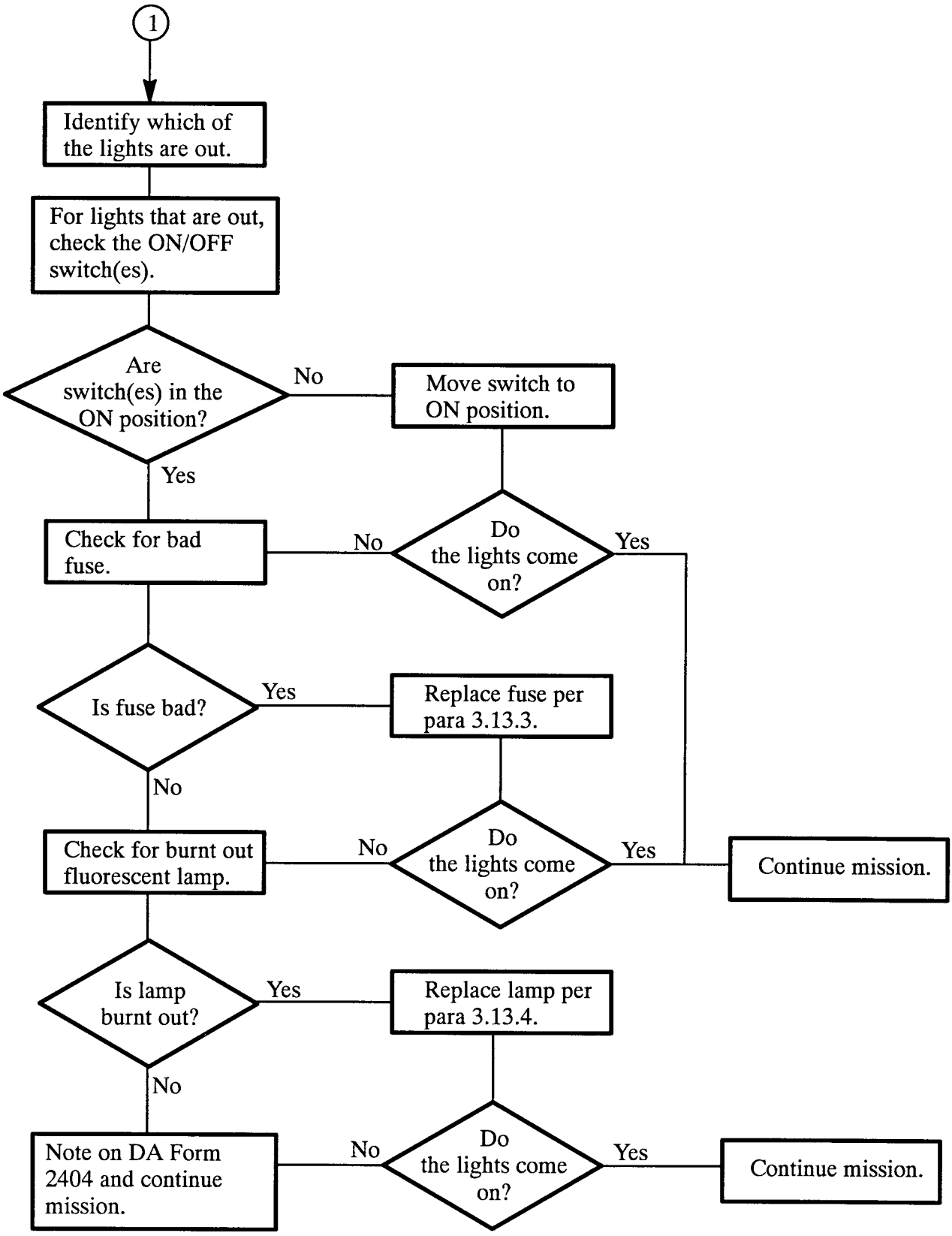


3.9 OPERATOR TROUBLESHOOTING - Continued.

8. NO LIGHTS IN ABS, INTERNAL POWER, STATIC MODE.



8. NO LIGHTS IN ABS, INTERNAL POWER, STATIC MODE - Continued.



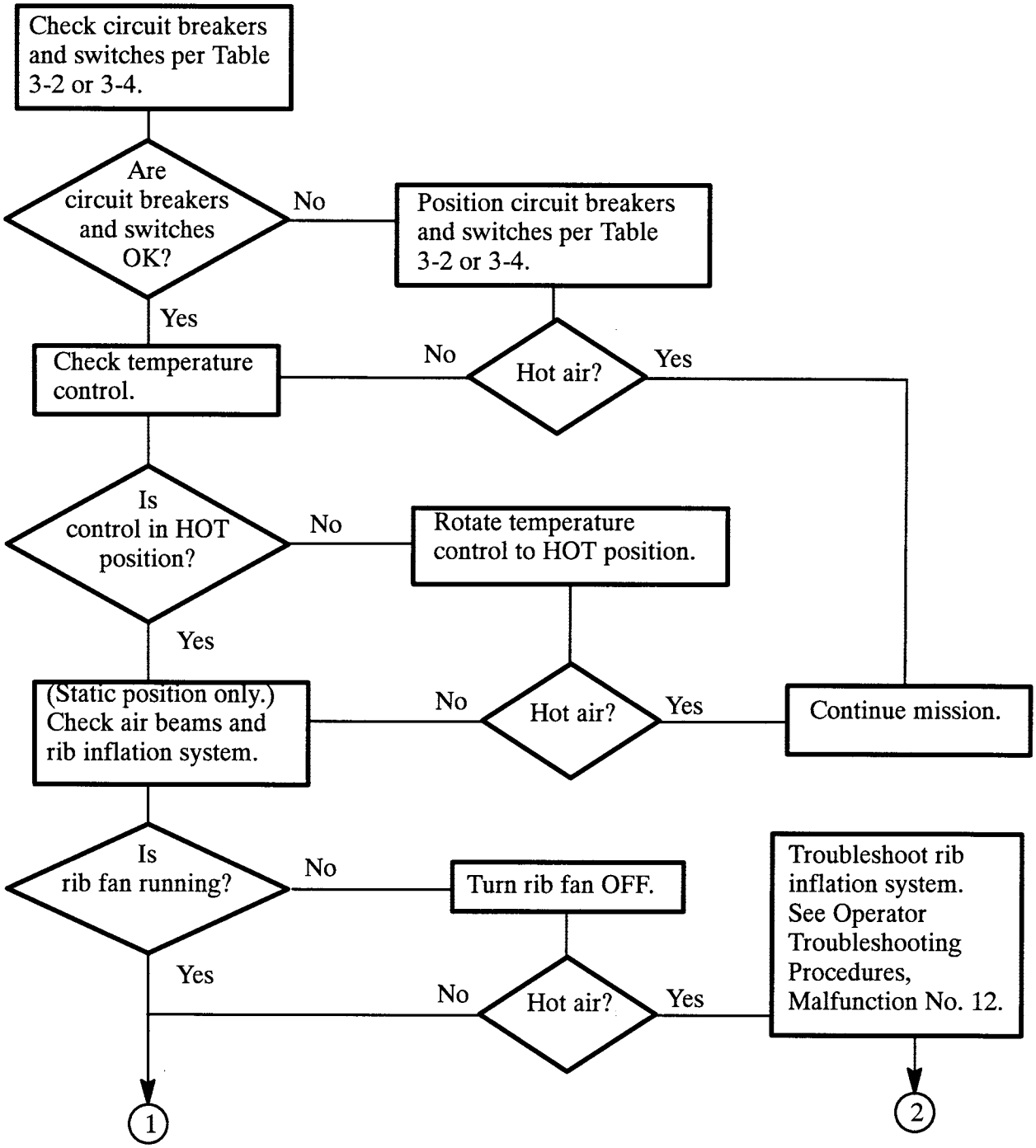
3.9 OPERATOR TROUBLESHOOTING - Continued.

9. NO HOT AIR, INTERNAL POWER, MOBILE OR STATIC MODE (NO TQG SUPPLEMENTAL).

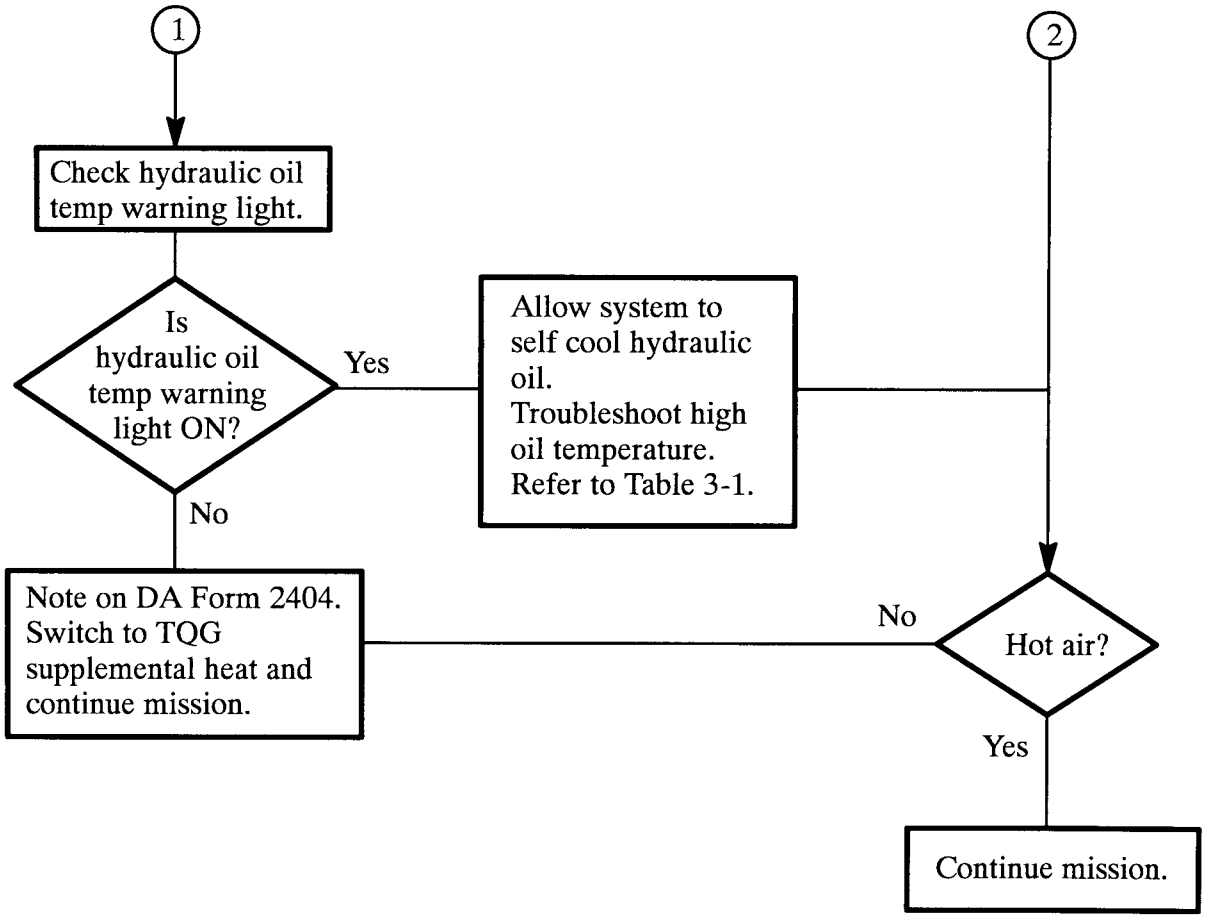
NOTE

ESS must be running in HEAT mode for 15 minutes before heat can be produced.

A leaking air beam and/or malfunctioning rib inflation system may cause a loss of heat.



9. NO HOT AIR, INTERNAL POWER, MOBILE OR STATIC MODE (NO TQG SUPPLEMENTAL) - Continued.

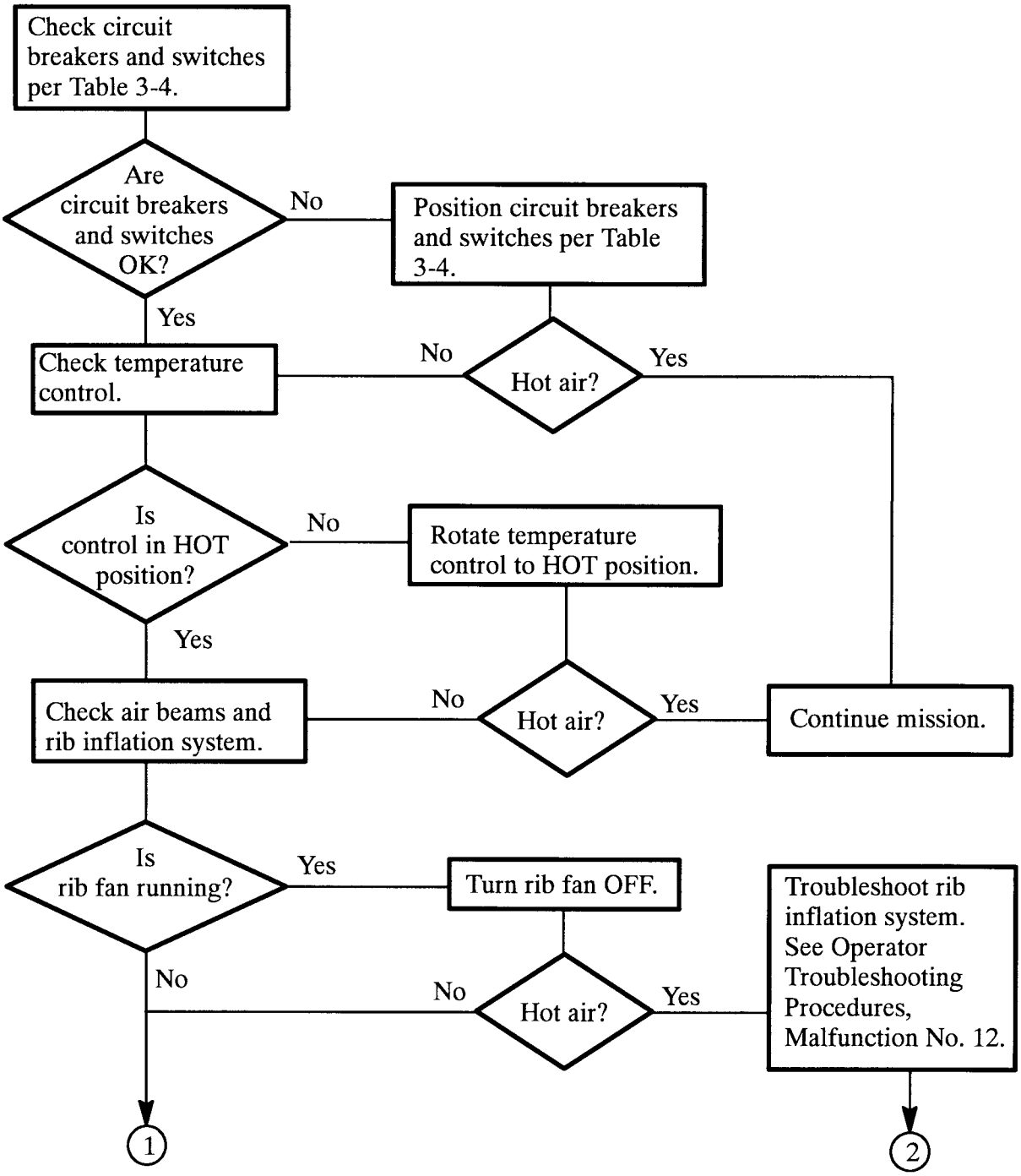


3.9 OPERATOR TROUBLESHOOTING - Continued.

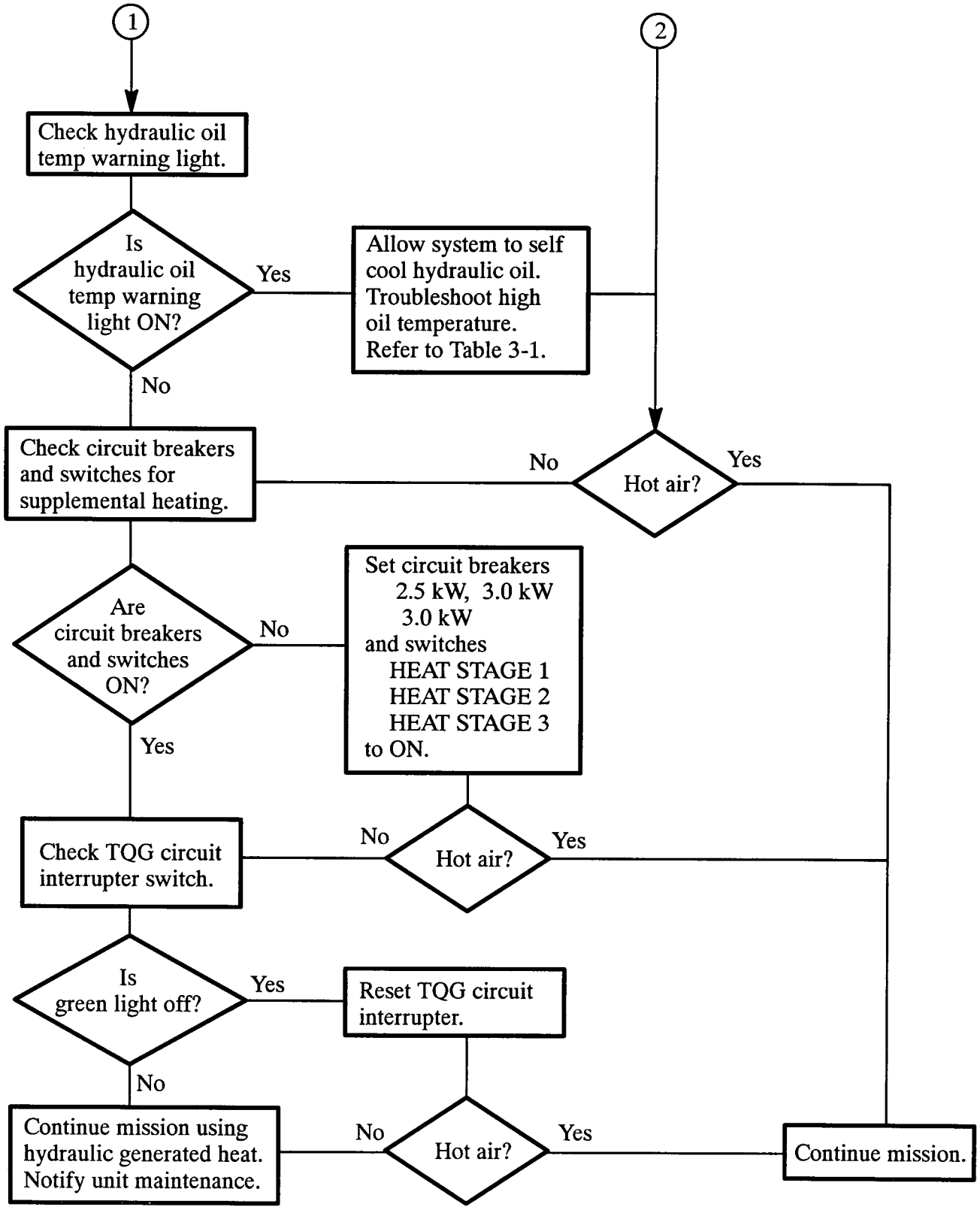
10. LOW HEAT WITH TQG SUPPLEMENTAL, INTERNAL POWER, STATIC MODE.

NOTE

ECU must be running in HEAT mode for 15 minutes before heat can be produced.
A leaking air beam and/or malfunctioning rib inflation system may cause a loss of heat.
If Hydraulic Oil Temp indicator light is On, the control system will switch to hydraulic self-cooling mode. This will temporarily turn off heat.



10. LOW HEAT WITH TQG SUPPLEMENTAL, INTERNAL POWER, STATIC MODE - Continued.



3.9 OPERATOR TROUBLESHOOTING - Continued.

11. NO AIR CONDITIONING, INTERNAL POWER, STATIC MODE.

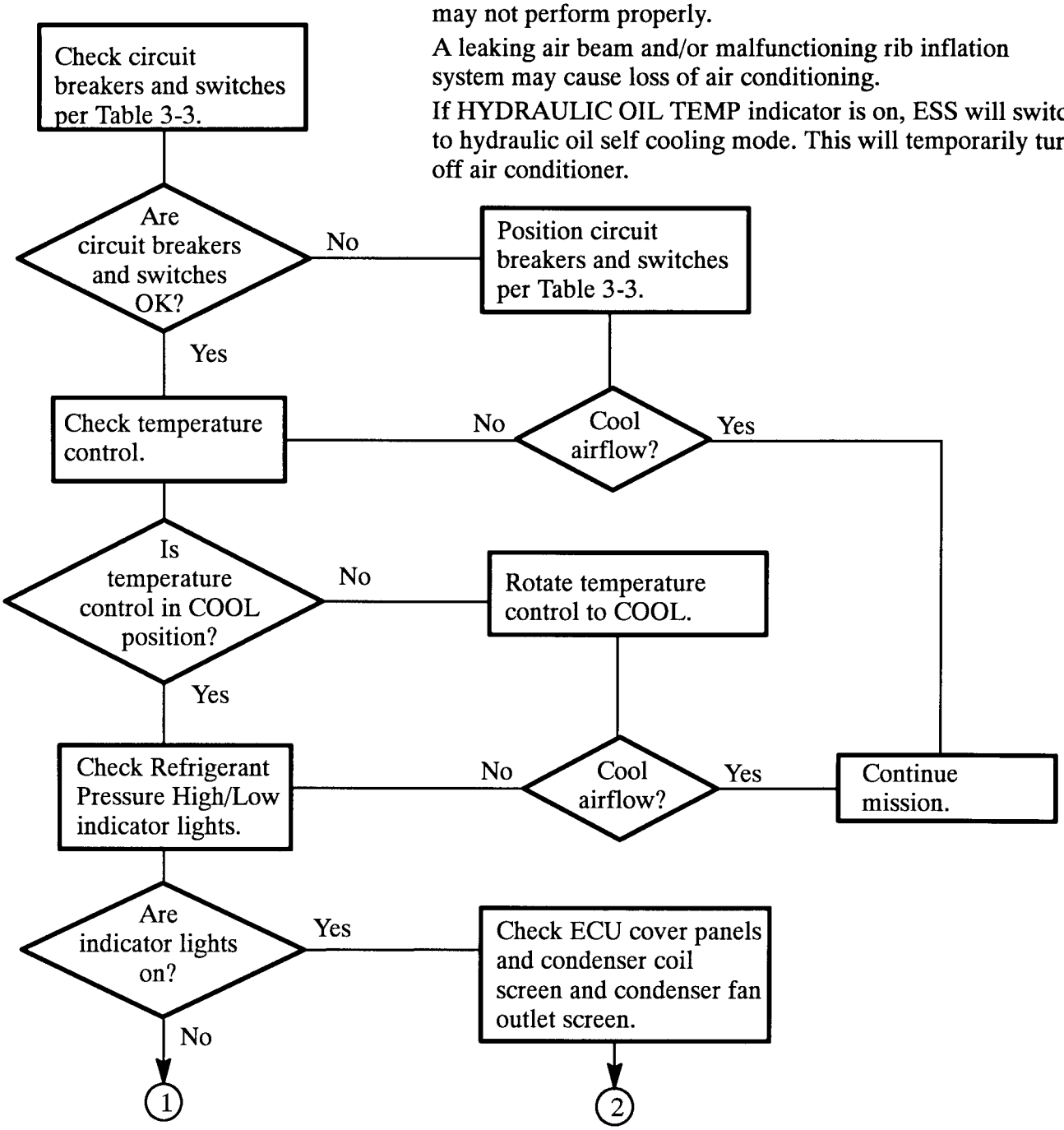
CAUTION

Turning COOL on and off repeatedly will damage air conditioner. Wait three minutes before switching on and off.

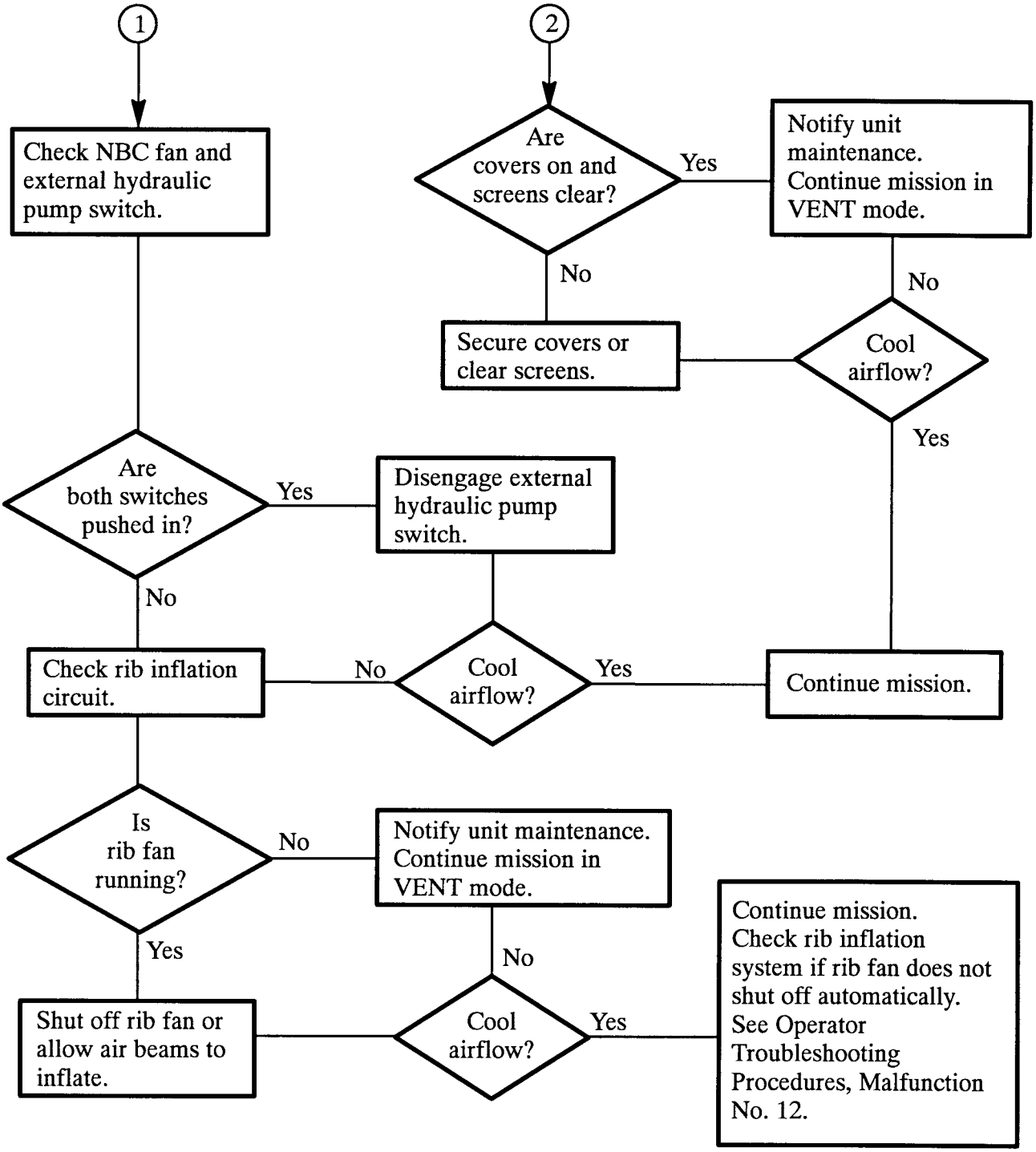
NOTE No air conditioning when rib fan is inflating the air beams. At ambient temperatures below 50°F the air conditioning may not perform properly.

A leaking air beam and/or malfunctioning rib inflation system may cause loss of air conditioning.

If HYDRAULIC OIL TEMP indicator is on, ESS will switch to hydraulic oil self cooling mode. This will temporarily turn off air conditioner.



11. NO AIR CONDITIONING, INTERNAL POWER, STATIC MODE - Continued.

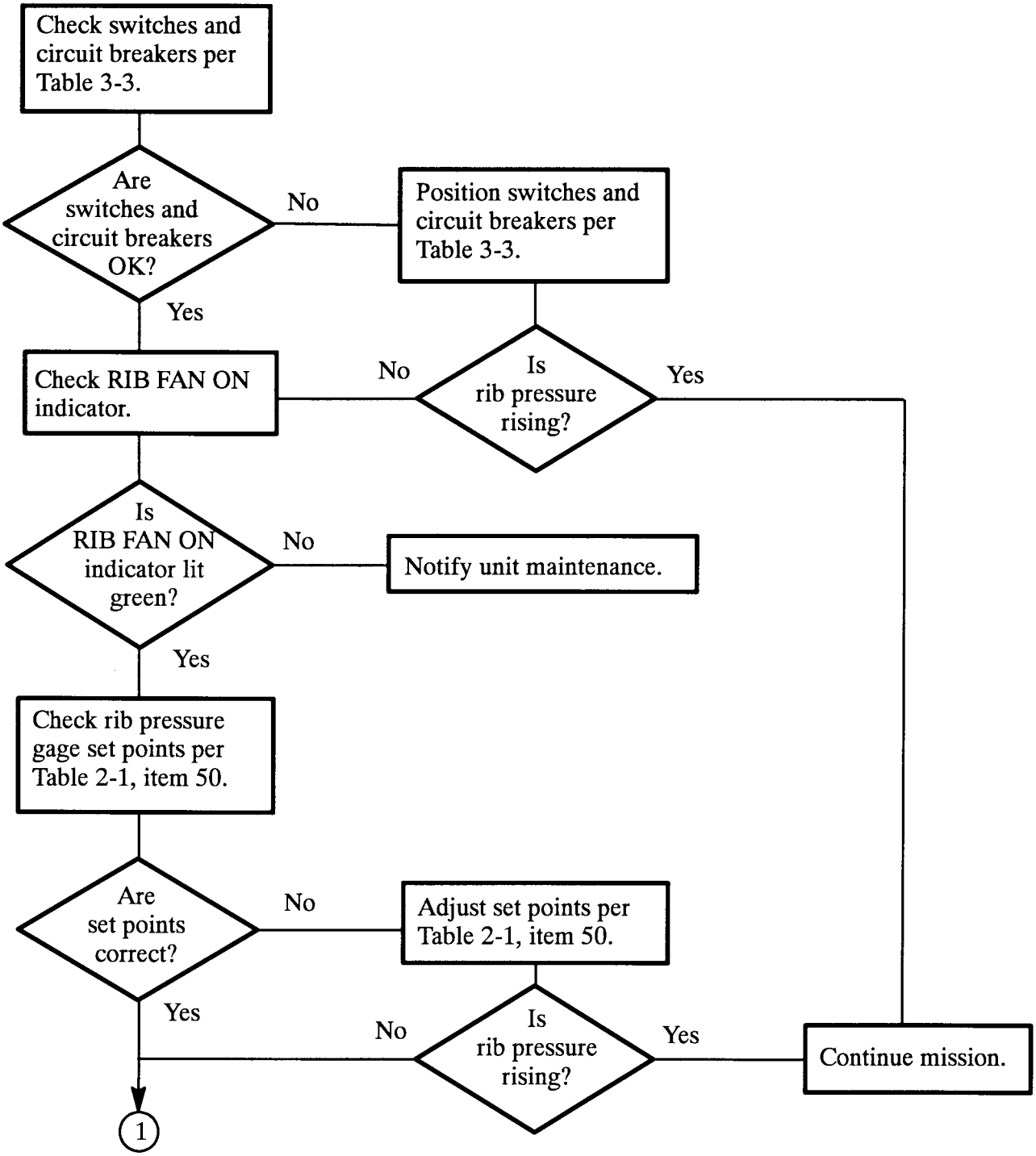


3.9 OPERATOR TROUBLESHOOTING - Continued.

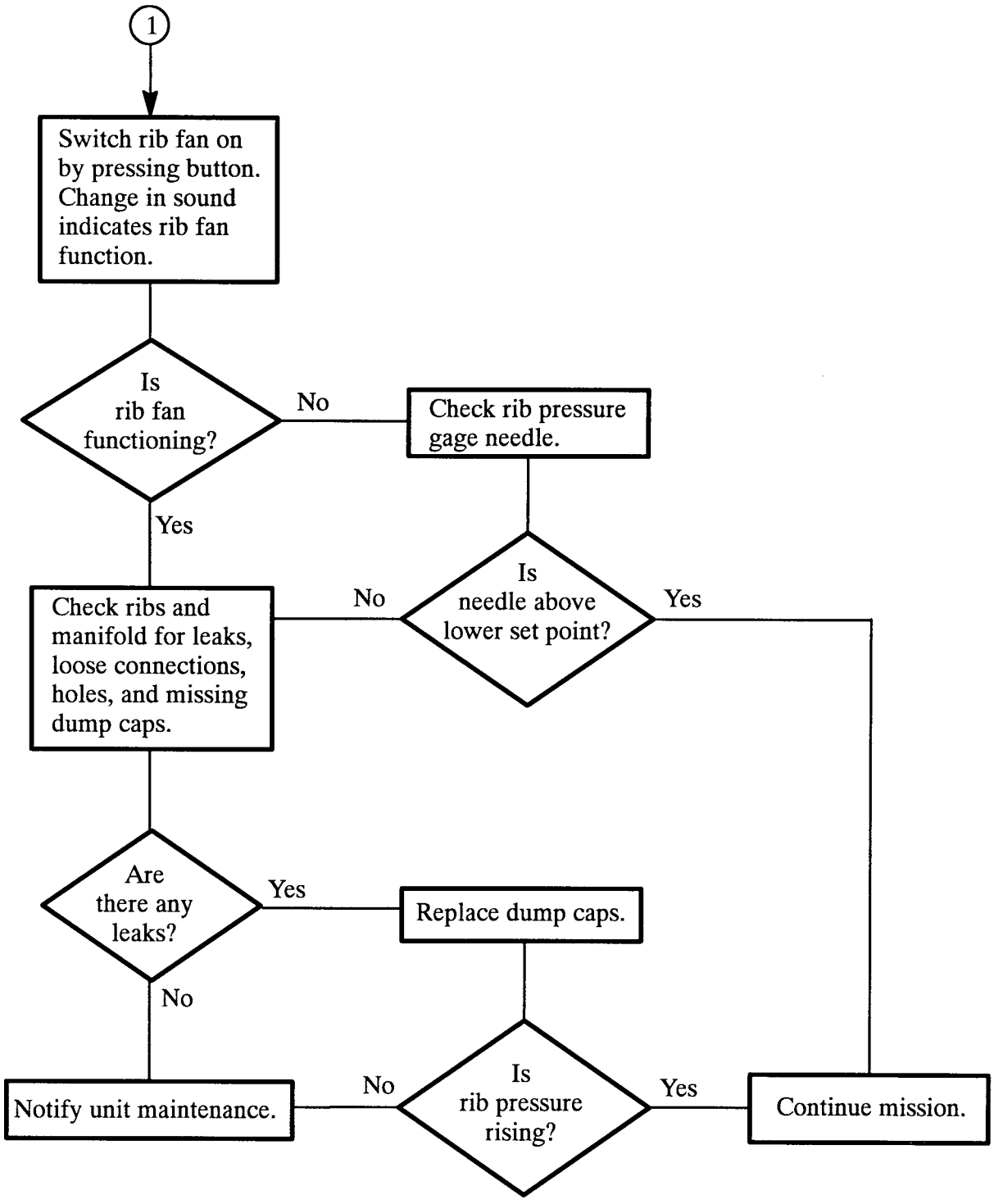
12. RIB PRESSURE LOW, AIR BEAMS DO NOT INFLATE WHEN RIB FAN SWITCH IS PRESSED, INTERNAL POWER, STATIC MODE.

NOTE

Rib fan will only operate if rib pressure drops below lower set point on rib pressure gage. Indicator may be lit without fan functioning.

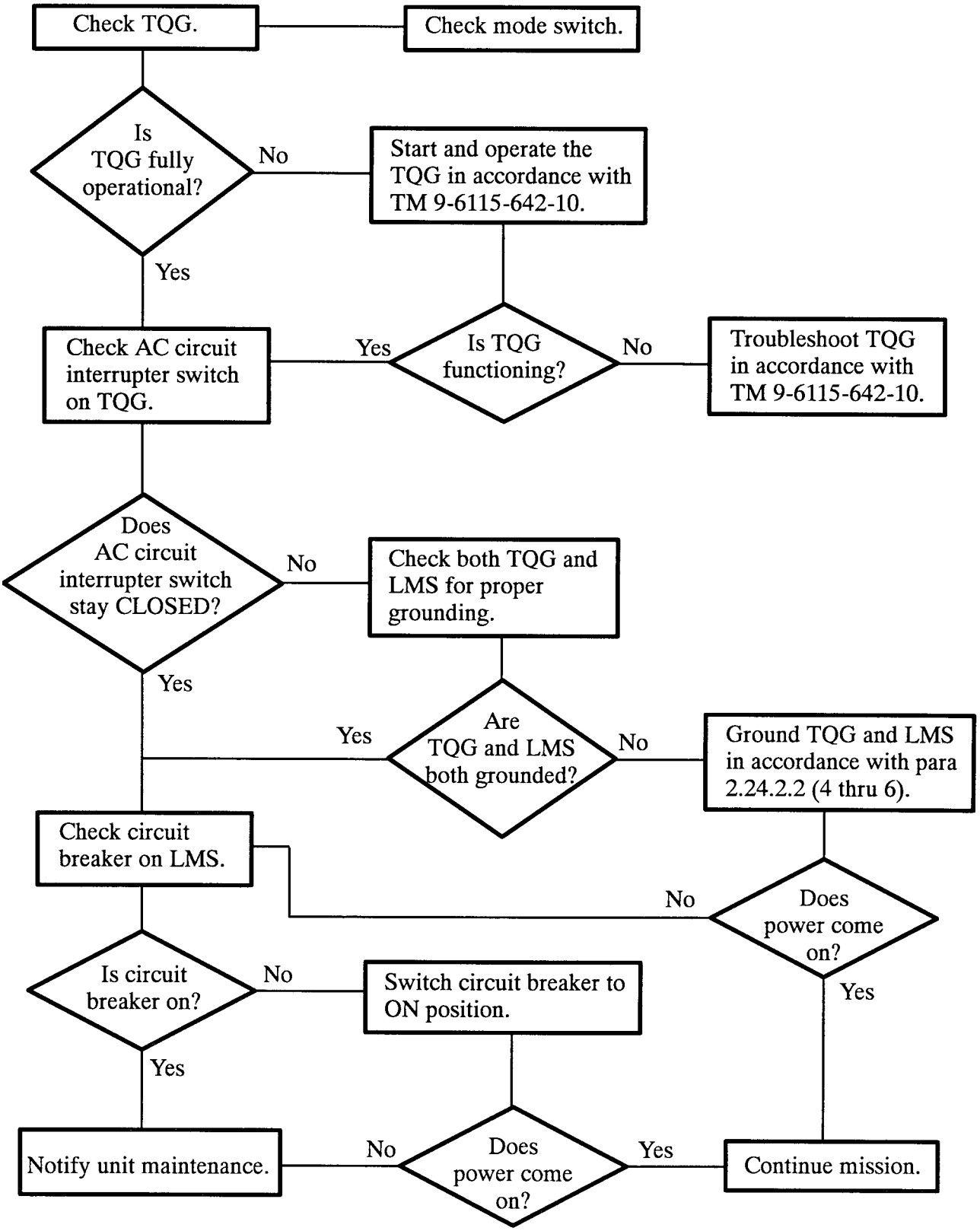


12. RIB PRESSURE LOW, AIR BEAMS DO NOT INFLATE WHEN RIB FAN SWITCH IS PRESSED, INTERNAL POWER, STATIC MODE - Continued.

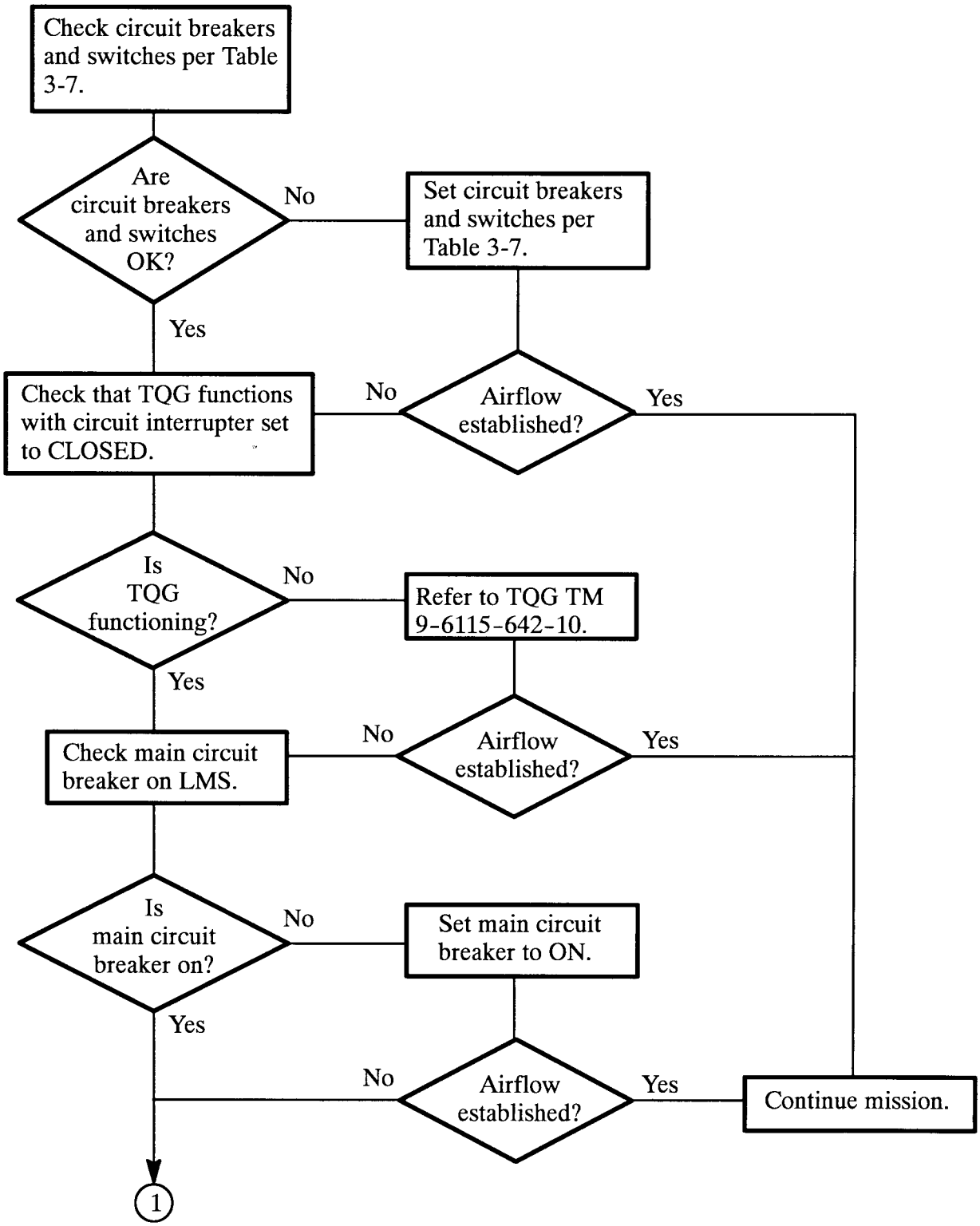


3.9 OPERATOR TROUBLESHOOTING - Continued.

13. NO POWER TO LMS, EXTERNAL POWER.

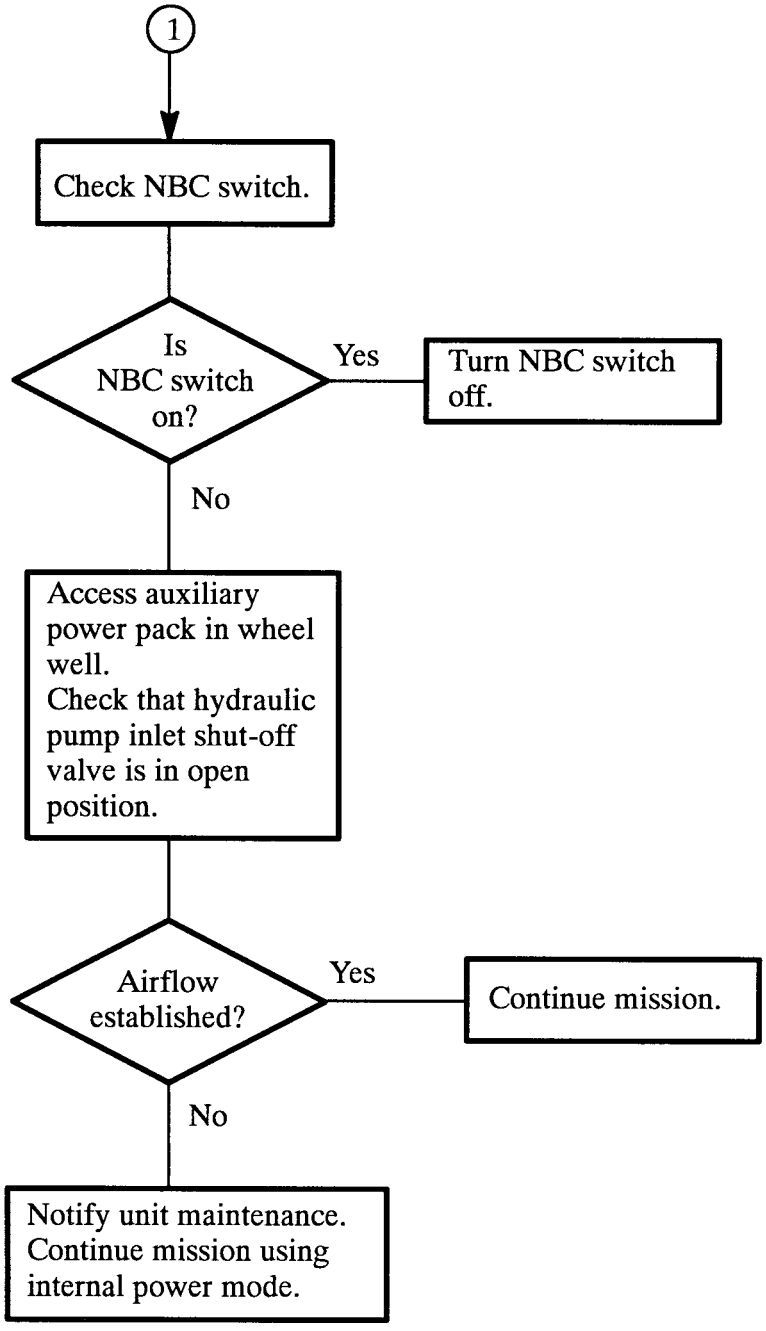


14. NO AIRFLOW INSIDE OF ABS, EXTERNAL POWER.

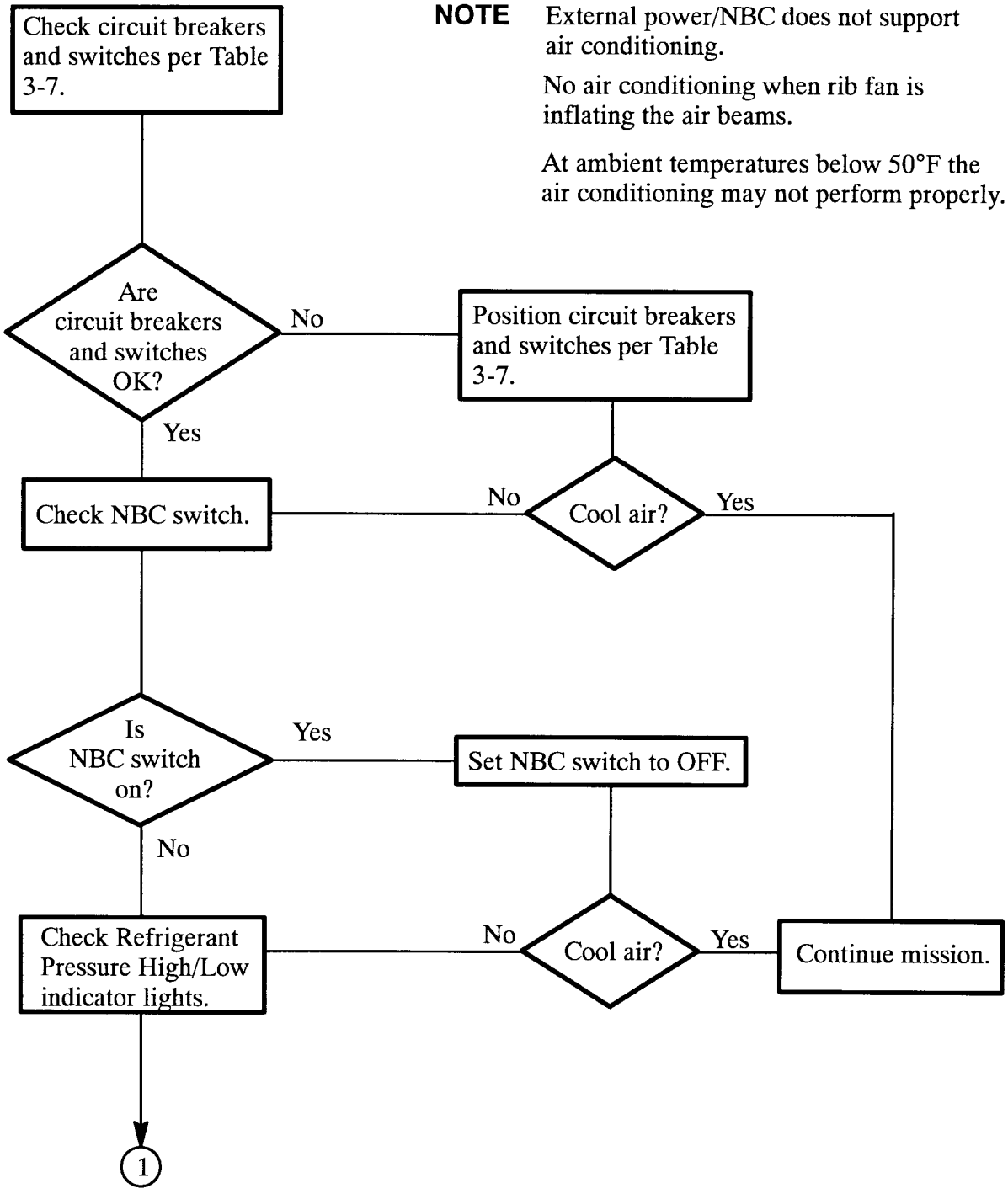


3.9 OPERATOR TROUBLESHOOTING - Continued.

14. NO AIR FLOW INSIDE OF ABS, EXTERNAL POWER - Continued.

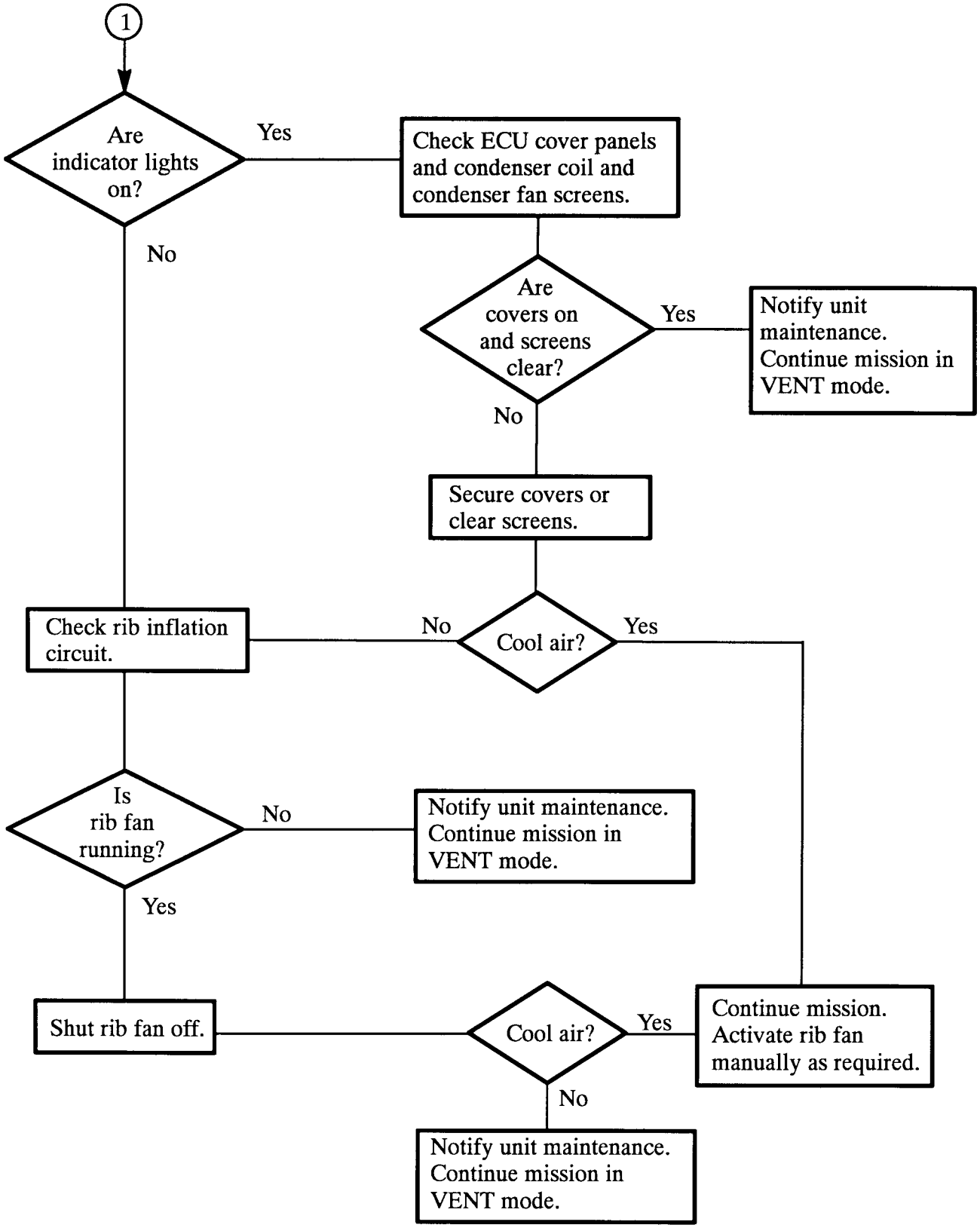


15. NO AIR CONDITIONING, EXTERNAL POWER.



3.9 OPERATOR TROUBLESHOOTING - Continued.

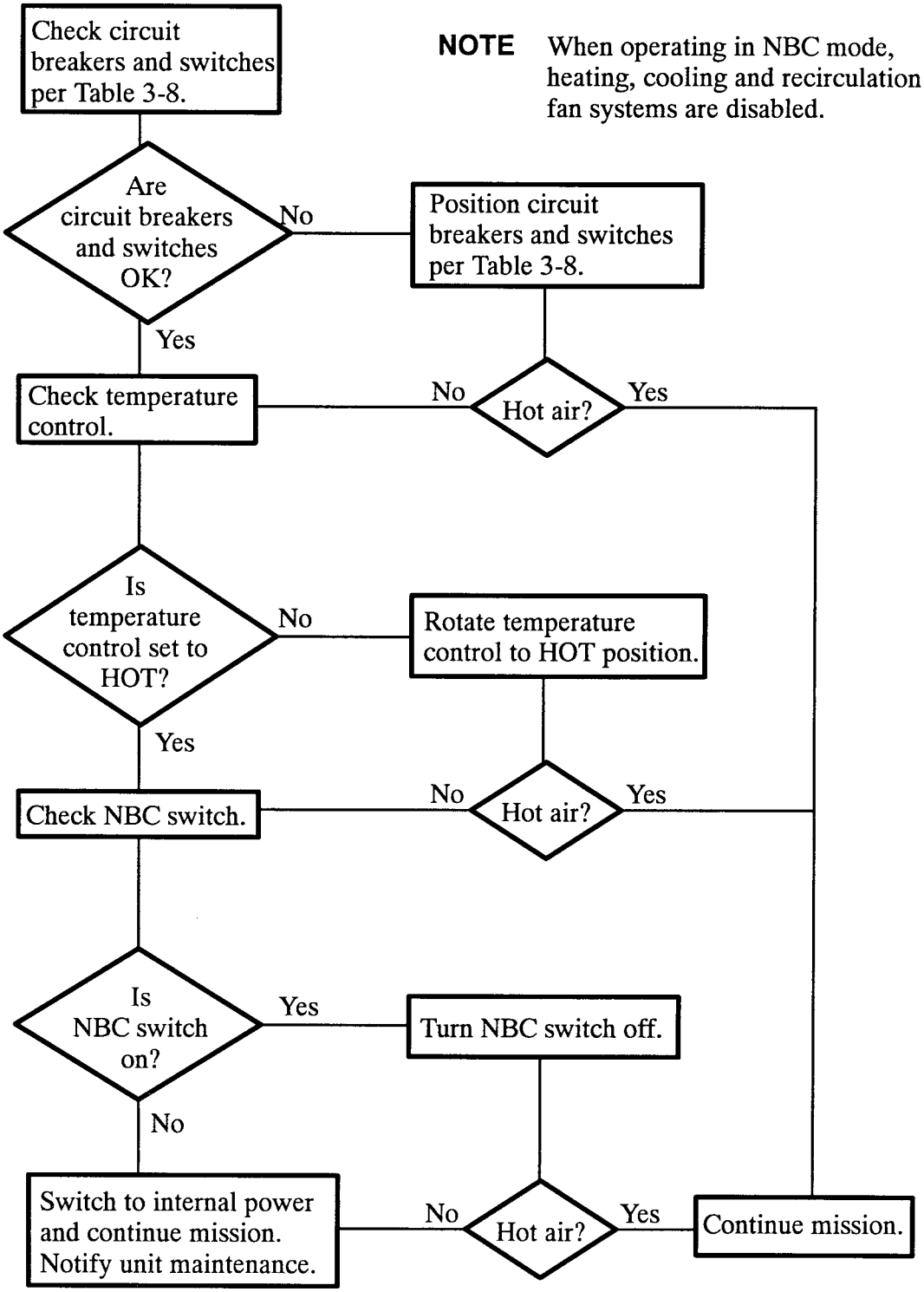
15. NO AIR CONDITIONING, EXTERNAL POWER - Continued.



16. NO HOT AIR, EXTERNAL POWER.

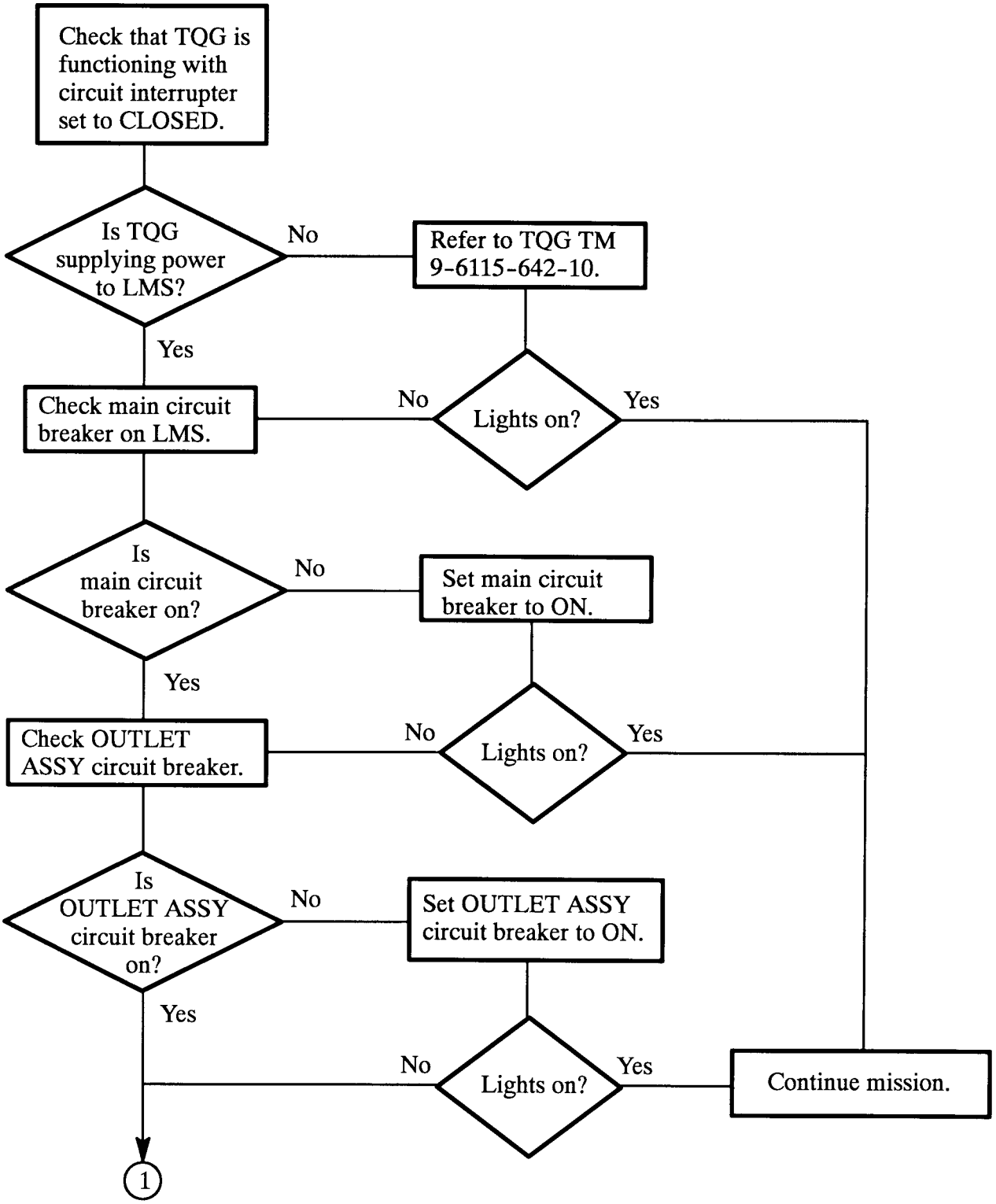
WARNING

10 kw TQG will only support heat stage 1. Turning heaters 2 through 4 ON will shut down 10 kw TQG.

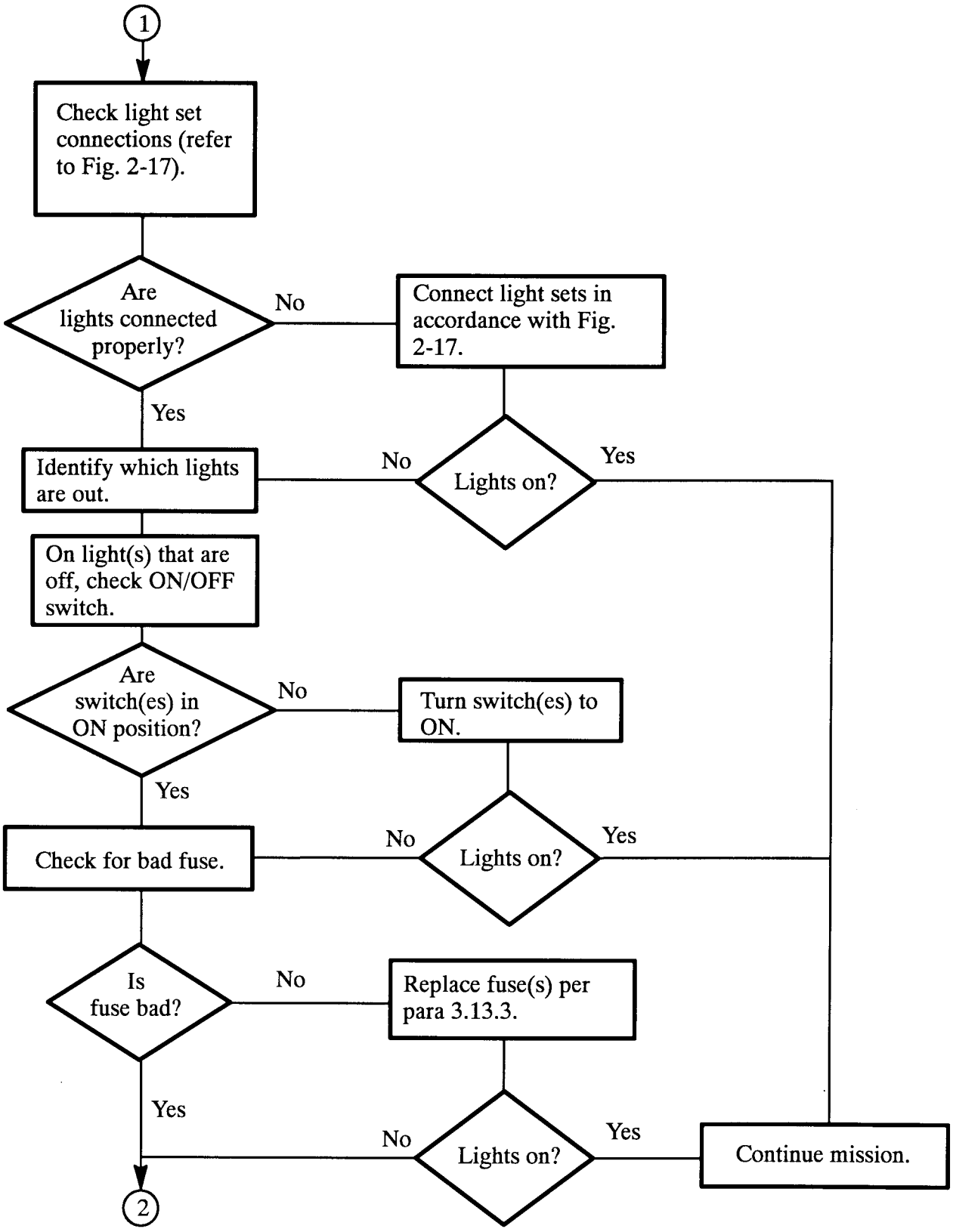


3.9 OPERATOR TROUBLESHOOTING - Continued.

17. NO LIGHTING IN ABS, EXTERNAL POWER.

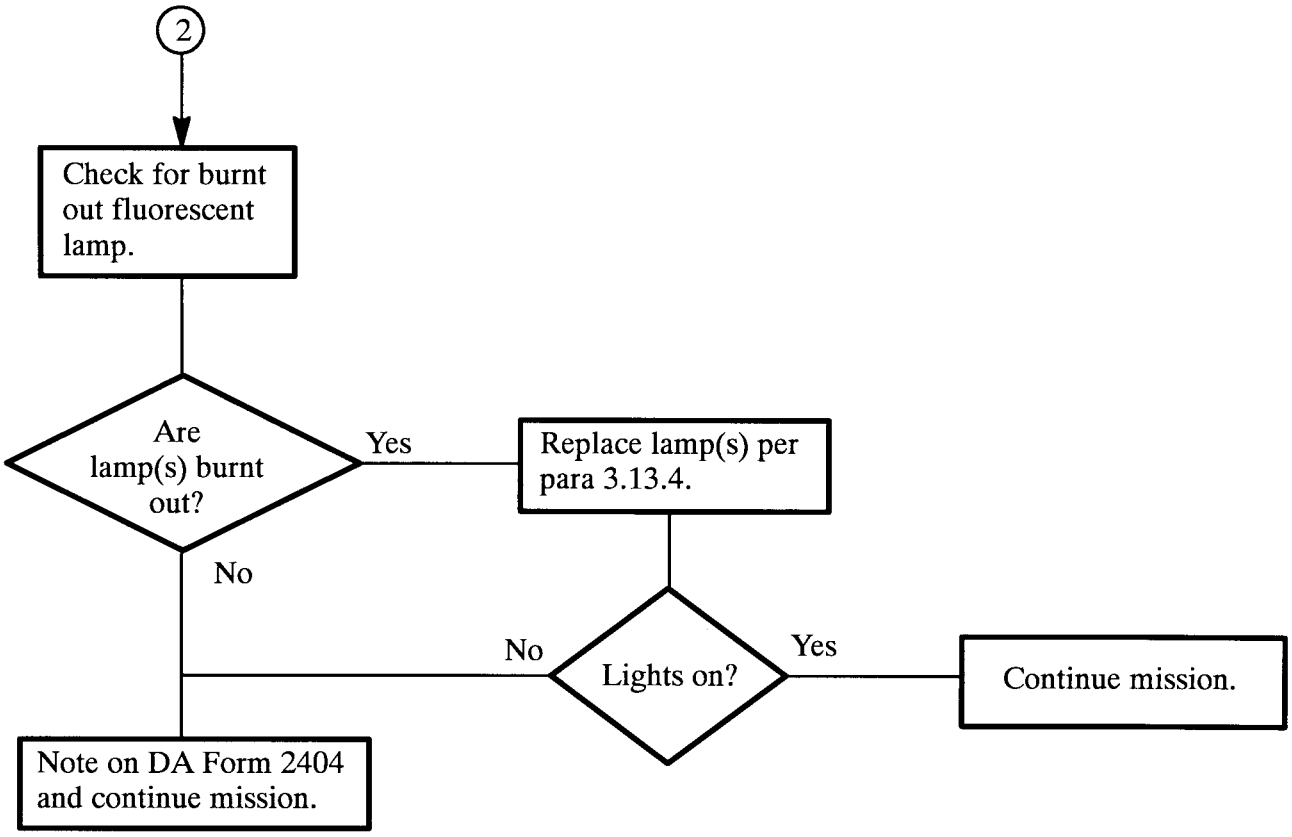


17. NO LIGHTING IN ABS, EXTERNAL POWER - Continued.

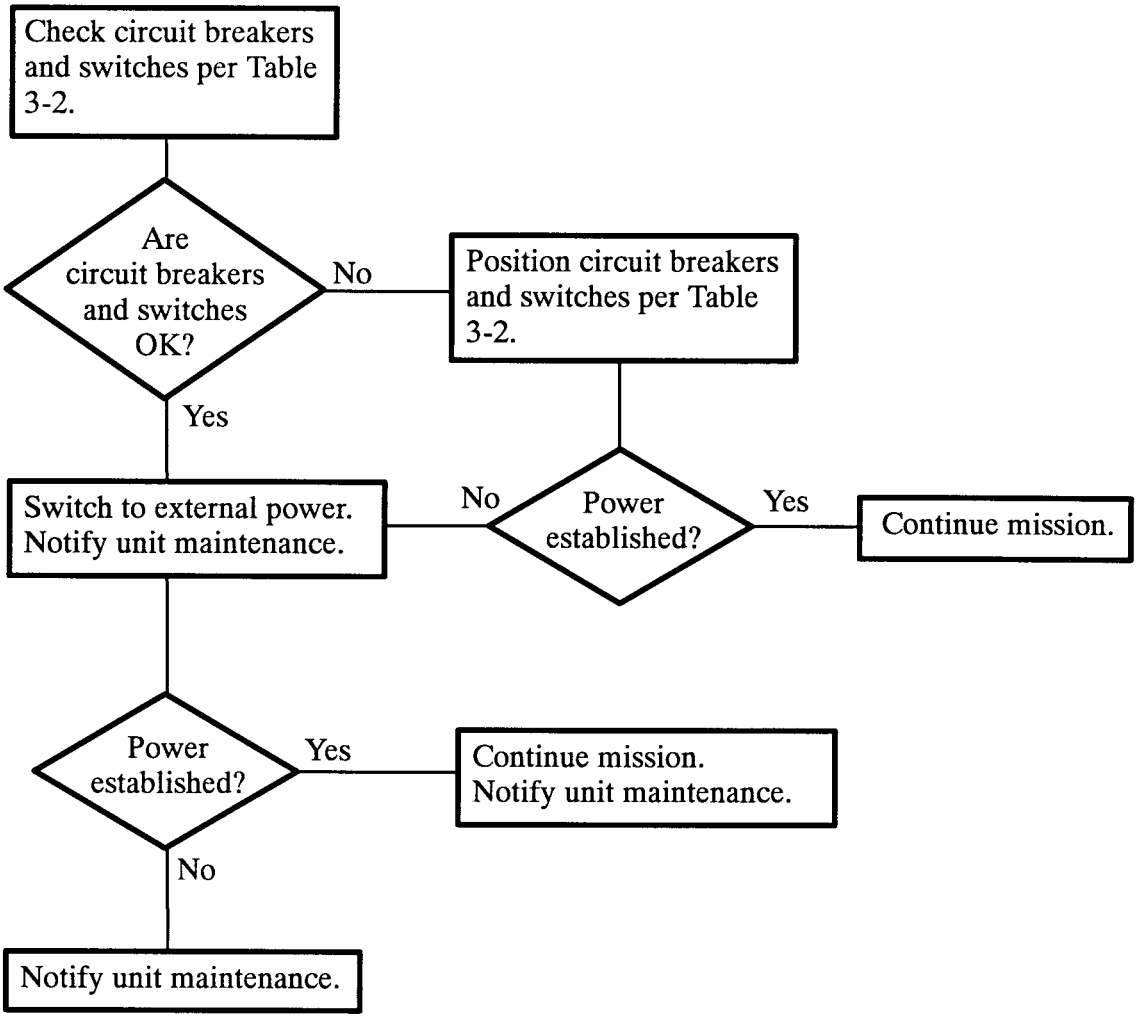


3.9 OPERATOR TROUBLESHOOTING - Continued.

17. NO LIGHTING IN ABS, EXTERNAL POWER - Continued.



18. NO POWER TO SYSTEM - ECV RUNNING, INTERNAL POWER, STATIC OR MOBILE MODE.



3.9 OPERATOR TROUBLESHOOTING - Continued.

Table 3-2. Circuit Breaker and Switch Configuration for Mobile Mode

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
Switch ON	ESS MODE	HEAT, VENT, or COOL
	MISSION PROFILE	MOBILE
	POWER MODE	INT

Table 3-3. Circuit Breaker and Switch Configuration for Static Mode, Internal Power, VENT or COOL, Non-NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
	OUTLET ASSY	
Switch ON	ESS MODE	VENT or COOL
	MISSION PROFILE	STATIC
	POWER MODE	INT
	RIB FAN	
	Inverter Switch	
	EPG Switch (located in cab on vehicle control box)	

Table 3-4. Circuit Breaker and Switch Configuration for Static Mode, Internal Power, HEAT, Non-NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
	OUTLET ASSY	
	2.5 kW Heat Stage 1 (if supplemental power is available)	
	3.0 kW Heat Stage 2 (if supplemental power is available)	

Table 3-4. Circuit Breaker and Switch Configuration for Static Mode, Internal Power, HEAT, Non-NBC - Continued

	Item Name	Configuration
	3.0 kW Heat Stage 3 (if supplemental power is available)	
Switch ON	ESS MODE	HEAT
	MISSION PROFILE	STATIC
	POWER MODE	INT
	RIB FAN	
	Inverter Switch	
	Heat Stage 1 (if supplemental power is available)	
	Heat Stage 2 (if supplemental power is available)	
	Heat Stage 3 (if supplemental power is available)	
	EPG Switch (located in cab on vehicle control box)	

Table 3-5. Circuit Breaker and Switch Configuration for Static Mode, Internal Power, VENT or COOL, NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
	OUTLET ASSY	
Switch ON	ESS MODE	VENT or COOL
	MISSION PROFILE	STATIC
	POWER MODE	INT
	RIB FAN	
	Inverter Switch	
	NBC Fan	
	EPG Switch (located in cab on vehicle control box)	

Table 3-6. Circuit Breaker and Switch Configuration for Static Mode, Internal Power, HEAT, NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	

3.9 OPERATOR TROUBLESHOOTING - Continued.

Table 3-6. Circuit Breaker and Switch Configuration for Static Mode, Internal Power, HEAT, NBC - Continued

	Item Name	Configuration
Circuit Breaker ON - Continued	OUTLET ASSY	
	2.5 kW Heat Stage 1 (if supplemental power is available)	
	3.0 kW Heat Stage 2 (if supplemental power is available)	
	3.0 kW Heat Stage 3 (if supplemental power is available)	
Switch ON	ESS MODE	HEAT
	MISSION PROFILE	STATIC
	POWER MODE	INT
	RIB FAN	
	Inverter Switch	
	NBC Fan	
	Heat Stage 1 (if supplemental power is available)	
	Heat Stage 2 (if supplemental power is available)	
	Heat Stage 3 (if supplemental power is available)	
	EPG Switch (located in cab on vehicle control box)	

Table 3-7. Circuit Breaker and Switch Configuration for Static Mode, External Power, VENT or COOL, Non-NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
	HYDRAULIC PUMP/MOTOR	
	OUTLET ASSY	
	A/C INPUT (on Converter)	
	Circuit Breaker (located on LMS exterior Power Panel)	
Switch ON	Converter DC OUTPUT Switch	
	ESS MODE	VENT or COOL
	MISSION PROFILE	STATIC
	POWER MODE	EXT
	RIB FAN	
	EXTERNAL HYDRAULIC PUMP	

Table 3-8. Circuit Breaker and Switch Configuration for Static Mode, External Power, HEAT, Non-NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
	HYDRAULIC PUMP/MOTOR	
	OUTLET ASSY	
	A/C INPUT (on Converter)	
	2.5 kW Heat Stage 1	
	3.0 kW Heat Stage 2 (30 kW power source or greater)	
	3.0 kW Heat Stage 3 (30 kW power source or greater)	
	10.0 kW Heat Stage 4 (30 kW power source or greater)	
	Circuit Breaker (located on LMS exterior Power Panel)	
Switch ON	Converter DC OUTPUT Switch	
	ESS MODE	HEAT
	MISSION PROFILE	STATIC
	POWER MODE	EXT
	RIB FAN	
	Heat Stage 1	
	Heat Stage 2 (30 kW power source or greater)	
	Heat Stage 3 (30 kW power source or greater)	
	Heat Stage 4 (30 kW power source or greater)	
	EXTERNAL HYDRAULIC PUMP	

Table 3-9. Circuit Breaker and Switch Configuration for Static Mode, External Power, VENT, NBC

	Item Name	Configuration
Circuit Breaker ON	LTG/INTERCOM	
	INSTM CONT	
	NBC/VENT	
	HEAT/COOL	
	HYDRAULIC PUMP/MOTOR	
	OUTLET ASSY	

3.9 OPERATOR TROUBLESHOOTING - Continued.

Table 3-9. Circuit Breaker and Switch Configuration for Static Mode, External Power, VENT, NBC - Continued

	Item Name	Configuration
	Circuit Breaker (located on LMS exterior Power Panel)	
Switch ON	Converter DC OUTPUT Switch	
	ESS MODE	VENT
	MISSION PROFILE	STATIC
	POWER MODE	EXT
	RIB FAN	
	NBC FAN	
	EXTERNAL HYDRAULIC PUMP	

Section III. OPERATOR MAINTENANCE PROCEDURES

3.10 GENERAL.

This section provides information on operator maintenance procedures. Remove/disassemble only to the extent necessary to remove or replace defective assemblies/components. Use standard maintenance shop practices/procedures.

3.11 LIGHTWEIGHT MULTIPURPOSE SHELTER (LMS).

3.11.1 Forward Light Box Assembly Lamp Replacement.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools/Test Equipment:

Screwdriver

Equipment Conditions:

System power OFF. ECV parking brake set. LTG/INTERCOM circuit breaker OFF and tagged.

Materials/Parts:

Two Halogen Lamps (57431) 2420 or equivalent
Incandescent Lamp (08803) 4593 or equivalent

a. Removal (Refer to figure 3-1)

(1) Turn lens and reflector (1) counterclockwise on task lamp (2) and remove lens and reflector (1). Remove O-ring (3). Do not discard O-ring.

(2) Pull halogen lamp (4) from task lamp (2).

(3) Pull lamp (5) and lamp retainer (6) from forward light box assembly (7).

(4) Tag wires and remove two screws (8) securing wires to lamp (5).

(5) Pull lamp (5) from lamp retainer (6).

b. Installation

(1) Install lamp (5) on lamp retainer (6).

(2) Secure wires to lamp (5) with two screws (8). Remove tags from wires.

(3) Install lamp (5) and lamp retainer (6) on forward light box assembly (7).

CAUTION

Use cloth when holding halogen lamp to prevent damage to lamp from skin contact.

(4) Insert halogen lamp (4) into task lamp (2).

(5) Install O-ring (3) on task lamp (2).

(6) Install lens and reflector (1) on task lamp (2) and turn clockwise to secure.

1. REFLECTOR
2. TASK LAMP
3. O-RING
4. HALOGEN LAMP
5. LAMP
6. LAMP RETAINER
7. FORWARD LIGHT BOX ASSEMBLY
8. SCREW

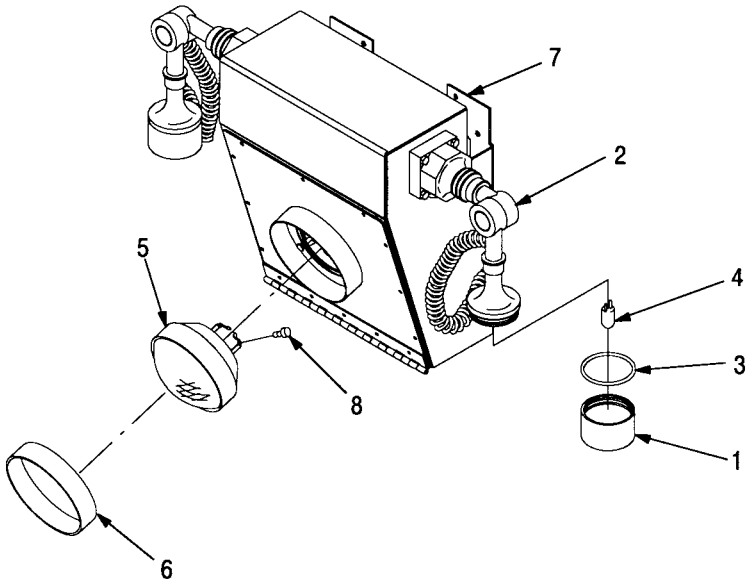


Figure 3-1. Forward Light Box Assembly Lamp Replacement

Follow-on maintenance: Turn on lamp and two task lamps to ensure lamps are working properly. Remove tag from LTG/INTERCOM circuit breaker.

3.11.2 Rear Light Box Assembly Lamp Replacement.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools/Test Equipment:

Screwdriver

Equipment Conditions:

System power OFF. ECV parking brake set.
LTG/INTERCOM circuit breaker OFF and tagged.

Materials/Parts:

Incandescent Lamp (08803) 4593 or equivalent

a. Removal

(1) Pull lamp (1) and lamp retainer (2) from light box (3).

(2) Tag wires and remove two screws (4) securing wires to lamp (1).

(3) Pull lamp (1) from lamp retainer (2).

b. Installation

(1) Install lamp (1) on lamp retainer (2).

(2) Secure wires to lamp (1) with two screws (4). Remove tags from wires.

(3) Install lamp (1) and lamp retainer (2) on light box (3).

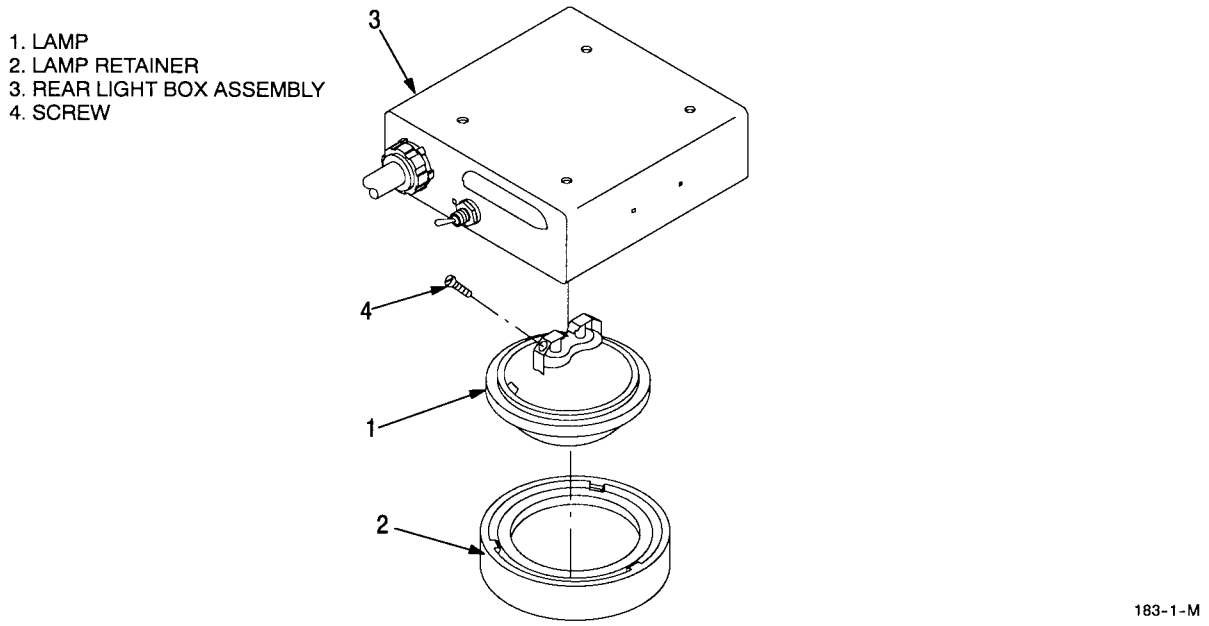


Figure 3-2. Rear Light Box Assembly Lamp Replacement

Follow-on maintenance: Turn on lamp to ensure lamp is working properly. Remove tag from LTG/INTERCOM circuit breaker.

3.11.3 Pushbutton Switch Assembly Lamp Replacement.

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Tools/Test Equipment:

Extraction Tool (Item 7, Appendix B, Section III)

Equipment Conditions:

System power OFF.
ECV parking brake set.

Materials/Parts:

Lamp (96906) MS3338-6839

CAUTION

Do not install indicator unit without all four lamps installed or short circuit will occur when power is applied.

Exercise care when pulling indicator unit from switch housing. Nylon lanyard attaching indicator unit to switch housing is not very long and easily broken.

a. Removal

(1) Using extraction tool, carefully squeeze tabs (1) and pry indicator unit (2) from switch housing (3).

(2) Using extraction tool, remove one to four lamps (4) from the back of the indicator unit (2).

b. Installation

(1) Using extraction tool, install one to four lamps (4) on the back of the indicator unit (2).

(2) Carefully squeeze tabs (1) and install indicator unit (2) into switch housing (3), ensuring that the aligning pin engages hole in switch housing (3).

1. TABS
2. INDICATOR UNIT
3. SWITCH HOUSING
4. LAMPS

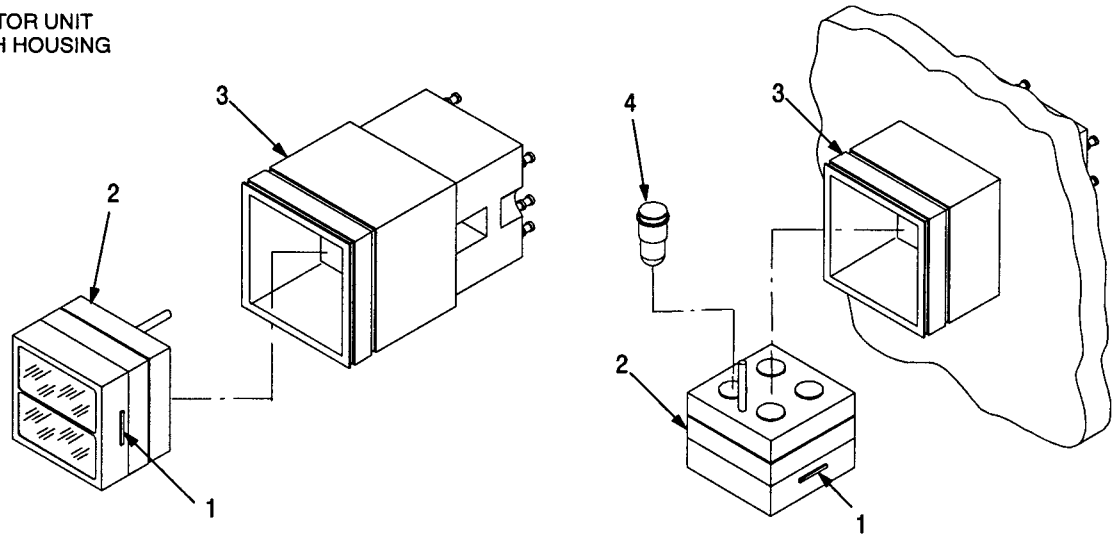


Figure 3-3. Pushbutton Switch Assembly Replacement

Follow-on maintenance: Turn on switch/indicator to ensure lamps are working properly.

3.12 ENVIRONMENTAL CONTROL UNIT (ECU).

3.12.1 ECU Work Platform Installation.

This task covers:

a. Installation b. Removal

INITIAL SETUP

Equipment Conditions:
ECV parking brake set.
ECV hood open.

Personnel: (2)

a. Installation
   (1) Lift work platform (1) up over ECV engine (2) with flat side up.
   (2) Align two slots (3) on work platform (1) with two lifting supports (4) on ECV (2).
   (3) Lower work platform (1) onto ledge under ECV windshield.

b. Removal
   (1) Lift work platform (1) off ECV engine (2).
   (2) Stow work platform (1) in appropriate place.
   (3) Close ECV hood.

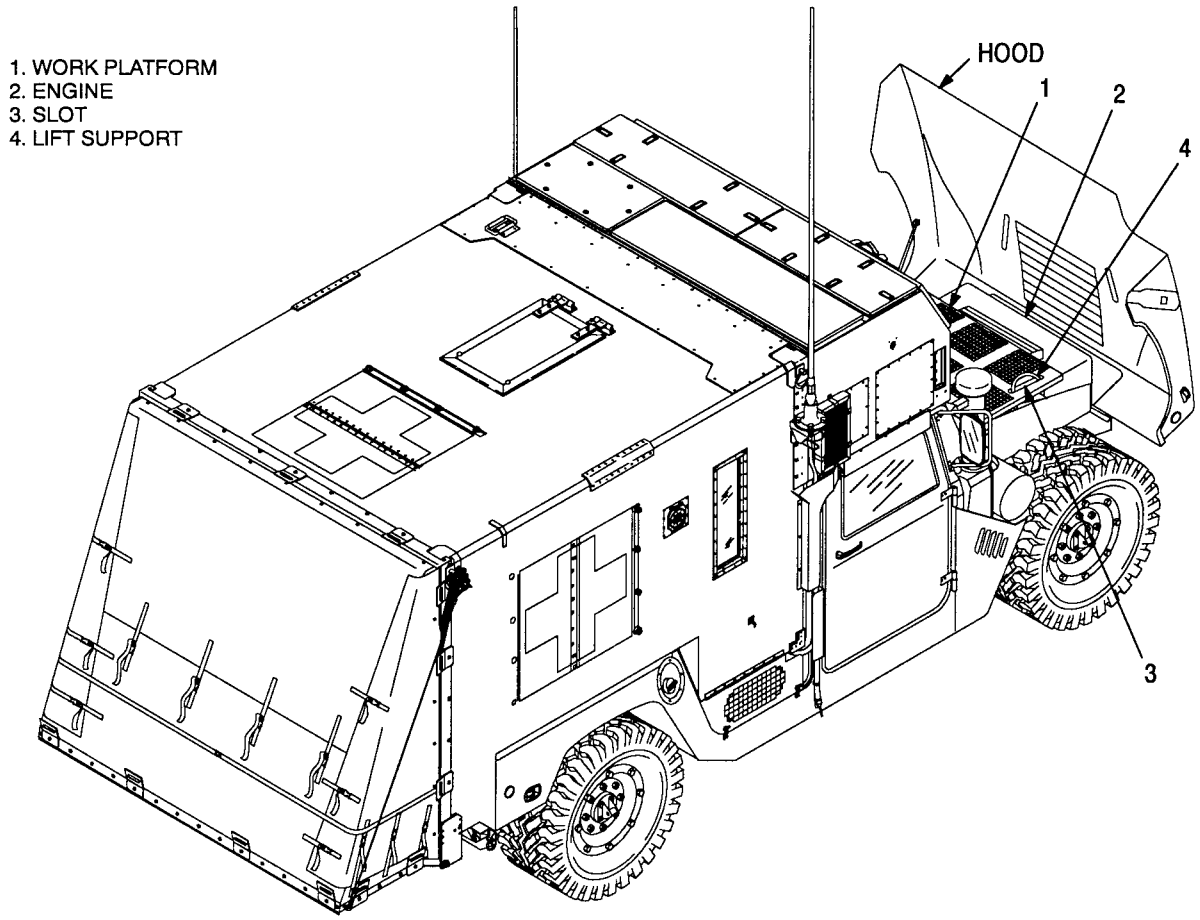


Figure 3-4. ECU Work Platform Installation

3.12.2 Filter Cleaning.

This task covers:	
a. Removal	b. Installation

INITIAL SETUP

Tools/Test Equipment:	Equipment Conditions:
Shop Equipment, Automotive Maintenance and Repair	ECV parking brake set. ECU work platform installed (see para 3.12.1).

a. Removal

(1) Turn six allen screws (1) and remove driver side rear cover assembly (2) from ECU (3).

(2) Turn three screw heads (4) 90° and open hinged access door (5).

(3) Slide filter (6) out of ECU (3). Wash filter (6) with water.

(4) Release ten screws (7) and remove prefilter cover assembly (8) from passenger side of ECU (3).

(5) Slide filter (9) out of ECU (3). Wash filter (9) with water.

b. Installation

NOTE

Note direction of airflow arrow on filter when installing.

(1) Align filter (9) between rails and slide into ECU (3).

(2) Position cover assembly (8) and secure to passenger side of ECU (3) with ten screws (7).

(3) Align filter (6) in between rails and slide into ECU (3).

(4) Close hinged access door (5) and turn three screw heads (4) 90° to secure.

(5) Position driver side rear cover assembly (2) on ECU (3) and turn six allen screws (1) to secure.

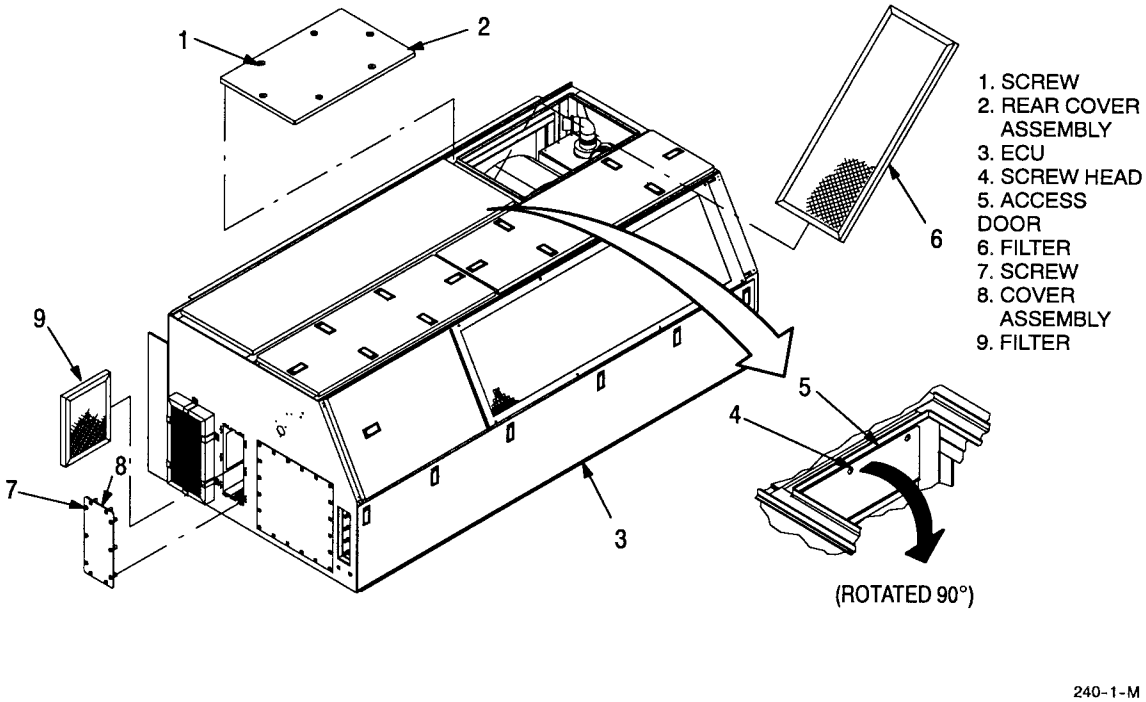


Figure 3-5. Filter Replacement

3.12.3 Drain Hydraulic Overflow Container.

This task covers:

a. Drain

INITIAL SETUP

Materials/Parts:

Drain Pan (Appendix C)
Wiping Rags (Item 7, Appendix D)

a. Drain

(1) Place drain pan (1) on driver side of ECV below drain hose (2).

(2) Open access panel (3).

(3) Open drain valve (4) and let fluid flow into drain pan(1).

(4) When fluid stops flowing, shut drain valve (4).

(5) Clean any spillage with rags, close access panel (3), and dispose of fluid properly.

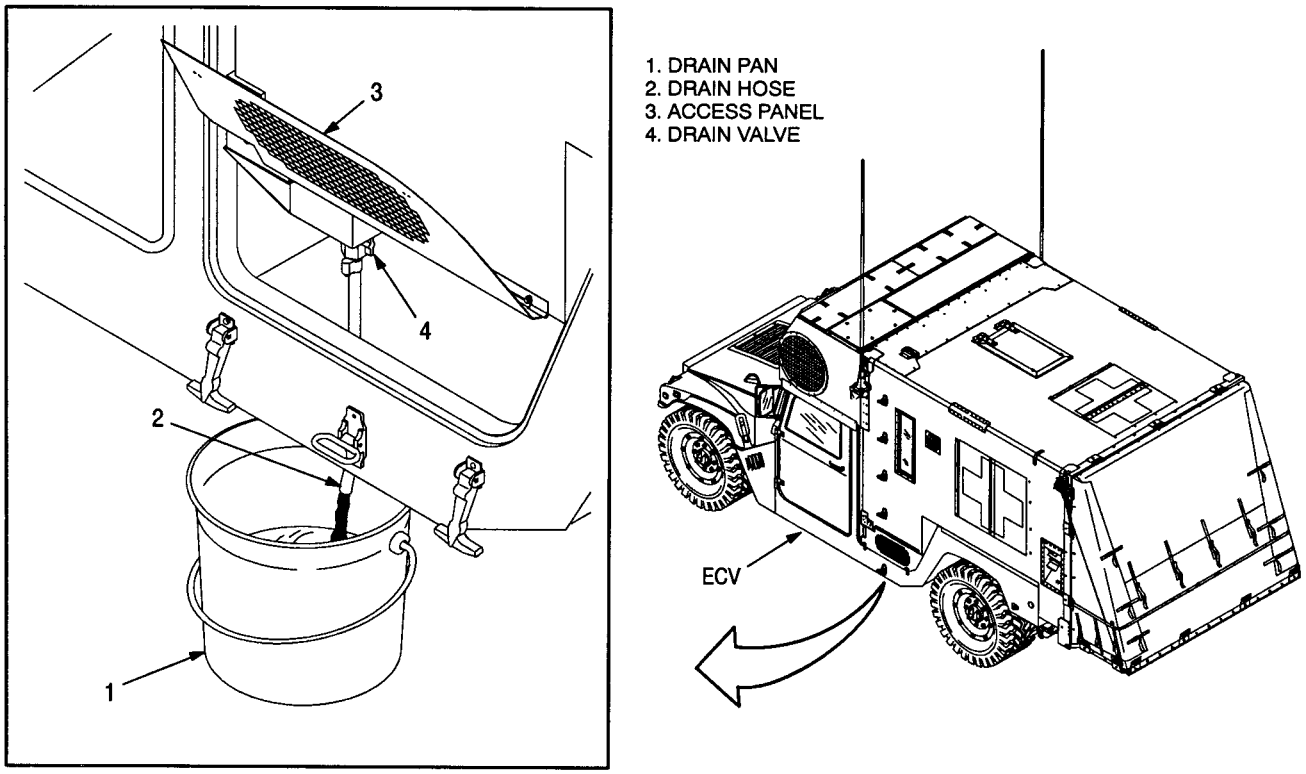


Figure 3-6. Drain Hydraulic Overflow Container

3.12.4 Fill Hydraulic Reservoir.

This task covers:

a. Fill

INITIAL SETUP

Tools/Test Equipment:	Equipment Conditions:
Funnel	System power off. Power panel and rear control panel tagged.
Materials/Parts:	ECV parking brake set.
Hydraulic Fluid (Item 4, Appendix D)	ECU work platform installed (see para 3.12.1).
Wiping Rags (Item 7, Appendix D)	

a. Fill

(1) Release latch (1) and open panel (2).

(2) Inspect fluid level on gage (3).

(3) Release six latches (4) and remove front top passenger side ECU cover (5).

(4) Unscrew and remove filler cap (6) from hydraulic reservoir (8).

(5) Rotate filter element (7) counterclockwise and remove from hydraulic reservoir (8).

CAUTION

Do not mix or substitute any other hydraulic fluid with MIL-H-5606.

NOTE

When filling the hydraulic reservoir, do not fill past the appropriate mark: COLD when system has not been running or has been running for less than 20 minutes; HOT when system has been running for more than 20 minutes. If hydraulic fluid is past the COLD mark when system has not been running, hydraulic fluid can overflow through the hydraulic reservoir filler cap.

When required, add just enough fluid to reach the mid-point on the gage. Start the system and let it reach operating temperature, then shut it off and check again. At 0°F and above, fluid can be checked before starting.

(6) Add hydraulic fluid per note above.

3.12.4 Fill Hydraulic Reservoir - Continued.

(7) Rotate filter element (7) clockwise. Make sure filter element (7) is fully seated.

(8) Install cap (6) onto hydraulic reservoir (8).

(9) Install front top passenger side ECU cover (5) and engage six latches to secure (4).

(10) Close panel (2) and engage latch (1).

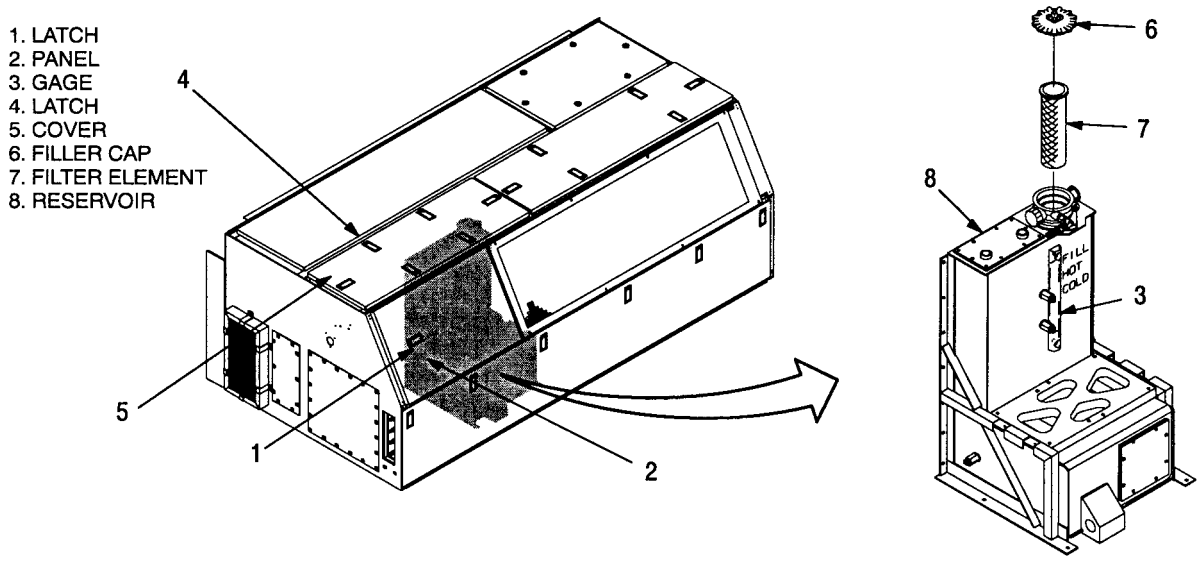


Figure 3-7. Fill Hydraulic Reservoir

3.12.5 NBC Filter Replacement.

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Tools/Test Equipment:	Equipment Conditions:
7/16 Inch Socket (Item 6, Appendix B, Section III) Socket Wrench Handle (Item 5, Appendix B, Section III) 6 Inch Extension (Item 3, Appendix B, Section III)	Power shut off, power panel and rear control panel tagged. ECV parking brake set. ECU work platform installed (see para 3.12.1). Air intake cover removed (TM 9-2320-387-10).
Materials/Parts:	References:
Three NBC Filters (81361) 5-19-7435 Nine Lockwashers (96906) MS35338-139	TM 9-2320-387-10

WARNING

To prevent death or injury to personnel from contamination, wear full MOPP gear when handling contaminated NBC filter. Dispose of NBC filter in accordance with NBC guidelines (refer to FM 3-11.5).

a. Removal (Refer to Figure 3-8)

NOTE

Ensure weather cap on air intake duct is removed before replacing NBC filters. Make note of where the cap is positioned. If cap is pushed to far on to the air intake duct, airflow will be restricted and will cause problems starting ECU.

(1) Release latches and open bottom front door assembly on ECU.

(2) Using 7/16 inch deep well socket (Item 8, Appendix B), remove seven nuts (1), seven lockwashers (2) and seven flat washers (3) securing plenum (4) to seven rods (5). Discard seven lockwashers (2).

(3) Remove two nuts (6), two lockwashers (7) and two flat washers (8) securing plenum (4) to two rods (9). Discard two lockwashers (7).

(4) Remove plenum (4) from seven rods (5) and two rods (9).

WARNING

NBC filter weighs 30 pounds. To prevent injury to personnel, use proper lifting techniques when handling NBC filter.

(5) Slide three NBC filters (10) from three channels in ECU (11).

(6) Dispose of three NBC filters (10) in accordance with NBC guidelines per FM 3-11.5.

3.13 AIR BEAM SHELTER (ABS).

3.13.1 Fabric Repair.

This task covers:

a. Repairs of small cuts under one inch in length, pin holes, and tears using Teflon seam repair tape

b. Repairs of cuts, rips, tears and abrasions over one inch in length using fabric

INITIAL SETUP

Tools/Test Equipment:

ABS Repair Kit (Item 6, Appendix B, Section II)

Materials/Parts:

Isopropyl Alcohol (Item 1, Appendix D)
Wiping Rags (Item 7, Appendix D)
Duct Tape (Item 8, Appendix D)

Equipment Conditions:

ABS deployed.

WARNING

Tacking and sealing irons operate at high temperatures. Use care to prevent injury to personnel. Severe burns may occur if sealing and tacking irons are touched.
Heat seal repairs may produce toxic fumes. To prevent injury to personnel, use in well ventilated area.

CAUTION

Do not place tacking and sealing irons on ABS surfaces. Surfaces will melt.

NOTE

Repairs are made using fabric patches or repair tape over the damaged area.
For temporary repairs, duct tape can be used on small cuts and pin holes until damaged area can be repaired with a heat welded patch.
Small cuts under one inch in length, pin holes and tears can be repaired by heat welding a patch over the damaged area. Larger or irregular tears will require sewing before heat welding the patch over the damaged area.

ABS repair kit contains all the tools and materials required to repair the ABS.

a. Repairs of small cuts under one inch in length, pin holes and tears using Teflon seam repair tape (Refer to Figure 3-9).
   (1) Place tacking and sealing irons (1 and 2) on insulation block (3). Plug in and allow to heat up for twenty minutes. Adjust sealing iron to maximum temperature.

WARNING

Alcohol solvents are flammable and give off harmful vapors. Use solvents sparingly and only in well ventilated area. Avoid prolonged breathing of vapors. Keep away from heat, sparks, open flames.

   (2) Clean the damaged area with rag dampened with alcohol. Allow area ample time to dry so that surface is not wet when repair tape (4) is applied.
   (3) Patch size is a function of the size and shape of damaged area. Round corners of patch. Repair tape (4) should be overlapped as required to cover damaged area. Repair tape (4) should extend at least one inch past damaged area in all directions.
   (4) Cut a piece of FEP plastic sheet to size of patch.

3.13.1 Fabric Repair - Continued.

NOTE

The sealing block provides a flat surface to work against and insulates the area to minimize heat escape during the sealing process.

(5) Place sealing block (5) behind damaged fabric area.
(6) Position FEP plastic sheet over damaged area and place repair tape over plastic sheet.
(7) Use tacking iron (1) to tack repair tape (4) in place. Hold tacking iron (1) to repair tape (4) for five seconds or until temporarily secured to the fabric.
(8) Keep sealing block (5) behind damaged fabric. Place a piece of silicon paper (6) over repair tape (4) to prevent staining of fabric. Hold sealing iron (2) against area to be repaired for one minute. Use timer (7) included with repair kit.
(9) Remove sealing iron and press cooling block (8) against hot repaired area for ten to fifteen seconds to draw out heat.

b. Repairs of cuts, rips, tears and abrasions over one inch in length with fabric (Refer to Figure 3-9).

(1) Place tacking and sealing irons (1 and 2) on insulation block (3). Plug in and allow to heat up for twenty minutes.
(2) On larger or irregular tears, first sew the opening closed using thread (9) and needles (10). Stitch opening closed, maintaining a minimum distance of 0.25 inch from damaged area and securely tying off thread (9) at each end of tear.

WARNING

Alcohol solvents are flammable and give off harmful vapors. Use solvents sparingly and only in well ventilated area. Avoid prolonged breathing of vapors. Keep away from heat, sparks, open flames.

(3) Clean damaged area using a rag dampened with alcohol. Allow area ample time to dry so the surface is not wet when repair patch (11) is applied.
(4) Patch size is a function of the size and shape of damaged area. Select a suitable size patch (11) or cut a patch (11) of size and shape required. Round off all exposed edges of patch (11) to prevent lifting.
(5) Cut a piece of FEP plastic sheet to size of patch.

NOTE

The sealing block provides a flat surface to work against and insulates the area to minimize heat escape during the sealing process.

(6) Place sealing block (5) behind damaged fabric area.
(7) Position FEP plastic sheet over damaged area and place patch over plastic sheet.

WARNING

Tacking and sealing irons operate at high temperatures. Use care to prevent injury to personnel. Severe burns may occur if sealing and tacking irons are touched.

Heat seal repairs may produce toxic fumes. To prevent injury to personnel, use in well ventilated area.

(8) Using tacking iron (1), tack patch (11) in place by holding tacking iron (1) to patch (11) for five seconds or until patch (11) is temporarily secured to fabric.
(9) With sealing block (5) still behind damaged fabric, place a piece of silicon paper (6) over patch (11) to prevent staining of fabric. Hold sealing iron (2) against area to be repaired for three minutes (use the timer (7) included with ABS repair kit).

3.12.5 NBC Filter Replacement - Continued.

b. Installation (Refer to Figure 3-8)

WARNING

NBC filter weighs 30 pounds. To prevent injury to personnel, use proper lifting techniques when handling NBC filter.

(1) Slide three new NBC filters (10) into three channels in ECU (11) so they each sit on the lower frame and are aligned with the openings on the plenum (4). Note direction of flow arrow.

(2) Install plenum (4) on seven rods (5) and two rods (9).

(3) Secure plenum (4) to two rods (9) with two nuts (6), two new lockwashers (7) and two flat washers (8).

(4) Secure plenum (4) to seven rods (5) with seven nuts (1), seven new lockwashers (2) and seven flat washers (3).

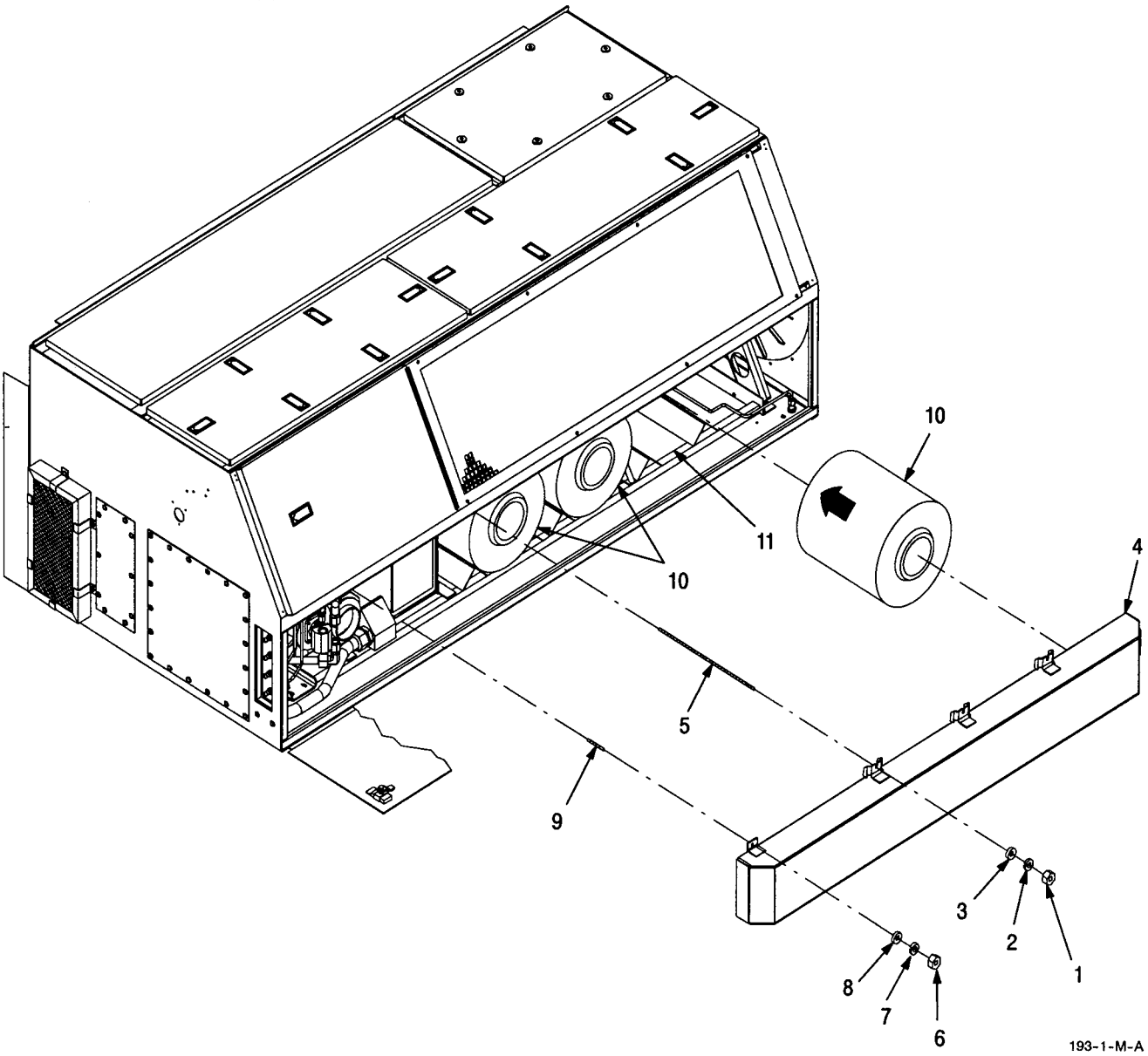


Figure 3-8. NBC Filter Replacement

(10) Remove sealing iron (2) and press cooling block (8) against hot patch area for ten to fifteen seconds to draw out heat.

(11) Repeat sealing process, as required, until entire patch (11) has been sealed in place. Ensure that all outside edges and corners have been totally sealed.

(12) After repaired area has cooled, check all edges and corners to ensure that patch (11) is bonded securely. If any edges or corners are loose, repeat sealing process.

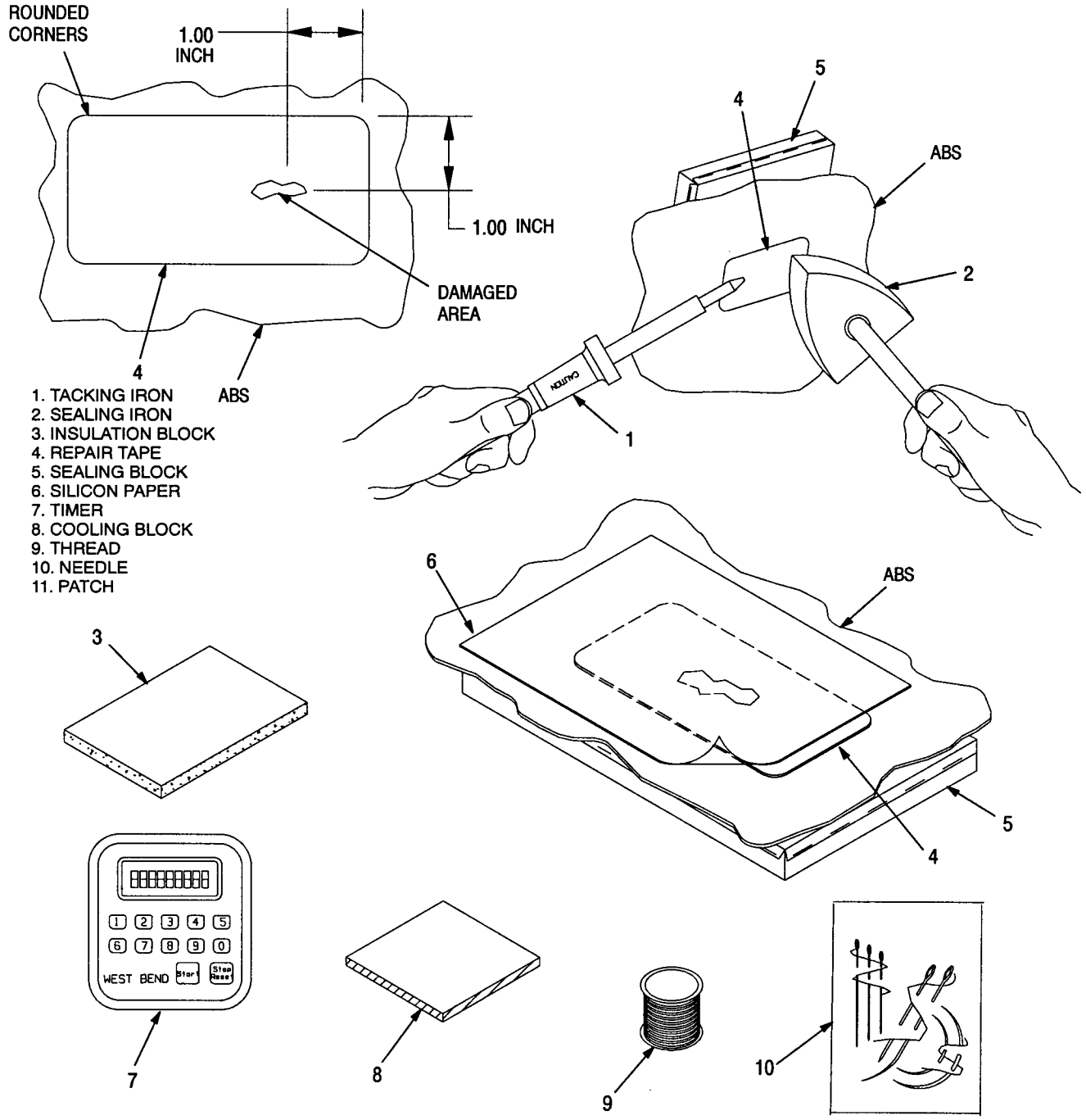


Figure 3-9. Fabric Repair (Sheet 1 of 2)

3.13.1 Fabric Repair - Continued.

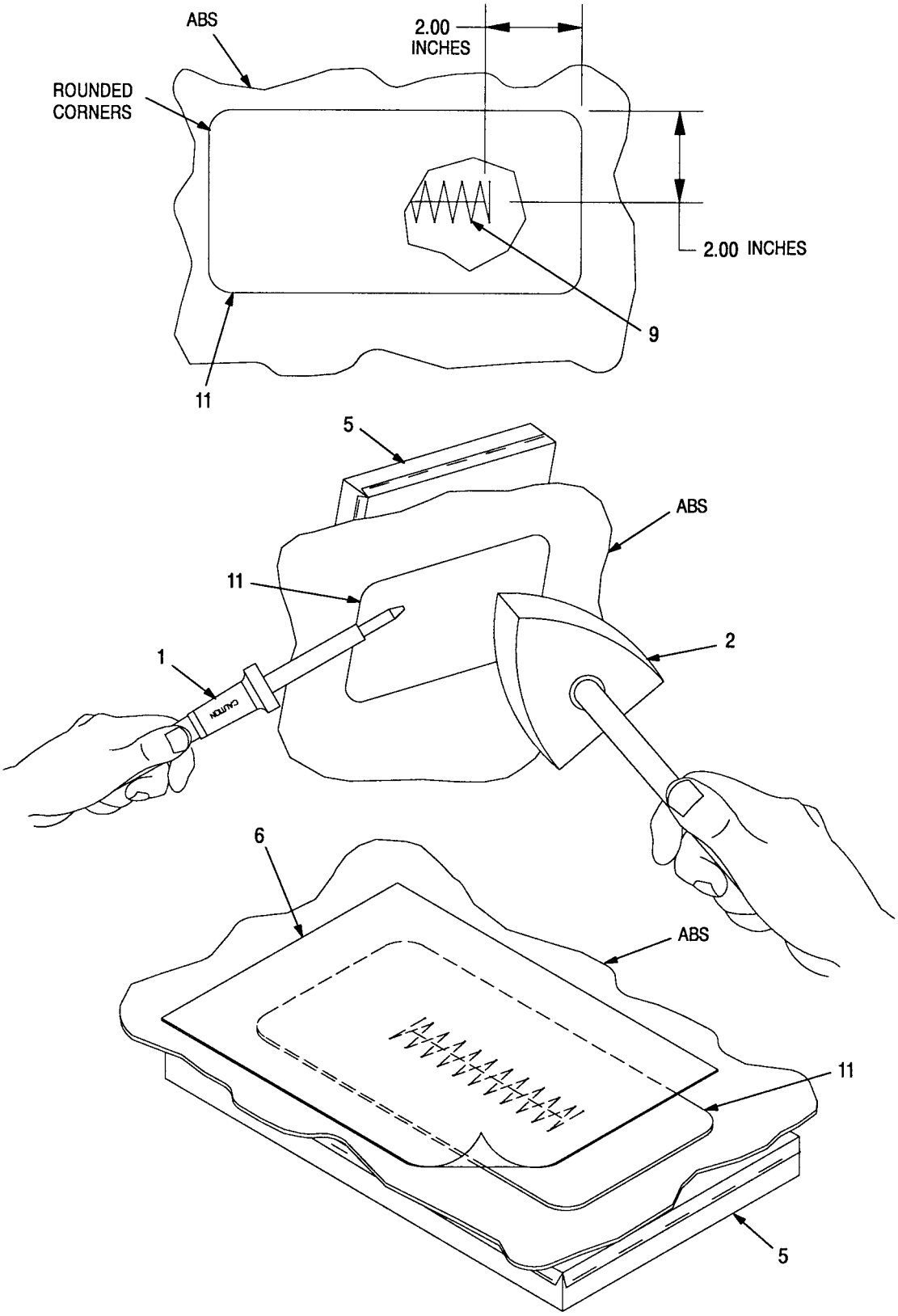


Figure 3-9. Fabric Repair (Sheet 2 of 2)

3.13.2 ABS Line Replacement.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools/Test Equipment:	Equipment Conditions:
ABS Repair Kit (Item 6, Appendix B, Section II)	ABS deployed, inflated or deflated.
Materials/Parts:	
Spare Parts Kit (Item 38, Appendix B, Section II)	

a. Removal (Refer to Figure 3-10)

(1) Untie or cut ABS line (1) from Dee Ring (2) on ABS (3).

(2) Pull ABS line (1) through holes on line slip (4). Discard ABS line (1).

b. Installation (Refer to Figure 3-10)

(1) Cut new ABS line (1) to proper length.

(2) Thread working end (5) of ABS line (1) through holes on line slip (4).

NOTE

ABS line is secured to line slip with figure eight knot.

(3) Hold working end (5) of ABS line (1) in one hand.

(4) Make crossing turn (6), bringing working end (5) of ABS line (1) over standing part (7).

(5) Take working end (5) behind standing part (7).

(6) Bring working end (5) to front of knot.

(7) Pass working end (5) through crossing turn (6). Pull tight.

(8) Thread other working end (8) of ABS line (1) through Dee Ring (2) on ABS (3).

(9) Pull approximately one and one half feet through Dee Ring (2).

NOTE

ABS line is secured to Dee Ring with bowline knot.

(10) Make crossing turn (9), bringing working end (8) of ABS line (1) over standing part (10). Hold crossing turn (9) in place with one hand.

(11) Pass working end (8) through back of crossing turn (9). Leave loop (11) in working end (8) to form final loop (11) of knot.

(12) Take working end (8) behind standing part (10).

(13) Pass working end (8) up through front of crossing turn (9).

(14) Pull on standing part (10) and on doubled working end (8) to tighten knot.

3.13.2 ABS Line Replacement - Continued.

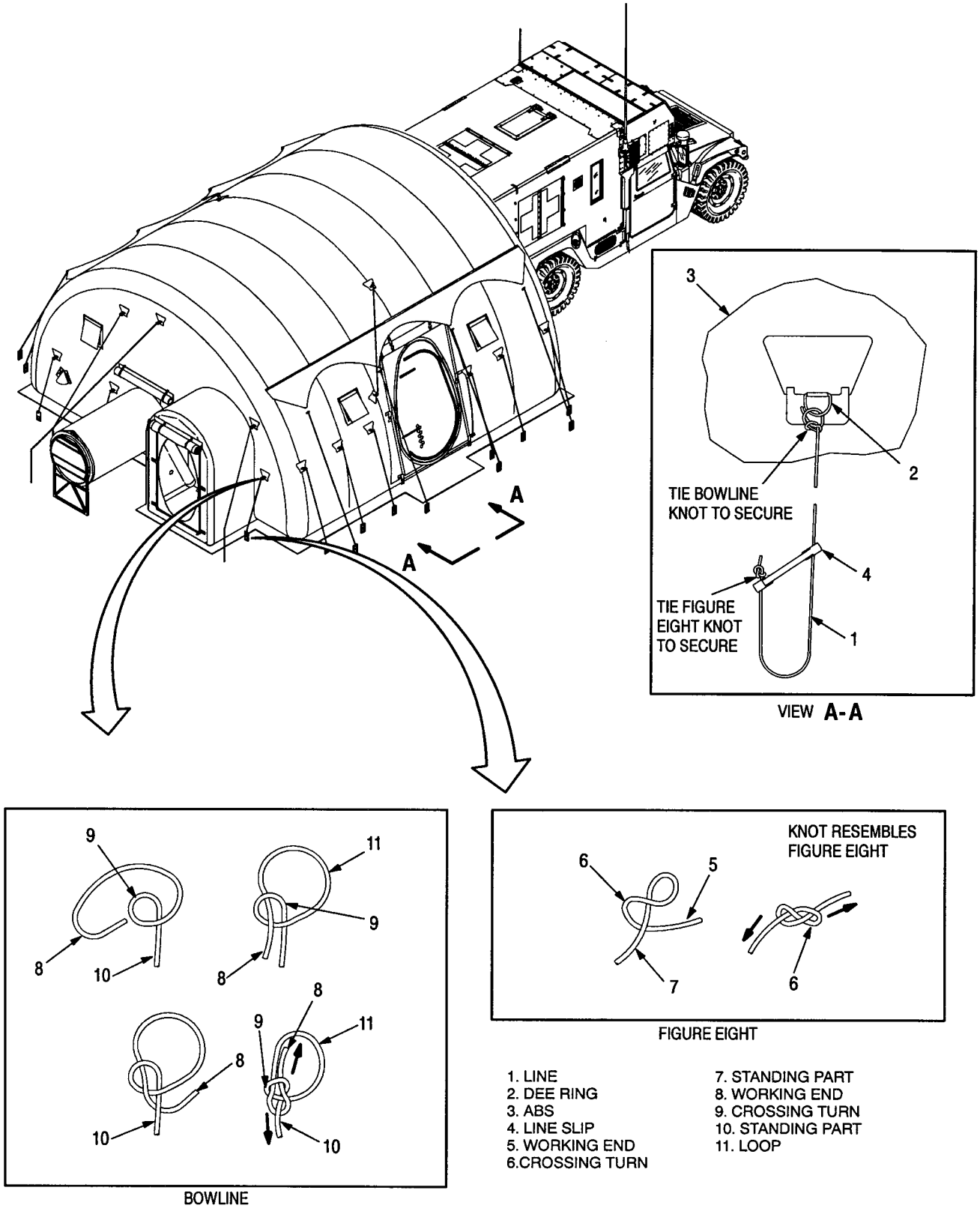


Figure 3-10. ABS Line Replacement

3.13.3 ABS Light Fuse Replacement.

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Materials/Parts:

Fuse (81349) MIL-F-15160/2

Equipment Conditions:

ABS light disconnected from extension cords and removed from ceiling straps.

a. Removal

(1) Push in and turn fuse holder cap (1) counterclockwise and remove fuse holder cap with fuse (2) from fuse holder (3).

(2) Remove fuse (2) from fuse holder cap (1).

CAUTION

Do not pry on glass body of fuse to remove. Prying could break glass body of fuse.

(3) Remove spare fuse (4) from end cap (5) on opposite end of light assembly (6).

b. Installation

(1) Install spare fuse (4) in fuse holder cap (1).

(2) Install fuse holder cap (1) in fuse holder (3) by pushing in and turning fuse holder cap clockwise.

(3) Install a replacement fuse as a spare fuse (4) in the end cap (5).

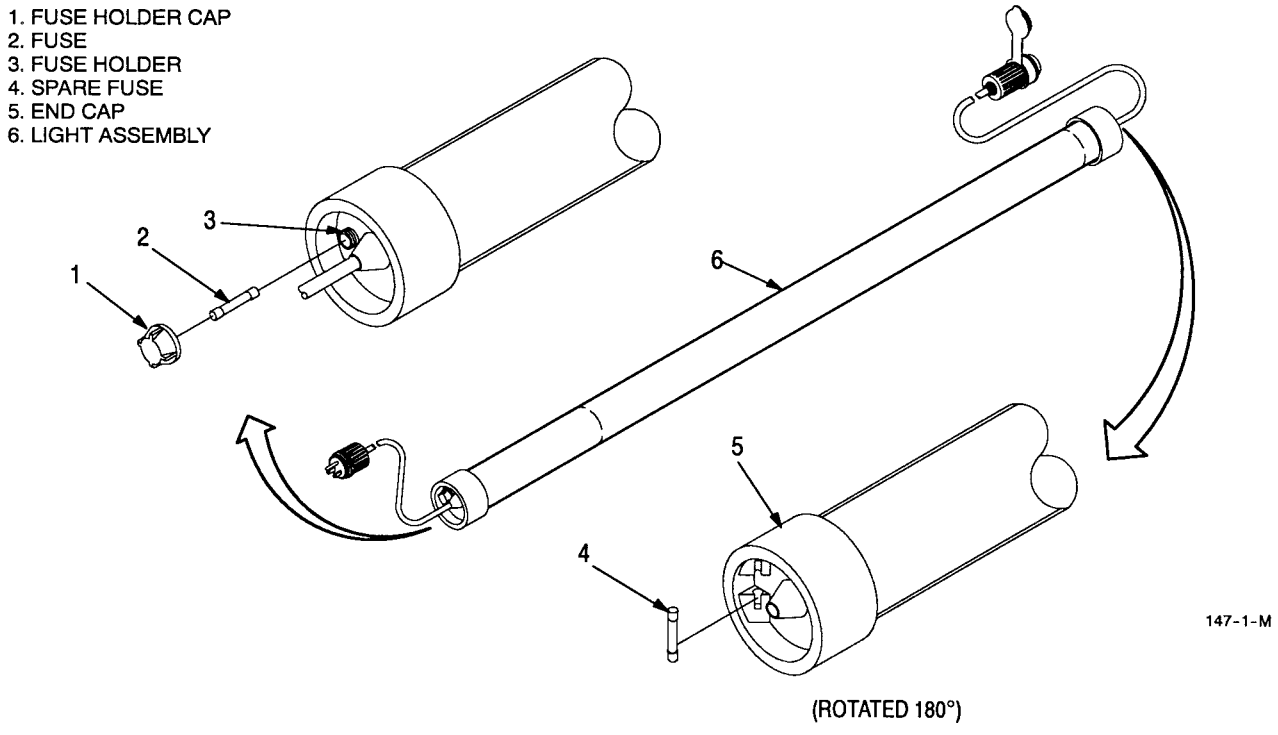


Figure 3-11. ABS Light Fuse Replacement

3.13.4 ABS Light Lamp Replacement.

This task covers:	
a. Removal	b. Installation
INITIAL SETUP	
Materials/Parts:	Equipment Conditions:
Lamp (81348) W-L-00116/28A	ABS light disconnected from extension cords and removed from ceiling straps.

a. Removal

(1) Remove end cap (1) from light assembly (2).

(2) Depress retainer connector (3) and pull lamp holder (4) from lamp (5).

(3) Remove lamp (5) from light assembly (2).

b. Installation

(1) Install lamp (5) in light assembly (2) through retainer clips (6), keeping the connector pins (7) in a vertical position.

(2) Install lamp holder (4) on lamp (5).

(3) Install end cap (1) on light assembly (2).

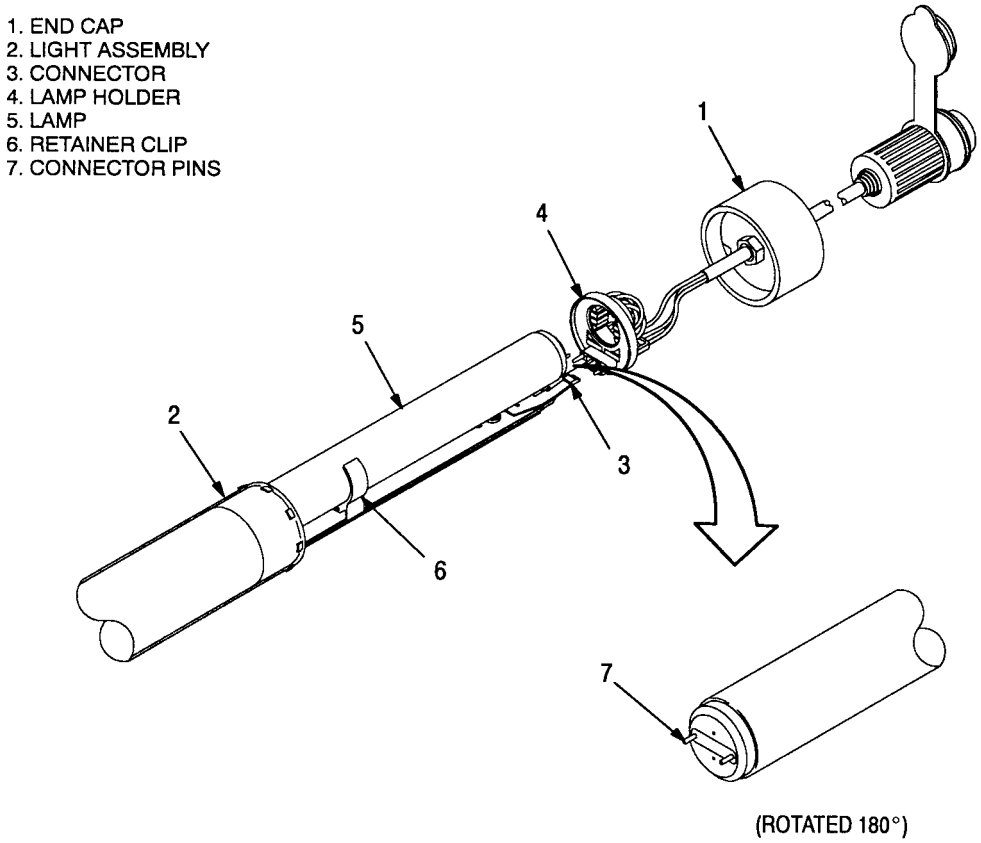


Figure 3-12. ABS Light Lamp Replacement

CHAPTER 4

ENTRY AND EXIT PROCEDURES FOR THE CBPS

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Section I. GENERAL INFORMATION

4.1 SCOPE.

a. The equipment and supply procedures should be followed in case of chemical, biological or radioactive contamination. These procedures will allow anyone to enter the Chemical Biological Protective Shelter (CBPS) System safely.

b. All non-monitoring procedures to be followed are the same regardless of the contamination. Separate monitoring equipment is required to check for each type of contamination. A Chemical Agent Monitor (CAM) or Improved Chemical Agent Monitor (ICAM) will check for chemical contamination and an available radiac will check for radiation. There is no equipment to monitor biological agents.

4.2 GENERAL.

To keep the inside of the CBPS free of contamination, the entries of personnel and equipment must be strictly controlled. The following procedures must be observed to prevent contaminating the interior of the CBPS when contamination is present outside the shelter or when casualties are brought in from a contaminated area.

a. Patients must be decontaminated before entering the CBPS per FM 4-02.4 and FM 4-02.7.

4.2 GENERAL - Continued.

b. Ambulatory patients not requiring assistance will enter through the ambulatory airlock. All other patients will be placed on a litter to enter the CBPS.

c. All personnel, equipment or supplies will be monitored by the CAM/ICAM before entering the CBPS.

d. Personnel and equipment entering the CBPS will be restricted. Communicating with someone outside the CBPS may be accomplished by passing messages through the airlock or using field radios or telephones.

e. Only mission essential equipment is allowed inside the CBPS. All contaminated equipment must be decontaminated before entering. Not all materials can be decontaminated. Items such as blankets or textiles absorb vapors from the air and can not be decontaminated easily. Do not take them into the CBPS if they have been directly exposed to contaminants.

f. When entering the litter airlock, always allow three minutes dwell time for getting rid of contaminants. Allow three minutes in the ambulatory airlock. If the outer airlock door is opened during this purging period, the dwell time must start over from the beginning.

g. Litters in the decontamination area are either 'clean' or 'dirty'. Dirty litters carry patients to the decontamination station. They are also used to transfer patients in a litter exchange. Only litters that can be decontaminated will carry patients into the CBPS. Litter status is determined by CAM/ICAM monitoring.

Section II. EQUIPMENT AND SUPPLIES

Equipment for the decontamination process is listed in FM 4-02.4 and FM 4-02.7. Special items required for entry into the CBPS are as follows:

4.3 DECONTAMINABLE LITTERS (NSN 6530-01-290-9964).

Decontaminable litters are made of a non-absorptive mesh material. If a patient arrives on a canvas litter, they must be transferred to a decontaminable litter. After decontamination, these litters are used to carry patients into the CBPS. Mark clean litters with a ring of red tape on the handle.

4.4 CHEMICAL AGENT MONITOR (CAM) (NSN 6665-01-199-4153)/Improved Chemical Agent Monitor (ICAM) (NSN 6665-01-357-8502).

A CAM/ICAM is used in the CBPS airlocks to monitor personnel, equipment and supplies for contamination. It is not used outside the decontamination area to detect clean or contaminated patients. Only the M8 detector paper is used outside the CBPS.

4.5 M8 DETECTOR PAPER (NSN 6665-00-050-8529).

M8 detector paper is used to determine if there is liquid chemical agent on ambulatory patients before they enter the CBPS.

4.6 CHLORINE SOLUTION.

A container of 0.5% chlorine solution and sponges are used inside the CBPS for decontaminating any areas found during CAM/ICAM monitoring that require further decontamination. General purpose detergent (NSN 7930-00-282-9699) is added to the solution (0.5% by weight).

4.7 M1A1 WATERPROOFING BAGS (NSN 4240-00-803-5839).

M1A1 waterproofing bags store patients' masks that have been removed inside the airlocks or CBPS. Trash bags can be used to contain masks if the M1A1 bags are not available.

4.8 LARGE PLASTIC BAGS.

These trash bags are used to contain and/or dispose of garments and other discarded supplies during entry or exit. A supply must be available in the Air Beam Shelter (ABS) and the ambulatory airlock.

4.9 DUCT TAPE.

Duct tape is used for sealing the bags of waste and clothing removed during entry processing. It is also used to mark the clean litters and to differentiate between pails of 5% and 0.5% chlorine solutions.

4.10 PROTECTIVE PATIENT WRAPS (NSN 8465-01-079-9875).

This wrap is used for protection of patients when they leave the CBPS after treatment.

Section III. ENTRY AND EXIT PROCEDURES

4.11 LITTER PATIENT ENTRY PROCEDURES.

Each litter patient is decontaminated per FM 4-02.4 and FM 4-02.7 and is placed in the tunnel airlock for a three-minute purging period. The timer on the airlock is set as the patient is placed in the airlock. The patient is removed from the inside airlock once the timer indicates the three-minute period has elapsed and the CAM/ICAMmonitoring, as described below, is completed.

4.12 AMBULATORY ENTRY PROCEDURES.

The first step in this procedure is to use M8 detector paper to determine if there is liquid contamination on the soldier's outer garments, over boots or Nuclear, Biological and Chemical (NBC) gloves. If no liquid is detected, the soldier enters the airlock in Mission Oriented Protective Posture (MOPP) gear. The soldier removes all protective over garments in the airlock before proceeding into the CBPS. If the M8 detector paper shows there is liquid agent present, the soldier removes outer garments, over boots and gloves outside the airlock door per FM 3-11.4. The soldier then enters the airlock wearing the mask and hood. The steps in this process are as follows:

4.12.1 Chemical Detection.

Use M8 detector paper to determine whether there is liquid agent on the outer clothing surfaces. Check the following items in order:

a. Sides and soles of over boots.

b. Pant legs of over garment.

c. Gloves.

d. Shoulders and top of hood.

e. Any part of clothing that has been in contact with the ground or vegetation.

f. Any areas of clothing that appear wet.

4.12.2 Enter the Airlock.

If no liquid agent is detected, enter the airlock. Set timer for minimum of three minutes. If outer door is opened during this purging, the dwell time must start over.

4.12.3 Remove MOPP Gear.

If liquid agent is detected, remove over garments, over boots and gloves outside the airlock per FM 3-11.4 and discard them. Then enter the airlock. If CAM/ICAM monitoring reveals that the second layer of clothing has been contaminated during entry, remove the clothing.

4.12.4 Remove Bags from Airlock.

Remove bagged clothing left in the airlock during the previous entry. Close the door and set the airlock timer.

4.12.5 Remove Outer Clothing in Airlock.

Remove over garment jacket, over garment trousers and over boots in order. Place them in a plastic trash bag.

4.12 AMBULATORY ENTRY PROCEDURES - Continued.

4.12.6 Seal Clothing in Bag.

Once all over garments are placed in a trash bag, seal it with tape. Mark your name on the bag for reuse of the clothing later. Leave the bag in the airlock. The next person entering will remove it from the airlock.

4.12.7 CAM/ICAM Check and Unmasking.

The CAM/ICAM operator in the CBPS first checks the airlock to see that the purging is complete and that the soldier has no agent vapor on his/her clothing. The soldier's mask is removed and placed in the M1A1 waterproofing bag. The bag is sealed with a rubber band and taken into the CBPS. The gloves are left on the airlock floor for reuse on exiting.

4.12.8 Exiting Airlocks.

Patients, non-patients, or equipment exiting the CBPS through either the TALP or Ambulatory airlock can do so without waiting any length of time after the inside door is secured. Prior to the next entry into the airlock of patients, non-patients, or equipment exiting the CBPS there has to be a three-minute purge time. Check airlock with CAM/ICAM before opening airlock again.

Section IV. MONITORING PROCEDURES WITH CAM/ICAM

4.13 GENERAL PROCEDURES OF MONITORING.

a. One soldier on the team inside the CBPS will be designated as the CAM/ICAM operator. This soldier will be trained in the CAM/ICAM operating and monitoring procedures.

b. The CAM/ICAM should be turned on as soon as it is known that chemically contaminated patients are to be received. It must be warmed up, preferably for 30 minutes, and be cleared and confidence-tested before it can be used for monitoring. Refer to TM 3-6665-331-10 or TM 3-6665-343-10 for operating instructions.

c. Confidence checks are performed in both the G and H modes. A confidence check is also performed after monitoring each patient.

d. In monitoring, place the CAM/ICAM inlet about 1/2 inch from the surface being monitored. The greater the distance, the less likely the CAM/ICAM is to respond to the contamination.

e. As soon as any bar readings appear, pull the CAM/ICAM away and/or put on its cap.

f. Monitor the areas that would most likely be contaminated first: The hair; near wounds where the garment was broken; at the neck, ankles and waist.

g. If contamination is found, stop monitoring and note the general location. Use the 0.5% chlorine solution (with soap) for spot decontamination of skin or hair.

h. Replace the black cap on the CAM/ICAM nozzle between patients, even though the display may be showing no bars.

i. Before switching modes or turning off the CAM/ICAM, always clear it by putting on the inlet cover and waiting for a zero bar reading in both modes.

4.14 MONITORING LITTER PATIENTS IN TUNNEL AIRLOCK.

a. The CAM/ICAM operator in the CBPS will open the inner airlock door just enough to extend the CAM/ICAM to the head of the litter patient. The operator holds the CAM/ICAM tip within 1/2 inch of the patient's hair for ten seconds, then withdraws it, closes the door, and reads the display. If there is no indication of agent, the operator switches to the second mode and takes a second reading at the patient's head.

b. If the CAM/ICAM shows a positive reading, the operator keeps the airlock door closed and allows the airlock to purge for an additional three minutes. Then the operator checks the airlock again.

c. If there is no indication of agent, the patient's mask is removed and sealed in an M1A1 waterproofing bag. The patient is then brought into the CBPS. As the patient is being removed from the inside airlock, another ten-second CAM/ICAM check is made around the wound.

d. Any time during the CAM/ICAM check, a positive reading indicates the patient must wait longer in the airlock. However, the physician determines whether to put on masks and bring the patient into the CBPS or to wait for more purging.

4.15 MONITORING AMBULATORY PATIENTS IN AIRLOCK.

a. The operator in the CBPS performs the first part of the CAM/ICAM check while the soldier is in the airlock. The operator extends the CAM/ICAM in the airlock to within 1/2 inch of the soldier's clothing. He holds it there through a count of ten seconds, then withdraws it and reads the display. The operator then switches to the second mode and repeats the process. This airlock check can be done at any time before the soldier unmasks in the airlock.

b. If the reading is zero bars in both G and H modes, the airlock purge period can be halted without waiting the full duration. If the CAM/ICAM detects contamination in the airlock, the person will be directed to wait the full five minutes.

c. If after five minutes, the CAM/ICAM is still reading more than zero bars, the operator will tell the entering soldier either to wait another five minutes in the airlock or to remove his fatigue clothing and combat boots, place them in a trash bag, mark the bag, and leave the bag in the airlock.

d. If the CAM/ICAM response is negative, the soldier will then remove his mask, bag it, and enter the ABS.

e. As soon as the soldier steps into the CBPS, the CAM/ICAM operator will again check for absorbed vapors on the clothing and hair. With the CAM/ICAM in the G mode, the operator places the tip of the CAM/ICAM 1/2 inch from any part of the soldier's clothing or hair. The operator then switches to the H mode and repeats. If contamination is found, the soldier is directed to either remove and bag his/her garments, go back to the airlock to remove them or to put a clean overgarment over his/her fatigues.

4.16 PASSING SUPPLIES AND EQUIPMENT INTO CBPS.

a. Supplies and equipment are passed into the CBPS through either of the airlocks when operating in a contaminated environment. The following are procedures for doing so.

(1) All supplies and equipment that are sent into the CBPS should be protected with contamination-avoidance covers during transportation and storage. They should also be kept in their outer packaging until they are ready to be passed into the airlock.

(2) All items that enter the CBPS have to first be checked for liquid contamination with M8 detector paper.

(3) Items are then placed into one of the airlocks. If possible, the outer packaging is removed as they are passed into the airlock (e.g., removing meal rations from their outer box and passing them in as individual meals).

(4) The CAM/ICAM operator in the ABS extends the CAM/ICAM into the airlock, placing the tip of the CAM/ICAM 1/2 inch away the supplies or equipment. The CAM/ICAM operator tests samples in the G mode then on the H mode.

(5) If no contamination is detected, the supplies or equipment are brought into the CBPS.

b. Waste materials are sent out through the airlocks. Bagged waste can be placed in either the ambulatory airlock or on a litter in the tunnel airlock.

APPENDIX A
REFERENCES

A.1 SCOPE.

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

A.2 MILITARY SPECIFICATIONS.

Brazing of Steels, Copper, Copper Alloys, Nickel Alloys, Aluminum and Aluminum Alloys.....MIL-B-7883
Hydraulic Fluid, Petroleum Base, For Preservation and Operation.....MIL-PRF-6083
Procedures, Sampling and Tables for Inspection by Attributes.....ASQC-Z1.4-93

A.3 FORMS.

Recommended Changes to Publications and Blank Forms .....DA Form 2028
Equipment Inspection and Maintenance Worksheet. .....DA Form 2404
Report of Discrepancy..... SF 364
Product Quality Deficiency Report ..... SF 368

A.4 FIELD MANUALS.

NBC Protection ..... FM 3-11.4
CBRN Decontamination..... FM 3-11.5
Medical Platoon Leaders Handbook - Tactics, Techniques and Procedures ..... FM 4-02.4
Health Service Support in a Nuclear, Biological and Chemical Environment ..... FM 4-02.7
First Aid ..... FM 4-25.11
Theater of Operations – Electrical Systems ..... FM 5-424
Operation and Maintenance of Ordnance Material in Cold Weather ..... FM 9-207
General Fabric Repair..... FM 10-16

A.5 TECHNICAL BULLETIN/MANUALS.

Lubrication Instructions - Generator Set, Skid Mounted, Tactical
Quiet 10 kW TQG, 60 and 400 Hz..... LO 9-6115-642-12
Operator's Manual for Chemical Agent Monitor (CAM) .....TM 3-6665-331-10
Operator's Manual for Improved Chemical Agent Monitor (ICAM) .....TM 3-6665-343-10
Operator's Manual for Truck, Utility.....TM 9-2320-387-10
Hand Receipt for Truck, Utility .....TM 9-2320-387-10-HR
Unit, Direct Support and General Support Maintenance for Truck,
Utility (Volume 1) ..... TM 9-2320-387-24-1
Unit, Direct Support and General Support Maintenance for Truck,
Utility (Volume 2)..... TM 9-2320-387-24-2
Direct Support and General Support Maintenance Repair Parts and Special Tools
List for Truck, Utility ..... TM 9-2320-387-24P
Operator's, Unit, Direct Support and General Support Maintenance Manual
(including Repair Parts and Special Tools List) for Chassis, Trailer ..... TM 9-2330-392-14&P
Generator Set, Skid Mounted, Tactical Quiet 10 kW TQG, 60 and 400 Hz .....TM 9-6115-642-10

A.5 TECHNICAL BULLETIN/MANUALS - Continued.

Unit, Direct Support, and General Support Maintenance Manual for Chemical Biological Protective Shelter (CBPS) System ..... TM 10-5410-228-24
Unit, Direct Support, and General Support Maintenance Repair Parts and Special Tools List for Chemical Biological Protective Shelter System ..... TM 10-5410-228-24P
Operator's, Unit, Direct Support and General Support for Lightweight Multipurpose Shelter (LMS) ..... TM 10-5411-224-14
Operator Manual SINCGARS ICOM Ground Combat Net Radio..... TM 11-5820-890-10-1
Installation Practices, Aircraft, Electric and Electronic Wiring ..... TM 55-1500-323-24
Procedures for Destruction of Equipment to Prevent Enemy Use ..... TM 750-244-3

A.6 DA PAMPHLETS.

Consolidated Index of Army Publications and Blank Forms..... DA PAM 25-30
Functional Users Manual for The Army Maintenance Management System (TAMMS) ..... DA PAM 750-8

APPENDIX B
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS
Section I. INTRODUCTION

B.1 SCOPE.

This appendix lists Components of End Item (COEI) and Basic Issue Items (BII) for the Chemical and Biological Protective Shelter (CBPS) System to help you inventory the items for safe and efficient operation of the equipment.

B.2 GENERAL.

The components of End Item and Basic Issue Items are divided into the following sections:

a. Section II. COEI. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. BII. These are the minimum essential items required to place the CBPS in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the CBPS during operation and whenever it is transferred between property accounts. These illustrations will assist you with hard-to-identify items. This manual is your authority to request/ requisition replacement BII, based on Table of Organization & Equipment/Modified Table of Organization & Equipment (TOE/MTOE) authorization of the end item.

B.3 EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listings.

a. Column (1) - Illustration Number. This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description, CAGEC and Part Number. Indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g. ea, in, pr).

e. Column (5) - Quantity Required (Qty Rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM LIST

(1) Illustration Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/M	(5) Qty Rqr
1	6230-01-242-2016	LIGHT SET (stored on HMT) (17023) BR2005	EA	1
2	5640-01-490-9666	ABS SOUND CONTROL BLANKET (81337) 5-4-7012-1	EA	1
2	5640-01-490-9662	ABS SOUND CONTROL BLANKET (81337) 5-4-7012-2	EA	1
2	5640-01-491-1330	ABS SOUND CONTROL BLANKET (81337) 5-4-7012-3	EA	1
2	5640-01-490-9664	ABS SOUND CONTROL BLANKET (81337) 5-4-7012-4	EA	1
3	8340-01-490-5370	DOOR, TENT (inner door stored in LMS) (81337) 5-4-7029-3	EA	1
4	8340-01-490-9655	DOOR, TENT (outer door stored on HMT) (81337) 5-4-7029-1	EA	1
5	4710-01-493-9538	TUBE, ASSEMBLY, METAL (installed on ABS retainer) (81337) 17-1-5529-1	EA	1
6	5410-01-491-4121	AIR BEAM REPAIR KIT (stored on HMT) (81337) PL5-4-7132-1	EA	1
7	8465-01-535-6270	BAG, STORAGE (81337) 17-2-1023-1	EA	6
8	8465-01-535-6269	BAG, STORAGE (81337) 17-2-1024-1	EA	6
9		BLANKET ASSEMBLY, SOUND (81337) 17-2-1060-1	EA	1
10	6150-01-487-5001	CABLE ASSY, POWER 100A (stored on HMT) (81337) 17-1-5886-1	EA	1
11	3940-01-535-4258	CARGO NET, HMMWV (optional, for airlift only) (81337) 17-2-0647-1	EA	1
12	3940-01-494-1543	CARGO NET, TRAILER (optional, for airlift only) (81337) 17-2-0648-1	EA	1
13		CHEMICAL BIOLOGICAL PROTECTIVE SHELTER ASSEMBLY (81337) 5-4-7001-1	EA	1
14	6150-01-494-4478	CORD ASSEMBLY, SPECIAL PURPOSE (32 FT) (81337) 17-2-0678-1	EA	1
15	6150-01-495-2019	CORD ASSEMBLY, SPECIAL PURPOSE (12 FT) (81337) 17-2-0678-2	EA	1
16	6150-01-494-4482	CORD ASSEMBLY, SPECIAL PURPOSE (7 FT) (81337) 17-2-0678-3	EA	1
17	5410-01-490-9663 5410-01-491-2858	DCS CONNECTOR (stored on HMT) (81337) 17-2-0979-1, -2	EA	1

Section II. COMPONENTS OF END ITEM LIST - Continued

(1) Illustration Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/M	(5) Qty Rqr
18		**Deleted**		
19	4940-01-502-7748	ENGINE PLATFORM (stored on HMT) (81337) 17-2-0660-1	EA	1
20		ENVIRONMENTAL CONTROL UNIT (ECU) (81337) 17-1-9194-1	EA	1
21		EXPANDED CAPACITY VEHICLE (ECV) (81337) 17-1-9238-1	EA	1
22		EXTINGUISHER, FIRE (secured at rear passenger side of LMS) (81337) 17-1-9201-1	EA	1
23	4210-00-595-1777	EXTINGUISHER, FIRE (secured on HMT)	EA	1
		(81345) UL 154 (GFE)		1
24		EYE BOLT (Attached to the AC motor when purchased and removed when AC is installed, stored on HMT.)	EA	1
25	6115-01-275-5061	GENERATOR (installed on HMT) (30554), MEP803A (GFE)	EA	1
26	5410-01-490-9669	GROUND CLOTH (stored on back of LMS) (81337) 5-4-7025-1	EA	1
27	8340-01-490-9665/ 8340-01-075-4017	LARGE PIN BAG WITH 40 12-INCH METAL STAKES (stored in ECV) (81337) 5-4-7031-2/(81349) MIL-P-501	EA	1
28	5975-01-502-5503	LIGHT STRAP ASSEMBLY (stored in Light Set) (81337) 5-4-7024-1	EA	1
29		LIGHTWEIGHT MULTIPURPOSE SHELTER (LMS) (81337) 17-1-5508-1	EA	1
30		LINER ASSEMBLY, AIRLOCK ENDWALL (81337) 5-4-7015-1	EA	1
31		LINER ASSEMBLY, AMBULANCE ENDWALL (81337) 5-4-7013-1	EA	1
32		LINER ASSEMBLY, SIDEWALL (81337) 5-4-7017-1	EA	2
33	8340-01-490-9661/ 8340-00-261-9751	MEDIUM PIN BAG/WITH 25 24-INCH WOOD STAKES (stored in ECV) (81337) 5-4-7031-3/(81349) MIL-P-2383(Size2)	EA	1
34	4240-01-528-4683	PRESSURE GAGE ASSEMBLY (stored on rear outer wall of LMS) (81337) 5-4-7056-1	EA	1
35	5340-01-491-5039	SHELTER STRAP ASSEMBLY (optional, for airlift only) (81337) 17-2-0667-1	EA	1
36	5120-01-013-1676	SLIDE HAMMER, GROUND ROD (stored on HMT) (97403) 13226E7741	EA	1

Section II. COMPONENTS OF END ITEM LIST - Continued

(1) Illustration Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/M	(5) Qty Rqr
37	8340-01-523-3925/ 8340-00-261-9750	SMALL PIN BAG/WITH 15 16-INCH WOOD STAKES (stored in ECV) (81337) 5-4-7031-1/(81349) MIL-P-2383(Size1)	EA	1
38	5410-01-490-9658	SPARE PARTS KIT (stored on HMT) (81337) PL5-4-7134-1	EA	1
39		TALP FRAME, INSIDE (inner door stored in LMS) (81337) 17-2-1552-1	EA	1
40		TALP OUTER (outer door stored on HMT) (81337) 17-2-1551-1, -2	EA	1
41	5940-01-502-7541	TALP RAILS (stored in LMS) (81337) 5-4-7073-1	EA	2
42		TRAILER, HIGH MOBILITY (HMT) (81337) 17-2-0534-1 (Silver Eagle Manufacturing Company)	EA	1
43	4240-01-348-5257	Recirculation Filter Assembly	EA	2

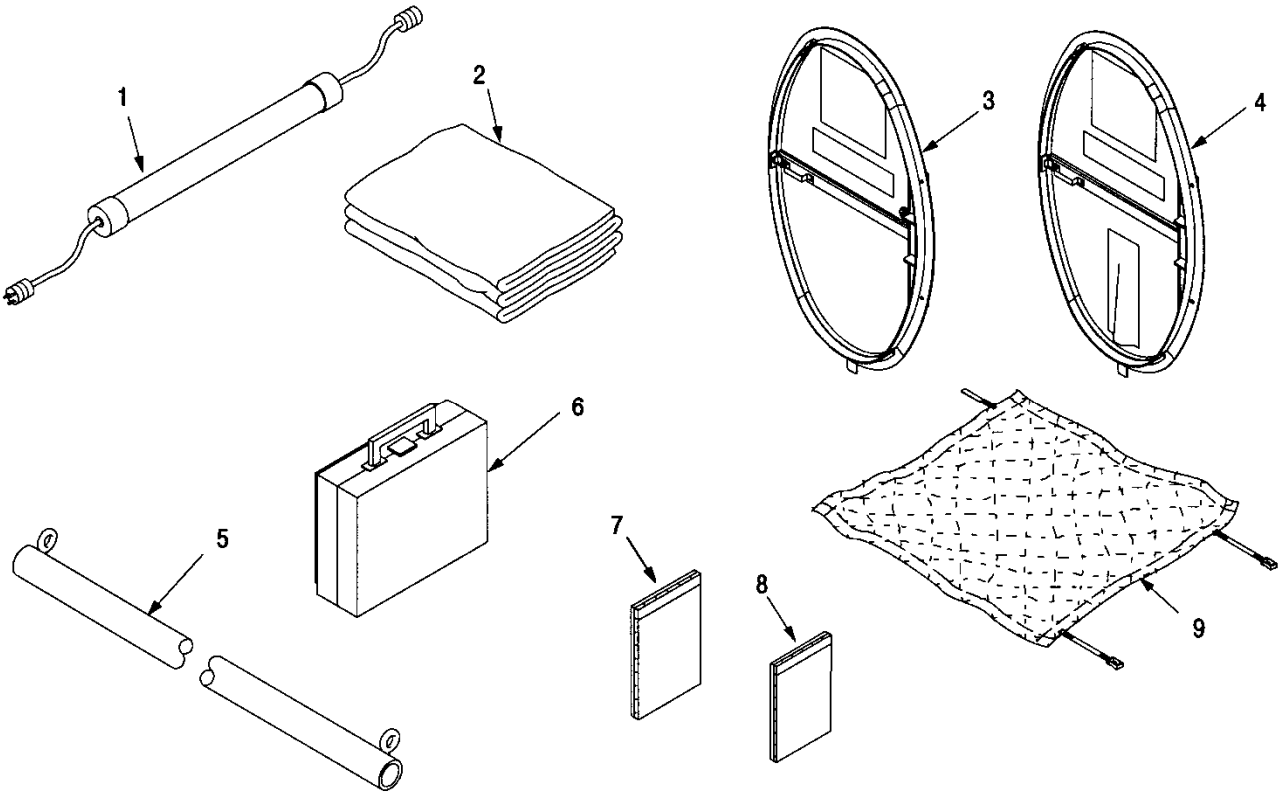
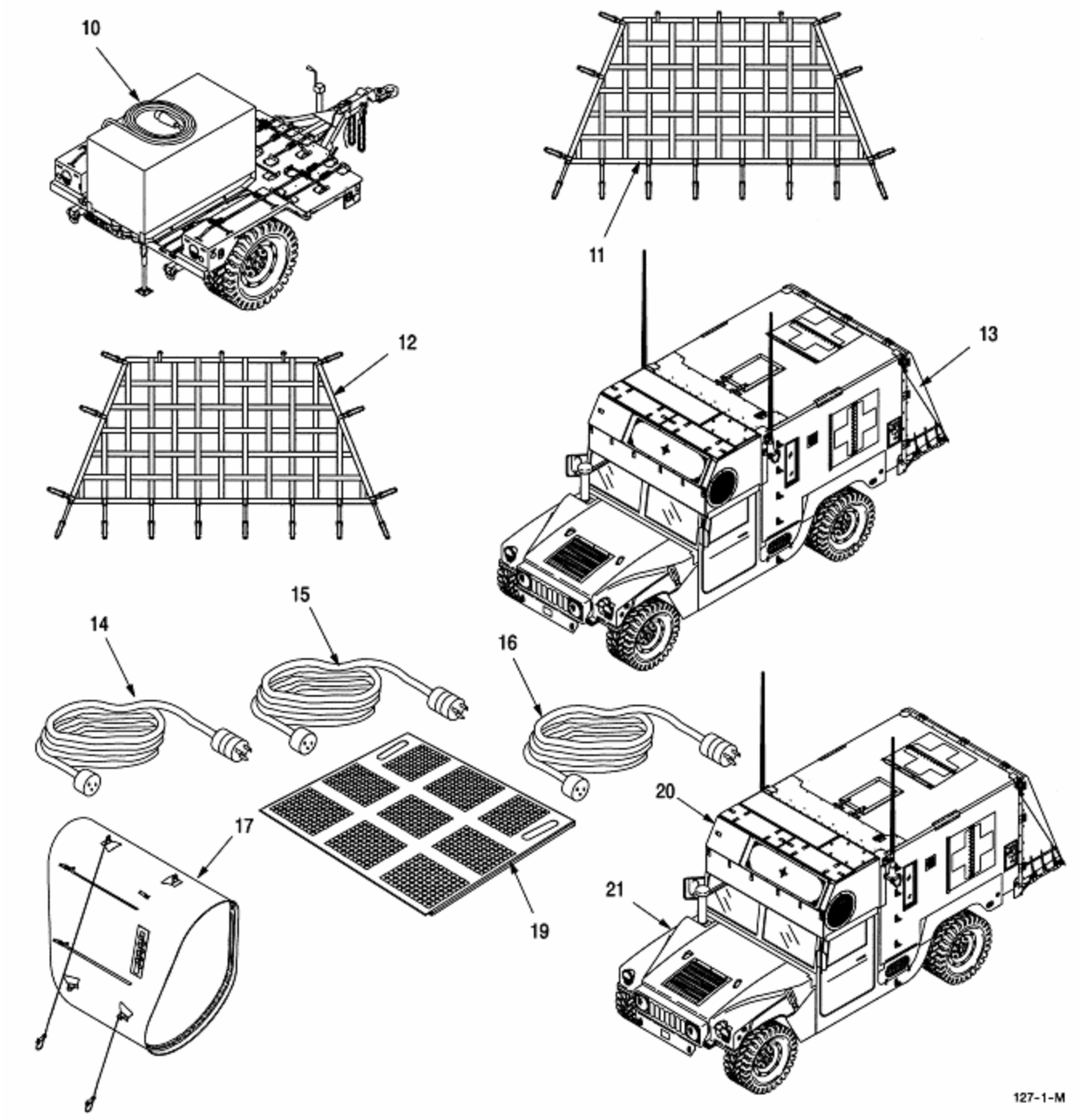


Figure B-1. Components of End Item (Sheet 1 of 4)



Item 18 - Deleted

Figure B-1. Components of End Item (Sheet 2 of 4

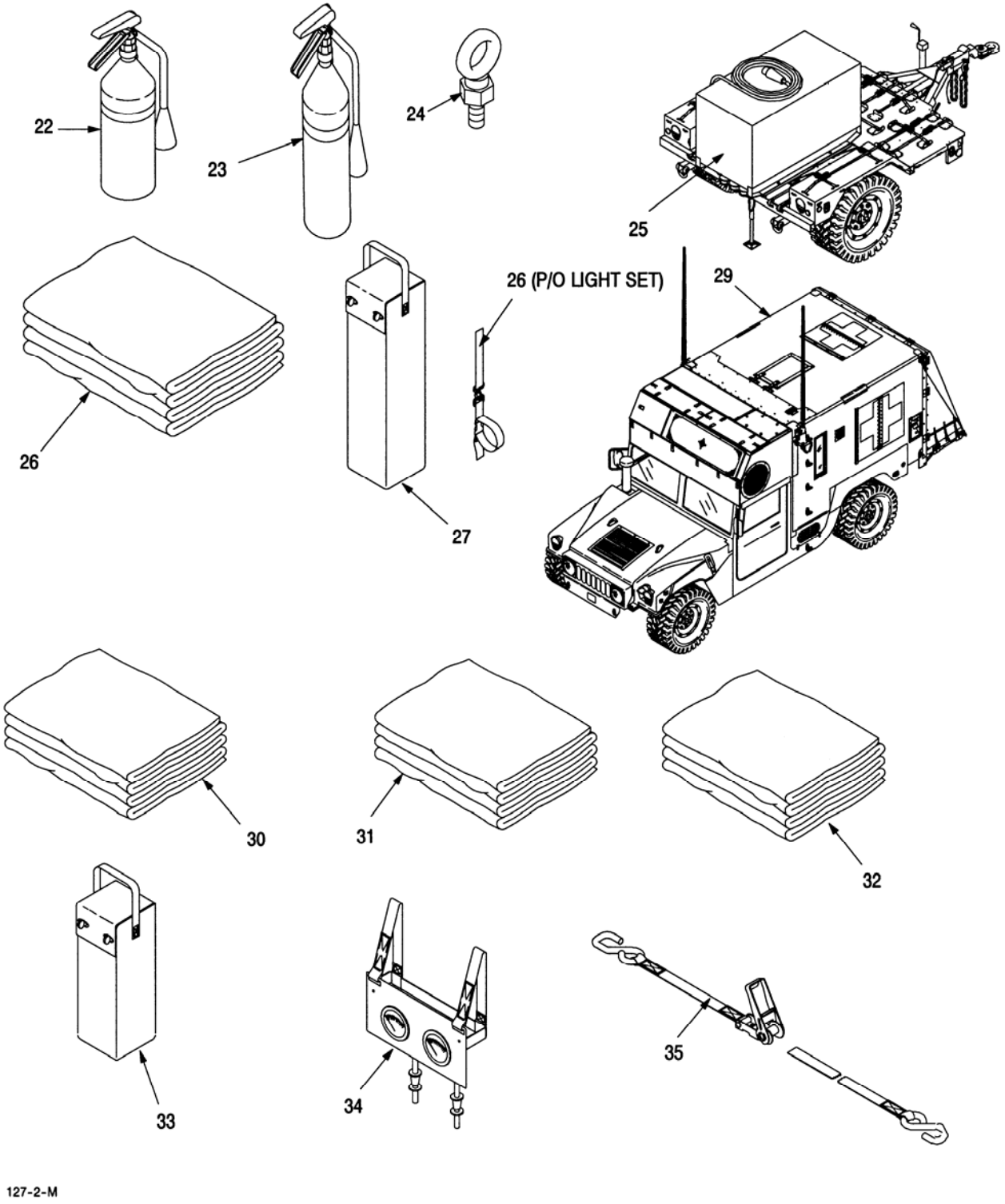


Figure B-1. Components of End Item (Sheet 3 of 4)

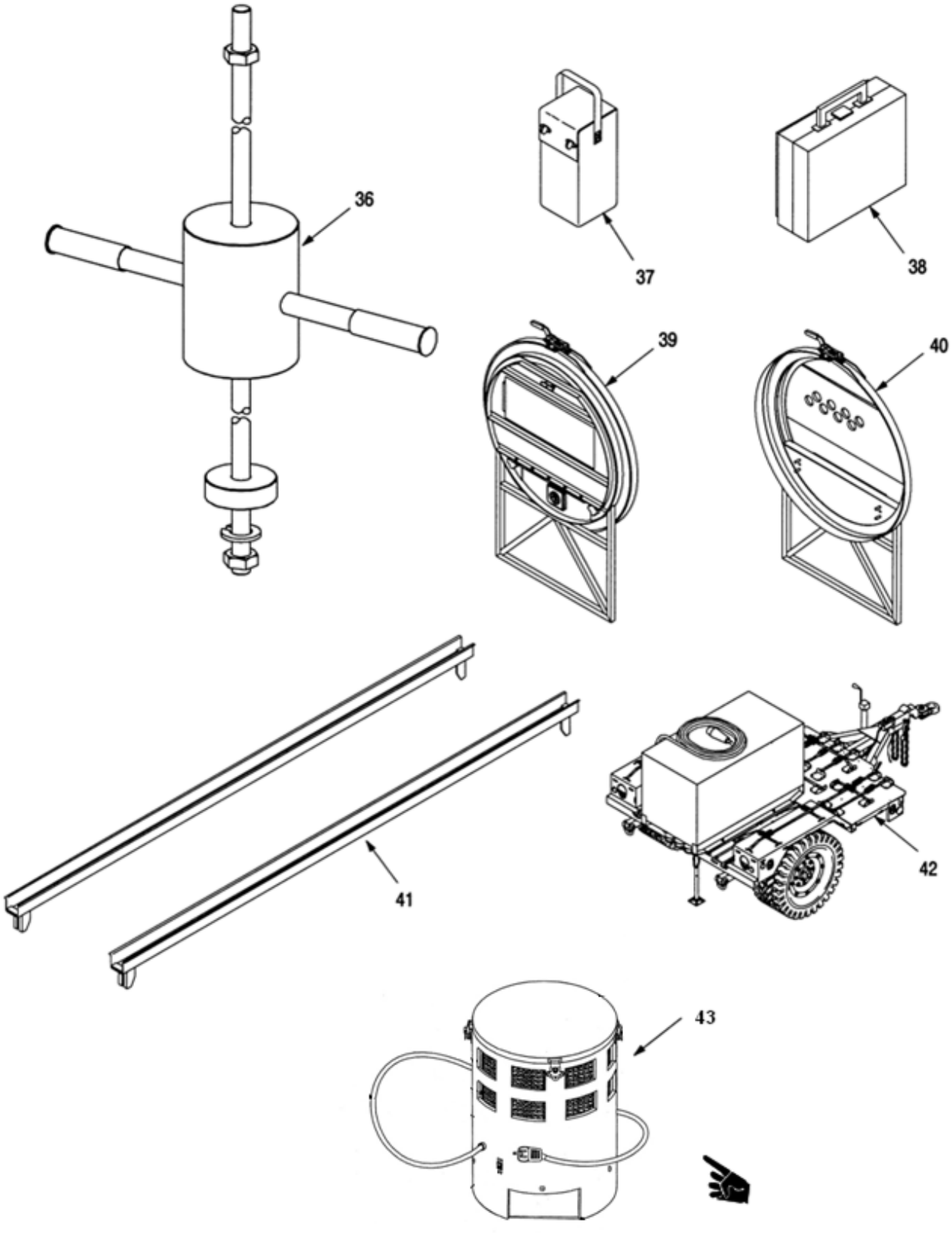
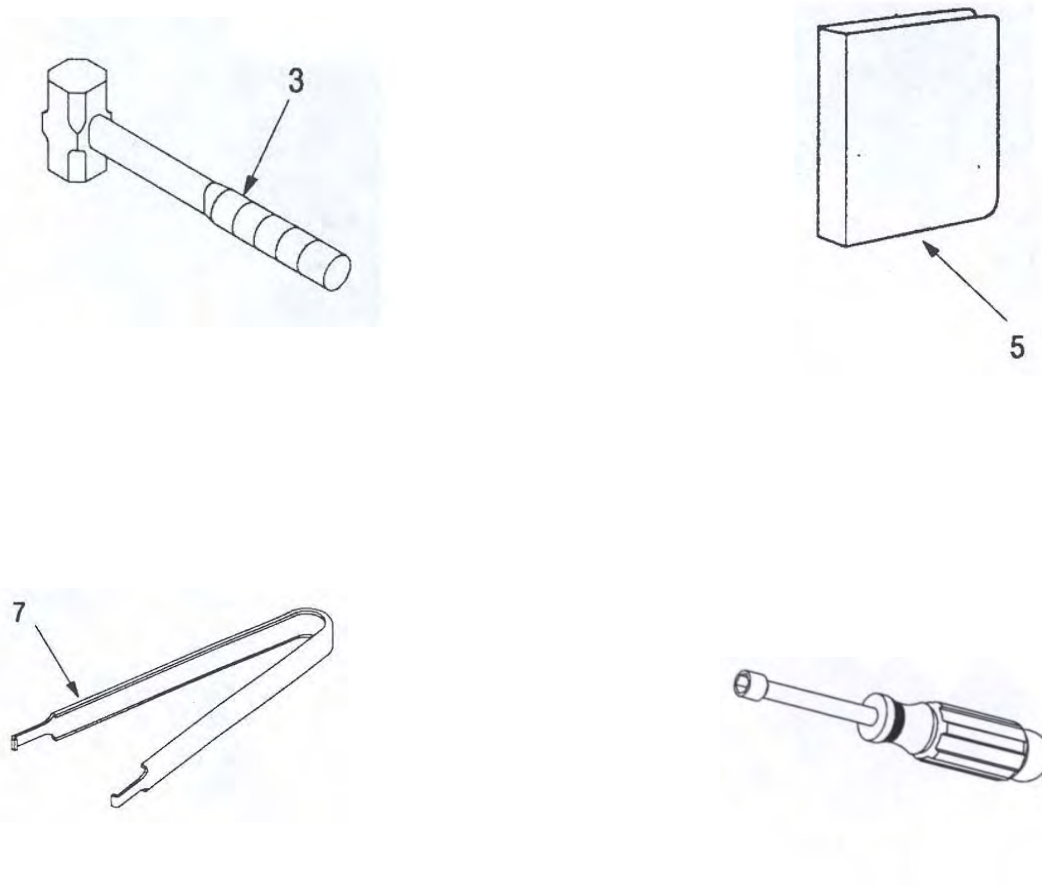


Figure B-1. Components of End Item (Sheet 4 of 4)

Section III. BASIC ISSUE ITEMS

(1) Illustration Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/M	(5) Qty Rqr
1		**Deleted**		
2		**Deleted**		
3		HAMMER, SLEDGE (secured on HMT) (81337) 17-1-9406-1 (GFE)	EA	2
4		**Deleted**		
5		OPERATOR'S MANUAL FOR CHEMICAL BIOLOGICAL PROTECTIVE SHELTER SYSTEM (90598) TM 10-5410-228-10	EA	1
6		**Deleted**		
7	5120-01-505-7504	TOOL, EXTRACTION (81337) 17-2-0986-1 (stored in ECV tool kit)	EA	1
8	5120-01-367-7034	NUT DRIVER, 7/16" (75347) 630-7/16	EA	1



121-1-M

Items 1, 2, 4, and 6 have been deleted.

Figure B-2. Basic Issue Items

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C.1 SCOPE.

This appendix lists additional items you are authorized in support of the Chemically and Biologically Protected Shelter (CBPS) System.

C.2 GENERAL.

This list identifies items that do not have to accompany the CBPS and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C.3 EXPLANATION OF LISTING.

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1)	(2)	(3)	(4)	
National Stock Number	Description (CAGEC) Part Number	UOC	U/M	Qty Auth
	Diamond Nets with Poles			2
	Hexagon Nets with Poles			6
4910-00-387-9592	Pan, Drain (81349) MIL-P-45819		GL	1
	Strap Assembly, Tie-down (81337) 17-2-1064-1			8
	Tape Dispenser (04963) ATG-752			1

APPENDIX D
EXPENDABLE AND DURABLE ITEM LIST
Section I. INTRODUCTION

D.1 SCOPE.

This appendix lists expendable and durable items that you will need to operate and maintain the CBPS. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except medical, class V repair parts, and heraldic items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

D.2 EXPLANATION OF COLUMNS.

a. Column (1) Item Number. This number is assigned to the entry in the listing and is referenced in the 'Initial Setup' of applicable tasks under the heading of 'Materials/Parts', (e.g., 'Cleaning compound, Item 5, Appendix D').

b. Column (2) Maintenance Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Unit Level Maintenance
F - Direct Support Maintenance

c. Column (3) National Stock Number. This is the National Stock Number (NSN) assigned to the item; use it to request or requisition the item.

d. Column (4) Description (CAGEC) Part Number. This indicates the Federal Item Name and, if required, a description to identify the item. The last line indicates the Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5) Unit of Measure (U/M). This indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character abbreviation, (e.g., EA, GL, PT). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE AND DURABLE ITEM LIST

(1) Item Number	(2) Maintenance Level	(3) National Stock Number	(4) Description (CAGEC) Part Number	(5) U/M
1	C	6810-00-286-5435	ALCOHOL, ISOPROPYL (81349) TT1735, GRADE A	GL
2	C	8520-00-262-7177	CREAM CLEANER, PLASTIC LIQUID (09177) 200-767-4A	CN
3	C	7930-00-282-9699	DETERGENT, GENERAL PURPOSE (81349), P/N MIL-D-16791	GL
4	C	9150-00-252-6383	FLUID, HYDRAULIC (81349) MIL-PRF-5606	QT
5	C	8415-00-009-1900	GLOVES, RUBBER (86523) N36	PR
6	C	9150-01-260-2534	LUBRICANT, SOLID (96906), P/N MIL-L-23398	CN

Section II. EXPENDABLE AND DURABLE ITEM LIST - Continued

(1) Item Number	(2) Maintenance Level	(3) National Stock Number	(4) Description (CAGEC) Part Number	(5) U/M
7	C	7920-00-148-9666	RAGS, WIPING (80244) 7920-00-148-9666	LB
8	C	5640-00-103-2254	TAPE, DUCT 60 YD (39428) 1791K70	RO

APPENDIX E
LOAD PLAN

E.1 HIGH MOBILITY TRAILER (HMT) LOADING.

a. Park HMT. Deploy front caster leg and level HMT. Deploy rear leg for stability.

b. Temporarily place power cord (1, Figure E--1, sheet 1) on ground behind HMT.

c. Temporarily place two fastening strap halves (2) on top of TQG. Allow mating fastening strap halves (3) to hang over HMT roadside fender.

d. Place two medical chests (4) vertically between TQG and roadside fender. The heavier of two medical chests should be placed at rear of HMT. Place water bottle (5) between TQG and roadside fender in front of two medical chests (4). Place two litter stands (44) vertically behind water bottle (5). Secure medical chests (4) and water bottle (5) in place with two fastening straps (6). Do not secure fastening straps (2 and 3) at this point.

e. Place one camouflage pole set (7) and one camouflage net set (8) on roadside fender. Camouflage pole set (7) should be placed on HMT fender first with camouflage net set (8) placed on top of it. Secure in place with fastening strap (9).

f. Temporarily place two fastening strap halves (10, sheet 2) on top of TQG as shown. Allow mating fastening strap halves (11) to hang over HMT curbside fender.

g. Place three medical chests (12) vertically between TQG and curbside fender. The heavier medical chests should be placed to rear of HMT. Secure three medical chests in place with two fastening straps (13). Do not secure fastening straps (10 and 11) at this point.

h. Place one camouflage pole set (14) and one camouflage net set (15) on curbside fender. Camouflage pole set (14) should be placed on HMT fender first with camouflage net set (15) placed on top of it. Secure in place with fastening strap (16).

i. Place airbeam repair kit (17), spare parts kit (18), slide hammer (19), ground rod, ground lead and fire extinguisher (20) in front of TQG between two brackets. Secure in place with fastening strap (21).

j. Temporarily remove four fastening strap halves (22) from location of center medical chest (23) by allowing them to hang over HMT deck. Temporarily remove four mating fastening strap halves (24) from same area. Place one medical chest (23) in strap brackets. Do not fasten four sets of fastening straps (22 and 24) at this point.

k. Temporarily remove three fastening strap halves (25) from location of curbside medical chest (26) by allowing them to hang over HMT deck. Temporarily remove three mating fastening strap halves (27) from same area. Place one medical chest (26) in strap brackets. Do not fasten three sets of fastening straps (25 and 27) at this point.

l. Repeat step k. for medical chest on roadside of HMT.

m. Place one Air Beam Shelter (ABS) quilted sidewall liner (28, sheet 3) on top of forward roadside medical chest (26). Secure only one fastening strap (29) over medical chest (26) and ABS quilted sidewall liner (28). Do not secure the remaining two fastening straps (30) at this point.

n. Place one ABS quilted sidewall liner (31) on top of forward curbside medical chest (26). Secure only one fastening strap (32) over medical chest (26) and ABS quilted sidewall liner (31). Do not secure the remaining two fastening straps (33) at this point.

o. Place ABS quilted end wall liners (34) on top of forward center medical chest (23) and secure in place using four fastening strap sets (22) and (24).

p. Place light set case (35, sheet 4) on top of ABS quilted liners (28, 31 and 34) in front of TQG. Make sure light set case (35) is centered on HMT.

q. Place backboard (36) upside down on top of light set (35).

E.1 HIGH MOBILITY TRAILER (HMT) LOADING - Continued.

r. Secure light set (35) and backboard (36) in place with four fastening straps (30 and 33).

s. Place TQG power cord (1) on top of backboard (36).

t. Install one 2--inch strap (37, sheet 5) across HMT to secure light set (35), backboard (36) and TQG power cord (1) in place.

u. Place two litters (38) upside down on top of three medical chests (12) on curbside of TQG.

v. Secure two litters (38) in place using two strap sets (10 and 11).

w. Place two litters (39) upside down on top of two medical chests (4) on roadside of TQG.

x. Secure two litters (39) in place using two strap sets (2 and 3).

y. Place maintenance platform (40) on top of TQG.

z. Place outer ambulatory airlock door (41) on top of maintenance platform (40).

aa. Place outer TALP door (42) on top of outer ambulatory airlock door (41).

ab. Install two 2--inch straps (43) across HMT to secure outer TALP door (42), outer ambulatory airlock door (41) and maintenance platform (40) in place. Hooks of 2--inch straps (43) should be attached to both HMT fender walls.

ac. Install two 2--inch straps (45) across TQG and HMT to secure outer TALP door (42), outer ambulatory airlock door (41) and maintenance platform (40) in place. Hooks of two 2--inch straps (45) should be attached to rear edge of TQG and front edge of HMT.

ad. Install one 2--inch strap (46) across HMT to secure four litters (38 and 39) in place.

ae. Install HMT travel cover.

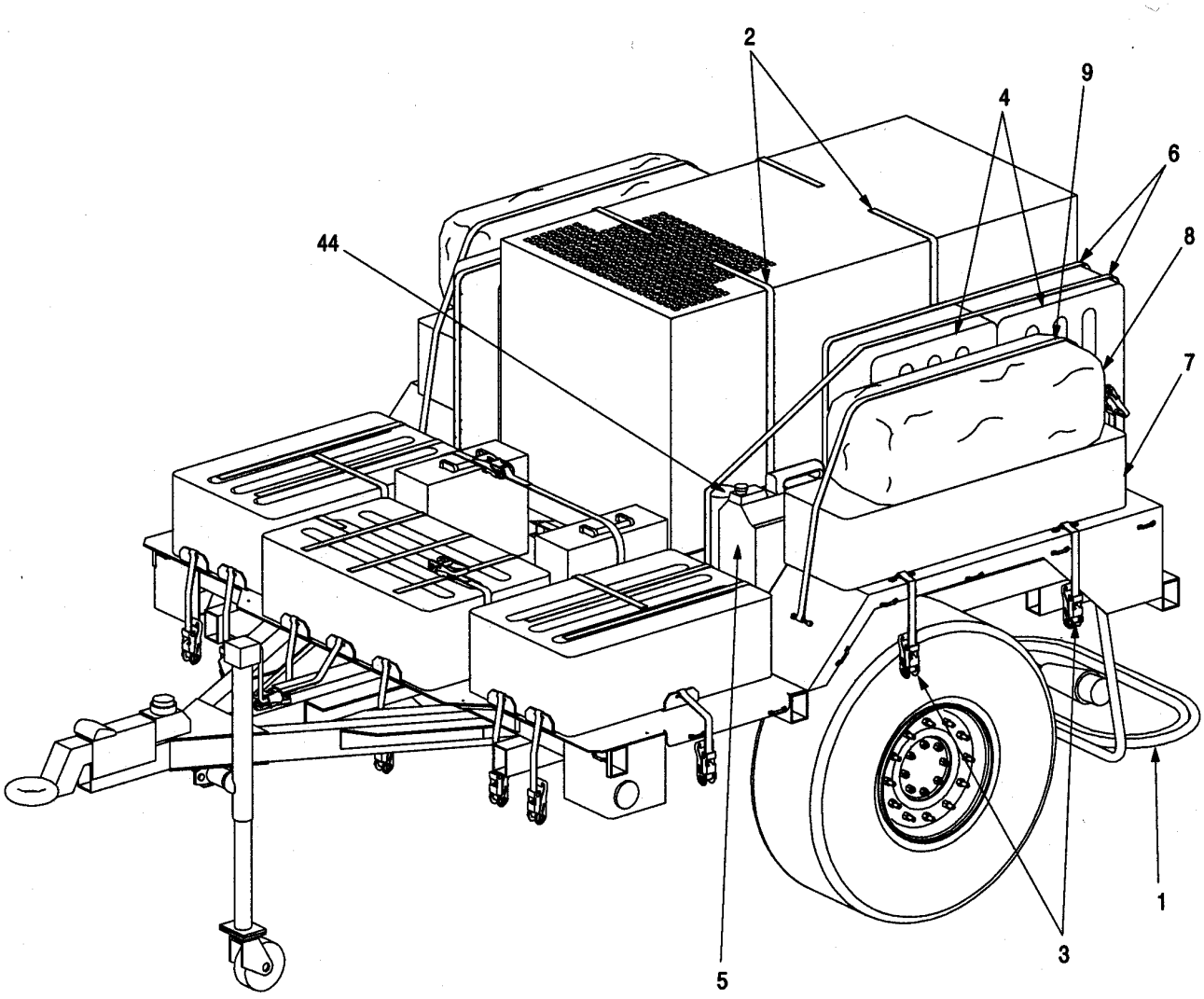


Figure E-1. HMT Load Plan (Sheet 1 of 5)

E.1 HIGH MOBILITY TRAILER (HMT) LOADING - Continued.

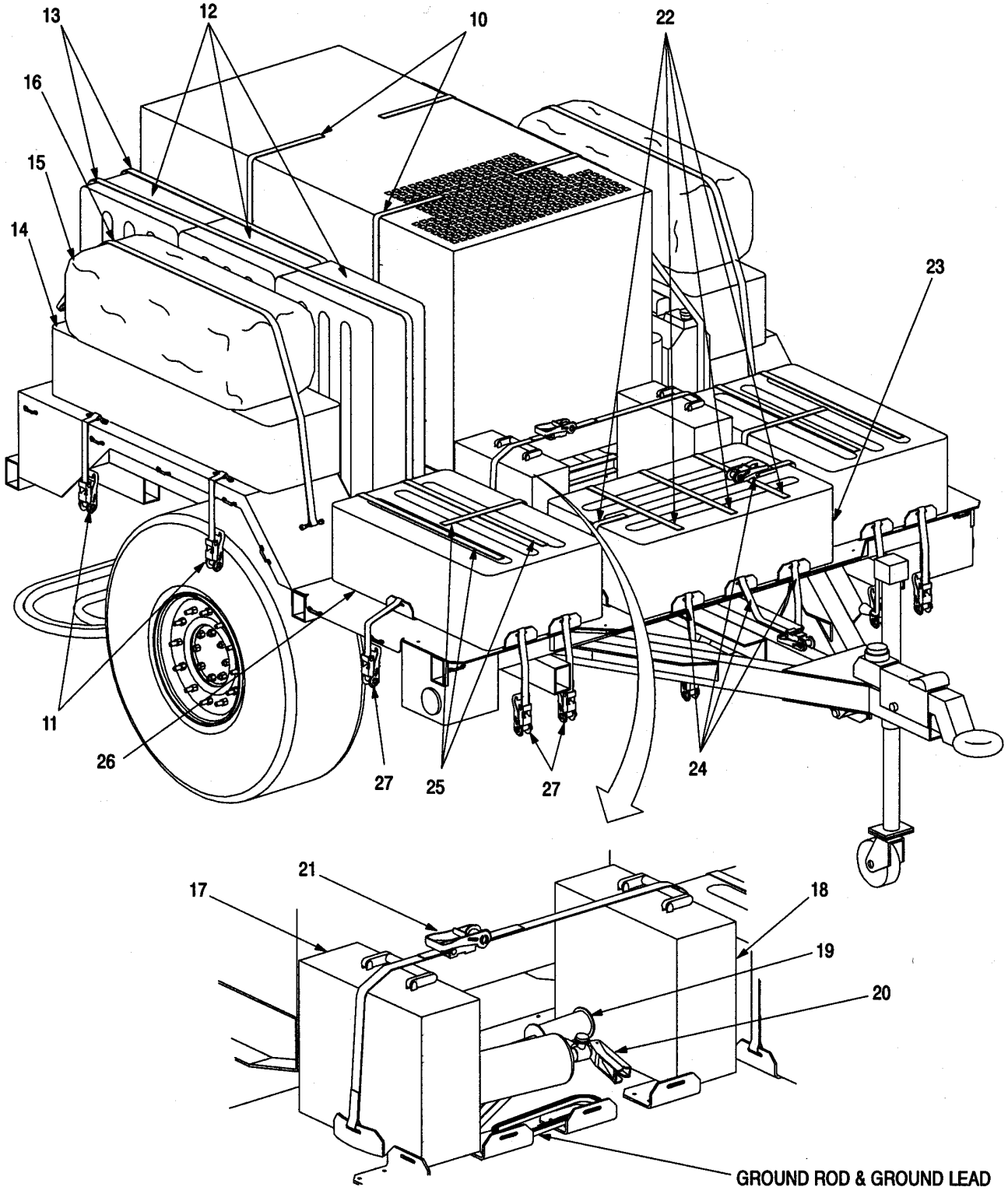


Figure E-1. HMT Load Plan (Sheet 2 of 5)

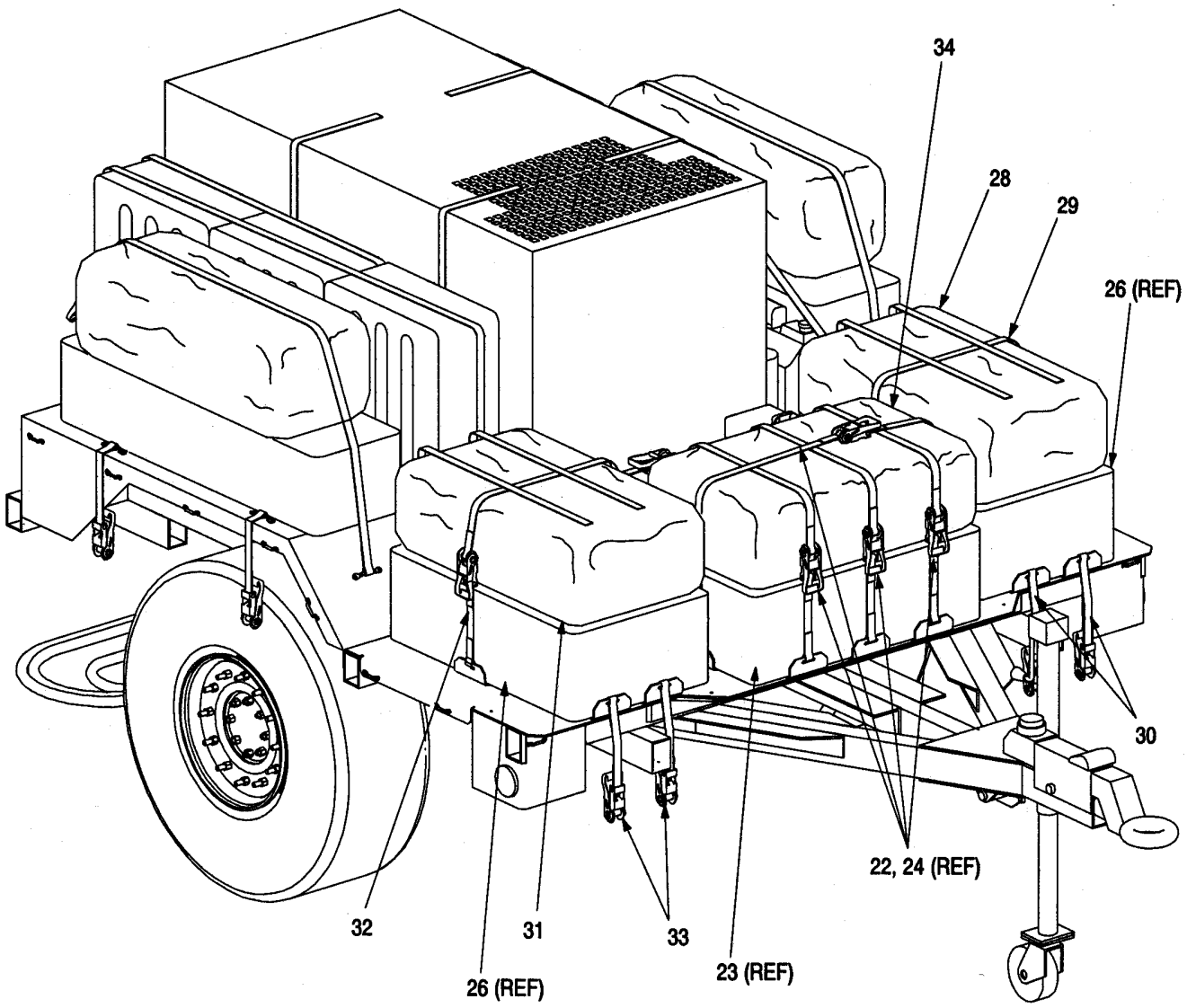


Figure E-1. HMT Load Plan (Sheet 3 of 5)

E.1 HIGH MOBILITY TRAILER (HMT) LOADING - Continued.

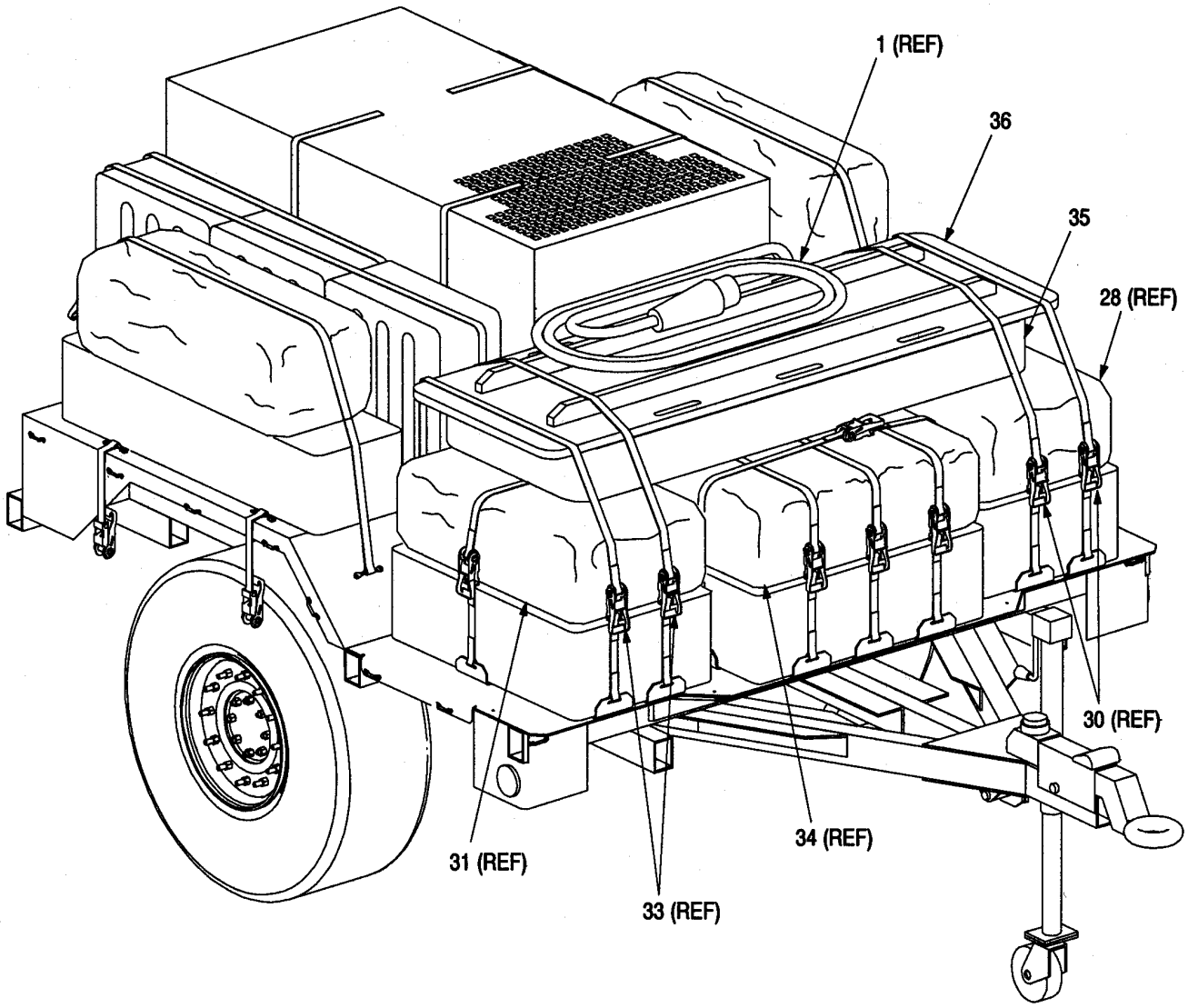


Figure E-1. HMT Load Plan (Sheet 4 of 5)

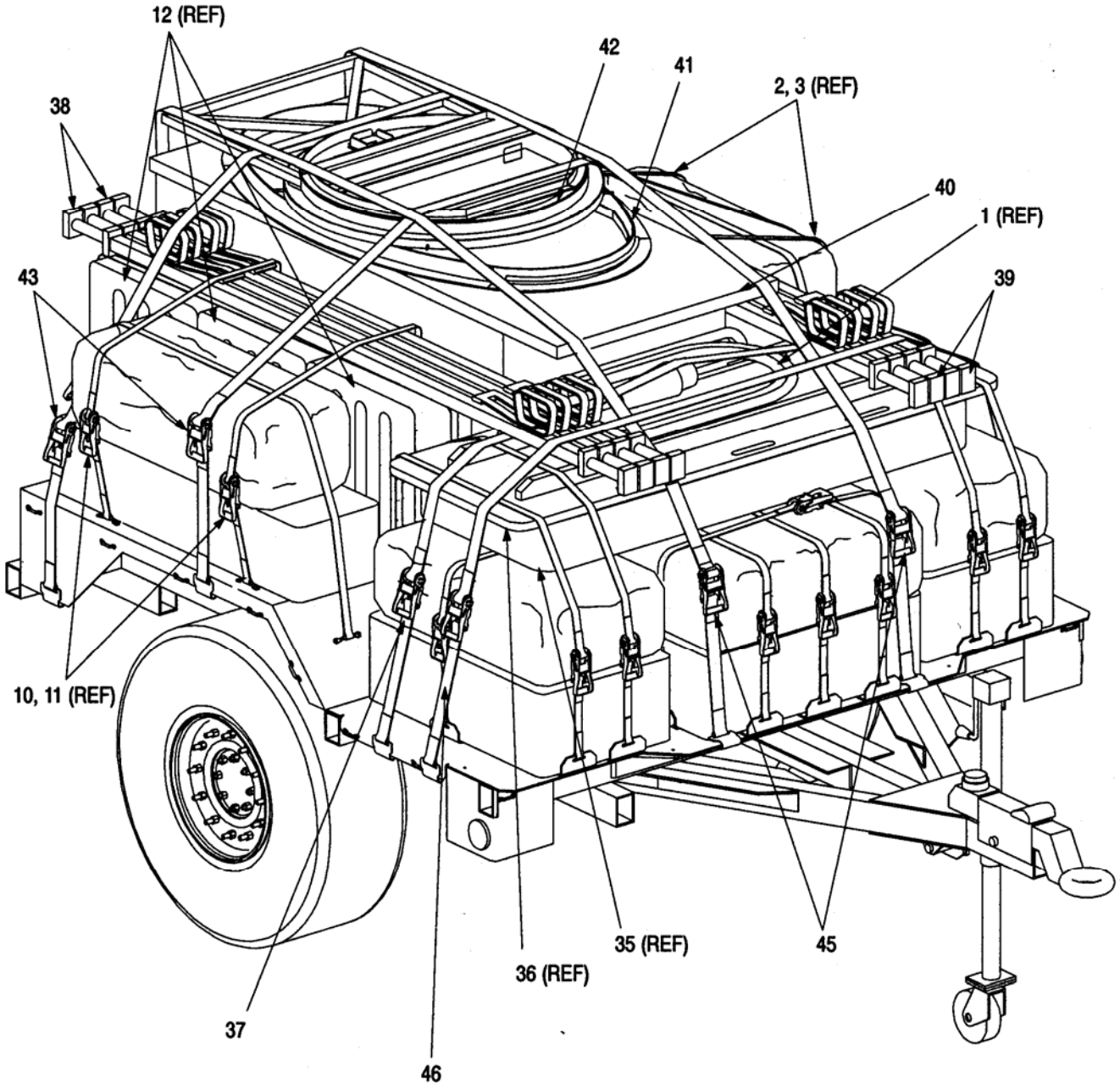


Figure E-1. HMT Load Plan (Sheet 5 of 5)

E.2 LIGHTWEIGHT MULTIPURPOSE SHELTER (LMS) LOADING.

Roadside:

a. Place one NBC recirculation filter over the wheel well and fasten three straps.
b. Place one medical chest on the wheel well and fasten three straps.
c. Place one litter stand on the sidewall and fasten two straps.
d. Place the inner ambulatory airlock door and inner TALP door behind the retaining bracket. Open TALP door. Pass the retention strap through the open TALP door and fasten to buckle. Close and latch TALP door.

Curbside:

e. Place one NBC recirculation filter over the wheel well and fasten three straps.
f. Place one medical chest on the wheel well and fasten three straps.
g. Place one litter stand on the sidewall and fasten two straps.
h. Place suction apparatus next to re-circulation filter and fasten strap.
i. Place two oxygen bottles on floor in rear corner and fasten strap.
j. Place fire extinguisher in bracket next to oxygen bottles and close bracket to hold in place.
k. Fasten the traction splint to the wall using two straps.

Ceiling:

l. Place four litter stands on ceiling and fasten eight straps.
m. Place one TALP rail on either side of litter stands with protruding legs facing towards the center of the vehicle and fasten in place using two straps for each rail.

E.3 EXPANDED CAPACITY VEHICLE (ECV) COMPARTMENT LOADING.

a. Place large tent pin bag flat on bottom of compartment.
b. Stand small tent pin bag vertically behind environmental control unit drainage reservoir.
c. Place medium tent pin bag on top of large tent pin bag.
d. Place two sledge hammers on top of large tent pin bag.
e. Place fire extinguisher on top of two sledge hammers.
f. Place pioneering kit diagonally on top of all previous components.
g. Close and latch compartment cover.

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS.

The following tables and illustrations identify and illustrate how the Chemical Biological Protective Shelter (CBPS) System is loaded. Key number (No.) in tables identify where that item is stored in the illustrations.

Table E-1. FST Load Plans

Key No.	Description	Dimensions (L x W x H) in
1	Medical Chest #3	31x19x11
2	Medical Chest #5	31x19x17
3	Medical Chest #6	31x16x20
4	ABS Liner Bag	25x25x10
5	Spare Parts Kit	16x14x6.5
6	Airbeam Repair Kit	16x14x6.6
7	ProPac	25x19x12
8	Engine Platform	39x34.5x1
9	TALP Door	50x35x2.5
10	AA Door	60x36x1.8
11	Defibulator	32x20x21.5
12	Large Blue Bag (Pre Op)	24x14x6
13	Small Blue Bag (Splint System, Pre Op)	8x6x3.5
14	HMT Fire Extinguisher	18x4 dia
15	Small Yellow Bag (Pre Op)	6x5x3.5
16	DCS Connector	30x13 dia (rolled)
17	Field Sink	30x27x14.5
18	Backboard	74x20x1.5
19	ABS Light Set	74x20x6.5
20	Blood Refrigerator	24x18x17.5
21	Recirc Filter	25x16.5 dia
22	Suction, Portable	13x10x6.5
23	EMT Bag (Pre Op)	32x21x1
24	OR Table	42x26x20
25	Bags (OR)	32x21x1
26	Anesthesia	12x9.5x15
27	Head Light	12x9x5.5
28	Bear 33	24x25x16
29	Reed Bag (Post Op)	32x21x1
30	Bag (Pre Op)	32x21x2
31	DELETED	
32	Inner LMS Sound Blanket	30x10x4

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

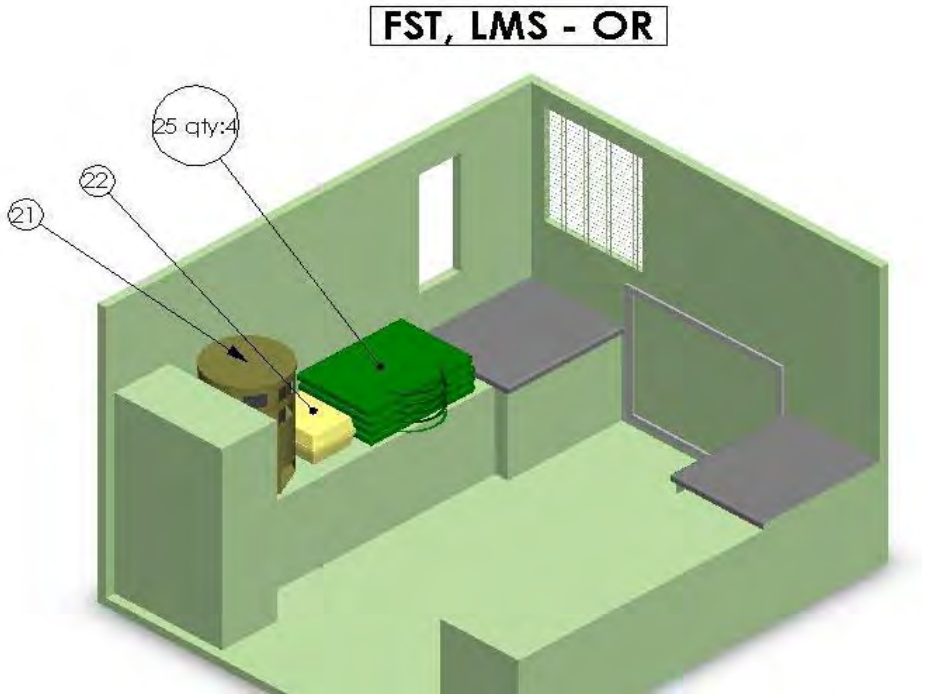


Figure E-2. FST, LMS - OR (Sheet 1 of 2)

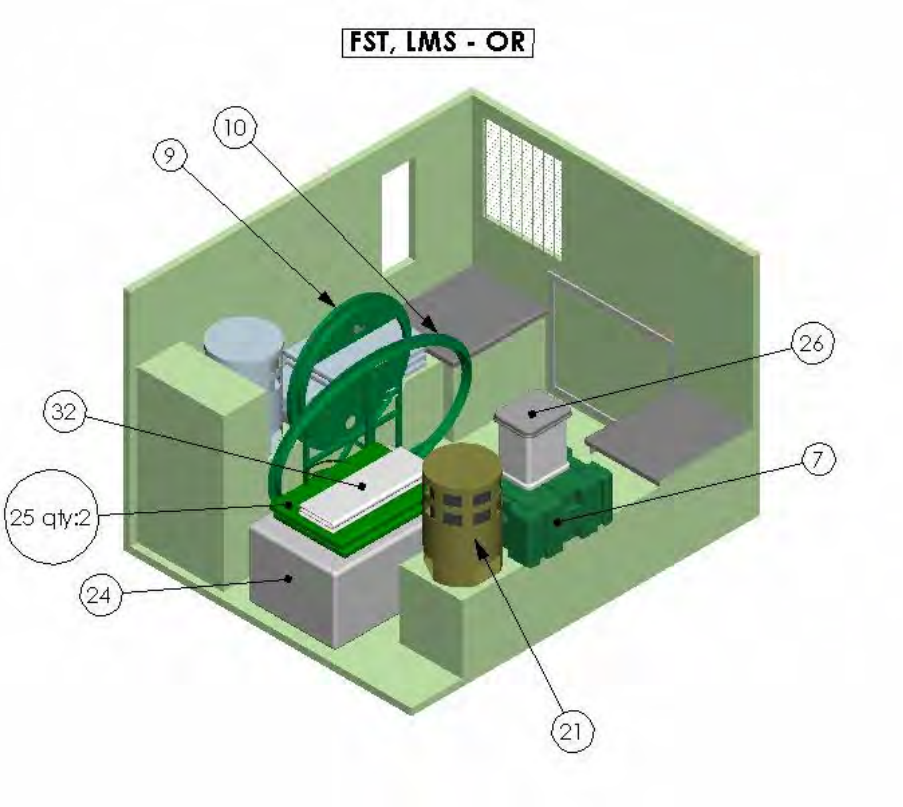


Figure E-2. FST, LMS - OR (Sheet 2 of 2)

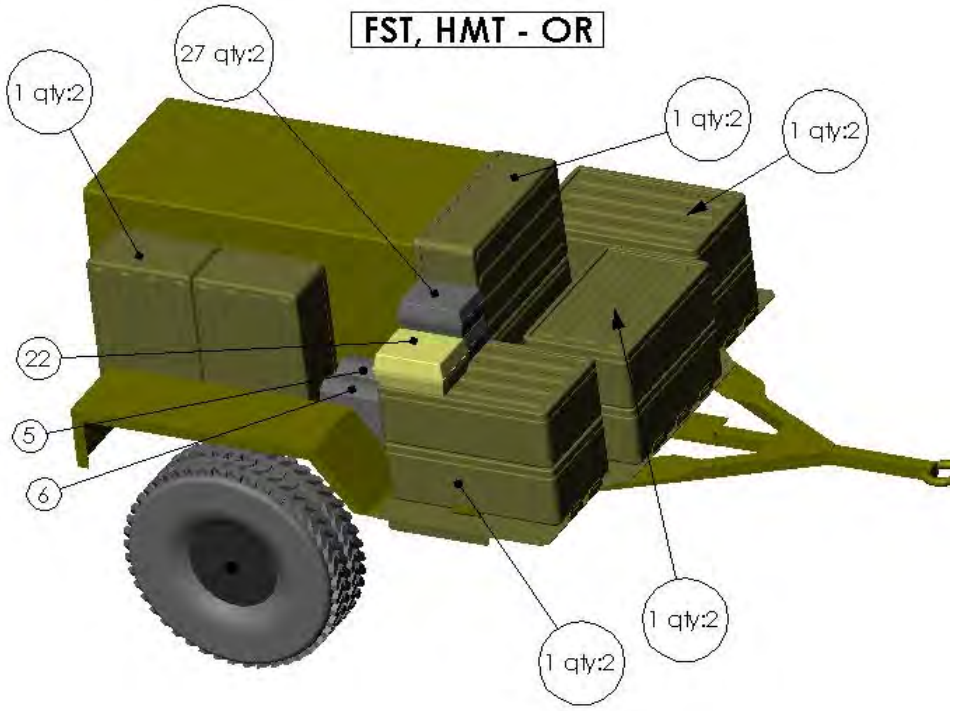


Figure E-3. FST, HMT - OR (Sheet 1 of 3)

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

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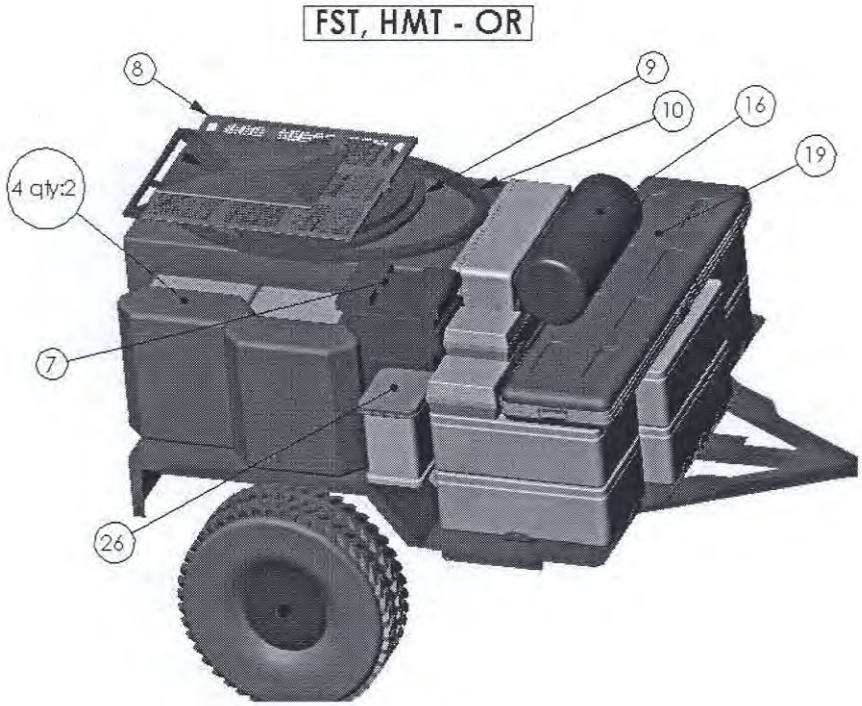


Figure E-3. FST, HMT - OR (Sheet 2 of 3)

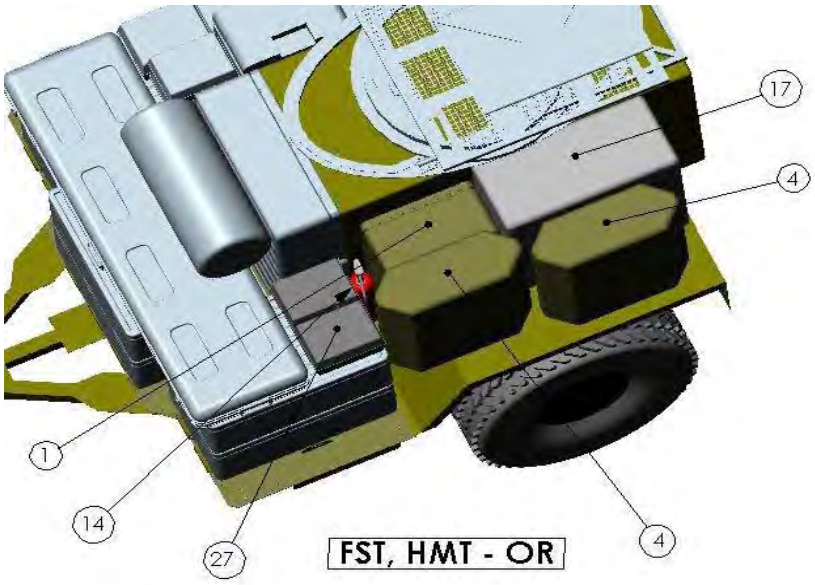


Figure E-3. FST, HMT - OR (Sheet 3 of 3)

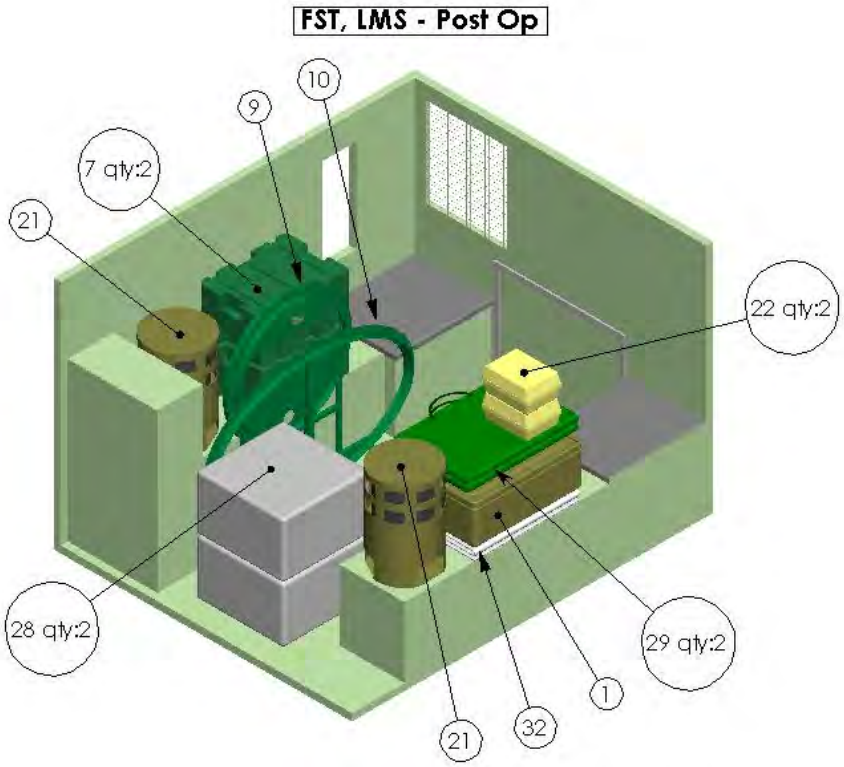


Figure E-4. FST, LMS - Post Op

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

Item 31 deleted.

FST, HMT - Post Op

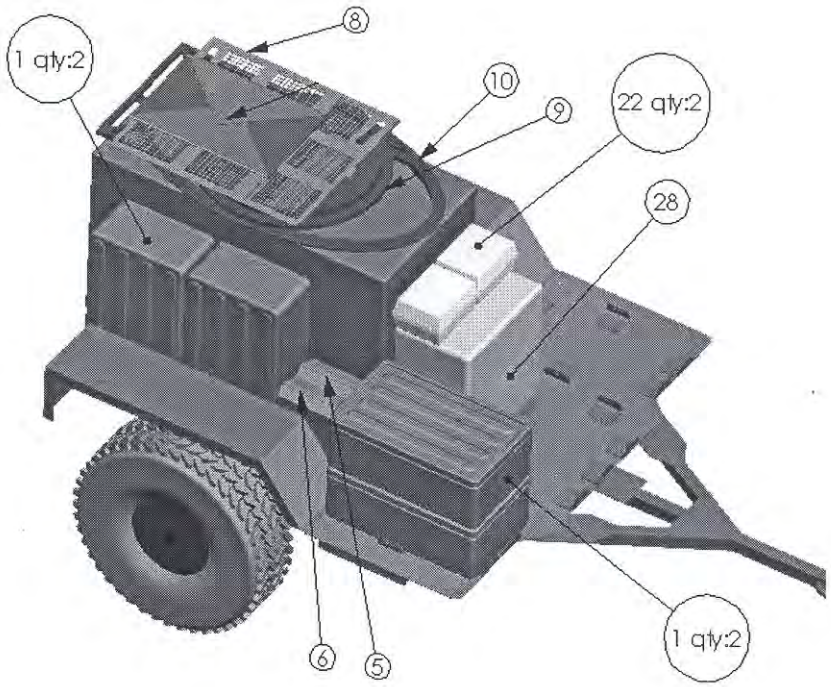


Figure E-5. FST, HMT - Post Op (Sheet 1 of 3)

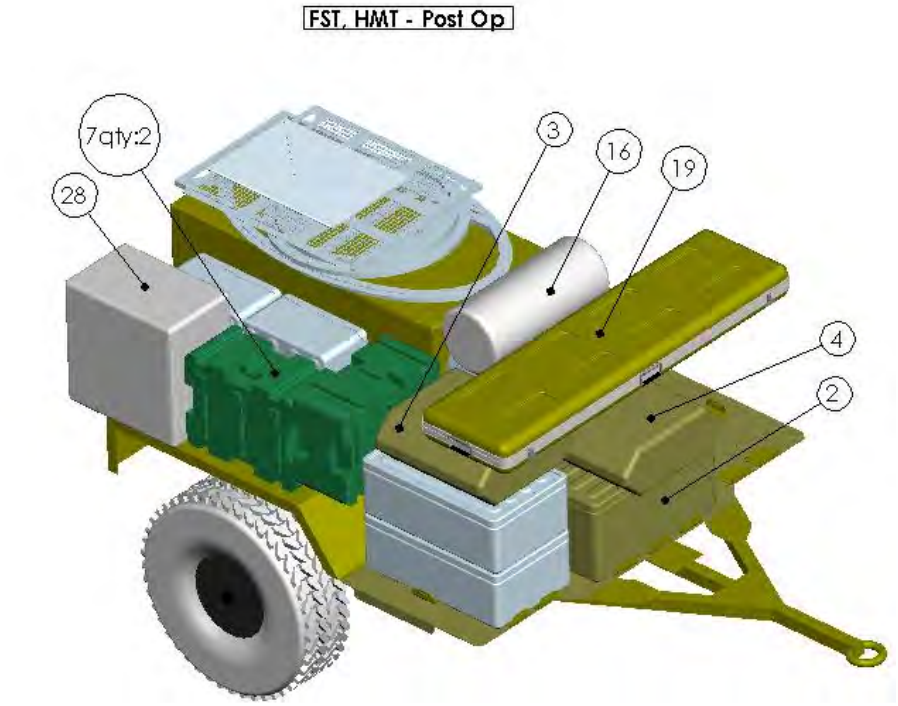


Figure E-5. FST, HMT - Post Op (Sheet 2 of 3)

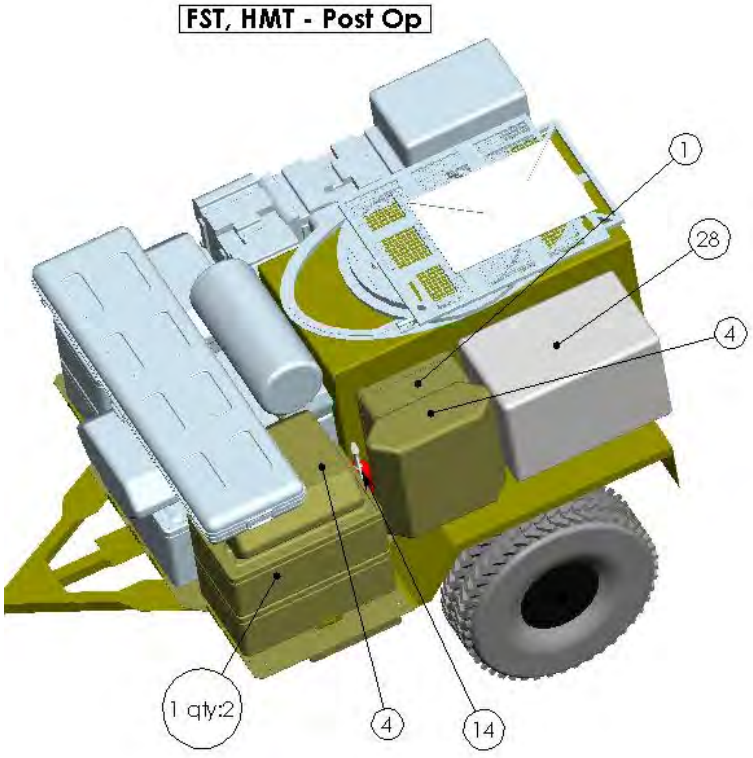


Figure E-5. FST, HMT - Post Op (Sheet 3 of 3)

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

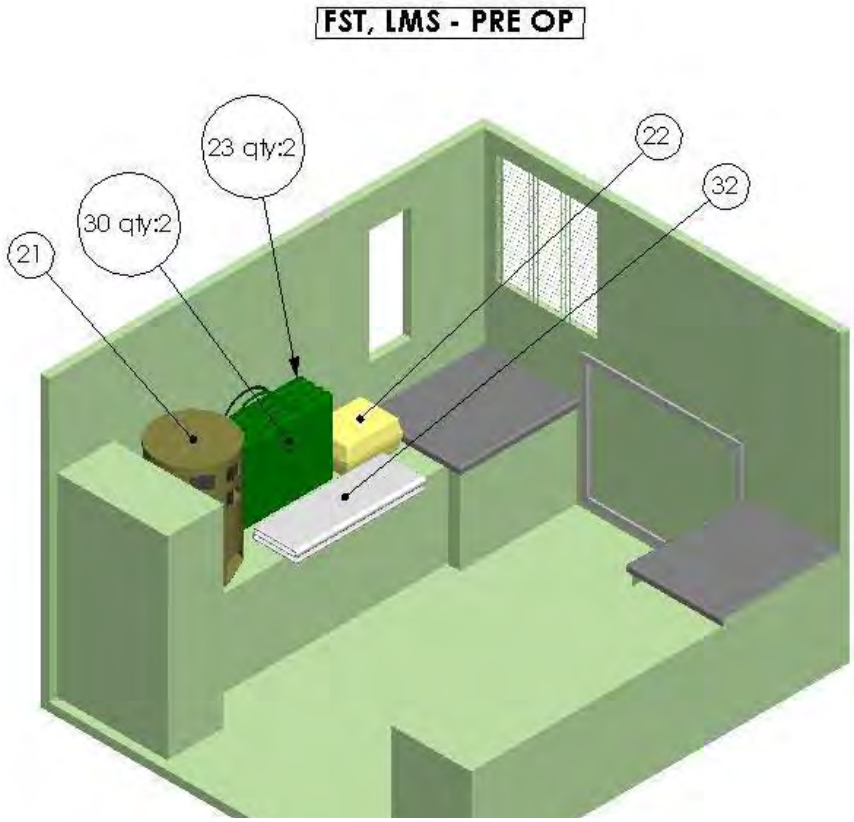


Figure E-6. FST, LMS - Pre Op (Sheet 1 of 2)

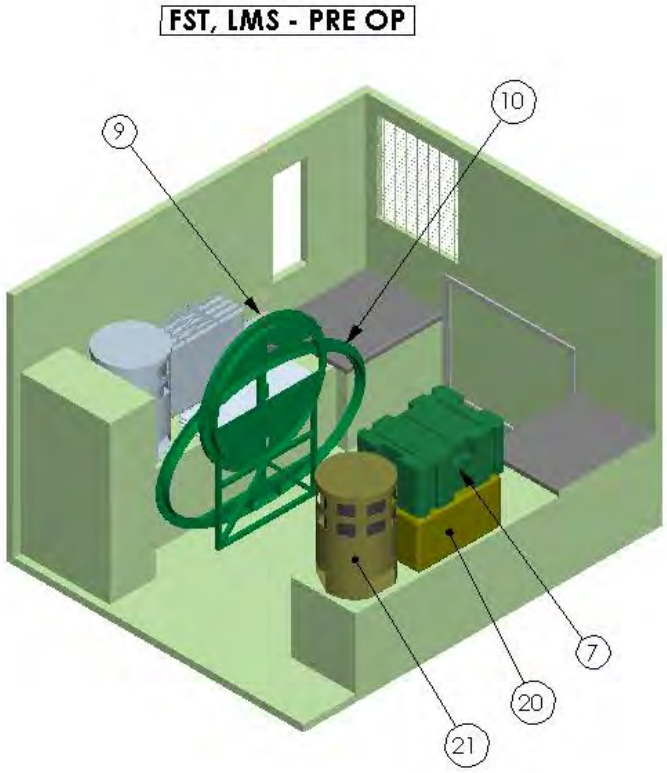


Figure E-6. FST, LMS - Pre Op (Sheet 2 of 2)

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

Item 31 deleted.

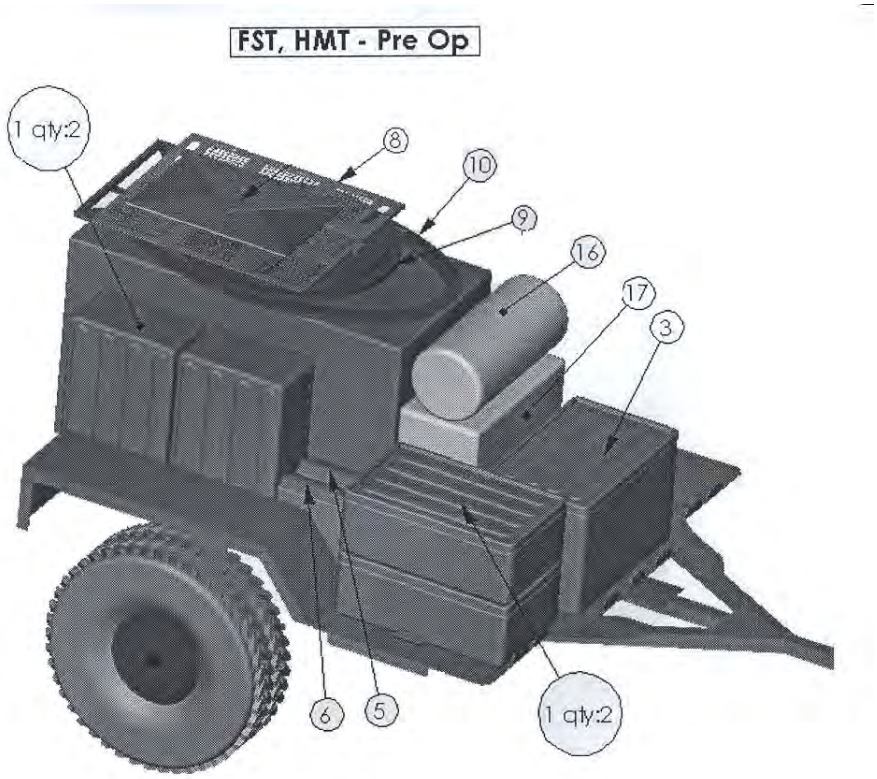


Figure E-7. FST, HMT - Pre Op (Sheet 1 of 4)

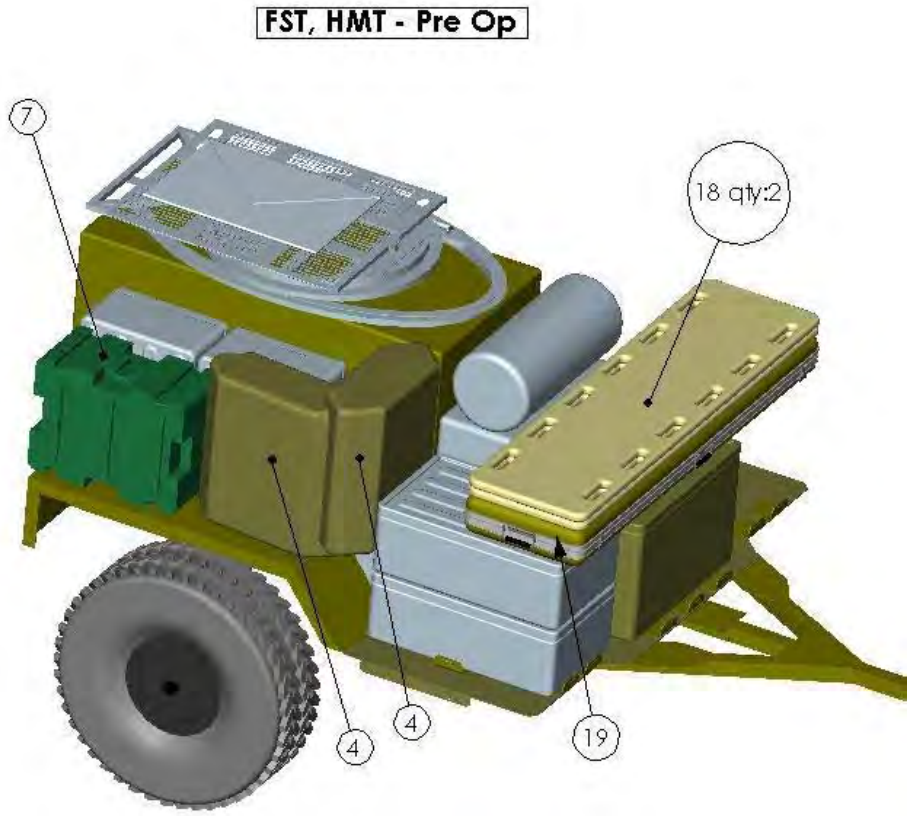


Figure E-7. FST, HMT - Pre Op (Sheet 2 of 4

)

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

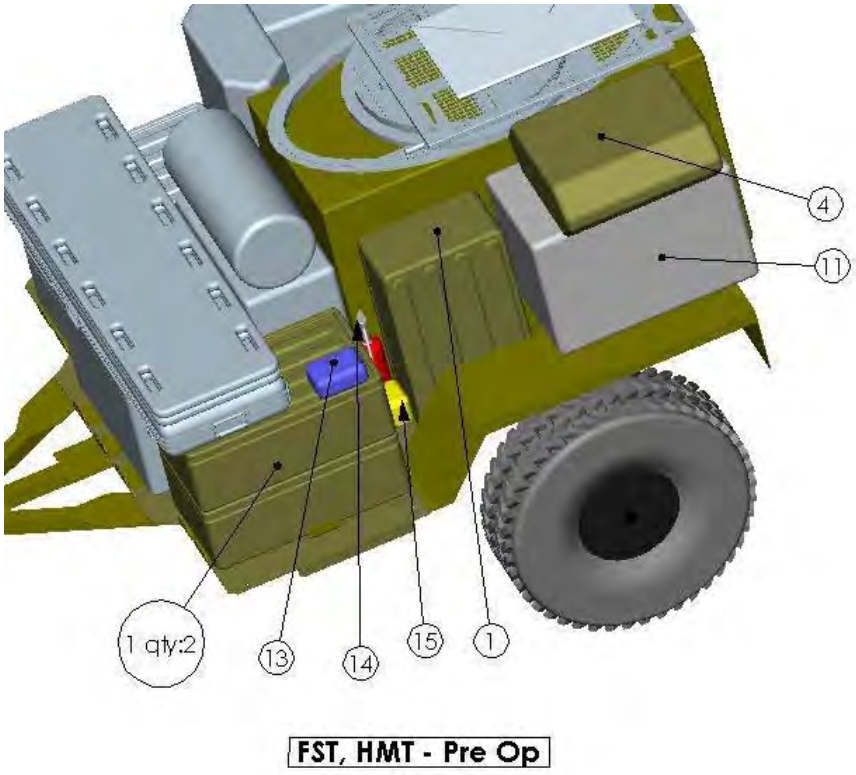


Figure E-7. FST, HMT - Pre Op (Sheet 3 of 4)

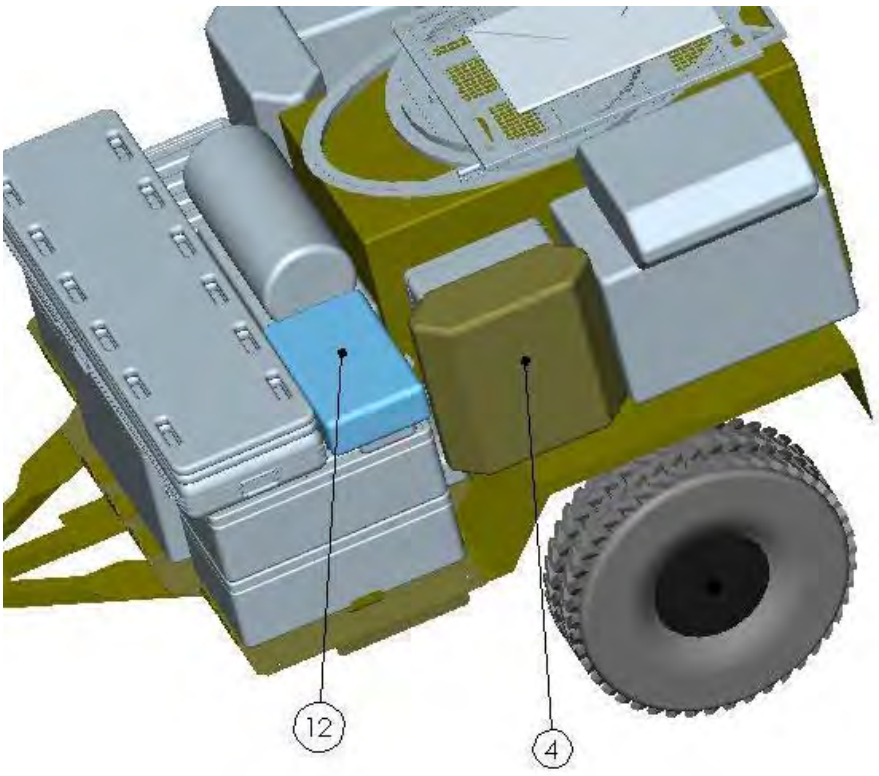


Figure E-7. FST, HMT - Pre Op (Sheet 4 of 4)

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

Table E-2. MTF Load Plans- Dental

Key No.	Description	Dimensions (L x W x H) in.
1	Small Dental Chest	27x15x9
2	Medical Chest # 3	31x19x11
3	Medical Chest # 6	31x16x20
4	ABS Liner Bag	25x25x10
5	Spare Parts Kit	16x14x6.5
6	Airbeam Repair Kit	16x14x6.6
7	Dental Equipment	24x12x8
8	Engine Platform	39x34.5x1
9	TALP Door	50x35x2.5
10	AA Door	60x36x1.8
11	Compressor, Dehydrator	24x21x16
12	Dental Suction	22x19x11
13	Field Sink	30x27x14.5
14	HMT Fire Extinguisher	18x4 dia
15	DCS Connector	30x13 dia (rolled)
16	ABS Light Set	74x20x6.5
17	Recirc Filter	25x16.5 dia
18	DELETED	
19	Inner LMS Sound Blanket	30x10x4
20	Litter Stands	30x6x6
21	Litter	96x6x6

MTF, LMS – Dental

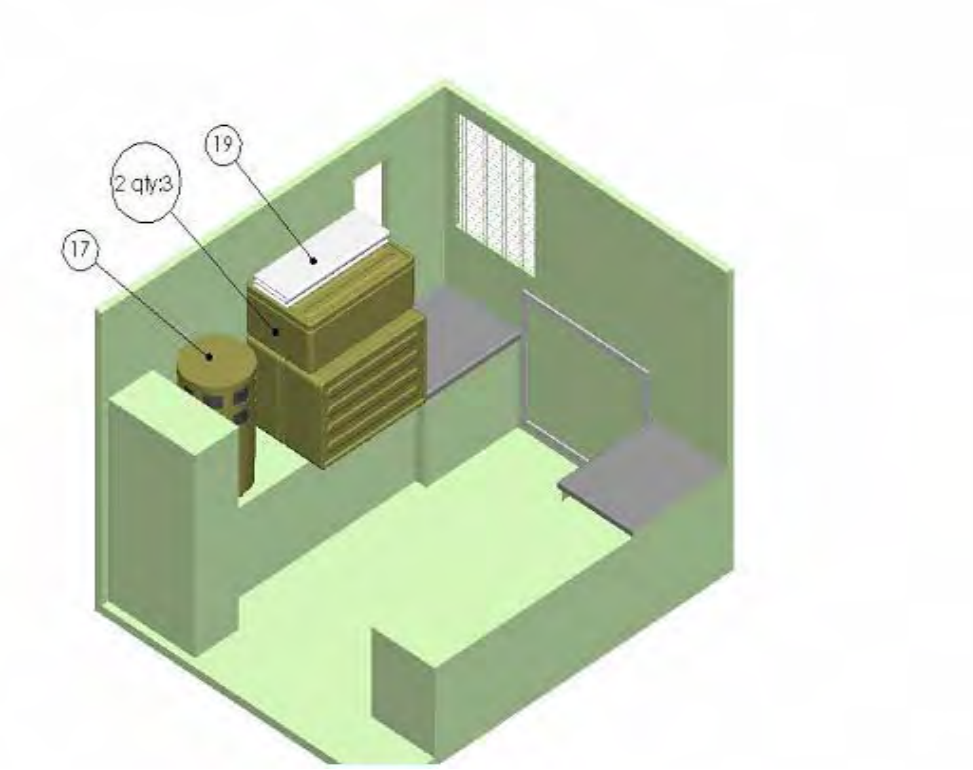


Figure E-8. MTF, LMS - Dental (Sheet 1 of 2)

MTF, LMS – Dental

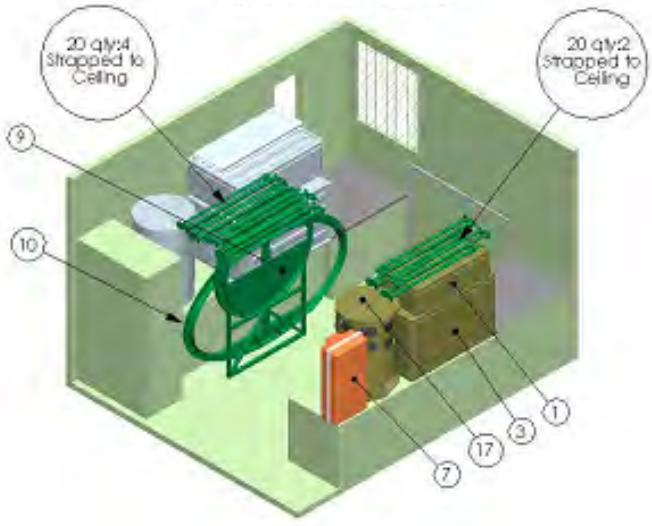


Figure E-8. MTF, LMS - Dental (Sheet 2 of 2)

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

MTF, HMT – Dental

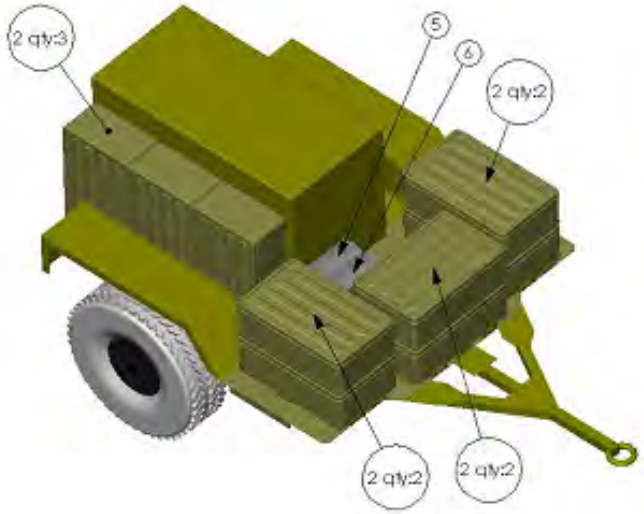


Figure E-9. MTF,HMT – Dental (Sheet 1 of 5).

MTF, HMT – Dental

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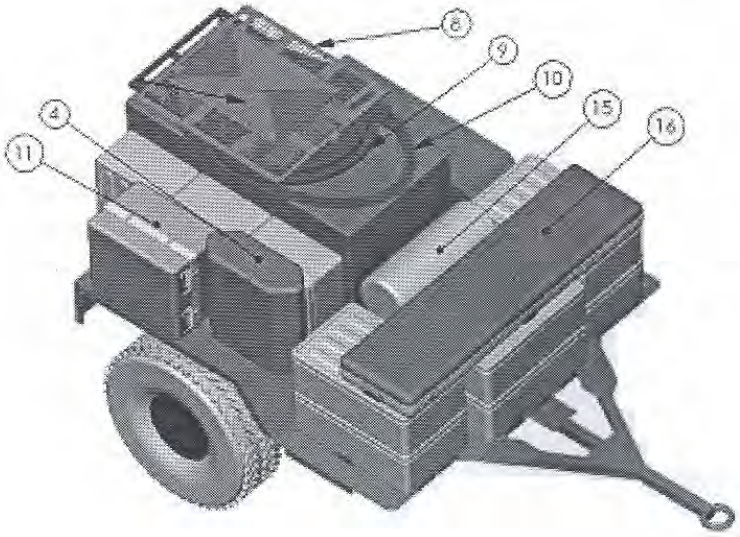


Figure E-9. MTF, HMT – Dental (Sheet 2 of 5).

MTF, HMT – Dental

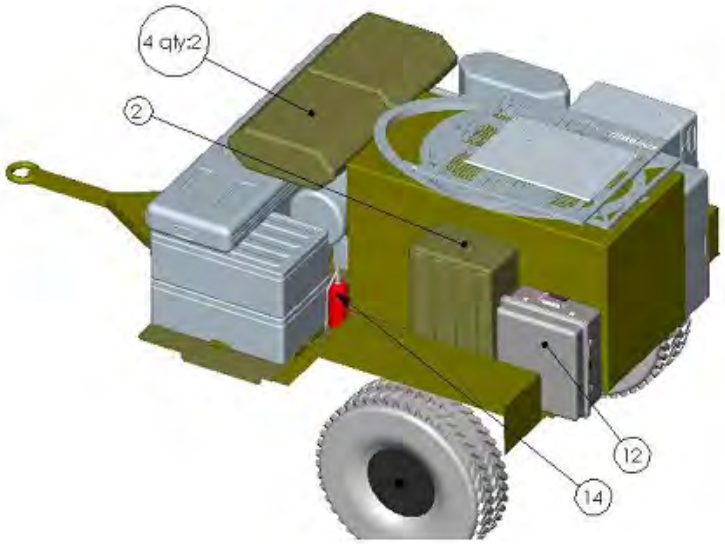


Figure E-9. MTF, HMT –Dental (Sheet 3 of 5).

MTF, HMT – Dental

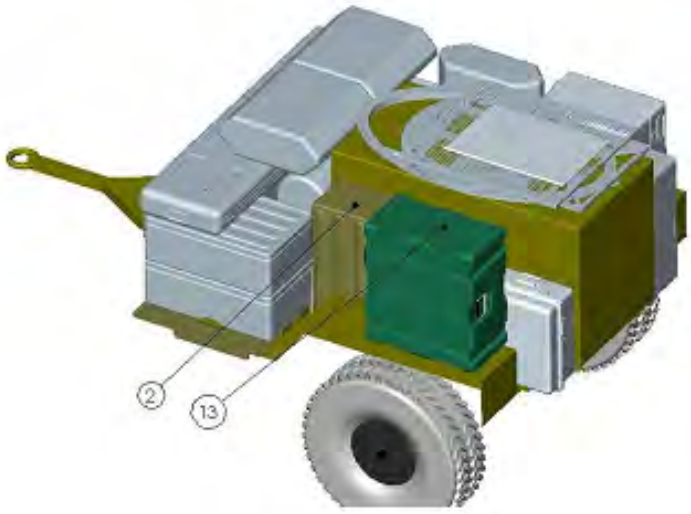


Figure E-9. MTF, HMT – Dental (Sheet 4 of 5).

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

MTF, HMT – Dental

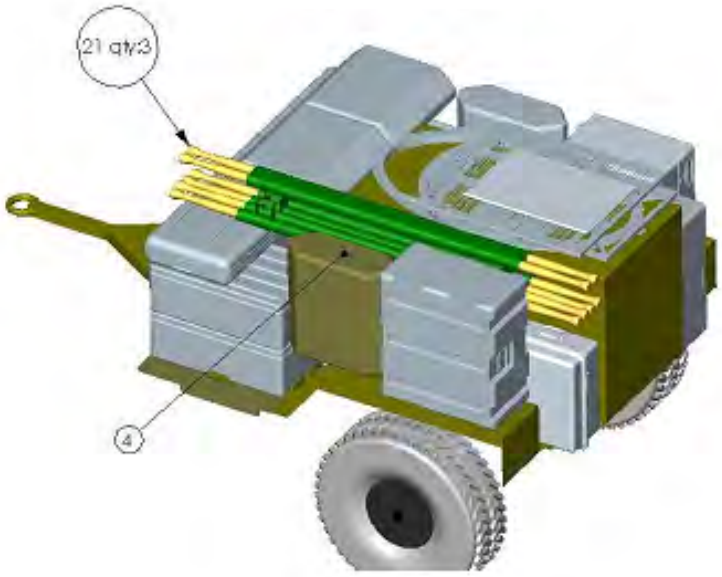


Figure E-9. MTF, HMT –Dental (Sheet 5 of 5).

Table E-3. MTF Load Plans- EMT

Key No.	Description	Dimensions (L x W x H) in.
1	Medical Chest # 3	31x19x11
2	ABS Liner Bag	25x25x10
3	Spare Parts Kit	16x14x6.5
4	Airbeam Repair Kit	16x14x6.6
5	EMT Case	22x15x15
6	Engine Platform	39x34.5x1
7	TALP Door	50x35x2.5
8	AA Door	60x36x1.8
9	Litter Stands	30x6x6
10	Litter	96x6x6
11	HMT Fire Extinguisher	18x4 dia
12	DCS Connector	30x13 dia (rolled)
13	ABS Light Set	74x20x6.5
14	Recirc Filter	25x16.5 dia
15	Suction, Portable	13x10x6.5
16	Oxygen, Portable	13x10x6.6
17	DELETED	
18	Inner LMS Sound Blanket	30x10x4

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

LMS, MTF - EMT

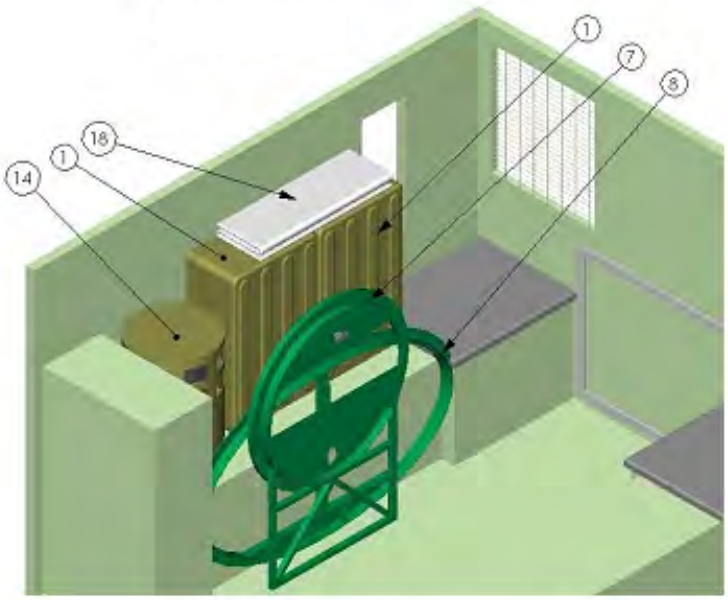


Figure E-10. LMS, MTF – EMT (Sheet 1 of 2).

LMS, MTF - EMT

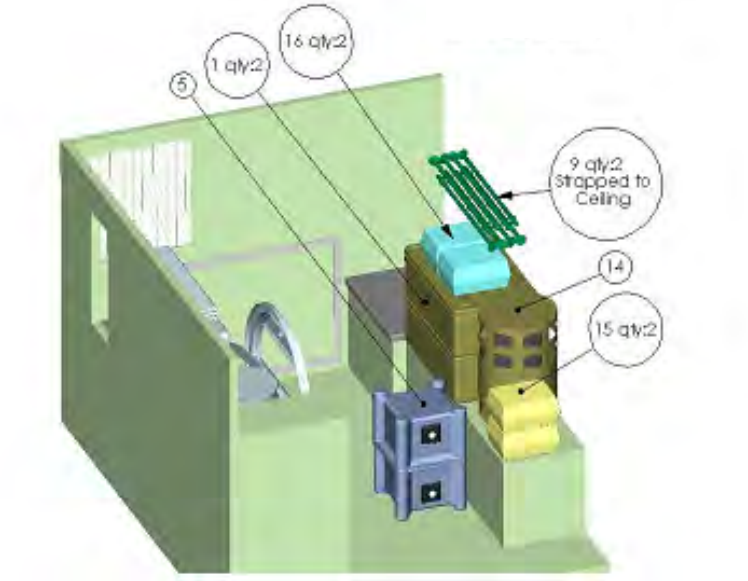


Figure E-10. LMS, MTF – EMT (Sheet 2 of 2).

HMT, MTF - EMT

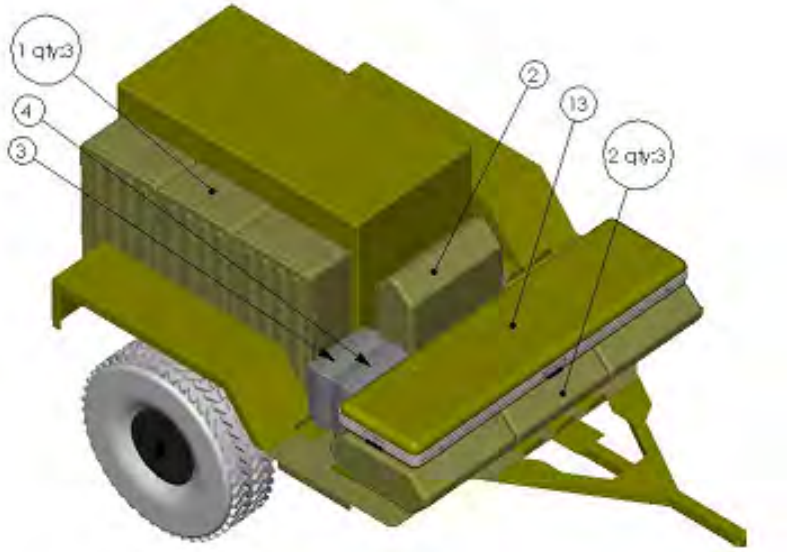


Figure E-11. HMT, MTF – EMT (Sheet 1 of 4).

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

HMT, MTF - EMT

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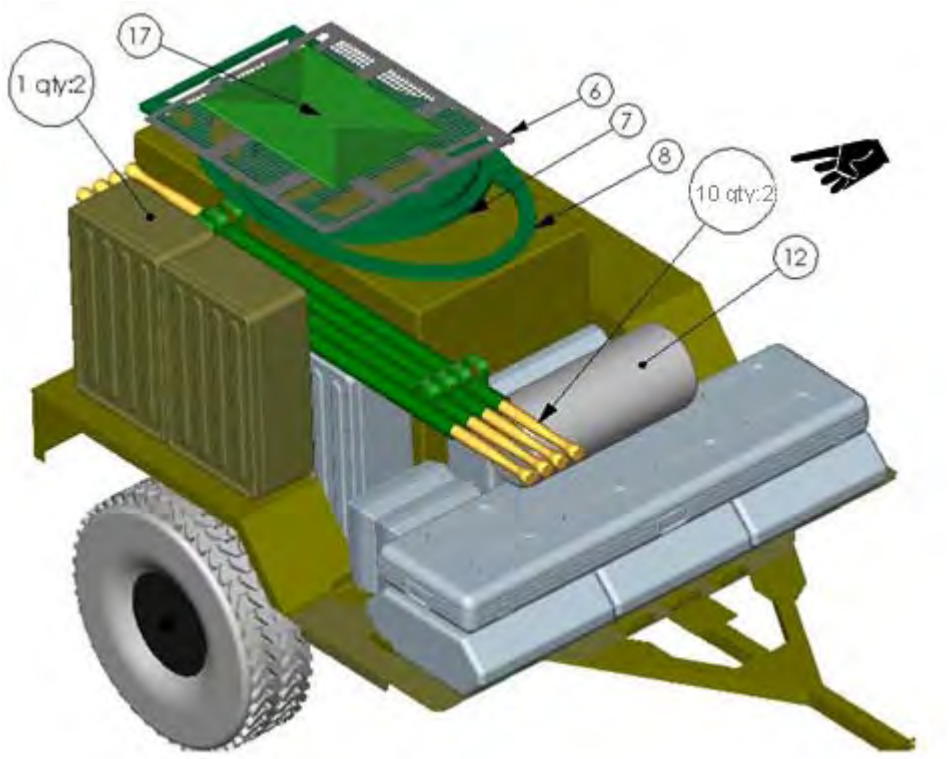


Figure E-11. HMT, DCS - EMT (Sheet 2 of 4)

HMT, MTF - EMT

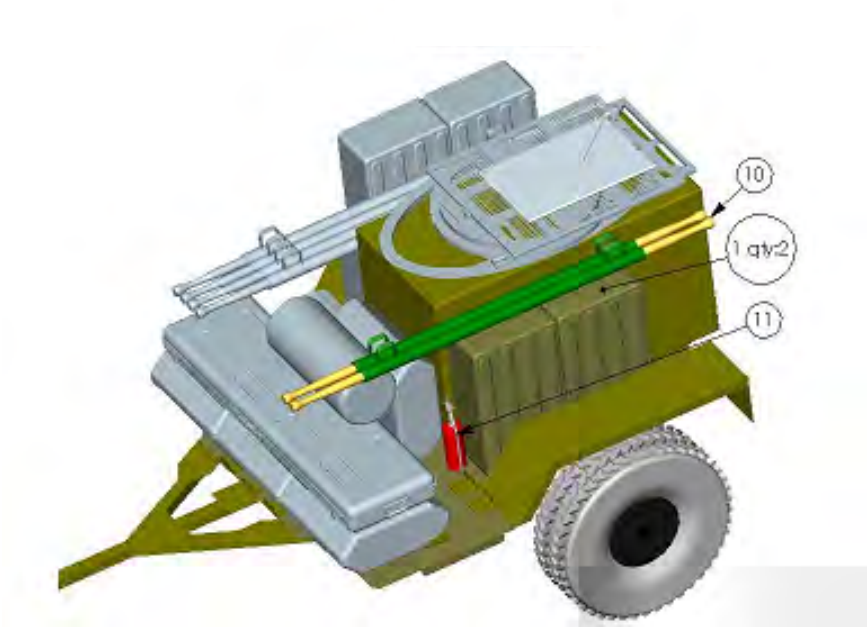


Figure E-11. HMT, MTF – EMT (Sheet 3 of 4).

HMT, MTF - EMT

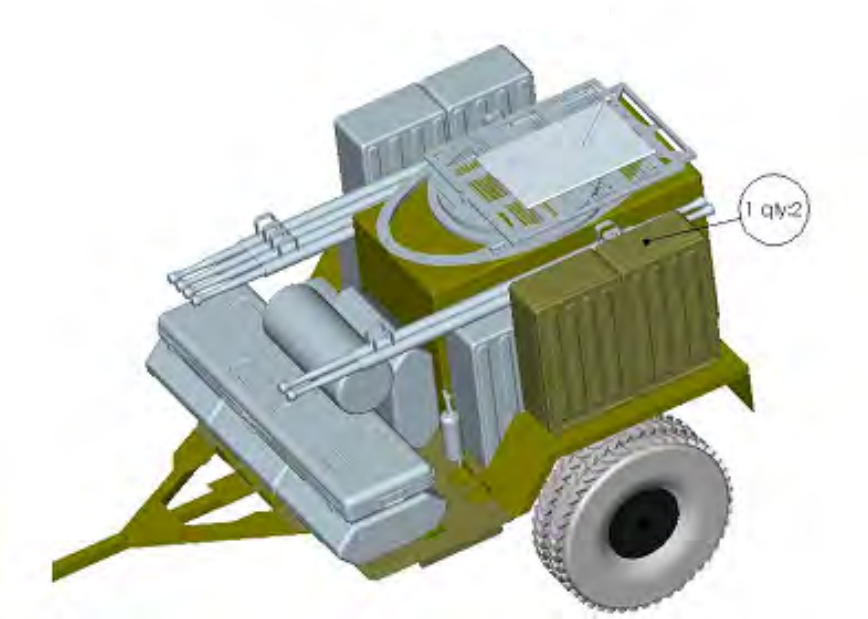


Figure E-11. HMT, MTF – EMT (Sheet 4 of 4).

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

Table E-4. MTF Load Plans- Patient Hold

Key No.	Description	Dimensions (L x W x H) in.
1	Medical Chest # 3	31x19x11
2	Hospital Bed (Folded)	33x24x6
3	ABS Liner Bag	25x25x10
4	Spare Parts Kit	16x14x6.5
5	Airbeam Repair Kit	16x14x6.6
6	Engine Platform	39x34.5x1
7	TALP Door	50x35x2.5
8	AA Door	60x36x1.8
9	Defibulator	20x15x3
10	HMT Fire Extinguisher	18x4 dia
11	DCS Connector	30x13 dia (rolled)
12	Field Sink	30x27x14.5
13	Backboard	74x20x1.5
14	ABS Light Set	74x20x6.5
15	Recirc Filter	25x16.5 dia
16	Suction, Portable	13x10x6.5
17	DELETED	
18	Inner LMS Sound Blanket	30x10x4
19	Litter Stands	30x6x6
20	Medical Chest # 6	31x16x20
21	Litter	96x6x6

LMS, MTF Pat. Hold

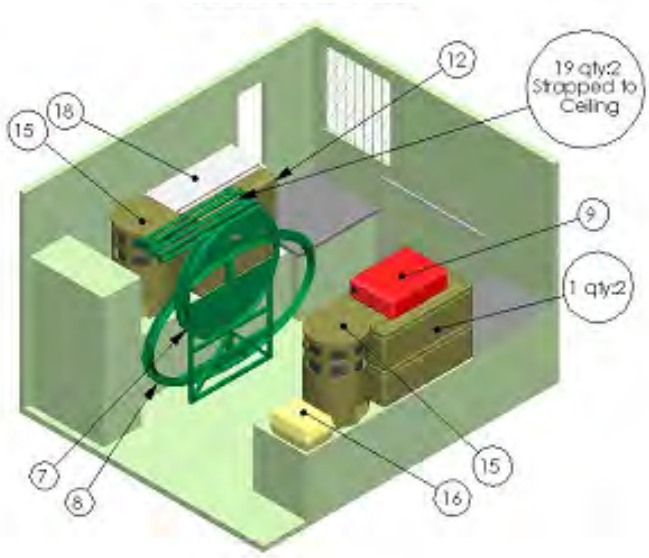


Figure E-12. LMS, MTF – Patient Hold.

HMT, MTF Pat. Hold

Item 17 deleted.

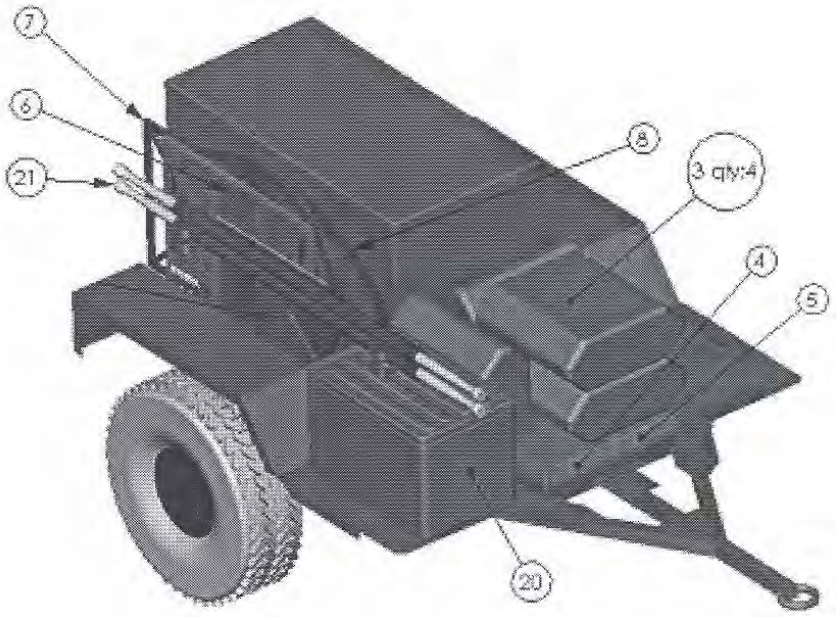


Figure E-13. HMT, MTF – Patient Hold (Sheet 1 of 3).

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

HMT, MTF Pat. Hold

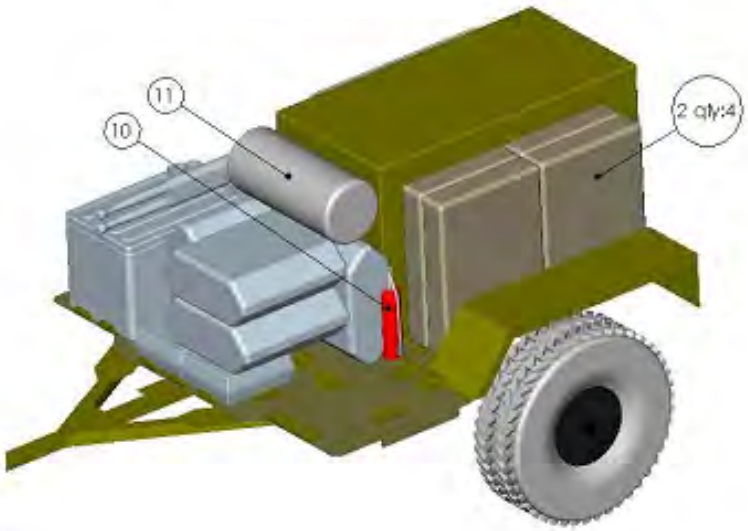


Figure E-13. HMT, MTF – Patient Hold (Sheet 2 of 3).

HMT, MTF Pat. Hold

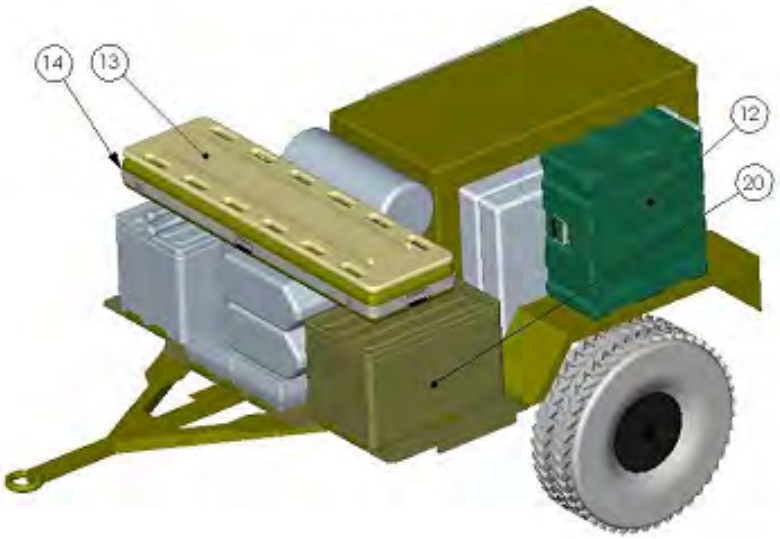


Figure E-13. HMT, MTF – Patient Hold (Sheet 3 of 3).

Table E-5. MTF Load Plans - X-Ray

Key No.	Description	Dimensions (L x W x H) in.
1	Medical Chest # 3	31x19x11
2	Medical Chest # 6	31x16x20
3	ABS Liner Bag	25x25x10
4	Spare Parts Kit	16x14x6.5
5	Airbeam Repair Kit	16x14x6.6
6	Engine Platform	39x34.5x1
7	TALP Door	50x35x2.5
8	AA Door	60x36x1.8
9	Litter Stands	30x6x6
10	HMT Fire Extinguisher	18x4 dia
11	DCS Connector	30x13 dia (rolled)
12	ABS Light Set	74x20x6.5
13	Recirc Filter	25x16.5 dia
14	DELETED	
15	Inner LMS Sound Blanket	30x10x4

LMS, MTF – X-Ray

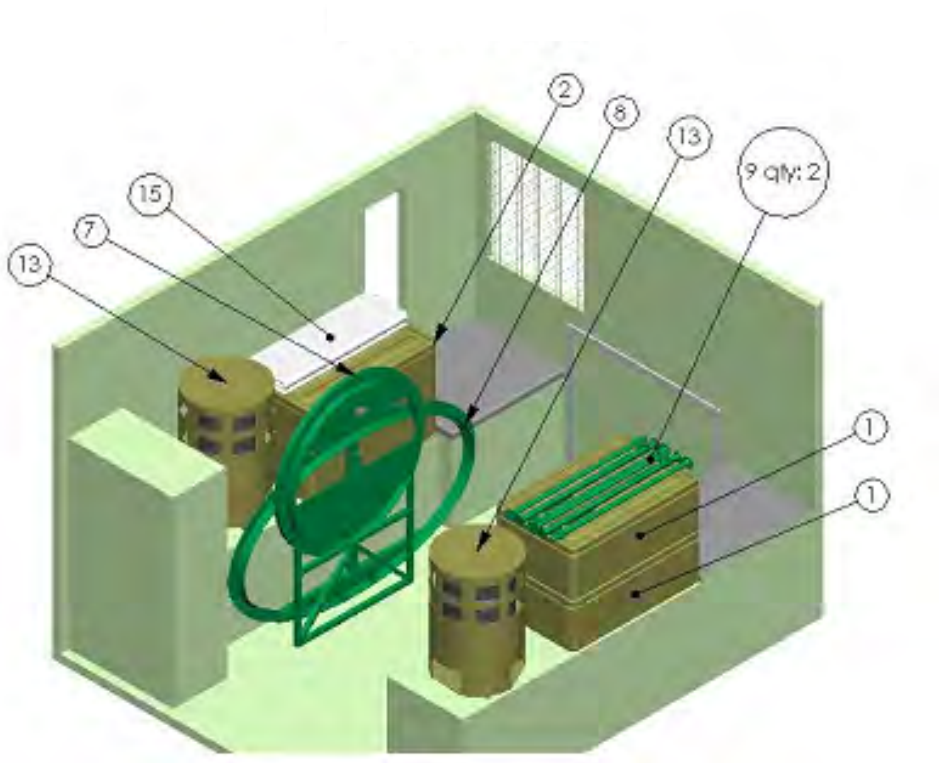


Figure E-14.. LMS, MTF – X-Ray.

E.4 FORWARD SURGICAL TEAM (FST) AND LEVEL II MEDICAL TREATMENT FACILITY (MTF) LOAD PLANS - Continued.

HMT, MTF – X-Ray

Item 14 deleted.

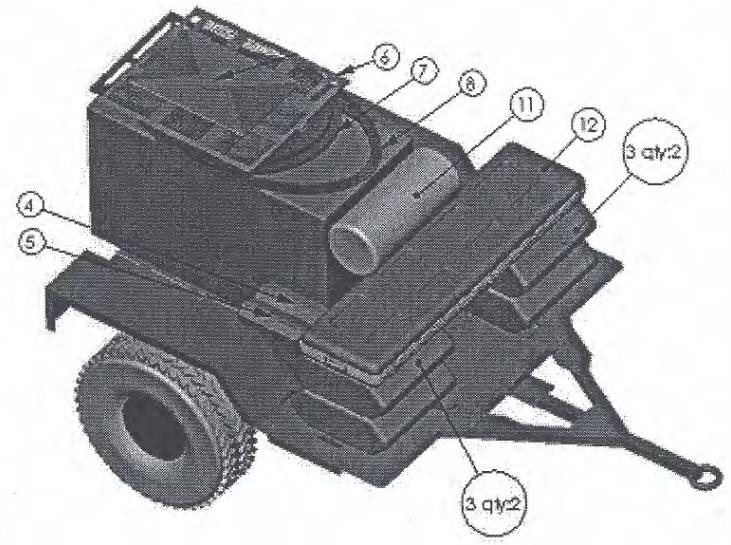


Figure E-15. HMT, MTF – X-Ray (Sheet 1 of 2).

LMS, MTF – X-Ray

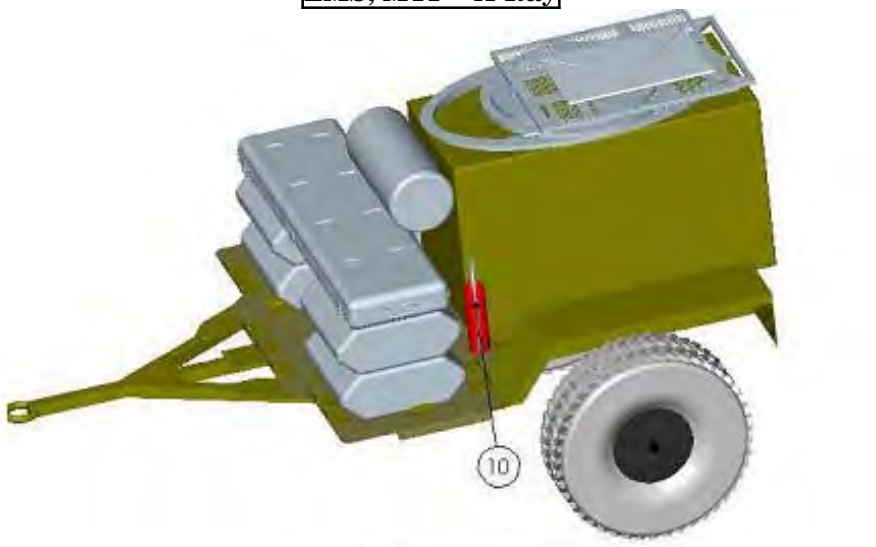


Figure E-15. HMT, MTF – X-Ray (Sheet 2 of 2).

APPENDIX F
CHEMICAL BIOLOGICAL PROTECTIVE SHELTER (CBPS) SYSTEM DECONTAMINATION (DECON)

F.1 CBPS MISSION CONTAMINATION SCENARIOS.

- A clean CBPS unit travels through a nuclear biological chemical (NBC) contaminated area and deploys in a clean area.
- A NBC contaminated CBPS unit strikes in a NBC contaminated area.
- A clean CBPS unit is set up in a clean area in non-NBC mode and then exposed to a NBC attack.

F.2 DECON LEVELS.

The instructions of this presentation are specific to the CBPS. These instructions have three purposes. If the CBPS becomes contaminated these procedures will:

a. Prevent the spread of contamination.

b. Ensure decontaminants used on the CBPS will not degrade the performance of any material properties or mechanical operations.

c. Ensure that the decontamination can be carried out with the least effort and greatest effectiveness. This appendix describes procedures for three levels of decontamination:

(1) Immediate Decon (Non-CBPS Specific) - Immediately following a NBC attack or exposure, skin decon should be performed using the skin decontaminating kit (SDK), followed by individual equipment decon using the individual equipment decon kit (IEDK). Lastly, operators use the on-board decon apparatus to decon surfaces that the users must come in contact with to operate the equipment or perform maintenance.

(2) Operational Decon (CBPS Specific) - This procedure includes a Mission Oriented Protective Posture (MOPP) gear exchange when thorough decon cannot be done. Soldiers continue to wear MOPP gear until thorough decon can be accomplished. Vehicle washdown should be performed within 6 hours of being contaminated when the mission does not permit a thorough decon. This process removes gross contamination and limits the spread of contamination.

(3) Thorough Decon (CBPS Specific) - This detailed procedure requires the support of a battalion decontamination unit and powered decontamination equipment with which decontaminants can be applied to areas that are difficult to reach, atop and underneath the system. These procedures are also conducted at designated decon sites which are predetermined by the decon unit.

F.3 OPERATIONAL DECON ABSTRACT.

Operational decon enables the CBPS crew to continue the mission with very little delay. It may be required once the CBPS has become contaminated with liquid or vapor agent, either in transport or while in operation. The main purpose of operational decon is to prevent contamination from being transferred from exterior surfaces to the interior NBC protected area of the LMS & ABS. Operational decon is necessary only if there is contamination on the exterior shelter surfaces that must be touched by someone preparing to enter the shelter, to perform maintenance, or to make the system ready for transport. Normally the crewmen who ride in the LMS will turn on the system when the CBPS is to be erected in a contaminated environment. Therefore, entries will normally be made only through the airlock using the prescribed procedures for entry/exit in a contaminated environment as described in the operators manual (Chapter 4).

NOTE

The transit cover and ground cloth are **not** made of agent-resistant materials. These items should be used even if detection paper identifies them to be contaminated. Only discard at the deliberate decon site as instructed.

F.4 SEQUENCE OF OPERATIONAL DECON PROCEDURES.

If the tent surfaces are heavily contaminated, the crew can wear the Suit, Contamination-Avoidance, Liquid-Protective (SCALP), to minimize contamination of MOPP gear when striking and preparing the contaminated shelter in NBC mode for movement to a new site. Using the SCALP prevents the over-garment and overboots from being exposed to liquid agent and preserves them for continued use.

a. Apply Detector Paper - To indicate whether decon may be necessary, place M9 detector paper in five locations on the CBPS when it is to be transported: 1) the front bumper, 2) the top of the LMS, 3) on a horizontal exterior surface of the TALP that would be exposed to falling agent, and 4) low on each side of the HMMWV frame.

b. Detection - Before beginning to strike the CBPS, examine the M9 paper for indication of contamination. Use M8 paper to confirm any positive M9 paper indications and to check any visible moisture apparent on other surfaces.

c. Operational Decon - If detector paper indicates contamination is present, use decon solution to neutralize those areas. Apply decon solution to all areas that are covered with ABS material; under window flaps, Ambulatory Airlock (AA) & Tunnel Airlock Litter Patient (TALP) airlocks, Fastex buckles (used as fasteners on the travel cover and door flaps), dump caps, pass-through ports, DCS connector, etc.

d. Initial Entry To Inflate - Follow instructions defined in the TM.

F.5 THOROUGH DECON ABSTRACT.

Thorough decon of the CBPS can be performed only with the support of a chemical battalion using either mobile M12 Power-Driven Decon Apparatus (PDDA) or mobile M17 Lightweight Decontamination System (LDS), and equipment for applying decon solution(s) and chemical agent monitoring (CAM). The FM 3-11.5 detailed equipment decontamination line for mobile vehicles involves a process of moving through five stations; primary wash, decon solution application, contact time, rinse, and chemical monitoring. CBPS should be treated as a fixed site (see figure F-1) once it has reached designated thorough decon site. The fixed site decon procedures in FM 3-11.5 are vague, therefore the following procedure is recommended. **Only bleach based decontaminates should be used on the CBPS.**

F.6 THOROUGH DECON PRECAUTIONS.

CAUTION

- Do not apply decontaminants to bare metal surfaces, such as hydraulic lines, motors, and unpainted portions of the POD/ECU interior.
- Do not spray decontaminant or rinse water into air intakes and filter system.
- If using, avoid applying DS2 directly to tent zippers or to hook-and-pile fastener tape and airlock vents.
- Avoid applying decon DS2 to the pressure relief valves on each side of the LMS shelter, to buckles of the tent, or to air beam dump caps.
- Avoid direct contact to ABS surfaces with high pressure decon apparatus. Use a 'fan' tip to reduce the risk of ABS material failure from extreme pressures.
- It is safe to apply all decontaminates to the air beam shelter (ABS) tent fabric, window material, and CBPS chemical-agent-resistant coating (CARC) painted surfaces.
- Do not allow decon solution or any liquids to enter the dump caps while removing dump caps and rolling the tent at any stage in the decontamination process.

F.7 SEQUENCE OF THOROUGH DECON PROCEDURES.

a. Request decon support (CBPS specific - Hill Site to allow adequate runoff).

b. Move CBPS to specified decontamination site in NBC mode.

c. Process through pre-staging area to coordinate removal of conventional contaminated items, augmented personnel and driver exchange process.

d. Park HMT in the normal operating area outlined in the operators manual (paragraph 2.25.3.2), hook up tactical quiet generator (TQG) in case auxiliary power needs to be used during decon procedures.

e. Lay down ground cloth and saturate with decon solution.

f. Unroll ABS.

g. Remove ABS staking ropes before erecting the ABS.

h. Deploy ABS in NBC mode, install AA and TALP doors, reseal ambulatory flaps.

i. Discard all expendable items that are effected by chemical agents and/or decontaminating solutions. DO NOT remove the ABS structure material, block and tackle and the travel cover that allows the block and tackle to lift the ABS. These items will be removed once the ABS is decontaminated and lifted back into the mobile position.

j. Stage 1: Apply Primary Wash.

k. Stage 2: Apply Decon Solution.

l. Driver exchange.

m. Stage 3: Decon Solution Contact Time (30 minutes).

n. Interior decon is performed during the above phases.

o. Stage 4: Rinse (ABS deployed in NBC mode).

p. Strike ABS in NBC mode.

(1) Fold ABS with incremental rinses.

(2) Lift ABS with block assembly, secure tent with steel safety cables.

(3) Remove and discard block assembly and tailgate travel extension.

NOTE

Do not throw away the steel pole used in travel extension; this will be used again when the system is supplied with replacement items.

(4) Avoid exposing the open dump caps to decon or rinse solutions during the above processes.

(5) Use supplied ratchet straps to secure the ABS during transport to the tactical reconstitution area.

(6) Discard ground cloth.

(7) Connect to decontaminated HMT.

q. Transfer and deploy in NBC mode in a designated clean area for CAM check.

r. Stage 5: Monitor with CAM.

(1) If no positive chemical presence go to next step.

(2) If a chemical presence remains then go back to Stage 2 on specified contaminated areas only.

s. Replacement parts are supplied at a separate reconstitution area.

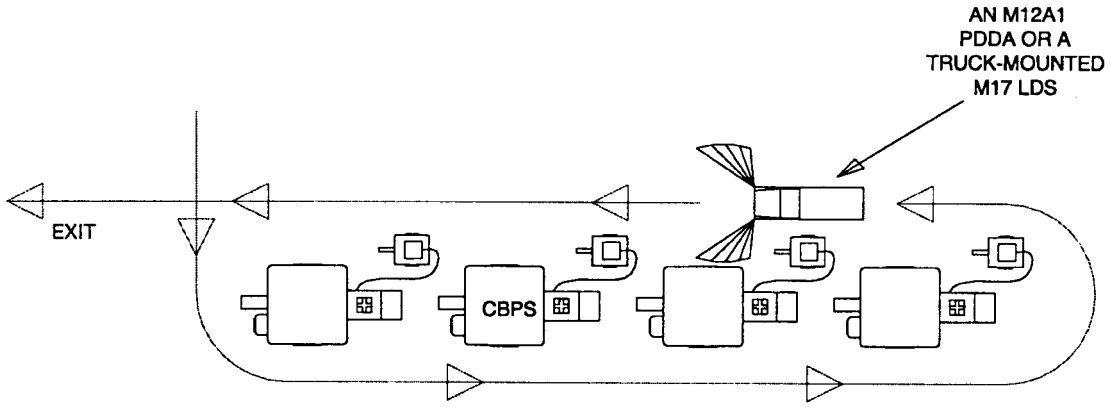


Figure F-1. Fixed-Site CBPS Decon Configuration

F.8 CBPS POST.

The following items need to be replaced after decontamination procedures.

Table F-1. CBPS Post-Through Decon Replacement Items

Item Name	Part Number	Qty per CBPS
Loose Items		
Tent Pin Bag Assembly (Small)	5-4-7031-1	1
Tent Pin Bag Assembly (Large)	5-4-7031-2	1
Pins, Tent, Wood, Size 1 (16” Long)	MIL-P-2383	25
Tent Pin Bag Assembly (Medium)	5-4-7031-3	1
Pins, Tent, Wood, Size 2 (24” Long)	MIL-P-2383	15
Hammer, Sledge	17-1-9406-1	2
Cargo Net, HMMWV	17-2-0647-1	1
Cargo Net, Trailer	17-2-0648-1	1
ABS Items		
Tent Lines	5-4-7034-1	22
Tent Lines	5-4-7034-2	8
Tent Lines	5-4-7034-3	3
Snaphook w/Retainer	5-4-7218-1	2
Ground Cloth Assembly	5-4-7025-1	1
Outer Storage Bag, Insulated Liner	17-2-1023-1	6
Outer Storage Bag, Insulated Liner	17-2-1024-1	6
Strap Assembly, Connector, Female, 4.00” Long	17-2-0780-3 (green) or 17-2-0780-4 (tan)	8
Strap Assembly, Connector, Male, 4.00” Long	17-2-0780-1 (green) or 17-2-0780-2 (tan)	8

Table F-1. CBPS Post-Through Decon Replacement Items - Continued

Item Name	Part Number	Qty per CBPS
Strap Assembly, Connector, Female, 19.00” Long	17-2-0780-9 (green) or 17-2-0780-10 (tan)	4
Strap Assembly, Connector, Male, 16.50” Long	17-2-0780-5 (green) or 17-2-0780-6 (tan)	4
Strap Assembly, Connector, Female, 13.00” Long	17-2-0780-7 (green) or 17-2-0780-8 (tan)	2
Strap Assembly, Connector, Male, 4.00” Long	17-2-0780-1 (green) or 17-2-0780-2 (tan)	2
Strap Assembly, Connector, Female, 13.00” Long	17-2-0780-7 (green) or 17-2-0780-8 (tan)	2
Strap Assembly, Connector, Male, 4.00” Long	17-2-0780-1 (green) or 17-2-0780-2 (tan)	8
Strap Assembly, Connector, Female, 4.00” Long	17-2-0780-3 (green) or 17-2-0780-4 (tan)	6
Tent Cover Items		
Tent Cover, Top Assembly	17-1-9128-1	1
Tent Cover, Bottom Assembly	17-1-9129-1	1
Tent Cover, Bottom Side Assembly	17-1-9130-1	2
Tent Cover, Top Right Assembly	17-1-9132-1	1
Tent Cover, Top Left Assembly	17-1-9133-1	1
Block Assembly	17-1-5521-1	2
Washer, Lock	MS35338-140	26
Washer, Lock	MS35338-139	31
Strap Assembly, Tent	17-2-0792-1	1
ECU Drainage Items		
Tubing, PVC	17-2-0506-7	1
Tubing, PVC	17-2-0500-4	1
Tubing, Drain	17-1-9472-1	4
Tubing, PVC	17-2-0500-1	1
Tubing, PVC	17-2-0506-2	1
Strap, Tiedown	MS3367-3-0	2
Tubing, PVC	17-2-0506-3	1
Tubing, PVC	17-2-0506-6	1
Tubing, PVC	17-2-0506-5	1
Tubing, PVC	17-2-0506-1	1
Washer, Lock	MS35338-139	3
LMS Items		
Strap	17-2-1001-5	1

F.8 CBPS POST - Continued.

Table F-1. CBPS Post-Through Decon Replacement Items - Continued

Item Name	Part Number	Qty per CBPS
HMT Items		
Strap Assembly	17-2-0666-1	6
Cover, Trailer, Canvas	17-2-0665-1	1
Strap Assembly, NBC Filter	17-2-0720-1	1
Strap Assembly, Trailer	17-2-0586-2	4
Strap Assembly, Medical Chest	17-2-0719-1	3
Strap Assembly, Trailer	17-2-0586-1	3
Strap Assembly, Trailer, CBPS	17-2-0721-1	6
Strap Assembly, Trailer, CBPS	17-2-0721-2	2
Strap Assembly, Trailer, CBPS	17-2-0721-3	2
Rivet, Blind, .250 dia x .350-.625 Grip	17-2-0284-1	74
Rivet, Blind, Closed End, .188 Dia x .126 x .250 Grip	M24243/6-A604H	12
Rivet, Blind, Closed End, .188 Dia x .251 x .375 Grip	M24243/6-A606H	24
Rivet, Blind, Structural, .250 Dia x .751 x .812 Grip	MS20600AD8W13	13

APPENDIX G
CBPS PERFORMANCE MEASURES

CBPS Performance Measures (Cab Crew)

REFERENCES:

TM 10-5410-228-10..... Chemical Biological Protective Shelter
TM 9-6115-642-10..... Generator Set, Skid Mounted, Tactical Quiet
FM 5-424 ..... Theater of Operations – Electrical Systems

	GO	NO GO
1. Perform CBPS PMCS in accordance with TM 10-5410-228-10.	____	____
2. Perform 10K PMCS in accordance with TM 10-5410-228-10.	____	____
3. Hook up Trailer to ECV.	____	____
4. Select appropriate site to establish system with minimum area of 50 X 100 ft. with 15 ft overhead clearance.	____	____
5. Position trailer with TQG ensuring front driver side ECV tire aligned with trailer axle allowing for 4 – 6 ft. space.	____	____
6. Unload HMT and stage equipment.	____	____
7. Ground system IAW FM 5-424 and local policies.	____	____
8. Prepare TQG for Operation.	____	____
9. Position and prepare ABS for establishment.	____	____
10. Engage EPG as directed by LMS crew.	____	____
11. Establish Talp Door.	____	____
12. Establish AMB Door.	____	____
13. Send in equipment sets to ABS.	____	____
14. Establish any additional equipment to receive patients.	____	____
15. Switch from Internal to External.	____	____
16. Complex systems.	____	____
17. Strike systems.	____	____

CBPS Performance Measures (LMS Crew)

REFERENCES:

TM 10-5410-228-24..... Unit, Direct Support and General Support Maintenance Manuals for Chemical Biological Protective Shelter (CBPS) System

TM 10-5410-228-24P ..... Unit, Direct Support and General Support Maintenance Repair Parts and Special Tools List for Chemical Biological Protective Shelter(CBPS) System

	GO	NO GO
1. Establish system in NBC mode.	____	____
2. Prepare Control Panel for System establishment.	____	____
3. Ensure EPG is disengaged prior to adjustment to ESS mode switch.	____	____
4. Assist air beam inflation.	____	____
5. Establish Talp Door.	____	____
6. Establish AMB Door.	____	____
7. Establish internal ABS.	____	____
8. Provide AC power to ABS.	____	____
9. Prepare ABS to receive patients.	____	____
10. Switch from Internal (INT) to External (EXT) power.	____	____
11. Complex systems.	____	____
12. Strike systems.	____	____

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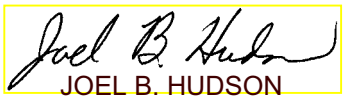
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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

5/9 (°F – 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 °C + 32 = °F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.741
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

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