

***TM 10-3510-221-10**

TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

LAUNDRY ADVANCED SYSTEM (LADS)

MODEL C (NSN: 3510-01-463-0114)

MODEL D (NSN: 3510-01-558-6662)

*This manual supersedes TM 10-3510-221-10 dated 31 October 2003.

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

HEADQUARTERS, DEPARTMENT OF THE ARMY

07 JULY 2008

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous material warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. For first aid instructions see FM 4-25.11.

EXPLANATION OF SAFETY WARNING ICONS



EAR PROTECTION - headphones over ears shows that noise level will harm ears.



ELECTRICAL - electrical wire to hand with electricity symbol running through hand shows that shock hazard is present.



HOT AREA - hand over object radiating heat shows that part is hot and can burn.



MOVING PARTS - hand with fingers caught between gears shows that the moving parts of the equipment present a danger to life or limb.

GENERAL SAFETY WARNING DESCRIPTIONS



WARNING

When the Laundry Advanced System is operating, the noise levels at the roadside of the equipment could cause noise induced hearing loss. Hearing protection must be worn at all times when working near this equipment.



WARNING

The Laundry Advanced system contains rotating and vibrating equipment. Never climb into the laundry drum. Personnel must keep their hands, feet, clothing, and loose personal items clear while equipment is operating. Failure to follow this warning may result in serious personal injury or death.



WARNING

Keep hands and fingers away from hinge points on ladder halves when opening and closing. Keep hands and fingers away from inner and outer rungs of ladder when adjusting. Never climb on ladder unless knobs and inner locking devices are properly tightened, footings are placed securely upon ground, and/or ladder is placed securely upon equipment to prevent slipping. Failure to observe this precaution may result in severe personal injury.

GENERAL SAFETY WARNING DESCRIPTIONS-CONTINUED

**WARNING**

Thermal heat exchanger fluid can reach temperatures near 400 °F when the heating system is operating. Operators must ensure the “cool down” cycle has been run prior to performing PMCS. Avoid contact with equipment surfaces. Personal conducting maintenance must wear impermeable gloves and goggles for protection. Failure to follow this warning may result in serious personal injury or death.

**WARNING**

LADS operates with hot water at approximately 212 °F (100 °C). Allow water to cool before conducting any type of work on the system. Heated water and steam can cause LADS surfaces to become very hot. Avoid contact with equipment surfaces. Failure to follow this warning could result in serious injury to personnel from scalding.

**WARNING**

The Laundry Advanced System requires 208 VAC, 3-phase, and single-phase, 50-60 Hz electrical power to operate the various subsystems. Only maintenance personnel shall conduct servicing, beyond troubleshooting on electrical controls and circuits. Contact with energized connections will result in serious personal injury or death. Electrical high voltage cannot be seen, but it can kill you, render you unconscious, or severely burn you. Electricity is unlike most other dangerous things you can come in contact with because it gives no warning and no symptoms to be wary of. Failure to observe this warning may result in severe injury or death by electrocution. To ensure your safety and that of other maintenance personnel, always observe the following precautions:

- Power supply shall be SHUT OFF and disconnected only by qualified personnel. Power source must be shut off and disconnected before attempting to disassemble power supply equipment. Failure to comply may result in severe injury or death by electrocution.
- LADS must be electrically grounded. Failure to properly ground the LADS IAW FM 5-424 may result in serious injury or death from electrical malfunction.
- DO NOT perform any maintenance on electrical equipment unless all power is removed and you are qualified to perform repairs.
- ALWAYS place POWER OFF warning tags on power supply switches so that no one can apply power while maintenance personnel are performing maintenance.
- Be certain that there is someone assisting or observing you who can remove power immediately. Check for signs of electrocution and begin CPR if necessary. For guidance on performing CPR, refer to FM 21-11. Seek immediate medical attention and notify supervisor if injury occurs.

WARNING

Precautions must be taken when working with pressurized (air, water, steam, or thermal fluid) systems. Residual pressure must be vented or isolated to prevent release before hoses, fittings, or equipment are connected or disconnected. Failure to follow this warning may result in personal injury or death.

GENERAL SAFETY WARNING DESCRIPTIONS-CONTINUED

WARNING

Before moving the Laundry System, ensure that all loose equipment is properly stowed and that nothing will drag on the ground. Failure to follow this warning may result in injury to personnel or damage to equipment.

WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.), and use caution to avoid injury to personnel.

EXPLANATION OF HAZARDOUS MATERIAL ICONS



BIOLOGICAL - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.



CHEMICAL - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



FIRE - flame shows that a material may ignite and cause burns.



VAPOR - human figure in a cloud shows that material vapors present a danger to life or health.

GENERAL HAZARDOUS MATERIALS DESCRIPTIONS



WARNING

The fuel, JP-8 or DF-2, used in the Laundry Advanced System is a combustible liquid. Vapors and liquid may ignite or explode. Do not smoke or use open flames when connecting fuel hoses, refueling, or when performing maintenance. Flames and fire can occur resulting in severe burns, personal injury, or death.



WARNING

Exhaust discharge contains deadly gases. Do not operate the Laundry Advanced System in an enclosed area unless exhaust discharge is properly vented outside. Severe personal injury or death due to carbon monoxide poisoning could result.



WARNING

Solvents, cleaners and adhesives are toxic and may be flammable and explosive. Wear protective goggles and use only in a well-ventilated area. Avoid contact with skin, eyes and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy, get fresh air immediately and get medical aid. If contact with eyes or skin is made, immediately flush with clean water and get medical aid for eyes immediately.

GENERAL HAZARDOUS MATERIALS DESCRIPTIONS-CONTINUED



WARNING

Detergent, sanitizer, and anti-foam used with the Laundry Advanced System are irritants. Operators must refer to Material Safety Data Sheets for pertinent information. Impermeable gloves and eye protection must be worn when handling or dispensing these items. Failure to follow this warning may result in personal illness or injury.



WARNING

Waste water generated during laundry operations may contain chemical and/or biological materials. When maintaining or servicing water plumbing or associated components, personnel must wear impermeable gloves and goggles for protection. Failure to follow this warning may result in serious illness.

WARNING

Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel and damage equipment. To prevent this, refer to TM 9-247 for further instructions.

LIST OF EFFECTIVE PAGES/WORKPACKAGES

NOTE: This manual supersedes TM 10-3510-221-10 dated 31 October 2003. Zero in the "Change No." column indicates an original page or work package.

Date of issue for the original manual is:

Original 07 JULY 2008

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HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 07 JULY 2008

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MODEL C (NSN: 3510-01-463-0114)

MODEL D (NSN: 3510-01-558-6662)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), located in the back of this manual directly to: Commander, TACOM Life Cycle Management Command, ATTN: AMSTA-LC-LMPP/TECH PUBS, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. You may also send in your recommended changes via electronic mail or by fax. Our fax number is Commercial 309-782-0726 and DSN 793-0726. Our e-mail address is TACOMLCMC.DAFORM2028@us.army.mil. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

HOW TO OBTAIN TECHNICAL MANUALS

When a new system is introduced to the Army inventory, it is the responsibility of the receiving units to notify and inform the Unit Publications Clerk that a Technical Manual is available for the new system. Throughout the life cycle of the new system, the Publications Proponent will also provide updates and changes to the Technical Manual.

To receive new Technical Manuals or change packages to fielded Technical Manuals, provide the Unit Publications Clerk the full Technical Manual number, title, date of publication, and number of copies required. The Unit Publications Clerk will then justify the request through the Unit Publications Officer. When the request is approved, DA Form 12-R is used to order the Technical Manual from the Army Publishing Directorate (APD). Obtain the form and request a publications account from the APD Web site at <http://www.apd.army.mil>. Once on the Website, click on the "Orders/Subscriptions/Reports" tab. From the dropdown menu, select "Establish an Account," then select "Tutorial" and follow the instructions in the tutorial presentation.

Complete information for obtaining Army publications can be found in DA PAM 25-33.

ORGANIZATION OF THIS MANUAL

In this manual, primary chapters appear in upper case/capital letters; work packages are presented in numeric sequence, e.g., 0001; paragraphs within a work package are not numbered and are presented in a titles format. For a first level paragraph title all upper case/capital letters, e.g., INTRODUCTION, the next subordinate paragraph title will have the first letter of the first word and of each principle word all upper case/capital letters, e.g., Still Operation. The location of additional material that must be referenced is clearly marked. Figures supporting maintenance procedures/text are located as close as possible to their references.

FRONT MATTER. Front matter consists of front cover, warning summary, title block, table of contents, and HOW TO USE THIS MANUAL PAGE.

CHAPTER 1 – INTRODUCTION. Chapter 1 contains general information, equipment description, and theory of operation.

CHAPTER 2 – OPERATOR INSTRUCTIONS. Chapter 2 contains a description and use of operator controls and indicators, operating procedures under usual conditions, and operating procedures under unusual conditions.

CHAPTER 3 – TROUBLESHOOTING PROCEDURES. Chapter 3 contains general troubleshooting information, a troubleshooting index, and troubleshooting procedures authorized at operator level.

CHAPTER 4 – PMCS MAINTENANCE INSTRUCTIONS. Chapter 4 provides preventive maintenance checks and services (PMCS) and lubrication instructions.

CHAPTER 5 – MAINTENANCE INSTRUCTIONS. Chapter 5 provides maintenance procedures authorized at crew level.

CHAPTER 6 – SUPPORTING INFORMATION. Chapter 6 contains references, components of end item (COEI) list, basic issue items list (BII) list, additional authorization list (AAL), and expendable and durable items list.

REAR MATTER – Rear matter consists of alphabetical index, DA Form 2028, authentication page, and back cover.

CHAPTER 1

**GENERAL INFORMATION, EQUIPMENT DESCRIPTION
AND THEORY OF OPERATION
FOR
LAUNDRY ADVANCED SYSTEM**

**CREW MAINTENANCE
GENERAL INFORMATION**

SCOPE

This manual contains instructions for operation, troubleshooting, PMCS and maintenance procedures for the Laundry Advanced System (LADS).

Type of Manual: Operator.

Model Number and Equipment Names: Laundry Advanced System: Model C and Model D

Purpose of Equipment: The system is used to perform field laundering of Army clothing and equipment.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 750–8, The Army Maintenance Management System (TAMMS) Users Manual; DA PAM 738–751, Functional Users Manual for the Army Maintenance Management System–Aviation (TAMMS–A); or AR 700–138, The Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your Laundry Advanced System 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 is to go to <https://aeeps.ria.army.mil/aeepspublic.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 numbers specified in DA PAM 750–8, The Army Maintenance Management System (TAMMS) Users Manual. We will send you a reply.

HAND RECEIPT MANUALS

Hand receipt manuals are not applicable to this equipment.

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army materiel 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 the problem in future items.

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

If a corrosion problem is identified, it can be reported using Standard Form (SF) 368, Product Quality Deficiency Report. Use of keywords such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem.

The form should be submitted to the address specified in DA PAM 750–8, The Army Maintenance Management System (TAMMS) User's Manual.

LIST OF ABBREVIATIONS/ACRONYMS-CONTINUED**OZONE DEPLETING SUBSTANCES**

The LADS does not contain any ozone depleting substances.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

References to “destruction of Army materiel to prevent enemy use” are contained in TM 750–244–3.

PREPARATION FOR STORAGE AND SHIPMENT

Refer to (WP 0020), PREPARATION FOR MOVEMENT.

WARRANTY INFORMATION

The Laundry Advanced System does not contain warranty provisions.

NOMENCLATURE CROSS-REFERENCE LIST

Common Name	Official Nomenclature
Fuel Probe	Adapter Assembly, Fuel
LADS	Laundry Advanced System
Laundry Unit	Laundry Advanced System
Touchscreen	Human Machine Interface (HMI)

LIST OF ABBREVIATIONS/ACRONYMS

ABBREVIATION/ACRONYMS	DEFINITION
AC	Alternating current
AR	Army Regulation
BDU	Battle Dress Utility
°C	Degree Celsius
CAGEC	Commercial and Government Entity Code
CBRN	Chemical, Biological, Radiological, Nuclear
cm	Centimeter
CCW	Counter clockwise
CW	Clockwise
CPC	Corrosion Prevention and Control
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit

LIST OF ABBREVIATIONS/ACRONYMS-CONTINUED

ABBREVIATION/ACRONYMS	DEFINITION
Cu	Cubic
DA	Department of the Army
DA PAM	Department of the Army Pamphlet
DC	Direct current
ESD	Electrostatic Device
°F	Degree Fahrenheit
FM	Field Manual
FRS	Finish Reapplication System
ft	Foot
gal	Gallon
GFCI	Ground Fault Circuit Interrupter
HMI	Human Machine Interface
hp	Horsepower
Hz	Hertz (frequency or cycles per second)
in.	Inches
I/O	Input/Output
ISO	International Organization for Standardization
kg	Kilogram
kW	Kilowatt
kPa	Kilopascal
LADS	Laundry Advanced System
Lb	Pound
L	Liters
LME	Lightweight Maintenance Enclosure
MAC	Maintenance Allocation Chart
MTOE	Modification Table of Organization and Equipment
NSN	National Stock Number
PCB	Printer Circuit Board
PLC	Programmable Logic Controller

LIST OF ABBREVIATIONS/ACRONYMS-CONTINUED

ABBREVIATION/ACRONYMS	DEFINITION
PMCS	Preventive Maintenance Checks and Services
PQDR	Product Quality Deficiency Report
Psi	Pounds per square inch
psig	Pounds per square inch gauge
Qty	Quantity
r/min	Revolutions Per Minute
RPSTL	Repair Parts and Special Tools List
SF	Standard Form
SMR	Source, Maintenance, Recoverability
SSR	Solid State Relays
TAMMS	The Army Maintenance Management System
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostics Equipment
TOE	Table of Organization and Equipment
TQG	Tactical Quiet Generator
VAC	Volts Alternating Current
VDC	Volts Direct Current
WCA	Warranty Claim Action
WP	Work Package

END OF WORK PACKAGE

**CREW MAINTENANCE
EQUIPMENT DESCRIPTION AND DATA**

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The Laundry Advanced System (LADS) (Figure 1) consists of two washing/drying systems. The LADS also includes a water recycle system, heating system, air system, and control system. These systems support the operation of both washing/drying systems. The LADS components are mounted on an International Organization for Standardization (ISO) frame which is mounted on a 22-1/2 ton M871A3 semi-trailer. The LADS uses external electrical power. This power is normally provided by a 30 kilowatt (kW), MEP-805A Tactical Quiet Generator Set. The LADS can also be operated with other field generators or commercial power. The LADS requires an external supply of potable water and an external supply of JP-8 fuel. Fuel is normally provided from a 400-gallon fuel tank. A storage locker is provided to store accessories, auxiliary equipment, and consumables.

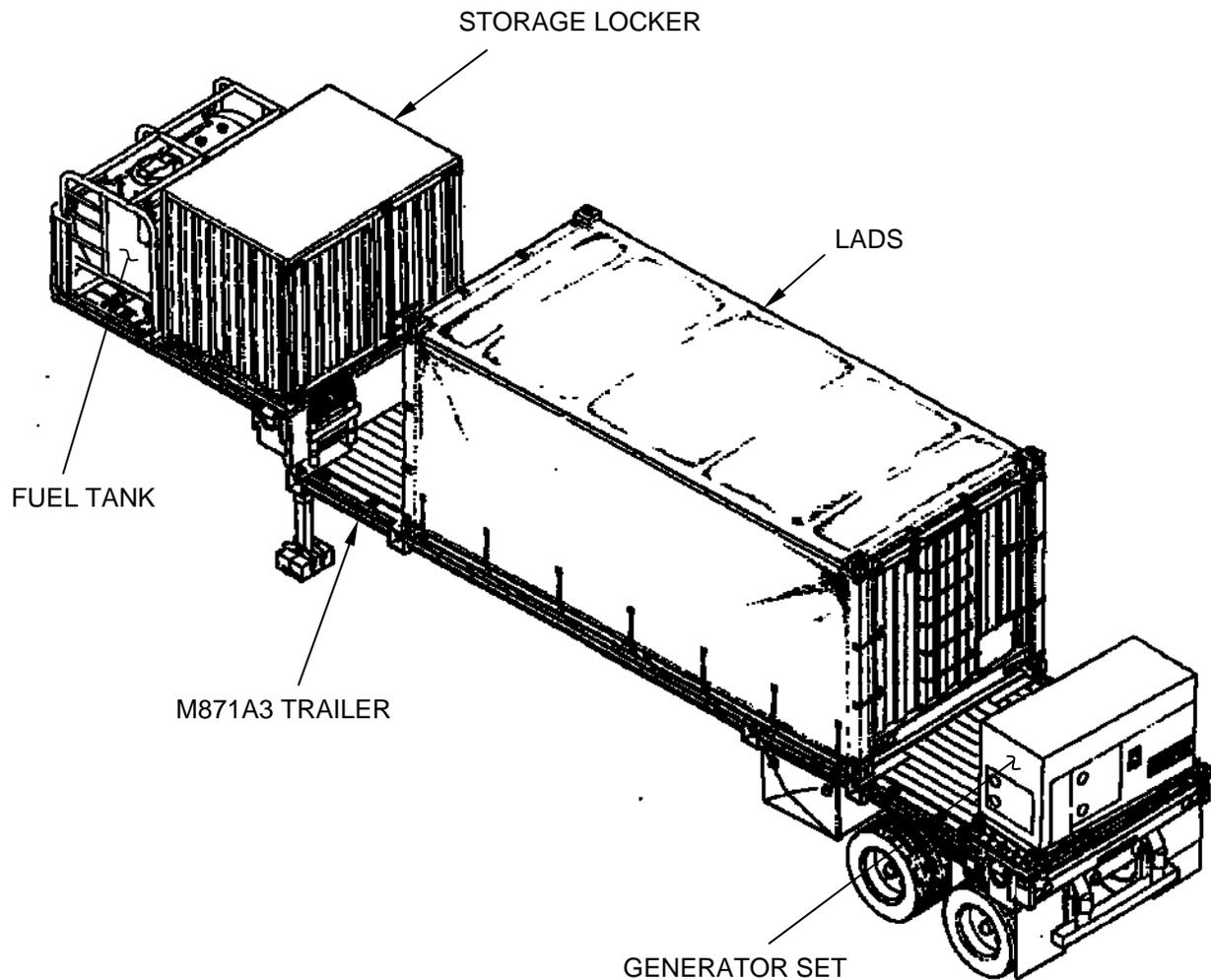


Figure 1. Laundry Advanced System.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS**ISO Frame**

The LADS components are mounted to an 8 foot (ft) wide X 8 ft high X 20 ft long ISO frame (Figure 2). The frame mounts to the M871A3 Trailer via ISO locks. Ladder rungs are provided at both ends of the frame to access the top of the LADS. A protective tarp is provided to cover the curbside, roadside, and top of the LADS during transport.

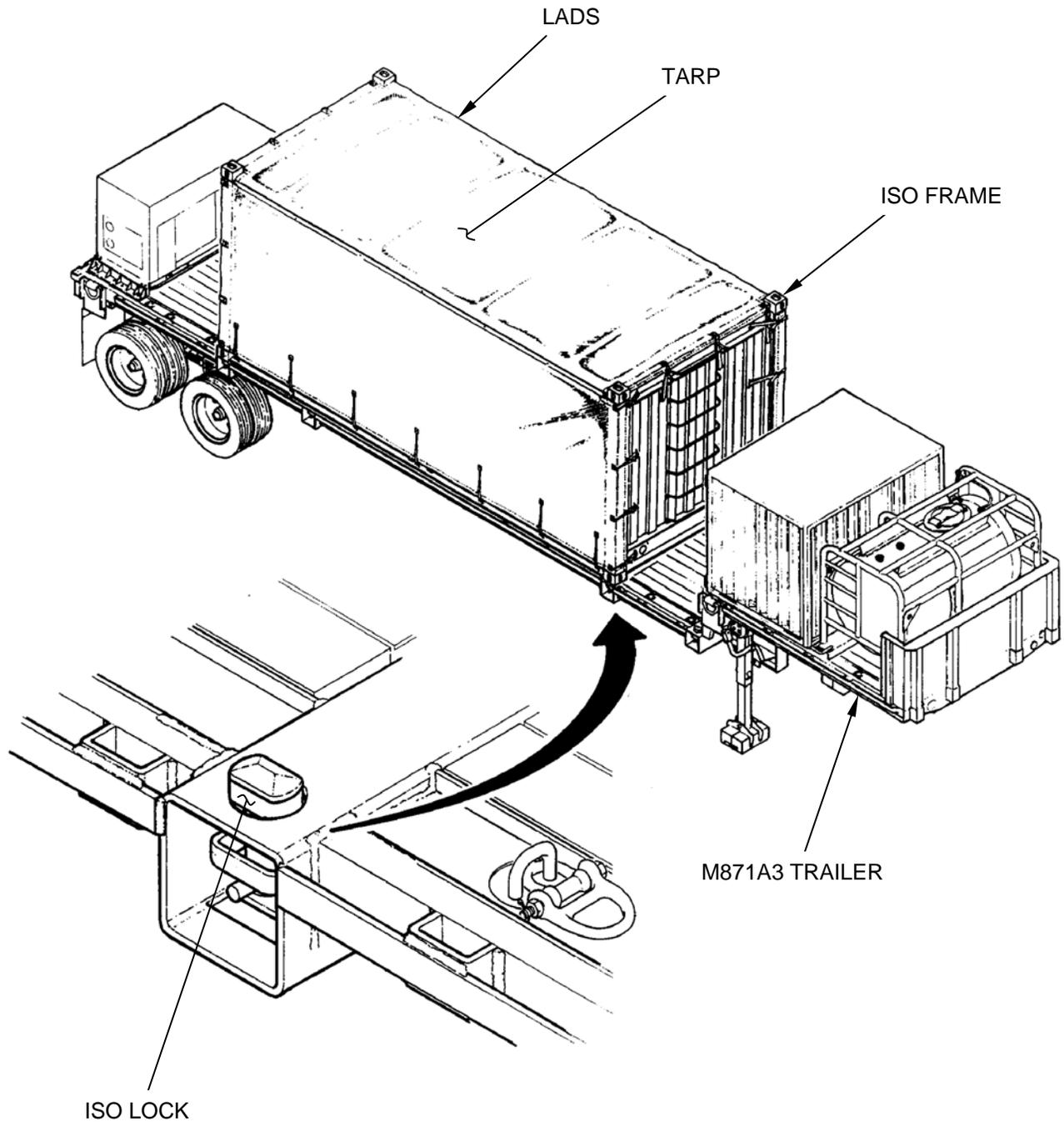


Figure 2. LADS ISO Frame.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Platform

A work platform (Figure 3) is provided at the curbside of the LADS to facilitate laundry and maintenance operations. A hand winch is used to raise and lower the platform. Two adjustable legs are provided to support the front of the platform. Hand rails are provided at the platform sides to prevent personnel from falling. Stairs are located on the side of the platform for ground-level access. The protective tarp used to cover the LADS during transport converts into an awning to protect personnel on the platform from exposure to rain, sun, and wind.

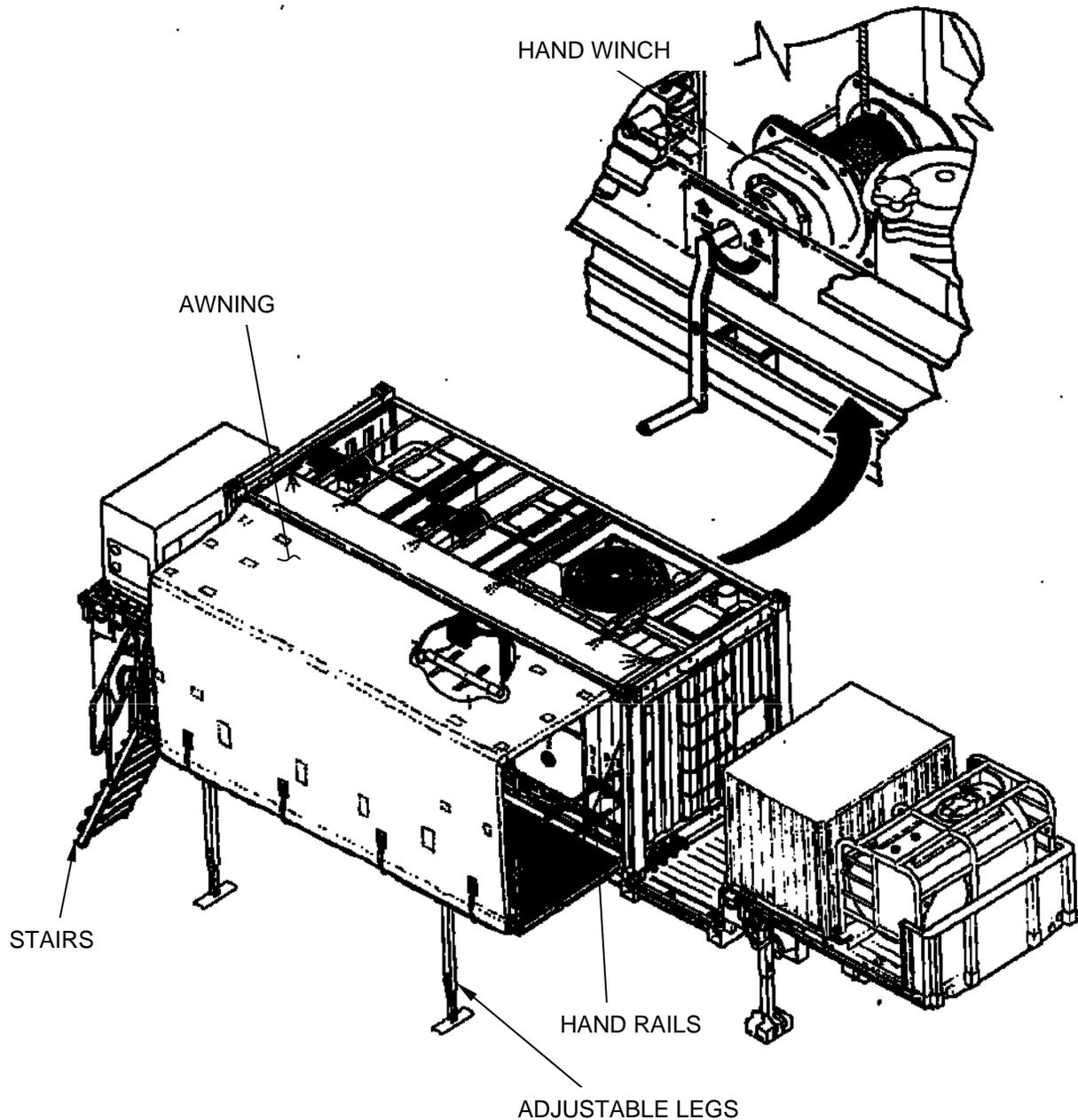


Figure 3. LADS Work Platform.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED**Storage Locker and Fuel Tank**

A 400-gallon fuel tank and storage locker are mounted on the upper deck of the trailer (Figure 4). The fuel tank has ports that connect directly to the LADS heater and 30 kW generator. The storage locker has a 200 cubic foot capacity and is used to store the LADS accessories, auxiliary equipment, and consumable supplies. Document holders are also provided for storage of the LADS Technical Manuals.

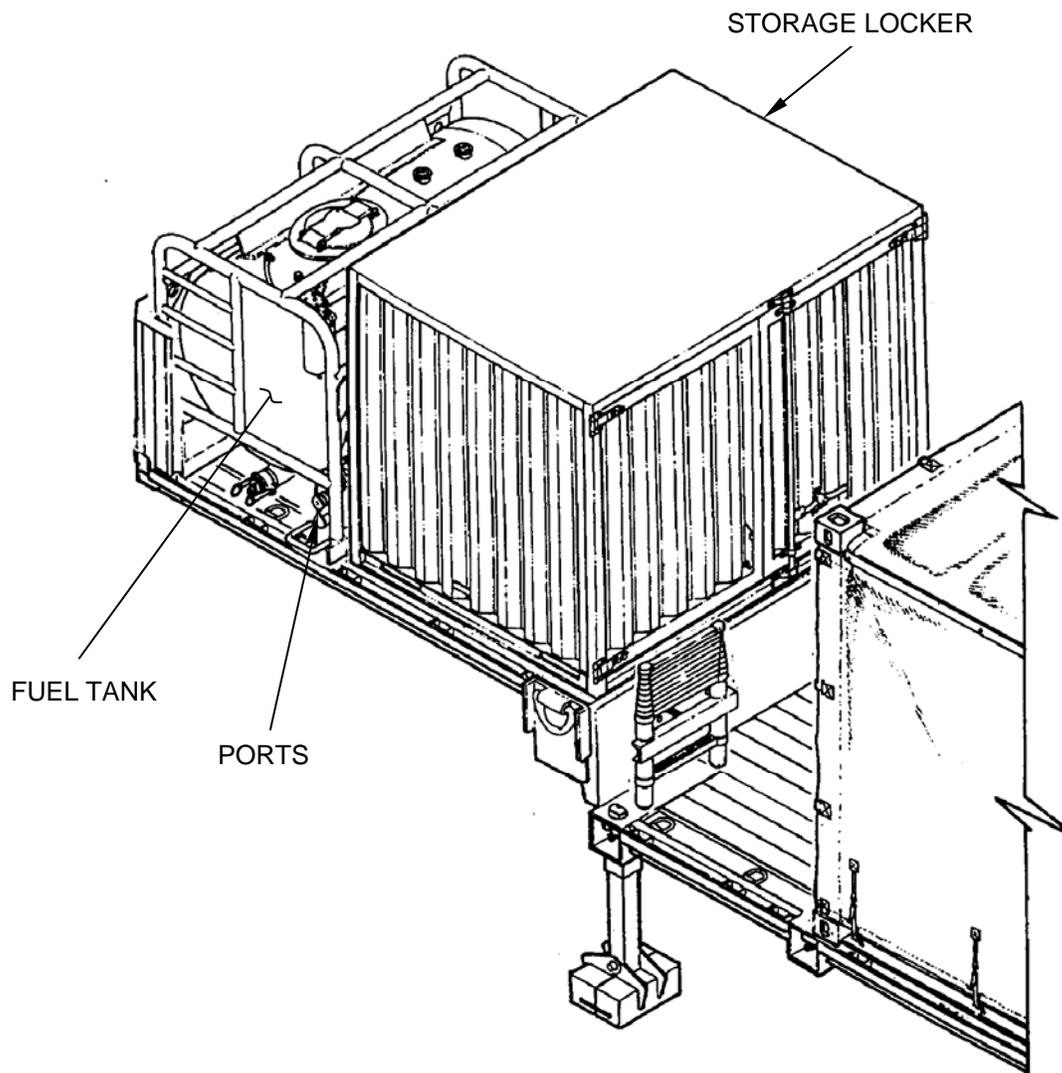


Figure 4. Storage Locker and Fuel Tank.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED**Washing/Drying System**

The washing/drying system contains two washing/drying drums (Figure 5). Each drum is capable of washing, rinsing, extracting, and drying 175 - 200 pounds of laundry per hour. Each drum is independently mounted to the LADS frame with four air bags and four shock absorbers. The air bags and shock absorbers reduce the amount of vibration that is transferred to the LADS structure when the drums rotate. Each drum consists of an outer shell which supports the basket, drive motor, brake, dryer ducting, blower, and front door. The basket consists of a metal housing with four flights that contain and distribute the laundry as it is rotated. The basket and outer edge of the flights are perforated to allow hot drying air to flow onto the laundry.

The basket is connected to a drive shaft that is attached to the drum housing with two pillow block bearings (Figure 6). This shaft is rotated by an electric motor that is connected to the shaft with two sheaves and a drive belt. The shaft also contains a brake rotor that is mounted between the calipers of an air brake. Laundry is loaded into the drum through the see-through front door. The door contains a lock that prevents it from being opened while the basket is rotating. Air used to dry the laundry is provided to each drum by independent electric blowers. A protective screen is located at the fresh air inlet to each blower. These screens prevent debris (sand, dirt, leaves, etc.) from entering the dryer ducting. A lint filter is used in the air re-circulation path for each blower. These filters remove lint and other particles from the air that is circulating from the drum back to the blower. The screens and filters are easily removed and are reusable after cleaning.

The LADS contains five water tanks (Figure 7). Each washing/drying drum has a wash tank and a rinse 1 tank. These tanks have an 80 gallon capacity. The rinse 2 tank has a 150 gallon capacity and is shared by both drums. Each tank has a sight glass that provides a visual indication to the operator that the tank is full. Pumps and valves are used to control the flow of water between the tanks and drums.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

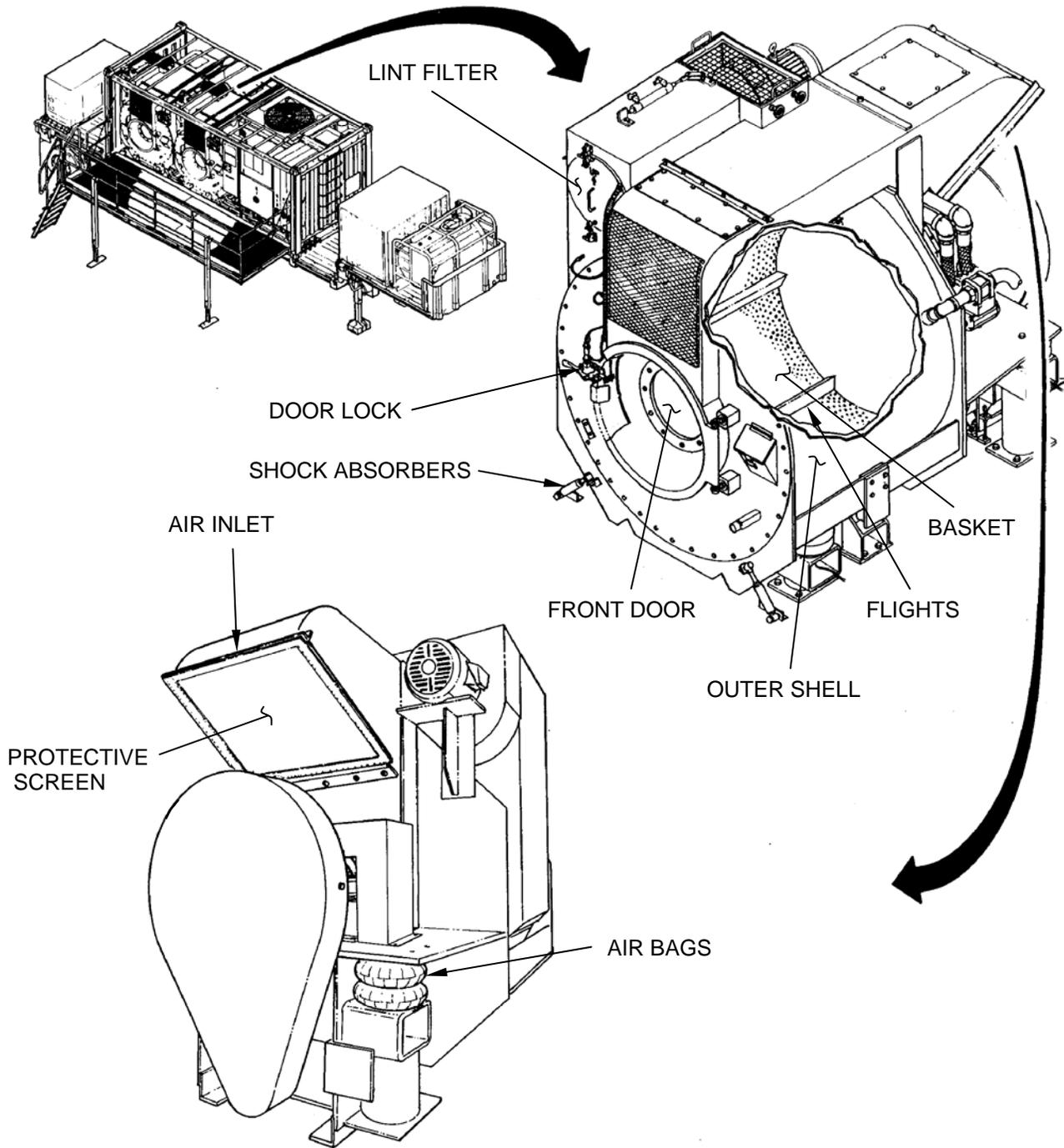


Figure 5. Washing and Drying Drums.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

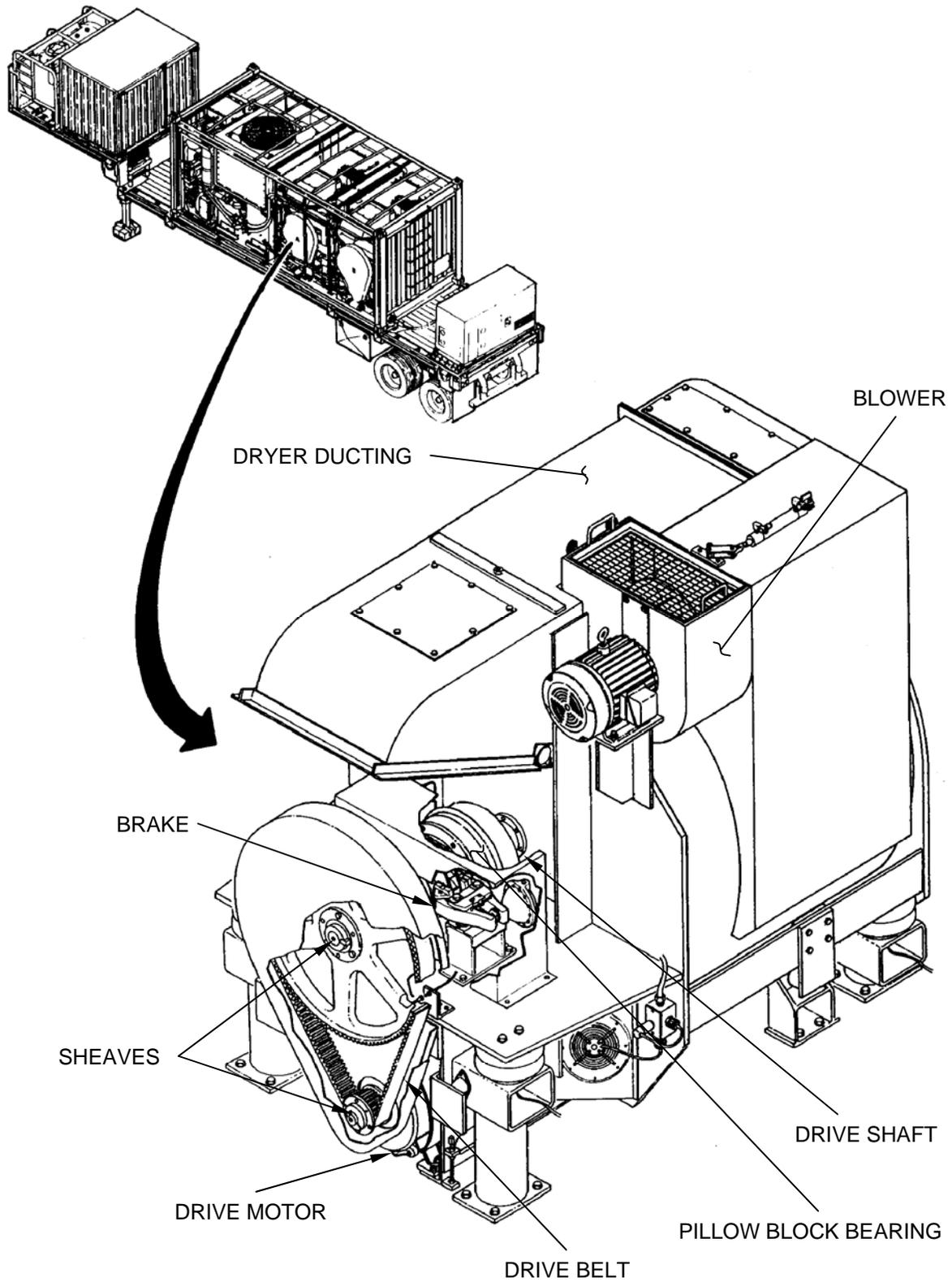


Figure 6. LADS Drum, Rear View.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

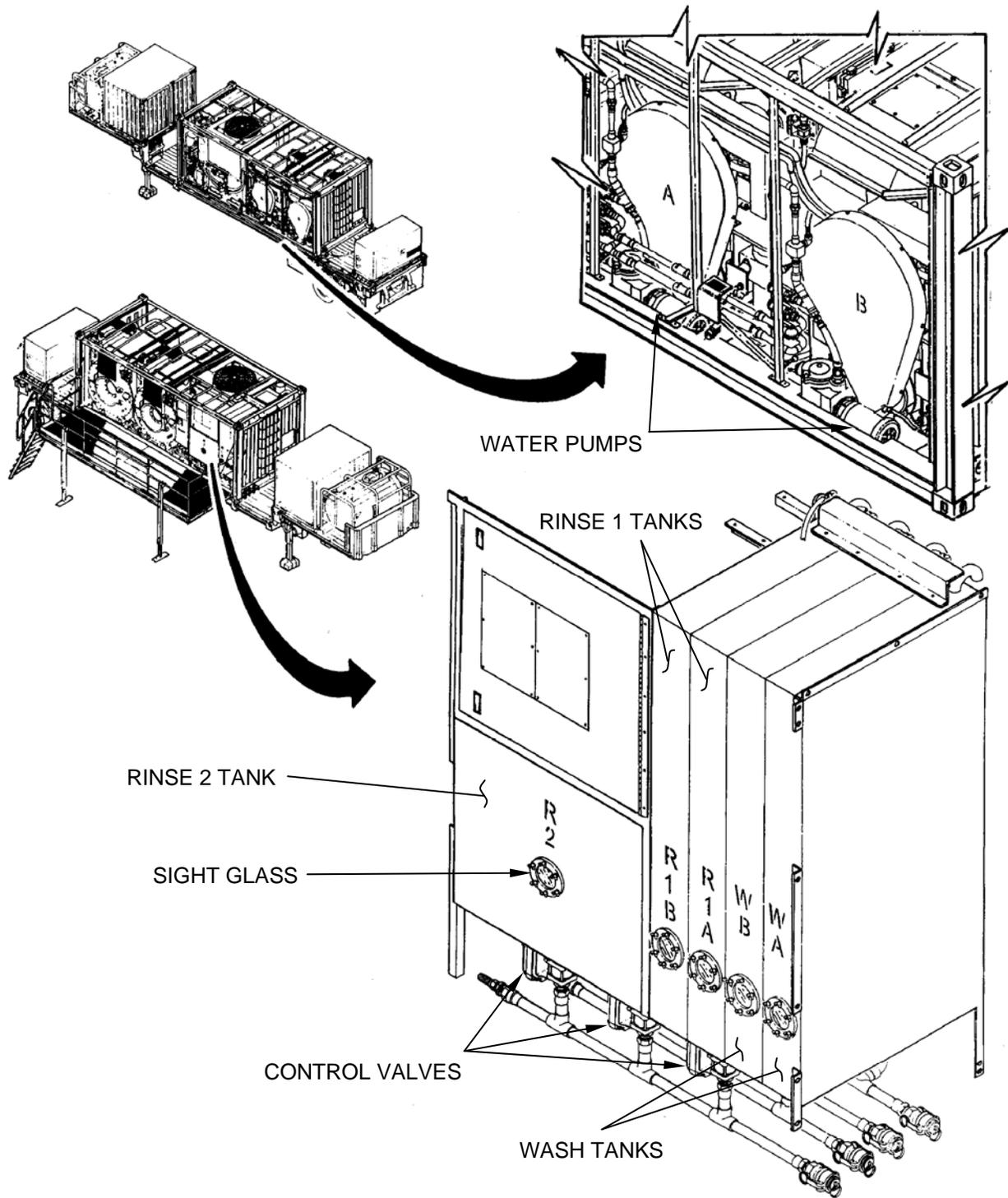


Figure 7. LADS Water Tanks.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Water Recycle System

The water recycle system (Figure 8) contains a still that is used to clean the dirty wash water coming from the washing/drying drums. This is done by boiling (distilling) the water. This water is then reused during the second-stage rinse process. Two access doors, located on the back of the still, are provided to facilitate cleaning out sludge that is created during the distillation process. A sight glass is located on the back of the still. This provides the operator with a visual indication of the water level inside the still.

A condenser is used to turn the steam, produced by the still, back into water. The condenser consists of four heat exchangers and an electric fan. Screens are provided for each heat exchanger to prevent debris from clogging up the cooling fins on the heat exchangers. The screens are easily removed and are reusable after cleaning.

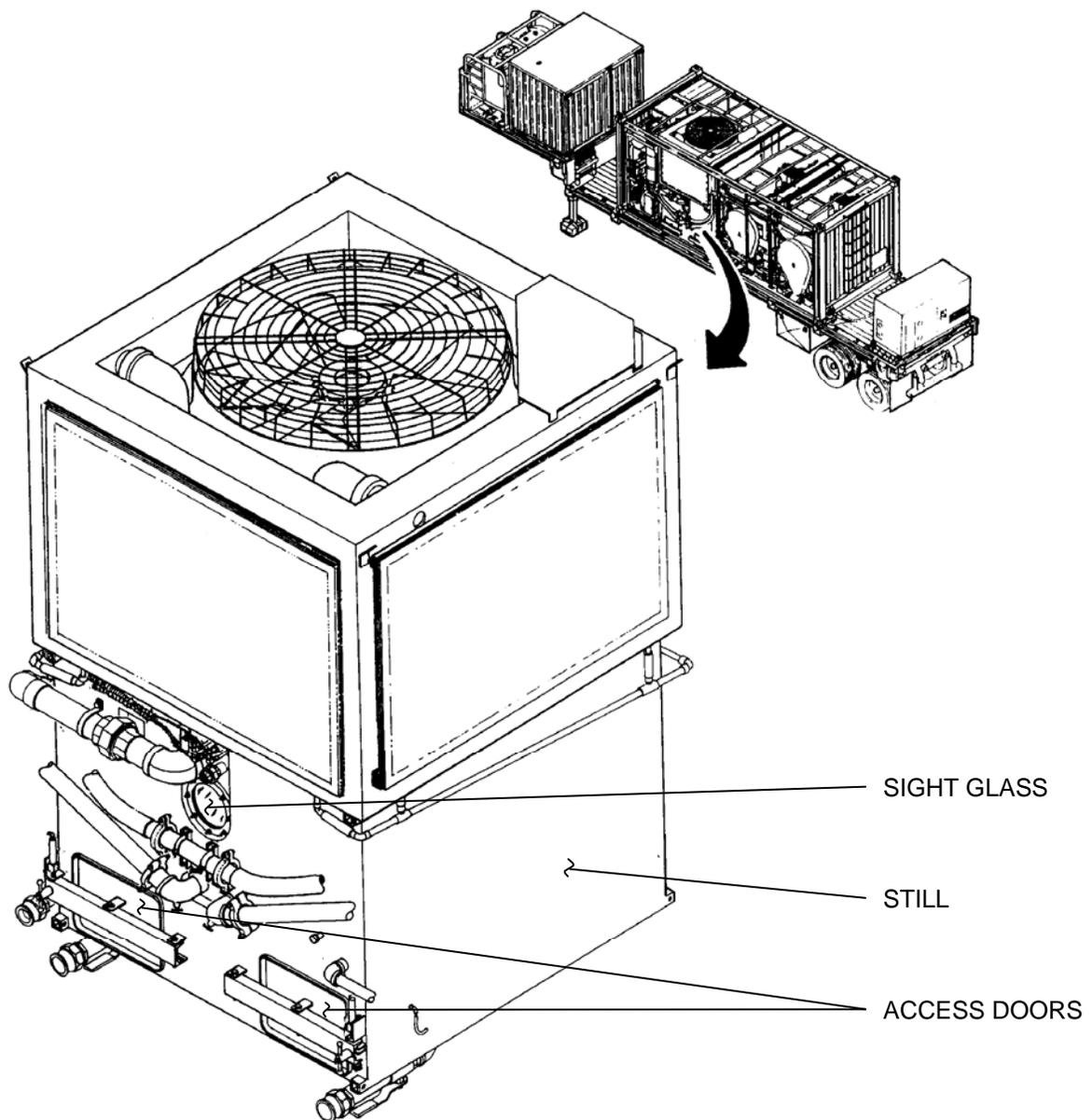


Figure 8. LADS Water Recycle System.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

The water draining from the condenser flows to a standpipe. When the standpipe is about two-thirds full the distillate pump takes the water from the standpipe and circulates the water through a set of particulate filters and a coalescer back to the rinse 2 tank.

The prefilters remove particles from the water and the coalescer removes light oil from the water.

A subcooler is provided to help cool the water going back to the rinse 2 tank. The subcooler is used when 90-140 ° F rinse water is needed and the outside temperature is above 60 °F.

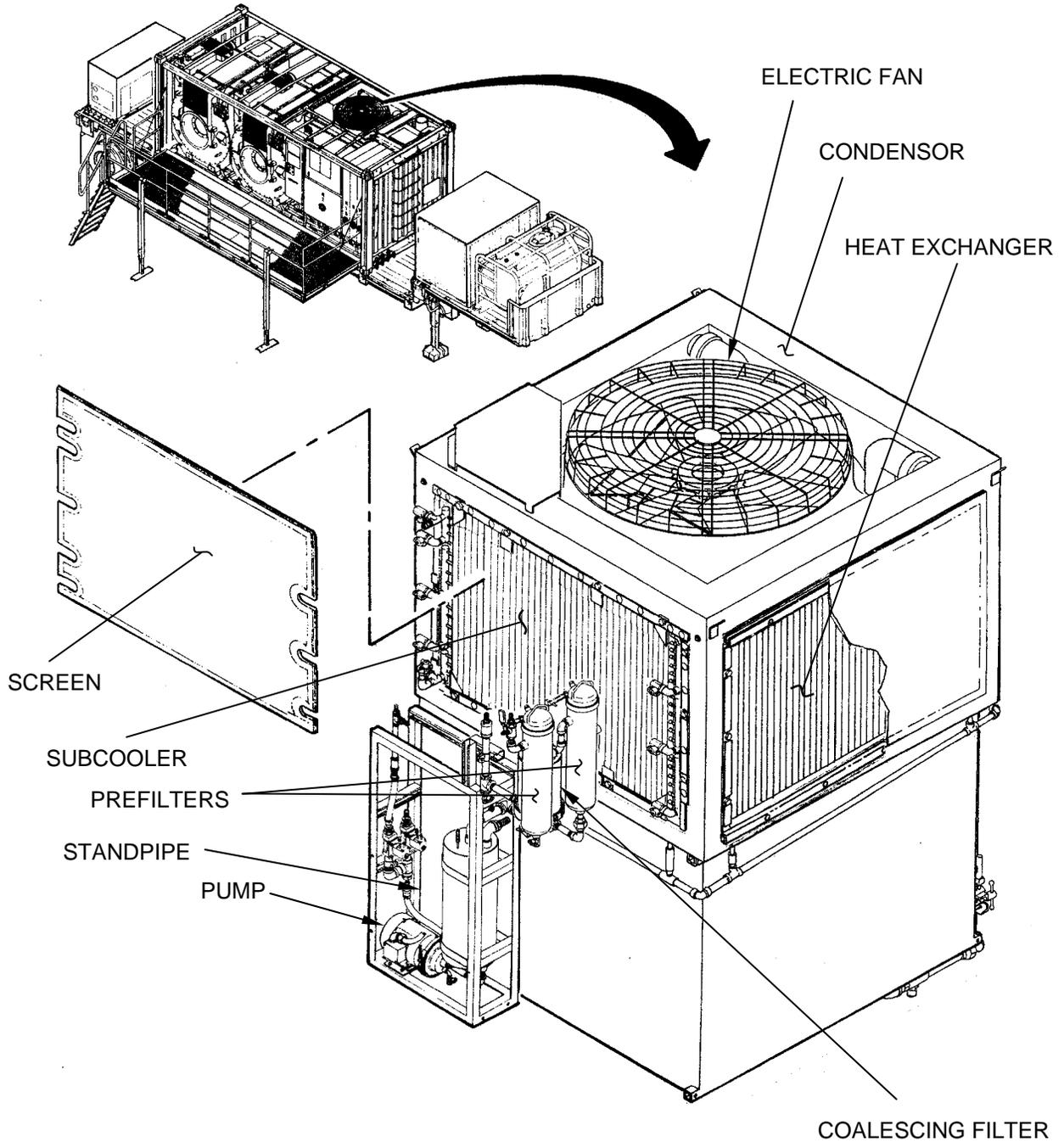


Figure 9. Water Recycle System Components.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Heating System

An oil-fired heater (Figure 10) is used to generate heat needed to boil water in the still and to heat the air used to dry the laundry. The heater uses an electric blower to draw in outside air. A screen is used to prevent debris in the air from entering the blower. The air is mixed with JP-8 and ignited to generate a flame inside the heater. The heater exhaust air is then used to heat thermal fluid that is moving through the heater coil.

The hot thermal fluid is circulated to heat exchangers in the washing/drying drums and still by the thermal fluid pump. An expansion tank is used to store thermal fluid and provide a place for the fluid to expand when it gets hot. The tank has a fill port to facilitate servicing of the thermal fluid.

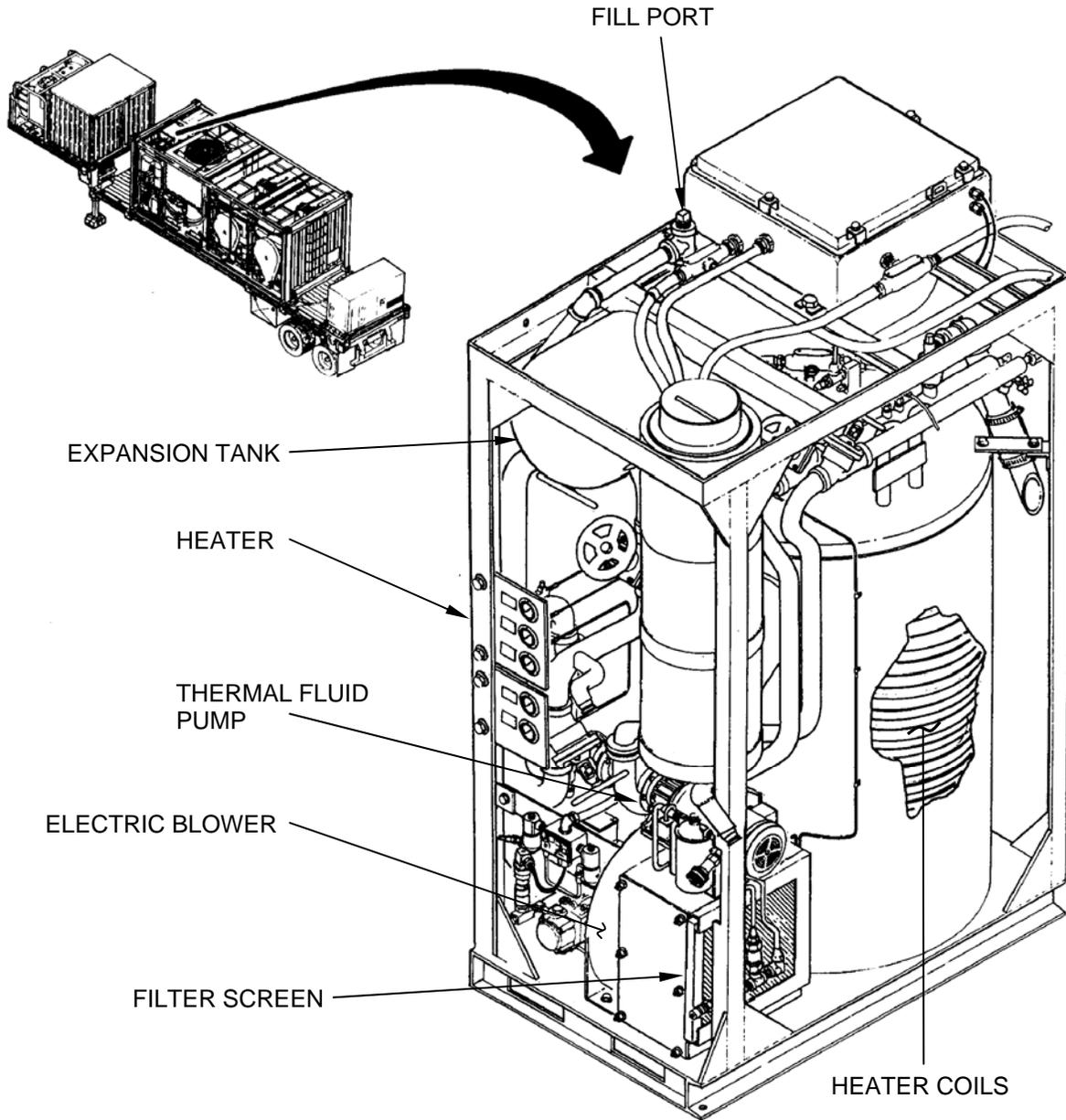


Figure 10. Heater Components.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Air System

The air system (Figure 11) provides dry compressed air to the other LADS systems. Air is used to pressurize the air bags that support the drums and to actuate ball valves, air dampers, brakes, and door locks used on the washing/drying system and water recycle system. A small amount of air is also used to detect the water level in the wash tanks, rinse tanks, standpipe, and still.

An air compressor is used to pressurize the air entering the system from atmospheric pressure to approximately 125 pounds per square inch gauge (psig). An inlet filter is used to prevent debris from entering the air compressor. An outlet filter and dehydrator are located at the compressor outlet. These items remove particles and moisture from the compressed air.

A tank stores product air under pressure. The tank contains enough air to allow the compressor to operate intermittently while still allowing smooth operation of the air-driven components. Two pressure regulators are mounted at the tank outlet. One regulator controls the pressure of the product air at approximately 80 psig. The other regulator controls the inflation pressure of the air bags at 65 psig.

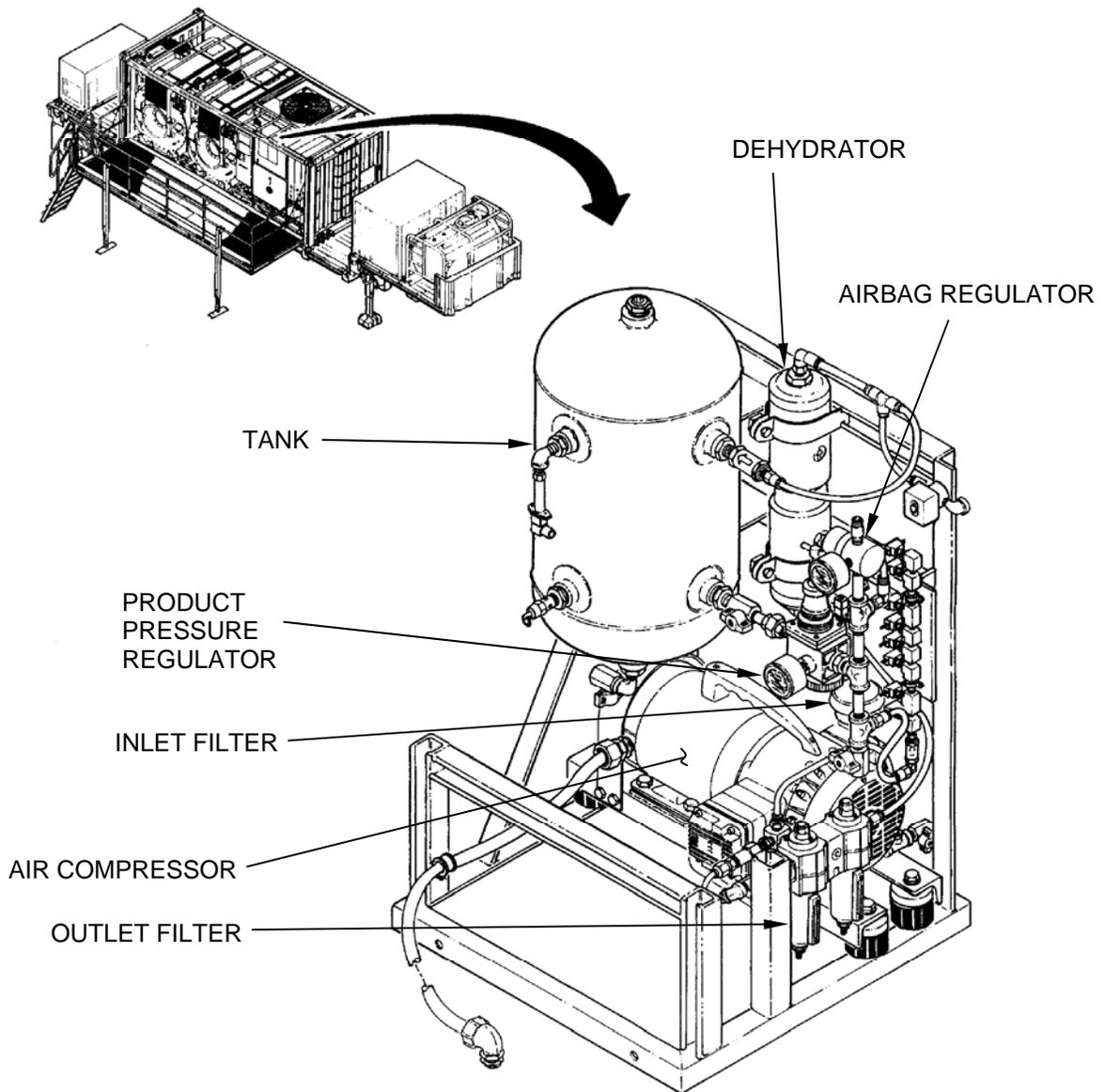


Figure 11. Air System Components.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED**Control System**

The control system (Figure 12) provides the electrical interface between the external power and the LADS electrical and electronic components. This system also includes the controls and indicators that the operator uses when performing laundry operations.

Electrical power enters the LADS through the main control enclosure. This enclosure contains an electrical compartment and an electronic compartment. The electrical compartment contains circuit breakers and relays that are connected to the inverter enclosure, heater enclosure, solenoid valves, and motors that utilize alternating current (AC) power. The electronic compartment contains the computer and related circuit boards that control the LADS operation. Items located in this compartment utilize direct current (DC) power. A disconnect switch is mounted on the main control enclosure. This switch removes power from the LADS when turned off.

An operator panel (LADS C model only) is provided for each washing/drying drum. These panels contain the controls and status indicators necessary for the operator to start and stop laundry operations as well as select different washing/drying formulas. Maintenance personnel also utilize operator panel (A) when communicating with the computer during troubleshooting and checkout.

The significant change for the LADS D Model (Figure 13) is the elimination of the operator control panels. All operator and maintenance functions previously controlled from these panels are now accessed via the Human Machine Interface (HMI) or touchscreen located on the Main Control Enclosure.

The inverter enclosure protects the four AC inverters used on the LADS from the outside weather. These inverters communicate with the computer and control the operating speeds of the drum motors, drum blowers, condenser fan, and heater.

The heater enclosure protects the flame programmer, ignition transformer, relays, and switches used to control the LADS heating system from the outside weather.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Control System

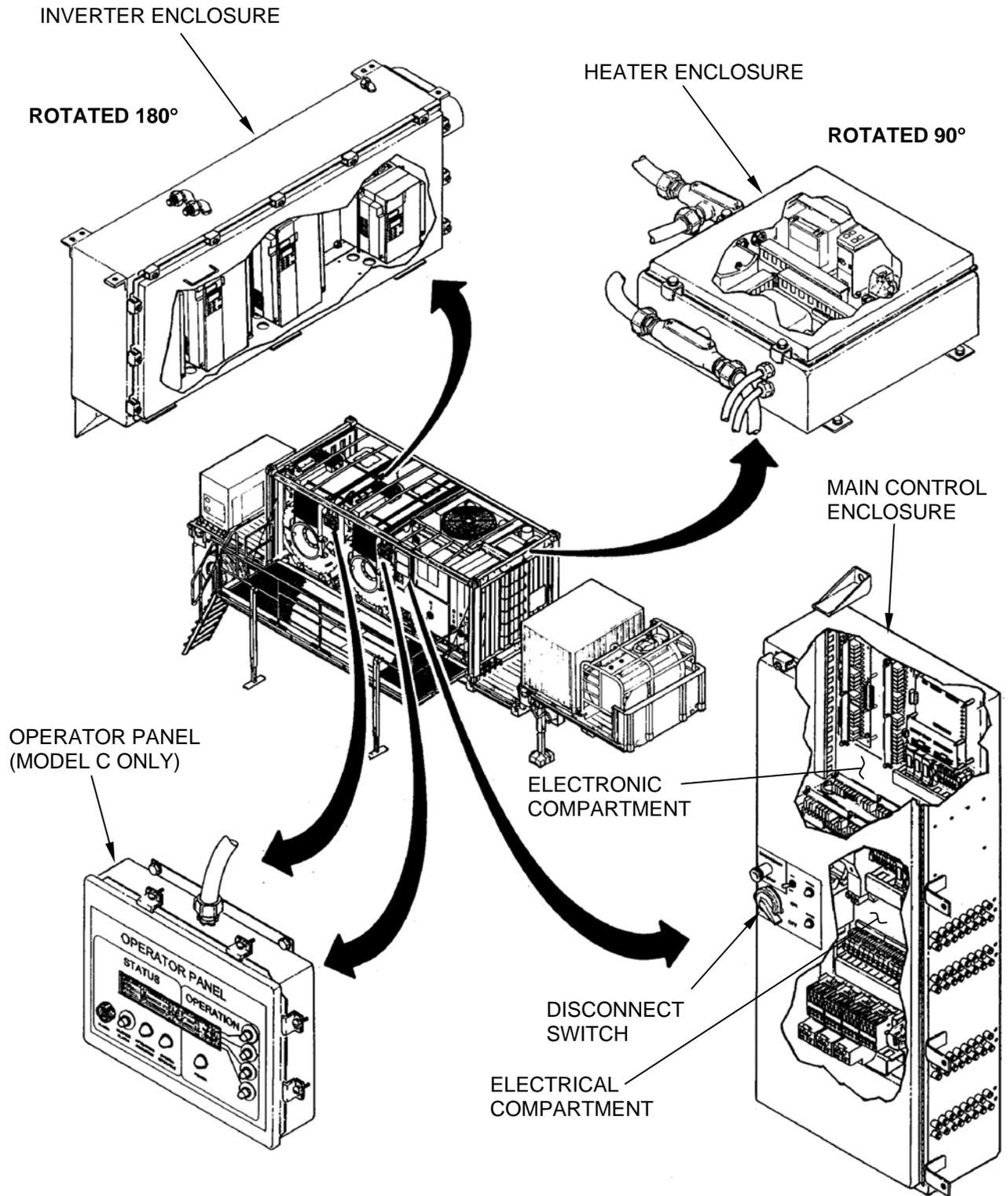


Figure 12. LADS Control System.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

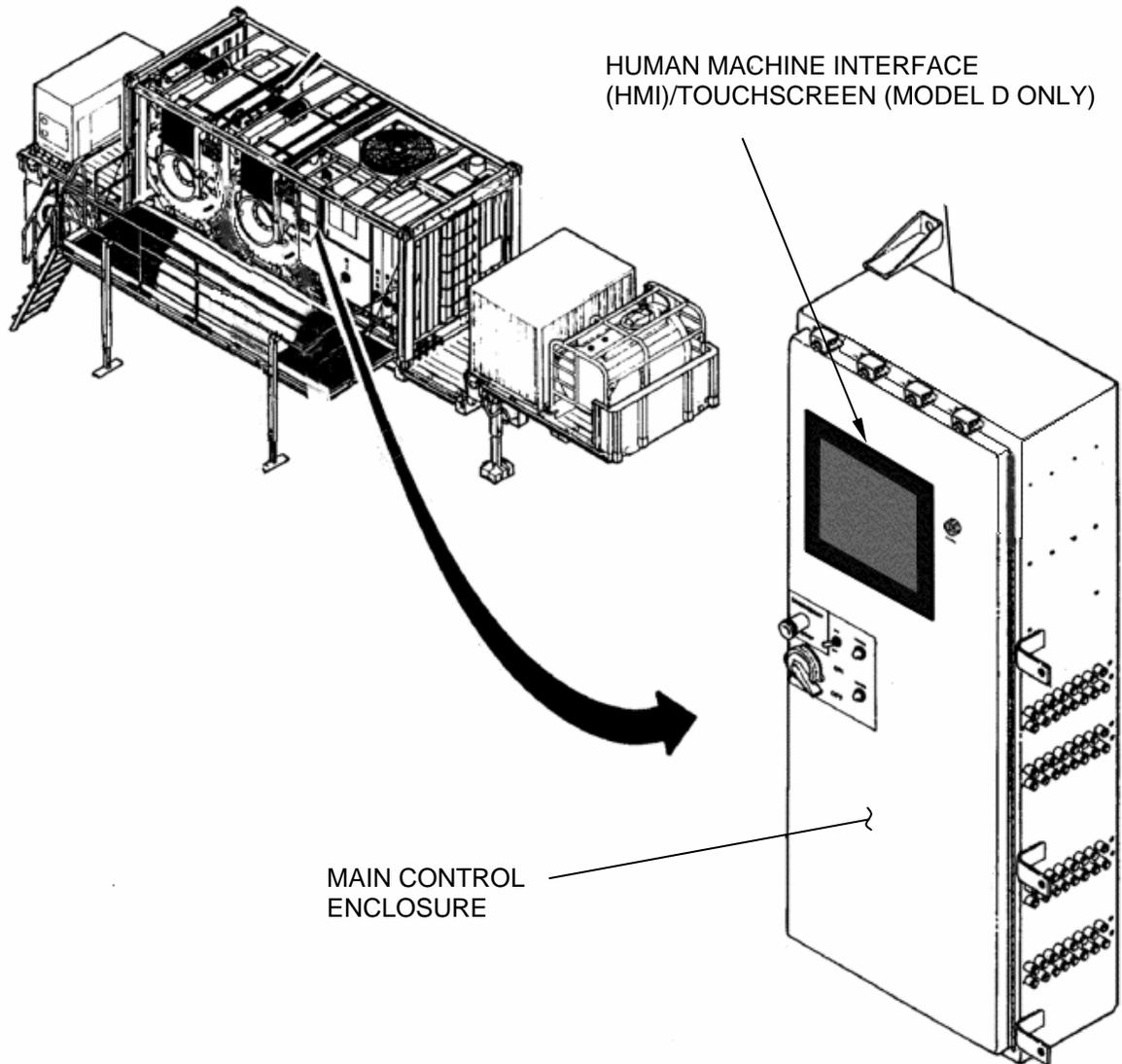


Figure 13. LADS Model D Touchscreen.

DIFFERENCES BETWEEN MODELS

The differences between LADS Model C and LADS Model D include the control system and operator interface as described in the control system description and noted throughout this manual. Information or procedures specific to one model are identified "Model C" or "Model D" as applicable. Detailed descriptions of differences between models can be found in WP 0007, Theory of Operation, Control System, LADS Model C and WP 0008, Theory of Operation, Control System, LADS Model D.

EQUIPMENT DATA

Table 1 provides information pertaining to operational, electrical, mechanical, and environmental characteristics of LADS and related equipment.

Table 1. Equipment Data.

ITEM	CHARACTERISTICS
<p>Operational Characteristics</p> <p>Laundry Output (Per Cycle) Laundry Output (Per Day) Water Capacity (Initial Charge) Water Consumption (Per Day) Fuel Consumption (Per Day)/Type Detergent Consumption Anti-Foam Consumption</p>	<p>350-400 lb/cycle (159-181 kg/cycle) 6,300-7,200 lb/day (2,862-3,258 kg/day) 460 gal (1,741 L) 540 gal/day maximum (2,044 L/day) 270 gal/day maximum (1,022 L/day)/JP-8 or DF-2 0.56 gal/day maximum (2.13 L/day) 1.13 gal/day maximum (4.26 L/day)</p>
<p>Electrical Characteristics</p> <p>Power Requirements</p>	<p>208 Vac, 3-Phase, 50-60 Hz</p>
<p>Mechanical Characteristics</p> <p>Shipping Configuration (LADS Only) Length Height Width Cubage Weight Shipping Configuration (LADS and Related Equipment on M871A3) Length Width Height Cubage Weight Operating Configuration (LADS on M871A3) Length Width Height Weight (LADS full of water) Operating Configuration (LADS on M971A3 in LME) Length Width Height Weight (LADS full of water)</p>	<p>240 in. (610 cm) 96 in. (244 cm) 96 in. (244 cm) 1,280 cu ft (36.24 cu meters) 29,300 lb (13,290 kg) 480 in. (1,219 cm) 96 in. (244 cm) 150 in. (381 cm) 4,000 cu ft (113.28 cu m) 51,240 lb (23,263 kg) 480 in. (1,219 cm) 198 in. (503 cm) 169 in. (429 cm) 33,000 lb (14,969 kg) 480 in. (1,219 cm) 288 in. (732 cm) 181 in. (460 cm) 33,000 lb (14,969 kg)</p>
<p>Environmental Characteristics</p> <p>Storage Temperature Operating Temperature (Sheltered) Operating Temperature (Unsheltered) Operating Altitude</p>	<p>-50 to 140 °F (-46 to 60 °C) -25 to 120 °F (-32 to 49 °C) 33 to 120 °F (1 to 49 °C) 7,500 ft maximum (2,286 meters)</p>

END OF WORK PACKAGE

**CREW MAINTENANCE
THEORY OF OPERATION
WASHING/DRYING SYSTEM**

WASHING/DRYING SYSTEM

The washing/drying system (Figure 1) performs all the operations related to washing, rinsing, extracting, and drying of the laundry. All other systems on the LADS are used to support these operations. Operation of the washing/drying system consists of the following sub-operations:

LOADING LAUNDRY AND STARTING CYCLE

The laundry is loaded into the drum through the front door. After the operator closes and latches the front door a position switch (ZS100) mounted near the door will provide a signal to the control system. If the door is not closed the control system will not allow a laundry cycle to be selected. The operator selects the appropriate laundry formula and starts the laundry cycle. Before the washing operation begins, the control system will provide a signal to extend the pneumatic lock (DN100) into the front door. This lock remains extended during the complete laundry cycle. A position switch (ZS101) mounted under the door lock provides a signal to the control system verifying that the lock is extended.

WASHING

During the washing portion of the laundry cycle, water is transferred from the wash tank to the drum. The laundry tumbles in the drum mixing with the detergent and water. The dirty water is drained from the drum to the still then a low-speed extract (spin) is used to squeeze the water out of the laundry. A detailed description of the washing cycle is as follows:

Fill from Wash Tank

The control system provides a signal to start drive motor (M100) and water pump (M101). The control system also opens ball valves (FV101 and FV106). The basket starts rotating at tumble speed (approximately 36 revolutions per minute (r/min)). As the basket is rotating, the water pump draws water out of the wash tank and pumps it into the drum. Approximately one minute into the wash cycle, the wash tank is empty and the drum is full of water. The control system turns off the water pump and closes ball valves (FV101 and FV106).

Washing

The basket continues to tumble for three or more minutes as determined by the formula and the water level in the still. The laundry is mixed with water and detergent. Mechanical action of the material tumbling is used to break or loosen the contaminants from the laundry.

Drain to Still

At the end of the wash time the control system opens ball valves (FV107 and FV109) and turns on the water pump (M101). Wash water is pumped out of the drum and into the still for approximately 2 minutes.

Extract to Still

While the drum is being drained the control system increases the drive motor speed until the basket is rotating at low extract speed (approximately 300 r/min). The basket remains at extract speed for approximately one minute while the drum is drained. At the end of extract, the control system turns off the drive motor and water pump, applies the brake (FV113), and closes ball valves (FV107 and FV109).

FIRST STAGE RINSING

During the first stage rinsing portion of the laundry cycle, water is transferred from the rinse 1 tank to the drum. The laundry tumbles in the drum mixing with the water. The water is drained from the drum to the wash tank then a low-speed extract (spin) is used to squeeze the water out of the laundry. A detailed description of the first stage rinsing cycle is as follows:

Fill from Rinse 1 Tank

The control system provides a signal to start drive motor (M100) and water pump (M101). The control system also opens ball valves (FV103 and FV106). The basket starts rotating at tumble speed. As the basket is rotating, the water pump draws water out of the rinse 1 tank and pumps it into the drum. Approximately one minute into the rinse cycle, the rinse 1 tank is empty and the drum is full of water. The control system turns off the water pump and closes ball valves (FV103 and FV106).

NOTE

All functional components on this diagram are used for washing/ drying system A and B. Example: FV100A is the inlet valve on wash tank A and FV100B is the inlet valve on wash tank B.

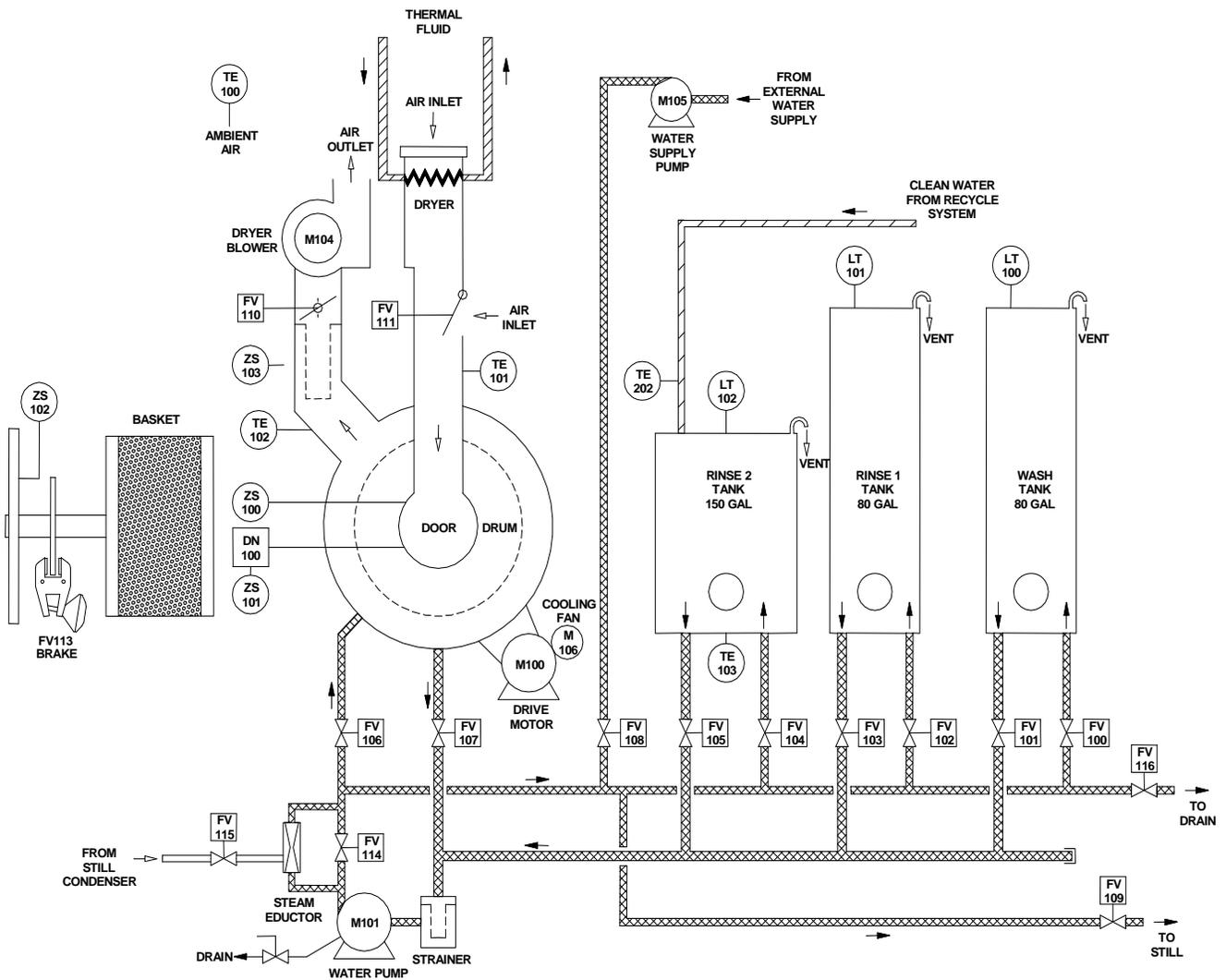


Figure 1. Washing/Drying System.

FIRST STAGE RINSING-CONTINUED

Rinsing 1

The basket continues to tumble for approximately two more minutes as determined by the formula. The laundry is mixed with water to rinse residual soap and dirt off of the laundry.

Drain to Wash Tank

At the end of the rinse time, the control system opens ball valves (FV100 and FV107) and turns on the water pump (M101). Rinse water is pumped out of the drum and into the wash tank for approximately two minutes.

Extract to Wash Tank

While the drum is being drained, the control system increases the drive motor speed until the basket is rotating at low extract speed. The basket remains at extract speed for approximately one minute while the drum is drained. At the end of extract, the control system turns off the drive motor and water pump, applies the brake (FV113), and closes ball valves (FV100 and FV107).

SECOND STAGE RINSING

During the second stage rinsing portion of the laundry cycle water is transferred from the rinse 2 tank to the drum. The laundry tumbles in the drum mixing with the water. The water is drained from the drum to the rinse 1 tank then a high-speed extract (spin) is used to squeeze the water out of the laundry. A detailed description of the second stage rinsing cycle is as follows:

Fill from Rinse 2 Tank

The control system provides a signal to start drive motor (M100) and water pump (M101). The control system also opens ball valves (FV105 and FV106). The basket starts rotating at tumble speed. As the basket is rotating, the water pump draws water out of the rinse 2 tank and pumps it into the drum. When the control system determines that 65 gallons of water has been moved out of the rinse 2 tank, it turns off the water pump and closes ball valves (FV105 and FV106). This occurs approximately one minute into the rinse cycle.

Rinsing 2

The basket continues to tumble for approximately two more minutes as determined by the formula. The laundry is mixed with water to rinse residual soap and dirt off of the laundry.

Drain to Rinse 1 Tank

The basket continues to tumble for approximately two more minutes as determined by the formula. At the end of the rinse time the control system opens ball valves (FV102 and FV107) and turns on the water pump (M101). Rinse water is pumped out of the drum and into the rinse 1 tank.

Extract to Rinse 1 Tank

While the drum is being drained the control system increases the drive motor speed until the basket is rotating at high extract speed (approximately 570 r/min). The basket remains at extract speed for approximately seven minutes while the drum is drained. At the end of extract, the control system turns off the drive motor (M100) and water pump (M101), applies the brake (FV113), and closes ball valves (FV102 and FV107).

Special Rinsing Steps

For the second-stage rinsing process the operator has the option of selecting a formula that calls for sanitizer or Finish Reapplication System (FRS) application. When these formulas are selected, the operator will be notified by the control system when it is time to add sanitizer or FRS. The operator adds the sanitizer or FRS through a sluice located on the front of the drum.

DRYING

During the drying portion of the laundry cycle hot air is blown over the material while the laundry tumbles and water is evaporated. The laundry tumbles in the drum for 20-43 minutes as specified by the formula. A detailed description of the drying cycle is as follows:

Dry, Heating-Up

The control system provides a signal to start drive motor (M100) and blower (M104). The control system also opens outlet damper (FV110) and closes inlet damper (FV111). The basket starts rotating at tumble speed. As the basket tumbles, ambient air is drawn through a heat exchanger connected to the LADS heating system. The hot air passing through the heat exchanger is then directed into the drum inlet. As the air enters the drum, it passes through the laundry removing moisture. The air is then exhausted out of the blower exhaust duct.

Dry, Controlled

While the air is circulating through the drum, temperature sensors (TE101 and TE102) monitor the temperature at the drum inlet and outlet. Once the air outlet temperature reaches a selected drying temperature, the control system will maintain the proper inlet temperature by opening and closing the inlet damper (FV111). This allows for accurate air temperature control regardless of the ambient temperature conditions and drying temperature selected.

Cool

Near the end of the drying cycle, the control system opens inlet damper (FV111) for approximately one minute to allow ambient air to circulate through the drum. This cools down the laundry so that it can be safely handled by the operator. At the end of the drying cycle, the control system turns off the drive motor (M100) and blower (M104) and applies the brake. The control system also closes outlet and inlet dampers (FV110 and FV111) and retracts the door lock (DN100).

UNLOAD LAUNDRY

The control system provides a signal to the operator panel that the laundry cycle is completed. The operator then opens the front door, removes the laundry, and repeats the process.

DRUM SUPPORT/VIBRATION DAMPENING

Before power is applied to the LADS the drum rests on the ISO frame structure. In the operational mode, the air system pressurizes four air bags that inflate to support the weight of the drum. Leveling valves connected to the front two air bag mounts are used to adjust the height of the air bags by adding or bleeding air pressure. This allows for side-to-side leveling of the drum when the LADS is located on uneven terrain. Four shock absorbers, located at each corner of the drum, are used to restrain the drum while it is rotating. Vibration eliminators are also located on the sides and back of the drum mounts to dampen the amount of vibration that is transferred to the LADS structure during the extraction steps.

DRUM ROTATION

The drum basket is driven by an electric motor (M100) connected via a drive belt and two sheaves. A cooling fan (M106) is used to continuously direct fresh air onto the drive motor to prevent the motor from overheating. During a laundry cycle, the control system changes the speed and direction of the motor to achieve the proper basket rotation needed for tumble, distribute, low extract and high extract as follows:

Rotation Direction

At tumble speed, basket rotation is in the clockwise (CW) direction during washing, rinsing, drying, and any time the drum is filling. The basket rotates in the counter-clockwise (CCW) direction which is used during all draining steps at tumble speed, and at the distribute, low extract, and high extract speeds.

DRUM ROTATION-CONTINUED

Rotation Speed

At tumble speed, the basket is rotating at about 28 r/min. Tumble speed is used during washing, rinsing, drying, and any time the drum is filling or draining. Distribute speed is at about 56 r/min. Distribute is used to transition between tumble and extract to allow the laundry to evenly distribute towards the outer wall of the basket using centrifugal force. Low and high extract speeds are 300 r/min and 530 r/min. Extract speed is used to force (squeeze) water out of the laundry.

Rotation Sensing

When the basket is rotating, proximity sensor (ZS102) monitors rotation of the drum sheave and provides a signal to the control system. This information is used to verify the drum basket is either rotating or stopped. During extracts the drive motor has the potential to stall when the drum is severely unbalanced or the basket is overloaded. If a stall occurs, the basket will not maintain extract speed resulting in improper removal of water from the laundry. This can lead to water transfer and drying problems. The control system monitors the drive motor for a stall condition using the signal from ZS102 to verify the basket is rotating at the proper speed. If the basket begins to slow down when it should be speeding up, the control system will automatically stop drum rotation and restart the extract. If two stalls are sensed in a row, the control system will notify the operator of a stall condition.

DRUM BRAKING

After the extraction step or drying cycle is finished, the control system provides a signal to open solenoid valve (SV113). When this valve opens air pressure is directed to a thruster which extends the brake caliper. Pads on the brake caliper apply friction to the brake rotor thereby causing the basket to slow down rapidly. Any time the basket is stopped, the brake is automatically applied to prevent rotation. When the control system is ready to start basket rotation, the signal to solenoid valve (SV113) is removed and the brake caliper retracts allowing free rotation of the basket.

DRUM BALANCING

During extract steps, it is possible for the laundry load to be unbalanced. If not controlled, an out of balance load can cause excessive shock and vibration to be transferred to the LADS structure or a drum motor stall. This could result in improper processing of laundry, premature failure of LADS components, or structural failures. To compensate for unbalanced loads, the LADS uses a self balancing process. At the start of extract, the basket is slowly rotated, to give the laundry a chance to distribute. As the rotational speed is increased, centrifugal force pulls the laundry out against the basket walls. If the laundry load is balanced, the control system will allow the basket to rotate at full extract speed. If the laundry load is unbalanced, the drum will contact a limit switch (ZS103). The limit switch will provide a signal to the control system to stop basket rotation. The control system will then attempt to redistribute and restart the extract step. If a balanced load can not be obtained in five attempts, the control system will notify the operator of an unbalanced load condition.

WATER LEVEL MONITORING

Each water tank contains a bubbler tube that extends to the tank bottom. When the LADS is operating, a small amount of air is directed from the air system to each bubbler tube. When a tank is empty, there is no resistance to the air coming out of the bubbler tube. As the water level in the tank begins to rise, the force (pressure) required to push the air out of the bubbler tube increases. This increase in pressure is measured by pressure sensors (LT100, LT101, and LT102) which provide signals to the control system. The control system uses this pressure information to determine the water level. During operation, this information is used to verify that the tank is draining or filling and to determine when the tank is drained or filled. The control system continuously monitors the water level in each tank and will notify the operator if the tank water levels are not within required limits. Each tank contains an overflow tube that prevents the tank from overflowing in the event of a ball valve or level sensing failure. Water from the overflow tube is collected and routed to a drain port at the back of the LADS.

WATER FILLING

The LADS water tanks and still must be filled with water before laundry operations can begin. During continuous operations, the water level will drop and the tanks must be refilled. Both operations are described below:

Initial Water Filling

When the LADS is initially started, it is necessary to fill the water tanks and still prior to performing laundry operations. After the LADS is turned on, the control system will turn on the water supply pump (M105) and prompt the operator to select the tank filling sequence. If the filling function is selected, the control system will open ball valves (FV100 and FV108). The water supply pump will draw water from the external water supply and fill the wash tanks to 65 gallons. The control system will close ball valves (FV100) and open ball valves (FV102) to fill the rinse 1 tanks to 65 gallons. The control system will close ball valves (FV102) and open ball valves (FV104) to fill the rinse 2 tank to 100-110 gallons. The control system will open ball valves (FV108 and FV109) to fill the still to 25 gallons (2 inches). The control system will then close ball valves (FV108 and FV109) and turn off the water supply pump.

Water Refilling

During continuous operations, the water level in rinse 2 tank will gradually drop due to residual moisture left in the laundry. When the water level drops below the amount required to perform a laundry cycle, the control system will automatically add water to the still. When this occurs, the control system will open ball valves (FV108 and FV109) and turn on the water supply pump (M105). The water supply pump will draw water from the external water supply and add it to the still. When the proper amount of water has been added, the control system will close ball valves (FV108 and FV109) and turn off the water supply pump. This water will eventually return to the rinse 2 tank through the normal water recycling process (WP 0004). The refilling process is performed after each drying cycle is started.

PRE-WASH CYCLE

The pre-wash cycle is used to enhance the cleaning of heavily soiled laundry and lessen the amount of dirt and other contaminants brought into the LADS water plumbing. Reducing the amount of dirt within the system results in less operator PMCS. This is accomplished by drawing water directly from the external water supply to the drum. The drum tumbles allowing the water to flush most of the dirt off of the laundry. The dirty water is then drained out of LADS through the pre-wash manifold connected to water plumbing under the water tank. A low-speed extract is also performed to squeeze as much dirty water as possible from the laundry. Once the extract is over the water plumbing is automatically flushed with fresh water to remove even more dirt. The pre-wash cycle then automatically goes into the normal washing cycle. A detailed description of the pre-wash cycle is as follows:

Fill from External Tank

The control system provides a signal to start the drive motor (M100) and the supply water pump (M105). The control system also opens ball valves (FV106 and FV108). The basket starts rotating at tumble speed. As the basket is rotating water is drawn out of the external water supply and is pumped into the drum. Approximately 1 minute into the cycle the control system turns off the water pump and closes valves (FV106 and FV108).

Pre-Washing

The basket continues to tumble for 2 minutes. Mechanical action of the material tumbling is used to break or loosen the contaminants from the laundry.

Drain Drum

At the end of the pre-wash time the control system opens ball valve (FV107) and ball valve (FV116) on the pre-wash manifold and turns on water pump (M101). Pre-wash water is pumped out of the drum through the pre-wash manifold to an external drain point for 2 minutes.

PRE-WASH CYCLE-CONTINUED

Extract Drum

While the drum is being drained the control system increases the drive motor speed until the basket is rotating at low extract speed. The basket remains at extract speed for one minute while the drum is drained. At the end of the extract, the control system turns off the drive motor and water pump, applies the brake, and closes ball valve (FV107).

Flush Plumbing

The control system opens ball valve (FV108) and turns on the water supply pump. The pump draws water from the external water supply and pushes the water through the LADS water plumbing to flush contaminants out of the plumbing through the pre-wash manifold. After ten seconds the control system turns off the water supply pump and closes ball valves (FV108 and FV116). The control system automatically starts into the WASHING step at the end of the pre-wash cycle.

WATER HEATING

After the water tanks have been filled, the control system prompts the operator to select the desired water temperature and then start the water heating sequence if desired. The water in the rinse 2 tank will be heated as described below:

Checking Water Temperature

The control system will open ball valves (FV104A and FV105A) and turn on the water pump (M101A) to obtain a representative sample temperature of the water in rinse 2 tank. After the sample has been obtained the control system will close the ball valves and turn off the water pump. If the actual water temperature is within 5 °F of the desired temperature, the water heating function will be bypassed. If the water is too hot, the operator can change the desired temperature or wait for the water to cool down. If the water is not hot enough, the heating process will continue.

Transfer Rinse 2 to Still

Once the control system has determined that water heating is required, it will open ball valves (FV105A and FV109A) and turn on the water pump (M101A) to transfer water from rinse 2 tank to the still. The amount of water transferred will be 50 to 70 gallons, depending on the amount of heating required. When enough water has been transferred to support distillation, the control system will close the ball valves and turn off the water pump.

Heating Rinse 2

After the still has begun to produce steam the control system will open ball valves (FV104, FV105, and FV115), close ball valves (FV114), and turn on both water pumps (M101). As the water coming out of rinse 2 tank is pumped through the steam eductors, it mixes with steam/water flowing from the still condenser. Using the input from temperature sensor (TE103), the control system will determine when the water is at the proper temperature. The control system will close ball valves (FV104, FV105, and FV115), open ball valve (FV114) and turn off both water pumps (M101). Any water left in the still will return to rinse 2 tank through the normal water recycle process (WP 0004). After two laundry cycles have been completed, the water initially heated for rinse 2 tank will be in the wash tank. All subsequent laundry cycles will be completed with heated water. If hot water is desired in all tanks before laundry operations are started, two Clean/Heat Wash Tank cycles can be performed as described in Water Transferring.

WATER TRANSFERRING

If a laundry cycle is interrupted and then restarted, it may be necessary to add water to the wash or rinse 1 tank in order to complete the cycle. In this circumstance the control system will automatically transfer water from the rinse 2 tank to the wash tank or rinse 1 tank. Water can also be transferred from the wash tank to the still, from the rinse 1 tank to the wash tank, and from the rinse 2 tank to the rinse 1 tank utilizing a Clean/Heat Wash Tank cycle. When these functions are selected, the control system will open the appropriate ball valves and turn on the water pump (M101). The control system will close the ball valves and turn off the water pump when the level indication at that wash and rinse 1 tanks determine that they are at the proper level. In the transfer mode, the control system will prevent further laundry operations until the rinse 2 tank has been refilled through the normal water recycling process (WP 0004).

WATER DRAINING

When a fresh supply of water is desired, preparing the LADS for transport, or when maintenance requires that the tanks be drained, the operator selects the DRAIN CYCLE. The drain cycle will remove water from the water tanks, still, and plumbing as described below:

Cooldown

Before the draining sequence starts, the system performs a cooldown sequence so the still interior can be safely accessed by the operator who is required to perform AFTER PMCS. After the still is clean and the doors are shut, the control system will prompt the operator to continue the drain cycle.

Drain System B

When the drain cycle continues, the control system will open ball valves (FV101B and FV109B) and turn on the water pump (M101B). Water in wash tank B will be pumped into the still and will gravity drain to the drain area. Anytime during the drain sequence, if the still level is more than 3 inches, the control system will hold up switching to the next tank draining sequence. This prevents overfilling the still. After wash tank B is drained, the control system will close ball valve (FV101B) and open ball valve (FV103B) to drain the rinse 1B tank. After the rinse 1B tank is drained, the control system will close ball valves (FV103B and FV109B) and turn off water pump (M101B).

Drain System A

Once system B is empty, the control system will open ball valves (FV101A and FV 109A) and turn on the water pump (M101A) to drain wash tank A. After wash tank A is drained, the control system will close ball valve (FV101A) and open ball valve (FV103A) to drain the rinse 1A tank. After the rinse 1A tank is drained, the control system will close ball valve (FV103A) and open ball valve (FV105A) to drain the rinse 2 tank. When the rinse 2 tank is drained, the control system will turn off water pump (M101A) and close ball valves (FV105A and FV109A).

Cycling Valves

The control system will prompt the operator to open manual drain valves and remove caps that are strategically located on the water plumbing. The control system will then cycle (open and close) all valves in the water plumbing several times to allow residual water to drain from the system.

END OF WORK PACKAGE

**CREW MAINTENANCE
THEORY OF OPERATION
WATER RECYCLE SYSTEM**

WATER RECYCLE SYSTEM

The water recycle system takes the dirty wash water from the drums and recycles the water for use during the second-stage rinse process. During start up of the LADS, the water recycle system also provides steam that is used to heat up the rinse 2 water. Water recycle system operation consists of the following sub-operations.

WATER DISTILLATION

The LADS uses a water distillation process (Figure 1) to remove contaminants from the dirty water produced during the washing sequence. A still is the primary component used in the water distillation process as described below:

Still Operation

The still contains fourteen heatplates that have hot thermal fluid (from the heating system) circulating through them. When dirty water is dumped into the still, it heats up and begins to boil. The solid materials in the water such as dirt and sand collect in the bottom of the still while the water turns into steam and exits through the top of the still. Connected to the still are several monitoring and safety devices. Temperature sensor (TE200) monitors the temperature of the steam exiting the still. Pressure sensor (PT200) continuously monitors the still internal pressure. If the pressure rises to an unsafe level, a signal sent to the control system by the sensor will prompt the heater to turn off. A relief valve is mounted on the still to prevent it from over-pressurizing in the event of a pressure sensor or control system failure. Level sensor (LT200) monitors the water level inside the still. A vacuum breaker is mounted on the still to prevent a negative pressure from being generated inside the still when cold water is dumped to the still from the drums or during the cooldown sequence.

Foam Control

During the distillation process, foam can be generated from detergent and other contaminants in the water. Excess foam can cause the still pressure to rise to undesirable levels. To prevent excessive foaming, an anti-foam solution must be injected into the still from an external container. As wash water is pumped from each laundry drum to the still, the control system will prompt the Operator to add anti-foam via a hand pump. Another method used to control the still boiling rate is by limiting the amount of water inside the still. If the still level is 7 inches or above, the control system will continue the washing step even after the normal wash time is completed. When the water level in the still drops below 7 inches, the control system will allow the drum to drain. This ensures the still does not get overfilled and decreases the chances of a boil-over.

WATER DISTILLATION-CONTINUED

Still Cleaning

At the end of the daily washing operations, the sludge collected at the bottom of the still and on the heatplates must be cleaned out. If this cleaning is not performed, the distillation rate will drop causing low water levels in the rinse 2 tank and delays in starting of further laundry cycles. The number of laundry cycles that can be done depends on how dirty the laundry is. Normally, 10-20 laundry cycles can be completed between cleanings. The dirtier the laundry is, the more frequently the still will need to be cleaned. After the last daily laundry cycle is completed, the operator selects a cooldown cycle. After level sensor (LT200) signals the control system that the water level in the still is below the heatplates, the control system will turn off the heater. At this time the thermal fluid will continue to circulate through the dryer heat exchangers and the still. The control system will turn on the dryer blowers (M104). Ambient air passing through the dryer heat exchangers will draw the residual heat out of the thermal fluid allowing the still to cool down. Once the thermal fluid temperature is below 150 °F, the control system will stop thermal fluid circulation and turn off the dryer blowers. The control system will also release locks (DN200) mounted on the access doors at the back of the still. The door locks prevent opening of the doors while boiling water is present inside the still. The still is cleaned by brushing debris from the heatplates and flushing the waste material out drain ports, with manual valves at the still bottom. Once the still is cleaned and the doors are closed, a position switch (ZS200) mounted on each door will provide a signal to the control system. The control system will not allow water heating or laundry operations to be started unless the still doors are closed.

WATER CONDENSING

A still condenser is used to turn the steam produced by the still back into water. The still condenser consists of four heat exchangers and an electric motor-driven fan (M200). As steam moves into the coils of the heat exchangers, ambient air passes by the cooling fins. This causes the steam to cool and turn back into liquid. The hot air is then directed out through the top of the fan. The water exiting the condenser gravity drains to the standpipe and is recirculated. Temperature sensor (TE201), located at the outlet of the condenser, is used to monitor the temperature of the condensed water.

WATER RECIRCULATION

The standpipe ensures a constant supply of water is available to the distillate pump (M201). As water flows out of the still condenser, it collects in the standpipe. When the water level is at sixteen inches in the standpipe, a signal from level sensor (LT201) will cause the control system to turn on the distillate pump. When the water level is at three inches in the standpipe, a signal from the level sensor to the control system will turn off the distillate pump. With the distillate pump on, water is pumped to the pre-filters, coalescer, and back to the rinse 2 tank.

PRE-FILTER/COALESCER OPERATION

During the distilling processes, some organic vapors such as light fractions of fuel or oil may combine with the steam exiting the top of the still. In addition, if a boil-over occurs, particulates may be carried along with the condensed water. To ensure only clean water is returned to the rinse 2 tank, a two-stage particulate filter and a coalescer are used. The pre-filters trap particulate contamination from the water to prevent premature clogging of the coalescer. The pre-filters contain disposable bags that are less expensive than the coalescer element. The coalescer contains a disposable element that separates the lighter fuel/oils from the heavier water. While the water recycle system is operating, the coalescer drains the separated fluid into an external waste container.

WATER TEMPERATURE CONTROL

Prior to entering the pre-filters, water may pass through the subcooler for additional cooling. The subcooler is an air-to-water heat exchanger that is used when the temperature of the water returning to the rinse 2 tank is twenty or more degrees above the selected set-point. In this circumstance, the signal from temperature sensor (TE202), located at the inlet to the rinse 2 tank, will prompt the control system to close solenoid valve (FV200) and open solenoid valve (FV201). When the valves reposition, water is forced to circulate through the subcooler before it gets to the pre-filters. As the water is passing through the coils of the subcooler, ambient air is drawn through the cooling fins by the still condenser fan. When the temperature of the water returning to the rinse 2 tank is acceptable, solenoid valve (FV200) is opened, and solenoid valve (FV201) is closed. This allows the water going into the pre-filters to bypass the subcooler.

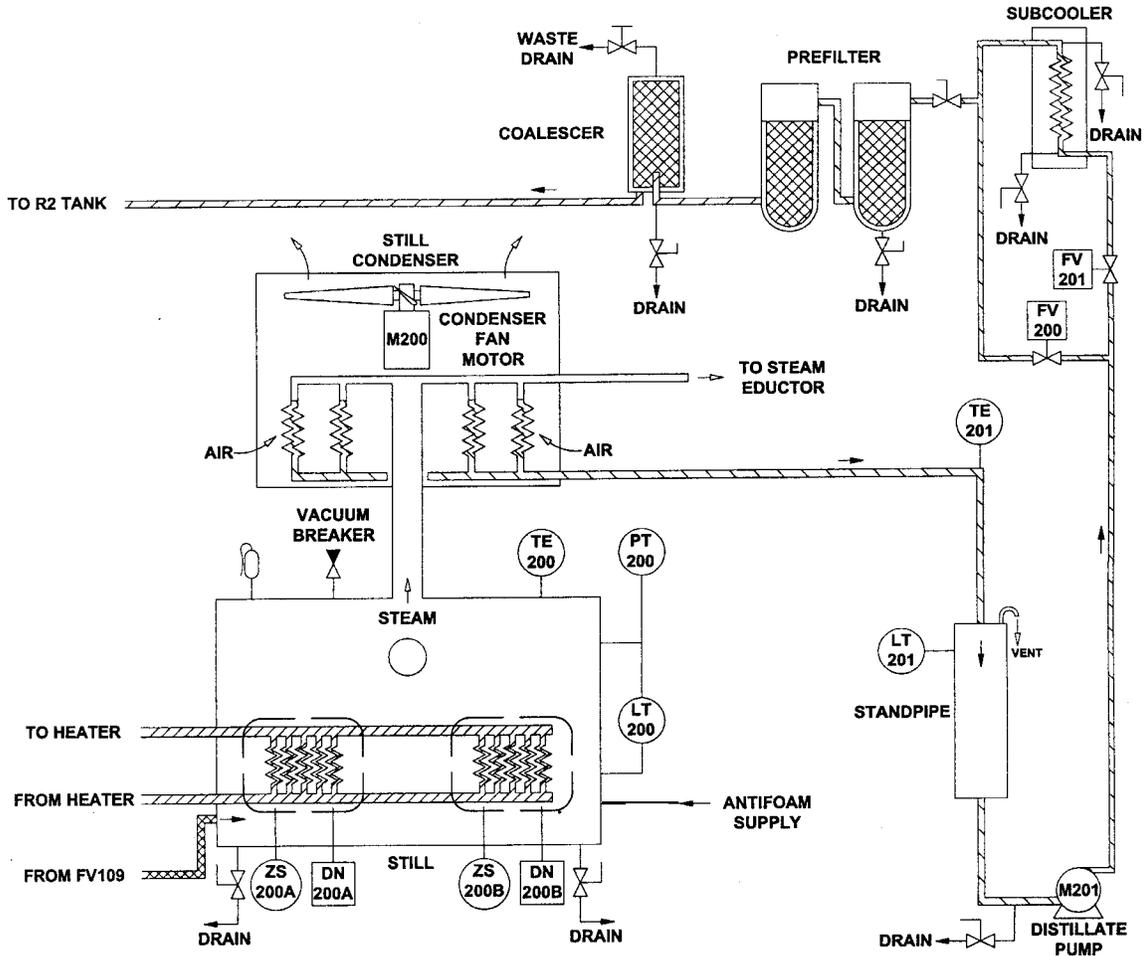


Figure 1. Water Distillation Process.

END OF WORK PACKAGE

**CREW MAINTENANCE
THEORY OF OPERATION
HEATING SYSTEM**

HEATING SYSTEM THEORY OF OPERATION

The heating system (Figure 1) provides hot thermal fluid to the water recycle system for boiling water, and to heat exchangers in the washing/drying systems for drying laundry. Heating system operation consists of the following sub-operations:

Thermal Fluid Heating

An oil-fired heater is used to heat the thermal fluid that is circulating through the heating system. Ambient air is drawn into the heater by the burner blower (M301). The blower consists of a squirrel-cage wheel driven by an electric motor. When the blower is on, it pushes air through the heater outer chamber into the burner chamber. As the air flows from the outer chamber to the burner chamber, it is preheated for maximum efficiency. The air gap created by routing the inlet air through the outer chamber creates a barrier that eliminates the need to insulate the burner chamber while also reducing the heater exterior surface temperature. This eliminates potential burn hazards to personnel and allows rapid cooldown of the heater after shutdown. When the blower is on, the fuel pump (M302) is also on. The fuel pump is a gear-type pump driven by an electric motor. The fuel pump draws fuel from an external supply. The fuel passes through a filter before entering the pump. The pressurized fuel coming out of the pump is supplied to two series-connected solenoid valves (FV300 and FV301). When the valves energize, fuel is supplied to the burner chamber. When air reaches the burner chamber, it is mixed with the fuel and ignited. Ignition of the fuel/air mixture occurs when two electrodes located in the burner chamber are energized with 10,000 volts. The ignition transformer that is controlled by the flame programmer provides the high voltage. As the hot air flows through the burner chamber, the coil filled with circulating thermal fluid is heated. The exhaust air is then vented from the top of the heater through an exhaust stack. Operation of the burner blower and fuel pump are continuous when the heating system is on. Ignition is turned off by the flame programmer once combustion is established. There are times during laundry operations that the still is not being used. When this occurs, the control system will turn the heater on and off as necessary to maintain the required dryer air temperatures. This is accomplished by turning off the burner blower and de-energizing fuel solenoid valves. When combustion is required, the control system will provide a call for heat signal to start the burner blower and fuel pump. Once the flame programmer verifies the blower is operating and fuel pressure is available, it will energize the fuel solenoid valves and apply power to the ignition transformer.

Thermal Fluid Circulation

Thermal fluid is circulated through the heating system by the thermal fluid pump (M300). The thermal fluid pump is a centrifugal type pump driven by an electrical motor. When the thermal fluid exits the heater coil it is pumped through the heat exchangers in the drum drying ducts. The thermal fluid then passes through the heatplates in the still and is returned to the heater. During laundry operations, the thermal fluid pump is continuously circulating thermal fluid, even when the heater is off. When the heater is on, the thermal fluid temperature rises and the thermal fluid expands. To compensate for this expansion the heater contains an expansion tank. When the thermal fluid is at ambient temperature, the expansion tank will be approximately one-third full of thermal fluid. As the heating system reaches its maximum operating temperature, the level in the expansion tank will rise to approximately two-thirds full. A vent is provided at the top of the expansion tank to bleed air pressure from the system as the thermal fluid expands. A relief valve is installed in the thermal fluid line at the outlet of the heater. This valve prevents the pressure of the thermal fluid from exceeding safe operating limits in the event of a control system failure. A strainer is provided at the thermal fluid pump inlet to prevent debris in the plumbing from entering the pump. Isolation valves are located throughout the thermal fluid plumbing to seal off portions of the heating system to reduce the amount of thermal fluid that will need to be drained for maintenance.

HEATING SYSTEM THEORY OF OPERATION-CONTINUED

Heater Monitoring and Control

Heater operation is monitored and controlled by a flame programmer (FP300). Once the flame programmer receives a call-for-heat signal from the control system to start the heater, the flame programmer will control heater operation until the control system removes the signal. Interface between the flame programmer and control system is discussed in (WP 0007, Model C or WP 0008, Model D) SYSTEM MONITORING AND CONTROL. The flame programmer and control system contain interlock circuits that are connected to various sensors and switches located on the heater. The devices used to monitor and control the heater are described in the following paragraphs:

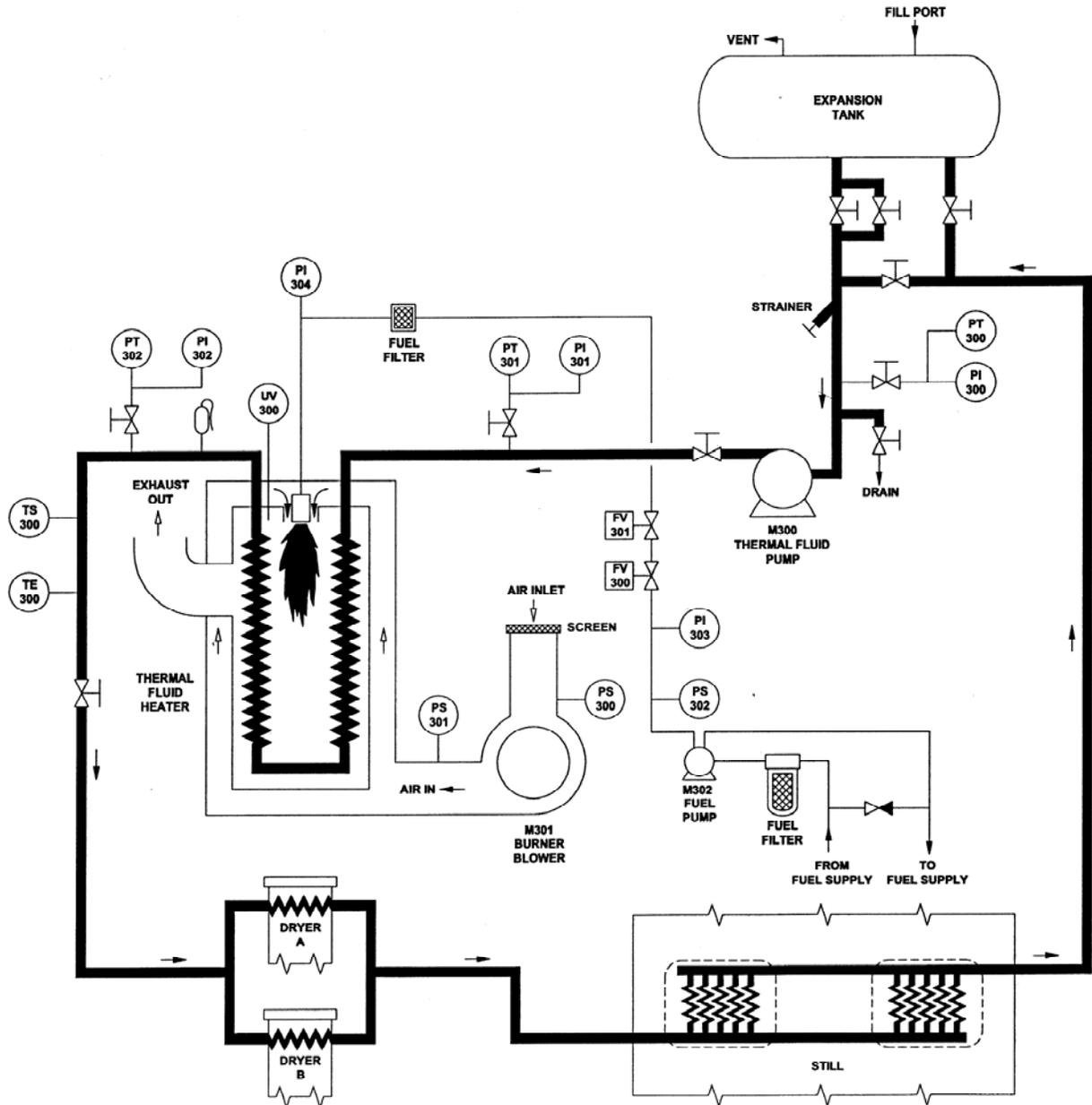


Figure 1. Heating System Operation.

HEATING SYSTEM THEORY OF OPERATION-CONTINUED

Air Pressure Monitoring

Two pressure switches are provided for monitoring air flow through the burner blower (M301). Pressure switch (PS300) monitors air pressure at the blower inlet. Pressure switch (PS301) monitors air pressure at the blower outlet. Signals from both switches are continuously monitored to ensure that adequate air flow is provided to support combustion. If sufficient air flow is not detected one or both switches will open the flame programmer interlock circuit to stop heater operation. Alarm signals will also be provided to the control system by the flame programmer and the pressure switch.

Fuel Pressure Monitoring

A pressure switch (PS302) is provided for monitoring pressure at the outlet of the fuel pump (M302). The signal from the switch is continuously monitored to ensure that adequate fuel pressure is available to support combustion. If sufficient fuel pressure is not detected, the switch will open the flame programmer interlock circuit to stop heater operation. Alarm signals will also be provided to the control system by the flame programmer and the pressure switch. When LADS is started, the heater fuel system must be primed. To prime the system, the operator lifts up a switch that connects 110 VAC power to the coil of the burner blower contactor (MC301). When the burner blower (M301) is operating the fuel pump is also operating. The operator releases the switch when the lines from the fuel supply are filled and the pump outlet pressure is high enough to sustain heater operation. Pressure gauge (PI303), connected to the fuel pump outlet, is provided to inform the operator when the fuel system is primed. Pressure gauge (PI304), connected to the burner chamber inlet, is provided to aid in troubleshooting fuel pressure problems.

Flame Monitoring

An ultra-violet light detector (UV300) is used to continuously monitor the presence of a flame inside the burner chamber. The signal from the detector is provided to the flame programmer (FP300). During start-up, the flame programmer uses this signal to turn off the ignition transformer. During operation, if this signal is not received by the flame programmer, the flame programmer will stop heater operation, and provide an interlock alarm signal to the control system.

Thermal Fluid Pressure Monitoring

Three pressure sensors are used for monitoring the pressure of the thermal fluid. Pressure sensor (PT300) monitors the thermal fluid pump (M300) inlet pressure. Pressure sensor (PT301) monitors the thermal fluid pump outlet pressure. Pressure sensor (PT302) monitors the thermal fluid heater outlet pressure. Signals from the pressure sensors are continuously monitored by the control system to ensure the thermal fluid is circulating at the proper flow rate. The control system will shut off operation of the heating system if the flow of thermal fluid is not within the required range. Pressure gauges (PI300, PI301, and PI302) are connected at the same locations as the pressure sensors, and are provided to monitor the thermal fluid pressure when troubleshooting and servicing the thermal fluid system.

Thermal Fluid Temperature Monitoring

Two temperature sensors are provided for monitoring the thermal fluid temperature at the heater outlet. Temperature sensor (TE300) is used to control operation of the heater and regulate the temperature of the thermal fluid going into the dryer heaters. When the still is not being used, the thermal fluid temperature will rise. The signal from TE300 will be used to detect this condition and the control system will turn off the call-for-heat signal to the flame programmer (FP300) as previously described. As long as the thermal fluid temperature is sufficient to maintain the selected drying temperature the heater will remain in this state. If the thermal fluid temperature must be increased to maintain the proper air drying temperature, the signal from TE300 will be used by the control system to apply the call-for-heat signal to the flame programmer. Temperature switch (TS300) continuously monitors the thermal fluid temperature to ensure that the thermal fluid does not overheat. If the thermal fluid temperature exceeds the specified limit, the switch will open the flame programmer interlock circuit to stop heater operation. Alarm signals will also be provided to the control system by the flame programmer and temperature switch.

HEATING SYSTEM THEORY OF OPERATION-CONTINUED**Thermal Fluid Level Monitoring**

The expansion tank contains a dipstick to periodically check the thermal fluid level in the tank. The dipstick has marks indicating when thermal fluid needs to be added and when the expansion tank is full.

END OF WORK PACKAGE

**CREW MAINTENANCE
THEORY OF OPERATION
AIR SYSTEM**

AIR SYSTEM

The air system provides dry compressed air to the other LADS systems. This air is used to pressurize the air bags that support the drums and to actuate ball valves, air dampers, brakes, and door locks used on the washing/drying system and water recycle system. A small amount of air is also used to detect the water level in the wash tanks, rinse tanks, still, and standpipe. Air system operation consists of the following sub-operations:

Air Compression and Conditioning

Ambient air enters the air system through an inlet filter. The inlet filter is used to prevent debris (sand, dirt, leaves, etc.) from entering the air compressor (M500). The air compressor is used to pressurize the air entering the system from atmospheric pressure to approximately 125 psig. The compressor is a two-stage, two-cylinder, reciprocating piston type that is driven by an electric motor. A relief valve is mounted at the compressor outlet to prevent the discharge pressure from exceeding safe limits. Air leaving the compressor is routed to an outlet filter that removes most of the water generated during the compression process from the product air. The filter contains two disposable elements that separate particles and water from the air. Float valves located in the filter bowls automatically drain the filters to remove the separated water. Once the air leaves the outlet filter, it passes through a dehydrator. The dehydrator is used to completely dry the product air. The dehydrator consists of a membrane vessel. When product air enters the vessel about 80 percent of the air passes through the membrane material where the water is squeezed out of the air. The other 20 percent of the air is used to sweep the moisture off of the membrane to a vent port. The dried product air is then routed to an air tank.

Compressed Air Storage

When the air leaves the dehydrator, it is stored in the air tank. When the tank is fully pressurized, it contains enough air to allow the compressor (M500) to operate intermittently (approximately 30 minutes per hour) while still allowing smooth operation of the air-driven components. Pressure sensor (PT500), mounted on the air tank, is used to determine when the compressor should turn on and off. When the pressure in the tank drops to 85 psig, due to operation of air driven components, the signal sent to the control system by the sensor will prompt the control system to turn on the compressor. Likewise, when the air tank has been recharged to the 125 psig, the signal from the sensor will turn off the compressor. A dump valve (FV500) opens to allow pressure trapped between the air tank and compressor to vent. A relief valve is mounted on the air tank to prevent the pressure of the stored air from exceeding safe limits. A storage tank vent valve is located at the tank bottom to allow the tank to be de-pressurized prior to performing maintenance on the air system. The air tank also contains an isolation valve that maintains the air pressure in the tank when the product pressure vent valve is opened. A check valve is provided at the tank inlet to prevent pressure in the air tank from bleeding back through the dehydrator, or out the dump valve, when the compressor is not operating.

Product Air Distribution

A pressure regulator (PR500) is used to control the pressure of the air delivered to the air-driven components. The regulator is set to deliver air at 80 psig regardless of normal changes in flow demand. The regulator is adjustable and contains a pressure gauge (PI500) that indicates the regulated pressure. Pressure sensor (PT501) is also mounted at the outlet of the pressure regulator. This sensor is used by the control system to verify that sufficient air pressure is available to operate the air-driven components. Product air leaving the pressure regulator is distributed to the solenoid manifolds, orifice manifold, and drum air bags. Four solenoid manifolds, each consisting of eight 4-way valves, are provided to control operation of the various air-actuated ball valves, air dampers, drum brakes and door locks. These 4-way valves use electrical signals received from the control system to control the direction of air flow to and from the air-driven components. The orifice manifold is used to control the flow of air to the tank level sensors. A filter is mounted at the manifold inlet to prevent particles from plugging the orifices.

AIR SYSTEM-CONTINUED

An inlet orifice is provided to isolate the individual level sensor orifices from pressure and flow surges. Eight level sensor orifices are used to supply a steady flow of low pressure air to the pressure sensor and bubbler tube used to determine the water levels in the wash tanks, rinse tanks, still, and standpipe. The air provided to the drum air bags passes through a regulator (PR501) that is set to deliver air at 65 psig. The regulator contains a pressure gauge (PI501) that indicates the regulated pressure. Each front air bag has a leveling valve that is mechanically connected to the drum. When the LADS is operating on unlevel terrain, the leveling valve adds or vents pressure from the air bag until the drum is level in the side-to-side direction.

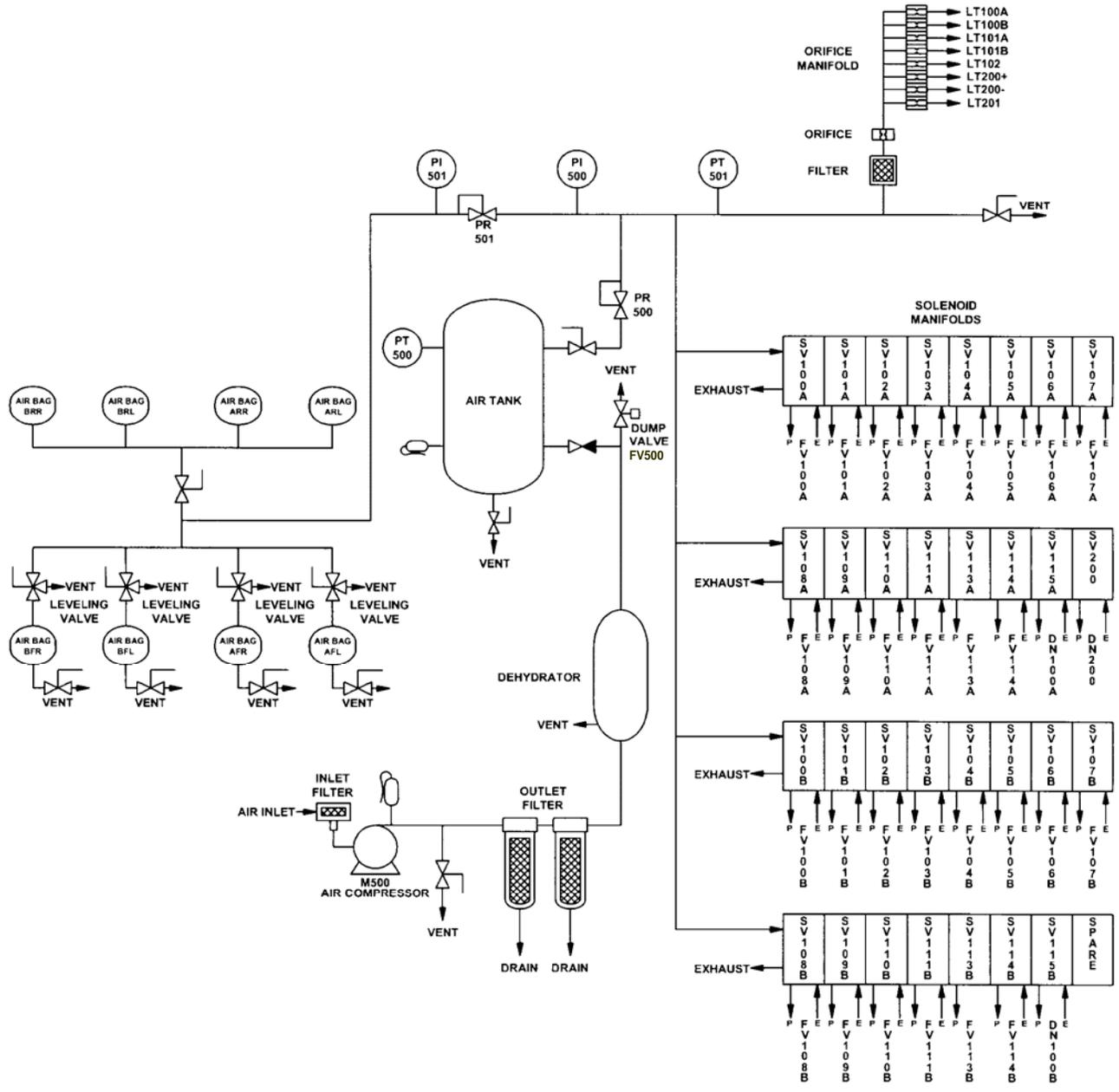


Figure 1. Air System Components.

END OF WORK PACKAGE

**CREW MAINTENANCE
THEORY OF OPERATION
CONTROL SYSTEM
LADS MODEL C**

CONTROL SYSTEM

The control system provides the electrical interface between the external power and the LADS electrical and electronic components. This system also controls all aspects of LADS automated operation and provides the interface to the controls and indicators that the operator uses when performing laundry operations. Control system operation consists of the following sub-operations.

Input Power Distribution and Conditioning

The LADS requires external 208 VAC, 3-Phase, 50/60 Hz electrical power in order to operate (Figure 1). External power is connected to the disconnect switch (SW1) located in the main control enclosure. This switch removes power from the LADS when turned off and provides power to the power distribution block (TB1) when turned on. Inside the main control enclosure power is divided and distributed to circuit breakers that protect all electrical circuits routed in the LADS. Input power is connected to a phase monitor (PM1) that continually analyzes the input power provided to the LADS. If an out-of-tolerance condition exists, power can not be applied, or will be automatically removed from the control system. Single-phase 110 VAC power is connected to a ground fault interrupt (GFI) circuit and the control power switch (SW2). When SW2 is turned on power is applied to two power supplies (PS1 and PS2). PS1 and PS2 supply direct current (DC) power to the electric and electronic components that provide control over all aspects of LADS operation.

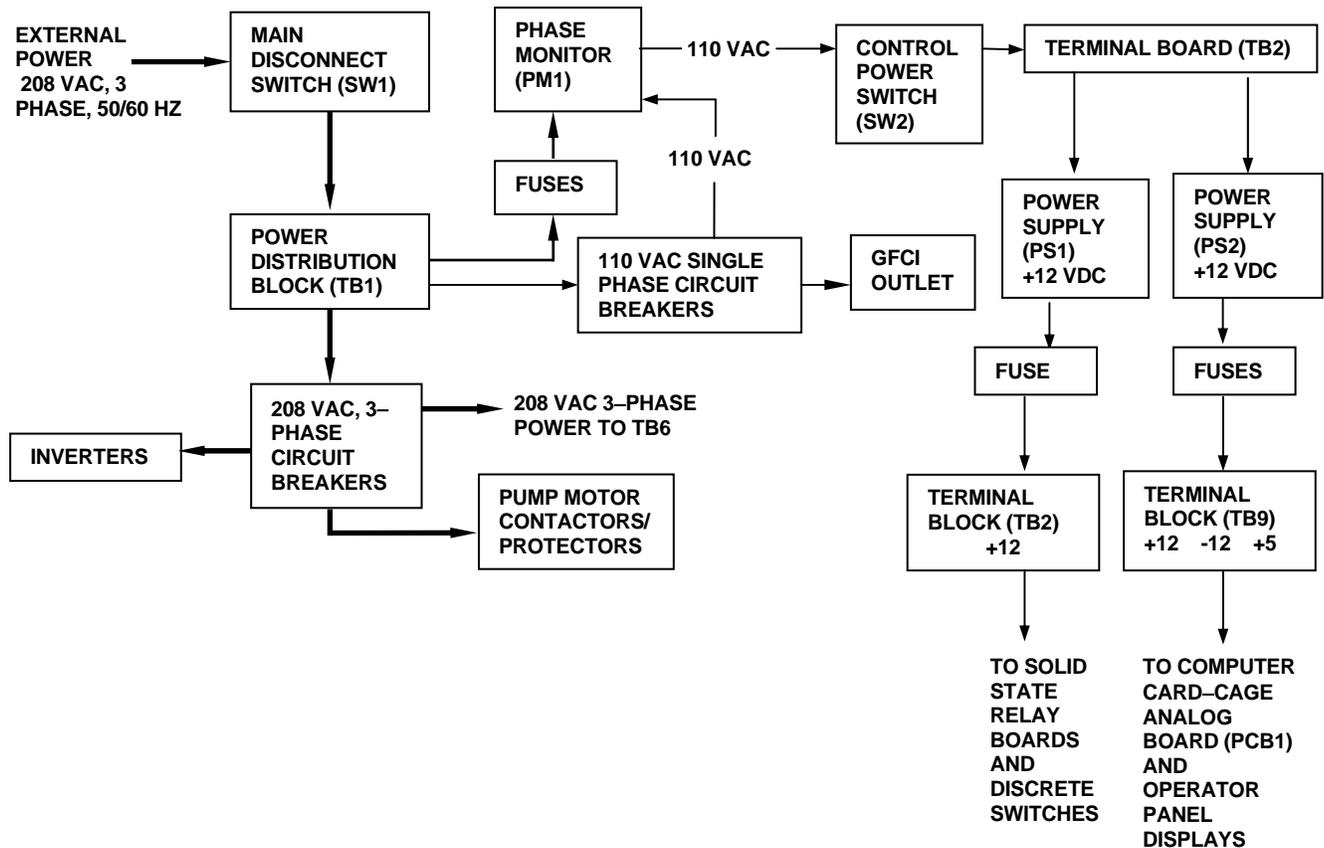


Figure 1. Power Distribution Block Diagram.

CONTROL SYSTEM-CONTINUED

System Monitoring and Control

LADS operation is electronically controlled. This control is accomplished using a central processing unit (PCB9) that contains custom software. PCB9 interfaces with other circuits to control and monitor all automatic operations as follows:

Monitoring System Inputs

Analog sensors and discrete switches are used to monitor all aspects of LADS operation (Figure 2). Analog card (PCB1) takes signals from the analog sensors and provides a conditioned signal to the analog-to-digital converter card (PCB11). PCB11 changes the signal to digital information and provides the information to the central processing unit (PCB9). The discrete input card (PCB2) provides a path from each discrete switching device to the optically isolated input card (PCB8). PCB8 takes the on or off signal from the switching device and provides a signal to PCB9.

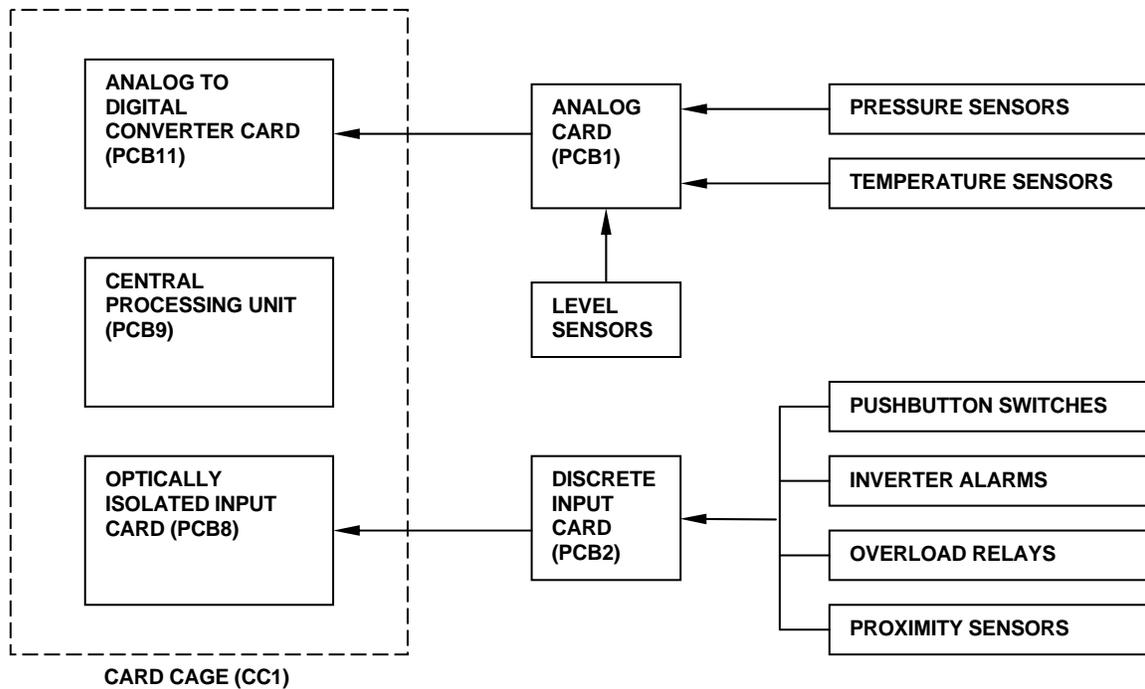


Figure 2. System Input Monitoring and Control Block Diagram.

CONTROL SYSTEM-CONTINUED

Controlling System Outputs

The LADS contains fans, motors, pumps, valves, and many other components that need to be turned on or off at specific times in order for correct laundry operations to occur. Based on software contained in the central processing unit (PCB9) the control system (Figure 3) will provide the required outputs to four solid-state relay cards (PCB3, 4, 5, and 6). Individual solid-state relays (SSRs) on these cards receive input signals from PCB9 through a digital input/output card (PCB7). When the SSRs receive an input signal they energize and provide AC or DC power to turn on the proper output.

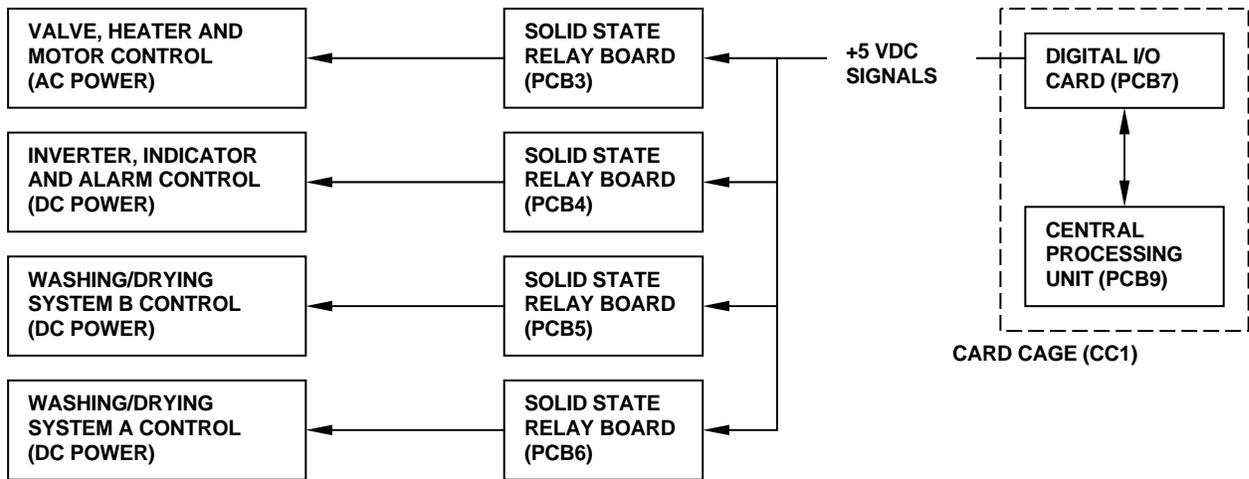


Figure 3. Controlling System Outputs Block Diagram.

CONTROL SYSTEM-CONTINUED

Operator Interface

Main power and control power are applied to LADS at the main control enclosure as previously discussed under input power distribution and conditioning. At the operator panels the operator uses pushbutton switches, indicating lights, an alarm, and a message display to control and monitor LADS operation (Figure 4). Operator panels A and B are used for selecting laundry formulas and starting and stopping laundry cycles on their assigned washing/drying systems. Operator panel A is used to drain, fill, and heat water tanks on both washing/drying systems and control operation of the air system. Operator panel A is also used by maintenance personnel to observe system alarms, monitor operating parameters, and initiate specific system or component tests. Communication between the operator panels and the control system is accomplished using several methods. Selection of menu options and turning off the alarm is done using pushbutton switches. These switches communicate with the CPU card (PCB9) by providing an input to the discrete input card (PCB2). PCB2 provides a signal to the optically isolated input card (PCB8) which provides the signal to PCB9. Indicator lights and the audible alarm are turned on when a solid-state relay (SSR) receives an input signal from PCB9 through the digital input/output (I/O) card (PCB7). When the 5 VDC signal is removed, the SSR switches and power is removed from the indicator. The display contains its own processing circuit that communicates digitally with PCB9. An interface card (PCB10) provides an interconnection between the display and PCB9. PCB10 also provides 5 VDC power from PS2 to the display backlight. There are four alarm levels associated with LADS operation. When the system is operating normally the alarm is off. If the alarm comes on, and remains steady, this indicates that some type of operator action is required (i.e., close doors, laundry, cycle is complete, add FRS, etc.). If the alarm comes on with a slow pulse a non-critical fault has occurred. If the alarm comes on with a fast pulse a critical fault has occurred and LADS operation will be shut down by the control system.

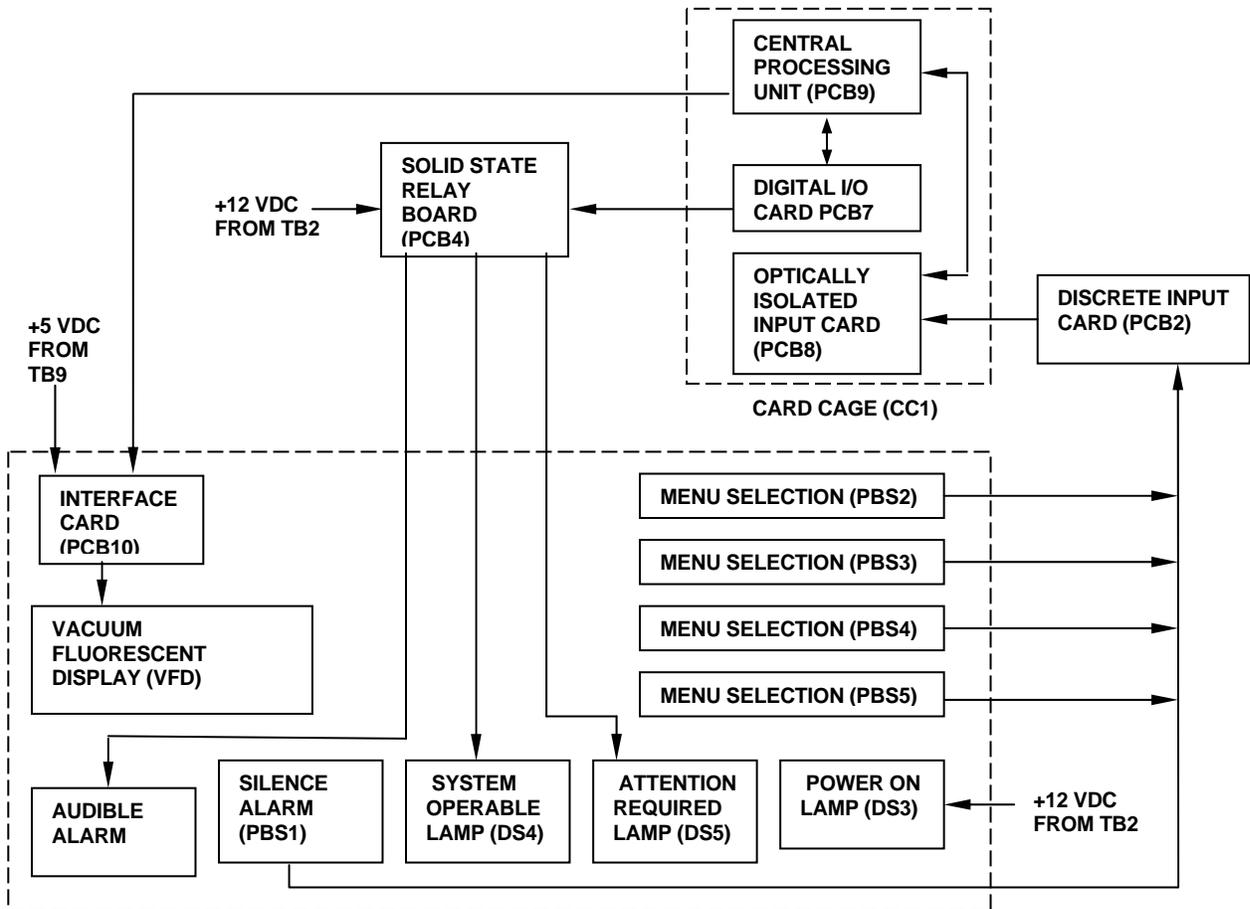


Figure 4. Operator Interface Block Diagram.

END OF WORK PACKAGE

**CREW MAINTENANCE
THEORY OF OPERATION
CONTROL SYSTEM
LADS MODEL D**

CONTROL SYSTEM

The control system provides the electrical interface between the external power and the LADS electrical and electronic components. This system also controls all aspects of LADS automated operation and provides the interface to the controls and indicators that the operator uses when performing laundry operations. Control system operation consists of the following sub-operations.

Input Power Distribution and Conditioning

The LADS requires external 208 VAC, 3-Phase, 50/60 Hz electrical power in order to operate (Figure 1). External power is connected to the disconnect switch (SW1) located in the main control enclosure. This switch removes power from the LADS when turned off and provides power to the power distribution block (TB1) when turned on. Inside the main control enclosure power is divided and distributed to circuit breakers that protect all electrical circuits routed in the LADS. Input power is connected to a phase monitor (PM1) that continually analyzes the input power provided to the LADS. If an out-of-tolerance condition exists, power can not be applied, or will be automatically removed from the control system. Single-phase 110 VAC power is connected to a ground fault circuit interrupter (GFCI) and the control power switch (SW2). When SW2 is turned on power is applied to two power supplies (PS1 and PS2). PS1 and PS2 supply direct current (DC) power to the electric and electronic components that provide control over all aspects of LADS operation.

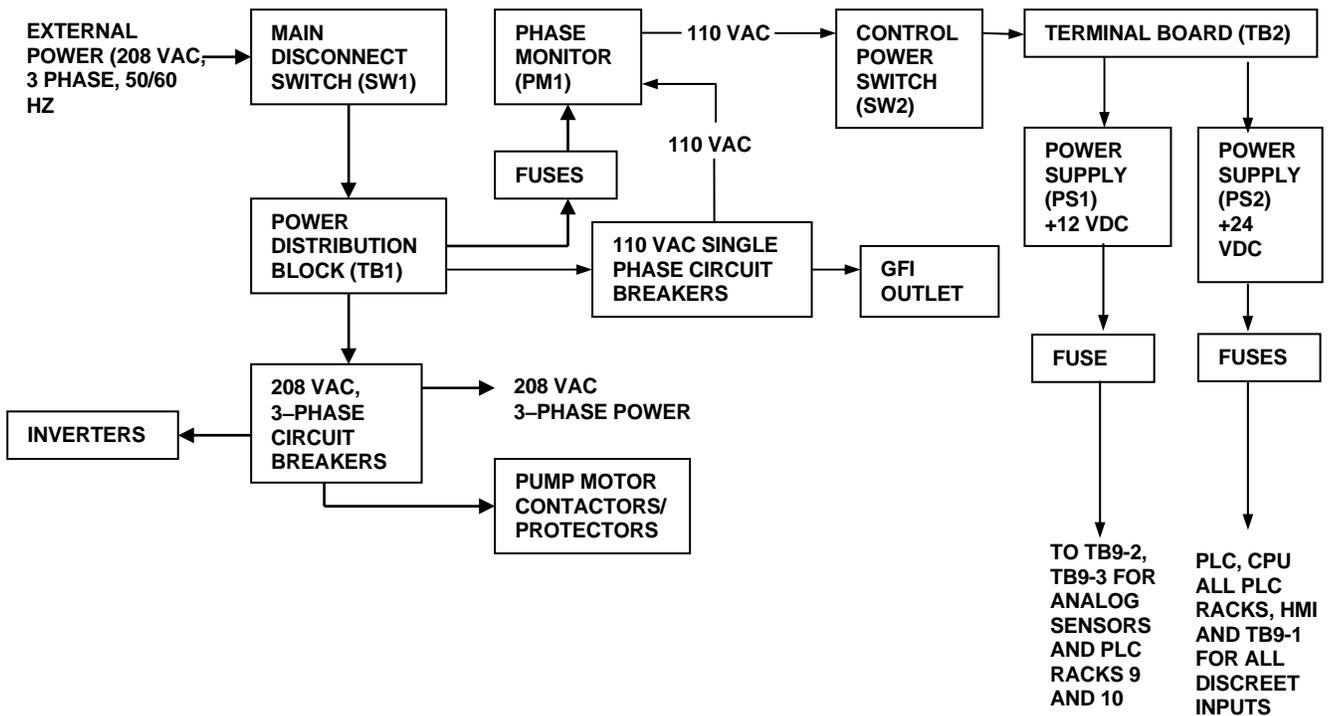


Figure 1. Power Distribution Block Diagram.

CONTROL SYSTEM-CONTINUED

System Monitoring and Control

LADS operation is electronically controlled. This control is accomplished using a Programmable Logic Controller (PLC) containing a Central Processing Unit (CPU) that contains custom software. The CPU interfaces with other circuits and sensors to control and monitor all automatic operations as follows:

Monitoring System Inputs

Analog sensors and discrete switches are used to monitor all aspects of LADS operation (Figure 2). Inputs arrive at the PLC through a series of external terminal boards and input rack modules. These signals are routed to the CPU, which interprets the data and responds with the appropriate output.

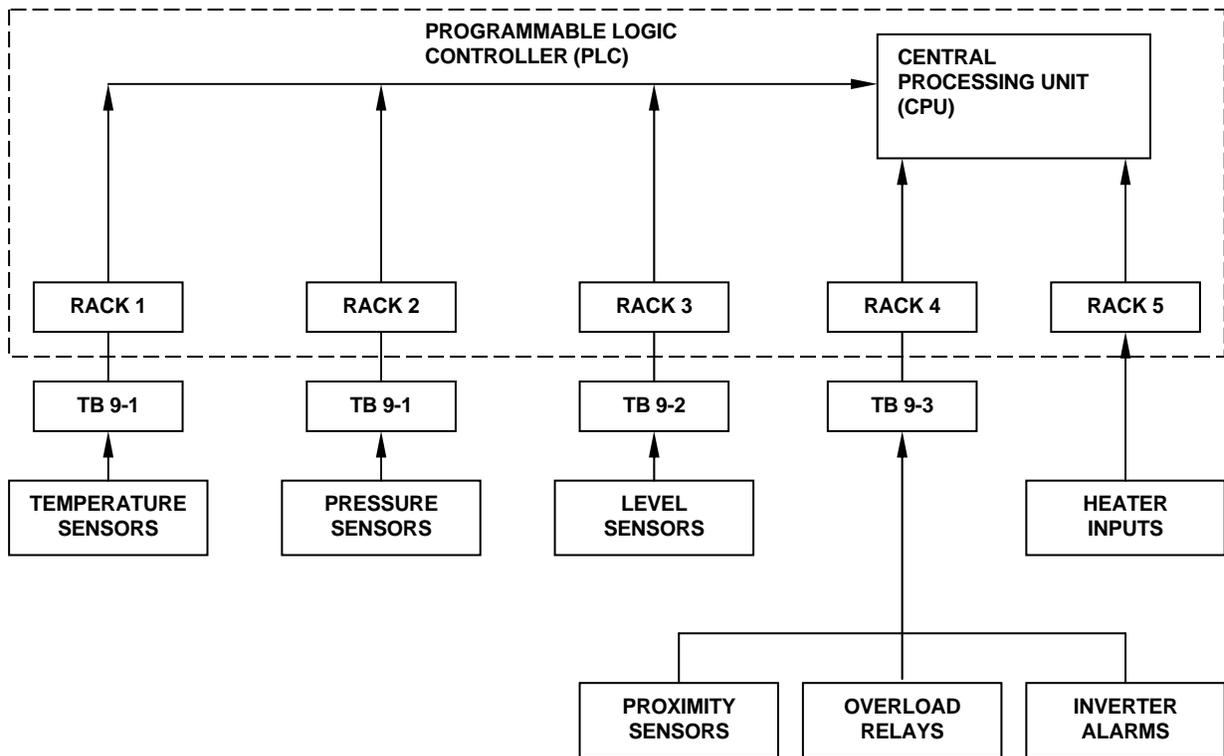


Figure 2. System Input Monitoring and Control Block Diagram.

CONTROL-CONTINUED

Controlling System Outputs

The LADS contains fans, motors, pumps, valves, and many other components that need to be turned on or off at specific times in order for correct laundry operations to occur (Figure 3). Software contained in the CPU interprets information from sensors located in all major subsystems as well as operator inputs and provides the proper outputs directly to the various components. This information is sent from the CPU to the output rack modules. The output rack modules in turn provide the control power directly to the component that is being commanded to turn on or off.

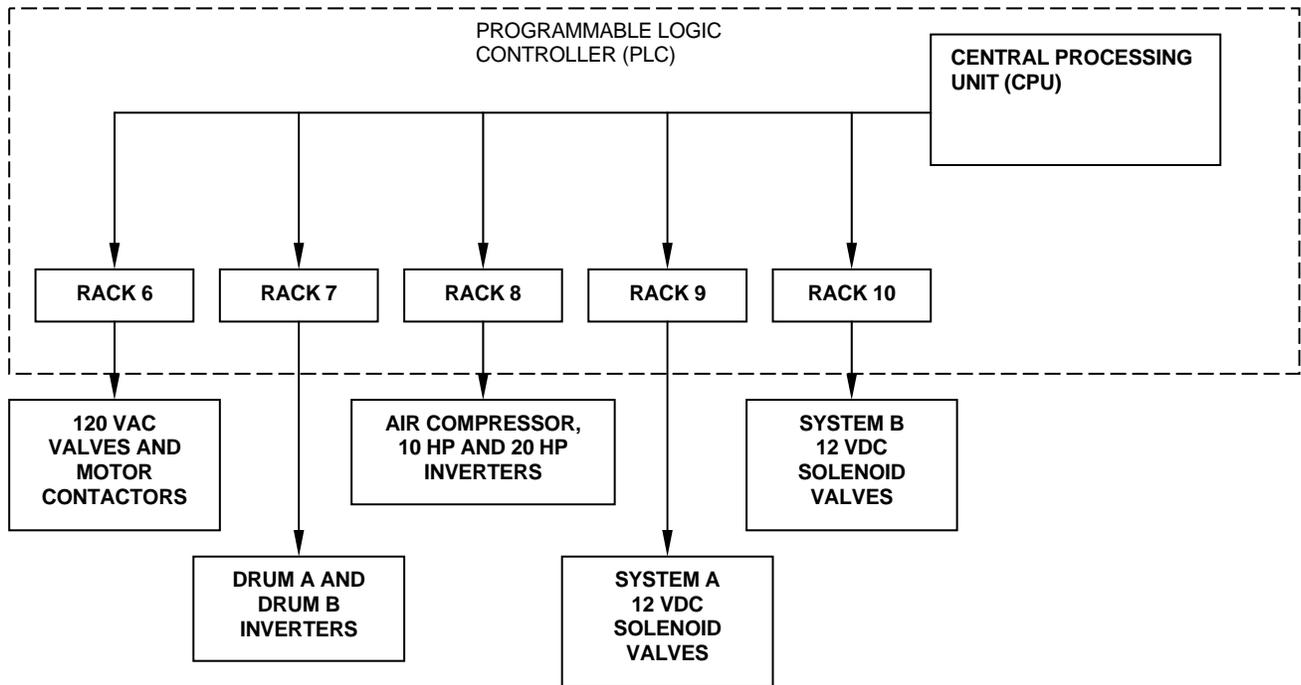


Figure 3. Controlling System Outputs Block Diagram.

CONTROL SYSTEM-CONTINUED

Operator Interface

Main power and control power are applied to LADS at the main control enclosure as previously discussed under Input Power Distribution and Conditioning. The operator controls and monitors all functions of LADS operation from the touchscreen display (Figure 4). The touchscreen displays all alarm information and system status. The touchscreen is also used by maintenance personnel to observe alarms, monitor operating parameters and initiate individual system or component tests. All operator inputs to the system are accomplished via the touchscreen. Selection of menu options and turning off the alarm is done by selecting and pressing one of the displayed screen options. The touchscreen communicates the selection directly to the CPU where it is processed and produces the appropriate control output.

The audible alarm is turned on when LADS enters a phase of the cycle of operation that requires operator action or the CPU receives an indication of a fault somewhere in the system. The audible alarm will continue to sound until ACKNOWLEDGE ALARM is pressed on the touchscreen sending a signal back to the CPU to silence the alarm. There are four alarm levels associated with LADS operation. When the system is operating normally the alarm is off. If the alarm comes on, and remains steady, this indicates that some type of operator action is required (i.e., close doors, laundry cycle is complete, add FRS, etc.). If the alarm comes on with a slow pulse a non-critical fault has occurred. If the alarm comes on with a fast pulse a critical fault has occurred and LADS operation will be shut down by the control system

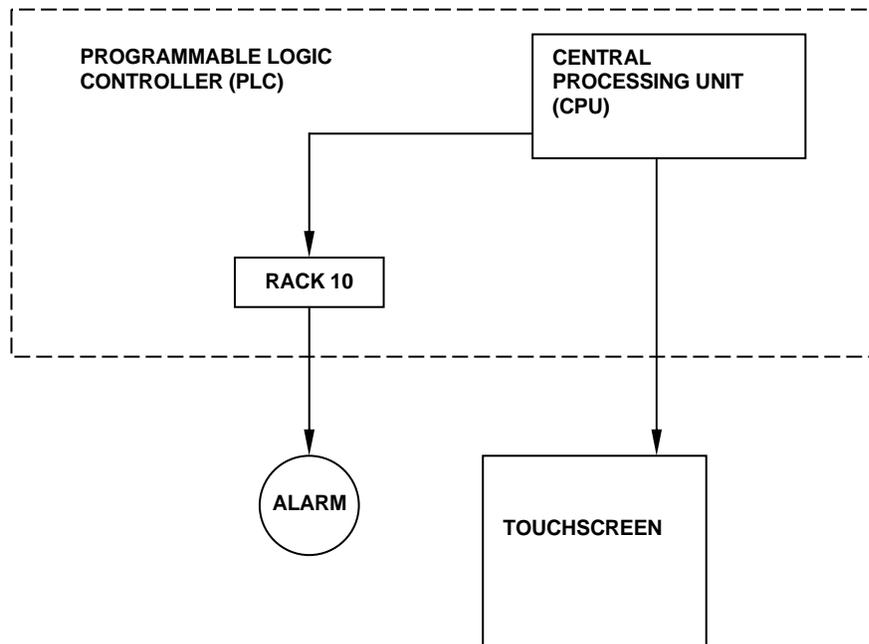


Figure 4. Operator Interface Block Diagram.

END OF WORK PACKAGE

CHAPTER 2

**OPERATOR INSTRUCTIONS
FOR
LAUNDRY ADVANCED SYSTEM**

**CREW MAINTENANCE
DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS**

MAIN CONTROL ENCLOSURE CONTROLS AND INDICATORS

Figure 1 shows the location of the controls and indicators found on the main control enclosure. Table 1 describes the use of these controls and indicators. To access the controls located inside the main control enclosure, loosen the eleven latches with a flat tip screwdriver from the toolbox (WP 0066, Table 2) and open door.

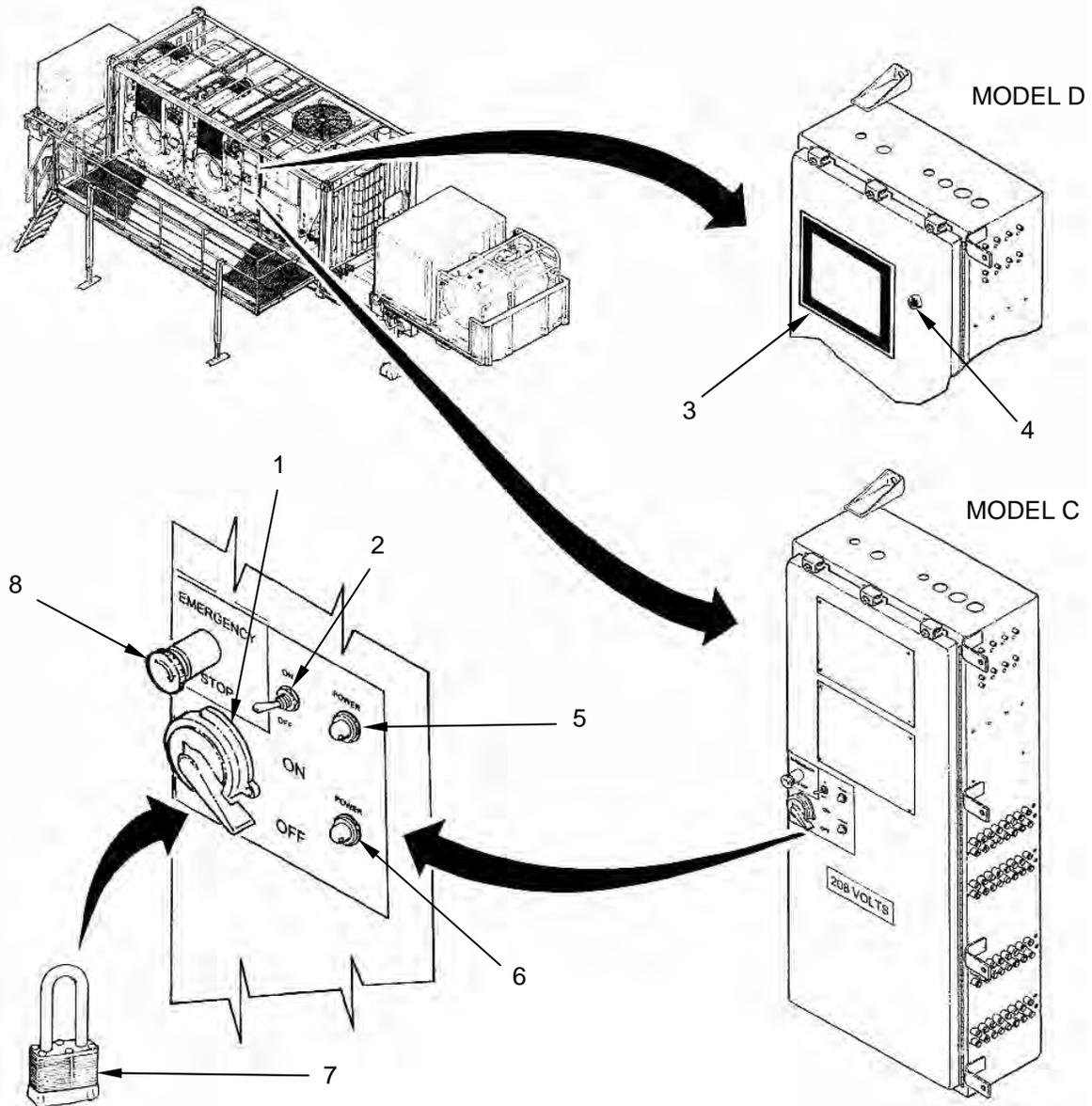


Figure 1. Main Enclosure Controls and Indicators, Exterior.

MAIN CONTROL ENCLOSURE CONTROLS AND INDICATORS-CONTINUED**Table 1. Main Control Enclosure Controls and Indicators, Exterior.**

INDEX	DESCRIPTION	FUNCTION
1	MAIN DISCONNECT ON/OFF, 2 Position Switch	Turns main power on or off
2	CONTROL POWER ON/OFF, 2 Position Switch	Turns control power on or off
3	Human Machine Interface (HMI) (D Model), LCD Touchscreen Display	Displays information on system operation and all control keys for operator action
4	Alarm (D Model), Audio	Sounds when a system attention or a fault occurs
5	CONTROL POWER, Indicator	Illuminates when control power is applied to LADS
6	MAIN POWER, Indicator	Illuminates when main power is applied to LADS
7	Padlock	Lock is from storage locker. Used for the electrical lockout of system
8	EMERGENCY STOP, Pushbutton Switch	Used to stop LADS operation under emergency situations

MAIN CONTROL ENCLOSURE CONTROLS AND INDICATORS-CONTINUED

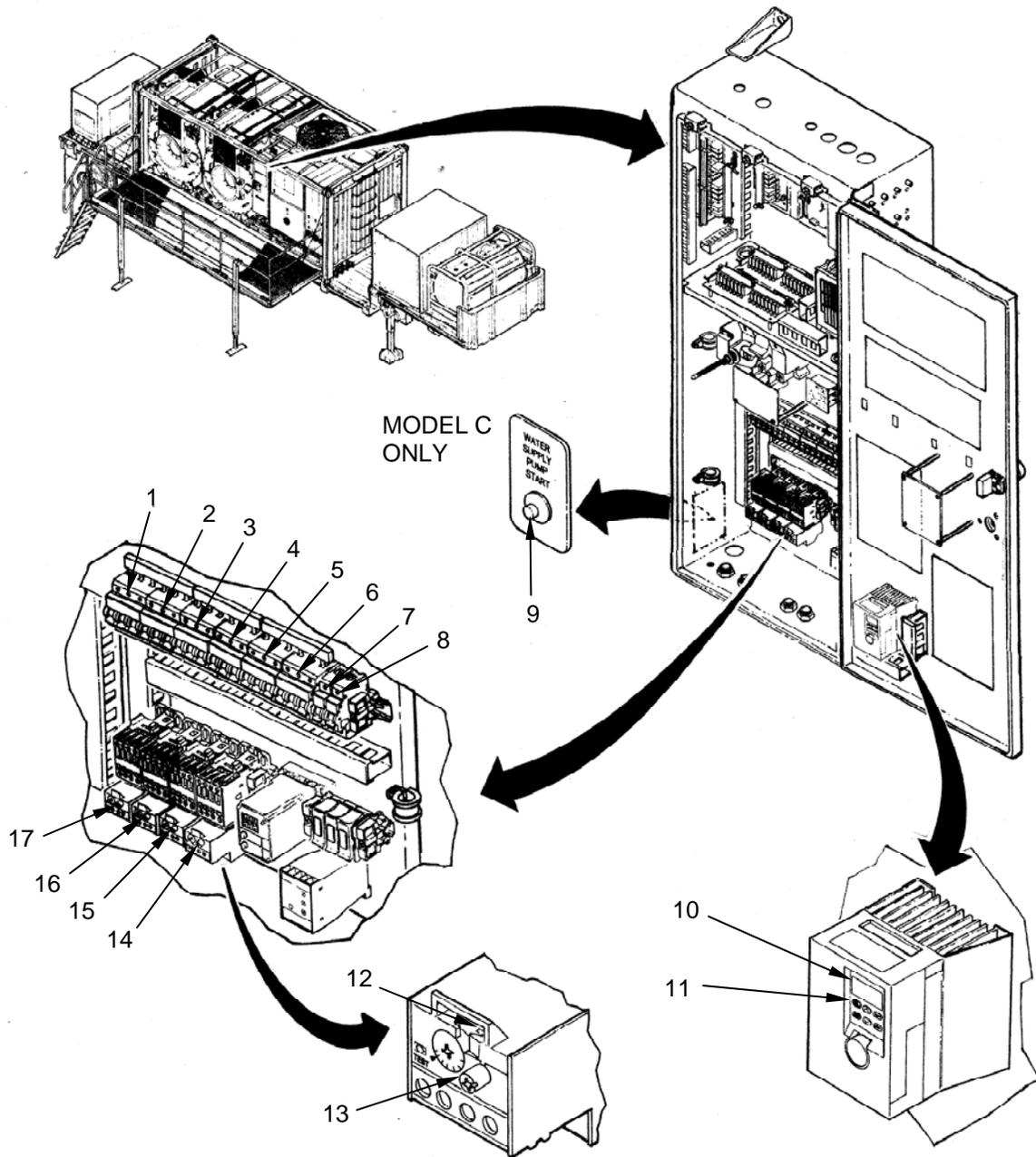


Figure 2. Main Control Enclosure Controls and Indicators, Circuit Breakers and Reset Buttons.

MAIN CONTROL ENCLOSURE CONTROLS AND INDICATORS-CONTINUED**Table 2. Main Control Enclosure Controls and Indicators, Circuit Breakers and Reset Buttons.**

INDEX	DESCRIPTION	FUNCTION
1	Circuit Breaker CB1, 63 AMP, Lever Actuated	Used to protect wiring and components in the 20 HP inverter circuits. Lever is ON in up position
2	Circuit Breaker CB2, 40 AMP, Lever Actuated	Used to protect wiring and components in the 10 HP inverter circuits. Lever is ON in up position
3	Circuit Breaker CB3, 40 AMP, Lever Actuated	Used to protect wiring and components in the Drum A inverter circuits. Lever is ON in up position
4	Circuit Breaker CB4, 40 AMP, Lever Actuated	Used to protect wiring and components in the Drum B inverter circuits. Lever is ON in up position
5	Circuit Breaker CB5, 20 AMP, Lever Actuated	Used to protect wiring and components in the water pump circuits. Lever is ON in up position
6	Circuit Breaker CB6, 16 AMP, Lever Actuated	Used to protect wiring and components in the external water pump, distillate pump, and air compressor circuits. Lever is ON in up position
7	Circuit Breaker CB7, 16 AMP, Lever Actuated	Used to protect wiring and components in the control power circuits. Lever is ON in up position
8	Circuit Breaker CB8, 16 AMP, Lever Actuated	Used to protect wiring and components in the external GFI circuit. Lever is ON in the up position
9	WATER SUPPLY PUMP START (C MODEL), Pushbutton Switch	Used to start water supply pump. Once started, the pump will remain on for 10 minutes
10	Digital Monitor, 4 X 1 Digital Display	Indicates error messages for air compressor inverter and related circuit
11	PRG/RESET, Key	Used to reset inverter errors
12	Trip Indicator	Used to indicate overload relay has tripped. A visible yellow flag indicates a tripped condition.
13	RESET Button	Used to reset tripped overload relay
14	OL201 Reset, Pushbutton Switch	Used to reset overload relay protecting distillate pump (M201)
15	OL105 Reset, Pushbutton Switch	Used to reset overload relay protecting water supply pump (M105)
16	OL101B Reset, Pushbutton Switch	Used to reset overload relay protecting water pump B (M101B)
17	OL101A Reset, Pushbutton Switch	Used to reset overload relay protecting water pump A (M101A)

OPERATOR PANEL CONTROLS AND INDICATORS

Two operator panels are used on LADS Model C. Operator panel A is used to operate washing/drying system A. Maintenance personnel also use operator panel A to control, monitor, and test LADS operation. Operator panel B is used only to operate washing/drying system B. Figure 2 shows the location of the controls and indicators found on the operator panels. Table 2 describes the use of these controls and indicators found on each operator panel.

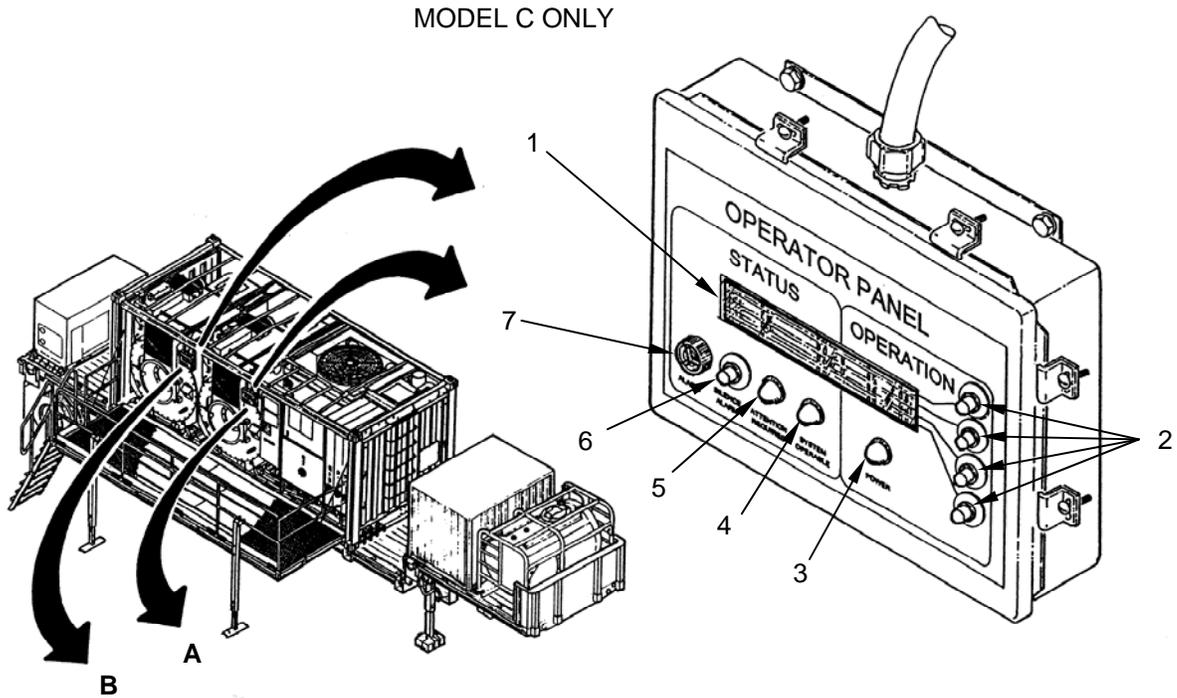


Figure 3. Operator Panel Controls and Indicators.

Table 3. Operator Panel Controls and Indicators.

INDEX	DESCRIPTION	FUNCTION
1	Display, Vacuum Fluorescent	Displays operator information
2	Menu Selection, Pushbutton Switches	Allows selection of options on panel display
3	POWER, Indicator	Illuminates when power is applied to operator panel
4	SYSTEM OPERABLE, Indicator	Illuminates green when system is ready to operate
5	ATTENTION REQUIRED, Indicator	Illuminates red when system requires attention
6	SILENCE ALARM, Pushbutton Switch	Silences audible alarm
7	Alarm, Audio	Sounds when a system attention or a fault occurs

INVERTER ENCLOSURE CONTROLS AND INDICATORS

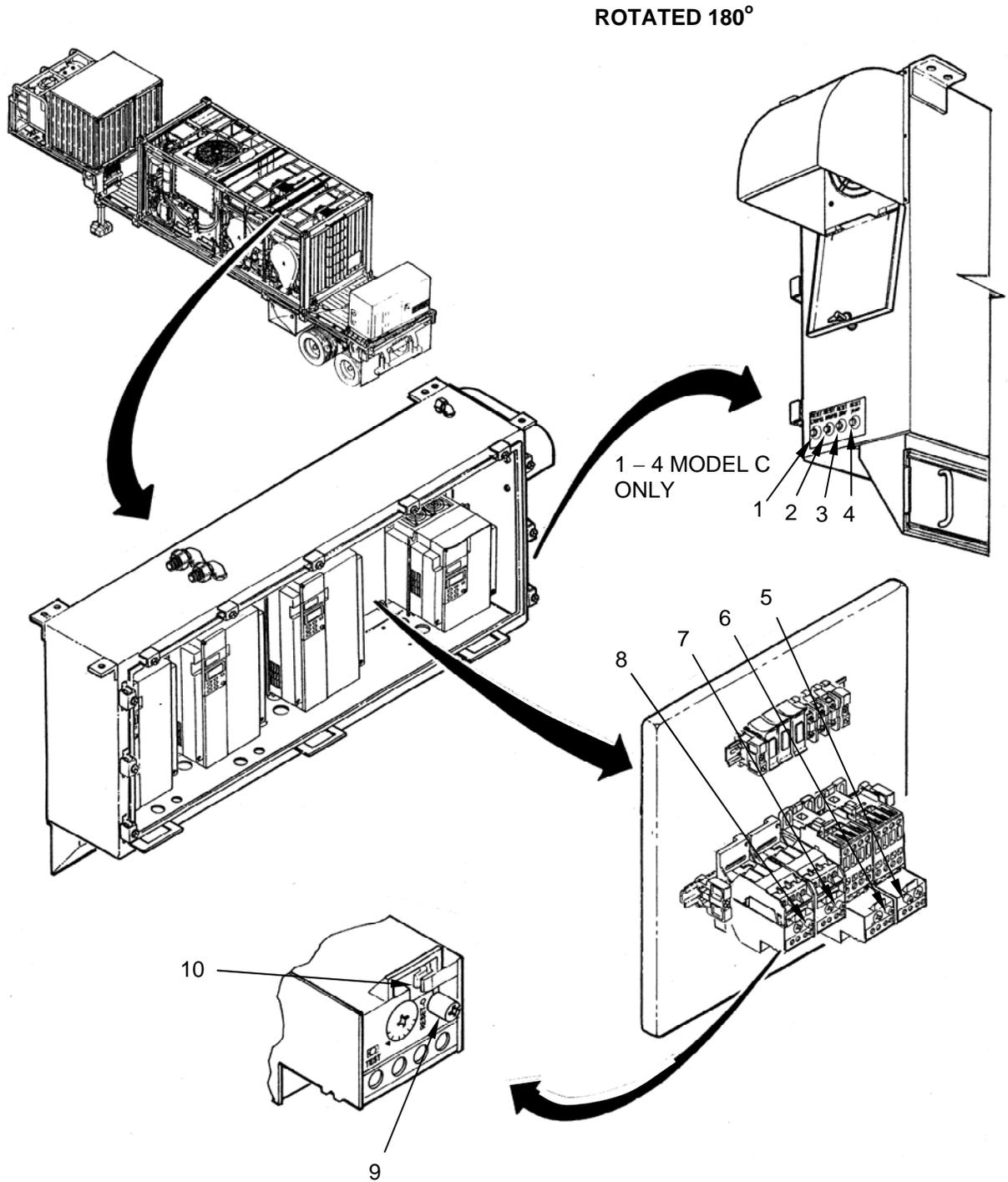


Figure 4. Inverter Enclosure Controls and Indicators.

INVERTER ENCLOSURE CONTROLS AND INDICATORS-CONTINUED**Table 4. Inverter Enclosure Controls and Indicators.**

INDEX	DESCRIPTION	FUNCTION
1	RESET DRUM A, Pushbutton Switch	Used to reset drum A inverter when a "DRUM A INVERTER FAULT" is displayed
2	RESET DRUM B, Pushbutton Switch	Used to reset drum B inverter when a "DRUM B INVERTER FAULT" is displayed
3	RESET 20 HP, Pushbutton Switch	Used to reset 20 HP inverter when a "20 HP INVERTER FAULT" is displayed
4	RESET 10 HP, Pushbutton Switch	Used to reset 10 HP inverter when a "10 HP INVERTER FAULT" is displayed
5	OL104B Reset, Pushbutton Switch	Used to reset overload relay protecting dryer blower B (M104B)
6	OL104A Reset, Pushbutton Switch	Used to reset overload relay protecting dryer blower A (M104A)
7	OL300 Reset, Pushbutton Switch	Used to reset overload relay protecting thermal fluid pump (M300)
8	OL200 Reset, Pushbutton Switch	Used to reset overload relay protecting still condenser fan (M200)
9	RESET Button	Used to reset tripped overload relay
10	Trip Indicator	Used to indicate overload relay has tripped. Yellow flag visible indicates tripped condition

HEATER CONTROLS AND INDICATORS

Figures 5 and 6 show the location of the controls and indicators found on the heating system. Tables 5 and 6 describe the use of these controls and indicators.

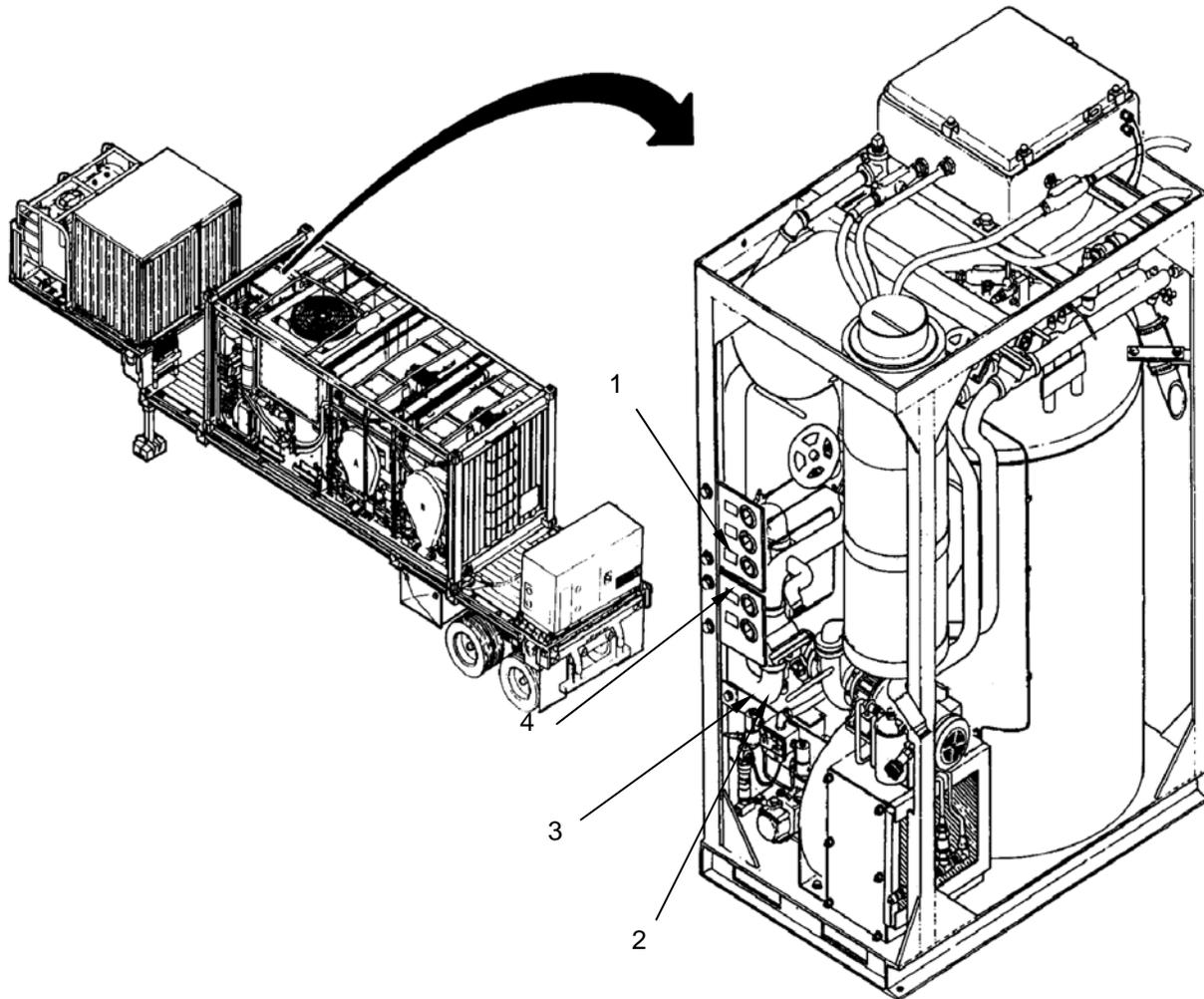


Figure 5. Heater Controls and Indicators.

Table 5. Heater Controls and Indicators.

INDEX	DESCRIPTION	FUNCTION
1	BURNER FUEL PRESSURE, Gage, 0–200 PSIG	Used to verify fuel pressure is available to support heater ignition
2	PRIME PUMP ON/OFF, Momentary Toggle Switch	Used to prime heater fuel system
3	FP300 RESET, Pushbutton Switch	Used to reset heater flame programmer when a heating system related failure is displayed
4	FUEL PUMP PRESSURE, Gage 0–200 PSIG	Used to verify fuel pump is primed and proper fuel pressure is available to run heating system

HEATER CONTROL ENCLOSURE CONTROLS AND INDICATORS

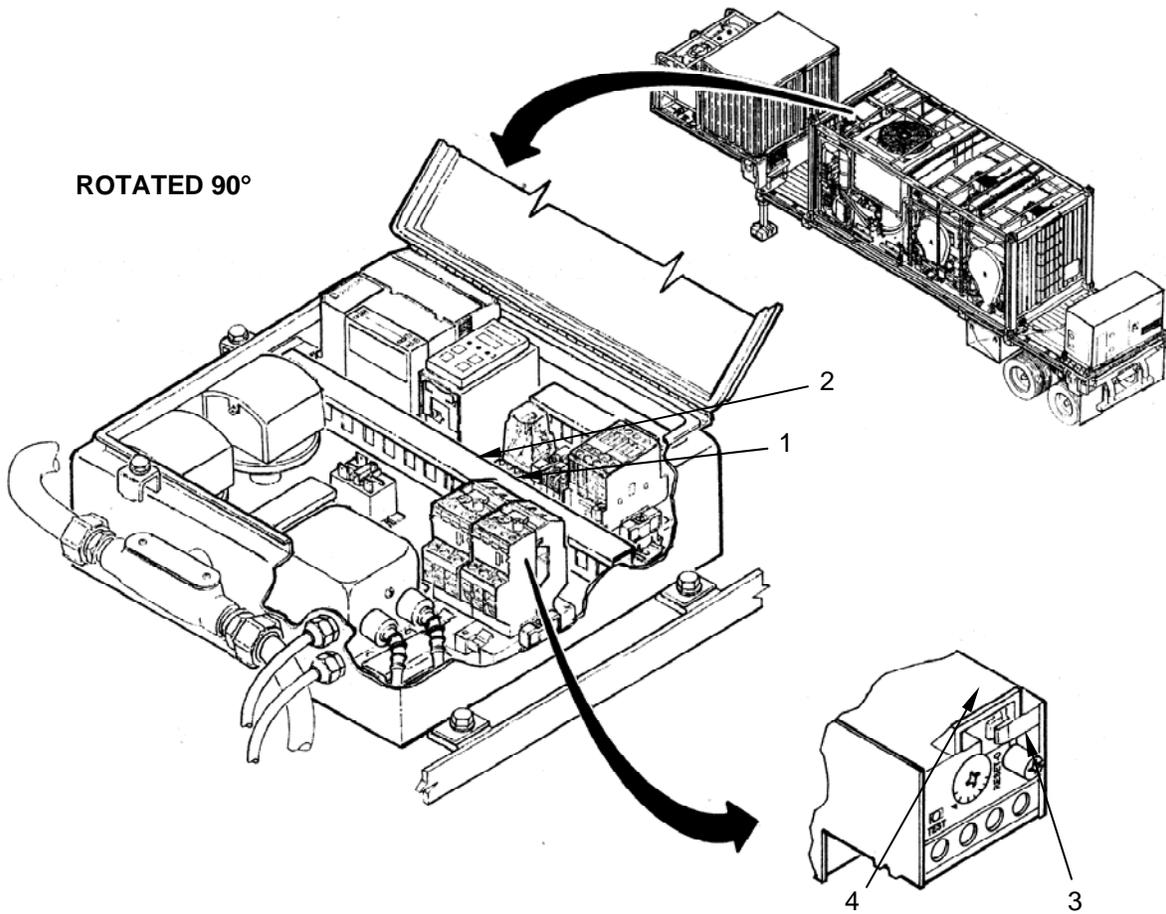


Figure 6. Heater Control Enclosure Controls and Indicators.

Table 6. Heater Control Enclosure Controls and Indicators.

INDEX	DESCRIPTION	FUNCTION
1	Burner Blower Motor Reset OL301, Pushbutton switch	Used to reset the burner blower motor (M301)
2	Fuel Pump Motor Reset OL302, Pushbutton switch	Used to reset the fuel pump motor (M302)
3	RESET Button	Used to reset tripped overload relay
4	Trip Indicator	Used to indicate overload relay has tripped. Yellow flag visible indicates tripped condition

BALL VALVE INFORMATION

There are ball valves throughout the system for various operations including draining water and venting air pressure. Figure 7 shows the proper position of a typical valve handle when it is opened or closed. When a valve is closed the handle (Figure 7, Item 2) will be across the body (Figure 7, Item 1) of the valve. When the valve is open the handle (Figure 7, Item 3) will be in line with the body (Figure 7, Item 1) of the valve. Table 7 shows the location and function of each of these valves as well as information for the valve position when the LADS is operating and in storage.

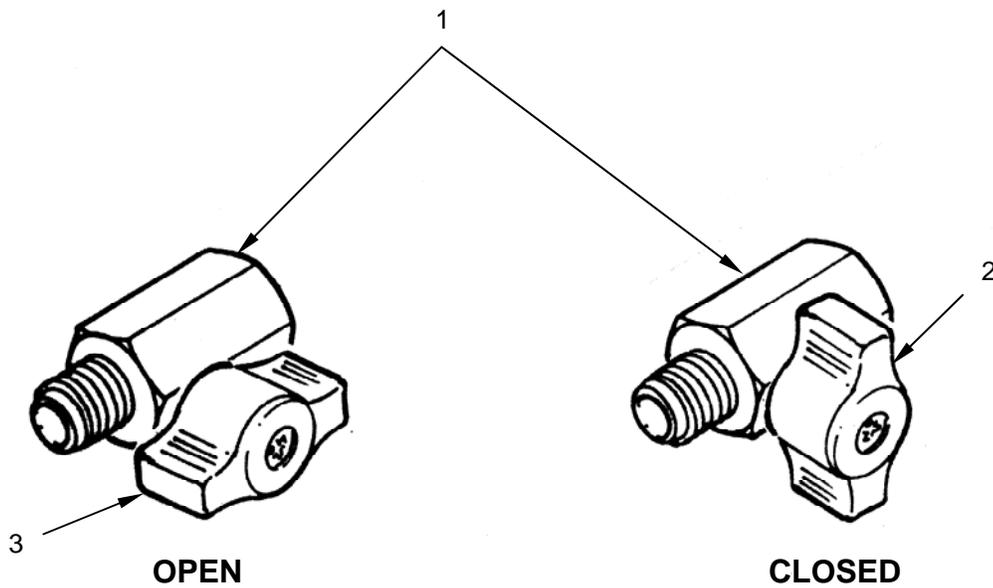


Figure 7. Typical Ball Valves.

BALL VALVE INFORMATION-CONTINUED**Table 7. Ball Valve Function and Location.**

LOCATION	FUNCTION	OPERATING POSITION	STORAGE POSITION
Water pump A housing	Drain water from water pump A to prevent freeze damage	Closed	Opened
Water pump B housing	Drain water from water pump B to prevent freeze damage	Closed	Opened
Under LH side of still	Drain water from still during cleaning and system draining	Closed	Opened
Under RH side of still	Drain water from still during cleaning and system draining	Closed	Opened
Distillate pump housing	Drain water from distillate pump and standpipe to prevent freeze damage	Closed	Opened
LH and RH sides of subcooler (Qty 8)	Drain water from subcooler to prevent freeze damage	Closed	Opened
Inlet to 1st-stage pre-filter	Block water flow from distillate pump when replacing pre-filters or coalescing filter	Opened	Opened
Bottom of 1st-Stage pre-filter housing	Drain water from pre-filters to prevent freeze damage	Closed	Opened
Bottom of coalescer housing	Drain water from coalescer to prevent freeze damage	Closed	Opened
Air compressor outlet tubing	Vent air pressure from air compressor outlet for maintenance	Closed	Closed
Bottom of air storage tank	Vent air pressure from air storage tank for maintenance	Closed	Closed
Before product pressure regulator	Isolate/store air pressure in air storage tank for maintenance	Opened	Opened
Outlet of air system piping	Vent air pressure from air tubing for maintenance	Closed	Closed
Under drum A front, LH air bag	Vent air from drum A front LH air bag when lowering drum for transport	Closed	Closed
Under drum A front, RH air bag	Vent air from drum A front RH air bag when lowering drum for transport	Closed	Closed
Under drum B front, LH air bag	Vent air from drum B front LH air bag when lowering drum for transport	Closed	Closed
Under drum B front, RH air bag	Vent air from drum B front RH air bag when lowering drum for transport	Closed	Closed
Behind and between drum A and B	Trap air in drum rear air bags when lowering drums	Opened	Opened

END OF WORK PACKAGE

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
SITING AND SHELTER REQUIREMENTS**

INITIAL SETUP:**References**

WP 0021

TM 10-5410-284-13&P

SITING REQUIREMENTS**General Information**

Proper siting and set-up of the LADS is the most important factor in achieving mission success. Prior to set-up there are many considerations that must be taken into account. These include terrain, space constraints, and traffic flow. The following paragraphs along with Figures 1 through 7 provide guidance for choosing a location to set-up the LADS and conduct laundry operations.

Terrain

The LADS must be operated on firm ground with a 5 percent slope or less. Leveling the LADS from front-to-back is more critical than left-to-right to enhance washing/drying drum balancing. Once the LADS is placed in position left-to-right level can be achieved using the landing legs on the front of the M871A3 trailer. The LADS should be positioned in a manner that allows drain water to run away, so as to not be a nuisance while conducting laundry operations. The drain area must be approved for waste disposal. The actual waste disposal requirements may vary depending on deployment condition and host nation/local requirements. If an external supply of fuel is to be used, the tank should be level or slightly higher than the LADS level. The height of the water supply is not critical to the LADS operation.

Space Constraints

Providing adequate space for conducting laundry operations is essential for efficient laundry processing. Allow adequate space to access all four sides and top of each LADS for operator PMCS and maintenance. There should be at least 4 feet of space at the curbside and sides of the LADS and 8 feet at the roadside of the LADS. Vegetation and other hindrances must clear the top of the LADS by 8 feet minimum and be cleared from the path of the heater, condenser fan, and dryer blower exhausts. If an external fuel tank is used, the tank must be located within at least 70 feet of the LADS fuel connection point. The water tank must be within 100 feet of the LADS water connection point. If the LADS is to be operated for long durations at one location, it is recommended that a utility power source be connected to the LADS. This will decrease the operating hours on the Generator Set. If an external power source is used, the LADS must be a maximum of 100 feet from the power connection point. Adequate space must also be provided for other functions associated with laundry operations such as receiving, inventory, bagging, unbagging, and shipping.

Traffic Flow

Designated parking areas should be laid out for personnel to drop-off and pick-up laundry. When possible these areas should be separated to help prevent mixing of clean and dirty laundry. Parking areas, and vehicle access to them, should be laid out in a manner that prevents vehicle traffic from interfering with laundry processing. Drain hoses coming from the LADS should be routed to avoid traffic areas and the drain area should be away from both vehicle and foot traffic. Fuel and water supply hoses must also be routed away from traffic. An unrestricted path must be maintained to allow tankers to service the LADS fuel and water supplies. If an external power source is used the power cable must be routed away from traffic.

SITING REQUIREMENTS-CONTINUED

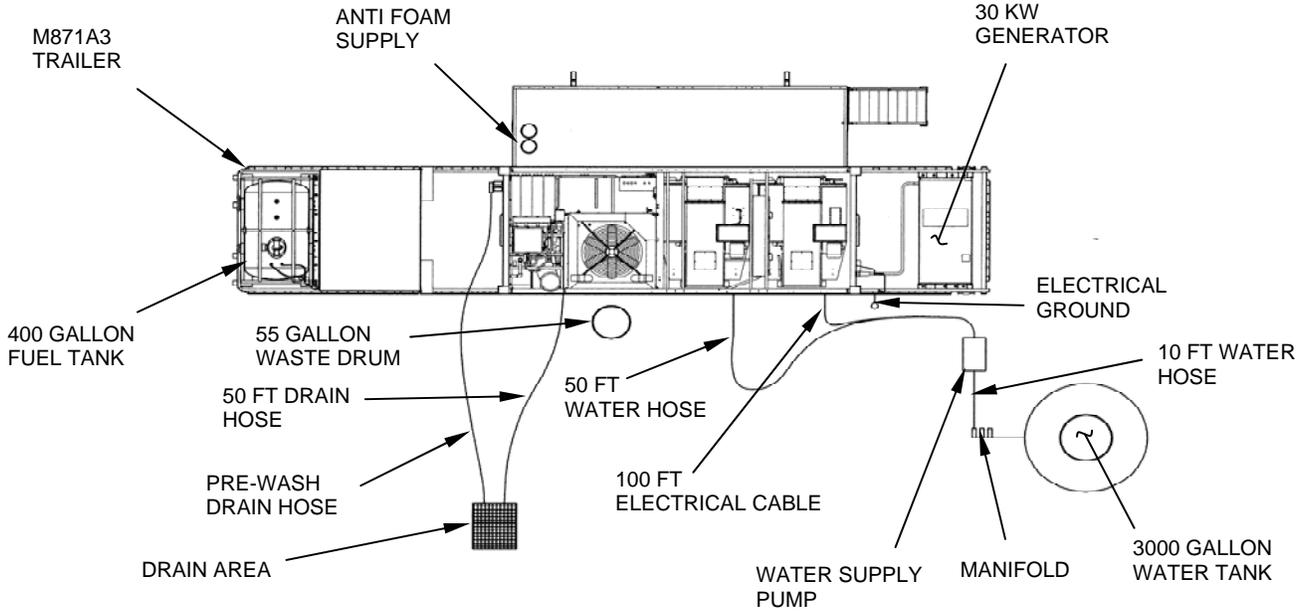


Figure 1. Typical LADS Set-up Top View.

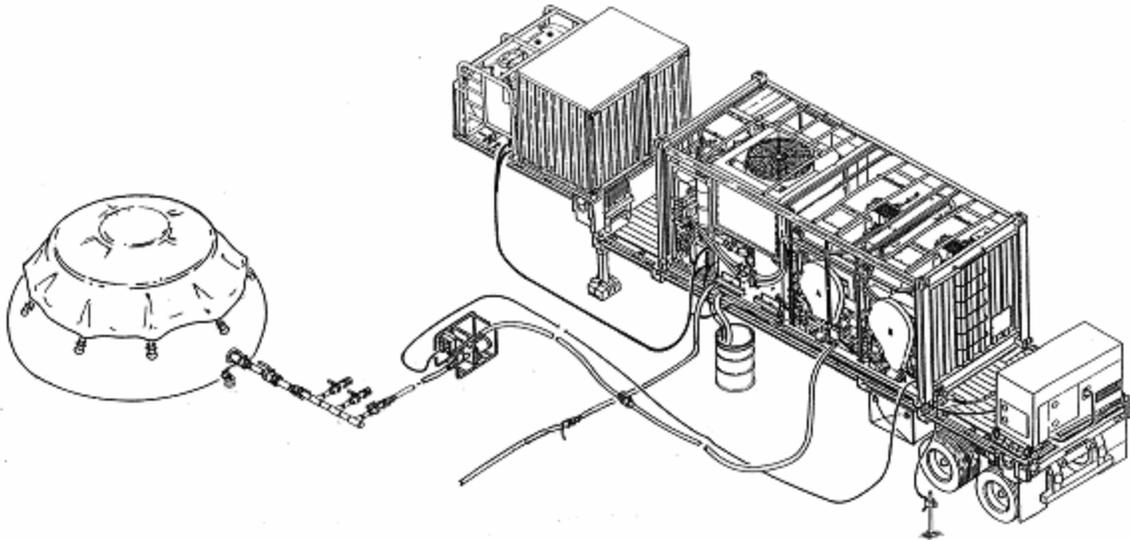


Figure 2. Typical LADS Set-up 3/4 View.

SITING REQUIREMENTS-CONTINUED

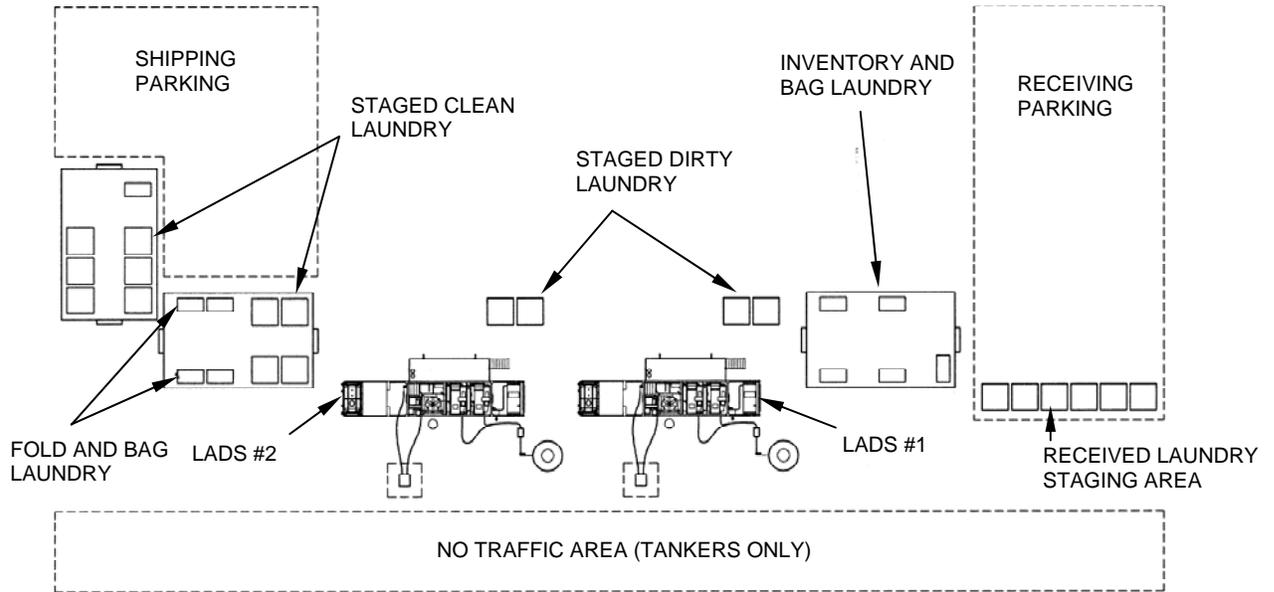


Figure 3. Typical Field Laundry Set-up, Two LADS in Series.

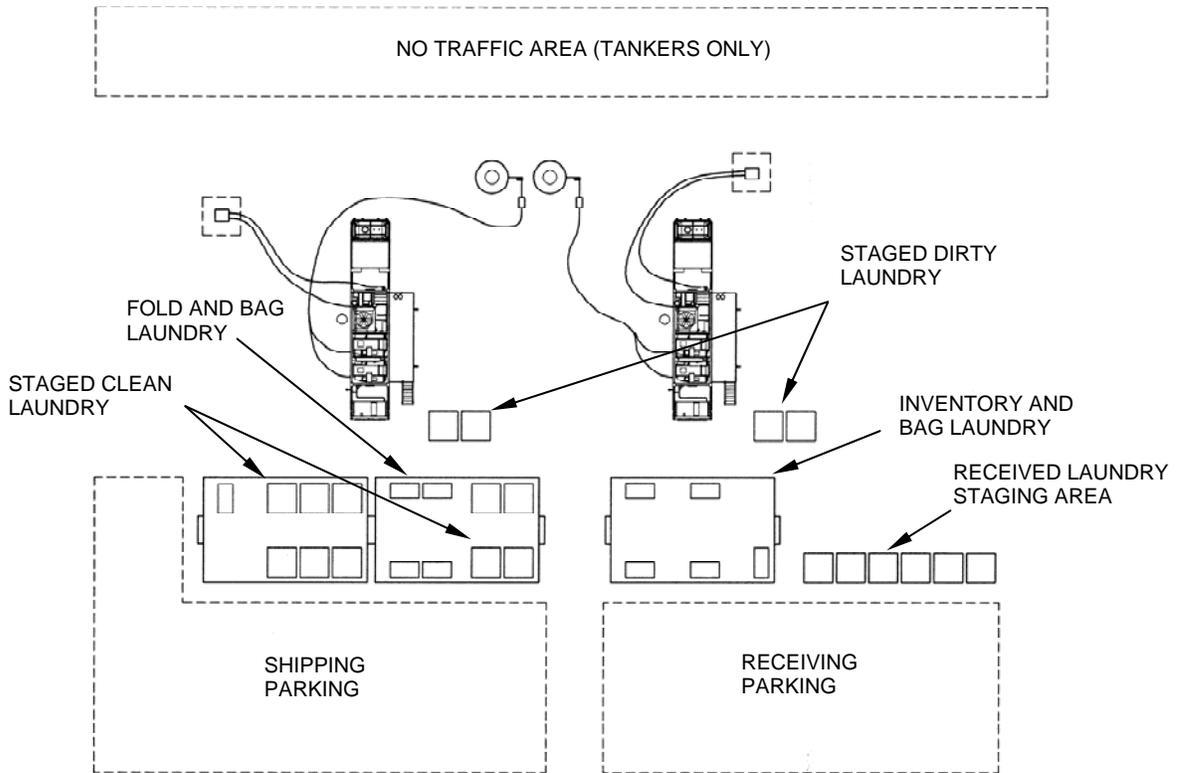


Figure 4. Typical Field Laundry Facility Set-up, Two LADS in Parallel.

SITING REQUIREMENTS-CONTINUED

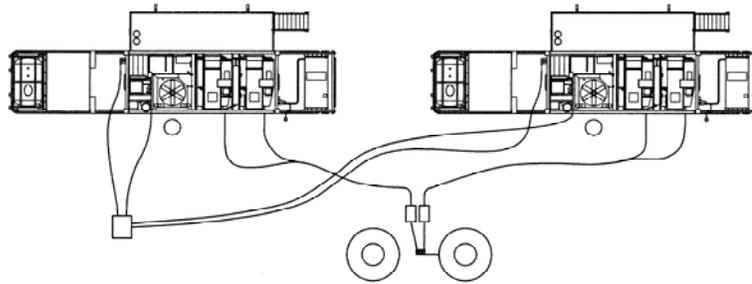


Figure 5. Typical Field Laundry Facility Set-up, Two LADS in Series Sharing Water Tank.

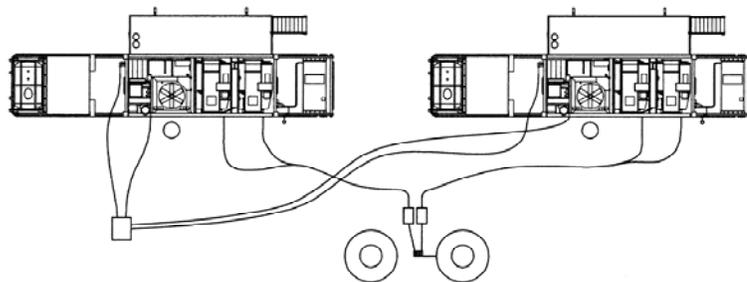


Figure 6. Typical Field Laundry Facility Set-up, Three LADS in Series Sharing Water Tank.

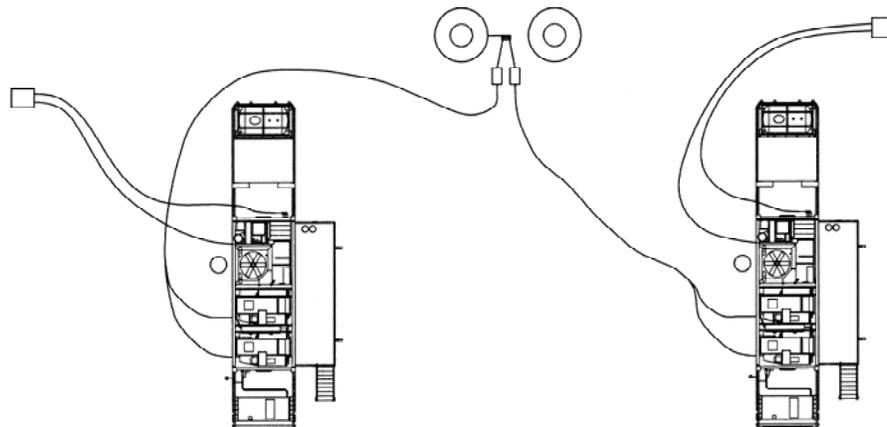


Figure 7. Typical Field Laundry Facility Set-up, Two LADS in Parallel Sharing Water Tank.

SHELTER REQUIREMENTS

**WARNING**

Exhaust discharge contains deadly gases. Do not operate Laundry System in an enclosed area unless exhaust discharge is properly vented outside. Severe personnel injury or death due to carbon monoxide poisoning could result. Seek immediate medical attention if injury occurs.

The LADS can be operated at ambient temperatures between 33 and 120 °F outside of a shelter. If ambient temperatures are expected to be below 33 °F, the LADS may be operated in a modified Lightweight Maintenance Enclosure (LME) Type II as shown below. The LADS can also be operated with a solar shade in high temperature and solar radiation conditions. It is recommended that the LADS water supply be kept inside the LME during cold weather operation. During periods when the LADS is operating, the LME windows should be opened and closed as necessary to control the temperature inside the LADS. To keep the LADS water plumbing, water supply, and interconnecting hoses from freezing a heater should be installed in the LME or the LADS should be operated every 3–4 hours to maintain temperatures above freezing. For operation and maintenance of the LME refer to TM 10-5410-284-13&P. For set-up and operation with solar shade refer to WP 0021.

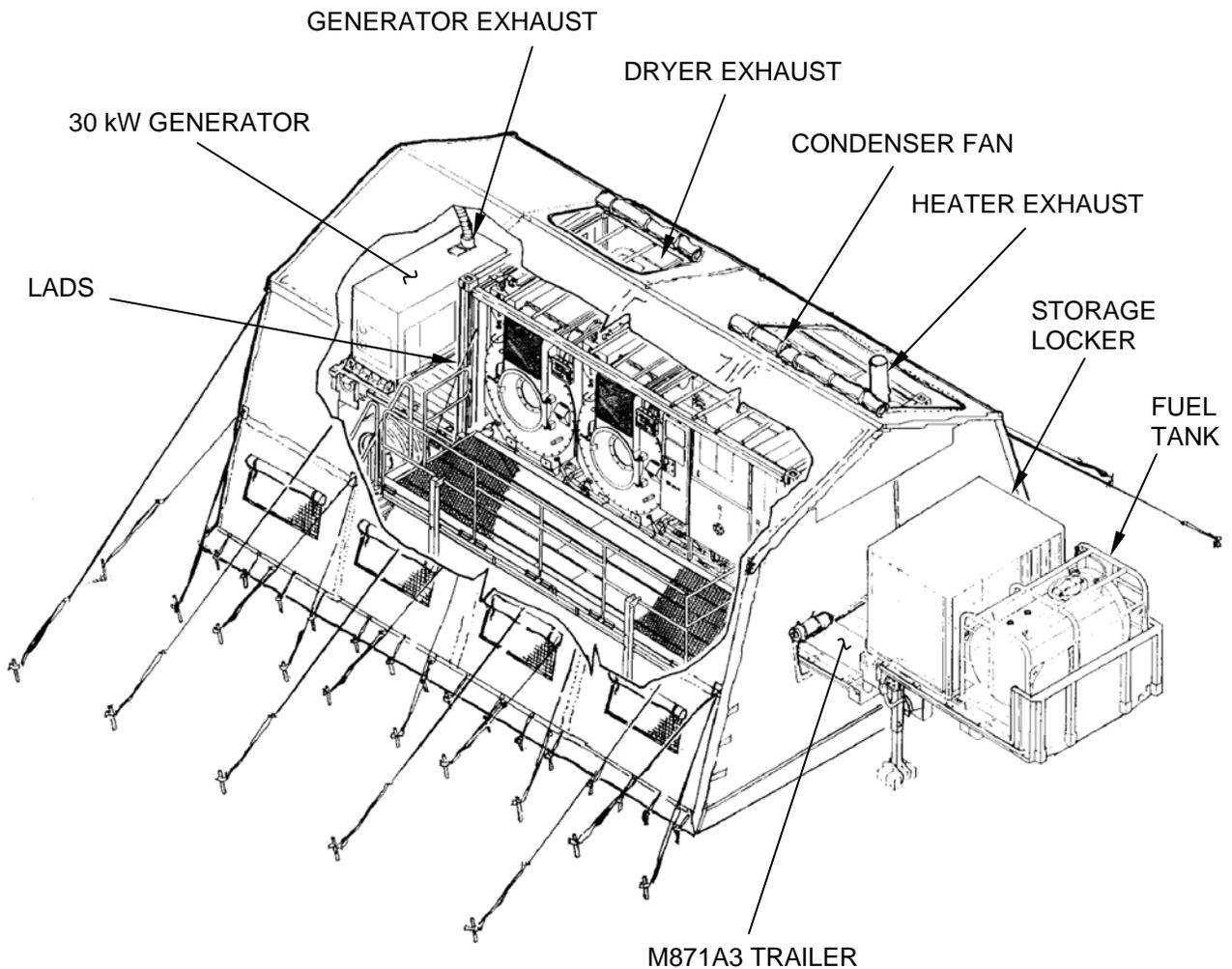


Figure 8. LADS in LME, Front View.

SHELTER REQUIREMENTS -CONTINUED

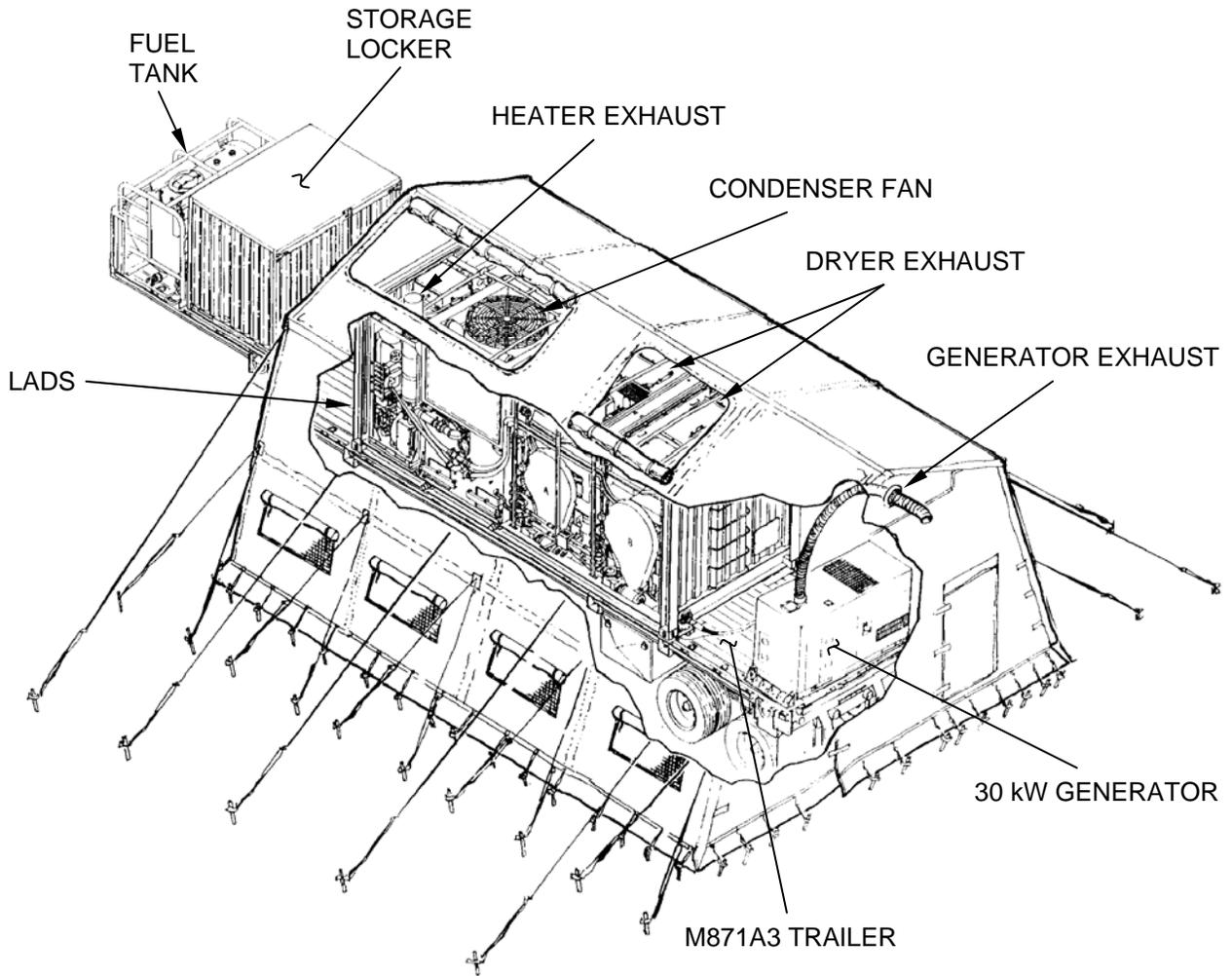


Figure 9. LADS in LME, Rear View.

END OF WORK PACKAGE

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
ASSEMBLY AND PREPARATION FOR USE**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit Assembly, Operator (WP 0066, Table 2, Item 11)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (4)

Shower/Laundry and Clothing Repair Supervisor (1)

References

TM 9-6115-644-10

TM 10-5430-237-12

Equipment Conditions

LADS properly positioned and leveled

REMOVE TELESCOPING LADDERS

1. Remove lock (Figure 1, Item 1) from holddown bracket (Figure 1, Item 2).
2. Loosen retainer (Figure 1, Item 4) then slide holddown bracket (Figure 1, Item 2) away from telescoping ladder (Figure 1, Item 3).
3. Slide telescoping ladder (Figure 1, Item 3) out from behind holddown bracket (Figure 1, Item 2) and remove from trailer.

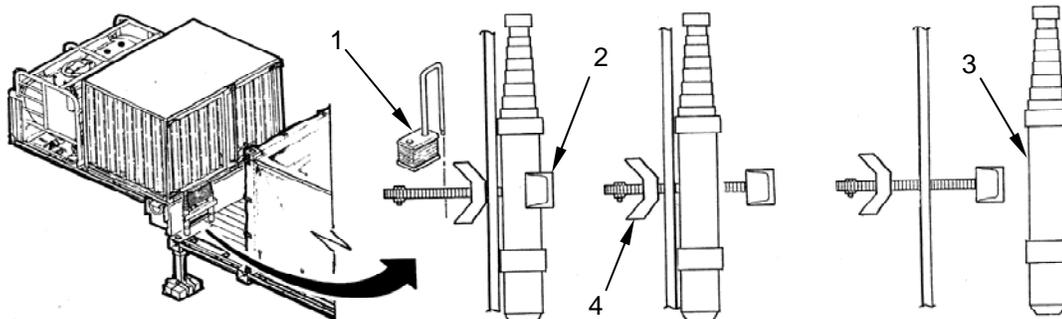


Figure 1. Telescoping Ladder Assembly.

4. Push holddown bracket (Figure 2, Item 2) tight against wall of trailer (Figure 2, Item 1), then tighten retainer (Figure 2, Item 3).
5. Install lock (Figure 2, Item 4) into holddown bracket (Figure 2, Item 2).
6. Repeat steps 1 through 5 for second ladder.

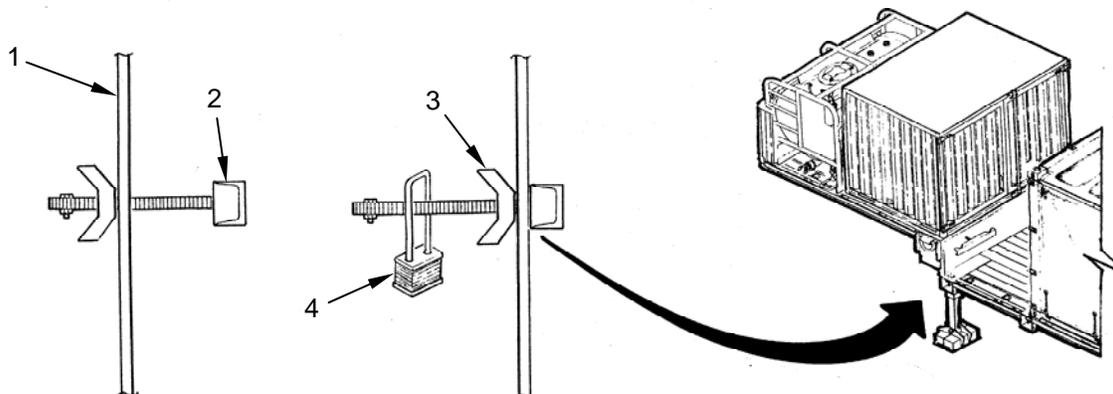


Figure 2. Telescoping Ladder Holddown Brackets.

END OF TASK

SET-UP TELESCOPING LADDERS**WARNING**

Always extend ladder from the bottom up. Keep hands and fingers away from sliding points on ladder sections when opening and closing. Never climb on ladder unless locking devices are properly engaged. Failure to observe these precautions may result in severe personal injury. Seek immediate medical attention if injury occurs.

1. Extend each ladder (Figure 3, Item 1) as follows:
 - a. Place foot on bottom rung (Figure 3, Item 5) and lift to separate from next higher rung until locks (Figure 3, Item 4) are engaged.
 - b. Continue extending ladder (Figure 3, Item 1) following process in step a until desired height is achieved.

WARNING

Always make sure ladder is resting on and supported by firm ground. Always keep ladder rungs dry and free of dirt. Do not over-reach. Move the ladder instead. Keep body centered between side rails. Never allow more than one person on the ladder at a time. Failure to observe these precautions may result in severe personal injury. Seek immediate medical attention if injury occurs.

2. Place ladders (Figure 3, Item 1) against both sides of trailer (Figure 3, Item 2) to gain access to trailer bottom deck (Figure 3, Item 3).

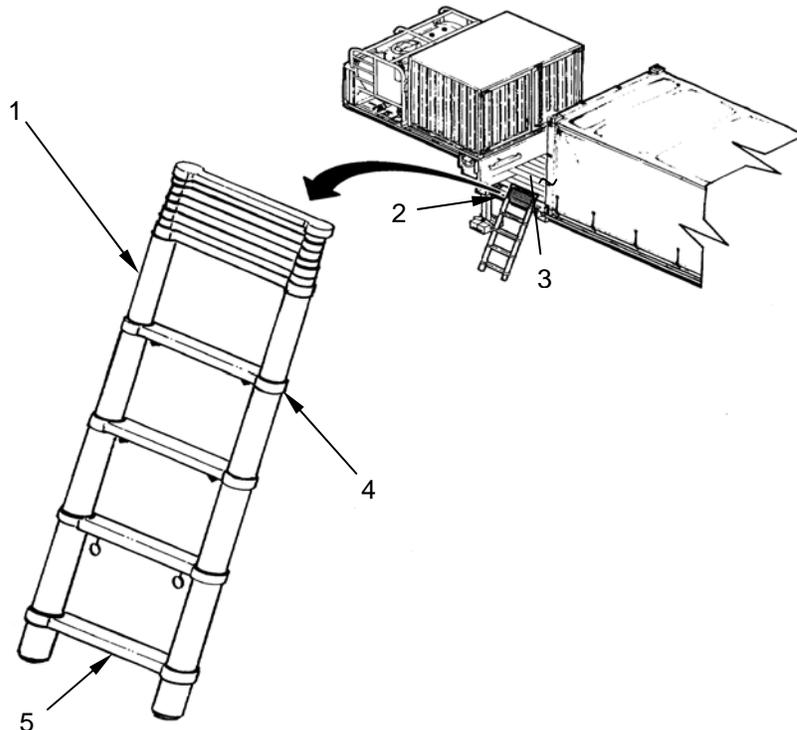


Figure 3. Telescoping Ladder Set-up.

END OF TASK

OPEN AND SECURE STORAGE LOCKER DOORS

1. Remove lock (Figure 4, Item 3) from hasp (Figure 4, Item 4).
2. Pivot hasp (Figure 4, Item 4) then lift, and turn handle (Figure 4, Item 6) until locking rod (Figure 4, Item 5) retracts from holder (Figure 4, Item 7).
3. Swing door (Figure 4, Item 2) out and away from storage locker (Figure 4, Item 1), then place handle (Figure 4, Item 6) back into hasp (Figure 4, Item 4).
4. Install lock (Figure 4, Item 3) back onto hasp (Figure 4, Item 4).

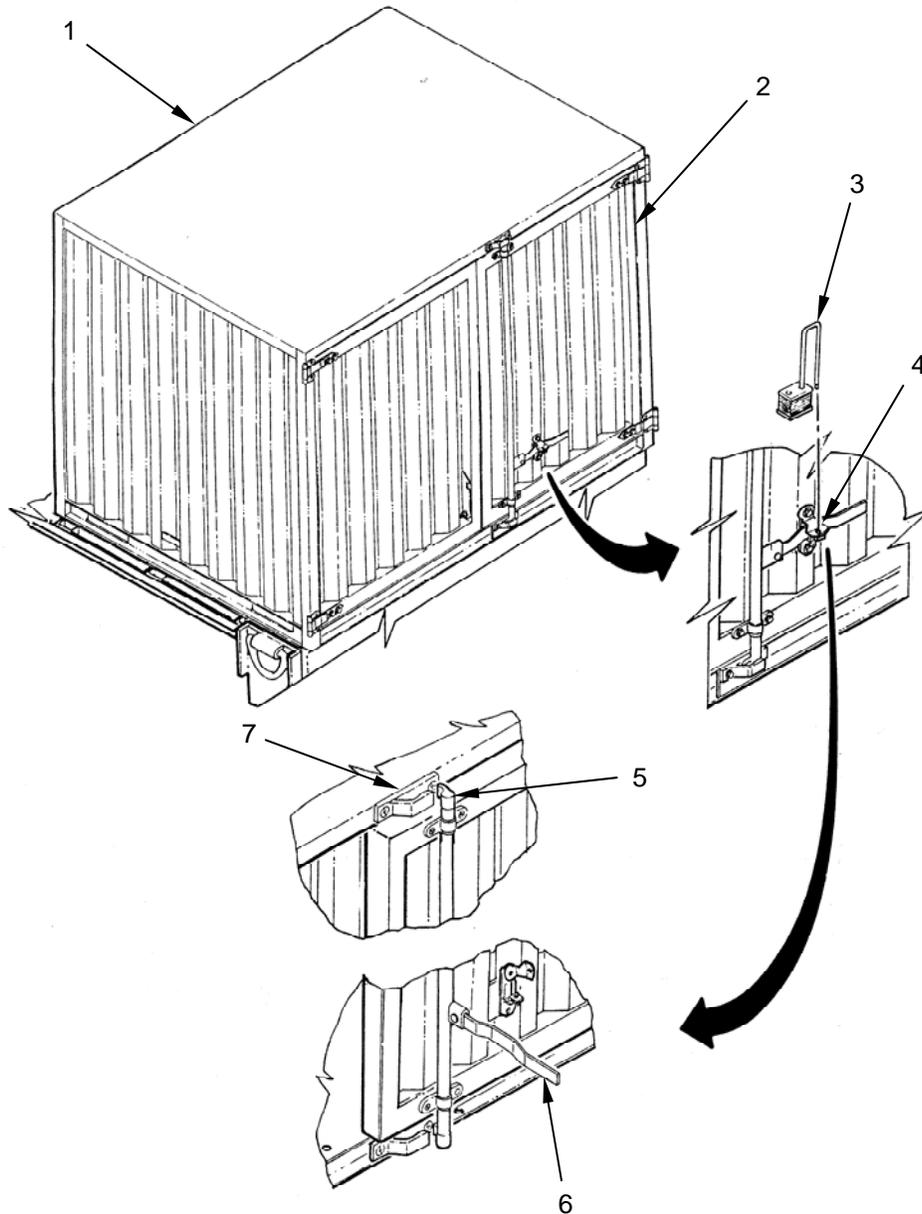


Figure 4. Storage Locker Assembly.

OPEN AND SECURE STORAGE LOCKER DOORS-CONTINUED

5. Open door (Figure 5, Item 2) to access cane lock (Figure 5, Item 3).
6. Lift and reposition cane lock (Figure 5, Item 3) behind door (Figure 5, Item 5).
7. Swing doors (Figure 5, Item 2 and Item 5) open against sides of storage locker (Figure 5, Item 1) and secure with retaining plates (Figure 5, Item 4).

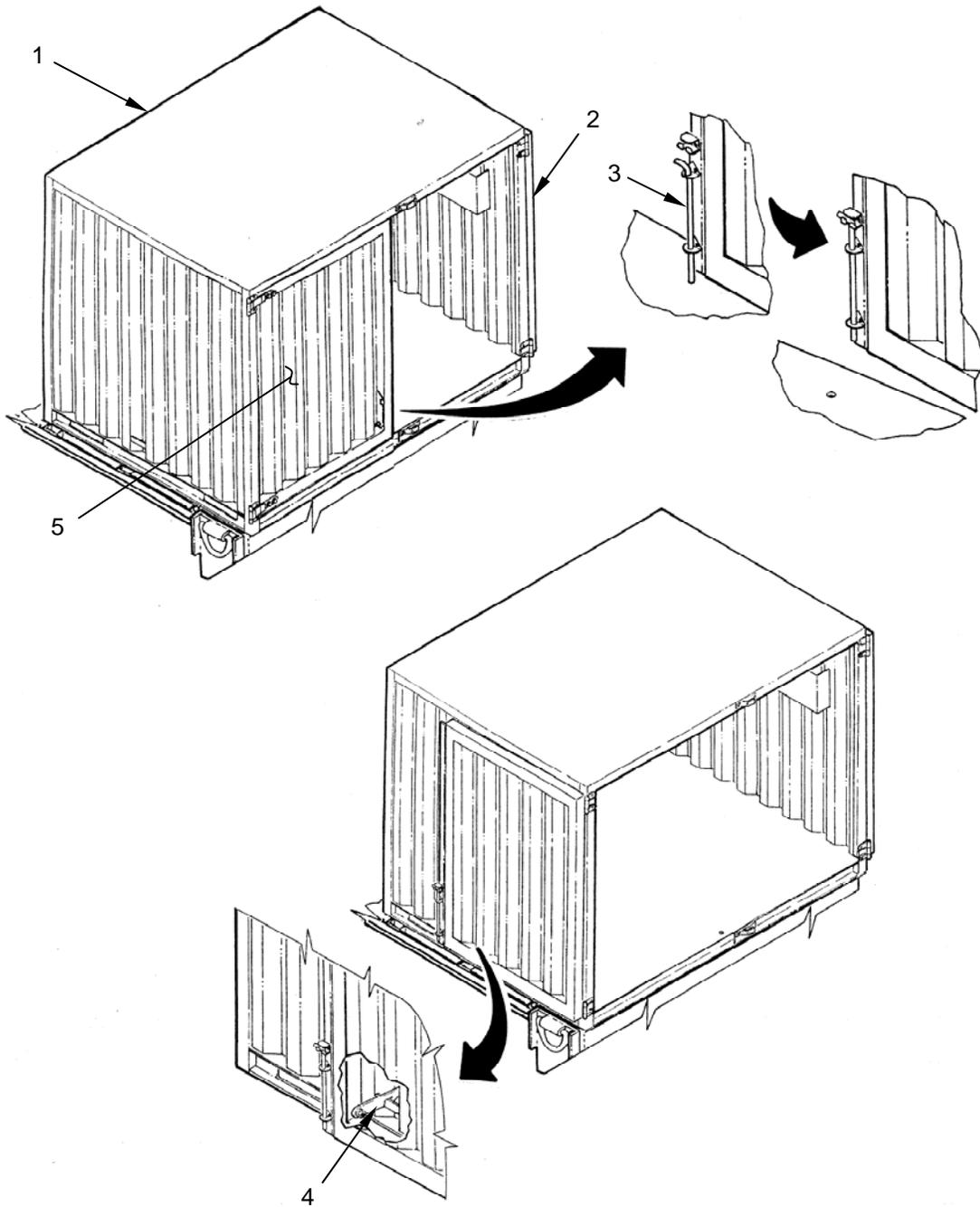


Figure 5. Storage Locker Doors.

END OF TASK

REMOVE STOWED ACCESSORIES**NOTE**

Personnel in the 5th percentile may require a step aid for this procedure.

1. Remove stabilizing bars (Figure 6, Item 3) as follows:
 - a. Push out on tab (Figure 6, Item 4) to change ratcheting direction of handle (Figure 6, Item 5).
 - b. Ratchet handle (Figure 6, Item 5) to release tension of wall pads (Figure 6, Items 2 and 6).
 - c. Apply pressure on wall pad (Figure 6, Item 2) nearest to handle (Figure 6, Item 5) then continue ratcheting handle until stabilizing bar (Figure 6, Item 3) can be removed from storage locker (Figure 6, Item 1).
2. Remove following items from storage locker (Figure 6, Item 1):

Folding ladder, qty 1	Operator tool box, qty 1	Clean-out rake, qty 1
Stairs, qty 1	Water supply pump, qty 1	Sluice tray, qty 1
Handrails qty 2	25-ft fuel hose, qty 1	Anti-foam container, qty 2
Awning supports, qty 6	Adapter, fuel hose, qty 1	Detergent container, qty 2
Side railing, qty 1	30-ft fuel hose, qty 1	Container, 55 gallon, qty 1
Water tank, qty 1	Exhaust extension, qty 1	Fire extinguisher, qty 1
Pre-wash manifold, qty 1		
3. Stow stabilizing bars (Figure 6, Item 3) inside storage locker (Figure 6, Item 1).

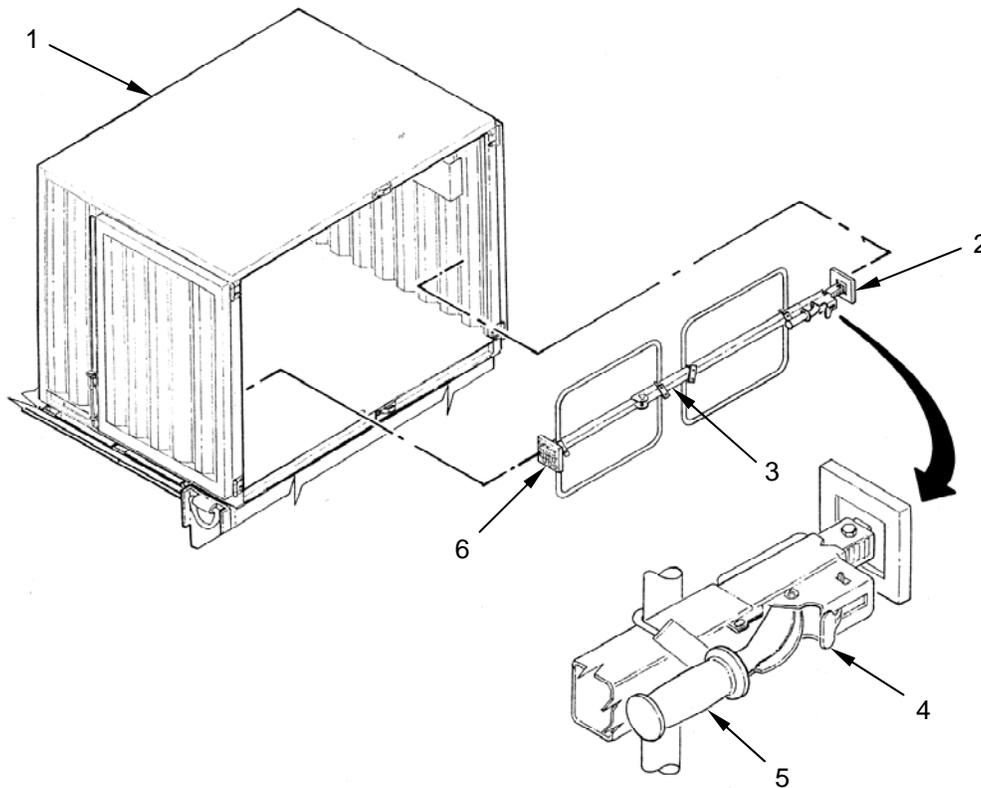


Figure 6. Storage Locker Stabilizer Bars.

END OF TASK

SETUP FOLDING LADDER**WARNING**

Keep hands and fingers away from hinge points on ladder halves when opening and closing. Keep hands and fingers away from inner and outer rungs of ladder when adjusting. Never climb on ladder unless knobs and locking devices are properly tightened. Failure to observe these precautions may result in severe personal injury. Seek immediate medical attention if injury occurs.

1. Place ladder (Figure 7, Item 1) flat on ground.
2. Loosen or push in on knobs (Figure 7, Item 4) then separate jaws (Figure 7, Item 5) on each side of ladder (Figure 7, Item 1).
3. Unfold ladder (Figure 7, Item 1) to desired angle then tighten knobs (Figure 7, Item 4) to lock jaws (Figure 7, Item 5) in place.
4. Pull out and pivot locking devices (Figure 7, Item 3) on each side of ladder (Figure 7, Item 1).
5. Slide outer section of ladder (Figure 7, Item 1) to desired height.
6. Pivot locking devices (Figure 7, Item 3) back into ladder (Figure 7, Item 1) to lock in height adjustment.

WARNING

Always make sure ladder is resting on and supported by firm ground. Always keep ladder rungs dry and free of dirt. Do not over-reach. Move the ladder instead. Keep body centered between side rails. Never allow more than one person on the ladder at a time. Failure to observe these precautions may result in severe personal injury. Seek immediate medical attention if injury occurs.

7. If ladder (Figure 7, Item 1) is set-up straight ensure top of ladder is resting on support angle (Figure 7, Item 2) and bottom of ladder is resting on firm even ground.

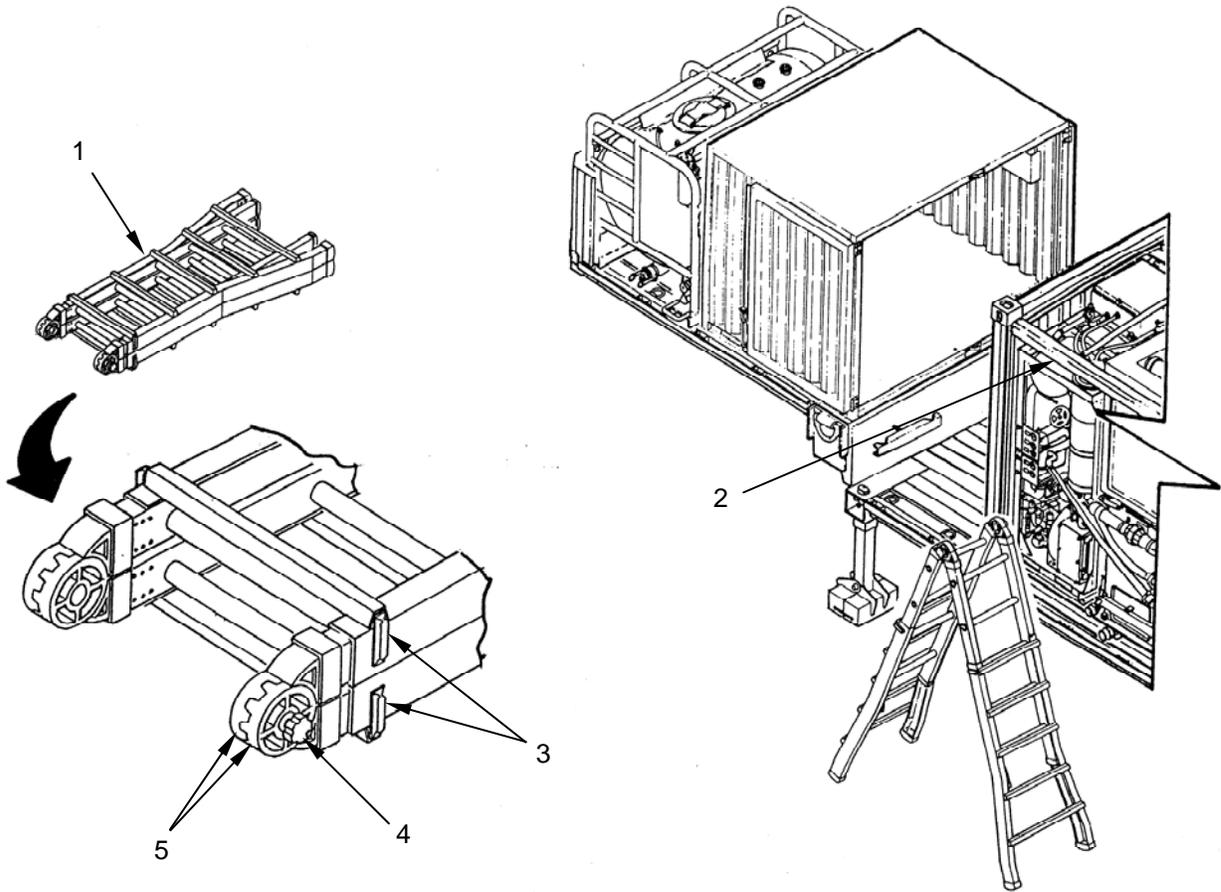


Figure 7. Folding Ladder Set-up.

END OF TASK

LOOSEN TARP

1. Loosen and disconnect straps (Figure 8, Item 3) securing tarp (Figure 8, Item 1) to ISO frame (Figure 8, Item 2).

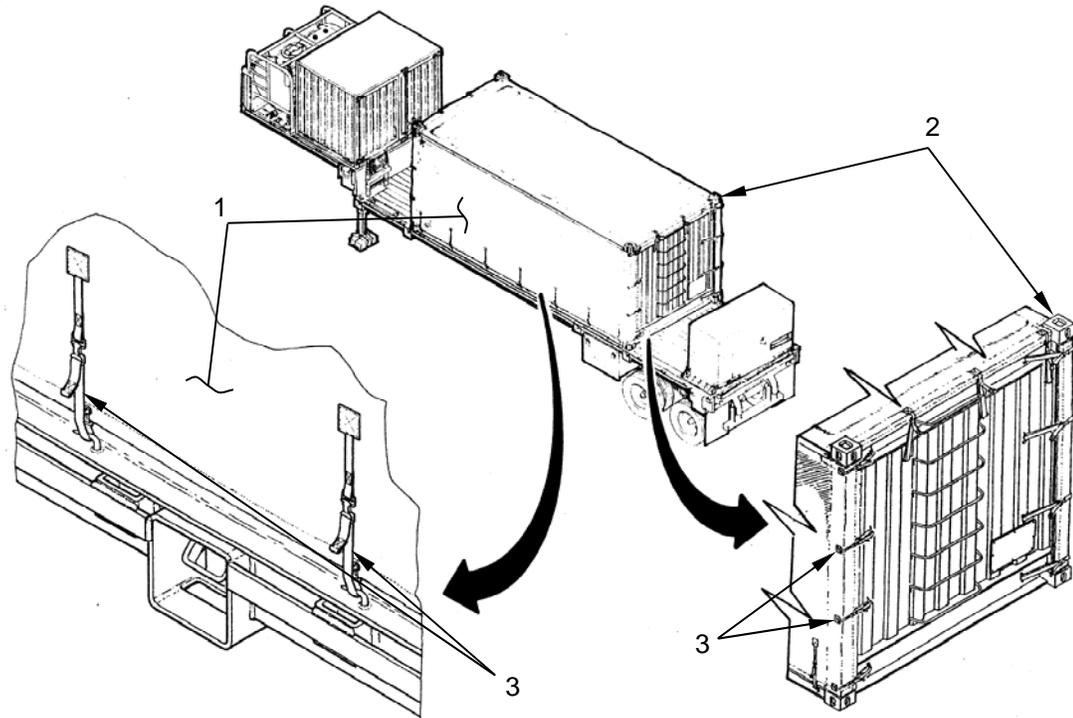


Figure 8. Tarp Assembly in Transport Configuration.

2. Flip roadside section (Figure 9, Item 1) over to expose back of the LADS.
3. Flip curbside section (Figure 9, Item 2) over to expose front of the LADS.

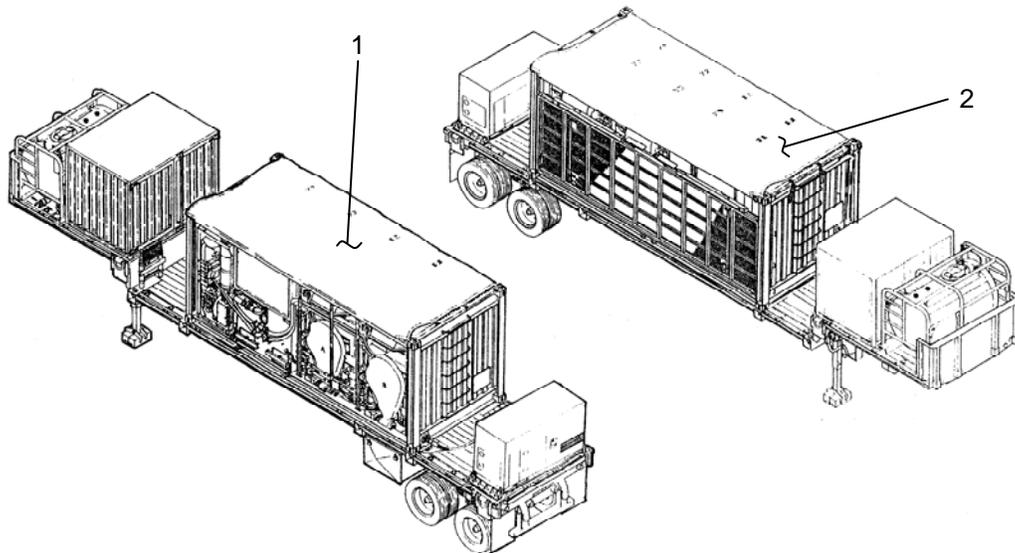


Figure 9. Tarp Assembly Folded.

END OF TASK

UNLOCK PLATFORM**WARNING**

Winch cable must be connected to platform prior to unlocking platform from ISO frame. Verify that all personnel remain clear of platform while it is being lowered. Failure to follow this precaution can cause severe injury or death to yourself or other personnel working nearby. Seek immediate medical attention if injury occurs.

1. Ensure shackle (Figure 10, Item 3) is attached to u-bolt (Figure 10, Item 2) on platform (Figure 10, Item 1). Attach shackle if necessary.
2. Remove winch handle (Figure 10, Item 8) from tool box and install onto winch (Figure 10, Item 9).
3. Use winch (Figure 10, Item 9) to remove any slack in cable (Figure 10, Item 10).
4. Unlock platform (Figure 10, Item 1) from ISO frame (Figure 10, Item 4) as follows:
 - a. Pivot hasp (Figure 10, Item 6) then lift and turn handle (Figure 10, Item 7) until stow bar (Figure 10, Item 5) retracts.
 - b. Repeat step a to unlock other end of platform (Figure 10, Item 1).

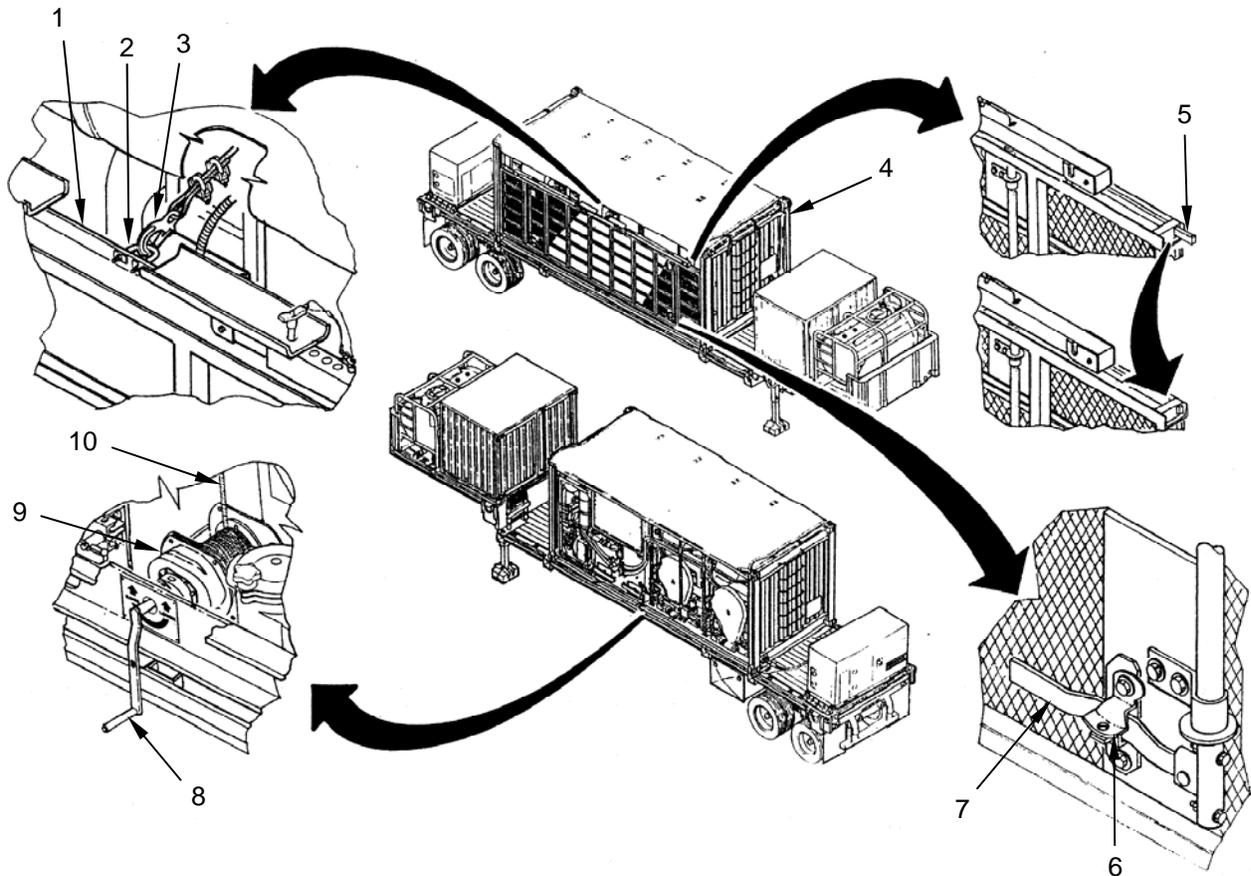


Figure 10. Unlocking Platform Assembly.

END OF TASK

LOWER PLATFORM**CAUTION**

When lowering platform never allow slack to build up in winch cable. Failure to follow this precaution may result in sudden drops of platform during raising and lowering operations and cause excess strain on cable.

1. Use winch (Figure 11, Item 1) to lower platform (Figure 11, Item 10) slightly until stow bars (Figure 11, Item 3) are clear of ISO frame (Figure 11, Item 2).

CAUTION

Handles must be secured prior to lowering platform. Failure to follow this precaution may result in damage to platform locking components if handles contact ISO frame.

During use, platform should be level with ISO frame. If platform is not even with ISO frame installation of railing and awning components will be more difficult and air system access door may not open.

Lowering platform below ISO frame can cause damage to torsion bars.

2. Place handles (Figure 11, Items 6 and 7) back into retainers (Figure 11, Items 5 and 8) then pivot hasps (Figure 11, Items 4 and 9) to secure handles.
3. Use winch (Figure 11, Item 1) to lower platform (Figure 11, Item 10) until platform is level with ISO frame (Figure 11, Item 2).

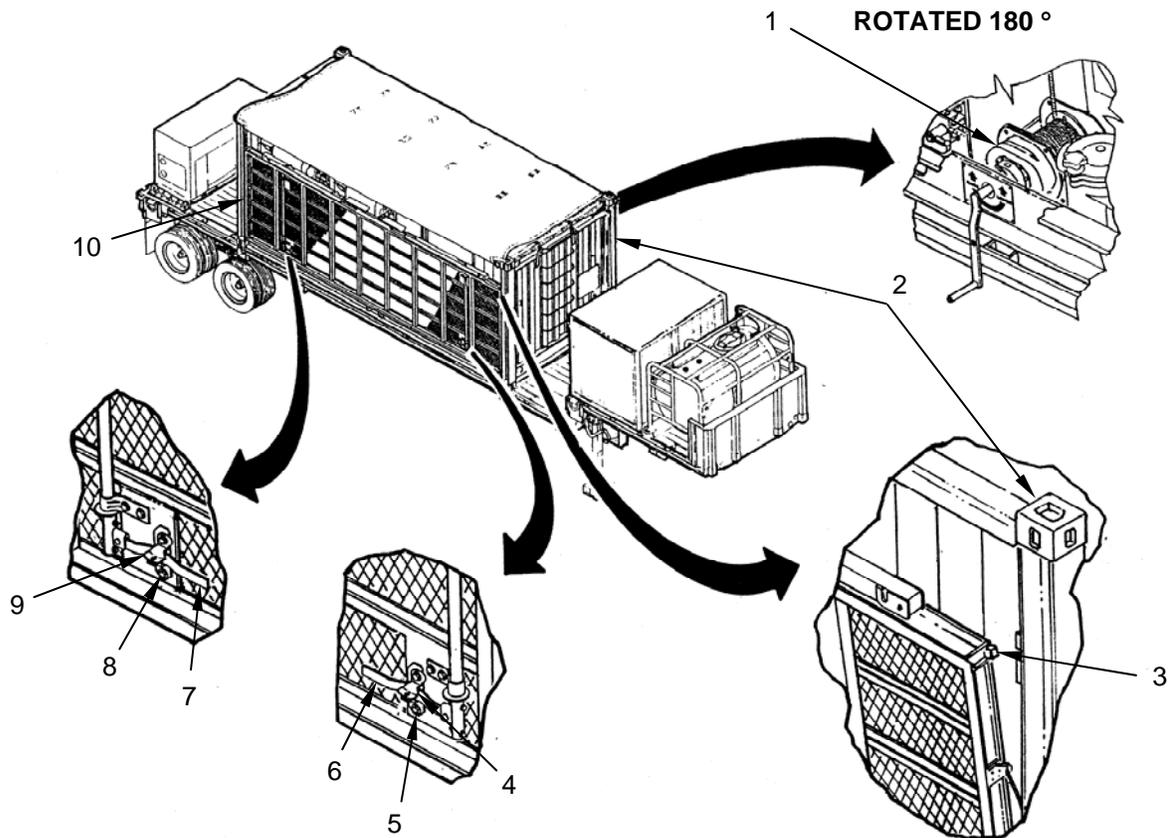


Figure 11. Lowering Platform Assembly.

END OF TASK

SECURE PLATFORM

1. Lower and secure two support legs (Figure 12, Item 4) as follows:
 - a. Pull quick-connect pin (Figure 12, Item 5) out of support leg (Figure 12, Item 4).
 - b. Pull quick-connect pin (Figure 12, Item 6) out of support leg (Figure 12, Item 4).
 - c. Grasp handle (Figure 12, Item 3) then rotate support leg (Figure 12, Item 4) to vertical position.
 - d. Slowly lower inner leg (Figure 12, Item 8) until foot (Figure 12, Item 7) has solid contact with ground and is supporting weight of platform (Figure 12, Item 1).
 - e. Install quick-connect pin (Figure 12, Item 5) to secure support leg (Figure 12, Item 4) to platform (Figure 12, Item 1).
 - f. Install quick-connect pin (Figure 12, Item 6) to fix position of support leg (Figure 12, Item 4).
2. Ensure platform (Figure 12, Item 1) is even with ISO frame (Figure 12, Item 2). Readjust support legs (Figure 12, Item 4) if necessary.

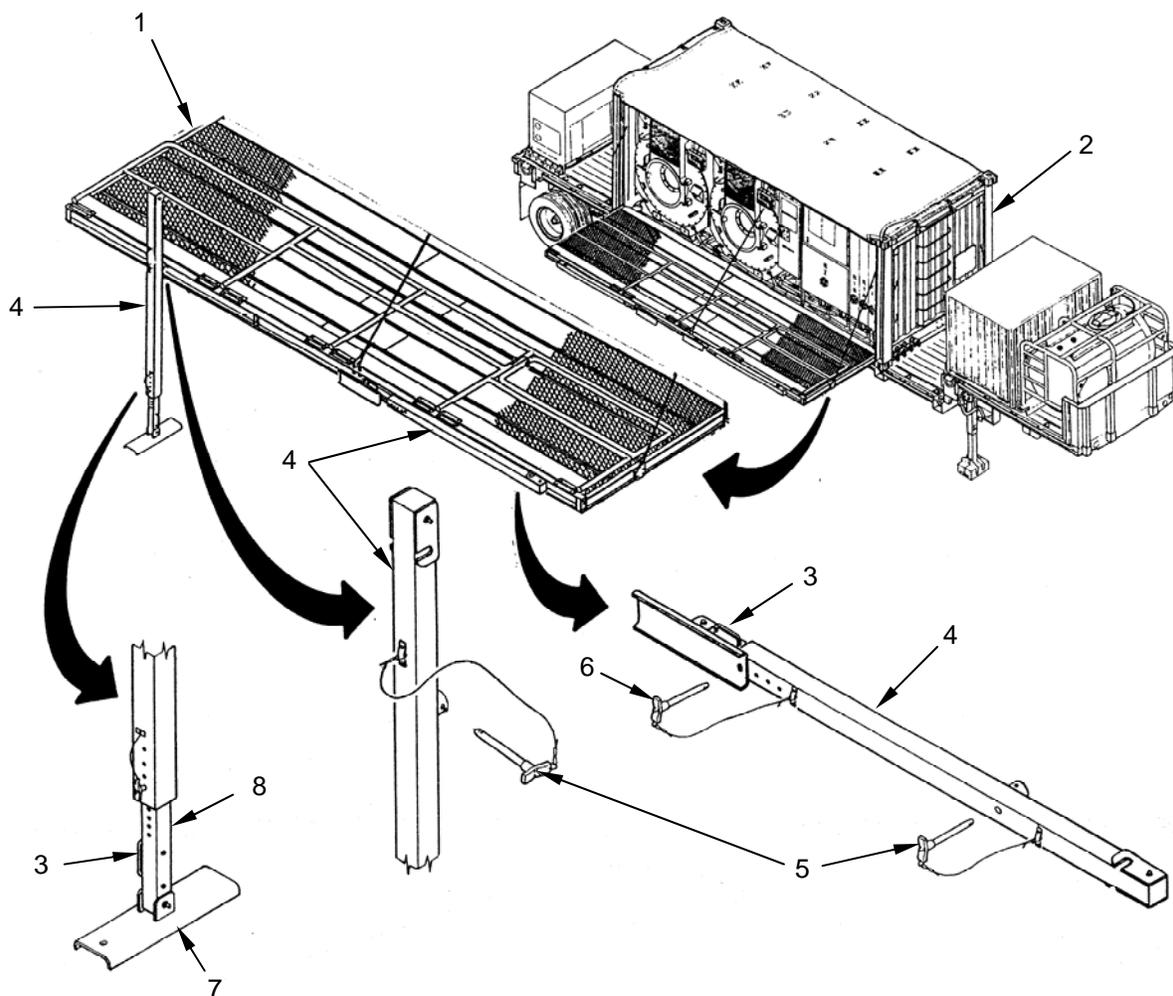


Figure 12. Platform Leg Assemblies.

END OF TASK

INSTALL STAIRS AND STOW WINCH CABLE

1. Position stairs (Figure 13, Item 4) onto platform (Figure 13, Item 5) then secure with two quick-connect pins (Figure 13, Item 3).
2. Install handrails (Figure 13, Item 2) onto stairs (Figure 13, Item 4) then secure each handrail with two quick-connect pins (Figure 13, Item 1).
3. Disconnect cable (Figure 13, Item 8) from platform (Figure 13, Item 5) as follows:
 - a. Use winch (Figure 13, Item 9) to slightly loosen cable (Figure 13, Item 8).
 - b. Unhook shackle (Figure 13, Item 6) from u-bolt (Figure 13, Item 11).

CAUTION

Maintain a slight tension when winding up winch cable to ensure cable wraps tightly on winch. Failure to follow this precaution may result in sudden drops of platform during raising and lower operations causing excess strain on cable.

4. Use winch (Figure 13, Item 9) to retract cable (Figure 13, Item 8) while maintaining a slight tension on cable.
5. Hook shackle (Figure 13, Item 6) on u-bolt (Figure 13, Item 7) then remove slack from cable (Figure 13, Item 8).
6. Remove and stow winch handle (Figure 13, Item 10) in tool box.

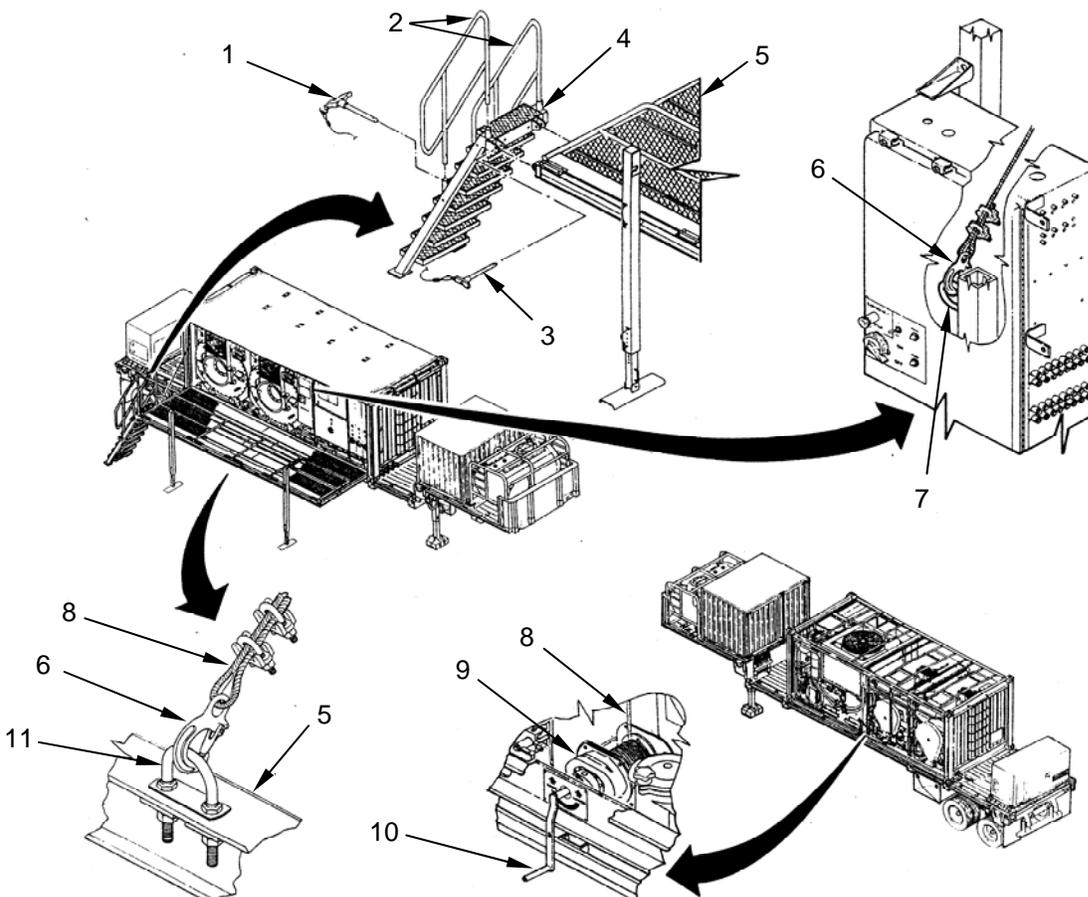


Figure 13. Stair Installation.

END OF TASK

INSTALL MAIN AND SIDE RAILINGS**NOTE**

When securing railings to ISO frame, misalignment of mating holes for quick-connect pins is an indication that platform is not level. This problem can be corrected by slightly raising or lowering platform as necessary.

1. Lift main railing (Figure 14, Item 1) up to vertical position.
2. Pull quick-connect pin (Figure 14, Item 3) out of main railing (Figure 14, Item 1) and gate (Figure 14, Item 2).
3. Swing gate (Figure 14, Item 2) over and mate with ISO frame (Figure 14, Item 4).
4. Install quick-connect pin (Figure 14, Item 3) to secure gate (Figure 14, Item 2) to ISO frame (Figure 14, Item 4).
5. Simultaneously flip two support brackets (Figure 14, Item 5) on each support leg (Figure 14, Item 6) over main railing (Figure 14, Item 1).

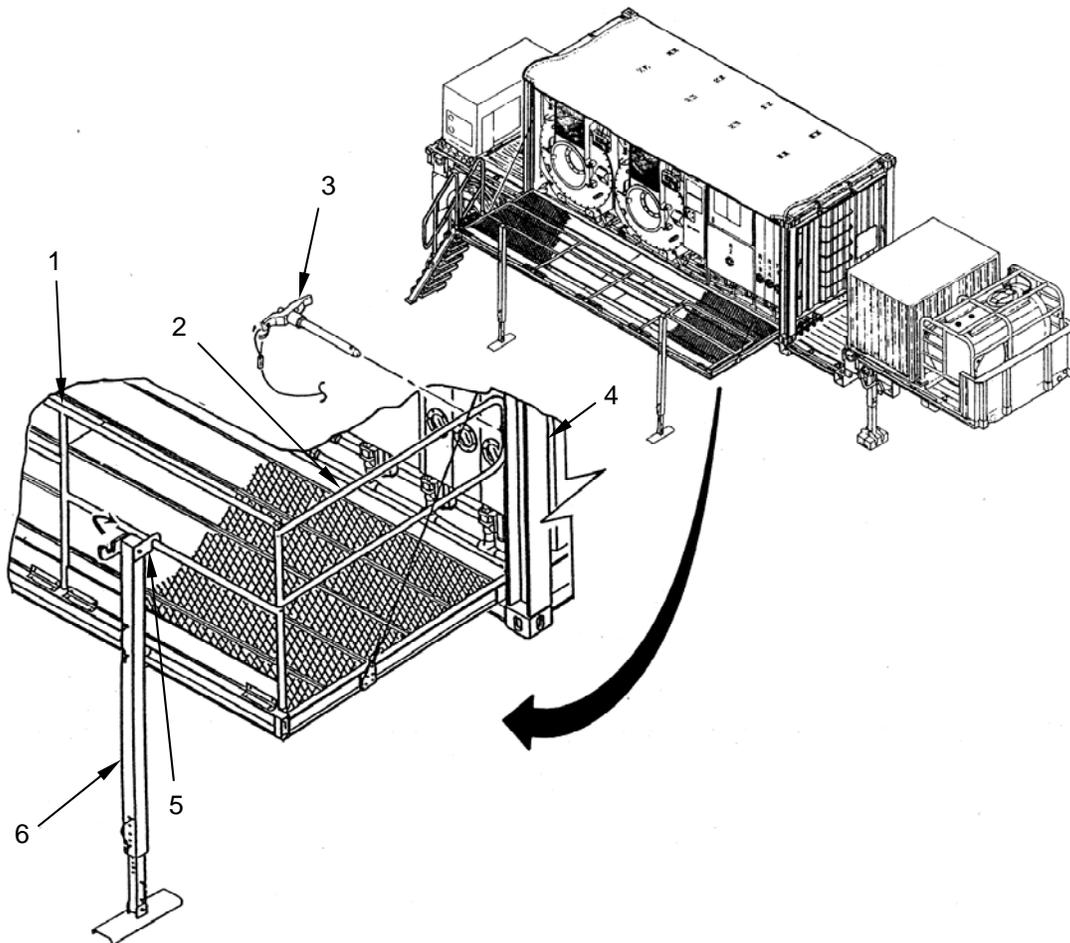


Figure 14. Main and Side Railing Assemblies.

INSTALL MAIN AND SIDE RAILINGS-CONTINUED

6. Pull quick-connect pin (Figure 15, Item 2) out of side railing (Figure 15, Item 1).
7. Slide side railing (Figure 15, Item 1) into hole in platform (Figure 15, Item 4).
8. Mate side railing (Figure 15, Item 1) with ISO frame (Figure 15, Item 3).
9. Install quick-connect pin (Figure 15, Item 2) to secure side railing (Figure 15, Item 1) to ISO frame (Figure 15, Item 3).

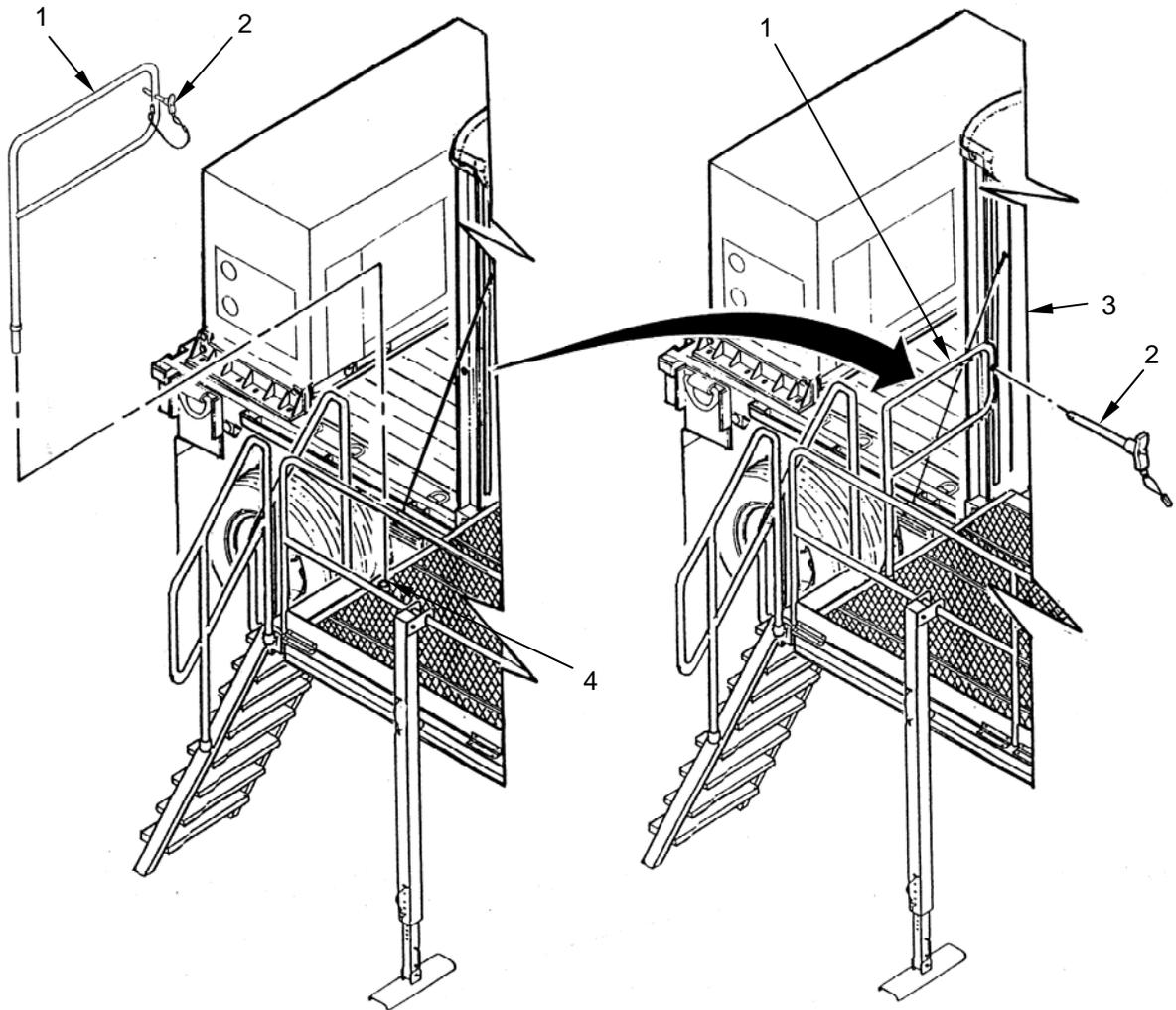


Figure 15. Side Railing Assemblies.

END OF TASK

SET-UP AWNING**NOTE**

Awning (Tarp) can be stowed on top of the LADS, partially deployed, or completely deployed as desired.

1. Determine what awning set-up is desired. To stow awning on top of the LADS follow steps 2 through 6. To partially deploy awning follow steps 7 through 11. To completely deploy awning follow steps 7 through 15.
2. Flip curbside section of tarp (Figure 16, Item 1) down over curbside of the LADS.
3. Fold roadside section of tarp on top of awning extension (Figure 16, Item 6) as follows:
 - a. Align back-bottom edge (Figure 16, Item 2) on roadside section of tarp (Figure 16, Item 1) even with curbside edge of the LADS.
 - b. From roadside-to-curbside, fold roadside section of tarp (Figure 16, Item 1) forward, until even with curbside edge of the LADS.
 - c. Repeat step b to fold roadside section of tarp (Figure 16, Item 1) over again.
 - d. Ensure roadside section of tarp (Figure 16, Item 1) is directly above and not hanging over awning extension (Figure 16, Item 6).

WARNING

Awning extension and awning supports are designed to support the awning/tarp only. Do not step on or hang from these items. Failure to follow this precaution may result in equipment damage and personal injury. Seek immediate medical attention if injury occurs.

4. Ensure awning extension (Figure 16, Item 6) is secured to tarp supports (Figure 16, Item 5) and ISO frame (Figure 16, Item 4). Tighten straps (Figure 16, Item 3) if necessary.
5. Flip curbside section of tarp (Figure 16, Item 1) over top of the LADS.

NOTE

For remaining steps refer to Figure 16, Sheet 2 of 2

6. Fold curbside section of tarp (Figure 16, Item 1) on top of roadside section of tarp as follows:
 - a. Align front-bottom edge (Figure 16, Item 2) on curbside section of tarp (Figure 16, Item 1) even with roadside edge of the LADS.
 - b. From roadside-to-curbside, fold curbside section of tarp (Figure 16, Item 1) forward, until even with curbside edge of the LADS.
 - c. Repeat step b to curbside section of tarp (Figure 16, Item 1) over again.
 - d. Ensure curbside section of tarp (Figure 16, Item 1) is directly above and not hanging over awning extension (Figure 16, Item 6).

SET-UP AWNING-CONTINUED

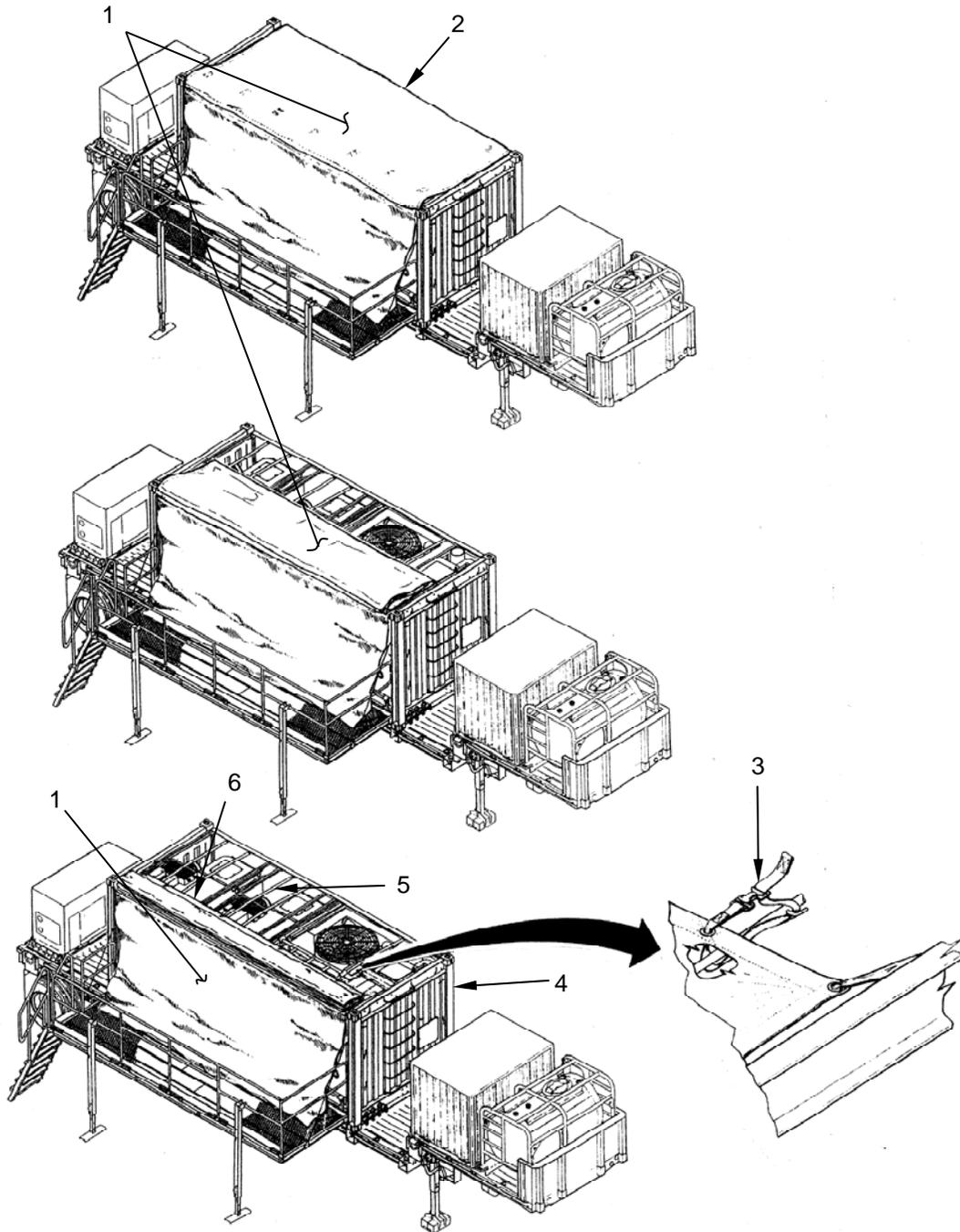


Figure 16. Awning Set-up (Sheet 1 of 2).

SET-UP AWNING-CONTINUED

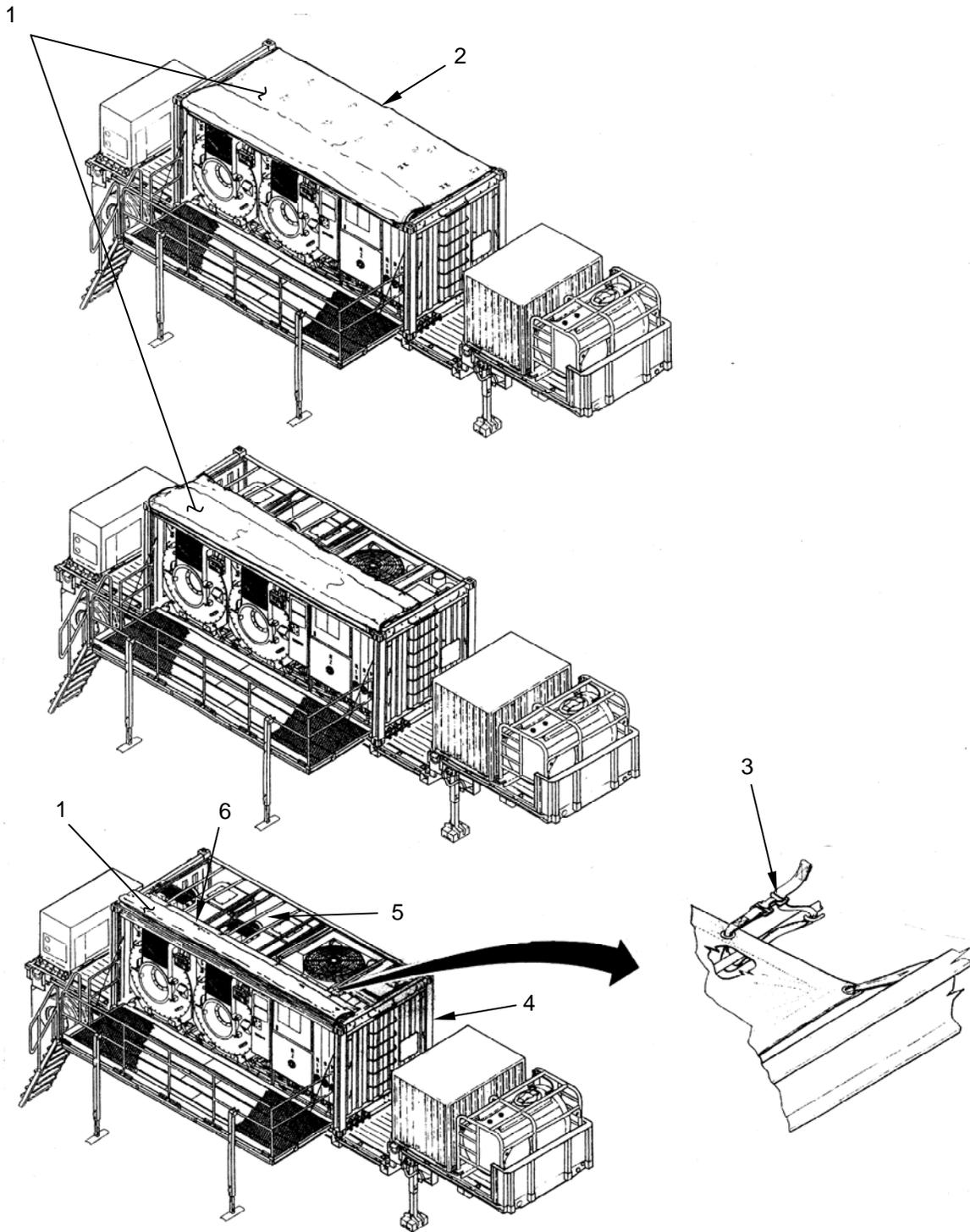


Figure16. Awning Set-up (Sheet 2 of 2).

SET-UP AWNING-CONTINUED

7. Install six awning supports (Figure 17, Item 1) as follows:
 - a. Loosen and remove straps (Figure 17, Item 4) securing awning supports (Figure 17, Item 1) together. Put straps in tool box.
 - b. Insert t-bolt (Figure 17, Item 2) into front support (Figure 17, Item 3).
 - c. Rotate awning support (Figure 17, Item 1) downward and mate with main railing (Figure 17, Item 5).
 - d. Insert quick-connect pin (Figure 17, Item 6) to secure awning support (Figure 17, Item 1) to main railing (Figure 17, Item 5).

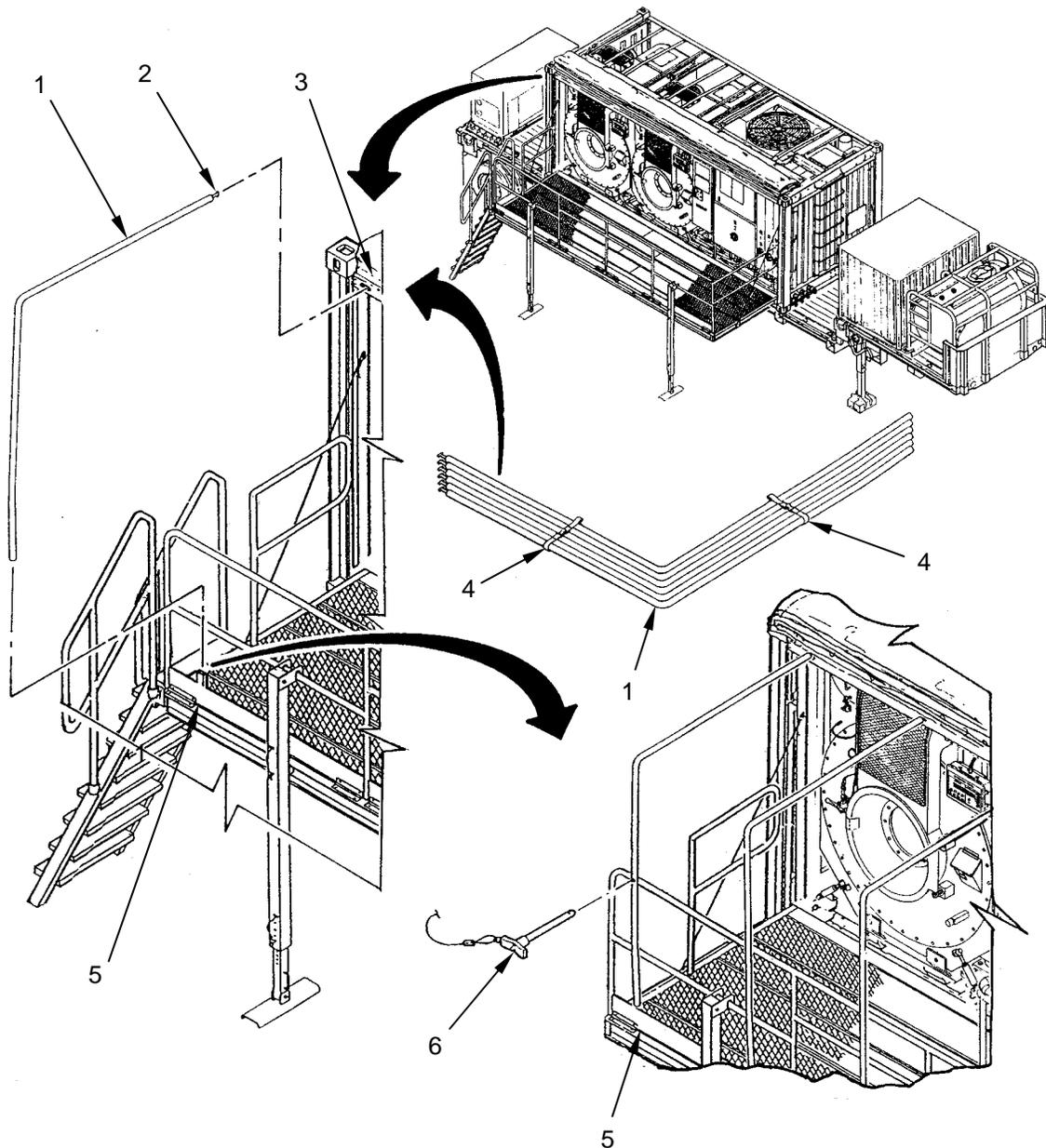


Figure 17. Awning Support Set-up.

SET-UP AWNING-CONTINUED

8. Flip curbside section of tarp (Figure 18, Item 1) over awning supports (Figure 18, Item 3).
9. Secure tarp (Figure 18, Item 1) to awning supports (Figure 18, Item 3) as follows:
 - a. Slide eight straps (Figure 18, Item 7) through loops (Figure 18, Item 6) and secure to awning supports (Figure 18, Item 3).
 - b. Wrap straps (Figure 18, Item 12) around main railing (Figure 18, Item 11). Pull straps tight and tie off.
 - c. Slide straps (Figure 18, Item 9) through loops (Figure 18, Item 8) to secure tarp (Figure 18, Item 1) to outer awning supports (Figure 18, Item 10).
10. If desired, install light (Figure 18, Item 5) to underside of tarp (Figure 18, Item 1) as follows:
 - a. Position light (Figure 18, Item 5) at desired location.
 - b. Route electrical cable (Figure 18, Item 2) between tarp (Figure 18, Item 1) and awning supports (Figure 18, Item 3).
 - c. Connect electrical cable (Figure 18, Item 2) at receptacle (Figure 18, Item 4).
11. If awning is to be completely deployed proceed to step 12, otherwise perform steps 3 and 4 to secure roadside section of tarp.

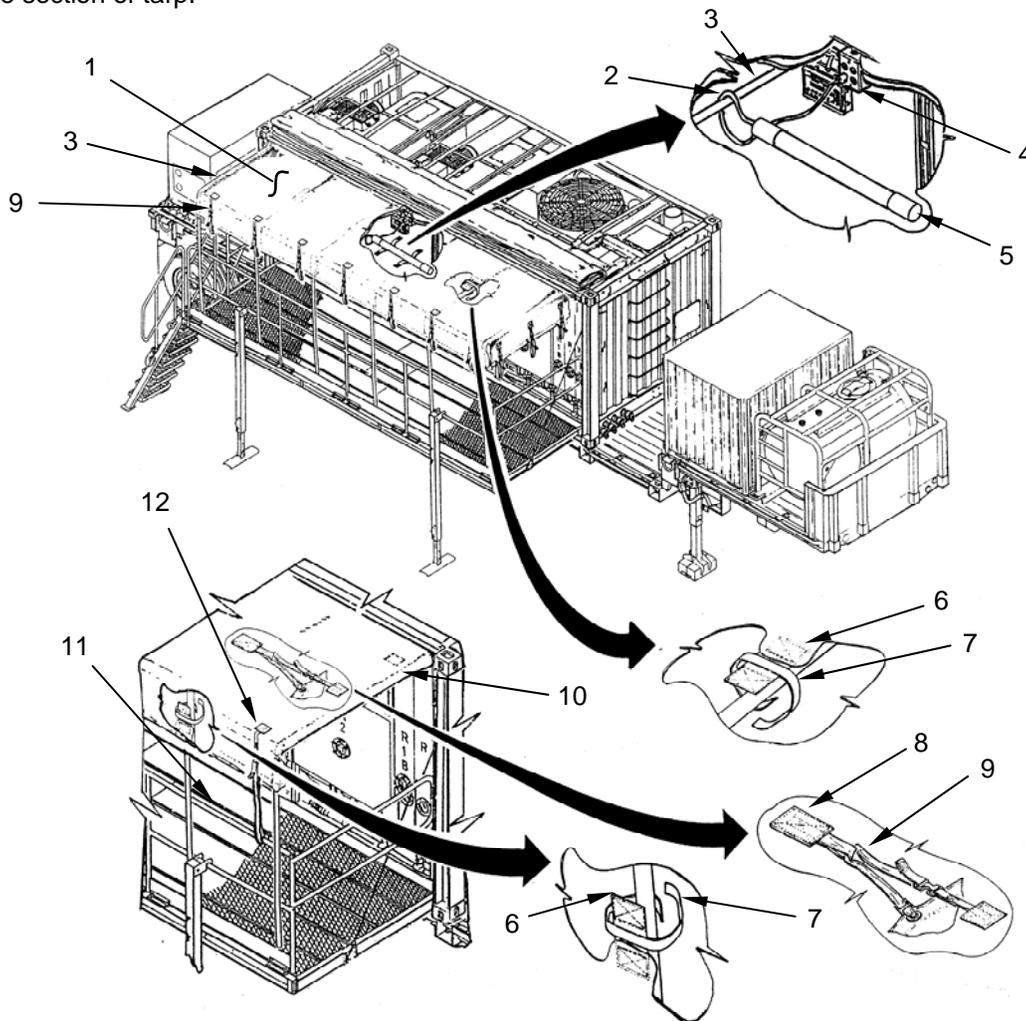


Figure 18. Securing Tarp.

SET-UP AWNING-CONTINUED

12. Flip roadside section of tarp (Figure 19, Item 1) over curbside section of tarp and awning supports (Figure 19, Item 13).
13. Secure tarp (Figure 19, Item 1) to awning supports (Figure 19, Item 13) as follows:
 - a. Slide four straps (Figure 19, Item 11) through loops (Figure 19, Item 12) and secure to awning supports (Figure 19, Item 13).
 - b. Slide straps (Figure 19, Item 6) through loops (Figure 19, Item 7) to secure tarp (Figure 19, Item 1) to outer awning supports (Figure 19, Item 8).
14. Roll up excess tarp (Figure 19, Item 1) and secure to underside of platform (Figure 19, Item 9) with bungee cords (Figure 19, Item 10).
15. Ensure awning extension (Figure 19, Item 4) is secured to tarp supports (Figure 19, Item 2) and ISO frame (Figure 19, Item 5). Tighten straps (Figure 19, Item 3) if necessary.

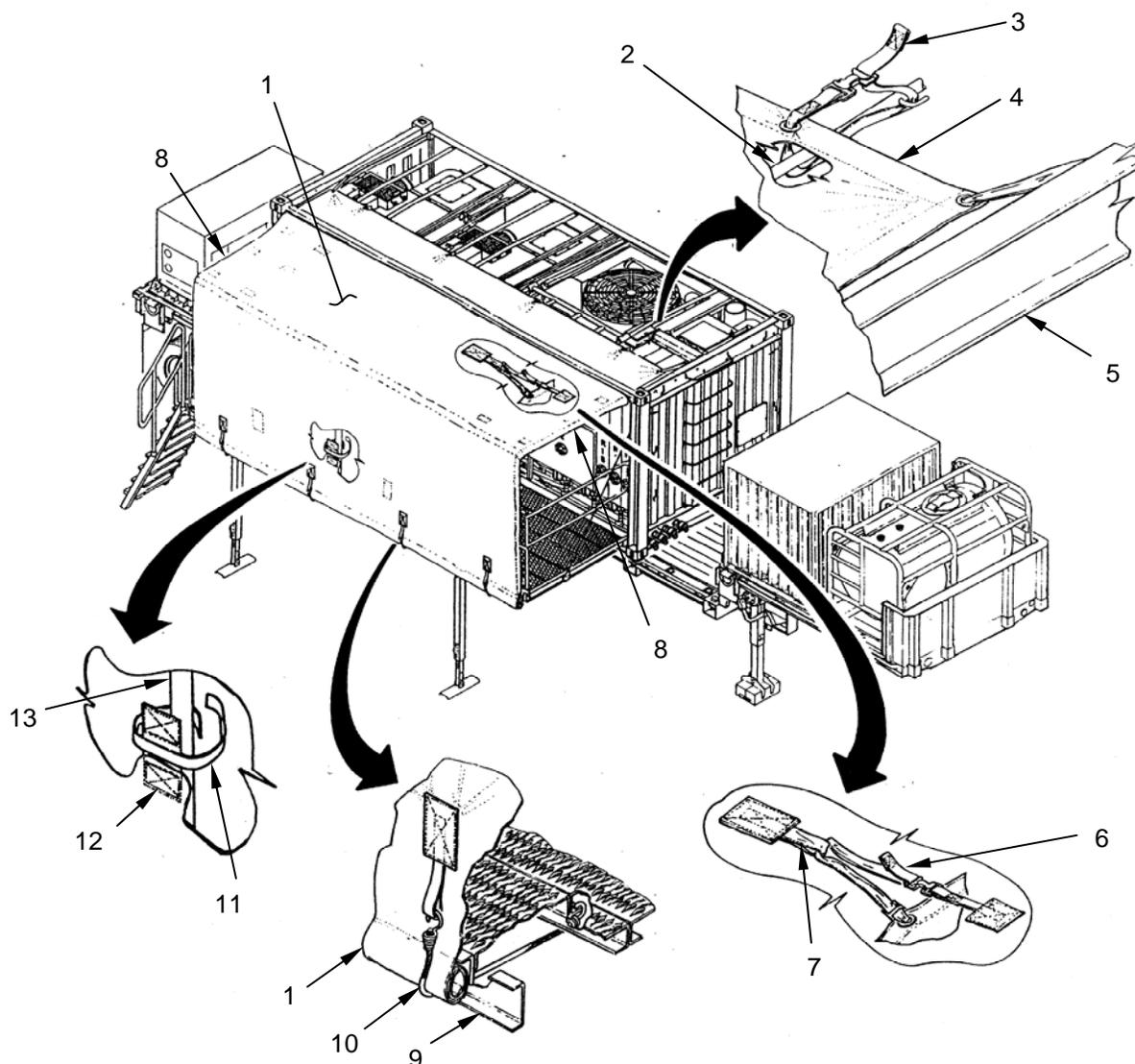


Figure 19. Awning Installation Complete.

END OF TASK

UNLOCK DRUMS

1. Remove four load binders (Figure 20, Item 2) securing back of washing/drying drums (Figure 20, Item 1) to ISO frame (Figure 20, Item 4) as follows:
 - a. Flip catch (Figure 20, Item 9) over to allow loosening of load binder (Figure 20, Item 2).
 - b. Grasp barrel (Figure 20, Item 7) then use handle (Figure 20, Item 10) to loosen until eye (Figure 20, Item 6) can be removed from hook point (Figure 20, Item 8).
 - c. Slide eye (Figure 20, Item 6) out of hook point (Figure 20, Item 8), then slide hook (Figure 20, Item 11) out of hook point (Figure 20, Item 12).
 - d. Stow load binders (Figure 20, Item 2) in storage locker.

NOTE

During transport drums may shift slightly making it difficult to remove pins from front of drums. If a pin is stuck it can be removed as air bags inflate during start-up.

2. Remove four pins (Figure 20, Item 5) securing front of washing/drying drums (Figure 20, Item 3) to ISO frame (Figure 20, Item 4) as follows:
 - a. Pull pin (Figure 20, Item 5) out of ISO frame (Figure 20, Item 4).
 - b. Place pin (Figure 20, Item 5) down into ISO frame (Figure 20, Item 4) on trailer surface.

UNLOCK DRUMS-CONTINUED

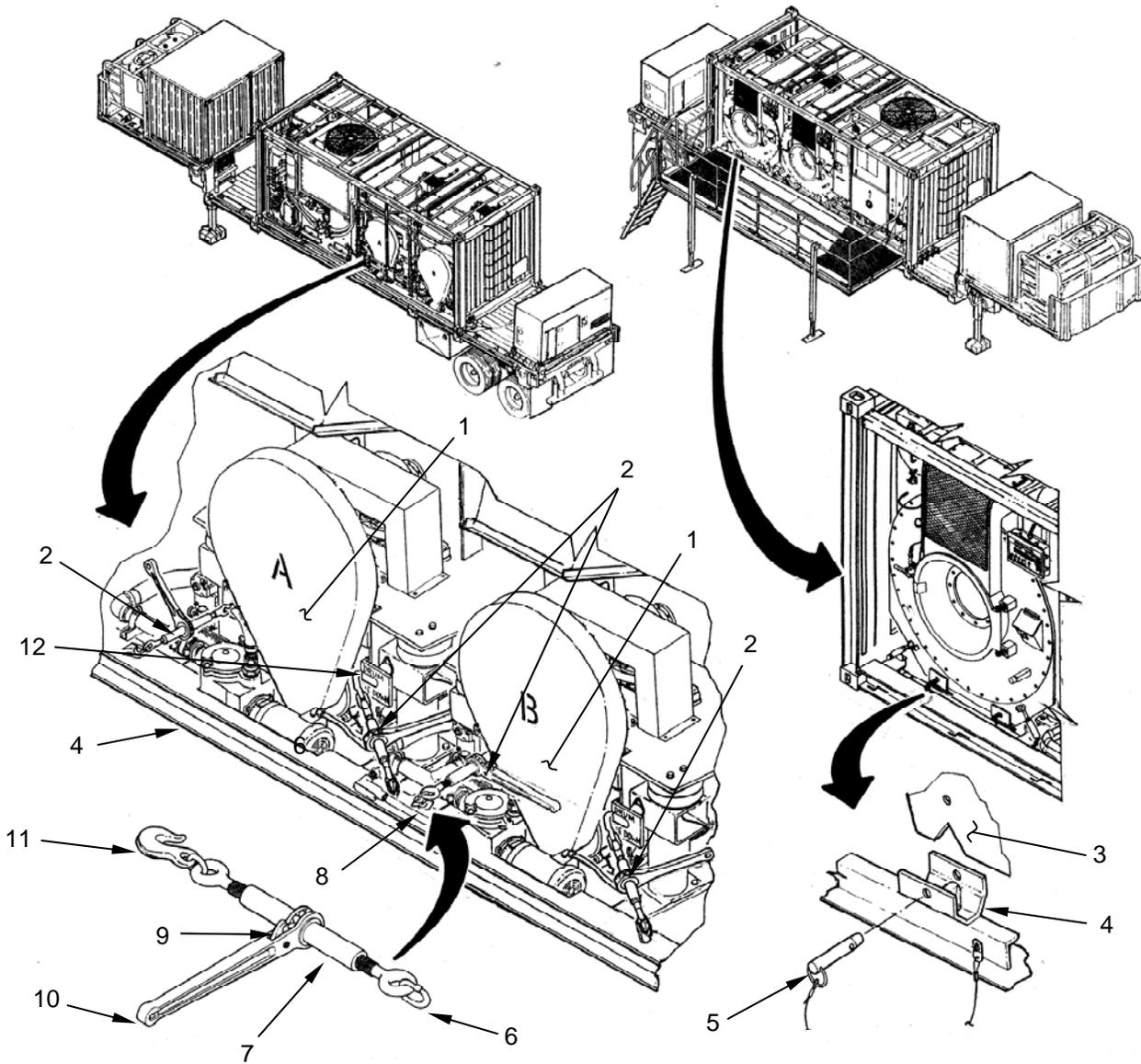


Figure 20. Unlocking Drums.

END OF TASK

REMOVE STOWED ACCESSORIES

1. Pull out on handles (Figure 21, Item 2) and open doors (Figure 21, Item 3).
2. Remove items from drum A as follows:
 - a. 10-ft water supply hose (Figure 21, Item 4), qty 1.
 - b. 50-ft water supply hoses (Figure 21, Item 6), qty 4.
3. Remove items from drum B as follows:
 - a. 5-ft drain hose (Figure 21, Item 5), qty 1.
 - b. Utility hose (Figure 21, Item 9), qty 1.
 - c. 50-ft drain hoses (Figure 21, Item 8), qty 2.
 - d. Spray nozzle (Figure 21, Item 1), qty 1.
 - e. 100-ft electrical cable (Figure 21, Item 7), qty 1.
4. Close drum doors (Figure 21, Item 3) then push in on handles (Figure 21, Item 2) to lock doors.

REMOVE STOWED ACCESSORIES-CONTINUED

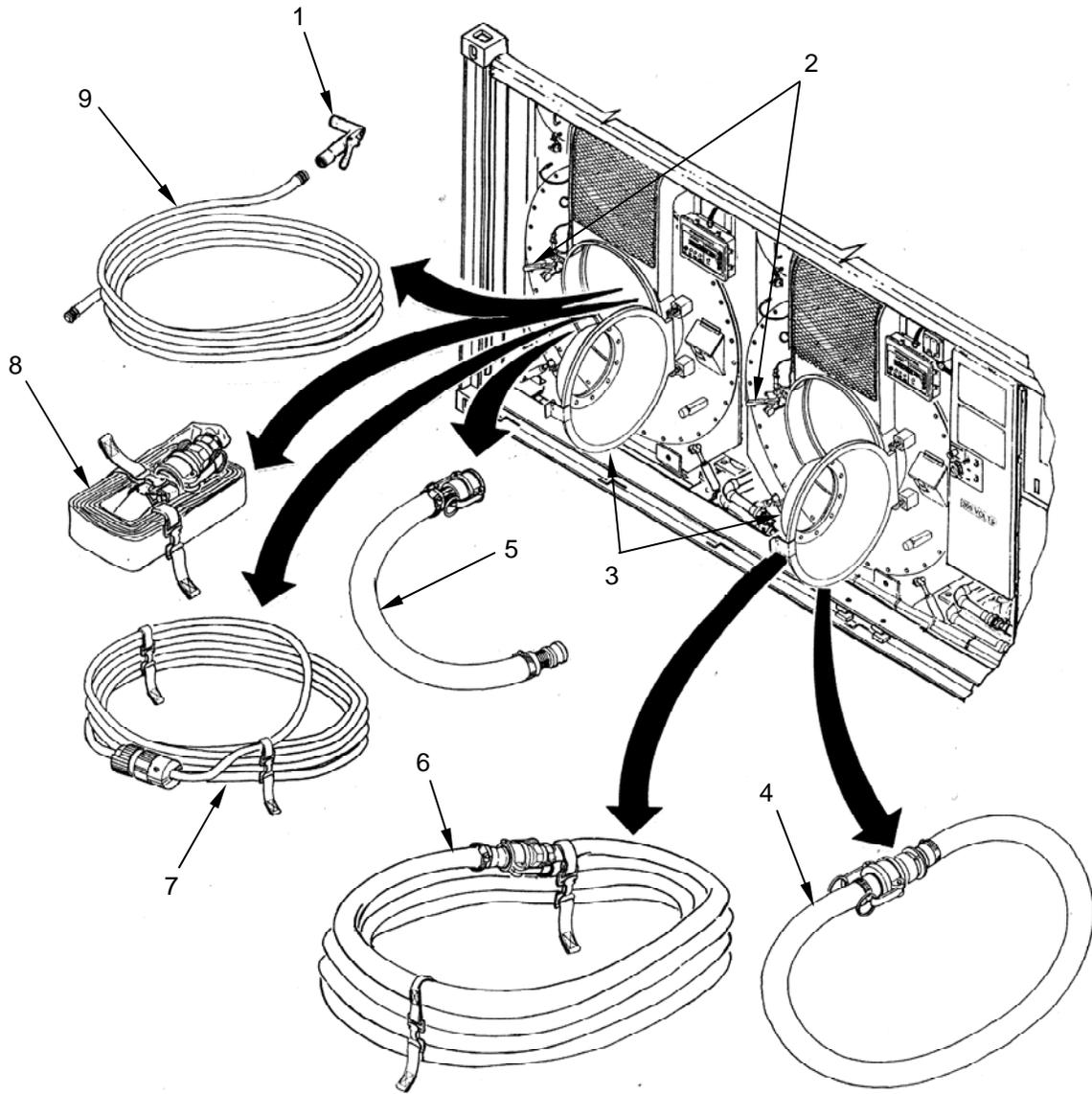


Figure 21. Stowed Accessories.

END OF TASK

ESTABLISH ELECTRICAL POWER SOURCE**WARNING**

Master power must be shut off before connecting the LADS power cable. Do not apply power to the LADS until a separate connection has been made with a suitable earth ground. Be careful not to come into contact with high-voltage connections. Whenever possible, keep one hand away from the equipment to reduce the hazard of current flowing through the body's vital organs. Failure to follow this warning may result in personnel injury or death. Seek immediate medical attention if injury occurs.

1. Press tab on handle and apply lock-out by placing a padlock (Figure 22, Item 12) on MAIN DISCONNECT (Figure 22, Item 1).
2. Determine what power source will be used to operate the LADS. If the MEP-805A generator is to be used proceed to step 4, otherwise continue to step 3.
3. Establish connection to electrical power source as follows:
 - a. Ensure MAIN DISCONNECT switch (Figure 22, Item 1) on main control enclosure (Figure 22, Item 11) is OFF. Position switch to OFF if necessary.
 - b. Drive grounding rod (Figure 22, Item 6) into the earth, near grounding lug (Figure 22, Item 8), to a minimum depth of eight feet.
 - c. Ensure grounding wire (Figure 22, Item 3) is attached to grounding lugs (Figure 22, Item 8) and (Figure 22, Item 2). Attach grounding wire if necessary using an adjustable wrench from tool box.
 - d. Connect grounding wire (Figure 22, Item 7) to grounding rod (Figure 22, Item 6) and grounding lug (Figure 22, Item 8).
 - e. If connected, disconnect generator power cable (Figure 22, Item 9) at junction box (Figure 22, Item 10).
 - f. Ensure external power source is not on.
 - g. Connect power cable (Figure 22, Item 5) from power source to junction box (Figure 22, Item 10). Proceed to Establish Water and Waste Drain in this work package.
4. Establish connection to MEP-805A generator as follows:
 - a. Ensure MAIN DISCONNECT switch (Figure 22, Item 1) on main control enclosure (Figure 22, Item 11) is OFF. Position switch to OFF if necessary.
 - b. Ensure MEP-805A generator is not on.
 - c. Drive grounding rod (Figure 22, Item 6) into the earth, near grounding lug (Figure 22, Item 8), to a minimum depth of eight feet.
 - d. Ensure grounding wire (Figure 22, Item 3) is attached to grounding lugs (Figure 22, Item 8), (Figure 22, Item 2) and (Figure 22, Item 4). Attach grounding wire, if necessary, using an adjustable wrench from tool box.
 - e. Connect grounding wire (Figure 22, Item 7) to grounding rod (Figure 22, Item 6) and grounding lug (Figure 22, Item 8).
 - f. Ensure power cable (Figure 22, Item 9) is connected at junction box (Figure 22, Item 10) and MEP-805A generator. Connect power cable, if necessary.

ESTABLISH ELECTRICAL POWER SOURCE-CONTINUED

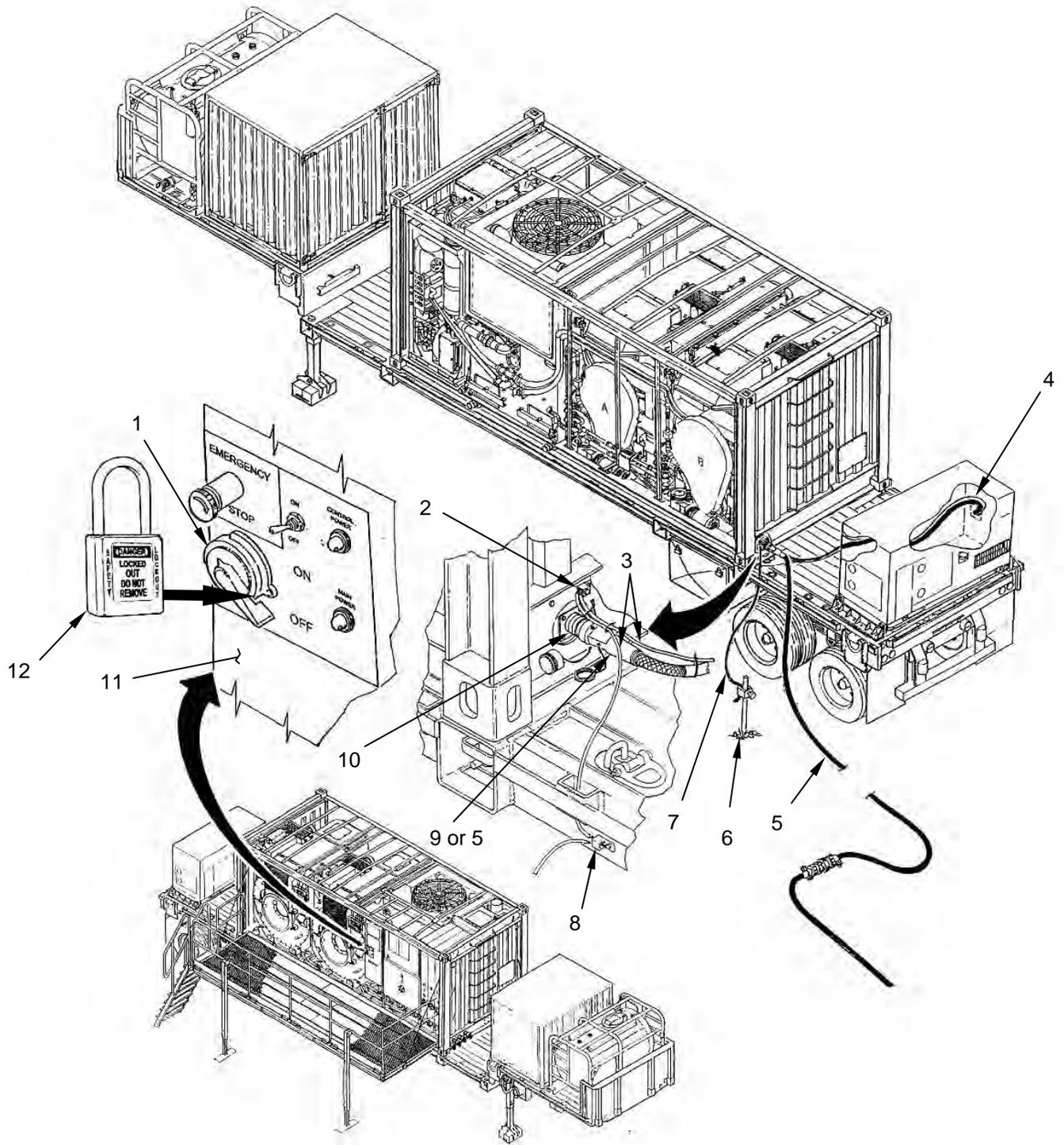


Figure 22. Establishing Electrical Power.

END OF TASK

ESTABLISH WATER AND WASTE DRAIN

1. Place waste container (Figure 23, Item 6) in front of and centered below still (Figure 23, Item 1).
2. Place coalescer drain tube (Figure 23, Item 7) in waste container (Figure 23, Item 6).
3. Place 5-ft drain hose (Figure 23, Item 5) on the ground below two drain ports (Figure 23, Item 2).
4. Route collapsible 50-ft drain hose (Figure 23, Item 4) as follows.
 - a. Remove strap (Figure 23, Item 3) from around hose (Figure 23, Item 4). Secure strap to either end of hose.
 - b. Disconnect, roll out, and route male end fitting of hose (Figure 23, Item 4) towards drainage area. Ensure hose is not kinked.
 - c. If necessary to reach drainage area, connect a second hose (Figure 23, Item 4) and roll out to drainage area.
 - d. Leave enough slack in hose (Figure 23, Item 4) to connect to drain port (Figure 23, Item 2).
5. Route 50-ft overflow hose (Figure 23, Item 8) as follows.
 - a. Remove straps (Figure 23, Item 9) from around hose (Figure 23, Item 8). Secure straps to either end of hose.
 - b. Disconnect, roll out, and route hose (Figure 23, Item 8) to drainage area.
 - c. Connect female end fitting of hose (Figure 23, Item 8) to overflow port (Figure 23, item 10).

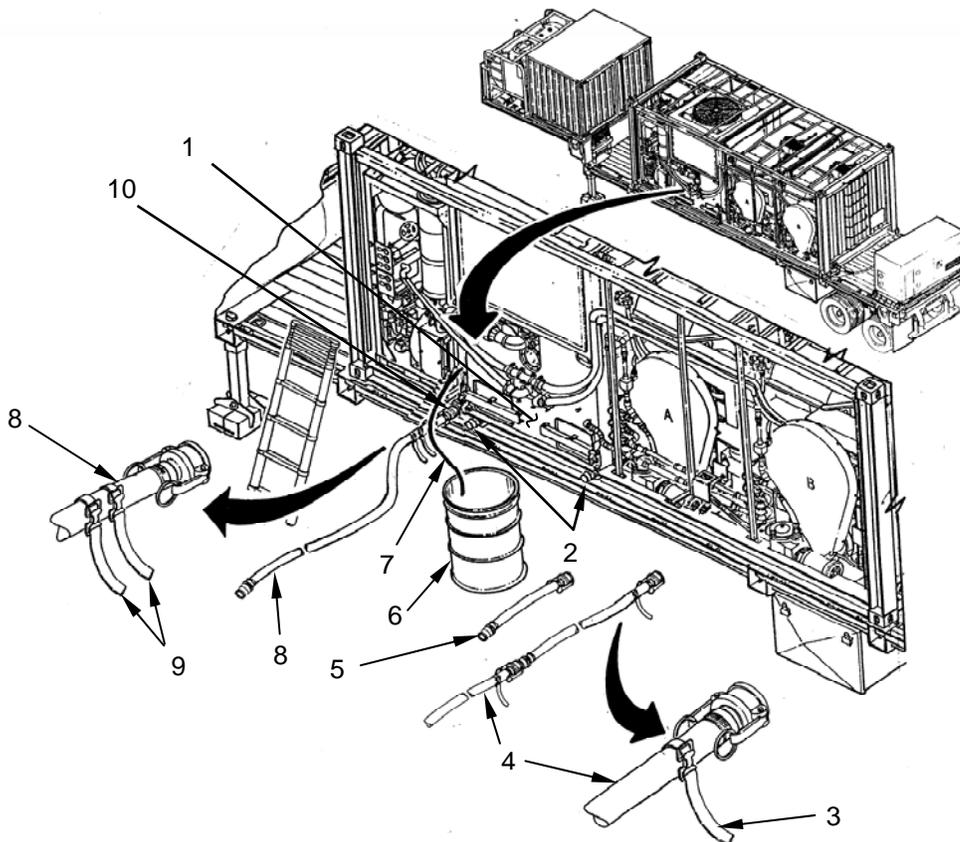


Figure 23. Establishing Water and Waste Drain.

ESTABLISH WATER AND WASTE DRAIN-CONTINUED

6. Set up pre-wash manifold as follows:
 - a. Remove two caps (Figure 24, Item 2) from front two ports on water manifolds (Figure 24, Item 6).
 - b. Attach pre-wash manifold (Figure 24, Item 5) to water manifolds (Figure 24, Item 6).
 - c. Feed electrical cable (Figure 24, Item 1) through hole in ISO frame wall (Figure 24, Item 8) and connect to pre-wash manifold (Figure 24, Item 5).
 - d. Place operation levers (Figure 24, Item 7) to AUTO.
 - e. Connect and Route 50-ft pre-wash drain hose (Figure 24, Item 3) as follows:
 - (1) Remove straps (Figure 24, Item 4) from around hose (Figure 24, Item 3). Secure straps to either end of hose.
 - (2) Disconnect, roll out, and route hose (Figure 24, Item 3) to drainage area.
 - (3) Connect female end of hose (Figure 24, Item 3) to pre-wash manifold (Figure 24, Item 5).

ESTABLISH WATER AND WASTE DRAIN-CONTINUED

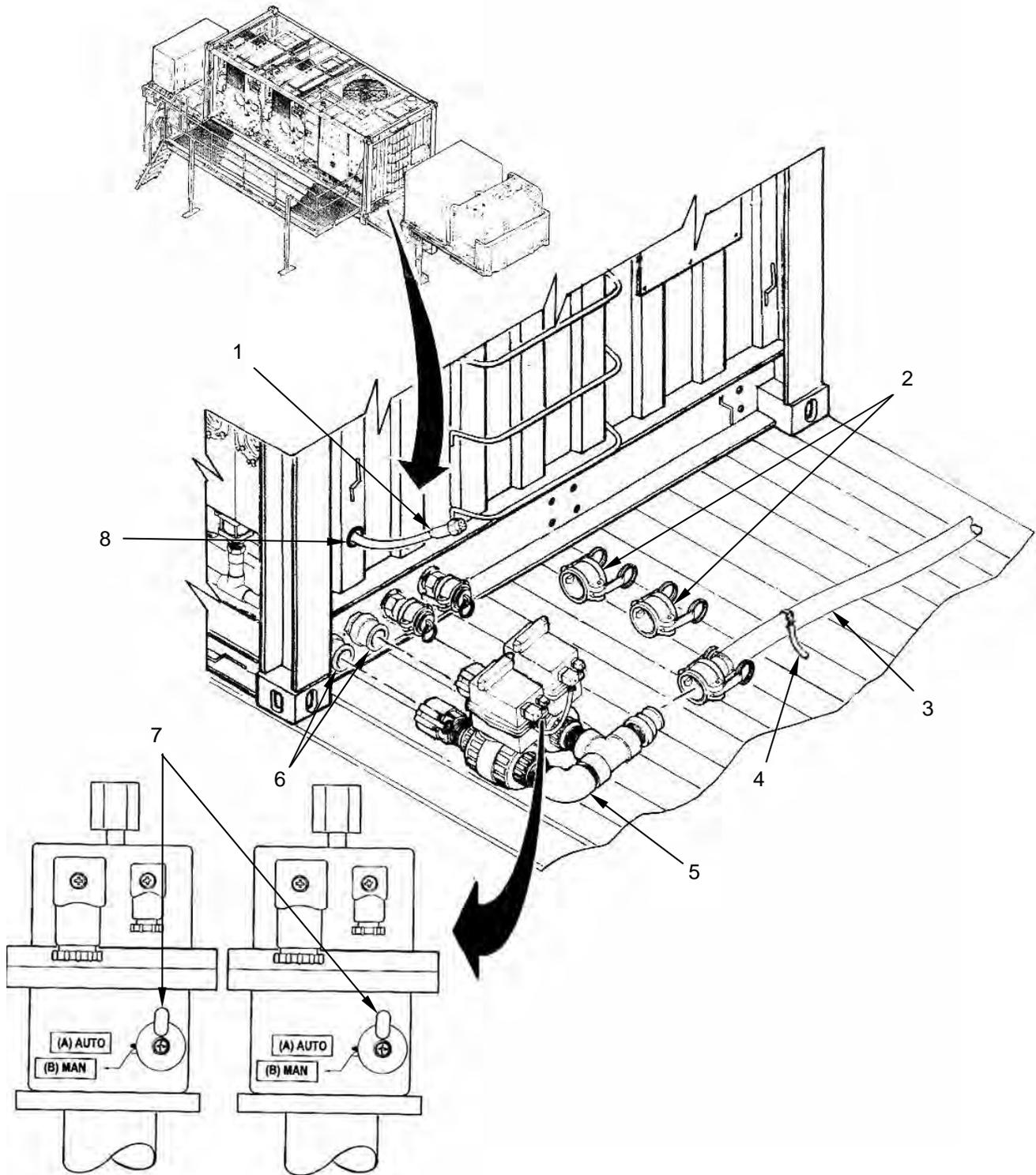


Figure 24. Connect Pre-wash Manifold.

END OF TASK

ESTABLISH WATER SUPPLY

1. Place water supply pump (Figure 25, Item 12) and water tank (Figure 25, Item 1) at desired location.
2. Set-up water tank (Figure 25, Item 1) IAW TM 10-5430-237-12.
3. Route 50-ft water supply hose (Figure 25, Item 3) as follows.
 - a. Remove straps (Figure 25, Item 7) from around hose (Figure 25, Item 3). Secure straps to either end of hose.
 - b. Disconnect, roll out, and route hose (Figure 25, Item 3) from water supply pump (Figure 25, Item 12) towards water supply port (Figure 25, Item 6).
 - c. If necessary connect second hose (Figure 25, Item 3) following steps a and b.
4. Connect 50-ft water supply hose (Figure 25, Item 3) at water supply pump (Figure 25, Item 12) and water supply port (Figure 25, Item 6).
5. Route electrical cable (Figure 25, Item 2) as follows:
 - a. Remove straps (Figure 25, Item 11) from around cable (Figure 25, Item 2). Secure straps to either end of cable.
 - b. Disconnect, roll out, and route cable (Figure 25, Item 2) from water supply pump (Figure 25, Item 12) towards junction box (Figure 25, Item 5).
6. Connect electrical cable (Figure 25, Item 2) at water supply pump (Figure 25, Item 12) and junction box (Figure 25, Item 5).
7. Disconnect and route 10-ft water supply hose (Figure 25, Item 10) between water supply pump (Figure 25, Item 12) and water tank (Figure 25, Item 1).
8. Connect 10-ft water supply hose (Figure 25, Item 10) at water supply pump (Figure 25, Item 12) and water tank (Figure 25, Item 1).
9. Connect spray nozzle (Figure 25, Item 9) to utility hose (Figure 25, Item 8).
10. Connect utility hose (Figure 25, Item 8) to faucet (Figure 25, Item 4).

ESTABLISH WATER SUPPLY-CONTINUED

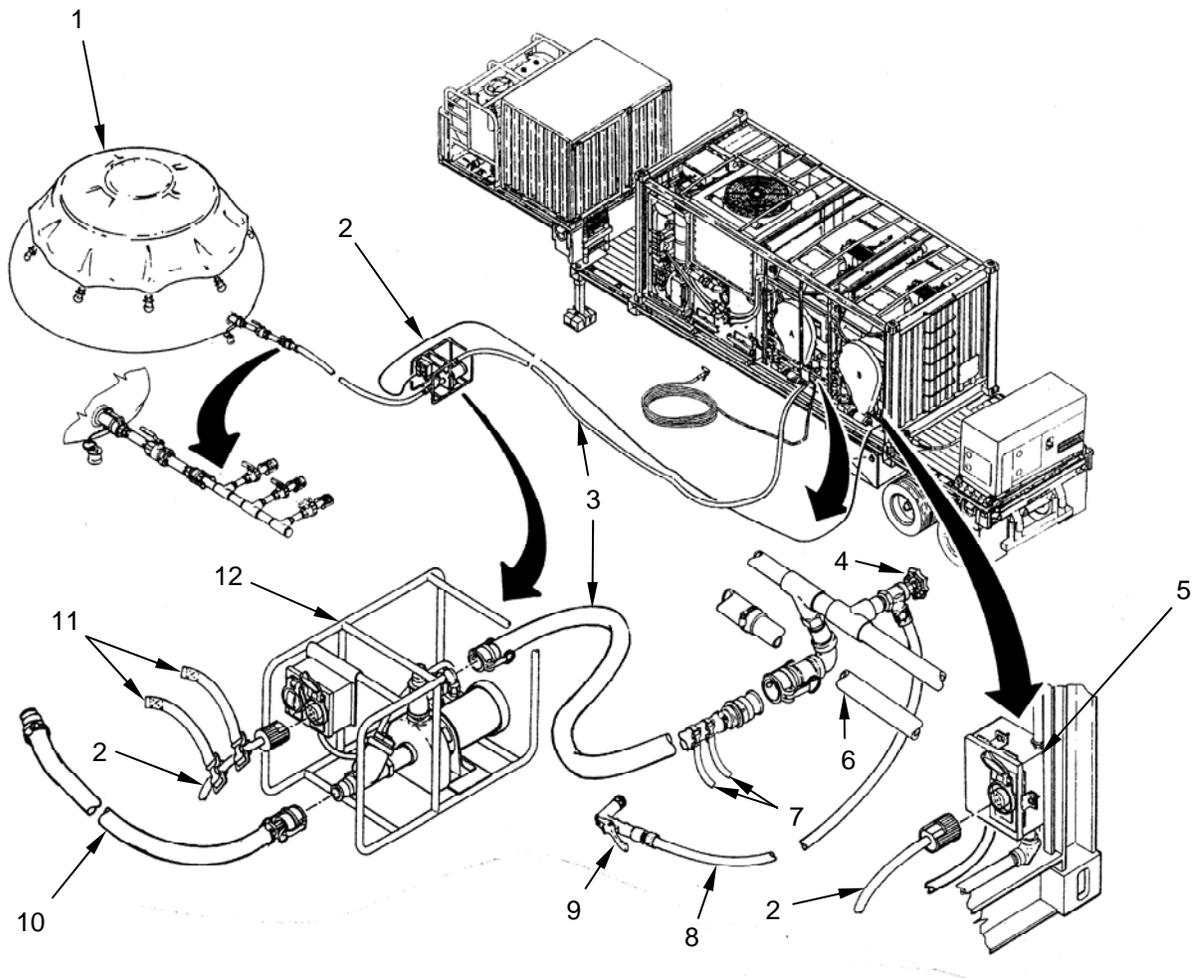


Figure 25. Establishing Water Supply.

END OF TASK

ESTABLISH FUEL SUPPLY**WARNING**

Before making connections or servicing fuel supply, ensure fuel container is properly connected to a suitable earth ground and electrically bonded to the LADS trailer. Ensure fire extinguishing equipment is available and operational. Wear protective impermeable gloves and eye protection. Avoid contact with skin, eyes and clothes. Flush eyes if exposed to fuel. Do not breath vapors. Failure to follow this warning may result in personnel injury or death. Seek immediate medical attention if injury occurs.

CAUTION

The LADS should only be operated using JP-8 or DF-2 fuel. Fuel supply must be free of water and contaminants. Connections on fuel hoses must be clean prior to connecting to heater and fuel supply. Improper, dirty, or contaminated fuel can cause damage to heater fuel system.

NOTE

The LADS may be connected to fuel tank located on the M871A3 trailer or to another fuel supply as desired.

1. Determine what fuel connection set-up is desired. To connect the LADS to the fuel tank on the M871A3 trailer, follow steps 2 through 6 and 14 through 19. To connect the LADS to another external fuel supply follow steps 7 through 19.
2. Connect 30-ft fuel hose (Figure 26, Item 9) at fuel tank connections (Figure 26, Item 3) and (Figure 26, Item 4). Ensure connections are fully seated.
3. Connect caps (Figure 26, Item 1) and plugs (Figure 26, Item 2) to each other.
4. Roll out and route 30-ft fuel hose (Figure 26, Item 9) towards the LADS heater connections (Figure 26, Item 5) and (Figure 26, Item 8).
5. Connect fuel hose (Figure 26, Item 9) at heater connections (Figure 26, Item 5) and (Figure 26, Item 8). Ensure connections are fully seated.
6. Connect caps (Figure 26, Item 7) and plugs (Figure 26, Item 6) to each other. Proceed to step 14.

ESTABLISH FUEL SUPPLY-CONTINUED

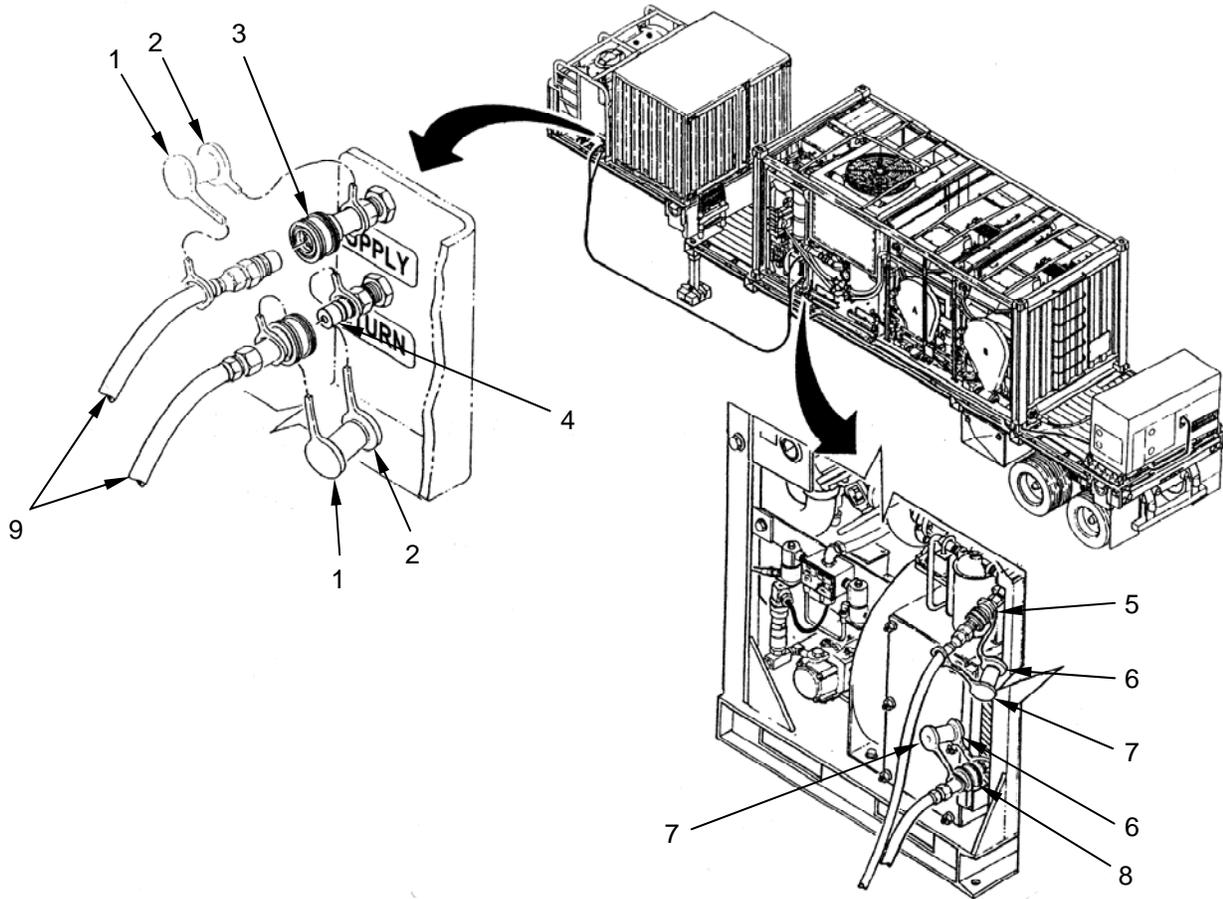


Figure 26. Fuel Supply Connections.

ESTABLISH FUEL SUPPLY-CONTINUED

14. Connect adapter (Figure 28, Item 3) to MEP-805A generator (TM 9-6115-644-10) and tighten using an adjustable wrench.
15. Connect 25-ft fuel hose (Figure 28, Item 2) to adapter (Figure 28, Item 3). Ensure connection is fully seated.
16. Connect cap (Figure 28, Item 4) and plug (Figure 28, Item 5) to each other.
17. Roll out and route 25-ft fuel hose (Figure 28, Item 2) towards fuel hose (Figure 28, Item 1) along side of M871A3 trailer.
18. Connect 25-ft fuel hose (Figure 28, Item 2) to 30-ft fuel hose (Figure 28, Item 1). Ensure connection is fully seated.
19. Connect cap (Figure 28, Item 6) and plug (Figure 28, Item 7) to each other.

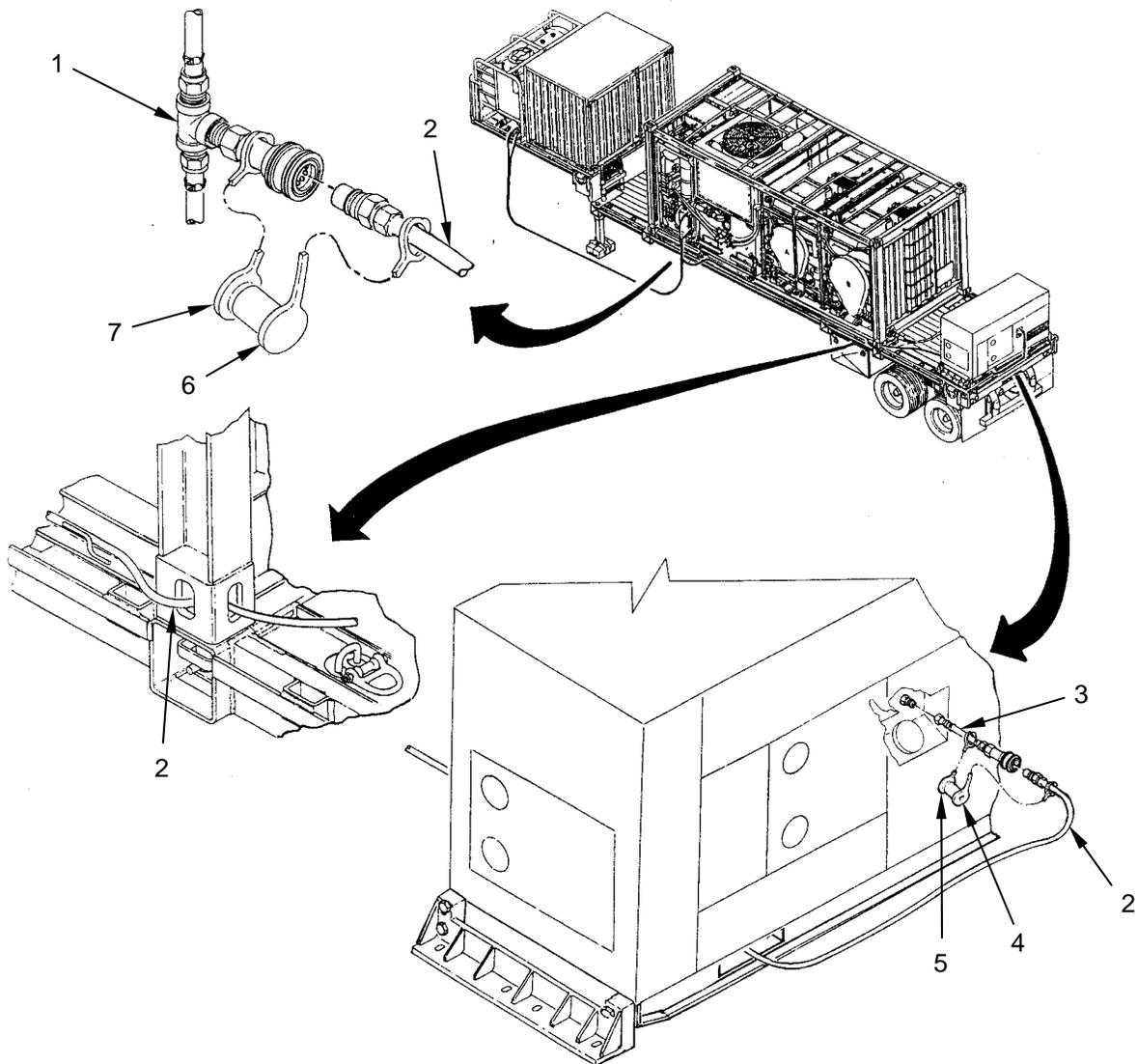


Figure 28. Completing Fuel Supply Connections.

END OF TASK

INSTALL EXHAUST DUCT

1. Pull exhaust duct extension (Figure 29, Item 1) up out of exhaust stack (Figure 29, Item 2).
2. Flip exhaust duct extension (Figure 29, Item 1) over and mate with exhaust stack (Figure 29, Item 2).

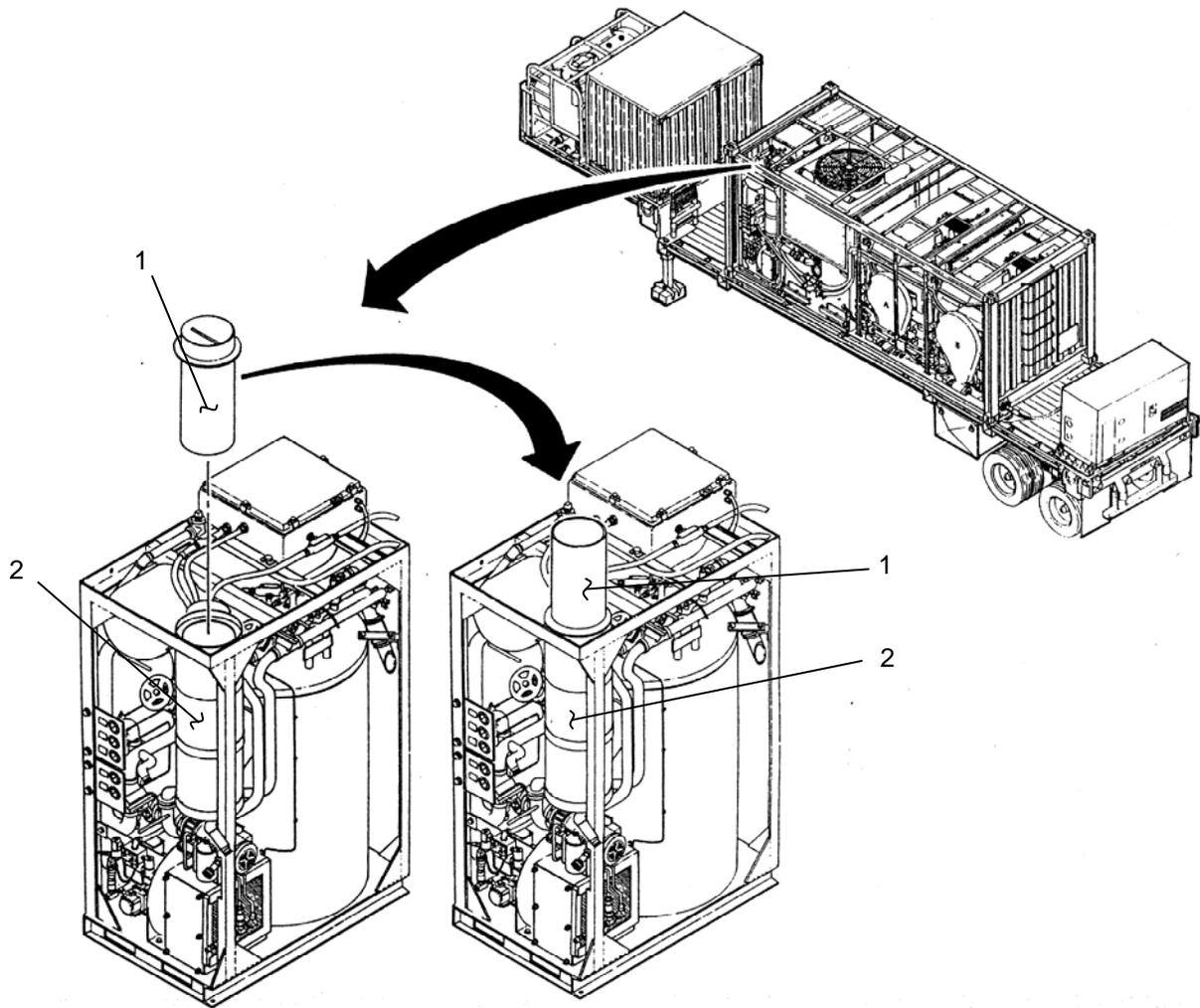


Figure 29. Exhaust Duct Installation.

END OF TASK

ESTABLISH ANTI-FOAM SUPPLY

1. Ensure cap (Figure 30, Item 3) is tight on anti-foam container (Figure 30, Item 4) then shake container thoroughly to remove any clumps.
2. Place anti-foam container (Figure 30, Item 4) on platform (Figure 30, Item 5) next to corner of ISO frame (Figure 30, Item 1).
3. Remove cap (Figure 30, Item 3) from anti-foam container (Figure 30, Item 4) and retain for later use.
4. Insert hand pump (Figure 30, Item 6) into anti-foam container (Figure 30, Item 4).
5. Stroke hand pump (Figure 30, Item 6) until anti-foam is visible at inlet to still (Figure 30 Item 2). Then add one more stroke.

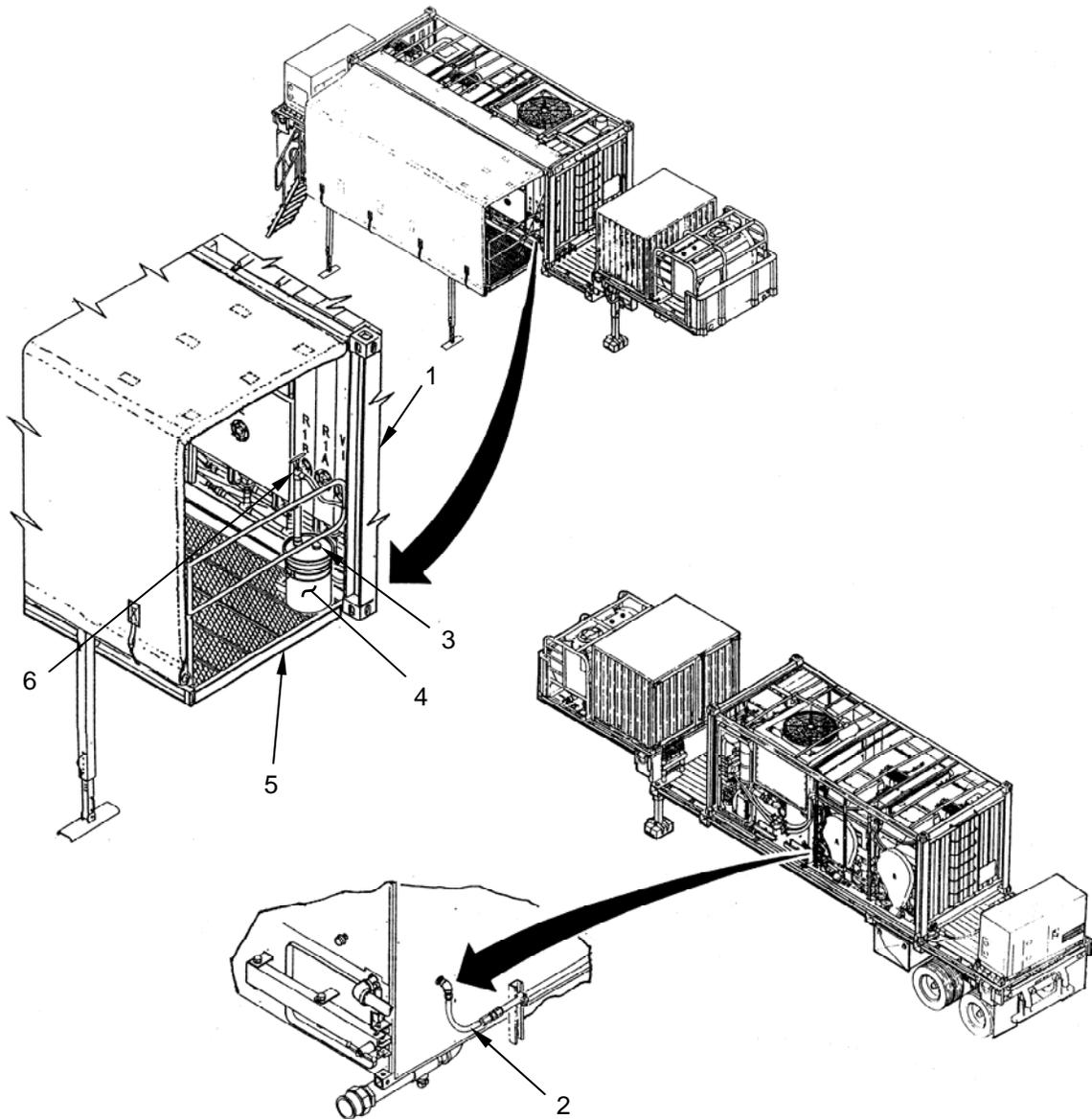


Figure 30. Establishing Anti Foam Supply.

END OF TASK

ESTABLISH DETERGENT SUPPLY

1. Place detergent container (Figure 31, Item 4) on platform (Figure 31, Item 3) next to front corner of ISO frame (Figure 31, Item 2).
2. Remove cap (Figure 31, Item 5) from detergent container (Figure 31, Item 4) and retain for later use.
3. Insert hand pump (Figure 31, Item 1) into detergent container (Figure 31, Item 4) and hand-tighten.

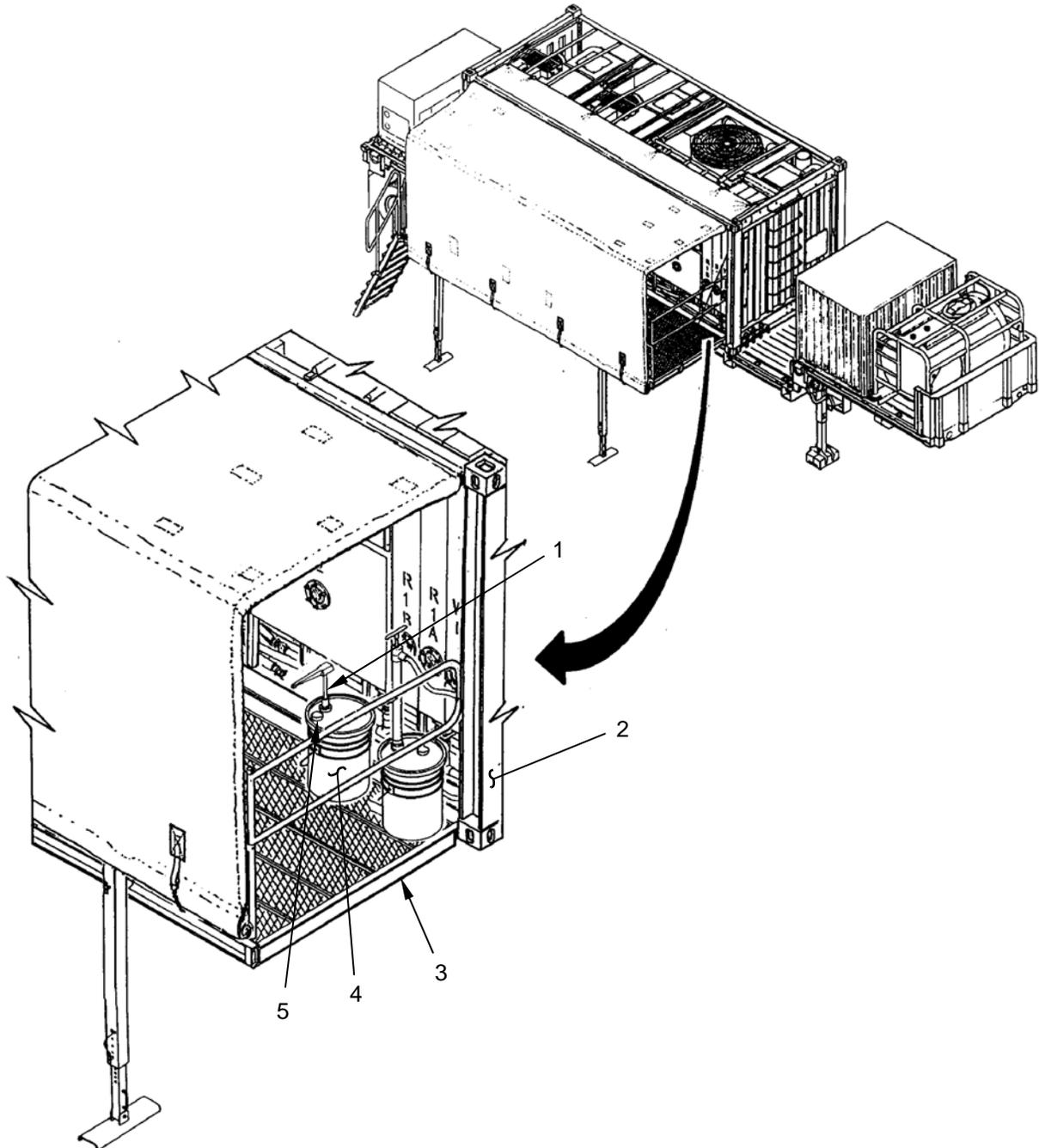


Figure 31. Detergent Supply.

END OF TASK

OPEN INVERTER AIR FLOW DOORS

1. Slide air inlet door (Figure 32, Item 2) forward until it contacts stop (Figure 32, Item 3).
2. Loosen knob (Figure 32, Item 4) then rotate latch (Figure 32, Item 5) to open air outlet door (Figure 32, Item 1).

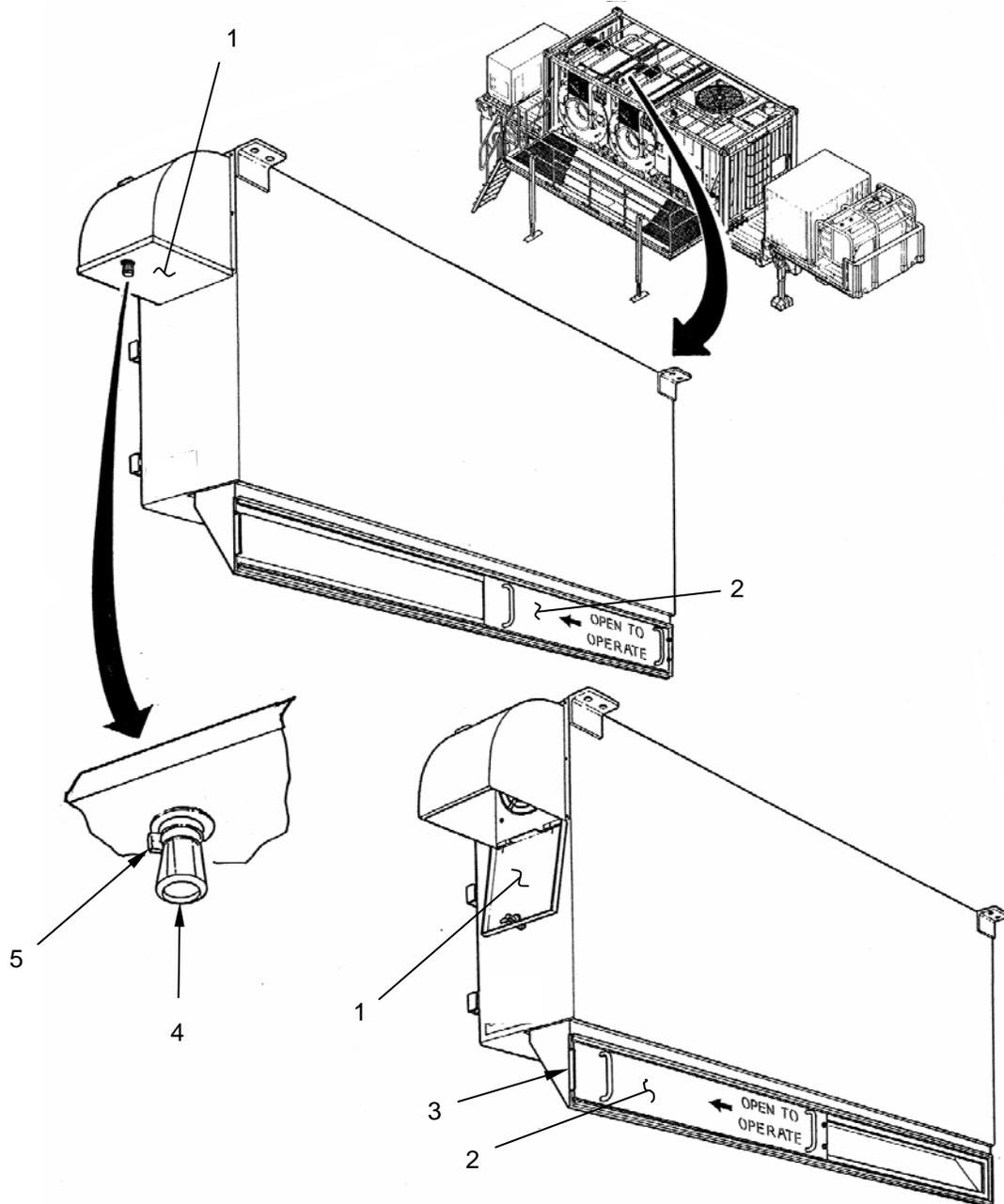


Figure 32. Inverter Assembly.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
INITIAL ADJUSTMENTS, BEFORE USE, AND SELF-TEST
LADS MODEL C**

INITIAL SETUP:

References

Personnel Required

- Shower/Laundry and Clothing Repair Specialist (2)
- Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

- Assembly and Preparation for Use (WP 0011) Complete

- TM 9-6115-644-10
- WP 0009
- WP 0014
- WP 0022
- WP 0023
- WP 0040
- WP 0041

INITIAL SYSTEM START-UP

WARNING

Operating personnel must be familiar with system operation, warnings, and emergency procedures prior to operating the LADS. Failure to operate this system properly can cause severe injury or death to yourself or other personnel working nearby. Seek immediate medical attention if injury occurs.

If any hazardous or unusual conditions are observed during operation, refer to WP 0022 to perform an emergency stop shutdown immediately.

1. Ensure all Before PMCS procedures have been completed (WP 0040).
2. Bring MEP-805A generator on-line (TM 9-6115-644-10) or apply external power as required.
3. Set generator output to 210 VAC, 60 HZ.
4. Verify EMERGENCY STOP switch is pulled out.

INITIAL SYSTEM START-UP-CONTINUED

NOTE

If indications displayed at main control enclosure or at operator panels are not as stated in the following procedures refer to WP 0023, Troubleshooting Index to determine the proper action to take.

If the control system detects a system failure the audible alarm will go on and off intermittently. Further operations may or may not be interrupted, depending on how critical the failure is. If this occurs the operator panel display (Figure 1 or Figure 2) will read:

In either case, refer to WP 0023, Troubleshooting Index to determine the proper action to take.

<p>SYSTEM SHUTDOWN</p> <p>XXXXXXXX FAILURE</p>	
---	--

Figure 1. System Shutdown Message.

or

<p>WASH CYCLE X IN PROGRESS WASH = XXX DRY = XXX FILL FROM WASH TANK XXXXXXXX FAILURE</p>	<p style="text-align: center;">PAUSE MODIFY TEMPS EXAMINE INPUTS</p>
--	---

Figure 2. Failure Message.

5. Position MAIN DISCONNECT switch to ON.
6. Verify MAIN POWER lamp is on,
7. Perform During PMCS items 1 and 2 (WP 0041).
8. Position CONTROL POWER switch to ON.

NOTE

The LADS contains a monitor that verifies correct electrical phasing with external power source. If phasing is not correct, CONTROL POWER lamp will not come on, with CONTROL POWER switch in ON position.

9. Verify CONTROL POWER Lamp is on.
10. Verify POWER lamps are on at operator panels A and B.

INITIAL SYSTEM START-UP-CONTINUED

11. Monitor display at operator panel A, it should read as Figure 3 then Figure 4:

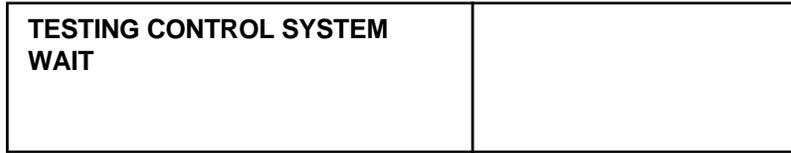


Figure 3. Testing Control System Display.



Figure 4. Press to Start Display.

END OF TASK

PRESSURIZE AIR SYSTEM

CAUTION

When pressurizing the air system the drum air bags will begin to inflate. If drum stowage pins could not be removed previously, ensure they are removed at this time. Attempting to inflate the air bags fully with the pins installed will result in damage to the air bags, pins, and drum structure

1. Press MENU SELECTION switch to start operation.
2. Monitor display (Figure 5), it should read:



Figure 5. Testing Air System Display.

3. Perform During PMCS item 3 (WP 0041).

PRESSURIZE AIR SYSTEM-CONTINUED

4. Wait about 15-20 minutes for air system to pressurize then monitor display (Figure 6), it should read:

<p>WATER LEVEL LOW</p>	<p>FILL TANKS OVERRIDE FILLING FLUSH TANKS/DRUM EXAMINE INPUTS</p>
-------------------------------	---

Figure 6. Fill Tanks Menu.

END OF TASK

PRIME WATER SUPPLY

1. Check rotation and prime water supply pump.

END OF TASK

FILL WATER TANKS

NOTE

For continuous laundry operations, always start with full water tanks for both systems. If a laundry cycle is started without enough water in the tanks the laundry cycle will be interrupted.

1. Press MENU SELECTION switch to start water filling.
2. Monitor display (Figure 7), it should read.

<p>FILLING WATER TANKS</p>	<p>OVERRIDE FILLING EXAMINE INPUTS</p>
-----------------------------------	---

Figure 7. Filling Tanks Display.

END OF TASK

PRIME FUEL SUPPLY AND HEAT RINSE 2 TANK

1. Wait about 15 minutes for tanks to fill then monitor display (Figure 8), it should read:

<p>SET WATER TEMPERATURE SETPNT= XXX F</p>	<p>MODIFY SETPOINT HEAT WATER OVERRIDE HEATING EXAMINE INPUTS</p>
---	--

Figure 8. Water Heating Menu.

PRIME FUEL SUPPLY AND HEAT RINSE 2 TANK-CONTINUED**WARNING**

When priming fuel supply, reading at burner pressure gauge must be at "ZERO". If pressure at this gauge increases when the "PRIME PUMP" switch is on, STOP the priming operation and notify Unit Maintenance. Attempting to start the heater with excess fuel in the combustion chamber may cause vapors and liquids to ignite or explode resulting in death or serious personal injury. Seek medical attention if injury occurs.

2. Prime fuel supply to heater as follows:
 - a. Lift and hold PRIME PUMP switch (WP 0009, Figure 5).
 - b. Observe reading on pressure gauge (WP 0009, Figure 5).
 - c. Release switch (WP 0009, Figure 5) when pressure gauge (WP 0009, Figure 5) remains steady at 135 psi or higher for a continuous 120 second period.
3. Proceed to WP 0014, Operating Procedures, System Start-up, step 19 to complete water heating.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
INITIAL ADJUSTMENTS, BEFORE USE, AND SELF-TEST
LADS MODEL D**

INITIAL SETUP:

	References
Personnel Required	TM 9-6115-644-10
Shower/Laundry and Clothing Repair Specialists (2)	WP 0022
Shower/Laundry and Clothing Repair Supervisor (1)	WP 0024
Equipment Conditions	WP 0040
Assembly and Preparation for Use Complete (WP 0011)	WP 0041

INITIAL SYSTEM START-UP**WARNING**

Operating personnel must be familiar with system operation, warnings, and emergency procedures prior to operating the LADS. Failure to operate this system properly can cause severe injury or death to yourself or other personnel working nearby. Seek immediate medical attention if injury occurs.

If any hazardous or unusual conditions are observed during operation, refer to WP 0022 to perform an emergency stop shutdown immediately.

1. Ensure all Before PMCS procedures have been completed (WP 0040).
2. Bring MEP-805A generator on-line (TM 9-6115-644-10) or apply external power as required.
3. Set generator output to 210 VAC, 60 HZ.
4. Verify EMERGENCY STOP switch is pulled out.
5. Position MAIN DISCONNECT switch to ON.
6. Verify MAIN POWER lamp is on,
7. Perform During PMCS items 1 and 2 (WP 0041).
8. Position CONTROL POWER switch to ON.

NOTE

The LADS contains a monitor that verifies correct electrical phasing with external power source. If phasing is not correct, CONTROL POWER lamp will not come on, with CONTROL POWER switch in ON position.

9. Verify CONTROL POWER LAMP is on.

INITIAL SYSTEM STARTUP-CONTINUED

NOTE

If indications displayed at touchscreen are not as stated in the following procedures refer to WP 0024, Troubleshooting Procedures to determine the proper action to take.

If the control system detects a system failure the audible alarm will go on and off intermittently. Further operations may or may not be interrupted, depending on the nature of the fault. If this occurs touchscreen will display the following (Figure 1). Refer to WP 0024, Troubleshooting Procedures to determine the proper action to take.



Figure 1. Alarm Message Display.

10. Monitor touchscreen (Figure 2). System will take approximately 30-40 seconds to boot up to START MENU.



Figure 2. Start Menu Initialization.

11. Press UTILITY OPERATION on touchscreen (Figure 2). UTILITY OPERATION MENU will be displayed (Figure 3) and air compressor will automatically start if system senses low air pressure.

INITIAL ADJUSTMENTS BEFORE USE AND SELF TEST-CONTINUED

Initial System Startup-Continued

NOTE

Only AIR SYSTEM STATUS, USE UTILITY HOSE, and RETURN will be selectable on touchscreen, until air pressure in system reaches 80 psi.

12. Press AIR SYSTEM STATUS on touchscreen (Figure 3) and verify display advances to START AIR SYSTEM screen (Figure 4).

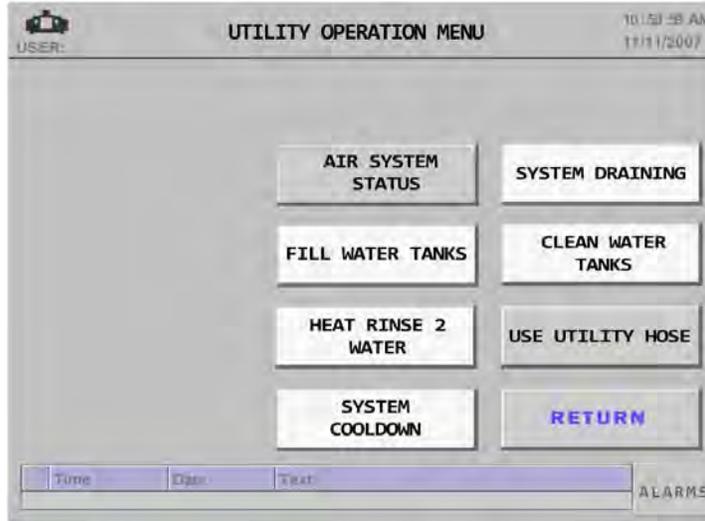


Figure 3. Utility Operations Menu.

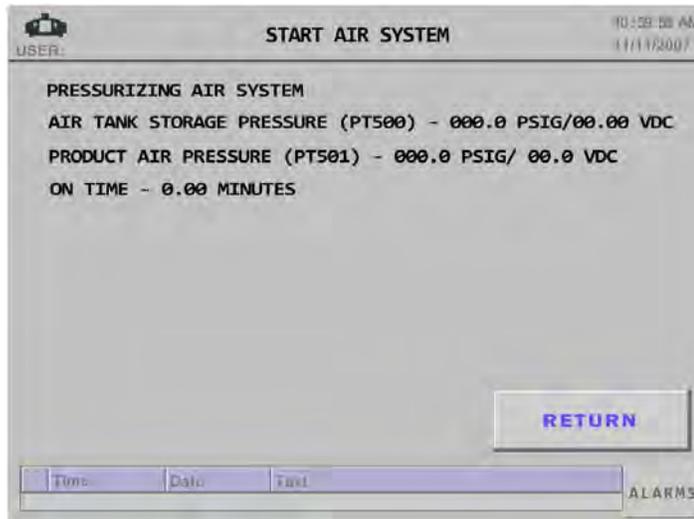


Figure 4. Start Air System.

INITIAL SYSTEM STARTUP-CONTINUED

13. Once air system has pressurized verify touchscreen displays the message READY TO PERFORM UTILITY OPERATIONS (Figure 5). Press RETURN to go to UTILITY OPERATION MENU.



Figure 5. Ready to Perform Utility Operations.

NOTE

For continuous laundry operations, always start with full water tanks for both systems. If a laundry cycle is started without enough water in the tanks the laundry cycle will be interrupted.

14. Check rotation and prime water supply pump as follows:
- Press USE UTILITY HOSE on touchscreen (Figure 6).
 - Press START WATER PUMP on touchscreen (Figure 7).
 - Unplug electrical cable or position water supply pump power switch to off.
 - When pump starts to slow down check rotation of fan on pump motor and ensure it is rotating same direction as pump direction arrow.
 - Plug electrical cable back into water supply pump or position power switch back to on.
 - Press STOP WATER PUMP then press RETURN.
 - Press RETURN to return to UTILITY OPERATION MENU.

INITIAL SYSTEM STARTUP-CONTINUED

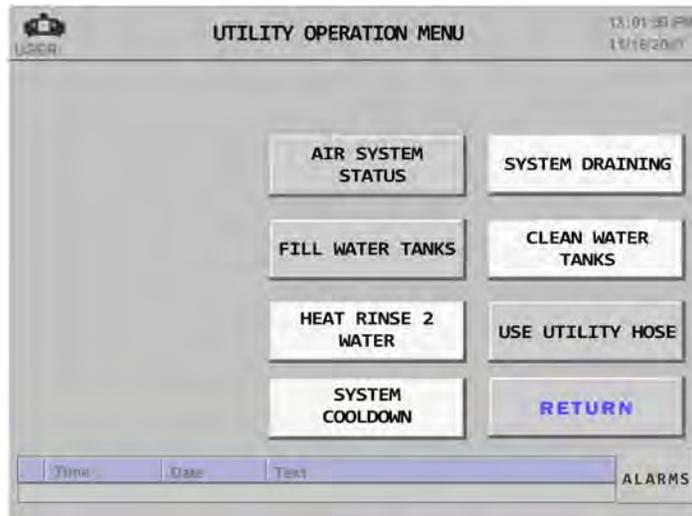


Figure 6. Utility Operation Menu Fill Water Tanks.



Figure 7. Use Utility Hose Screen.

15. Press FILL WATER TANKS on touchscreen (Figure 6).

INITIAL SYSTEM STARTUP-CONTINUED

NOTE

Water tanks take between 10-15 minutes to fill. At any point in filling cycle **VERRIDE FILLING** can be selected on touchscreen to stop filling process and return to **UTILITY OPERATION MENU**.

- 16. Observe touchscreen and verify **FILL WATER TANKS MODE** screen is displayed (Figure 8).

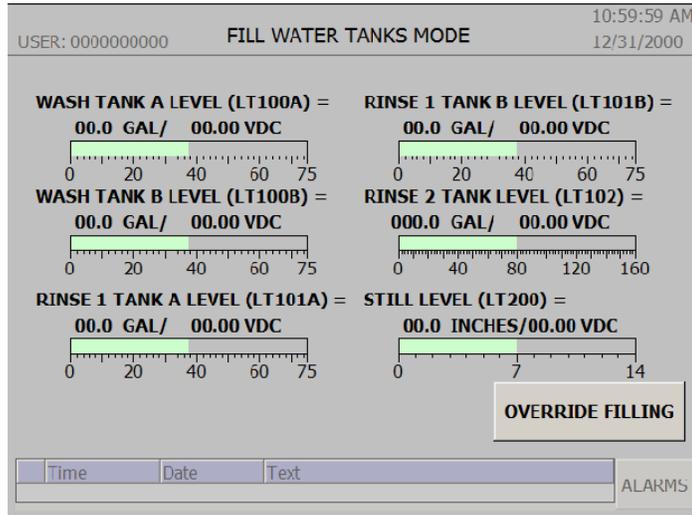


Figure 8. Fill Water Tanks Mode Screen.

- 17. Verify touchscreen has returned to **UTILITY OPERATION MENU** once water tanks are full.
- 18. If water heating is desired press **HEAT RINSE 2 WATER** (Figure 9).

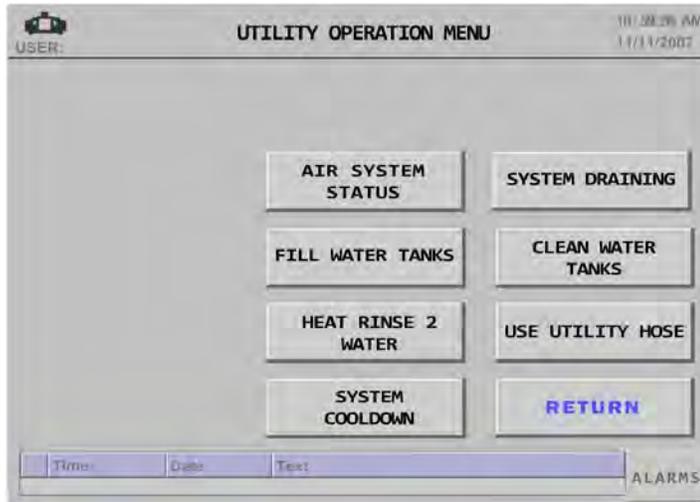


Figure 9. Heat Rinse 2 Water.

INITIAL SYSTEM STARTUP-CONTINUED

NOTE

Set temperature arrows will change temperature in 5 degree increments, alternately, touching the temperature display box will display a keypad onscreen that can be used to set desired temperature in 1 degree increments.

Setting temperature above or below allowable range of 70–160 °F will cause the temperature to return to the default value of 150 °F

19. Select desired temperature (Figure 10).

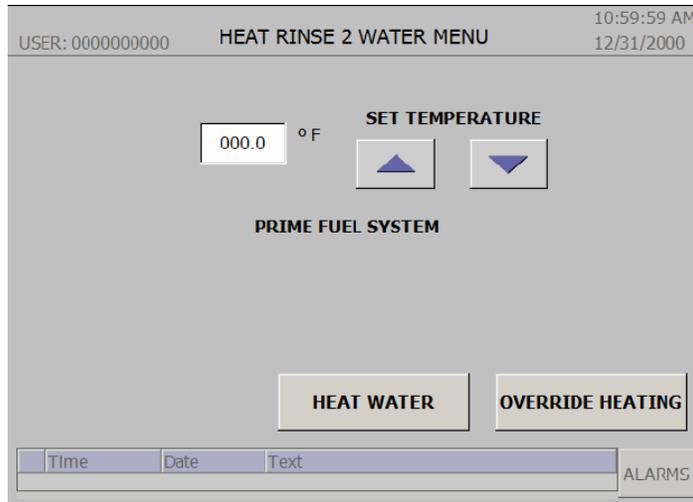


Figure 10. Heat Rinse 2 Set Temperature Screen.

NOTE

OVERRIDE HEATING can be selected at any time during cycle to discontinue heating process and return to UTILITY OPERATION MENU.

After water heating is complete, only the rinse 2 tank will have hot water. Water in the other tanks will be heated after two laundry cycles are completed.

20. Once desired temperature is set, press HEAT WATER (Figure 10).
21. Observe touchscreen and verify the following screens (Figures 11 through 15) display in succession as HEAT RINSE 2 WATER cycle progresses.

INITIAL SYSTEM STARTUP-CONTINUED

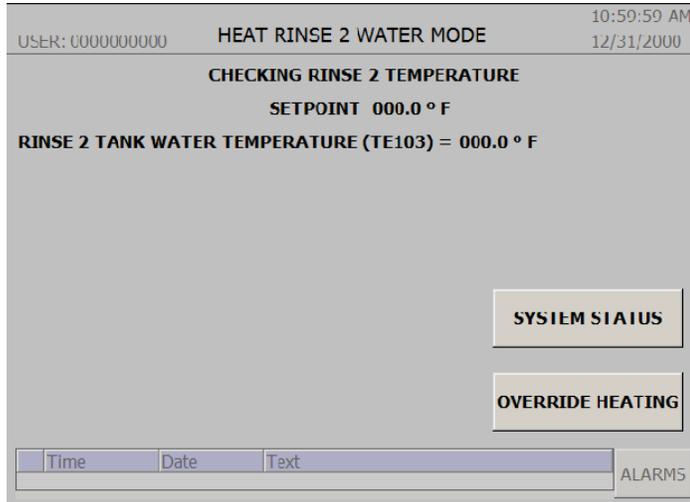


Figure 11. Checking Rinse 2 Temperature.

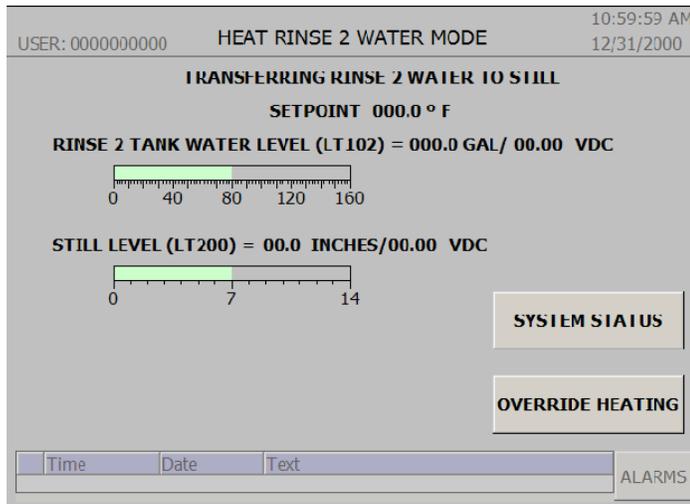


Figure 12. Transferring Rinse 2 Water to Still.

INITIAL SYSTEM STARTUP-CONTINUED

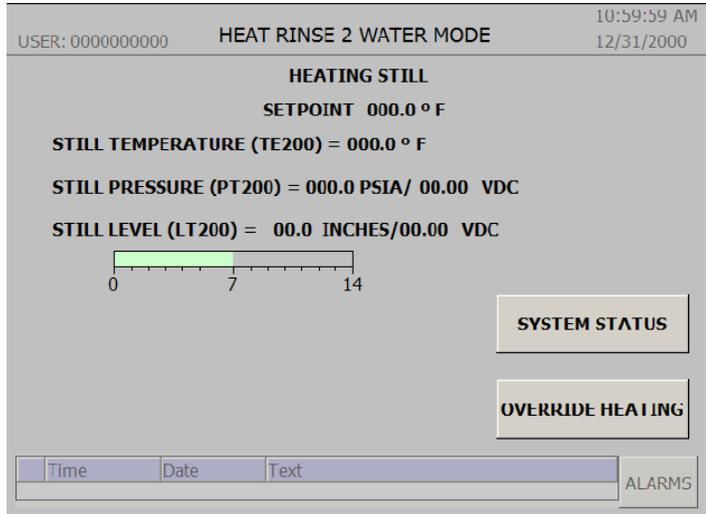


Figure 13. Heating Still.

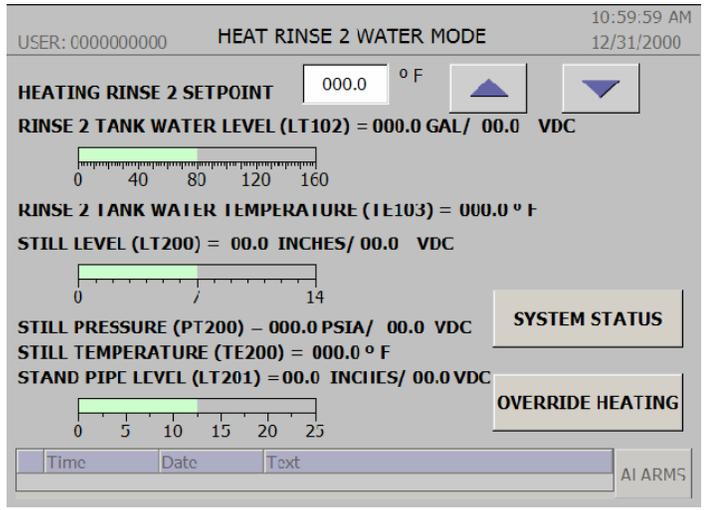


Figure 14. Heating Rinse 2 Setpoint.

INITIAL SYSTEM STARTUP-CONTINUED

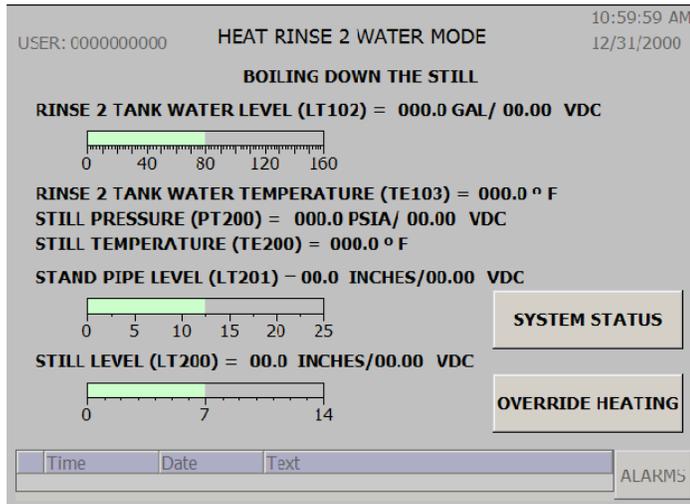


Figure 15. Boiling Down the Still.

22. Verify touchscreen shows Heat Rinse Water cycle is complete (Figure 16).

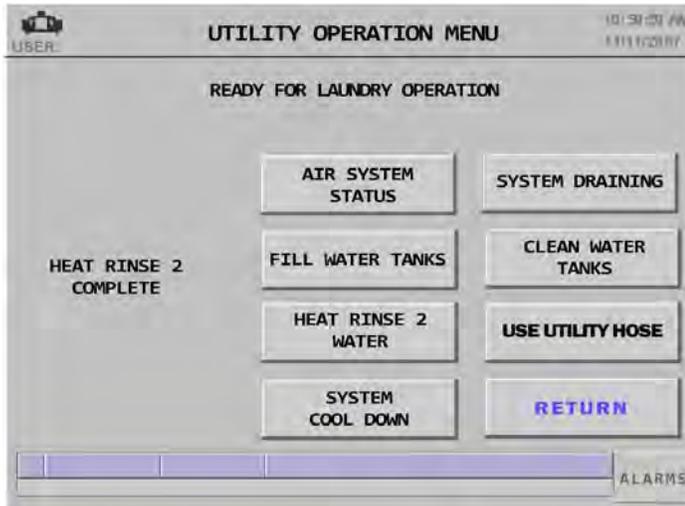


Figure 16. Heat Rinse 2 Cycle Complete.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
OPERATION PROCEDURES
LADS MODEL C**

INITIAL SETUP:

References

Materials/Parts

- Anti Foam (WP 0068, Table 1)
- Detergent (WP 0068, Table 1)

Personnel Required

- Shower/Laundry and Clothing Repair Specialists (2)
- Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

- Assembly and Preparation for Use (WP 0011) Complete

- TM 9-6115-644-10
- WP 0009
- WP 0016
- WP 0022
- WP 0023
- WP 0025
- WP 0040
- WP 0041
- WP 0042
- WP 0048
- WP 0069

SYSTEM STARTUP

WARNING

Operating personnel must be familiar with system operation, warnings, and emergency procedures prior to operating the LADS. Failure to operate this system properly can cause severe injury or death to yourself or other personnel working nearby. Seek immediate medical attention if injury occurs.

If any hazardous or unusual conditions are observed during operation, refer to WP 0022 to perform an emergency stop shutdown immediately.

1. Ensure all Before PMCS procedures have been completed (WP 0040).
2. Bring MEP-805A generator on-line or apply external power as required.
3. Set generator output to 210 VAC, 60 HZ.
4. Verify EMERGENCY STOP switch (WP 0009, Figure 1) is pulled out.

SYSTEM STARTUP-CONTINUED

NOTE

If indications displayed at main control enclosure or at operator panels are not as stated in the following procedures refer to WP 0023, Troubleshooting Index to determine the proper action to take.

If the control system detects a system failure the audible alarm will go on and off intermittently. Further operations may or may not be interrupted, depending on how critical the failure is. If this occurs the operator panel display will look like either Figure 1 or Figure 2.

In either case, refer to WP 0023, Troubleshooting Index to determine the proper action to take.

<p>SYSTEM SHUTDOWN</p> <p>XXXXXXXX FAILURE</p>	
---	--

Figure 1. System Shutdown Message.

or

<p>WASH CYCLE X IN PROGRESS WASH = XXX DRY = XXX FILL FROM WASH TANK XXXXXXXX FAILURE</p>	<p style="text-align: center;">PAUSE MODIFY TEMPS</p> <p style="text-align: center;">EXAMINE INPUTS</p>
--	---

Figure 2. Failure Message.

5. Position MAIN DISCONNECT switch to ON.
6. Perform DURING PMCS items 1 and 2 (WP 0041).
7. Position CONTROL POWER switch to ON.
8. Verify POWER lamps are on at operator panels A and B.

SYSTEM STARTUP-CONTINUED

9. Monitor display at operator panel A, it should read as Figure 3 then Figure 4.

<p>TESTING CONTROL SYSTEM WAIT</p>	
---	--

Figure 3. Testing Control System Display.

	<p>PRESS TO START</p>
--	------------------------------

Figure 4. Press to Start Display.

10. Press MENU SELECTION switch to start operation.

11. Monitor display (Figure 5), it should read:

<p>TESTING AIR SYSTEM AIR TANK PRESS=XXX PSIG WAIT</p>	
---	--

Figure 5. Testing Air System Display.

12. Perform During PMCS item 3 (WP 0041).

13. Wait for air system to pressurize then monitor display (Figure 6) or (Figure 7), it should read:

<p>WATER LEVEL LOW</p>	<p>FILL TANKS OVERRIDE FILLING EXAMINE INPUTS</p>
-------------------------------	---

Figure 6. Fill Tanks Menu.

<p>SET WATER TEMPERATURE SETPNT = XXX F</p>	<p>MODIFY SETPOINT HEAT WATER OVERRIDE HEATING EXAMINE INPUTS</p>
--	--

Figure 7. Water Heating Menu.

SYSTEM STARTUP-CONTINUED

If WATER LEVEL LOW is displayed, continue to step 14, otherwise proceed to step 17.

NOTE

For continuous laundry operations, always start with full water tanks for both systems. If a laundry cycle is started without enough water in the tanks, the laundry cycle will be interrupted.

If the LADS operation is stopped while in progress, OVERRIDE FILLING should be selected when system is restarted. Selecting the FILL TANKS option will result in excess water being added to the water tanks.

- 14. Press MENU SELECTION switch as follows:
 - a. Select FILL TANKS to fill all water tanks to proper level. Proceed to step 15.
 - b. Select OVERRIDE FILLING to bypass water filling. Proceed to step 17.

15. Monitor display (Figure 8), it should read:

<p>FILLING WATER TANKS</p>	<p>OVERRIDE FILLING EXAMINE INPUTS</p>
-----------------------------------	--

Figure 8. Filling Water Tanks Display.

16. Wait about 10-15 minutes for tanks to fill then proceed to step 17.

17. Monitor display (Figure 9), it should read:

<p>SET WATER TEMPERATURE SETPNT= XXX F</p>	<p>MODIFY SETPOINT HEAT WATER OVERRIDE HEATING EXAMINE INPUTS</p>
--	---

Figure 9. Water Heating Menu.

SYSTEM STARTUP-CONTINUED

WARNING



When priming fuel supply, reading at burner pressure gauge must be at “ZERO”. If pressure at this gauge increases when the “PRIME PUMP” switch is on, STOP the priming operation and notify Unit Maintenance. Attempting to start the heater with excess fuel in the combustion chamber may cause vapors and liquids to ignite or explode resulting in death or serious personal injury. Seek immediate medical attention if injury occurs.

18. Prime fuel supply to heater as follows:
 - a. Lift and hold PRIME PUMP switch (WP 0009, Figure 4).
 - b. Observe reading on pressure gauge (WP 0009, Figure 4).
 - c. Release switch (WP 0009, Figure 4) when pressure gauge (WP 0009, Figure 4) remains steady at 135 psi or higher for a continuous 30 second period.

19. Press MENU SELECTION switch as follows:
 - a. Select MODIFY SETPOINT to change displayed setpoint in 5 degree increments until desired setpoint is displayed. Continue to step 19b.
 - b. Select HEAT WATER to heat rinse 2 tank. Continue to step 20.
 - c. Select OVERRIDE HEATING to bypass rinse 2 tank heating. Proceed to **Load Laundry**.

20. Monitor display (Figure 10), it should read:

<p>HEATING WATER SETPNT= XXX F TEMP = XXX F</p>	<p>MODIFY SETPOINT</p>
<p>HEATING RINSE 2</p>	<p>EXAMINE INPUTS</p>

Figure 10. Heating Water Screen.

NOTE

After water heating is complete, only the rinse 2 tank will have hot water. Water in the other tanks can be heated by continuing with this procedure or laundry operations can be started if desired. If laundry operations are started all tanks will be heated after two laundry cycles are completed.

21. Wait 30-40 minutes for rinse 2 tank to heat-up. If hot water is desired in all tanks continue to step 23, otherwise proceed to Load Laundry.

SYSTEM STARTUP-CONTINUED

NOTE

The following procedures need to be performed at operator panel A to heat water for drum A and at operator panel B to heat water for drum B.

Selecting CLEAN/HEAT WASH TANK cycle once will move the hot rinse 2 water to the rinse 1 tank. Selecting CLEAN/HEAT WASH TANK a second time will move the hot rinse 1 water to the wash tank.

Once the CLEAN/HEAT WASH TANK cycle is started for one drum the other operator panel will be forced into STAGGERING cycles mode. Operation at that panel will not be allowed until the cycle for the other drum is completed.

22. At operator panel A monitor display (Figure 11) it should read:

<p>WASH CYCLE X WASH= XXX F DRY= XXX F SELECT CYCLE, TEMP, START</p>	<p>SELECT CYCLE MODIFY TEMPS START CYCLE EXAMINE INPUTS</p>
--	--

Figure 11. Select Cycle Menu.

23. Press SELECT CYCLE switch to toggle through available cycles until CLEAN/HEAT WASH TANK is displayed.

24. Monitor display (Figure 12), it should read:

<p>CLEAN/HEAT WASH TANK WASH= XXX F DRY= XXX F SELECT CYCLE, TEMP, START</p>	<p>SELECT CYCLE MODIFY TEMPS START CYCLE EXAMINE INPUTS</p>
--	--

Figure 12. Clean/Heat Wash Tanks Menu.

25. Press START CYCLE to start heating water for drum A rinse 1 tank.

26. When audible alarm sounds press SILENCE ALARM switch.

27. Monitor display (Figure 13), it should read:

<p>WASH CYCLE X IN PROGRESS WASH= XXX F DRY= XXX F DRAIN TO STILL ADD ANTI FOAM</p>	<p>PAUSE EXAMINE INPUTS</p>
---	---

Figure 13. Add Anti-Foam Display.

SYSTEM STARTUP-CONTINUED

28. Add one stroke of anti-foam with hand pump (Figure 14, Item 1).
29. Wait for cycle to be completed. When audible alarm sounds press SILENCE ALARM switch.
30. Perform steps 23 through 29 for drum B rinse 1 tank.
31. Perform steps 23 through 29 for drum A wash tank.
32. Perform steps 23 through 29 for drum B wash 1 tank.
33. Continue to **Load Laundry** after water heating is completed.

END OF TASK**Load Laundry****CAUTION**

Never load more than 200 lbs or less than 50 lbs of laundry into one drum. Excessive or undersized loads can cause stress to drum structure and drive components leading to premature failure.

Only use the detergent specified in this manual. Never add more than 1 ounce of detergent per load. Use of the wrong detergent or too much detergent can cause excessive sudsing, overflowing of tanks, and still boil-overs.

Never use chlorine bleach in the LADS. If chlorine bleach enters the still, hydrochloric acid will be produced, causing rapid deterioration of the still, still condenser, and condensate plumbing.

1. Pull out on handle (Figure 14, Item 3) and open drum door (Figure 14, Item 2).
2. Add 1 ounce (stroke) of detergent onto any bag of laundry being loaded.
3. Load laundry bags. Refer to WP 0069 for guidance on properly loading laundry bags and drum.
4. Make sure laundry is clear of door (Figure 14, Item 2).
5. Close drum door (Figure 14, Item 2) then push in on handle (Figure 14, Item 3) to lock door.
6. Proceed to **Select and Start Laundry Cycle**.

SYSTEM STARTUP-CONTINUED

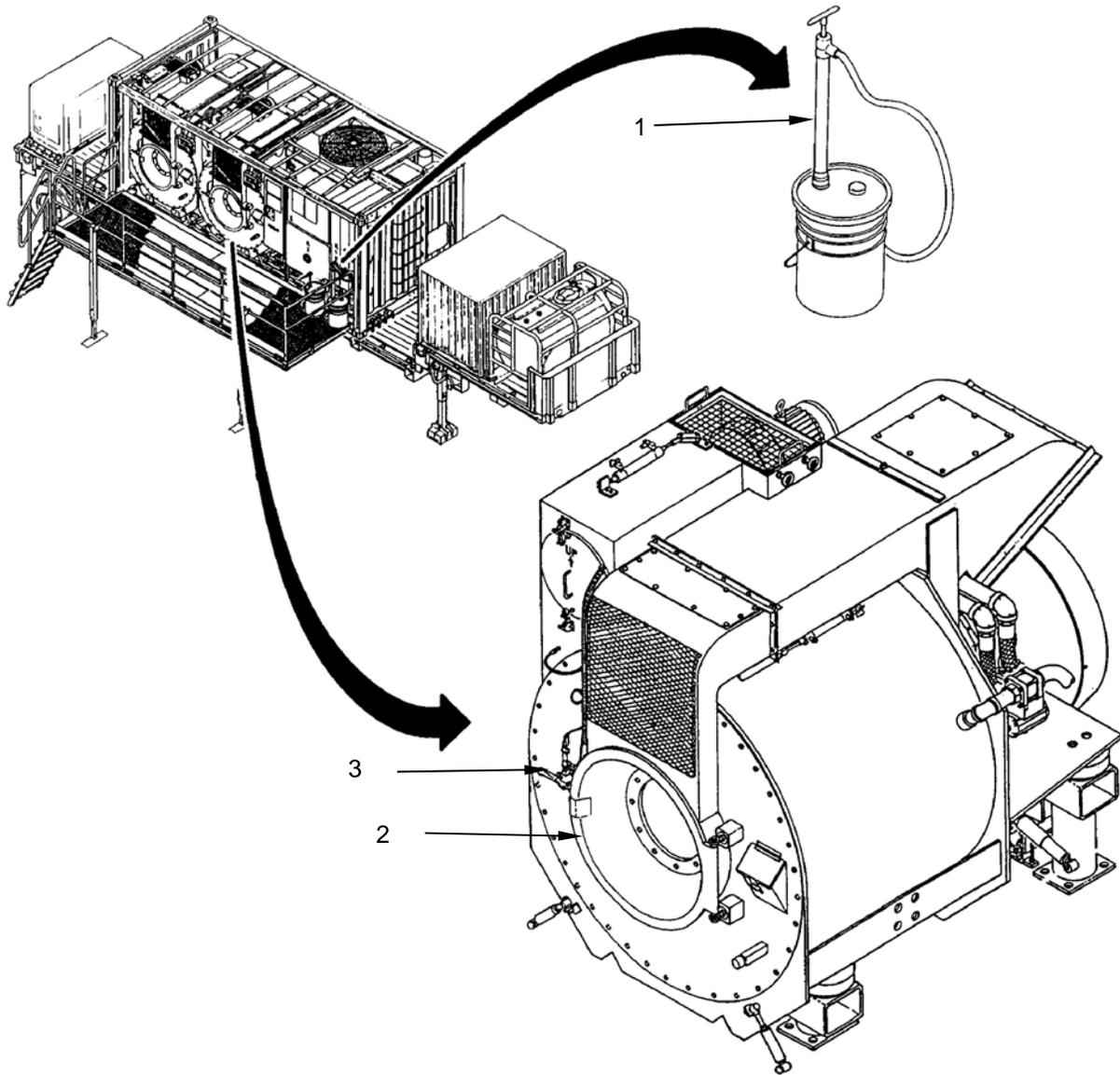


Figure 14. Drum Assembly and Anti-Foam Container.

SELECT AND START LAUNDRY CYCLE

NOTE

The following procedures are performed at operator panel A for drum A and operator panel B for drum B.

If one drum is already operating the operating panel for the second drum will read STAGGERING CYCLES. The laundry menu will appear for the second drum as soon as the first drum reaches the DRAIN TO RINSE 1 TANK step. This typically occurs 18-20 minutes after the first cycle is started.

During continuous laundry operations, review WP 0041, PMCS During Operation after each cycle and at shift change. Perform actions as indicated.

1. Monitor display (Figure 15), it should read:

<p>WASH CYCLE X WASH= XXX F DRY= XXX F SELECT CYCLE, TEMP, START</p>	<p>SELECT CYCLE MODIFY TEMPS START CYCLE EXAMINE INPUTS</p>
---	--

Figure 15. Start Cycle Menu.

CAUTION

Laundering small loads at higher dryer temperatures may lead to material shrinkage. Utilize lower dryer temperatures when full loads are not being laundered.

2. Press MENU SELECTION switch as follows:
 - a. Select SELECT CYCLE to toggle to next available cycle until desired laundry cycle is displayed.
 - b. Select MODIFY TEMPS to change displayed washing or drying temperature. Proceed to step 3.
 - c. Select START CYCLE to start laundry cycle. Proceed to **Laundry Cycle Operation**.
3. Monitor display (Figure 16), it should read:

<p>WASH CYCLE X WASH= XXX F DRY= XXX F SELECT CYCLE, TEMP, START</p>	<p>MODIFY WASH TEMP MODIFY DRY TEMP RETURN</p>
---	---

Figure 16. Modify Wash and Dry Temperature Menu.

SELECT AND START LAUNDRY CYCLE-CONTINUED**NOTE**

If wash temperature setpoint is changed, water temperature for systems A and B will change. If dry temperature setpoint is changed only the system where change was made will be affected.

Changes made to wash temperatures will return to the default setpoint when control power is removed from the LADS and reapplied.

Temperature of water used during a laundry cycle will not change to modified wash temperature until 3 laundry cycles after the change was selected.

Changes made to dry temperature will return to the default setpoint after the laundry cycle is completed.

4. Press MENU SELECTION switch as follows:
 - a. Select MODIFY WASH TEMP to change displayed setpoint in 5 degree increments until desired setpoint is displayed.
 - b. Select MODIFY DRY TEMP to change displayed setpoint in 5 degree increments until desired setpoint is displayed.
 - c. Select RETURN to accept changed setpoints. Return to step 2.

END OF TASK

LAUNDRY CYCLE OPERATION

NOTE

A typical laundry cycle lasts 65-75 minutes. Once a laundry cycle starts, operation is automatic until the cycle is complete. When a continuous audible alarm sounds, this indicates that some type of operator action is required or the cycle is complete.

If a laundry cycle must be interrupted during operation follow the guidelines in WP 0025, Introduction to Troubleshooting for proper procedures for pausing.

To prevent still boil-overs, the control system will attempt to limit the still water level. This is done by not switching from the WASHING step to the DRAIN TO STILL until the still water level is low enough to accept the next drum load of water. This may result in the WASHING step being longer than the times listed for each cycle.

1. Monitor display (Figure 17 and Figure 18), it should read:

<p>WASH CYCLE X IN PROGRESS WASH= XXX F DRY= XXX F FILL FROM WASH TANK</p>	<p>PAUSE</p> <p>EXAMINE INPUTS</p>
---	--

Figure 17. Wash Cycle in Progress Display.

or

<p>WASH CYCLE X IN PROGRESS WASH= XXX F DRY= XXX F XFER SUPPLY WATER TO DRUM</p>	<p>PAUSE</p> <p>EXAMINE INPUTS</p>
---	--

Figure 18. Transfer Water to Drum Display.

2. Wait for laundry cycle to reach DRAIN TO STILL step.
3. When audible alarm sounds, press SILENCE ALARM switch.
4. Monitor display (Figure 19), it should read:

<p>WASH CYCLE X IN PROGRESS WASH= XXX F DRY= XXX F DRAIN TO STILL ADD ANTI-FOAM</p>	<p>PAUSE</p> <p>EXAMINE INPUTS</p>
--	--

Figure 19. Drain to Still Display.

5. Add one stroke of anti-foam with hand pump (Figure 14, Item 1).
6. If FRS or sanitizer needs to be added proceed to step 7, otherwise proceed to **Unload Laundry** to complete laundry cycle.
7. When audible alarm sounds, press SILENCE ALARM switch.

LAUNDRY CYCLE OPERATION-CONTINUED

8. Monitor display (Figure 20), it should read:

CYCLE PAUSED ADD FRS (or SANITIZER)	CONTINUE CYCLE
--	-----------------------

Figure 20. Add FRS or Sanitizer Display.

9. Unlock latch (Figure 21, Item 1) and open lid (Figure 21, Item 2).

10. Add FRS or sanitizer.

11. Close lid (Figure 21, Item 2) and engage latch (Figure 21, Item 1).

12. Press MENU SELECTION switch to continue cycle. Proceed to **Unload Laundry** to complete laundry cycle.

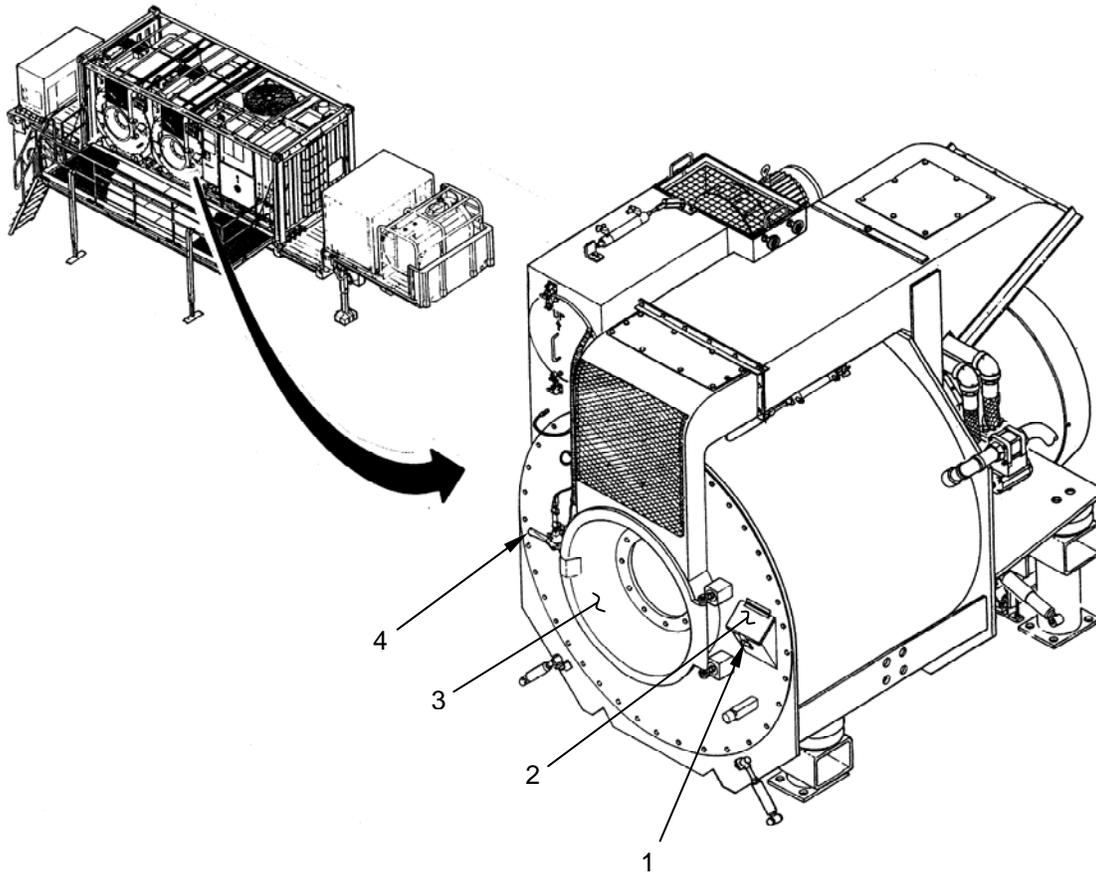


Figure 21. Laundry Drum.

END OF TASK

UNLOAD LAUNDRY**NOTE**

After laundry is unloaded it should be removed from the mesh bag as soon as possible. Laundry will be extremely wrinkled if left in mesh bags.

1. Wait for cycle to be completed. When audible alarm sounds, press SILENCE ALARM switch on operator panel.
2. Monitor display (Figure 22), it should read:



Figure 22. Unload Laundry Display.

3. Pull out on handle (Figure 21, Item 4) and open drum door (Figure 21, Item 3).
4. Unload laundry.
5. Clean lint filter (WP 0048).
6. Perform additional laundry operations. After last laundry load is completed proceed to **System Shutdown**.

END OF TASK

SYSTEM SHUTDOWN

This procedure describes steps required to perform a normal system shutdown after daily laundry operations have concluded. If the LADS needs to be drained to change the water for sanitary reasons, dirty water, prevent over-night freezing, or in preparation for movement, refer to WP 0016, Draining Procedures.

WARNING



Prior to removing power from the LADS a cooldown cycle must be run. This allows piping and system components to cool down to safe temperatures prior to performing AFTER PMCS procedures. Thermal fluid can reach temperatures near 400 ° F while the heating system is operating. Failure to perform the cooldown procedure could result in personnel being exposed to hot fluids and external surfaces causing severe injury or death. Seek immediate medical attention if injury occurs.

NOTE

Laundry cycle must be completed for system B before a cooldown cycle can be initiated.

1. Monitor display (Figure 23) at operator panel A, it should read:

<p>WASH CYCLE X WASH= XXXF DRY= XXXF SELECT CYCLE, TEMP, START</p>	<p>SELECT CYCLE MODIFY TEMPS START CYCLE</p>
---	---

Figure 23. Select Cycle Menu.

2. Press MENU SELECTION switch to toggle through available cycles until COOLDOWN CYCLE is displayed.
3. Press MENU SELECTION switch to start cooldown cycle.

NOTE

A normal cooldown lasts about 30 minutes. Once a cooldown cycle starts, operation is automatic until cycle is completed. When a continuous audible alarm sounds this indicates the cycle is complete.

4. Wait for cycle to be completed. When audible alarm sounds, press SILENCE ALARM switch on operator panel.
5. Monitor display (Figure 24), it should read:

<p>CYCLE COMPLETE PERFORM AFTER PMCS</p>	
---	--

Figure 24. Perform After PMCS Display.

6. Perform After PMCS (WP 0042).

SYSTEM SHUTDOWN-CONTINUED

7. Position CONTROL POWER switch to OFF.
8. Position MAIN DISCONNECT switch to OFF and apply lock-out.
9. Discontinue operation of MEP-805A generator (TM 9-6115-644-10) or remove external power as required.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
OPERATION PROCEDURES
LADS MODEL D**

INITIAL SETUP:**References****Materials/Parts**

Anti Foam (WP 0068, Table 1)

Detergent (WP 0068, Table 1)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (2)

Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

Assembly and Preparation for Use Complete (WP 0011)

TM 9-6115-644-10

WP 0017

WP 0022

WP 0024

WP 0026

WP 0040

WP 0041

WP 0042

WP 0048

WP 0069

SYSTEM STARTUP**WARNING**

Operating personnel must be familiar with system operation, warnings, and emergency procedures prior to operating the LADS. Failure to operate this system properly can cause severe injury or death to yourself or other personnel working nearby. Seek immediate medical attention if injury occurs.

If any hazardous or unusual conditions are observed during operation, refer to WP 0022 to perform an emergency stop shutdown immediately.

1. Ensure all Before PMCS procedures have been completed (WP 0040).
2. Bring MEP-805A generator (TM 9-6115-644-10) on-line or apply external power as required.
3. Set generator output to 210 VAC, 60 HZ.
4. Verify EMERGENCY STOP switch is pulled out.
5. Position MAIN DISCONNECT switch to ON.
6. Verify MAIN POWER lamp is on.
7. Perform DURING PMCS items 1 and 2 (WP 0041).
8. Position CONTROL POWER switch to ON.
9. Verify CONTROL POWER LAMP is on.

SYSTEM STARTUP-CONTINUED

NOTE

If indications displayed at touchscreen are not as stated in the following procedures refer to WP 0024, Troubleshooting Index, to determine the proper action to take.

If the control system detects a system failure the audible alarm will go on and off intermittently. Further operations may or may not be interrupted, depending on the nature of the fault. If this occurs touchscreen will display the alarm message as in Figure 1.



Figure 1. Alarm Message Displayed.

10. Wait for Control System to initialize (30-40 seconds) and START MENU to be displayed (Figure 2).



Figure 2. Start Menu Initialization Screen.

SYSTEM STARTUP-CONTINUED**NOTE**

LAUNDRY OPERATION button will be visible but not selectable until air pressure and water levels are sufficient to conduct laundry operations.

For continuous laundry operations, always start with full water tanks for both systems. If a laundry cycle is started without enough water in the tanks, the laundry cycle will be interrupted.

11. If air and water levels are not sufficient to start laundry operations, proceed to next step. If heating water is desired, proceed to step 19, otherwise proceed to Start Laundry Operations.
12. Press UTILITY OPERATION on touchscreen (Figure 2). UTILITY OPERATION MENU will be displayed (Figure 3) and air compressor will automatically start if system senses low air pressure.

NOTE

Until air pressure in system reaches 80 psi only AIR SYSTEM STATUS, USE UTILITY HOSE, and RETURN will be selectable on touchscreen.

13. Press AIR SYSTEM STATUS on touchscreen (Figure 3) and verify display advances to START AIR SYSTEM screen (Figure 4).

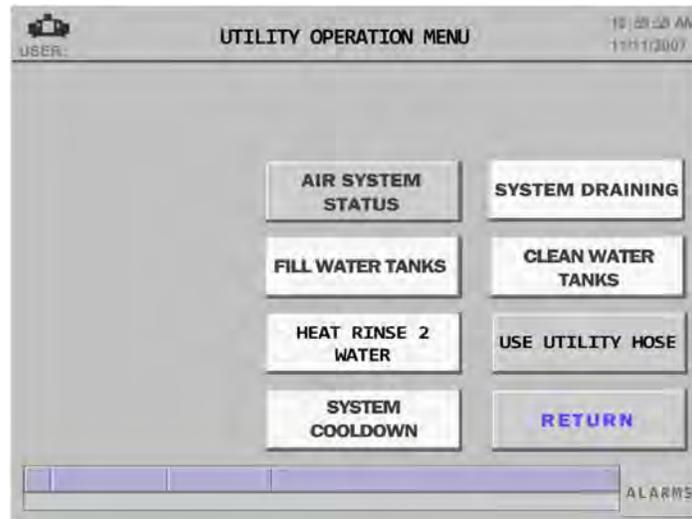


Figure 3. Utility Operations Menu Screen.

SYSTEM STARTUP-CONTINUED

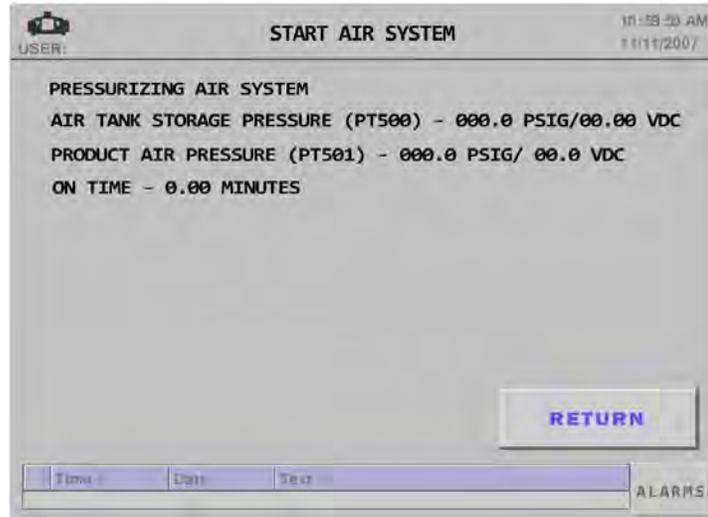


Figure 4. Start Air System Screen.

14. Perform During PMCS item 3 (WP 0041).

SYSTEM STARTUP-CONTINUED

NOTE

Once air system has pressurized touchscreen will display one of two messages. If water levels are too low to start laundry operations, only **READY TO PERFORM UTILITY OPERATIONS** will be displayed (Figure 5). If water levels are sufficient to start laundry operations then display will also show **READY TO PERFORM LAUNDRY OPERATIONS** (Figure 6).

- When prompted that system is ready, press RETURN (Figure 5) on touchscreen to return to UTILITY OPERATION MENU.



Figure 5. Ready to Perform Utility Operations Screen.

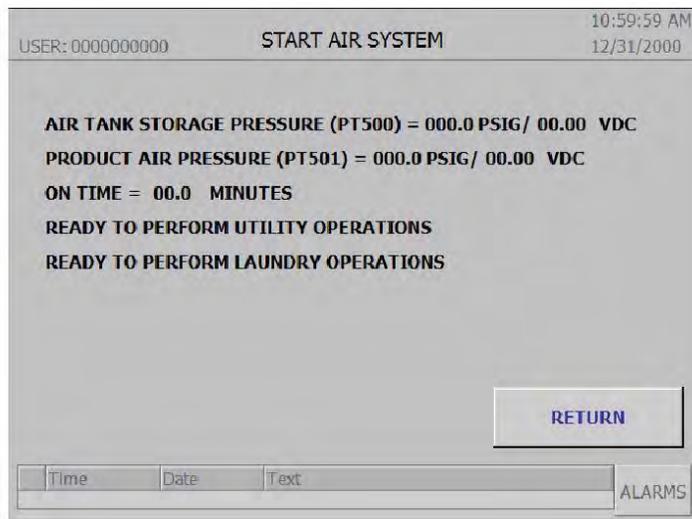


Figure 6. Ready to Perform Laundry Operations Screen.

SYSTEM STARTUP-CONTINUED

NOTE

At any point in filling cycle **OVERRIDE FILLING** can be selected to stop filling process and return to **UTILITY OPERATION MENU**.

16. Press **FILL WATER TANKS** on **UTILITY OPERATION MENU** (Figure 7).

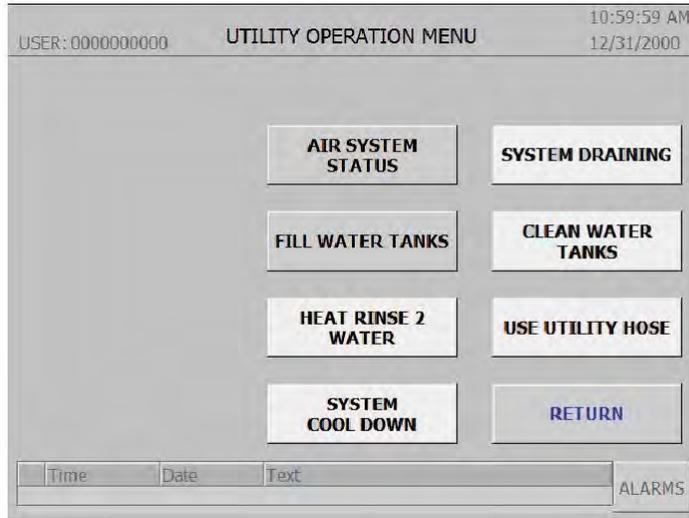


Figure 7. Utility Operations Menu, Fill Water Tanks.

17. Observe touchscreen and verify **FILL WATER TANKS MODE** screen is displayed (Figure 8).

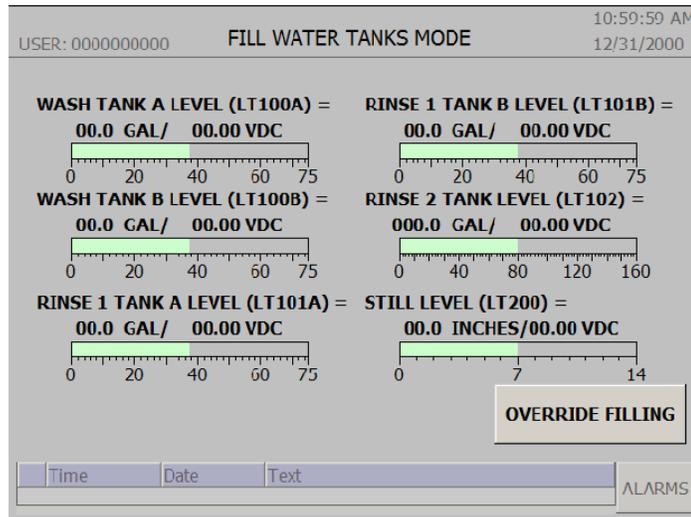


Figure 8. Fill Water Tanks Mode Screen.

SYSTEM STARTUP-CONTINUED**NOTE**

Water tanks take between 10-15 minutes to fill. Once filling has completed, touchscreen will automatically go back to UTILITY OPERATION MENU (Figure 9).

18. Verify touchscreen has returned to UTILITY OPERATION MENU and shows FILL WATER TANKS COMPLETE (Figure 9).

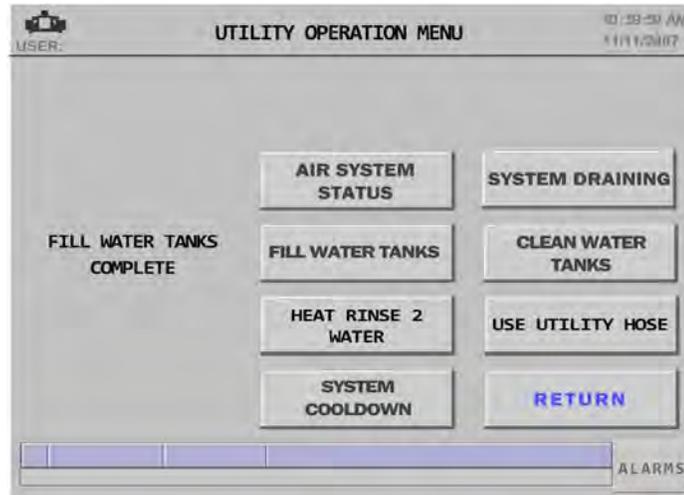


Figure 9. Fill Tanks Complete Screen.

19. If water heating is desired press HEAT RINSE 2 WATER (Figure 9) and proceed to next step. If water heating is not desired, press RETURN and proceed to Laundry Operations.

SYSTEM STARTUP-CONTINUED

NOTE

Pressing SET TEMPERATURE arrows will change temperature in 5 degree increments. Touching the temperature display box will display a keypad onscreen that can be used to set desired temperature in 1 degree increments.

Setting temperature above or below allowable range of 70-160 °F will cause the temperature to return to the default value of 150 °F.

20. Select desired temperature (Figure 10).

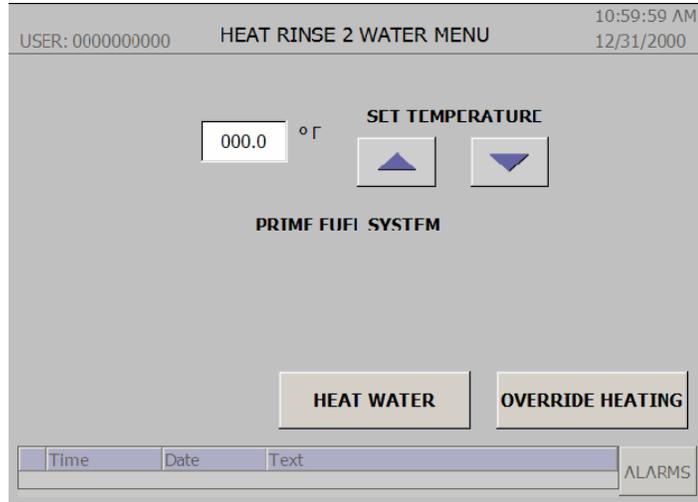


Figure 10. Heat Rinse 2 Water Menu.

NOTE

OVERRIDE HEATING can be selected at any time during cycle to discontinue heating process and return to UTILITY OPERATION MENU.

Rinse tank 2 water will take 30-45 minutes to heat-up. After water heating is complete, only the rinse 2 tank will have hot water. Tanks will be heated after two laundry cycles are completed.

21. Once desired temperature is set, press HEAT WATER (Figure 10).

SYSTEM STARTUP-CONTINUED

NOTE

During the first step of HEAT RINSE 2 WATER the control system will check the the temperature of the water in the Rinse 2 Tank and compare it to the set point. If the water temperature is within 20 °F of set point the control system will skip over the Heating Rinse 2 Water process and return to the UTILITY OPERATION MENU with the message WATER TEMPERATURE WITHIN RANGE, as shown in Figure 11.

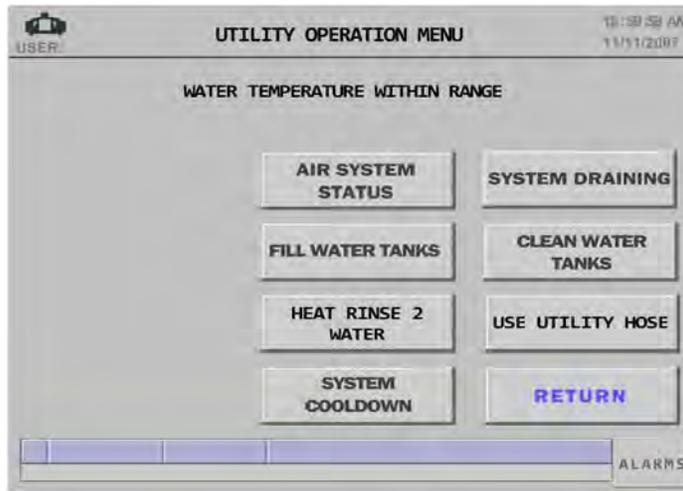


Figure 11. Water Temperature Within Range Message.

22. Observe touchscreen. The following screens (Figures 12 through 16) will display in succession as HEAT RINSE 2 WATER cycle progresses.

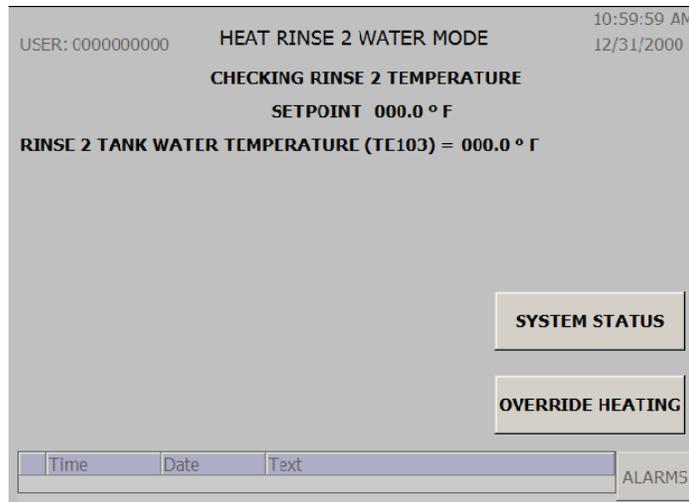


Figure 12. Checking Rinse 2 Temperature Screen.

SYSTEM STARTUP-CONTINUED

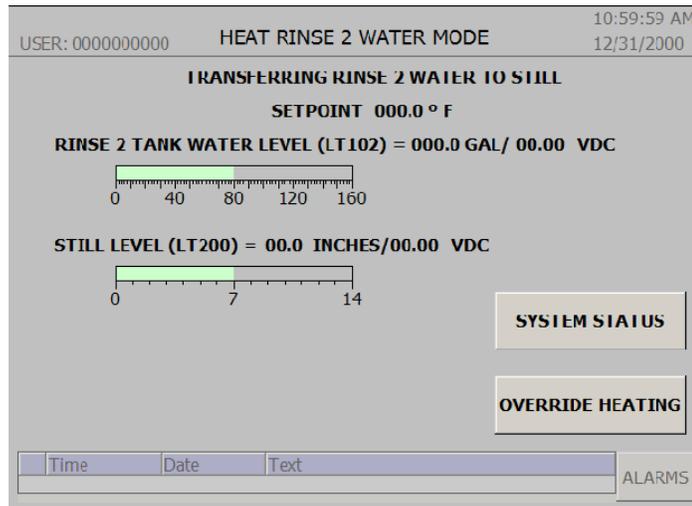


Figure 13. Transferring Rinse 2 Water to Still Screen.

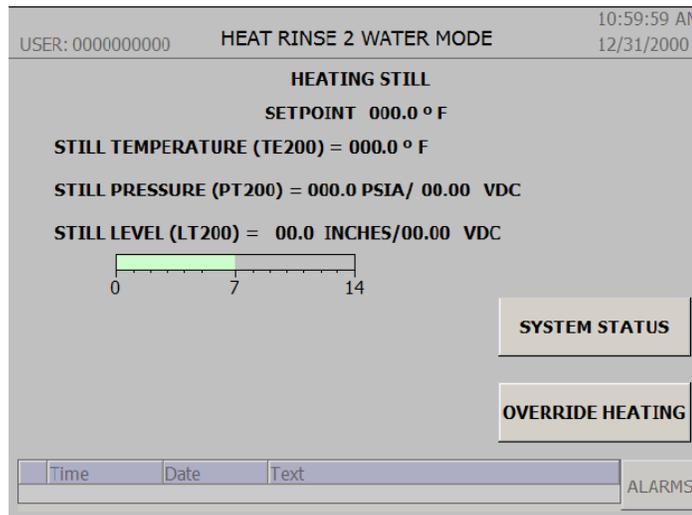


Figure 14. Heating Still Screen.

SYSTEM STARTUP-CONTINUED

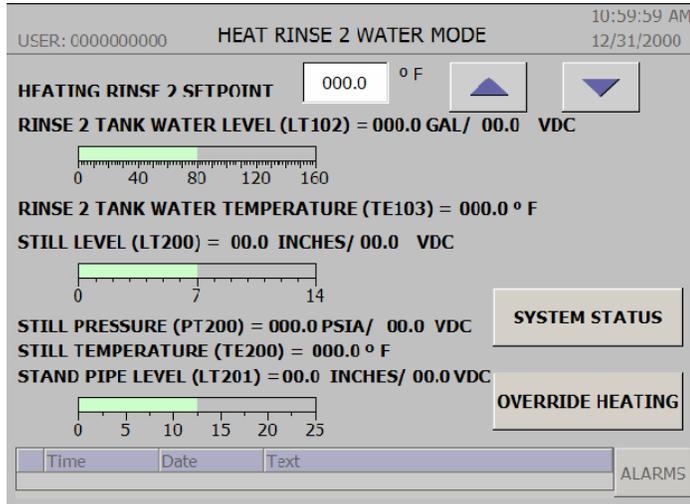


Figure 15. Heating Rinse 2 Water Screen.

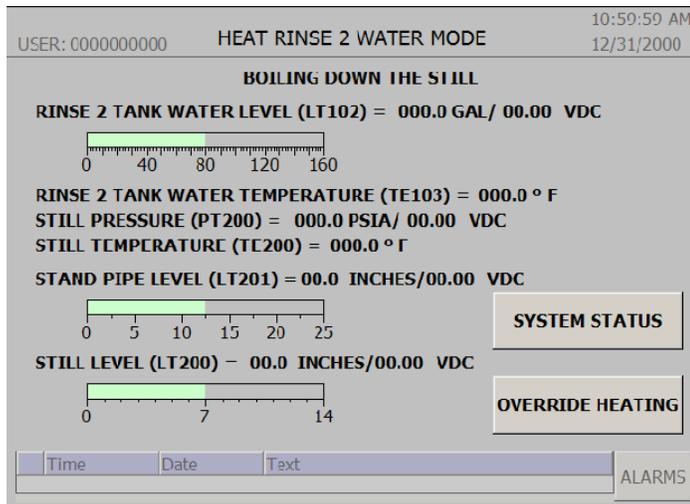


Figure 16. Boiling Down the Still Screen.

SYSTEM STARTUP-CONTINUED

23. Observe touchscreen. When HEAT RINSE 2 operation is complete touchscreen will display HEAT RINSE 2 COMPLETE and READY FOR LAUNDRY OPERATION screen (Figure 17). Proceed to Start Laundry Operation.

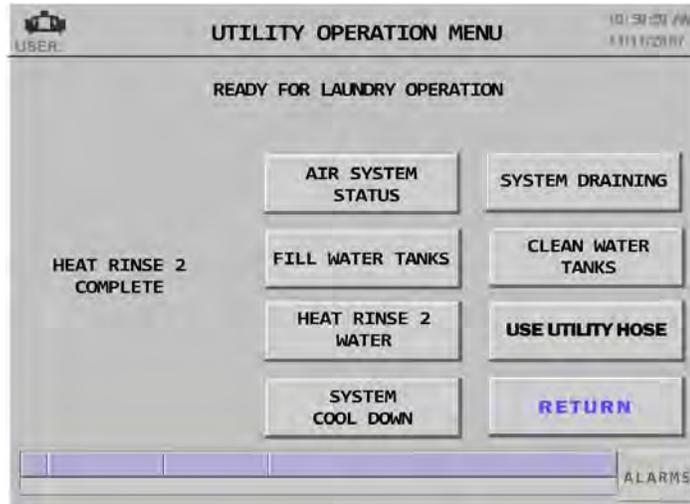


Figure 17. Heat Rinse 2 Complete Screen.

END OF TASK

START LAUNDRY OPERATION**NOTE**

If one drum is already operating and the other drum is selected the touchscreen will display STAGGERING CYCLES (Figure 18). The laundry menu will appear for the second drum as soon as the first drum reaches the DRAIN TO RINSE 1 TANK step. This typically occurs 18-20 minutes after the first cycle is started.

During continuous laundry operations refer to WP 0041, During PMCS after each cycle and at shift change. Perform actions as indicated.

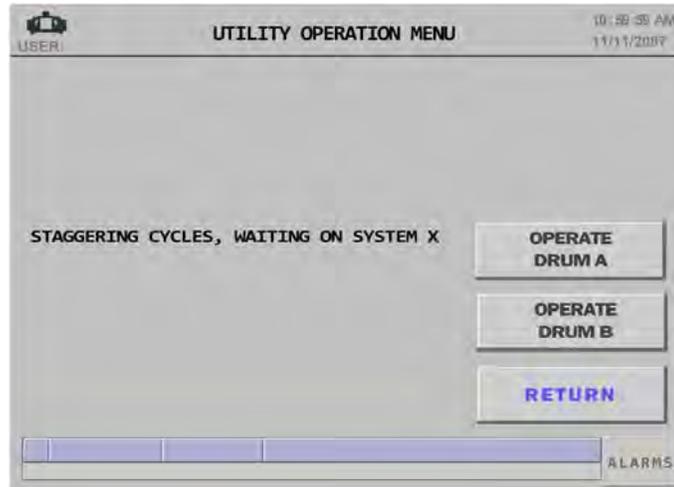


Figure 18. Staggering Cycles Screen.

1. Press RETURN to go to START MENU (Figure 19).



Figure 19. Start Menu Ready for Laundry Operation.

2. Press LAUNDRY OPERATION (Figure 19).

START LAUNDRY OPERATION -CONTINUED**NOTE**

After selecting OPERATE DRUM A or OPERATE DRUM B, condensor fan and heating system will automatically come on and remain on until LAUNDRY OPERATION MENU is exited.

3. Select OPERATE DRUM A or OPERATE DRUM B as desired (Figure 20).

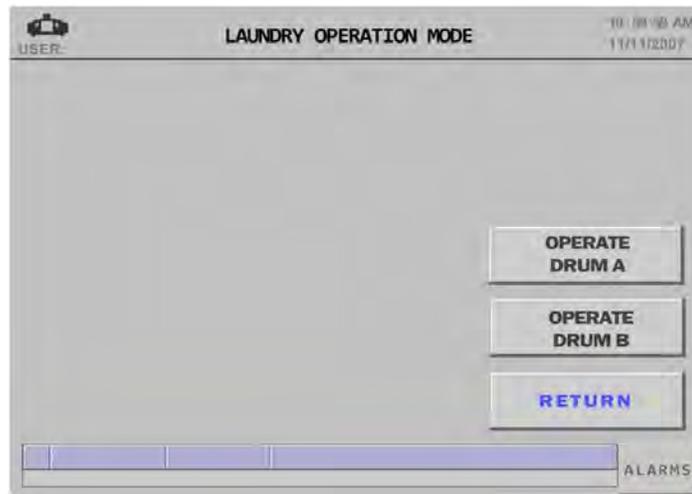


Figure 20. Laundry Operation Mode.

END OF TASK

SELECT LAUNDRY CYCLE**CAUTION**

Laundering small loads at higher dryer temperatures may lead to material shrinkage. Utilize lower dryer temperatures when full loads are not being laundered.

1. Select desired laundry cycle as follows:
 - a. Determine type of items to be laundered.
 - b. Press CHANGE CYCLE (Figure 21) to toggle through available cycles until desired laundry cycle is displayed.

NOTE

Default washing temperature is 150 °F and default drying temperature is 160 °F.

2. If default washing and drying temperatures are desired proceed to Load Laundry. If other than default temperatures are desired press MODIFY TEMPERATURES (Figure 21).



Figure 21. Laundry Cycle Screen.

SELECT LAUNDRY CYCLE-CONTINUED**NOTE**

Pressing SET TEMPERATURE arrows will change temperature in 5 degree increments. Touching the temperature display box will display a keypad onscreen that can be used to set desired temperature in 1 degree increments.

Setting temperature above or below allowable range of 70-160 °F will cause the temperature to return to the default value of 150 °F.

3. Select desired washing and/or drying temperature (Figure 22).

The screenshot displays the 'LAUNDRY OPERATION MODE' interface. At the top, it shows 'USER: 0000000000' on the left, 'LAUNDRY OPERATION MODE' in the center, and '10:59:59 AM' and '12/31/2000' on the right. Below this, the screen is titled 'CHANGE DRUM A TEMPERATURES' and 'CHANGE WATER TEMPERATURE'. Under 'CHANGE WATER TEMPERATURE', there is a text box containing '000.0 °F' and two arrow buttons (up and down). Below that, under 'CHANGE DRYING TEMPERATURE', there is another text box containing '000.0 °F' and two arrow buttons (up and down). A 'RETURN' button is located at the bottom right of the main content area. At the very bottom of the screen, there is a status bar with fields for 'Time', 'Date', 'Text', and 'ALARMS'.

Figure 22. Setting Water and Drying Temperature Screen.

4. Once desired cycle and temperatures are set, press RETURN and proceed to Load Laundry.

END OF TASK

LOAD LAUNDRY**CAUTION**

Never load more than 200 lbs or less than 50 lbs of laundry into one drum. Excessive or undersized loads can cause stress to drum structure and drive components leading to premature failure.

Only use the detergent specified in this manual. Never add more than 1 ounce of detergent per load. Use of the wrong detergent or too much detergent can cause excessive sudsing, overflowing of tanks, and still boil-overs.

Never use chlorine bleach in the LADS. If chlorine bleach enters the still, hydrochloric acid will be produced, causing rapid deterioration of the still, still condenser, and condensate plumbing.

1. Pull out on handle (Figure 23, Item 1) and open drum door (Figure 23, Item 2).
2. Add 1 ounce (stroke) of detergent onto any bag of laundry being loaded.
3. Load laundry bags. Refer to WP 0069 for guidance on properly loading laundry bags and drum.
4. Make sure laundry is clear of door.
5. Close drum door (Figure 23, Item 2) then push in on handle (Figure 23, Item 1) to lock door.

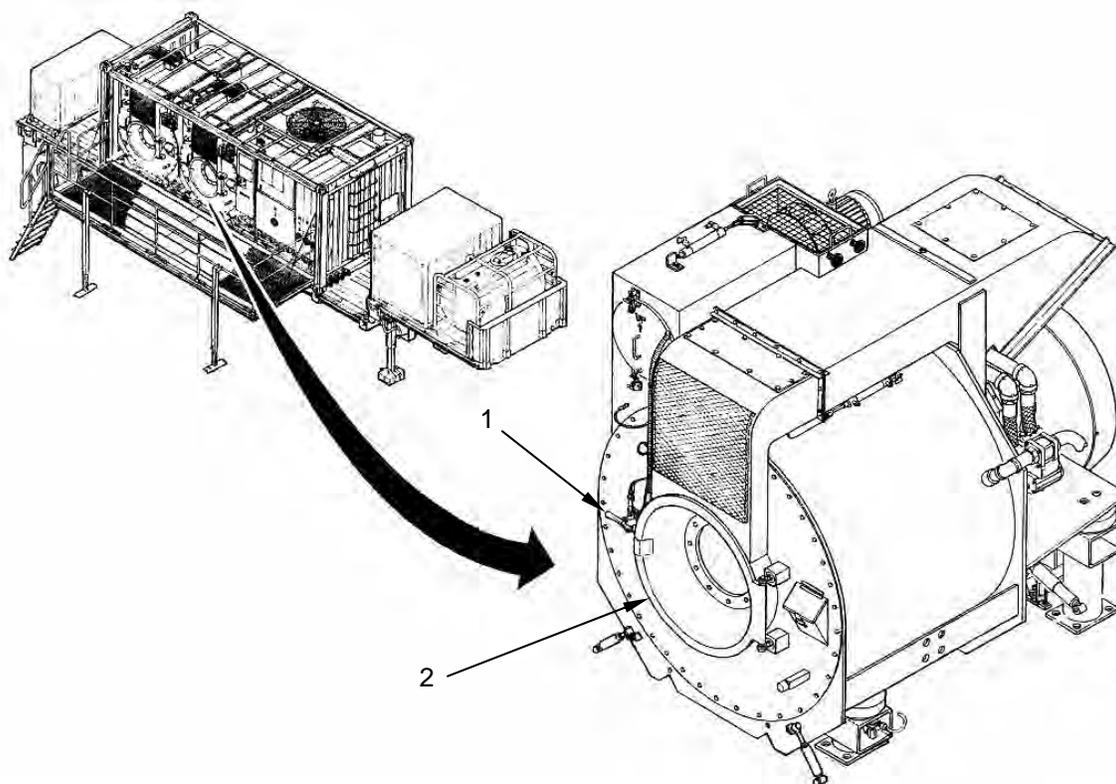


Figure 23. LADS Drum Door.

END OF TASK

LAUNDRY CYCLE OPERATION**NOTE**

A typical laundry cycle lasts 65-75 minutes. Once a laundry cycle starts, operation is automatic until the cycle is complete. When a continuous audible alarm sounds, this indicates that some type of operator action is required or the cycle is complete.

If a laundry cycle must be interrupted during operation follow the guidelines in WP 0026, Introduction to Troubleshooting for proper procedures to pause cycle.

To prevent still boil-overs, the control system will attempt to limit the still water level. This is done by not switching from the WASHING step to the DRAIN TO STILL step until the still water level is low enough to accept the next drum load of water. This may result in the WASHING step being longer than the times listed for each cycle.

1. Press START CYCLE on touchscreen (Figure 21).
2. Observe display to verify system is progressing through laundry cycle (Figure 24).

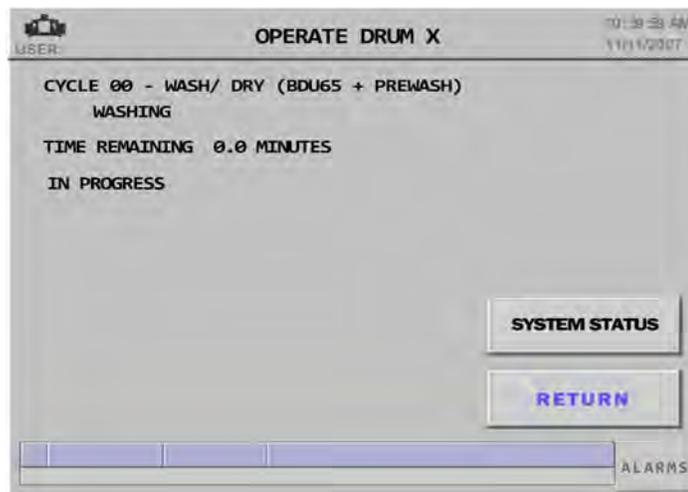


Figure 24. Cycle in Progress Screen.

LAUNDRY CYCLE OPERATION-CONTINUED

- Wait for laundry cycle to reach DRAIN TO STILL step (Figure 25).



Figure 25. Drain to Still Screen.

- When audible alarm sounds, press ACKNOWLEDGE ALARM (Figure 25).
- Add one stroke of anti-foam with hand pump (Figure 26, Item 1).

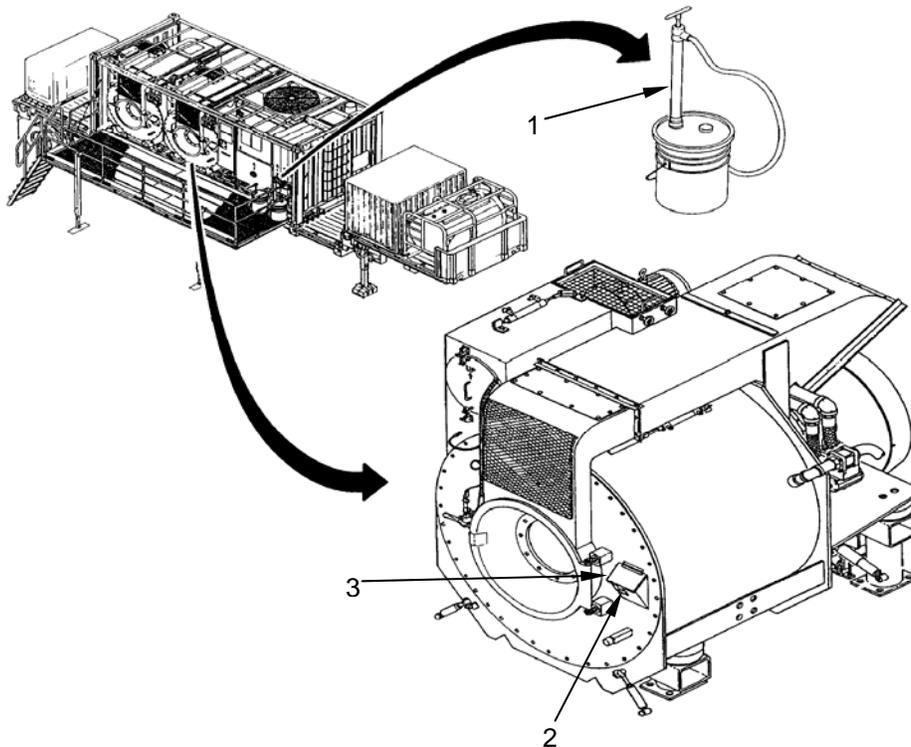


Figure 26. Adding Anti-Foam, Sanitizer, or FRS.

LAUNDRY CYCLE OPERATION-CONTINUED

6. If FRS or sanitizer needs to be added proceed to next step, otherwise proceed to step 11.
7. When audible alarm sounds, press ACKNOWLEDGE ALARM (Figure 27).

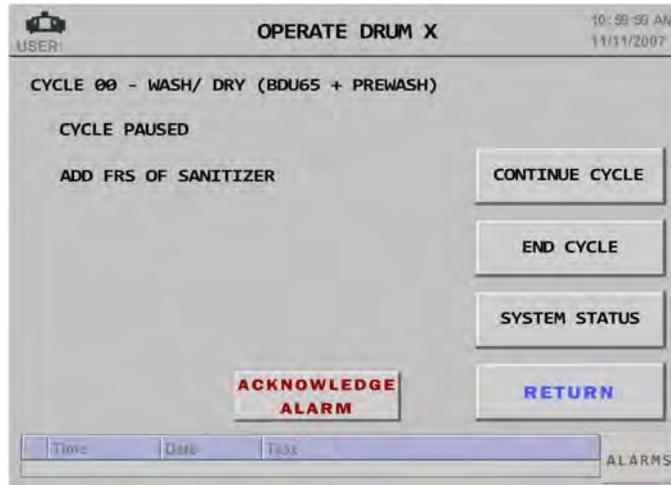


Figure 27. Add FRS Screen.

8. Unlock latch (Figure 26, Item 2) and open lid (Figure 26, Item 3).
9. Add FRS or sanitizer.
10. Close lid (Figure 26, Item 3) and engage latch (Figure 26, Item 2).
11. Press CONTINUE CYCLE on touchscreen (Figure 27).
12. Wait for cycle to complete. When audible alarm sounds, press ACKNOWLEDGE ALARM (Figure 28).



Figure 28. Cycle Complete Screen.

END OF TASK

UNLOAD LAUNDRY

1. Pull out on handle (Figure 23, Item 1) and open drum door (Figure 23, Item 2).

NOTE

After laundry is unloaded it should be removed from the mesh bag as soon as possible. Laundry will be extremely wrinkled if left in mesh bags.

2. Unload laundry.
3. Clean lint filter (WP 0048).
4. To perform additional laundry operations go to Start Laundry Operations in this work package. After last laundry load is completed proceed to System Shutdown.

END OF TASK

SYSTEM SHUTDOWN

This procedure describes steps required to perform a normal system shutdown after daily laundry operations have concluded. If the LADS needs to be drained to change the water for sanitary reasons, dirty water, prevent over-night freezing, or in preparation for movement, refer to WP 0017, Draining Procedures.

WARNING



Prior to removing power from the LADS a cooldown cycle must be run. This allows piping and system components to cool down to safe temperatures prior to performing AFTER PMCS procedures. Thermal fluid can reach temperatures near 400 °F while the heating system is operating. Failure to perform the cooldown procedure could result in personnel being exposed to hot fluids and external surfaces causing severe burn injury or death. Seek immediate medical attention if injury occurs.

NOTE

Laundry cycle must be completed for both systems before a cooldown cycle can be initiated.

1. Press RETURN on touchscreen until START MENU is displayed (Figure 29) then press UTILITY OPERATION.



Figure 29. Start Menu.

SYSTEM SHUTDOWN-CONTINUED**NOTE**

A normal cooldown lasts about 30 minutes. Once a cooldown cycle starts, operation is automatic until cycle is completed. When a continuous audible alarm sounds this indicates the cycle is complete. Operator can override cooldown at any time by selecting **VERRIDE COOLDOWN** on touchscreen.

2. Press **SYSTEM COOLDOWN** (Figure 30) to start cooldown process.

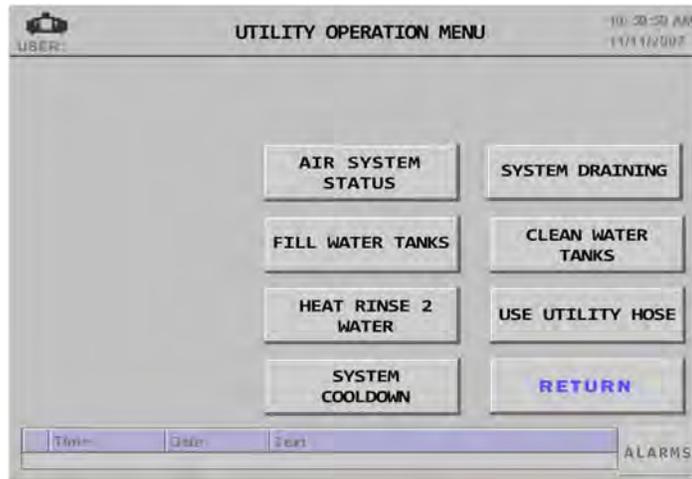


Figure 30. Utility Operation Menu.

SYSTEM SHUTDOWN-CONTINUED

3. Observe touchscreen to verify system is progressing through Cool Down Mode (Figures 25 and 26).

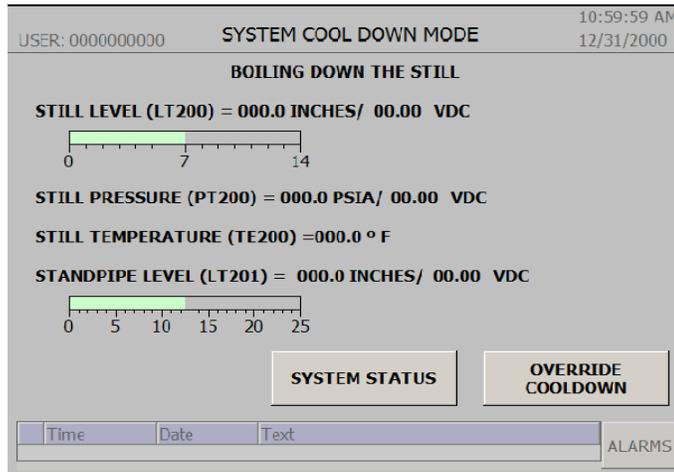


Figure 31. Boiling Down the Still Screen.

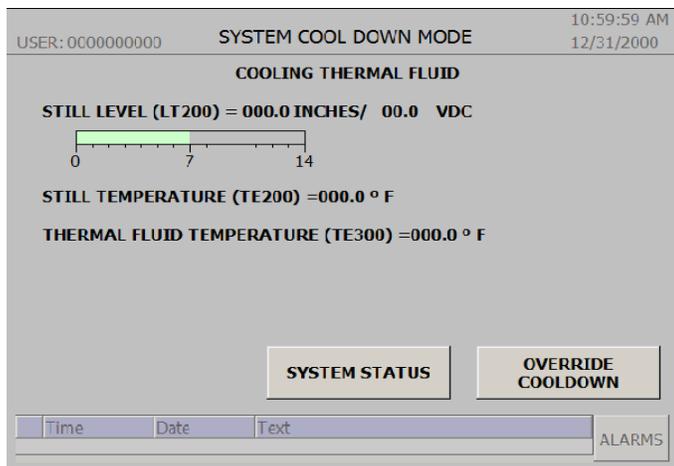


Figure 32. Cooling Thermal Fluid Screen.

SYSTEM SHUTDOWN-CONTINUED

- When cooldown is complete, alarm will sound. Press ACKNOWLEDGE ALARM (Figure 33).

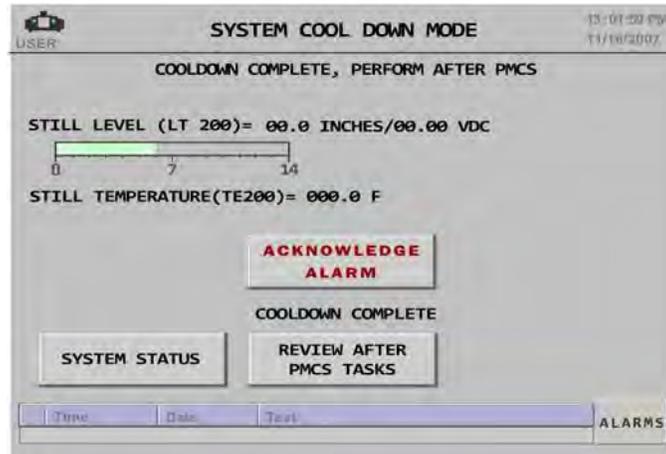


Figure 33. Cool Down Complete.

- Perform After PMCS (WP 0042).
- Position CONTROL POWER switch to OFF.
- Position MAIN DISCONNECT switch to OFF and apply lock-out by pushing the tab to apply padlock.
- Discontinue operation of MEP-805A generator (TM 9-6115-644-10) or remove external power as required.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
DRAINING PROCEDURES
LADS MODEL C**

INITIAL SETUP:**Materials/Parts**

Clean container with 2-3 gallons clean water

Personnel Required

Shower/Laundry and Clothing Repair Specialists (2)

Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

Assembly and Preparation for Use (WP 0011)

Complete

References

TM 9-6115-644-10

WP 0009

WP 0042

FLUSHING ANTI-FOAM AND DETERGENT HAND PUMPS**NOTE**

Laundry cycles must be completed for systems A and B before a drain cycle can be initiated.

The procedures for draining the LADS to change dirty water, prevent over-night freezing, or in preparation for movement are the same except where noted.

1. If the LADS is being drained to change dirty water, proceed to **Starting Drain Cycle**, otherwise continue to next step.

CAUTION

Failure to properly clean and flush anti-foam and detergent hand pumps can cause either solution to harden inside pumps and tubing. This will lead to pump and tubing damage and prevent the proper amount of solution from being added during follow on operations. Failure to flush water from pumps and tubing after cleaning can lead to freeze damage.

2. Fill a clean container (Figure 1, Item 8) with 2-3 gallons of clean water.
3. Place water container (Figure 1, Item 8) next to detergent container (Figure 1, Item 9) and anti-foam container (Figure 1, Item 7).
4. Remove hand pump (Figure 1, Item 1) from detergent container (Figure 1, Item 9) then place in water container (Figure 1, Item 8).
5. Install cap (Figure 1, Item 10) onto detergent container (Figure 1, Item 9).
6. Stroke hand pump (Figure 1, Item 1) to flush detergent out of pump. Continue stroking until detergent is completely flushed from hand pump.
7. Remove hand pump (Figure 1, Item 1) from water container (Figure 1, Item 8) and stroke to flush water out of pump.
8. Stow hand pump (Figure 1, Item 1) in tool box.
9. Remove anti-foam hand pump (Figure 1, Item 5) from anti-foam container (Figure 1, Item 7) then place in water container (Figure 1, Item 8).

FLUSHING ANTI-FOAM AND DETERGENT HAND PUMPS-CONTINUED

10. Install cap (Figure 1, Item 6) onto anti-foam container (Figure 1, Item 7).
11. Stroke hand pump (Figure 1, Item 5) to flush anti-foam out of pump. Continue stroking until anti-foam is completely flushed from tubing (Figure 1, Item 3) and water is visible at inlet to still (Figure 1, Item 4).
12. Rinse anti-foam off of hand pump (Figure 1, Item 5) then remove pump from water container (Figure 1, Item 8).
13. Stroke hand pump (Figure 1, Item 5) to flush water out of pump and tubing (Figure 1, Item 3).
14. Stow hand pump (Figure 1, Item 5) under water tank (Figure 1, Item 2).
15. Remove detergent container (Figure 1, Item 9) and anti-foam container (Figure 1, Item 7) from platform.

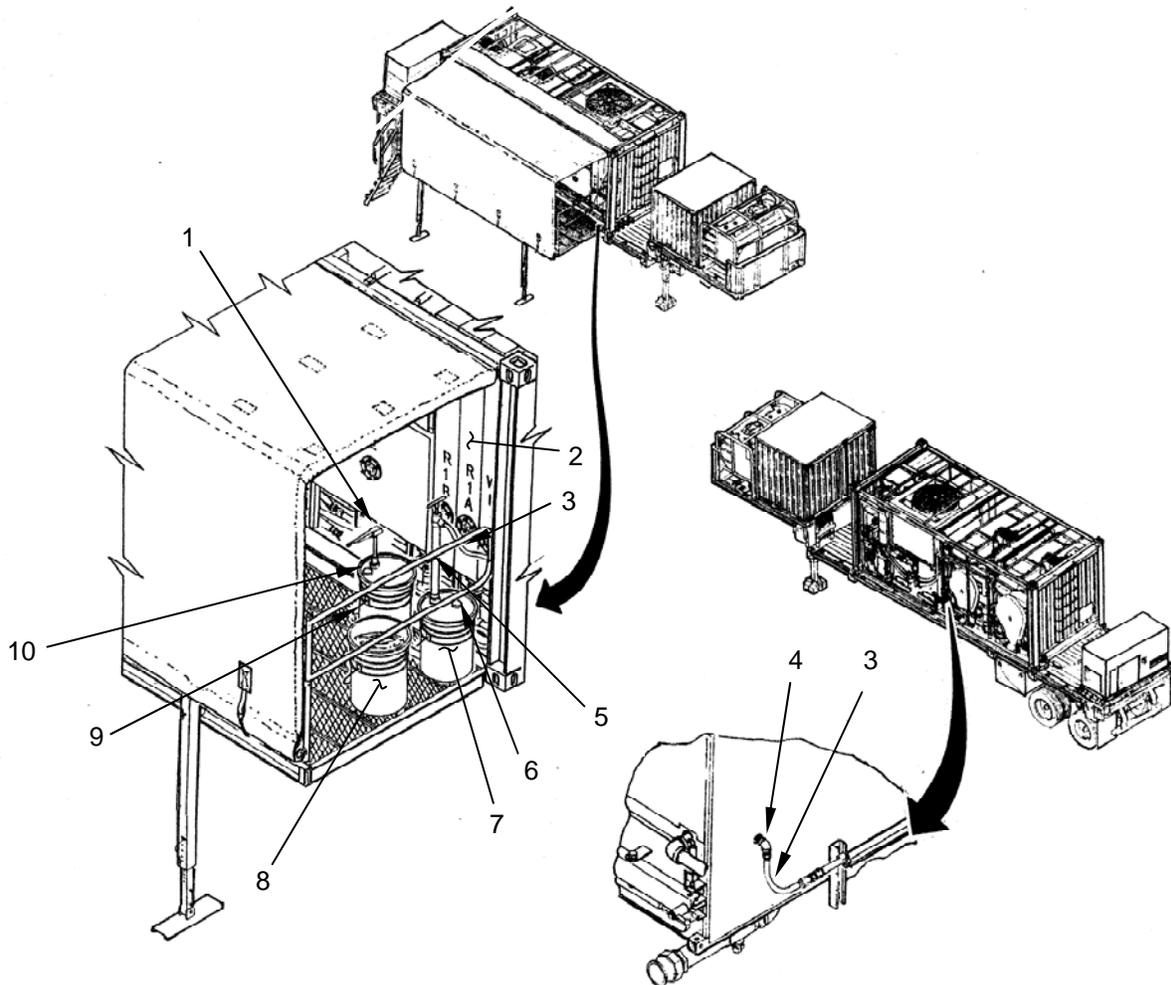


Figure 1. Anti-Foam and Detergent.

END OF TASK

STARTING DRAIN CYCLE

1. Monitor display (Figure 2) at operator panel A, it should read:

<p>WASH CYCLE WASH=XXXF DRY=XXXF SELECT CYCLE, TEMP, START</p>	<p>SELECT CYCLE MODIFY TEMPS START CYCLE EXAMINE INPUTS</p>
---	--

Figure 2. Operator Display, Wash Cycle.

2. Press MENU SELECTION switch to toggle through available cycles until DRAIN CYCLE is displayed.
3. Monitor display (Figure 3) at operator panel A, it should read:

<p>DRAIN CYCLE WASH=XXXF DRY=XXXF SELECT CYCLE, TEMP, START</p>	<p>SELECT CYCLE MODIFY TEMPS START CYCLE EXAMINE INPUTS</p>
--	--

Figure 3. Operator Display, Drain Cycle.

4. Press MENU SELECTION switch to start drain cycle.

NOTE

The control system will automatically perform a cooldown cycle when a drain cycle is initiated. A normal cooldown lasts about 30 minutes. Operation is automatic until the cooldown portion of drain cycle is complete. When a continuous audible alarm sounds this indicates the cooldown cycle is complete.

5. Wait for cooldown cycle to be completed. When audible alarm sounds press SILENCE ALARM switch on operator panel A.
6. Monitor display (Figure 4), it should read:

<p>DRAIN CYCLE PAUSED PERFORM AFTER PMCS</p>	<p>CONTINUE CYCLE EXAMINE INPUTS</p>
---	---

Figure 4. Operator Display, Perform After PMCS.

7. Perform AFTER PMCS (WP 0042). When cleaning still, do not add anti-foam if the LADS is not going to be refilled with water.

END OF TASK

CONTINUING DRAIN CYCLE

1. Connect 5-ft drain hose (Figure 5, Item 3) to drain port (Figure 5, Item 2).
2. Connect 50-ft drain hose (Figure 5, Item 4) to 5 ft drain hose (Figure 5, Item 3).
3. Route 50-ft drain hose (Figure 5, Item 4) out to drain area approved for waste disposal. If necessary attach a second 50-ft drain hose.
4. Open drain valve (Figure 5, Item 1) where hose (Figure 5, Item 2) is connected.

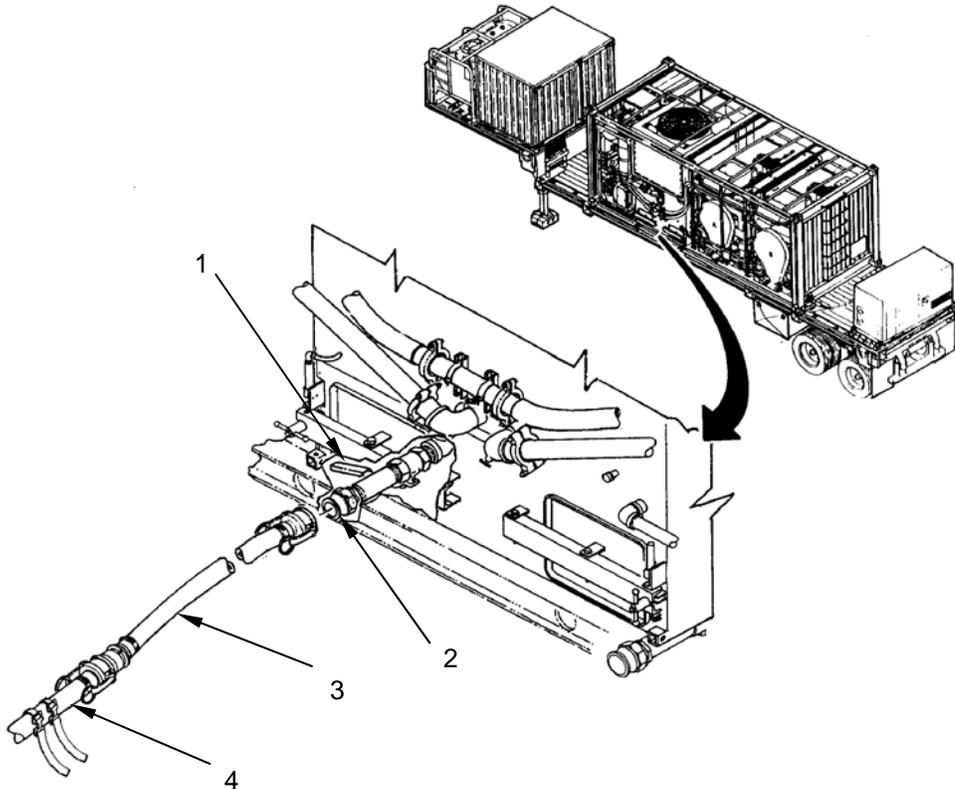


Figure 5. Drain Hose Connections.

5. Monitor display (Figure 6), it should read:

DRAIN CYCLE PAUSED	CONTINUE CYCLE
	EXAMINE INPUTS

Figure 6. Operator Display, Continue Cycle.

6. Press MENU SELECTION switch to continue drain cycle.

CONTINUING DRAIN CYCLE-CONTINUED**NOTE**

The control system will automatically drain water tanks. This will take about 15 minutes. When a continuous audible alarm sounds this indicates the water tanks are drained.

7. Wait for water tanks to drain. When audible alarm sounds, press SILENCE ALARM switch on operator panel A.
8. Monitor display (Figure 7), it should read:

CYCLE PAUSED	CONTINUE CYCLE
OPEN DRAINS, REMOVE CAPS	EXAMINE INPUTS

Figure 7. Operator Display, Cycle Paused.

9. If draining the LADS to change water in tanks, proceed to **System Shutdown**, otherwise continue to **Completing Drain Cycle**.

END OF TASK**COMPLETING DRAIN CYCLE**

1. Shut-off water flow from water supply container (Figure 8, Item 1).
2. Disconnect 50-ft water hose (Figure 8, Item 9) at water supply port (Figure 8, Item 10).
3. Close manual valve (Figure 8, Item 12) on air system only if draining in preparation for movement.
4. Disconnect utility hose (Figure 8, Item 8).
5. Open utility hose shut-off valve (Figure 8, Item 11).
6. Drain residual water from the LADS plumbing as follows:
 - a. Disconnect drain hose (Figure 8, Item 14) from pre-wash manifold (Figure 8, Item 15).
 - b. Remove two caps (Figure 8, Item 13) and pre-wash manifold (Figure 8 Item 15) or four caps (Figure 8, Item 13) from end of water manifolds (Figure 8, Item 16).

NOTE

Refer to Work Package 0009 to determine when valve is open or closed.

- c. Open manual valves (Figure 8, Item 26) on both water pumps (Figure 8, Item 27).
- d. Open manual valve (Figure 8, Item 24) on distillate pump (Figure 8, Item 25).
- e. Open manual valve (Figure 8, Item 22) on first-stage pre-filter (Figure 8, Item 21).
- f. Open manual valve (Figure 8, Item 23) at outlet to coalescer (Figure 8, Item 20).
- g. Open eight manual valves (Figure 8, Item 19) on subcooler (Figure 8, Item 18).

COMPLETING DRAIN CYCLE-CONTINUED

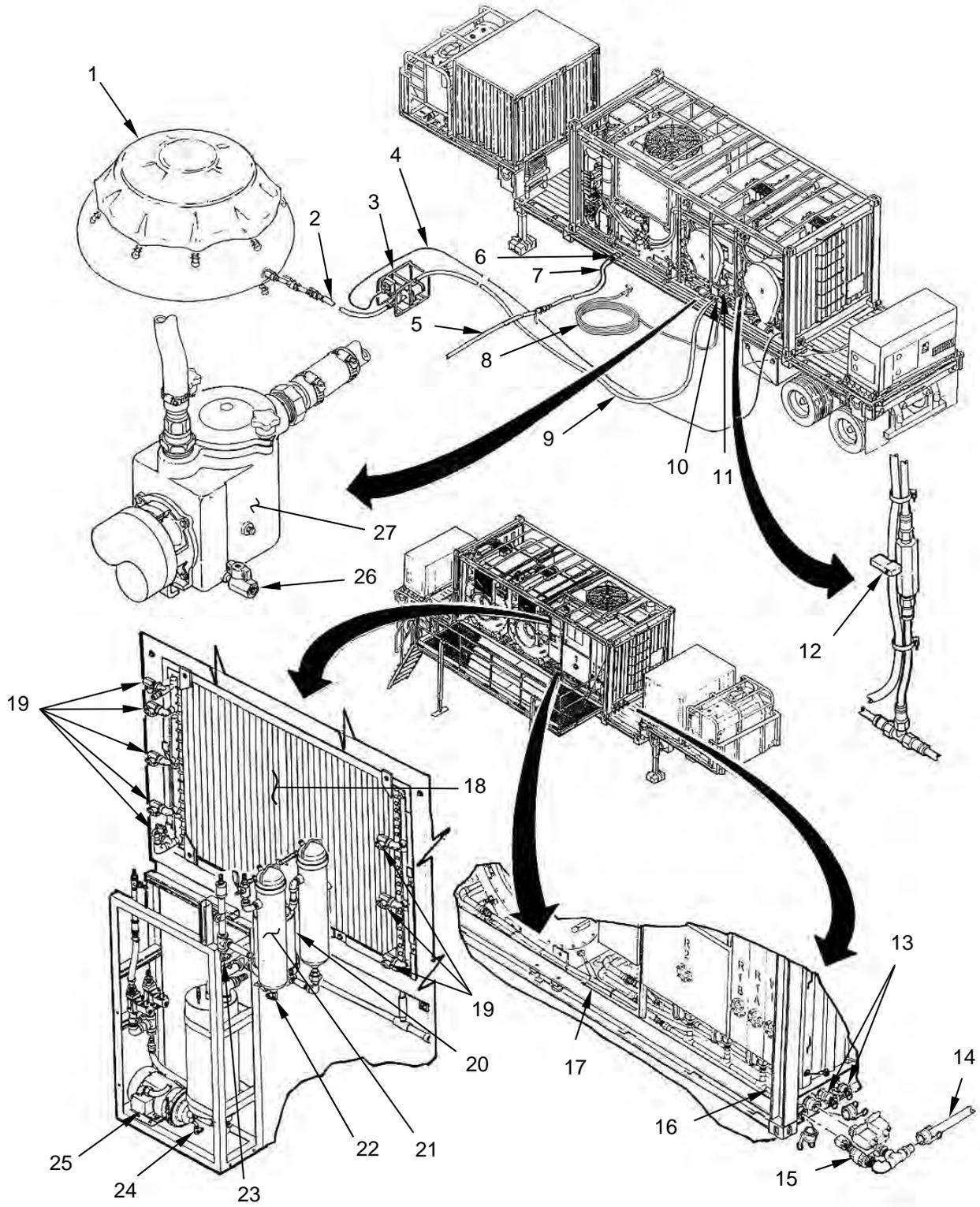


Figure 8. Draining Point Locations.

COMPLETING DRAIN CYCLE-CONTINUED

7. Press MENU SELECTION switch to continue drain cycle.

NOTE

The control system will wait several minutes to allow residual water to drain. The control system will then automatically open and close all control valves several times to complete the drain cycle. This will take about 5 minutes. When a continuous audible alarm sounds this indicates the drain cycle is complete.

8. Wait for residual water to drain. When audible alarm sounds press SILENCE ALARM switch on operator panel A.
9. Monitor display (Figure 9), it should read:



Figure 9. Operator Display, Cycle Complete.

10. Lift up on hoses (Figure 8, Item 17) to allow water to drain towards water manifolds (Figure 8, Item 16).

CAUTION

All manual valves that were opened for draining should be left open during transport. Closing manual valves may allow residual water to flow around during movement, fill-up an area of plumbing, and cause freeze damage.

11. Install four caps (Figure 8, Item 13). Leave all manual drain valves open.
12. Drain residual water from water supply plumbing as follows:
 - a. Disconnect electrical cable (Figure 8, Item 4) from water supply pump (Figure 8, Item 3).
 - b. Disconnect 10-ft water supply hose (Figure 8, Item 2) from water supply pump (Figure 8, Item 3).
 - c. Disconnect 50-ft water supply hose (Figure 8, Item 9) from water supply pump (Figure 8, Item 3).
 - d. Drain water from water supply pump (Figure 8, Item 3) and water hoses (Figure 8, Items 2, 8, and 9).
13. Drain residual water from drain plumbing as follows:
 - a. Disconnect 5-ft drain hose (Figure 8, Item 7) from 50-ft drain hose (Figure 8, Item 5).
 - b. Disconnect 5-ft drain hose (Figure 8, Item 7) from drain port (Figure 8, Item 6).
 - c. Drain water from hoses (Figure 8, Items 5 and 7).

END OF TASK

SYSTEM SHUTDOWN

1. If draining the LADS to change water in the tanks close drain valve (Figure 5, Item 1) and disconnect hose (Figure 5, Item 3). Otherwise proceed to step 2.
2. Position mode switches (Figure 10, Item 3) on pre-wash manifold (Figure 10, Item 2) to MAN (11 o'clock position).
3. Manually open valves (Figure 10, Item 1) on pre-wash manifold (Figure 10, Item 2).
4. Position mode switches (Figure 10, Item 3) back to AUTO, leaving valves (Figure 10, Item 1) in the open position.

NOTE

The manual valves (Figure 10, Item 1) are shown in the open position.

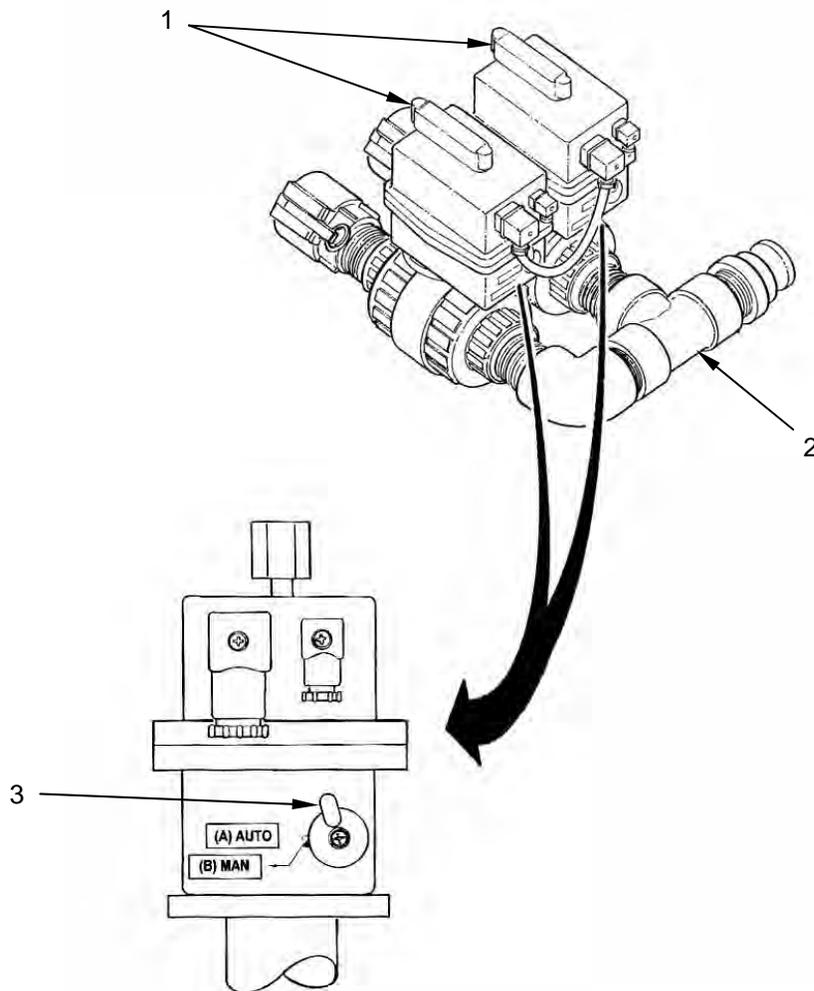


Figure 10. Pre-wash Manifold Mode Switch, Manual Position.

SYSTEM SHUTDOWN-CONTINUED

5. Position CONTROL POWER switch to OFF.
6. Position MAIN DISCONNECT switch to OFF and apply lock-out.
7. Push in on EMERGENCY STOP switch only if preparing for movement.
8. Discontinue operation of MEP-805A generator (TM 9-6115-644-10) or remove external power as required.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
DRAINING PROCEDURES
LADS MODEL D**

INITIAL SETUP:**Materials/Parts**

Clean container with 2-3 gallons clean water

Personnel Required

Shower/Laundry and Clothing Repair Specialists (2)

Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

Assembly and Preparation for Use Complete (WP 0011)

References

WP 0042

TM 9-6115-644-10

FLUSHING ANTI-FOAM AND DETERGENT HAND PUMPS**NOTE**

Laundry cycles must be completed for drums A and B before a drain cycle can be initiated.

The procedures for draining the LADS to change dirty water, prevent over-night freezing, or in preparation for movement are the same except where noted.

1. If the LADS is being drained to change dirty water, proceed to **Drain Cycle Cooldown** within this work package, otherwise continue to step 2.

CAUTION

Failure to properly clean and flush anti-foam and detergent hand pumps can cause either solution to harden inside pumps and tubing. This will lead to pump and tubing damage and prevent the proper amount of solution from being added during follow on operations. Failure to flush water from pumps and tubing after cleaning can lead to freeze damage.

2. Fill a clean container (Figure 1, Item 8) with 2-3 gallons of clean water.
3. Place water container (Figure 1, Item 8) next to detergent container (Figure 1, Item 9) and anti-foam container (Figure 1, Item 7).
4. Remove hand pump (Figure 1, Item 1) from detergent container (Figure 1, Item 9) then place in water container (Figure 1, Item 8).
5. Install cap (Figure 1, Item 10) onto detergent container (Figure 1, Item 9).
6. Stroke hand pump (Figure 1, Item 1) to flush detergent out of pump. Continue stroking until detergent is completely flushed from hand pump.
7. Remove hand pump (Figure 1, Item 1) from water container (Figure 1, Item 8) and stroke to flush water out of pump.
8. Stow hand pump (Figure 1, Item 1) in tool box.

FLUSHING ANTI-FOAM AND DETERGENT HAND PUMPS-CONTINUED

9. Remove anti-foam hand pump (Figure 1, Item 5) from anti-foam container (Figure 1, Item 7) then place in water container (Figure 1, Item 8).
10. Install cap (Figure 1, Item 6) onto anti-foam container (Figure 1, Item 7).
11. Stroke hand pump (Figure 1, Item 5) to flush anti-foam out of pump. Continue stroking until anti-foam is completely flushed from tubing (Figure 1, Item 3) and water is visible at inlet to still (Figure 1, Item 4).
12. Rinse anti-foam off of hand pump (Figure 1, Item 5) then remove pump from water container (Figure 1, Item 8).
13. Stroke hand pump (Figure 1, Item 5) to flush water out of pump and tubing (Figure 1, Item 3).
14. Stow hand pump (Figure 1, Item 5) under water tank (Figure 1, Item 2).
15. Remove detergent container (Figure 1, Item 9) and anti-foam container (Figure 1, Item 7) from platform.

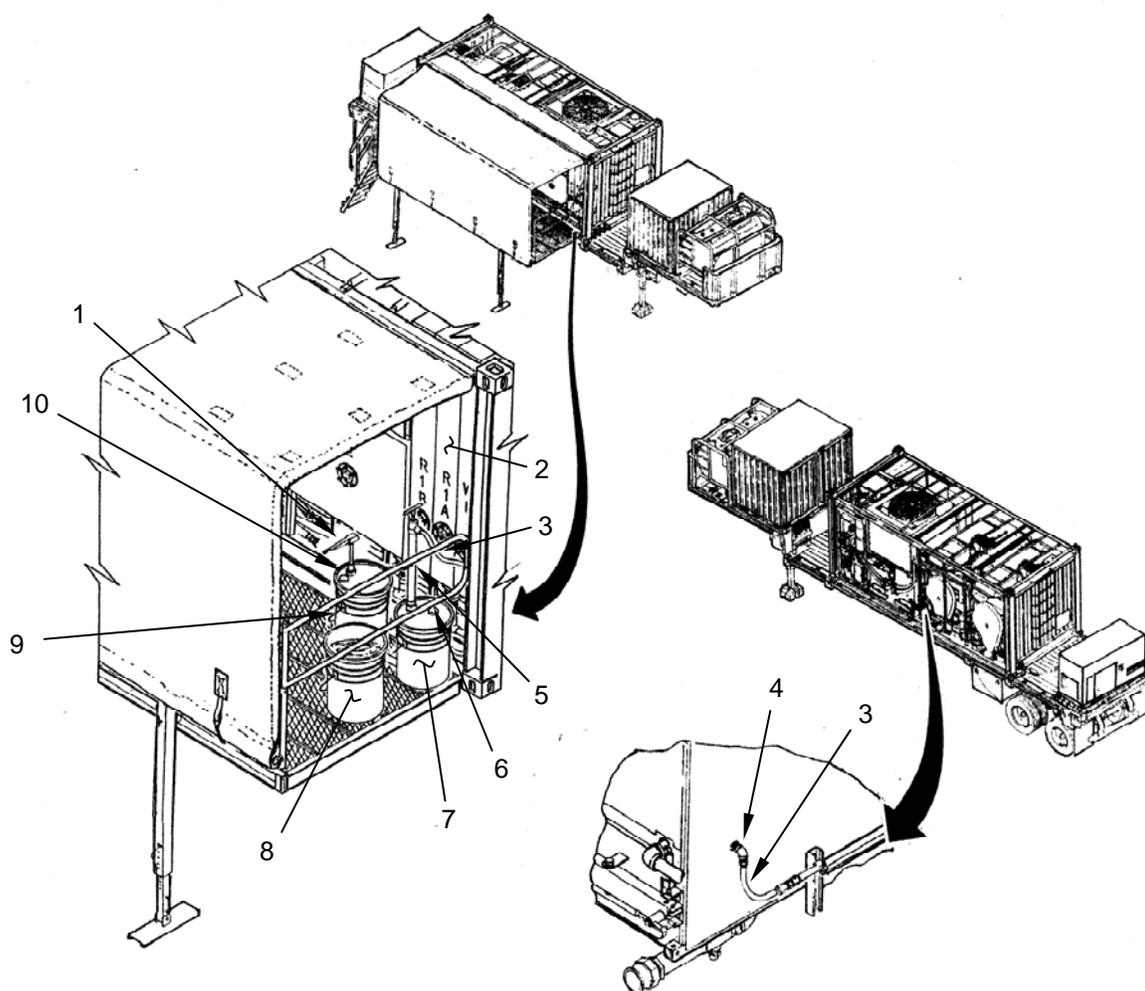


Figure 1. Anti-Foam and Detergent.

END OF TASK

DRAIN CYCLE COOLDOWN

1. Press RETURN on touchscreen until START MENU (Figure 2) is displayed then press UTILITY OPERATION.

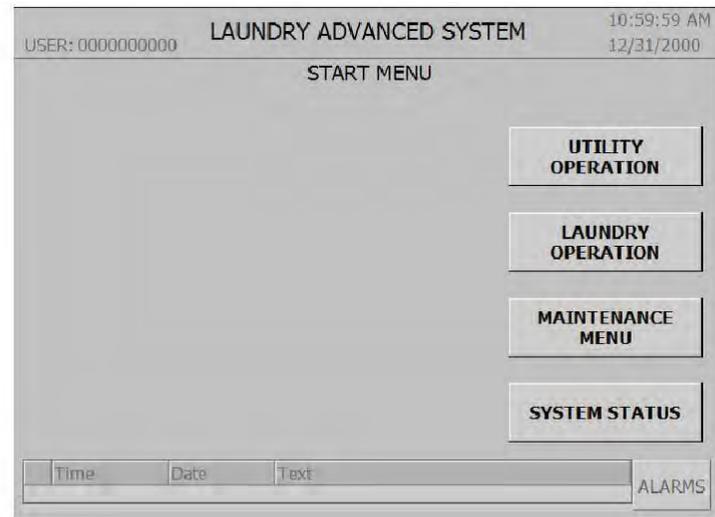


Figure 2. Start Menu.

DRAIN CYCLE COOLDOWN-CONTINUED

NOTE

The control system will automatically perform a cooldown cycle when a drain cycle is initiated. A normal cooldown lasts about 30 minutes. Operation is automatic until the cooldown portion of the drain cycle is complete. When a continuous audible alarm sounds this indicates the cooldown cycle is complete.

2. Press SYSTEM DRAINING (Figure 3) to start draining process.

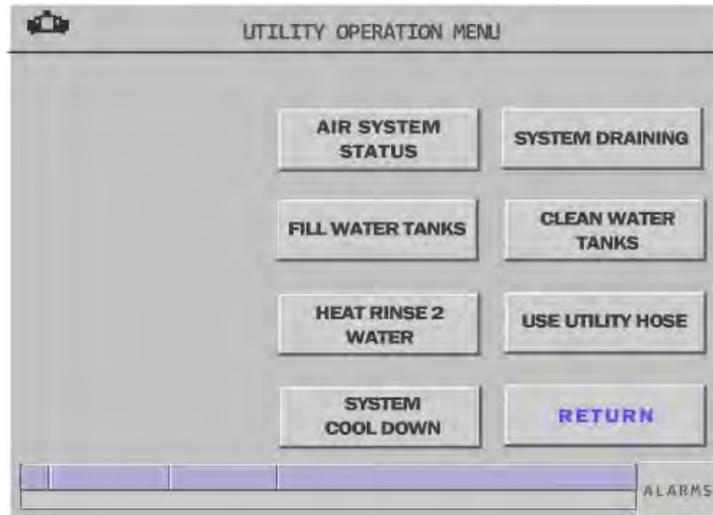


Figure 3. Utility Operation Menu.

3. Observe touchscreen to verify system is progressing through the cooldown cycle (Figures 4 and 5).

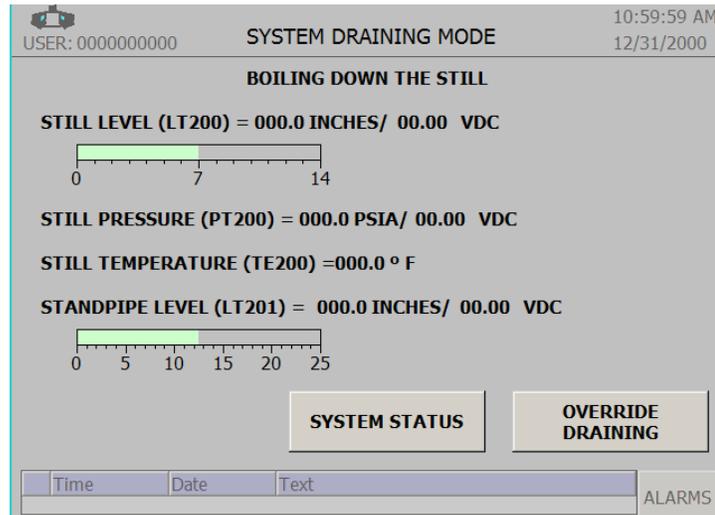


Figure 4. Boiling Down the Still Screen.

DRAIN CYCLE COOLDOWN -CONTINUED

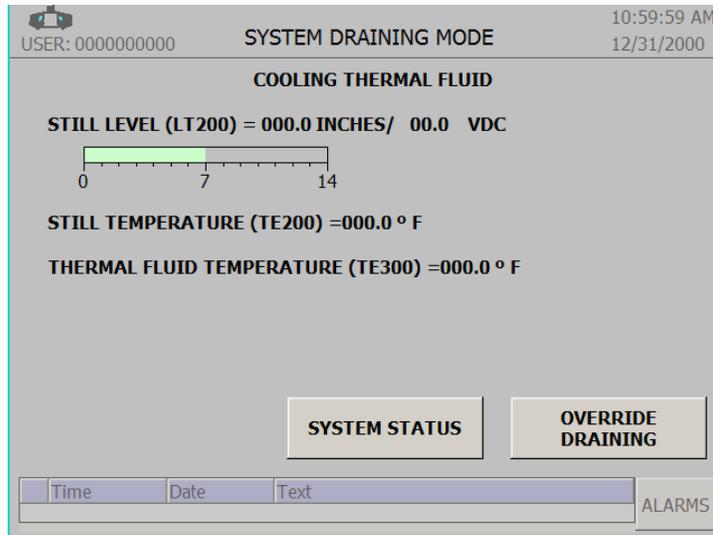


Figure 5. Cooling Thermal Fluid Screen.

4. Observe touchscreen to verify system has completed the cooldown cycle (Figure 6) and press **ACKNOWLEDGE ALARM**.

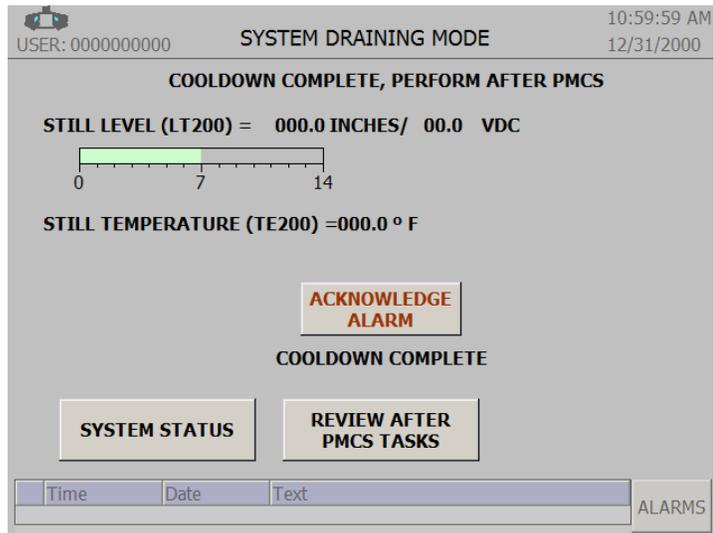


Figure 6. Cooldown Complete Screen.

5. Perform **AFTER PMCS** (WP 0042). When cleaning still, do not add anti-foam if the LADS is not going to be refilled with water.

END OF TASK

DRAIN CYCLE

1. Connect 5-ft drain hose (Figure 7, Item 3) to drain port (Figure 7, Item 2).
2. Connect 50-ft drain hose (Figure 7, Item 4) to 5-ft drain hose (Figure 7, Item 3).
3. Route 50-ft drain hose (Figure 7, Item 4) out to drain area approved for waste disposal. If necessary attach a second 50-ft drain hose.
4. Open drain valve (Figure 7, Item 1) where hose (Figure 7, Item 3) is connected.

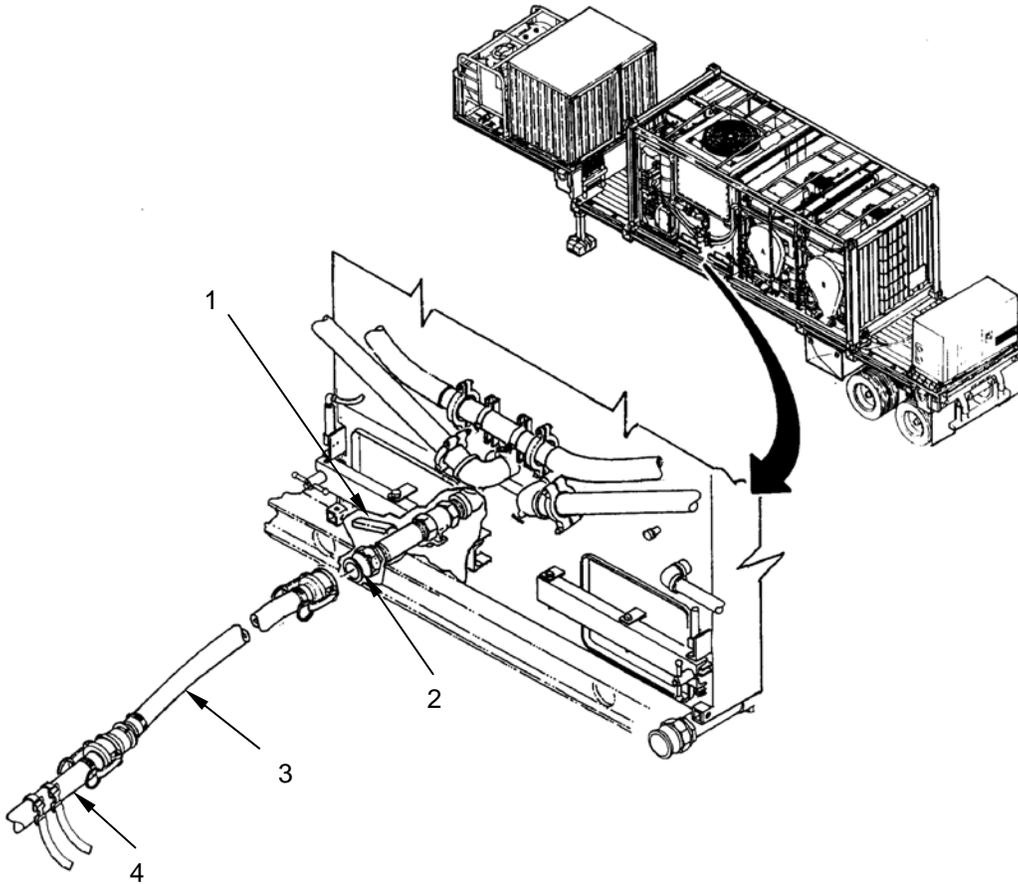


Figure 7. Drain Hose Connections.

DRAIN CYCLE-CONTINUED

5. Press CONTINUE DRAINING (Figure 8) to restart draining process.

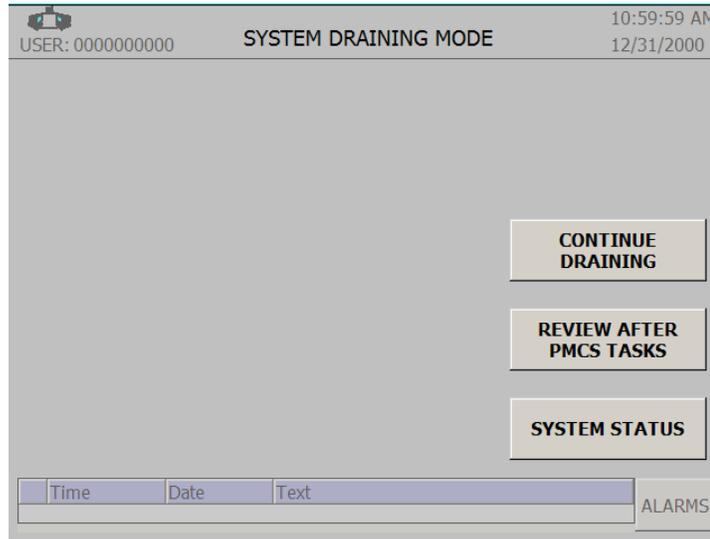


Figure 8. Continue Draining Screen.

NOTE

The control system will automatically drain water tanks. This will take about 15 minutes. When a continuous audible alarm sounds this indicates the water tanks are drained.

If still water level rises to greater than (>) 3 inches, draining cycle will pause until still level drops to less than (<) 3 inches.

6. Observe touchscreen to verify system is progressing through DRAINING CYCLE (Figure 9).

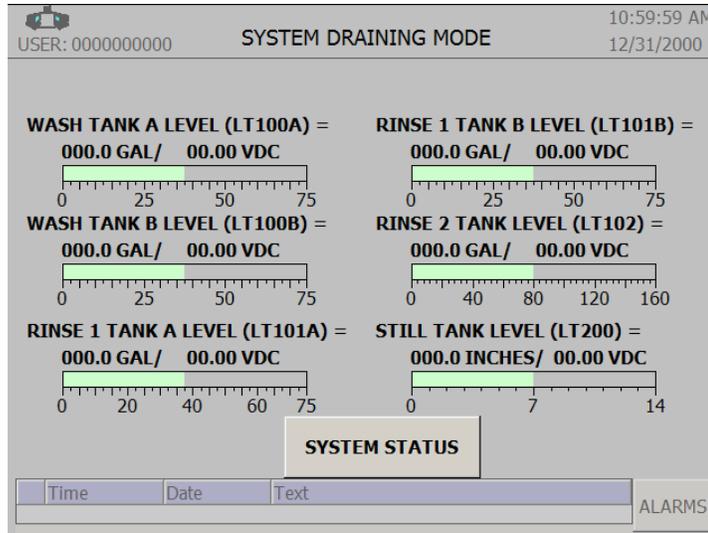


Figure 9. System Draining Mode Screen.

DRAIN CYCLE-CONTINUED

7. Wait for water tanks to drain (Figure 10). When audible alarm sounds, press ACKNOWLEDGE ALARM on touch screen.

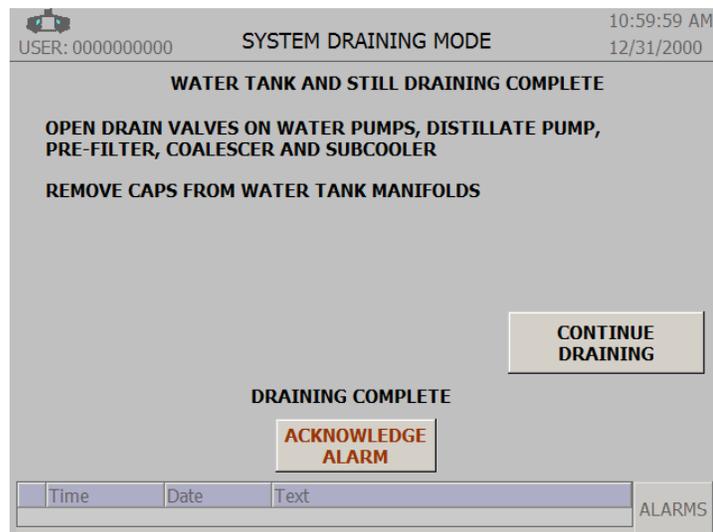


Figure 10. Water Tank and Still Draining Complete Screen.

8. If draining the LADS to change water in tanks, proceed to System Shutdown, otherwise continue to Completing Drain Cycle within this work package.

END OF TASK

COMPLETING DRAIN CYCLE

1. Shut-off water flow from water supply container (Figure 11, Item 1).
2. Disconnect 50-ft water hose (Figure 11, Item 9) at water supply port (Figure 11, Item 10).
3. Close manual valve (Figure 11, Item 12) on air system only if draining in preparation for movement.
4. Disconnect utility hose (Figure 11, Item 8).
5. Open utility hose shut-off valve (Figure 11, Item 11).
6. Drain residual water from the LADS plumbing as follows:
 - a. Disconnect drain hose (Figure 11, Item 14) from pre-wash manifold (Figure 11, Item 15).
 - b. Remove two caps (Figure 11, Item 13) and pre-wash manifold (Figure 11 Item 15) or four caps from water manifolds (Figure 11, Item 13).
 - c. Open manual valves (Figure 11, Item 26) on both water pumps (Figure 11, Item 27)
 - d. Open manual valve (Figure 11, Item 24) on distillate pump (Figure 11, Item 25).
 - e. Open manual valve (Figure 11, Item 22) on first-stage pre-filter (Figure 11, Item 21).
 - f. Open manual valve (Figure 11, Item 23) at outlet to coalescer (Figure 11, Item 20).
 - g. Open eight manual valves (Figure 11, Item 19) on subcooler (Figure 11, Item 18).
7. Press CONTINUE DRAINING on touchscreen to continue drain cycle.

COMPLETING DRAIN CYCLE-CONTINUED

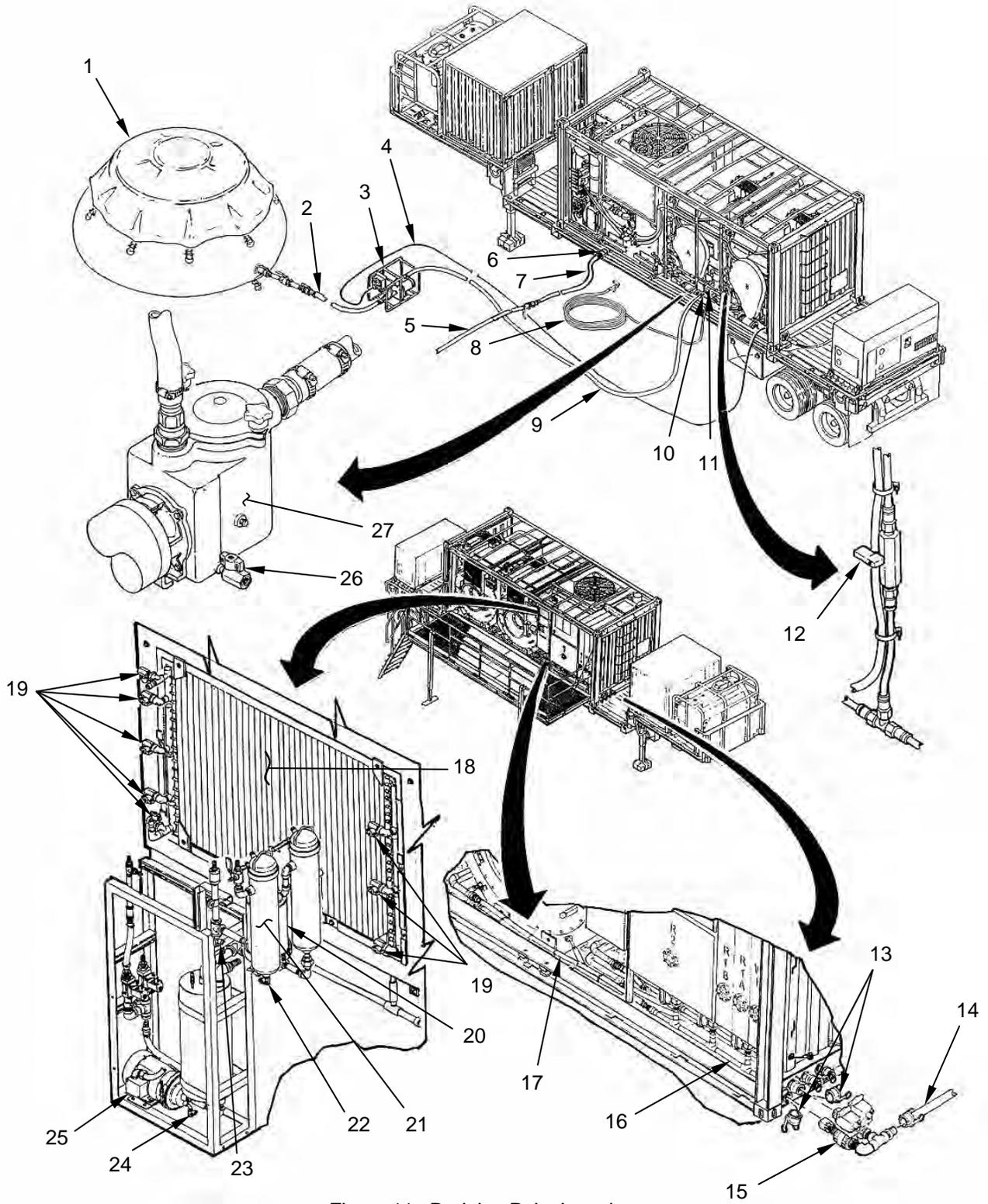


Figure 11. Draining Point Locations.

COMPLETING DRAIN CYCLE-CONTINUED

NOTE

The control system will wait several minutes to allow residual water to drain. The control system will then automatically open and close all control valves (Figure 12) several times to complete the drain cycle. This will take about 5 minutes. When a continuous audible alarm sounds this indicates the drain cycle is complete.

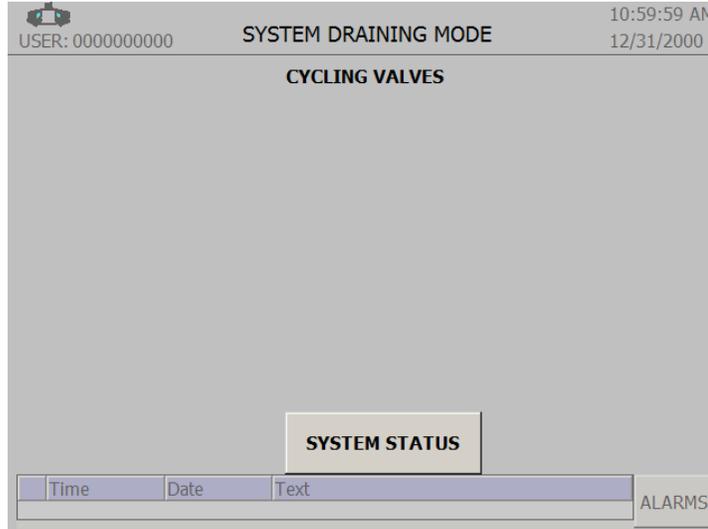


Figure 12. Cycling Valves Screen.

8. Wait for residual water to drain. When audible alarm sounds press ACKNOWLEDGE ALARM (Figure 13).

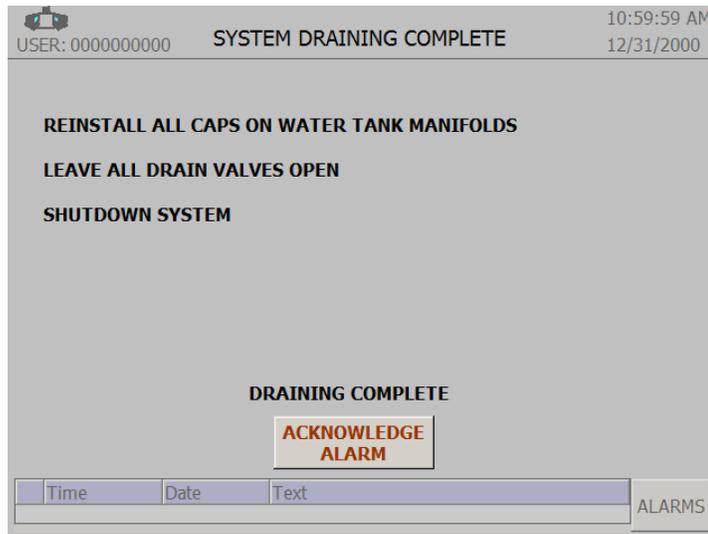


Figure 13. Reinstall Caps Screen.

COMPLETING DRAIN CYCLE-CONTINUED

9. Lift up on hoses (Figure 11, Item 17) to allow water to drain towards water manifolds (Figure 11, Item 16).

CAUTION

All manual valves that were opened for draining should be left open during transport. Closing manual valves may allow residual water to flow around during movement, fill-up an area of plumbing, and cause freeze damage.

10. Install four caps (Figure 11, Item 13). Leave all manual drain valves open.
11. Drain residual water from water supply plumbing as follows:
- a. Disconnect electrical cable (Figure 11, Item 4) from water supply pump (Figure 11, Item 3)
 - b. Disconnect 10-ft water supply hose (Figure 11, Item 2) from water supply pump (Figure 11, Item 3)
 - c. Disconnect 50-ft water supply hose (Figure 11, Item 9) from water supply pump (Figure 11, Item 3).
 - d. Drain water from water supply pump (Figure 11, Item 3) and water hoses (Figure 11, Items 2, 8, and 9).
12. Drain residual water from drain plumbing as follows:
- a. Disconnect 5-ft drain hose (Figure 11, Item 7) from 50-ft drain hose (Figure 11, Item 5).
 - b. Disconnect 5-ft drain hose (Figure 11, Item 7) from still drain port (Figure 11, Item 6).
 - c. Drain water from hoses (Figure 11, Items 5 and 7).

END OF TASK

SYSTEM SHUTDOWN

1. If draining the LADS to change water in the tanks close drain valve (Figure 7, Item 1) and disconnect hose (Figure 7, Item 3). Otherwise proceed to step 2.
2. Position mode switches (Figure 14, Item 3) on pre-wash manifold (Figure 14, Item 2) to MAN (11 o'clock position).
3. Manually open valves (Figure 14, Item 1) on pre-wash manifold (Figure 14, Item 2).
4. Position mode switches (Figure 14, Item 3) back to AUTO, leaving valves (Figure 14, Item 1) in the open position.

NOTE

The manual valves (Figure 14 Item 1) are shown in the open position.

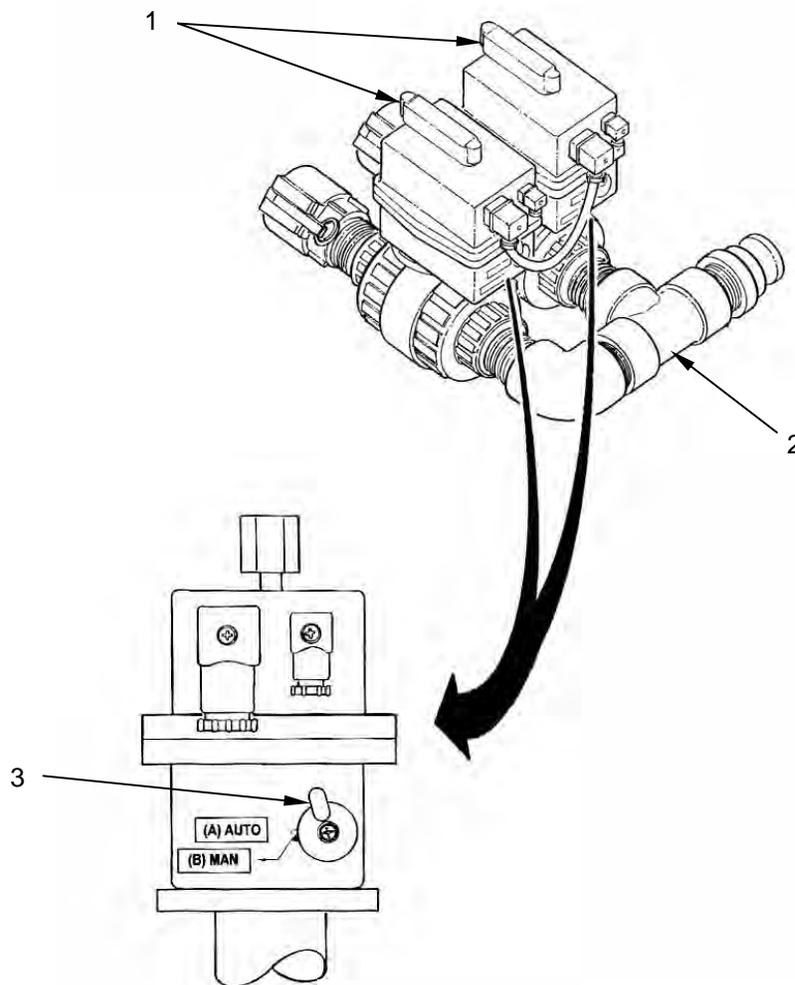


Figure 14. Pre-wash Manifold Mode Switch, Manual Position.

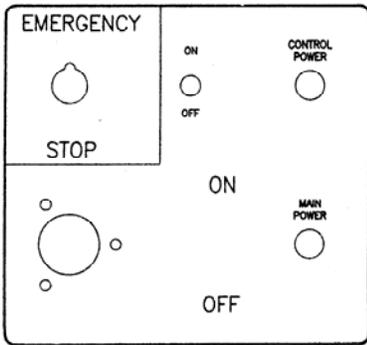
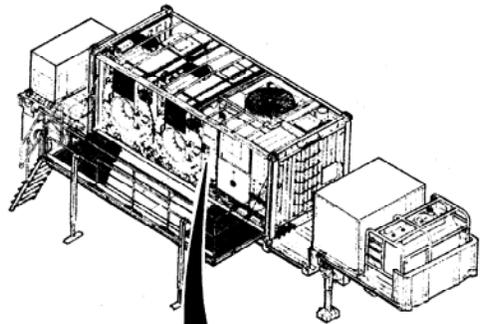
SYSTEM SHUTDOWN-CONTINUED

5. Position CONTROL POWER switch to OFF.
6. Position MAIN DISCONNECT switch to OFF and apply lock-out.
7. Push in on EMERGENCY STOP switch only if preparing for movement.
8. Discontinue operation of MEP-805A generator (TM 9-6115-644-10) or remove external power as required.
9. Push tab on handle and insert padlock.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
DECALS AND INSTRUCTION PLATES
LADS MODEL C**

DECALS AND INSTRUCTION PLATES



DAILY OPERATING PROCEDURES

This procedure describes steps required to perform normal daily operations. Refer to TM 10-3510-221-10 for more detailed procedures on OPERATING UNDER USUAL AND UNUSUAL CONDITIONS.

A. System Start-up

1. Perform BEFORE PMCS.
2. Apply external power.
3. Set generator output to 210 VAC, 60 HZ.
4. Verify EMERGENCY STOP is pulled out.
5. Position MAIN DISCONNECT to ON.
6. Position CONTROL POWER to ON.
7. When operator panel A display reads "PRESS TO START", press MENU SELECTION switch.
8. Wait for air system to pressurize (about 15 minutes when completely empty).
9. Monitor display, it should read "WATER LEVEL LOW" or "SET WATER TEMPERATURE".
10. If WATER LEVEL LOW is displayed continue to step 11, otherwise proceed to step 13.
11. Select FILL TANKS.
12. Wait for tanks to fill (about 15 minutes when completely empty).
13. Monitor display, it should read "SET WATER TEMPERATURE".
14. Prime fuel supply to heater as follows:
 - a. Push and hold PRIME PUMP switch.
 - b. Observe reading on fuel pump pressure gauge.
 - c. Release switch when gauge remains steady at 135 psi or higher for a continuous 120 second period.
15. Press appropriate MENU SELECTION switch to MODIFY SETPOINT and/or HEAT WATER. Proceed to step B to load laundry.
16. Wait for water heating to be completed (about 20 - 40 minutes) then proceed to step B to load laundry.

B. Load Laundry

1. Unlock and open drum doors.
2. Load laundry. Make sure laundry is clear of doors.
3. Close and lock drum doors. Proceed to step C to select and start laundry cycle.

C. Select/Start Laundry Cycle(s)

1. Press appropriate MENU SELECTION switch to MODIFY washing/drying temperatures and/or SELECT cycle for each drum.
2. Select START CYCLE to start laundry cycle for each drum. Proceed to step D.

D. Laundry Cycle Operation

1. Monitor display, it should read "WASH CYCLE IN PROGRESS".
2. If FRS or sanitizer need to be added proceed to step 3, otherwise proceed to step E to complete laundry cycle.
3. When audible alarm sounds press SILENCE ALARM switch.
4. Add FRS or sanitizer through sluice lid.
5. Press MENU SELECTION switch to continue cycle. Proceed to step E to complete laundry cycle.

E. Unload Laundry

1. Wait for cycle to be completed (about 60 - 70 minutes). When audible alarm sounds press SILENCE ALARM.
2. Monitor display, it should read "CYCLE COMPLETE".
3. Unlock and open drum door.
4. Unload laundry.
5. Clean lint filter.
6. Repeat steps B through E to perform additional laundry operations, otherwise proceed to step F for system shutdown.

F. System Shutdown

1. Close and lock both drum doors.
2. Monitor display at operator panel A, it should read "WASH CYCLE X".
3. Press MENU SELECTION switch to select "COLD/DOWN CYCLE".
4. Press MENU SELECTION switch to start cooldown cycle.
5. Wait for cycle to be completed (about 20 - 40 minutes). When audible alarm sounds press SILENCE ALARM switch on operator panel A.
6. Perform AFTER PMCS.
7. Position CONTROL POWER to OFF.
8. Position MAIN DISCONNECT to OFF.
9. Remove external power.

**LAUNDRY ADVANCED SYSTEM
CYCLE DESCRIPTIONS**

WASHDRY1 (BDU 70 MIN) Washdry moderately soiled BDUs		WASHDRY3 (BDU 65 MIN) Washdry lightly soiled BDUs		WASHDRYS (SLEEPING BAG) Washdry sleeping bags		WASHFRS/DRY Washdry fresh re-applications	
STEP	TIME (min)	STEP	TIME (min)	STEP	TIME (min)	STEP	TIME (min)
FILL FROM WASH TANK	1	FILL FROM WASH TANK	1	FILL FROM WASH TANK	1	FILL FROM WASH TANK	1
WASHING	4	WASHING	3	WASHING	3	WASHING	3
DRAIN TO STELL	2	DRAIN TO STELL	1	DRAIN TO STELL	2	DRAIN TO STELL	1
EXTRACT TO STELL	2	EXTRACT TO STELL	2	EXTRACT TO STELL	2	EXTRACT TO STELL	2
FILL FROM RINSE 1 TANK	1	FILL FROM RINSE 1 TANK	1	FILL FROM RINSE 1 TANK	1	FILL FROM RINSE 1 TANK	1
RINSING 1	2	RINSING 1	2	RINSING 1	2	RINSING 1	2
DRAIN TO WASH TANK	2	DRAIN TO WASH TANK	2	DRAIN TO WASH TANK	2	DRAIN TO WASH TANK	1
EXTRACT TO WASH TANK	2	EXTRACT TO WASH TANK	2	EXTRACT TO WASH TANK	2	EXTRACT TO WASH TANK	2
FILL FROM RINSE 2 TANK	1	FILL FROM RINSE 2 TANK	1	FILL FROM RINSE 2 TANK	2	PAUSE, ADD FRD	-
RINSING 2	2	RINSING 2	2	RINSING 2	2	FILL FROM RINSE 2 TANK	1
DRAIN TO RINSE 1 TANK	2	DRAIN TO RINSE 1 TANK	1	DRAIN TO RINSE 1 TANK	2	DRAIN TO RINSE 2 TANK	12
EXTRACT TO RINSE 1 TANK	8	EXTRACT TO RINSE 1 TANK	8	EXTRACT TO RINSE 1 TANK	8	DRAIN TO RINSE 1 TANK	1
DRY	40	DRY	39	DRY (CHANGE DRY TEMP 140°F)	41	EXTRACT TO RINSE 1 TANK	8
COOL	1	COOL	1	COOL	1	DRY	34
TOTAL CYCLE TIME *	70	TOTAL CYCLE TIME *	65	TOTAL CYCLE TIME *	70	LOCK	1
						TOTAL CYCLE TIME *	70

WASHDRY2 (BDU 75 MIN) Washdry heavily soiled BDUs		WASHDRY4 (GORTOX) Washdry Gortex Berms		WASH/SANITIZE/DRY Washdry items requiring sanitizing		DRY ONLY (10 MIN) or (20 MIN) Dry Items for 10 or 20 minutes	
STEP	TIME (min)	STEP	TIME (min)	STEP	TIME (min)	STEP	TIME (min)
FILL FROM WASH TANK	1	FILL FROM WASH TANK	1	FILL FROM WASH TANK	3	FILL FROM WASH TANK	1
WASHING	6	WASHING	3	WASHING	3	WASHING	3
DRAIN TO STELL	2	DRAIN TO STELL	1	DRAIN TO STELL	2	DRY	10 or 20
EXTRACT TO STELL	2	EXTRACT TO STELL	2	EXTRACT TO STELL	2	COOL	4
FILL FROM RINSE 1 TANK	1	FILL FROM RINSE 1 TANK	1	FILL FROM RINSE 1 TANK	1	TOTAL CYCLE TIME *	11 or 21
RINSING 1	2	RINSING 1	2	RINSING 1	2		
DRAIN TO WASH TANK	2	DRAIN TO WASH TANK	2	DRAIN TO WASH TANK	2		
EXTRACT TO WASH TANK	2	EXTRACT TO WASH TANK	2	EXTRACT TO WASH TANK	2		
FILL FROM RINSE 2 TANK	1	FILL FROM RINSE 2 TANK	1	FILL FROM RINSE 2 TANK	2		
RINSING 2	2	RINSING 2	2	RINSING 2	2		
DRAIN TO RINSE 1 TANK	2	DRAIN TO RINSE 1 TANK	1	DRAIN TO RINSE 1 TANK	2		
EXTRACT TO RINSE 1 TANK	8	EXTRACT TO RINSE 1 TANK	8	EXTRACT TO RINSE 1 TANK	4		
DRY	43	DRY (CHANGE DRY TEMP 140°F)	25	DRY	41		
COOL	1	COOL	1	COOL	1		
TOTAL CYCLE TIME *	75	TOTAL CYCLE TIME *	51	TOTAL CYCLE TIME *	70		

CLEANHEAT WASH TANK Cleanse and heat the wash tank	
STEP	TIME (min)
TRANSFER WASH TO STELL	1
TRANSFER RINSE 1 TO WASH	1
TRANSFER RINSE TO RINSE 1	1
WATER RECYCLING, WAIT	36
TOTAL CYCLE TIME *	39

208 VOLTS

Figure 1. Main Control Enclosure, Front.

DECALS AND INSTRUCTION PLATES-CONTINUED

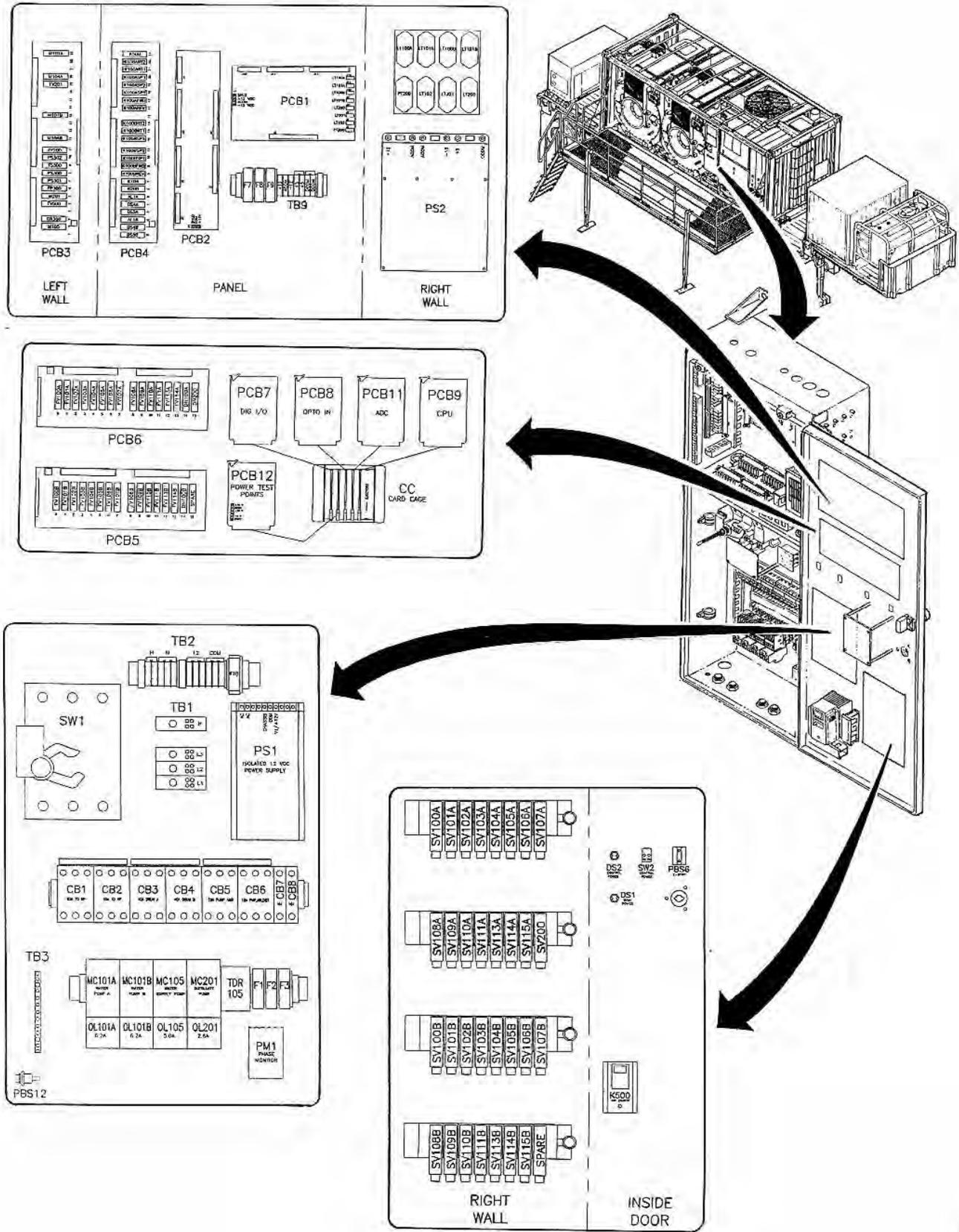


Figure 2. Main Control Enclosure, Interior.

DECALS AND INSTRUCTION PLATES-CONTINUED

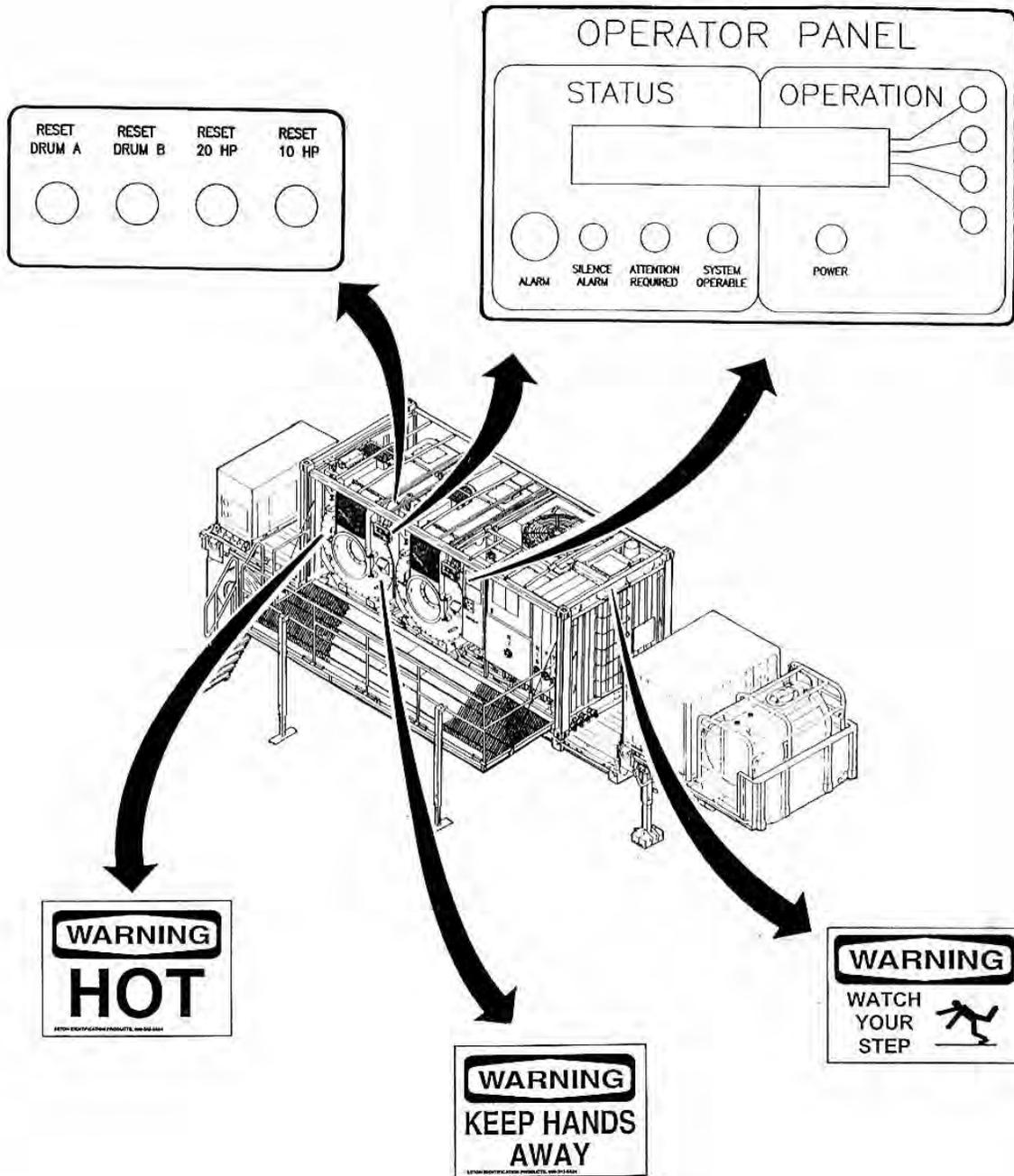
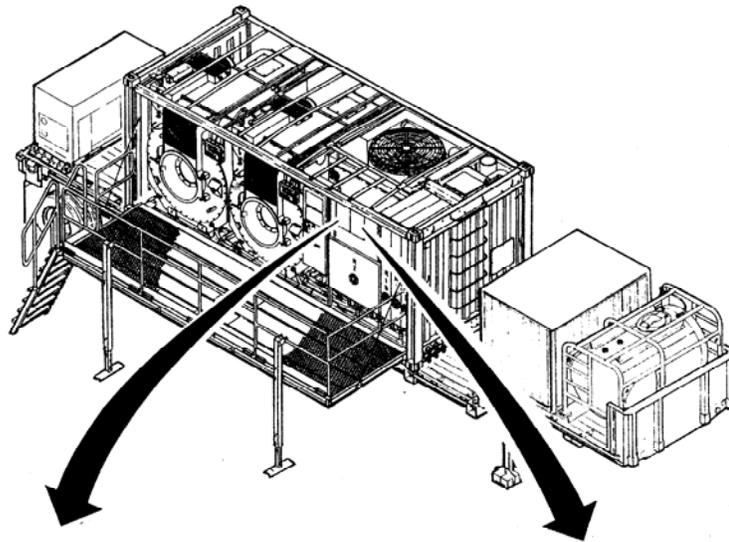


Figure 3. Warning Decals, Front of LADS.

DECALS AND INSTRUCTION PLATES-CONTINUED



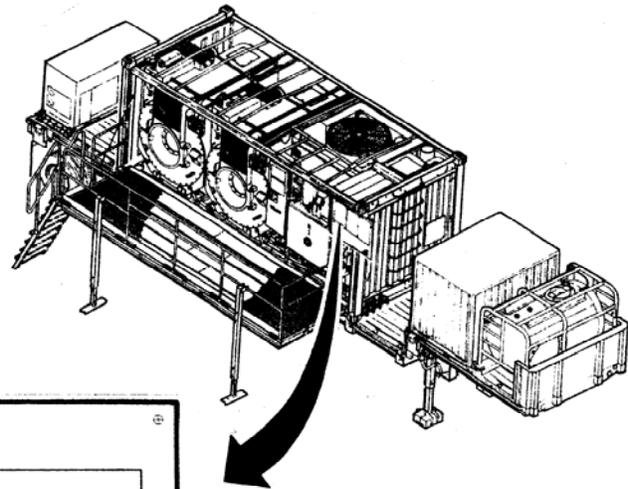
LAUNDRY ADVANCED SYSTEM		
MALFUNCTION/SYMPOM INDEX (Observed Faults)		
Malfuction/Symptom	Troubleshooting Procedure	
CONTROL SYSTEM (Main Control Enclosure Indications)		
1. CONTROL POWER lamp is not on	WP 0027 00	
2. MAIN POWER lamp is not on	WP 0027 00	
CONTROL SYSTEM (Operator Panel Indications)		
1. ALARM does not sound	Complete Cycle/Notify Maintenance	
2. ALARM will not turn off when SILENCE ALARM switch is pressed	Complete Cycle/Notify Maintenance	
3. ATTENTION REQUIRED lamp is not on	WP 0028 00	
4. Display does not come on	WP 0028 00	
5. Display comes on but has scrambled or no characters	Notify Maintenance	
6. Display state does not change when menu selection switch is pressed	Notify Maintenance	
7. SYSTEM OPERABLE lamp is not on	WP 0028 00	
CONTROL SYSTEM (Observed Faults)		
1. Inverter enclosure fan does not come on	Notify Maintenance	
2. Drum motor cooling fan does not come on	Notify Maintenance	
WASHING/DRYING SYSTEM (Observed Faults)		
1. Drum Door Will Not Open	Notify Maintenance	
2. Drum Shaking Excessively	Pause Cycle/WP 0019 00	
3. Laundry Cycle Can Not Be Started	Notify Maintenance	
4. Laundry Not Drying	WP 0019 00	
5. R2 Tank Not Heating	WP 0019 00	
6. Water Spraying From Blower During Extract	Complete Cycle/Notify Maintenance	
7. Water Not Draining From Drum	Pause Cycle/WP 0019 00	
8. Water Visible at Rear Seal of Drum	Complete Cycle/WP 0019 00	
WATER RECYCLE SYSTEM (Observed Faults)		
1. Cooledown or Drain Cycle Will Not Finish	Notify Maintenance	
2. Recycled Water Temperature High	Complete Cycle(s) WP 0021 00	
3. Still Door(s) Will Not Open	WP 0021 00	
HEATING SYSTEM (Observed Faults)		
1. Heater Smoking	WP 0023 00	
2. Fuel Pumps Will Not Prime	WP 0023 00	
AIR SYSTEM (Observed Faults)		
1. Air Compressor Does Not Come On	WP 0025 00	
2. Water In Air Lines	Complete Cycle/Notify Maintenance	
AUXILIARY EQUIPMENT (Observed Faults)		
1. Auxiliary Overhead Light Does Not Turn On	WP 0030 00	

LAUNDRY ADVANCED SYSTEM		
MALFUNCTION/SYMPOM INDEX (Operator Panel Alarm Messages)		
FAILURE MESSAGE	ALARM LEVEL	OPERATOR ACTION
Air Compr Inverter Fault	3	Pause Cycle(s)/WP 0026 00
Air Product Press Lo	4	WP 0026 00
Air Product Press Hi	3	Complete Cycle(s)/Notify Maintenance
Air Tank Not Pressurizing	4	WP 0026 00
Air Tank Press Hi	3	Complete Cycle(s)/Notify Maintenance
Ambient Air Temp Hi	3	Complete Cycle(s)/WP 0020 00
Ambient Air Temp Lo	3	Complete Cycle(s)/WP 0020 00
Burner Blwr In Press Lo	3	Pause Cycle(s)/WP 0024 00
Burner Blwr Out Press Lo	3	Pause Cycle(s)/WP 0024 00
Burner Blower Overload	3	Pause Cycle(s)/Notify Maintenance
Condensate Temp Hi	3	Complete Cycle(s)/WP 0022 00
Condensate Temp Lo	3	Complete Cycle(s)/Notify Maintenance
Condenser Fan Overload	3	End Cycle(s)/Notify Maintenance
CPU Test Failure (Only at Startup)	4	WP 0029 00
Distillate Pump Overload	3	Notify Maintenance

LAUNDRY ADVANCED SYSTEM		
MALFUNCTION/SYMPOM INDEX (Operator Panel Alarm Messages CONT.)		
FAILURE MESSAGE	ALARM LEVEL	OPERATOR ACTION
Drum X Braking Slow	3	Complete Cycle/Notify Maintenance
Drum X Inverter Fault	3	Pause Cycle/WP 0020 00
Drum X No Rotation	3	Pause Cycle/WP 0020 00
Drum X Stalling	2	Pause Cycle/WP 0020 00
Drum X Will Not Balance	2	WP 0020 00
Drum Door X Not Locked	2	WP 0020 00
Dryer X Inlet Temp Hi	3	Pause Cycle/WP 0020 00
Dryer X Inlet Temp Lo	3	Pause Cycle/WP 0020 00
Dryer Blower X Overload	3	Pause Cycle/Notify Maintenance
Emergency Stop Activated	4	WP 0029 00
Fuel Level Lo	3	Pause Cycle(s)/WP 0024 00
Fuel Pressure Lo	3	Pause Cycle(s)/WP 0024 00
Fuel Pump Overload	3	Pause Cycle/Notify Maintenance
Heating System Failure	3	Pause Cycle(s)/WP 0024 00
LT100X Failure	3	Complete Cycle/Notify Maintenance
LT101X Failure	3	Complete Cycle/Notify Maintenance
LT102 Failure	3	End Cycle/Notify Maintenance
LT200 Failure	3	Complete Cycle/Notify Maintenance
LT201 Failure	3	End Cycle/Notify Maintenance
PCB3 SSR X FAULT	3	Complete Cycle(s)/Notify Maintenance
PT200 Failure	4	Notify Maintenance
PT300 Failure	3	Complete Cycle(s)/Notify Maintenance
PT301 Failure	3	Complete Cycle(s)/Notify Maintenance
PT302 Failure	3	Complete Cycle(s)/Notify Maintenance
PT500 Failure	4	Notify Maintenance
PT501 Failure	4	Notify Maintenance
RAM Test Failure (Only at Startup)	4	WP 0029 00
ROM Test Failure (Only at Startup)	4	WP 0029 00
R1 Tank X Not Emptying	3	Pause Cycle/WP 0020 00
R1 Tank X Not Filling	3	Pause Cycle/WP 0020 00
R2 Tank Not Emptying	3	Pause Cycle(s)/WP 0020 00
R2 Tank Not Filling	3	Pause Cycle(s)/WP 0020 00
R2 Water Temp Hi	3	Complete Cycle/WP 0020 00
R2 Water Temp Lo	3	Complete Cycle/WP 0020 00
Stall Sensing Fault	3	Complete Cycle(s)/Notify Maintenance
Standpipe Level Lo	3	Complete Cycle(s)/WP 0022 00
Standpipe Not Emptying	3	WP 0022 00
Still Door(s) Open	2	WP 0022 00
Still Not Boiling Down	3	Complete Cycle(s)/Notify Maintenance
Still Not Filling	3	Complete Cycle(s)/WP 0022 00
Still Press Hi	3	WP 0022 00
Still Press Lo	3	Complete Cycle(s)/Notify Maintenance
Still Temp Lo	3	Complete Cycle(s)/Notify Maintenance
TE00X Failure	3	Complete Cycle(s)/Notify Maintenance
TE300 Failure	3	End Cycle/Notify Maintenance
TF Flow Lo	3	End Cycle(s)/WP 0024 00
TF Pump Inlet Press Lo	3	End Cycle(s)/WP 0024 00
TF Pump Outlet Press Hi	3	End Cycle(s)/Notify Maintenance
TF Pump Outlet Press Lo	3	End Cycle(s)/WP 0024 00
TF Pump Overload	3	End Cycle(s)/Notify Maintenance
TF Temp Hi	3	End Cycle(s)/Notify Maintenance
TF Temp Hi Limit	3	End Cycle(s)/Notify Maintenance
TF Temp Lo	3	End Cycle(s)/Notify Maintenance
VREF(S) Out Of Range	3	End Cycle(s)/Notify Maintenance
Wash Tank X Not Emptying	3	Pause Cycle/WP 0020 00
Wash Tank X Not Filling	3	Pause Cycle/WP 0020 00
Water Pump X Overload	3	Pause Cycle/Notify Maintenance
Water Supply Pump Overload	3	Complete Cycle(s)/Notify Maintenance
10 HP Inverter Fault	3	Pause Cycle(s)/WP 0020 00
20 HP Inverter Fault	3	Pause Cycle(s)/WP 0022 00

Figure 4. Malfunction Index Placards.

DECALS AND INSTRUCTION PLATES-CONTINUED



LAUNDRY ADVANCED SYSTEM		
INPUT INDEX		
ANALOG INPUTS		
SENSOR	FUNCTION	RANGE
LT100A	Wash Tank A Level	0-75 GALS
LT100B	Wash Tank B Level	0-75 GALS
LT101A	Rinse 1 Tank A Level	0-75 GALS
LT101B	Rinse 1 Tank B Level	0-75 GALS
LT102	Rinse 2 Tank Level	0-160 GALS
LT200	Still Level	0-14 INCHES
LT201	Standpipe Level	0-25 INCHES
PT200	Still Internal Pressure	0-5 PSIG
PT300	Thermal Fluid Pump Inlet Pressure	VAC-15 PSIG
PT301	Thermal Fluid Pump Outlet Pressure	0-100 PSIG
PT302	Heater Thermal Fluid Outlet Pressure	0-100 PSIG
PT500	Air Tank Storage Pressure	0-200 PSIG
PT501	Product Air Pressure	0-200 PSIG
TE100	Ambient Air Temperature	-58 - 212 F
TE101A	Dryer A Inlet Temperature	-58 - 392 F
TE101B	Dryer B Inlet Temperature	-58 - 392 F
TE102A	Dryer A Outlet Temperature	-58 - 392 F
TE102B	Dryer B Outlet Temperature	-58 - 392 F
TE103	Rinse 2 Tank Outlet Water Temperature	-58 - 212 F
TE200	Still Internal Temperature	-58 - 392 F
TE201	Still Condenser Outlet Water Temperature	-58 - 392 F
TE202	Rinse 2 Tank Inlet Water Temperature	-58 - 392 F
TE300	Heater Outlet Thermal Fluid Temperature	-58 - 482 F
VREFL	PCB1 Voltage Reference Lo	0.75 - 0.79 VDC
VREFH	PCB1 Voltage Reference Hi	9.20 - 9.25 VDC
DISCRETE INPUTS		
DEVICE	FUNCTION	STATUS
FP300	Flame Programmer Alarm Signal	OFF=Normal/ON=Fault Detected
K100A	Drum A Inverter Fault Signal	OFF=Normal/ON=Fault
K100B	Drum B Inverter Fault Signal	OFF=Normal/ON=Fault
K104	Dryer Blowers A and B Inverter Fault Signal	OFF=Normal/ON=Fault
K200	Still Condenser Fan/Heating System Inverter Fault Signal	OFF=Normal/ON=Fault
K500	Air Compressor Inverter Fault Signal	OFF=Normal/ON=Fault
OL101A	Water Pump A Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL101B	Water Pump B Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL104A	Dryer Blower A Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL104B	Dryer Blower B Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL105	Water Supply Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL200	Still Condenser Fan Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL201	Distillate Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL300	Thermal Fluid Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL301	Burner Blower Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL302	Fuel Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
P8S5A	Operator Panel A SILENCE ALARM Switch	OFF=Released/ON=Depressed
P8S5B	Operator Panel B SILENCE ALARM Switch	OFF=Released/ON=Depressed
P8300	Burner Blower Air Inlet Pressure Switch	OFF=Low Air Press/ON=Normal Air Press
P8301	Burner Blower Air Outlet Pressure Switch	OFF=Low Air Press/ON=Normal Air Press
P8302	Burner Fuel Pressure Switch	OFF=Low Fuel Press/ON=Normal Fuel Press
T8300	Thermal Fluid Temperature Limit Switch	ON=Normal Temp/OFF=High Temp
ZS100A	Drum Door A Position Switch	OFF=Door Open/ON=Door Closed
ZS100B	Drum Door B Position Switch	OFF=Door Open/ON=Door Closed
ZS101A	Drum Door Lock A Position Switch	OFF=Retracted/ON=Extended
ZS101B	Drum Door Lock B Position Switch	OFF=Retracted/ON=Extended
ZS102A	Drum A Rotation Sensor	OFF=Spoke Not Aligned/ON=Spoke Aligned
ZS102B	Drum B Rotation Sensor	OFF=Spoke Not Aligned/ON=Spoke Aligned
ZS103A	Drum A Balance Switch	OFF=Balanced/ON=Not Balanced
ZS103B	Drum B Balance Switch	OFF=Balanced/ON=Not Balanced
ZS200	Still Doors Position Switch	OFF=Door(s) Open/ON=Doors Closed

Figure 5. Input Index Placard.

DECALS AND INSTRUCTION PLATES-CONTINUED

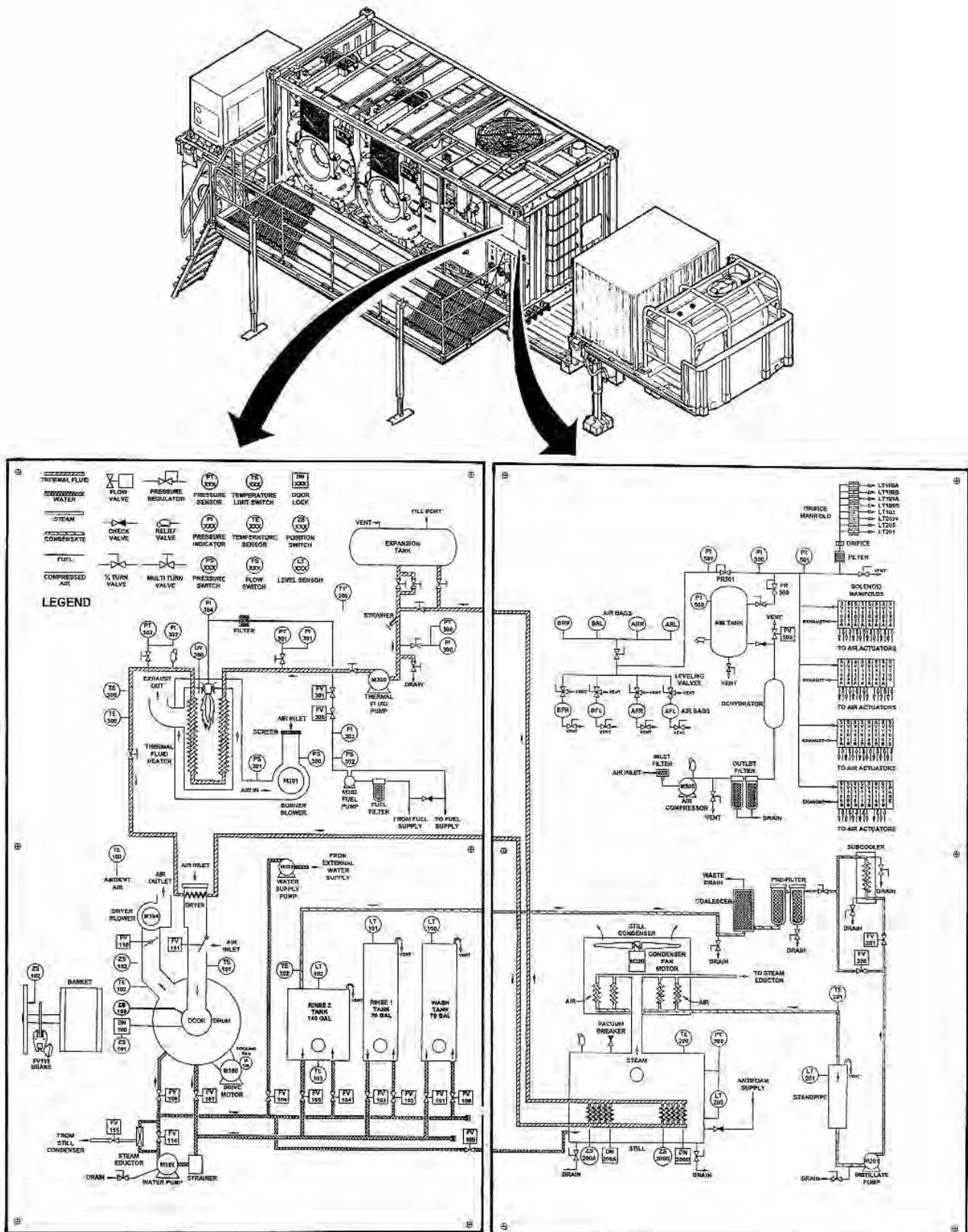


Figure 6. Systems Diagram Placards.

DECALS AND INSTRUCTION PLATES-CONTINUED

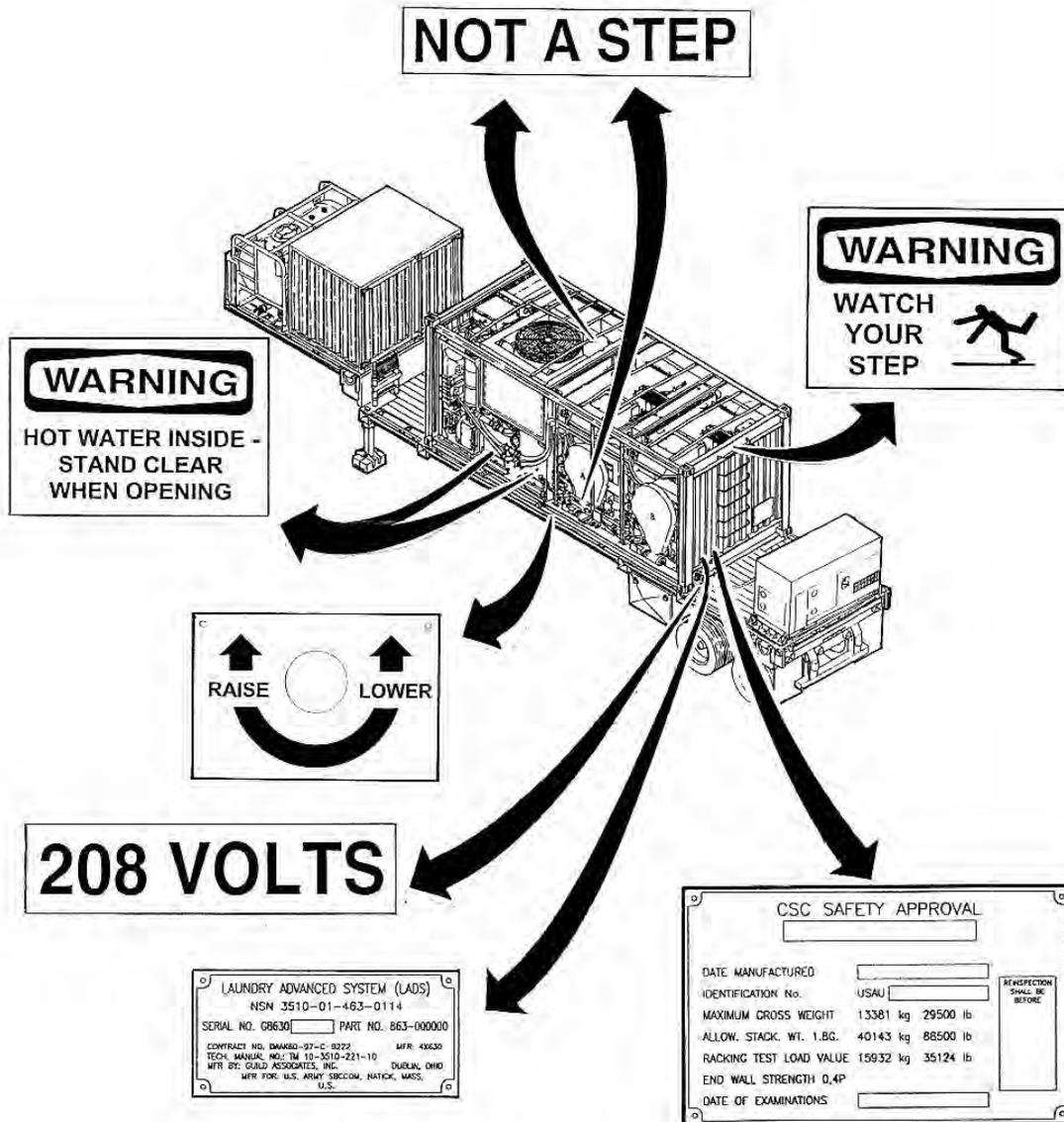


Figure 7. Decals and Placards, Rear of LADS.

DECALS AND INSTRUCTION PLATES-CONTINUED

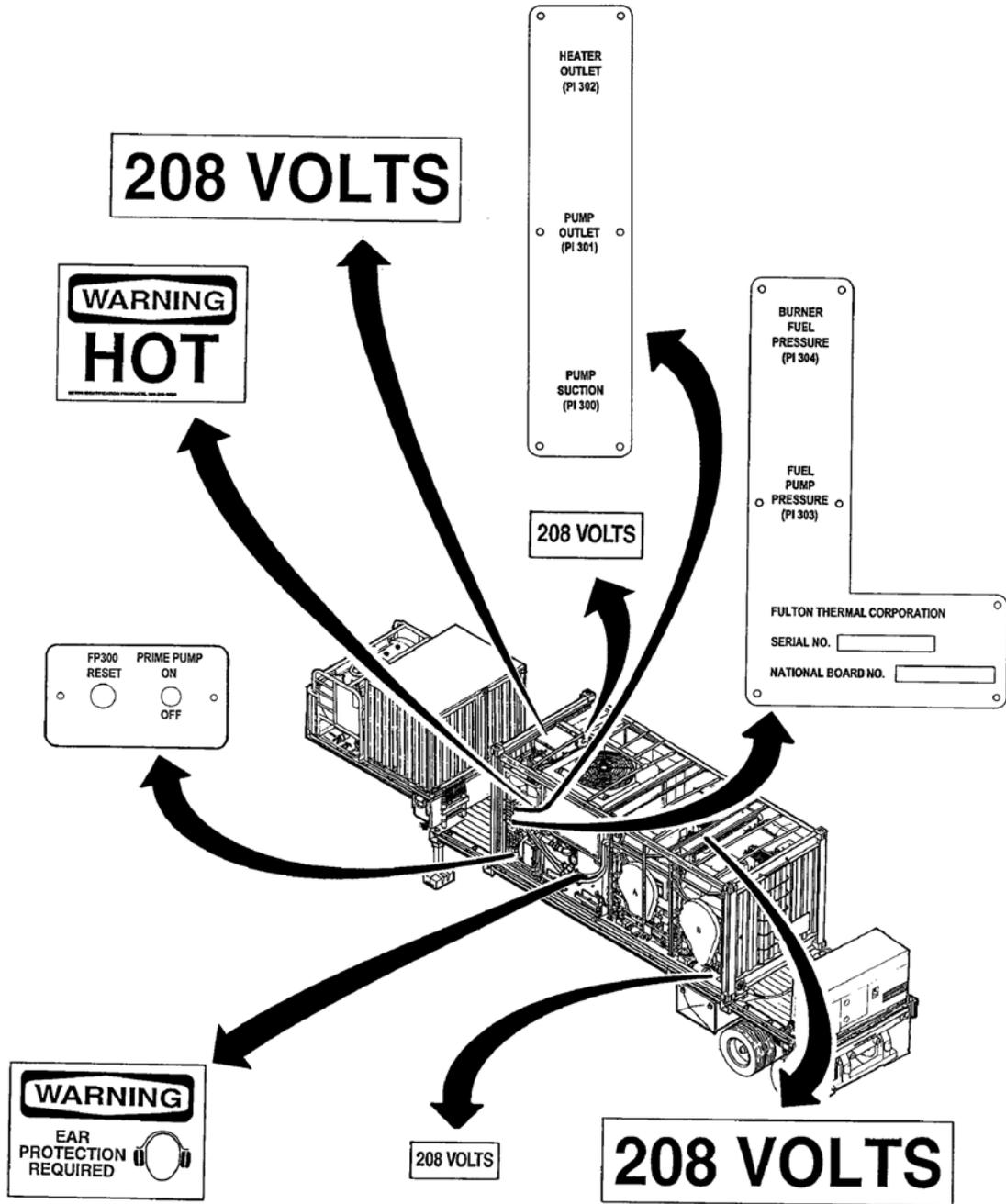


Figure 8. Decals and Placards, Rear of LADS-Continued.

END OF WORK PACKAGE

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
DECALS AND INSTRUCTION PLATES
LADS MODEL D**

DECALS AND INSTRUCTION PLATES

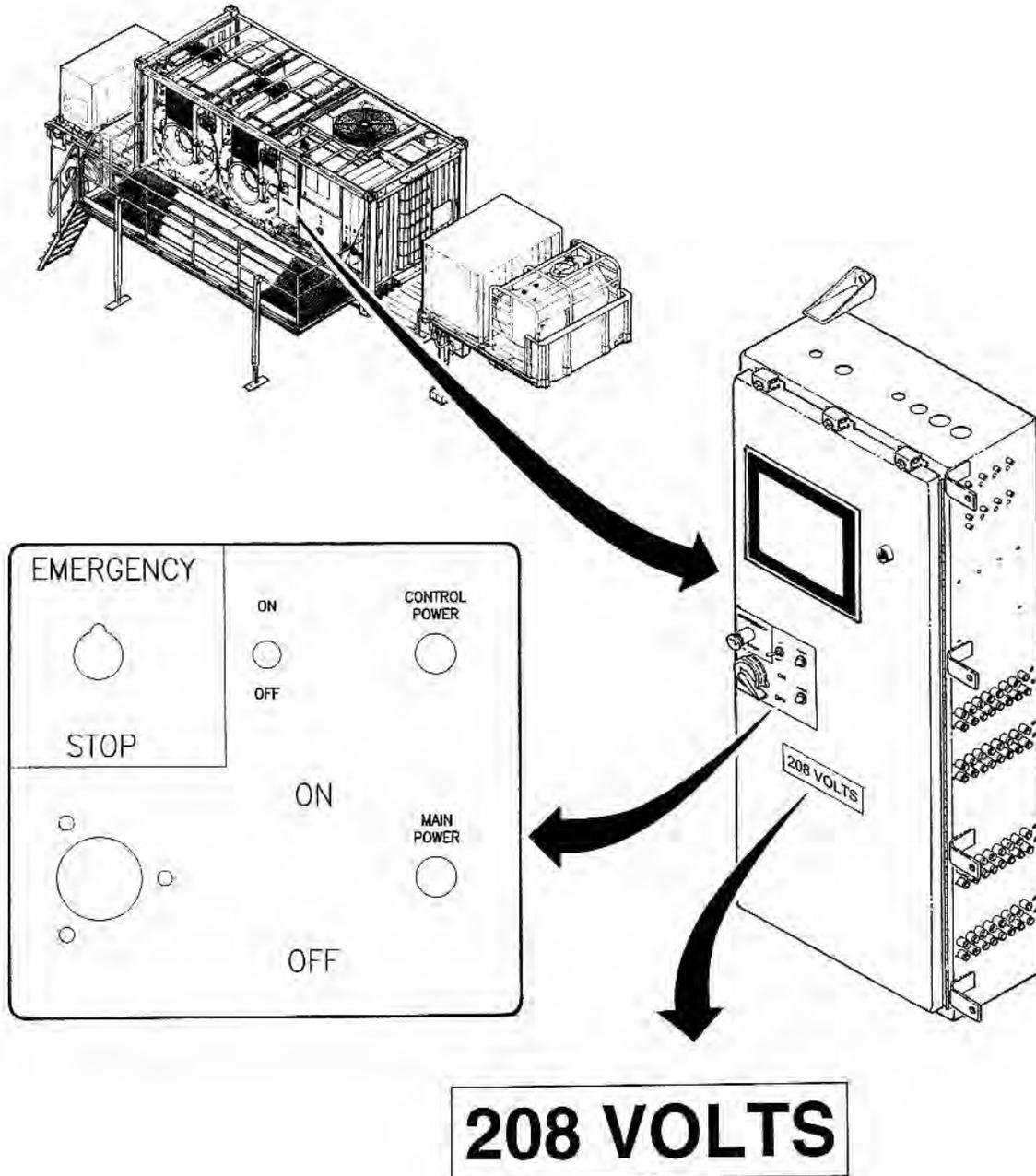


Figure 1. Main Control Enclosure, Front.

DECALS AND INSTRUCTION PLATES-CONTINUED

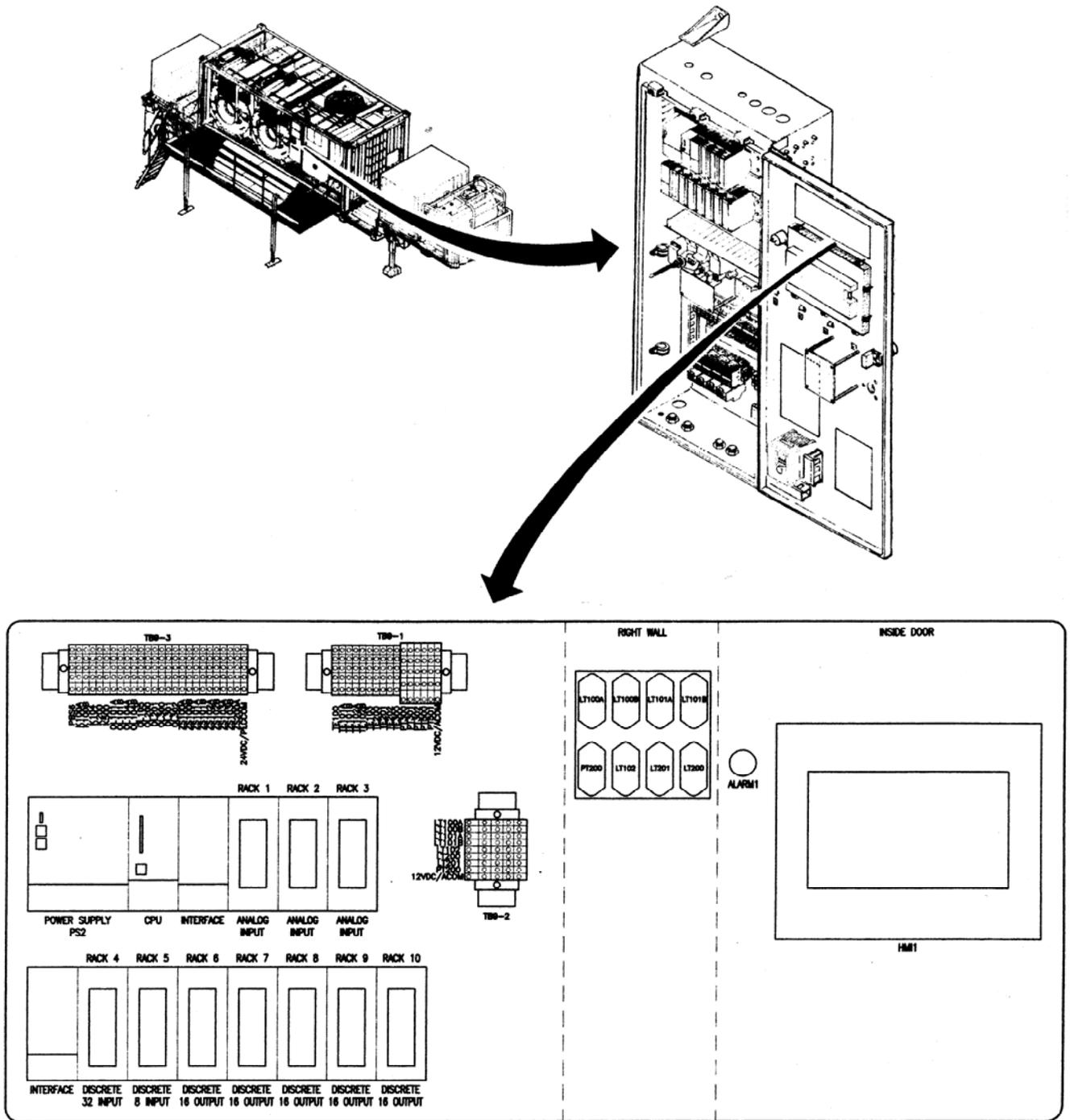


Figure 2. Main Control Enclosure, Interior (Sheet 1 of 2).

DECALS AND INSTRUCTION PLATES-CONTINUED

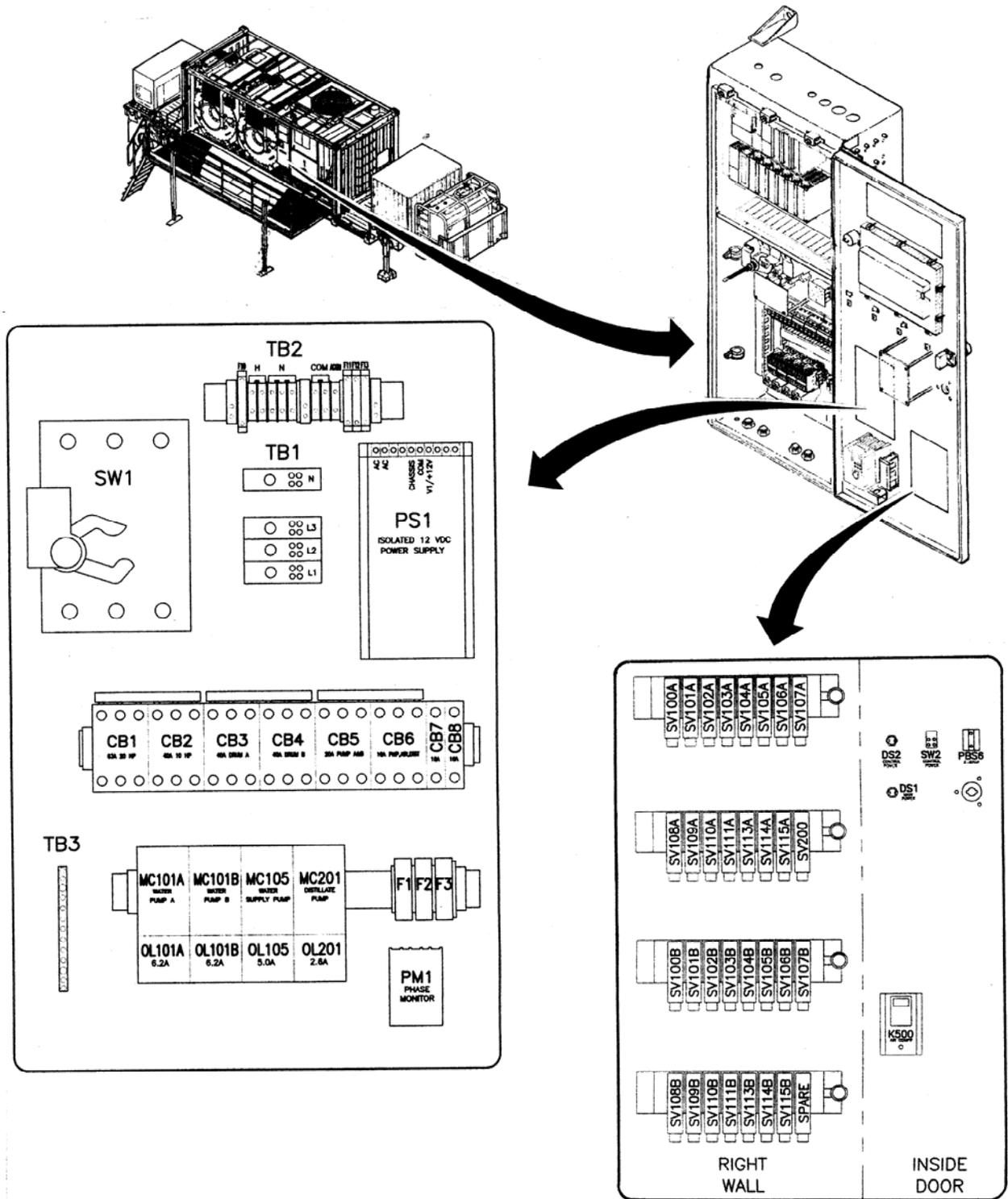


Figure 2. Main Control Enclosure, Interior (Sheet 2 of 2).

DECALS AND INSTRUCTION PLATES-CONTINUED

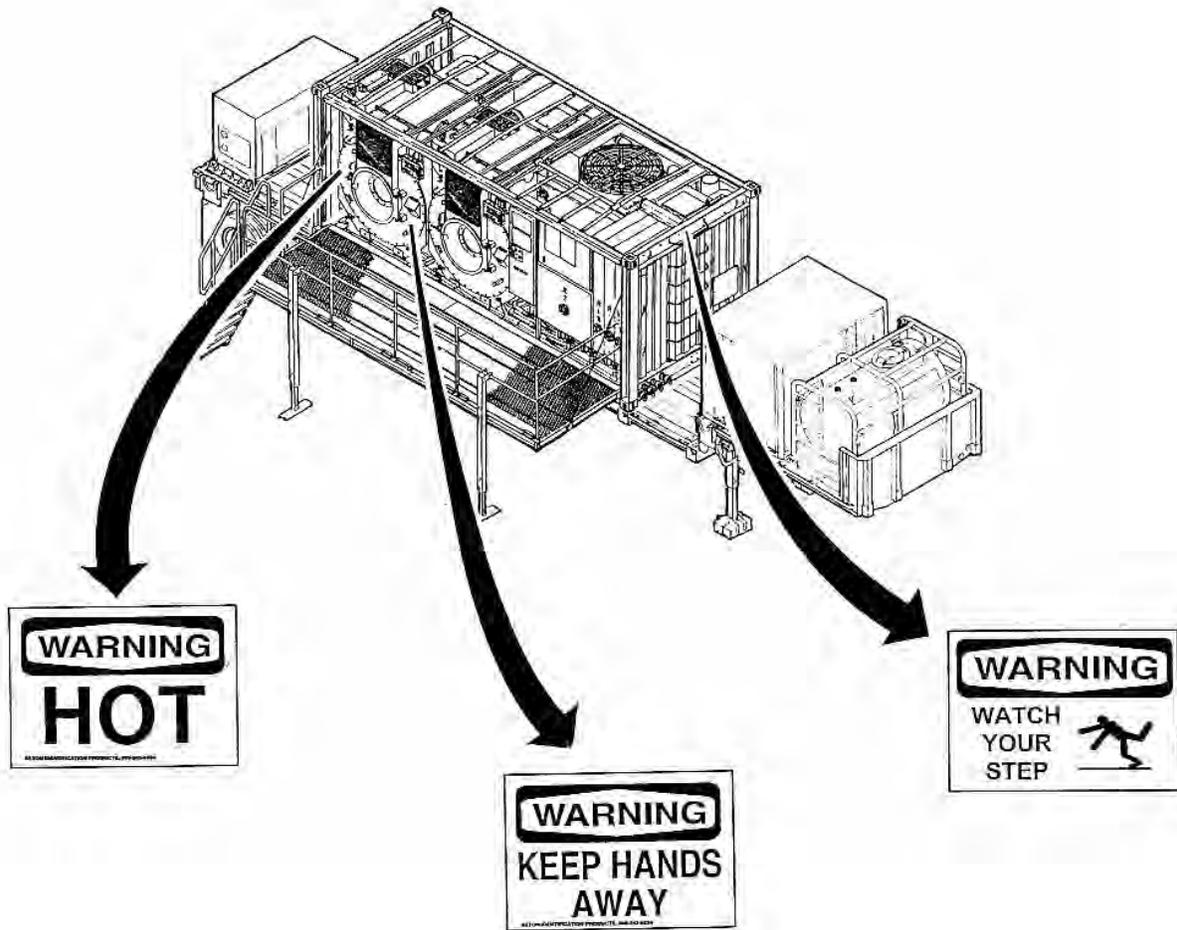


Figure 3. Warning Decals, Front of LADS.

DECALS AND INSTRUCTION PLATES-CONTINUED

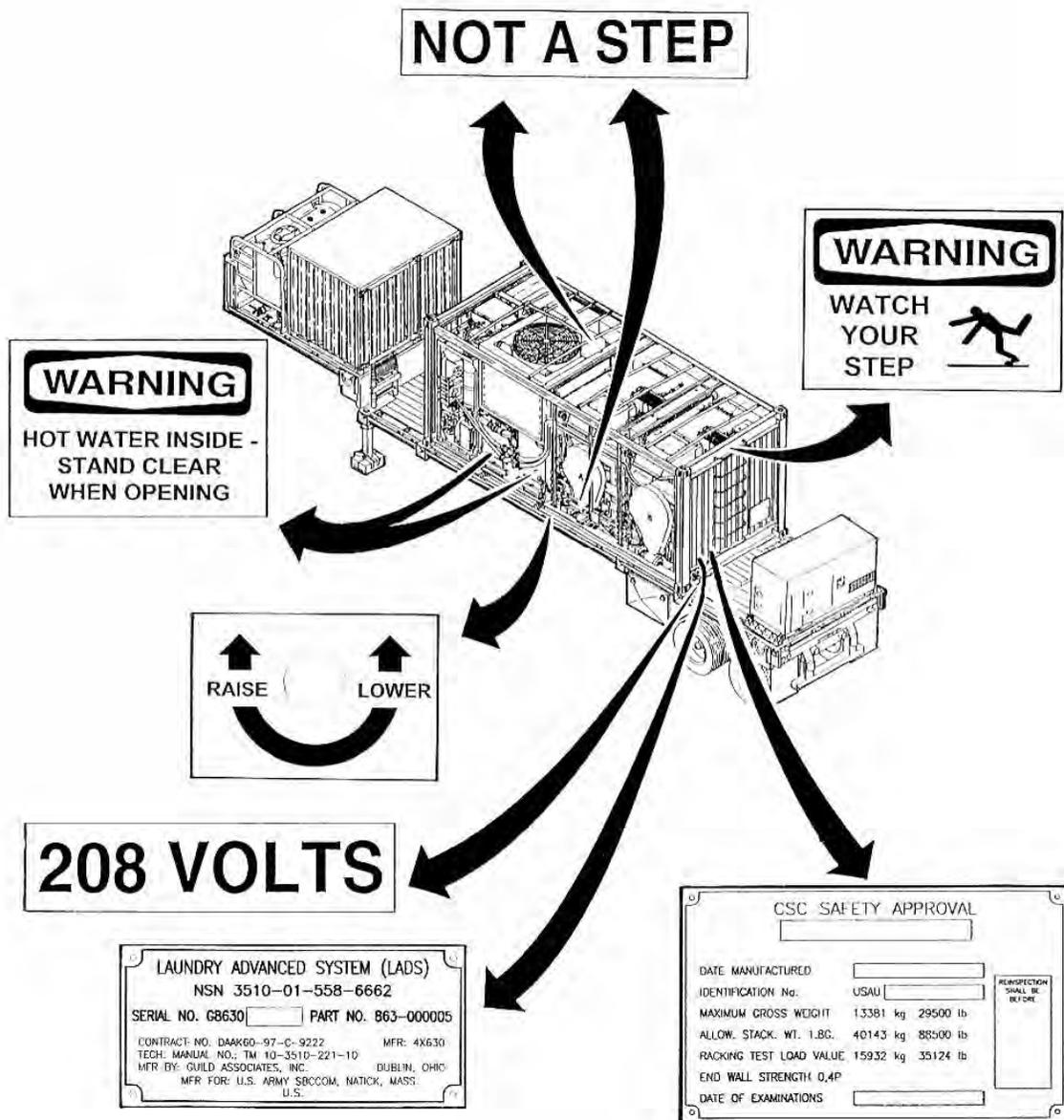


Figure 4. Decals and Placards, Rear of LADS.

DECALS AND INSTRUCTION PLATES-CONTINUED

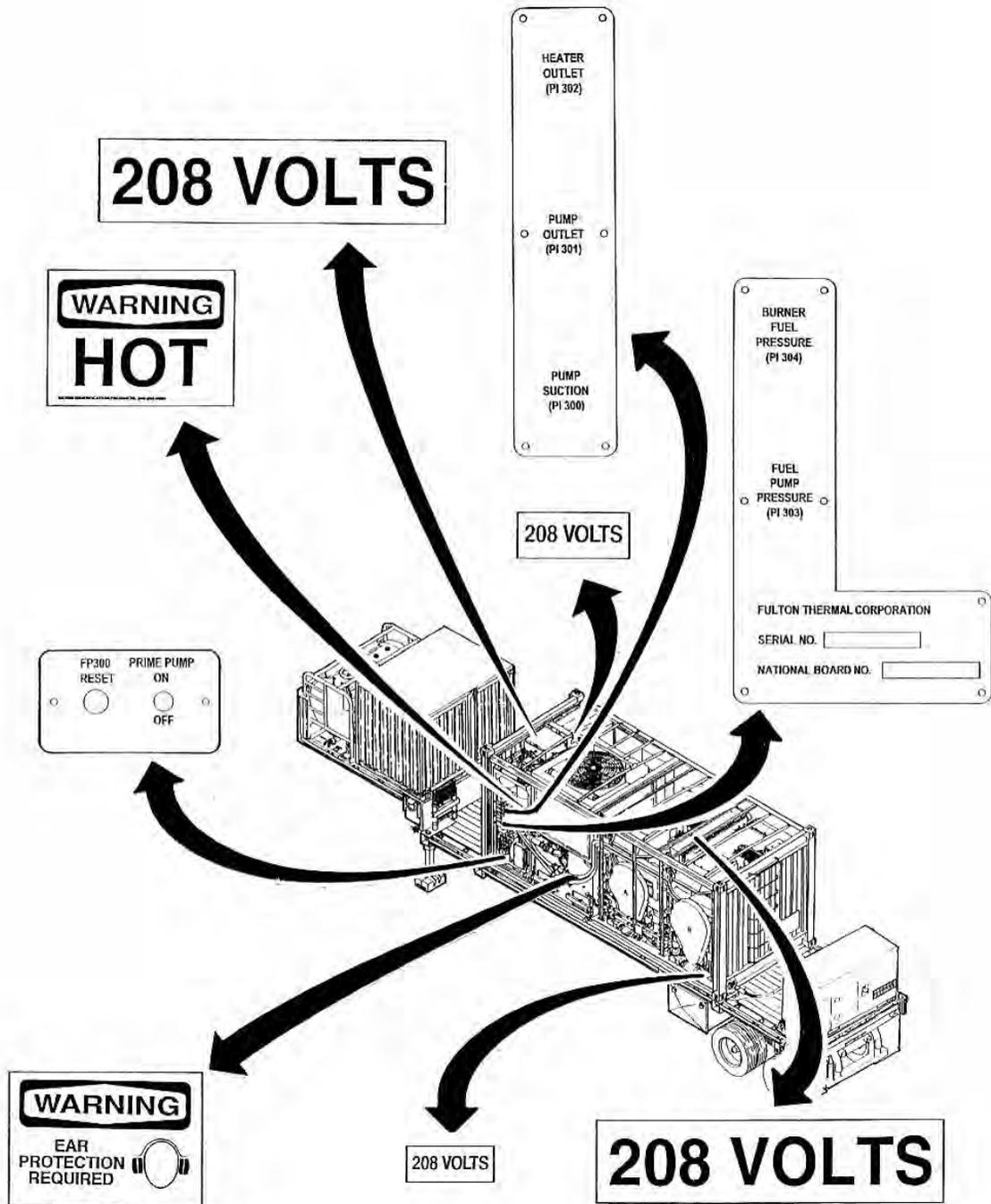


Figure 5. Decals and Placards, Rear of LADS-Continued.

END OF WORK PACKAGE

**CREW MAINTENANCE
OPERATION UNDER USUAL CONDITIONS
PREPARATION FOR MOVEMENT**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit Assembly, Operator (WP 0066, Table 2)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (4)

Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

Water drained from LADS IAW WP 0016, Model C

or WP 0017, Model D

Lockout applied (WP 0009)

References

TM 9-6115-644-10

TM 10-5410-284-13&P

DISCONNECT WATER DRAIN**CAUTION**

Never transport LADS full of water. Water in tanks causes unnecessary stress on the tank and may lead to cracks in tank walls.

1. Stow coalescer drain tube (Figure 1, Item 5) between still (Figure 1, Item 4) and heater (Figure 1, Item 3).
2. Disconnect 50-ft drain hose (Figure 1, Item 2) from drain port (Figure 1, Item 6).
3. Roll up two 50-ft hoses (Figure 1, Item 2) as follows:
 - a. Roll up hose (Figure 1, Item 2) small enough to fit into drum.
 - b. Connect end fittings (Figure 1, Item 1) together.
 - c. Install two straps (Figure 1, Item 10).
 - d. Repeat for 50-hose that was removed from pre-wash manifold during drain cycle.
4. Disconnect two 50-ft drain hoses (Figure 1, Item 7) from each other.
5. Roll up 50-ft drain hoses (Figure 1, Item 7) as follows:
 - a. Roll up hoses (Figure 1, Item 7) as tight as possible.
 - b. Connect end fittings (Figure 1, Item 8) together.
 - c. Install strap (Figure 1, Item 9).

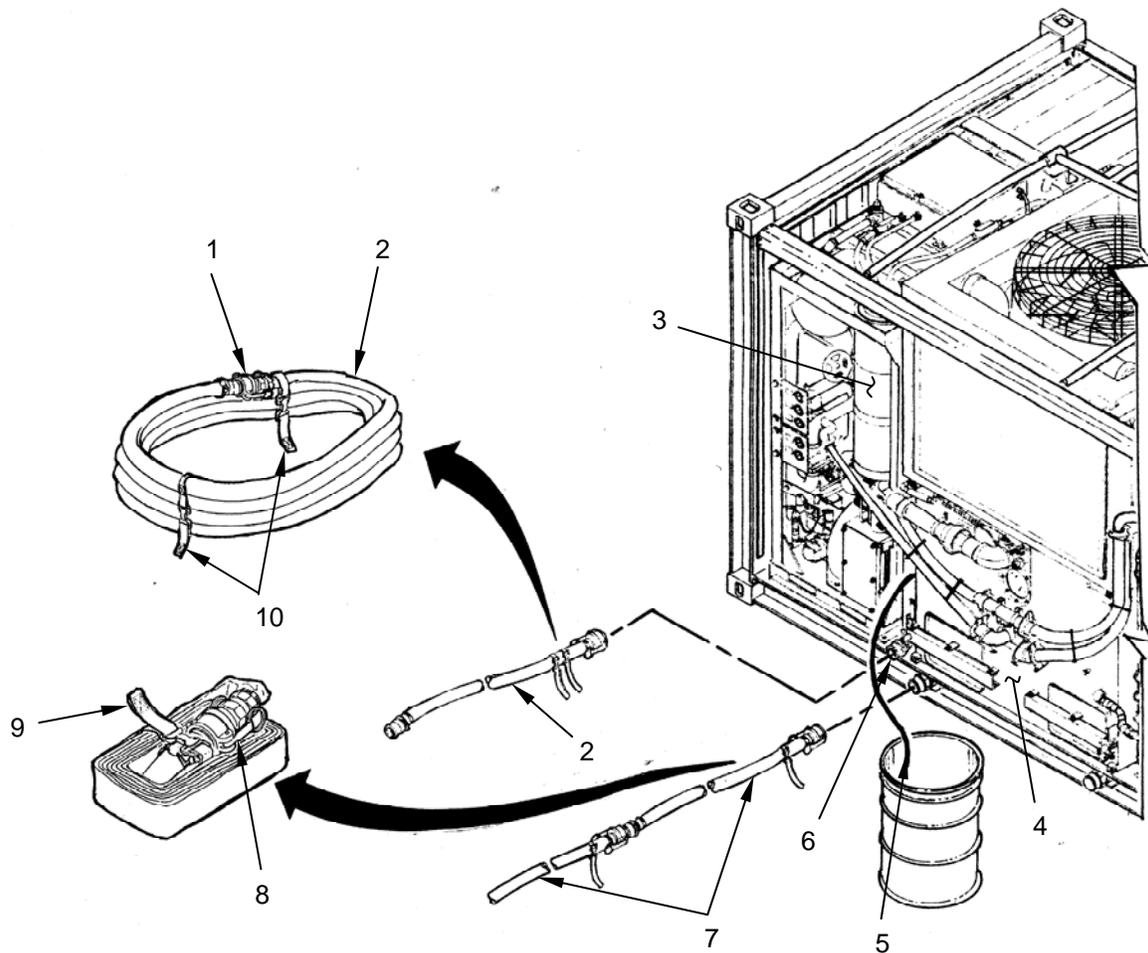
DISCONNECT WATER DRAIN-CONTINUED

Figure 1. Water Drain Components.

END OF TASK**DISCONNECT WATER SUPPLY**

1. Disconnect electrical cable (Figure 2, Item 5) at junction box (Figure 2, Item 6).
2. Roll up electrical cable (Figure 2, Item 5), connect end connections (Figure 2, Item 7) together, then install two straps (Figure 2, Item 4).
3. Disconnect two 50-ft water supply hoses (Figure 2, Item 3) from each other.
4. Roll up each 50-ft water supply hose (Figure 2, Item 3) as follows:
 - a. Roll up hose (Figure 2, Item 3) small enough to fit into drum.
 - b. Connect end fittings (Figure 2, Item 8) together.
 - c. Install two straps (Figure 2, Item 4).

DISCONNECT WATER SUPPLY-CONTINUED

5. Disconnect 10-ft water supply hose (Figure 2, Item 2) at water supply (Figure 2, Item 1).
6. Connect end fittings (Figure 2, Item 9) on hose (Figure 2, Item 2) together.

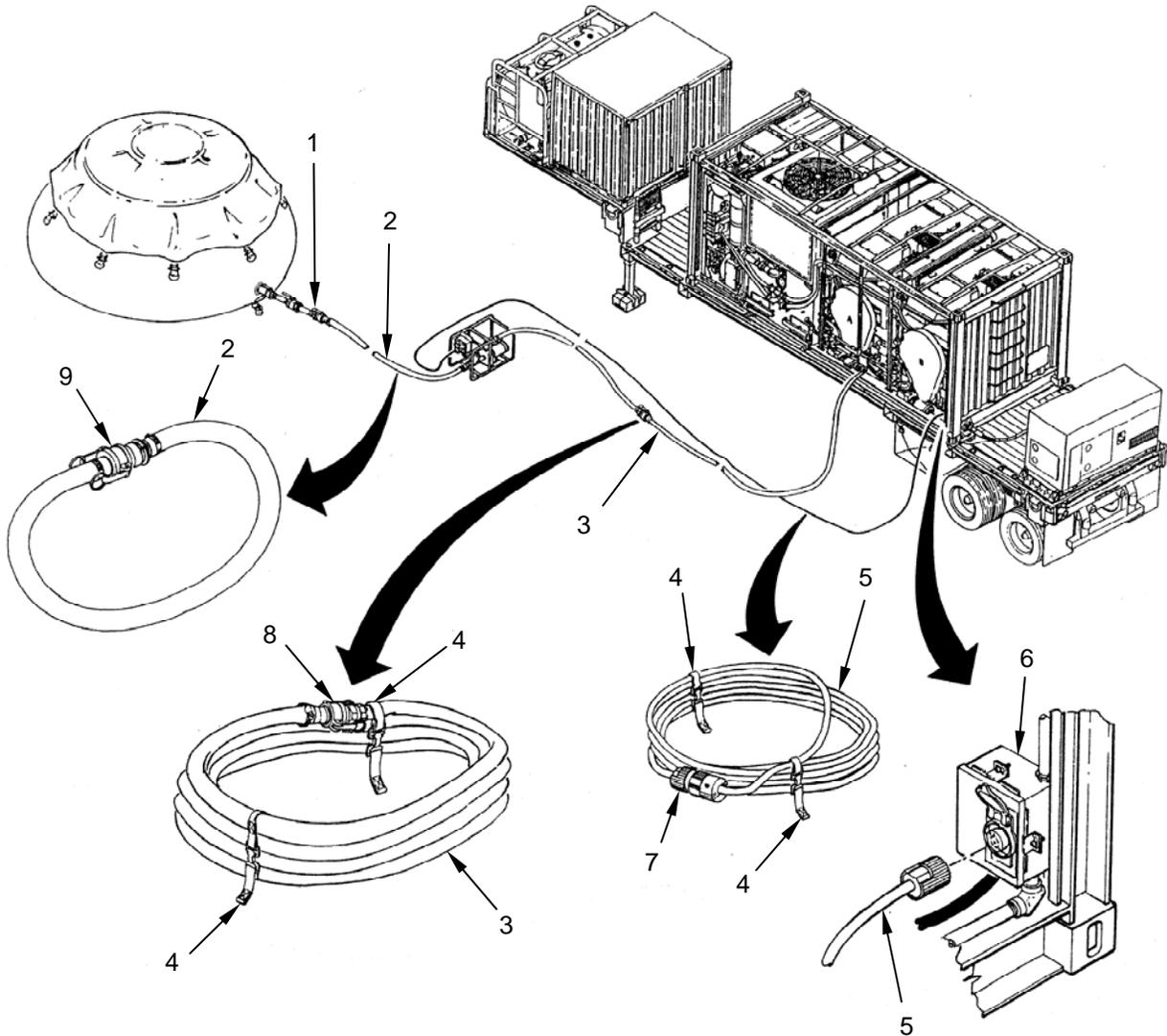


Figure 2. Water Supply Components.

END OF TASK

LOWER DRUMS

**WARNING**

Keep hands and feet clear of drums bottoms when venting air bags. Failure to follow this precaution could result in severe personal injury. Seek immediate medical attention if injury occurs.

NOTE

In order for drums to rest properly on ISO frame, air pressure must be vented from front air bags before air pressure is vented from rear air bags.

1. Verify manual valve (Figure 3, Item 1) is closed.
2. Open four manual valves (Figure 3, Item 3) under four front air bags (Figure 3, Item 2).
3. Wait for air pressure to vent from front air bags (Figure 3, Item 2) then open manual valve (Figure 3, Item 1).
4. Wait for air pressure to vent from rear air bags (Figure 3, Item 4) then close manual valves (Figure 3 Item 3).

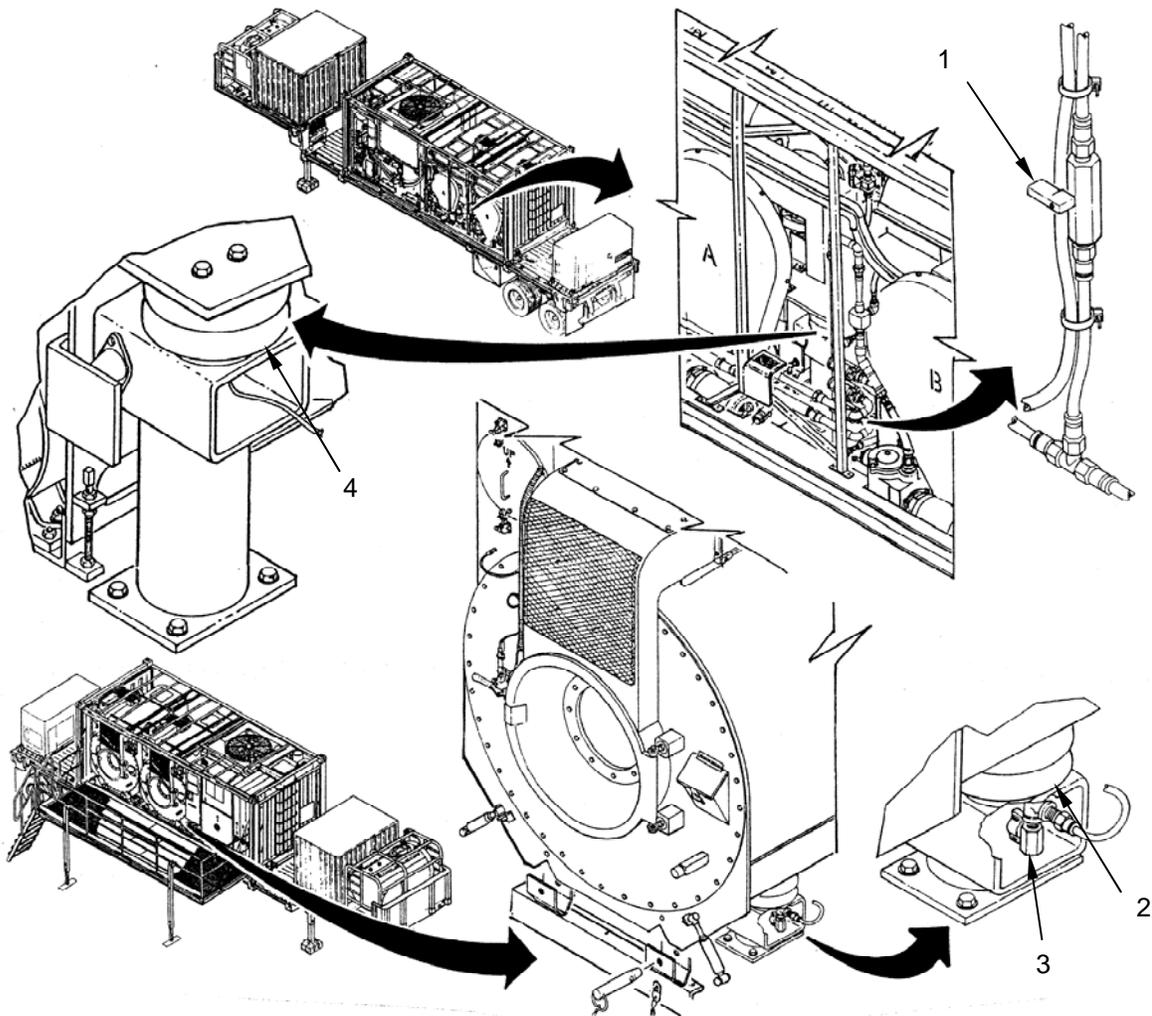


Figure 3. Air Bag Locations.

END OF TASK

SECURE DRUMS

1. Insert four pins (Figure 4, Item 5) to secure front of drums (Figure 4, Item 2) to ISO frame (Figure 4, Item 3).
2. Rotate pins (Figure 4, Item 5) as necessary to ensure ball (Figure 4, Item 4) is contacting ISO frame (Figure 4, Item 3).

CAUTION

Load binders only need to be tightened until all slack is removed between hook points. Over or Under-tightening load binders can cause drums to shift, causing difficulty when removing load binders and front pins during set-up.

3. Install four load binders (Figure 4, Item 1) at hook points (Figure 4, Item 12) and (Figure 4, Item 8) as follows:
 - a. Attach hook (Figure 4, Item 11) to hook point (Figure 4, Item 12).
 - b. Thread eye (Figure 4, Item 6) in or out as necessary then attach to hook point (Figure 4, Item 8).
 - c. Position catch (Figure 4, Item 9) to tightening position then rotate barrel (Figure 4, Item 7) to hand-tighten load binder.
 - d. Use handle (Figure 4, Item 10) to tighten load binder until all slack is removed from hook point (Figure 4, Item 12) to hook point (Figure 4, Item 8).

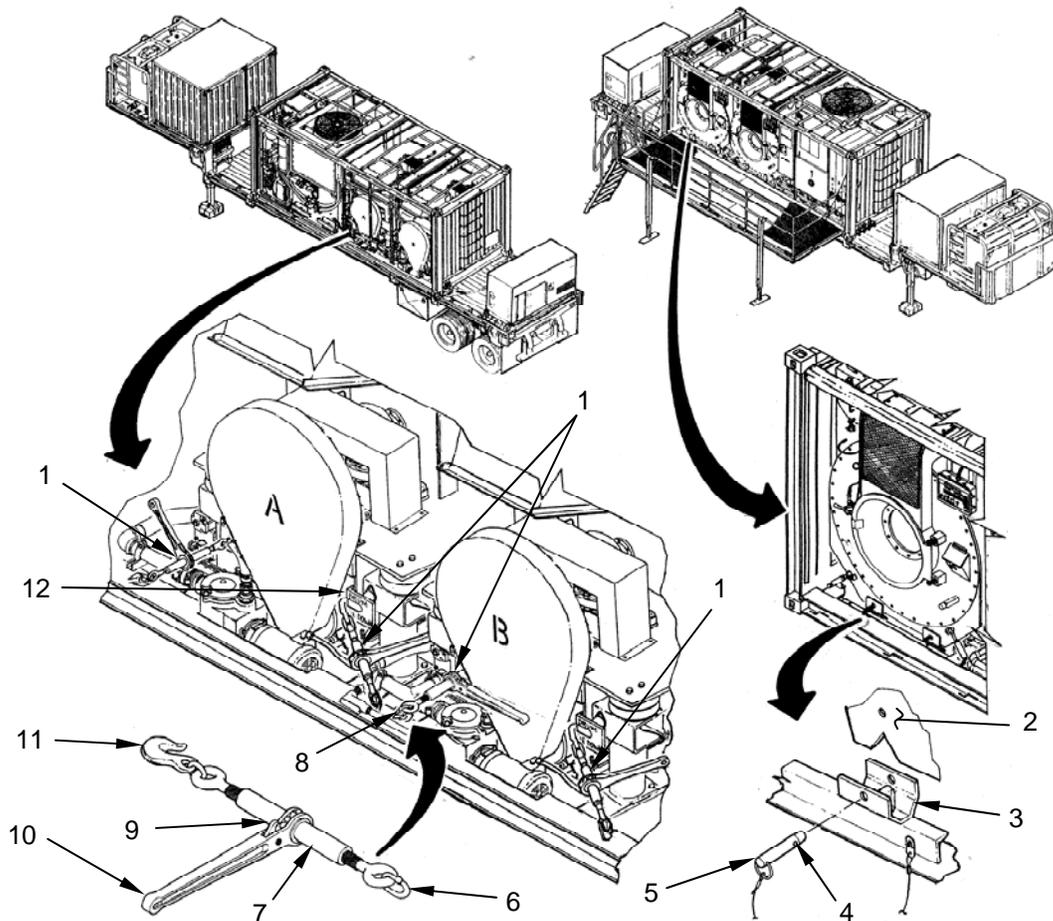


Figure 4. Securing Drums.

END OF TASK

STOW EQUIPMENT IN DRUMS

1. Pull out on handles (Figure 5, Item 2) and open doors (Figure 5, Item 5).
2. Stow items in drum A as follows:
 - a. 10-ft water supply hose (Figure 5, Item 6), qty 1.
 - b. 50-ft water supply hoses (Figure 5, Item 8), qty 4.
3. Stow items in drums B as follows:
 - a. 5-ft drain hose (Figure 5, Item 7), qty 1.
 - b. Utility hose (Figure 5, Item 11), qty 1.
 - c. 50-ft drain hoses (Figure 5, Item 10), qty 2.
 - d. Spray nozzle (Figure 5, Item 1), qty 1.
 - e. 100-ft electrical cable (Figure 5, Item 9), qty 1.
4. Close drum doors (Figure 5, Item 5) then push in on handles (Figure 5, Item 2) to lock doors.
5. Ensure sluice lids (Figure 5, Item 3) are closed and latches (Figure 5, Item 4) are engaged.

STOW EQUIPMENT IN DRUMS-CONTINUED

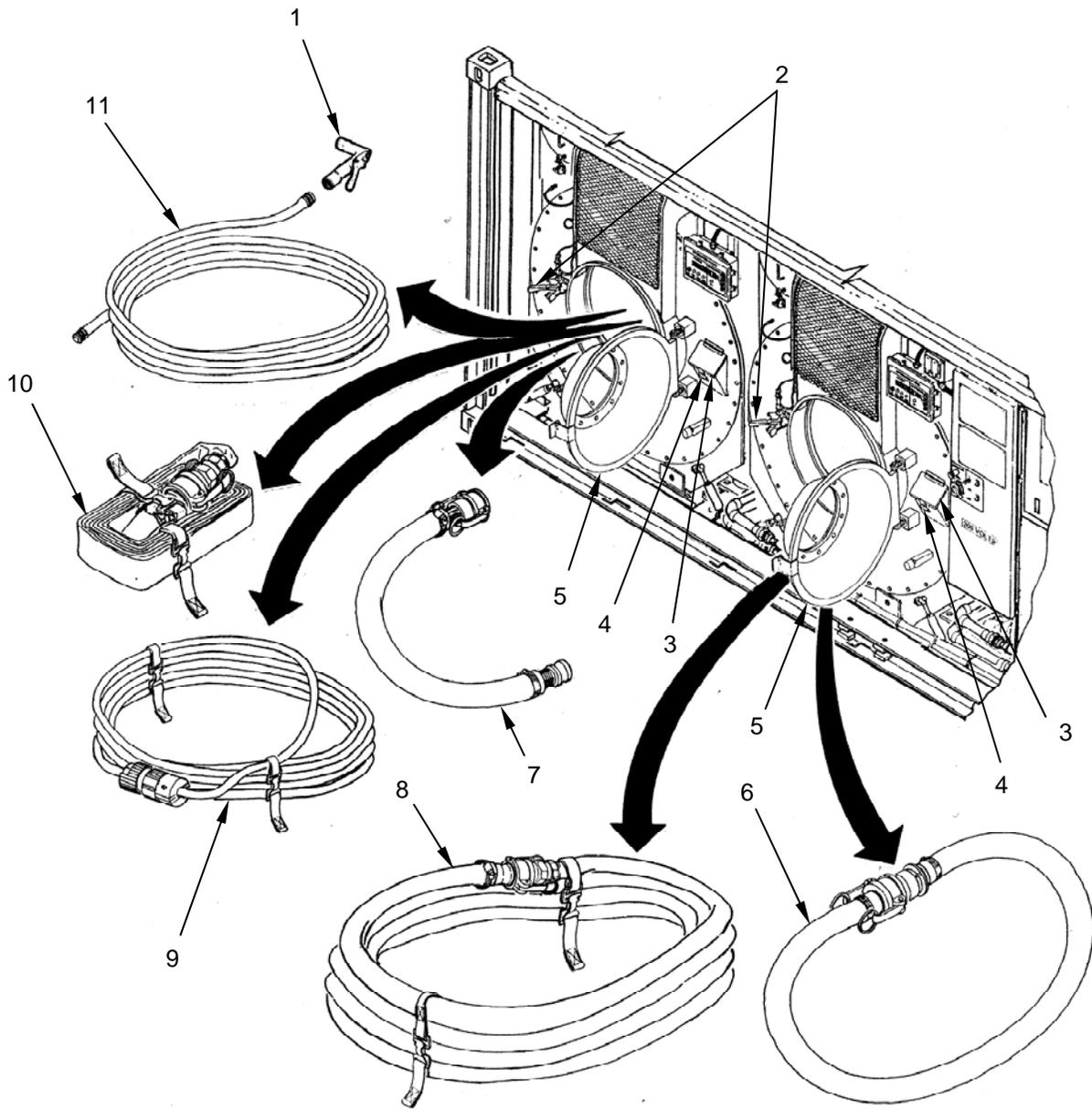


Figure 5. Equipment Stowed in Drums.

END OF TASK

STOW EXHAUST DUCT

1. Pull exhaust duct extension (Figure 6, Item 1) up out of exhaust stack (Figure 6, Item 2).
2. Flip exhaust duct extension (Figure 6, Item 1) over and place inside exhaust stack (Figure 6, Item 2).

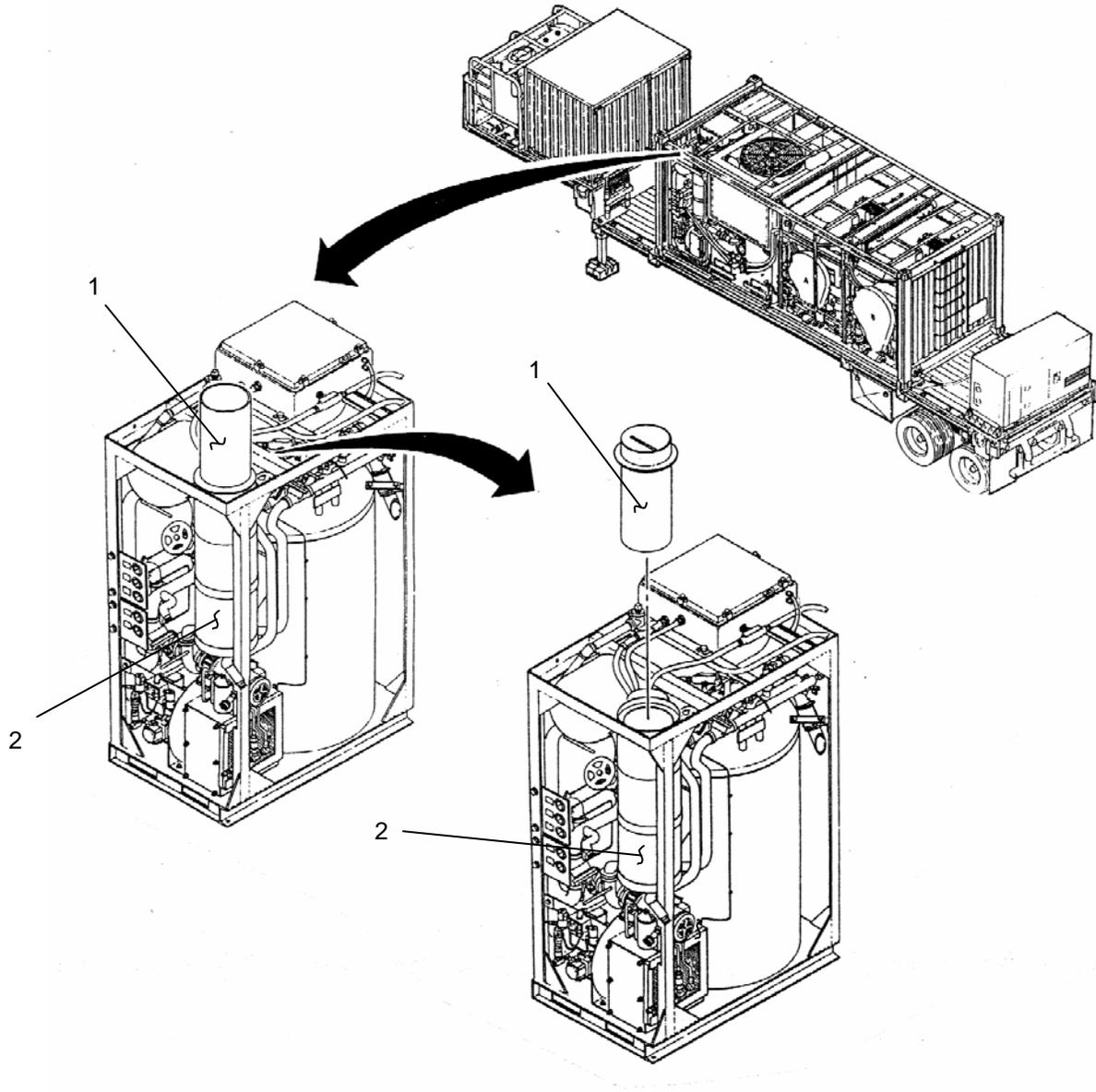


Figure 6. Stowing Exhaust Duct.

END OF TASK

DISCONNECT FUEL SUPPLY**WARNING**

The fuel, JP-8 or DF-2, used in the LADS is a combustible liquid. Vapors and liquids may ignite or explode. Do not smoke or use open flames when disconnecting fuel hoses. Flames and fire can occur resulting in severe burns, personal injury, or death. Wear protective impermeable gloves and eye protection. Avoid contact with skin, eyes and clothes. Flush eyes if exposed to fuel. Do not breath vapors. Seek immediate medical attention if injury occurs.

CAUTION

Hose(s) connections must not be left uncovered when stowed. Dirt or other contamination on connections can cause damage to heater fuel system.

Do not store fuel hoses inside drums. Fuel leaking into drums will contaminate the water plumbing and cause an odor in laundry during subsequent operations.

1. Determine what fuel connection set-up was used during operation. If the LADS was connected to fuel tank on the M871A3 trailer, follow steps 2 through 12. If the LADS was connected to another external fuel supply follow steps 2 through 9 and 13 through 16.
2. Disconnect fuel hose (Figure 7, Item 3) from fuel hose (Figure 7, Item 1).
3. Install cap (Figure 7, Item 6) on fuel hose (Figure 7, Item 3) and dust plug (Figure 7, Item 7) on fuel hose (Figure 7, Item 1).
4. Disconnect fuel hose (Figure 7, Item 3) from adapter (Figure 7, Item 2).
5. Install cap (Figure 7, Item 4) on fuel hose (Figure 7, Item 3) and plug (Figure 7, Item 5) on adapter (Figure 7, Item 2).
6. Roll up fuel hose (Figure 7, Item 3).

DISCONNECT FUEL SUPPLY-CONTINUED

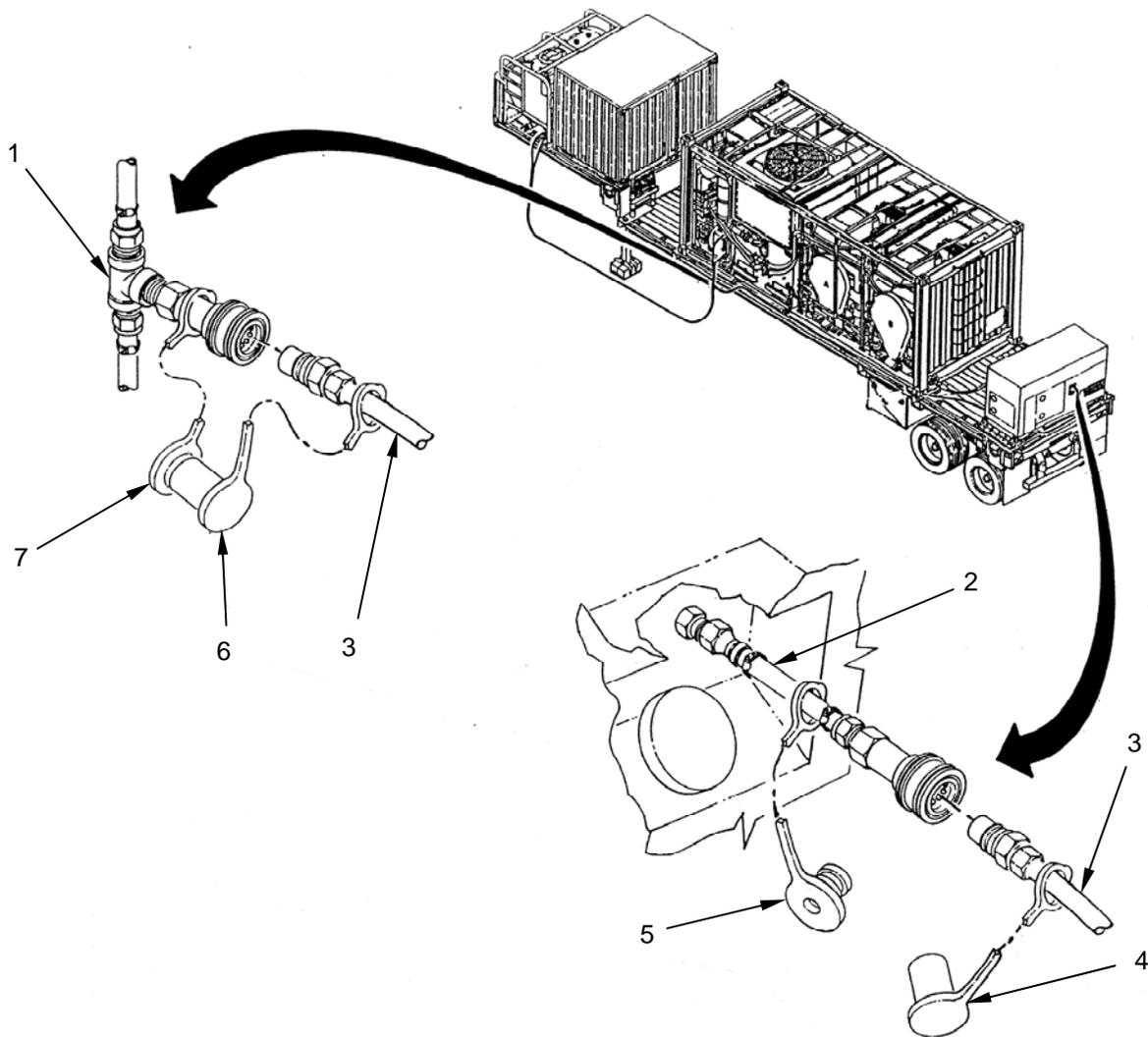


Figure 7. Fuel Supply Disconnection Points.

DISCONNECT FUEL SUPPLY-CONTINUED

CAUTION

Do not reconnect adapter to fuel hose once it has been removed from generator. Making connection to hose will release internal shutoff in quick-connect fitting causing all fuel trapped inside hose to leak out.

7. Disconnect adapter (Figure 8, Item 3) from MEP-805A generator (TM 9-6115-644-10).
8. Disconnect fuel hose (Figure 8, Item 6) at heater connections (Figure 8, Items 1 and 5).
9. Install dust plugs (Figure 8, Item 2) and caps (Figure 8, Item 4) onto fuel hose (Figure 8, Item 6) and heater connections (Figure 8, Items 1 and 5).

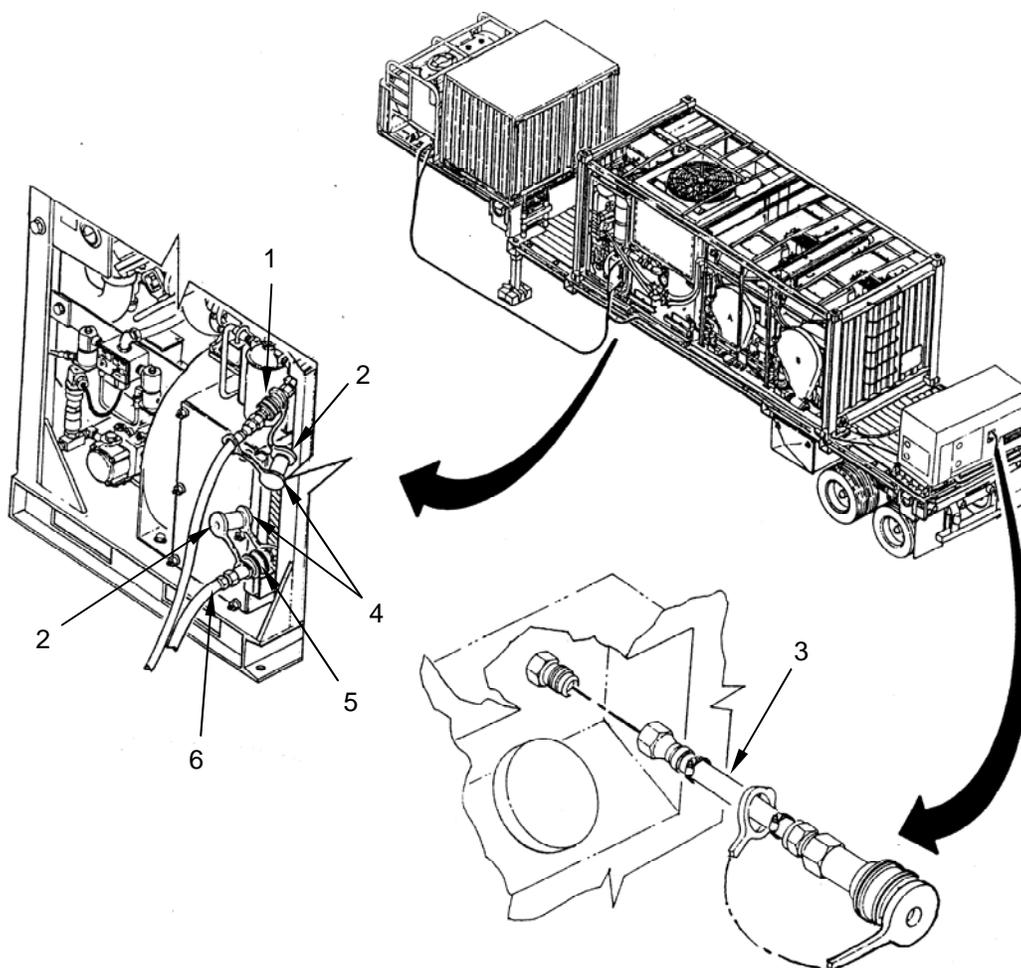


Figure 8. Fuel Supply Adapter Disconnection.

DISCONNECT FUEL SUPPLY-CONTINUED

10. Disconnect fuel hose (Figure 9, Item 8) at fuel tank connections (Figure 9, Items 5 and 6).
11. Install dust plugs (Figure 9, Item 4) and caps (Figure 9, Item 7) onto fuel hose (Figure 9, Item 8) and fuel tank connections (Figure 9, Items 5 and 6).
12. Roll up fuel hose (Figure 9, Item 8) while draining fuel back into fuel supply.
13. Disconnect fuel hose (Figure 9, Item 8) at fuel probe (Figure 9, Item 1).
14. Install plugs (Figure 9, Item 9) onto fuel hose end fittings (Figure 9, Items 2 and 10).
15. Remove fuel probe (Figure 9, Item 1) from fuel supply.
16. Proceed to Disconnect Electrical Power Source.

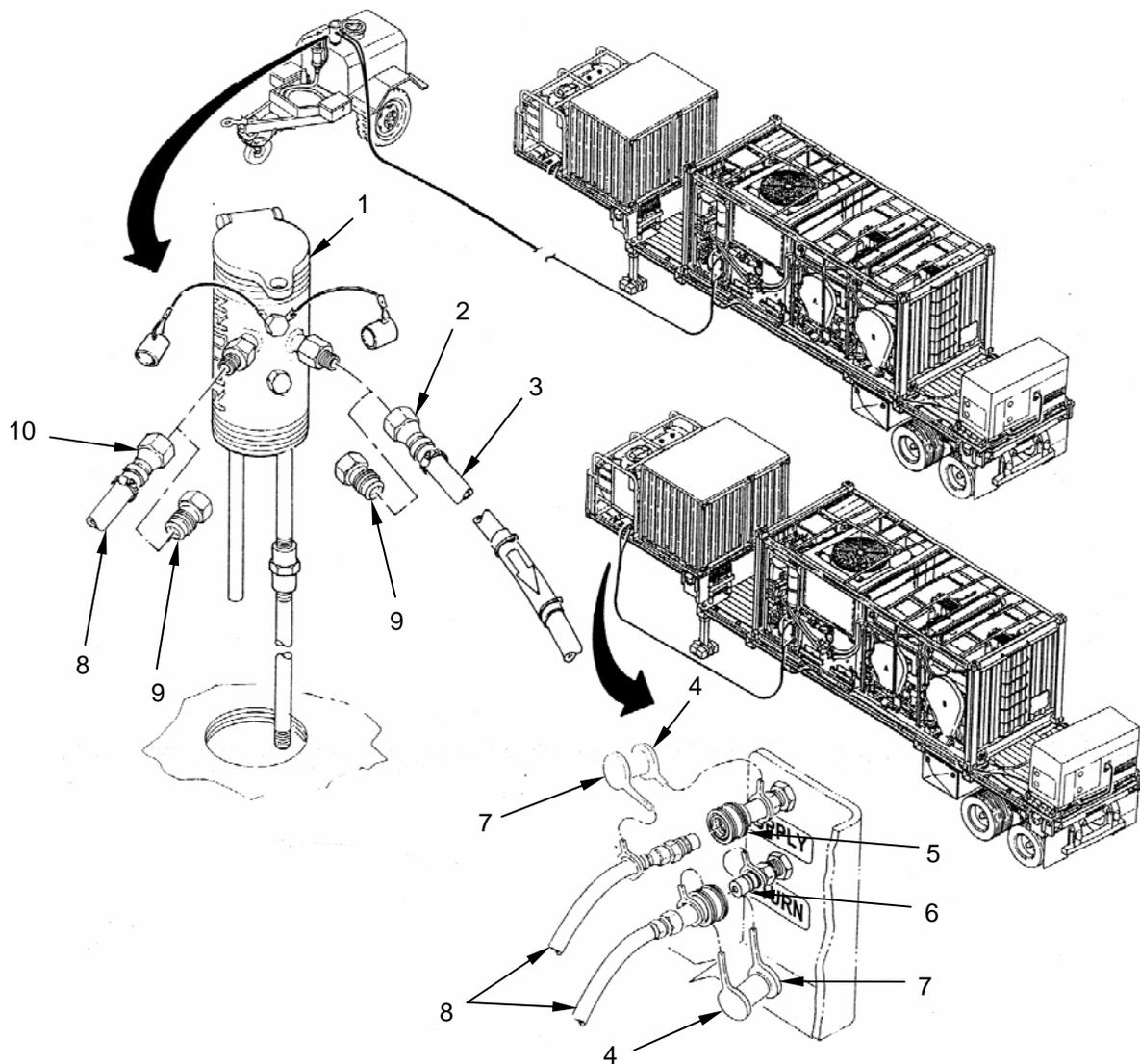


Figure 9. Fuel Probe Disconnection.

END OF TASK

DISCONNECT ELECTRICAL POWER SOURCE**WARNING**

Master power must be shut off before disconnecting the LADS power cable. Be careful not to contact high-voltage connections. Whenever possible, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body. Failure to follow this warning may result in personnel injury or death. Seek immediate medical attention if injury occurs.

1. Determine what power source was used to operate the LADS. If the MEP-805A generator was used proceed to step 3, otherwise continue to step 2.
2. Disconnect power cable (Figure 10, Item 1) at junction box (Figure 10, Item 5).
3. Disconnect grounding wire (Figure 10, Item 2) from grounding rod (Figure 10, Item 3) and grounding lug (Figure 10, Item 4).
4. Pull grounding rod (Figure 10, Item 3) out of ground. Clean grounding rod after removal.
5. Stow grounding wire (Figure 10, Item 2) and grounding rod (Figure 10, Item 3) on MEP-805A generator (TM 9-6115-644-10).

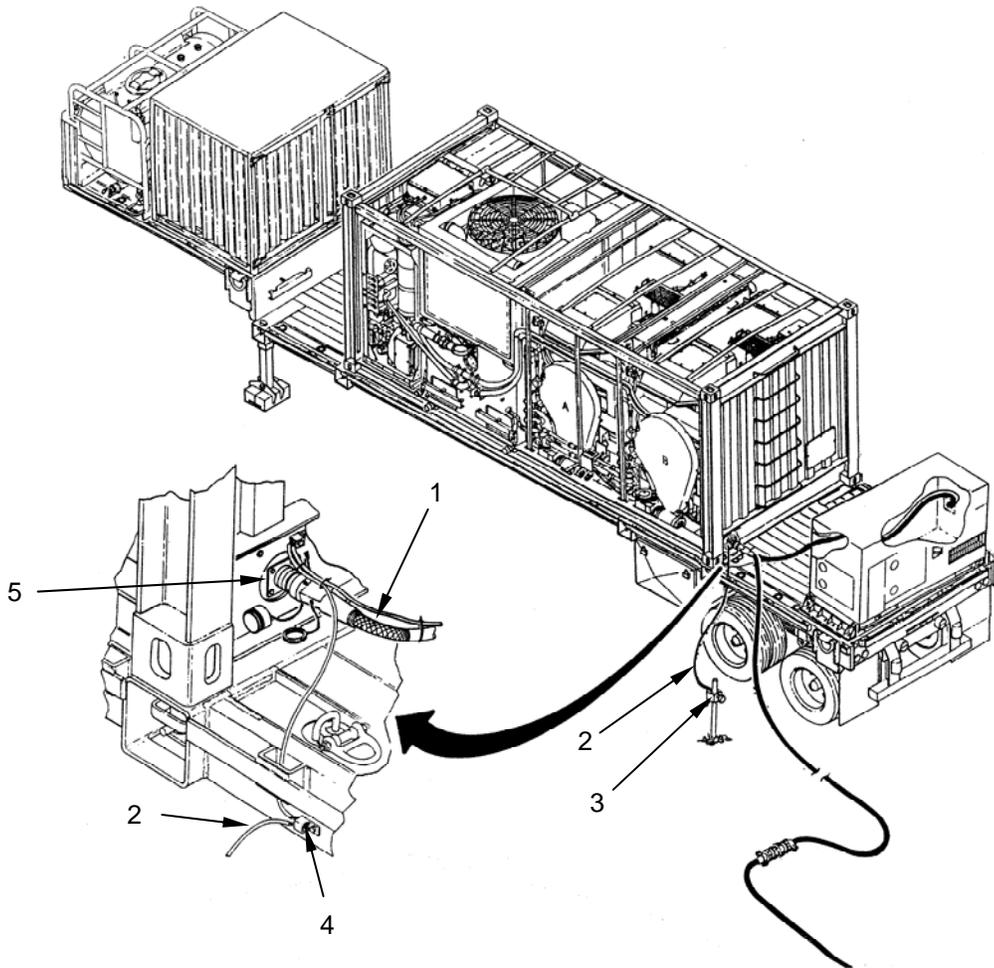


Figure 10. Electrical Power Source Disconnection.

END OF TASK

SECURE INVERTER AIR FLOW DOORS

1. Close air outlet door (Figure 11, Item 1) then rotate latch (Figure 11, Item 5) to lock door in place.
2. Tighten knob (Figure 11, Item 4).
3. Close air inlet door (Figure 11, Item 3) and fully seat with lip seal (Figure 11, Item 2).

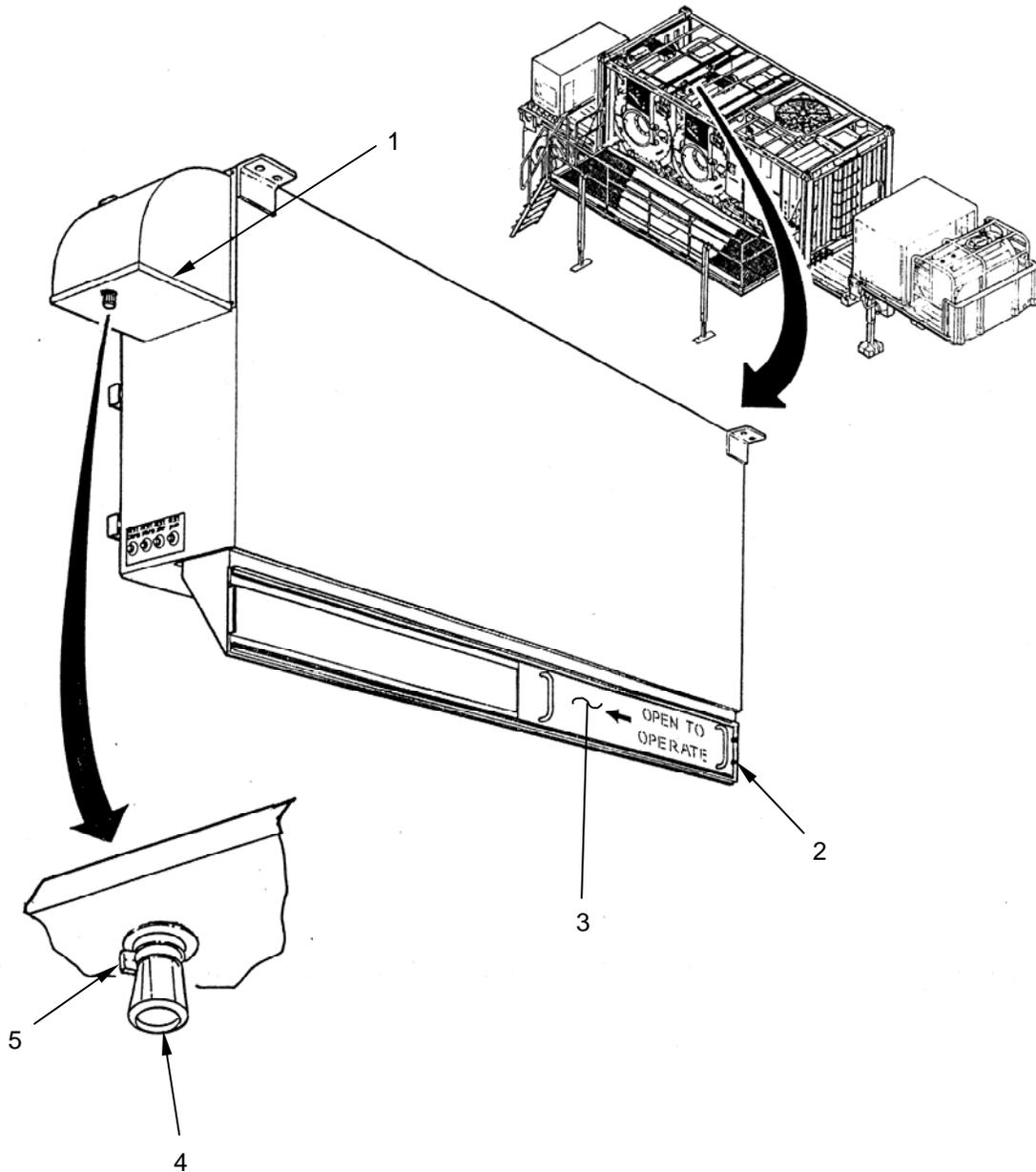


Figure 11. Inverter Air Flow Doors.

END OF TASK

TAKE DOWN AWNING

1. Determine what awning set-up was used. If awning was completely deployed follow steps 2 through 8. If awning was partially deployed follow steps 5 through 8. If awning was stowed on top of the LADS proceed to Stow Main and Side Railings.
2. Remove bungee cords (Figure 12, item 3) securing tarp (Figure 12, Item 4) to underside of platform (Figure 12, Item 2). Stow bungee cords in tool box.

WARNING

Awning extension and awning supports are designed to support the awning/tarp only. Do not step on or hang from these items. Failure to follow this precaution may result in equipment damage and personal injury.

3. Unfasten straps (Figure 12, Items 1 and 5) securing underside of tarp (Figure 12, Item 4) to awning supports (Figure 12, Item 6). Stow straps (Figure 12, Item 5) in tool box.
4. Flip back section of tarp (Figure 12, item 4) over and lay on top of the LADS.

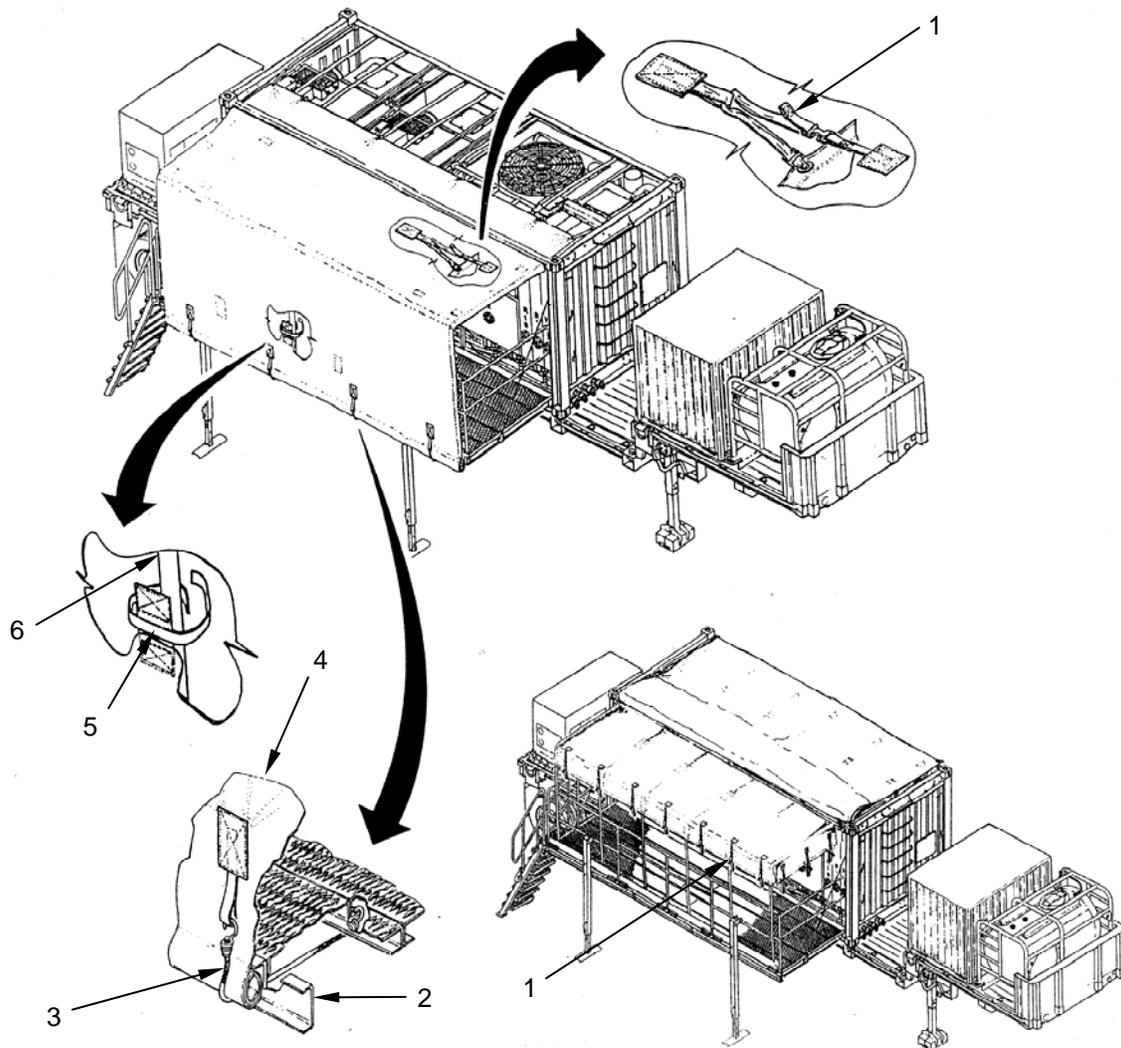


Figure 12. Awning Removal.

TAKE DOWN AWNING-CONTINUED

5. Unfasten straps (Figure 13, Items 5 and 6) securing underside of tarp (Figure 13, Item 10) to awning supports (Figure 13, Item 7) and main railing (Figure 13, Item 8). Stow straps in tool box.
6. Remove light (Figure 13, Item 4), if installed, from underside of tarp (Figure 13, Item 10) as follows:
 - a. Disconnect electrical cable (Figure 13, Item 2) at receptacle (Figure 13, Item 3).
 - b. Pull electrical cable (Figure 13, Item 2) out from between tarp (Figure 13, Item 10) and awning supports (Figure 13, Item 1).
 - c. Unfasten straps (Figure 13, Item 9) securing light (Figure 13, Item 4).
 - d. Stow light (Figure 13, Item 4) IAW TM 10-5410-284-13&P, LME.
7. Flip front section of tarp (Figure 13, Item, 10) over and lay on top of the LADS.

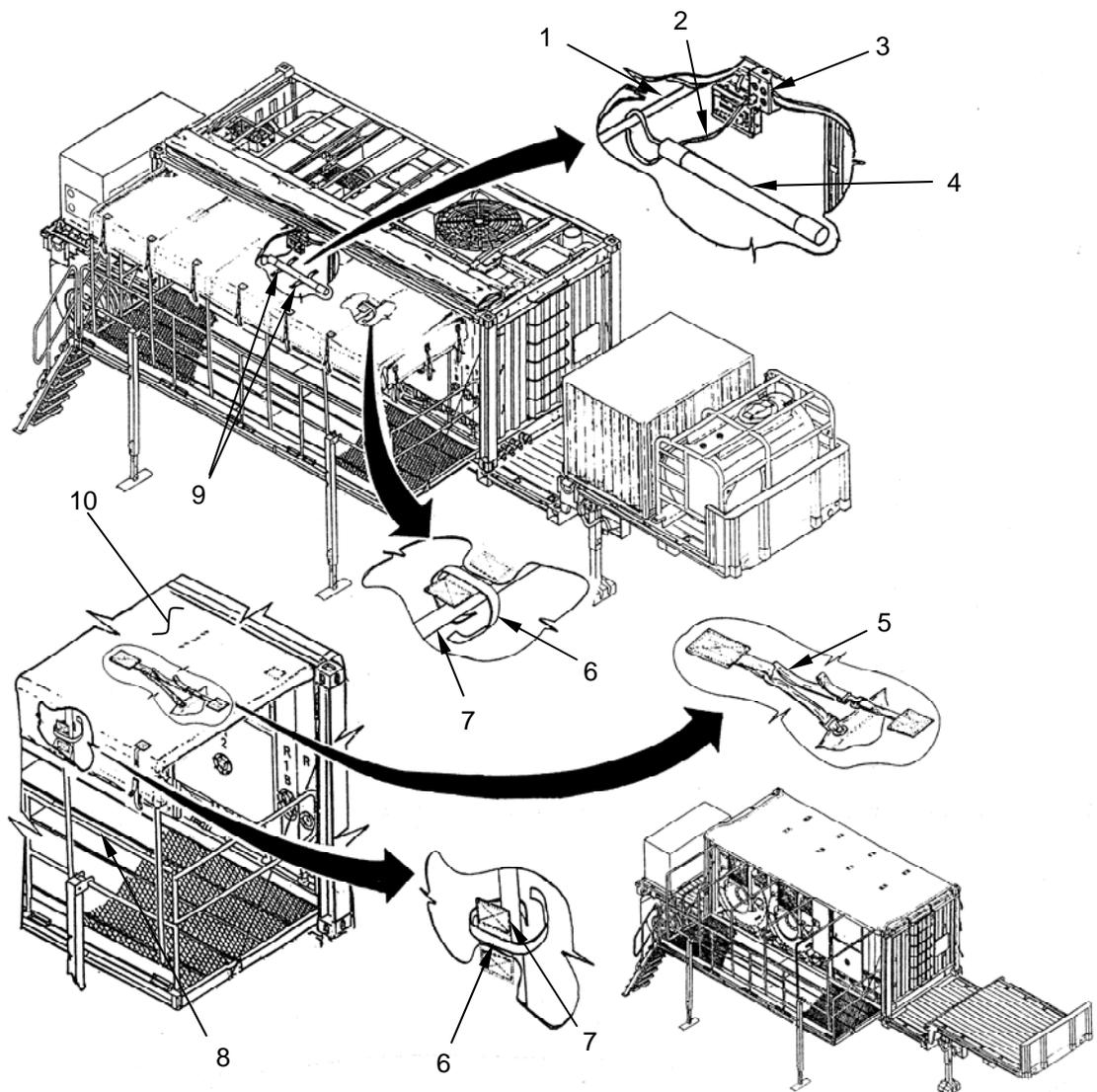


Figure 13. Removal of Awning Light and Straps.

TAKE DOWN AWNING-CONTINUED

CAUTION

Quick-connect pins must be properly stowed. Loose pins can get caught in platform as it is raised causing damage to pins and platform during lowering operations.

8. Remove six awning supports (Figure 14, Item 4) as follows:
 - a. Pull quick-connect pins (Figure 14, Item 6) securing awning support (Figure 14, Item 4) to main railing (Figure 14, Item 5).
 - b. Lift each awning support (Figure 14, Item 4) then rotate upward to unhook t-bolt (Figure 14, Item 1) from front support (Figure 14, Item 2).
 - c. Stack awning supports (Figure 14, Item 4) and secure together with straps (Figure 14, Item 3).
 - d. Install six quick-connect pins (Figure 14, Item 6) into top holes on main railing (Figure 14, Item 5).

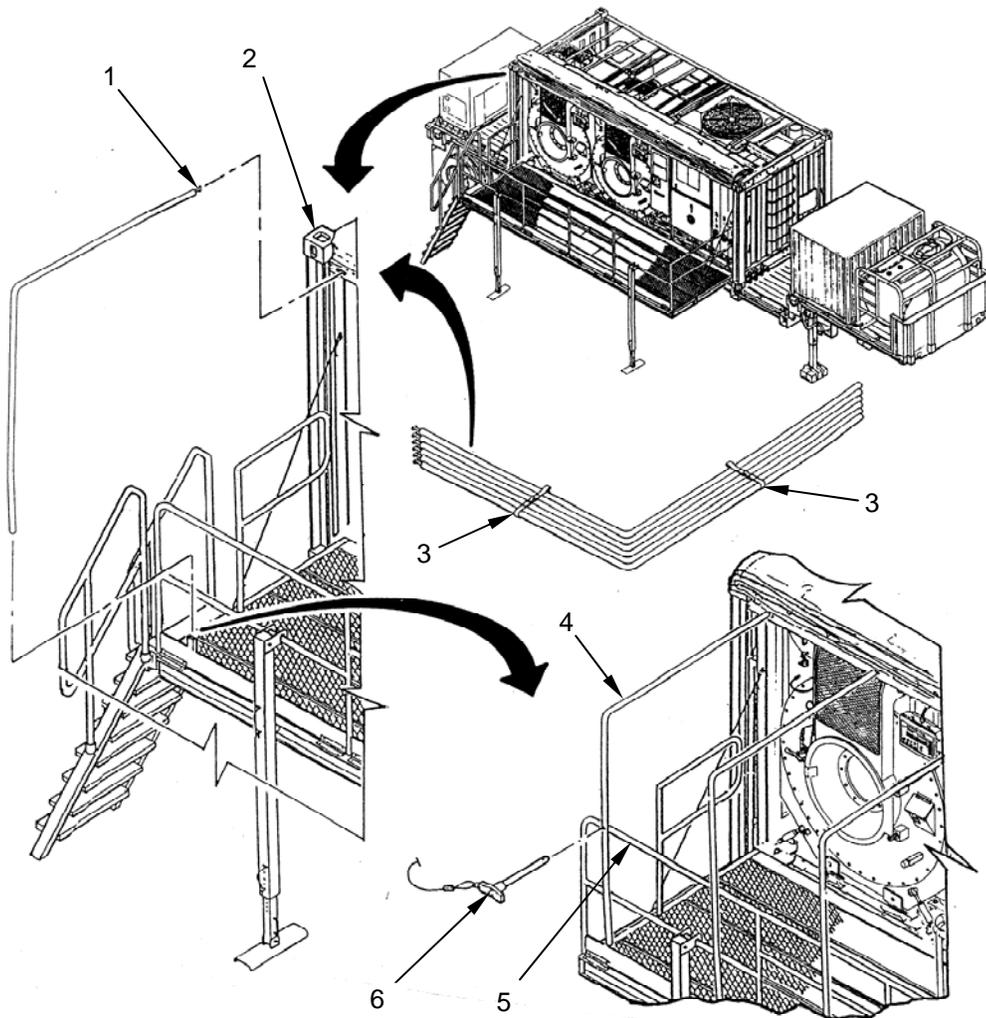


Figure 14. Taking Down Awning.

END OF TASK

STOW MAIN AND SIDE RAILINGS

1. Remove side railing (Figure 15, Item 3) as follows:
 - a. Pull quick-connect pin (Figure 15, Item 1) out of side railing (Figure 15, Item 3) and ISO frame (Figure 15, Item 2).
 - b. Lift side railing (Figure 15, Item 3) out of hole in platform (Figure 15, Item 4).
 - c. Install quick-connect pin (Figure 15, Item 1) into side railing (Figure 15, Item 3).

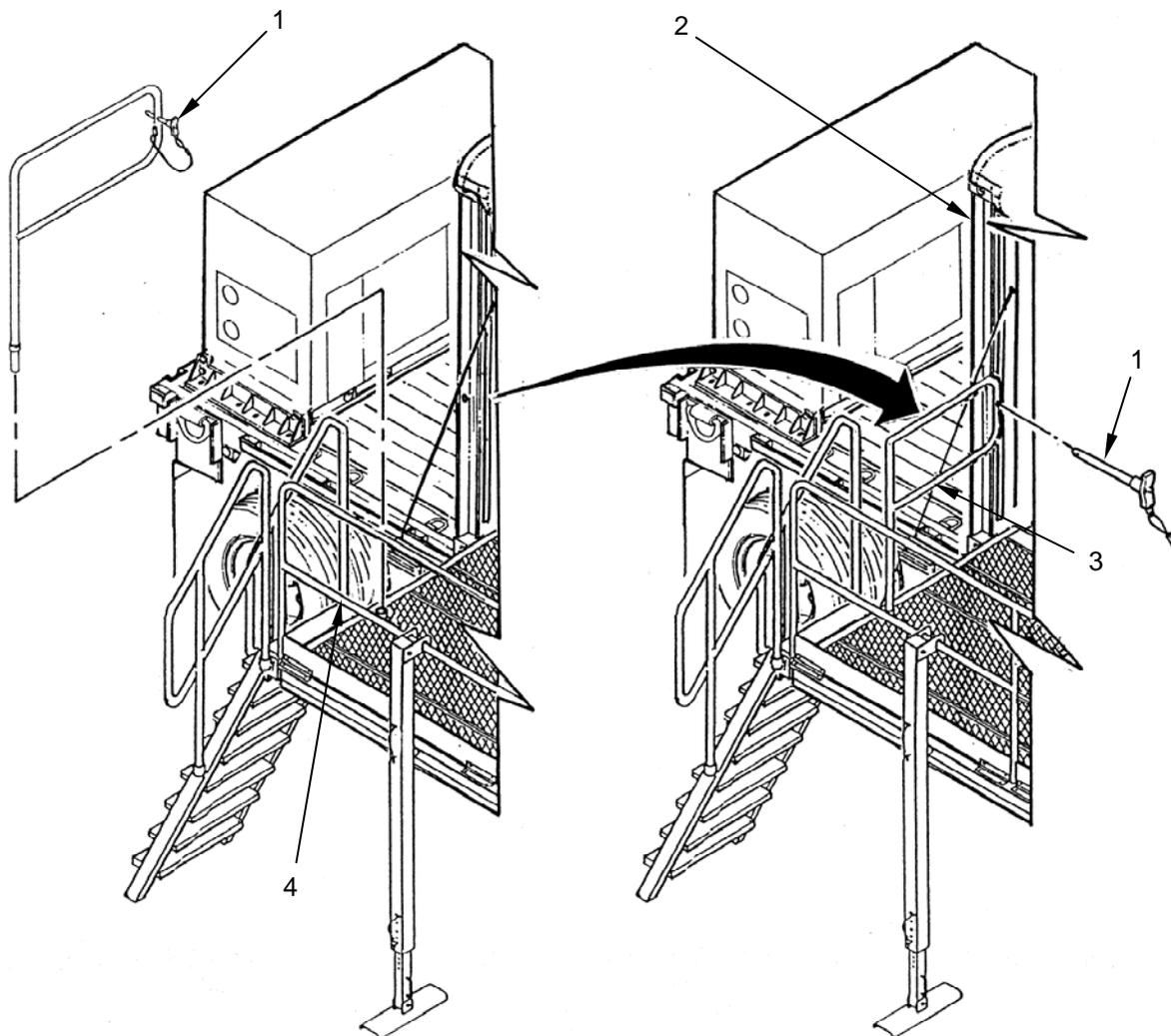


Figure 15. Side Railing Removal.

STOW MAIN AND SIDE RAILINGS-CONTINUED**CAUTION**

Quick-connect pins must be properly stowed. Loose pins can get caught in platform as it is raised causing damage to pins and platform during lowering operations.

2. Lower and stow main railing (Figure 16, Item 4) as follows:
 - a. Flip four support brackets (Figure 16, Item 5) off of main railing (Figure 16, Item 4).
 - b. Pull quick-connect pin (Figure 16, Item 1) out of gate (Figure 16, Item 3) and ISO frame (Figure 16, Item 2).
 - c. Swing gate (Figure 16, Item 3) inside of main railing (Figure 16, Item 4) then secure with quick-connect pin (Figure 16, Item 1).
 - d. Lower main railing (Figure 16, Item 4) to horizontal position.

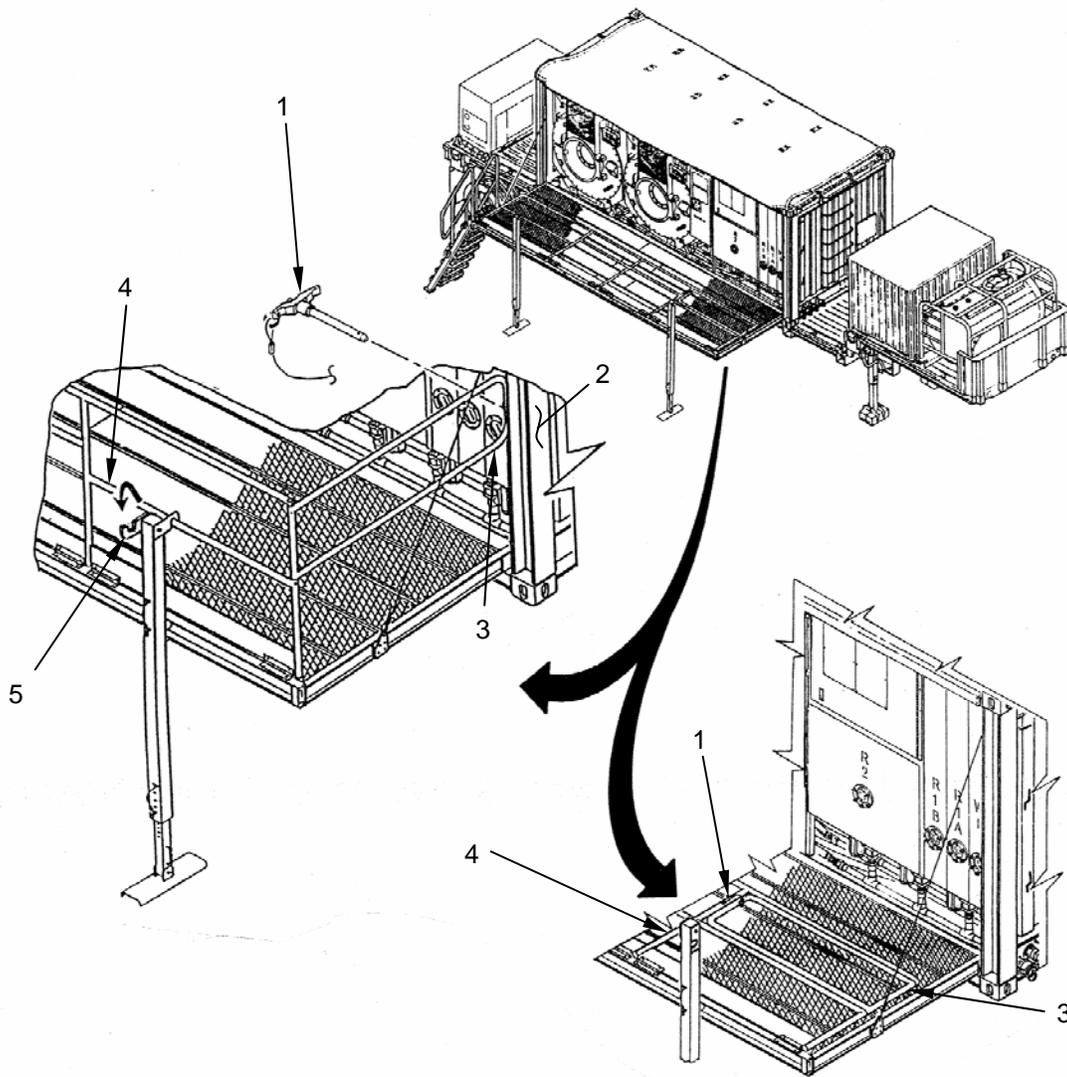


Figure 16. Stowing Main Railing.

END OF TASK

DEPLOY WINCH CABLE

CAUTION

Maintain a slight tension when paying out winch cable to ensure cable wraps remain tight on winch. Failure to follow this precaution may result in sudden drops of platform during raising and lower operations causing excess strain on cable.

1. Remove winch handle (Figure 17, Item 4) from tool box and install onto winch (Figure 17, Item 3).
2. Loosen cable (Figure 17, Item 7) slightly then unhook shackle (Figure 17, Item 5) from u-bolt (Figure 17, Item 8).
3. Use winch (Figure 17, Item 3) to pay out cable (Figure 17, Item 7) while maintaining a slight tension on cable.
4. Connect shackle (Figure 17, Item 5) to u-bolt (Figure 17, Item 6).
5. Use winch (Figure 17, Item 3) to slightly raise platform (Figure 17, Item 2) until support legs (Figure 17, Item 1) are no longer contacting ground.

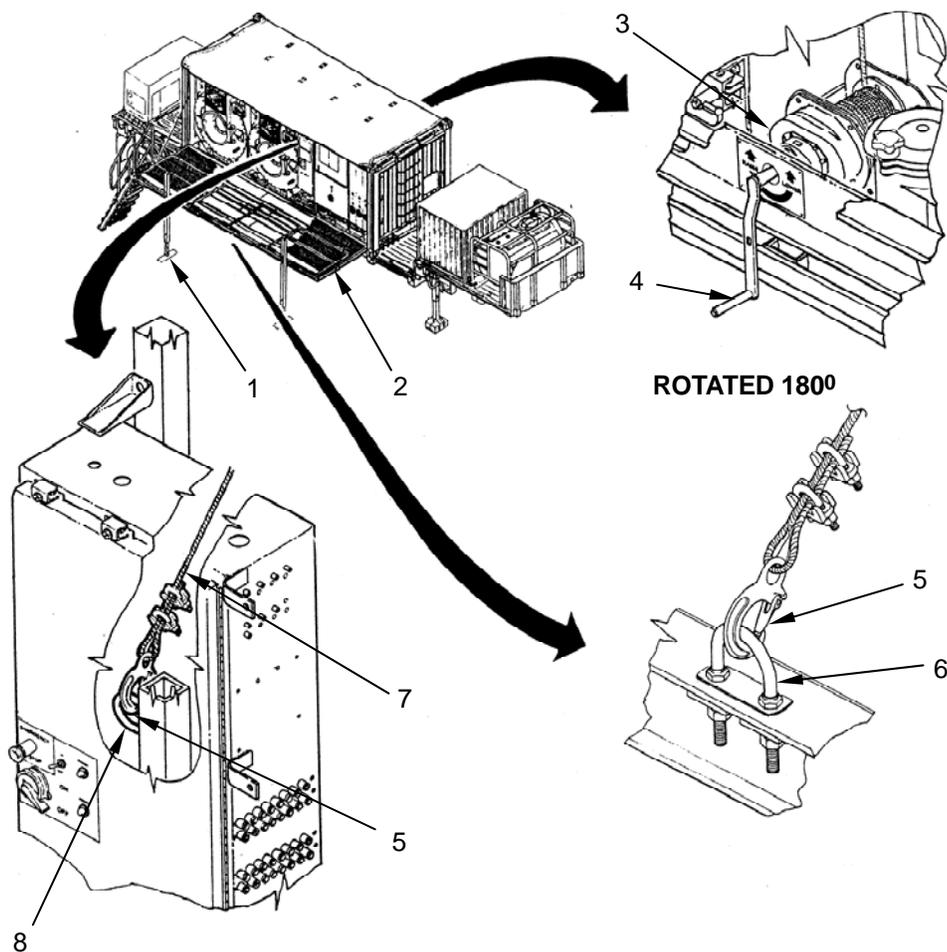


Figure 17. Deploying Winch Cable.

END OF TASK

REMOVE STAIRS

1. Remove two quick-connect pins (Figure 18, Item 5) from each handrail (Figure 18, Item 1).
2. Remove handrails (Figure 18, Item 1) from stairs (Figure 18, Item 4) and place on ground.
3. Remove two quick-connect pins (Figure 18, Item 3) securing stairs (Figure 18, Item 4) to platform (Figure 18, Item 2).
4. Lift stairs (Figure 18, Item 4) off of platform (Figure 18, Item 2) and place on ground.
5. Insert quick-connect pins (Figure 18, Items 3 and 5) into stairs (Figure 18, Item 4).

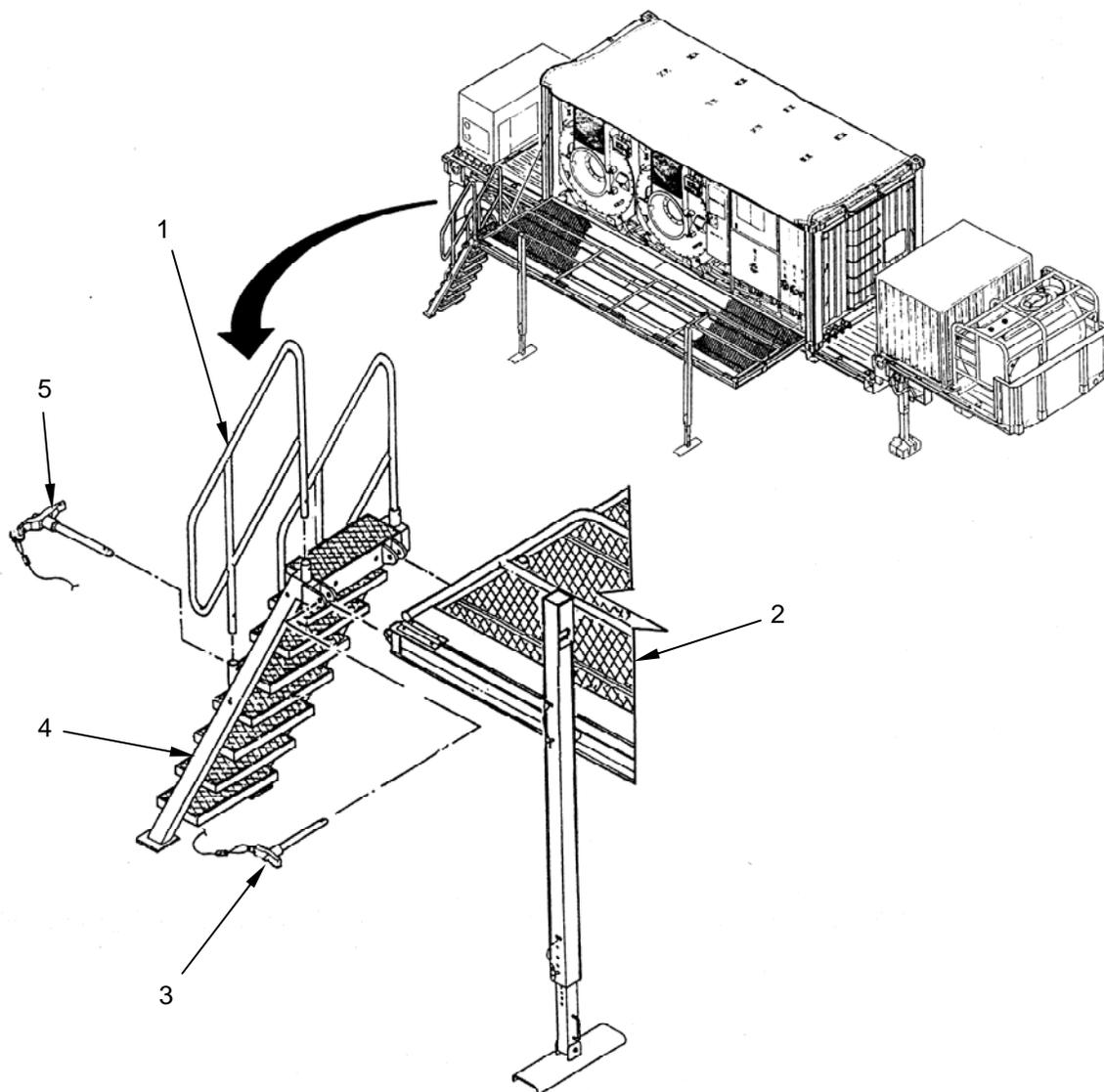


Figure 18. Stair Removal.

END OF TASK

RAISE AND SECURE PLATFORM

1. Raise and secure two support legs (Figure 19, Item 2) as follows:
 - a. Pull quick-connect pin (Figure 19, Item 4) and slide inner leg (Figure 19, Item 8) up until handle (Figure 19, Item 6) contacts outer leg (Figure 19, Item 5).
 - b. Fold foot (Figure 19, Item 7) over then insert quick-connect pin (Figure 19, Item 4) through foot and front side of outer leg (Figure 19, Item 5).
 - c. Pull quick-connect pin (Figure 19, Item 3) securing support leg (Figure 19, Item 2) to platform (Figure 19, Item 1).
 - d. Rotate support leg (Figure 19, Item 2) to horizontal position.
 - e. Insert quick-connect pin (Figure 19, Item 4) through support leg (Figure 19, Item 2) then into platform (Figure 19, Item 1).
 - f. Insert quick-connect pin (Figure 19, Item 3) into support leg (Figure 19, Item 2).

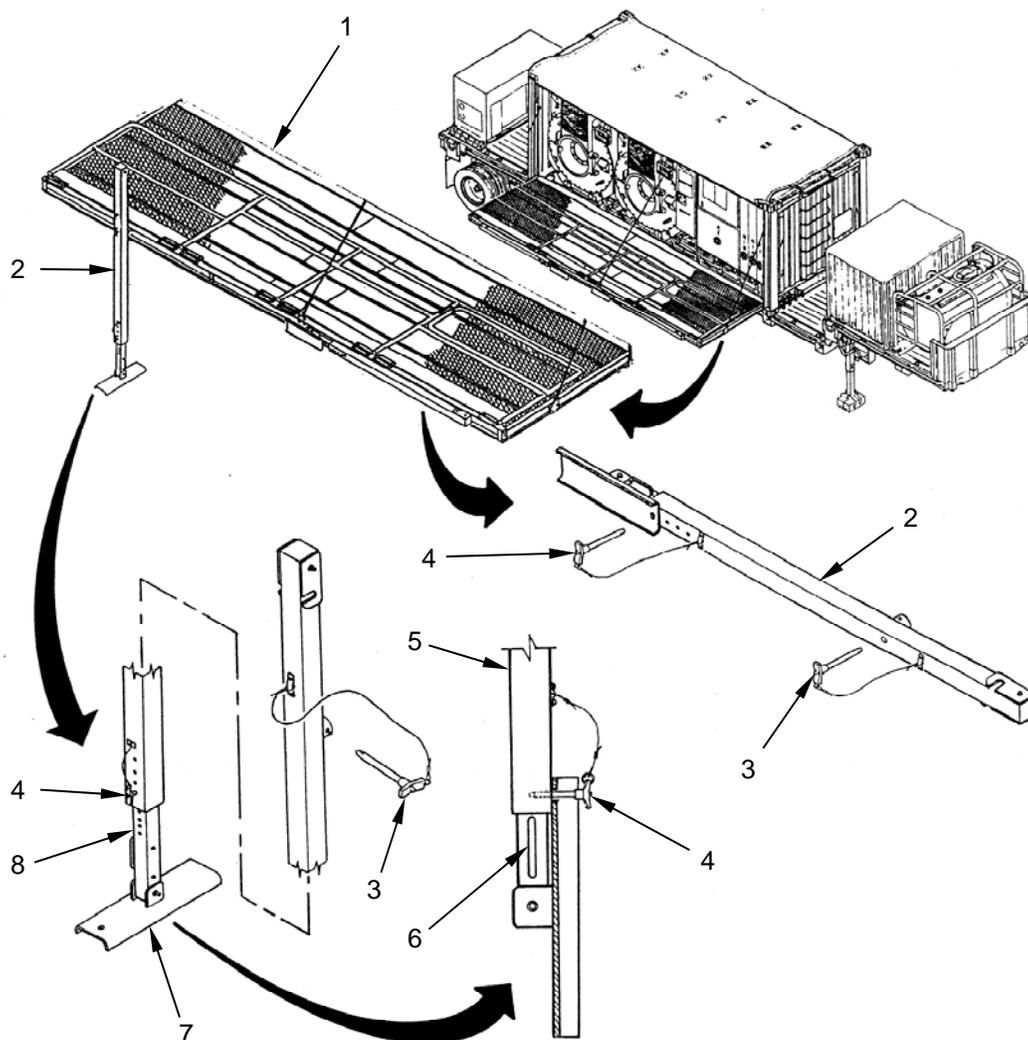


Figure 19. Stowing Support Legs.

RAISE AND SECURE PLATFORM-CONTINUED**CAUTION**

Stow bars must be retracted prior to raising platform. Failure to follow this precaution may result in damage to platform locking components.

2. Pivot hasps (Figure 20, Item 9) then lift and turn handles (Figure 20, Item 10) until stow bars (Figure 20, Item 3) retract.

WARNING

Verify that all personnel remain clear of platform while it is being raised. Failure to follow this precaution can cause severe personnel injury or death.

Platform must be secured before movement. Improper stowage of platform could result in platform extending during transport. Failure to follow this precaution may cause damage to platform and/or result in serious injury or death to personnel involved with movement and handling of the LADS. Seek immediate medical attention if injury occurs.

3. Use winch (Figure 20, Item 7) to raise platform (Figure 20, Item 1) until stow bars (Figure 20, Item 3) are behind stow brackets (Figure 20, Item 4).
4. Lock platform (Figure 20, Item 1) to ISO frame (Figure 20, Item 2) as follows:
 - a. Turn handle (Figure 20, Item 10) until stow bar (Figure 20, Item 3) extends into stow bracket (Figure 20, Item 4).
 - b. Insert handle (Figure 20, Item 10) into retainer (Figure 20, Item 8).
 - c. Pivot hasp (Figure 20, Item 9) over top of handle (Figure 20, Item 10).
 - d. Repeat step a through c to lock other end of platform (Figure 20, Item 1).
5. Use winch (Figure 20, Item 7) to pull cable (Figure 20, Item 5) taught. Remove winch handle (Figure 20, Item 6) and stow in tool box.

RAISE AND SECURE PLATFORM-CONTINUED

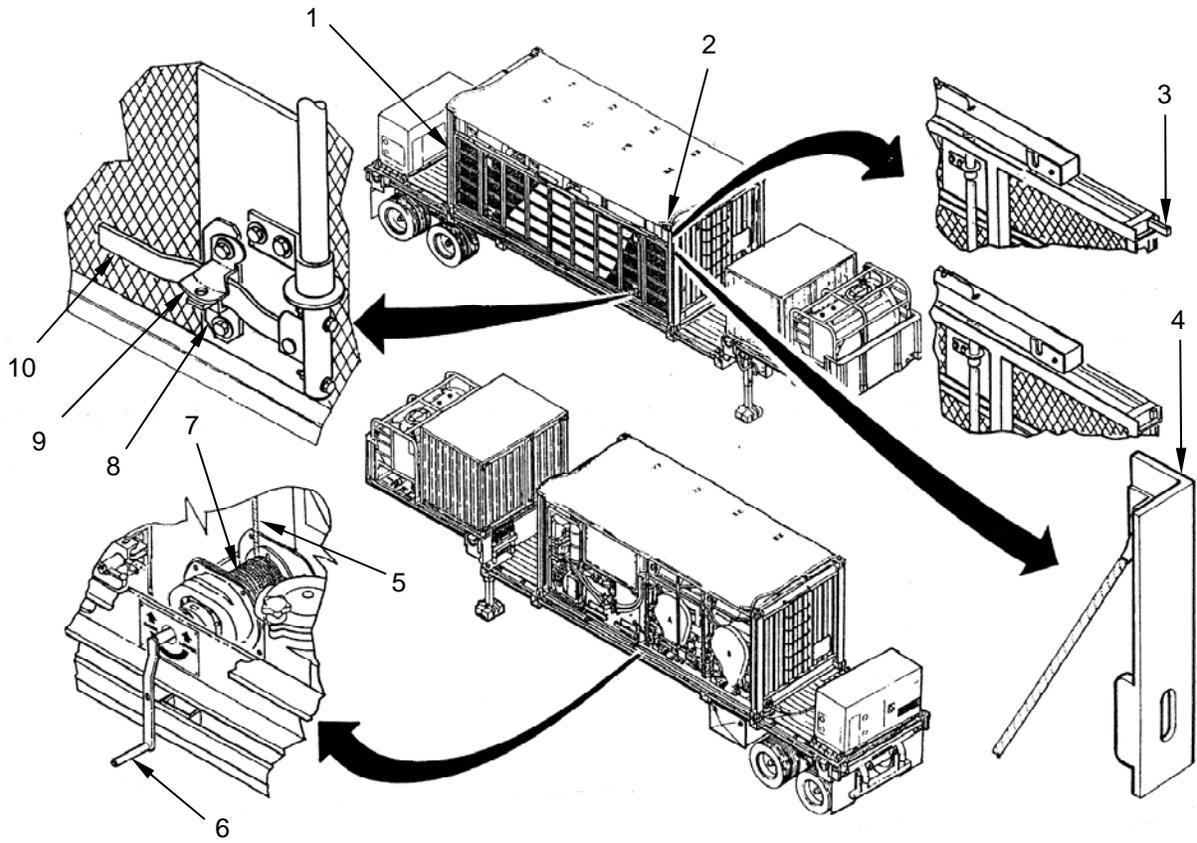


Figure 20. Raise and Secure Platform.

END OF TASK

SECURE TARP

1. Flip front section of tarp (Figure 21, Item 1) over to cover curbside of the LADS.
2. Flip back section of tarp (Figure 21, Item 1) over top and roadside of the LADS.
3. Pull sides of tarp (Figure 21, Item 1) over end walls (Figure 21, Item 2).

NOTE

To evenly secure tarp, tighten the center straps on both sides to the ISO frame first, then work towards the ISO frame end walls.

4. Connect straps (Figure 21, Item 5) to ISO frame (Figure 21, Item 4).
5. Pull straps (Figure 21, Item 5) tight starting at center of the LADS and working towards end walls (Figure 21, Item 2).
6. Connect and tighten straps (Figure 21, Item 3) to end walls of ISO frame (Figure 21, Item 4).

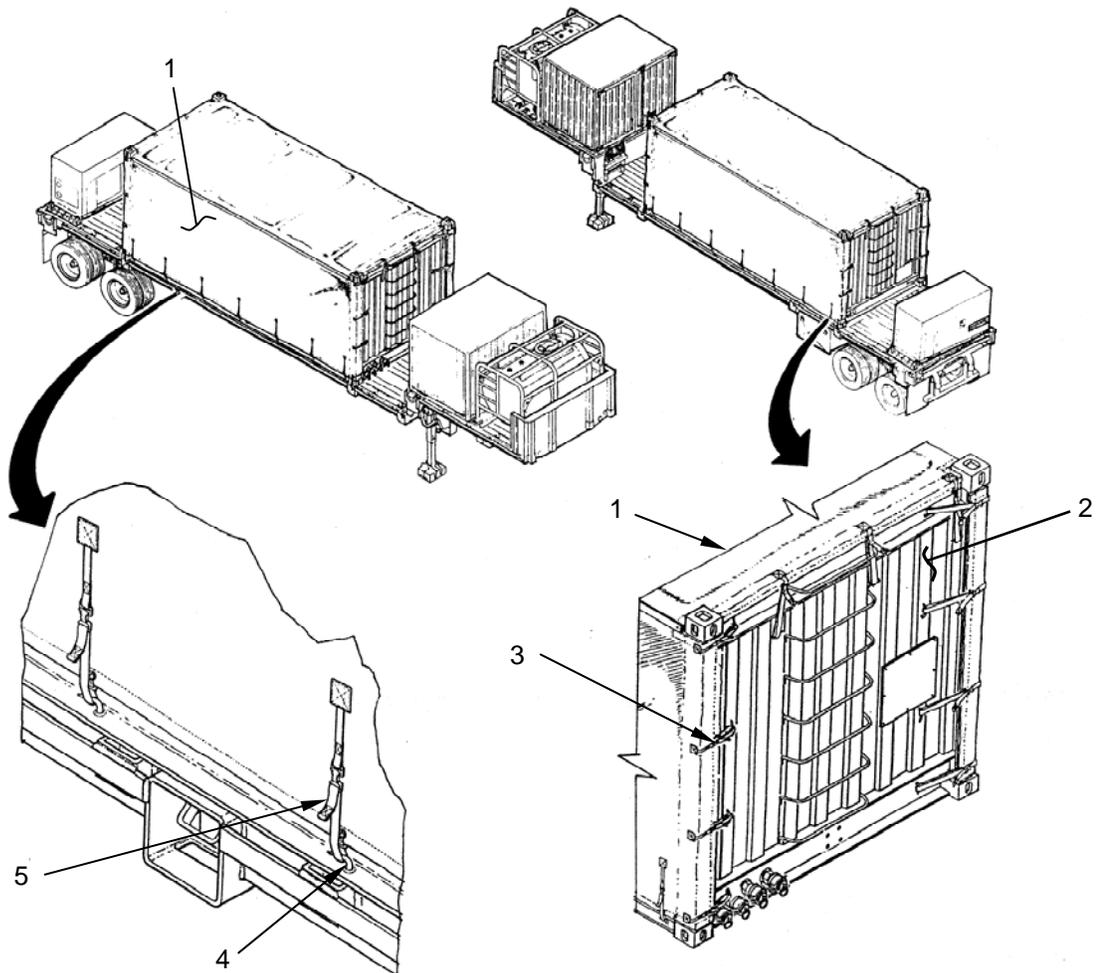


Figure 21. Securing Tarp.

END OF TASK

BREAKDOWN FOLDING LADDER**WARNING**

Keep hands and fingers away from hinge points on ladder halves when opening and closing. Keep hands and fingers away from inner and outer rungs of ladder when adjusting. Never climb on ladder unless knobs and locking devices are properly tightened. Failure to observe this precaution may result in severe personal injury. Seek immediate medical attention if injury occurs.

1. Place ladder (Figure 22, Item 1) flat on ground.
2. Return ladder (Figure 22, Item 1) to storage height as follows:
 - a. Pull out and pivot locking devices (Figure 22, Item 2) on each side of ladder (Figure 22, Item 1).
 - b. Slide outer section of ladder (Figure 22, Item 4) in as far as possible.
 - c. Pivot locking devices (Figure 22, Item 2) back into inner section of ladder (Figure 22, Item 1).
3. Fold ladder (Figure 22, Item 1) flat as follows:
 - a. Hold higher section of ladder (Figure 22, Item 3) so it does not fall.
 - b. Loosen or pull out on knobs (Figure 22, Item 5) then separate jaws (Figure 22, Item 6) on each side of ladder (Figure 22, Item 1).
 - c. Fold ladder (Figure 22, Item 1) flat, then tighten knobs (Figure 22, Item 5) to lock jaws (Figure 22, Item 6) in place.

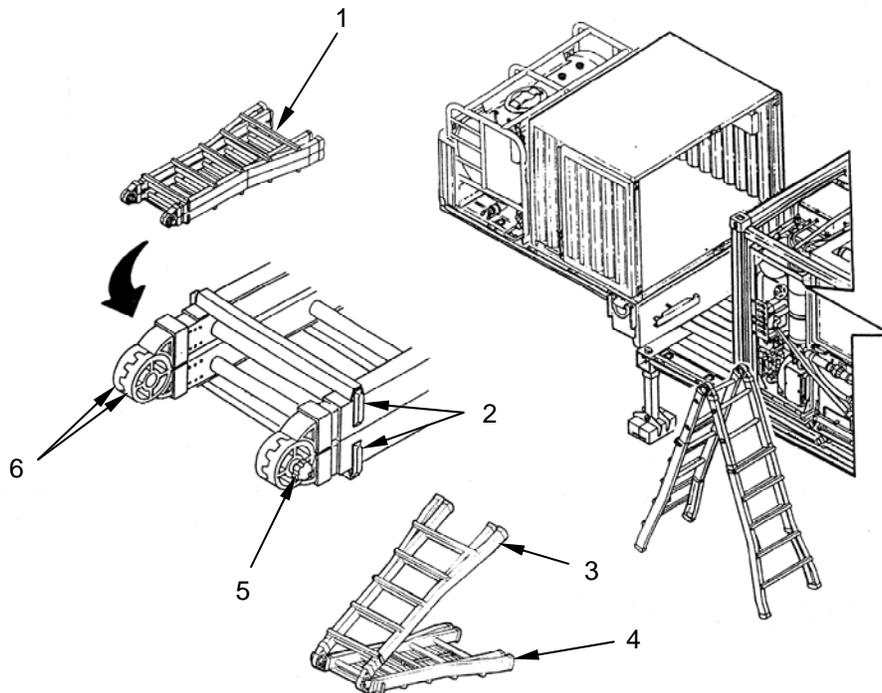


Figure 22. Folding Ladder Breakdown.

END OF TASK

STOW ACCESSORIES**CAUTION**

Stowed equipment can shift during transport if not properly secured. Use care when arranging equipment in storage locker. Ensure load stabilizers cover all items and are properly tightened. Failure to follow this precaution may result in equipment becoming unserviceable for next mission.

NOTE

Personnel in the 5th percentile may require a step aid for this procedure.

1. Stow following items in storage locker as shown in Figures 23 and 24:

Folding Ladder, qty 1
Stairs, qty 1
Handrails, qty 2
Awning supports, qty 6
Side railing, qty 1
Water tank, qty 1
Operator tool kit, qty 1

Water supply pump, qty 1
25-ft fuel hose, qty 1
Adapter, fuel hose, qty 1
30-ft fuel hose, qty 1
Exhaust extension, qty 1
Clean-out rake, qty 1
Sluice tray, qty 1

Anti-foam container, qty 2
Detergent container, qty 2
Container, 55-gallon, qty 1
Fire extinguisher, qty 1
Pre-wash manifold, qty 1

STOW ACCESSORIES-CONTINUED

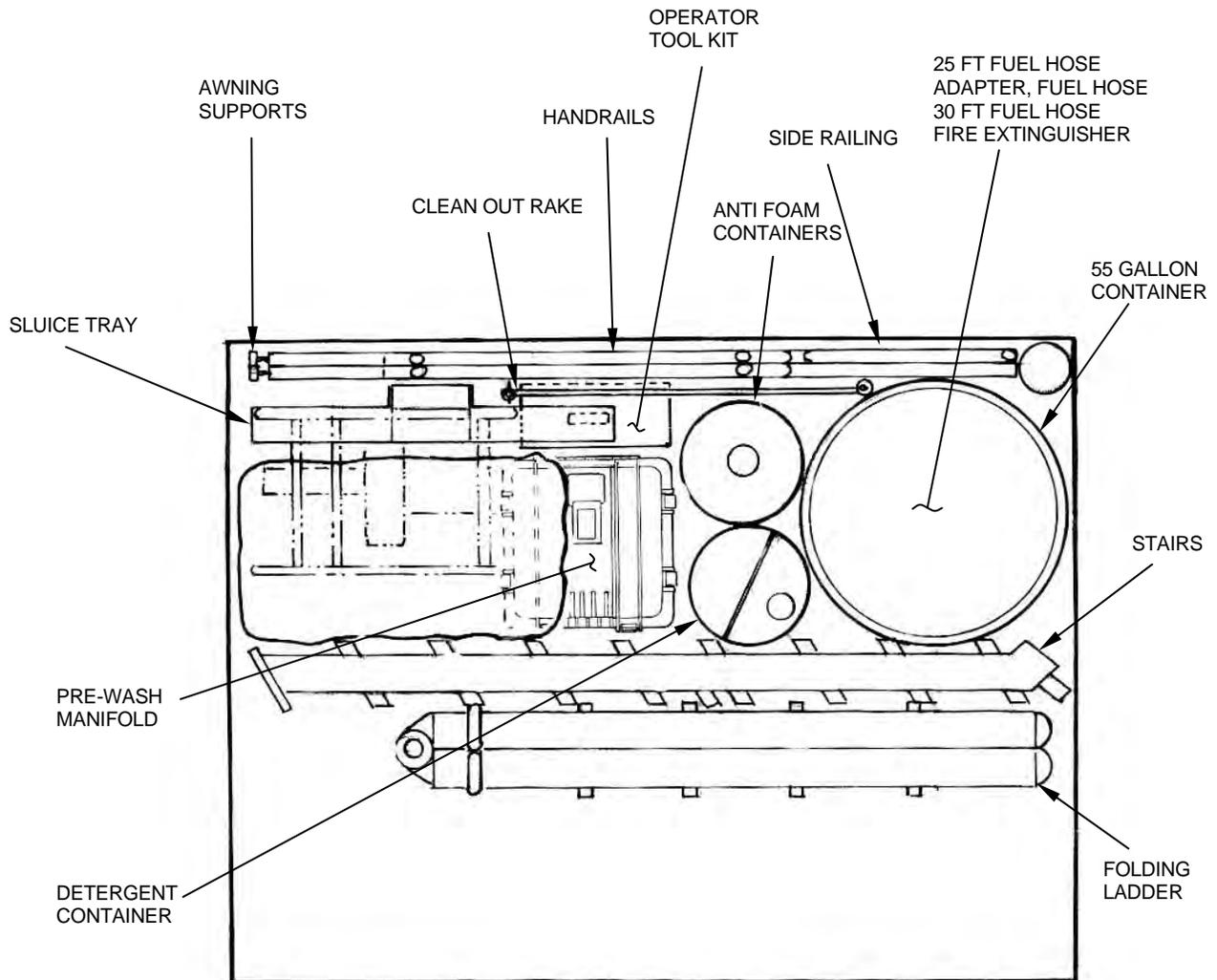


Figure 23. Storage Locker Load Plan, Top View.

STOW ACCESSORIES-CONTINUED

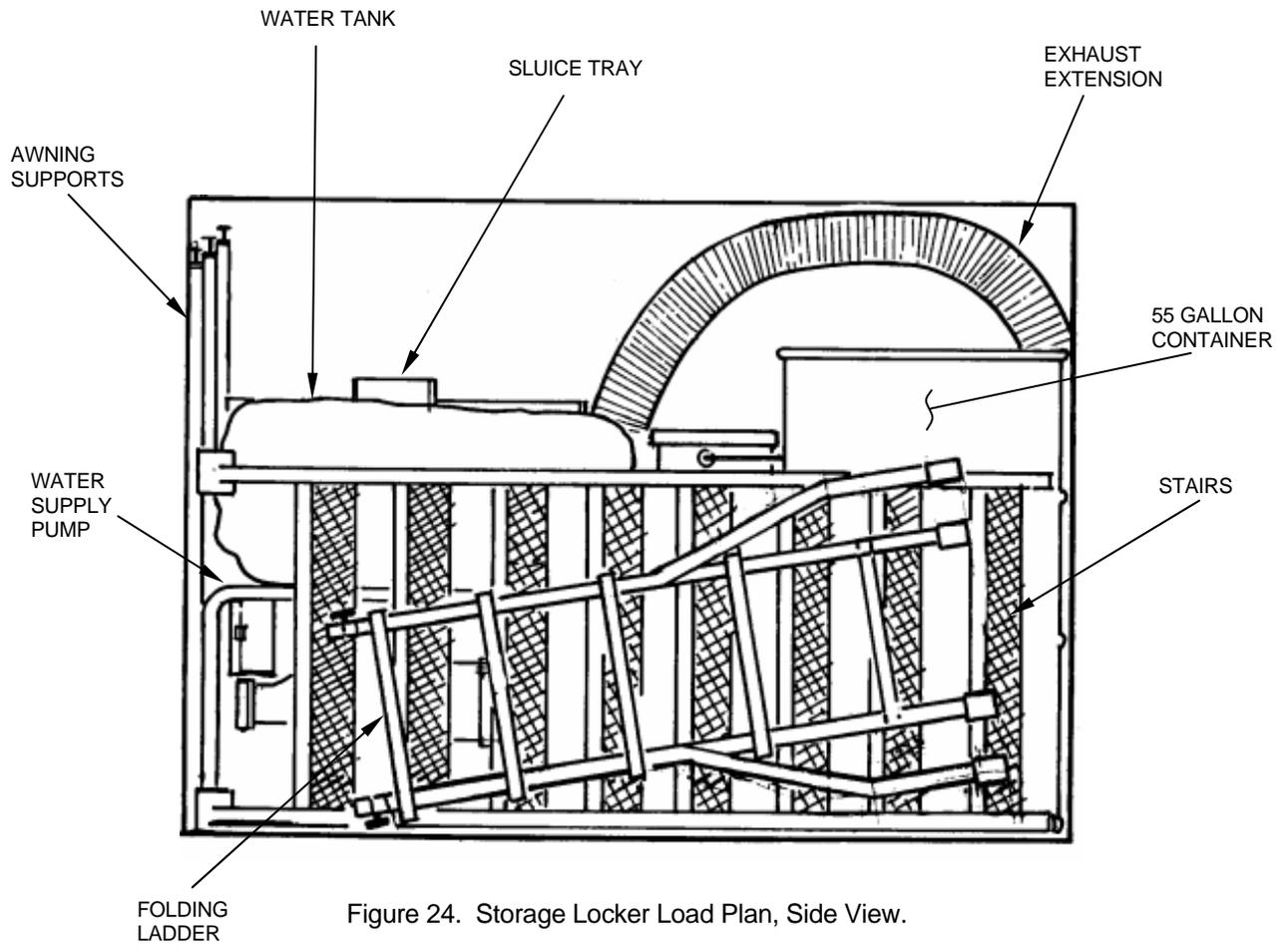


Figure 24. Storage Locker Load Plan, Side View.

STOW ACCESSORIES-CONTINUED

CAUTION

Do not over-tighten stabilizer bars. Too much tension on bars can cause walls of storage locker to bow and make it difficult to open and close the doors.

2. Install stabilizing bars (Figure 25, Item 6) to secure items in storage locker (Figure 25, Item 1) as follows:
 - a. Place stabilizing bar (Figure 25, Item 6) in a position where it can prevent movement of stored items.
 - b. Ensure both wall pads (Figure 25, Items 5 and 7) are set to apply tension to a valley (Figure 25, Item 4) in walls of storage locker (Figure 25, Item 1).
 - c. Push in on tab (Figure 25, Item 3) to change ratcheting direction of handle (Figure 25, Item 2).
 - d. Ratchet handle (Figure 25, Item 2) to apply tension of wall pads (Figure 25, Items 5 and 7) until stabilizer bar is tight.
 - e. Repeat process for second bar as required.

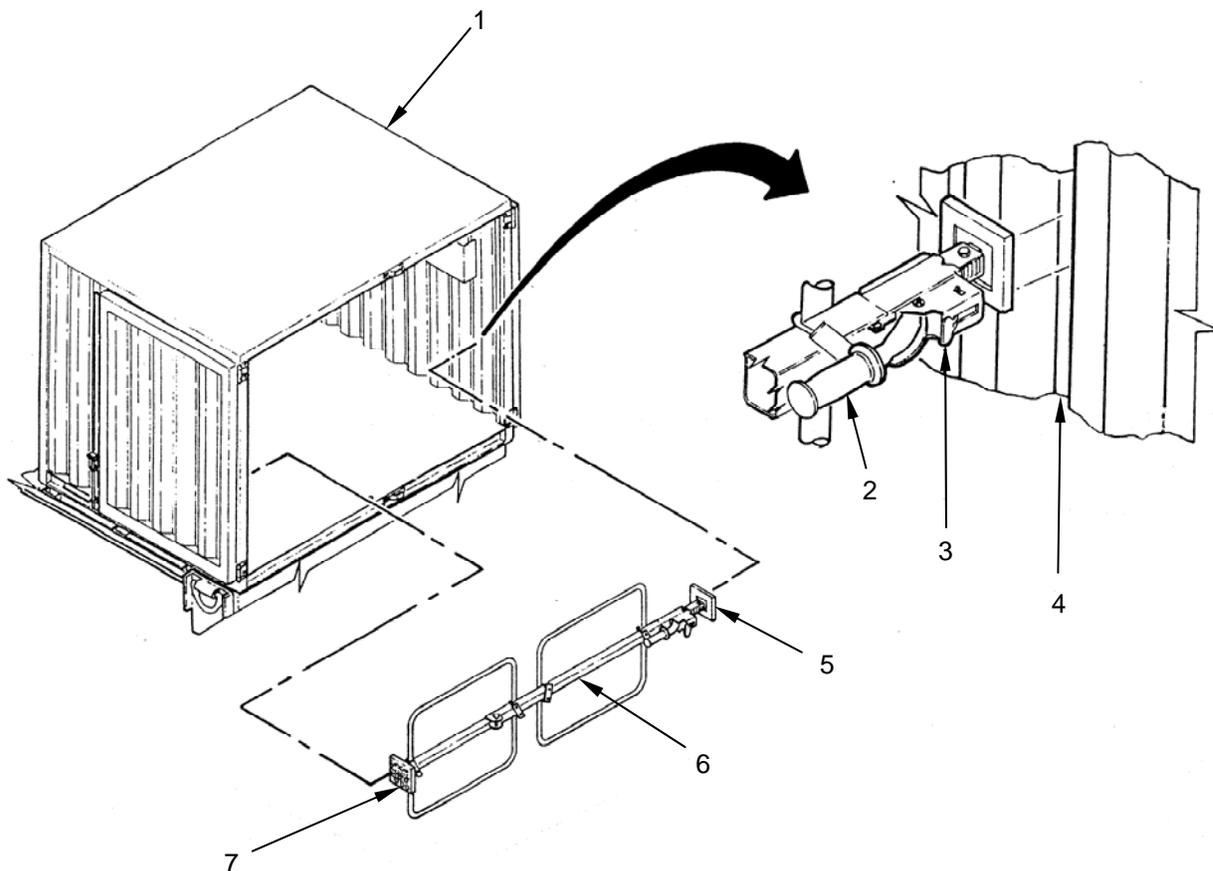


Figure 25. Stabilizing Bar Installation.

END OF TASK

CLOSE AND SECURE STORAGE LOCKER DOORS

1. Lift-up to unlock fingers (Figure 26, Item 1) from retaining plates (Figure 26, Item 2).
2. Swing doors (Figure 26, Items 8 and 10) back towards opening in storage locker, but do not close doors.
3. Close door (Figure 26, Item 10) then lift and reposition cane lock (Figure 26, Item 9) to secure door.
4. Remove lock (Figure 26, Item 4) from hasp (Figure 25, Item 5).
5. Pivot hasp (Figure 26, Item 5) then lift and turn handle (Figure 26, Item 6).
6. Close door (Figure 26, Item 8) until locking rod (Figure 26, Item 3) is aligned with holder (Figure 26, Item 7).
7. Turn handle (Figure 26, Item 6) until locking rod (Figure 26, Item 3) engages in holder (Figure 26, Item 7).
8. Pivot hasp (Figure 26, Item 5) over handle (Figure 26, Item 6).
9. Install lock (Figure 26, Item 4) back onto hasp (Figure 26, Item 5).

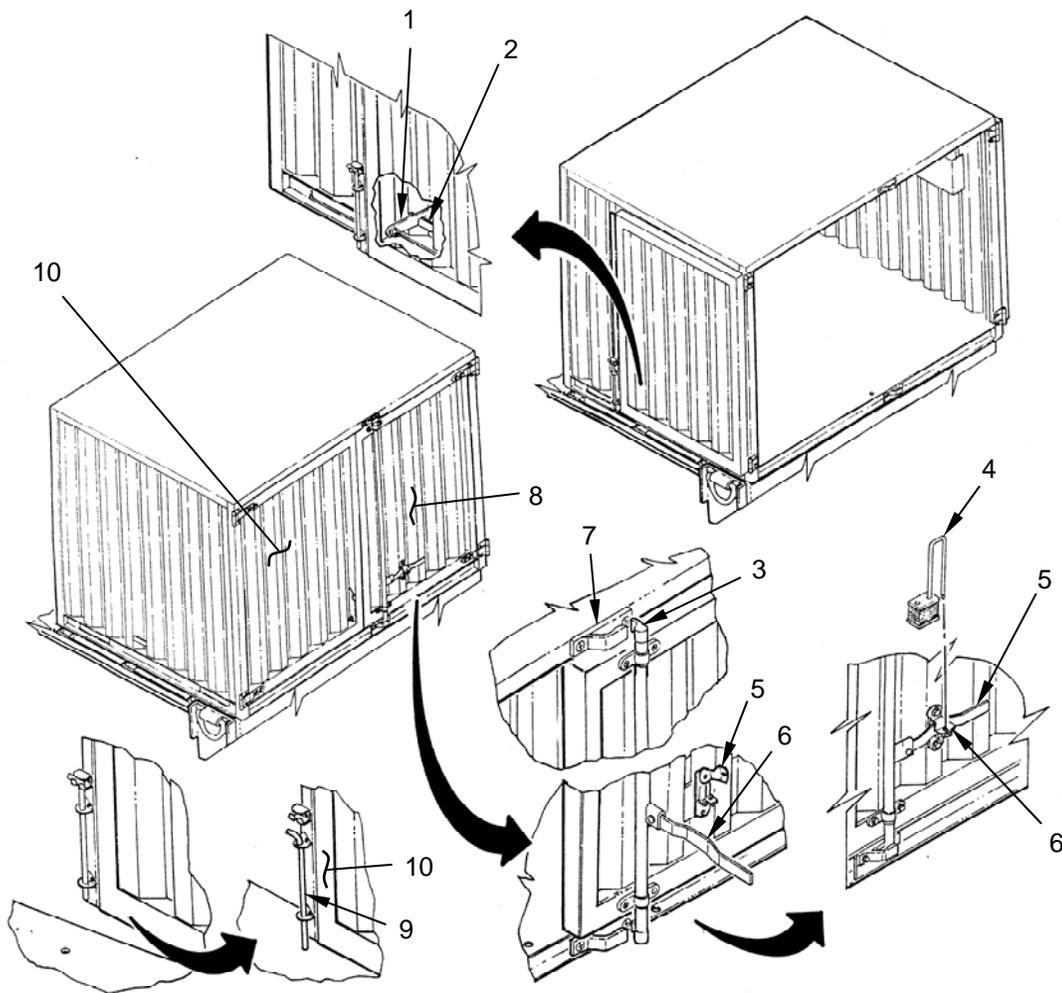


Figure 26. Closing and Securing Storage Locker Doors.

END OF TASK

RETRACT TELESCOPING LADDER**WARNING**

Always retract ladder from the top down. Keep hands and fingers away from sliding points on ladder sections when opening and closing. Never climb on ladder unless locking devices are properly engaged. Failure to observe these precautions may result in severe personal injury. Seek immediate medical attention if injury occurs.

1. Push in on latches (Figure 27, Item 4) under lower rung (Figure 27, Item 2) of top ladder section to unlock.
2. Push down on upper rung (Figure 27, Item 1) to collapse section.
3. Repeat steps 1 and 2 until only the bottom section remains extended.
4. Pull down on rings (Figure 27, Item 3) to collapse last ladder section.

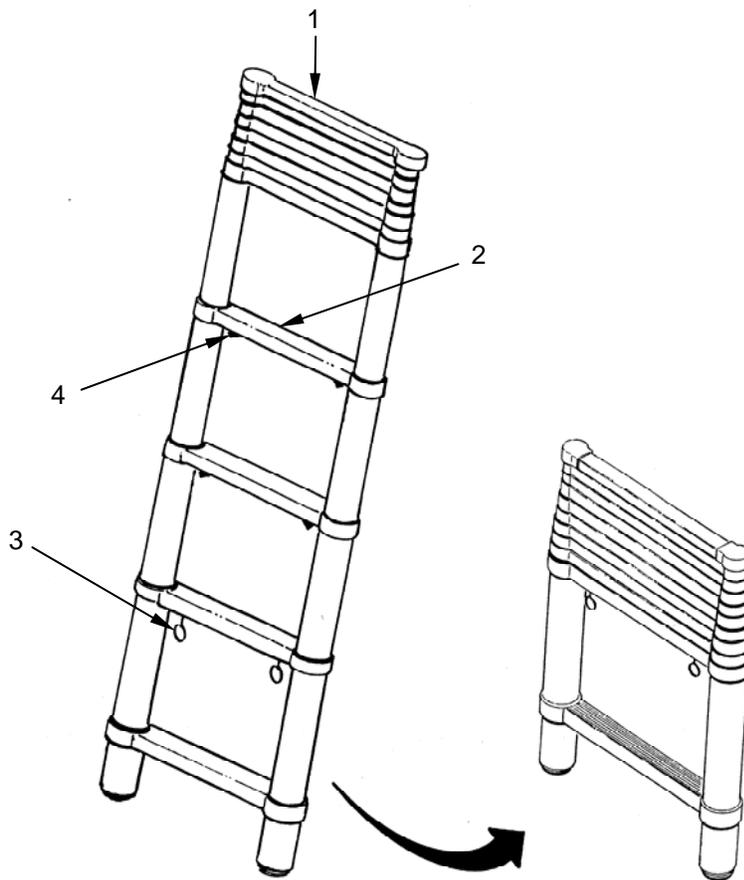


Figure 27. Telescoping Ladder.

END OF TASK

SECURE TELESCOPING LADDERS

1. Remove lock (Figure 28, Item 1) from holddown bracket (Figure 28, Item 3).
2. Loosen retainer (Figure 28, Item 2) then slide holddown bracket (Figure 28, Item 3) rearward.
3. Slide telescoping ladder (Figure 28, Item 5) behind holddown bracket (Figure 28, Item 3).
4. Push in on holddown bracket (Figure 28, Item 3) until telescoping ladder (Figure 28, Item 5) is tight against wall of trailer (Figure 28, Item 4).
5. Tighten retainer (Figure 28, Item 2).
6. Install lock (Figure 28, Item 1) into holddown bracket (Figure 28, Item 3).
7. Repeat steps 1 through 6 for second ladder.

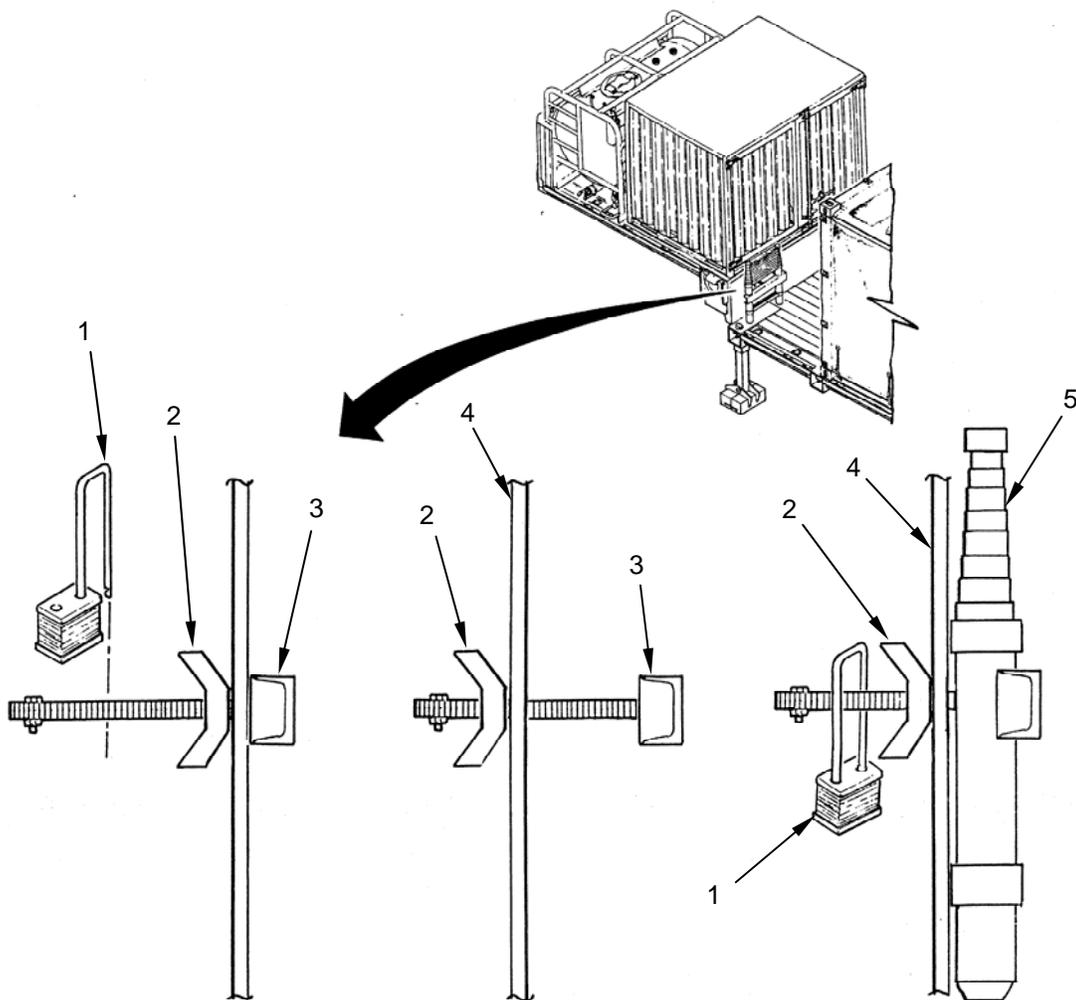


Figure 28. Securing Telescoping Ladders.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATION UNDER UNUSUAL CONDITIONS**

INITIAL SETUP:	References
	FM 3-11.4
Materials/Parts	FM 3-11.5
Solar Shade	WP 0010
Personnel Required	WP 0012
Shower/Laundry and Clothing Repair Specialist (2)	WP 0013
Shower/Laundry and Clothing Repair Supervisor (1)	WP 0016
Equipment Conditions	WP 0017
Assembly and Preparation for Use Complete (WP 0011)	WP 0043
	WP 0044

UNUSUAL ENVIRONMENT/WEATHER

This work package contains instructions for safely operating the Laundry Advanced System (LADS) under unusual conditions. In addition to normal preventive maintenance service, special care must be taken to keep the LADS operational in extreme environmental weather conditions. This work package also includes references for the decontamination of the LADS.

Operation in Cold

The LADS can not be operated unsheltered when temperatures are below 33 °F. To operate below this temperature, the LADS must be placed in an LME Type II. The water supply to the LADS must also be stored in a manner that will assure it will not freeze. For suggested set-up in the LME, refer to sheltering requirements (WP 0010).

If temperatures in the LME are expected to drop below 33 °F during periods when the LADS is set-up, but not operating, a drain cycle (WP 0016, Model C or WP 0017, Model D) should be performed. This will prevent damage to plumbing caused by freezing water. The hoses between the water supply, water supply pump, and the LADS should also be drained. To avoid draining the LADS at temperatures between 25 °F and 33 °F, run a Heat Water cycle (WP 0012, Model C or WP 0013, Model D) for both drums every few hours to maintain heat in the system.

Storage in Extreme Cold

Care must be taken when handling electrical cables. Extreme cold weather can cause insulation material on electrical wire to crack, causing short circuits.

Care must be taken when handling hoses. Extreme cold weather can cause materials to become hard, brittle, and easily damaged or broken.

When sitting for any period of time in temperatures below 0 °F, place the LADS in a sheltered area out of the wind. Clean off any buildup of ice or snow. Place a footing of planks or brush under frame to prevent unit from freezing to the ground.

Refer to work package WP 0044, for proper lubrication during extreme cold conditions.

UNUSUAL ENVIRONMENT/WEATHER-CONTINUED

Operation in Heat

When operating at temperatures above 90 °F, the still distillation rate can increase to the point where boil-overs can occur. Adding an extra stoke of anti-foam during each cycle will help prevent boil-overs.

Operation in Extreme Heat

When operating in extreme heat follow OPERATION IN HEAT guidelines. Perform quarterly PMCS monthly and semi-annual PMCS quarterly (WP 0043). Refer to work package WP 0044, for proper lubrication during extreme heat conditions.

Avoid operation in the hottest part of the day, utilize night operations when practical.

Setup the LADS where the midday sun will be directed away from the rear or roadside of the unit.

If desired a solar shade kit (Figure 1) can be deployed. The solar shade acts to block the sun from the entire rear (roadside) of the LADS and the top surface of the inverter enclosure. The solar shade also provides solar protection to personnel when still cleaning and water pump strainer operations are being performed. Prior to installing the solar shade the tarp awning extension must be properly deployed to prevent the sun from overheating the top front area of the LADS. The solar shade is secured along the back rail running along the top of the LADS as shown in the figure below. When tying off the shade make sure it is clear of the LADS heater exhaust stack. The solar shade is secured to the ground using tensioning rope and stakes similar to the used for most tents. The solar shade has a flap that folds-over to cover the inverter enclosure. A spacer is installed under the flap to keep the shade lifted up. A duct extension is installed with the flap to prevent the hot exhaust air coming out of the drum A dryer duct from going under the solar shade.

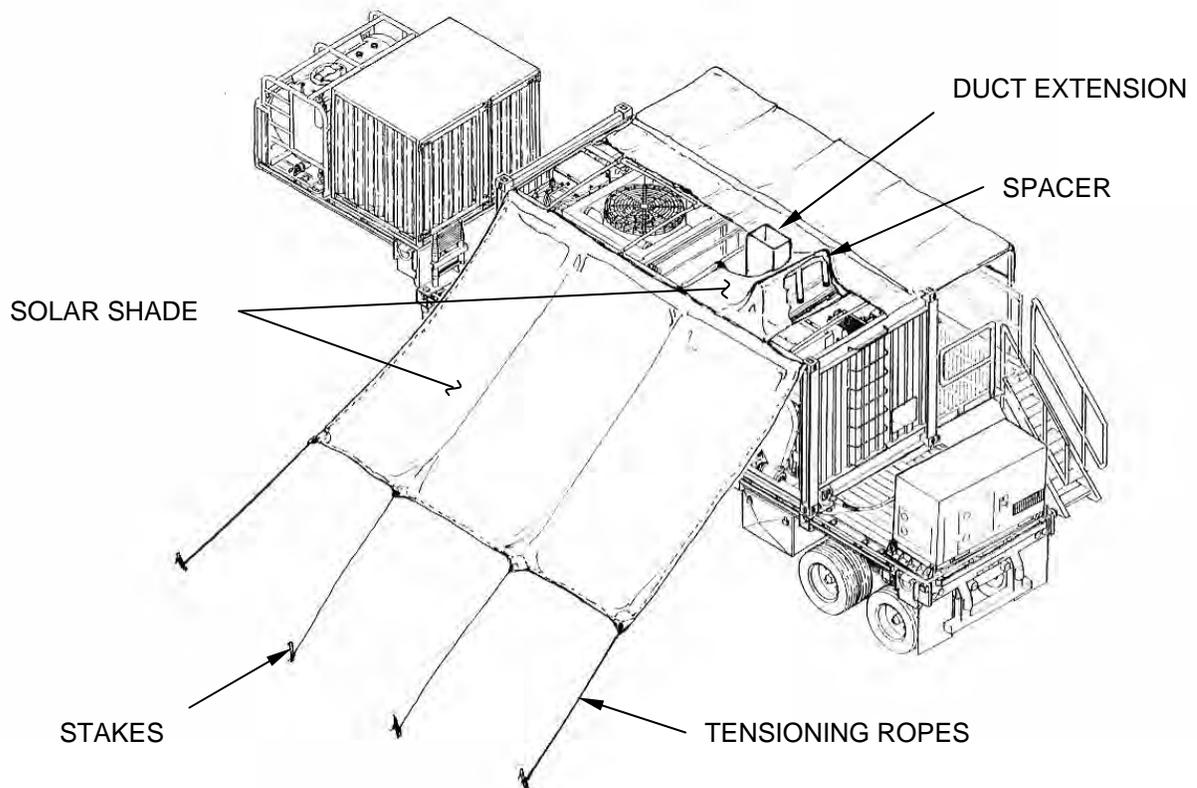


Figure 1. LADS with Solar Shade Installed.

UNUSUAL ENVIRONMENT/WEATHER-CONTINUED**Operation in High Wind**

When operating in high wind fasten drum door open with elastic cord to avoid injury.

Operation in Dusty, Muddy or Sandy Areas

When operating in sandy muddy, or dusty areas, refer to WP 0043 to perform weekly PMCS daily, quarterly PMCS monthly, and semi-annual PMCS quarterly.

Keep the LADS closed when not in use. Ensure all manual drain valves are closed. Close and lock drum doors. Ensure that panels or doors on electrical enclosures and junction boxes are closed. If possible, raise platform and install tarp.

Typically laundry turned in under these conditions will be heavily soiled. When laundering heavily soiled items the LADS wash and rinse 1 water will also be heavily soiled. In addition, the still will collect more soil and will need to be cleaned more frequently. It is recommended that the system be drained after daily operations and refilled with fresh water. If desired a pre-wash may be performed as part of a BDU 65 minute cycle utilizing the pre-wash manifold set-up (WP 0011).

UNUSUAL ENVIRONMENT/WEATHER-CONTINUED**Operation at Different Altitudes**

The LADS heater operation is sensitive to changes in altitude. Whenever the LADS is moved to higher or lower altitudes the fuel/air mixture may need to be readjusted.

1. Slide air inlet filter (Figure 2, Item 5) out of heater (Figure 2, Item 1).
2. Loosen, but do not remove wing screw (Figure 2, Item 2).
3. Pivot inlet plate (Figure 2, Item 3) until wing screw (Figure 2, Item 2) is as listed in Table 1.
4. Hand tighten wing screw (Figure 2, Item 2).
5. Slide air inlet filter (Figure 2, Item 5) back into heater (Figure 2, Item 1) with direction arrow (Figure 2, Item 4) pointing towards heater inlet.

Table 1. Heater Air Inlet Settings.

ALTITUDE RANGE (FEET)	ALTITUDE RANGE (METERS)	INLET PLATE POSITION
0-2,500	0-762	Full Closed
2,501-5,000	763-1,524	Half Open
5,001-7,500	1,525-2,286	Full Open

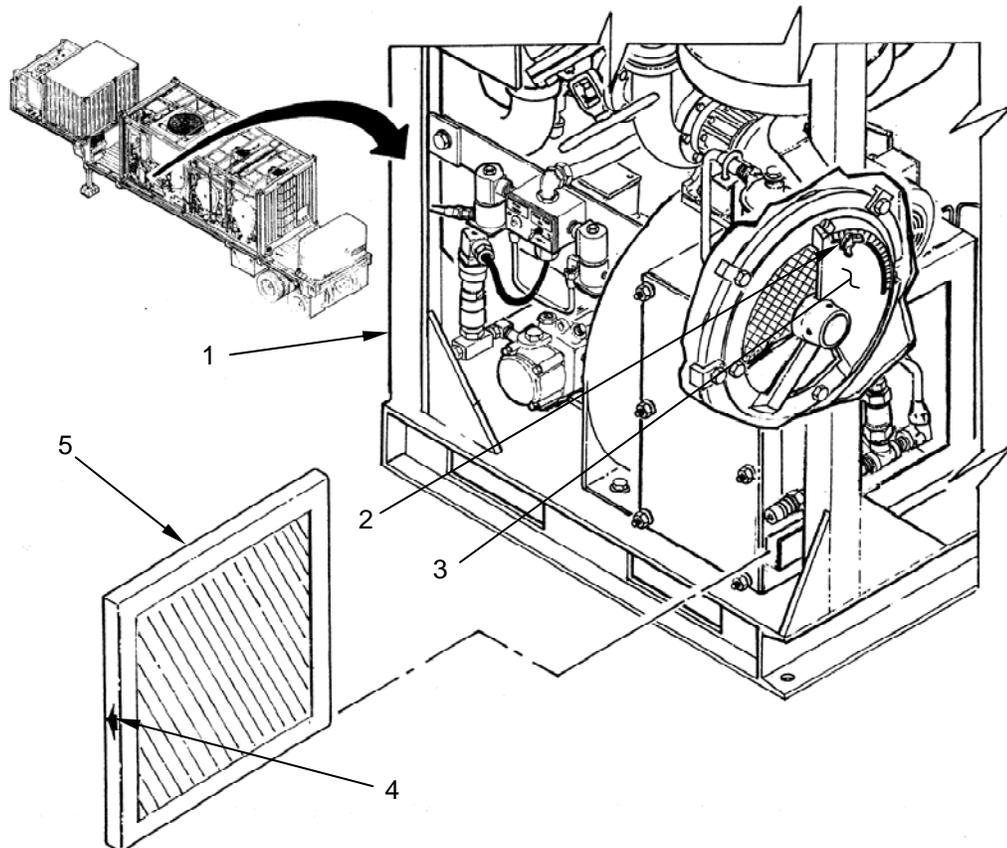


Figure 2. Air Inlet Plate.

UNUSUAL ENVIRONMENT/WEATHER-CONTINUED**Operation in Rain**

LADS should always be kept in the ready for transport mode unless it is needed to conduct laundry operations. Unnecessary exposure to rain may lead to water and/or potential freeze damage. Always keep tarp deployed over the top and back of LADS when not in use. When the LADS is set-up, but not operating in rainy conditions, the heater exhaust stack may collect water. Prior to operating the LADS after rain, unthread cap (Figure 3, Item 3) from bottom of exhaust stack (Figure 3, Item 2). Allow residual water to drain then thread cap (Figure 3, Item 3) on bottom of exhaust stack (Figure 3, Item 2) hand tight.

When the LADS is set-up, whether operating or not operating in rainy conditions, watch for water collecting on awning extension (Figure 3, Item 1) and awning (Figure 3, Item 4). Periodically push up on bottom of each to drain water.

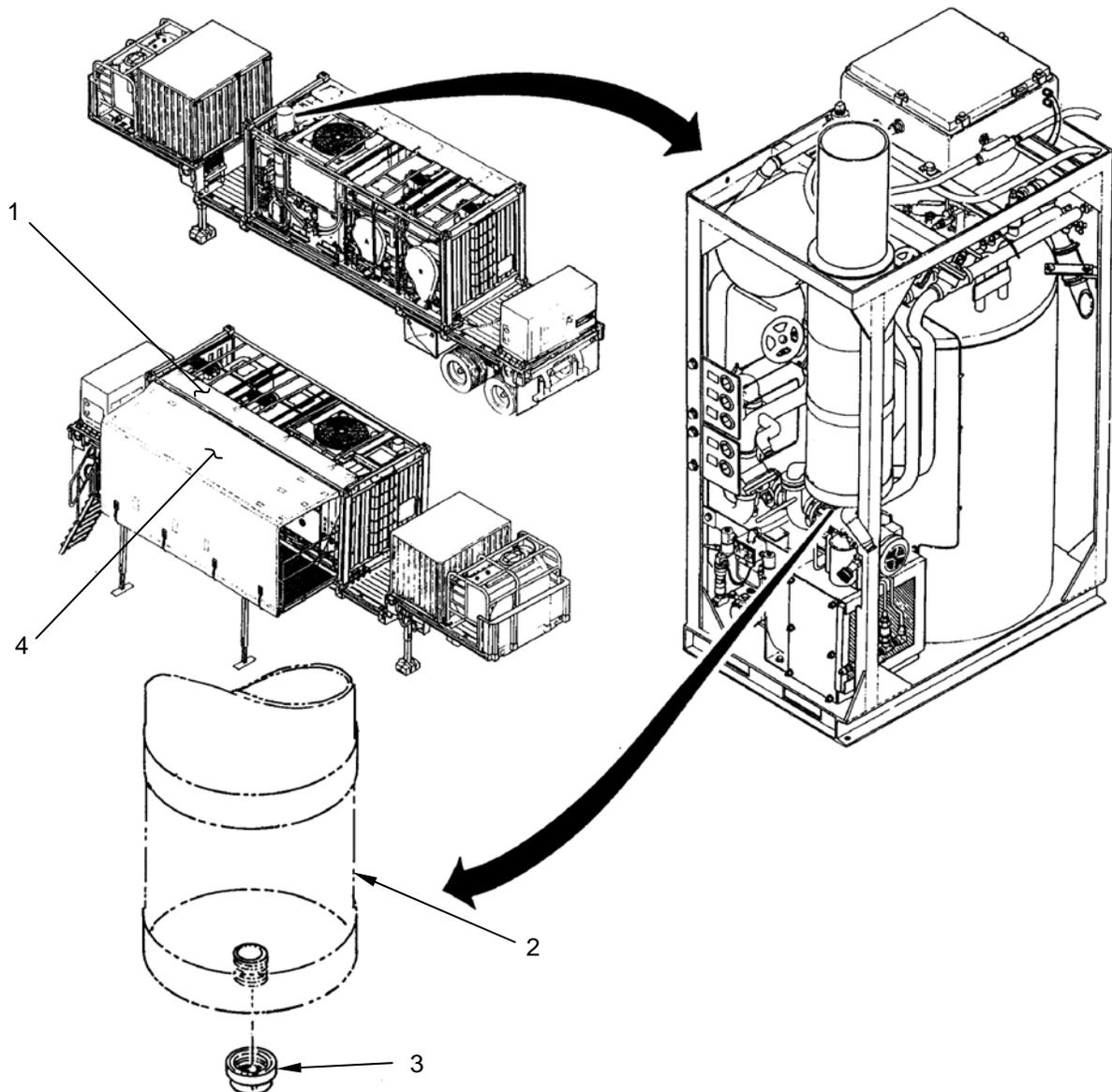


Figure 3. Heater Exhaust Drain.

MANUAL PRE-WASH MANIFOLD OPERATION

1. Locate correct valve for system A or system B.
2. Position mode switch (Figure 4, Item 3) on pre-wash manifold (Figure 4, Item 2) to MAN (11 o'clock position).
3. During pre-wash cycle when DRAIN DRUM step begins, position manual valve (Figure 4, Item 1) to open (inline with water flow).
4. Wait for pre-wash cycle to complete FLUSH PLUMBING step then position manual valve (Figure 4, Item 1) to close (opposite water flow).
5. Repeat steps 1 through 4 for each pre-wash cycle as desired. After last cycle position mode switch (Figure 4, Item 3) back to AUTO (12 o'clock position)

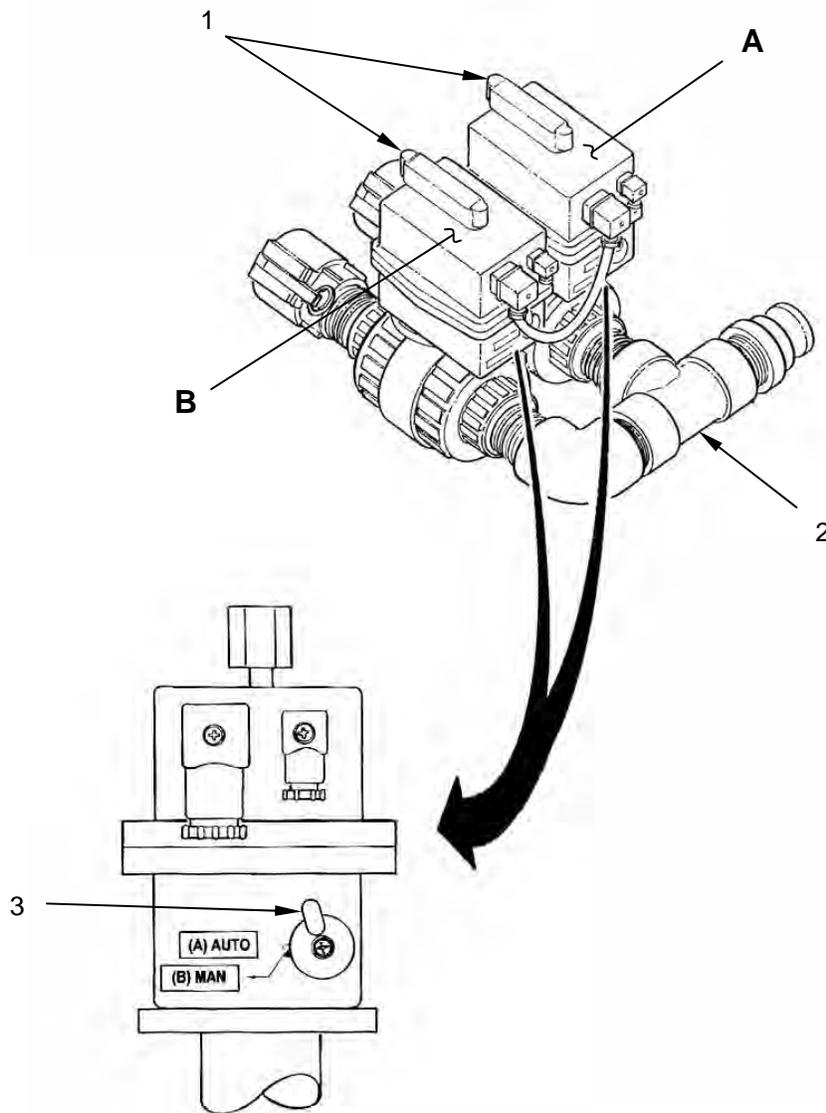


Figure 4. Pre-wash Manifold Manual Operation.

INTERIM CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR (CBRN) PROCEDURES**Decontamination Procedures****NOTE**

Detailed decontamination and protection procedures can be found in FM 3-11.4 and 3-11.5

General

The following emergency procedures can be performed until thorough decon facilities are available. The commander will supervise, assign crew duties, and assist the supporting CBRN unit.

Emergency Procedures

If CBRN attack is known or suspected, install tarp on the LADS following preparation for movement procedures. If the sealed system is contaminated it may be evacuated to a clean area and the outer portion decontaminated as an operational decon. Do not unmask until told to do so.

Nuclear Decontamination

Brush fallout from skin, clothing, and equipment with any available brushes, rags, or tree branches. Wash skin and have radiation check made as soon as tactical situation permits. (You can find instructions for the radiation check in FM 3-11.5).

Biological Decontamination

Biological decontamination must be compatible with the biological agent. FM 3-11.5 must be used to identify specific procedures.

Chemical Detection and Decontamination**WARNING**

Do not use decontamination spray on personnel. It could cause personal injury. Seek immediate medical attention if injury occurs.

NOTE

Decon procedures take time. Do as much as you can based on the tactical situation.

Use the chemical agent monitor to detect the chemical agent. Also the M8 paper from the M256 chemical agent detector kit or M9 paper may be used to determine if liquid is present on the vehicle surface.

If exposure to liquid agent is known or suspected, clean exposed skin, clothing, and personal gear, in that order, using M258A1 kit. Use the buddy system. Wash exposed skin and thoroughly decontaminate as soon as tactical situation permits.

If the M8 or M9 paper indicates that liquid chemical agent is present on the vehicle surface use the M-13 decon apparatus for operational decon of the servicing unit. Avoid getting liquid agent into the sealed system. Spray only surfaces that will be touched by the crew or operator.

END OF WORK PACKAGE

**CREW MAINTENANCE
EMERGENCY**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

ReferencesWP 0037

INITIATING AN EMERGENCY STOP**NOTE**

When an emergency stop is initiated, the control system will automatically stop operation of the LADS systems.

1. To initiate an emergency stop push in on EMERGENCY STOP switch (Figure 1, Item 1) on main control enclosure (Figure 1, Item 2).

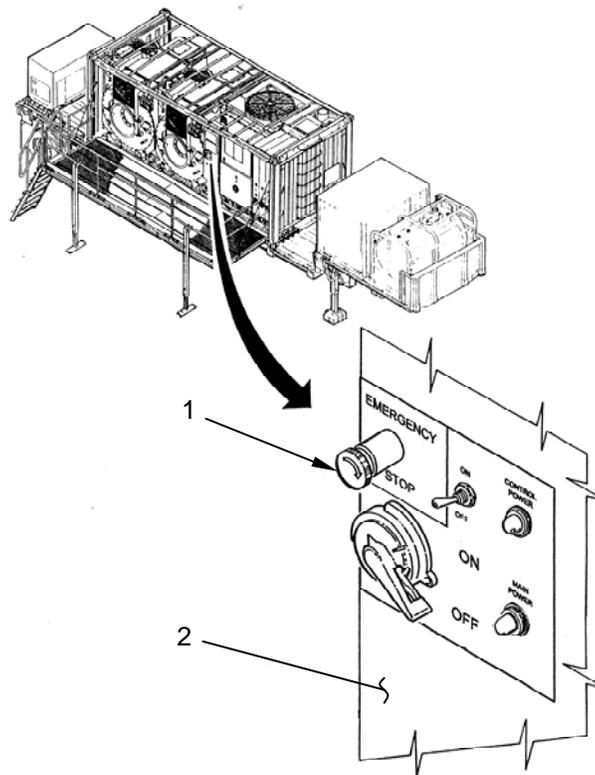


Figure 1. Emergency Stop Switch Location.



INITIATING AN EMERGENCY STOP-CONTINUED

WARNING

Before attempting to clear an emergency stop make sure condition causing the emergency shutdown has been corrected. Failure to follow this precaution may result in equipment damage and/or serious personal injury or death. Seek immediate medical attention if injury occurs.

- 2. To clear an emergency stop condition refer to (WP 0037).

END OF WORK PACKAGE



CHAPTER 3
TROUBLESHOOTING PROCEDURES
FOR
LAUNDRY ADVANCED SYSTEM

**CREW MAINTENANCE
TROUBLESHOOTING INDEX
LADS MODEL C**

MALFUNCTION/SYMPTOM INDEX

Table 1. System Observed Faults.

MALFUNCTION/SYMPTON	WP NUMBER/ CORRECTIVE ACTION
Control System (Main Control Enclosure Indications)	
1. CONTROL POWER lamp is not on	WP 0035
2. MAIN POWER lamp is not on	WP 0035
Control System (Operator Panel Indications)	
1. ALARM does not sound	Complete Cycle/Notify Unit Maintenance
2. ALARM will not turn off when SILENCE ALARM switch is pressed	Complete Cycle/Notify Unit Maintenance
3. ATTENTION REQUIRED lamp is not on	WP 0036
4. Display comes on but has scrambled or no characters Notify Unit Maintenance	Notify Unit Maintenance
5. Display does not come on	WP 0036
6. Display state does not change when menu selection switch is press	Notify Unit Maintenance
7. SYSTEM OPERABLE lamp is not on	WP 0036
Control System	
1. Drum motor cooling fan does not come on	Notify Unit Maintenance
2. Inverter enclosure fan does not come on	Notify Unit Maintenance
Washing/Drying System	
1. Drum Door Will Not Open	Notify Unit Maintenance
2. Drum Shaking Excessively	Pause Cycle/WP 0027
3. Laundry Cycle Can Not Be Started	Notify Unit Maintenance
4. Laundry Cycle Remains in Washing Step	Notify Unit Maintenance
5. Laundry Not Clean	WP 0027
6. Laundry Not Drying	WP 0027
7. R2 Tank Not Heating	WP 0027
8. Water Not Draining From Drum	Pause Cycle/WP 0027

MALFUNCTION/SYMPTOM INDEX-CONTINUED

Table 1. System Observed Faults-Continued.

MALFUNCTION/SYMPTOM	WP NUMBER/ CORRECTIVE ACTION
Washing/Drying System-Continued	
9. Water Spraying From Blower During Extract	Complete Cycle/Notify Unit Maintenance
10. Water Visible at Rear Seal of Drum	Complete Cycle/WP 0027
Water Recycle System	
1. Cooldown or Drain Cycle Will Not Finish	Notify Unit Maintenance
2. Recycled Water Temperature High	WP 0029
3. Still Door(s) Will Not Open	WP 0029
Heating System	
1. Fuel Pump Will Not Prime	WP 0031
2. Heater Smoking	WP 0031
Air System	
1. Air Compressor Does Not Come On	WP 0033
2. Water In Air Lines	Complete Cycle(s)/Notify Unit Maintenance
Auxiliary Equipment	
1. Auxiliary Overhead Light Does Not Turn On	WP 0038
Control System (Operator Panel Alarm Messages)	Refer to Table 2

PANEL ALARM MESSAGES

Table 2. Operator Panel Alarm Messages.

FAILURE MESSAGE	ALARM LEVEL	WP NUMBER/ CORRECTIVE ACTION
Air Compr Inverter Fault	3	Pause Cycle(s)/WP 0034
Air Product Press Lo	4	WP 0034
Air Product Press Hi	3	Complete Cycle(s)Notify Unit Maintenance
Air Tank Not Pressurizing	4	WP 0034
Air Tank Press Hi	3	Complete Cycle(s)/Notify Unit Maintenance
Ambient Air Temp Hi	3	Complete Cycle(s)/WP 0028
Ambient Air Temp Lo	3	Complete Cycle(s)/WP 0028
Burner Blwr In Press Lo	3	Pause Cycle(s)/WP 0032
Burner Blwr Out Press Lo	3	Pause Cycle(s)/WP 0032
Burner Blower Overload	3	Pause Cycle(s)/WP 0032
Condensate Temp Hi	3	Complete Cycle(s)/WP 0030
Condensate Temp Lo	3	Complete Cycle(s)/Notify Unit Maintenance
Condenser Fan Overload	3	Pause Cycle(s)/WP 0030
CPU Test Failure (Only at Startup)	4	WP 0037
Distillate Pump Overload	3	Notify Unit Maintenance
Drum A Braking Slow	3	Complete Cycle(s)/Notify Unit Maintenance
Drum A Inverter Fault	3	Pause Cycle(s)/WP 0028
Drum A No Rotation	3	Pause Cycle(s)/WP 0028
Drum A Stalling	2	Pause Cycle(s)/WP 0028
Drum A Will Not Balance	2	WP 0029
Drum B Braking Slow	3	Complete Cycle(s)/Notify Unit Maintenance
Drum B Inverter Fault	3	Pause Cycle(s)/WP 0028
Drum B No Rotation	3	Pause Cycle(s)/ WP 0028
Drum B Stalling	2	Pause Cycle(s)/ WP 0028
Drum B Will Not Balance	2	WP 0028
Drum Door A Not Locked	2	WP 0028
Drum Door B Not Locked	2	WP 0028
Dryer A Inlet Temp Hi	3	Pause Cycle(s)/ WP 0028
Dryer A Inlet Temp Lo	3	Pause Cycle(s)/ WP 0028
Dryer B Inlet Temp Hi	3	Pause Cycle(s)/ WP 0028
Dryer B Inlet Temp Lo	3	Pause Cycle(s)/ WP 0028
Dryer Blower A Overload	3	Pause Cycle(s)/ WP 0028
Dryer Blower B Overload	3	Pause Cycle(s)/ WP 0028
Emergency Stop Activated	4	WP 0028
Fuel Level Lo	4	Pause Cycle(s)/ WP 0032
Fuel Pressure Lo	3	Pause Cycle(s)/ WP 0032
Fuel Pump Overload	3	Pause Cycle(s)/ WP 0032
Heating System Failure	3	Pause Cycle(s)/ WP 0032
LT100A Failure	3	Complete Cycle(s)/Notify Unit Maintenance
LT100B Failure	3	Complete Cycle(s)/Notify Unit Maintenance
LT101A Failure	3	Complete Cycle(s)/Notify Unit Maintenance
LT101B Failure	3	Complete Cycle(s)/Notify Unit Maintenance
LT102 Failure	3	End Cycle(s)/Notify Unit Maintenance
LT200 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
LT201 Failure	3	End Cycle(s)/Notify Unit Maintenance
PCB3 SSR 7 FAULT	3	Complete Cycle(s)/Notify Unit Maintenance
PCB3 SSR 8 FAULT	3	Complete Cycle(s)/Notify Unit Maintenance
PCB3 SSR 9 FAULT	3	Complete Cycle(s)/Notify Unit Maintenance

PANEL ALARM MESSAGES-CONTINUED

Table 2. Operator Panel Alarm Messages-Continued.

FAILURE MESSAGE	ALARM LEVEL	WP NUMBER/ CORRECTIVE ACTION
PT200 Failure	4	Notify Unit Maintenance
PT300 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
PT301 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
PT302 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
PT500 Failure	4	Notify Unit Maintenance
PT501 Failure	4	Notify Unit Maintenance
RAM Test Failure (Only at Startup)	4	WP 0037
ROM Test Failure (Only at Startup)	4	WP 0037
R1 Tank A Not Emptying	3	Pause Cycle(s)/ WP 0028
R1 Tank A Not Filling	3	Pause Cycle(s)/ WP 0028
R1 Tank B Not Emptying	3	Pause Cycle(s)/ WP 0028
R1 Tank B Not Filling	3	Pause Cycle(s)/ WP 0028
R2 Tank Not Emptying	3	Pause Cycle(s)/ WP 0028
R2 Tank Not Filling	3	Pause Cycle(s)/ WP 0028
R2 Water Temp Hi	3	Complete Cycle/ WP 0030
R2 Water Temp Lo	3	Complete Cycle/ WP 0030
Stall Sensing Fault	3	Complete Cycle(s)/Notify Unit Maintenance
Standpipe Level Lo	3	Complete Cycle(s)/ WP 0030
Standpipe Not Emptying	3	WP 0030
Still Door(s) Open	2	WP 0030
Still Not Boiling Down	3	Complete Cycle(s)/Notify Unit Maintenance
Still Not Filling	3	Complete Cycle(s)/ WP 0030
Still Press Hi	3	WP 0030
Still Press Lo	3	Complete Cycle(s)/Notify Unit Maintenance
Still Temp Lo	3	Complete Cycle(s)/Notify Unit Maintenance
TE100 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
TE101A Failure	3	Complete Cycle/Notify Unit Maintenance
TE101B Failure	3	Complete Cycle/Notify Unit Maintenance
TE102A Failure	3	Complete Cycle/Notify Unit Maintenance
TE102B Failure	3	Complete Cycle/Notify Unit Maintenance
TE103 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
TE200 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
TE201 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
TE202 Failure	3	Complete Cycle(s)/Notify Unit Maintenance
TE300 Failure	3	End Cycle(s)/Notify Unit Maintenance
TF Flow Lo	3	End Cycle(s)/ WP 0032
TF Pump Inlet Press Lo	3	End Cycle(s)/ WP 0032
TF Pump Outlet Press Hi	3	End Cycle(s)/Notify Unit Maintenance
TF Pump Outlet Press Lo	3	End Cycle(s)/ WP 0032
TF Pump Overload	3	Pause Cycle(s)/ WP 0032
TF Temp Hi	3	End Cycle(s)/Notify Unit Maintenance
TF Temp Hi Limit	3	End Cycle(s)/Notify Unit Maintenance
TF Temp Lo	3	End Cycle(s)/Notify Unit Maintenance
VREF(S) Out Of Range	3	End Cycle(s)/Notify Unit Maintenance
Wash Tank A Not Emptying	3	Pause Cycle(s)/ WP 0028
Wash Tank A Not Filling	3	Pause Cycle(s)/ WP 0028
Wash Tank B Not Emptying	3	Pause Cycle(s)/ WP 0028
Wash Tank B Not Filling	3	Pause Cycle(s)/ WP 0028

PANEL ALARM MESSAGES-CONTINUED**Table 2. Operator Panel Alarm Messages-Continued**

FAILURE MESSAGE	ALARM LEVEL	WP NUMBER/ CORRECTIVE ACTION
Water Pump A Overload	3	Pause Cycle(s)/ WP 0028
Water Pump B Overload	3	Pause Cycle(s)/ WP 0028
Water Supply Pump Overload	3	Pause Cycle(s)/ WP 0028
10 HP Inverter Fault	3	Pause Cycle(s)/ WP 0028
20 HP Inverter Fault	3	Pause Cycle(s)/ WP 0030

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING INDEX
LADS MODEL D**

MALFUNCTION/SYMPTOM INDEX

Table 1. System Observed Faults.

MALFUNCTION/SYMPTOM	WP NUMBER/CORRECTIVE ACTION
Control System (Main Control Enclosure Indications)	
1. ALARM does not sound	Complete Cycle/Notify Unit Maintenance
2. ALARM will not turn off when Silence Alarm icon is pressed	Complete Cycle/Notify Unit Maintenance
3. CONTROL POWER lamp is not on	WP 0035
4. Touchscreen comes on but has scrambled or no characters	Notify Unit Maintenance
5. Touchscreen does not come on	Notify Unit Maintenance
6. Touchscreen state does not change when menu options are selected	Notify Unit Maintenance
7. MAIN POWER lamp is not on	WP 0035
Control System	Notify Unit Maintenance
1. Drum motor cooling fan does not come on	Notify Unit Maintenance
2. Inverter enclosure fan does not come on	Notify Unit Maintenance
Washing/Drying System	Notify Unit Maintenance
1. Drum Door Will Not Open	Pause Cycle/WP 0027
2. Drum Shaking Excessively	Notify Unit Maintenance
3. Laundry Cycle Can Not Be Started	Notify Unit Maintenance
4. Laundry Cycle Remains in Washing Step	WP 0027
5. Laundry Not Clean	WP 0027
6. Laundry Not Drying	WP 0027
7. R2 Tank Not Heating	WP 0027
8. Water Not Draining From Drum	Pause Cycle/WP 0027

MALFUNCTION/SYMPTOM INDEX-CONTINUED**Table 1. System Observed Faults-Continued.**

MALFUNCTION/SYMPTON	WP NUMBER/CORRECTIVE ACTION
Washing/Drying System-Continued	
9. Water Spraying From Blower During Extract	Complete Cycle/Notify Unit Maintenance
10. Water Visible at Rear Seal of Drum	Complete Cycle/WP 0027
Water Recycle System	
1. Cooldown or Drain Cycle Will Not Finish	Notify Unit Maintenance
2. Recycled Water Temperature High	WP 0029
3. Still Door(s) Will Not Open	WP 0029
Heating System	
1. Fuel Pump Will Not Prime	WP 0031
2. Heater Smoking	WP 0031
Air System	
1. Air Compressor Does Not Come On	WP 0033
2. Water In Air Lines	Complete Cycle(s)/Notify Unit Maintenance
Auxiliary Equipment	
1. Auxiliary Overhead Light Does Not Turn On	WP 0038
Control System (HMI Displayed Fault Codes)	Refer to Table 2

TOUCHSCREEN ALARM MESSAGES

Table 2. Touchscreen Displayed Alarm Messages.

FAILURE MESSAGE	FAULT CODE	ALARM LEVEL	WP NUMBER/CORRECTIVE ACTION
Air Compr Inverter Fault	53N01	3	Pause Cycle(s)/WP 0034
Air Product Press Lo	53N02	4	WP 0034
Air Product Press Hi	54N01	3	Complete Cycle(s)/Notify Unit Maintenance
Air Tank Not Pressurizing	54N02	4	WP 0034
Air Tank Press Hi	53N03	3	Complete Cycle(s)/Notify Unit Maintenance
Ambient Air Temp Hi	13N01	3	Complete Cycle(s)/WP 0028
Ambient Air Temp Lo	13N02	3	Complete Cycle(s)/WP 0028
Burner Blwr In Press Lo	33N01	3	Pause Cycle(s)/WP 0032
Burner Blwr Out Press Lo	33N02	3	Pause Cycle(s)/WP 0032
Burner Blower Overload	33N03	3	Pause Cycle(s)/WP 0032
Condensate Temp Hi	23N01	3	Complete Cycle(s)/ WP 0030
Condenser Fan Overload	23N02	3	Pause Cycle(s)/WP 0030
Distillate Pump Overload	23N03	3	Pause Cycle(s)/WP 0030
Drum A Braking Slow	13A01	3	Complete Cycle(s)/Notify Unit Maintenance
Drum A Inverter Fault	13A02	3	Pause Cycle(s)/WP 0028
Drum A No Rotation	13A03	3	Pause Cycle(s)/WP 0028
Drum A Stalling	12A01	2	Pause Cycle(s)/WP 0028
Drum A Will Not Balance	12A02	2	WP 0028
Drum B Braking Slow	13B01	3	Complete Cycle(s)/Notify Unit Maintenance
Drum B Inverter Fault	13B02	3	Pause Cycle(s)/WP 0028
Drum B No Rotation	13B03	3	Pause Cycle(s)/WP 0028
Drum B Stalling	12B01	2	Pause Cycle(s)/WP 0028
Drum B Will Not Balance	12B02	2	WP 0028
Drum Door A Not Locked	12A03	2	WP 0028
Drum Door B Not Locked	12B03	2	WP 0028
Dryer A Inlet Temp Hi	13A05	3	Pause Cycle(s)/WP 0028
Dryer A Inlet Temp Lo	13A06	3	Pause Cycle(s)/WP 0028
Dryer B Inlet Temp Hi	13B05	3	Pause Cycle(s)/WP 0028
Dryer B Inlet Temp Lo	13B06	3	Pause Cycle(s)/WP 0028
Dryer Blower A Overload	13A04	3	Pause Cycle(s)/WP 0028
Dryer Blower B Overload	13B04	3	Pause Cycle(s)/WP 0028
Emergency Stop Activated	44N01	4	WP 0037
Fuel Level Lo	34N04	4	Pause Cycle(s)/WP 0032
Fuel Pressure Lo	33N04	3	Pause Cycle(s)/WP 0032
Fuel Pump Overload	33N05	3	Pause Cycle(s)/WP 0032
Heating System Failure	33N06	3	Pause Cycle(s)/WP 0032
LT100A Failure	13A07	3	Complete Cycle(s)/Notify Unit Maintenance
LT100B Failure	13B07	3	Complete Cycle(s)/Notify Unit Maintenance
LT101A Failure	13A08	3	Complete Cycle(s)/Notify Unit Maintenance
LT101B Failure	13B08	3	Complete Cycle(s)/Notify Unit Maintenance
LT102 Failure	13N03	3	End Cycle(s)/Notify Unit Maintenance

TOUCHSCREEN ALARM MESSAGES-CONTINUED

Table 2. Touchscreen Displayed Alarm Messages-Continued.

FAILURE MESSAGE	FAULT CODE	ALARM LEVEL	WP NUMBER/CORRECTIVE ACTION
LT200 Failure	23N04	3	Complete Cycle(s)/Notify Unit Maintenance
LT201 Failure	23N05	3	End Cycle(s)/Notify Unit Maintenance
PLC Rack 1 Fault	43N03	3	Notify Unit Maintenance
PLC Rack 2 Fault	43N05	3	Notify Unit Maintenance
PLC Rack 3 Fault	43N06	3	Notify Unit Maintenance
PLC Rack 4 Fault	43N07	3	Notify Unit Maintenance
PLC Rack 5 Fault	43N08	3	Notify Unit Maintenance
PLC Rack 6 Fault	43N09	3	Notify Unit Maintenance
PLC Rack 7 Fault	43N10	3	Notify Unit Maintenance
PLC Rack 8 Fault	43N11	3	Notify Unit Maintenance
PLC Rack 9 Fault	43N12	3	Notify Unit Maintenance
PLC Rack 10 Fault	43N04	3	Notify Unit Maintenance
PT200 Failure	23N06	4	Notify Unit Maintenance
PT300 Failure	33N07	3	Complete Cycle(s)/Notify Unit Maintenance
PT301 Failure	33N08	3	Complete Cycle(s)/Notify Unit Maintenance
PT302 Failure	33N09	3	Complete Cycle(s)/Notify Unit Maintenance
PT500 Failure	54N03	4	Notify Unit Maintenance
PT501 Failure	54N04	4	Notify Unit Maintenance
R1 Tank A Not Emptying	13A09	3	Pause Cycle(s)/WP 0028
R1 Tank A Not Filling	13A10	3	Pause Cycle(s)/WP 0028
R1 Tank B Not Emptying	13B09	3	Pause Cycle(s)/WP 0028
R1 Tank B Not Filling	13B10	3	Pause Cycle(s)/WP 0028
R2 Tank Not Emptying	13N04	3	Pause Cycle(s)/WP 0028
R2 Tank Not Filling	13N05	3	Pause Cycle(s)/WP 0028
Standpipe Not Emptying	23N07	3	WP 0030
Still Door(s) Open	23N08	2	WP 0030
Still Not Boiling Down	23N09	3	Complete Cycle(s)/Notify Unit Maintenance
Still Not Filling	23N10	3	Complete Cycle(s)/WP 0030
Still Press Hi	23N11	3	WP 0030
TE100 Failure	13N06	3	Complete Cycle(s)/Notify Unit Maintenance
TE101A Failure	13A11	3	Complete Cycle/Notify Unit Maintenance
TE101B Failure	13B11	3	Complete Cycle/Notify Unit Maintenance
TE102A Failure	13A12	3	Complete Cycle/Notify Unit Maintenance
TE102B Failure	13B12	3	Complete Cycle/Notify Unit Maintenance
TE103 Failure	13N07	3	Complete Cycle(s)/Notify Unit Maintenance
TE200 Failure	23N12	3	Complete Cycle(s)/Notify Unit Maintenance
TE201 Failure	23N13	3	Complete Cycle(s)/Notify Unit Maintenance
TE202 Failure	23N14	3	Complete Cycle(s)/Notify Unit Maintenance
TE300 Failure	33N10	3	End Cycle(s)/Notify Unit Maintenance

TOUCHSCREEN ALARM MESSAGES-CONTINUED

Table 2. Touchscreen Displayed Alarm Messages-Continued.

FAILURE MESSAGE	FAULT CODE	ALARM LEVEL	WP NUMBER/CORRECTIVE ACTION
TF Flow Lo	33N11	3	End Cycle(s)/WP 0032
TF Pump Inlet Press Lo	33N12	3	End Cycle(s)/WP 0032
TF Pump Outlet Press Hi	33N13	3	End Cycle(s)/Notify Unit Maintenance
TF Pump Outlet Press Lo	33N14	3	End Cycle(s)/WP 0032
TF Pump Overload	33N15	3	Pause Cycle(s)/WP 0032
TF Temp Hi	33N16	3	End Cycle(s)/Notify Unit Maintenance
TF Temp Hi Limit	33N17	3	End Cycle(s)/Notify Unit Maintenance
TF Temp Lo	33N18	3	End Cycle(s)/Notify Unit Maintenance
Wash Tank A Not Emptying	13A13	3	Pause Cycle(s)/WP 0028
Wash Tank A Not Filling	13A14	3	Pause Cycle(s)/WP 0028
Wash Tank B Not Emptying	13B13	3	Pause Cycle(s)/WP 0028
Wash Tank B Not Filling	13B14	3	Pause Cycle(s)/WP 0028
Water Pump A Overload	13A15	3	Pause Cycle(s)/WP 0028
Water Pump B Overload	13B15	3	Pause Cycle(s)/WP 0028
Water Recycling Slow	23N15	3	Continue Cycle(s)/Notify Unit Maintenance
Water Supply Pump Overload	13N07	3	Pause Cycle(s)/WP 0028
10 HP Inverter Fault	43N01	3	Pause Cycle(s)/WP 0028
20 HP Inverter Fault	43N02	3	Pause Cycle(s)/WP 0030

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
LADS MODEL C**

INTRODUCTION TO TROUBLESHOOTING

This chapter contains information for troubleshooting common LADS malfunctions. This chapter cannot list all tests, inspections, and corrective actions needed to correct all malfunctions. If a malfunction is not listed, or if the actions listed do not correct the fault, notify your supervisor.

ALARM CONDITIONS

When the control system detects the need for some type of operator attention relating to a laundry cycle, an audible alarm will sound, and a message will be displayed at operator panel A or B. If a fault occurs, or attention is required on washing/drying system A or B, water recycle system, heating system, air system, or control system, the indication will be provided at operator panel A. There are four alarm levels associated with the LADS operation; Level 1: When the system is operating normally the audible alarms are off, the SYSTEM OPERATIONAL lamps are on, and the ATTENTION REQUIRED lamps are off. Level 2: If the alarm(s) comes on, and remains steady, this indicates that some type of operator action is required. In most cases level 2 alarms alert the operator of a condition that must be corrected, but is not necessarily a fault (i.e. "DRUM DOOR NOT LOCKED", "ADD ANTI-FOAM", "ADD FRS", "UNLOAD LAUNDRY", etc.). In all cases (except "ADD ANTI-FOAM" and "DRUM WON'T BALANCE") the operator must perform the required action before the control system will allow laundry cycle(s) to continue. Level 3: If the alarm comes on with a slow pulse a non-critical fault has occurred. In most cases the current laundry cycle(s) may be completed, however, in some cases the current laundry cycle must be ended. Level 4: If the alarm comes on with a fast pulse a critical fault has occurred and LADS operation will be shut-down by the control system. Whenever a level 4 alarm comes on, the ATTENTION REQUIRED lamp(s) will also be on and the SYSTEM OPERATIONAL lamp will be off. When level 3 or 4 alarm messages appear, they should be written down to help your supervisor and/or maintenance personnel when conducting troubleshooting procedures.

EXAMINING SYSTEM STATUS

During water filling, water heating, laundry, cooldown, and draining operations, the status of key system parameters can be monitored using the EXAMINE INPUTS mode. Also, when conducting troubleshooting procedures, references may be made to use the EXAMINE INPUTS mode to observe a particular sensor or switch status. Obtaining access to this information is described below.

1. Monitor display (Figure 1 or Figure 2), it should read:

<p>WASH CYCLE X IN PROGRESS WASH = XXX DRY = XXX FILL FROM WASH TANK</p>	<p>PAUSE</p> <p>EXAMINE INPUTS</p>
--	--

Figure 1. Cycle in Progress Display.

or

<p>CYCLE PAUSED</p>	<p>CONTINUE CYCLE END CYCLE</p> <p>EXAMINE INPUTS</p>
----------------------------	---

Figure 2. Cycle Paused Display.

EXAMINING SYSTEM STATUS-CONTINUED

2. Press MENU SELECTION switch to select EXAMINE INPUTS.
3. Monitor display (Figure 3), it should read:

EXAMINE INPUTS	ANALOG INPUTS DISCRETE INPUTS RETURN
-----------------------	--

Figure 3. Examine Inputs Display.

4. Press appropriate MENU SELECTION switch as follows:
 - a. Select ANALOG INPUTS to monitor status of analog inputs (Refer to Table 1). Proceed to step 5.
 - b. Select DISCRETE INPUTS to monitor status of discrete inputs (Refer to Table 2). Proceed to step 5.
 - c. Select RETURN to exit examine inputs menu.
5. Monitor display (Figure 4 or Figure 5), it should read:

ANALOG INPUTS LT100A=1.50 VDC= 0 GALS	PREVIOUS INPUT NEXT INPUT RETURN
--	--

Figure 4. Analog Inputs Display.

or

DISCRETE INPUTS ZS100A=ON	PREVIOUS INPUT NEXT INPUT RETURN
--------------------------------------	--

Figure 5. Discrete Inputs Display.

6. Press appropriate MENU SELECTION switch as follows:
 - a. Select PREVIOUS INPUT to monitor previous input.
 - b. Select NEXT INPUT to monitor next input.
 - c. Select RETURN to exit analog or discrete inputs menu and return to step 4.

Table 1. Analog Inputs Data.

SENSOR	FUNCTION	RANGE
LT100A	Wash Tank A Level	0-80 GALS
LT100B	Wash Tank B Level	0-80 GALS
LT101A	Rinse 1 Tank A Level	0-80 GALS
LT101B	Rinse 1 Tank B Level	0-80 GALS
LT102	Rinse 2 Tank Level	0-150 GALS
LT200	Still Level	0-15 INCHES
LT201	Standpipe Level	0-25 INCHES
PT200	Still Internal Pressure	0-5 PSIG
PT300	Thermal Fluid Pump Inlet Pressure	VAC-15PSIG
PT301	Thermal Fluid Pump Outlet Pressure	0-100 PSIG
PT302	Heater Thermal Fluid Outlet Pressure	0-100 PSIG
PT500	Air Tank Storage Pressure	0-200 PSIG
PT501	Product Air Pressure	0-200 PSIG
TE100	Ambient Air	-52-212 Degrees F
TE101A	Dryer A Inlet Air Temperature	-52-392 Degrees F
TE101B	Dryer B Inlet Air Temperature	-52-392 Degrees F
TE102A	Dryer A Outlet Air Temperature	-52-392 Degrees F
TE102B	Dryer B Outlet Air Temperature	-52-392 Degrees F
TE103	Rinse 2 Tank Outlet Water Temperature	-58-212 Degrees F
TE200	Still Internal Temperature	-58-392 Degrees F
TE201	Still Condenser Outlet Water Temperature	-58-392 Degrees F
TE202	Rinse 2 Tank Inlet Water Temperature	-58-392 Degrees F
TE300	Heater Outlet Thermal Fluid Temperature	-58-482 Degrees F
VREFL	PCB1 Voltage Reference Lo	0.75-0.79 VDC
VREFH	PCB1 Voltage Reference Hi	9.20-9.25 VDC

Table 2. Discrete Inputs Data.

DEVICE	FUNCTION	STATUS
OL200	Still Condenser Fan Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL201	Distillate Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL300	Thermal Fluid Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL301	Burner Blower Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
OL302	Fuel Pump Overload Relay Trip Detector	OFF=Normal/ON=Trip Detected
PBS5A	Operator Panel A SILENCE ALARM Switch	OFF=Switch Released/ON=Switch Depressed
PBS5B	Operator Panel A SILENCE ALARM Switch	OFF=Switch Released/ON=Switch Depressed
PS302	BURNER fuel pressure switch	OFF=No or Low Fuel Pressure/ON=Normal Fuel Pressure
PS300	Burner Blower Inlet Air Pressure Switch	OFF=No of Low Air Pressure/ON=Normal Air Pressure
PS301	Burner Blower Outlet Air Pressure Switch	OFF=No of Low Air Pressure/ON=Normal Air Pressure
TS300	Thermal Fluid Temperature Limit Switch	ON=Normal Temperature/OFF=High Temperature
ZS100A	Drum Door A Position Switch	OFF=Door Open/On=Door Closed
ZS100B	Drum Door B Position Switch	OFF=Door Open/On=Door Closed
ZS101A	Drum Door Lock A Position Switch	OFF=Lock Retracted/ON=Lock Extended

Tabel 2. Discrete Inputs Data-Continued.

DEVICE	FUNCTION	STATUS
ZS101B	Drum Door Lock B Position Switch	OFF=Lock Retracted/ON=Lock Extended
ZS102A	Drum A Rotation Sensor	OFF=Sprocket Spoke Not Aligned/ON Sprocket Spoke Aligned
ZS102B	Drum B Rotation Sensor	OFF=Sprocket Spoke Not Aligned/ON Sprocket Spoke Aligned
ZS103A	Drum A Balance Switch	OFF=Drum Balanced/ON=Drum Not Balanced
ZS103B	Drum B Balance Switch	OFF=Drum Balanced/ON=Drum Not Balanced
ZS200	Still Doors Position Switch	OFF=Door(s) Open/ON=Doors Closed

TROUBLESHOOTING GUIDELINES

In WP 0023, Troubleshooting Index is a quick reference index for determining the proper disposition of system malfunctions/symptoms. There are two methods for finding malfunctions/symptoms on the LADS. Operators may observe a malfunction or the control system may detect a fault. Malfunction/symptoms are listed in the index as follows: The faults that would normally be observed during startup are listed first. The remaining faults that could be observed at any time during laundry operations are listed next. These malfunctions /symptoms are listed alphabetically by system. The faults that are detected by the control system, and communicated to the operator through the operator panel A display, are listed last in Table 1. This table lists the alarm messages in alphabetical order along with listing of the "ALARM LEVEL" associated with each message. Associated with each malfunction/symptom or alarm message is an "WP NUMBER/CORRECTIVE ACTION" column. This column provides information on what action you should take when a fault occurs. Possible dispositions include:

Pause Cycle

If "PAUSE" is listed, you may be able to troubleshoot and fix the fault during current laundry cycle(s). Cycles can not be paused in the "XFER FROM WATER SUPPLY", "FILL FROM WASH TANK", "FILL FROM RINSE1 TANK", or "FILL FROM RINSE 2 TANK" steps. Pausing a cycle during "PRE-WASHING", "WASHING", "RINSING 1", or "RINSING 2" steps should be avoided if possible to prevent starting drum rotation from a complete stop with the full weight of the laundry and water in the drum. If a cycle is paused during the "EXTRACT TO STILL", "EXTRACT TO WASH TANK" or "EXTRACT TO RINSE 1 TANK" steps the control system will automatically go back to the "DRAIN TO STILL", "DRAIN TO WASH TANK", or "DRAIN TO RINSE 2 TANK" steps. If a cycle is paused at any time during a "DRY" step, the entire "DRY" step will be repeated. To avoid repeating the "DRY" step, utilize the "DRY ONLY 10 or 20 MIN" cycles after correcting a problem and restarting the cycle. Pause a laundry cycle as follows:

1. Monitor display (Figure 6), it should read:

WASH CYCLE X IN PROGRESS WASH = XXX DRY = XXX	PAUSE
	EXAMINE INPUTS

Figure 6. Cycle in Progress Display.

2. Press MENU SELECTION switch to pause laundry cycle.
3. Monitor display (Figure 7), it should read:

CYCLE PAUSED	CONTINUE CYCLE END CYCLE
	EXAMINE INPUTS

Figure 7. Cycle Paused Display.

TROUBLESHOOTING GUIDELINES—CONTINUED

Once the laundry cycle is paused, perform the referenced troubleshooting work package or notify maintenance as required. After fault has been corrected continue laundry cycle as follows

1. Monitor display (Figure 8), it should read:

CYCLE PAUSED	CONTINUE CYCLE END CYCLE EXAMINE INPUTS
---------------------	---

Figure 8. Cycle Paused Display.

2. Press MENU SELECTION switch to continue laundry cycle.

Complete Cycle

If “COMPLETE CYCLE” is listed, the fault should not prevent you from completing the current laundry cycle(s). Once the laundry cycle is complete, determine if the alarm message is still being displayed. If so, perform the referenced troubleshooting work package or notify maintenance as required. If you cannot complete the laundry cycle, follow the “END CYCLE” instructions.

End Cycle

If “END CYCLE” is listed, the fault will prevent you from completing the current laundry cycle(s), and therefore, must be terminated as follows:

1. Monitor display (Figure 9), it should read:

WASH CYCLE X IN PROGRESS WASH = XXX DRY = XXX	PAUSE EXAMINE INPUTS
--	--------------------------------------

Figure 9. Cycle in Progress Display.

2. Press MENU SELECTION switch to interrupt laundry cycle.
3. Monitor display (Figure 10), it should read

CYCLE PAUSED	CONTINUE CYCLE END CYCLE EXAMINE INPUTS
---------------------	---

Figure 10. Cycle Paused Display.

4. Press MENU SELECTION switch to end laundry cycle.

Once the laundry cycle has ended, determine if the alarm message is still being displayed. If so, perform the referenced troubleshooting work package or notify maintenance as required. If the laundry cycle cannot be ended follow the “Notify Maintenance” instructions.

TROUBLESHOOTING GUIDELINES-CONTINUED**Notify Maintenance**

If "Notify Maintenance" is listed, the fault will prevent further laundry operations from continuing and maintenance should be notified immediately. When "Notify Maintenance" is required, leave the LADS in power on condition if possible. This will enable maintenance personnel to troubleshoot and correct problems more efficiently and result in bringing the LADS back into operation more rapidly. If power can not be left on, operator personnel should record: 1. The cycle step in progress at the time of the fault, 2. The fault messages displayed or observed, and 3. The level, pressure, and temperature readings using the "EXAMINE INPUTS" mode.

WP 00XX

If a work package is listed, proceed directly to the referenced work package to start the troubleshooting process. Should any one malfunction/symptom require more than one troubleshooting procedure to arrive at the most likely fault, a reference will be made within the starting procedure to lead you to subsequent procedures, until successful fault isolation or disposition is achieved.

TROUBLESHOOTING PROCEDURES

Troubleshooting work packages (WP 0027 through WP 0038) contain step-by-step procedures of the tests or inspections, and corrective actions required to return the LADS to normal operation or to determine if the malfunction requires a higher level of maintenance be performed. Separate work packages are provided for the observed and displayed faults for the Washing/Drying System, Water Recycle System, Heating System, Air System, and Control System. Within each work package the faults are listed in alphabetical order. Each work package is headed by initial step information that outlines certain conditions that must be met before starting the task. DO NOT start a task until you understand what you are to do.

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
LADS MODEL D**

INTRODUCTION TO TROUBLESHOOTING

This chapter contains information for troubleshooting common LADS malfunctions. This chapter cannot list all tests, inspections, and corrective actions needed to correct all malfunctions. If a malfunction is not listed, or if the actions listed do not correct the fault, notify your supervisor

ALARM CONDITIONS

When the control system detects the need for some type of operator attention relating to a laundry cycle or sub-system problem, an audible alarm will sound, and a message will be displayed at the touchscreen. LADS operation has four alarm levels; Level 1: When the system is operating normally the audible alarm is off. Level 2: If the alarm(s) comes on, and remains steady, this indicates that some type of operator action is required. When a Level 2 alarm sounds the touchscreen will also display a flashing message in the center of the screen (Figure 1). In most cases level 2 alarms alert the operator of a condition that must be corrected, but is not necessarily a fault (i.e. "DRUM DOOR NOT LOCKED", "ADD ANTI-FOAM", "ADD FR5", "UNLOAD LAUNDRY", etc.). In all cases (except "ADD ANTI-FOAM" "DRUM STALLING", and "DRUM WON'T BALANCE") the operator must perform the required action before the control system will allow laundry cycle(s) to continue. Level 3: If the alarm comes on with a slow pulse a non-critical fault has occurred. These faults will be displayed at the bottom of the screen as shown in Figure 2. In most cases the current laundry cycle(s) may be completed, however, in some cases the current laundry cycle must be ended. Level 4: If the alarm comes on with a fast pulse a critical fault has occurred and LADS operation will be shut-down by the control system. These faults are also displayed at the bottom of the screen. Whenever a level 4 alarm comes on system operation will not continue, even after the fault is corrected, unless control power is turned off and the system is restarted. When level 3 or 4 alarm messages appear, they should be written down to help your supervisor and/or maintenance personnel when conducting troubleshooting procedures.

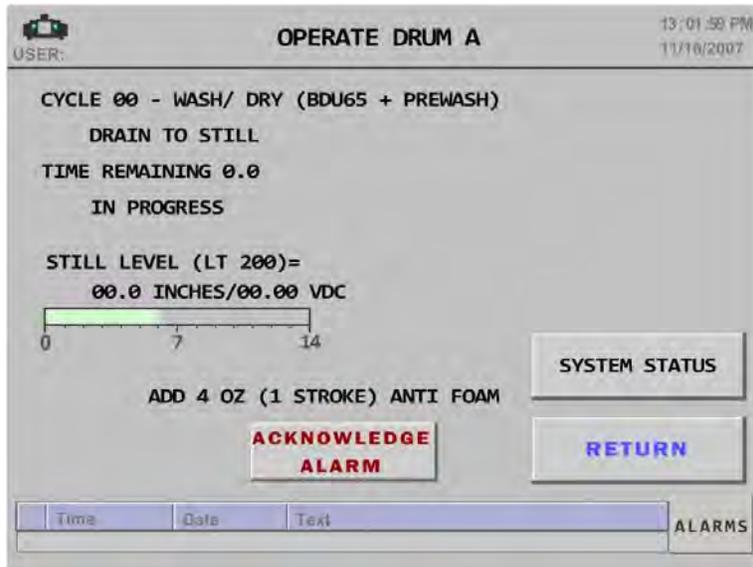


Figure 1. Level 2 Alarm Screen.

ALARM CONDITIONS-CONTINUED

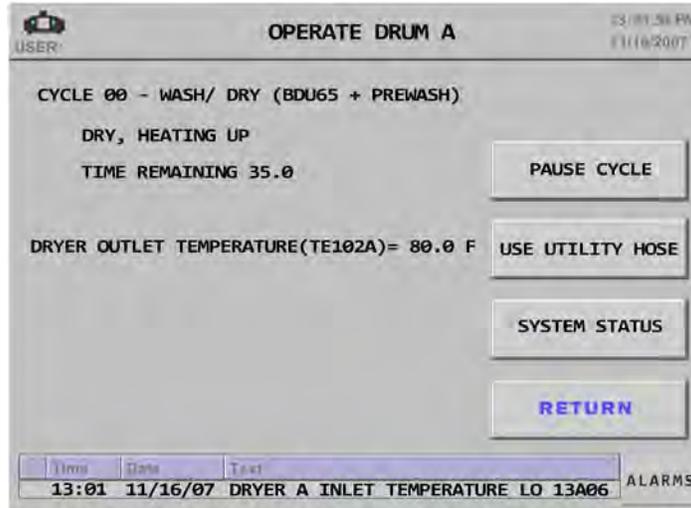


Figure 2. Level 3 or 4 Alarm Screen.

ALARM ACKNOWLEDGEMENT

When a Level 2 alarm comes on the operator should look at the center of the touchscreen to observe the message. The operator can then perform the necessary action and silence the alarm by pressing the flashing ACKNOWLEDGE ALARM icon (Figure 1).

For level 3 or 4 alarms the operator should press the ALARMS key in the lower right corner of the screen (Figure 2) to bring up the Alarm Screen.

Once the Alarms Screen is displayed (Figure 3) the operator can press the check (✓) key to silence the alarm.

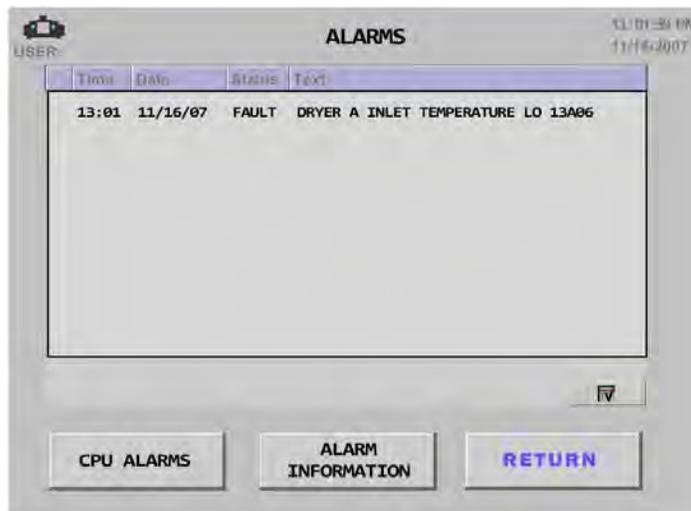


Figure 3. Typical Alarm Screen.

The D Model LADS displays a five digit fault code for each fault. The first digit of the fault code represents the system affected. The second digit represents the alarm level and the third digit represents a breakdown for faults that can occur on washing/drying system A or B. The fourth and fifth digits are sequence numbers that follows alphabetical order.

Additional information about the alarm can be found by selecting the ALARM INFORMATION key.

ALARM ACKNOWLEDGEMENT-CONTINUED

Alarms are displayed in alphabetical order on several screens (refer to Figure 4). Use NEXT or PREVIOUS keys to find the alarm you are looking for. If the fault is still active your fault will be red. Select the fault for more information.

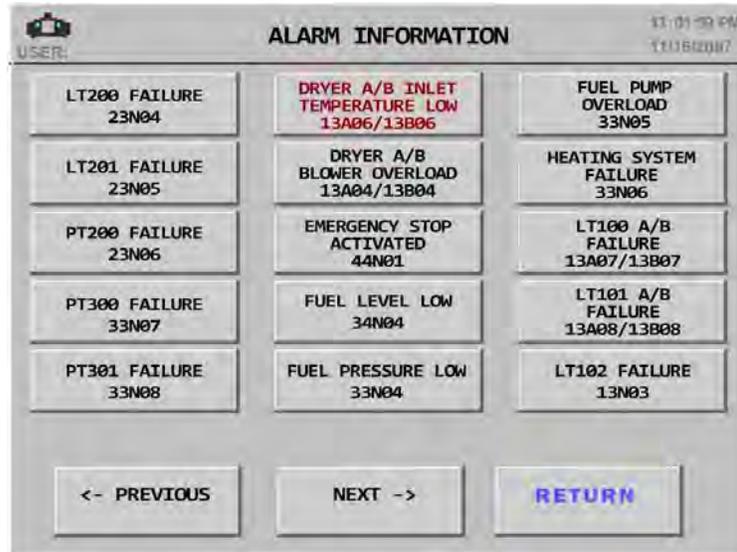


Figure 4. Alarm Information Screen.

A screen specific to your fault will appear (refer to Figure 5). Follow the guidance provided on the screen in WP 0024, the Troubleshooting Index work package, and WP 0027 through WP 0038 for guidance in the troubleshooting work packages to attempt to correct your problem.

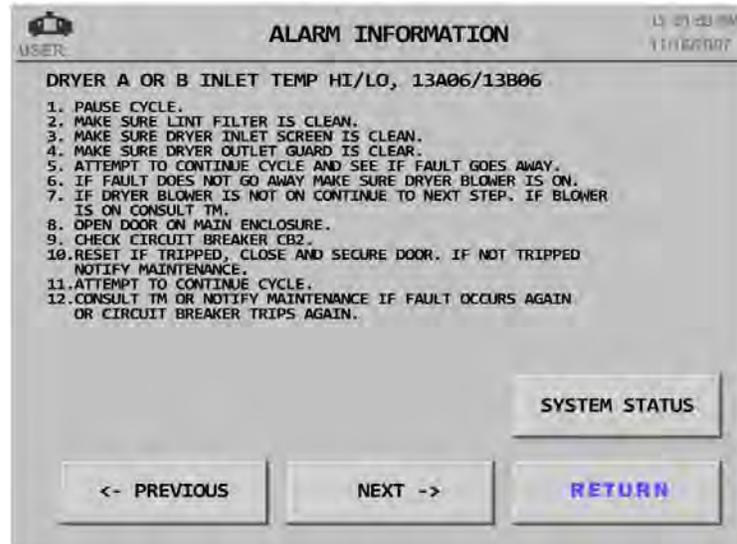


Figure 5. Specific Alarm Information Screen.

ALARM ACKNOWLEDGEMENT-CONTINUED

If you correct the problem the fault will turn back to gray. Select RETURN to get back to the Alarms Screen (Figure 3). Your fault message should be cleared. If the message does not clear, press check (✓) key to try and clear alarm. If fault will not clear continue troubleshooting steps. If fault clears, resolve other faults. When Alarms Screen is clear of all faults select RETURN to get back to utility or laundry operations.

EXAMINING SYSTEM STATUS

During most utility and laundry operations system information that is important to the step you are on is shown on the screen. Other system information can be viewed by selecting SYSTEM STATUS (Figure 6).



Figure 6. Start Menu Screen.

The System Status Screen has a listing of the major sub-systems (Figure 7). To review the status of a particular input, select the desired sub-system screen. If you do not know which sub-system the input is in, review Table 1 to help you find out.

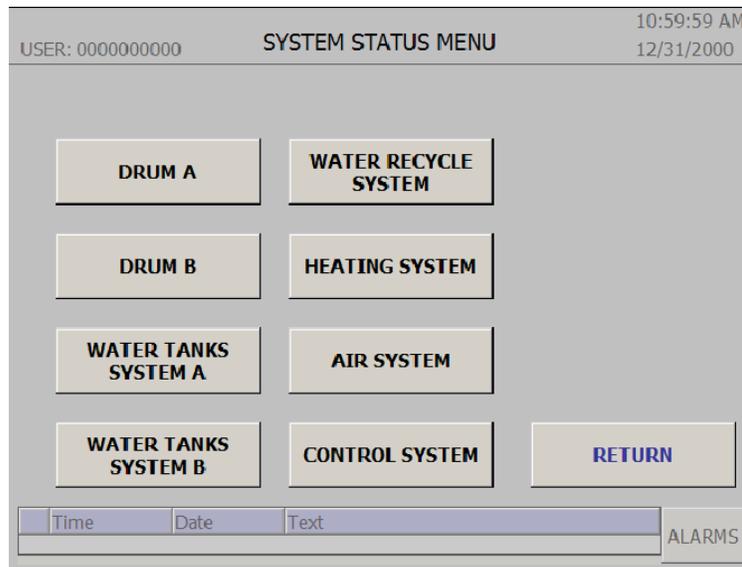


Figure 7. System Status Screen.

EXAMINING SYSTEM STATUS-CONTINUED

Table 1. Inputs Data.

SENSOR	SCREEN/SUBSYSTEM	FUNCTION	STATUS
K100A	Control System	Drum A Inverter Fault Signal	OFF=Normal ON=Fault Detected
K100B	Control System	Drum B Inverter Fault Signal	OFF=Normal ON=Fault Detected
K104	Control System	10 HP Inverter Fault Signal	OFF=Normal ON=Fault Detected
K200	Control System	20 HP Inverter Fault Signal	OFF=Normal ON=Fault Detected
K500	Control System	Air Compressor Inverter Fault Signal	OFF=Normal ON=Fault Detected
LT100A	Water Tanks System A	Wash Tank A Level	0-80 GALS
LT100B	Water Tanks System B	Wash Tank B Level	0-80 GALS
LT101A	Water Tanks System A	Rinse 1 Tank A Level	0-80 GALS
LT101B	Water Tanks System B	Rinse 1 Tank B Level	0-80 GALS
LT102	Water Tanks System A or B	Rinse 2 Tank Level	0-150 GALS
LT200	Water Recycle System	Still Level	0-15 INCHES
LT201	Water Recycle System	Standpipe Level	0-25 INCHES
OL200	Water Recycle System	Still Condenser Fan Overload Relay Trip Detector	OFF=Normal ON=Trip Detected
OL201	Water Recycle System	Distillate Pump Overload Relay Trip Detector	OFF=Normal ON=Trip Detected
OL300	Heating System	Thermal Fluid Pump Overload Relay Trip Detector	OFF=Normal ON=Trip Detected
OL301	Heating System	Burner Blower Overload Relay Trip Detector	OFF=Normal ON=Trip Detected
OL302	Heating System	Fuel Pump Overload Relay Trip Detector	OFF=Normal ON=Trip Detected
PS300	Heating System	Burner Blower Inlet Air Pressure Switch	OFF=No of Low Air Pressure ON=Normal Air Pressure
PS301	Heating System	Burner Blower Outlet Air Pressure Switch	OFF=No of Low Air Pressure ON=Normal Air Pressure
PS302	Heating System	Burner fuel pressure switch	OFF=No or Low Fuel Pressure ON=Normal Fuel Pressure
PT200	Water Recycle System	Still Internal Pressure	0-5 PSIG
PT300	Heating System	Thermal Fluid Pump Inlet Pressure	VAC-15PSIG

EXAMINING SYSTEM STATUS-CONTINUED

Table 1. Inputs Data-Continued.

SENSOR	SCREEN/SUBSYSTEM	FUNCTION	STATUS
PT301	Heating System	Thermal Fluid Pump Outlet Pressure	0–100 PSIG
PT302	Heating System	Heater Thermal Fluid Outlet Pressure	0–100 PSIG
PT500	Air System	Air Tank Storage Pressure	0–200 PSIG
PT501	Air System	Product Air Pressure	0–200 PSIG
TE100	Drum A or B	Ambient Air	-52–212 °F
TE101A	Drum A	Dryer A Inlet Air Temperature	-52–392 °F
TE101B	Drum B	Dryer B Inlet Air Temperature	-52–392 °F
TE102A	Drum A	Dryer A Outlet Air Temperature	-52–392 °F
TE102B	Drum B	Dryer B Outlet Air Temperature	-52–392 °F
TE103	Water Tanks System A or B	Rinse 2 Tank Outlet Water Temperature	-58–212 °F
TE200	Water Recycle System	Still Internal Temperature	-58–392 °F
TE201	Water Recycle System	Still Condenser Outlet Water Temperature	-58–392 °F
TE202	Water Tanks System A or B	Rinse 2 Tank Inlet Water Temperature	-58–392 °F
TE300	Heating System	Heater Outlet Thermal Fluid Temperature	-58–482 °F
TS300	Heating System	Thermal Fluid Temperature Limit Switch	OFF=High Temperature ON=Normal Temperature
ZS100A	Drum A	Drum Door A Position Switch	OFF=Door Open ON=Door Closed
ZS100B	Drum B	Drum Door B Position Switch	OFF=Door Open ON=Door Closed
ZS101A	Drum A	Drum Door Lock A Position Switch	OFF=Lock Retracted ON=Lock Extended
ZS101B	Drum B	Drum Door Lock B Position Switch	OFF=Lock Retracted ON=Lock Extended
ZS102A	Drum A	Drum A Rotation Sensor	OFF=Sprocket Spoke Not Aligned ON Sprocket Spoke Aligned
ZS102B	Drum B	Drum B Rotation Sensor	OFF=Sprocket Spoke Not Aligned ON Sprocket Spoke Aligned
ZS103A	Drum A	Drum A Balance Switch	OFF=Drum Balanced ON=Drum Not Balanced
ZS103B	Drum B	Drum B Balance Switch	OFF=Drum Balanced ON=Drum Not Balanced
ZS200	Water Recycle System	Still Doors Position Switch	OFF=Door(s) Open ON=Doors Closed

EXAMINING SYSTEM STATUS-CONTINUED

Once you are at the sub-system screen you can review the status information on the diagram or select EXAMINE INPUTS and review the information for each input in alphanumeric order (refer to Figures 8 and 9).

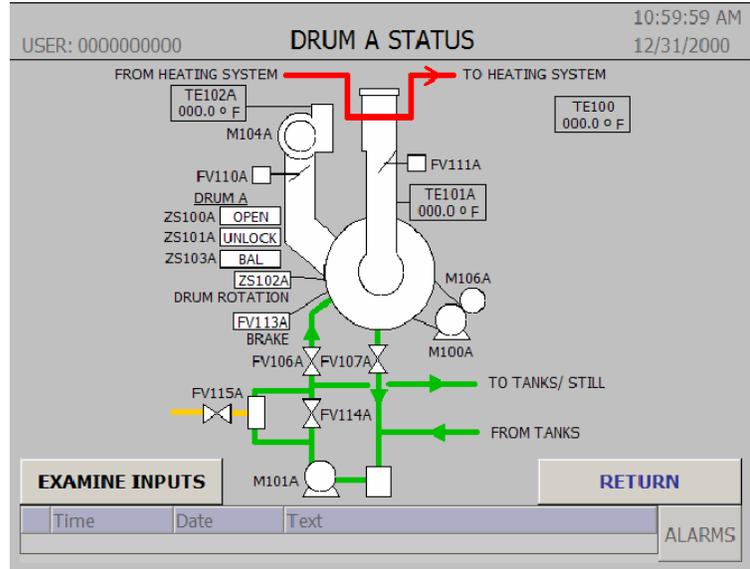


Figure 8. Drum Status Screen.

The screen displays the following input status information:

- TE101A - DRYTER A INLET TEMPERATURE**
000.0° F -58 - 392° F
- TE101A - DRYTER A INLET TEMPERATURE**
000.0° F -58 - 392° F
- ZS100A - DRUM DOOR LOCK A POSITION SWITCH**
 OFF OFF = DOOR OPEN/ ON = DOOR CLOSED
- ZS101A - DRUM DOOR LOCK A POSITION SWITCH**
 OFF OFF = RETRACTED/ ON = EXTENDED
- ZS102A DRUM A ROTATION SENSOR**
 OFF OFF = SPOKE NOT ALIGNED
ON = SPOKE ALIGNED
- ZS103A DRUM A BALANCE SWITCH**
 OFF OFF = BALANCEE
ON = NOT BALANCED

A 'NEXT->' button is located to the right of the ZS102A status, and a 'RETURN' button is at the bottom right.

Figure 9. Examine Drum Inputs Screen.

When you are done looking at the input status select RETURN to get out of the system status mode and get back to normal operation.

TROUBLESHOOTING GUIDELINES

In WP 0024, Troubleshooting Index there is a quick reference index for determining the proper disposition of system malfunctions/symptoms. There are two methods for finding malfunctions/symptoms on the LADS. Operators may observe a malfunction or the control system may detect a fault. Malfunction/symptoms are listed in the index as follows: The faults that would normally be observed during startup are listed first. The remaining faults that could be observed at any time during laundry operations are listed next. These malfunctions/symptoms are listed alphabetically by sub-system. The faults that are detected by the control system and communicated to the operator through the touchscreen are listed last in Table 2. This table lists the alarm messages in alphabetical order along with a listing of the "ALARM LEVEL" associated with each message. Associated with each malfunction/symptom or alarm message is an "WP NUMBER/CORRECTIVE ACTION" column. This column provides information on what action you should take when a fault occurs. Possible dispositions include:

Pause Cycle

If "PAUSE CYCLE" is listed, you may be able to troubleshoot and fix the fault during current laundry cycle(s). Cycles can not be paused in the "XFER FROM WATER SUPPLY", "PRE-WASHING", "FILL FROM WASH TANK", "WASHING", "FILL FROM RINSE1 TANK", "RINSING 1", "FILL FROM RINSE 2 TANK", or "RINSING 2" steps. If a cycle is paused during the "EXTRACT TO STILL", "EXTRACT TO WASH TANK" or "EXTRACT TO RINSE 1 TANK" steps the control system will automatically go back to the "DRAIN TO STILL", "DRAIN TO WASH TANK", or "DRAIN TO RINSE 2 TANK" steps. If a cycle is paused at any time during a "DRY" step, the entire "DRY" step will be repeated. To avoid repeating the "DRY" step, utilize the "DRY ONLY 10 or 20 MIN" cycles after correcting a problem and restarting the cycle. Pause a laundry cycle as follows:

1. Monitor the display, it should read as in Figure 10.
2. Press PAUSE CYCLE to pause laundry cycle.

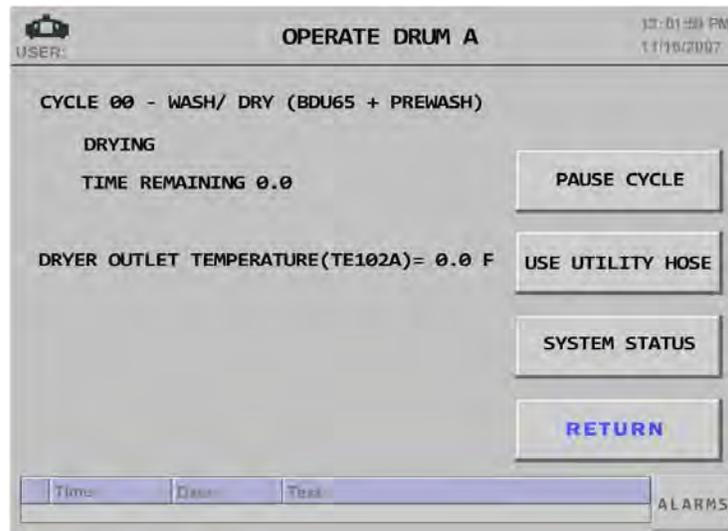


Figure 10. Pause Cycle Screen.

TROUBLESHOOTING GUIDELINES-CONTINUED

3. Monitor the display, it should read as in Figure 11.



Figure 11. Cycle Paused Screen.

4. Once the laundry cycle is paused, perform the referenced troubleshooting work package or notify maintenance as required.
5. After fault has been corrected continue laundry cycle as follows:

NOTE

When there is a level 4 alarm a system shutdown will occur and control power must be cycled off then back on to allow the control system to reset and system operation to resume.

6. Determine if a system shutdown has occurred. If a shutdown has occurred continue to step 7, otherwise continue to step 9.
7. Position CONTROL POWER switch to OFF then back ON.
8. Wait for control system to boot-up then navigate back to LAUNDRY CYCLE screen.
9. Monitor the display. It should appear as in Figure 11.
10. Press CONTINUE CYCLE to continue laundry cycle.

Complete Cycle

If "CONTINUE CYCLE" is listed, the fault should not prevent you from completing the current laundry cycle(s). Once the laundry cycle is complete, determine if the alarm message is still being displayed. If so, perform the referenced troubleshooting work package or notify maintenance as required. If you cannot complete the laundry cycle, follow the "End Cycle" instructions.

TROUBLESHOOTING GUIDELINES-CONTINUED

End Cycle

If "END CYCLE" is listed, the fault will prevent you from completing the current laundry cycle(s), and therefore, must be terminated as follows:

1. Monitor the display, it should appear as in Figure 10.
2. Press PAUSE CYCLE to interrupt laundry cycle.
3. Monitor the display, it should appear as in Figure 11.
4. Press MENU SELECTION switch to end laundry cycle.

Once the laundry cycle has ended, determine if the alarm message is still being displayed. If so, perform the referenced troubleshooting work package or notify maintenance as required. If the laundry cycle cannot be ended follow the "Notify Maintenance" instructions.

Notify Maintenance

If "Notify Maintenance" is listed, the fault will prevent further laundry operations from continuing and maintenance should be notified immediately. When "Notify Maintenance" is required, leave the LADS in power on condition if possible. This will enable maintenance personnel to troubleshoot and correct problems more efficiently and result in bringing the LADS back into operation more rapidly. If power can not be left on, operator personnel should record the following on DA Form 2404: 1) the cycle step in progress at the time of the fault, 2) the fault messages displayed or observed, and 3) the level, pressure, and temperature readings using the "SYSTEM STATUS" mode.

WP 00XX

If a Work Package (WP) is listed, proceed directly to the referenced WP to start the troubleshooting process. Should any one malfunction/symptom require more than one troubleshooting procedure to arrive at the most likely fault, a reference will be made within the starting procedure to lead you to subsequent procedures, until successful fault isolation or disposition is achieved.

TROUBLESHOOTING PROCEDURES

WPs 0027 through WP 0038, Troubleshooting work packages, contain step-by-step procedures of the tests or inspections, and corrective actions required to return the LADS to normal operation or to determine if the malfunction requires a higher level of maintenance to be performed. Separate work packages are provided for the observed and displayed faults for the Washing/Drying System, Water Recycle System, Heating System, Air System, and Control System. Within each WP the faults are listed in alphabetical order. Each WP is headed by initial step information that outlines certain conditions that must be met before starting the task. DO NOT start a task until you understand what you are to do.

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
WASHING/DRYING SYSTEM OBSERVED FAULTS**

INITIAL SETUP:

References

Personnel Required

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Initial Adjustments, Before Use and Self Test completed (WP 0012, Model C, or WP 0013, Model D)

- WP 0009
- WP 0016
- WP 0017
- WP 0021
- WP 0028
- WP 0032
- WP 0044
- WP 0050
- WP 0058
- WP 0069

DRUM SHAKING EXCESSIVELY

Step

1. Do substeps below:
 - a. Pause laundry cycle.
 - b. Unlock and open drum door.

NOTE

If laundry load exceeds 200 lbs, is under 50 lbs, has over-stuffed bags, or if the LADS is not properly leveled, drum will not balance properly.

- c. Check for excessive or under-sized load (Over 30 or Under 10 Bags).

Condition/Indication

Was too much laundry or not enough laundry loaded?

Response

YES-Properly load drum and go to step 4.

NO-Go to step 2.

Step

2. Check for laundry bags twisted into large groups.

Condition/Indication

Were laundry bags twisted together?

Response

YES-Untwist bags and go to step 4.

NO-Go to step 3.

DRUM SHAKING EXCESSIVELY-CONTINUED**Step**

3. Check for over-stuffed laundry bags.

Condition/Indication

Are bags over-stuffed?

Response

YES-Remove and re-bag any over-stuffed bags. Go to step 4.

NO-Notify maintenance.

Step

4. Do substeps below:
 - a. Close and lock drum door.
 - b. Resume and complete laundry cycle.

Condition/Indication

Does laundry cycle finish without any shaking or balancing problems?

Response

YES-Return to normal operation.

NO-Notify maintenance.

END OF TASK**LAUNDRY NOT CLEAN****Step**

1. Determine if laundry was excessively dirty prior to washing.

Condition/Indication

Was laundry excessively dirty?

Response

YES-Prior to processing excessively dirty laundry pre-wash the laundry as described in the Laundry Processing Guidelines section of WP 0069.

NO-Go to step 2.

Step

2. Check water temperature used versus washing instructions for laundry load.

LAUNDRY NOT CLEAN-CONTINUED**Condition/Indication**

Was correct water temperature used?

Response

YES-Go to step 3.

NO-Repeat laundry cycle with proper water temperature.

Step

3. Determine which laundry cycle was used to process laundry.

Condition/Indication

Was a laundry cycle that has a longer wash time used?

Response

YES-Go to step 4.

NO-Repeat laundry cycle using a longer wash cycle.

Step

4. Check cleanliness of water in the Wash and Rinse 1 tanks.

Condition/Indication

Does water appear to be dirty?

Response

YES-Drain dirty water IAW (WP 0016, Model C or WP 0017, Model D), return to normal operation

NO-Repeat laundry cycle.

END OF TASK**LAUNDRY NOT DRYING**

Refer to Fault Codes 13A05/13B05 (WP 0028, DRYER A or B INLET TEMP HI/LO FAULT).

END OF TASK**R2 TANK NOT HEATING****Step**

1. Check drain valves on bottom of still.

Condition/Indication

Are drain valves open?

R2 TANK NOT HEATING-CONTINUED**Response**

YES-Close drain valves. Return to Initial Adjustments, Before Use and Self Tests (WP 0012, C Model or WP 0013, D Model) to refill water tanks and still.

NO-Go to step 2.

Step

2. Check for water leakage at still door gaskets.

Condition/Indication

Is water leaking from gasket(s)?

Response

YES-Replace still door gasket(s) (WP 0058).

NO-Go to step 3.

Step

3. Using EXAMINE INPUTS mode (Model C) or SYSTEM STATUS mode (Model D) observe reading for TE300 (thermal fluid temperature).

Condition/Indication

Is reading >250 °F?

Response

YES-Go to step 4.

NO-Go to Fault Code 33N06 (WP 0032, HEATING SYSTEM FAILURE FAULT).

Step

4. Do substeps below

- a. Select OVERRIDE HEATING mode.
- b. Perform laundry operations on loads better suited for current temperature and allow water to heat-up to desired temperature.

Condition/Indication

Does R2 WATER TEMP increase to desired temperature after 3 or less cycles.

Response

YES-Return to normal operation.

NO-Perform laundry operations as necessary then Notify Maintenance.

END OF TASK

WATER NOT DRAINING FROM DRUM**Step**

1. Do substeps below:
 - a. Pause laundry cycle.
 - b. Determine if pre-wash manifold is connected at side of water tank.

Condition/Indication

Is pre-wash manifold attached?

Response

YES-Go to step 2.

NO-Go to step 6.

Step

2. Determine if the pre-wash part of the laundry cycle was in progress when the fault was observed.

Condition/Indication

Was pre-wash step of wash cycle in progress?

Response

YES-Go to step 3.

NO-Go to step 6.

Step

3. Check to ensure electrical cable is properly seated and tight at pre-wash manifold.

Condition/Indication

Is cable properly connected?

Response

YES-Go to step 4.

NO-Properly connect cable. Return to normal operation.

Step

4. Do substeps below:
 - a. Continue laundry cycle.
 - b. Observe status of display and wait for "DRAIN DRUM or EXTRACT DRUM" to appear.
 - c. Check position of ball valve on pre-wash manifold for drum that is trying to drain.

WATER NOT DRAINING FROM DRUM-CONTINUED**Condition/Indication**

Is valve opened?

Response

YES-Go to step 6.

NO-Go to step 5.

Step

5. Attempt to manually open ball valve on pre-wash manifold.

Condition/Indication

Does valve open?

Response

YES-Refer to WP 0021 to manually control pre-wash manifold ball valve. Continue laundry operations.

NO-End cycle, conduct laundry cycles that do not use pre-wash step, then notify maintenance.

Step

6. Observe operation of water pump A or B.

Condition/Indication

Is pump running?

Response

YES-Go to step 9.

NO-Go to step 7.

Step

7. Do substeps listed below:

- a. Position CONTROL POWER switch to OFF.

**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

- b. Open door on main control enclosure.
- c. Observe position of circuit breaker CB5 (WP 0009, Figure 2).

WATER NOT DRAINING FROM DRUM-CONTINUED**Condition/Indication**

Is circuit breaker ON?

Response

YES–Notify maintenance.

NO–Go to step 8.

Step

8. Do the substeps listed below:
 - a. Position circuit breaker to ON then close and secure door.
 - b. Position CONTROL POWER switch to ON.
 - c. Continue laundry cycle.

Condition/Indication

Does water drain from drum?

Response

YES-Continue normal operation.

NO-Go to step 9.

Step

9. Check for debris in water pump strainer (WP 0050).

Condition/Indication

Is strainer clean?

Response

YES-Go to step 10.

NO-Clean and replace strainer. Continue laundry cycle.

Step

10. Disconnect hose from drain port at bottom of drum then check for debris blocking drain port or hose.

Condition/Indication

Is drain port or hose blocked with debris?

Response

YES-Remove blockage. Go to step 11.

NO-Go to step 11.

WATER NOT DRAINING FROM DRUM-CONTINUED**Step**

11. Do substeps below:
 - a. Reconnect hose to drain port at bottom of drum.
 - b. Continue laundry cycle.

Condition/Indication

Does water drain from drum?

Response

YES-Return to normal operation.

NO-Notify maintenance.

END OF TASK**WATER VISIBLE AT REAR SEAL OF DRUM****Step**

1. Do substeps below:
 - a. Pause laundry cycle.
 - b. Check for presence of standing water inside drum.

Condition/Indication

Is standing water visible through window in drum door?

Response

YES-Go to WATER NOT DRAINING FROM DRUM FAULT.

NO-Go to step 2.

Step

2. Do substeps below:
 - a. Lubricate rear drum seal (WP 0044).
 - b. Continue laundry cycle.
 - c. Observe rear drum seal during extract portions of laundry cycle.

Condition/Indication

Does water come out of rear drum seal?

WATER VISIBLE AT REAR SEAL OF DRUM-CONTINUED**Response**

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
WASHING/DRYING SYSTEM DISPLAYED FAULTS**

INITIAL SETUP:**References****Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Initial Adjustments, Before Use and Self Test

completed (WP 0012, Model C or WP 0013, Model D)

WP 0009

WP 0021

WP 0026

WP 0027

WP 0029

WP 0046

WP 0047

WP 0048

WP 0050

FAULT CODE 13N01-AMBIENT TEMPERATURE HI OR FAULT CODE 13N02-AMBIENT TEMPERATURE LO
Step

1. Obtain ambient temperature

Condition/Indication

Is temperature between 33 and 120 °F?

Response

YES-Notify maintenance.

NO-Refer to WP 0021, Operation Under Unusual Conditions.

END OF TASK**FAULT CODES 13A02/13B02-DRUM A OR B INVERTER FAULT****Step**

1. Do substeps below:
 - a. Pause laundry cycle.
 - b. Verify drum is not rotating, drum door is closed, and handle is engaged.
 - c. Check voltage and frequency output from power source.

Condition/Indication

Is voltage and frequency set to correct levels?

Response

YES-Go to step 2.

NO-Correct external power source output voltage and/or frequency as necessary. Go to step 2.

FAULT CODES 13A02/13B02-DRUM A OR B INVERTER FAULT-CONTINUED**Step**

2. Do substeps below:
 - a. For Model C press DRUM A or DRUM B RESET switch (WP 0009, Figure 3) at inverter enclosure. For Model D press √ key on ALARMS screen.
 - b. Wait about 20 seconds, then continue laundry cycle.

Condition/Indication

Does another "DRUM INVERTER FAULT" occur?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK**FAULT CODES 13A03/13B03-DRUM A OR B NO ROTATION FAULT****WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond troubleshooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

Step

1. Observe operator display.

Condition/Indication

Does display indicate an INVERTER FAULT message?

Response

YES-Go to DRUM A (Fault Code 13A02) or B (Fault Code 13B02) INVERTER FAULT.

NO-Go to step 2.

Step

2. Do substeps below:
 - a. Open door on main control enclosure.
 - b. Observe position of circuit breaker CB3 (WP 0009, Figure 2) for drum A or CB4 (WP 0009, Figure 2) for drum B.

FAULT CODES 13A03/13B03-DRUM A OR B NO ROTATION FAULT-CONTINUED**Condition/Indication**

Is circuit breaker ON?

Response

YES-Notify maintenance.

NO-Go to step 3.

Step

3. Do substeps below:
 - a. Position circuit breaker to ON then close and secure door.
 - b. Continue laundry cycle.

Condition/Indication

Does another "DRUM NO ROTATION FAULT" occur?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK**FAULT CODES 12A03/12B03-DRUM DOOR A/B NOT LOCKED OR DRUM DOOR A/B OPEN****Step**

1. Check position of drum door (Figure 1, Item 2) and handle (Figure 1, Item 3).

Condition/Indication

Is drum door closed and handle engaged?

Response

YES-Go to step 2.

NO-Close door and engage handle. Return to normal operation.

Step

2. Move handle (Figure 1, Item 3) back and forth slightly and listen for lock (Figure 1, Item 1) to extend.

Condition/Indication

Does lock extend when handle is moved?

FAULT CODES 12A03/12B03-DRUM DOOR A/B NOT LOCKED OR DRUM DOOR A/B OPEN-CONTINUED**Response**

YES-Return to normal operation.

NO-Notify maintenance.

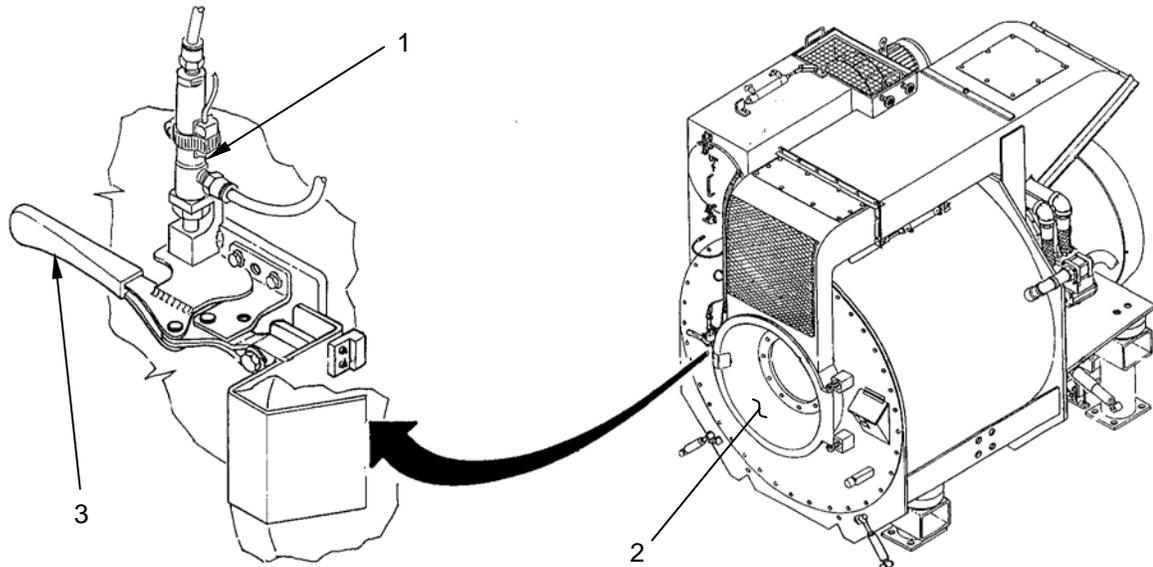


Figure 1. Drum Door Lock.

END OF TASK**FAULT CODE 12A01/12B01-DRUM A OR B STALLING****Step**

1. Do substeps below:
 - a. Pause laundry cycle.
 - b. Continue laundry cycle.

Condition/Indication

Does another drum motor stall occur?

Response

YES-Go to step 2.

NO-Return to normal operation.

FAULT CODE 12A01/12B01-DRUM A OR B STALLING-CONTINUED**Step**

2. Check for debris in water pump strainer (WP 0050).

Condition/Indication

Is strainer clean?

Response

YES-Go to step 3.

NO-Clean and replace strainer. Continue laundry cycle.

Step

3. Check for presence of standing water inside drum.

Condition/Indication

Is standing water visible through window in drum door?

Response

YES-Go to WATER NOT DRAINING FROM DRUM FAULT.

NO-Go to step 4.

Step

4. Check voltage and frequency output from power source.

Condition/Indication

Is voltage and frequency set to correct levels?

Response

YES-Notify Maintenance.

NO-Correct external power source output voltage and/or frequency as necessary.

END OF TASK**FAULT CODE 12A02/12B02-DRUM A/B WILL NOT BALANCE**

Refer to WP 0027, DRUM SHAKING EXCESSIVELY FAULT.

END OF TASK

FAULT CODES 13A04/13B04-DRYER A/B BLOWER OVERLOAD**Step**

1. Do substeps listed below:
 - c. Pause cycle
 - d. Determine if there is a 10 HP Inverter Fault (Fault Code 43N01).

Condition/Indication

Is a 10 HP Inverter Fault displayed?

Response

YES-Go to 10 HP INVERTER FAULT.

NO-Go to step 2.

Step

2. Do substeps listed below:
 - a. Position CONTROL POWER and MAIN POWER switched to off.

**WARNING**

High voltage is present in inverter control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond troubleshooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

- b. Open panel on inverter enclosure.
- c. Check trip indicator (WP 0009, Figure 2) on overload relay OL104A for dryer blower A or OL104B for dryer blower B.

Condition/Indication

Is indicator tripped?

Response

YES-Press RESET button (WP 0009, Figure 2) to reset overload relay. Close and secure panel. Go to step 3.

NO-Notify maintenance.

FAULT CODES 13A04/13B04-DRYER A/B BLOWER OVERLOAD-CONTINUED**Step**

3. Do substeps listed below:
 - a. Position MAIN POWER switch to ON.
 - b. Position CONTROL POWER switch to ON.
 - c. Wait for control system to boot-up then attempt to continue cycle.

Condition/Indication

Does fault return?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK**FAULT CODES 13A05/13A06-DRYER A/B INLET TEMP HI OR FAULT CODES 13B05/13B06-DRYER A/B INLET TEMP LO****Step**

1. Do substeps listed below:
 - a. Pause laundry cycle.
 - b. Remove and inspect lint filter (WP 0048).

Condition/Indication

Is lint filter clean?

Response

YES-Go to step 2.

NO-Clean and reinstall lint filter. Continue laundry cycle and return to normal operation.

Step

2. Check cleanliness of dryer inlet screen (WP 0046).

Condition/Indication

Is dryer inlet screen clean?

Response

YES-Go to step 3.

NO-Clean and reinstall dryer inlet screen. Continue laundry cycle and return to normal operation.

FAULT CODES 13A05/13A06-DRYER A/B INLET TEMP HI OR FAULT CODES 13B05/13B06-DRYER A/B INLET TEMP LO-CONTINUED**Step**

3. Check dryer outlet guard for debris (WP 0047).

Condition/Indication

Is dryer outlet guard clear?

Response

YES-Go to step 4.

NO-Remove debris from dryer outlet guard. Continue laundry cycle and return to normal operation.

Step

4. Continue laundry cycle, then check drying temperature used versus drying instructions for laundry load.

Condition/Indication

Was correct drying temperature used?

Response

YES-Pause laundry cycle. Go to step 5.

NO-Repeat laundry cycle with proper drying temperature or perform DRY ONLY cycle as desired.

Step

5. Continue laundry cycle.

Condition/Indication

Does dryer blower come on?

Response

YES-Pause laundry cycle. Go to step 8.

NO-Go to step 6.

FAULT CODES 13A05/13A06-DRYER A/B INLET TEMP HI OR FAULT CODES 13B05/13B06-DRYER A/B INLET TEMP LO-CONTINUED
**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond trouble- shooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

Step

6. Do substeps listed below:
 - a. Open door on main control enclosure.
 - b. Observe position of circuit breaker CB2 (WP 0009, Figure 2).

Condition/Indication

Is circuit breaker ON?

Response

YES-Notify maintenance.

NO-Go to step 8.

**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond troubleshooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

Step

7. Do substeps listed below:
 - a. Position circuit breaker to ON then close and secure door.
 - b. Continue laundry cycle.

Condition/Indication

Does dryer blower come on?

Response

YES-Return to normal operation.

NO-Notify maintenance.

FAULT CODES 13A05/13A06-DRYER A/B INLET TEMP HI OR FAULT CODES 13B05/13B06-DRYER A/B INLET TEMP LO-CONTINUED**Step**

8. Check for debris in water pump strainer (WP 0050).

Condition/Indication

Is strainer clean?

Response

YES-Go to step 9.

NO-Clean and replace strainer. Continue laundry cycle and return to normal operation.

Step

9. Check for debris at drain port in bottom of washing/drying drum.

Condition/Indication

Is drain port blocked?

Response

YES-Remove blockage as necessary. Continue laundry cycle and return to normal operation.

NO-Run drying cycle to complete current load then notify maintenance.

END OF TASK**FAULT CODES 13A10/13B10-R1 NOT FILLING OR FAULT CODES 13A14/13B14-WASH TANK NOT FILLING****Step**

1. Determine if problem occurred during initial filling or during a laundry cycle.

Condition/Indication

Did problem occur during initial filling?

Response

YES-Go to step 2.

NO-Pause laundry cycle. Go to step 11.

Step

2. Check water supply.

Condition/Indication

Is water supply adequate?

FAULT CODES 13A10/13B10-R1 NOT FILLING OR FAULT CODES 13A14/13B14-WASH TANK NOT FILLING-CONTINUED**Response**

YES-Go to step 3.

NO-Replenish water supply. Return to normal operation.

Step

3. Check hose connections at water supply, water supply pump, and LADS.

Condition/Indication

Are hoses properly connected?

Response

YES-Go to step 4.

NO-Properly connect hoses. Return to normal operation.

Step

4. Check petcock on water supply pump.

Condition/Indication

Is petcock open?

Response

YES-Close petcock. Return to normal operation.

NO-Go to step 5.

Step

5. Check electrical cable connection at water supply pump and LADS.

Condition/Indication

Is electrical cable properly connected?

Response

YES-Go to step 6.

NO-Properly connect cable. Return to normal operation.

Step

6. Check rotation and proper priming of water supply pump. Refer to WP 0013, steps 14 c through g.

Condition/Indication

Is pump running properly?

FAULT CODES 13A10/13B10-R1 NOT FILLING OR FAULT CODES 13A14/13B14-WASH TANK NOT FILLING-CONTINUED**Response**

YES-Go to step 8.

NO-Go to step 7.

**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond troubleshooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

Step

7. Do following substeps:

- c. Open door on main enclosure.
- d. Observe position of CB6 (WP 0009, Figure 2).

Condition/Indication

Is circuit breaker ON?

Response

YES-Install an operational water supply pump.

NO-Reset circuit breaker and return to normal operation.

Step

8. Check security of caps and/or pre-wash manifold on water tank manifolds.

Condition/Indication

Are caps and/or pre-wash manifold installed?

Response

YES-Go to step 9.

NO-Properly install cap(s) or pre-wash manifold. Return to normal operation.

Step

9. If installed, check position of ball valves on pre-wash manifold.

Condition/Indication

Are valves closed?

FAULT CODES 13A10/13B10-R1 NOT FILLING OR FAULT CODES 13A14/13B14-WASH TANK NOT FILLING-CONTINUED**Response**

YES-Go to step 10.

NO-Disconnect pre-wash manifold and re-install caps on water tank manifolds. Conduct laundry operations that do not use pre-wash step, then Notify maintenance.

Step

10. Check all water hose connections for signs of leakage.

Condition/Indication

Are any leaks found?

Response

YES-Repair as necessary or notify maintenance.

NO-Notify maintenance.

Step

11. Check for debris in water pump strainer (WP 0050).

Condition/Indication

Is strainer clean?

Response

YES-Go to step 12.

NO-Clean and replace strainer. Continue laundry cycle and return to normal operation.

Step

12. Check for presence of standing water inside drum.

Condition/Indication

Is standing water visible through window in drum door?

Response

YES-Go to WATER NOT DRAINING FROM DRUM FAULT.

NO-Return to step 6.

END OF TASK

FAULT CODES 13A09/13B09-R1 NOT EMPTYING, FAULT CODE 13N04-R2 NOT EMPTYING, OR FAULT CODES 13A13/13B13-WASH TANK NOT EMPTYING

1. Do substeps listed below:
 - a. Pause laundry cycle.
 - b. Check for debris in water pump strainer (WP 0050).

Condition/Indication

Is strainer clean?

Response

YES-Go to step 2.

NO-Clean and replace strainer. Return to normal operation.

Step

2. Continue laundry cycle.

Condition/Indication

Does water drain from drum?

Response

YES-Return to normal operation.

NO-Notify maintenance.

END OF TASK**FAULT CODE 13N05-R2 TANK NOT FILLING****Step**

1. Determine if problem occurred during initial filling or during a laundry cycle.

Condition/Indication

Did problem occur during initial filling?

Response

YES-Go to Fault Code 13A10/13B10, R1 NOT FILLING FAULT or Fault Code 13A14/13B14, WASH TANK(S) NOT FILLING FAULT.

NO-Go to step 2.

Step

2. Check drain valves on distillate pump, pre-filter, and coalescer.

FAULT CODE 13N05-R2 TANK NOT FILLING-CONTINUED**Condition/Indication**

Are any drain valves open?

Response

YES-Close valve(s). Continue laundry cycle and return to normal operation.

NO-Go to step 3.

Step

3. Check eight drain valves on subcooler.

Condition/Indication

Are any drain valves open?

Response

YES-Close drain valve(s). Continue laundry cycle and return to normal operation.

NO-Go to step 4.

Step

4. Check drain valves on bottom of still.

Condition/Indication

Are drain valves open?

Response

YES-Close drain valves. Continue laundry cycle and return to normal operation.

NO-Go to step 5.

Step

5. Check all condensate hose connections for signs of leakage.

Condition/Indication

Are any leaks found?

Response

YES-Repair as necessary or notify maintenance.

NO-Notify maintenance.

END OF TASK

R2 WATER TEMPERATURE HI OR LO**Step**

1. Using EXAMINE INPUTS mode (Model C) or SYSTEM STATUS mode (Model D) observe reading for TE103 R2 tank water temperature.

Condition/Indication

Is temperature displayed higher than selected temperature?

Response

YES-Go to step 2.

NO-Go to step 3.

Step

2. Perform laundry operations on loads better suited for current temperature and allow water to cooldown to desired temperature.

Condition/Indication

Does R2 WATER TEMP HI fault disappear after 3 or less cycles?

Response

YES-Return to normal operation.

NO-Go to WP 0029, RECYCLED WATER TEMPERATURE HIGH FAULT.

Step

3. Perform laundry operations on loads better suited for current temperature and allow water to heat-up to desired temperature.

Condition/Indication

Does R2 WATER TEMP LO fault disappear after 3 or less cycles?

Response

YES-Return to normal operation.

NO-Perform laundry operations as necessary then notify maintenance.

END OF TASK

FAULT CODE 13A15/13B15-WATER PUMP A/B OVERLOAD**Step**

1. Do substeps listed below:
 - a. Pause cycle.
 - b. Open door on main enclosure.
 - c. Check trip indicator (WP 0009, Figure 2) on overload relay OL101A for water pump A or OL101B for water pump B.

Condition/Indication

Is indicator tripped?

Response

YES- Press RESET button (WP 0009, Figure 2) to reset overload relay. Close and secure door. Go to step 2.

NO-Notify maintenance.

Step

2. Continue cycle. Refer to WP 0026.

Condition/Indication

Does fault return?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK**FAULT CODE 13N07-WATER SUPPLY PUMP OVERLOAD****Step**

1. Do substeps listed below.
 - a. Pause cycle(s) or override utility operation.
 - b. Open door on main control enclosure.
 - c. Check trip indicator (WP 0009, Figure 2) on overload relay OL105.

Condition/Indication

Is indicator tripped?

FAULT CODE 13N07-WATER SUPPLY PUMP OVERLOAD-CONTINUED**Response**

YES– Press RESET button (WP 0009, Figure 2) to reset overload relay. Close and secure door. Go to step 2.

NO–Notify maintenance.

Step

2. Attempt to restart FILL WATER TANKS or continue cycle.

Condition/Indication

Does fault return?

Response

YES–Notify maintenance.

NO–Return to normal operation.

END OF TASK**FAULT CODE 43N01-10 HP INVERTER FAULT****Step**

1. Do substeps listed below:

- a. Pause laundry cycle .
- b. Position CONTROL POWER switch to OFF.
- c. Position MAIN POWER switch to OFF.
- d. Wait about 20 seconds, then position MAIN POWER switch to ON.
- e. Position CONTROL POWER switch to ON.
- f. For Model C press 10 HP RESET switch (WP 0009, Figure 4) at inverter enclosure. For Model D press √ key on ALARMS screen.
- g. Wait about 20 seconds, then continue laundry cycle.

Condition/Indication

Does another “10 HP INVERTER FAULT” occur?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
WATER RECYCLE SYSTEM OBSERVED FAULTS**

INITIAL SETUP:**References****Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Initial Adjustments, Before Use and Self Test completed (WP 0012, Model C or WP 0013, Model D)

WP 0014

WP 0015

WP 0016

WP 0017

WP 0055

RECYCLED WATER TEMPERATURE HIGH**Step**

1. Do following substeps:
 - a. Perform cooldown cycle then shut down the LADS (WP 0014, Model C or WP 0015, Model D).
 - b. Check for debris on subcooler inlet screen (WP 0055).

Condition/Indication

Is inlet screen clear?

Response

YES-Go to step 2.

NO-Remove debris from inlet screen. Return to normal operation.

Step

2. Remove inlet screen and check for debris on subcooler (WP 0055).

Condition/Indication

Is subcooler clear?

Response

YES-Continue laundry cycle(s). When laundry cycles are completed notify maintenance.

NO-Remove debris from subcooler. Return to normal operation.

END OF TASK

STILL DOORS WILL NOT OPEN**NOTE**

Still doors are locked when control power is removed from LADS. Doors will not unlock unless still temperature is less than 150 °F and water level is less than four inches.

Step

1. Run cooldown cycle (WP 0014, Model C or WP 0015, Model D).

Condition/Indication

Do doors unlock?

Response

YES-Return to normal operation.

NO-Go to step 2.

Step

2. Open drain valves and allow still to drain (WP 0016, Model C or WP 0017, Model D).

Condition/Indication

Do doors unlock?

Response

YES-Return to normal operation.

NO-Notify maintenance.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
WATER RECYCLE SYSTEM DISPLAYED FAULTS**

INITIAL SETUP:**References****Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Initial Adjustments, Before Use and Self Test

completed (WP 0012, Model C or WP 0013, Model D)

WP 0009

WP 0014

WP 0015

WP 0040

WP 0054

WP 0056

WP 0057

WP 0058

FAULT CODE 23N01-CONDENSATE TEMPERATURE HI**NOTE**

During continuous operation at high temperatures the condensate temperature may get high enough to cause a "CONDENSATE TEMPERATURE HI" failure message. In this case, the message will disappear within several minutes after the boiling rate in the still decreases. If the fault occurs, and the failure message disappears before the end of the cycle, no operator action will be necessary.

Step

1. Do substeps listed below:
 - a. Perform a cooldown cycle then shutdown LADS (WP 0014, Model C or WP 0015, Model D).
 - b. Check for debris on heat exchanger inlet screens (WP 0054).

Condition/Indication

Are inlet screens clear?

Response

YES-Go to step 2.

NO-Remove debris from inlet screens. Return to normal operation.

Step

2. Remove inlet screens and check for debris on heat exchangers (WP 0054).

Condition/Indication

Are heat exchangers clear?

Response

YES-Go to step 3.

NO-Remove debris from heat exchangers. Return to normal operation.

Step

3. Check for debris on still condenser fan guard (WP 0040).

FAULT CODE 23N01-CONDENSATE TEMPERATURE HI-CONTINUED**Condition/Indication**

Is fan guard clear?

Response

YES-Notify maintenance.

NO-Remove debris from fan guard. Return to normal operation.

END OF TASK**FAULT CODE 23N02-CONDENSER FAN OVERLOAD****Step**

1. Perform substeps listed below.
 - a. Pause cycle(s) or override utility operation.

**WARNING**

High voltage is present in inverter control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond troubleshooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

- b. Open door on inverter enclosure (WP 0009, Figure 4).
- c. Check trip indicator (WP 0009, Figure 4) on overload relay OL200.

Condition/Indication

Is indicator tripped?

Response

YES- Press RESET button (WP 0009, Figure 4) to reset overload relay. Close and secure door. Go to step 2.

NO-Notify Maintenance.

Step

2. Do substeps listed below:
 - a. Go to 20 HP INVERTER FAULT alarm screen and follow guidance on clearing that fault.
 - b. Attempt to continue cycle or utility operations.

Condition/Indication

Does fault return?

FAULT CODE 23N02-CONDENSER FAN OVERLOAD-CONTINUED**Response**

YES–Notify Maintenance.

NO–Return to normal operation.

END OF TASK**FAULT CODE 23N03-DISTILLATE PUMP OVERLOAD****Step**

1. Perform substeps listed below.
 - a. Pause cycle(s) or override utility operation.

**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond troubleshooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

- b. Open door on main control enclosure.
 - c. Check trip indicator (WP 0009, Figure 2) on overload relay OL201.

Condition/Indication

Is indicator tripped?

Response

YES– Press RESET button (WP 0009, Figure 2) to reset overload relay. Close and secure door. Go to step 2.

NO–Notify Maintenance.

Step

2. Attempt to continue cycle or utility operations.

Condition/Indication

Does fault return?

Response

YES–Consult TM or Notify Maintenance.

NO–Return to normal operation.

END OF TASK

FAULT CODE 23N10-STANDPIPE LEVEL LO OR STILL NOT FILLING**Step**

1. Check drain valves on bottom of still.

Condition/Indication

Are drain valves open?

Response

YES-Close drain valves. Return to normal operation.

NO-Go to step 2.

Step

2. Check for water leakage at still door gaskets.

Condition/Indication

Is water leaking from gasket(s)?

Response

YES-Replace still door gasket(s) (WP 0058).

NO-Go to step 3.

Step

3. Check drain valve on distillate pump.

Condition/Indication

Is drain valve open?

Response

YES-Close drain valve. Return to normal operation.

NO-Go to step 4.

Step

4. Check all condensate hose connections for signs of leakage.

Condition/Indication

Are any leaks found?

FAULT CODE 23N10-STANDPIPE LEVEL LO OR STILL NOT FILLING-CONTINUED**Response**

YES-Repair as necessary or notify maintenance.

NO-Notify maintenance.

END OF TASK**FAULT CODE 23N07-STANDPIPE NOT EMPTYING****NOTE**

During high speed extracts water bouncing around inside standpipe may get high enough to cause a "STANDPIPE NOT EMPTYING" failure message. In this case the message will disappear within 30 seconds after the extract is completed and no operator action will be necessary.

Step

1. Using EXAMINE INPUTS mode (Model C) or SYSTEM STATUS mode (Model D) observe reading for LT201 (standpipe level).

Condition/Indication

Is LT201 reading > 24 inches?

Response

YES-Go to step 3.

NO-Go to step 2.

Step

2. Continue to observe LT201 reading for approximately five minutes.

Condition/Indication

Does reading drop to 3 inches at least once?

Response

YES-Return to normal operation.

NO-Go to step 3.

Step

3. Check for clogged first-stage pre-filter bag (WP 0056).

Condition/Indication

Is first stage pre-filter clogged?

FAULT CODE 23N07-STANDPIPE NOT EMPTYING-CONTINUED**Response**

YES-Replace filter bag. Return to normal operation.

NO-Reinstall filter bag. Go to step 4.

Step

4. Check for clogged second-stage pre-filter bag (WP 0057).

Condition/Indication

Is second stage pre-filter clogged?

Response

YES-Replace filter bag. Return to normal operation.

NO-Reinstall filter bag. Go to step 5.

Step

5. Check for clogged cartridge in coalescing filter (WP 0056).

Condition/Indication

Is coalescer cartridge clogged?

Response

YES-Replace coalescer cartridge. Return to normal operation.

NO-Reinstall coalescer cartridge. Go to step 6.

Step

6. Slightly open drain valve on distillate pump.

Condition/Indication

Is water coming out of drain valve?

Response

YES-Close drain valve. Go to step 7.

NO-Notify Maintenance.

Step

7. Using EXAMINE INPUTS mode (Model C) or SYSTEM STATUS mode (Model D) observe LT201 reading for approximately five minutes.

Condition/Indication

Does reading drop to 3 inches at least once?

FAULT CODE 23N07-STANDPIPE NOT EMPTYING -CONTINUED**Response**

YES-Return to normal operation.

NO-Go to step 8.

Step

8. Do substeps listed below:

- a. Position CONTROL POWER switch to OFF.

**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

- b. Open door on main control enclosure.
- c. Observe position of circuit breaker CB6 (WP 0009, Figure 2).

Condition/Indication

Is circuit breaker ON?

Response

YES-Notify Maintenance.

NO-Go to step 9.

Step

9. Do the substeps listed below:

- a. Position circuit breaker to ON then close and secure door.
- b. Position CONTROL POWER switch to ON.
- c. Using EXAMINE INPUTS mode (Model C) or SYSTEM STATUS mode (Model D) observe LT201 reading for approximately five minutes.

Condition/Indication

Does reading drop to 3 inches at least once?

Response

YES-Start or continue laundry operations.

NO-Notify Maintenance.

END OF TASK

FAULT CODE 23N08-STILL DOOR(S) OPEN**CAUTION**

When still doors are properly closed and tightened there should be a gap of approximately 1/8 inch between still door arms target and each position sensor. Never tighten the doors to the point where the target is contacting the sensor. Failure to observe this precaution may result in damage to the target and/or sensor.

Step

1. Check still doors (Figure 1, Item 4).

Condition/Indication

Are doors closed?

Response

YES-Go to step 2.

NO-Close still doors. Return to normal operation.

Step

2. Check position of sensor targets (Figure 1, Item 3) on still door arms (Figure 1, Item 1).

Condition/Indication

Are targets within 1/8 inch of door sensors (Figure 1, Item 2)?

Response

YES-Notify Maintenance.

NO-Go to step 3.

FAULT CODE 23N08-STILL DOOR(S) OPEN-CONTINUED

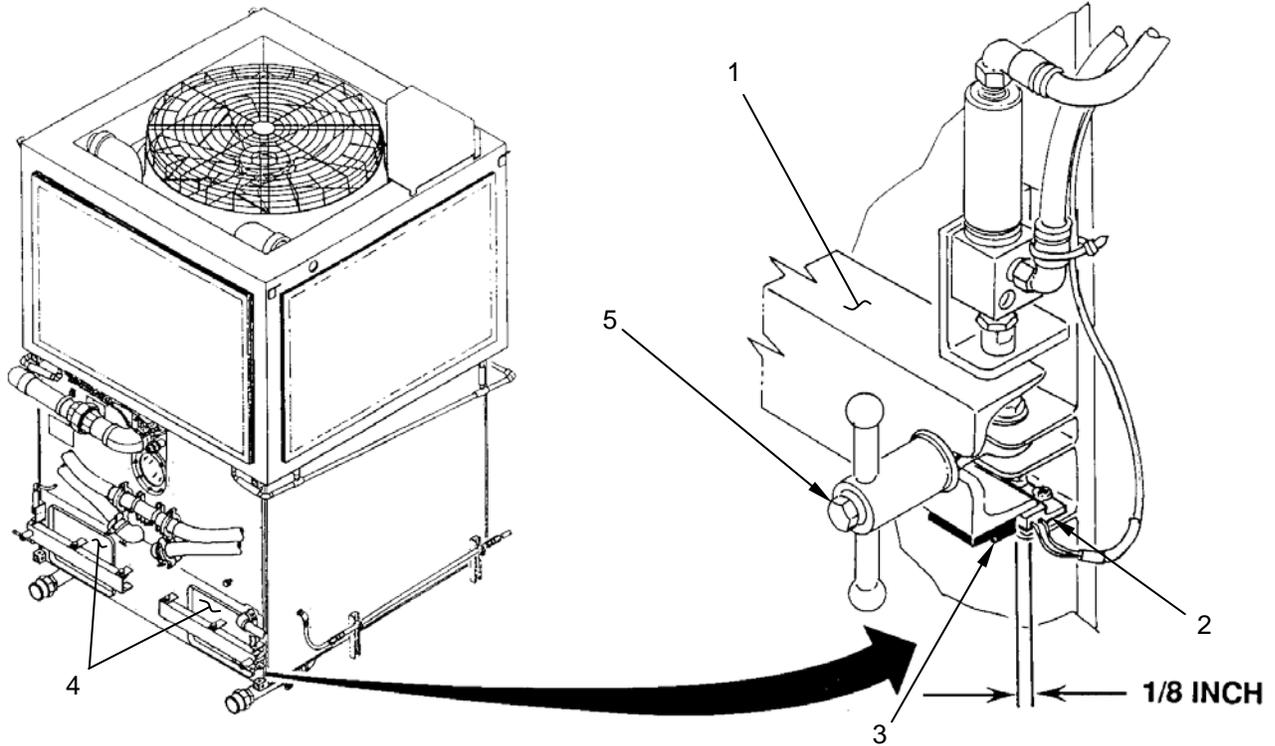


Figure 1. Still Doors.

Step

3. Do substeps listed below:

- a. Tighten knobs (Figure 1, Item 5) to achieve proper clearance between still door targets (Figure 1, Item 3) and sensors (Figure 1, Item 2).
- b. Observe operator display.

Condition/Indication

Is "STILL DOOR(S) OPEN displayed?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK

FAULT CODE 23N11-STILL PRESSURE HI**NOTE**

When a STILL PRESSURE HI fault occurs there is good possibility that a boil over will occur. Boil overs will cause steam loaded with anti-foam to be carried through the distillate plumbing into the coalescing filter. This will result in the premature clogging of the pre-filters and coalescing filter.

Repeated STILL PRESSURE HI faults are an indication that the boiling rate in the still is too fast due not enough anti-foam or too much detergent is being added.

Step

1. Do the substeps listed below:
 - a. Add one full stroke of anti-foam with hand pump.
 - b. Observe the sight glass on the still.

Condition/Indication

Is boiling water or foam visible?

Response

YES-Add anti-foam with hand pump in 1/2 stroke increments as necessary to prevent the still from boiling over if possible.

NO-Go to step 2.

Step

2. Observe operator display for approximately 5 minutes.

Condition/Indication

After 5 minutes is "STILL PRESSURE HI" displayed?

Response

YES-Go to step 3.

NO-Return to normal operation.

Step

3. Observe operation of condenser fan.

Condition/Indication

Is condenser fan on?

FAULT CODE 23N11-STILL PRESSURE HI-CONTINUED**Response**

YES-Notify maintenance.

NO-Go to Fault Code 43N02, 20 HP INVERTER FAULT.

END OF TASK**FAULT CODE 43N02-20 HP INVERTER FAULT****Step**

1. Do the substeps listed below:
 - a. Pause laundry cycle.
 - b. Position CONTROL POWER switch to OFF.
 - c. Position MAIN POWER switch to OFF.
 - d. Wait about 20 seconds, then position MAIN POWER switch to ON.
 - e. Position CONTROL POWER switch to ON.
 - f. For Model C press 20 HP RESET switch (WP 0009, Figure 4) at inverter enclosure. For Model D press √ key on ALARMS screen.
 - g. Wait about 20 seconds, then observe fault message display.

Condition/Indication

Does "20 HP INVERTER FAULT" message disappear?

Response

YES-Go to step 2.

NO-Notify maintenance.

Step

2. Perform water heating procedure (WP 0014, Model C or WP 0015, Model D) and listen for condenser fan to come on.

Condition/Indication

Does condenser fan come on?

Response

YES-Go to step 3.

NO-Go to step 4.

FAULT CODE 43N02-20 HP INVERTER FAULT -CONTINUED**Step**

3. Observe fault message display.

Condition/Indication

Does another "20 HP INVERTER FAULT" message appear?

Response

YES-Notify maintenance.

NO-Continued heating water or continue laundry cycles.

**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

Step

4. Do substeps listed below:
 - a. Open door on main control enclosure.
 - b. Observe position of circuit breaker CB1 (WP 0009, Figure 2).

Condition/Indication

Is circuit breaker ON?

Response

YES-Notify maintenance.

NO-Go to step 5.

Step

5. Do substeps listed below:
 - a. Position circuit breaker to ON then close and secure door.
 - b. Repeat steps 2 through 11 to verify correct operation. If CB1 trips again notify maintenance.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
HEATING SYSTEM OBSERVED FAULTS**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment ConditionsInitial Adjustments, Before Use and Self Test
completed (WP 0012, Model C or WP 0013, Model D)**References**

WP 0021

WP 0032

FUEL PUMP WILL NOT PRIME

Refer to Fault Code 33N04, FUEL PRESSURE LO FAULT (WP 0032).

END OF TASK**HEATER SMOKING****Step**

1. Check adjustment on inlet cover (WP 0021).

Condition/Indication

Is inlet plate set properly?

Response

YES–Notify maintenance.

NO–Adjust inlet plate as necessary. Return to normal operation.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
HEATING SYSTEM DISPLAYED FAULTS**

INITIAL SETUP:**References****Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Initial Adjustments, Before Use and Self Test

completed (WP 0012, Model C or WP 0013, Model D)

WP 0009

WP 0014

WP 0015

WP 0021

WP 0030

WP 0059

FAULT CODES 33N01/33N02-BURNER BLOWER INLET OR OUTLET PRESSURE LO
Step

1. Observe operator display.

Condition/Indication

Is "20 HP INVERTER FAULT" message also displayed (Fault Code 43N02)?

Response

YES-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

NO-Go to step 2.

Step

2. Observe operation of still condenser fan.

Condition/Indication

Is condenser fan on?

Response

YES-Go to step 3.

NO-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

Step

3. Remove and inspect burner blower inlet filter (WP 0059).

Condition/Indication

Is inlet filter clean?

Response

YES-Go to step 4.

NO-Clean or replace inlet filter (WP 0059). Go to step 5.

FAULT CODES 33N01/33N02-BURNER BLOWER INLET OR OUTLET PRESSURE LO**Step**

4. Check adjustment on inlet cover (WP 0021).

Condition/Indication

Is inlet cover set properly?

Response

YES-Go to step 5.

NO-Adjust inlet cover as necessary. Go to step 5.

Step

5. Do substeps listed below:

- a. At heater press FP300 RESET switch (WP 0009, Figure 5).
- b. Wait about 30 seconds then observe heater operation.

Condition/Indication

Does burner blower come on?

YES-Go to step 6.

NO-Notify maintenance.

Step

6. Observe operator display for approximately 5 minutes.

Condition/Indication

Does another "BURNER BLWR INLET PRESS LO" message appear?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK

FAULT CODE 33N03-BURNER BLOWER OVERLOAD**Step**

1. Perform substeps listed below.
 - a. Pause cycle(s) or override utility operation.

WARNING

High voltage is present in heater enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

- b. Open door on heater enclosure (WP 0009, Figure 6).
- c. Check trip indicator (WP 0009, Figure 6) on overload relay OL301.

Condition/Indication

Is indicator tripped?

Response

YES- Press RESET button (WP 0009, Figure 6) to reset overload relay. Close and secure door. Go to step 2.

NO-Notify maintenance.

Step

2. Attempt to continue cycle or utility operation. Refer to WP 0026-9, step 5.

Condition/Indication

Does fault return?

Response

YES-Consult TM or notify maintenance.

NO-Return to normal operation.

END OF TASK**FAULT CODE 33N04-FUEL PRESSURE LO, FAULT CODE 33N04-FUEL LEVEL LO, OR FUEL PUMP WILL NOT PRIME****Step**

1. Check fuel supply.

Condition/Indication

Is fuel supply adequate?

FAULT CODE 33N04-FUEL PRESSURE LO, FAULT CODE 33N04-FUEL LEVEL LO OR FUEL PUMP WILL NOT PRIME-CONTINUED**Response**

YES-Go to step 2.

NO-Replenish fuel supply. Go to step 4.

Step

2. Check hose connections at fuel source and at heater.

Condition/Indication

Are hoses properly connected?

Response

YES-Go to step 3.

NO-Properly connect hoses. Go to step 4.

Step

3. Check entire length of fuel hoses for kinks or other obstruction.

Condition/Indication

Are hoses kinked or obstructed?

Response

YES-Remove kink(s) or obstruction(s) from hoses. Go to step 4.

NO-Go to step 4.

Step

4. Do substeps listed below:

- a. Position CONTROL POWER switch to OFF and then back to ON.
- b. At heater press FP300 RESET switch (WP 0009, Figure 5).
- c. Perform water heating procedure (WP 0014, Model C) or (WP 0015, Model D).
- d. When HEAT WATER option is displayed lift up on PRIME PUMP switch (WP 0009, Figure 5) and listen for fuel pump to come on.

Condition/Indication

Does fuel pump come on?

Response

YES-Go to step 5.

NO-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

FAULT CODE 33N04-FUEL PRESSURE LO, FAULT CODE 33N04-FUEL LEVEL LO OR FUEL PUMP WILL NOT PRIME-CONTINUED**Step**

5. Lift up on PRIME PUMP switch (WP 0009, Figure 5) and observe fuel pump pressure gage for approximately 2 minutes.

Condition/Indication

Does fuel pressure remain steady at or above 135 psi for last 30 seconds of priming?

Response

YES-Go to step 6.

NO-Notify maintenance.

Step

6. Do substeps listed below:
 - a. Determine if laundry or water heating operations were in progress when fault occurred.
 - b. At operator display select OVERRIDE HEATING (to continue laundry cycles) or HEAT WATER then proceed to step 11.
 - c. Wait about 30 seconds then observe heater operation.

Condition/Indication

Does heater come on?

Response

YES-Go to step 7.

NO-Notify maintenance.

Step

7. Observe fault display for approximately 5 minutes.

Condition/Indication

Does another "FUEL PRESSURE LO" message appear?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK

FAULT CODE 33N05-FUEL PUMP OVERLOAD**Step**

1. Perform substeps listed below:
 - a. Pause cycle(s) or override utility operation.

WARNING

High voltage is present in heater enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

- b. Open door on heater enclosure.
 - c. Check trip indicator (WP 0009, Figure 6) on overload relay OL302.

Condition/Indication

Is indicator tripped?

Response

YES- Press RESET button (WP 0009, Figure 6) to reset overload relay. Close and secure door. Go to step 2.

NO-Notify maintenance.

Step

2. Attempt to continue cycle or utility operation. Refer to WP 0026.

Condition/Indication

Does fault return?

Response

YES-Consult TM or notify maintenance.

NO-Return to normal operation.

END OF TASK**FAULT CODE 33N06-HEATING SYSTEM FAILURE****Step**

1. Observe fault display.

Condition/Indication

Is "20 HP INVERTER FAULT" message also displayed?

FAULT CODE 33N06-HEATING SYSTEM FAILURE-CONTINUED**Response**

YES-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

NO-Go to step 2.

Step

2. Observe operation of still condenser fan.

Condition/Indication

Is condenser fan on?

Response

YES-Go to step 3.

NO-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

Step

3. Do substeps listed below:

- a. At heater press FP300 RESET switch (WP 0009, Figure 5).
- b. Wait about 30 seconds then observe heater operation.

Condition/Indication

Does burner blower come on?

Response

YES-Go to step 4.

NO-Notify maintenance.

Step

4. Observe fault display for approximately 5 minutes.

Condition/Indication

Does another "HEATING SYSTEM FAILURE" message appear?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK

FAULT CODE 33N11-TF FLOW LO, FAULT CODE 33N12-TF PUMP INLET PRESS LO, OR FAULT CODE 33N14-TF PUMP OUTLET PRESS LO**Step**

1. Observe fault display.

Condition/Indication

Is "20 HP INVERTER FAULT" (Fault Code 43N02) message also displayed?

Response

YES-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

NO-Go to step 2.

Step

2. Observe operation of still condenser fan.

Condition/Indication

Is condenser fan on?

Response

YES-Go to step 3.

NO-Go to Fault Code 43N02, 20 HP INVERTER FAULT (WP 0030).

Step

3. Observe fault display for approximately 5 minutes.

Condition/Indication

Does another "TF FLOW, PUMP IN PRESS, or PUMP OUT PRESS LO" message appear?

Response

YES-Notify maintenance.

NO-Continue heating water or continue laundry cycles.

END OF TASK

FAULT CODE 33N15-TF PUMP OVERLOAD**Step**

1. Do substeps listed below:
 - a. Pause cycle(s) or override utility operation.

WARNING

High voltage is present in inverter enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

- b. Open door on inverter enclosure (WP 0009, Figure 4).
 - c. Check trip indicator (WP 0009, Figure 4) on overload relay OL300.

Condition/Indication

Is indicator tripped?

Response

YES- Press RESET button (WP 0009, Figure 4) to reset overload relay. Close and secure door. Go to step 2.

NO-Notify maintenance.

Step

2. Do substeps listed below:
 - a. Go to 20 HP INVERTER FAULT alarm screen and follow guidance on clearing that fault.
 - b. Attempt to continue cycle(s) or utility operations.

Condition/Indication

Does fault return?

Response

YES-Consult TM or notify maintenance.

NO-Return to normal operation.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
AIR SYSTEM OBSERVED FAULTS**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment ConditionsBefore Use and Self Test completed (WP 0012,
Model C or WP 0013, Model D)**References**

WP 0009

WP 0014

WP 0015

WP 0034

AIR COMPRESSOR DOES NOT COME ON**Step**

1. Observe operator display.

Condition/Indication

Is "AIR COMPR INVTR FAULT" message also displayed?

Response

YES-Go to Fault Code 53N01, AIR COMPRESSOR INVERTER FAULT (WP 0034).

NO-Go to step 2.

Step

2. Do substeps listed below:
 - a. Position CONTROL POWER switch to OFF.

WARNING

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Only maintenance personnel shall conduct servicing beyond trouble-shooting procedures on electrical controls and circuits. Seek immediate medical attention if injury occurs.

- b. Open door on main control enclosure.
- c. Observe position of circuit breaker CB6 (WP 0009, Figure 2)

Condition/Indication

Is circuit breaker ON?

Response

YES-Notify maintenance.

NO-Go to step 3.

AIR COMPRESSOR DOES NOT COME ON-CONTINUED**Step**

3. Do substeps listed below:
 - a. Position circuit breaker to ON then close and secure door.
 - b. Position CONTROL POWER switch to ON.
 - c. Perform System Startup (WP 0014, Model C or WP 0015, Model D).
 - d. Open access door to air system.
 - e. Observe air compressor operation.

Condition/Indication

Is air compressor on?

Response

YES-Go to step 4.

NO-Notify maintenance.

Step

4. Wait about 15 minutes to verify correct operation.

Condition/Indication

Does air compressor stay on until air system is pressurized?

Response

YES-Continue water filling, water heating, or laundry cycles.

NO-Notify maintenance.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
AIR SYSTEM DISPLAYED FAULTS**

INITIAL SETUP:**References****Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment ConditionsInitial Adjustments, Before Use and Self Test
completed (WP 0012, Model C or WP 0013, Model D)WP 0009
WP 0014
WP 0015
WP 0033
WP 0060
WP 0061
WP 0062

FAULT CODE 53N01-AIR COMPRESSOR INVERTER FAULT**Step**

1. Do substeps listed below:
 - a. Position CONTROL POWER switch to OFF.

WARNING

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

- b. Open door on main control enclosure.
- c. Position CONTROL POWER switch to ON.
- d. Press PRG/RESET key (Figure 1, Item 1) on air compressor inverter (Figure 1, Item 2)
- e. Close and secure door to main control enclosure.
- f. Observe fault display for about 20 seconds.

FAULT CODE 53N01-AIR COMPRESSOR INVERTER FAULT-CONTINUED

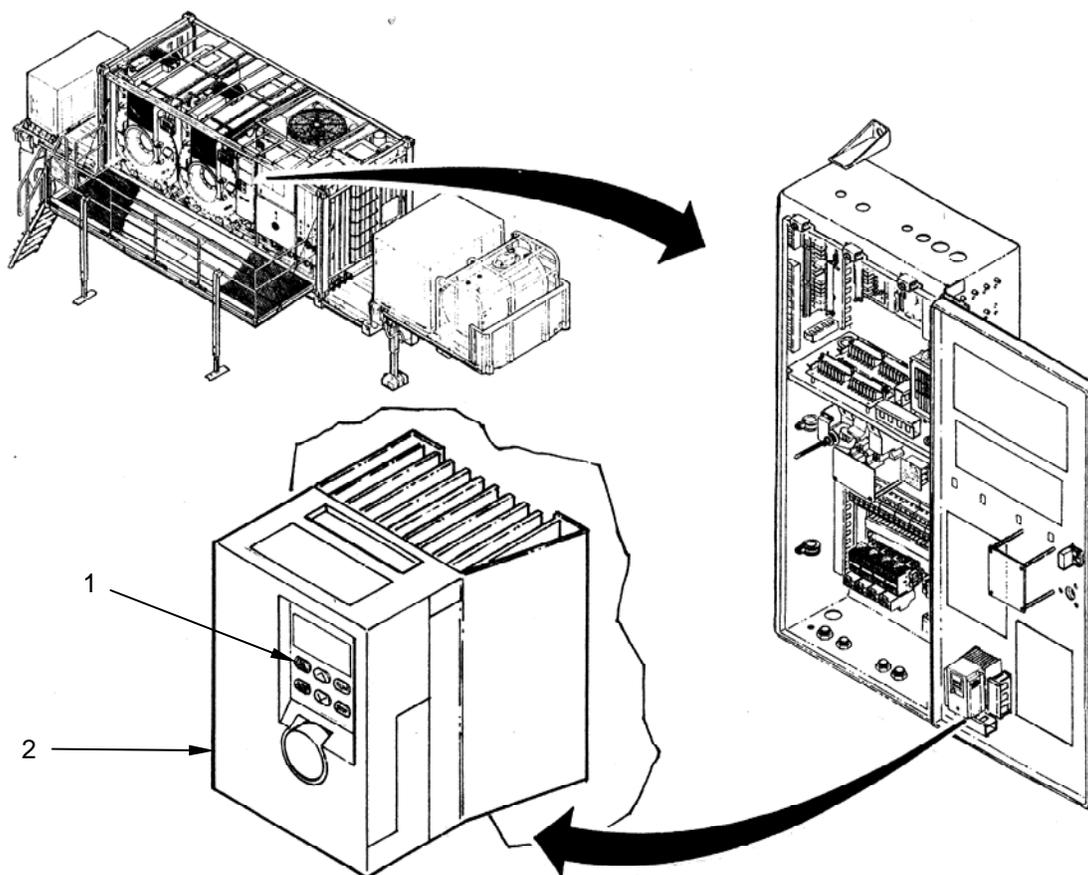


Figure 1. Main Control Enclosure.

Condition/Indication

Does "AIR COMPR INVTR FAULT" message disappear?

Response

YES-Go to step 2.

NO-Notify maintenance.

Step

2. Do substeps listed below:
 - a. Perform System Startup (WP 0014, Model C or WP 0015, Model D)
 - b. Open access door to air system.
 - c. Observe air compressor operation.

FAULT CODE 53N01-AIR COMPRESSOR INVERTER FAULT-CONTINUED**Condition/Indication**

Is air compressor on?

Response

YES-Close access door and return to normal operation.

NO-Notify maintenance.

END OF TASK**FAULT CODE 54N02-AIR TANK NOT PRESSURIZING OR PRODUCT PRESSURE LO****Step**

1. Do substeps listed below:
 - a. Position CONTROL POWER switch to OFF and then back to ON.
 - b. Perform System Startup (WP 0014, Model C or WP 0015, Model D)
 - c. Open access door to air system.
 - d. Observe air compressor operation.

Condition/Indication

Is air compressor on?

Response

YES-Go to step 2.

NO-Go to WP 0033, AIR COMPRESSOR DOES NOT COME ON FAULT.

Step

2. Check for air venting from manual valves (Figure 2, Item 3) on front air bags (Figure 2, Item 2).

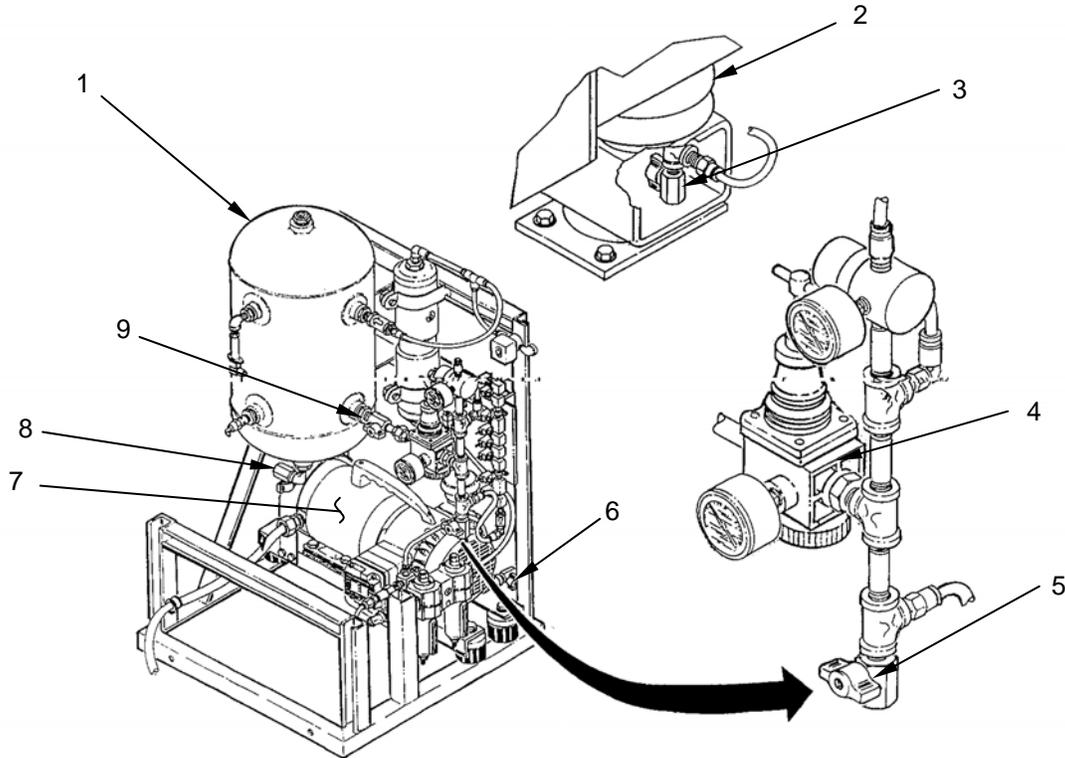
Condition/Indication

Is air venting from manual valve(s)?

Response

YES-Close manual valve(s). Return to normal operation.

NO-Go to step 3.

FAULT CODE 54N02-AIR TANK NOT PRESSURIZING OR PRODUCT PRESSURE LO-CONTINUED
**Step**

3. Check for air venting from manual valve (Figure 2, Item 6) at outlet of air compressor (Figure 2, Item 7).

Condition/Indication

Is air venting from manual valve?

Response

YES-Close manual valve and access door. Perform System Startup (WP 0014, Model C or WP 0015, Model D).

NO-Go to step 4.

Step

4. Check for air venting from manual valve (Figure 2, Item 5) at outlet of pressure regulator (Figure 2, Item 4).

Condition/Indication

Is air venting from manual valve?

Response

YES-Close manual valve and access door. Perform System Startup (WP 0014, Model C or WP 0015, Model D).

NO-Go to step 5.

FAULT CODE 54N02-AIR TANK NOT PRESSURIZING OR PRODUCT PRESSURE LO-CONTINUED**Step**

5. Check position of manual valve (Figure 2, Item 9) at outlet of air tank (Figure 2, Item 1).

Condition/Indication

Is valve open?

Response

YES-Go to step 6.

NO-Open valve and close access door. Perform System Startup (WP 0014, Model C or WP 0015, Model D).

Step

6. Check manual valve (Figure 2, Item 8) at bottom of air tank (Figure 2, Item 1).

Condition/Indication

Is manual valve open?

Response

YES-Close manual valve. Perform System Startup (WP 0014, Model C or WP 0015, Model D).

NO-Go to step 7.

Step

7. Do substeps listed below:

- a. Position CONTROL POWER switch to OFF.
- b. Position MAIN POWER switch to OFF.
- c. Replace inlet filter (WP 0060).
- d. Position MAIN POWER switch to ON.
- e. Position CONTROL POWER switch to ON.
- f. Perform System Startup (WP 0014 for Model C or WP 0015 for Model D)
- g. Wait about 15 minutes to determine if air system pressurizes.

Condition/Indication

Does air system pressurize?

Response

YES-Continue water filling, water heating, or laundry cycles.

NO-Go to step 8.

FAULT CODE 54N02-AIR TANK NOT PRESSURIZING OR PRODUCT PRESSURE LO-CONTINUED**Step**

8. Do substeps listed below:
 - a. Position CONTROL POWER switch to OFF.
 - b. Position MAIN POWER switch to OFF.
 - c. Replace first and second stage outlet filter (WP 0061).
 - d. Position MAIN POWER switch to ON.
 - e. Position CONTROL POWER switch to ON.
 - f. Perform System Startup (WP 0014, Model C or WP 0015, Model D).
 - g. Wait about 15 minutes to determine if air system pressurizes.

Condition/Indication

Does air system pressurize?

Response

YES-Continue water filling, water heating, or laundry cycles.

NO-Go to step 9.

Step

9. Do substeps listed below:
 - a. Position CONTROL POWER switch to OFF.
 - b. Position MAIN POWER switch to OFF.
 - c. Replace automatic drains (WP 0062).
 - d. Position MAIN POWER switch to ON.
 - e. Position CONTROL POWER switch to ON.
 - f. Perform System Startup (WP 0014, Model C or WP 0015, Model D).
 - g. Wait about 15 minutes to determine if air system pressurizes.

Condition/Indication

Does air system pressurize?

FAULT CODE 54N02-AIR TANK NOT PRESSURIZING OR PRODUCT PRESSURE LO-CONTINUED**Response**

YES-Continue water filling, water heating, or laundry cycles.

NO-Notify maintenance.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
MAIN CONTROL ENCLOSURE INDICATIONS**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit Assembly, Operator, (WP 0066, Table 2, Item 11)

Personnel Required

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Assembly and Preparation for Use completed (WP 0011)

References

WP 0009

WP 0063

TM 9-6115-644-10

CONTROL POWER LAMP IS NOT ON**Step**

1. Check status of MAIN POWER lamp.

Condition/Indication

Is MAIN POWER lamp on?

Response

YES-Go to step 2.

NO-Go to MAIN POWER LAMP IS NOT ON.

Step

2. Check position of CONTROL POWER switch.

Condition/Indication

Is switch in ON position?

Response

YES-Go to step 3.

NO-Position CONTROL POWER to ON. Return to normal operation.

Step

3. Replace CONTROL POWER lamp (WP 0063).

Condition/Indication

Does lamp come on?

Response

YES-Return to normal operation.

NO-Notify maintenance.

END OF TASK

MAIN POWER LAMP IS NOT ON**Step**

1. Verify external power is connected to LADS and is on line.

Condition/Indication

Is external power connected and on-line?

Response

YES-Go to step 2.

NO-Connect external power or bring power on line. Return to normal operation.

Step

2. Check position of MAIN POWER switch.

Condition/Indication

Is MAIN POWER switch in the ON position?

Response

YES-Go to step 3.

NO-Position MAIN POWER switch to ON. Return to normal operation.

Step

3. Replace MAIN POWER lamp (WP 0063).

Condition/Indication

Does lamp come on?

Response

YES-Return to normal operation.

NO-Go to step 4.

MAIN POWER LAMP IS NOT ON-CONTINUED**WARNING**

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

Step

4. Do substeps listed below:
 - a. Open door on main control enclosure.
 - b. Observe position of circuit breaker CB7 (WP 0009, Figure 2). Refer to Table 2.

Condition/Indication

Is circuit breaker ON?

Response

YES-Go to step 6.

NO-Go to step 5.

Step

5. Do substeps listed below:
 - a. Position circuit breaker CB7 (WP 0009, Figure 2) to ON then close and secure door.
 - b. Position MAIN POWER switch to ON.
 - c. Determine if MAIN POWER lamp (WP 0009, Figure 2) comes on.

Condition/Indication

Does MAIN POWER lamp come on?

Response

YES-Close and secure door. Return to normal operation.

NO-Close and secure door. Notify maintenance.

Step

6. Do substeps listed below:
 - a. Ensure CONTROL POWER is off.

MAIN POWER LAMP IS NOT ON-CONTINUED

- b. Check voltage and frequency output from MEP-805A generator (TM 9-6115-644-10) or request authorized power generation personnel to check voltage and frequency output from the power source.

Condition/Indication

Is voltage in 208-212 VAC range and frequency in 50-60 Hz range?

Response

YES-Notify maintenance.

NO-Adjust voltage and/or frequency at MEP-805A generator or request authorized power generation personnel to correct voltage and frequency output from the power source. Go to step 7.

Step

7. Determine if MAIN POWER lamp comes on.

Condition/Indication

Does MAIN POWER lamp come on?

Response

YES-Close and secure door. Return to normal operation.

NO-Close and secure door. Notify maintenance.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
OPERATOR PANEL INDICATIONS**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Assembly and Preparation for Use completed (WP 0011)

References

WP 0009

WP 0035

WP 0064

ATTENTION REQUIRED LAMP IS NOT ON (MODEL C)**Step**

1. Observe status of SYSTEM OPERABLE lamp (WP 0009, Figure 3).

Condition/Indication

Is lamp on?

Response

YES-No attention is required. Return to normal operation.

NO-Go to step 2.

Step

2. Observe status of display (WP 0009, Figure 3).

Condition/Indication

Does display indicate a failure message?

Response

YES-Go to step 3.

NO-Notify maintenance.

Step

3. Replace ATTENTION REQUIRED lamp (WP 0064).

Condition/Indication

Does lamp come on?

Response

YES-Return to normal operation.

NO-Notify maintenance.

DISPLAY DOES NOT COME ON**Step**

1. Check status of CONTROL POWER lamp (WP 0009, Figure 2).

Condition/Indication

Is CONTROL POWER lamp on?

Response

YES-Notify maintenance.

NO-Go to CONTROL POWER LAMP IS NOT ON FAULT (WP 0035).

END OF TASK**SYSTEM OPERABLE LAMP IS NOT ON (MODEL C)****Step**

1. Observe status of ATTENTION REQUIRED lamp (WP 0009, Figure 3).

Condition/Indication

Is lamp on?

Response

YES-Identify appropriate corrective action for fault listed on operator display.

NO-Go to step 2.

Step

2. Observe status of display (WP 0009, Figure 3).

Condition/Indication

Does display indicate a failure message?

Response

YES- Identify appropriate corrective action for fault listed on operator display.

NO-Go to step 3.

Step

3. Replace SYSTEM OPERABLE lamp (WP 0064).

SYSTEM OPERABLE LAMP IS NOT ON-CONTINUED**Condition/Indication**

Does lamp come on?

Response

YES-Return to normal operation.

NO-Notify maintenance.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
CONTROL SYSTEM DISPLAYED FAULTS**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Assembly and Preparation for Use completed (WP 0011)

References

WP 0009

TM 9-6115-644-10

EMERGENCY STOP ACTIVATED**WARNING**

Before attempting to clear an emergency stop make sure condition causing the emergency shutdown has been corrected. Failure to follow this precaution may result in equipment damage and/or serious personal injury or death. Seek immediate medical attention if injury occurs.

Step

1. Determine cause of emergency stop condition.

Condition/Indication

Was emergency stop selected by operator or maintenance personnel?

Response

YES-Correct unsafe condition. Go to step 2.

NO-Go to step 8.

Step

2. Do substeps listed below:
 - a. Position CONTROL POWER switch to OFF.
 - b. Position MAIN POWER switch to OFF.
 - c. Twist and pull out on EMERGENCY STOP switch.
 - d. Position MAIN POWER switch to ON.
 - e. Position CONTROL POWER switch to ON.
 - f. Observe operator display.

Condition/Indication

Does "EMERGENCY STOP" message appear?

EMERGENCY STOP ACTIVATED-CONTINUED**Response**

YES-Go to step 3.

NO-Continue water filling, water heating, or laundry cycles.

Step

3. Observe position of EMERGENCY STOP switch.

Condition/Indication

Is EMERGENCY STOP switch pulled out?

Response

YES-Go to step 4.

NO-Return to step 2.

Step

4. Check voltage and frequency output from MEP-805A generator (TM 9-6115-644-10) or request authorized power generation personnel to check voltage and frequency output from the power source.

Condition/Indication

Is voltage in 208-212 VAC range and frequency in 50-60 Hz range?

Response

YES-Notify maintenance.

NO-Adjust voltage and/or frequency at MEP-805A generator or request authorized power generation personnel to correct voltage and frequency output from the power source.

END OF TASK**CPU, RAM, OR ROM TEST FAILURE (MODEL C)****NOTE**

Rapidly turning the CONTROL POWER switch ON and OFF sometimes causes voltage spikes on the control system. These voltage spikes can lead to false self-test computer failure messages. Cycling the CONTROL POWER switch OFF then back ON will clear the fault unless an actual computer failure has occurred.

Step

1. Do substeps listed below
 - a. Position CONTROL POWER switch to OFF, wait a few seconds, then slowly position switch back to ON.
 - b. Observe display (WP 0009, Figure 3) at operator panel A.

CPU, RAM, OR ROM TEST FAILURE (MODEL C)-CONTINUED**Condition/Indication**

Does "CPU, RAM, or ROM TEST FAILURE" message reappear?

Response

YES-Notify maintenance.

NO-Return to normal operation.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TROUBLESHOOTING PROCEDURES
AUXILIARY ACCESSORIES**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialists (1)

Equipment Conditions

Assembly and Preparation for Use completed (WP 0011)

References

WP 0009

OVERHEAD LIGHT DOES NOT TURN ON**Step**

1. Check electrical connection at outlet box.

Condition/Indication

Is light cable connected?

Response

YES-Go to step 2.

NO-Properly connect cable. Return to normal operation.

Step

2. Check RESET button on GFCI receptacle.

Condition/Indication

Is button tripped?

Response

YES-Press RESET button. Go to step 4b.

NO-Go to step 3.

WARNING

High voltage is present in main control enclosure. Use extreme caution when working inside. Never place hands or tools on exposed wire connections. Death on contact may result if personnel fail to observe this safety precaution. Seek immediate medical attention if injury occurs.

Step

3. Do substeps listed below:
 - a. Open door on main control enclosure.
 - b. Observe position of circuit breaker CB 8 (WP 0009, Figure 2).

OVERHEAD LIGHT DOES NOT TURN ON-CONTINUED**Condition/Indication**

Is circuit breaker ON?

Response

YES-Go to step 5.

NO-Go to step 4.

Step

4. Do substeps listed below:
 - a. Position circuit breaker to ON then close and secure door.
 - b. Check overhead light.

Condition/Indication

Is light(s) on?

Response

YES-Return to normal operation.

NO-Notify maintenance.

Step

5. Check lamp in overhead light.

Condition/Indication

Is lamp burned out?

Response

YES-Replace lamp. Return to normal operation.

NO-Notify maintenance.

END OF TASK

END OF WORK PACKAGE

CHAPTER 4

**PMCS MAINTENANCE INSTRUCTIONS
FOR
LAUNDRY ADVANCED SYSTEM**

**CREW MAINTENANCE
PMCS INTRODUCTION**

General

Preventive Maintenance Checks and Services (PMCS) are performed to keep the LADS in operating condition. The checks are used to find, correct, or report problems. Operators are to do the PMCS jobs as shown in the PMCS table. PMCS are done every day the LADS is operated, using the PMCS table. Pay attention to WARNING and CAUTION statements. A WARNING means someone could get hurt. A CAUTION means equipment could be damaged.

Before you begin operating the LADS equipment, do Before PMCS.

During operation, do During PMCS.

After operation, do After PMCS.

Do Weekly PMCS once a week while performing After PMCS when the LADS is set-up and operating.

Do Monthly PMCS once a month while performing After PMCS when the LADS is set-up and operating.

Do Quarterly PMCS once a every three months while performing After PMCS when the LADS is set-up and operating.

Do Post-Deployment PMCS after returning from any deployment requiring the LADS to moved, set-up, operated for laundry processing, drained, and packed-up.

If you find something wrong when performing PMCS, fix it if you can, using troubleshooting procedures and/or maintenance procedures. If you do not have the tools required to perform a repair, or if repair is too difficult, notify unit maintenance.

The right-hand column of the PMCS table lists conditions that make the LADS not fully mission capable. Write up items not fixed on DA Form 2404 for unit maintenance. For further information on how to use this form, see DA PAM 750-8.

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army materiel 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 the problem in future items.

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

If a corrosion problem is identified, it can be reported using Standard Form (SF) 368, Product Quality Deficiency Report. Use of keywords such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem.

The form should be submitted to the address specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS).

Leakage Definition

CAUTION

Equipment operation is allowable with minor leakages except for fuel (no class allowable) or thermal fluid leaks (class I allowable). Of course, consideration must be given to the fluid capacity of the item or system being checked. When in doubt, ask your supervisor.

When operating with class I or II fluid leaks, continue to check fluid levels as required in your PMCS

Class III leaks should be reported immediately to your supervisor.

It is necessary to know how fluid leakage affects the status of the LADS. The following are definitions of the classes of leakage an maintainer needs to know to be able to determine the condition of the leak. Learn and then be familiar with them, and REMEMBER - WHEN IN DOUBT, ASK YOUR SUPERVISOR.

Leakage definitions for Operator PMCS.

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

Inspection

Look for signs of a problem or trouble. Senses can help here. You can feel, smell, hear, or see many problems. Be alert when inspecting LADS.

Inspect to see if items are in good condition. Are they correctly assembled, stowed, secured, excessively worn, leaking, corroded, or properly lubricated? Correct any problems found.

There are some common items to check all over the LADS. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, bare metal, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify unit maintenance.
2. Welds: Many items on the LADS are welded. To check these welds look for chipped paint, rust, corrosion, or gaps. When these conditions exist, notify unit maintenance on DA Form 2404.
3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires and broken connectors. If any are found, notify unit maintenance.
4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. Correct any problems found. If tools are not available, notify unit maintenance.

Lubrication Service Intervals

For safer, more trouble free operations, make sure that your LADS is serviced when it needs it.

Your LADS will require extra service and care when you operate under unusual conditions. High or low temperatures, long periods of hard use, or continued use in sand, water, mud, or snow will break down the lubricant, requiring you to add or change the lubricant more often.

END OF WORK PACKAGE

**CREW MAINTENANCE
PMCS, INCLUDING LUBRICATION INSTRUCTIONS
BEFORE OPERATION**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Extension (WP 0066, Table 1, Item 12)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (2)

Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

Assembly and Preparation for Use

Complete (WP 0011)

References

WP 0066

TM 9-6115-644-10

Table 1. Operator Before PMCS.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
1	Before	Fuel supply	<p>Check for adequate supply of fuel (JP-8 or DF-2) in fuel tank (Figure 1, Item 1).</p> <p>Ensure supply hoses (Figure 1, Item 2) are not damaged and are connected at fuel tank and heater (Figure 1, Item 3).</p> <p>Ensure supply hose (Figure 1, Item 4) is not damaged and is connected at supply hose (Figure 1, Item 2) and generator (Figure 1, Item 5).</p>	<p>Fuel supply is less than 350 gals.</p> <p>Supply hoses are damaged or not connected.</p> <p>Supply hose is damaged or not connected.</p>
2	Before	Heater	<p>Ensure blower air inlet screen (Figure 1, Item 6) is not blocked with debris.</p> <p>Check fuel lines (Figure 1, Item 7) for evidence of leakage.</p>	<p>Screen is blocked.</p> <p>Any class I leak is detected.</p>

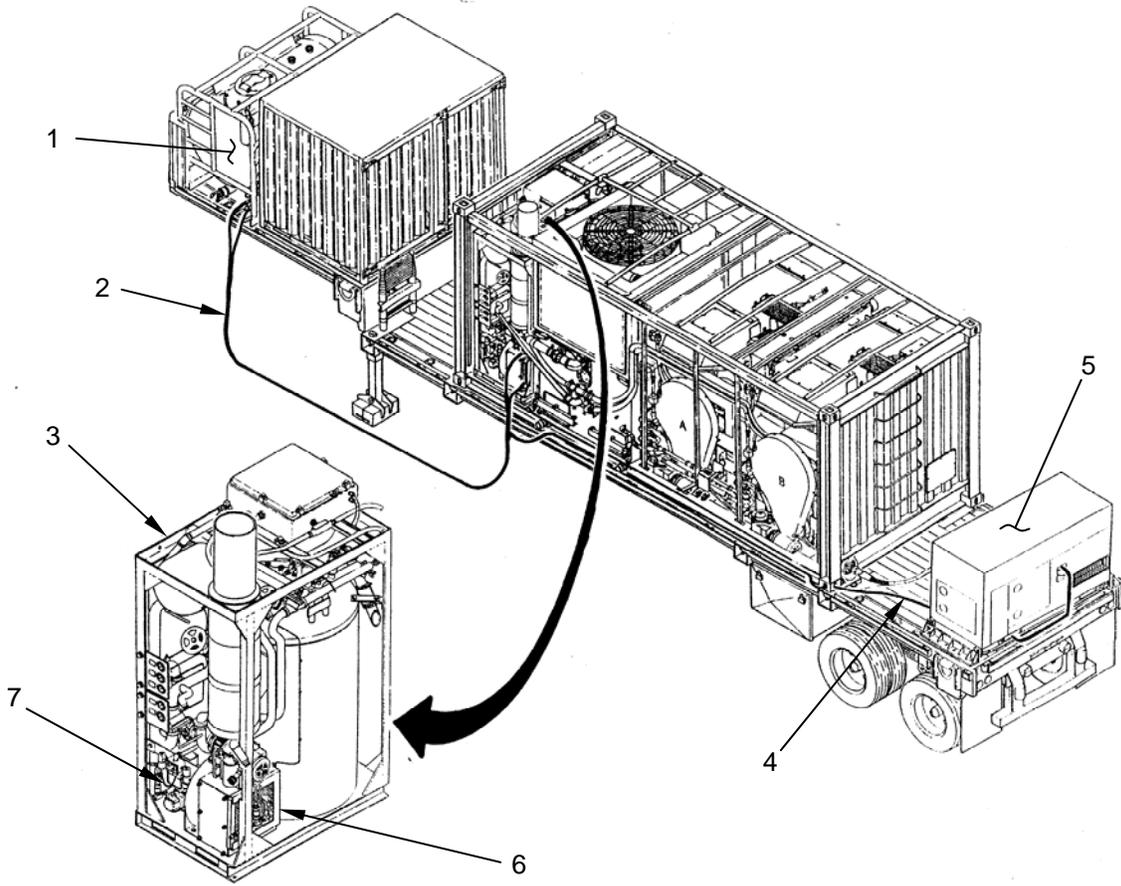


Figure 1. Heater and Fuel Supply.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
3	Before	Thermal fluid plumbing	Check thermal fluid plumbing (Figure 2, Item 8) for evidence of leakage.	Any class II leak is detected.
4	Before	Still	<p>Ensure doors (Figure 2, Item 9) are closed and knobs (Figure 2, Item 10) are hand tight.</p> <p>Ensure handles on drain valves (Figure 2, Item 11) are in the closed/forward position.</p>	<p>Doors are open and knobs are not tightened.</p> <p>Valves are open.</p>
5	Before	Still Condenser	Ensure all three heat exchanger inlet screens (Figure 2, Item 12) are not blocked with debris.	Screens are blocked.

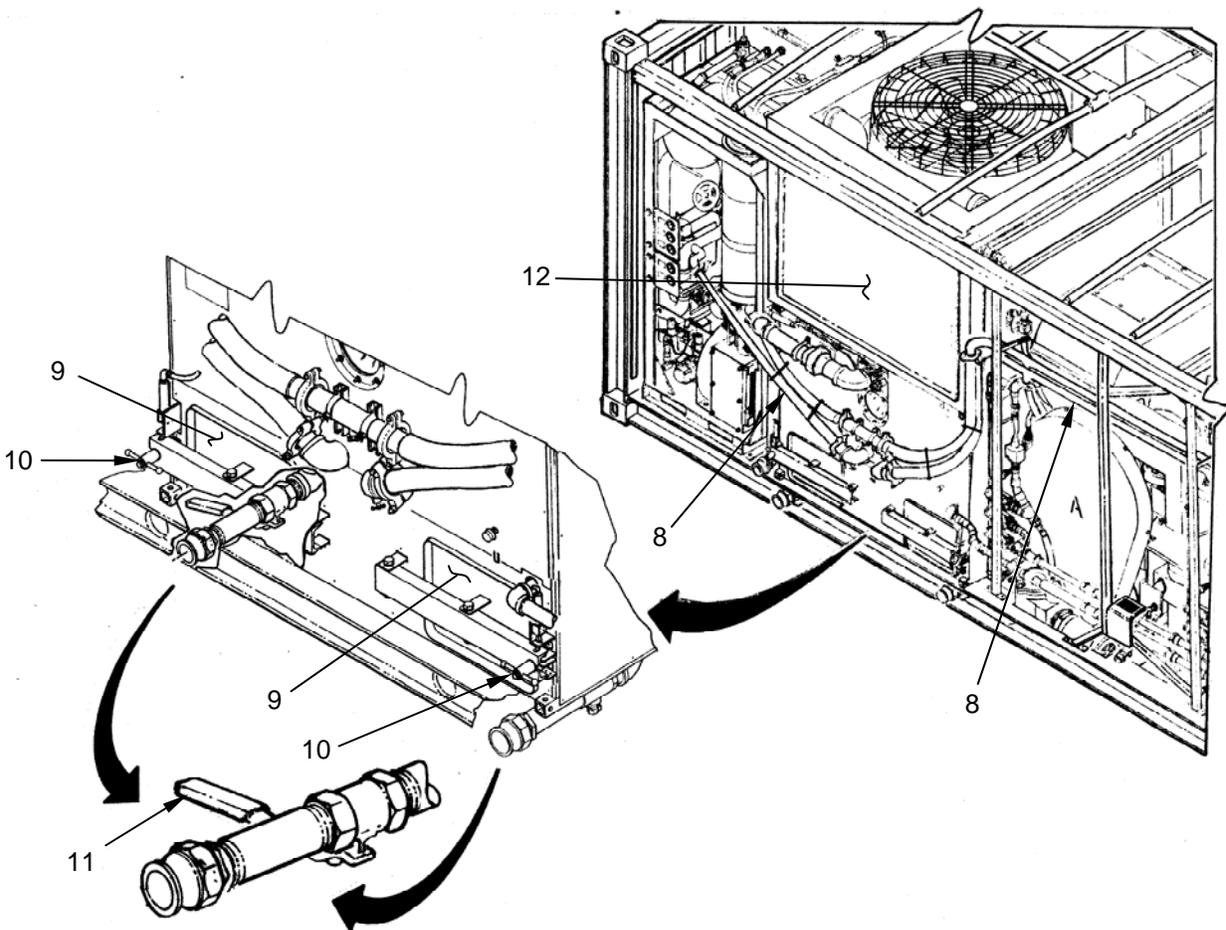


Figure 2. Thermal Fluid Plumbing.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
6	Before	Water supply	<p>Check for adequate supply of water in external container (Figure 3, Item 13).</p> <p>Ensure supply hoses (Figure 3, Item 14) are not damaged and are connected at external container, water supply pump (Figure 3, Item 15), and LADS piping connections (Figure 3, Item 16).</p>	<p>Water supply is < 500 gals.</p> <p>Supply hoses damaged or not connected.</p>
7	Before	Water supply pump	<p>Check electrical cable (Figure 3, Item 17) on water supply pump (Figure 3, Item 15) for damage and proper connection at junction box (Figure 3, Item 18).</p>	<p>Electrical cable is damaged or not connected.</p>
8	Before	Water pumps	<p>Ensure manual valves (Figure 3, Item 19) are closed.</p> <p>Ensure pump cover (Figure 3, Item 20) is properly installed.</p>	<p>Manual valves are open.</p> <p>Cover is not properly installed.</p>
9	Before	Water Plumbing	<p>Check water plumbing (Figure 3, Item 21) for evidence of leakage.</p> <p>Ensure shut-off valve (Figure 3, Item 22) for utility hose is closed.</p>	<p>Any class III leak is detected.</p> <p>Valve is not closed.</p>

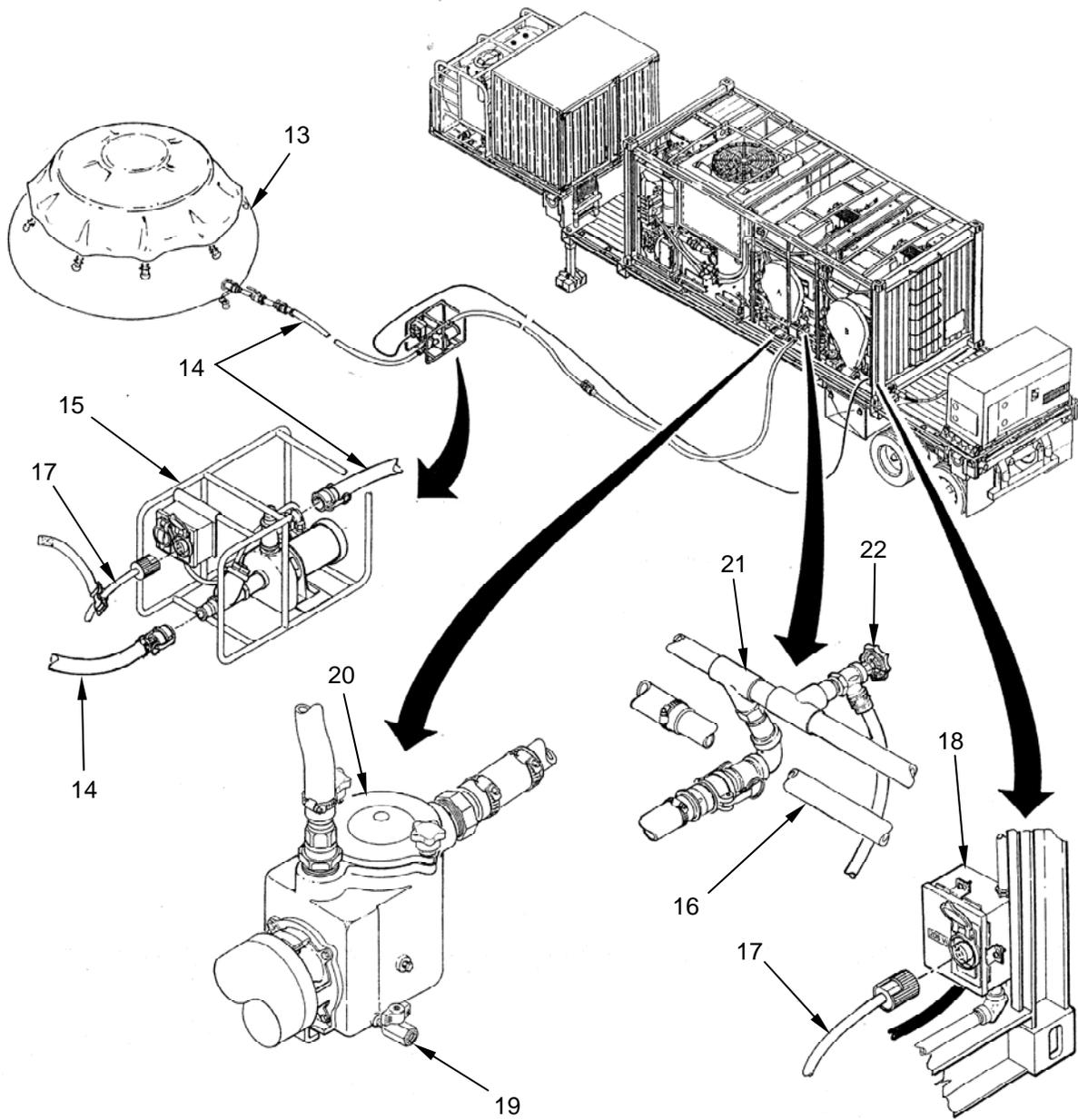


Figure 3. Water Supply Connections.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
10	Before	Washing/drying drums	Ensure dryer inlet screens (Figure 4, Item 23) are installed and there is no debris blocking air flow.	Screens are not installed or are blocked.
11	Before	Inverter Enclosure	Ensure load binders (Figure 4, Item 24) are not installed.	Load binders are installed.
12	Before	Air System	Ensure shutoff valve (Figure 4, Item 26) is open.	Valve is closed.

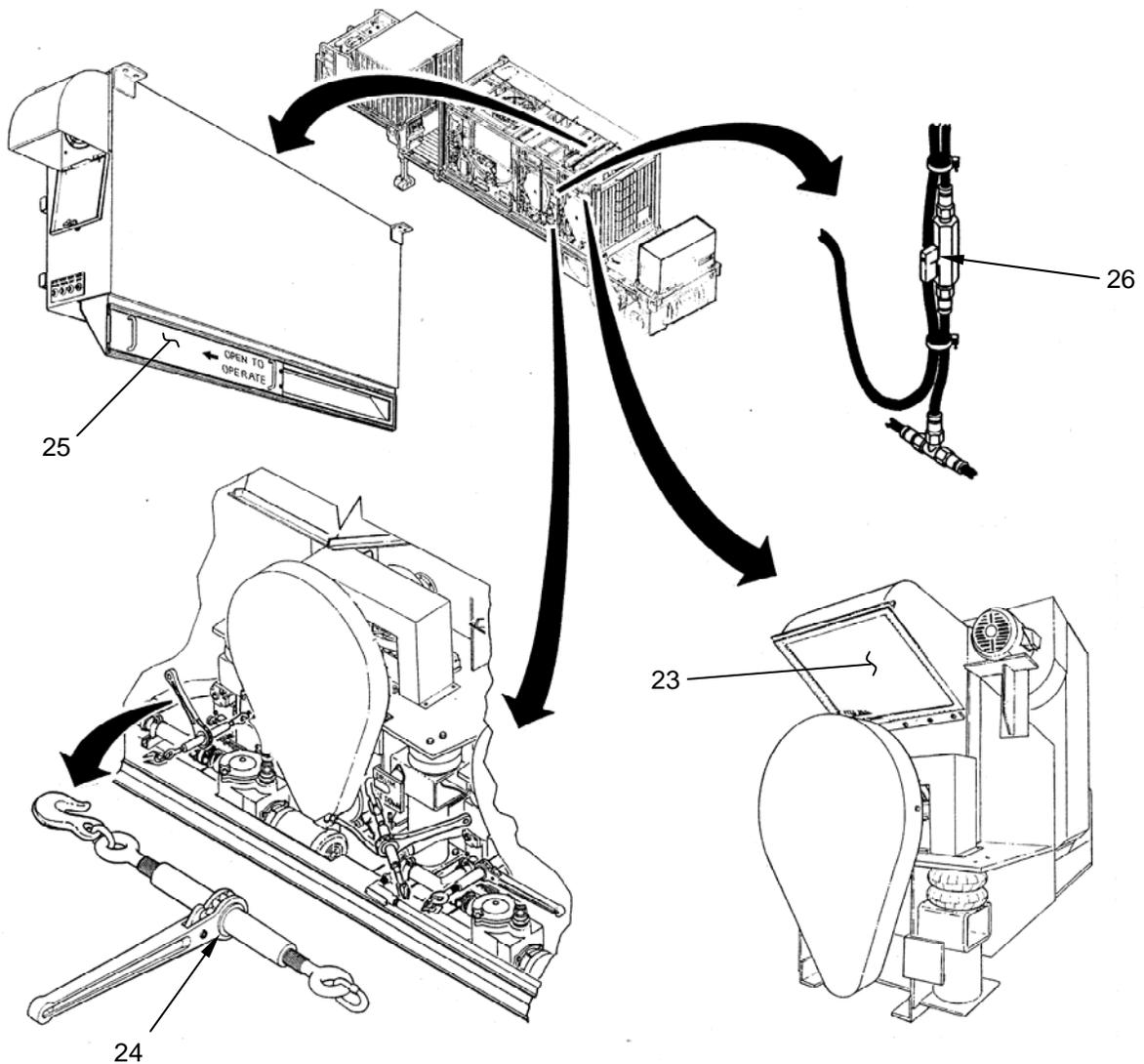


Figure 4. Drums and Inverter.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
13	Before	Electrical supply	<p>Ensure external electrical power is available. If power is supplied by Tactical Quiet Generator (TQG) ensure all PMCS has been done per TM 9-6115-644-10.</p> <p>Check main electrical cable (Figure 5, Item 27) for damage and proper connection at external power source (Figure 5, Item 28) and at the LADS electrical box (Figure 5, Item 29).</p> <p>Check ground wires (Figure 5, Item 30) for proper connection at ISO frame (Figure 5, Item 31) and trailer (Figure 5, Item 32).</p>	<p>External electrical power is not available.</p> <p>Electrical cable is damaged or not connected.</p> <p>Ground wire is not properly connected.</p>

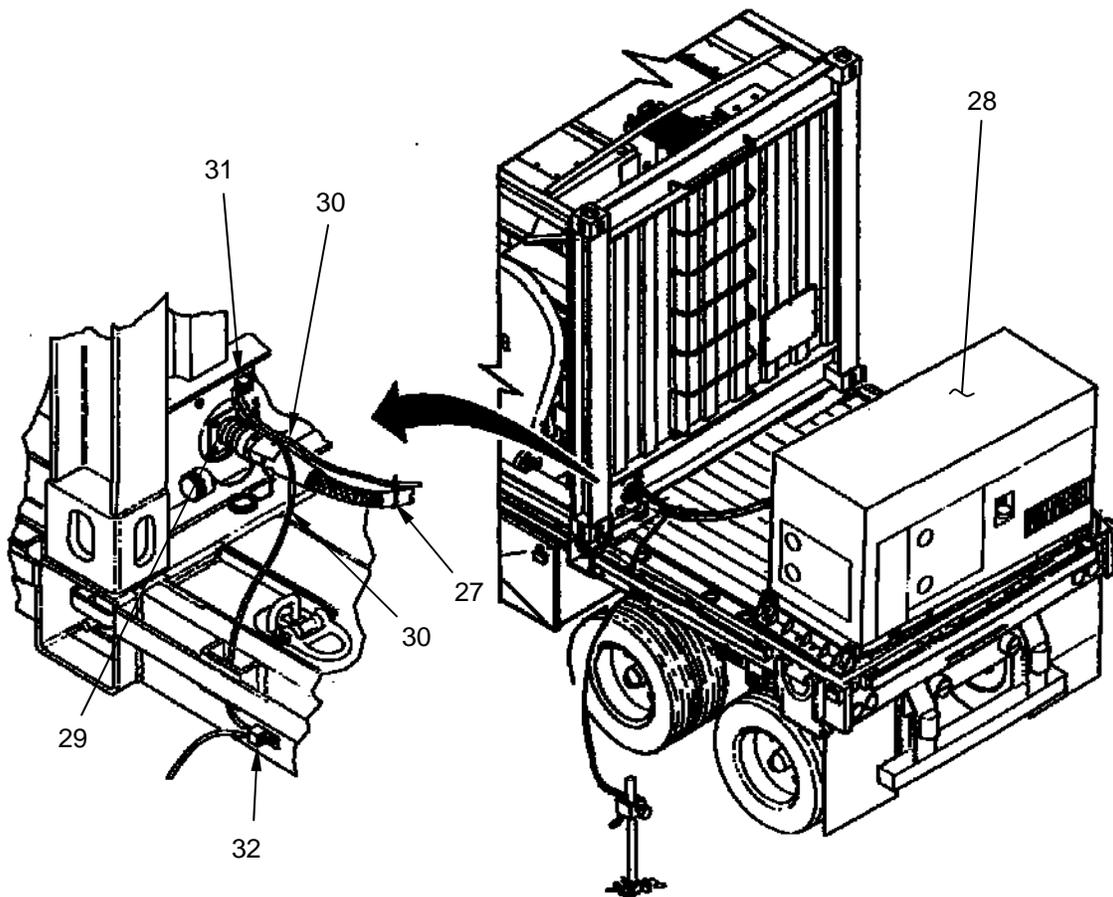


Figure 5. Electrical Connections.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
14	Before	Dryer air outlet guards	Ensure dryer blower outlet guards (Figure 6, Item 33) are not blocked with debris.	Guards are blocked.
15	Before	Still condenser	Ensure fan guard (Figure 6, Item 34) and inlet shroud (Figure 6, Item 35) are not blocked with debris.	Guard or shroud are blocked.
16	Before	Heater	Ensure exhaust duct (Figure 6, Item 36) is not blocked with debris.	Exhaust duct is blocked.

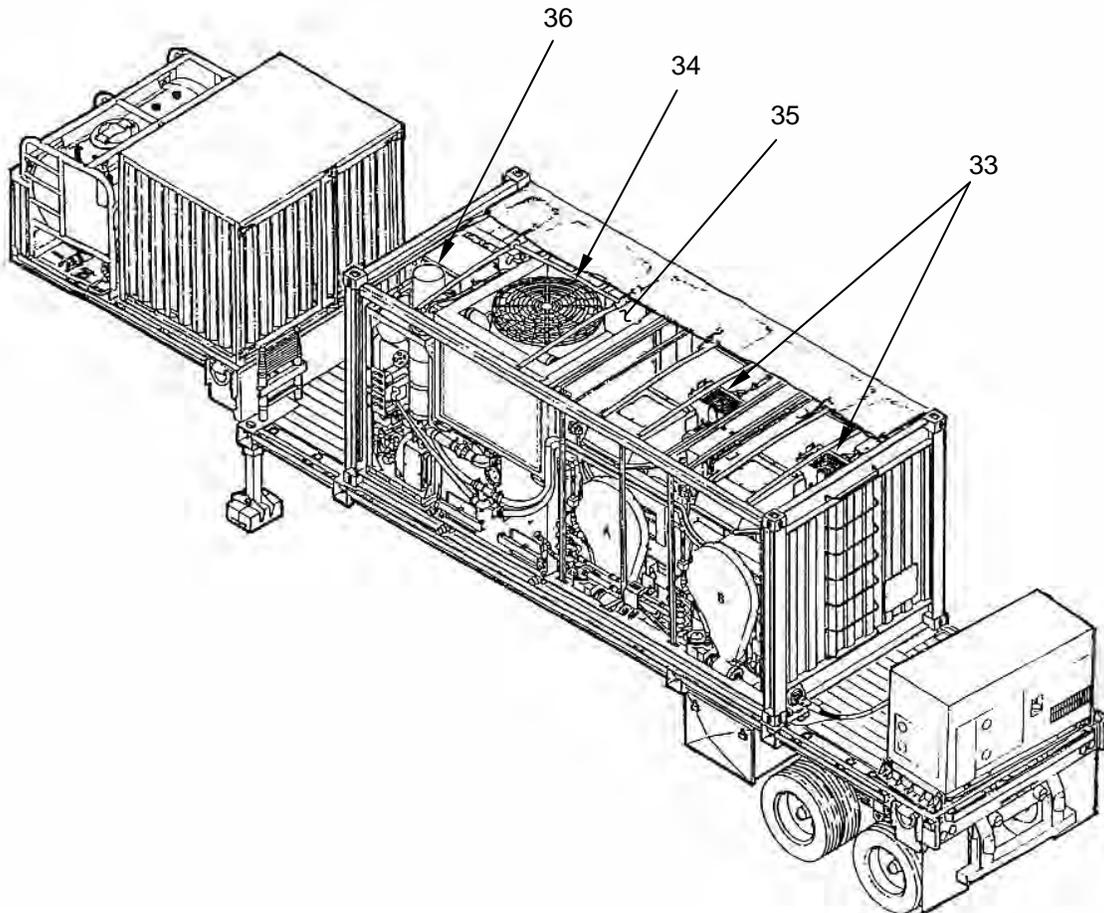


Figure 6. Exhaust Locations.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
17	Before	Anti-foam supply	<p>Check for adequate supply of anti-foam in external container (Figure 7, Item 37).</p> <p>Shake anti-foam container (Figure 7, Item 37) to mix solution.</p> <p>Ensure hand pump (Figure 7, Item 38) is inserted completely into container (Figure 7, Item 37).</p>	<p>Anti-foam supply is < 1 gal.</p> <p>Anti-foam has clumps.</p> <p>Hand pump is not fully inserted.</p>
18	Before	Detergent supply	<p>Check for adequate supply of detergent in external container (Figure 7, Item 39).</p>	<p>Detergent supply is < 1 gal.</p>

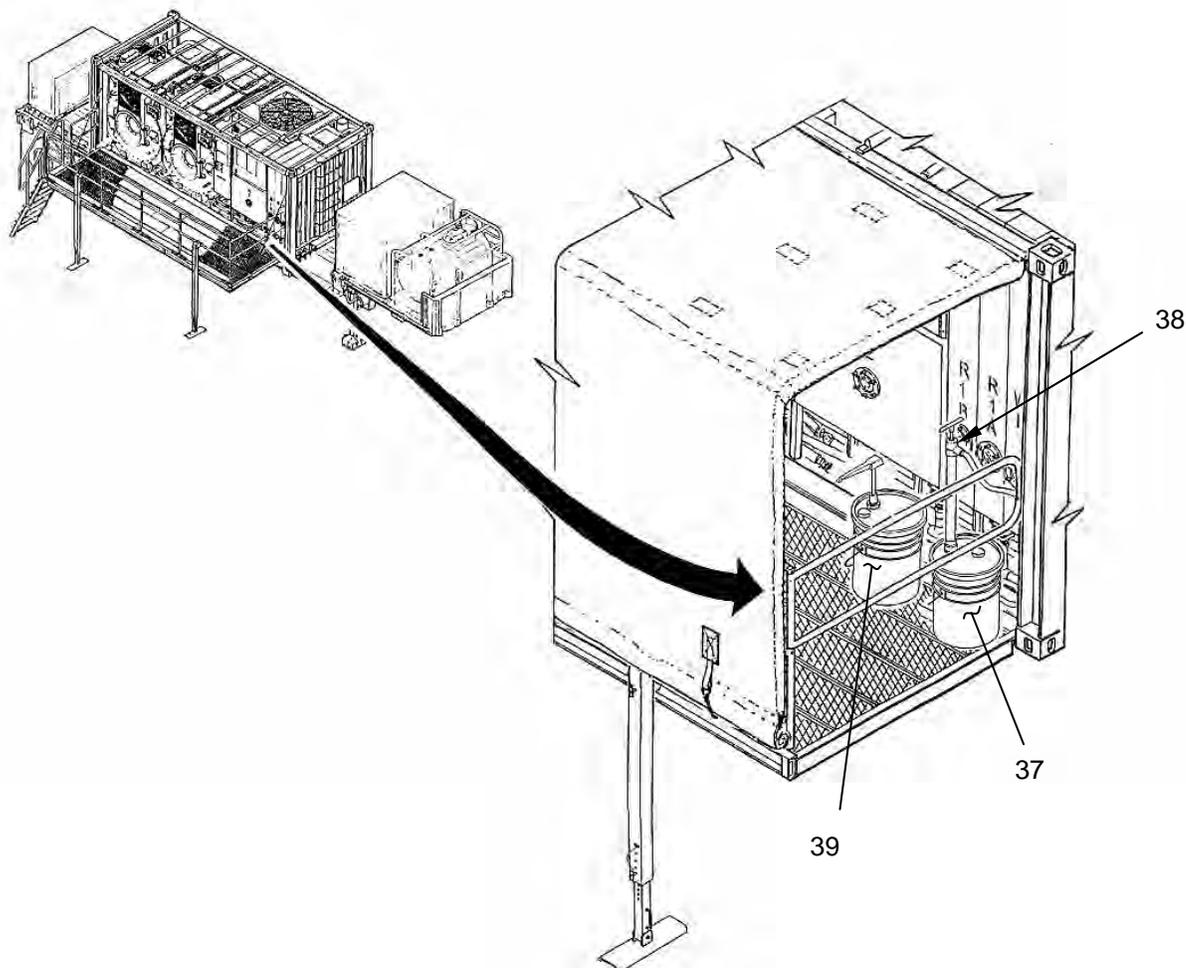


Figure 7. Anti-Foam and Detergent.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
19	Before	Pre-Wash Manifold	<p>Ensure Pre-Wash manifold (Figure 8, Item 40) is properly connected to LADS piping connections (Figure 8, Item 41).</p> <p>Check electrical cable (Figure 8, Item 42) for proper connection.</p> <p>Ensure hose (Figure 8, Item 43) is properly connected and routed to drain area.</p> <p>Ensure both operation levers (Figure 8, Item 44) are set to AUTO.</p>	<p>Manifold is not connected.</p> <p>Electrical cable is not connected.</p> <p>Hose is not connected and properly routed.</p> <p>Operation levers are set to MANUAL.</p>

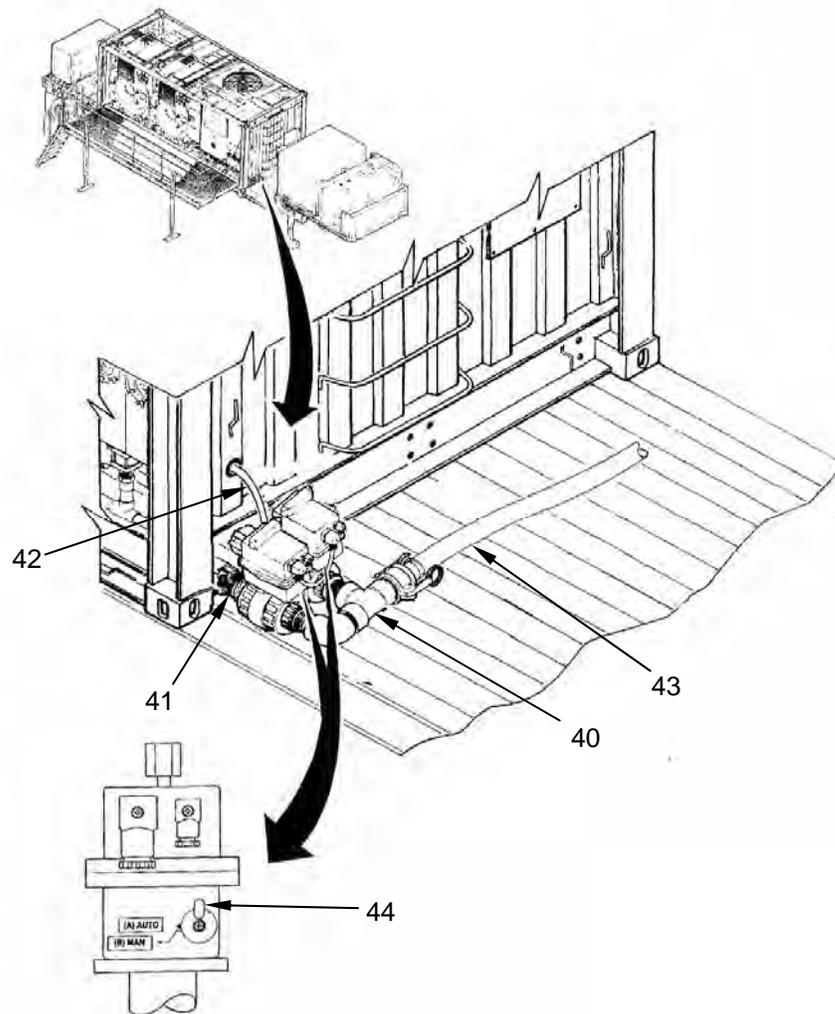


Figure 8. Pre-Wash Manifold.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
20	Before	Subcooler	Ensure inlet screen (Figure 9, Item 45) is not blocked with debris. Ensure eight manual valves (Figure 9, Item 46) are closed.	Screen is blocked. Manual valves are open.
21	Before	Pre-Filter	Ensure manual valve (Figure 9, Item 47) is closed.	Manual valve is open.
22	Before	Coalescer	Ensure manual valve (Figure 9, Item 48) is closed. Ensure petcock (Figure 9, Item 49) is closed.	Manual valve or petcock is open.
23	Before	Distillate Pump	Ensure manual valve (Figure 9, Item 50) is closed.	Manual valve is open.

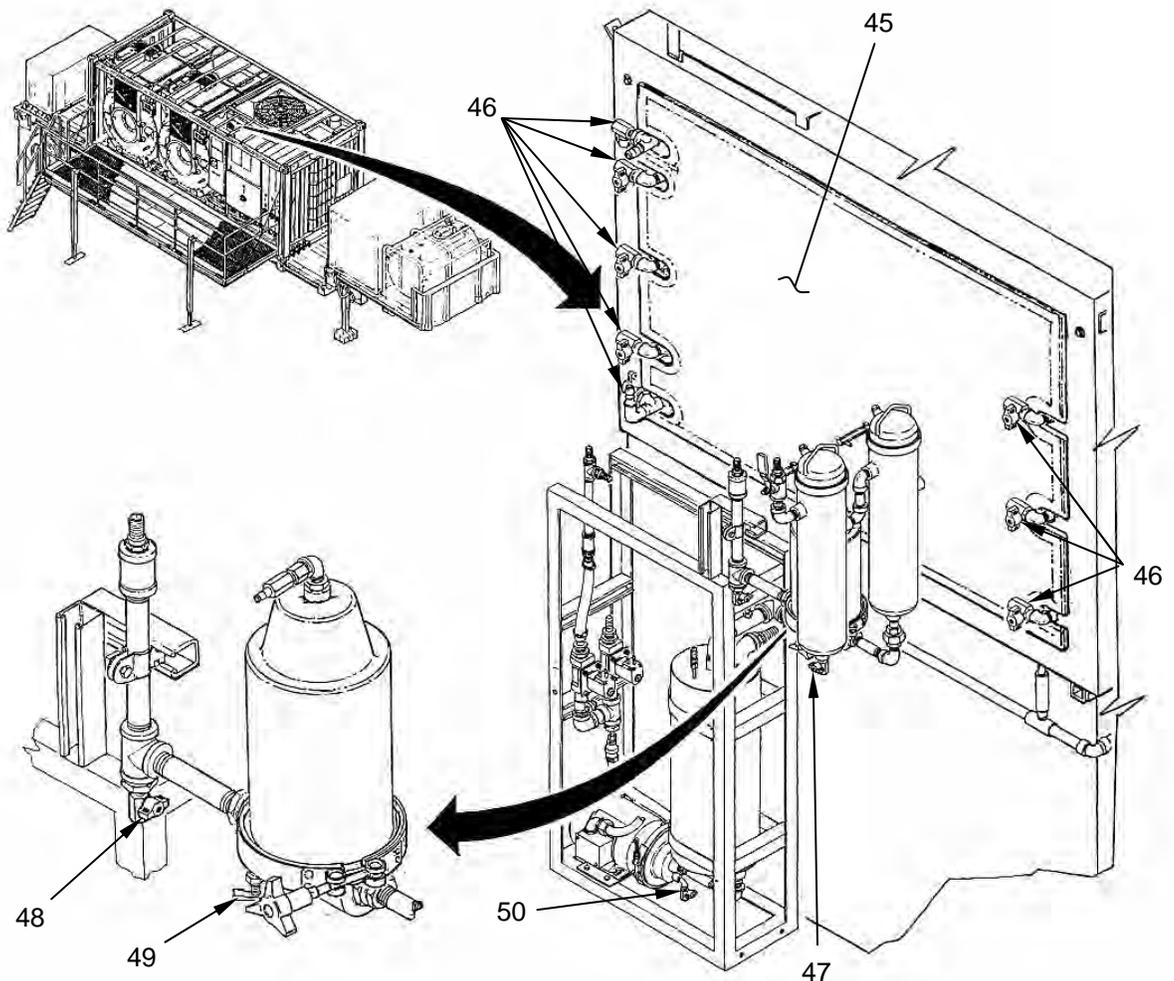


Figure 9. Water Recycle Components.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
24	Before	Air System	Ensure three manual valves (Figure 10, Item 51) are closed. Ensure manual valve (Figure 10, Item 52) is open.	Manual valves are open. Manual valve is closed.
25	Before	Inverter Enclosure	Ensure inlet door (Figure 10, Item 53) and outlet door (Figure 10, Item 54) are open and not blocked with debris.	Door is closed or blocked.

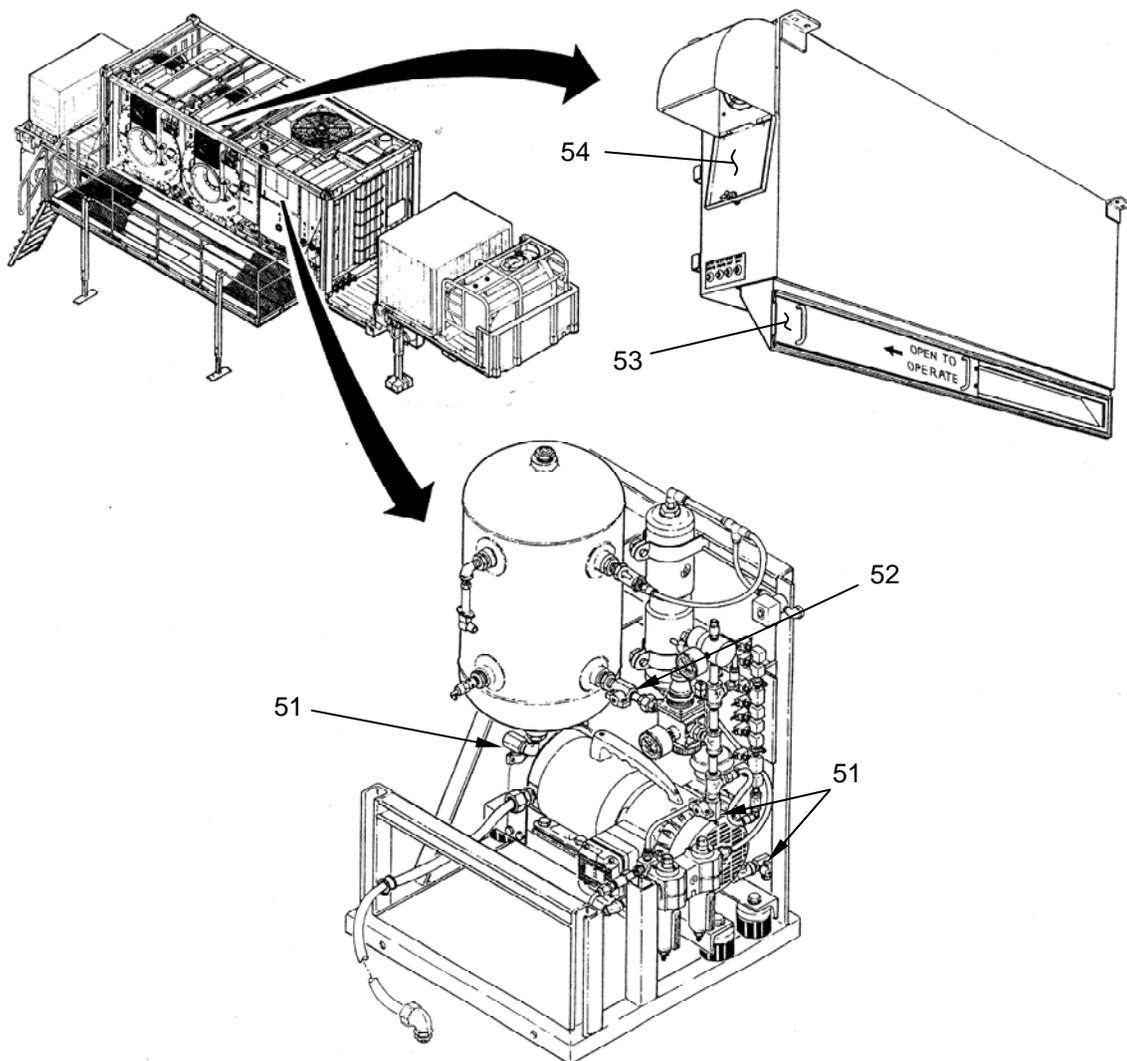


Figure 10. Air System Components and Inverter Enclosure.

Table 1. Operator Before PMCS-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
25	Before	Washing/Drying Drums	<p>Ensure sluice lids (Figure 11, Item 55) are closed and latches (Figure 11, Item 56) are engaged.</p> <p>Ensure retaining pins (Figure 11, Item 57) are not installed.</p> <p>Ensure four air bag manual valves (Figure 11, Item 58) are closed.</p> <p>Ensure lint filters (Figure 11, Item 59) are cleaned and installed and latches (Figure 11, Item 60) are engaged.</p>	<p>Lids are not closed and locked.</p> <p>Pins are installed.</p> <p>Manual valves are open.</p> <p>Lint filter is not clean, not installed or latches are not engaged.</p>

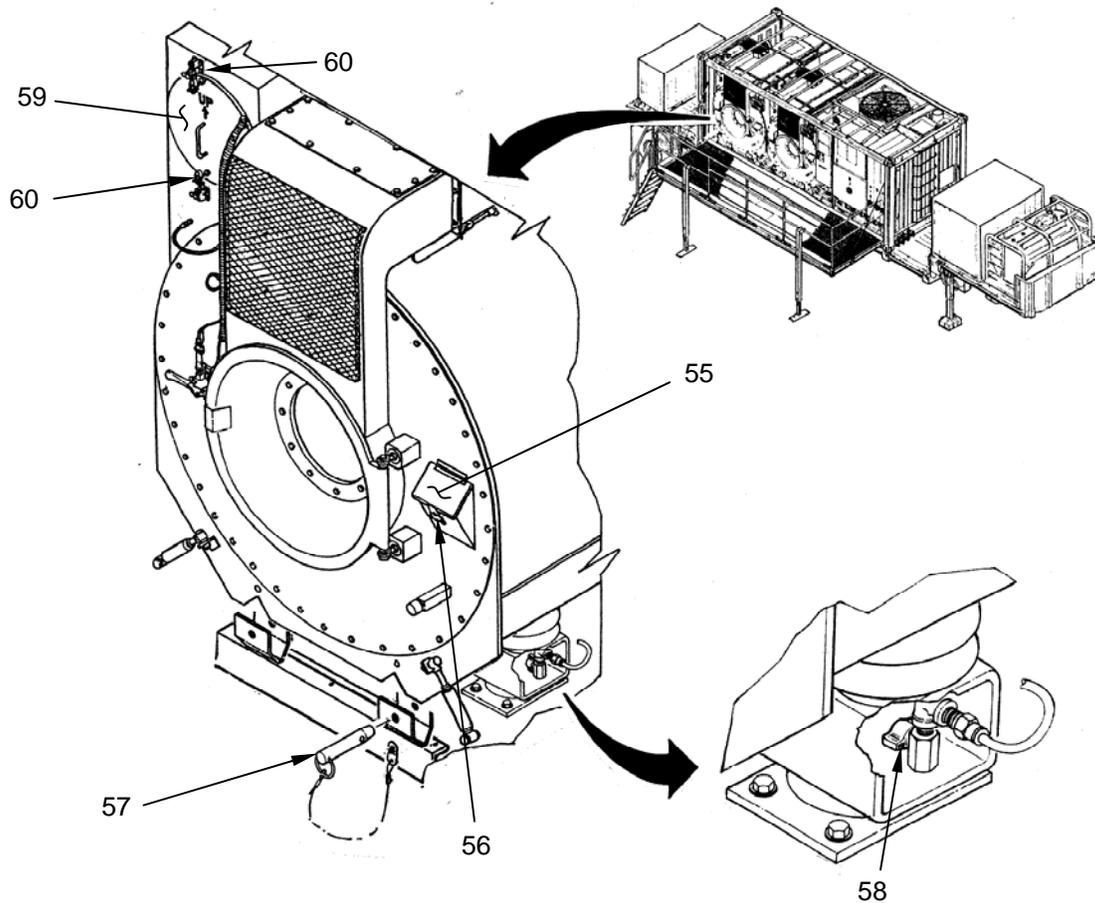


Figure 11. Washing/Drying Drums.

END OF WORK PACKAGE

**CREW MAINTENANCE
PMCS, INCLUDING LUBRICATION INSTRUCTIONS
DURING OPERATION**

INITIAL SETUP:

Personnel Required

Shower/Laundry and Clothing Repair Specialist (2)
Shower/Laundry and Clothing Repair Supervisor (1)

References

WP 0048
WP 0050

Equipment Conditions

Assembly and Preparation for Use complete (WP 0011)

Table 1. Operator During PMCS.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
1	During	Inverter Enclosure Fan	At start-up, ensure fan (Figure 1, Item 1) is blowing air out of enclosure after start-up.	Fan is not blowing air.
2	During	Drum Motor Cooling Fans	At start-up, ensure fans (Figure 1, Item 2) are blowing air around drive motors after start-up.	Fans are not blowing air.
3	During	Air System Outlet Filters	At start-up, when air compressor (Figure 1, Item 3) is on, ensure indicators (Figure 1, Item 4) on both outlet filters (Figure 1, Item 5) are green.	Either indicator is red.

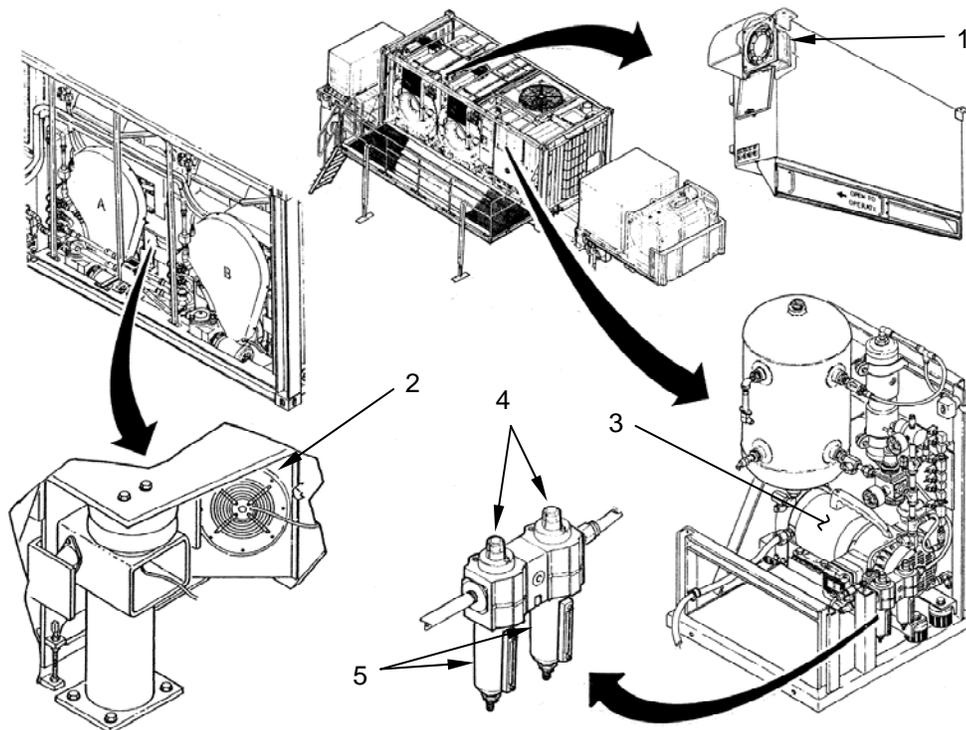


Figure 1. Fan and Air Compressor Locations.

Table 1. Operator During PMCS-Continued

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
4	During	Dryer Lint Filters	Clean/Inspect lint filters (WP 0048) after each laundry cycle.	Filters are damaged or not clean.
5	During	Water Pump Strainer	Clean strainers (WP 0050) after every fifth laundry cycle. NOTE Items marked 6 through 11 should be checked at shift change by the on coming shift.	Strainers are damaged or not clean.
6	During	Fuel Supply	Check for adequate supply of fuel (JP-8 or DF-2) in external container (Figure 2, Item 6).	Fuel supply is less than 100 gals.
7	During	Water Supply	Check for adequate supply of water in external container (Figure 2, Item 7).	Water supply is less than 300 gals.
8	During	Water Plumbing	Check water plumbing (Figure 2, Item 8) for evidence of leakage.	Any class III leak is detected.
9	During	Thermal Fluid Plumbing	Check thermal fluid plumbing (Figure 2, Item 9) for evidence of leakage.	Any class II leak is detected.
10	During	Anti-foam Supply	Check for adequate supply of anti-foam in external container (Figure 2, Item 10).	Anti-foam supply is less than 1 gal.
11	During	Detergent Supply	Check for adequate supply of detergent in external container (Figure 2, Item 11).	Detergent supply is less than 1 gal.

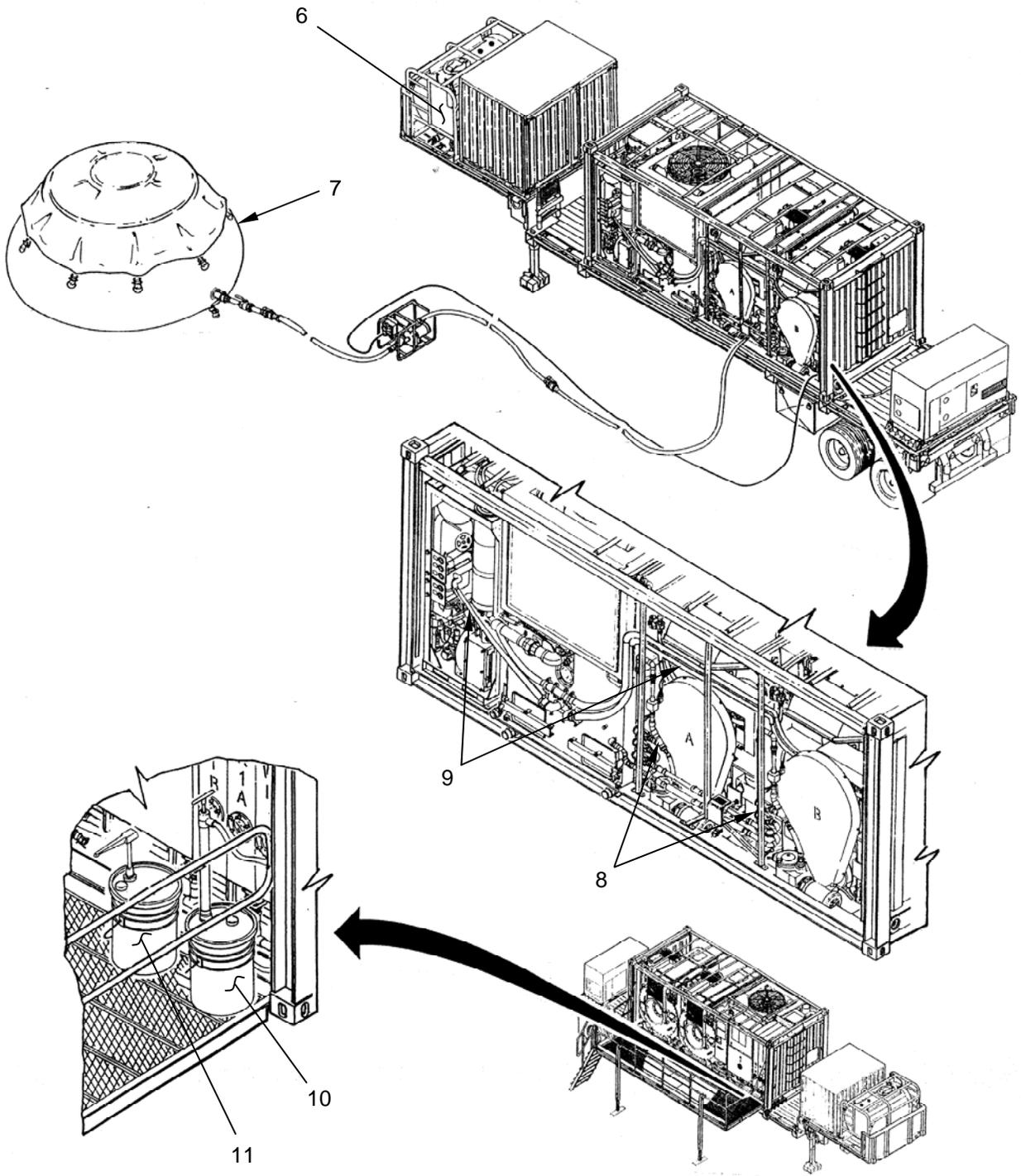


Figure 2. During PMCS Inspection Points.

END OF WORK PACKAGE

**CREW MAINTENANCE
PMCS, INCLUDING LUBRICATION INSTRUCTIONS
AFTER OPERATION**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Extension (WP 0066, Table 1, Item 12)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (2)

Shower/Laundry and Clothing Repair Supervisor (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014, Model C or WP 0015, Model D)

References

WP 0046

WP 0047

WP 0050

WP 0053

WP 0054

WP 0055

Table 1. Operator After PMCS.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
1	After	Dryer inlet screens	Ensure dryer inlet screens (Figure 1, Item 1) are not blocked with debris. If necessary clean screens (WP 0046).	Screens are blocked.
2	After	Dryer outlet guards	Ensure dryer outlet guards (Figure 1, Item 2) are not blocked with debris. If necessary clean guards (WP 0047).	Guards are blocked.
3	After	Water pump strainers	Clean/Inspect strainers (WP 0050).	Strainers are damaged or not clean.
4	After	Still	Drain and clean still (WP 0053).	Still is not clean.
5	After	Still condenser air inlet screens	Ensure three heat exchanger air inlet screens (Figure 1, Item 3) are not blocked with debris. If necessary clean screens (WP 0054).	Screens are blocked.
6	After	Subcooler air inlet screen	Ensure air inlet screens (Figure 1, Item 4) are not blocked with debris. If necessary clean screen (WP 0055).	Screen is blocked.

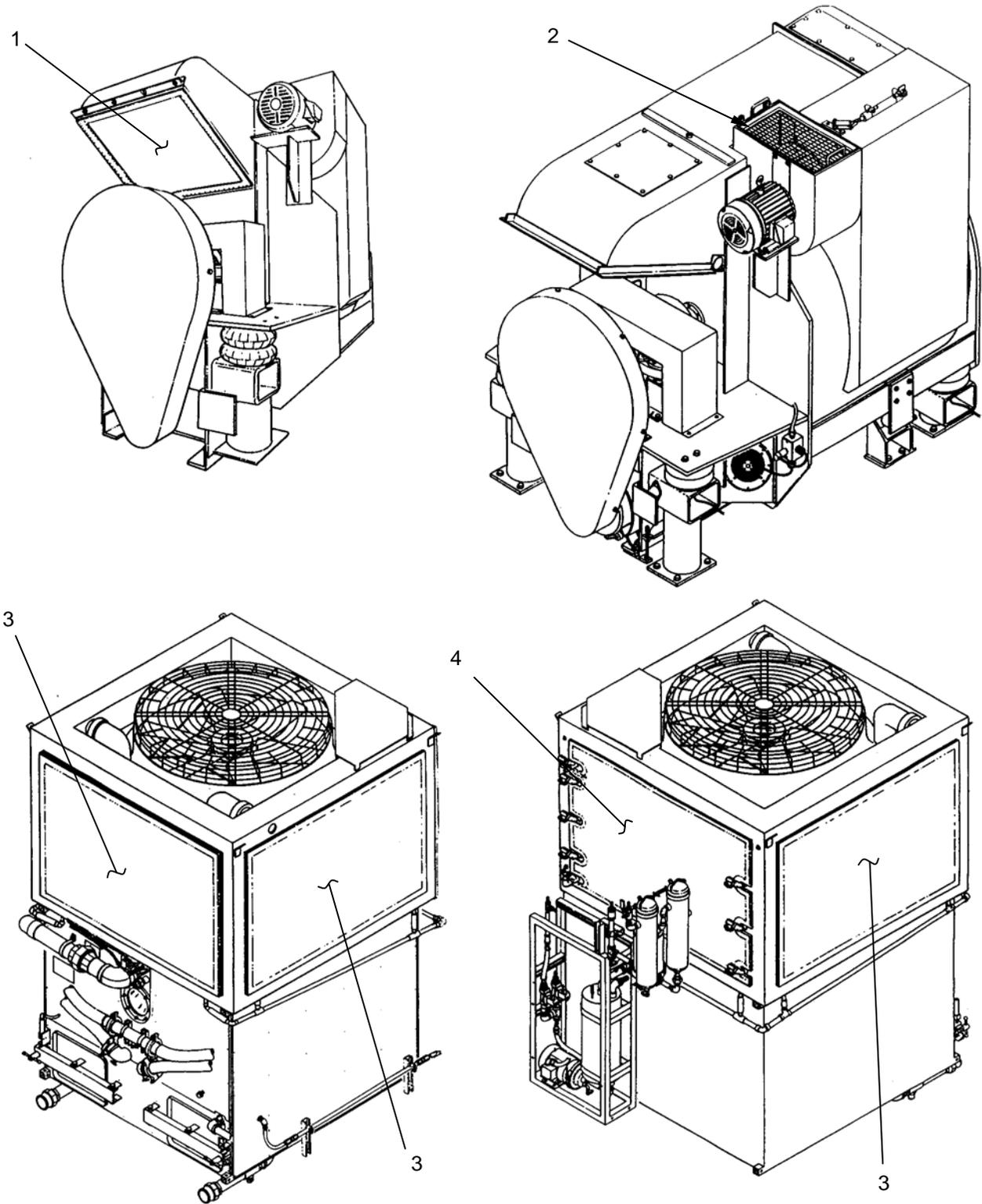


Figure 1. After PMCS Inspection Points.

END OF WORK PACKAGE

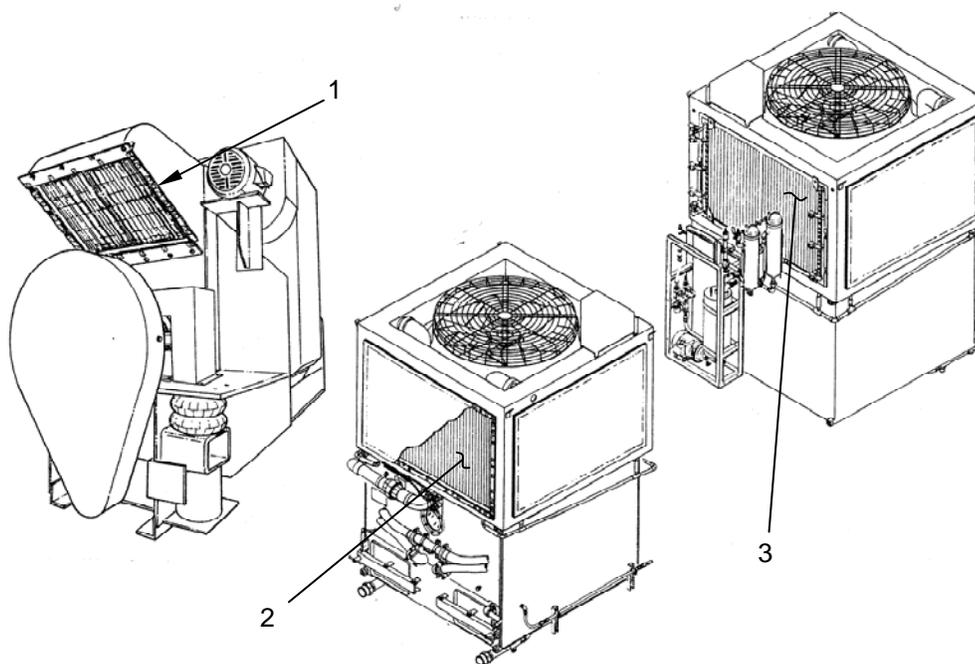


Figure 1. PMCS Inspection Points, Part 1.

Table 1. Operator PMCS, Other Intervals-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
5	Semi-Annually or Post-Deployment	Washing/Drying drums	Lubricate drive bearings (WP 0044). Lubricate drive motors (WP 0044). Lubricate rear seals (WP 0044).	Not lubricated Not lubricated Not lubricated
6	Semi-Annually or Post-Deployment	Still	Lubricate brake calipers (WP 0044). Lubricate still door clamping knobs (WP 0044).	Not lubricated Not lubricated
7	Semi-Annually or Post-Deployment	Heater	Lubricate thermal fluid pump motor (WP 0044). Clean heater air inlet filter (WP 0059).	Not lubricated Filter is not clean.
8	Semi-Annually or Post-Deployment	Air System	Replace inlet filter (WP 0060). Replace outlet filter elements (WP 0061).	Filter element is not clean. Element(s) is not clean.

Table 1. Operator PMCS, Other Intervals-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
9	Semi-Annually or Post-Deployment	Load binders	Lubricate drum stowage load binders (WP 0044).	Not lubricated
10	Semi-Annually or Post-Deployment	Grounding Lug	Lubricate grounding lug (WP 0044).	Not lubricated
11	Annually or Post-Deployment	LADS	Clean the LADS (WP 0045).	LADS is not clean.
12	Annually or Post-Deployment	Water tanks	Clean inside of water tanks (WP 0051, Model C or WP 0052, Model D).	Water tanks are not filled with fresh water.
13	Annually or Post-Deployment	Air System	Replace outlet filter automatic drains (WP 0062).	Filter element is not clean.
14	Annually or Post-Deployment	Tarp/Awning	Inspect tarp (Figure 2, Item 4) for tears in material, fraying on edges, security of straps (Figure 2, Item 5), and missing or damaged buckles (Figure 2, Item 6).	Tarp is unserviceable. If tarp is unserviceable, notify unit maintenance.

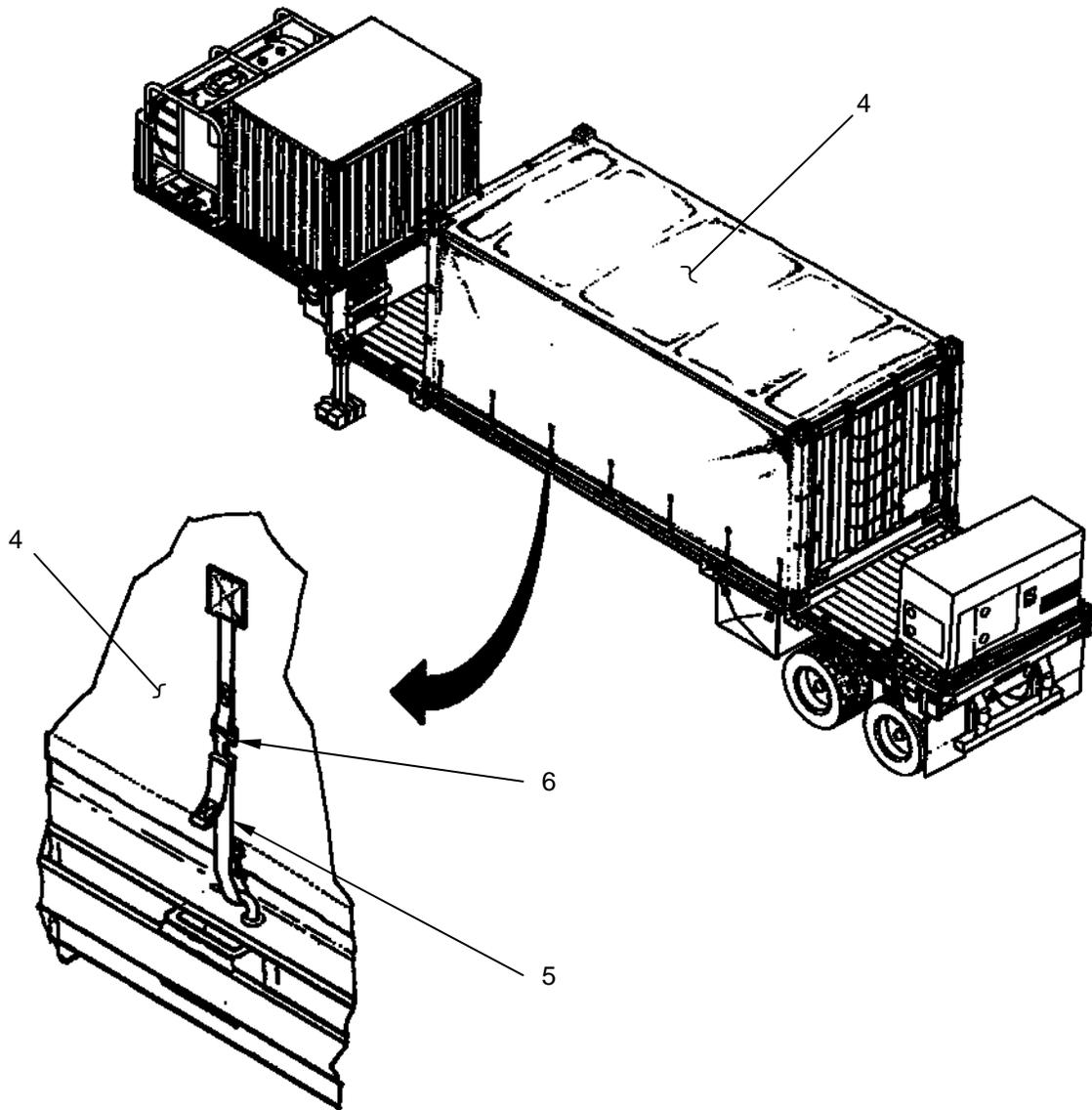


Figure 2. PMCS Inspection Points, Part 2.

Table 1. Operator PMCS, Other Intervals-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
15	Annually or Post—Deployment	Platform	<p>Inspect welds on platform (Figure 3, Item 7). Check security of railing (Figure 3, Item 8) and support legs (Figure 3, Item 9).</p> <p>Inspect welds on railing (Figure 3, Item 8) and gate (Figure 3, Item 10). Check security of gate. Check for damaged or missing quick-connect (QC) pins (Figure 3, Item 11).</p> <p>Inspect stow handles (Figure 3, Item 12), stow rods (Figure 3, Item 13), and stow bars (Figure 3, Item 14) for damage. Ensure stow bars properly lock into ISO frame (Figure 3, Item 15).</p> <p>Inspect support legs for damage to handles (Figure 3, Item 16), feet (Figure 3, Item 17), rail retainers (Figure 3, Item 18), and legs (Figure 3, Item 19). Check for damaged or missing QC pins (Figure 3, Item 20).</p> <p>Inspect safety cables (Figure 3, Item 21) for kinks and fraying. Ensure cables are secured to platform (Figure 3, Item 7) and ISO frame (Figure 3, Item 15).</p> <p>Inspect winch cable (Figure 3, Item 22) for kinks or fraying. Ensure cable is riding inside pulleys (Figure 3, Item 23). Check shackle (Figure 3, Item 24) for cracks and bending. Ensure clamps (Figure 3, Item 25) are tight.</p> <p>Inspect snatch blocks (Figure 3, Item 26) for security. Ensure fasteners (Figure 3, Items 27 and 28) are hand-tight.</p>	<p>Cracks in welds are present. Railings or legs are loose.</p> <p>Cracks in welds are present. Gate is loose. QC pins are missing or damaged.</p> <p>Stow linkage is damaged or does not lock platform in place.</p> <p>Legs or leg parts are damaged. QC pins are missing or damaged.</p> <p>Cables are kinked, frayed, or not secure.</p> <p>Cable is kinked, frayed, or out of pulleys. Shackle is damage or clamps are loose.</p> <p>Snatch block fasteners are loose.</p>

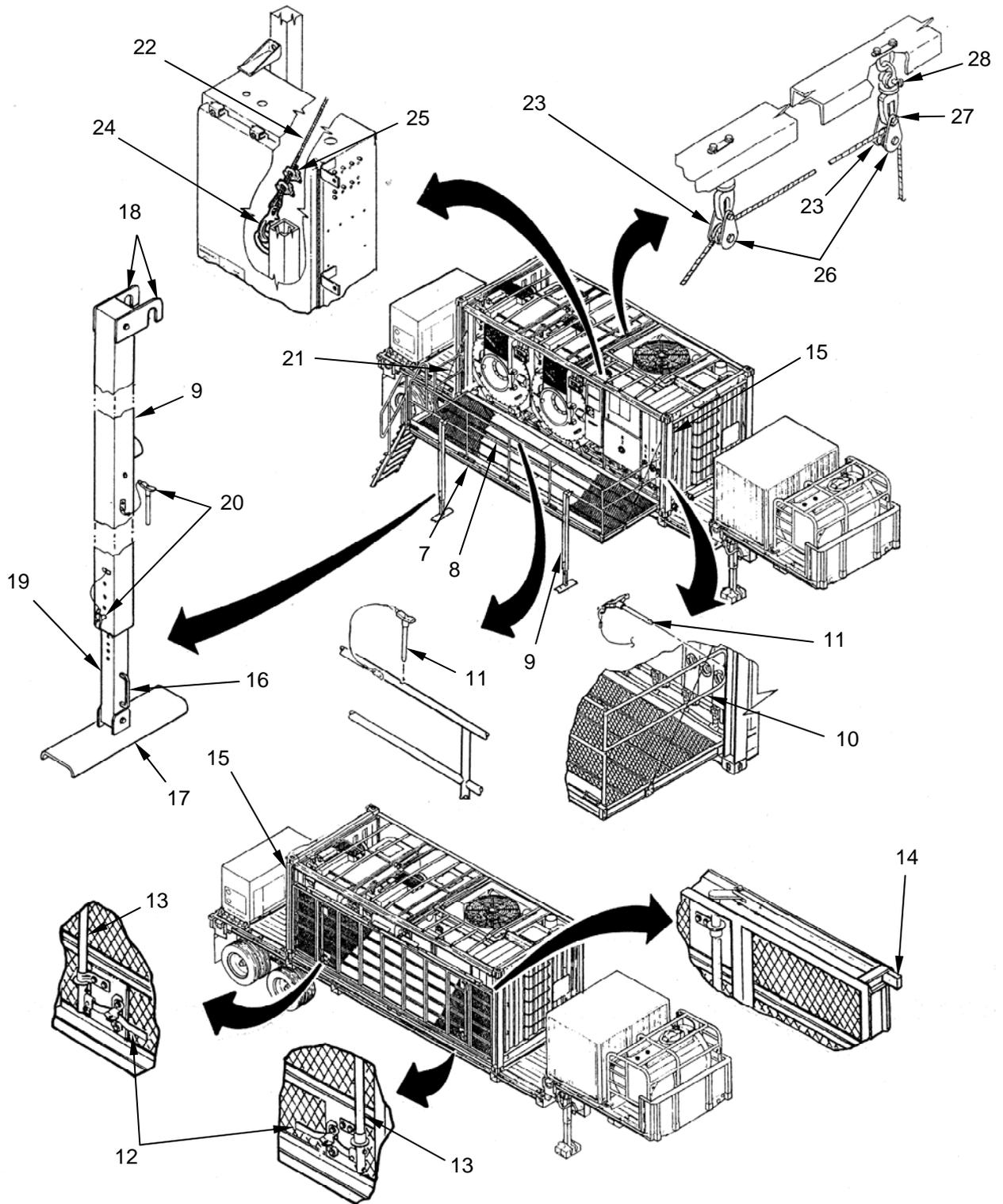


Figure 3. PMCS Inspection Points, Part 3.

Table 1. Operator PMCS, Other Intervals-Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF
16	Annually or Post—Deployment	Accessories	<p>Inspect welds on stairs (Figure 4, Item 29), awning supports (Figure 4, Item 30), and railings (Figure 4, Item 31 and 32).</p> <p>Inspect stairs (Figure 4, Item 29) and railing (Figure 4, Item 32) for damaged or missing QC pins (Figure 4, Item 33).</p> <p>Inspect sluice tray (Figure 4, Item 34) for damage. Check for damaged or missing lanyards (Figure 4, Item 35) and S-hooks (Figure 4, Item 36).</p> <p>Inspect rake (Figure 4, Item 37) for damage and worn out bristles.</p> <p>Inspect fuel hoses (Figure 4, Items 38, 39, and 40), water hoses (Figure 4, Items 41 and 42), and drain hoses (Figure 4, Items 43 and 44) for cracks, splits, and holes. Ensure clamps are tight and end connections are not damaged.</p> <p>Inspect water supply pump electrical cable (Figure 4, Item 45) for fraying and damaged connections.</p> <p>Inspect anti-foam and detergent hand-pumps (Figure 4, Items 46 and 47) for leakage and damage.</p> <p>Inspect pre-wash manifold (Figure 4, Item 48) for cracks in piping. Check for damaged hose or electrical connections.</p>	<p>Cracks in welds are present.</p> <p>QC pins are damaged or missing.</p> <p>Sluice tray is bent. Lanyards or S-hooks are missing.</p> <p>Rake is bent or bristles are worn out</p> <p>Hoses are leaking, clamps are loose, or connections are damaged.</p> <p>Cable is frayed or connections are damaged.</p> <p>Hand-pumps are leaking or damaged.</p> <p>Piping is cracked or connections are damaged.</p>

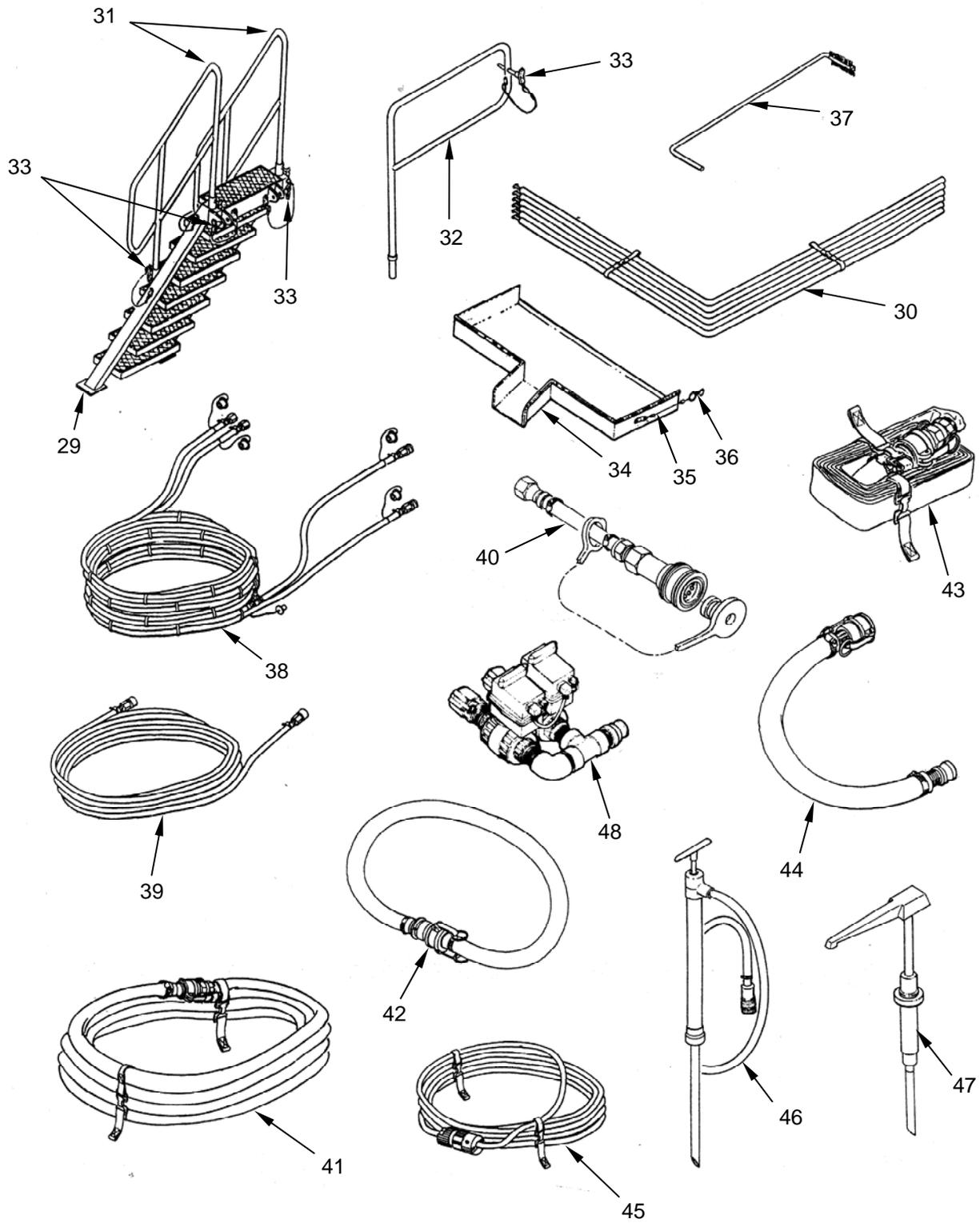


Figure 4. Accessories.

END OF WORK PACKAGE

**CREW MAINTENANCE
LUBRICATION INSTRUCTIONS**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Extension (WP 0066, Table 1, Item 12)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014, Model C or WP 0015, Model D)

References

DA PAM 738-750

FM 9-207

LUBRICATION INSTRUCTIONS**General**

The Laundry Advanced System must receive lubrication with approved lubricants at recommended intervals in order to be mission-ready at all times.

The lubrication chart, Figure 1, shows lubrication points, components to be lubricated, the required lubricant, and recommended intervals for lubrication. Any special lubrication instructions required for specific components are contained in the NOTES section of Figure 1.

Recommended intervals are based on normal conditions of operation, temperature, and humidity. When operating under extreme conditions, lubricants should always be changed more frequently. When in doubt, notify your supervisor. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.

Maintain a record of lubrication performed and report any problems noted during lubrication. Refer to DA PAM 738-750 for maintenance forms and procedures to record and report any findings.

Keep all external parts of equipment not requiring lubrication free of lubricants. After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.

Refer to FM 9-207 for lubrication instructions in cold weather.

After operation in mud, sandy, or dusty conditions, clean and inspect all points of lubrication for fouled lubricants. Change lubricants, if required.

Clean all fittings and the area around lubrication points with a lint free cloth or equivalent before lubricating equipment. After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.

If dust caps are installed, re-install after lubrication is complete.

LUBRICATION INSTRUCTIONS-CONTINUED

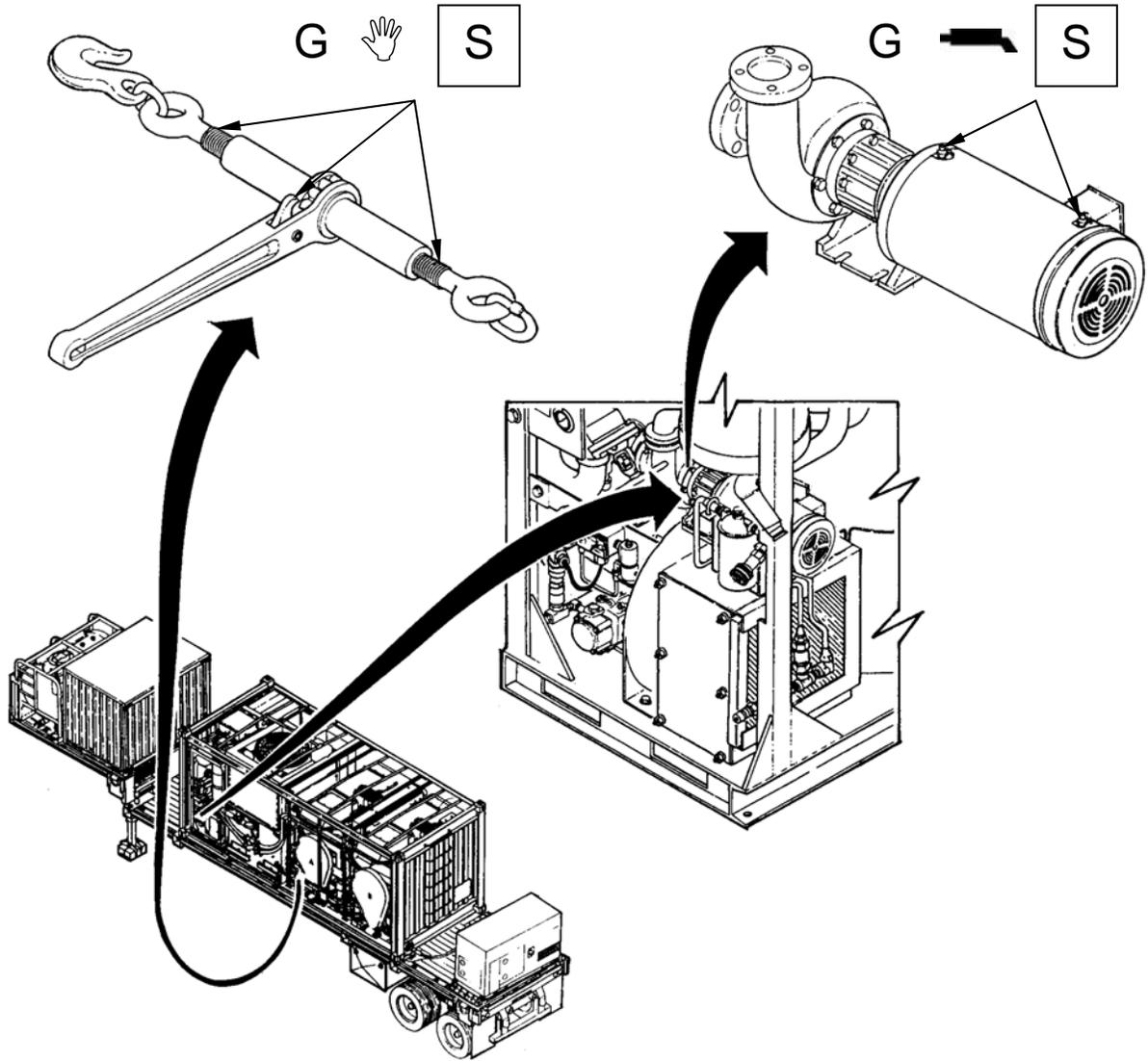


Figure 1. Load Binder and Water Pump Lubrications Points.

Table 1. Lubrication Instructions.

TABLE OF LUBRICANTS			SYMBOLS	FREQUENCY	METHOD OF APPLICATION
IDENTIFICATION LETTER	SPECIFICATION	TYPE OF LUBRICANT			
G	NLGI #2, Lithium, Complex EP	Grease, General Purpose	S	SEMI-ANNUALLY	Hand Grease Gun

LUBRICATION INSTRUCTIONS-CONTINUED

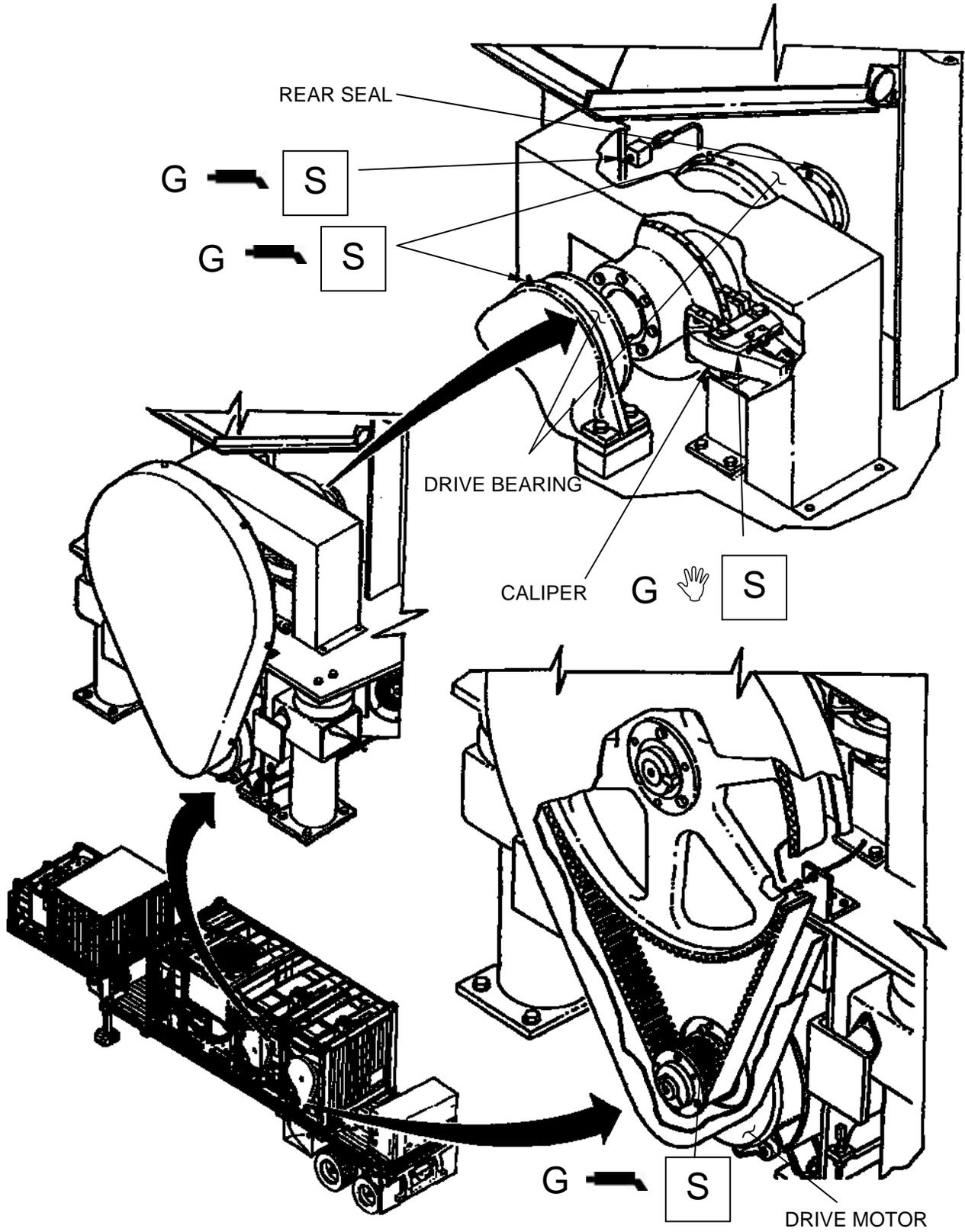


Figure 2. Drum Lubrication Points.

LUBRICATION INSTRUCTIONS-CONTINUED

NOTE

Current fielded LADS may not have lubrication points shown in Figure 3.

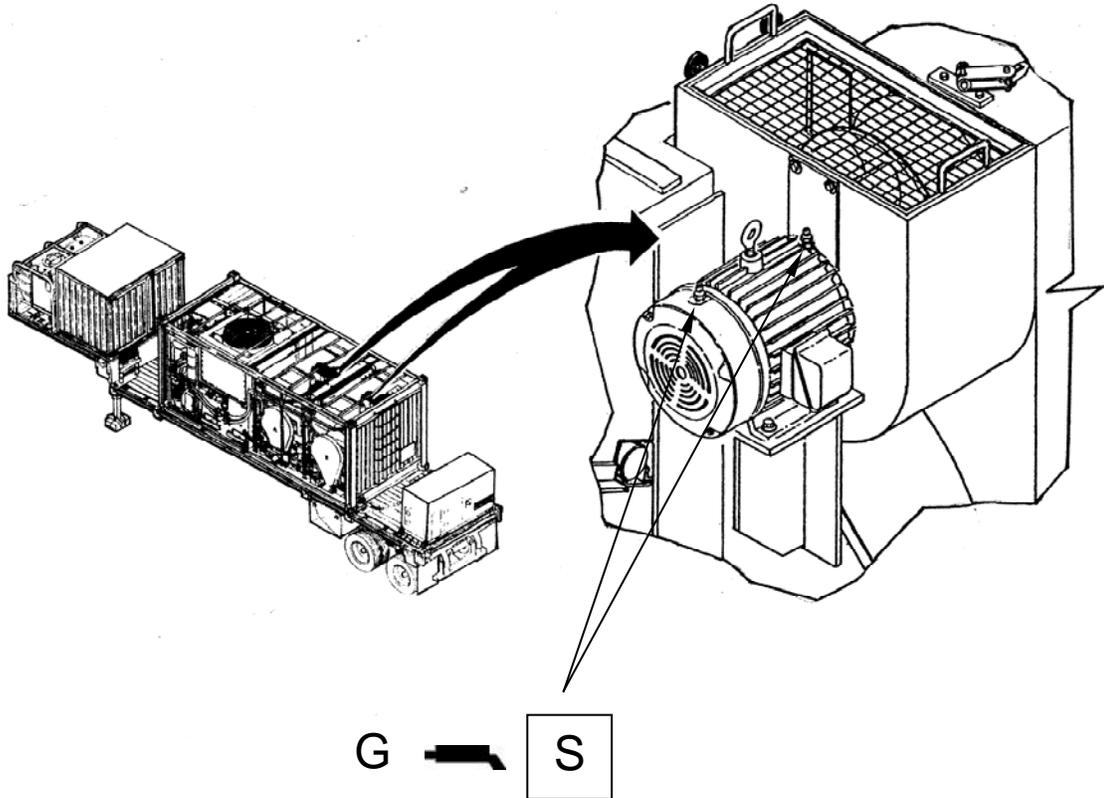


Figure 3. Dryer Blower Lubrication Points.

LUBRICATION INSTRUCTIONS-CONTINUED

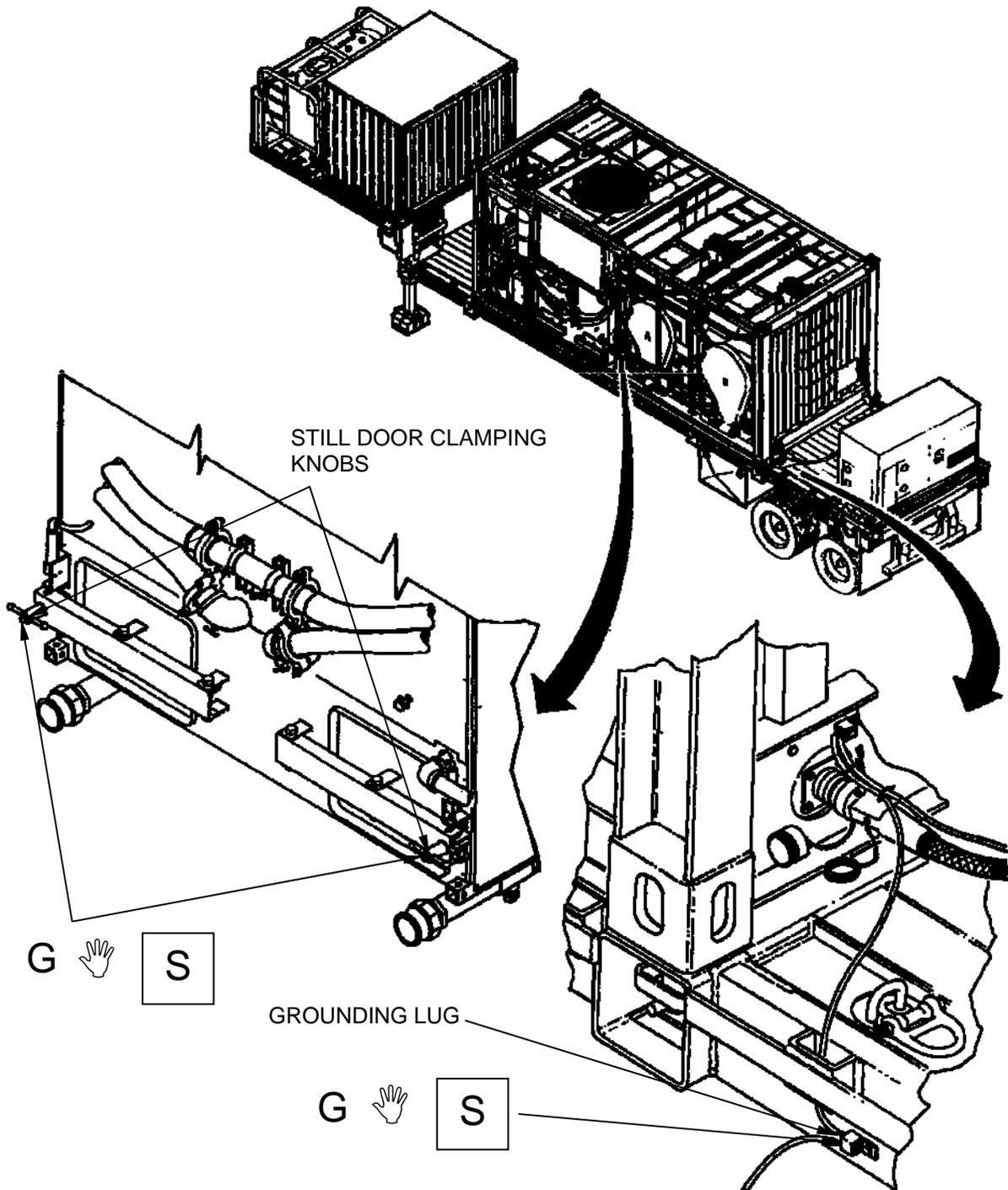


Figure 4. Still and Grounding Lug Lubrication Points.

END OF WORK PACKAGE

CHAPTER 5
MAINTENANCE INSTRUCTIONS
FOR
LAUNDRY ADVANCED SYSTEM

**CREW MAINTENANCE
LADS
SERVICE**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit Assembly, Operator (WP 0066, Table 2, Item 11)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (2)

Equipment Conditions

LADS power shut off at main control enclosure (WP 0014, Model C or WP 0015, Model D).

References

WP 0011

WP 0020

WP 0042

WP 0043

WP 0069

TM 9-6115-644-10

TM 9-2330-326-14&P

SERVICE**LADS****NOTE**

The LADS must be positioned in a wash rack or parking area where water utilities or a pressure washer are available.

1. Start with LADS in the ready-for-transport (storage) configuration (WP 0020).
2. Clean the outside of tarp (Figure 1, Item 1) and end walls of ISO frame (Figure 1, Item 3).
3. Loosen all straps (Figure 1, Item 2) on tarp (Figure 1, Item 1).
4. Flip front section of tarp (Figure 1, Item 1) over top of LADS.
5. Clean the exposed portion of tarp (Figure 1, Item 1) and exposed underside of platform (Figure 1, Item 11).
6. Clean outside of storage locker (Figure 1, Item 4).

CAUTION

Ensure all openings on fuel tank are sealed or closed before washing. Contaminating fuel supply with water can lead to failures of the heater fuel system.

7. Clean outside of fuel tank (Figure 1, Item 5).
8. Clean MEP-805A generator as specified in TM 9-6115-644-10.
9. Clean M871A3 trailer as specified in TM 9-2330-326-14&P.
10. Set-up LADS per WP 0011, Assembly and Preparation for Use Procedures, except completely deploy awning without securing any straps.

SERVICE-CONTINUED**CAUTION**

Never aim high-pressure water spray directly at controls, electrical connections, conduit penetrations, and edges around enclosure doors. Water can cause damage to electrical and electronic components and cause short circuits in wiring. Also, never aim high-pressure water at fins on still condenser or heat exchangers. The fins may be damaged or torn off causing leaks in heat exchanger tubing.

11. Ensure main control enclosure (Figure 1, Item 8), operator panels (Model C Only) (Figure 1, Items 9 and 10), inverter enclosure (Figure 1, Item 14), and heater enclosure (Figure 1, Item 6) are all closed and door latches (Figure 1, Item 7) are tight.
12. Ensure inverter enclosure inlet duct (Figure 1, Item 12) and outlet duct (Figure 1, Item 13) are closed.
13. Remove the following items for cleaning as specified in PMCS tables (WP 0042) and (WP 0043).

Dryer Inlet Screens, qty 2

Lint Filters, qty 2

Condenser Screens, qty 3

Dryer Outlet Guards, qty 2

Water Pump Strainers, qty 2

Subcooler Screen, qty 1

Heater Air Filter, qty 1

SERVICE-CONTINUED

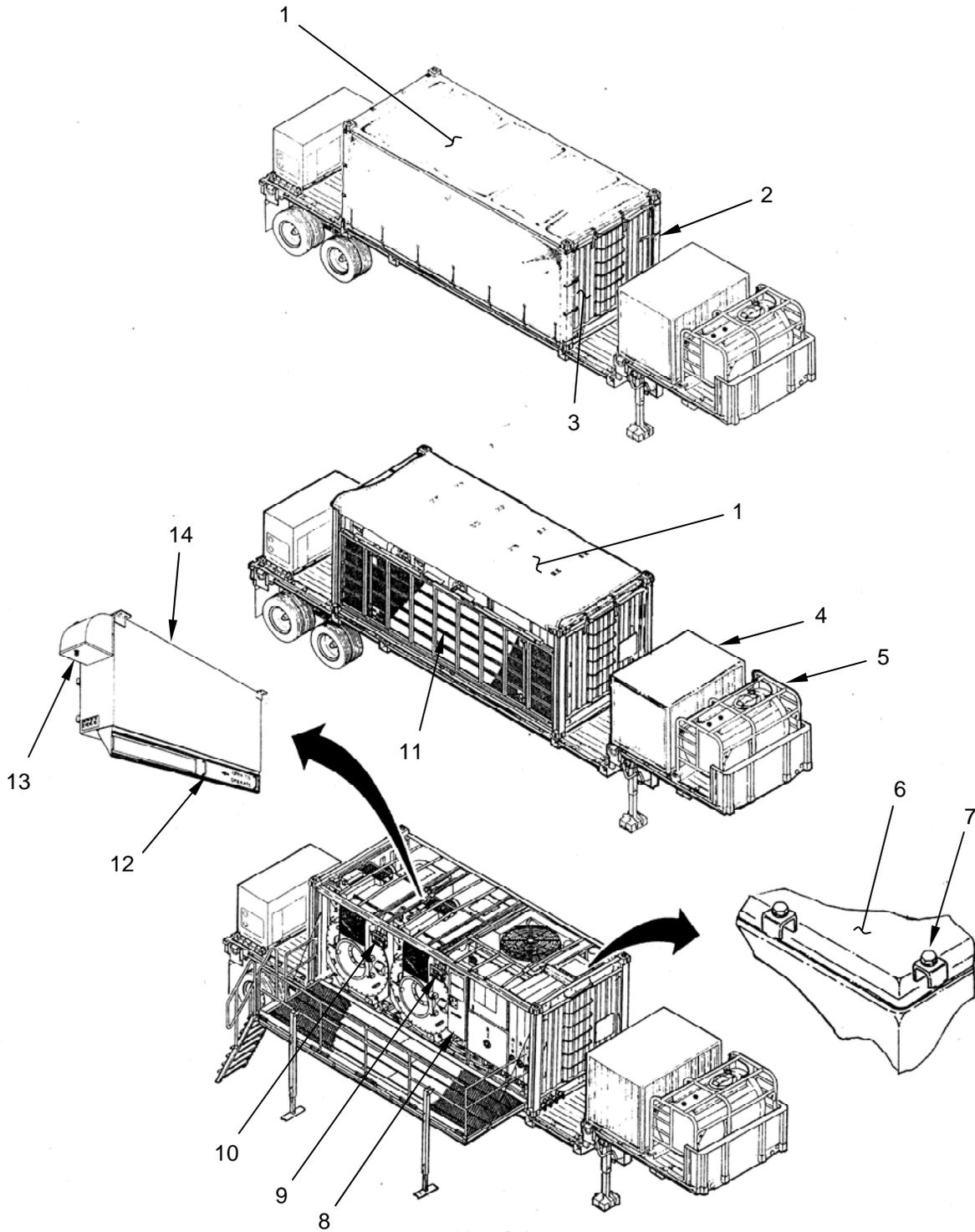


Figure 1. LADS Servicing and Cleaning, Part 1.

SERVICE-CONTINUED**CAUTION**

Be careful when walking on LADS not to step on conduit runs, electrical cables, air tube harness, fan guards, and water piping. When cleaning back side of unit utilize the supplied ladder to access hard to reach areas. Damage to these areas can result in multiple failures when LADS is restarted.

14. Clean top of LADS as follows:

- a. Clean awning extension (Figure 2, Item 2) and exposed portion of tarp (Figure 2, Item 1).
- b. Loosen straps (Figure 2, Item 4) and flip awning extension (Figure 2, Item 2) out of the way.
- c. Clean exposed surfaces on top of LADS.
- d. Clean out trough (Figure 2, Item 3). After cleaning ensure water flows out of trough.
- e. Reposition awning extension (Figure 2, Item 2) and secure with straps (Figure 2, Item 4).
- f. Fold front and back sections of tarp (Figure 2, Item 1) on top of awning extension (Figure 2, Item 2).
- g. Rinse off blower wheels (Figure 2, Item 7) on both drums and remove debris from blower housing (Figure 2, Item 8).

15. Clean front of LADS as follows:

- a. Clean exposed surfaces starting at top and working down. Flush all dirt and debris towards back of LADS.
- b. Clean inside drum basket areas (Figure 2, Item 10) and lint filter areas (Figure 2, Item 11).
- c. Open access door (Figure 2, Item 5). Clean backside of door and exposed LADS surfaces.
- d. Clean top, bottom, and sides of platform (Figure 2, Item 6).

16. Clean back of LADS as follows:

- a. Clean exposed surfaces starting at top and working down. Flush all dirt and debris out back of LADS.
- b. Clean out trough (Figure 2, Item 9). After cleaning ensure water flows out of trough.

17. Perform a final rinse of exposed LADS surfaces.

18. Perform all other applicable crew PMCS (WP 0042) and (WP 0043).

19. Ensure all applicable maintenance PMCS is performed TM 10-3510-221-23.

20. Ensure LADS is operational following guidelines set forth in WP 0069, Preparation for Deployment.

21. Return LADS to stowed configuration per WP 0020, Preparation For Movement instructions.

SERVICE-CONTINUED

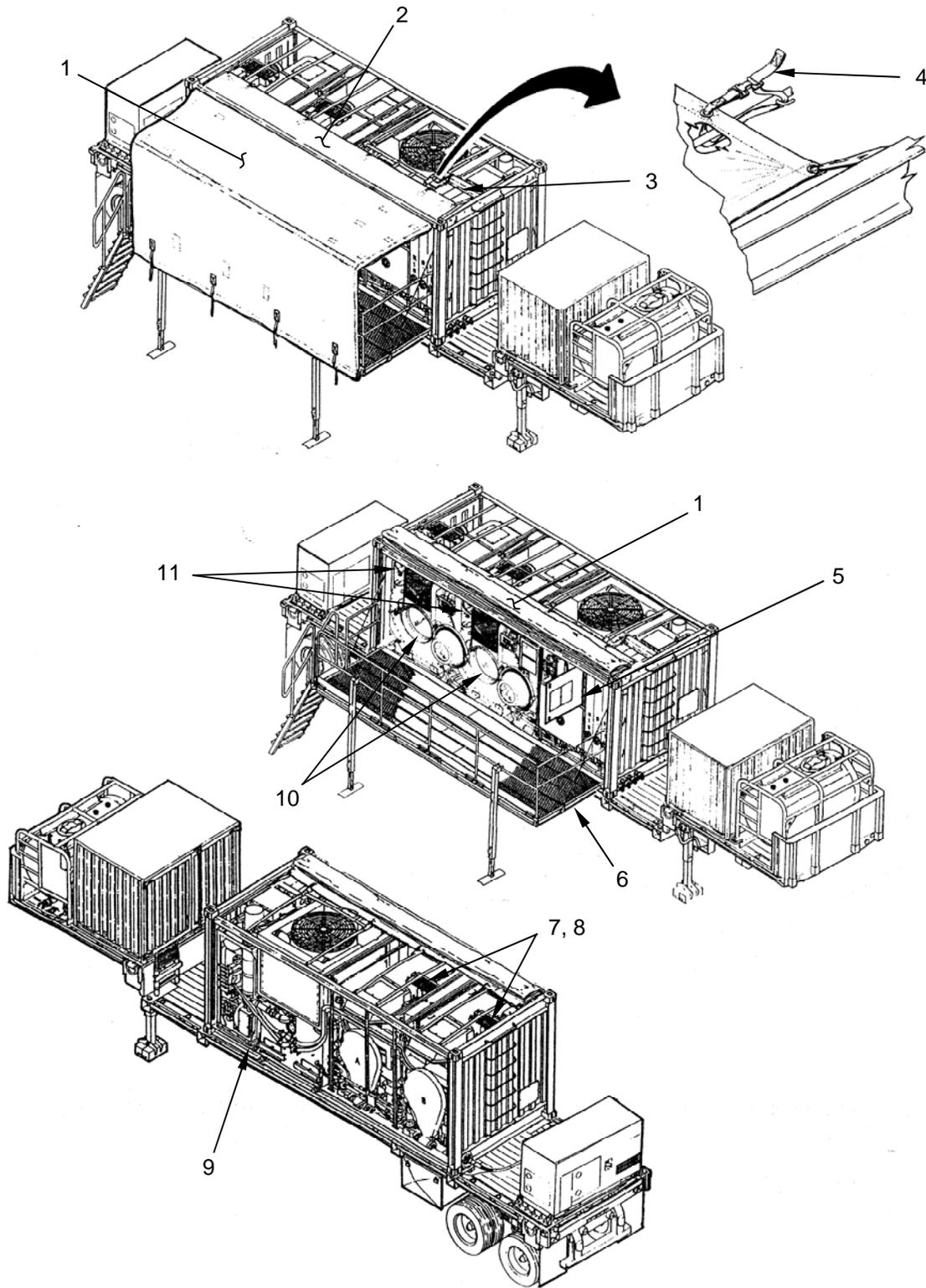


Figure 2. LADS Servicing and Cleaning, Part 2.

END OF WORK PACKAGE

**CREW MAINTENANCE
DRUM ASSEMBLY A & DRUM ASSEMBLY B
DRYER INLET SCREEN
SERVICE**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Extension (WP 0066, Table 1, Item 12)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014,

Model C or WP 0015, Model D)

SERVICE**Dryer Inlet Screen****WARNING**

Thermal fluid can reach temperatures near 400 °F when the heating system is operating. Make sure cooldown cycle has been run prior to performing maintenance. Always wear gloves and eye protection. Failure to follow this precaution could result in severe burn injuries. Seek immediate medical attention if injury occurs.

1. Remove screens (Figure 1, Item 2) from dryer ducting (Figure 1, Item 1).
2. Rinse screens (Figure 1, Item 2) with water until all debris is removed.
3. Inspect screens (Figure 1, Item 2) for tears. Replace if torn.
4. Reinstall screens (Figure 1, Item 2) onto dryer ducting (Figure 1, Item 1).

SERVICE-CONTINUED

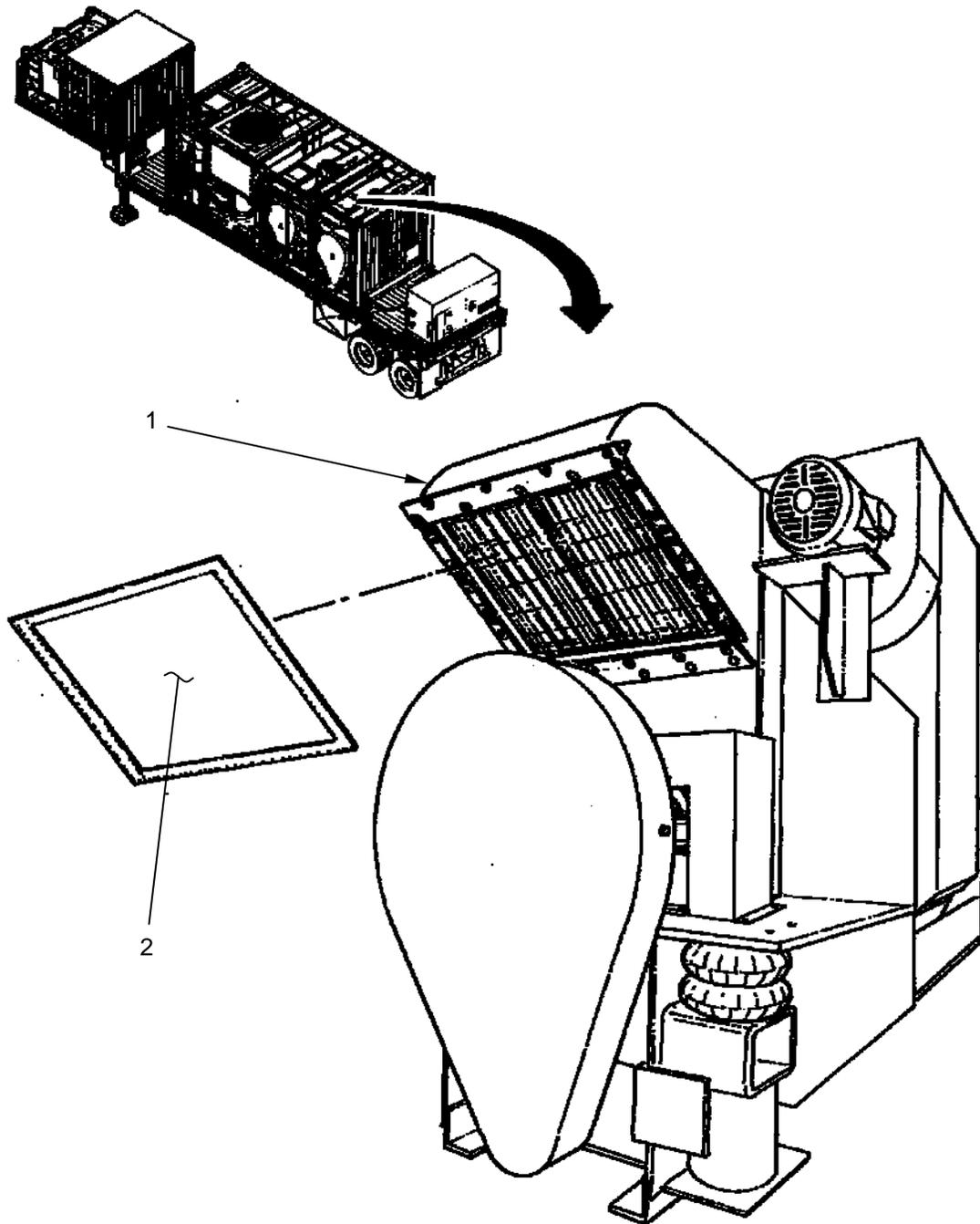


Figure 1. Dryer Inlet Screen.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
DRUM ASSEMBLY A & DRUM ASSEMBLY B
DRYER OUTLET GUARD
SERVICE**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Folding (WP 0066, Table 1, Item 12)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

LADS power shut off at main control enclosure (WP 0014, Model C or WP 0015, Model D).

Cooldown Cycle Complete (WP 0014, Model C or WP 0015, Model D)

SERVICE**Dryer Outlet Guard****WARNING**

Dryer blower fan blades are sharp. Ensure power is removed from LADS prior to removing guard. Never spin fan blades by hand. Failure to follow this precaution could result in serious injury. Seek immediate medical attention if injury occurs.

1. Loosen two knobs (Figure 1, Item 1), then remove guard (Figure 1, Item 2) from dryer duct (Figure 1, Item 3).
2. Remove any lint buildup on guard (Figure 1, Item 2), dryer duct (Figure 1, Item 3), and fan blades (Figure 1, Item 5).
3. Insert guard (Figure 1, Item 2) into gussets (Figure 1, Item 4) on dryer duct (Figure 1, Item 3), then tighten two knobs (Figure 1, Item 1).

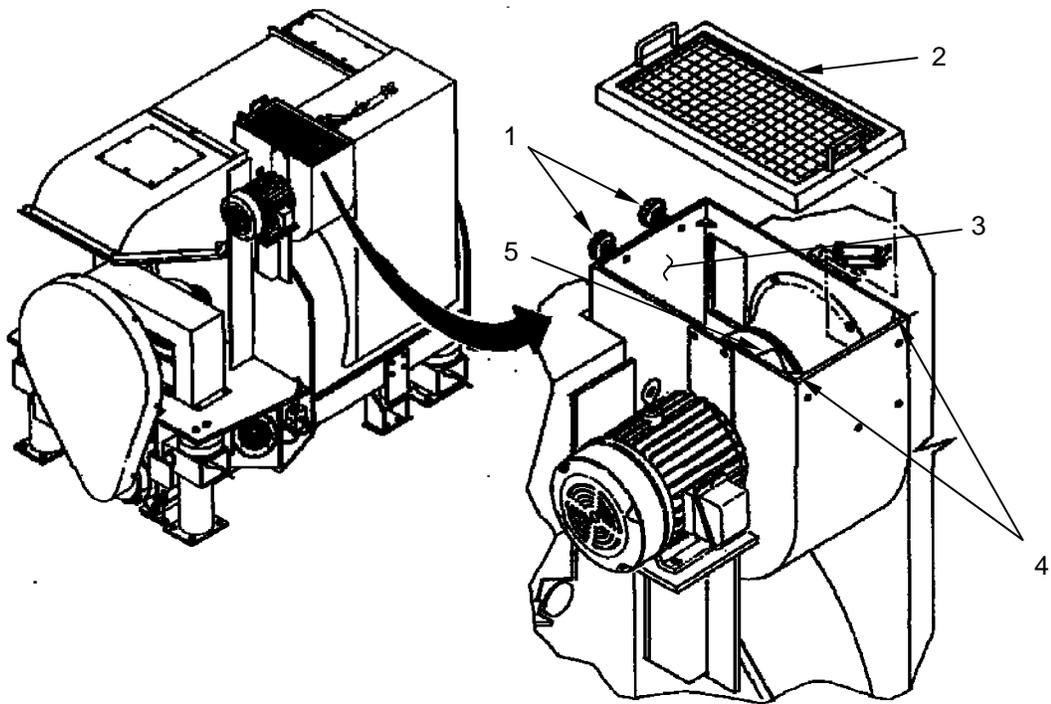


Figure 1. Dryer Outlet Guard.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
LINT FILTER ASSEMBLY
DRYER LINT FILTER
SERVICE**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

References

WP 0049

Equipment ConditionsCooldown Cycle Complete (WP 0014, Model C or WP
0015, Model D)

SERVICE**Dryer Lint Filter**

1. Unlock latches (Figure 1, Item 5).
2. Slide lint filters (Figure 1, Item 3) out of dryer ducting (Figure 1, Item 1).
3. Brush lint off of lint filters (Figure 1, Item 3).
4. Inspect lint filters (Figure 1, Item 3) for tears or obvious damage. Replace if torn or damaged (WP 0049).
5. Inspect gaskets (Figure 1, Item 2) on back side of lint filters (Figure 1, Item 3) for tears or obvious damage. Notify maintenance if torn or damaged.
6. Reinstall lint filters (Figure 1, Item 3) with direction arrow (Figure 1, Item 4) pointing up.
7. Engage latches (Figure 1, Item 5) to secure lint filters (Figure 1, Item 3).

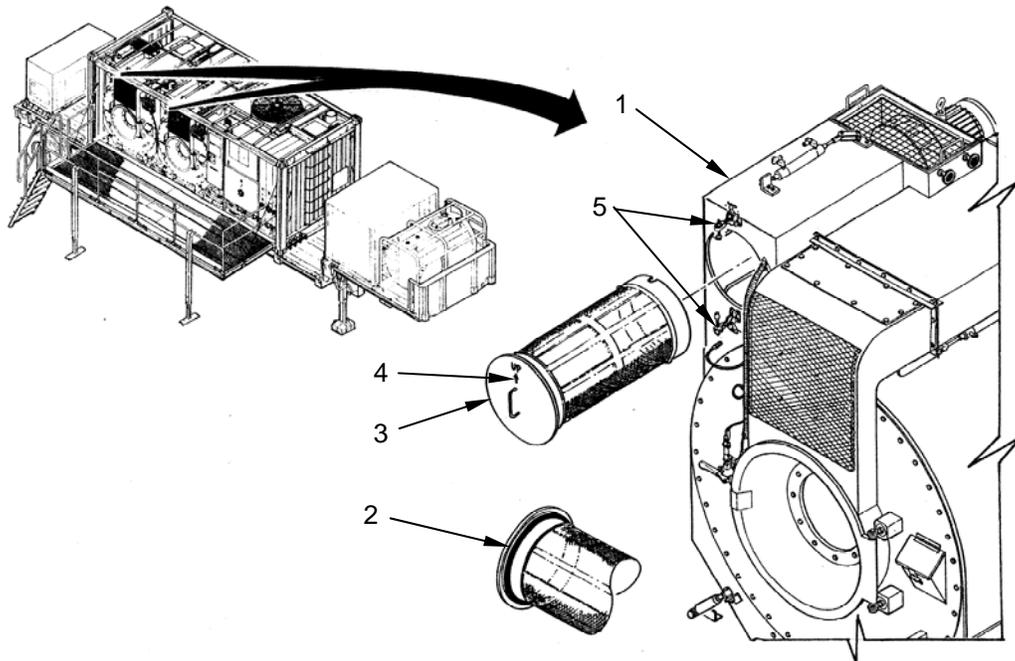


Figure 1. Dryer Lint Filter.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
LINT FILTER ASSEMBLY
DRYER LINT FILTER
REPLACE**

INITIAL SETUP:**Materials/Parts**

Filter, Lint, Drying (WP 0068, Table 1, Item 6)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014, Model C or WP 0015, Model D)

References

WP 0048

REPLACE**Dryer Lint Filter Removal**

1. Remove lint filter from drum (WP 0048).
2. Loosen two clamps (Figure 1, Item 2) and slide off of frame (Figure 1, Item 4).
3. Slide filter element (Figure 1, Item 3) off of frame (Figure 1, Item 4).

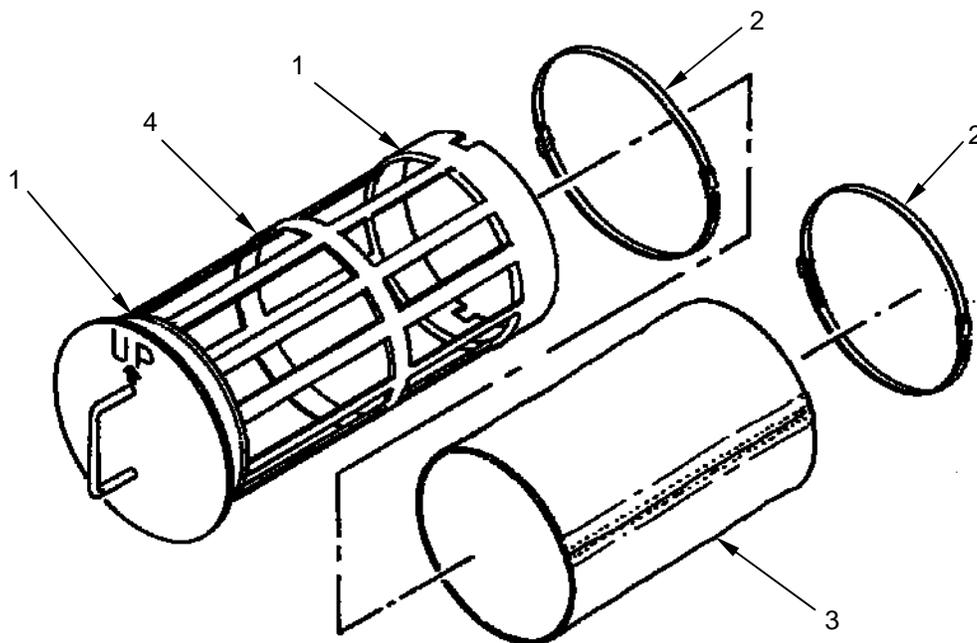


Figure 1. Dryer Lint Filter.

END OF TASK

REPLACE-CONTINUED**Dryer Lint Filter Installation**

1. Slide new filter element (Figure 1, Item 3) onto frame (Figure 1, Item 4).
2. Slide two clamps (Figure 1, Item 2) over filter element (Figure 1, Item 3).
3. Tighten two clamps (Figure 1, Item 2) ensuring clamps are seated in grooves (Figure 1, Item 1) on frame (Figure 1, Item 4).
4. Install lint filter into drum (WP 0048).

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
PUMP ASSEMBLY, WATER A & PUMP ASSEMBLY, WATER B
SERVICE**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

SERVICE**Water Pump**

1. Open manual valve (Figure 1, Item 3) on water pump (Figure 1, Item 4)
2. Allow water to drain then close manual valve (Figure 1, Item 3).
3. Loosen clamping knobs (Figure 1, Item 2) securing cover (Figure 1, Item 1) to pump housing (Figure 1, Item 5).
4. Rotate cover (Figure 1, Item 1) to clear clamping knobs (Figure 1, Item 2) then remove cover.
5. Pull strainer (Figure 1, Item 7) out of pump housing (Figure 1, Item 5).
6. Remove gasket (Figure 1, Item 6) from pump housing (Figure 1, Item 5).

CAUTION

Do not attempt to remove debris from strainer by striking it against a solid object. Doing so will cause strainer to go out-of-round and prevent re-installation into pump housing.

NOTE

Remove debris stuck in mesh of strainer from the inside. Trying to pull debris through the mesh from the outside is harder and causes debris to get stuck.

7. Remove debris from inside strainer (Figure 1, Item 7).
8. Rinse strainer (Figure 1, Item 7) with water to remove all loose debris.
9. Rinse cover (Figure 1, Item 1) and gasket (Figure 1, Item 6) with water to remove all loose debris.
10. Inspect strainer (Figure 1, Item 7) and gasket (Figure 1, Item 6) for obvious damage. Replace if damaged.
11. Insert strainer (Figure 1, Item 7) into pump housing (Figure 1, Item 5).
12. Place gasket (Figure 1, Item 6) in groove on pump housing (Figure 1, Item 5).
13. Install cover (Figure 1, Item 1) and rotate under clamping knobs (Figure 1, Item 2).
14. Hold cover (Figure 1, Item 1) in place, then evenly hand-tighten clamping knobs (Figure 1, Item 2).

SERVICE-CONTINUED

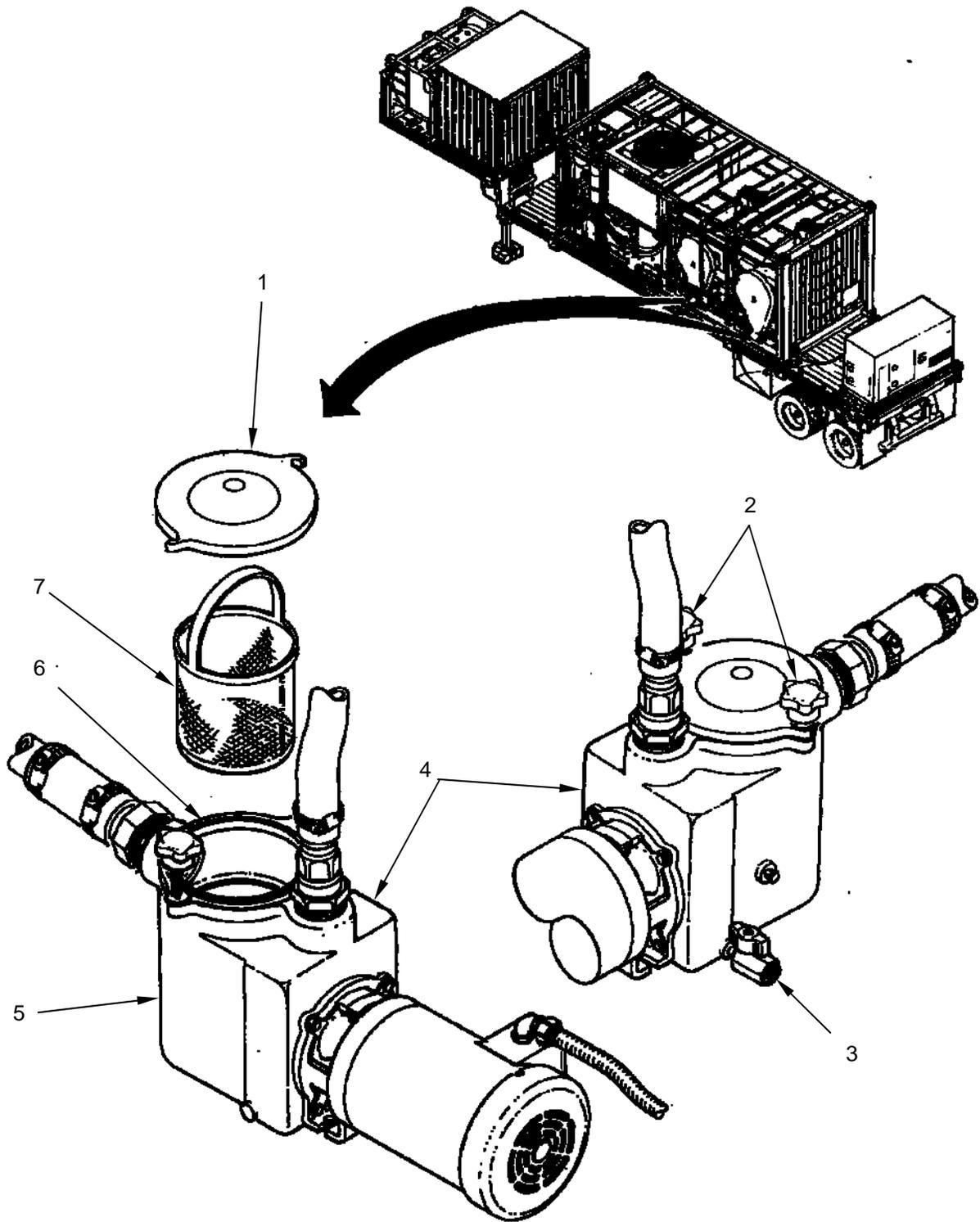


Figure 1. Water Pump and Strainer.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TANK ASSEMBLY
SERVICE
LADS MODEL C**

INITIAL SETUP:

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Drain Cycle Complete (WP 0016)

References

WP 0012

WP 0050

SERVICE

Water Tank

NOTE

LADS control system contains a FLUSH TANKS/DRUM mode that automatically turns on the external water supply pump and opens the water control valves under the water tanks and at the inlet and outlet of both drums. Once the water tank sight glasses are removed or the drum doors are opened these areas may be flushed utilizing the utility hose. This mode of operation will only work when the system has been properly drained.

1. Perform a Drain Cycle following the steps for Starting Drain Cycle (WP 0016) as if you were draining to change dirty water.
2. After system is draining is completed skip Completing Drain Cycle and perform a System Shutdown per WP 0016.
3. Perform a System Start-up and Pressurize Air System per WP 0012.
4. Wait for air system to pressurize then monitor display (Figure 1), it should read:

WATER LEVEL LOW	FILL TANKS OVERRIDE FILLING FLUSH TANKS/DRUM EXAMINE INPUTS
------------------------	--

Figure 1. Water Level Low Display.

5. Press menu selection switch to FLUSH TANKS/DRUM.
6. Monitor display (Figure 2) it should read:

FLUSH TANKS/DRUM	EXIT
-------------------------	-------------

Figure 2. Flush Tanks/Drum Display.

SERVICE-CONTINUED

7. Remove caps (Figure 3, Item 1) and/or pre-wash manifold (Figure 3, Item 2) from manifolds (Figure 3, Item 3).

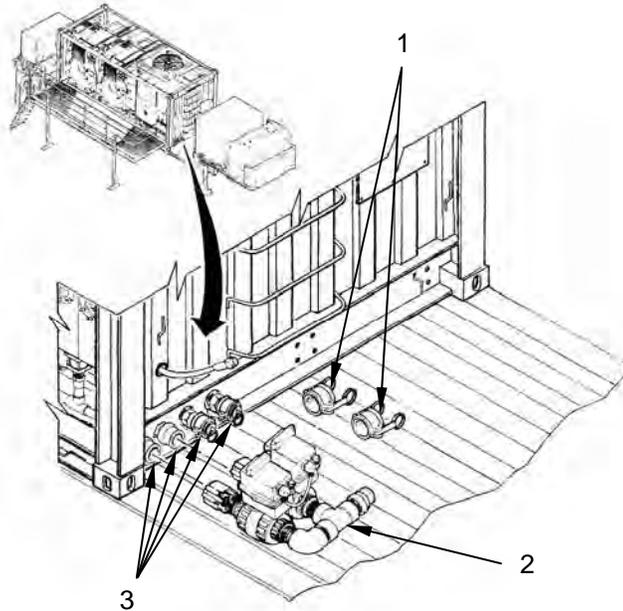


Figure 3. Pre-wash Manifold.

8. Gain access to wash tank A (Figure 4, Item 4) as follows:

CAUTION

Be careful when handling sight glass. Sight glass will shatter if dropped on edge

- a. Remove six wing nuts (Figure 4, Item 6), lock washers (Figure 4, Item 7), and flat washers (Figure 4, Item 8).
 - b. Remove ring (Figure 4, Item 9), sight glass (Figure 4, Item 11), and gaskets (Figure 4, Items 10 and 12).
 - c. Set aside all loose parts for re-installation after tanks are cleaned.
9. Clean and rinse out wash tank A (Figure 4, Item 4) with water.
10. Clean and rinse off sight glass (Figure 4, Item 11) and gaskets (Figure 4, Items 10 and 12).
11. Ensure all debris and dirt is removed from sealing area (Figure 4, Item 5).

SERVICE-CONTINUED

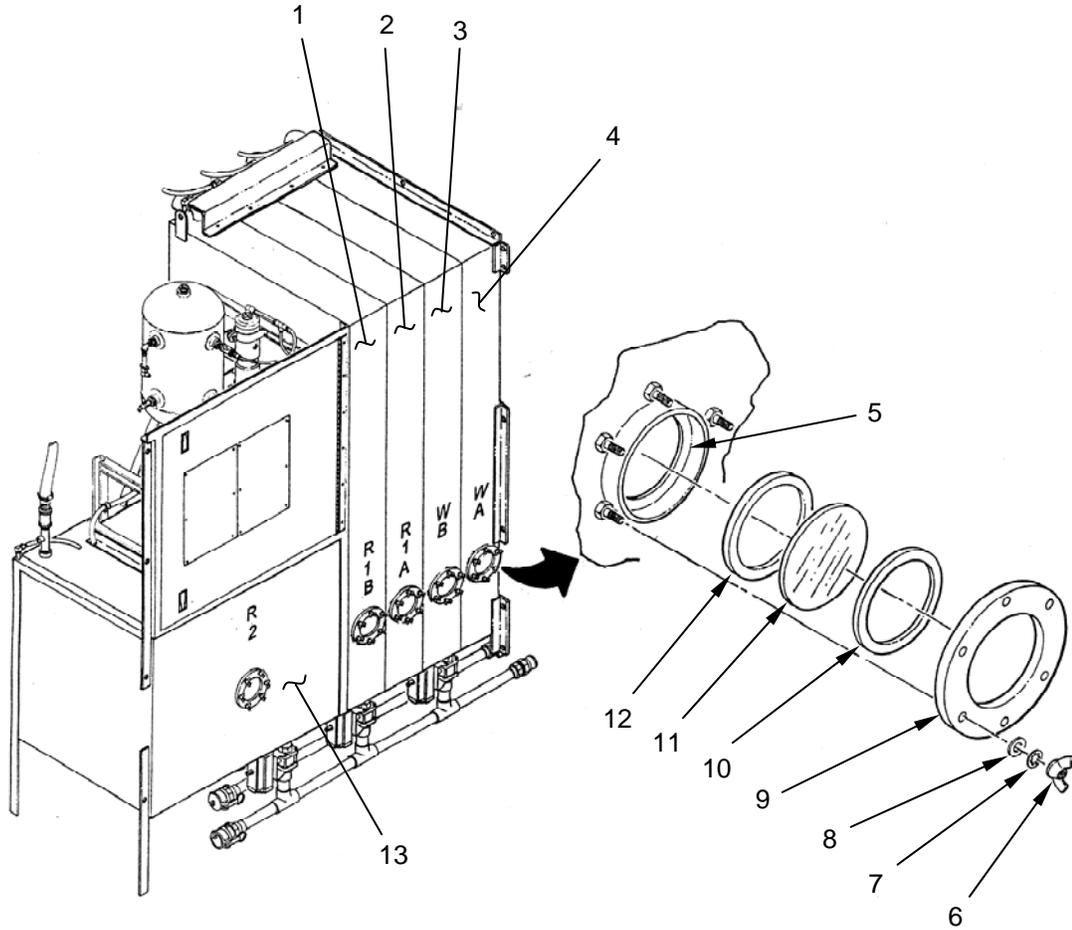


Figure 4. Water Tank Sight Glass Assembly.

SERVICE-CONTINUED

12. Close-out wash tank A (Figure 4, Item 4) as follows:

CAUTION

Be careful when installing sight glass not to pinch or cut gasket on tank sealing area. A damaged gasket will cause water leakage around sight glass.

NOTE

Installation of sight glass requires the sight glass, gaskets, and ring be held in place while attaching hardware is installed.

Wing nuts must be tightened evenly to ensure pressure is applied equally around sight glass.

- a. Place first gasket (Figure 4, Item 12) on sealing area (Figure 4, Item 5), then place sight glass (Figure 4, Item 11) and second gasket (Figure 4, Item 10) on top.
- b. Install ring (Figure 4, Item 9) over sight glass (Figure 4, Item 11).
- c. Loosely install six flat washers (Figure 4, Item 8), lock washers (Figure 4, Item 7), and wing nuts (Figure 4, Item 6).
- d. Ensure outer gasket (Figure 4, Item 10) is inside of sealing area (Figure 4, Item 5).
- e. Evenly hand-tighten wing nuts (Figure 4, Item 6) until ring (Figure 4, Item 9) contacts sealing area (Figure 4, Item 5).

13. Clean wash tank B (Figure 4, Item 3) following steps 8 through 12.

14. Clean rinse 1 tank A (Figure 4, Item 2) following steps 8 through 12.

15. Clean rinse 1 tank B (Figure 4, Item 1) following steps 8 through 12.

16. Clean rinse 2 tank (Figure 4, Item 13) following steps 8 through 12.

NOTE

Debris and dirt rinsed out of water tanks will either flow to manifold drains or towards water pumps depending on the slope of the terrain.

17. Rinse all debris and dirt from area where manifolds (Figure 3, Items 3) drain.

18. Clean and re-install water pump strainers (WP 0050).

19. Install caps (Figure 3, Item 1) and/or pre-wash manifold (Figure 3, Item 2) onto manifolds (Figure 3, Item 3).

20. Monitor display (Figure 5), it should read:

FLUSH TANKS/DRUM	EXIT
-------------------------	-------------

Figure 5. Flush Tanks/Drum Exit Display.

SERVICE-CONTINUED

21. Press menu selection switch to exit FLUSH TANKS/DRUM mode.
22. Monitor display (Figure 6) it should read:

WATER LEVEL LOW	FILL TANKS OVERRIDE FILLING FLUSH TANKS/DRUM EXAMINE INPUTS
------------------------	--

Figure 6. Water Level Low Display.

23. Select FILL TANKS menu selection switch to fill all the water tanks to proper level or perform System Shutdown (WP 0016).

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
TANK ASSEMBLY
SERVICE
LADS MODEL D**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Drain Cycle Complete (WP 0017)

References

WP 0013

WP 0050

SERVICE**Water Tank****NOTE**

LADS control system contains a CLEAN WATER TANKS mode that automatically turns on the external water supply pump and opens the water control valves under the water tanks and at the inlet and outlet of both drums. Once the water tank sight glasses are removed or the drum doors are opened these areas may be flushed utilizing the utility hose. This mode of operation will only work when the system has been properly drained.

1. Perform a Drain Cycle following the steps for Starting Drain Cycle (WP 0017) as if you were draining to change dirty water.
2. After system draining is complete skip Completing Drain Cycle and perform a System Shutdown per WP 0017.
3. Perform a System Start-up per WP 0013, stopping at step 13.
4. Wait for air system to pressurize then monitor display (Figure 1), it should read:

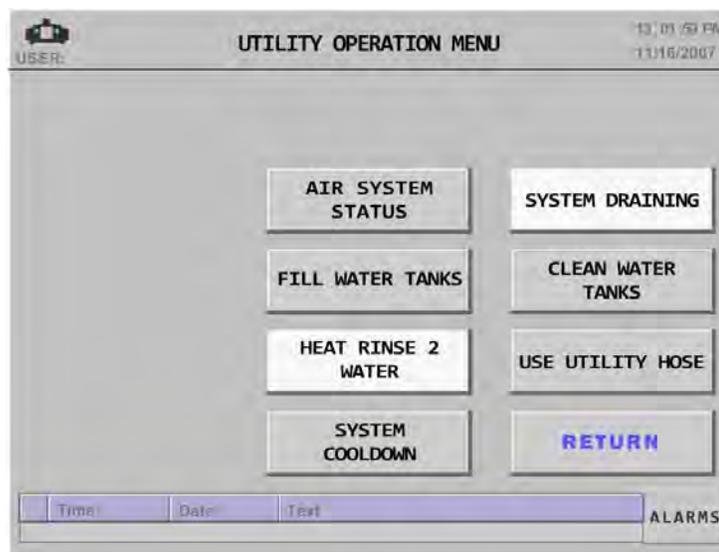


Figure 1. Utility Operation Menu.

5. Press menu selection CLEAN WATER TANKS.

SERVICE-CONTINUED

6. Monitor display (Figure 2), it should read:

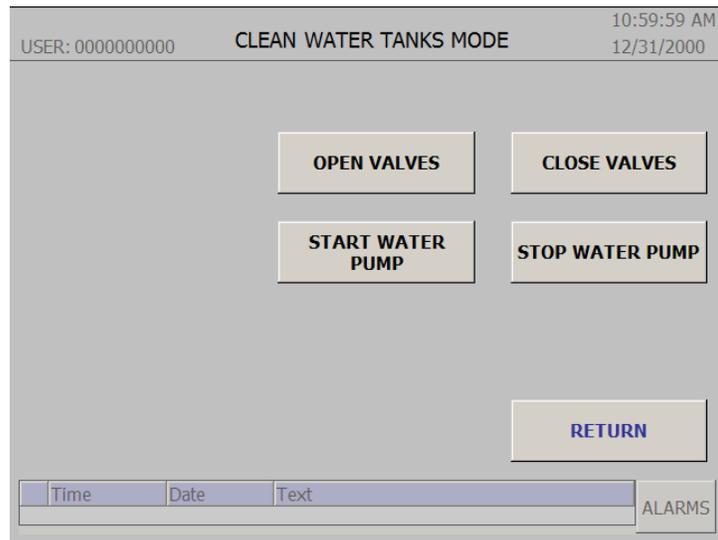


Figure 2. Flush Tanks/Drum Display.

7. Remove caps (Figure 3, Item 1) and/or pre-wash manifold (Figure 3, Item 2) from manifolds (Figure 3, Item 3).

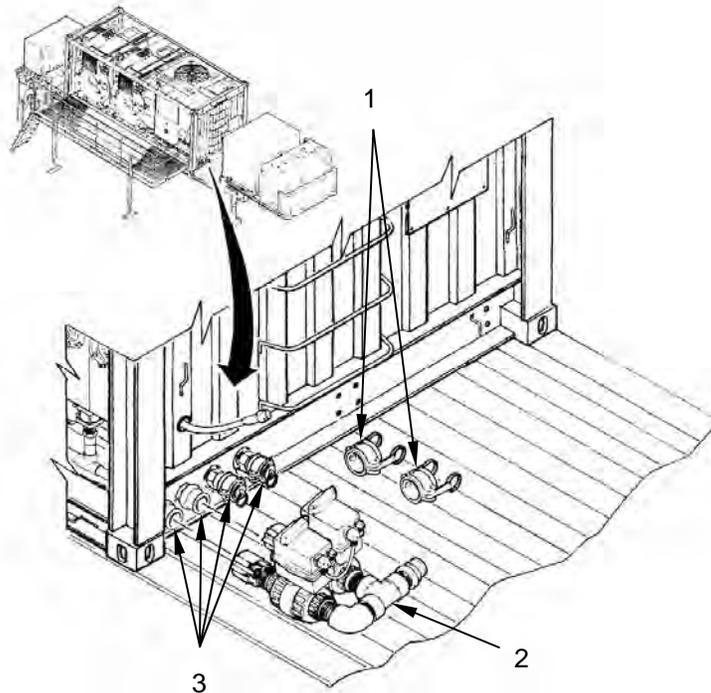


Figure 3. Pre-wash Manifold.

8. On HMI press menu selection OPEN VALVES, then press START WATER PUMP.

SERVICE-CONTINUED

9. Gain access to wash tank A (Figure 4, Item 4) as follows:

CAUTION

Be careful when handling sight glass. Sight glass will shatter if dropped on edge.

- a. Remove six wing nuts (Figure 4, Item 6), lock washers (Figure 4, Item 7), and flat washers (Figure 4, Item 8).
 - b. Remove ring (Figure 4, Item 9), sight glass (Figure 4, Item 11), and gaskets (Figure 4, Items 10 and 12).
 - c. Set aside all loose parts for re-installation after tanks are cleaned.
10. Clean and rinse out wash tank A (Figure 4, Item 4) with water.
11. Clean and rinse off sight glass (Figure 4, Item 11) and gaskets (Figure 4, Items 10 and 12).
12. Ensure all debris and dirt is removed from sealing area (Figure 4, Item 5).

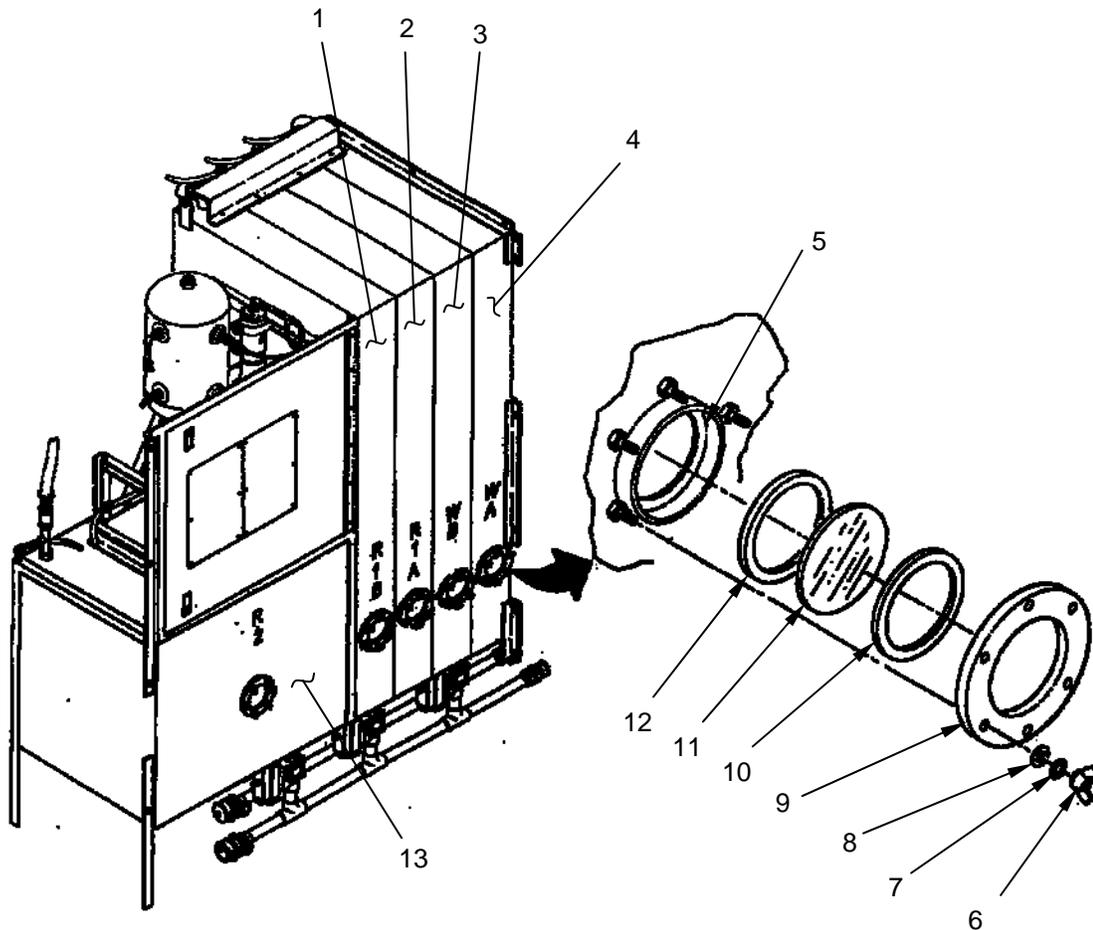


Figure 4. Water Tank Sight Glass Assembly.

SERVICE-CONTINUED

13. Close-out wash tank A (Figure 4, Item 4) as follows:

CAUTION

Be careful when installing sight glass not to pinch or cut gasket on tank sealing area. A damaged gasket will cause water leakage around sight glass.

NOTE

Installation of sight glass requires the sight glass, gaskets, and ring be held in place while attaching hardware is installed.

Wing nuts must be tightened evenly to ensure pressure is applied equally around sight glass.

- a. Place first gasket (Figure 4, Item 12) on sealing area (Figure 4, Item 5), then place sight glass (Figure 4, Item 11) and second gasket (Figure 4, Item 10) on top.
 - b. Install ring (Figure 4, Item 9) over sight glass (Figure 4, Item 11).
 - c. Loosely install six flat washers (Figure 4, Item 8), lock washers (Figure 4, Item 7), and wing nuts (Figure 4, Item 6)
 - d. Ensure outer gasket (Figure 4, Item 10) is inside of sealing area (Figure 4, Item 5).
 - e. Evenly hand-tighten wing nuts (Figure 4, Item 6) until ring (Figure 4, Item 9) contacts sealing area (Figure 4, Item 5).
14. Clean wash tank B (Figure 4, Item 3) following steps 9 through 13.
15. Clean rinse 1 tank A (Figure 4, Item 2) following steps 9 through 13.
16. Clean rinse 1 tank B (Figure 4, Item 1) following steps 9 through 13.
17. Clean rinse 2 tank (Figure 4, Item 13) following steps 9 through 13.

NOTE

Debris and dirt rinsed out of water tanks will either flow to manifold drains or towards water pumps depending on the slope of the terrain.

18. Rinse all debris and dirt from area where manifolds (Figure 3, Items 2, 3, 4, and 7) drain.
19. Clean and re-install water pump strainers (WP 0050).
20. Install caps (Figure 3, Item 1) and/or pre-wash manifold (Figure 3, Item 2) onto manifolds (Figure 3, Item 3).

SERVICE-CONTINUED

21. On HMI (Figure 5) press menu selection STOP WATER PUMP, then press CLOSE VALVES.

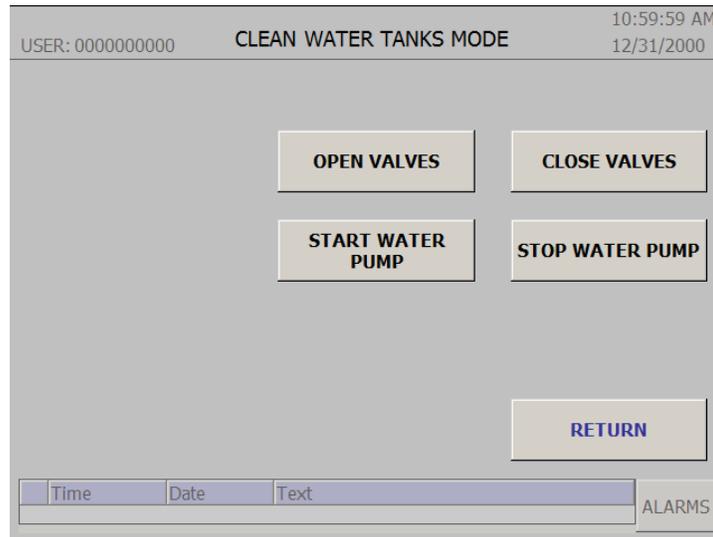


Figure 5. Clean Water Tanks Mode Menu.

22. Press RETURN to exit CLEAN WATER TANKS MODE.

23. Monitor display (Figure 6) it should read:

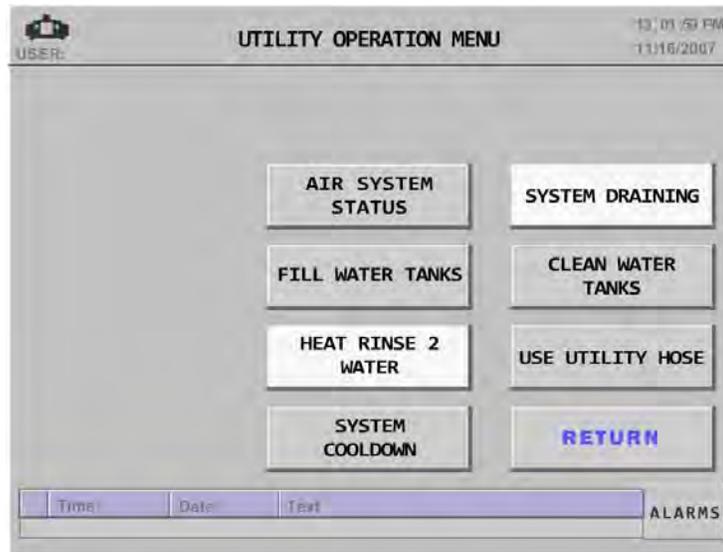


Figure 6. Water Level Low Display.

24. Press FILL TANKS to fill all the water tanks to proper level or perform System Shutdown (WP 0017).

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
STILL ASSEMBLY
SERVICE**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Extension (WP 0066, Table 1, Item 12)
Drum, Metal, 55 Gallon, 16 Gauge (WP 0066, Table 2, Item 3)
Rake, Still (WP 0066, Table 1, Item 19)

Materials/Parts

Rag Wiping

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014,
Model C or WP 0015, Model D)

References

WP 0058

SERVICE**Still Assembly****WARNING**

Still can reach temperatures near 220 °F when operating. Make sure cooldown cycle has been run prior to performing maintenance. Be aware that temperature of water inside still may be near 180 °F even after cooldown cycle is finished. Stand clear of door when opening. Avoid contact with hot surfaces. Wear impermeable gloves and goggles for protection. Failure to follow this precaution could result in severe burn injuries. Seek immediate medical attention if injury occurs.

1. Place an empty 55-gallon container (Figure 1, Item 1) below still (Figure 1, Item 2).
2. Connect 5-ft drain hose (Figure 1, Item 12) to still (Figure 1, Item 2). Place hose in container.
3. Open drain valve (Figure 1, Item 13) on side of still (Figure 1, Item 2) where hose (Figure 1, Item 12) is connected.
4. Wait for still (Figure 1, Item 2) to drain (approximately 40 gallons).
5. Install sluice tray (Figure 1, Item 10) under still (Figure 1, Item 2) then connect two lanyards (Figure 1, Item 6).
6. Open doors (Figure 1, Item 9) on still (Figure 1, Item 2) as follows:
 - a. Loosen clamping knobs (Figure 1, Item 5), but do not pivot off of doors (Figure 1, Item 9).
 - b. Pull doors (Figure 1, Item 9) outward and allow any residual water to drain into sluice tray (Figure 1, Item 10).
 - c. Pivot clamping knobs (Figure 1, Item 5) off of door arms (Figure 1, Item 4) and swing doors (Figure 1, Item 9) open.
7. Use rake (Figure 1, Item 11) to scrape residue out of still (Figure 1, Item 2) into container (Figure 1, Item 1).
8. Use rake (Figure 1, Item 11) to brush residue off of heat plates (Figure 1, Item 7).

SERVICE-CONTINUED

9. Rinse inside of still (Figure 1, Item 2) with water until all residue is removed. Repeat steps 7 and 8 if necessary.
10. Rinse and wipe off door gaskets (Figure 1, Item 8) and door openings of still (Figure 1, Item 2) to remove any residue.
11. Rinse and wipe off sluice tray (Figure 1, Item 10) and rake (Figure 1, Item 11).
12. Disconnect lanyards (Figure 1, Item 6) then remove sluice tray (Figure 1, Item 10).
13. Rinse entire area around still to remove any residue.
14. Close drain valve (Figure 1, Item 13).
15. Remove hose (Figure 1, Item 12) from container and disconnect hose from still (Figure 1, Item 2). When container is full, place cover to container and dispose of container contents per local regulations.
16. Inspect surface of door gaskets (Figure 1, Item 8) for cuts or tears. Replace if damaged (WP 0058).
17. Close doors (Figure 1, Item 9) as follows:
 - a. Swing doors (Figure 1, Item 9) closed and insert into openings on still (Figure 1, Item 2).
 - b. Pivot and push doors (Figure 1, Item 9) until they seat tight against still (Figure 1, Item 2).
 - c. Pivot clamping knobs (Figure 1, Item 5) onto door arms (Figure 1, Item 4).
 - d. Hand-tighten clamping knobs (Figure 1, Item 5) until gasket compression is felt, then tighten two more turns.
18. Stroke hand pump (Figure 1, Item 3) one time to inject anti-foam into still (Figure 1, Item 2).

SERVICE-CONTINUED

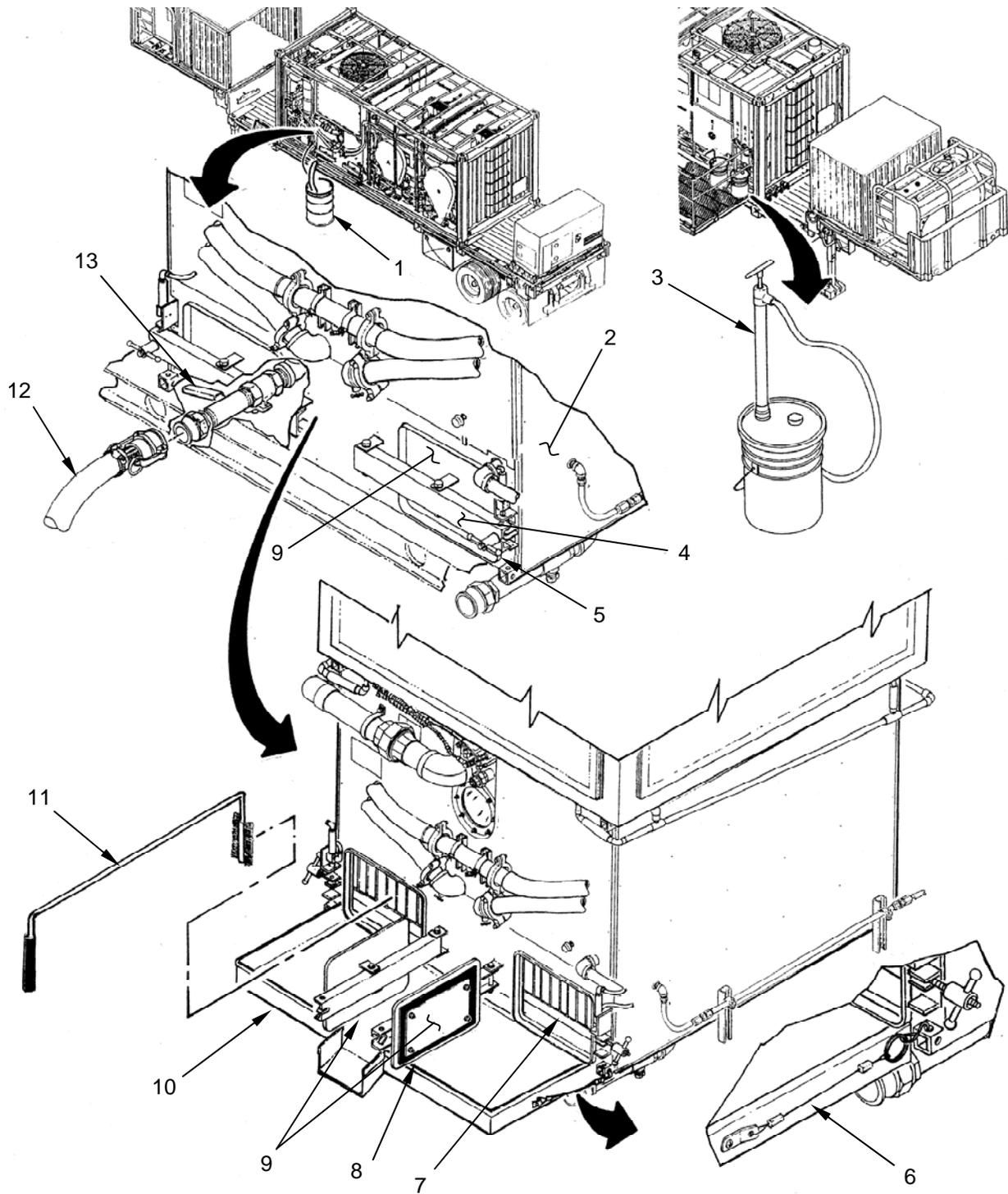


Figure 1. Still Assembly.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
STILL CONDENSER ASSEMBLY
HEAT EXCHANGER INLET SCREEN
SERVICE**

INITIAL SETUP:**Tools and Special Tools**

Ladder, Extension (WP 0066, Table 1, Item 12)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014,
Model C or WP 0015, Model D)

SERVICE**Heat Exchanger Inlet Screen****WARNING**

Keep hands and fingers away from hinge points on ladder halves when opening and closing. Keep hands and fingers away from inner and outer rungs of ladder when adjusting. Never climb on ladder unless knobs and locking devices are properly tightened, footings are placed securely on the ground and/or ladder is placed securely upon the LADS. Failure to observe this precaution may result in severe personal injury. Seek immediate medical attention if injury occurs.

1. Remove rear screen (Figure 1, Item 5) from still condenser (Figure 1, Item 1).
2. Slide side screens (Figure 1, Item 2) out of tracks (Figure 1, Item 4).
3. Remove tracks (Figure 1, Item 3) from screens (Figure 1, Item 2).
4. Clean, then rinse screens (Figure 1, Item 2 and 5) with water until all debris is removed.
5. Inspect screens (Figure 1, Item 2 and 5) for tears or obvious damage. Replace if torn or damaged.
6. Reinstall tracks (Figure 1, Item 3) onto screens (Figure 1, Item 2).
7. Slide side screens (Figure 1, Item 2) into tracks (Figure 1, Item 4).
8. Reinstall screen (Figure 1, Item 5).

SERVICE-CONTINUED

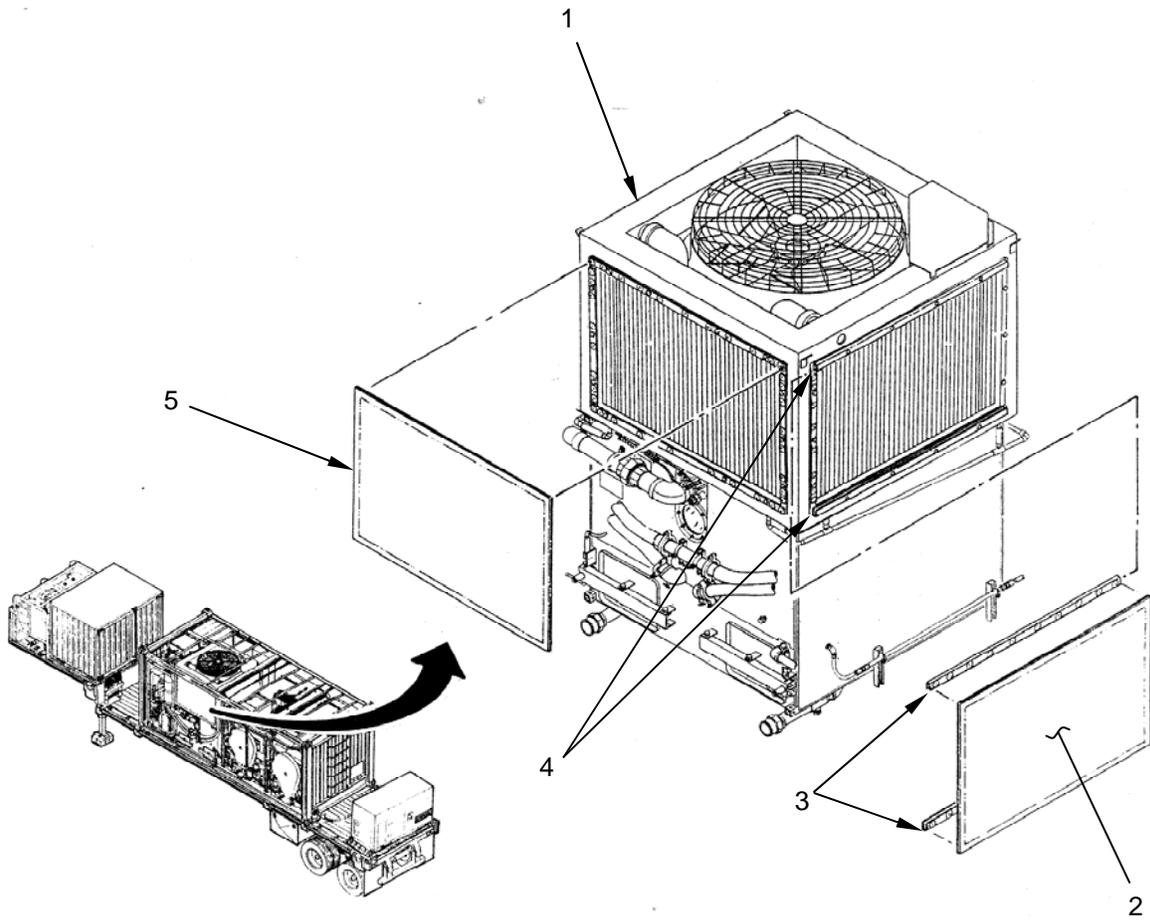


Figure 1. Heat Exchanger Inlet Screens.

END OF TASK

END OF WORK PACKAGE

**CREW MAINTENANCE
STILL CONDENSER ASSEMBLY
SUBCOOLER AIR INLET SCREEN
SERVICE**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014, Model C or WP 0015, Model D)

SERVICE**Subcooler Air Inlet Screen**

1. Remove screen (Figure 1, Item 3) from subcooler (Figure 1, Item 1) being careful not to tear screen on manual valves (Figure 1, Item 2).
2. Clean, then rinse screen (Figure 1, Item 3) with water until all debris is removed.
3. Inspect screen (Figure 1, Item 3) for tears or obvious damage. Replace if torn or damaged.
4. Reinstall screen (Figure 1, Item 3) onto subcooler (Figure 1, Item 1).

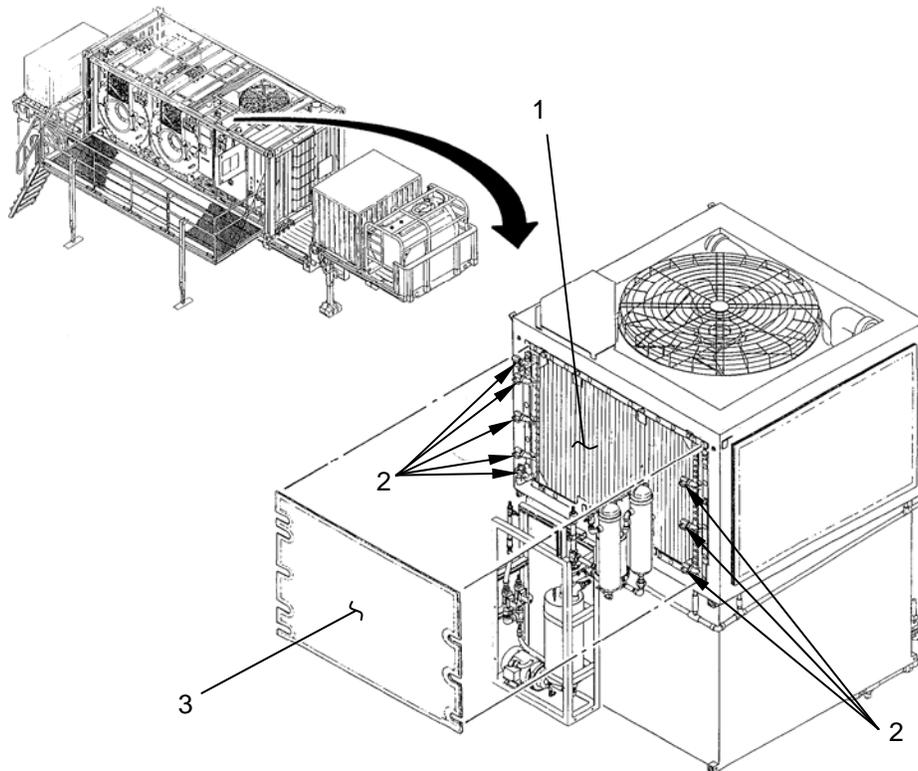


Figure 1. Subcooler Air Inlet Screen.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
DISTILLATE ASSEMBLY
COALESCER FILTER CARTRIDGE
REPAIR**

INITIAL SETUP:**Materials/Parts**

Filter, Element, Fluid, Coalescing Filter (WP 0068, Table 1, Item 5)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

REPAIR**Coalescer Filter Cartridge Removal****WARNING**

Distillate piping can reach temperatures near 200 °F when the water recycle system is operating. Avoid contact with hot surfaces. Wear impermeable gloves and goggles for protection. Failure to follow this precaution could result in severe burn injuries. Seek immediate medical attention if injury occurs.

1. Disengage two latches (Figure 1, Item 1), then open access door (Figure 1, Item 13).
2. Close manual valve (Figure 1, Item 12).
3. Open manual valve (Figure 1, Item 11).
4. Allow water to drain, then close manual valve (Figure 1, Item 11).
5. Push in on end of ring (Figure 1, Item 6), then pull drain tube (Figure 1, Item 5) out of fitting (Figure 1, Item 7).
6. Loosen clamp (Figure 1, Item 9) then separate cover (Figure 1, Item 8) from body (Figure 1, Item 10).
7. Remove and discard cartridge (Figure 1, Item 2) and gasket (Figure 1, Item 4).
8. Rinse inside of cover (Figure 1, Item 8) and body (Figure 1, Item 10) with water.

REPAIR-CONTINUED

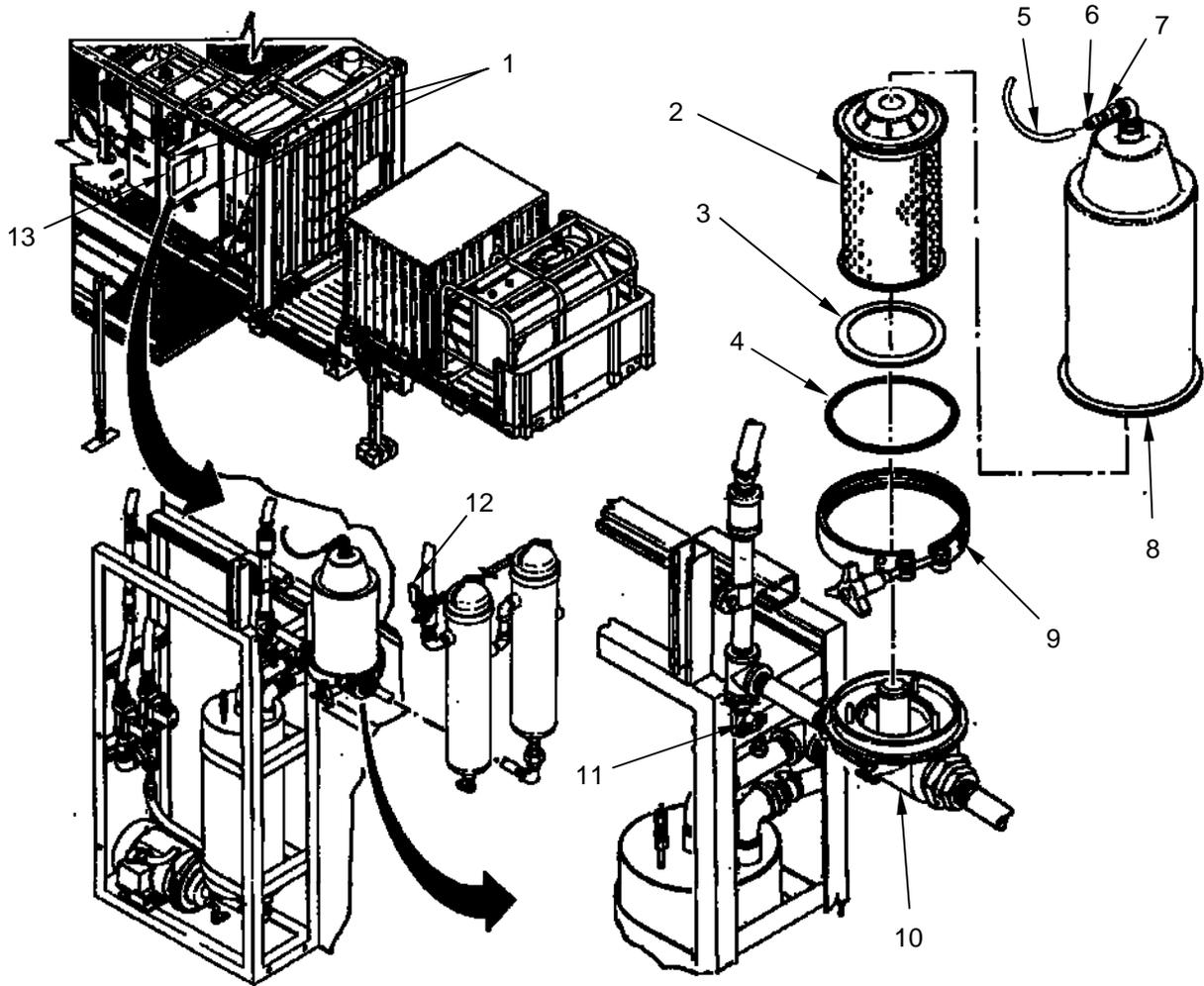


Figure 1. Coalescer and Filter.

END OF TASK

REPAIR-CONTINUED**Coalescer Filter Cartridge Installation****NOTE**

The filter cartridge has a flat gasket installed on the bottom to allow for use on several different model filters. The filter model used on LADS requires that the flat gasket be removed prior to installation.

1. Remove flat gasket (Figure 1, Item 3) from bottom of new cartridge (Figure 1, Item 2) and discard gasket.
2. Install new gasket (Figure 1, Item 4) into body (Figure 1, Item 10).
3. Install cartridge (Figure 1, Item 2) onto body (Figure 1, Item 10).
4. Mate cover (Figure 1, Item 8) with body (Figure 1, Item 10).
5. Install and tighten clamp (Figure 1, Item 9).
6. Push drain tube (Figure 1, Item 5) back into fitting (Figure 1, Item 7).
7. Open manual valve (Figure 1, Item 12).
8. Close access door (Figure 1, Item 13) and secure by engaging two latches (Figure 1, Item 1).

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
HOUSING, BAG-FILTER
PRE-FILTER BAG
REPAIR**

INITIAL SETUP:**Materials/Parts**

Filter, Bag, 5 Micron (WP 0068, Table 1, Item 3)

Filter, Bag, 10 Micron (WP 0068, Table 1, Item 4)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

REPAIR**Pre-Filter Bag Removal****WARNING**

Distillate piping can reach temperatures near 200 °F when the water recycle system is operating. Avoid contact with hot surfaces. Wear impermeable gloves and goggles for protection. Failure to follow this precaution could result in severe burn injuries. Seek immediate medical attention if injury occurs.

NOTE

The procedures for replacing the first and second stage pre-filters are the same except where noted.

1. Disengage two latches (Figure 1, Item 1), then open access door (Figure 1, Item 12).
2. Close manual valve (Figure 1, Item 11).
3. Open manual valve (Figure 1, Item 9) to drain first stage pre-filter (Figure 1, Item 8) or manual valve (Figure 1, Item 10) for second-stage pre-filter (Figure 1, Item 7).
4. Allow water to drain from pre-filter (Figure 1, Item 8) or (Figure 1, Item 7) then close manual valve (Figure 1, Item 9) or (Figure 1, Item 10).
5. Loosen clamp (Figure 1, Item 3) then separate cover (Figure 1, Item 2) from housing (Figure 1, Item 5).
6. Remove gasket (Figure 1, Item 4) from housing (Figure 1, Item 5).
7. Remove and discard bag filter (Figure 1, Item 6).
8. Rinse cover (Figure 1, Item 2) and gasket (Figure 1, Item 3) with water.
9. Inspect gasket (Figure 1, Item 4) for cuts or tears. Replace if damaged.

REPAIR-CONTINUED

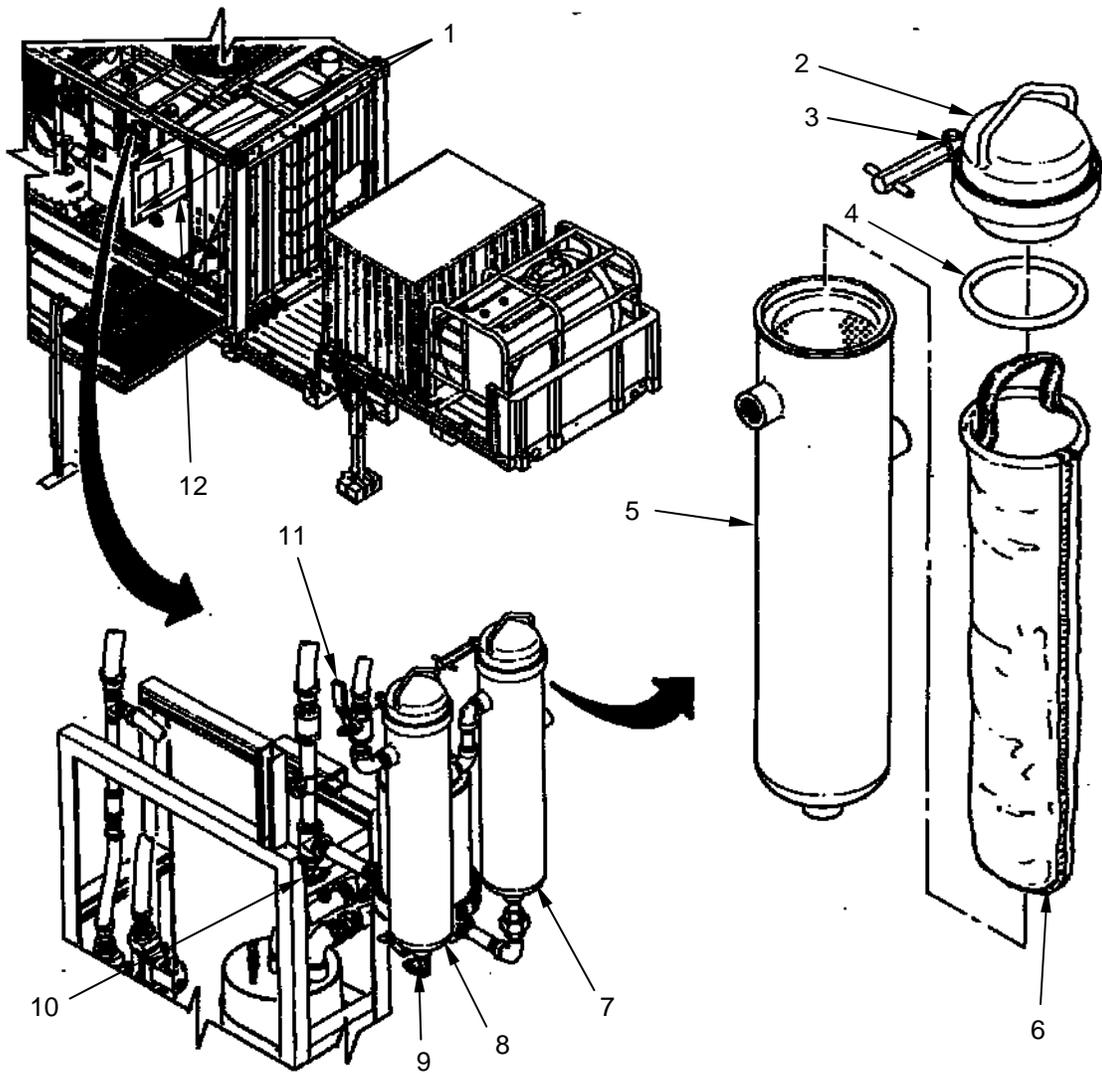


Figure 1. Pre-Filter Bag.

END OF TASK

REPAIR-CONTINUED**Pre-Filter Bag Installation**

1. Insert new bag filter (Figure 1, Item 6) into housing (Figure 1, Item 5).
2. Install gasket (Figure 1, Item 4) onto cover (Figure 1, Item 2).
3. Mate cover (Figure 1, Item 2) with housing (Figure 1, Item 5).
4. Install and tighten clamp (Figure 1, Item 3).
5. Open manual valve (Figure 1, Item 11).
6. Close access door (Figure 1, Item 12) and secure by engaging two latches (Figure 1, Item 1).

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
DOOR ASSEMBLY, STILL
STILL DOOR GASKET
REPAIR**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, Assembly, Operator, (WP 0066, Table 1, Item 11)

Materials/Parts

Gasket, Still Door (WP 0069, Table 1)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

Cooldown Cycle Complete (WP 0014, Model C or WP 0015, Model D)

References

WP 0016

WP 0017

REPAIR**Still Door Gasket Removal**

1. Drain and clean still (WP 0016, C Model or WP 0017, D Model).
2. Remove six nuts (Figure 1, Item 3), lock washers (Figure 1, Item 2), and flat washers (Figure 1, Item 4) securing cover plate (Figure 1, Item 5) to door (Figure 1, Item 7).
3. Remove cover plate (Figure 1, Item 5) and gasket (Figure 1, Item 6) from door (Figure 1, Item 7).

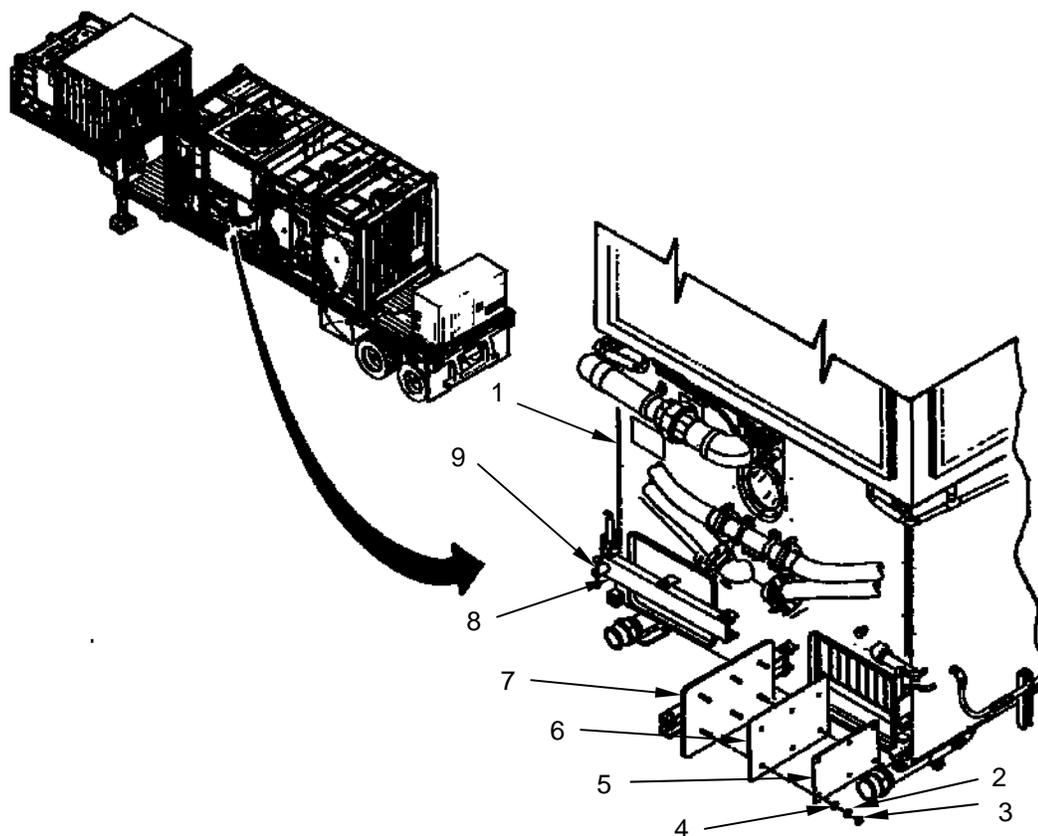


Figure 1. Still Door Assembly.

END OF TASK

REPAIR-CONTINUED**Still Door Gasket Installation**

1. Install new gasket (Figure 1, Item 6) onto door (Figure 1, Item 7).
2. Install cover plate (Figure 1, Item 5) over gasket (Figure 1, Item 6) then secure with six nuts (Figure 1, Item 3), lock washers (Figure 1, Item 2), and flat washers (Figure 1, Item 4).
3. Close door (Figure 1, Item 7) as follows:
 - a. Swing door (Figure 1, Item 7) closed and insert into opening in still (Figure 1, Item 1).
 - b. Pivot and push door (Figure 1, Item 7) until it seats tight against still (Figure 1, Item 1).
 - c. Pivot clamping knobs (Figure 1, Item 9) onto door arms (Figure 1, Item 8).
 - d. Hand-tighten clamping knobs (Figure 1, Item 9) until gasket compression is felt, then tighten two more turns.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
HEATER ASSEMBLY
HEATER AIR INLET FILTER
SERVICE**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

SERVICE**Heater Air Inlet Filter Service**

1. Slide filter (Figure 1, Item 1) out of track (Figure 1, Item 2).
2. Clean and rinse filter (Figure 1, Item 1) with water.
3. Inspect filter (Figure 1, Item 1) for damage to screen mesh (Figure 1, Item 3) or frame (Figure 1, Item 4). Replace if necessary.
4. Slide filter (Figure 1, Item 1) into track (Figure 1, Item 2) with direction arrow (Figure 1, Item 5) pointing towards heater inlet.

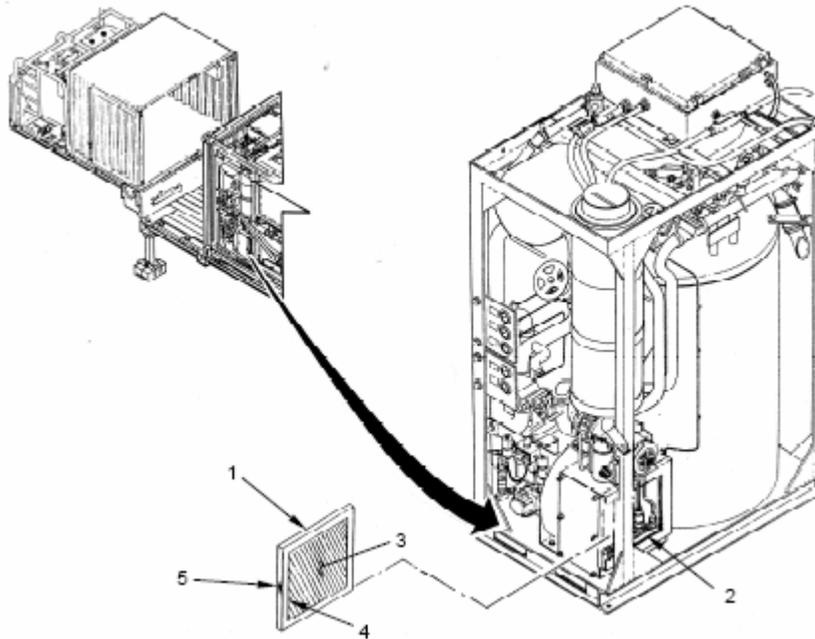


Figure 1. Heater Air Inlet Filter.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
AIR SYSTEM ASSEMBLY
AIR INLET FILTER
REPAIR**

INITIAL SETUP:**Materials/Parts**

Filter, Assembly (WP 0069, Table 1)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment ConditionsLADS power shut off at main control enclosure
(WP 0014, Model C or WP 0015, Model D).**REPAIR****Air Inlet Filter Removal**

1. Disengage two latches (Figure 1, Item 4), then open access door (Figure 1, Item 1).
2. Unthread inlet filter (Figure 1, Item 2) from compressor (Figure 1, Item 3).

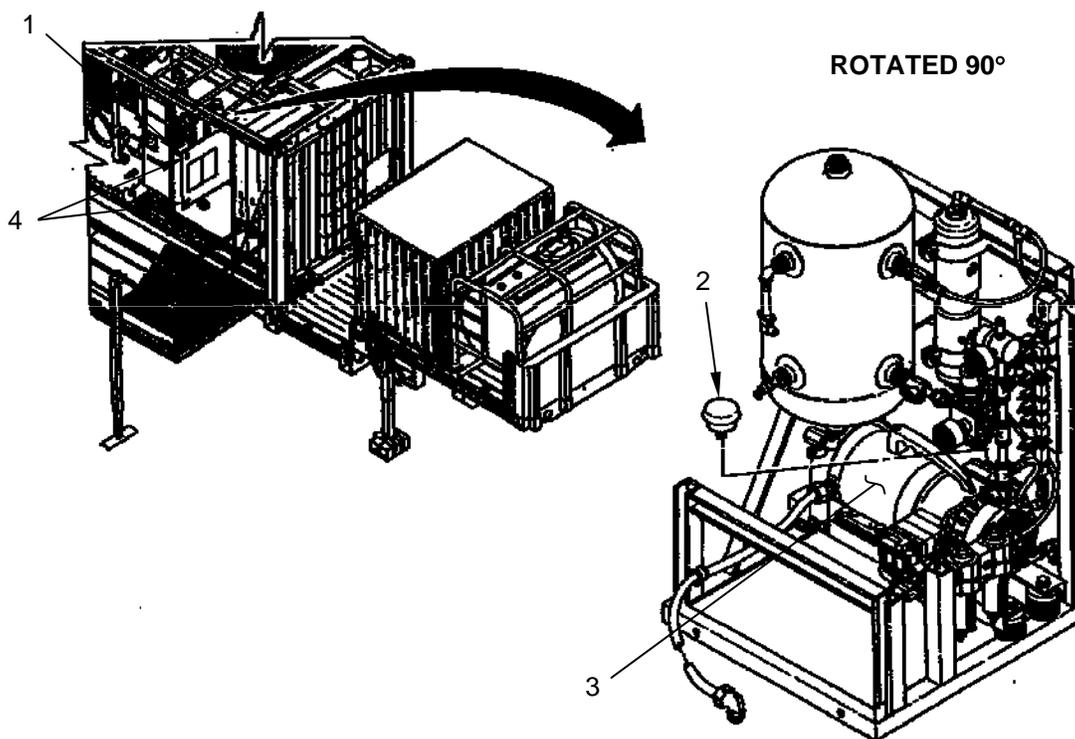


Figure 1. Air Inlet Filter.

END OF TASK**Air Inlet Filter Installation**

1. Thread new inlet filter (Figure 1, Item 2) onto compressor (Figure 1, Item 3).
2. Close access door (Figure 1, Item 1) and secure by engaging two latches (Figure 1, Item 4).

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
FILTER, FLUID AIR OUTLET
AIR OUTLET FILTER ELEMENT
REPAIR**

INITIAL SETUP:**Material/Parts**

Parts Kit, Air Filter, Elements and Packings

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment ConditionsLADS power shut off at main control enclosure
(WP 0014, Model C or WP 0015, Model D).

REPAIR**Air Outlet Filter Element Removal****NOTE**

This procedure covers replacement of the first and second-stage outlet filters.

1. Disengage two latches (Figure 1, Item 2), then open access door (Figure 1, Item 1).
2. Open manual valve (Figure 2, Item 10), allow air to vent from air line (Figure 2, Item 11), then close valve.

CAUTION

Floats for filter automatic drains are loose in filter bowls. Turning bowls upside down may cause floats to fall out and be damaged.

3. Push up slightly, then rotate, and remove bowl (Figure 2, Item 6) from first-stage filter (Figure 2, Item 1).
4. Unthread retainer (Figure 2, Item 8), then remove filter element (Figure 2, Item 9).
5. Push up slightly, then rotate, and remove bowl (Figure 2, Item 5) from second-stage filter (Figure 2, Item 2).
6. Unthread filter element (Figure 2, Item 3).
7. Remove preformed packings (Figure 2, Items 4 and 7) from bowls (Figure 2, Items 5 and 6).
8. Wipe away any debris from areas where bowls (Figure 2, Items 5 and 6) mate with filters (Figure 2, Items 1 and 2).

REPAIR-CONTINUED

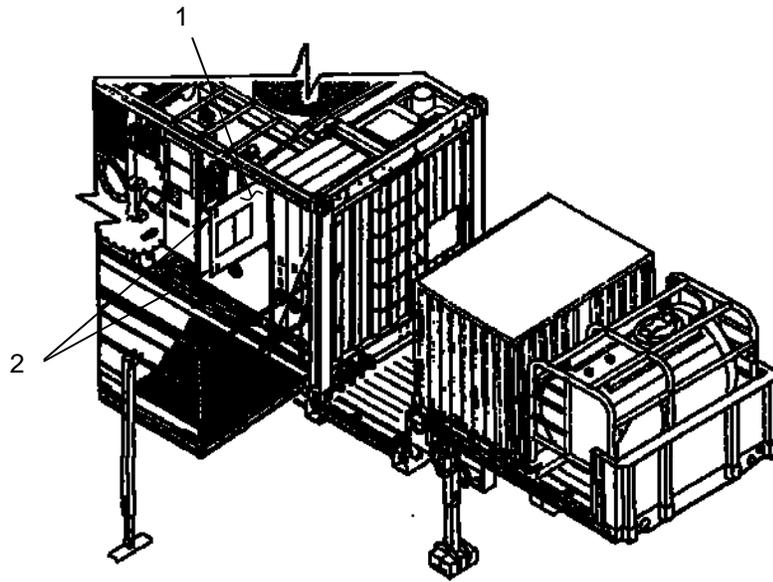


Figure 1. Air System Access Door.

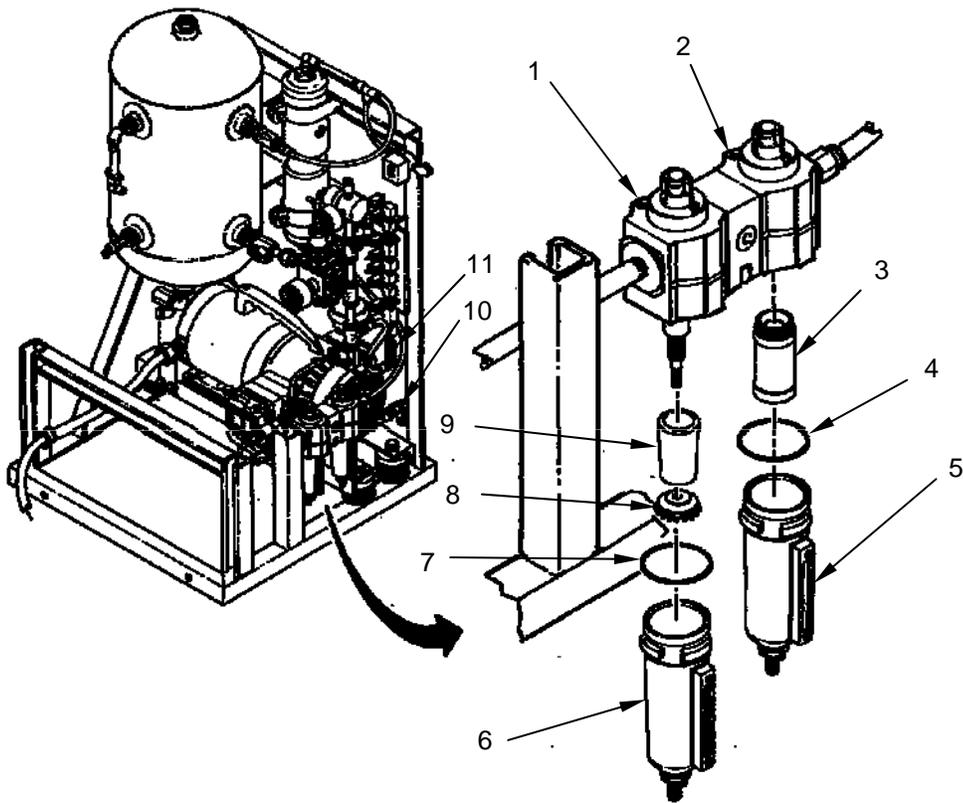


Figure 2. Air Outlet Filter Elements.

END OF TASK

REPAIR-CONTINUED**Air Outlet Filter Element Installation**

1. Apply a thin coat of grease to new preformed packings (Figure 2, Items 4 and 7).
2. Install preformed packings (Figure 2, Items 4 and 7) onto bowls (Figure 2, Items 5 and 6).
3. Thread new filter element (Figure 2, Item 3) into second-stage filter (Figure 2, Item 2), then hand-tighten.
4. Insert bowl (Figure 2, Item 5) into second-stage filter (Figure 2, Item 2), then rotate to engage.
5. Install new filter element (Figure 2, Item 9) on first-stage filter (Figure 2, Item 1), then install, and hand-tighten retainer (Figure 2, Item 8).
6. Insert bowl (Figure 2, Item 6) into second-stage filter (Figure 2, Item 1), then rotate to engage.
7. Close access door (Figure 1, Item 1) and secure by engaging two latches (Figure 1, Item 2).

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
FILTER, FLUID, AIR OUTLET
AIR OUTLET FILTER AUTOMATIC DRAIN
REPAIR**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit Assembly, Operator, (WP 0066, Table 2, Item 11)

Materials Parts

Parts Kit, Air Filter, Float Valves and Packings
Grease, Ball and Roller, General Purpose Lithium (WP
0068, Item 9)

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

LADS power shut off at main control enclosure (WP 0014, Model C or WP 0015, Model D).

REPAIR**Air Outlet Filter Automatic Drain Removal****NOTE**

This procedure covers replacement of the automatic drain in the first or second-stage outlet filter.

1. Disengage two latches (Figure 1, Item 2), then open access door (Figure 1, Item 1).
2. Open manual valve (Figure 2, Item 8), allow air to vent from air line (Figure 2, Item 9), then close valve.

CAUTION

Float for filter automatic drain is loose in filter bowl. Turning bowl upside down may cause float to fall out and be damaged.

3. Push up slightly, then rotate, and remove bowl (Figure 2, Item 7) from first-stage filter (Figure 2, Item 1) or second-stage filter (Figure 2, Item 2).
4. Remove nut (Figure 2, Item 6) from bottom of bowl (Figure 2, Item 7).
5. Remove automatic drain (Figure 2, Item 3) and gasket (Figure 2, Item 4) from bowl (Figure 2, Item 7).
6. Remove preformed packing (Figure 2, Item 5) from bowl (Figure 2, Item 7).
7. Rinse bowl (Figure 2, Item 7) with water and wipe away any debris.
8. Wipe away any debris from area on filter (Figure 2, Items 1 or 2) where bowl (Figure 2, Item 7) is attached.

REPAIR-CONTINUED

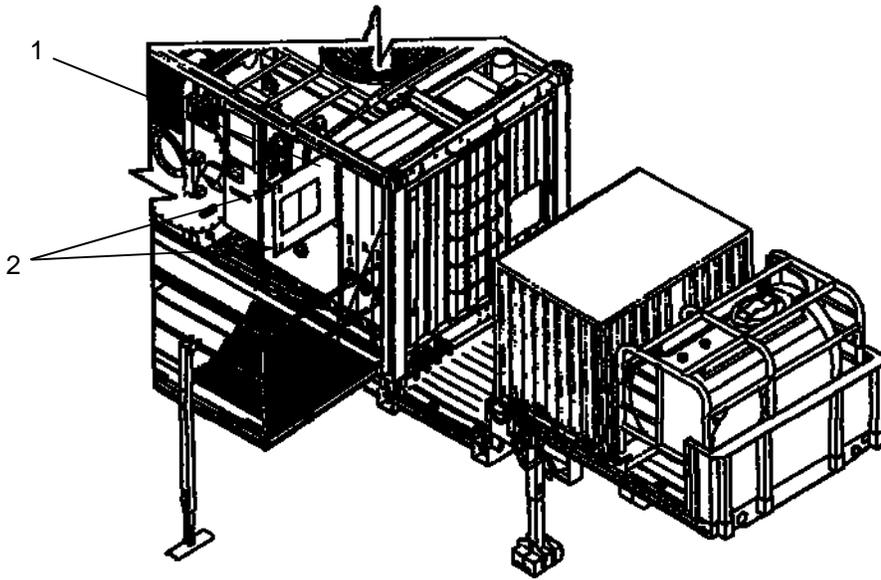


Figure 1. Air System Access Door.

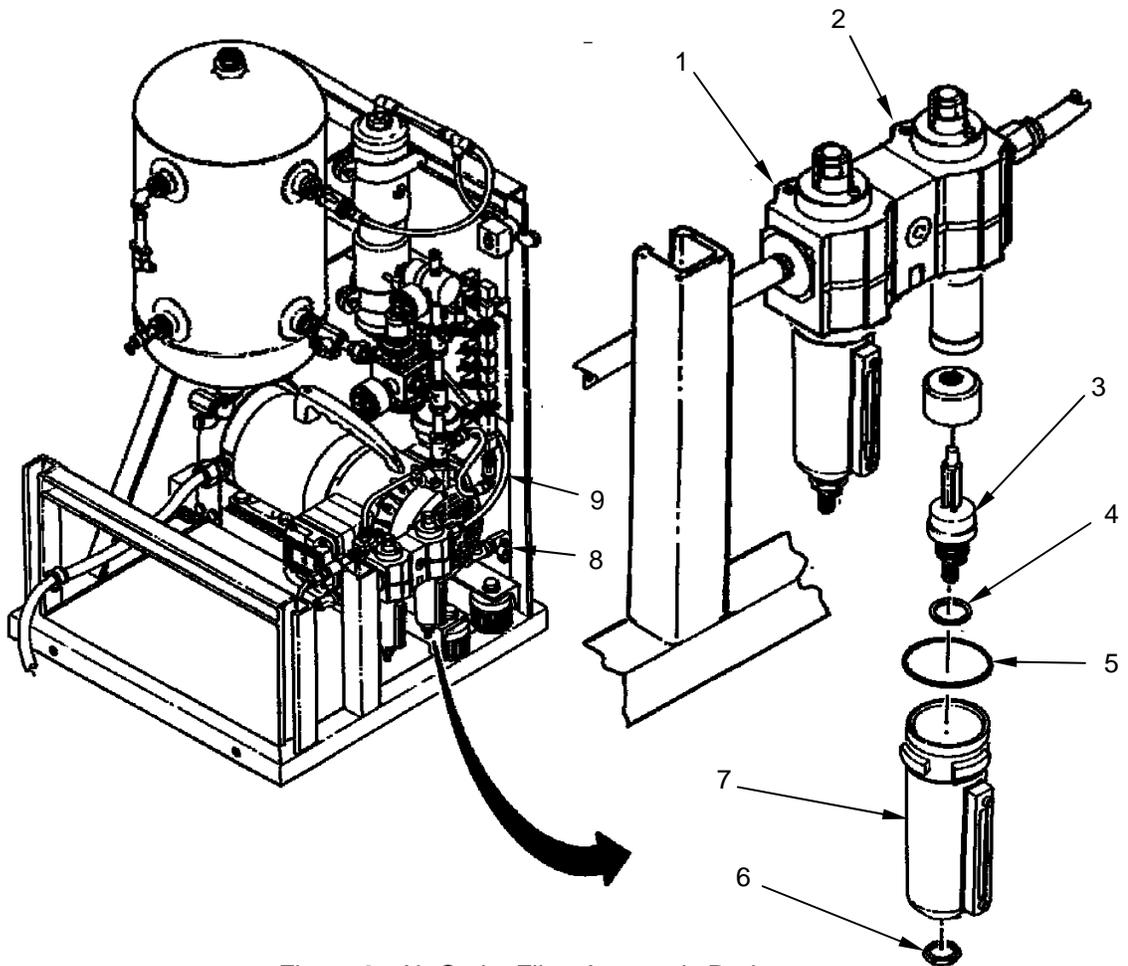


Figure 2. Air Outlet Filter Automatic Drain.

END OF TASK

REPAIR-CONTINUED**Air Outlet Filter Automatic Drain Installation**

1. Apply a thin coat of grease to new gasket (Figure 2, Item 4) and new preformed packing (Figure 2, Item 5).
2. Install gasket (Figure 2, Item 4) on new automatic drain (Figure 2, Item 3).
3. Insert automatic drain (Figure 2, Item 3) into bowl (Figure 2, Item 7) ensure gasket (Figure 2, Item 4) remains on automatic drain.
4. Thread nut (Figure 2, Item 6) onto automatic drain (Figure 2, Item 3). Tighten nut until compression of gasket (Figure 2, Item 4) is felt.
5. Install preformed packing (Figure 2, Item 5) onto bowl (Figure 2, Item 7).
6. Insert bowl (Figure 2, Item 7) into first-stage (Figure 2, Item 1) or second-stage filter (Figure 2, Item 2), then rotate to engage.
7. Close access door (Figure 1, Item 1) and secure by engaging two latches (Figure 1, Item 2).

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
ENCLOSURE ASSEMBLY, MAIN CONTROL
LED LAMP
REPAIR**

INITIAL SETUP:**Materials/Parts**

Light Emitting Diode

Personnel Required

Shower/Laundry and Clothing Repair Specialist (1)

Equipment Conditions

LADS power shut off at main control enclosure (WP 0014, Model C or WP 0015, Model D).

REPAIR**LED Lamp Removal**

1. Unthread lens (Figure 1, Item 2) from lamp socket (Figure 1, Item 1).
2. Push in and twist lamp (Figure 1, Item 3) to remove from lamp socket (Figure 1, Item 1).

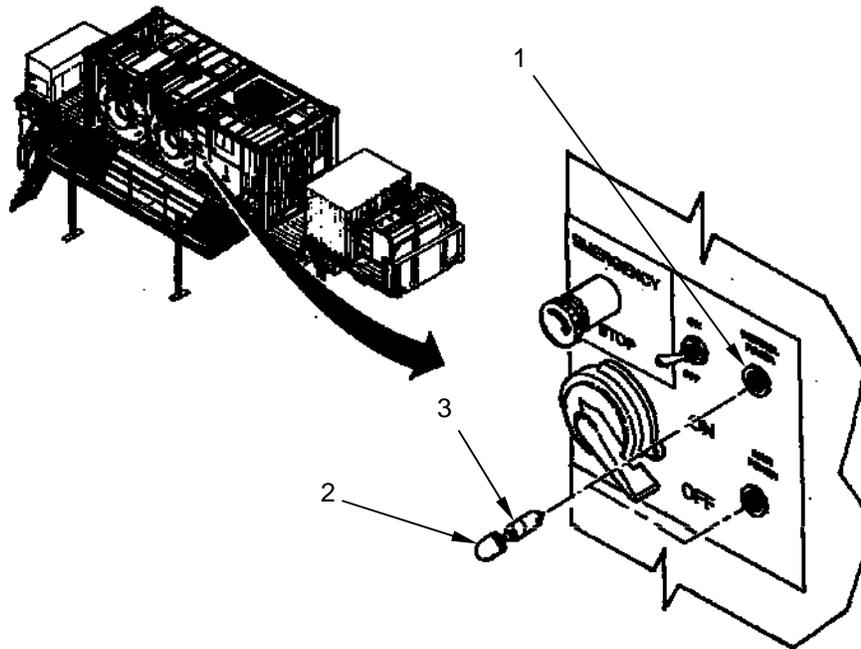


Figure 1. LED Lamp Installation.

END OF TASK**LED Lamp Installation**

1. Insert new lamp (Figure 1, Item 3) into lamp socket (Figure 1, Item 1) then push in and twist to lock in place.
2. Thread lens (Figure 1, Item 2) onto lamp socket (Figure 1, Item 1).
3. Perform System Start-Up (WP 0014, Model C or WP 0015, Model D) then check lamp operation.

END OF TASK**END OF WORK PACKAGE**

**CREW MAINTENANCE
OPERATOR PANEL ASSEMBLY
12 VDC LAMP
REPAIR
LADS MODEL C**

INITIAL SETUP:**Personnel Required**

Shower/Laundry and Clothing Repair Specialist (1)

Materials/Parts

Lamp, Incandescent, 12MB

Equipment Conditions

LADS Power Shut Off at Main Enclosure (WP 0014)

REPAIR**12 VDC Lamp Removal**

1. Unthread lens (Figure 1, Item 3) from lamp socket (Figure 1, Item 1).
2. Push in and twist lamp (Figure 1, Item 2) to remove from lamp socket (Figure 1, Item 1).

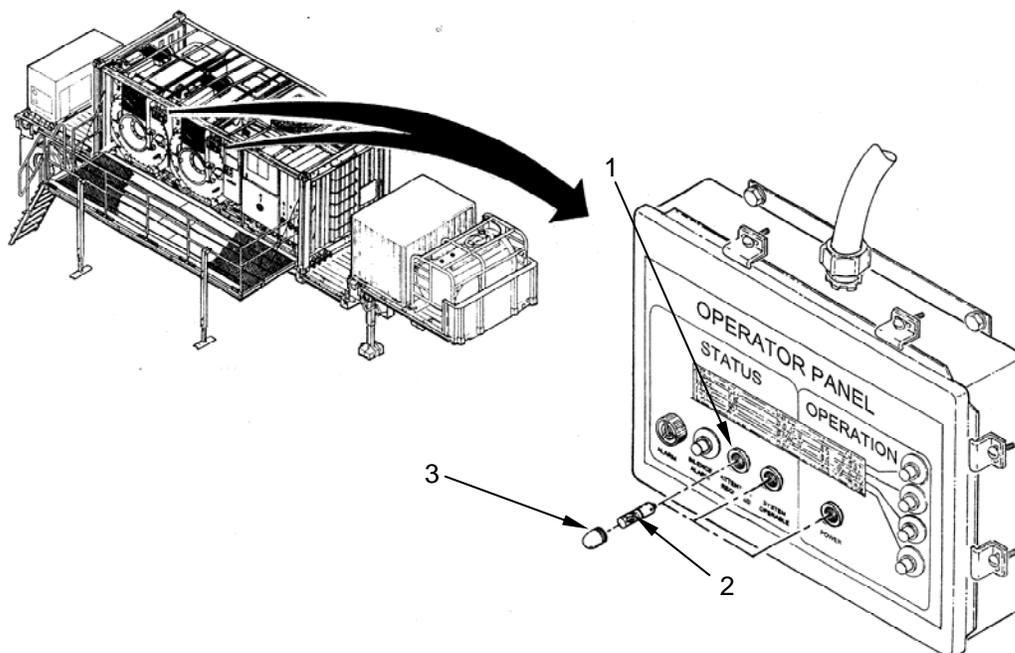


Figure 1. 12 VDC Lamp.

END OF TASK**12 VDC Lamp Installation**

1. Insert new lamp (Figure 1, Item 2) into lamp socket (Figure 1, Item 1) then push in and twist to lock in place.
2. Thread lens (Figure 1, Item 3) onto lamp socket (Figure 1, Item 1).
3. Perform SYSTEM START-UP (WP 0014) then check lamp operation.

END OF TASK**END OF WORK PACKAGE**

CHAPTER 6
SUPPORTING INFORMATION
FOR
LAUNDRY ADVANCED SYSTEM

**CREW MAINTENANCE
LADS REFERENCES**

SCOPE

This work package lists all Forms, Field Manuals, and Technical Manuals referenced in this manual.

FORMS

Recommended Changes to Publications and Blank Forms	DA Form 2028
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Product Quality Deficiency Report	SF-368
Request for Establishment of a Publications Account	DA 12-R

FIELD MANUALS

First Aid	FM 4-25.11
Theater of Operations Electrical Systems Chapter 8 Generators, Determining Grounding Systems	FM 5-424
Lubrication Instructions for Cold Weather	FM 9-207
Quartermaster Principles	FM 10-1
Field Sanitation and Hygiene	FM 21-10
Techniques and Procedures for Quartermaster Field Service Companies	FM 42-414
Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection	FM 3-11.4
Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination	FM 3-11.5

TECHNICAL MANUALS

Destruction of Army Material to Prevent Enemy Use	TM 750-244-6
Medium Tactical Vehicles (MTV) 5 ton 6 X6 M1083 Series Operator's Instructions	TM 9-2320-366-10
Tactical Dual-Purpose Breakbulk/Container Transport Semi-Trailer Operator, Unit, Direct Support, General Support Maintenance Manual, with RPSTL	TM 9-2330-326-14&P
Tactical Quiet Skid Mounted Generator Set Operator's Manual	TM 9-6115-644-10
Lightweight Maintenance Enclosure (LME) Operator, Unit, Direct Support Maintenance Manual with RPSTL	TM 10-5410-284-13&P
Operators and Unit Maintenance Manual (Including Repair Parts and Special Tools List) Tank Fabric, Collapsible, Air Column Supported, Open Top Water Storage 3000 Gallons	TM 10-5430-237-12&P

ARMY REGULATIONS

Soldier Support in the Field	AR 700-135
The Army Logistics Readiness and Sustainability	AR 700-138

PAMPHLETS

User's Guide for Army Publications and Forms	DA PAM 25-33
The Army Maintenance Management System (TAMMS)	DA PAM 750-8
The Army Maintenance Management System-Aviation (TAMMS-A)	DA PAM 738-751

END OF WORK PACKAGE

**CREW MAINTENANCE
LADS COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS**

**COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS
INTRODUCTION****Scope**

This work package lists COEI and BII for the LADS to help you inventory items for safe and efficient operation of the equipment.

General

The COEI and BII information is divided into the following lists:

Components of End Item (COEI). This list is for information purposes only and is not authority to requisition replacements. These items are part of the LADS. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

Basic Issue Items (BII). These essential items are required to place the LADS in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the LADS during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

Explanation of Columns in the COEI List and BII List

Column (1) - Illus Number. Gives you the number of the item illustrated.

Column (2) - National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (3) - Description, Part Number/(CAGEC). Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the part number and the Commercial Government Entity Code (CAGEC) (in parentheses).

Column (4) - Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Column (5) - Unit of Issue (U/I). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

Column (6) - Qty Rqr. Indicates the quantity required.

COMPONENTS OF END ITEM (COEI) LIST-CONTINUED

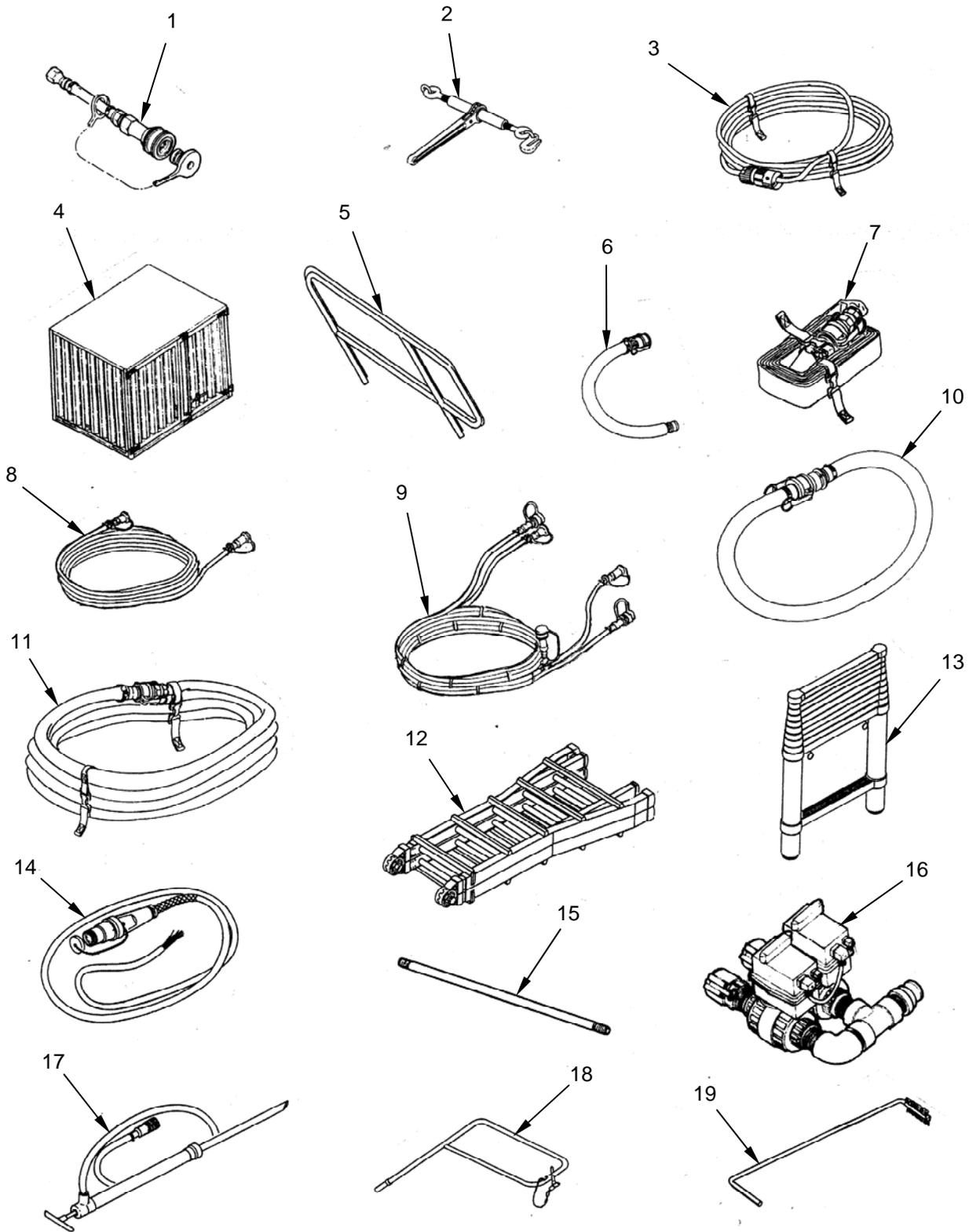


Figure 1. COEI List (Sheet 1 of 2).

COMPONENTS OF END ITEM (COEI) LIST-CONTINUED

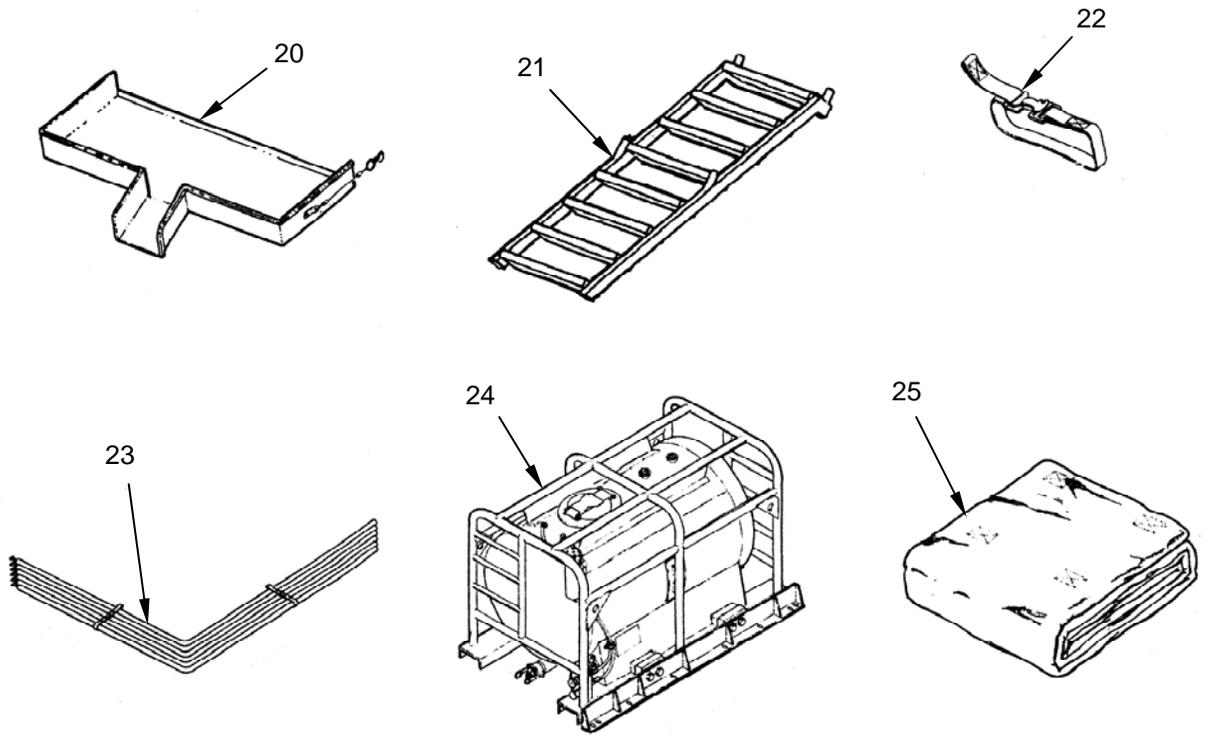


Figure 1. COEI List (Sheet 2 of 2).

Table 1. Components of End Item (COEI) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) UNIT OF ISSUE	(6) QTY RQR
1		ADAPTER ASSEMBLY, FUEL HOSE 863-870120 (4X630), STORAGE LOCKER		EA	1
2	3990-01-481-3300	BINDER, LOAD 863-890010 (4X630), M871A3 TRAILER		EA	4
3		CABLE ASSEMBLY, WATER PUMP, 100 FT 863-850120 (4X630), DRUM B		EA	1
4		CONTAINER, STORAGE, 863-880100 (4X630)		EA	1
5	5340-01-493-5219	HANDRAIL, STAIRS, 863-840030 (4X630), STORAGE LOCKER		EA	1
6		HOSE ASSEMBLY, 5 FT 863-860100 (4X630), DRUM B		EA	1
7		HOSE ASSEMBLY, 50 FT 863-860110 (4X630), DRUM B		EA	2
8		HOSE ASSEMBLY, FUEL, 25 FT 863-870110 (4X630) STORAGE LOCKER		EA	1
9		HOSE ASSEMBLY, FUEL, 30 FT 863-870130 (4X630), STORAGE LOCKER		EA	1
10		HOSE ASSEMBLY, WATER SUPPLY, 10 FT 863-850110 (4X630), DRUM B		EA	1
11		HOSE ASSEMBLY, WATER SUPPLY, 50 FT, 863-850100 (4X630), DRUM A		EA	4
12	5440-01-481-3355	LADDER, EXTENSION, 863-000205 (4X630), STORAGE LOCKER		EA	1
13	5440-01-506-2927	LADDER, EXTENSION, 8148T5 (39428), M871A3 TRAILER		EA	2

Table 1. Components of End Item (COEI) List-Continued.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) UNIT OF ISSUE	(6) QTY RQR
14		PIGTAIL ASSEMBLY, POWER 12 FT 863-740400 (4X630), M871A3 TRAILER		EA	1
15	4710-01-493-4683	PIPE, METALLIC, DRUM FILL 863-870140 (4X630) STORAGE LOCKER		EA	1
16		PREWASH MANIFOLD W/CASE, 863-850155 (4X630) STORAGE LOCKER		EA	1
17		PUMP ASSEMBLY, ANTI-FOAM, MANUAL 863-860040 (4X630), UNDER WATER TANKS		EA	1
18		RAILING ASSEMBLY, SHORT 863-810230 (4X630), STORAGE LOCKER		EA	1
19	3510-01-481-3299	RAKE, STILL 863-860030 (4X630), STORAGE LOCKER		EA	1
20		SLUICE ASSEMBLY 863-860010 (4X630), STORAGE LOCKER		EA	1
21		STAIR ASSEMBLY 863-840010 (4X630), STORAGE LOCKER		EA	1
22	5340-01-481-1669	STRAP, WEBBING 863-830120 (4X630) STORAGE LOCKER		EA	12
23		SUPPORT ASSEMBLY, AWNING 863-830020 (4X630), STORAGE LOCKER		EA	6
24		TANK, FUEL, 400 GALLON 863-000090 (4X630), M871A3 TRAILER		EA	1
25	8340-01-482-9868	TARPAULIN 863-830001 (4X630), ISO FRAME		EA	1

BASIC ISSUE ITEMS (BII) LIST

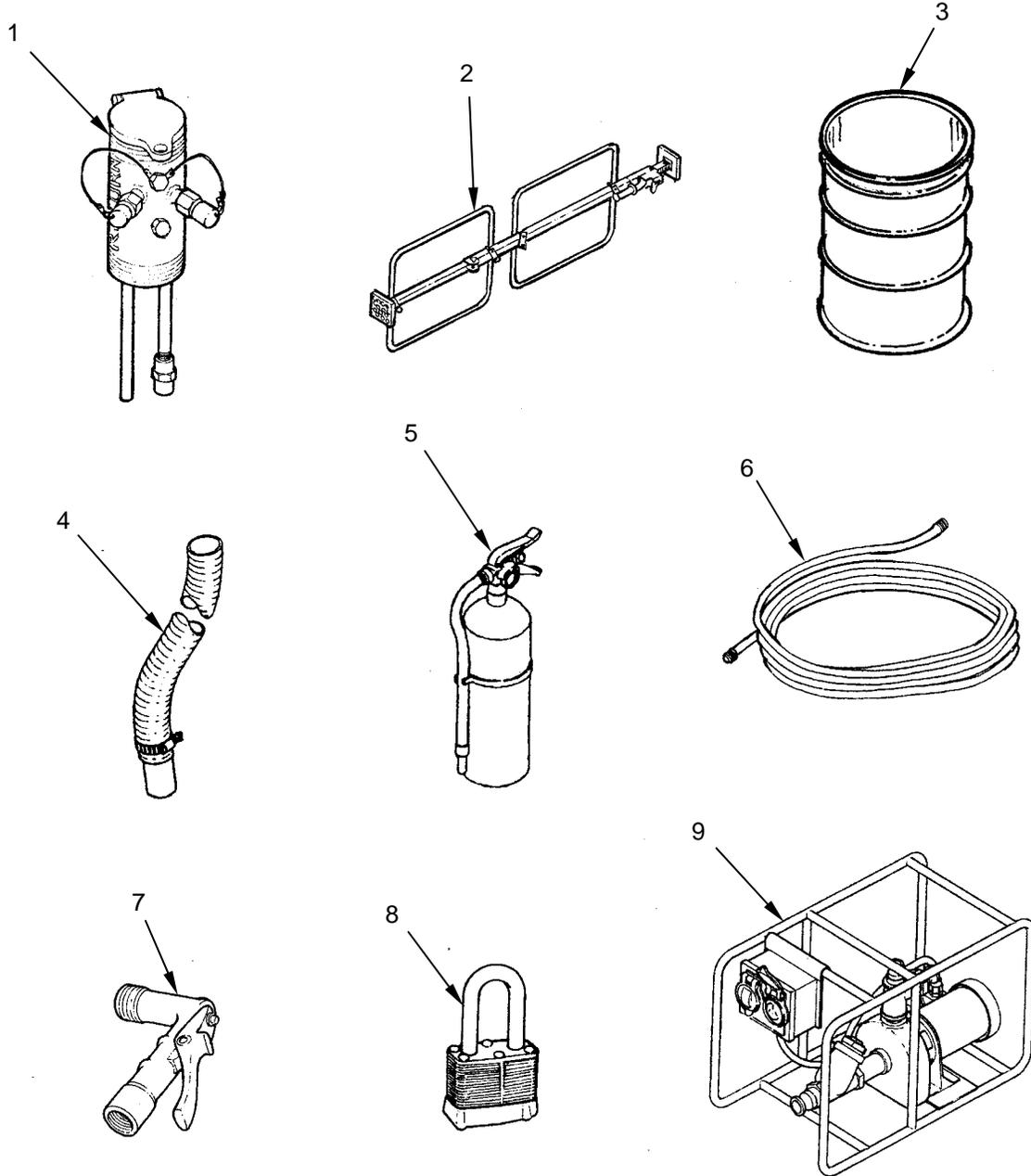


Figure 2. BII List (Sheet 1 of 2).

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

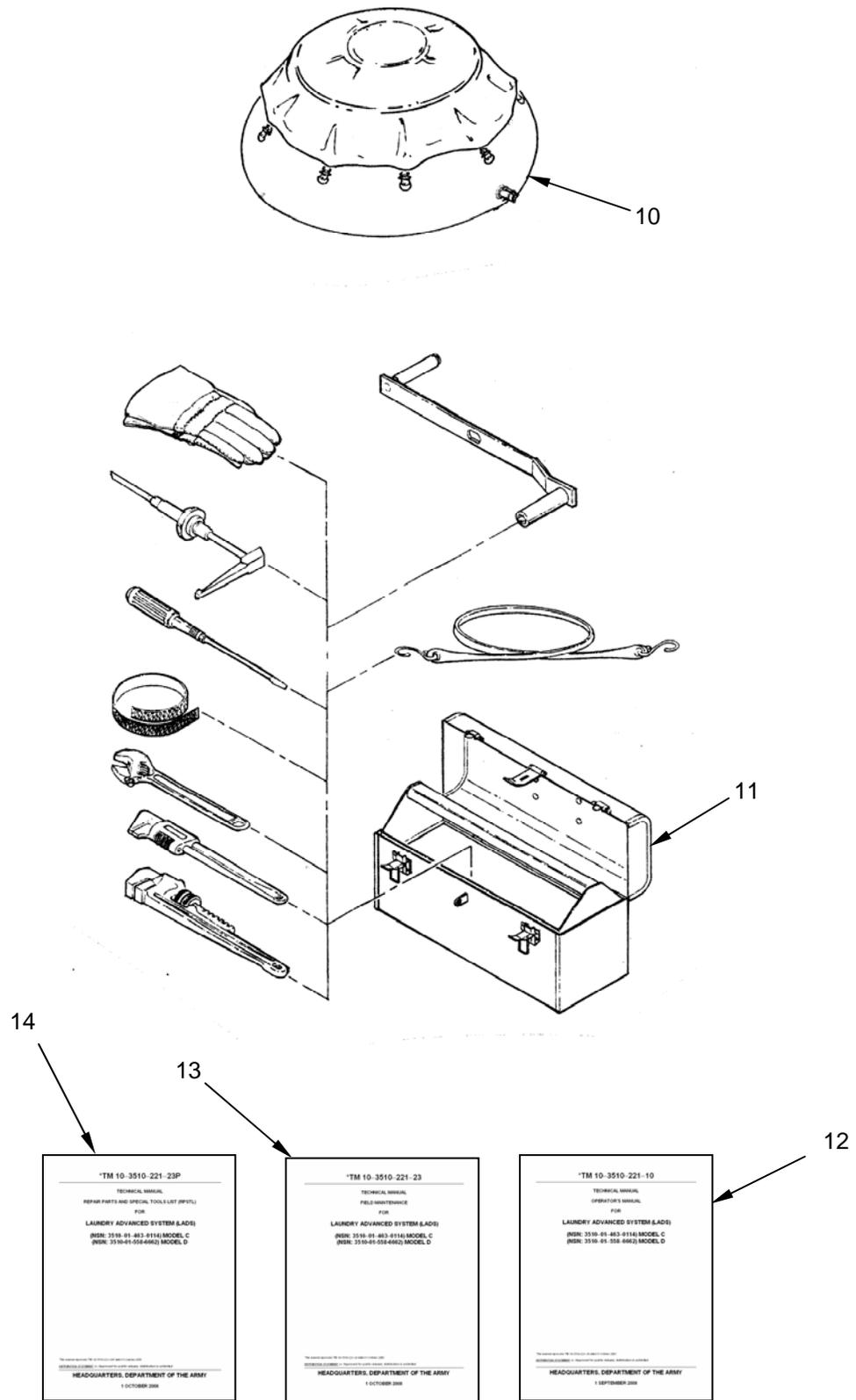


Figure 2. BII List (Sheet 2 of 2).

Table 2. Basic Issue Items (BI) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) UNIT OF ISSUE	(6) QTY RQR
1	4510-01-214-9139	ADAPTER ASSEMBLY, FUEL 6-1-8285 (81337), STORAGE LOCKER		EA	1
2		BAR, CARGO STABILIZER, BAR ASSEMBLY 863-820200 (4X630) STORAGE LOCKER		EA	2
3	8110-00-597-2353	DRUM, METAL, 55 GALLON, 16 GAUGE, PPD- D-729 (81348) STORAGE LOCKER		EA	1
4		EXTENSION, GENERATOR EXHAUST 863-900010 (4X630), STORAGE LOCKER		EA	1
5	4210-00-889-2491	EXTINGUISHER, FIRE, 10 LB., ABC, A-A-393 (58536) STORAGE LOCKER		EA	1
6				EA	1
7	4720-01-447-8759	HOSE, NON METALLIC, 50 FT 29-58050 (58358), DRUM B		EA	1
8		NOZZLE, GARDEN HOSE 352444-588C (77860), DRUM B		EA	3
9	5340-01-247-9650	PADLOCK 1176A41 (39428), STORAGE LOCKER, M871A3 TRAILER		EA	1
10	4320-01-245-6936	PUMP, UNIT, CENTRIFUGAL 6-1-9932 (81337), STORAGE LOCKER		EA	1
11	5430-01-359-4774	TANK, FABRIC, COLLAPSIBLE 90074 (05476), STORAGE LOCKER		EA	1
		TOOL KIT ASSEMBLY, OPERATOR 863-880020 (4X630), STORAGE LOCKER		EA	1
	8415-01-481-4429	GLOVES, HEAT PROTECT 863-000487 (4X630)		EA	1
	5340-01-481-3206	HANDLE, MANUAL 863-710122 (4X630)			

Table 2. Basic Issue Items (BII) List-Continued.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, PART NUMBER/(CAGEC)	(4) USABLE ON CODE	(5) UNIT OF ISSUE	(6) QTY RQR
	5120-01-482-0016	SCREWDRIVER, FLAT TIP, 6" 5720A13 (39428)		EA	1
	5340-01-274-2744	STRAP, ELASTIC, 24" 3891T18 (39428)		EA	4
		STRAP, HOOK & LOOP, 1" X 12" 863-830140 (4X630)		EA	12
		PUMP, MANUAL, 1 OZ STROKE 4249K18 (39428)		EA	1
	5120-00-449-8083	WRENCH, ADJUSTABLE, 10" 1B7536 (11083)		EA	1
	5120-01-481—8391	WRENCH, ADJUSTABLE, 11" 5382A2 (39428)		EA	1
	5120-01-481-8392	WRENCH, PIPE, 2" JAW 5357A125 (39428)		EA	1
12		TM 10-3510-221-10		EA	1
13		TM 10-3510-221-23 Field Maintenance for LADS		EA	1
14		TM 10-3510-221-23P Repair Parts and Special Tools List (RPSTL) for LADS		EA	1

END OF WORK PACKAGE

**CREW MAINTENANCE
ADDITIONAL AUTHORIZATION LIST (AAL)**

INTRODUCTION

Scope

This work package lists additional items you are authorized for the support of the LADS

General

This list identifies items that do not have to accompany the LADS and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA, or JTA.

Explanation Of Columns In The AAL

Column (1) - National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) - Description, Part Number/(CAGEC). Identifies the Federal item name (in all capital letters), followed by a minimum description when needed. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (3) - Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Column (4) - Unit of Issue (U/I) Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) - Qty Recm. Indicates the quantity recommended.

Table 1. Additional Authorization List.

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION, PART NUMBER, AND (CAGEC)	(3) USABLE ON CODE	(4) U/I	(5) QTY RECM
	ADAPTER ASSEMBLY, FUEL HOSE 863-870120 (4X630)		EA	1
	ADAPTER, MANIFOLD, 2 IN MALE TO 1- 1/2 IN FEMALE, 863-850140 (4X630)		EA	2
	ADAPTER, MANIFOLD, 2 IN FEMALE TO 1-1/2 IN FEMALE, 863-850150 (4X630)		EA	2
	ADAPTER, MANIFOLD, 2 IN FEMALE TO 1-1/2 IN MALE, 863-850160 (4X630)		EA	2

Table 1. Additional Authorization List-Continued.

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION, PART NUMBER, AND (CAGEC)	(3) USABLE ON CODE	(4) U/I	(5) QTY RECM
2510-00-741-7585	ADAPTER, MANIFOLD, 1-1/2 IN MALE TO MALE, 863-850170 (4X630)		EA	2
	BOARD, GROUND JACK		EA	2
6150-01-220-5587	CABLE ASSEMBLY, POWER, ELECTRICAL, 100 AMP, 50 FT, MIL-C-29184 (81349)		EA	2
	HOSE ASSEMBLY, 70 FT, 863-870100 (4X630)		EA	2
	MANIFOLD, WATER SUPPLY, 863-85013 (4X630)		EA	1
	SOLAR SHADE, 9-1-1424-1 (81337)		EA	1

END OF WORK PACKAGE

**CREW MAINTENANCE
EXPENDABLE AND DURABLE ITEMS LIST**

EXPENDABLE AND DURABLE ITEMS LIST

INTRODUCTION

Scope

This work package lists expendable and durable items that you will need to operate and maintain the LADS. This list 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), CTA 50-909, Field and Garrison Furnishings and Equipment or CTA 8-100, Army Medical Department Expendable/Durable Items.

Explanation of Columns in the Expendable/Durable Items List

Column (1) - Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., Grease, Ball and Roller, General Purpose (WP 0068, Item 9).

Column (2) - Level. This column indicates the lowest level of maintenance that requires the listed item (C=Operator/Crew).

Column (3) - National Stock Number (NSN), This is the NSN assigned to the item which you can use to requisition it.

Column (4) - Item Name, Description, Part Number/(CAGEC). This column provides the other information you need to identify the item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC)(in parentheses).

Column (5) –U/I. Unit of Issue (U/I) code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Table 1. Expendable and Durable Items List.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/(CAGEC)	(5) U/I
1	C	6850-01-506-6533	ANTI-FOAM, COMPOUND SAG 30, (0YTZ6) (5 GALLON CONTAINER)	GAL
2	C	7930-01-506-7081	DETERGENT, LAUNDRY KINDET, 863- 000900 (4X630) (5 GALLON CONTAINER)	GAL
3	C	4330-01-506-5774	FILTER ELEMENT, FLUID, 5 MICRON, 863-000555 (4X630)	EA
4	C	4330-01-506-5083	FILTER ELEMENT, FLUID, 10 MICRON, 683-000248 (4X630)	EA
5	C	4330-00-001-7841	FILTER ELEMENT, FLUID, COALESCING FILTER, 863-210902 (4X630)	EA

EXPENDABLE AND DURABLE ITEMS LIST-CONTINUED

Table 1. Expendable and Durable Items List-Continued.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/(CAGEC)	(5) U/I
6	C	3510-01-481-7830	FILTER, LINT, DRYING TUMBLER, 863-110133 (4X630)	EA
7	C	8415-01-481-4429	GLOVES, MEN'S AND WOMEN'S IMPERMEABLE, (10 PER PACKAGE) 863-000-487 (4X630)	PG
8	C	4240-01-292-2818	GOGGLES, FUTURE 9301 S345C (08895)	EA
9	C	9150-01-496-4919	GREASE, BALL AND ROLLER, GENERAL PURPOSE LITHIUM, COMPLEX EP 863-000264 (4X630),	TU
10	C	3510-01-506-6759	NET, LAUNDRY, BLUE 863-00091 (4X630)	EA
11	C	3510-01-506-6761	NET, LAUNDRY, GREEN 863-000-487 (4X630)	EA
12	C	3510-01-506-6756	NET, LAUNDRY, WHITE 863-000920 (4X630)	EA
13	C	7920-00-205-3570	RAG, WIPING, UNDYED COTTON 7920-00-205-3570 (80244)	BE
14	C		SANITIZER, 44150 (NONE)	GAL
15	C	8030-01-408-9444	WATER REPELLENT COMPOUND, FRS, STORMSHED, (01ZB8)	GAL

END OF WORK PACKAGE

**CREW MAINTENANCE
ADDITIONAL SUPPORTING INFORMATION**

LAUNDRY PROCESSING GUIDELINES**Receiving Laundry**

Laundry that is excessively soiled (sandy, dusty or muddy) should be pre-washed using the BDU65 +PREWASH laundry cycle. This will use extra water but will keep the LADS cleaner longer. The cleaner the water in the LADS stays, the less often you will need to: drain and refill the water tanks, clean the still, and replace the coalescing and pre-filters. The cleaner the water stays, the easier it will be to clean out the water tanks.

The LADS is not an industrial laundry machine. Do not clean shop rags or other clothing soaked in oil, fuel, or other chemicals. Coveralls or uniforms from aviation or motor-pool personnel can be processed in the LADS with oil and fuel stains. If they are soaked in oil or fuel, or caked with grease they are unserviceable and should be discarded.

Synthetics or materials that are not compatible with warm or high temperatures should not be laundered in the LADS. The lowest water temperature available is 20 degrees above the ambient (outside) temperature. The lowest drying temperature available is 110 °F. If you are unsure if an item can be laundered in the LADS, check the label for recommended washing and drying temperatures.

Non-military issue bras will be destroyed if laundered in the LADS. Straps on bras will get out of bags and cause multiple bags to become tangled. Underwires from bras will rip out and clog up the drum drain plumbing. Protective gloves should be worn by personnel handling laundry to prevent coming in contact with biological and chemical contamination that may be present.

Pockets on all laundry must be checked. Pens, paper, money, hardware, etc. can fall out and clog the drum drain plumbing. Ammunition or other explosives left in laundry can be set-off by the forces encountered during extracts.

Bagging Laundry

Mesh bags should only be loaded half full. Over-stuffing bags will not allow all surfaces of laundry to be exposed to the washing, rinsing, or drying process. This will result in poorly laundered clothing. Over-stuffing bags can also cause inefficiencies in drum balancing that will lead to longer cycle times.

When mesh bags get holes in them or the zippers don't work the bags are unserviceable and should be replaced. Using bags with broken zippers will cause the laundry to come out of the bag during the cycle. This results in lost or mixed-up laundry.

Loading Laundry

Over-loading or under-loading drums will cause balancing problems and drum inverter faults. Both of these conditions will lead to longer cycle times. A typical load of laundry should be 20 to 30 properly loaded mesh bags. Never put more than six sleeping bags into drum at one time. Drums will have a hard time balancing if an odd number of sleeping bags are loaded. Always load two, four, or six bags per drum.

When laundering loose sheets or blankets, balancing problems may be encountered because the garments don't evenly distribute in the drum. Use trial and error to find a loading combination that works, then stay with that loading plan.

LAUNDRY PROCESSING GUIDLINES-CONTINUED

Washing Laundry

Mixing whites with colors will turn whites gray.

Bleach can not be used in the LADS. A sanitizer is available if required by health monitoring personnel.

Use only the specified detergent. Add detergent in one (1) ounce doses. Clothing laundered in home washing machines will retain soap due to the load speed of the spin cycle. This residual soap will come out during extracts adding soap to the LADS water. If soap suds are visible in drum during rinsing steps cut back on the amount of detergent added. Too much detergent will cause excessive foam in still and water tanks. Too much foam in still can cause boil-overs and rapid consumption of pre-filters and coalescing filters.

If the water pump strainers are not clean, water will not transfer properly during laundry cycles. This will cause poorly washed, rinsed, and dried laundry.

Change the water in the LADS when it is dirty. Don't let water sit idle in the LADS water tanks or water supply tank for days. During periods of inactivity, drain the LADS and water supply tank.

Drying Laundry

If lint filters are not clean, air can not flow through drum, and the laundry will not dry.

Fabric softener sheets should not be used because they will clog the water strainers. Use drying temperatures compatible with laundry. Check the labels before setting dry temperatures. Use lower temperatures when not drying full loads. Using too high of a drying temperature will shrink laundry.

Unloading Laundry

Don't let laundry bags sit in drums after drying. Keep the process moving. Removing the bags from the drums and the laundry from the bags immediately after the cycle is completed will prevent excessive wrinkles.

MISSION PLANNING

Proper planning helps ensure a successful deployment. In order to properly plan a mission the number of soldiers to be supported and the deployment duration must be determined. Once this information is obtained, the number of LADS, auxiliary equipment, and consumables required to support the mission can be calculated. After the quantities have been identified, it is necessary to ensure these items are available, serviceable, and ready for transport. The following paragraphs provide guidance on how to plan for the mission based on total number of soldiers to be supported, daily laundry requirements, and deployment duration.

Determining How Many LADS

The number of LADS required to support a mission is directly dependant on the laundry requirements. The LADS can process 7,500 lbs (500 soldiers' worth at 15 lbs per soldier) of laundry in a 20-hour day if the laundry is processed on a continuous basis using the "BDU 65 MIN" cycle. This equates to 18 cycles per drum with the average load of 28 bags, weighing 7.5 lbs each. In a field environment, it is more realistic to expect daily laundry outputs in the 5,000 lbs per day range. This takes into account several factors: 1. There are normally delays encountered when the laundry is received and bagged, causing idle time on the LADS. 2. Soldier's do not always turn in amounts of laundry that can evenly be divided into the perfectly loaded bag. This causes bags weighing as low as 2 or 3 lbs to be laundered in place of ones weighing 7.5 lbs. 3. Soldier's clothing can be soiled to the point where the longer "BDU 70 MIN" or "BDU 75 MIN" cycles should be used. This results in less than 18 cycles per day. 4. If the LADS is inoperable for any period of time in a given day, extra laundry must be processed the following day, to prevent falling behind. 5. During a long deployment in harsh environmental conditions downtimes should be expected for both corrective and preventative maintenance. The following formula provides guidance on how to calculate the number of LADS required to perform a mission.

MISSION PLANNING-CONTINUED

To determine the number of LADS for a deployment use the following calculation:

$$\frac{\text{NOS} \times 15 \text{ lbs} \times \text{ULF} \times \text{SF} \times \text{EF}}{7,500 \text{ lbs}} = \text{Number of LADS Required (always round up to nearest whole number)}$$

Where:

NOS = Number of soldiers serviced per day

ULF = Under Load Factor 1+ Percentage of laundry bags that weigh < 7.5 lbs

SF = Soil Factor 1 + 0% for lightly soiled, 7.5% for moderately soiled, or 15% for heavily soiled laundry

EF = Environmental Factor 1 + 25% if temperatures < 32 degrees F or >100 degrees F are expected + 25% for dusty conditions

Example 1:

$$\frac{325 \times 15 \text{ lbs} \times 1.25 \times 1.15 \times 1.25}{7,500 \text{ lbs}} = 1.17 \text{ LADS or 2 LADS when rounded up}$$

Where:

NOS = 325 soldiers

ULF = 1.25 for 25% of laundry bags weighing less than 7.5 lbs

SF= 1.15 for heavily soiled laundry

EF= 1.25 for high temperatures

Example 2:

$$\frac{400 \times 15 \text{ lbs} \times 1.25 \times 1.00 \times 1.00}{7,500 \text{ lbs}} = 1.00 \text{ LADS}$$

Where:

NOS = 400 soldiers

ULF = 1.25 for 25% of laundry bags weighing less than 7.5 lbs

SF = 1.00 for lightly soiled laundry

EF = 1.00 for moderate temperatures

Example 3:

$$\frac{450 \times 15 \text{ lbs} \times 1.25 \times 1.15 \times 1.50}{7,500 \text{ lbs}} = 1.94 \text{ LADS or 2 LADS when rounded up}$$

Where:

NOS = 450 soldiers

ULF = 1.25 for 25% of laundry bags weighing less than 7.5 lbs

SF = 1.15 for heavily soiled laundry

EF = 1.50 for high temperatures and dusty conditions

MISSION PLANNING-CONTINUED**Preparing the LADS for Deployment**

Properly preparing the LADS for deployment is essential to mission success. Each LADS that is to be deployed should be set-up as described in WP 0011, ASSEMBLY AND PREPARATION FOR USE procedures. After the LADS is set-up perform all "BEFORE, QUARTERLY, SEMI-ANNUAL, and ANNUAL PMCS" IAW WP 0040 and WP 0043. In addition, all required PMCS from TM 10-3510-221-24 should be completed by maintenance personnel. After all PMCS is completed the LADS should be started using WP 0012, Model C or WP 0013, Model D INITIAL ADJUSTMENTS, BEFORE USE, AND SELF TEST procedures. After the water tanks are filled and heated, at least 3 consecutive laundry cycles should be completed for each drum using WP 0014, Model C or WP 0015, Model D, OPERATING PROCEDURES,. If any problems are encountered during set-up or operation they should be corrected and verified. After the simulated operation is completed the LADS should be drained using WP 0016, Model C or WP 0017, Model D, DRAINING PROCEDURES. As part of the draining procedures all WP 0042, AFTER PMCS should be performed. Once drained, use WP 0020, PREPARATION FOR MOVEMENT to pack-up the LADS. Perform an inventory of all the LADS accessories as identified in the WP 0066, COMPONENTS OF END ITEM (COEI) LIST. Store the LADS accessories in the storage locker on the M871 trailer.

Equipment Requirements

Equipment required to perform laundry operations includes those items found in the "BASIC ISSUE ITEM" list, "ADDITIONAL AUTHORIZED ITEM" list, and "EXPENDABLE AND DURABLE ITEMS" list. Other commonly used equipment is identified in Table 3. This equipment should be identified, inventoried, inspected, and prepared for deployment as appropriate. Ensure all required PMCS is performed on the Generator Set, Trailer, and Tractor per the applicable TM. For operation of the Generator Set refer to TM 9-6115-644-10. For operation of the Trailer refer to TM 9-2330-326-14&P, for operation of the Tractor refer to TM 9-2320-336-10.

Table 1. Equipment Requirements for Mission Planning.

NATIONAL STOCK NUMBER	DESCRIPTION, PART NUMBER, AND CAGEC	U/I	QTY
	APRON, DISPOSABLE, 7738T11 (39428), (100 PER BOX)	BX	1
8105-01-183-9768	BAG, PLASTIC, A-A-1668 (58536), (125 PER BOX)	BX	4
7920-00-061-0038	BRUSH, SCRUB, 7920-00-061-0038, (83421)	EA	1 PER LADS
7240-00-160-0440	CAN, TRASH AND GARBAGE, 90146HDC (0T115)	EA	3
7105-00-269-8463	CHAIR, FOLDING, A-A-3083 (58536)	EA	6 PER LADS
7930-01-306-8369	CLEANING COMPOUND, SOLVENT, SIMPLE GREEN 13005 (1Z575)	EA	6 PER LADS
4820-01-477-9033	COCK, DRAIN, 4000-51R (43990)	EA	2 PER LADS
7240-00-161-1143	COVER, CAN, TRASH AND GARBAGE, 90146HDL (0T115)	EA	3
7110-00-656-1110	DESK, FIELD, MIL D 10821 (81349)	EA	2

MISSION PLANNING-CONTINUED

Table 1. Equipment Requirements for Mission Planning -Continued.

NATIONAL STOCK NUMBER	DESCRIPTION, PART NUMBER, AND CAGEC	U/I	QTY
5855-01-073-1384	FILTER ASSEMBLY, C87714 (51034)	EA	1 PER LADS
4330-01-481-7604	FILTER ELEMENT, FLUID, 863-410901 (4X630)	EA	1 PER LADS
4330-01-506-5774	FILTER ELEMENT, FLUID, 5 MICRON, 863-000555 (4X630)	EA	SEE TABLE 2
4330-01-506-5083	FILTER ELEMENT, FLUID, 10 MICRON, 683-000248 (4X630)	EA	SEE TABLE 2
4330-01-484-1465	FILTER, ELEMENT, FLUID, AIR FILTER PARTICULATE, 4438-01 (43990)	EA	1 PER LADS
4330-00-001-7841	FILTER ELEMENT, FLUID, COALESCING FILTER, 863-210902 (4X630)	EA	SEE TABLE 2
4460-01-481-7830	FILTER, ELECTROSTATIC, 6B701 (25794)	EA	1
6230-00-643-3486	FLASHLIGHT, E/N95, 6330-00-643-3486 (80244)	EA	2 PER LADS
5330-01-481-1846	GASKET, STILL DOOR, 863-210111 (4X630)	EA	2
5330-01-493-4411	GASKET, WATER PUMP COVER, 863-130990 (4X630)	EA	2
8414-01-434-1781	GLOVES, DISPOSABLE, 8414-01-434-1781 (80244) GRER-LG (100 PER BOX)	BX	4
8415-01-441-0149	GLOVES, MEN'S AND WOMEN'S, IMPERMEABLE, 50801 (1H8U7) (10 PER PACKAGE)	PG	4
4240-01-292-2818	GOGGLES, INDUSTRIAL, SAFETY, FUTURA 9301S345C (08895)	EA	1 PER LADS
	GUN, GREASE, 1055K14 (39428)	EA	1
	HAMPER, MOBILE, 27 CuFt, 2631T19 (39428)	EA	1
5120-00-265-7462	HAMMER, HAND, 41796 (90172)	EA	1
5980-01-493-5664	LIGHT EMITTING DIODE, 863-510902 (4X630)	EA	1
6240-00-001-9404	LAMP, INCANDESCENT, 12MB (88204)	EA	1
	MASK, DUST, 5450T42 (39428) (20 PER BOX)	BX	5
4330-01-506-6345	PARTS KIT, AIR FILTER GASKET, 863-410500 (4X630)	EA	2 PER LADS

MISSION PLANNING-CONTINUED

Table 1. Equipment Requirements for Mission Planning -Continued.

NATIONAL STOCK NUMBER	DESCRIPTION, CAGEC, AND PART NUMBER	U/I	QTY
4330-01-506-6352	PARTS KIT, AIR FILTER, PRE-FORMED, 863-410510 (4X630)	EA	2 PER LADS
5340-01-247-9650	PADLOCK, 1176A41 (39428)	EA	3 PER LADS
7240-01-150-0716	PAIL, UTILITY 3 GALLON, 77APX (0REY5)	EA	1 PER LADS
6515-00-137-6345	PLUG, EAR, (400 PER BOX) 4-375 (89875)	BX	1
7920-00-205-3570	RAG, WIPING, 7920-00-205-3570 (80244) (50 LB BUNDLE)	BE	1
5975-00-878-3791	ROD, GROUNDING, 9 FT, AA55804-3B (58536)	EA	2 PER LADS
3510-01-481-3396	SCREEN AIR INLET, CONDENSER, 863-220100 (4X630)	EA	3
3510-01-481-3393	SCREEN AIR INLET, CONDENSER, 863-220101 (4X630)	EA	1
3510-01-481-6856	SCREEN, AIR INLET, DRYER, 863-110011 (4X630)	EA	2
5120-01-013-1676	SLIDE HAMMER, 1322687741 (97430)	EA	1
7110-01-415-6895	TABLE, FOLDING, LEGS 9-1-0191 (81337)	EA	5
8340-01-456-3628	TENT, MEDIUM GENERAL PURPOSE, 2480108 (73005)	EA	2
3920-00-929-8588	TRUCK, HAND, 1/2X26X29-1/2, LAUNDRY, A-A-50025-4 (58536)	EA	1
6145-01-226-9164	WIRE, ELECTRICAL, A-A-59551 (58536)	FT	25

Consumables Planning

The amount of consumables required to support the LADS is directly related to the number of laundry cycles the LADS is operated per day times the number of operating days. Table 4 provides quantity factors for each consumable required per cycle. Multiplying these factors by the number of cycles per day, then by the number of days in the deployment will provide information on how much of each consumable is required.

Table 2. Consumable Calculations.

DESCRIPTION	QUANTITY PER CYCLE FACTOR	UNIT OF MEASURE	UNIT OF ISSUE
POTABLE WATER	12.8	Gallons	1 Gallon
POTABLE WATER (W/PRE-WASH)	60.0	Gallons	1 Gallon
FUEL (JP-8 OR DF-2)	7.5	Gallons	1 Gallon
ANTI-FOAM	0.031	Gallons	5 Gallons
DETERGENT	0.008	Gallons	5 Gallons

MISSION PLANNING-CONTINUED**Table 2. Consumable Calculations-Continued.**

DESCRIPTION	QUANTITY PER CYCLE FACTOR	UNIT OF MEASURE	UNIT OF ISSUE
FILTER, BAG (10-MICRON)	0.10	Each	1 Each
FILTER, BAG (5-MICRON)	0.03	Each	1 Each
FILTER ELEMENT COALESCER	0.009	Each	1 Each

Example 1: To determine the amount of anti-foam required use the following calculation:

$QF \times \#C \times \#D =$ Quantity of Anti-Foam Required (always round up to nearest whole number) UOI

Where:

QF = Quantity per Cycle Factor

#C = Number of Cycles per Day

#D = Number of Deployment Days

UOI = Unit of Issue

$\frac{0.031 \times 36 \times 45}{5} = 10.04$ Containers or 11 Containers when rounded up

Where:

QF = 0.031

#C = 36 Cycles (18 Cycles per Drum)

#D = 45 Days

UOI = 5—Gallons

Example 2: To determine the amount of 10 micron bag filters required use the following calculation:

$\frac{0.10 \times 24 \times 60}{1} = 144$ Filters

Where:

QF = 0.10

#C = 24 Cycles (12 Cycles per Drum)

#D = 60 Days

UOI = 1 Each

Personnel Planning

The number of personnel required to support the LADS is directly related to the amount of laundry to be processed and the number of LADS to be deployed. A minimum of 1 crew (1 Supervisor and 2 Operators) is required when operating the LADS for 10 hours or less per day. If continuous 20-hour daily operations are expected, a minimum of 2 crews per LADS are required. In addition, personnel are required to support the laundry receiving, bagging, un-bagging, and shipping operations. These operations require at least one supervisor per shift and 1 laundry handling person for every 50 soldiers worth of laundry processed.

END OF WORK PACKAGE

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By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:



JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0817501

DISTRIBUTION: To be distributed in accordance with initial distribution number (IDN) 256615 requirements for TM 10-3510-221-10.

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4,5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@avma27.army.mil

To: TACOMLCMC.DAForm2028@us.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **PublicationDate:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:**T
15. **Submitter LName:** Smith
16. **Submitter Phone:** (123) 123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE <i>21 October 2003</i>
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TO: (Forward to proponent of publication or form) (Include ZIP Code) COMMANDER TACOM Life Cycle Management Command, ATTNAMSTA-LC-LMPP / TECH PUBS1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: (Activity and location) (Include ZIP Code) <i>PFC Jane Doe</i> <i>CO A 3rd Engineer BR</i> <i>Ft. Leonardwood, MO 63108</i>
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PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER TM 10-4110-258-23P	DATE 30 October 2002	TITLE Refrigeration Unit, Mechanical 9K BTU, Electric Model F90000RE
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).
SAMPLE						

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE Jane Doe, PFC	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION 508-233-4141	SIGNATURE Jane Doe <i>Jane Doe</i>
---	--	---

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

TO: (Forward direct to addressee listed in publication) COMMANDER TACOM Life Cycle Management Command ATTN: AMSTA-LC-SECT 15 KANSAS STREET NATICK, MA 01760-5052	FROM: (Activity and location) (Include ZIP Code) <i>PFC Jane Doe</i> <i>CO A 3rd Engineer BR</i> <i>Ft. Leonardwood, MO 63108</i>	DATE <i>21 October 2003</i>
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 10-1670-296-23&P					DATE 30 October 2002		TITLE Unit Manual for Ancillary Equipment for Low Velocity Air Drop Systems	
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
0066 00-1					4			<i>Callout 16 in figure 4 is pointed to a <u>D-Ring</u>. In the Repair Parts List key for figure 4, item 16 is called a <u>Snap Hook</u>. Please correct one or the other.</i>
PART III – REMARKS <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE	

TO: <i>(Forward direct to addressee listed in publication)</i> COMMANDER: TACOM Life Cycle Management Command, ATTN: AMSTA-LC-LMPP / TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 10-3510-221-10	DATE 07 JULY 2008	TITLE Laundry Advanced System (LADS)
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
----------------------------	--	-----------

TO: <i>(Forward direct to addressee listed in publication)</i> COMMANDER: TACOM Life Cycle Management Command, ATTN: AMSTA-LC-LMPP / TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
---	--	-------------

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 10-3510-221-10	DATE 07 JULY 2008	TITLE Laundry Advanced System (LADS)
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

Empty space for remarks

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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TO: <i>(Forward direct to addressee listed in publication)</i> COMMANDER: TACOM Life Cycle Management Command, ATTN: AMSTA-LC-LMPP / TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 10-3510-221-10	DATE 07 JULY 2008	TITLE Laundry Advanced System (LADS)
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 feet

Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

 _F Fahrenheit temperature $\frac{5}{9}$ (after subtracting 32) Celsius temperature _C

PIN: 078210-000