U.S. MARINE CORPS TECHNICAL MANUAL

OPERATION AND UNIT MAINTENANCE INSTRUCTIONS WITH ILLUSTRATED PARTS BREAKDOWN

SMALL FIELD REFRIGERATION SYSTEM
4130-01-565-7655

FEBRUARY 2010
PCN 500 116090 00

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HOW TO USE THIS MANUAL

This manual is designed to provide instructions to perform set-up, operation, and scheduled maintenance procedures on the Small Field Refrigeration System (SFRS). This manual also provides corrective maintenance, troubleshooting, and component adjustment procedures for the refrigeration unit aboard the SFRS.

The information contained in this manual is the latest available information at the time of publication.

This manual is arranged into four chapters with the following titles:

Chapter 1 General Instructions

This chapter describes the general and physical description, provides reference data, and provides an illustration of the major components of the entire unit. Warranty and request for publications are also discussed.

Chapter 2 Operating Instructions

This chapter discusses the theory of operation, system controls and displays, operator service requirements, operation under normal and unusual conditions, shut-down, and emergency shut-down procedures.

Chapter 3 Maintenance Instructions

This section provides maintenance forms, tools required, maintenance procedures, operator maintenance and service instruction, troubleshooting procedures, and component adjustment procedures.

Chapter 4 Repair Parts List

This section lists the repair parts information for the component parts in exploded views and digital pictures, SMR codes, NSN to manufacturer cross reference, and manufacturer to NSN cross reference.

Throughout this manual the reader will see the following symbols, used to emphasize important and critical instructions:

NOTE ---------- This indicates a condition that is essential to highlight.

CAUTION ---------- **This indicates a condition that may cause equipment damage.**

WARNING ---------- **THIS INDICATES A CONDITION THAT MAY CAUSE PERSONNEL INJURY OR DEATH.**

SAFETY SUMMARY

GENERAL SAFETY PRECAUTIONS

This safety summary contains general safety warnings and hazardous material warnings that must be understood and applied during operation and maintenance of the SFRS. Failure to observe these precautions could result in equipment damage and / or serious injury or death to personnel.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must observe safety regulations at all times. Do not replace components or make adjustments inside the equipment with the power supply connected or the voltage supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the OFF position. To avoid casualties, always remove power and ensure the unit is discharged.

CHECK A CIRCUIT BEFORE TOUCHING IT.

Never operate equipment with any cover, screen, or panel removed unless instructions specifically direct you to do so. Remove power and check circuit with a meter. After checking with a meter, ground the circuit before touching components or wires.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person enter the container or reach into the equipment for the purpose of servicing or adjusting except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

SAFETY STEPS TO FOLLOW FOR THE VICTIM OF ELECTRICAL SHOCK

Do not try to pull or grab the individual.

If possible, turn OFF the electrical power.

If you cannot turn OFF the electrical power, pull, push, or lift the person to safety using a dry wooden pole, dry rope, or some other insulating material.

Send for help as soon as possible.

After the injured person is free of contact with the source of electrical shock, move the person a short distance away. Immediately start artificial respiration if necessary.

SPECIFIC SAFETY PRECAUTIONS

Warnings used in this manual are repeated here to stress how important they are. Study these warnings carefully; they can save lives.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

WARNING

Make sure all power plugs are clean and dry before connecting to any power receptacle.

WARNING

Never use air for leak testing. It has been determined that pressurized mixtures of refrigerant and air can undergo combustion when exposed to an ignition source.

WARNING

Always wear goggles or safety glasses when working with or around the refrigeration system. Refrigerant can cause permanent damage if it comes in contact with your eyes. Use the following first aid instructions to treat exposure to refrigerant:

- **Eyes**: For contact with liquid, immediately flush eyes with large amounts of water and get prompt medical attention.
- **Skin**: Flush areas with large amounts of warm water, do not apply heat. Wrap burns with dry, sterile, bulky dressing to protect from infection/injury. Get medical attention.
- **Inhalation**: Move victim to fresh air and restore breathing if necessary. Stay with victim until emergency personnel arrive.

WARNING

Fluorocarbon refrigerants tend to displace air and can cause oxygen depletion which could result in DEATH BY SUFFOCATION. Provide adequate ventilation in enclosed or confined areas

WARNING

Fluorocarbon refrigerants may produce toxic gases. In the presence of an open flame or electrical short, these gases are severe respiratory irritants capable of causing death.

WARNING

Fluorocarbon refrigerants evaporate rapidly, freezing anything they contact if accidentally released into the atmosphere from the liquid state.

WARNING

Failure to properly support the RU may cause serious injury or death. Use forklift only to support and transport the RU. Do not attempt to remove the RU manually.

WARNING

Do not stand beneath the RU at any time. Failure to observe this warning may cause serious injury or death.

WARNING

Protect skin and clothing from prolonged or repeated contact with refrigerant oil. Rubber gloves are recommended.

WARNING

Wash thoroughly immediately after handling refrigerant oil to prevent irritation

WARNING

Never operate the refrigeration unit with the compressor discharge valve closed. Compressors can explode, causing serious injury.

WARNING

Make sure power to the unit is OFF and power plug disconnected before performing maintenance.

WARNING

Wear rubber gloves and wash the cleaning solution from the skin immediately if accidental contact occurs. Do not allow the cleaning solution to splash onto concrete.

WARNING

The unit may start at any time when the On/Off switch in the ON position. This unit is capable of automatic operation and may start at any time without prior warning.

WARNING

Do NOT start the unit with the discharge service valve fully screwed in (front seated). Severe personal injury may result.

WARNING

Units may start at any time when the unit is connected to live electric power and the controller is ON. Be sure to turn the unit OFF before opening doors or inspecting any part

WARNING

Keep hands and loose clothing clear of fans and belts at all times when the unit is running or when opening or closing compressor service valves or serious injury may result.

ABBREVIATIONS

The following abbreviations are used throughout this manual.

Abbreviation	Definition
A	Amp(s)
AC	Alternating Current
BTU	British Thermal Unit
BTR/hr	British Thermal Unit Per Hour
°C	Degrees Celsius
cc	Cubic Centimeters
CFM	Cubic Feet Per Minute
cm	Centimeters
dBA	Decibels, A-weighted
DC	Direct Current
ea	Each
°F	Degrees Fahrenheit
ft	Foot/Feet
ft_2	Square Foot/Feet
ft^3	Cubic Foot/Feet
Gal	Gallon(s)
GPH	Gallon(s) Per Hour
GFCI	Ground Fault Circuit Interrupter
Hz	Hertz
hp	Horsepower
hrs	Hour(s)
in	Inch(es)
ID	Item Designator Number
KPa	Kilo Pascals
KW	Kilowatts
L	Liter
lb	Pound(s)
Max	Maximum
m	Meters
m^3	Cubic Meters
mm	Millimeters
Min	Minimum
N/A	Not Applicable
NS	Not Shown
NSN	National Stock Number
POLs	Petroleum, Oils and Lubricants
PDB	Power Distribution Box
pf	Power Factor
PSI	Pound-Force Per Square Inch
PSIG	Pound-Force Per Square Inch Gauge
qt	Quart
RPM	Revolutions Per Minute
RPS	Ruggedized Power Supply
SCFM	Standard Cubic Feet Per Minute
TAMCN	Table of Authorized Materiel Control Number
USMC	United States Marine Corps
V	Volt(s)

Abbreviation	Definition
VAC	Volt(s) Alternating Current
VDC	Volt(s) Direct Current
W	Watts

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CHAPTER 1

GENERAL INSTRUCTIONS

I. GENERAL DESCRIPTION AND SPECIFICATION DATA

1-1. Scope

a. This technical manual provides operation and maintenance instructions for the Small Field Refrigeration System NSN 4130-01-565-7655. This manual covers instructions for the operation, inspection and maintenance, with illustrated parts breakdown, for the Small Field Refrigeration System and its components. Equipment is manufactured by Sea Box Inc. of East Riverton, NJ, USA.

b. Instructions include all necessary operation, maintenance and test procedures; specific subject matter may be located by reference to the Table of Contents. For procurement and identification purposes, parts and assemblies can be identified through use of the Illustrated Parts Breakdown, Chapter 4.

c. This technical manual is the only source of guidance for the Small Field Refrigeration System and components, therefore, it is recommended that the following requirements are followed.

NOTE

Using service will utilize its own procedure for reporting errors and equipment improvement recommendations.

TASK	RESPONSIBILITY
Storage	User
Issue User	User
Control User	User
Repair	User
Inspection Responsibility	User
Inspection Form	User will annotate inspections on NAVMC 10560.
Periodic Inspection and Maintenance	User. Refer to paragraph 3-7.

1-2. Orientation

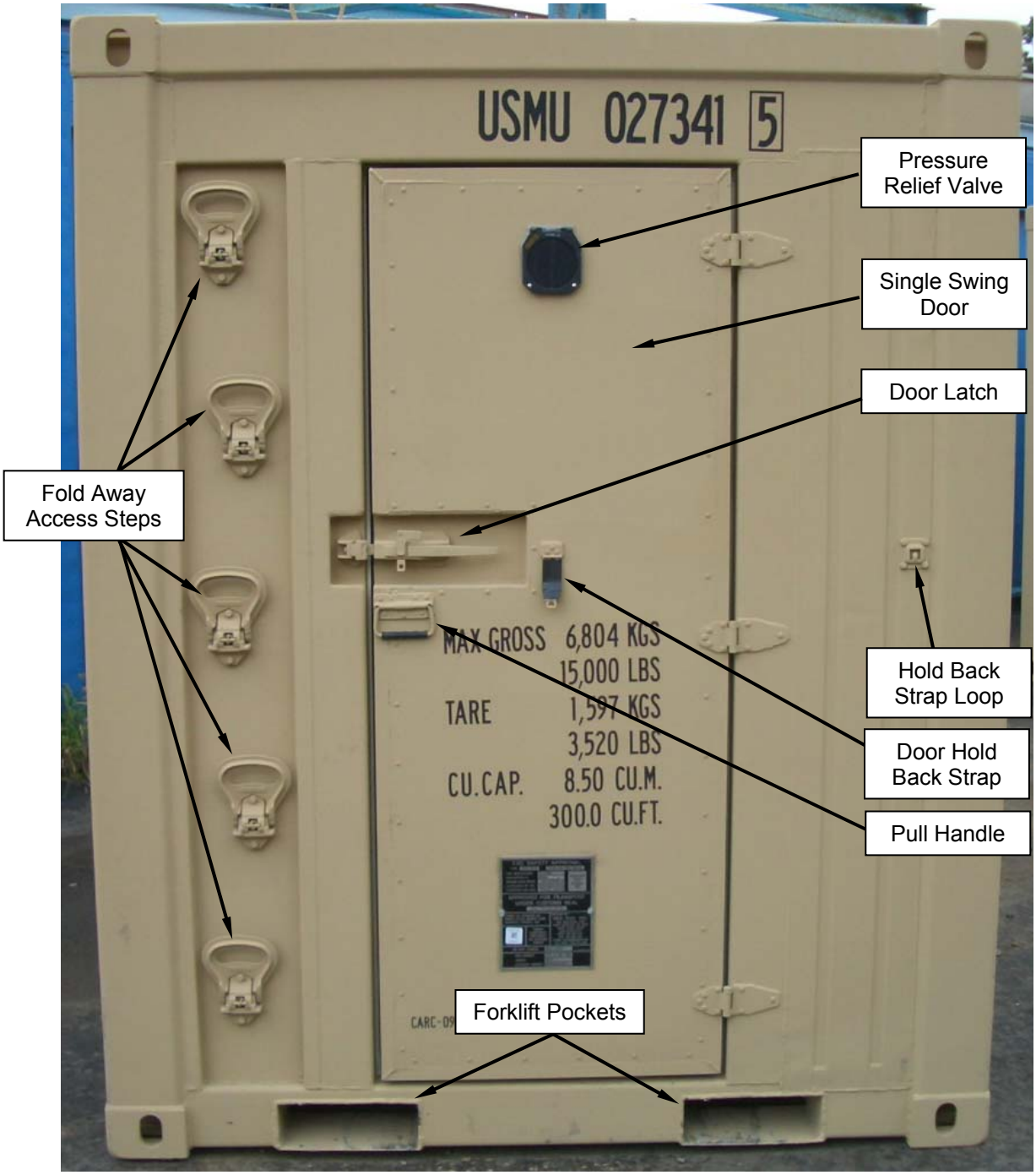


Figure 1-1. ISO Container.

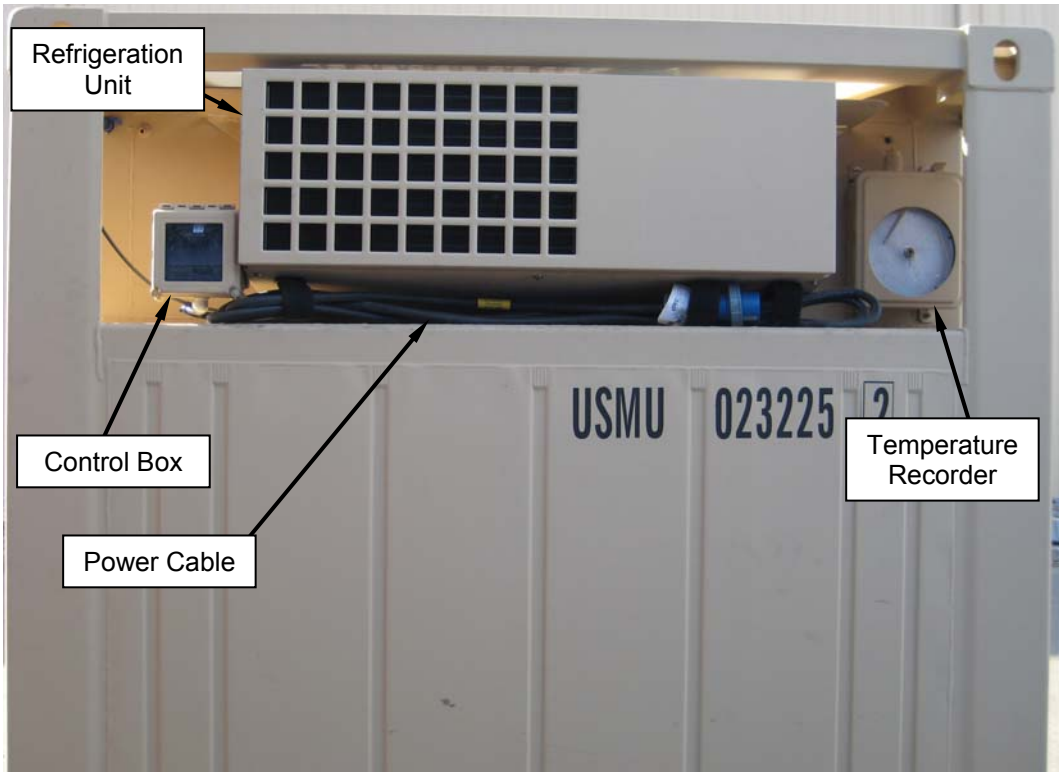


Figure 1-2. Refrigeration Unit.

Figure 1-3. Control Box Interior.

1-3. Physical Description and Specification Data

a. Small Field Refrigeration System. The Small Field Refrigeration System provides the capability to transport large, perishable cargo in a climate controlled, ISO standard container. The Small Field Refrigeration System is a self-contained refrigerated system that may be powered by shore power, military generator or an optional clip-on generator unit. The container is a 6.5 ft long, 8 ft wide, 8 ft tall ISO certified insulated container. Interior electrical lighting system is provided for low light conditions. Four way forklift pockets allow for easy transport. Container couplers are supplied to allow connection of multiple units and each unit is supplied with integrated storage brackets. Access steps lead to the non-slip roof for easy safe access. A heavy duty tread plate aluminum floor is installed to meet safety requirements. An air curtain is attached to a sliding track inside the container door to maintain interior temperature when door is open.

b. Refrigeration Unit. The Refrigeration Unit provides freezing, refrigeration and heating capability. It is powered by 208/230 VAC, 3-phase, 60 Hertz power. The unit is designed to operate between -25°F and 125°F using R-404A refrigerant. The refrigeration unit is a one-piece nose mounted unit that uses a semi hermetic compressor in the condenser section. Heating is accomplished by energizing the heating resistances. The control circuits operate on 24 VDC rectified from an AC transformer. Each refrigeration system is protected by high and low pressure cutout switches. Unit operation is performed from a remote control box. It includes an On/Off switch, manual defrost switch, thermometer, thermostat, thermostat adjustment, and indicator lights. Compressor operation is controlled by the thermostat energizing the compressor contact during cooling operation. An electronic defrost timer can initiate defrost automatically. Defrost is normally terminated by the defrost termination switch mounted on the evaporator coil; although the defrost cycle can be terminated by pressing the On/Off switch.

c. Single Swing Door. The single swing door is used to gain access to the container interior. There is a locking door handle and a pull handle used to open the door once it has been unlocked. The door is fitted with a pressure relief valve, locking door handle, pull handle, and door hold-back strap.

d. M13 Controller. The M13 controller regulates unit function and displays operating information. It can be used to select operating mode, setpoint, and display features. It is equipped with controls that regulate power, temperature, defrost, and setpoint. The controller is supplied with a digital display that indicates condition and relevant information.

e. Leading Particulars. For the index of leading particulars of significant Small Field Refrigeration System components refer to Table 1-1.

Table 1-1. Index, Tables of Leading Particulars

ISO CONTAINER

Weight:

Gross Weight	15,000 lbs (6,804 Kg)
Tare Weight	3,520 lbs (1,597 Kg)
Payload	11,480 lbs (5,207 Kg)

Exterior Dimensions:

Height	8 ft (2.44 m)
Length	6 ft 5.5 in (1.97 m)
Width	8 ft (2.44 m)

Interior Dimensions:

Height	6 ft (1.83 m)
Length	5 ft 11.69 in (1.82 m)
Width	7 ft 3.31 in (2.22 m)
Door Opening Height	75 in (1.90 m)
Door Opening Width	28 in (0.71 m)

Capacity:

Cubic Capacity (Dry Freight)	300 ft^3 (8.5 m^3)
Cubic Capacity (Reefer Freight)	281.6 ft^3 (8.0 m^3)

REFRIGERATION UNIT

Standby AC Motor:

Voltage	190/208 VAC
Phase	3
Frequency	50/60 Hz
Horsepower	2
Full Load Current	14.1/8.1 A

Refrigeration Specifications:

Total System Oil Charge	42.2 oz (1250 cc)
Compressor Oil Type	Polyol Ester (P/N 203513)
Refrigerant Charge and Type	4.8 ib (2.2 kg) R-404A
Defrost Method	Hot Gas

Defrost Termination Switch:

Opens	48 (+/– 5.4) °F = 8.9 (+/– 3) °C
Closes	36 (+/– 5.4) °F = 2.2 (+/– 3) °C

High Pressure Cutout Switch:

Opens	450 (+/–10) psi
Closes	375 (+/–10) psi

Low Pressure Cutout Switch:

Opens	5 to 11 in. Vacuum
Closes	4 to 7 psi (27.6 to 48.3 kPa)

Table 1-1. Index, Tables of Leading Particulars - Continued

Evaporator Fan Motor:	
Voltage	26 V
Number	2
Power Rating	100 W
Full Load RPM	2800
Full Load Current	5.2 A
Condenser Fan Motor:	
Voltage	26 V
Number	1
Power Rating	180 W
Full Load RPM	2800
Full Load Current	8.9 A
Fuses:	
Voltage	24 V
Evaporator Fan Fuse 1	10 A
Evaporator Fan Fuse 2	10 A
Evaporator Fan Fuse 3	15 A
M-13 Fuse 4	3 A
M-13 Fuse 4/1	3 A
Transformer Fuse 5	5 A
External Lamp Fuse 6	1 A
External Lamp Fuse 7	1 A
Hot Gas Solenoid Coils:	
Voltage	24 V
Current	1.3 A
Resistance	20 Ω
Heaters:	
Voltage	220 VAC
Number	2
Power	750 W
Full Load Current	3.5 A

II. PUBLICATION

1-4. Copyright Information

Sea Box Inc. and Thermo King Corporation grant the U.S. Government permission to reprint the information in this Technical Manual (TM) for use by the military services. This permission also includes the right to post the TM on controlled government "limited access" websites. This information is not intended for disclosure to the public or commercial entities, companies and / or organizations that are considered to be competitors of Sea Box Inc. and Thermo King Corporation.

1-5. Requisitioning of Publications

To view or print the TM, SL-3, or any other printed publications, use the on-line access to MCLB, Albany Georgia publications website at https://pubs.ala.usmc.mil. Refer to the SL-1-2 under equipment ID numbers or TM numbers for a listing of related publications.

1-6. Publications Feedback

Technical publications play a critical role in achieving system and equipment readiness. Because of this factor, the currency and accuracy of the data published in these documents are essential. Form NAVMC 10772, recommended Changes to Publications / Logistics-Maintenance Data Coding provides a medium for accelerating information feedback to effect the necessary corrections, changes, and / or revisions, as appropriate. Typographical errors need not be reported. The NAVMC 10772 may be submitted via the internet using website https://pubs.ala.usmc.mil/navmc/ , scrolling down to the NAVMC Tracking Program, and following instructions provided or by electronic mail to smb.log.tech.pubs.fct@usmc.mil. A paper copy may be mailed to Commander, Marine Corps Systems Command, Attn: Assistant Commander Acquisition and Logistics (LOG/TP), 814 Radford Blvd, Suite 20343, Albany, Georgia 31704-0343.

1-7. Report of Errors, Omissions, and Recommendations

Report of errors, omissions, and recommendations for improvement of this manual by its user is encouraged. Such reports should be submitted by using Marine Corps NAVMAC 10772, directly on-line at https://pubs.logcom.usmc.mil.

1-8. Changes

Changes will be forwarded as required. Changes to Marine Corps Stocklist and Marine Corps Technical Manuals will be numbered consecutively beginning with number 1. Each change will show the new effective date of this RPL and latest Marine Corps Modification Technical Instructions for which repair parts are included. When changes are received, annotate the Record of Changes sheet.

a. Changes to other service publications and commercial manuals, adapted for Marine Corps use, will be identified by Alpha letters beginning with letter A. These changes will be handled the same as changes to Marine Corps Stocklist.

b. Changes to Marine Corps Stocklists for NSNs will not be made on an as received basis. Changes to NSNs, initiated by replacement parts, substitute parts, standardization and other actions that are denoted by phrase code actions in the MCML and CMDN Files, will be held until it has been determined that a sufficient number of changes warrant such action.

1-9. Applicable Publications

For full information concerning the Marine Corps Stocklist publications, see the current edition of MCO P5215.17C, The Marine Corps Technical Publications System.

III. WARRANTY

For warranty provisions refer to SI 11574A/11609A-OI.

IV. PREPARATION FOR USE

1-10. Visual Inspection Upon Initial Receipt

Table 1-2. Visual Inspection Upon Initial Receipt

Component	Inspection/Service
	EXTERIOR
Cargo Door	Inspect Door Hardware (Cargo Door) for bent or broken door handle.
Refrigeration Unit	Check refrigeration unit for secure installation. Install and secure loose or missing mount bolts.
Control Box	Open control box door. Check for loose electrical connections or hardware.
Electrical Cable	Check electrical cable for cuts, deep abrasions, burned or discolored wiring.
Chart Recorder	Check chart recorder unit for secure installation. Install and secure loose or missing chart recorder. Check for presence and proper installation of stylus.
	INTERIOR
Cargo Door	Inspect cargo door for obvious damage such as cracks and holes affecting serviceability. Check seal for damage.
Air Curtain	Check air curtain for obvious damage such as cracks and breaks affecting serviceability. Check floor track for damage.
Lighting	Check light for security of components.
Container Couplers	Check for presence and serviceability of container couplers (3).
Lighting	Check for presence and serviceability of chart recorder paper (20).
Flooring	Inspect container floor for punctures and obvious damage. Inspect floor for blocked or clogged drains.

1-11. Initial Checkout and Inventory

a. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of sections 1-13 and 1-14 as applicable. Retain a copy of the packing slip and/or hand receipt in the manual holder.

b. Check to see if the equipment has been modified.

c. Check to insure the following items are present:

(1) Tie-down Straps (3)
(2) Chart Recorder (1)
(3) Recorder Key (1)
(4) Temperature Recording Charts (20)
(5) Container Couplers (1)

1-12. Maintenance Forms, Records, and Reports

Marine Corps Units using Asset Tracking Logistics and Supply System (ATLASS) will maintain the forms and records information in accordance with the applicable ATLASS requirements. All other Marine Corps Units will maintain forms and records associated with the operation and maintenance of ground equipment as prescribed by TM 4700-15.

1-13. For Shipping Discrepancies

Marine Corps users fill out and forward SF 361 as prescribed in UM 4400-124, and MCO P4610.1GE, uniform settlement of Military Freight Loss and Damage claims to the Source of Supply (SOS).

1-14. For Packaging Discrepancies

Marine Corps users fill out and forward SF 364 as prescribed in UM 4400-124 and SECNAVINST 4355.18, via Supply Discrepancy Report Procedures.

1-15. Installation and Relocation

a. Siting.

(1) Transport. The refrigerated container system is designed for highway, railway and water transport of perishable materials. Transport the refrigerated container system only on equipment compatible with DTR 4500.9-R and MCO P4600.7_ transport requirements.

(2) Fixed Site. Although there are no specific siting requirements for the placement of the Small Field Refrigeration System, there are several factors that should be considered during site selection. Place the SFRS on firm, flat, and level ground. Choose a site that is firm and dry, away from any potential flood areas, and clear of trees that may create problems in high winds. The site must be free of debris. The ground should be level, varying no more than three (3) inches in ten (10) feet on unprepared soil. To prevent the danger of excess exposure to moisture, do not site the SFRS near a water feature. Consider condensate drainage from the RU when siting. Also consider the need for power. Place the SFRS close enough to an appropriate power source so that the unit may be operated properly. Consider the need for vehicular and personnel access. Vehicle access and proximity to a roadway is important. However, concealment and other factors may be more important. Place the container so that the single swing door can be fully opened and personnel can load the container with the least amount of interference. Ensure that container placement allows for vehicular access as needed.

b. Input Requirements.

Power. There are two different power installation options available to operate the LFRS:

(1) 208/220 VAC, 3 phase.

c. Installation Procedure.

When using the SFRS alone, with no other units coupled, set up the container as follows:

(1) Site the SFRS on flat, level, and stable ground.

(2) Consider the need for electrical connections when selecting a site. The container should be sited near an appropriate power source.

(3) Consider vehicular and personnel traffic. Site the container so that the door may be fully opened and personnel may easily gain access to the interior of the container. Keep vehicles from driving over power cables.

(4) Use the forklift pockets to lift the container.

(5) Move the container into place with two personnel, one to drive the forklift and move the container and the other to assist and ensure proper placement.

(6) Once properly sited, uncoil and remove the plug end of the power cord from below the RU and connect to the power source.

(7) Once power is connected there are no additional adjustments required. Grounding of the unit is accomplished through the power cable connections and the unit is commissioned before leaving the factory eliminating the need for initial adjustments to the equipment.

b. When coupling two, three, or four containers, set up and couple the containers as follows:

(1) Site the SFRS units on flat, level, and stable ground.

(2) Consider the need for electrical connections when selecting a site. The container should be sited near an appropriate power source.

(3) Consider vehicular and personnel traffic. Site the container so that the door may be opened and personnel may easily gain access to the interior of the container.

(4) Use the forklift pockets to lift the container.

(5) Move the container into place with two personnel, one to drive the forklift and move the container and the other to assist and ensure proper placement.

(6) Align the containers, with all doors exposed, next to each other with approximately 1-foot gap between the corners.

(7) Position the coupler locking handle in the OPEN position so that the stem is aligned with the collar as shown in Figure 1-4.

Figure 1-4. Twist-lock Coupler.

(8) Insert the container coupler into the ISO aperture in upper left hand corner of container as shown in Figure 1-5.

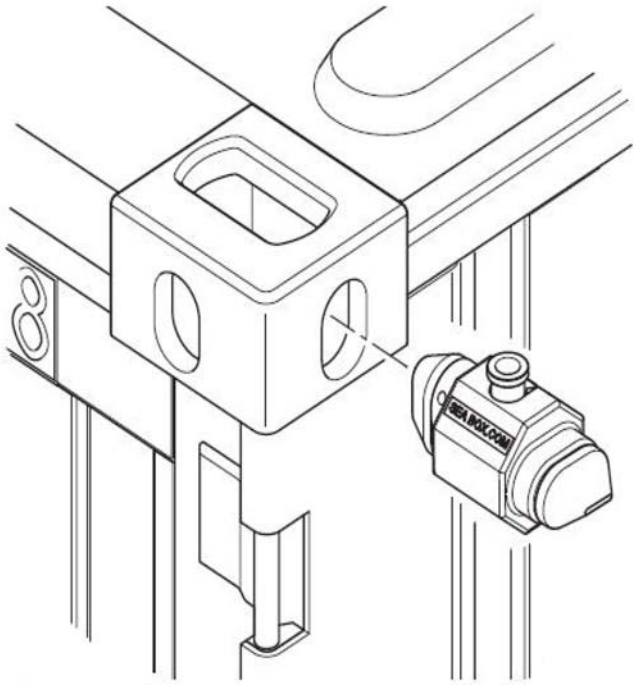


Figure 1-5. Container Connection.

(9) Rotate the body of the container coupler 90° as shown in Figure 1-6 so that it locks into place.

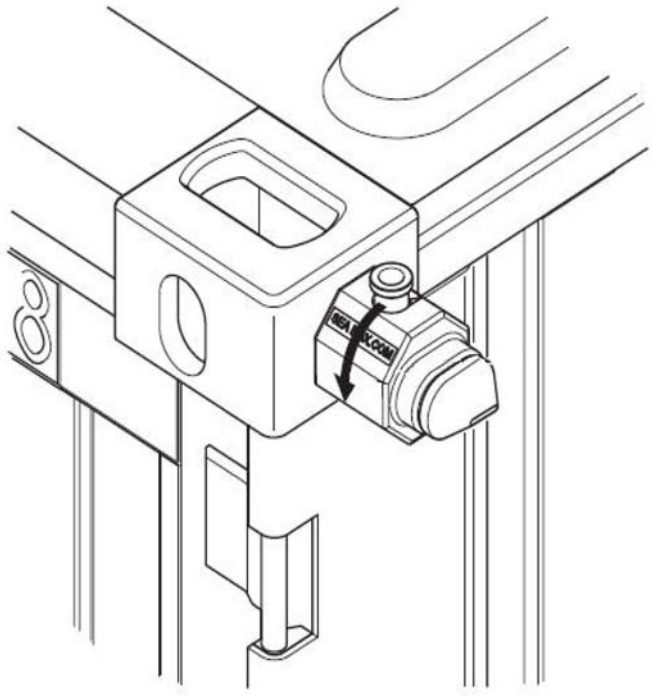


Figure 1-6. Container Connection.

(10) Ensure the locking handle is in the OPEN position and the container coupler is positioned to mate with the ISO aperture of the second container as shown in Figure 1-7.

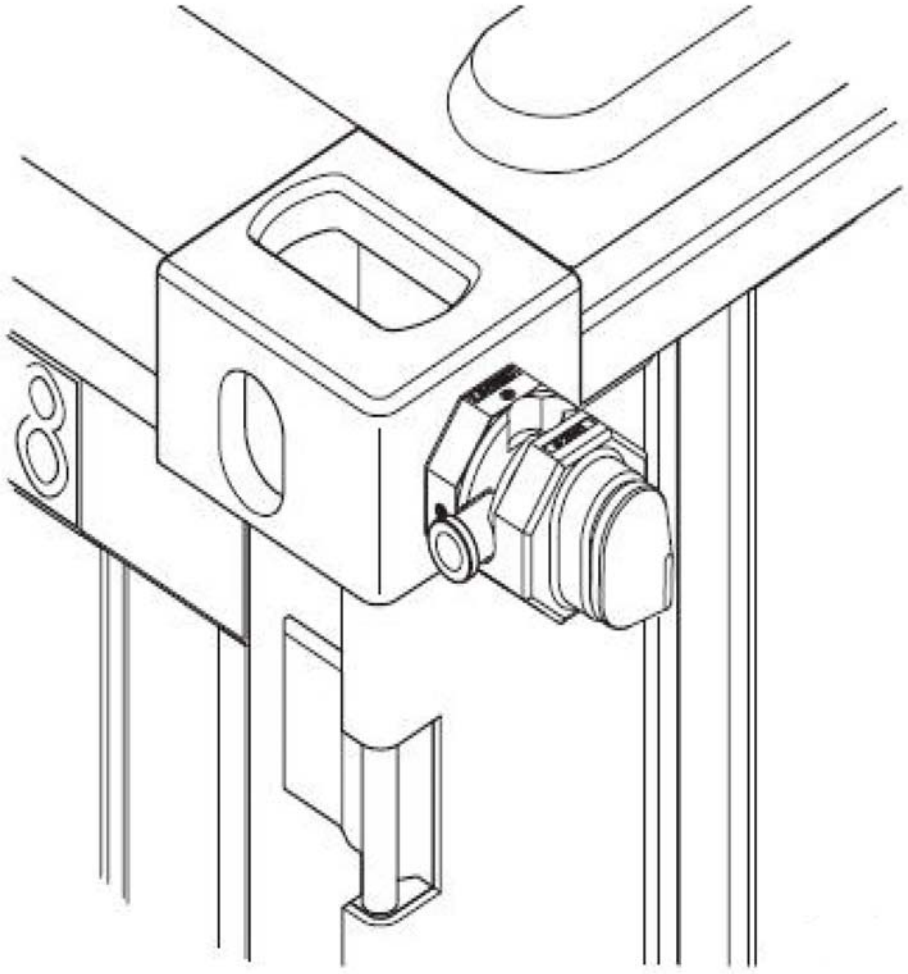


Figure 1-7. Container Connection.

(11) Insert the second, third, and fourth container couplers in the remaining ISO apertures as shown in Figure 1-8.

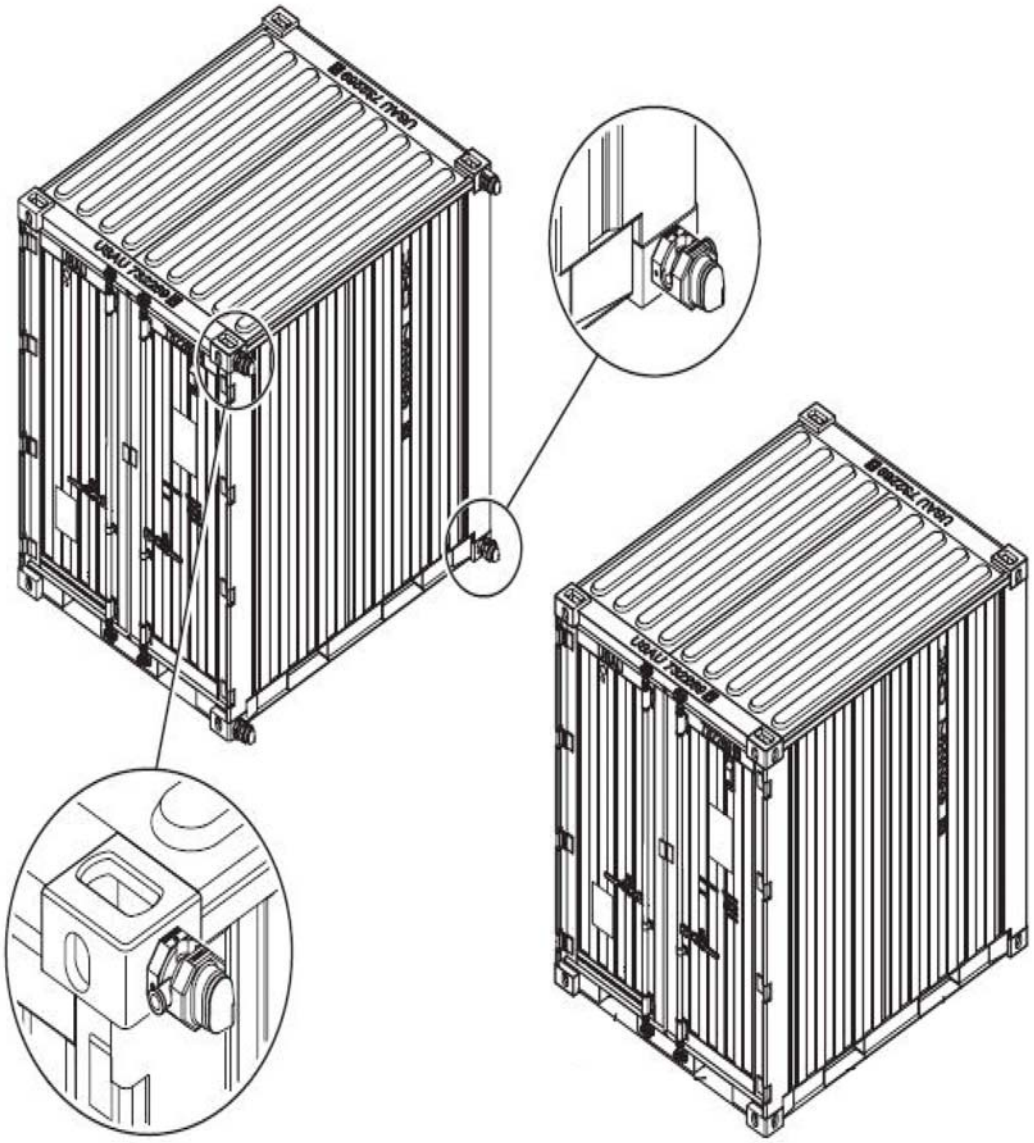


Figure 1-8. Container Connection.

CAUTION

Connecting multiple SFRS containers together with couplers is a tool free operation. DO NOT hit containers with a hammer or use extension levers or bars to operate the coupler locking handle.

NOTE

The horizontal twist-lock coupler handle should move freely from the OPEN to the LOCKED position. If the twist- lock coupler handle cannot be manually moved into the LOCKED position, use a fork lift to reposition one of the containers so they are aligned properly. DO NOT ATTEMPT TO FORCE THE TWIST-LOCK COUPLER HANDLE.

(12) Using a fork lift, slide the mating container onto the moveable cone of the couplers so the container is flush against the surface of the container coupler bodies. Rotate the container coupler handles as shown in Figure 1-9 into the LOCKED position. Release the handle on all four couplers to secure containers.

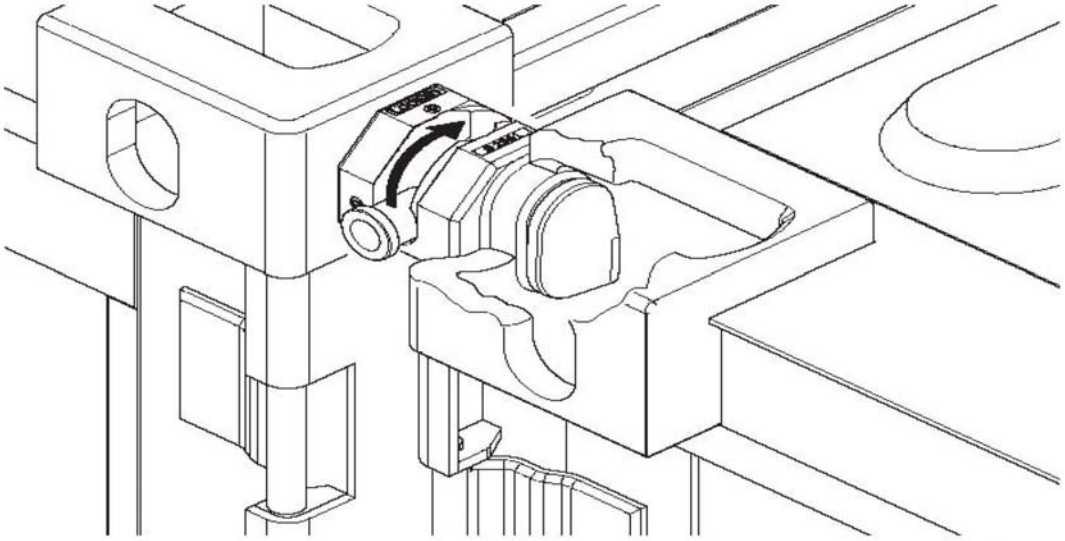


Figure 1-9. Container Connection.

V. PREPARATION FOR STORAGE

1-16. Preparation for Storage and Reshipment

a. When using the SFRS individually, prepare the system for movement as follows:

(1) Disconnect power cord from power source. Coil and secure power cord with retaining straps.

(2) Close and latch the container door.

b. When using the SFRS coupled with other systems, prepare the systems for movement as follows:

(1) Disconnect power cord from power source.

(2) Secure all cargo with tie downs.

(3) Close and latch the container door.

(4) Rotate the container coupler handles into the OPEN position as shown in Figure 1-10. Release the handle on all four couplers to free containers from each other.

Figure 1-10. Coupler in OPEN Position.

(5) Carefully lift each container away with a forklift.

(6) Once separated, the containers may be transported individually.

VI. DESTRUCTION TO PREVENT ENEMY USE

a. Authority for Destruction

Destruction of the equipment will be accomplished only upon the order of the commander. The destruction procedures described below will be used to prevent further use of the equipment.

b. Methods of Destruction

Use of any of the methods of destruction given below. The time available for destruction is the major factor in determining the method of destruction.

(1) Smash. Smash the cabinet, meters, and controls. Use sledges, axes, hammers, crowbars, and other heavy tool available. Remove the top panel, and smash the internal components.

(2) Cut. Cut the wiring of the SFRS. Use axes, hand axes, or machetes.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

(3) Burn. Burn the technical manuals first. Burn as much of the equipment as is flammable; use gasoline, oil, and similar materials. Pour gasoline on the cut cables and internal wiring and ignite them. Use a flamethrower to burn the spare parts, or pour gasoline on spares and ignite them. Use incendiary grenades to complete the destruction of the unit.

(4) Dispose. Bury or scatter destroyed parts, or throw them into nearby waterways.

CHAPTER 2

OPERATING INSTRUCTIONS

I. SYSTEM CONTROLS AND COMPONENTS

2-1. System Components

Figure 2-1. ISO Container.

Figure 2-2. Control Box, Refrigeration Unit, and Chart Recorder.

Figure 2-3. Container Couplers, Light Switch, Thermometer, Light, and Document Holders.

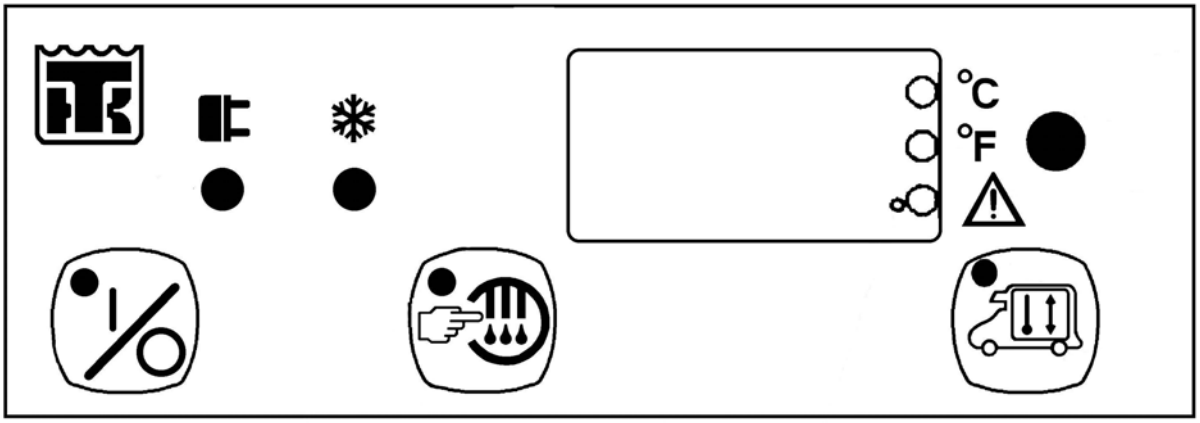


Figure 2-4. M13 Controller.

2-2. System Controls

a. Details for operating controls and indicators of the Small Field Refrigeration System and associated components are given in Table 2-1 and shown in Figure 2-5.

Table 2-1. Operating Controls and Indicators.

Item No.	Description	Type Component	Function
1	Chart Temperature Recorder	Electrical	Records temperature for 30 days.
2	M13 Controller Unit	Electrical	Regulates unit functions and displays operating information.
3	Lighting	Electrical	Illuminates container interior.
4	Lighting Controls	Electrical	Controls Interior Lightning.
5	Thermometer	Environmental	Displays interior temperature.

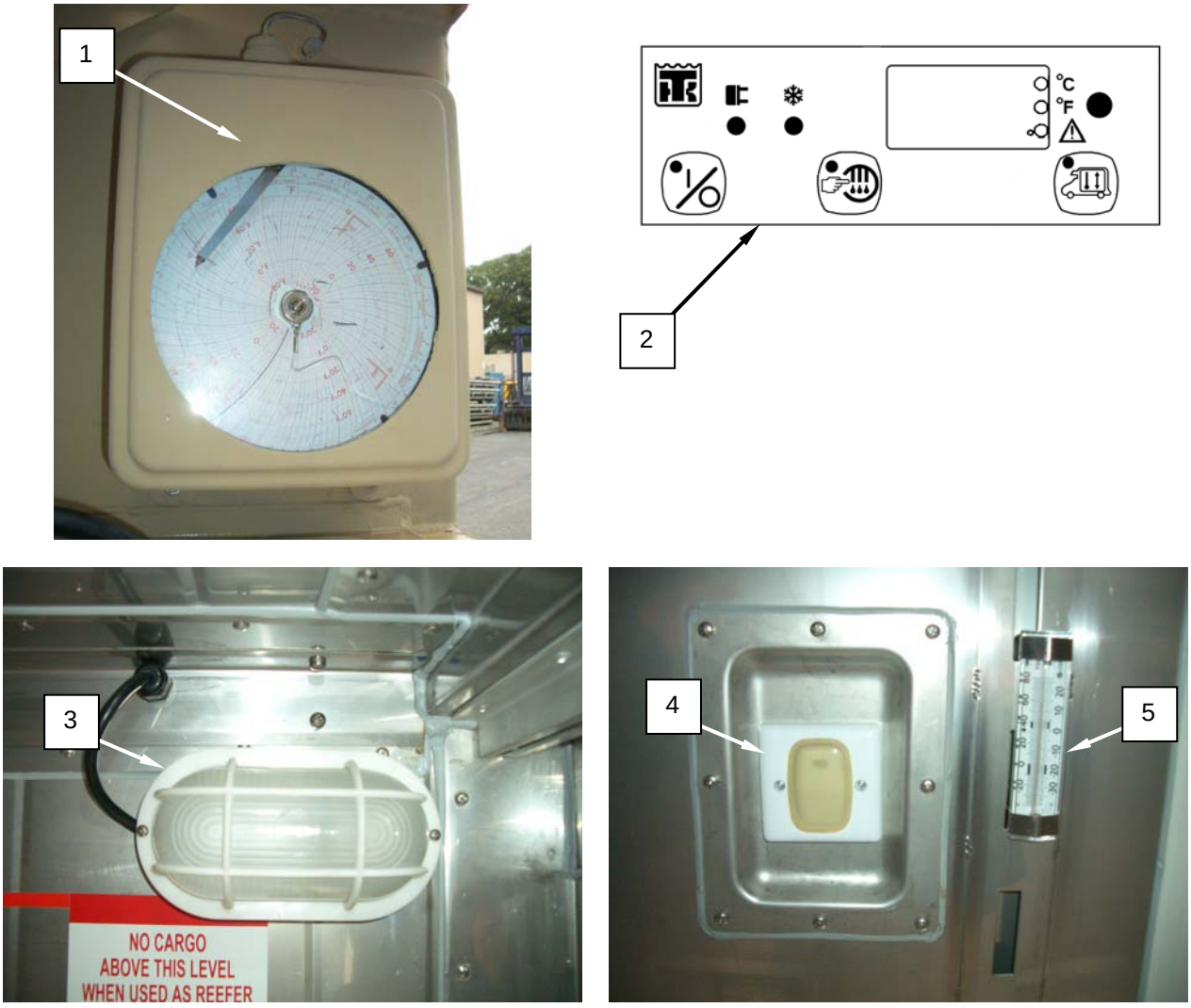


Figure 2-5. Operating Controls and Indicators.

b. Details for operating controls and indicators of the M13 Controller are given in Table 2-2 and shown in Figure 2-6.

Table 2-2. Operating Controls and Indicators for M13 Controller

Item No.	Description	Type Component	Function
1	ON Indicator Light	Electrical	Indicates unit is ON when illuminated.
2	ON-OFF Key	Electrical	Controls unit operation. Restarts unit when stopped by overload
3	Power Cord Indicator Light	Electrical	Indicates unit is connected to AC power when illuminated.
4	Unit Operation Indicator Light	Electrical	Indicates unit is in operation when illuminated. Green light indicates cooling mode. Red light indicates heating mode.
5	Defrost Indicator Light	Electrical	Indicates unit is in defrost mode when illuminated.
6	Manual Defrost Key	Electrical	Controls defrost cycle.
7	Celsius LED Indicator	Electrical	Indicates temperature displayed is in Celsius when illuminated.
8	Fahrenheit LED Indicator	Electrical	Indicates temperature displayed is in Fahrenheit when illuminated.
9	AC Overload LED	Electrical	Indicates overload relay has opened and unit has stopped.
10	Setpoint LED	Electrical	Indicates temperature displayed is setpoint temperature.
11	Setpoint Key Indicator	Electrical	Indicates setpoint is adjustable using Thermostat Dial when illuminated.
12	Setpoint Key	Electrical	Controls setpoint display. When pressed, displays setpoint temperature for 10 to 15 seconds.
13	Thermostat Dial	Electrical	Controls thermostat setpoint when Setpoint Key Indicator is illuminated.
14	Digital Display	Electrical	Displays digital data.

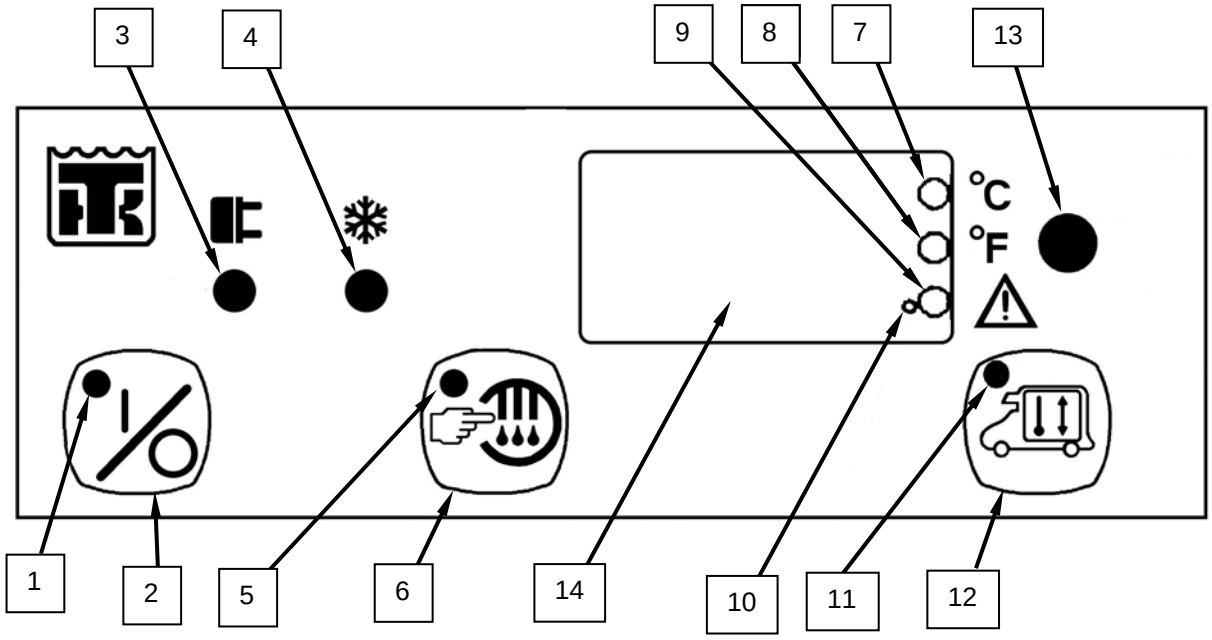


Figure 2-6. M13 Controller Operating Controls and Indicators.

II. THEORY OF OPERATION

2-3. Theory of Operation

The Small Field Refrigeration System consists of an 8ft x 8ft x 6.5 ft insulated container with an integrated refrigeration unit. Power to the container is delivered from an outside source.

2-4. Insulated Container

Small Field Refrigeration System ISO containers can be coupled together with a system of container couplings. Up to three containers can be coupled together. When 3 SFRS units are coupled together they can be transported as a Twenty foot Equivalent Unit (TEU). This dimension is recognized commercially and may, if desired, be transported by common carrier. The container has a single swing door to allow access and sliding track air curtains to help retain interior temperatures.

2-5. Refrigeration Unit

The RU removes heat from the container (refrigerates) using a vapor compression cycle which uses the refrigerant R404A. The compressor compresses a low-pressure superheated vapor into a high-pressure superheated vapor. This superheated vapor is then cooled in the condenser coil, and is condensed and subcooled, thus leaving as a subcooled liquid and directed into the receiver tank. The subcooled liquid refrigerant is expanded through the Thermal Expansion Valve (TXV) into the evaporator as a low temperature saturated mixture. Heat is absorbed from the conditioned space by heat transfer from the air to the evaporator coil. Heat is absorbed by the evaporated as refrigerant absorbs latent heat and becomes a superheated vapor. After leaving the evaporator, the refrigerant flows through the Compressor Pressure Regulator, or Suction Pressure Regulator, which modulates the refrigerant flow rate, and thus the RU cooling capacity.

The RU is equipped with a Hot Gas Defrost solenoid which defrosts the coil by feeding the high temperature, high pressure gas from the compressor into the inlet port of the evaporator coil.

A hot gas solenoid valve provides local heat to the evaporator by means of hot gas from the discharge line. An electronic defrost timer can initiate defrost automatically. Defrost is normally terminated by the defrost termination switch mounted on the evaporator coil. The defrost cycle can be terminated by pressing the On/Off switch. The defrost timer automatically initiates the defrost cycle at preset intervals and is powered directly by the standby power supply. This means that the defrost timer is counting whenever the unit is connected to the main supply even when the unit is switched off.

The refrigeration unit's control circuits operate on 24 VDC rectified from an AC transformer and is protected by high and low pressure cutout switches. Unit operation is performed from a remote control box. It includes an On/Off switch, manual defrost switch, thermometer, thermostat, thermostat adjustment, and indicator lights. Compressor operation is controlled by the thermostat, energizing the compressor contact during cooling operation.

The refrigeration unit cycles among Heat, Cool and Null to maintain the box temperature at the thermostat setpoint. The operating modes are: Cool, Null, Heat and Defrost. The thermostat controls the operation of the unit by energizing and de-energizing the Power Relay PR. When the Power Relay is energized, the condenser fans are powered up (as well as the compressor motor). When the unit is connected to the main supply, the external lamp is powered up by 110 V.

2-6. Cool Mode Operations

The thermostat energizes the Power Relay at box temperatures higher than setpoint. The thermostat keeps the Power Relay energized while the box temperature is higher than 4° F (2.2° C) above setpoint. The Power Relay energizes the evaporator and condenser fan relays, the drain heaters and the compressor contactor. The fans and the compressor run and the unit cools.

2-7. Null Mode Operations

The thermostat shifts from Cool to Null at box temperatures lower than setpoint. The thermostat shifts the unit from Cool to Heat at 4° F (2.2° C) below the setpoint. The thermostat shifts the unit from Heat to Null at setpoint.

2-8. Heat Mode Operations

The thermostat shifts the unit to Heat at temperatures more than 4° F (2.2° C) below the thermostat setpoint. The thermostat keeps the unit running in Heat until the temperature reaches the thermostat setpoint. When the unit is in Heat mode, the thermostat drives the heater contactor, the evaporator fans and the electric resistant heaters, and the unit heats.

2-9. Defrost Mode Operations

The Defrost cycle can be initiated any time the evaporator coil temperature is below 36° F (2.2^0 C). Defrost is initiated automatically by the defrost timer, or manually by pressing the manual defrost switch. When the Power Relay is energized, the drain heaters are activated and the defrost relay energizes the Solenoid Valve PS to route hot refrigerant gas to the evaporator. The defrost relay also interrupts power to the fan relays to stop the evaporator and condenser fans during defrost. The Defrost cycle will continue until the evaporator coil temperature rises to 48 °F (8.9^0 C), causing the defrost termination switch to open. Defrost cycle can also be terminated by pressing the On/Off switch twice.

III. PRE-OPERATING PROCEDURES

2-10. General

a. Container Door Operation.

(1) The SFRS container door can be operated from the exterior handle or the interior emergency release pushrod.

CAUTION

The container door has two handles; a door handle and a pull handle. The door handle should only be used to break the vacuum between the container and the door seal. The door is opened by pulling on the pull handle once the vacuum seal is broken. Damage to the door handle may result if it is used to pull the door open.

(2) To operate the door from the exterior the latch must be raised in the unlocked position as shown in Fig 2-7. Pull back on the door handle to break the vacuum between the container and the door. Use the pull handle to open the door once the vacuum has been broken.

Figure 2-7. Door Handle.

(3) To operate the door from the container interior depress the pushrod shown in Fig 2-8 and apply pressure to the door.

Figure 2-8. Interior Emergency Release Pushrod.

b. Loading.

(1) Be sure the unit is OFF before opening the door to minimize frost accumulation on the evaporator coil and heat gain inside the box.

(2) Spot check and record load temperature while loading. Especially note any off-temperature product.

(3) Load product so that there is adequate space for air circulation completely around the load. DO NOT block the evaporator inlet or outlet.

(4) Products should be pre-cooled before loading. Refrigeration units are designed to maintain loads at a consistent temperature, NOT to cool down hot loads.

c. After Loading Procedures.

(1) Be sure all doors are closed and locked.

(2) Adjust the thermostat to the desired temperature setpoint.

(3) Start the unit.

(4) Half an hour after loading, defrost the unit by momentarily pressing the Manual Defrost switch. If the coil temperature drops below 36^0 F (2.2^0 C), the unit will defrost. The defrost cycle should stop automatically.

2-11. Fluid and Lubrication Requirements

The following fluids and lubricants are required to properly operate the SFRS.

Total System Oil Charge ..... 42.2 oz (1250 cc)
Compressor Oil Type .....Polyol Ester (POE Oil)
Refrigerant Charge and Type..... 2.2 kg (4.8 lbs.) R-404A

2-12. Before, During, and After Operations Checks

a. Before Operations Inspection.

(1) Inspect for leaks. Inspect for refrigerant leaks and worn refrigerant lines.

(2) Inspect electrical connections. Electrical connections should be securely fastened. Wires and terminals should be free of corrosion, cracks or moisture.

(3) Defrost Drain. Check the defrost drain hose and fittings to be sure that they are open so condensation can run out during defrosting. Check the bottom end of the drain hose to be sure that it is not plugged or crushed.

(4) Structural. Visually check container and refrigeration unit for physical damage.

(5) Sightglass. Check for proper refrigerant charge level through the sightglass.

b. During Operations Inspection.

(1) Thermostat. Dial the thermostat setting above and below the box temperature to check thermostat operation.

(2) Pre-Cooling. With the thermostat set at the desired temperature, allow the unit to run for one-half to one hour before loading the container. Pre-cooling will remove residual body heat and moisture from the box interior and provide a good test of the refrigeration system.

(3) Defrost. When the unit has finished pre-cooling, the container interior (evaporator temperature dropped below 36^0 F (2.2° C), initiate a defrost cycle with the manual defrost switch. The defrost cycle should end automatically.

IV. CONTROLLER FUNCTIONS

2-13. Controller Functions

a. Controller Operation Indicators.

(1) With the unit or the controller OFF, the display screen will be dark and nothing will appear on the display screen. When the unit ON/OFF key is pressed ON, the Unit Operation Indicator Light will be lit. The unit will display the return air temperature or the setpoint temperature on the display screen, depending on the current operating mode. When the unit is switched OFF, the screen is blank and the Unit Operation Indicator Light goes OFF.

(2) During normal operation, the return air temperature remains on the display screen. To display the setpoint, press the setpoint key.

b. Manual Defrost Procedure.

A manual defrost may be initiated anytime the evaporator coil temperature is below 36° F (2.2° C).

(1) Press the manual defrost key. The defrost indicator will light, indicating that the unit is defrosting.

(2) The unit will automatically return to the proper operating mode when the defrost cycle is finished. The unit will return to cooling mode automatically when the coil temperature reaches 48° F (8.9° C).

(3) To end the defrost cycle before automatic termination, press the ON/OFF key to OFF.

c. Setpoint Selection Procedure.

CAUTION

Do not accidentally move the thermostat dial. The setpoint temperature can be changed by moving the dial without pressing the setpoint key.

(1) Press the setpoint key and the setpoint temperature is displayed on the screen.

(2) Observe the controller display and turn the thermostat dial to the desired setpoint temperature.

(3) Release the setpoint key. The return air temperature should appear on the display screen after 10 seconds.

V. NORMAL OPERATING PROCEDURES

2-14. Modes of Operation

The refrigeration unit automatically selects the modes of operation based on the internal box temperature and the selected setpoint. The only mode of operation that requires a selection from the user is the defrost mode.

a. Cooling Mode.

(1) When the unit temperature is set to cool it will operate in the cooling mode, this is indicated by the Unit Operation Indicator Light, which will be illuminated green.

b. Heating Mode.

(1) When the unit temperature is set to heat it will operate in the heating mode, this is indicated by the Unit Operation Indicator Light, which will be illuminated red.

c. Null Mode

(1) When in cool mode, the system automatically shifts into the null mode when the refrigeration temperature drops below the setpoint temperature.

(2) When in heat mode, the system automatically shifts into the null mode when the refrigeration temperature is higher the setpoint temperature.

d. Defrost Mode.

(1) When the manual defrost button is selected the unit will operate in the defrost mode, this is indicated by the Defrost Indicator Light, which will be illuminated.

2-15. Startup

a. Connect the external power supply to the power receptacle. Make sure that the power supply voltage is correct for the unit. The Power Cord LED must be ON.

b. Press the On/Off Switch in the Control Box. The On/Off LED must be ON.

c. Adjust the thermostat setting.

2-16. Shutdown

a. Press the On/Off Switch in the Control Box. The On/Off LED must be OFF.

b. Disconnect the external power supply from the power receptacle. The Power Cord LED must be OFF.

2-17. Emergency Shutdown

a. Press the On/Off Switch in the Control Box. The On/Off LED must be OFF.

VI. OPERATION UNDER UNUSUAL CONDITIONS

2-18. Unusual Conditions

a. Operation in Heavy Rain or Flooding.

(1) Keep container doors closed and secure whenever possible.

(2) Keep refrigeration unit controller protected from rain.

(3) To minimize the effects of flooding or heavy rain, dig a trench around the container to evacuate excess water.

(4) Keep power cable and plug away from water or excess moisture.

(5) Keep circuits and electrical components covered and protected from moisture.

b. Operation in Extreme Moist Heat

(1) Keep power cable and plug away from water or excess moisture.

c. Operation in Extreme Dry Heat

There are no specific operational requirements or restrictions for operation in extreme dry heat.

d. Operation in Extreme Cold

(1) Keep power cable and plug away from water or excess moisture.

(2) Do not touch bare metal surfaces with bare hands.

e. Operation in Salt Air or Sea Spray

(3) Keep power cable and plug away from water or excess moisture.

(4) Clean components that are exposed to salt more frequently.

f. Operation in Dust Storms or Sand Storms

(1) Keep container doors closed and secure whenever possible.

(2) Keep power plug free of sand and other particles.

g. Operation in High Altitude

There are no specific operational requirements or restrictions for operation in high altitudes.

h. Operation in Snow

(1) Keep power cable and plug away from water or excess moisture.

(2) Keep plug clear of ice and other particles.

i. Operation in Mud

(1) Keep power cable and plug away from water or excess moisture. Keep plug clear of mud and other particles.

(2) Clean floor more frequently. Keep floor free of mud whenever possible.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

I. GENERAL INFORMATION

3-1. Scope

This chapter of the Technical Manual (TM) contains instructions for Preventive Maintenance Checks and Services (PMCS) for the Small Field Refrigeration System (SFRS) and associated components. Additionally, troubleshooting procedures, corrective maintenance, and component adjustment procedures for the SFRS are provided.

3-2. Tools Required for Maintenance Procedures

Table 3-1. Tool Requirements

TAMCN	NOMEN	NSN
B0061	Cooling and Refrigeration Expeditionary Kit	4120-01-558-5664
C7073	Common #1 Tool Set	4910-01-238-8115
C7911	Shop Equipment, Tool Room, Common #24	4940-01-550-4900

3-3. Corrosion Prevention and Control (CPAC)

CPAC of Marine Corps Material is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future systems. Refer to MIL-HDBK-138B for corrosive failure definitions. If corrosion is detected refer to section 3-4 for PQDR reporting procedures.

3-4. Product Quality Deficiency Reporting (PQDR)

Materiel Defects Reporting. The Using Unit will submit all form, fit, or function deficiencies in accordance with standard Product Quality Deficiency Reporting (PQDR) procedures contained in TM 4700-15/1_, Ground Equipment Record Procedures, and MCO 4855.10B, PQDR, via the Product Data Reporting and Evaluation Program (PDREP) at http://www.nslcptsmh.navsea.navy.mil/pdrep/pdrep.htm.

Another option that is available for the submission of PQDRs is the Easy (EZ) PQDR, which can be accessed at the USMC PQDR Screening Point website at http://www.logcom.usmc.mil/pqdr. PDREP access is not required for EZ PQDR.

If web access is not available, PQDRs should be submitted to the PQDR Screening Point via e-mail attachment to: smblogcompqdrstracking@usmc.mil. The PQDR form is available at website: http://www.logcom.usmc.mil/pqdr. Disposition for the failed item will be furnished to the user based on the PQDR. Submit Supply Discrepancy Reports (SDR), SF 364, per Users Manual (UM)-4400-124, Fleet Marine Force (FMF) Supported Activities Supply System (SASSY) Using Unit Procedures and Secretary of the Navy Instruction (SECNAVINST) 4355.18, Reporting of Item and Packaging Discrepancies, on shortages, overages, packaging, and preservation discrepancies. Any damage due to improper packaging will be submitted via SDR procedures. Damage due to shipping discrepancies will be submitted as a Transportation Discrepancy Report, SF 361 in accordance with UM-4400-124 and MCO P4610.16E, Uniform Settlement of Military Freight Loss and Damage Claims.

II. PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-5. Preventive Maintenance Tasks

a. The equipment user, or maintainer, shall perform required inspection and maintenance at intervals specified in Table 3-2. All inspections and maintenance shall be annotated on applicable maintenance forms for each item of equipment.

Table 3-2. Inspection and Maintenance Schedule.

Inspection/Service	Equipment/Maintenance	Interval
Periodic Check	Check defrost cycle during operation. Check for proper initiation and termination. Check thermostat cycle sequence during operation. Check operation of protection shutdown circuits.	Bi-monthly
Periodic Check	Check thermostat and thermometer calibration in 32 °F (0 °C) ice-water bath. Inspect wire harness for damaged wires or loose connections.	Annually
Before Operation	Wind chart recorder.	Monthly
Before Operation	Check refrigerant level.	Bi-monthly
Before Operation	Visually inspect unit and refrigerant hoses for fluid leaks. Visually inspect unit for damaged, loose or broken parts. Clean defrost drains. Clean entire unit including evaporator coil and condenser coil. Check all unit mounting bolts, brackets, lines, etc.	Bi-monthly
Before Operation	Replace dehydrator.	Annually

III. CORRECTIVE MAINTENANCE PROCEDURES

3-6. Corrective Maintenance Tasks

a. Replace Air Curtain.

(1) Remove three screws from the air curtain bracket and remove the plastic air curtain.

(2) Unscrew the air curtain bracket from the track pin.

(3) Align a replacement air curtain bracket to the track pin and retain with hardware.

(4) Align a replacement air curtain to the air curtain bracket. The individual air curtains are secured to one another with a plastic collar. Ensure that the air curtain aligns with the plastic collar before securing with hardware.

b. Replace Interior Light.

(1) Remove two screws retaining the light cover to the container and remove the light cover. Set aside screws and cover.

(2) Unscrew the light from the socket and replace with a new light bulb of 40W maximum.

(3) Align light cover to container and secure with hardware set aside earlier.

c. Replace Door Gasket

(1) Remove screws, rivets, and metal retaining strips securing gasket to door.

(2) Pull or cut gasket free from door.

(3) Align replacement gasket and fit to door.

(4) Align metal retaining strips and secure with rivets.

(5) Align screws to holes in door and screw gasket to door.

(6) Inspect door seal for correct fitment.

d. Replace Door Handle

(1) Remove putty covering screws in door handle.

(2) Unscrew and remove door handle from door.

(3) Align replacement door handle to container door and secure with four screws.

(4) Cover screws and seal perimeter of door handle with putty.

(5) Inspect door latch for positive closing.

e. Replace Refrigeration Unit (RU).

(1) Disconnect power to SFRS.

(2) Disconnect the internal light power cable from the left side of the refrigeration container compartment. Cable is disconnected by unscrewing the collar counter-clockwise.

(3) Remove wires from pile tape strap and let wires hang free.

(4) Remove five bolts securing cover to RU and set aside cover.

(5) From the container interior, cut tie wrap securing the evaporator line to the container interior wall.

(6) Withdraw the evaporator line from the container wall. Pull the evaporator line away from container wall until the heating element wires inside the evaporator line are free.

(7) Carefully fold the evaporator line tubing and wires out of the way.

(8) Remove five bolts securing the top debris cover on the container exterior.

(9) Remove two mounting bolts below the RU.

WARNING

Failure to properly support the RU may cause serious injury or death. Use forklift only to support and transport the RU. Do not attempt to remove the RU manually.

(10) Support the RU with a forklift using the support plates on both sides of the RU. Use a second person to help guide the forklift operator.

(11) Once supported, remove the two upper mounting bolts.

WARNING

Do not stand beneath the RU at any time. Failure to observe this warning may cause serious injury or death.

(12) There is a gasket seal between the RU and the container. One person should stand inside the container and push the RU from the inside to assist the forklift operator in overcoming the seal.

(13) Remove the RU from the container once the seal has been broken.

(14) Lift a replacement RU with forklift by aligning the forks to support plates and lifting into position on the container.

(15) Seat the replacement RU into the container until the gasket seal is established.

(16) Secure RU to container with four mounting bolts.

(17) Align the top debris cover and secure with five bolts.

(18) Align the evaporator line to the interior container wall. Pass the heating element wires through the opening in the container wall. Secure evaporator line to opening in container wall with wire ties.

(19) Align RU cover and secure with five bolts.

(20) Route wires below RU and secure with pile tape straps.

(21) Connect the internal light power cable to the left side of the refrigeration container compartment. Cable is connected by screwing the collar clockwise.

(22) Connect SFRS power cable.

f. Replace Control Box.

Procedures for the replacement of the Control Box have not yet been developed. They will be included in the next version of this technical manual.

g. Compressor Removal.

(1) Pump down the compressor IAW 3-8.w.

(2) Disconnect the discharge and suction hoses.

(3) Keep the compressor ports and the suction and discharge lines for the compressor covered to prevent contamination of system components.

(4) Remove the compressor mounting screws. Remove the compressor.

h. Compressor Installation.

NOTE

Any compressor installed in this system must contain the proper amount of compressor oil (see the Specifications section). Always check to make sure that the compressor contains the proper amount of oil. Follow the system cleanup procedures to remove old oil from the system.

(1) Place the compressor in position and install the mounting screws and the belt.

(2) Connect suction line and discharge line.

(3) Pressurize the system and test for leaks.

(4) Evacuate the system and recharge.

i. Condenser Coil Removal.

(1) Recover the refrigerant charge.

(2) Remove the condenser cover.

(3) Remove the condenser fan.

(4) Remove the inlet and liquid lines.

(5) Remove mounting screws and nuts.

(6) Remove the condenser oil.

j. Condenser Coil Installation.

(1) Clean the tubes for soldering.

(2) Place the coil in the unit and install the screws and nuts.

(3) Solder the inlet and liquid line connections.

(4) Pressurize the system and test for leaks.

(5) Mount condenser fan.

(6) Evacuate the system.

(7) Recharge the unit.

(8) Reinstall the cover.

k. Filter Drier Removal.

(1) Pump down the low side of the system IAW 3-8.u and equalize the pressure to slightly positive.

(2) Disconnect the nuts at the ends of the drier.

(3) Loosen the mounting hardware and remove the drier.

l. Filter Drier Installation.

(1) Place new O-rings in the fittings on the ends of the drier.

(2) Install the new drier and tighten the mounting screws and nuts.

(3) Install and tighten the inlet nut. Hold the drier with a back-up wrench on the hex behind the fitting.

(4) Release a small amount of refrigerant to purge the air through the drier, and then tighten the outlet nut.

(5) Pressurize the system and inspect for leaks. If no leaks are found, open the refrigeration valves and place the unit in operation.

m. Evaporator Assembly Removal.

(1) Pump down the low side IAW 3-8.u and equalize the pressure to slightly positive.

(2) Remove evaporator fan motor assy.

(3) Disconnect the expansion valve from the distributor and remove the expansion valve.

(4) Remove the defrost termination switch.

n. Evaporator Assembly Installation.

(1) Install the evaporator fan motor assembly.

(2) Install the expansion valve (Figure 3-1).

(3) Install the Low Pressure Cutout.

(4) Install the defrost termination switch.

(5) Connect refrigeration lines.

(6) Pressurize the system and test for leaks. If no leaks are found, evacuate the system.

(7) Connect the evaporator fan motor lead(s). Install the evaporator panel(s).

(8) Open the refrigeration valves and place the unit in operation. Check the refrigeration charge and compressor oil and add as required.

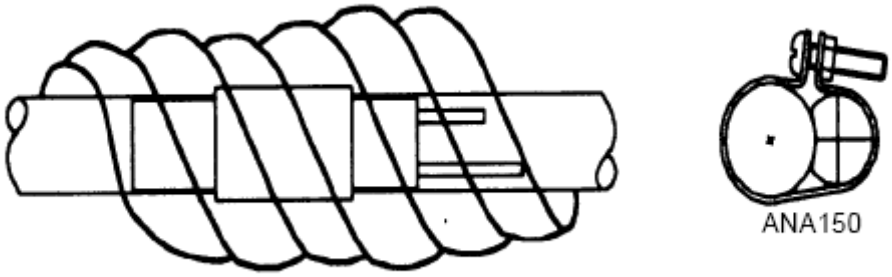


Figure 3-1. Bulb Location.

o. High Pressure Cutout (HPCS) Removal.

(1) Recover the refrigerant charge.

(2) Disconnect the wires and remove the switch.

p. High Pressure Cutout (HPCS) Installation.

(1) Apply a refrigerant locktite to the threads of the switch.

(2) Install and tighten the switch and reconnect the connector.

(3) Pressurize the refrigeration system and test for leaks.

(4) If no leaks are found, charge the system.

q. Low Pressure Cutout Switch Removal.

(1) Pump down the low side IAW 3-8.u and stop the unit.

(2) Unplug the switch connector and remove the switch.

r. Low Pressure Cutout Switch Installation.

(1) Apply an refrigerant oil to the threads of the switch.

(2) Install and tighten the switch and reconnect the connector.

(3) Pressurize the refrigeration system and test for leaks.

(4) If no leaks are found, evacuate the low side.

(5) Open the receiver tank outlet valve, start the unit and check the refrigerant charge.

(6) If no leaks are found, evacuate the system.

(7) Recharge the unit with refrigerant and check compressor oil.

s. Hot Gas Solenoid Valve Removal.

(1) Recover the refrigerant charge.

(2) Disconnect the coil wires.

(3) Unsolder the refrigeration lines from the solenoid.

(4) Unbolt the solenoid and remove the mounting bracket.

t. Hot Gas Solenoid Valve Installation.

(1) Bolt the solenoid to the mounting bracket.

(2) Solder the refrigeration lines and electrical wires to the solenoid.

(3) Pressurize the system and test for leaks.

(4) Evacuate and recharge the system.

u. Low Side Pump Down Procedure.

(1) Install a gauge manifold.

(2) Run the unit in cool for 10 minutes or more.

(3) Fully screw in the (front seat) the receiver tank outlet valve (RTOV).

(4) Pump down the low side to a 25 inch vacuum. Stop the unit. Low side pressure should remain below a 15 inch vacuum for 2 minutes or more.

(a) If pressure rises to zero and stops, it indicates a low side leak to the atmosphere.

(b) If pressure rises above zero it indicates refrigerant boiling out of the oil or internal high pressure to low pressure area leaks.

(5) With the low side pumped down and a slight positive pressure established perform the following:

(a) Add or remove refrigerant oil

(b) Clean expansion valve screen

(c) Change expansion valve

(d) Replace drier.

v. Removing the Compressor or Compressor Head.

(1) Pump down the low side IAW 3-8.u to a 15 inch vacuum or more.

(2) Stop the unit.

(3) Immediately fully screw in (front seat) the discharge service valve.

(4) Balance pressures through the manifold. Add additional pressure from the discharge service valve if necessary to establish 1 to 2 psig.

(5) Fully screw in (front seat) the suction service valve.

WARNING

Do NOT start the unit with the discharge service valve fully screwed in (front seated). Severe personal injury may result.

w. Compressor Pump down Procedures.

(1) Install a gauge manifold.

(2) Run the unit in cool for 5 minutes or more.

(3) Fully screw in (front seat) the suction service valve

(4) Run the compressor until a slight vacuum is achieved.

(5) Shut the system down and a slight amount of pressure will return to the system.

(6) Run the system again until a 0 psi reading is achieved.

(7) Close both the suction and discharge valves.

(8) Stop the unit. Crankcase pressure should remain below zero psig for 15 seconds or more. If pressure rises, repeat pump down several more times.

(9) If Pressure Still Rises:

(a) To zero and stops: Low pressure leak to the atmosphere.

(b) Above zero: Refrigerant boiling out of the oil or internal high to low pressure area leak through the reed plate.

x. Adding or Removing Compressor Oil.

(1) Pump down the compressor IAW 3-8.w and adjust pressures slightly positive (1 to 2 psig).

y. Removing the Compressor or Compressor Head.

(1) Pump down the compressor IAW 3-8.w to a 15 inch vacuum.

(2) Stop the unit.

(3) Immediately fully screw in (front seat) the discharge service valve.

(4) Balance pressures through the gauge manifold to 1 or 2 psig.

(5) If 1 to 2 psig cannot be established, the refrigerant must be recovered or a low side pump down must be performed IAW 3-8.u.

WARNING

Do NOT start the unit with the discharge service valve fully screwed in (front seated). Severe personal injury may result.

z. Installing And Purging A Gauge Manifold Equipped With Low Loss Fittings.

(1) Remove both the discharge and suction service valve stem caps. Save and reuse the caps and sealing washers or gaskets.

(2) Make sure both service valves are fully screwed out (back seated).

(3) Remove the service port caps for both the suction and discharge service valve. Save and reuse the caps and sealing washers or gaskets.

(4) Attach the high pressure gauge line to the discharge service port finger tight.

(5) Turn the discharge service valve stem 1/4 turn open to the service port.

(6) Open both manifold hand valves.

(7) Slowly screw a 1/4 inch flare fitting into the service line low loss fitting to purge the service line. Remove the flare fitting after purging.

(8) Slowly screw a 1/4 inch flare fitting into the manifold low pressure line low loss fitting to purge the line.

(9) Remove the flare fitting after purging.

(10) Install the manifold low pressure line on the suction service valve service port.

(11) Turn the suction service valve stem 1/4 turn open to the service port.

(12) Close both manifold hand valves.

aa. Removing The Gauge Manifold.

(1) Operate the unit in cool mode.

(2) Fully screw out (back seat) the discharge service valve stem.

(3) Open both manifold hand valves.

(4) Fully screw in (front seat) the suction service valve and pump down the compressor IAW 3-8.w. Turn off the unit.

(5) Establish compressor crankcase pressure between 1 and 3 psig.

(6) Remove the gauge lines and cap the service ports.

(7) Fully screw out (back seat) the suction service valve.

(8) Install and tighten both stem caps.

(9) Secure all manifold lines to the hose anchors when the manifold is not in use.

bb. Adjusting The CPR Valve.

(1) Reduce the box temperature to 25-30 °F.

(2) Determine the ambient temperature.

(3) Using the chart in figure 3-2, determine the CPR pressure based on the ambient temperature.

(4) Set the valve to the appropriate pressure.

cc. Setting The CPR Valve.

NOTE

The CPR (Compressor Pressure Regulator) valve is also called the suction pressure regulator valve. Use the following procedure to set the CPR valve set point.

(1) Install a gauge manifold.

(2) Set the thermostat to 30 °F.

(3) Run the unit in cool until the box temperature is at 30 °F.

(4) Press the manual defrost key to place the unit in defrost.

(5) Monitor the suction pressure and compare it to the suction pressure for the current ambient temperature as shown on the chart in figure 3-2.

(6) If the suction pressure differs from what is shown in the chart, remove the protective cap from the CPR valve and turn the adjuster as necessary to obtain the suction pressure shown in the chart.

(7) Take the unit out of defrost and repeat steps 3 through 5 to recheck the suction pressure and readjust the CPR valve if necessary. Reinstall the protective cap when finished.

(8) Remove the gauge manifold set.

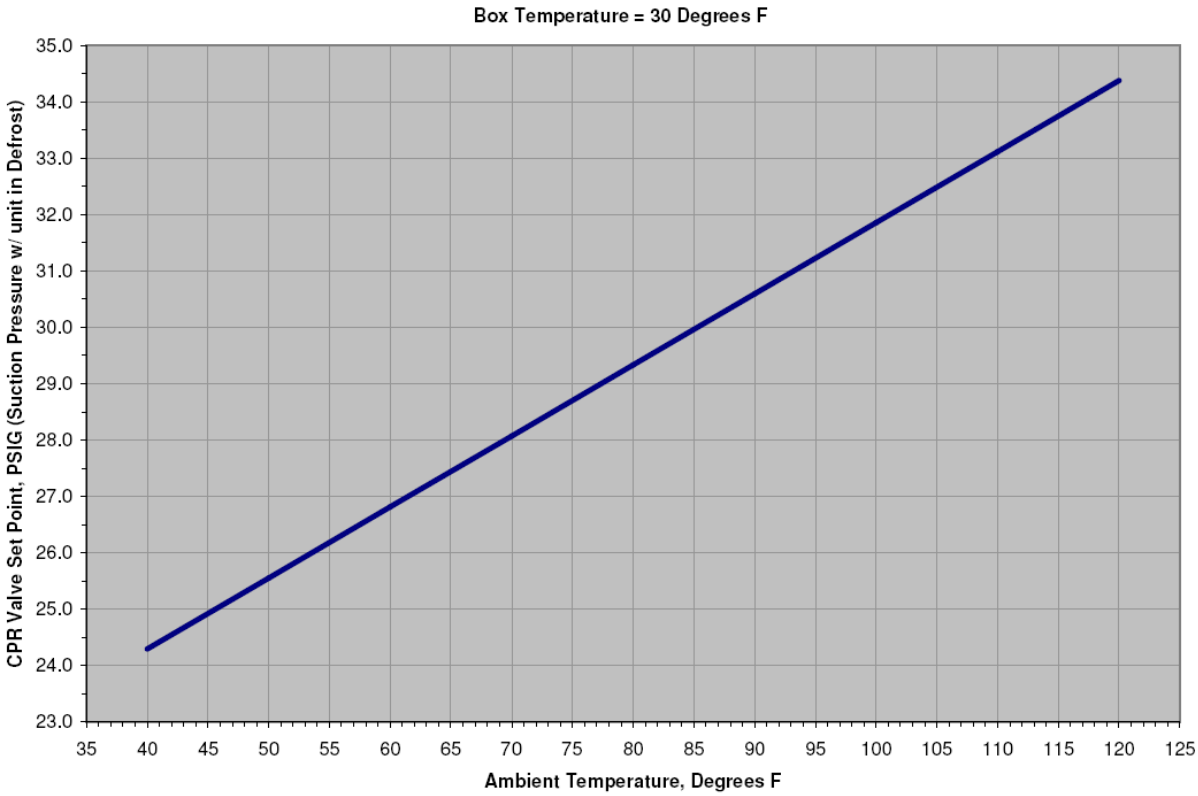


Figure 3-2. CPR Valve Pressure Setpoint Chart.

dd. Refrigeration Unit Removal

WARNING

Failure to follow safe working practices may cause serious injury or death. It is imperative that the RU be supported by a forklift and that at no time shall a person be allowed directly underneath the RU. This equipment is heavy and should only be moved by mechanical means. Manually moving the RU is not recommended and dangerous.

(1) Disconnect internal light power cable from the connector located on the container wall, behind and above the control box. Disconnect by unscrewing counter-clockwise.

(2) Remove wires from Velcro straps and let hang free.

(3) Remove RU lower cover by removing five 10mm bolts. Set aside cover and hardware.

(4) Locate the evaporator lines on the rear interior wall. Cut the lower tie wrap from the evaporator lines. Remove the elbow connecting into the RU. Inside the evaporator line are heating element wires to prevent freezing. Be careful not to damage these wires when removing the elbow.

(5) Carefully fold the tubing and wires out of the way.

(6) From the rear exterior of the SFRS, remove five 8mm bolts securing the top debris cover.

(7) Remove the lower two 21mm mounting bolts securing the RU to the container.

(8) Support the RU using a forklift. Have the forklift operator support the RU by using the support plates attached to either side of the RU.

(9) With RU properly supported, remove the upper bolts.

(10) One person should push the RU from inside the SFRS to assist the forklift operator in removing the RU. This will assist in overcoming the seal created by the gasket.

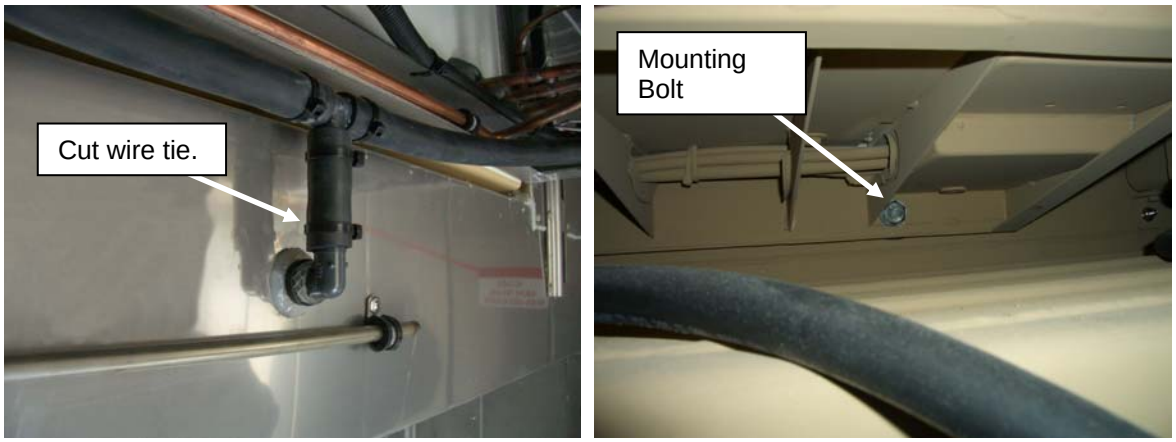


Figure 3-3. RU Removal.

ee. Emergency Container Body Repairs.

A damaged container panel may be repaired using one of the following three methods. Refer to the appropriate section below for detailed information on a delaminating repair, patch repair, or section repair. Emergency repairs can be performed to prevent additional damage to container panels.

(1) Damage to the coating of the container panel that does not expose or puncture the lining of the panel should not be repaired. Any damage to the container panel that exposes or punctures the lining should be repaired immediately to prevent further damage. Adhesive aluminum tape or foil can be used to repair any damage to the container panel that exposes or punctures the lining. The tape or foil thickness should exceed 90 microns. If using thinner tape or foil, a second or third layer should be applied. Repair damage to the container panel that exposes or punctures the lining as follows.

(a) Prepare the area to be repaired by clearing it of all loose particles or jagged edges that may prevent the tape or foil from properly adhering to the container.

(b) Affix the adhesive tape or foil to the damaged container panel in a manner that fully covers the damage and surrounding area.

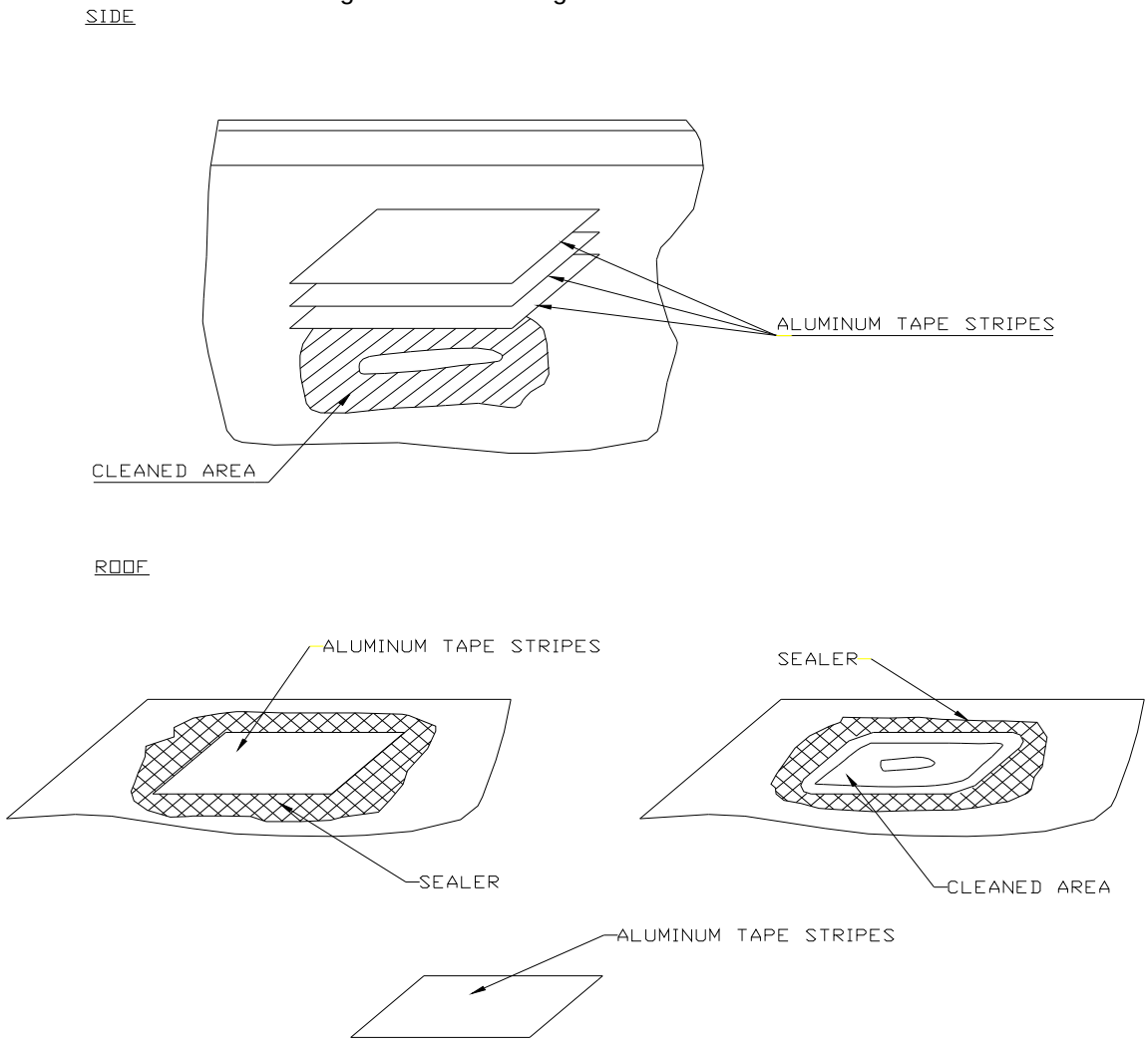


Figure 3-4. Emergency Repairs.

3-7. Cleaning Tasks

a. Clean Condenser.

Procedures to clean the Condenser have not yet been developed. They will be included in the next version of this technical manual.

b. Clean Evaporator.

Procedures to clean the Evaporator have not yet been developed. They will be included in the next version of this technical manual.

IV. TROUBLESHOOTING AND FAULT ISOLATION PROCEDURES

Problems or operating malfunctions which may occur on the SFRS and associated equipment. After remedial action has been taken, testing of affected equipment shall be carried out to insure that it is serviceable and in satisfactory operating condition.

3-8. Troubleshooting M13 Controller

a. Blank display when the On/Off switch is pressed.

Step	Probable Cause	Remedy
1	Incorrect line voltage	Check voltage on Pin 2 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 2.
2	Faulty fuse	Check Fuse 4 located inside the control box as indicated in Figure 3-3 . If fault is not corrected proceed to step 3.
3	Faulty Control Box	Replace Control Box IAW 3-8.f.

b. Unit is not cooling when the Box Temperature is higher than the Setpoint Temperature.

Step	Probable Cause	Remedy
1	Incorrect line voltage	Check voltage on Pin 6 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 2.
2	Faulty Control Box	Replace Control Box IAW 3-8.f.

c. Defrost cycle is not initiated when the Manual Defrost switch is pressed.

Step	Probable Cause	Remedy
1	Box temperature is below setpoint temperature.	Box temperature must be higher than Setpoint temperature. If fault is not corrected proceed to step 2.
2	Evaporator coil temperature higher than 36 °F.	Evaporator Coil temperature must be lower than 36 °F. If fault is not corrected proceed to step 3.
3	Incorrect line voltage	Press the Manual Defrost switch and check voltage on Pin 8 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 4.
4	Faulty Control Box	Replace Control Box IAW 3-8.f.

d. Defrost LED is OFF when the unit is in Defrost Mode.

Step	Probable Cause	Remedy
1	Incorrect line voltage. Open circuit.	Check for open circuit on yellow wire, between Pin 4 C-9 and Pin 2 C-2, as indicated in Figure 3-3. If fault is not corrected proceed to step 2.
2	Incorrect line voltage.	Check voltage on Pin 8 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 3.
3	Faulty Control Box.	Replace Control Box IAW 3-8.f.

e. Temperature displayed is out of range.

Step	Probable Cause	Remedy
1	Incorrect voltage setting.	Check that the Control Box 12/24V selector is in the 24V position. If fault is not corrected proceed to step 2.
2	Faulty thermostat sensor.	Check the thermostat sensor IAW 3-8.cc.

f. Unit is not working in Electric Mode.

Step	Probable Cause	Remedy
1	Faulty overload relay.	Check the AC Overload Relay (AC Overload LED must be OFF) IAW 3-8.dd. If fault is not corrected proceed to step 2.
2	Faulty Fuse	Check the fuses on PCB IAW 3-8.ee. If fault is not corrected proceed to step 3.
3	Incorrect line voltage	Check voltage on Pin 2 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 4.
4	Incorrect line voltage	Check voltage on Pin 1 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 5.
5	Faulty Control Box	Replace Control Box IAW 3-8.f.

g. Unit is stopped by the AC OL Relay, but the AC Overload LED is OFF.

Step	Probable Cause	Remedy
1	Incorrect line voltage	Check voltage on Pin 5 C-9 as indicated in Figure 3-3. If fault is not corrected proceed to step 2.
2	Faulty Control Box	Replace Control Box IAW 3-8.f.

h. Compressor does not run.

Step	Probable Cause	Remedy
1	Faulty source power.	Check for power at source. If fault is not corrected proceed to step 2.
2	Faulty cable or plug.	Check for power at plug. If fault is not corrected proceed to step 3.
3	Faulty compressor contactor.	Check for power at compressor contactor IAW 3-8.ff. If fault is not corrected proceed to step 4.
4	Faulty compressor contactor.	Check for power at overload terminals (contactor closed) IAW 3-8.ff. If fault is not corrected proceed to step 5.
5	Faulty motor.	Check for power at motor terminals IAW 3-8.gg.

i. Power at compressor terminals but does not run.

Step	Probable Cause	Remedy
1	Faulty Compressor	Replace compressor IAW 3-8.ff.

j. Compressor hums but does not run.

Step	Probable Cause	Remedy
1	Improper power input.	Power source for single phasing. If fault is not corrected proceed to step 2.
2	Faulty capacitor.	Check capacitors

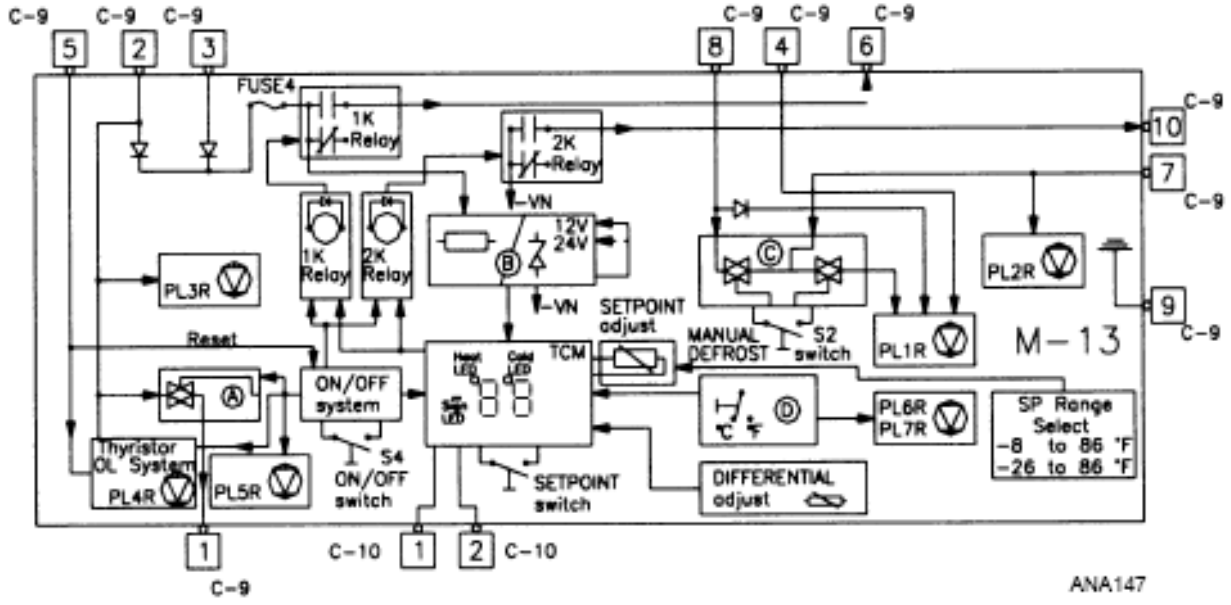


Figure 3-3. Wiring Diagram.

3-9. Troubleshooting Mechanical System

a. If the desired box temperature cannot be obtained, any of the following may be indicated.

Step	Probable Cause	Remedy
1	Warm load.	Pre-cool cargo before loading. If fault is not corrected proceed to step 2.
2	Too many or excessively long door openings.	Keep door closed as much as possible to retain cold air. If fault is not corrected proceed to step 3.
3	Improper air flow.	Do not load product in front of the air return or discharge. If fault is not corrected proceed to step 4.
4	Poor insulation or seal.	Check door seal to ensure gasket is serviceable IAW 3-8.c. Inspect door latch to ensure complete seal IAW 3-8.d. If fault is not corrected proceed to step 5.
5	Ice on the evaporator coil.	Run the unit through a defrost cycle IAW 2-8. If fault is not corrected proceed to step 6.
6	Dirty Coils	Clean evaporator coils IAW 3-9.a. Clean condenser coils IAW 3-9 b. If fault is not corrected proceed to step 7.
7	Refrigerant Shortage	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 8.
8	Excessive Oil	Ensure proper compressor oil level IAW 3-8.hh. If fault is not corrected proceed to step 9.
9	Moisture in the system (Indicated by frozen expansion valve).	Warm expansion valve with hand or hot towels. If valve opens, evacuate system IAW 3-8.hh and replace drier IAW 3-8.k. If fault is not corrected proceed to step 10.
10	Expansion Valve looses charge.	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 11.
11	Air in system.	Recover and evacuate system 3-8.hh. If fault is not corrected proceed to step 12.

12	Extremely hot or cold liquid line indicating a refrigerant shortage, lack of liquid seal at receiver outlet, or restriction.	An extremely hot liquid line indicates either a shortage of refrigerant or a lack of liquid seal at the receiver outlet. Charge refrigerant 3-8.hh or repair seal at receiver outlet IAW 3-8.k. A cold liquid line indicates a restriction and some flashing taking place in the liquid line sight glass. Repair restriction or replace liquid line IAW 3-8.jj. If fault is not corrected proceed to step 13.
13	Dirty or wet drier as indicated by the drier outlet line being colder than the inlet line.	Replace drier IAW 3-8.k. If fault is not corrected proceed to step 14.
14	Dirt in the expansion valve screen.	Recover the refrigerant charge IAW 3-8.hh, remove the screen and clean. If moisture is in the refrigeration system, it will collect at the expansion valve and freeze. This is indicated by abnormally low suction pressure. Clean the refrigeration system IAW 3-8.hh, replace the drier IAW 3-8.k, evacuate the system IAW 3-8.hh, pressurize and check for leaks IAW 3-8.kk. If no leaks are found, charge the system IAW 3-8.hh.

3-10. Troubleshooting the Electrical Mechanical System

(1) Compressor Does Not Run.

Step	Probable Cause	Remedy
1	Overload relay open	Turn On-Off switch OFF and back ON. If fault is not corrected proceed to step 2.
2	Improperly wired compressor	Check wiring IAW 3-8.ff. If fault is not corrected proceed to step 3.
3	Low line voltage	Check line voltage to determine location of voltage drop. If fault is not corrected proceed to step 4.
4	Relay contacts not closing	Check and replace relay if defective 3-8.gg. If fault is not corrected proceed to step 5.
5	Open circuit in motor winding	Check motor leads. If leads OK, replace motor 3-8.jj. If fault is not corrected proceed to step 6.
6	Power relay open	Check relay, replace if defective 3-8.ff. If fault is not corrected proceed to step 7.
7	Compressor wiring defective	Close power supply start or disconnect switch IAW 3-8.ff. If fault is not corrected proceed to step 8.

8	Fuses blown	Replace fuses IAW 3-8-ff. If fault is not corrected proceed to step 9.
9	Thermostat stuck open	Check thermostat IAW 3-8.cc. If fault is not corrected proceed to step 10.
10	High pressure cutout switch open	Eliminate cause of excessive pressure IAW 3-8.hh. If fault is not corrected proceed to step 11.
11	Compressor piston stuck	Replace compressor IAW 3-8.ff. If fault is not corrected proceed to step 12.
12	Low pressure cutout open	Recharge refrigerant IAW 3-8.hh, leak test IAW 3-8.kk. If fault is not corrected proceed to step 13.
13	Shortage of refrigerant	Check for leaks, repair as required, and recharge refrigerant IAW 3-8.hh.

(2) Unit short cycles.

Step	Probable Cause	Remedy
1	Clogged condenser coil	Clean coil IAW 3-9.a. If fault is not corrected proceed to step 2.
2	Shortage of refrigerant (low pressure cutout)	Repair leak and recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	Evaporator fan rotating in wrong direction	Check DC motor polarity IAW 3-8.ll. If fault is not corrected proceed to step 4.
4	Restricted expansion valve (low pressure cutout)	Replace expansion valve IAW 38-ii. If fault is not corrected proceed to step 5.
5	Refrigerant overcharge (high pressure cutout)	Remove excess charge IAW 3-8.hh. If fault is not corrected proceed to step 6.
6	Cycling on high pressure cutout	Check air flow and fan IAW 3-8.ll.

(3) Unit operates long or continuously.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Repair leak and recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Discharge valve leaking	Replace compressor IAW 3-8.ff. If fault is not corrected proceed to step 3.
3	Dirty condenser	Clean condenser coil IAW 3-9.b. If fault is not corrected proceed to step 4.
4	Air in system	Evacuate the system IAW 3-8.hh. If fault is not corrected proceed to step 5.
5	Compressor inefficient	Replace compressor IAW 3-8.ff. If fault is not corrected proceed to step 6.
6	Plugged expansion valve.	Clean or replace expansion valve IAW 38-ii. If fault is not corrected proceed to step 7.
7	Iced or plugged coil	Defrost or clean IAW 3-9.b. If fault is not corrected proceed to step 8.
8	Too many door openings	Keep doors closed. If fault is not corrected proceed to step 9.
9	Load too warm	Precool hot product. If fault is not corrected proceed to step 10.
10	Excessive superheat at expansion valve	Replace expansion valve IAW 38-ii. If fault is not corrected proceed to step 11.
11	Door seals worn	Repair/replace IAW 3-8.c.

(4) Box temperature too high.

Step	Probable Cause	Remedy
1	Refrigerant shortage	Repair leak and recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Thermostat set too high	Reset control IAW 2.6. If fault is not corrected proceed to step 3.
3	Expansion valve or strainer plugged	Clean or replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 4.
4	Restricted lines	Clean restriction IAW 3-8.jj. If fault is not corrected proceed to step 5.
5	Hot load	Pre-cool hot product. If fault is not corrected proceed to step 6.
6	Expansion valve superheat too high or too low	Replace expansion valve IAW 3-8.ii.

(5) Head pressure too high.

Step	Probable Cause	Remedy
1	Refrigerant overcharge	Remove excess IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Air in system	Evacuate system IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	Dirty condenser	Clean coil IAW 3-9.a. If fault is not corrected proceed to step 4.
4	Restricted condenser	Clean condenser IAW 3-9.a. If fault is not corrected proceed to step 5.
5	Condenser fan not running	Check condenser fan motor IAW 3-8.mm. If fault is not corrected proceed to step 6.
6	Condenser fan rotating backwards	Check fan motor polarity IAW 3-8.mm.

(6) Head pressure too low.

Step	Probable Cause	Remedy
1	Refrigerant shortage	Repair leak and recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Compressor suction or discharge valve inefficient	Replace compressor IAW 3-8.ff.

(7) Noisy Unit.

Step	Probable Cause	Remedy
1	Insufficient compressor oil	Add oil to proper level IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Mounting bolts loose	Tighten. If fault is not corrected proceed to step 3.
3	Refrigerant flooding back	Adjust oil level or refrigerant charge IAW 3-8.hh.

(8) Compressor loses oil.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Repair leak, recharge IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Plugged expansion valve or strainer	Clean or replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 3.
3	Wrong oil viscosity	Use proper oil IAW 3-8.hh. If fault is not corrected proceed to step 4.
4	Short cycling	Refer to Unit Short Cycles 3-12 (2). If fault is not corrected proceed to step 5.
5	Superheat too high	Replace expansion valve IAW 3-8.ii.

(9) Frosted or sweating suction line.

Step	Probable Cause	Remedy
1	Expansion valve set too low, admitting excess refrigerant	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 2.
2	Frosted evaporator coil	Defrost coil. If fault is not corrected proceed to step 3.
3	Dirty evaporator coil	Clean or remove debris 3-9.b. If fault is not corrected proceed to step 4.
4	Evaporator fans fail	Repair fans IAW 3-8.ll.

(10) Hot liquid line.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Repair leak IAW 3-8.jj and recharge refrigerant IAW 3-8.hh.

(11) Frosted liquid line.

Step	Probable Cause	Remedy
1	Restricted dehydrator or strainer	Replace dehydrator IAW 3-8.nn. Replace strainer IAW 3-8.ii.

(12) Condenser coils cool when unit is in cool.

Step	Probable Cause	Remedy
1	Refrigerant undercharge	Repair leak and recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Compressor inefficient	Replace compressor IAW 3-8.ff.

(13) Unit in vacuum. Frost on expansion valve only.

Step	Probable Cause	Remedy
1	Ice plugging expansion valve orifice	Apply hot wet cloth to expansion valve. If fault is not corrected proceed to step 2.
2	Moisture indicated by increase in suction pressure	Replace drier IAW 3-8.k. If fault is not corrected proceed to step 3.
3	Plugged expansion valve strainer	Clean strainer IAW 3-8.ii. If fault is not corrected proceed to step 4.
4	Sensor bulb lost charge	Replace expansion valve IAW 3-8.ii.

3-11. Troubleshooting the Refrigeration System

(1) Rapid cycling.

Step	Probable Cause	Remedy
1	Air short cycling around evaporator coil	Check for foreign obstruction to airflow. If fault is not corrected proceed to step 2.
2	Reverse fan rotation	Replace condenser fan IAW 3-8.mm.

(2) Unit cools in defrost cycle.

Step	Probable Cause	Remedy
1	Faulty pilot solenoid	Replace pilot solenoid IAW 3-8.oo. If fault is not corrected proceed to step 2.
2	Loose or broken electrical connections	Repair or replace electrical connections.

(3) High head pressure.

Step	Probable Cause	Remedy
1	Overcharge of refrigerant	Remove excess refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Air through condenser too hot (ambient)	Heat air through condenser. If fault is not corrected proceed to step 3.
3	Air flow through condenser restricted	Clear condenser IAW 3-9.a or remove foreign air flow restriction. If fault is not corrected proceed to step 4.
4	Air in refrigerant system	Recover and evacuate system IAW 3-8.hh. If fault is not corrected proceed to step 5.
5	Condenser fan blades bent or broken	Replace condenser fan IAW 3-8.mm. If fault is not corrected proceed to step 6.
6	Restricted line on the high side	Clear restricted line IAW 3-8.pp. If fault is not corrected proceed to step 7.
7	Reverse fan rotation.	Replace condenser fan IAW 3-8.mm. If fault is not corrected proceed to step 8.
8	Condenser fan motor not operating	Replace condenser fan IAW 3-8.mm.

(4) Low head pressure.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	No refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	Air through condenser too cold (ambient)	Heat air through condenser. If fault is not corrected proceed to step 4.
4	Compressor discharge valves leaking	Replace discharge valves IAW 3-8.ff. If fault is not corrected proceed to step 5.
5	Broken valve plate in compressor	Replace compressor IAW 3-8.ff.

(5) High suction pressure.

Step	Probable Cause	Remedy
1	Overcharge of refrigerant	Remove excess refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Compressor suction valves leaking	Replace suction valve IAW 3-8.ff. If fault is not corrected proceed to step 3.
3	Expansion valve feeler bulb improperly mounted	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 4.
4	Expansion valve feeler valve making poor contact	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 5.
5	Expansion valve open too much	Close expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 6.
6	Expansion valve needle eroded or leaking	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 7.
7	Liquid refrigerant entering compressor	Replace compressor IAW 3-8.ff.

(6) Low suction pressure.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Air through condenser too cold (ambient)	Heat air through condenser. If fault is not corrected proceed to step 3.
3	Air through evaporator restricted	Clear evaporator IAW 3-9.b or replace evaporator IAW 3-8.m. If fault is not corrected proceed to step 4.
4	Evaporator needs defrosting	Defrost evaporator. If fault is not corrected proceed to step 5.

5	Expansion valve power element lost its charge	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 6.
6	Expansion valve closed too much	Open expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 7.
7	Expansion valve partially closed by ice, dirt, or wax.	Clear expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 8.
8	Restricted line on the low side	Replace restricted line IAW 3-8.jj. If fault is not corrected proceed to step 9.
9	Restricted line on the high side	Replace restricted line IAW 3-8.pp. If fault is not corrected proceed to step 10.
10	Restricted dehydrator	Replace dehydrator IAW 3-8.nn. If fault is not corrected proceed to step 11.
11	Evaporator fan motor not operating	Replace evaporator fan IAW 3-8.ll.

(7) No suction pressure.

Step	Probable Cause	Remedy
1	No refrigerant	Recharge refrigerant IAW 3-8.hh.

(8) Unit operating in a vacuum.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	No refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	Evaporator needs defrosting	Defrost evaporator. If fault is not corrected proceed to step 4.
4	Expansion valve partially closed by ice, dirt, or wax.	Clear expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 5.
5	Restricted line on the low side	Replace restricted line IAW 3-8.jj. If fault is not corrected proceed to step 6.
6	Restricted line on the high side	Replace restricted line IAW 3-8.pp. If fault is not corrected proceed to step 7.
7	Restricted dehydrator	Replace dehydrator IAW 3-8.nn. If fault is not corrected proceed to step 8.
8	Evaporator fan motor not operating	Replace evaporator fan IAW 3-8.ll.

(9) Sight glass empty.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Air through condenser too cold (ambient)	Heat air through condenser.

(10) Suction line frosting back.

Step	Probable Cause	Remedy
1	Air through evaporator restricted	Clear foreign air flow restriction. If fault is not corrected proceed to step 2.
2	Evaporator needs defrosting	Defrost evaporator. If fault is not corrected proceed to step 3.
3	Expansion valve feeler bulb improperly mounted	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 4.
4	Expansion valve feeler valve making poor contact	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 5.
5	Expansion valve open too much	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 6.
6	Expansion valve needle eroded or leaking	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 7.
7	Evaporator fan motor not operating	Replace evaporator fan IAW 3-8.ll.

(11)Noisy compressor.

Step	Probable Cause	Remedy
1	Overcharge of refrigerant	Remove excess refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Air in refrigerant system	Recover and evacuate system IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	Evaporator needs defrosting	Defrost evaporator. If fault is not corrected proceed to step 4.
4	Compressor bearing loose or burned out	Replace compressor IAW 3-8.ff. If fault is not corrected proceed to step 5.
5	Broken valve plate in compressor	Replace compressor IAW 3-8.ff. If fault is not corrected proceed to step 6.
6	Liquid refrigerant entering compressor	Replace compressor IAW 3-8.ff. If fault is not corrected proceed to step 7.
7	Evaporator fan motor not operating	Replace evaporator fan IAW 3-8.ll.

(12)Unit not refrigerating.

Step	Probable Cause	Remedy
1	Overcharge of refrigerant	Remove excess refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	Shortage of refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	No refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 4.
4	Air in refrigerant system	Recover and evacuate system IAW 3-8.hh. If fault is not corrected proceed to step 5.
5	Too much compressor oil in system	Recover and evacuate system IAW 3-8.hh. If fault is not corrected proceed to step 6.
6	Expansion valve power element lost its charge	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 7.
7	Expansion valve feeler valve making poor contact	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 8.
8	Expansion valve closed too much	Replace expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 9.
9	Expansion valve partially closed by ice, dirt, or wax.	Clear expansion valve IAW 3-8.ii. If fault is not corrected proceed to step 10.
10	Restricted line on the high side	Replace restricted line IAW 3-8.pp. If fault is not corrected proceed to step 11.

11	Restricted dehydrator	Replace dehydrator IAW 3-8.nn. If fault is not corrected proceed to step 12.
12	Faulty pilot solenoid	Replace pilot solenoid IAW 3-8.oo. If fault is not corrected proceed to step 13.
13	Evaporator fan motor not operating	Replace evaporator fan IAW 3-8.ll.

(13) Unit not defrosting.

Step	Probable Cause	Remedy
1	Shortage of refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 2.
2	No refrigerant	Recharge refrigerant IAW 3-8.hh. If fault is not corrected proceed to step 3.
3	Faulty pilot solenoid	Replace pilot solenoid IAW 3-8.oo. If fault is not corrected proceed to step 4.
4	Loose or broken electrical connections	Repair or replace electrical connections.

3-12. SFRS High Ambient Operation

CHAPTER 4

REPAIR PARTS LIST

SECTION I

I. REPAIR PARTS INFORMATION

4-1. Scope

This section furnishes complete data, including items used in conjunction with and furnished as part of, or with, the equipment, to enable the user to perform required maintenance and supply support of the equipment described herein. It is comprised of the following parts: Item Identification Listing, Item Number Cross-Reference, National Stock Number (NSN) Cross-Reference, and Part Number (P/N) Cross-Reference.

This preface furnishes explanations and application of the information contained in the succeeding parts of this RPL, defines Source Maintenance Recoverability (SMR) codes (Chapter 4, Section III).

SECTION II

II. ITEM IDENTIFICATION LISTING

4-2. Repair Parts Lists and Illustrations

This listing comprises the main part of the RPL. It is arranged in columns which show stock numbers, item identification, and other data necessary to maintain this equipment in an operative condition. Illustrations are placed either before, or in close proximity to, the component or assembly. The items are arranged in top down breakdown sequence within the major combination.

a. Repair Parts: This listing presents all repair parts contained in the equipment and is numbered in sequence by component. Repair parts need not be identical with parts of the original equipment, but as replacement parts they are considered suitable or preferred.

b. Item Numbers (Column 1): This column specifies item numbers assigned in numerical sequence and in the order that each item appears in the RPL. The item numbers are provided for reference purposes. In emergencies, these item numbers may be used for RPL number and date on requisitions which combat units transmit by message.

c. Model (Column 2): This column indicates by an alphabetical code the specific application of repair parts, components, or assemblies when more than one model of an assembly, component, or equipment is contained in this publication.

d. Stock Number (Column 3): This column furnishes National Stock Numbers (NSNs) assigned to those centrally managed items required for support of the equipment. When they have been assigned, NSNs will be used in all supply operation, from original purchase to final disposal of the item. Absence of an NSN indicates the item is not normally stocked as a repair part, as indicated by the source code portion of the SMR codes. If an item without an NSN is required, it should be determined if the item can be obtained from assembly, manufacturer or salvage by referring to the source code. Items not stock numbered, that cannot be obtained from these sources, may be requisitioned using the manufacturer's code and part number referencing the RPL number, date of the RPL and the line item number which applies.

e. Reference Designator (Column 4): This column contains alphabetical and/or numerical designators for referencing an individual repair part to an illustration. The absence of a reference designator indicates there is not an illustration for the part.

f. Indenture Code (Column 5): This column contains the Indenture Code Letter which indicates the relationship of a line item to the end item or to the preceding component, assembly, or subassembly. Visual indentation of the line item is not shown; however, the Indenture Code Letter will enable the user of the RPL to interpret the relationship of the line item with its next higher assembly.

1. Normally, the Indenture Code Letters indicate the following relationship:

Code	Relationship
"A"	End item
"B"	Component; attaching parts for component or detail parts of the end item not contained in a component
"C"	Assembly; attaching parts for assembly or detail parts of component not contained in a component
"D"	Subassembly; attaching parts for subassembly or detail parts of assembly not contained in subassembly
"E"	Detail parts of subassembly
"F"	And so forth

g. Item Identification (Column 6): This column contains the item name and description of the repair part. When an item is duplicated, the abbreviation (S/A) is inserted after the noun name to indicate "same as". S/A items refer to the line item number of the item's first appearance in the major combination. When an item is fabricated from other items, the abbreviation FAB FR, followed by the item required for the fabrication, is inserted after the item identification. When an item is assembled from other items, the abbreviation ASSEM FR is used, followed by each item required for the assembly of the item. When the items comprise a kit or set, a complete list of the components will be given in alphabetical order immediately following the item, under the heading "Consist of ", abbreviated (C/O).

h. Unit of Measure (Column 7): This column indicates the measure of quantity specified in column 8 and is not to be used for requisitioning purposes. When requisitioning parts, the Unit of Issue, Stores Account Code, and Unit Price should be obtained from the "Federal Supply Catalog, Management Data List (C-ML-MC)."

i. Quantity (Column 8): This column is divided into sub-columns (1) and (2) and indicates the following:

1. The quantity of a maintenance or a non-maintenance part used in a specific application within the end item.

2. The consolidated quantity of a maintenance part used in an end item upon the item's first appearance in this list.

j. Source Maintenance Recoverability Code (Column 9): This column contains a series of alphabetic letters which denote the uniform source, maintenance and recoverability coding structure. This Code is assigned to items subordinate to or associated with an end item, i.e., spares, repair, parts and support equipment. The uniform code format is composed of three parts consisting of a two (2) position Source Code, a two (2) position Maintenance Code and a one (1) position Recoverability Code.

1. The code provides the user with information on each item relative to (1) the method of obtaining the item; for example, by requisition, fabrication or salvage; (2) the lowest maintenance echelon authorized to remove, replace and use the item and the lowest echelon capable to perform complete repair, and (3) disposition action on unserviceable items.

2. Definitions of SMR codes are listed on page viii of the preface. Sample SMR codes are:

(1)	(2)		(3)
Source	Maintenance		Recoverability
	Use	Repair	
PA	F	F	A
PB	F	H	H
PC	O	Z	Z
AF	F	Z	Z
MF	F	F	F
KF	H	Z	Z
XA	F	Z	Z
XB	O	F	F
XC	H	Z	Z

SECTION III

III. DEFINITIONS AND APPLICATION OF SOURCE, MAINTENANCE, RECOVERABILITY CODES (SMRC)

4-3. Source Codes

Source codes are assigned to support items and indicate the manner of acquiring the item for maintenance or overhaul of end items. Source codes are entered in the first and second position of the SMR code.

a. SERIES A: ASSEMBLE, COMPLETE ASSEMBLY NOT STOCKED

1. Code “A” entered in the first position of the source code applies to items that are not procured as assemblies but are assembled within the Marine Corps prior to installation. The code entered in the second position designates the lowest echelon authorized to assemble the item. All the parts used in the assembly will be “P” coded.

Code	Application/Explanation
AO	Assemble at organizational maintenance level 2nd echelon.
AF	Assemble at field maintenance level 3rd echelon.
AH	Assemble at field maintenance level 4th echelon.
AD	Assemble at depot maintenance 5th echelon.

b. SERIES K: ITEMS OF A KIT, NOT PURCHASED SEPARATELY

KD An item of depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul or repair.

KF An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance

KB Items included in both a depot overhaul/repair kit and a maintenance kit.

c. SERIES M: MANUFACTURE, PARTS NOT PRODUCED

Code “M” entered in the first position of the source code applies to items that are not procured but are capable of being fabricated or manufactured within the Marine Corps. These items have relatively low usage and will generally be fabricated or manufactured only as required for immediate repair or replacement. The code entered in the second position designates the lowest echelon authorized to manufacture or fabricate the item. Units will requisition the bulk materiel under the NSNs and the quantities indicated to effect the fabrication or manufacture of the item.

MO Manufacture or fabricate at organizational maintenance level 2nd echelon.

MF Manufacture or fabricate at field maintenance level 3rd echelon.

MH Manufacture or fabricate at field maintenance level 4th echelon.

MD Manufacture or fabricate at field maintenance level 5th echelon.

d. SERIES P: PARTS PROCURED, SUPPLY SYSTEM STOCK

PA Applied to items procured for the Marine Corps supply system for anticipated or known usage.

PB Applied to items for which no usage is anticipated, but procured for the Marine Corps supply system in limited quantity for issuing purposes.

PC Applied to items procured for the Marine Corps supply system which would be coded PA except that they are deteriorative in nature.

PG Applied to parts procured from the Marine Corps supply system to provide for the sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which because of probable discontinuance or shutdown of production facilities would prove uneconomical to reproduce at a later time.

SERIES X: NOT PROCURED, GENERALLY IMPRACTICAL FOR STOCKING, MAINTENANCE, OR MANUFACTURE

Items listed in this publication, which are source coded XA or XB, may have been subsequently assigned an NSN because of other application in the Marine Corps. Therefore, if an item source coded in the XA or XB series in this publication is required, users are directed to first make the following investigations:

Check the corresponding part number in the Master Cross-Reference List (MCRL), to determine if an NSN has been assigned.
If an NSN has been obtained from the above check, refer to the Management Data List (MDL) for the latest supply management decision regarding the stock number.
Check stock for availability of part(s) having a National Stock Number.
If the review of stock discloses that materiel is not available, refer to the MDL for inventory record data regarding the preferred NSN which may have been obtained in the Master Cross-Reference List (MCRL) and Management Data List (MDL) review.
Prepare a requisition citing the stock number shown in the Management Data list (MDL).

The above review will assist the user in obtaining the correct item of supply from the supply system, when available, rather than through alternate methods such as obtaining the desired part from salvage, requisitioning the next higher assembly, or recommending that the equipment be overhauled or retired. If a stock number for the desired item does not exist, then the source of supply as defined below will prevail:

XA Applied to items not maintained in the supply system; replacement of these parts is neither practical nor economical. Support of the end equipment will be affected by replacing the next higher assembly.

XB Applied to items not procured for stock, but may be acquired for use through salvage. Activities requiring such items will attempt to obtain them from salvage, if not obtainable from salvage, all efforts to manufacture or assemble the item should be exhausted prior to requisitioning. Such items will be requisitioned through normal supply channels citing manufacturer's code and part number with supporting justification.

XC Applied to installation drawing, diagram, instruction sheet or field service drawing identified by a manufacturer's part number.

4-4. Maintenance Codes

Maintenance codes are assigned to indicate the levels of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth position of the SMR code.

a. (Third Position): The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code	Application/Explanation
C	Crew 1st echelon
O	Organizational 2nd echelon
F	Field 3rd echelon
H	Field 4th echelon
D	Depot 5th echelon

b. (Fourth Position): The maintenance code entered in the fourth position indicated whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair. This does not preclude some repair which should be accomplished at a lower level of maintenance unless specifically excluded by the appropriate code (i.e., L).

Code	Application/Explanation
O	Organizational 2nd echelon
F	Field 3rd echelon
H	Field 4th echelon
D	Depot 5th echelon
L	Repair restricted to designated Specialized Repair Activity.
Z	Non-reparable. No repair is authorized
B	No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item.

4-5. Recoverability Codes

Recoverability codes are assigned to support items and indicate the disposition action for unserviceable items. The recoverability code is entered in the fifth position of the SMR code.

Code	Application/Explanation
Z	Non-reparable item. When unserviceable, condemn and dispose at the maintenance level indicated in position 3.
O	Reparable item. When uneconomically reparable, condemn at organizational level.
F	Reparable item. When uneconomically reparable, condemn and dispose at field maintenance level 3rd echelon.
H	Reparable item. When uneconomically reparable, condemn at field maintenance level 4th echelon.
D	Reparable item. When beyond lower level of repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Reparable item. Repair, condemnation and disposal not authorized below Specified Special Repair Activity level.
A	Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/directives for specific instructions.

SECTION IV

IV. NATIONAL STOCK NUMBER (NSN) TO MANUFACTURER'S PART NUMBER (P/N) CROSS REFERENCE

National Stock Number	Manufacturer Part Number	Manufacturer Cage Code	Figure No.	Item No.
2990-01-544-1972	41-977	43904	4-9	6
4110-01-518-8491	102-0722	61510	4-3	1
4110-01-518-8491	102-0722	61510	4-6	19
4130-01-518-8499	66-8471	61510	4-3	12
4130-01-518-8505	67-1798	61510	4-3	11
4130-01-542-1361	67-1620	43904	4-5	5
4130-01-542-1365	67-1619	43904	4-3	7
4140-01-518-8169	78-1378	61510	4-5	4
4140-01-518-8169	78-1378	61510	4-6	2
4140-01-518-8170	78-1370	61510	4-6	3
4140-01-542-1654	98-5650	43904	4-5	6
4520-01-518-7604	45-1395	43904	4-6	16
4710-01-542-1606	66-9963	43904	4-5	16
4710-01-542-1609	66-9964	43904	4-5	13
4720-01-519-2672	11-9223	61510	4-5	9
4730-01-542-3005	55-9258	43904	4-5	8
4730-01-542-3238	55-2181	43904	4-3	23
4820-01-518-8554	22-1073	61510	4-3	31
4820-01-518-8574	66-9314	61510	4-5	2
5110-01-519-3565	61-1126	61510	4-5	3
5305-01-536-4095	55-8531	61510	4-3	16
5305-01-542-1372	55-7035	43904	4-3	8
5305-01-542-1372	55-7035	43904	4-8	3
5305-01-542-1518	55-7036	43904	4-5	4
5305-01-542-1518	55-7036	43904	4-6	3
5305-01-542-1525	55-7172	43904	4-2	6
5305-01-542-1525	55-7172	43904	4-5	6
5305-01-542-1527	55-7340	43904	4-2	5
5305-01-542-1527	55-7340	43904	4-2	7
5305-01-542-1527	55-7340	43904	4-3	9
5305-01-542-1527	55-7340	43904	4-5	6
5305-01-542-1527	55-7340	43904	4-5	19
5305-01-542-1580	55-8316	43904	4-9	4
5305-01-542-1589	55-9452	43904	4-6	4
5305-01-542-1589	55-9452	43904	4-6	18
5305-01-542-1589	55-9452	43904	4-9	6
5310-01-542-0900	55-7354	43904	4-3	7
5310-01-542-0900	55-7354	43904	4-3	8
5310-01-542-0900	55-7354	43904	4-8	3
5310-01-542-0900	55-7354	43904	4-9	4
5310-01-542-0900	55-7354	43904	4-9	8
5310-01-542-1309	55-9354	43904	4-5	6
5310-01-542-1314	55-7697	43904	4-6	4
5310-01-542-1314	55-7697	43904	4-6	18
5310-01-542-1314	55-7697	43904	4-9	6
5310-01-542-1383	55-9353	43904	4-5	6
5310-01-542-1389	55-7075	43904	4-3	7
5310-01-542-1389	55-7075	43904	4-3	8
5310-01-542-1389	55-7075	43904	4-8	3
5310-01-542-1389	55-7075	43904	4-9	4
5310-01-542-1389	55-7075	43904	4-9	8
5310-01-542-1521	55-7085	43904	4-2	4
5310-01-542-1521	55-7085	43904	4-3	4
5310-01-542-1523	55-7089	43904	4-2	3
5310-01-542-1523	55-7089	43904	4-2	5
5310-01-542-1523	55-7089	43904	4-2	7
5310-01-542-1523	55-7089	43904	4-3	16
5310-01-542-1523	55-7089	43904	4-5	4
5310-01-542-1523	55-7089	43904	4-5	19

National Stock Number	Manufacturer Part Number	Manufacturer Cage Code	Figure No.	Item No.
5310-01-542-1537	55-7367	43904	4-6	4
5310-01-542-1546	55-7404	43904	4-2	5
5310-01-542-1546	55-7404	43904	4-2	7
5310-01-542-1546	55-7404	43904	4-3	9
5310-01-542-1546	55-7404	43904	4-3	16
5310-01-542-1546	55-7404	43904	4-5	4
5310-01-542-1546	55-7404	43904	4-5	19
5310-01-542-1546	55-7404	43904	4-6	3
5310-01-542-1546	55-7404	43904	4-8	2
5310-01-542-1570	55-7861	43904	4-6	4
5310-01-542-1570	55-7861	43904	4-6	18
5310-01-542-1570	55-7861	43904	4-9	6
5310-01-542-1604	55-9826	43904	4-3	9
5310-01-542-1604	55-9826	43904	4-6	3
5310-01-542-5990	55-8237	43904	4-2	6
5310-01-542-5990	55-8237	43904	4-2	8
5310-01-542-5990	55-8237	43904	4-3	7
5310-01-542-5990	55-8237	43904	4-9	4
5310-01-546-5115	55-7698	61510	4-6	18
5310-01-546-5115	55-7698	61510	4-9	6
5315-01-542-2655	91-240	43904	4-6	17
5325-01-542-2948	33-2801	43904	4-5	11
5330-01-542-0872	44-8681	43904	4-7	2
5330-01-542-0877	44-5837	43904	4-7	2
5330-01-542-1274	44-7812	43904	4-7	2
5330-01-542-1607	44-5885	43904	4-7	2
5330-01-544-1926	44-6324	43904	4-7	2
5340-01-542-1152	91-9990	43904	4-2	4
5340-01-542-1601	55-9825	43904	4-2	7
5340-01-542-1601	55-9825	43904	4-5	19
5340-01-542-1601	55-9825	43904	4-6	4
5340-01-542-1635	91-9988	43904	4-5	12
5340-01-542-1646	92-923	43904	4-8	1
5340-01-542-2650	41-944	43904	4-8	13
5365-01-542-1403	51-173	43904	4-3	2
5905-01-518-7813	41-3143	61510	4-6	4
5905-01-519-2725	44-9925	61510	4-9	10
5910-01-518-7342	41-2992	61510	4-9	7
5920-01-464-4348	44-9524	61510	4-8	7
5920-01-464-4373	41-1932	61510	4-1	18
5920-01-519-2684	44-9758	61510	4-8	7
5920-01-519-2688	44-9344	61510	4-8	7
5920-01-521-0508	41-4180	61510	4-8	14
5920-01-521-0511	41-5863	61510	4-8	14
5925-01-519-2713	41-3097	61510	4-8	8
5925-01-519-2715	41-3091	61510	4-8	9
5925-01-519-2717	41-3099	61510	4-8	10
5930-01-518-7554	41-3136	61510	4-6	1
5930-01-518-7556	44-8030	61510	4-3	28
5930-01-518-7556	44-8030	61510	4-6	8
5930-01-518-8463	44-8064	61510	4-3	27
5930-01-518-8463	44-8064	61510	4-6	7
5935-01-464-7700	44-7330	61510	4-7	3
5935-01-464-7710	44-7327	61510	4-7	4
5935-01-464-7711	44-5835	61510	4-7	6
5935-01-464-7714	44-5838	61510	4-7	7
5935-01-464-7719	44-9569	61510	4-7	8
5935-01-464-7721	44-6959	61510	4-7	9
5935-01-464-7722	44-7881	61510	4-7	11
5935-01-464-7741	44-7880	61510	4-7	10
5935-01-464-7747	44-8294	61510	4-7	12
5935-01-464-7753	44-7872	61510	4-7	13
5935-01-464-7759	44-7884	61510	4-7	14
5935-01-464-7765	44-7829	61510	4-7	15

National Stock Number	Manufacturer Part Number	Manufacturer Cage Code	Figure No.	Item No.
5935-01-464-7766	41-1527	61510	4-7	17
5935-01-464-7769	41-1310	61510	4-7	18
5935-01-519-2681	41-876	61510	4-8	4
5935-01-519-2682	41-946	61510	4-8	5
5935-01-542-1538	41-3423	43904	4-1	16
5935-01-542-1538	41-3423	43904	4-6	6
5935-01-542-2614	41-1507	43904	4-1	15
5935-01-542-2640	44-7811	43904	4-7	16
5935-01-542-2647	41-898	43904	4-8	12
5935-01-542-3380	41-942	43904	4-8	13
5935-01-542-7050	44-5884	43904	4-7	5
5940-01-542-0898	44-5883	43904	4-7	1
5940-01-542-0904	44-5836	43904	4-7	1
5940-01-542-0908	41-1807	43904	4-1	18
5940-01-542-1326	44-5839	43904	4-7	5
5940-01-542-1378	44-8853	43904	4-7	5
5940-01-542-1395	44-8851	43904	4-7	1
5940-01-542-1402	41-6450	43904	4-3	1
5940-01-542-1402	41-6450	43904	4-6	19
5945-01-518-7497	41-3707	61510	4-8	6
5945-01-518-7509	41-1005	61510	4-8	15
5945-01-518-8517	66-7878	61510	4-3	15
5950-01-518-7320	41-3435	61510	4-9	2
5950-01-518-8526	41-5051	61510	4-3	16
5961-01-518-7489	41-3438	61510	4-9	5
5998-01-518-7389	41-4259	61510	4-8	3
5999-01-518-8753	41-3156	61510	4-5	10
5999-01-518-8753	41-3156	43904	4-6	15
5999-01-542-2662	41-3134	43904	4-9	9
6110-01-518-8113	45-1780	61510	4-1	17
6110-01-518-8113	45-1780	61510	4-6	9
6150-01-519-6921	41-3442	80298	4-6	12
6645-01-066-5840	44-5703	61510	4-1	13
6680-01-519-2675	66-7682	43904	4-3	14
7690-01-550-5368	91-7499	43904	4-10	3
7690-01-550-5370	91-9995	43904	4-10	7
9330-01-542-0547	91-9989	43904	4-2	4
9330-01-542-0547	91-9989	43904	4-5	14
9330-01-542-0547	91-9989	43904	4-9	1
9330-01-542-0553	91-9992	43904	4-2	8
9515-01-542-1397	91-9613	43904	4-1	18

SECTION V

V MANUFACTURER'S PART NUMBER (P/N) TO NATIONAL STOCK NUMBER (NSN) CROSS REFERENCE

Manufacturer Part Number	National Stock Number	Manufacturer Cage Code	Figure No.	Item No.
102-0722	4110-01-518-8491	61510	4-3	1
102-0722	4110-01-518-8491	61510	4-6	19
11-9223	4720-01-519-2672	61510	4-5	9
22-1073	4820-01-518-8554	61510	4-3	31
33-2801	5325-01-542-2948	43904	4-5	11
41-1005	5945-01-518-7509	61510	4-8	15
41-1310	5935-01-464-7769	61510	4-7	18
41-1507	5935-01-542-2614	43904	4-1	15
41-1527	5935-01-464-7766	61510	4-7	17
41-1807	5940-01-542-0908	43904	4-1	18
41-1932	5920-01-464-4373	61510	4-1	18
41-2992	5910-01-518-7342	61510	4-9	7
41-3091	5925-01-519-2715	61510	4-8	9
41-3097	5925-01-519-2713	61510	4-8	8
41-3099	5925-01-519-2717	61510	4-8	10
41-3134	5999-01-542-2662	43904	4-9	9
41-3136	5930-01-518-7554	61510	4-6	1
41-3143	5905-01-518-7813	61510	4-6	4
41-3156	5999-01-518-8753	61510	4-5	10
41-3156	5999-01-518-8753	43904	4-6	15
41-3423	5935-01-542-1538	43904	4-1	16
41-3423	5935-01-542-1538	43904	4-6	6
41-3435	5950-01-518-7320	61510	4-9	2
41-3438	5961-01-518-7489	61510	4-9	5
41-3442	6150-01-519-6921	80298	4-6	12
41-3707	5945-01-518-7497	61510	4-8	6
41-4180	5920-01-521-0508	61510	4-8	14
41-4259	5998-01-518-7389	61510	4-8	3
41-5051	5950-01-518-8526	61510	4-3	16
41-5863	5920-01-521-0511	61510	4-8	14
41-6450	5940-01-542-1402	43904	4-3	1
41-6450	5940-01-542-1402	43904	4-6	19
41-876	5935-01-519-2681	61510	4-8	4
41-898	5935-01-542-2647	43904	4-8	12
41-942	5935-01-542-3380	43904	4-8	13
41-944	5340-01-542-2650	43904	4-8	13
41-946	5935-01-519-2682	61510	4-8	5
41-977	2990-01-544-1972	43904	4-9	6
44-5703	6645-01-066-5840	61510	4-1	13
44-5835	5935-01-464-7711	61510	4-7	6
44-5836	5940-01-542-0904	43904	4-7	1
44-5837	5330-01-542-0877	43904	4-7	2
44-5838	5935-01-464-7714	61510	4-7	7
44-5839	5940-01-542-1326	43904	4-7	5
44-5883	5940-01-542-0898	43904	4-7	1
44-5884	5935-01-542-7050	43904	4-7	5
44-5885	5330-01-542-1607	43904	4-7	2
44-6324	5330-01-544-1926	43904	4-7	2
44-6959	5935-01-464-7721	61510	4-7	9
44-7327	5935-01-464-7710	61510	4-7	4
44-7330	5935-01-464-7700	61510	4-7	3
44-7811	5935-01-542-2640	43904	4-7	16
44-7812	5330-01-542-1274	43904	4-7	2
44-7829	5935-01-464-7765	61510	4-7	15
44-7872	5935-01-464-7753	61510	4-7	13
44-7880	5935-01-464-7741	61510	4-7	10
44-7881	5935-01-464-7722	61510	4-7	11
44-7884	5935-01-464-7759	61510	4-7	14

Manufacturer Part Number	National Stock Number	Manufacturer Cage Code	Figure No.	Item No.
44-8030	5930-01-518-7556	61510	4-3	28
44-8030	5930-01-518-7556	61510	4-6	8
44-8064	5930-01-518-8463	61510	4-3	27
44-8064	5930-01-518-8463	61510	4-6	7
44-8294	5935-01-464-7747	61510	4-7	12
44-8681	5330-01-542-0872	43904	4-7	2
44-8851	5940-01-542-1395	43904	4-7	1
44-8853	5940-01-542-1378	43904	4-7	5
44-9344	5920-01-519-2688	61510	4-8	7
44-9524	5920-01-464-4348	61510	4-8	7
44-9569	5935-01-464-7719	61510	4-7	8
44-9758	5920-01-519-2684	61510	4-8	7
44-9925	5905-01-519-2725	61510	4-9	10
45-1395	4520-01-518-7604	43904	4-6	16
45-1780	6110-01-518-8113	61510	4-1	17
45-1780	6110-01-518-8113	61510	4-6	9
51-173	5365-01-542-1403	43904	4-3	2
55-2181	4730-01-542-3238	43904	4-3	23
55-7035	5305-01-542-1372	43904	4-3	8
55-7035	5305-01-542-1372	43904	4-8	3
55-7036	5305-01-542-1518	43904	4-5	4
55-7036	5305-01-542-1518	43904	4-6	3
55-7075	5310-01-542-1389	43904	4-3	7
55-7075	5310-01-542-1389	43904	4-3	8
55-7075	5310-01-542-1389	43904	4-8	3
55-7075	5310-01-542-1389	43904	4-9	4
55-7075	5310-01-542-1389	43904	4-9	8
55-7085	5310-01-542-1521	43904	4-2	4
55-7085	5310-01-542-1521	43904	4-3	4
55-7089	5310-01-542-1523	43904	4-2	3
55-7089	5310-01-542-1523	43904	4-2	5
55-7089	5310-01-542-1523	43904	4-2	7
55-7089	5310-01-542-1523	43904	4-3	16
55-7089	5310-01-542-1523	43904	4-5	4
55-7089	5310-01-542-1523	43904	4-5	19
55-7172	5305-01-542-1525	43904	4-2	6
55-7172	5305-01-542-1525	43904	4-5	6
55-7340	5305-01-542-1527	43904	4-2	5
55-7340	5305-01-542-1527	43904	4-2	7
55-7340	5305-01-542-1527	43904	4-3	9
55-7340	5305-01-542-1527	43904	4-5	6
55-7340	5305-01-542-1527	43904	4-5	19
55-7354	5310-01-542-0900	43904	4-3	7
55-7354	5310-01-542-0900	43904	4-3	8
55-7354	5310-01-542-0900	43904	4-8	3
55-7354	5310-01-542-0900	43904	4-9	4
55-7354	5310-01-542-0900	43904	4-9	8
55-7367	5310-01-542-1537	43904	4-6	4
55-7404	5310-01-542-1546	43904	4-2	5
55-7404	5310-01-542-1546	43904	4-2	7
55-7404	5310-01-542-1546	43904	4-3	9
55-7404	5310-01-542-1546	43904	4-3	16
55-7404	5310-01-542-1546	43904	4-5	4
55-7404	5310-01-542-1546	43904	4-5	19
55-7404	5310-01-542-1546	43904	4-6	3
55-7404	5310-01-542-1546	43904	4-8	2
55-7697	5310-01-542-1314	43904	4-6	4
55-7697	5310-01-542-1314	43904	4-6	18
55-7697	5310-01-542-1314	43904	4-9	6
55-7698	5310-01-546-5115	61510	4-6	18
55-7698	5310-01-546-5115	61510	4-9	6
55-7861	5310-01-542-1570	43904	4-6	4
55-7861	5310-01-542-1570	43904	4-6	18
55-7861	5310-01-542-1570	43904	4-9	6

Manufacturer Part Number	National Stock Number	Manufacturer Cage Code	Figure No.	Item No.
55-8237	5310-01-542-5990	43904	4-2	6
55-8237	5310-01-542-5990	43904	4-2	8
55-8237	5310-01-542-5990	43904	4-3	7
55-8237	5310-01-542-5990	43904	4-9	4
55-8316	5305-01-542-1580	43904	4-9	4
55-8531	5305-01-536-4095	61510	4-3	16
55-9258	4730-01-542-3005	43904	4-5	8
55-9353	5310-01-542-1383	43904	4-5	6
55-9354	5310-01-542-1309	43904	4-5	6
55-9452	5305-01-542-1589	43904	4-6	4
55-9452	5305-01-542-1589	43904	4-6	18
55-9452	5305-01-542-1589	43904	4-9	6
55-9825	5340-01-542-1601	43904	4-2	7
55-9825	5340-01-542-1601	43904	4-5	19
55-9825	5340-01-542-1601	43904	4-6	4
55-9826	5310-01-542-1604	43904	4-3	9
55-9826	5310-01-542-1604	43904	4-6	3
61-1126	5110-01-519-3565	61510	4-5	3
66-7682	6680-01-519-2675	43904	4-3	14
66-7878	5945-01-518-8517	61510	4-3	15
66-8471	4130-01-518-8499	61510	4-3	12
66-9314	4820-01-518-8574	61510	4-5	2
66-9963	4710-01-542-1606	43904	4-5	16
66-9964	4710-01-542-1609	43904	4-5	13
67-1619	4130-01-542-1365	43904	4-3	7
67-1620	4130-01-542-1361	43904	4-5	5
67-1798	4130-01-518-8505	61510	4-3	11
78-1370	4140-01-518-8170	61510	4-6	3
78-1378	4140-01-518-8169	61510	4-5	4
78-1378	4140-01-518-8169	61510	4-6	2
91-240	5315-01-542-2655	43904	4-6	17
91-7499	7690-01-550-5368	43904	4-10	3
91-9613	9515-01-542-1397	43904	4-1	18
91-9988	5340-01-542-1635	43904	4-5	12
91-9989	9330-01-542-0547	43904	4-2	4
91-9989	9330-01-542-0547	43904	4-5	14
91-9989	9330-01-542-0547	43904	4-9	1
91-9990	5340-01-542-1152	43904	4-2	4
91-9992	9330-01-542-0553	43904	4-2	8
91-9995	7690-01-550-5370	43904	4-10	7
92-923	5340-01-542-1646	43904	4-8	1
98-5650	4140-01-542-1654	43904	4-5	6

SECTION VI

VI. IDENTIFICATION OF PARTS

This listing comprises the main part of the RPL. It is arranged in columns which show stock numbers, item identification, and other data necessary to maintain this equipment in an operative condition.

4-6. Repair Parts Lists and Illustrations

Figure 4-1. Container Front.

Table 4-1. Container Front.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-1	1	PAOZZ		0FXA9	SB1423.024	STEP EXTERNAL	EA	5	5
4-1	2	PAOZZ		0FXA9	SB1423.023	DOOR LATCH ASSEMBLY - EXTERIOR	EA	1	1
4-1	3	PAOZZ		0FXA9	SB1423.027	PRESSURE RELIEF VALVE W/NUT & SCREEN	EA	1	1

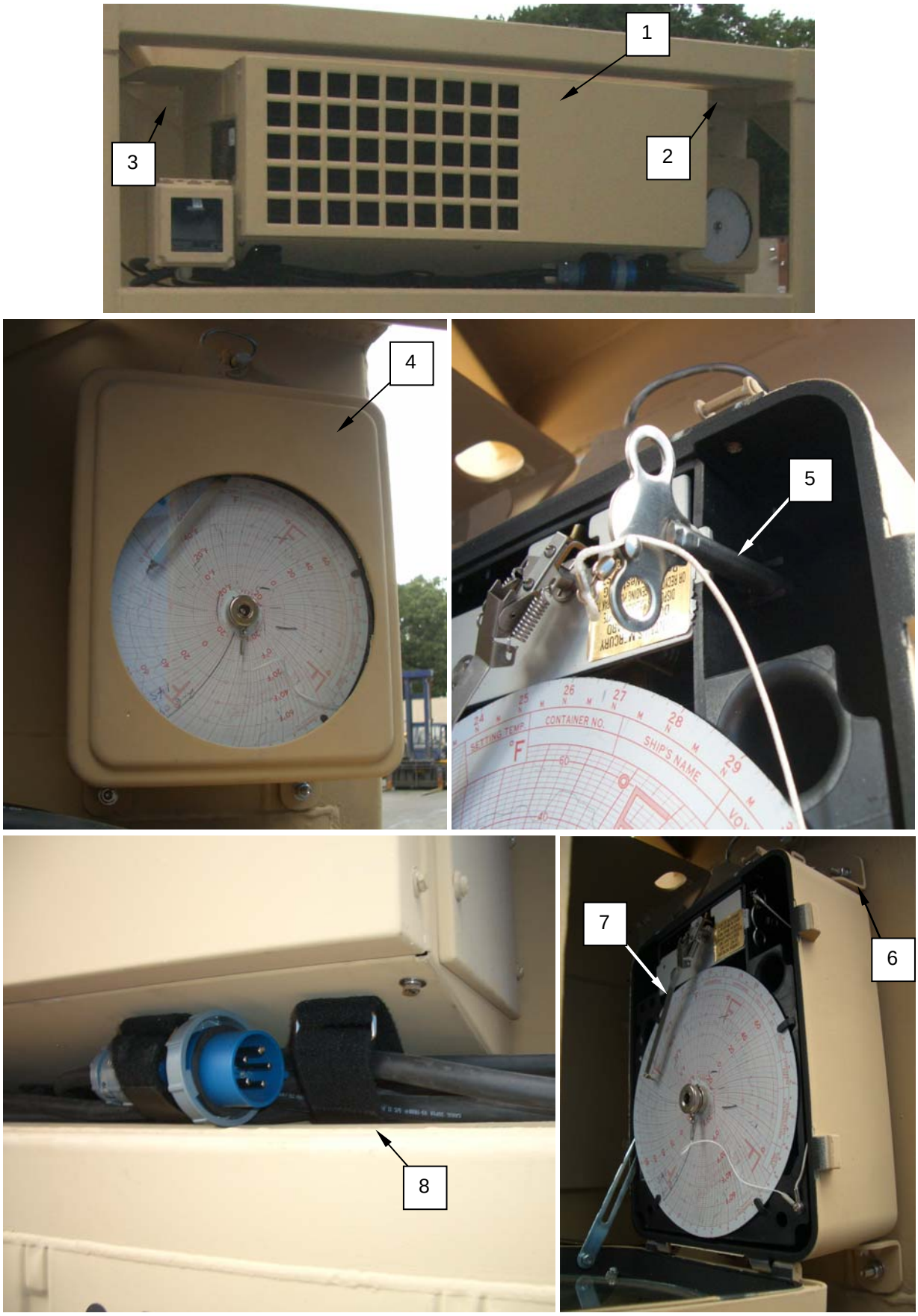


Figure 4-2. Container Rear.

Table 4-2. Container Rear.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-2	1	PAOFF		0FXA9	SB405	ENHANCED REFRIGERATION UNIT	EA	1	1
4-2	2	XBOFF		0FXA9	SB1423.002	FORKLIFT BRACKET-R	EA	1	1
4-2	3	XBOFF		0FXA9	SB1423.003	FORKLIFT BRACKET-L	EA	1	1
4-2	4	PAOZZ		0FXA9	SB1423.006	CHART RECORDER	EA	1	1
4-2	5	PAOZZ		0FXA9	SB1423.012	RECORDER KEY	EA	1	1
4-2	6	XBOZZ		0FXA9	SB1423.007	RECORDER MOUNTING BRACKET	EA	1	1
4-2	7	XBOZZ		0FXA9	SB1423.010	CHART STYLUS	EA	1	1
4-2	8	PAOZZ		0FXA9	SB1423.026	HOOK & LOOP STRAP	EA	3	3

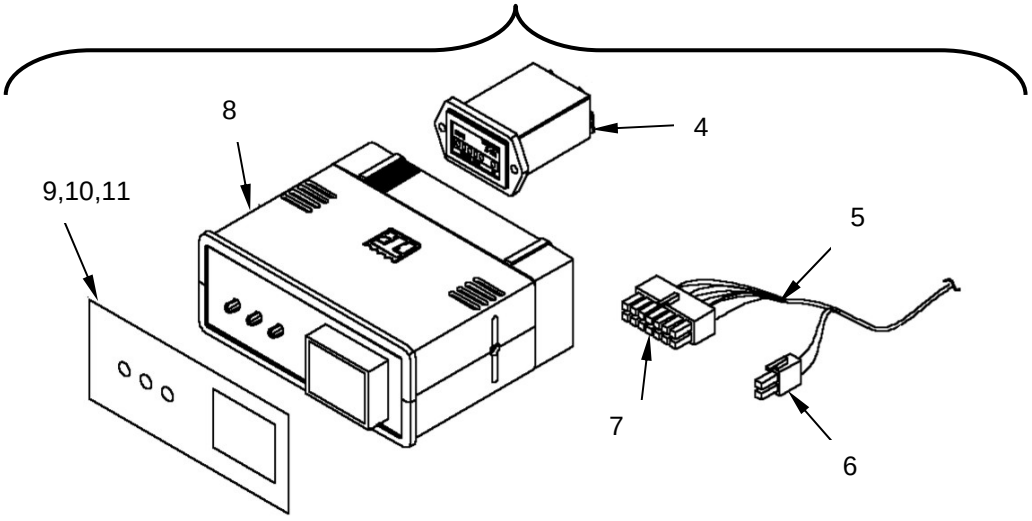


Figure 4-3. Control Box.

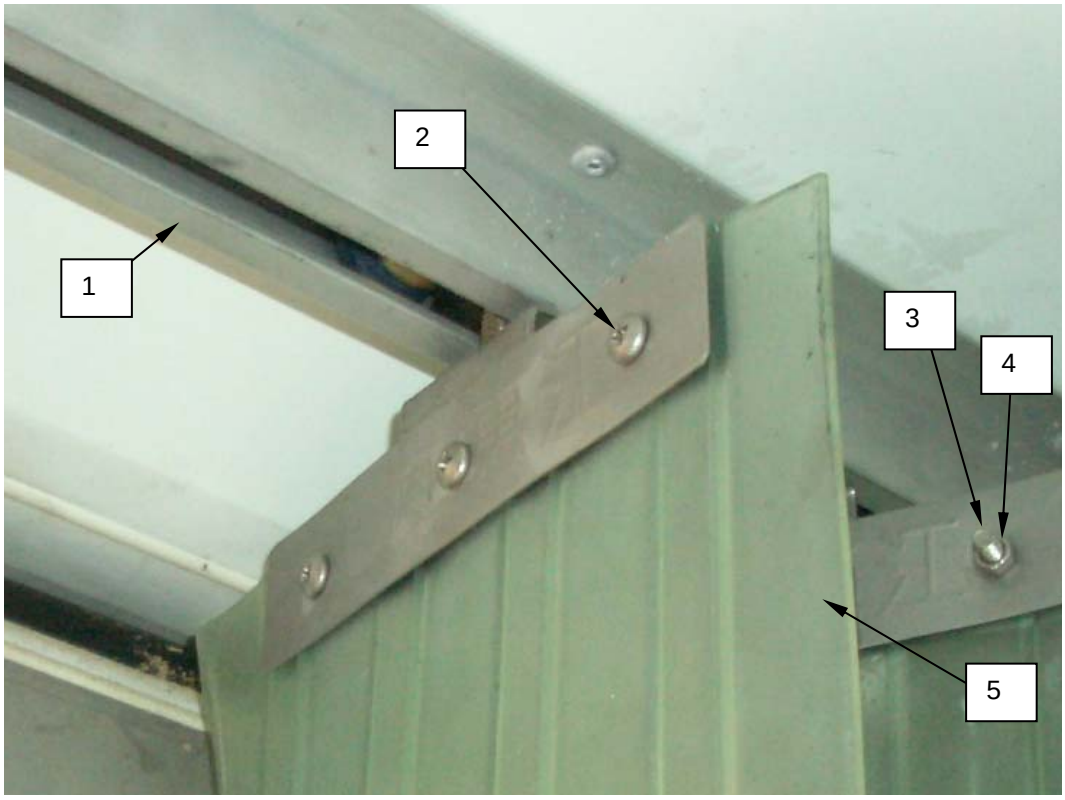
Table 4-3. Control Box.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-3	1	XBOZZ		0FXA9	SB1423.018	CONTROL BOX, ENCLOSURE	EA	1	1
4-3	2	XBOZZ		0FXA9	SB1423.028	CONTROL BOX MOUNTING BRACKET	EA	1	1
4-3	3	XBOZZ		0FXA9	SB1423.001	CONTROLLER MOUNTING BRACKET	EA	1	1
4-3	4	PAOZZ	6645010665840	61510	44-5703	METER,TIME TOTALIZING	EA	1	1
4-3	5	XBOZZ		43904	41-5890	WIRING HARNESS	EA	1	1
4-3	6	PAOZZ	5935015422614	43904	41-1507	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-3	7	PAOZZ	5935015421538	43904	41-3423	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-3	8	PAOZZ	6110015188113	61510	45-1780	CONTROLLER, MOTOR	EA	1	1
4-3	9	PAOZZ	9515015421397	43904	91-9613	PLATE,METAL	EA	1	1
4-3	10	PAOZZ	5920014644373	61510	41-1932	FUSE	EA	1	1
4-3	11	PAOZZ	5940015420908	43904	41-1807	TERMINAL,TAPER RECEPTACLE,ELECTRICAL	EA	12	12

Figure 4-4. Container Interior.

Table 4-4. Container Interior.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-4	1	XAOZZ		0FXA9	SB1423.008	RECORDER SENSOR ELEMENT	EA	1	1
4-4	2	PAOZZ		0FXA9	SB1423.017	FLOOR DRAIN	EA	1	1
4-4	3	PAOZZ		0FXA9	SB1423.004	MANUAL HOLDER	EA	2	2
4-4	4	PAOZZ		0FXA9	SB1423.005	THERMOMETER	EA	1	1
4-4	5	PAOZZ		0FXA9	SB1423.013	LIGHT SWITCH	EA	1	1
4-4	6	PAOZZ		0FXA9	SB1423.014	LIGHT FIXTURE	EA	1	1
4-4	7	PAOZZ		39428	1532K31	LIGHT BULB 40W - 115VAC -60 HZ	EA	1	1



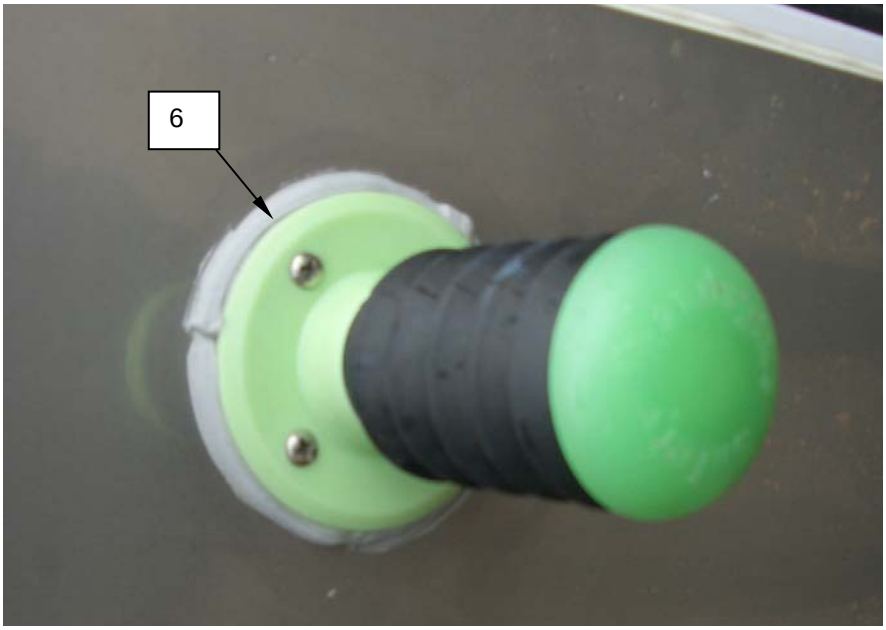


Figure 4-5. Container Interior Door.

Table 4-5. Container Interior Door.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-5	1	XBOZZ		0FXA9	SB1423.020	AIR CURTAIN RAIL	EA	1	1
4-5	2	PAOZZ	5305015596861	39428	91280A222	SCREW,CAP, HEXAGON HEAD	EA	12	12
4-5	3	PAOZZ	5310015746197	39428	91169A170	WASHER,LOCK	EA	12	12
4-5	4	PAOZZ		39428	90592A012	NUT,PLAIN,HEXAGON	EA	12	12
4-5	5	PAOZZ		0FXA9	SB1423.021	AIR CURTAIN FLAPS	EA	4	4
4-5	6	PAOZZ		0FXA9	SB1423.025	INTERIOR DOOR RELEASE	EA	1	1

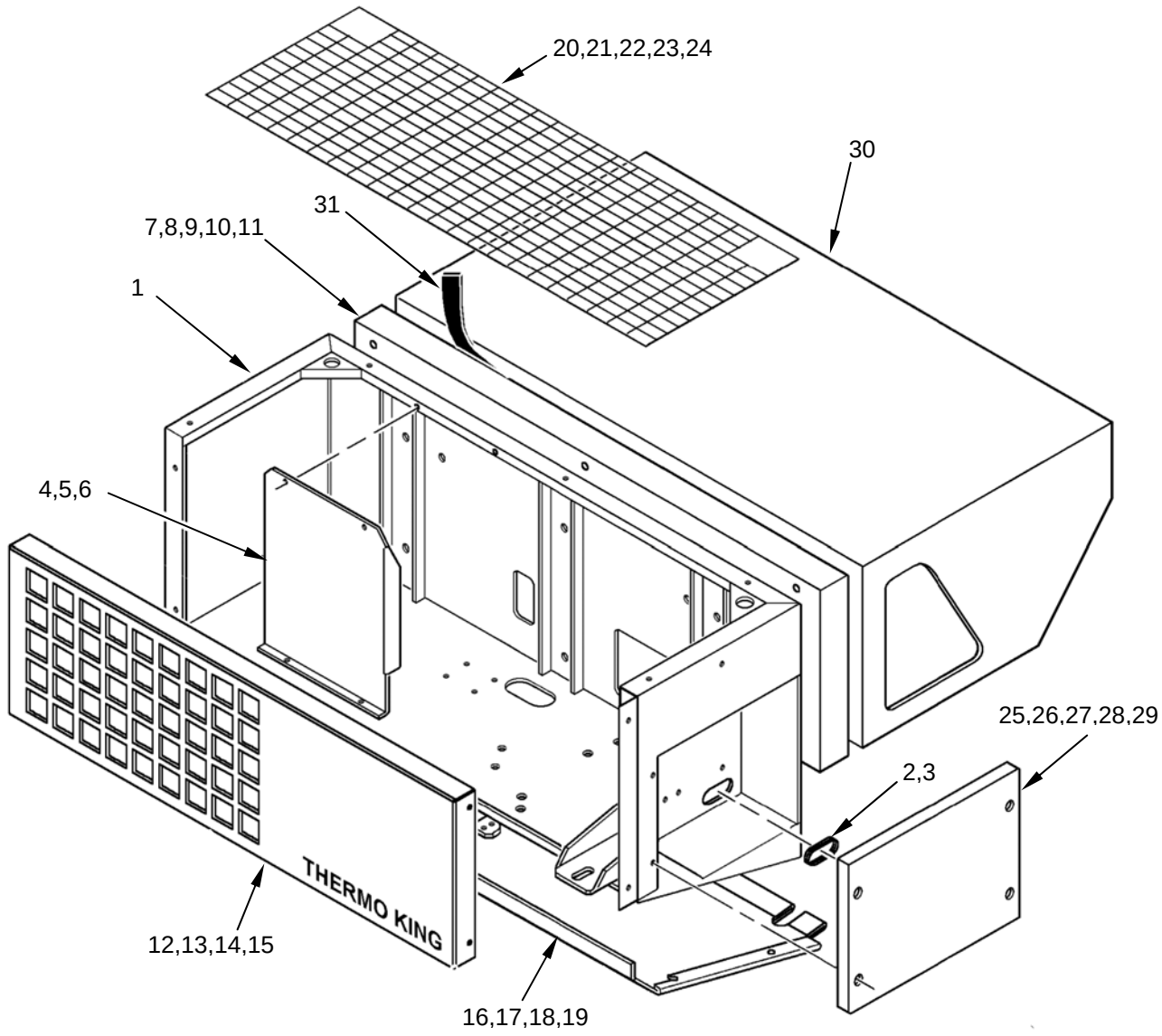


Figure 4-6. RU Frame Assembly.

Table 4-6. RU Frame Assembly.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-6	1	XBOZZ		43904	98-6805	FRAME, CONDENSER	EA	1	1
4-6	2	XBOZZ		43904	33-3539	GROMMET	EA	5	5
4-6	3	XBOZZ		43904	33-3944	GROMMET	EA	1	1

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-6	4	XBOZZ		43904	92-3584	PANEL, BLANK	EA	1	1
4-6	5	XBOZZ		43904	55-8851	SCREW, MACHINE	EA	4	4
4-6	6	PAOZZ	5310015421523	43904	55-7089	WASHER,FLAT	EA	4	4
4-6	7	PAOZZ	5340015421152	43904	91-9990	BULKHEAD	EA	1	1
4-6	8	PAOZZ	9330015420547	43904	91-9989	PLASTIC STRIP, PRESSURE SENSITIVE ADHESIVE	EA	2	2
4-6	9	XBOZZ		43904	55-8808	SCREW, S	EA	6	6
4-6	10	PAOZZ	5310015421521	43904	55-7085	WASHER,FLAT	EA	6	6
4-6	11	XBOZZ		43904	55-7339	NUT, PLAIN, HEXAGON	EA	6	6
4-6	12	XBOZZ		43904	98-6808	GRILLE, METAL	EA	1	1
4-6	13	PAOZZ	5305015421527	43904	55-7340	SCREW,MACHINE	EA	4	4
4-6	14	PAOZZ	5310015421523	43904	55-7089	WASHER,FLAT	EA	4	4
4-6	15	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	4	4
4-6	16	XBOZZ		43904	98-6807	PANEL, BLANK	EA	1	1
4-6	17	PAOZZ	5305015421525	43904	55-7172	SCREW,MACHINE	EA	8	8
4-6	18	XBOZZ		43904	55-6996	WASHER,LOCK	EA	8	8
4-6	19	PAOZZ	5310015425990	43904	55-8237	WASHER, FLAT	EA	8	8
4-6	20	XBOZZ		43904	98-6806	GRILLE, METAL	EA	1	1
4-6	21	PAOZZ	5340015421601	43904	55-9825	CLAMP,LOOP	EA	5	5
4-6	22	PAOZZ	5305015421527	43904	55-7340	SCREW,MACHINE	EA	5	5
4-6	23	PAOZZ	5310015421523	43904	55-7089	WASHER,FLAT	EA	5	5
4-6	24	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	5	5
4-6	25	XBOZZ		43904	92-925	COVER, CONTROL BOX	EA	1	1
4-6	26	XBOZZ		43904	55-9621	SCREW,MACHINE	EA	4	4
4-6	27	XBOZZ		43904	55-6996	WASHER,LOCK	EA	4	4
4-6	28	PAOZZ	5310015425990	43904	55-8237	WASHER, FLAT	EA	4	4
4-6	29	PAOZZ	9330015420553	43904	91-9992	PLASTIC STRIP, PRESSURE SENSITIVE ADHESIVE	EA	1	1
4-6	30	PAOZZ		43904	33-2660	TAPE	EA	1	1
4-6	31	XBOZZ		43904	98-6812	HOUSING, EVAPORATOR	EA	1	1

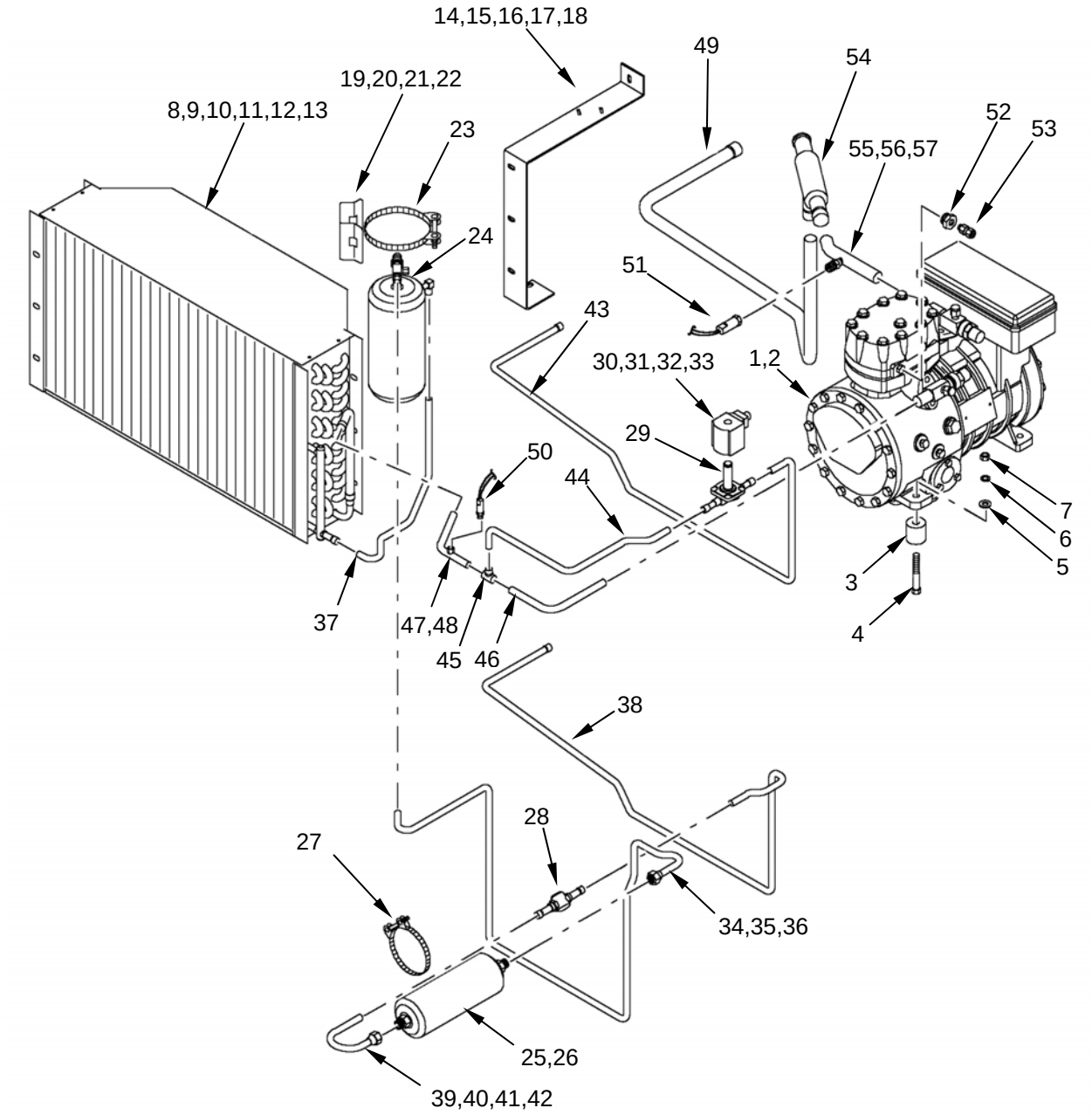


Figure 4-7. RU Refrigeration Group (Sheet 1 of 2).

Table 4-7. RU Refrigeration Group.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-7	1	PAOZZ	4110015188491	61510	1020722	COMPRESSOR, MOTOR	EA	1	1
4-7	2	PAOZZ	5940015421402	43904	41-6450	TERMINAL BOX	EA	1	1

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-7	3	PAOZZ	5365015421403	43904	51-173	SPACER,SLEEVE	EA	4	4
4-7	4	PAOZZ		43904	55-9158	SCREW - COMPRESSOR	EA	4	4
4-7	5	PAOZZ	5310015421521	43904	55-7085	WASHER,FLAT	EA	4	4
4-7	6	PAOZZ		43904	55-9485	WASHER, SPECIAL	EA	4	4
4-7	7	PAOZZ		43904	55-7339	NUT, PLAIN, HEXAGON	EA	4	4
4-7	8	PAOZZ	4130015421365	43904	67-1619	CONDENSER COIL,REFRIGERATION	EA	1	1
4-7	9	PAOZZ		43904	55-8375	NUT, CAPTIVE	EA	6	6
4-7	10	PAOZZ	5310015425990	43904	55-8237	WASHER, FLAT	EA	3	3
4-7	11	PAOZZ	5310015421389	43904	55-7075	WASHER, FLAT	EA	2	2
4-7	12	PAOZZ		43904	55-6996	WASHER,LOCK	EA	3	3
4-7	13	PAOZZ	5310015420900	43904	55-7354	NUT,PLAIN,HEXAGON	EA	2	2
4-7	14	PAOZZ		43904	92-3583	BRACKET,ANGLE	EA	1	1
4-7	15	PAOZZ	5305015421372	43904	55-7035	SCREW,MACHINE	EA	3	3
4-7	16	PAOZZ	5310015421389	43904	55-7075	WASHER, FLAT	EA	3	3
4-7	17	PAOZZ		43904	55-6996	WASHER,LOCK	EA	3	3
4-7	18	PAOZZ	5310015420900	43904	55-7354	NUT,PLAIN,HEXAGON	EA	3	3
4-7	19	PAOZZ		43904	92-636	BRACKET,MOUNTING	EA	1	1
4-7	20	PAOZZ	5305015421527	43904	55-7340	SCREW,MACHINE	EA	2	2
4-7	21	PAOZZ	5310015421604	43904	55-9826	WASHER,FLAT	EA	2	2
4-7	22	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	2	2
4-7	23	PAOZZ		43904	55-2688	CLAMP,LOOP	EA	1	1
4-7	24	PAOZZ	4130015188505	61510	67-1798	TANK,RECEIVER, REFRIGERATION	EA	1	1
4-7	25	PAOZZ	4130015188499	61510	66-8471	FILTER-DRIER,REFRIGERANT	EA	1	1
4-7	26	PAOZZ		43904	33-1015	O-RING	EA	2	2
4-7	27	PAOZZ		43904	55-6225	CLAMP	EA	1	1
4-7	28	PAOZZ	6680015192675	43904	66-7682	INDICATOR SET,LIQUID QUANTITY	EA	1	1
4-7	29	PAOZZ	5945015188517	61510	66-7878	RELAY, ELECTROMAGNETIC	EA	1	1
4-7	30	PAOZZ	5950015188526	61510	41-5051	COIL,ELECTRICAL	EA	1	1
4-7	31	PAOZZ	5305015364095	61510	55-8531	SCREW, COIL	EA	1	1
4-7	32	PAOZZ	5310015421523	43904	55-7089	WASHER,FLAT	EA	1	1

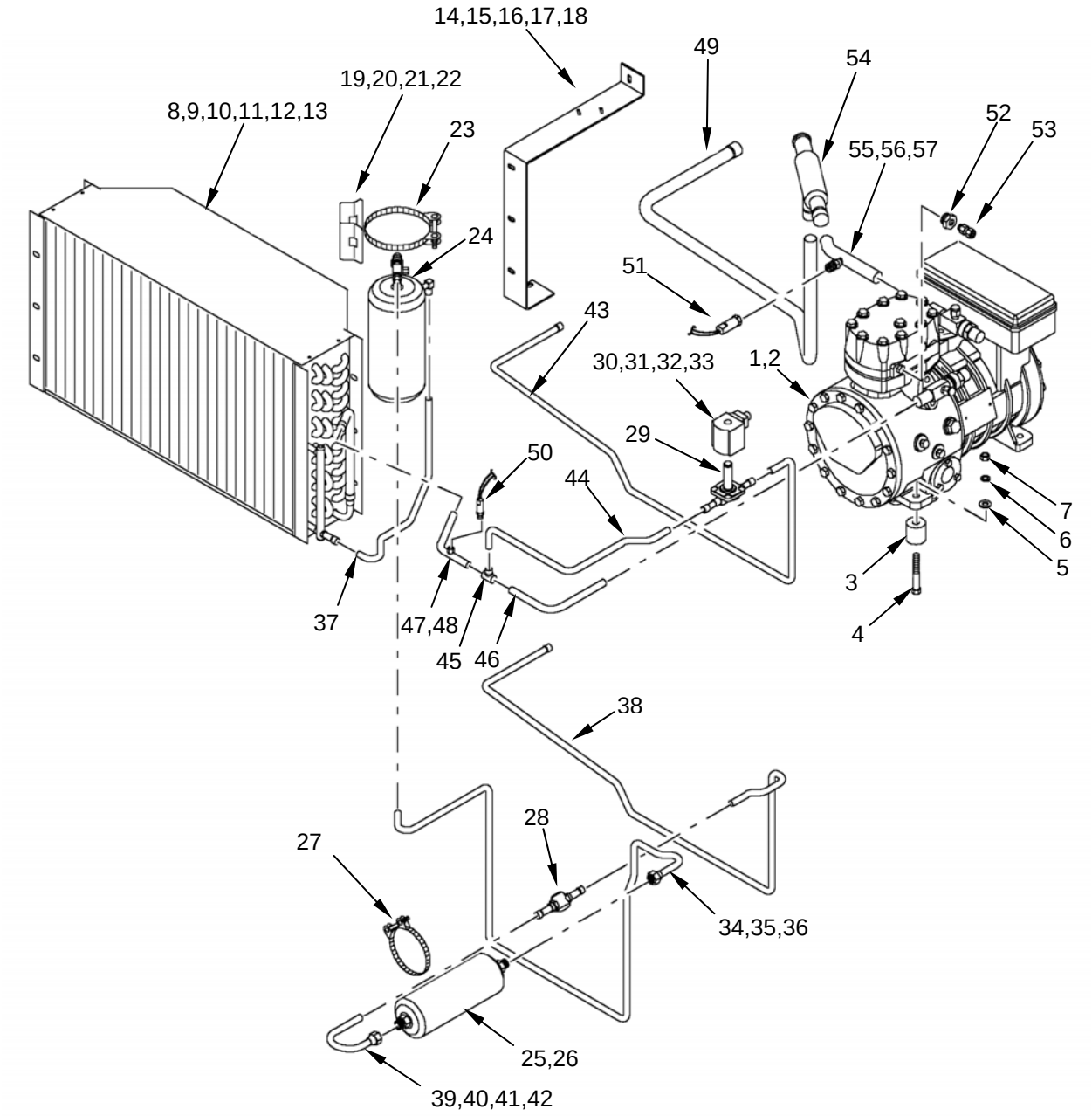


Figure 4-7. RU Refrigeration Group (Sheet 1 of 2).

Table 4-7. RU Refrigeration Group.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-7	33	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	1	1
4-7	34	PAOZZ		43904	61-2596	TUBE ASSEMBLY,METAL	EA	1	1

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-7	35	PAOZZ		43904	55-9286	O-RING,SHOULDER	EA	1	1
4-7	36	PAOZZ		43904	55-9009	NUT	EA	1	1
4-7	37	PAOZZ		43904	61-2589	TUBE ASSEMBLY,METAL	EA	1	1
4-7	38	PAOZZ		43904	61-2587	TUBE ASSEMBLY,METAL	EA	1	1
4-7	39	PAOZZ		43904	61-2588	TUBE ASSEMBLY,METAL	EA	1	1
4-7	40	PAOZZ		43904	55-9286	O-RING,SHOULDER	EA	1	1
4-7	41	PAOZZ		43904	55-9009	NUT	EA	1	1
4-7	42	PAOZZ		43904	92-1502	CLAMP	EA	1	1
4-7	43	PAOZZ		43904	61-2590	TUBE ASSEMBLY,METAL	EA	1	1
4-7	44	PAOZZ		43904	61-2591	TUBE ASSEMBLY,METAL	EA	1	1
4-7	45	PAOZZ	4730015423238	43904	55-2181	TEE,TUBE	EA	1	1
4-7	46	PAOZZ		43904	61-2592	TUBE ASSEMBLY,METAL	EA	1	1
4-7	47	PAOZZ		43904	61-2593	TUBE ASSEMBLY,METAL	EA	1	1
4-7	48	PAOZZ		43904	61-439	ADAPTER	EA	1	1
4-7	49	PAOZZ		43904	61-2594	TUBE ASSEMBLY,METAL	EA	1	1
4-7	50	PAOZZ	5930015188463	61510	44-8064	SWITCH,PRESSURE	EA	1	1
4-7	51	PAOZZ	5930015187556	61510	44-8030	SWITCH	EA	1	1
4-7	52	PAOZZ		43904	61-2060	ADAPTER	EA	1	1
4-7	53	PAOZZ		43904	61-1193	VALVE	EA	1	1
4-7	54	PAOZZ	4820015188554	61510	22-1073	VALVE,REGULATING,SYSTEM PRESSURE	EA	1	1
4-7	55	PAOZZ		43904	61-2595	TUBE ASSEMBLY,METAL	EA	1	1
4-7	56	PAOZZ		43904	61-2504	VALVE	EA	1	1
4-7	57	PAOZZ		43904	61-404	INSERT	EA	1	1

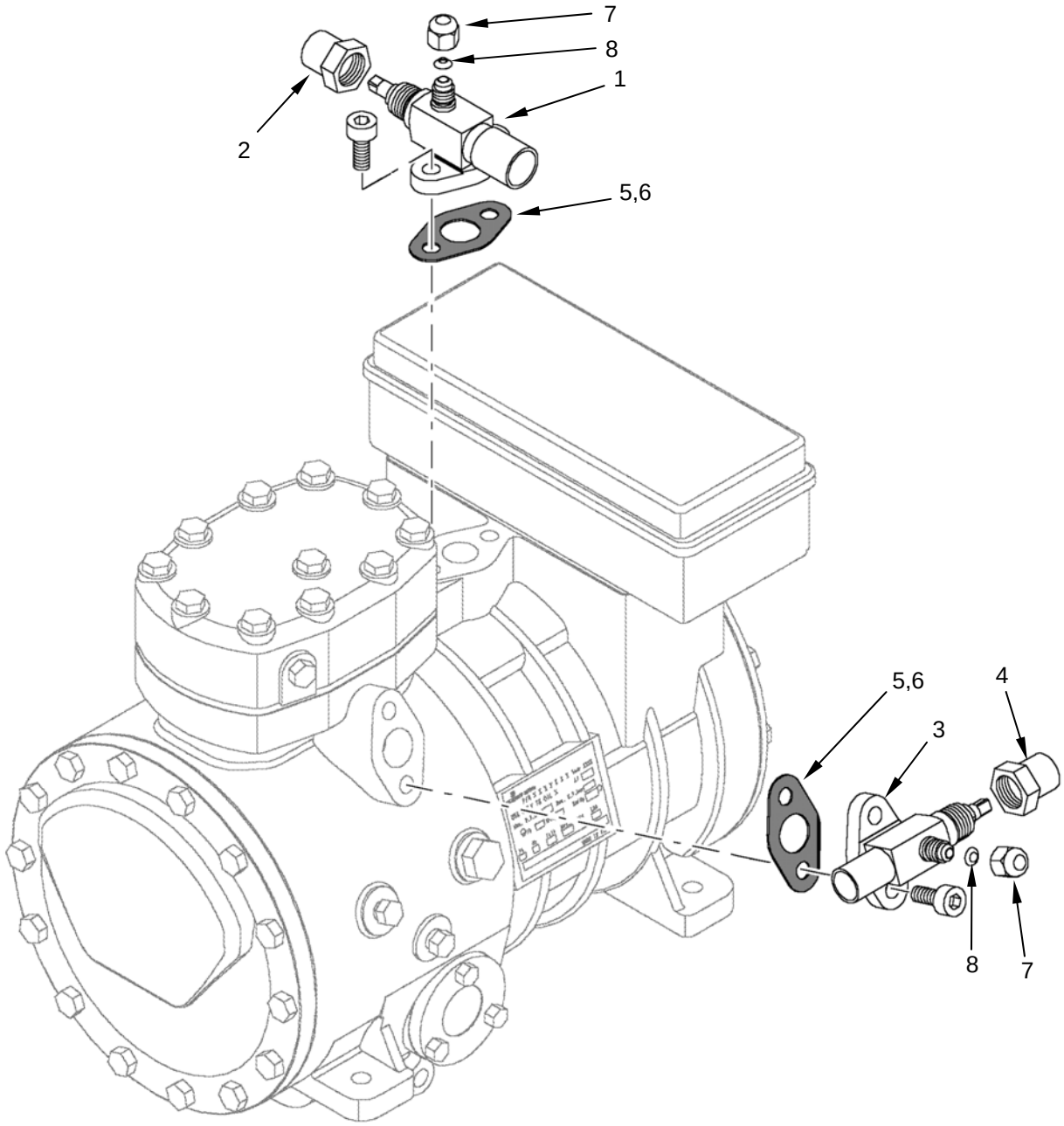


Figure 4-8. RU Service Valves.

Table 4-8. RU Service Valves.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-8	1	PAOZZ		43904	61-342	VALVE	EA	1	1
4-8	2	PAOZZ		43904	61-342A	CAP	EA	1	1
4-8	3	PAOZZ		43904	61-1424	VALVE	EA	1	1
4-8	4	PAOZZ		43904	61-1424A	CAP	EA	1	1
4-8	5	PAOZZ		43904	33-3625	GASKET	EA	1	1
4-8	6	PAOZZ		43904	33-3626	GASKET	EA	1	1
4-8	7	PAOZZ		43904	55-1983	CAP,SEAL	EA	1	1
4-8	8	PAOZZ		43904	33-768	GASKET	EA	1	1

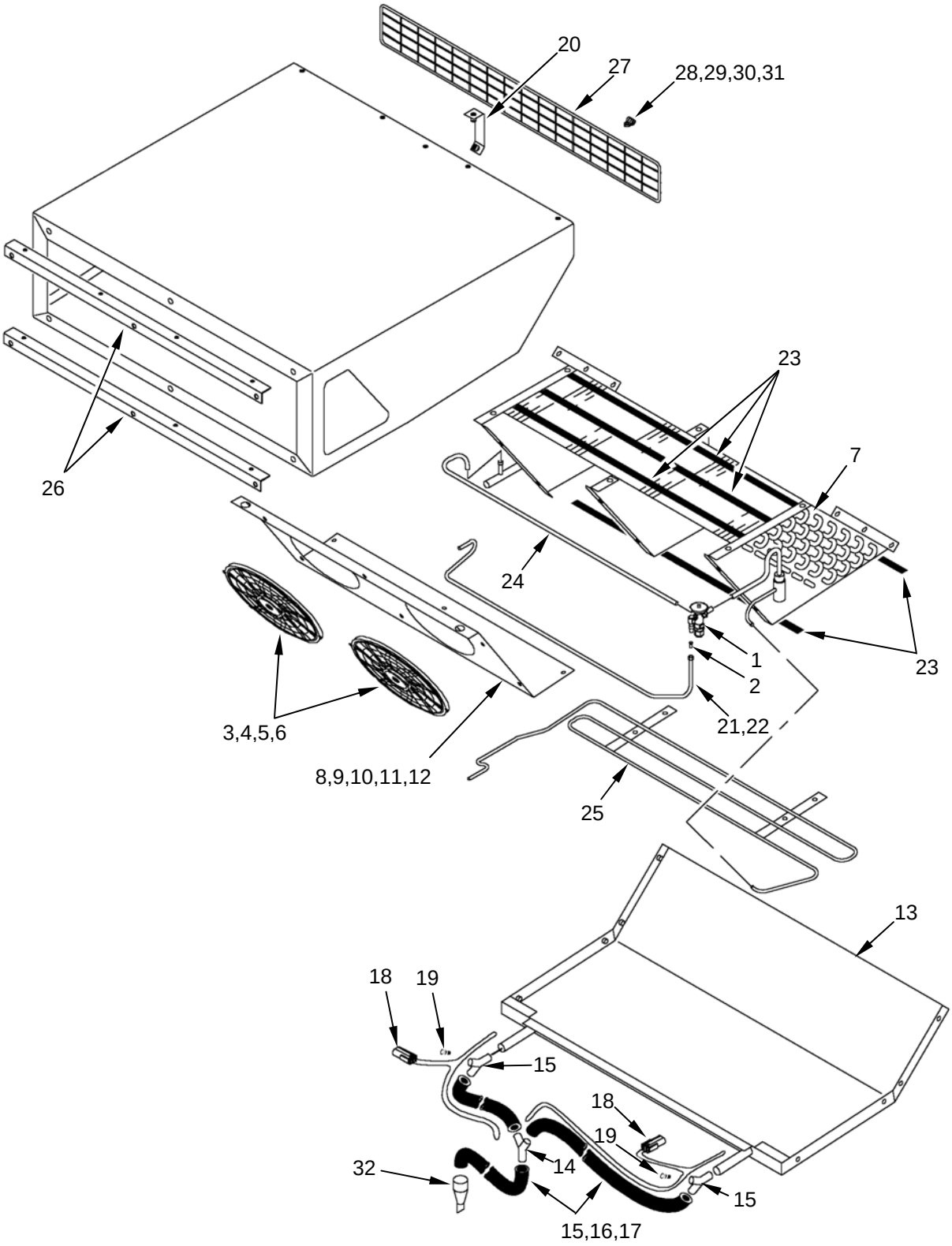


Figure 4-9. RU Evaporator Components (Sheet 1 of 2).

Table 4-9. RU Evaporator Components.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-9	1	PAOZZ	4820015188574	61510	66-9314	VALVE,EXPANSION	EA	1	1
4-9	2	PAOZZ	5110015193565	61510	61-1126	NOZZLE,EXPANSION	EA	1	1
4-9	3	PAOZZ	4140015188169	61510	78-1378	FAN,MOTOR,EVAPORATOR	EA	2	2
4-9	4	PAOZZ	5305015421518	43904	55-7036	SCREW,MACHINE	EA	8	8
4-9	5	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	8	8
4-9	6	PAOZZ	5310015421523	43904	55-7089	WASHER,FLAT	EA	8	8
4-9	7	PAOZZ	4130015421361	43904	67-1620	EVAPORATOR COIL,REFRIGERATION	EA	1	1
4-9	8	PAOZZ	4140015421654	43904	98-5650	HOUSING,CENTRIFUGAL FAN	EA	1	1
4-9	9	PAOZZ	5305015421525	43904	55-7172	SCREW,MACHINE	EA	35	35
4-9	10	PAOZZ	5310015421383	43904	55-9353	WASHER,FLAT	EA	35	35
4-9	11	PAOZZ	5305015421527	43904	55-7340	SCREW,MACHINE	EA	7	7
4-9	12	PAOZZ	5310015421309	43904	55-9354	WASHER,FLAT	EA	9	9
4-9	13	PAOZZ		43904	98-6813	PAN,DRIP	EA	1	1
4-9	14	PAOZZ	4730015423005	43904	55-9258	TEE,HOSE	EA	3	3
4-9	15	PAOZZ	4720015192672	61510	11-9223	HOSE – DRAIN	EA	1	1
4-9	16	PAOZZ		43904	92-1903	CLAMP,HOSE	EA	5	5
4-9	17	PAOZZ		43904	55-2330	BANDWRAP	EA	7	7
4-9	18	PAOZZ	5999015188753	61510	41-3156	HEATER CONDENSATE D	EA	2	2
4-9	19	PAOZZ	5325015422948	43904	33-2801	GROMMET, NONMETALLIC	EA	2	2
4-9	20	PAOZZ	5340015421635	43904	91-9988	BRACKET,DOUBLE ANGLE	EA	1	1
4-9	21	PAOZZ	4710015421609	43904	66-9964	TUBE,BENT,METALLIC	EA	1	1
4-9	22	PAOZZ		43904	51-344	NUT	EA	1	1
4-9	23	PAOZZ	9330015420547	43904	91-9989	PLASTIC STRIP, PRESSURE SENSITIVE ADHESIVE	EA	5	5
4-9	24	PAOZZ		43904	61-2597	TUBE ASSEMBLY,METAL	EA	1	1
4-9	25	PAOZZ	4710015421606	43904	66-9963	TUBE,BENT,METALLIC	EA	1	1
4-9	26	XBOZZ		43904	92-3606	BRACKET	EA	2	2

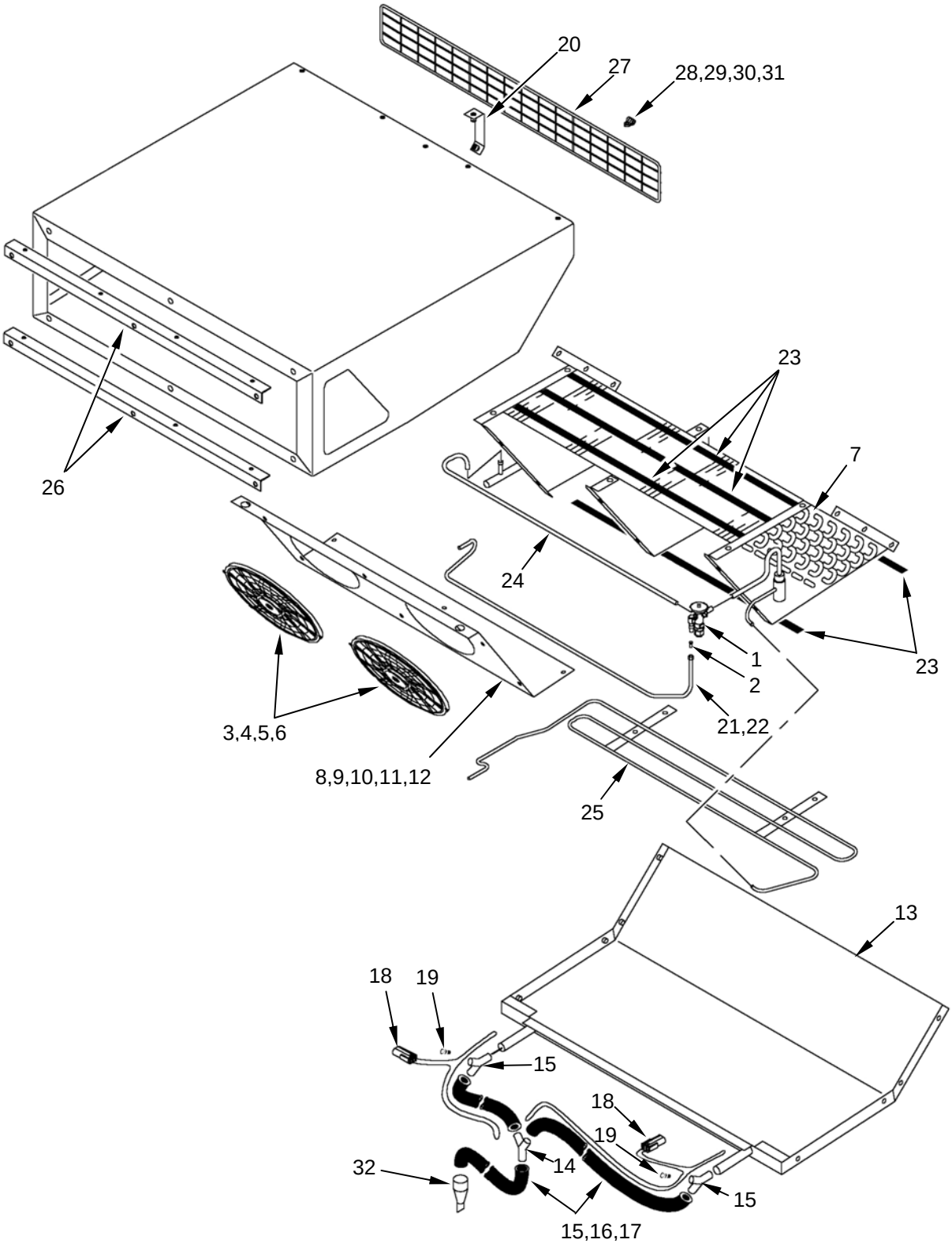


Figure 4-9. RU Evaporator Components (Sheet 2 of 2).

Table 4-9. RU Evaporator Components.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-9	27	PAOZZ		43904	92-3607	GRILLE	EA	1	1
4-9	28	PAOZZ	5340015421601	43904	55-9825	CLAMP,LOOP	EA	6	6
4-9	29	PAOZZ	5305015421527	43904	55-7340	SCREW,MACHINE	EA	6	6
4-9	30	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	6	6
4-9	31	PAOZZ	5310015421523	43904	55-7089	WASHER,FLAT	EA	6	6
4-9	32	PAOZZ	4820015423236	61510	66-1273	VALVE,CHECK	EA	1	1

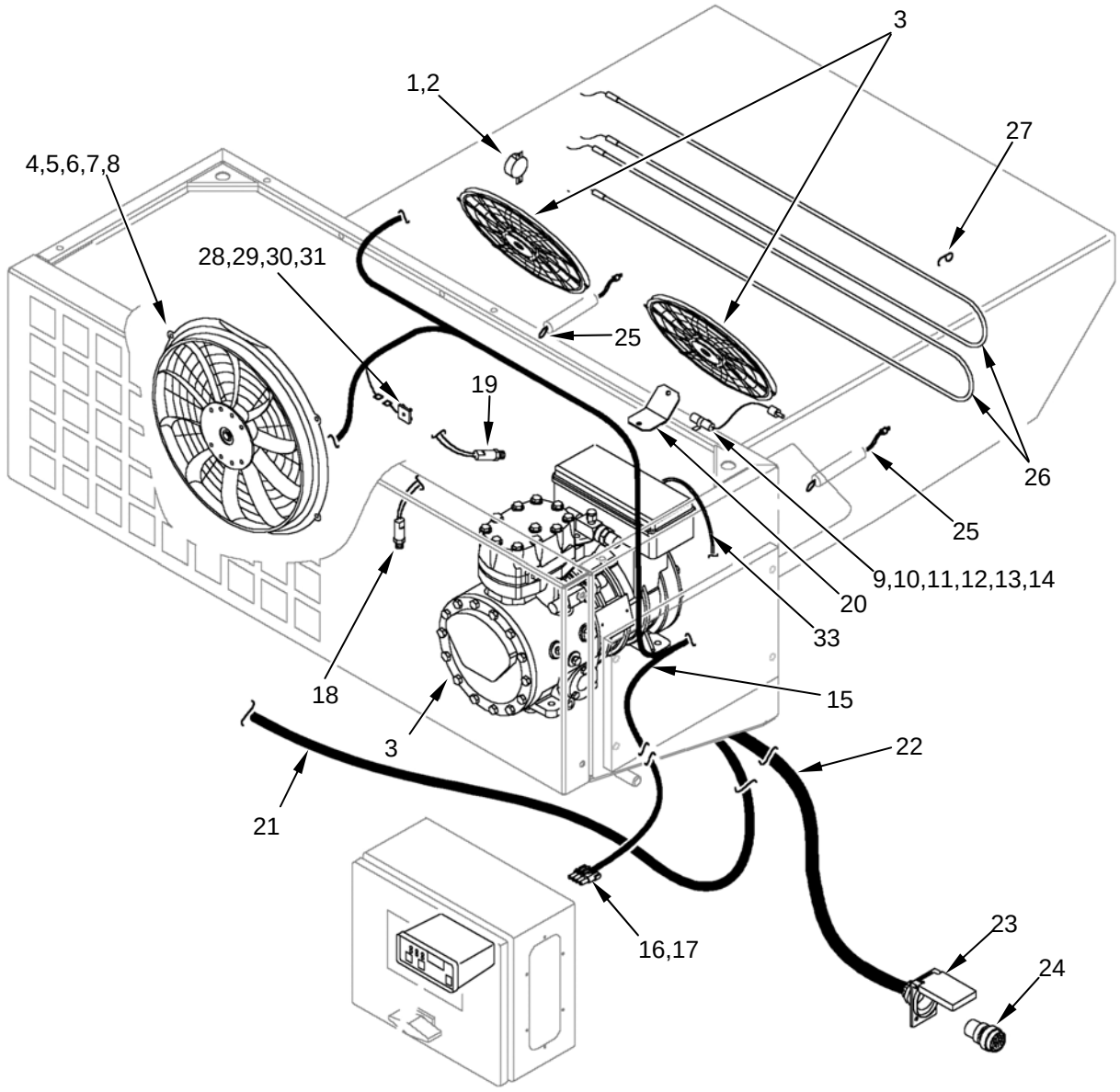


Figure 4-10. RU Electrical Components .

Table 4-10. RU Electrical Components.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-10	1	PAOZZ	5930015187554	61510	41-3136	SWITCH,PUSH	EA	1	1
4-10	2	PAOZZ		61510	55-9900	SCREW,SWIT	EA	2	2
4-10	3	PAOZZ	4140015188169	61510	78-1378	FAN,MOTOR, EVAPORATOR	EA	2	2
4-10	4	PAOZZ	4140015188170	61510	78-1370	FAN,MOTOR, CONDENSER	EA	1	1

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-10	5	PAOZZ	5305015421518	43904	55-7036	SCREW,MACHINE	EA	4	4
4-10	6	PAOZZ	5310015421604	43904	55-9826	WASHER,FLAT	EA	4	4
4-10	7	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	4	4
4-10	8	PAOZZ		43904	55-8375	NUT, CAPTIVE	EA	4	4
4-10	9	PAOZZ	5905015187813	61510	41-3143	RESISTOR,THERMAL	EA	1	1
4-10	10	PAOZZ	5340015421601	43904	55-9825	CLAMP,LOOP	EA	1	1
4-10	11	PAOZZ	5305015421589	43904	55-9452	SCREW,MACHINE	EA	1	1
4-10	12	PAOZZ	5310015421314	43904	55-7697	WASHER,FLAT	EA	2	2
4-10	13	PAOZZ	5310015421570	43904	55-7861	WASHER,LOCK	EA	1	1
4-10	14	PAOZZ	5310015421537	43904	55-7367	NUT,PLAIN,HEXAGON	EA	1	1
4-10	15	PAOZZ	5935015421538	43904	41-3423	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-10	16	PAOZZ		43904	55-2332	BANDWRAP	EA	4	4
4-10	17	PAOZZ	5930015188463	61510	44-8064	SWITCH,PRESSURE	EA	1	1
4-10	18	PAOZZ	5930015187556	61510	44-8030	SWITCH,PRESSURE	EA	1	1
4-10	19	PAOZZ		43904	41-5891	CABLE - POWER	EA	1	1
4-10	20	PAOZZ		43904	41-6311	CABLE,POWER (3PH)	EA	1	1
4-10	21	PAOZZ	6150015196921	80298	41-3442	CABLE ASSEMBLY,SPECIAL PURPOSE, ELECTRICAL	EA	1	1
4-10	22	PAOZZ		43904	44-4645	CONNECTOR, RECEPTACLE, ELECTRICAL	EA	1	1
4-10	23	PAOZZ		43904	44-4646	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-10	24	PAOZZ	5999015188753	43904	41-3156	HEATER CONDENSATE D	EA	2	2
4-10	25	PAOZZ	4520015187604	43904	45-1395	HEATING ELEMENT, ELECTRICAL, NONIMMERSION TYPE	EA	2	2
4-10	26	PAOZZ	5315015422655	43904	91-240	PIN,LOCK	EA	8	8
4-10	27	PAOZZ		43904	41-3999	HARNESS	EA	1	1
4-10	28	PAOZZ		43904	41-363	RECTIFIER	EA	1	1
4-10	29	PAOZZ	5305015421589	43904	55-9452	SCREW,MACHINE	EA	1	1
4-10	30	PAOZZ	5310015421570	43904	55-7861	WASHER,LOCK	EA	1	1
4-10	31	PAOZZ	5310015421314	43904	55-7697	WASHER,FLAT	EA	2	2
4-10	32	PAOZZ	5310015465115	61510	55-7698	NUT,PLAIN,HEXAGON	EA	1	1
4-10	33	PAOZZ		43904	92-3608	BRACKET	EA	1	1

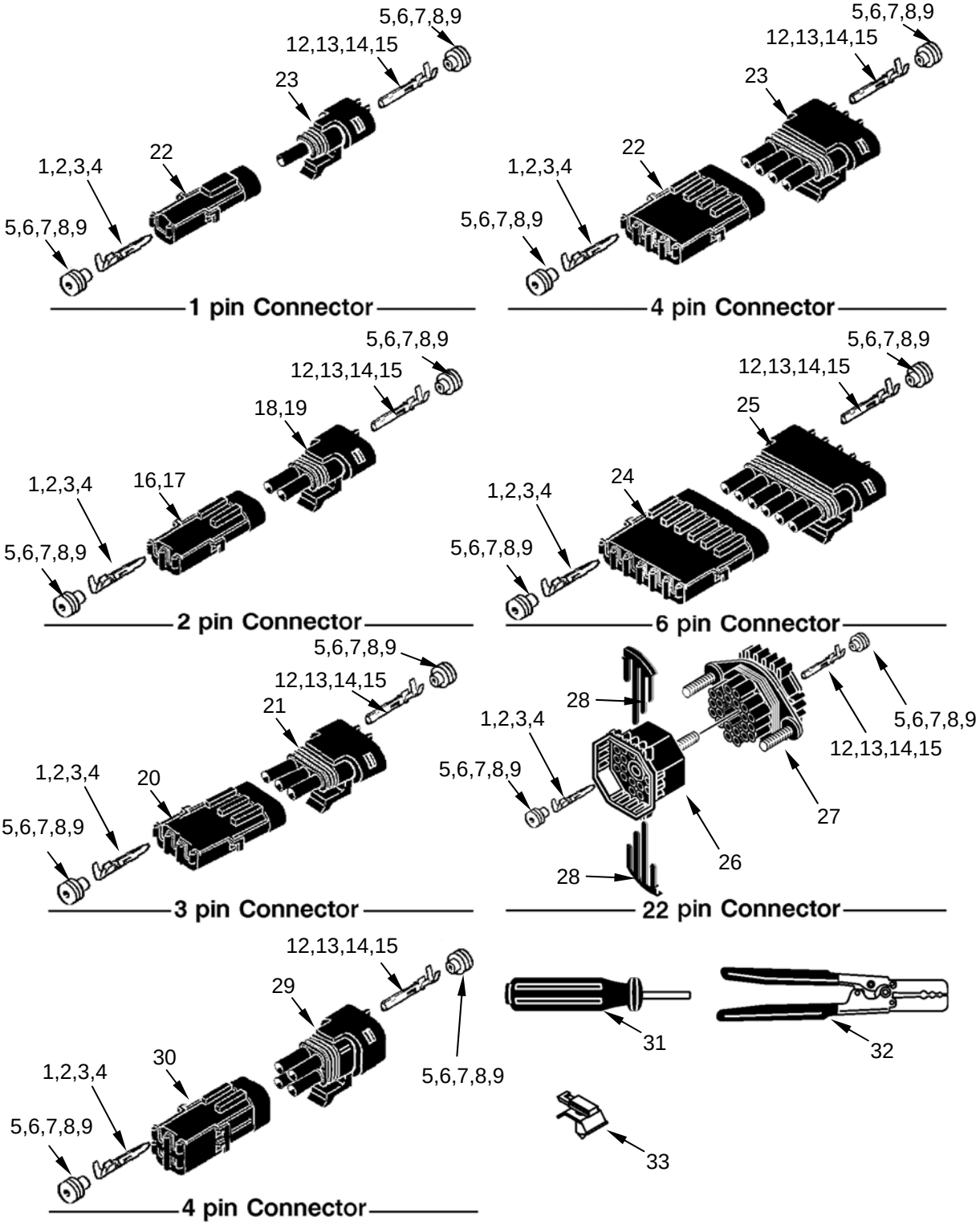


Figure 4-11. RU Weather Pack Connectors (Sheet 1 of 2).

Table 4-11. RU Weather Pack Connectors.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-11	1	PAOZZ	5940015420904	43904	44-5836	TERMINAL,STUD	EA	1	1
4-11	2	PAOZZ	5940015420898	43904	44-5883	TERMINAL,STUD	EA	1	1
4-11	3	PAOZZ	5940015421395	43904	44-8851	TERMINAL,STUD	EA	1	1
4-11	4	PAOZZ		43904	41-7403	TERMINAL,STUD	EA	1	1
4-11	5	PAOZZ	5330015420872	43904	44-8681	CAP,SEAL,NONMETALLIC	EA	1	1
4-11	6	PAOZZ	5330015421607	43904	44-5885	CAP,SEAL,NONMETALLIC	EA	1	1
4-11	7	PAOZZ	5330015420877	43904	44-5837	CAP,SEAL,NONMETALLIC	EA	1	1
4-11	8	PAOZZ	5330015441926	43904	44-6324	SEAL,PLAIN	EA	1	1
4-11	9	PAOZZ	5330015421274	43904	44-7812	CAP,SEAL,NONMETALLIC	EA	1	1
4-11	10	PAOZZ	5935014647700	61510	44-7330	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	11	PAOZZ	5935014647710	61510	44-7327	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	12	PAOZZ	5940015421326	43904	44-5839	TERMINAL,TAPER RECEPTACLE,ELECTRICAL	EA	1	1
4-11	13	PAOZZ	5935015427050	43904	44-5884	TERMINATION,SHIELD,ELECTRICAL CONNECTOR	EA	1	1
4-11	14	PAOZZ	5940015421378	43904	44-8853	TERMINAL,TAPER RECEPTACLE,ELECTRICAL	EA	1	1
4-11	15	PAOZZ		43904	41-8207	TERMINAL,TAPER RECEPTACLE,ELECTRICAL	EA	1	1
4-11	16	PAOZZ	5935014647711	61510	44-5835	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	17	PAOZZ		43904	41-8208	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	18	PAOZZ	5935014647714	61510	44-5838	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	19	PAOZZ		43904	41-8209	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	20	PAOZZ	5935014647719	61510	44-9569	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	21	PAOZZ	5935014647721	61510	44-6959	CONNECTOR,PLUG,ELECTRICAL	EA	1	1

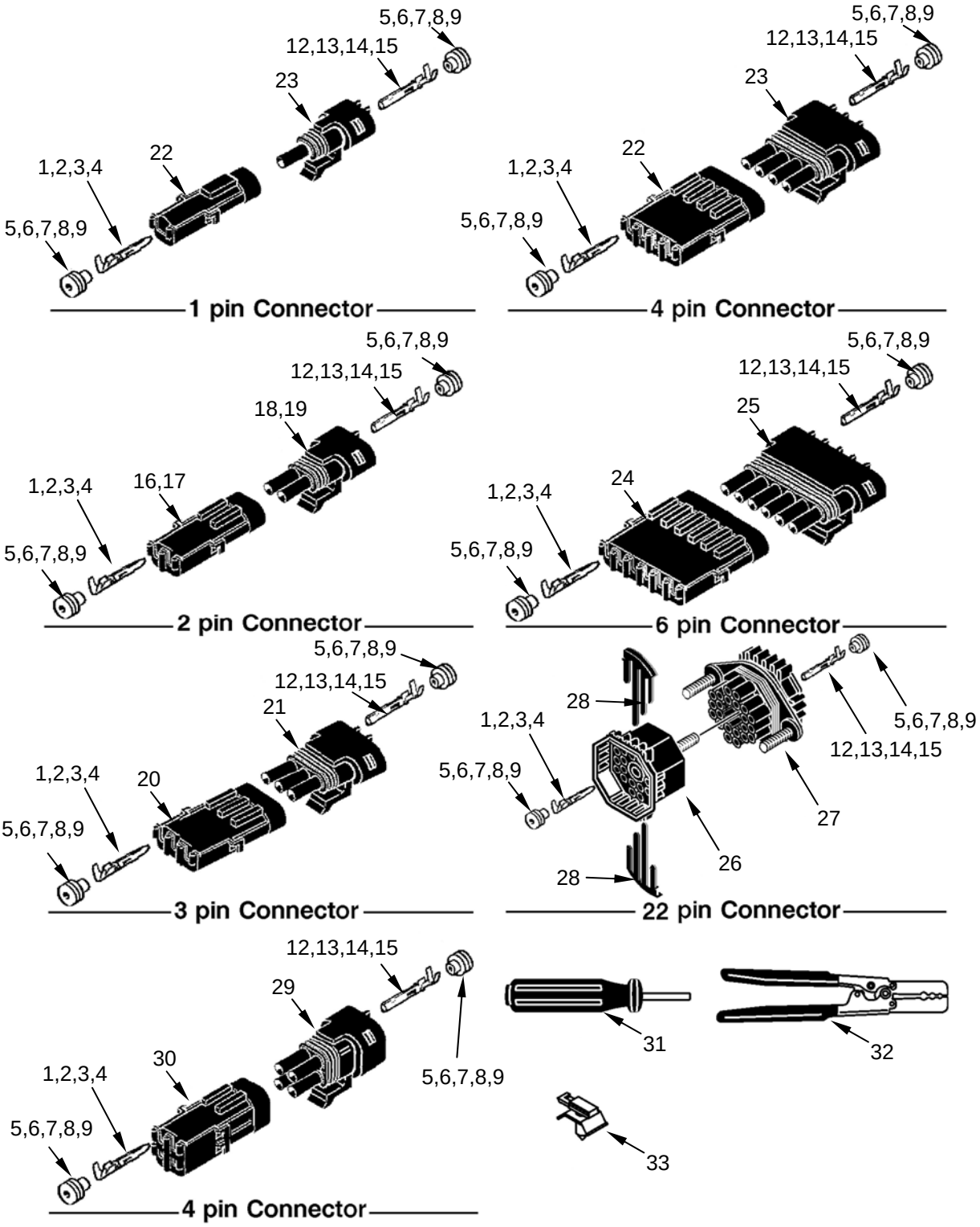


Figure 4-11. RU Weather Pack Connectors (Sheet 2 of 2).

Table 4-11. RU Weather Pack Connectors.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-11	22	PAOZZ	5935014647741	61510	44-7880	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	23	PAOZZ	5935014647722	61510	44-7881	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	24	PAOZZ	5935014647747	61510	44-8294	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	25	PAOZZ	5935014647753	61510	44-7872	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	26	PAOZZ	5935014647759	61510	44-7884	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	27	PAOZZ	5935014647765	61510	44-7829	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	28	PAOZZ	5935015422640	43904	44-7811	RETAINER,ELECTRICAL CONNECTOR	EA	2	2
4-11	29	PAOZZ	5935014647766	61510	41-1527	CONNECTOR,PLUG,ELECTRICAL	EA	1	1
4-11	30	PAOZZ	5935014647769	61510	41-1310	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	1	1
4-11	31	PAOZZ		43904	204-623	TOOL	EA	1	1
4-11	32	PAOZZ		43904	204-624	TOOL	EA	1	1
4-11	33	PAOZZ		43904	55-9704	CLIP,LOCKING	EA	1	1

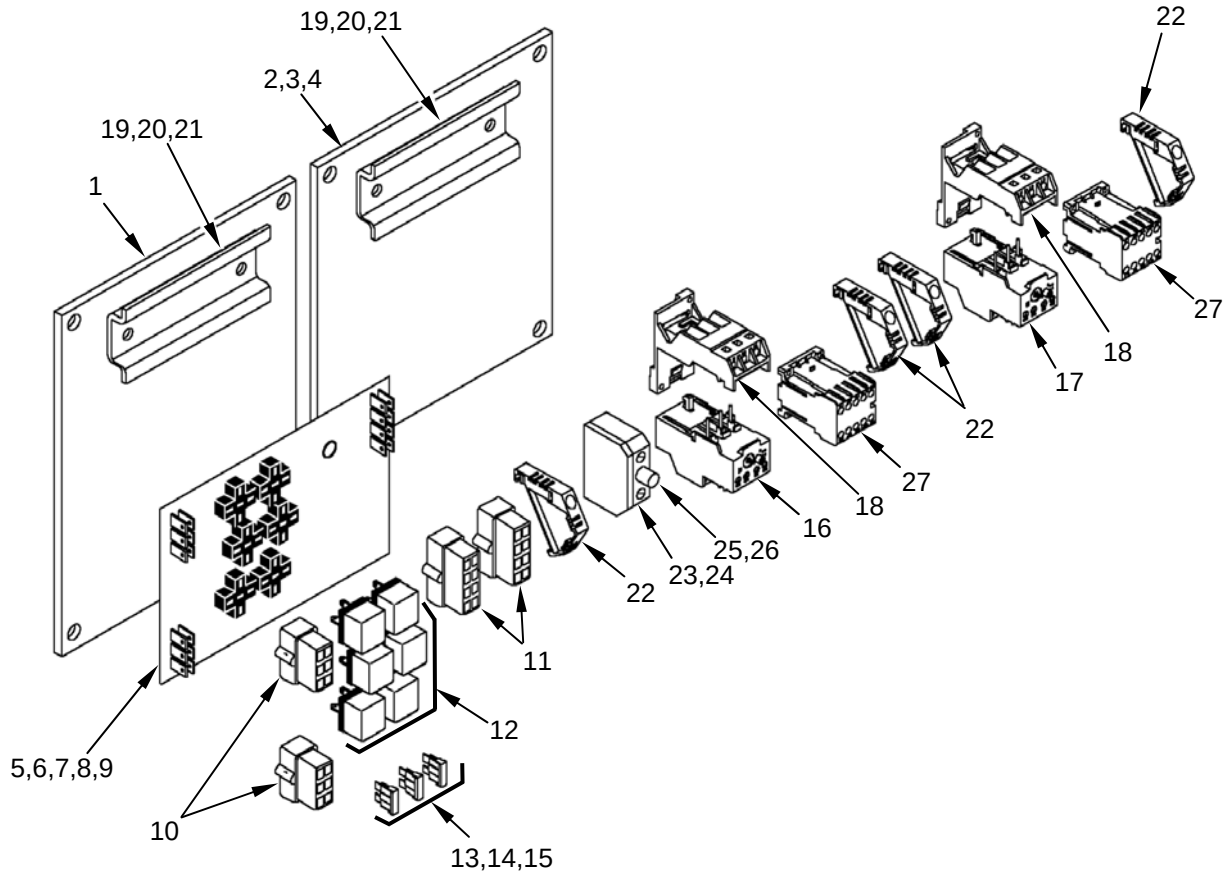


Figure 4-12. RU Control Box.

Table 4-12. RU Control Box.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-12	1	PAOZZ	5340015421646	43904	92-923	PLATE,MOUNTING	EA	1	1
4-12	2	PAOZZ		43904	92-3601	PLATE,MOUNTING	EA	1	1
4-12	3	PAOZZ		43904	55-9620	SCREW,MACHINE	EA	6	6
4-12	4	PAOZZ	5310015421546	43904	55-7404	WASHER,LOCK	EA	10	10
4-12	5	PAOZZ	5998015187389	61510	41-4259	CIRCUIT CARD ASSEMBLY	EA	1	1
4-12	6	PAOZZ	5305015421372	43904	55-7035	SCREW,MACHINE	EA	6	6
4-12	7	PAOZZ	5310015421389	43904	55-7075	WASHER,FLAT	EA	6	6
4-12	8	PAOZZ		43904	55-6996	WASHER,LOCK	EA	6	6
4-12	9	PAOZZ	5310015420900	43904	55-7354	NUT,PLAIN,HEXAGON	EA	6	6
4-12	10	PAOZZ	5935015192681	61510	41-876	CONNECTOR, RECEPTACLE, ELECTRICAL	EA	2	2
4-12	11	PAOZZ	5935015192682	61510	41-946	CONNECTOR, RECEPTACLE, ELECTRICAL	EA	2	2
4-12	12	PAOZZ	5945015187497	61510	41-3707	RELAY, ELECTROMAGNETIC	EA	6	6
4-12	13	PAOZZ	5920015192684	61510	44-9758	FUSE,CARTRIDGE	EA	2	2
4-12	14	PAOZZ	5920015192688	61510	44-9344	FUSE,INCLOSED LINK	EA	1	1
4-12	15	PAOZZ	5920014644348	61510	44-9524	FUSE,INCLOSED LINK	EA	1	1
4-12	16	PAOZZ	5925015192713	61510	41-3097	CIRCUIT BREAKER	EA	1	1
4-12	17	PAOZZ	5925015192715	61510	41-3091	CIRCUIT BREAKER	EA	1	1
4-12	18	PAOZZ	5925015192717	61510	41-3099	CIRCUIT BREAKER SUBASSEMBLY	EA	1	1
4-12	19	PAOZZ		43904	92-3602	CHANNEL, DIN	EA	1	1
4-12	20	PAOZZ		43904	92-924	CHANNEL, DIN	EA	1	1
4-12	21	PAOZZ		43904	55-9495	RIVET	EA	4	4
4-12	22	PAOZZ	5935015422647	43904	41-898	CONNECTOR,RECEPTACLE,ELECTRICAL	EA	4	4
4-12	23	PAOZZ	5935015423380	43904	41-942	CONNECTOR,PLUG, ELECTRICAL	EA	1	1
4-12	24	PAOZZ	5340015422650	43904	41-944	COVER,ACCESS	EA	1	1
4-12	25	PAOZZ	5920015210511	61510	41-5863	FUSE,CARTRIDGE	EA	1	1
4-12	26	PAOZZ	5920015210508	61510	41-4180	FUSE,CARTRIDGE	EA	2	2
4-12	27	PAOZZ	5945015187509	61510	41-1005	RELAY, ELECTROMAGNETIC	EA	2	2

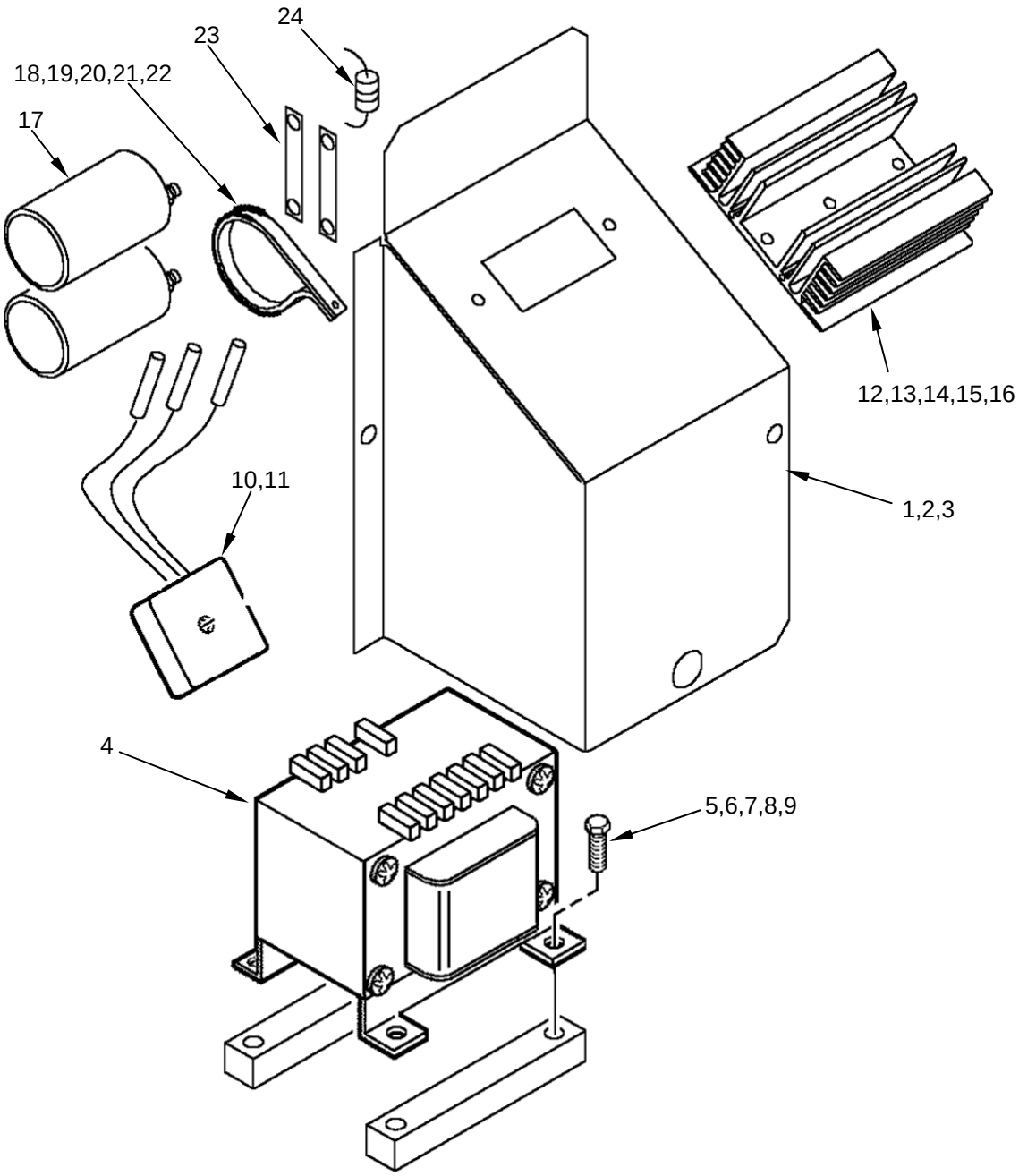


Figure 4-13. RU Transformer Group.

Table 4-13. RU Transformer Group.

(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-13	1	XBOZZ		43904	92-922	COVER,ACCESS	EA	1	1
4-13	2	PAOZZ	9330015420547	43904	91-9989	PLASTIC STRIP, PRESSURE SENSITIVE ADHESIVE	EA	1	1
4-13	3	PAOZZ		43904	55-7042	NUT - COVER	EA	2	2
4-13	4	PAOZZ	5950015187320	61510	41-3435	TRANSFORMER, POWER	EA	1	1
4-13	5	PAOZZ		43904	55-8464	SCREW - TRANSFORMER	EA	4	4
4-13	6	PAOZZ	5305015421580	43904	55-8316	SCREW,MACHINE	EA	4	4
4-13	7	PAOZZ	5310015421389	43904	55-7075	WASHER,FLAT	EA	8	8
4-13	8	PAOZZ	5310015425990	43904	55-8237	WASHER, FLAT	EA	8	8
4-13	9	PAOZZ	5310015420900	43904	55-7354	NUT,PLAIN,HEXAGON	EA	4	4
4-13	10	PAOZZ	5961015187489	61510	41-3438	RECTIFIER, SEMICONDUCTOR DEVICE,UNITIZED	EA	1	1
4-13	11	PAOZZ		43904	51-250	SCREW,MACHINE	EA	1	1
4-13	12	PAOZZ	2990015441972	43904	41-977	RADIATOR,HEATER, COOLANT,ENGINE	EA	1	1
4-13	13	PAOZZ	5305015421589	43904	55-9452	SCREW,MACHINE	EA	2	2
4-13	14	PAOZZ	5310015421314	43904	55-7697	WASHER,FLAT	EA	4	4
4-13	15	PAOZZ	5310015421570	43904	55-7861	WASHER,LOCK	EA	2	2
4-13	16	PAOZZ	5310015465115	61510	55-7698	NUT,PLAIN,HEXAGON	EA	2	2
4-13	17	PAOZZ	5910015187342	61510	41-2992	CAPACITOR,FIXED, ELECTROLYTIC	EA	2	2
4-13	18	PAOZZ		43904	55-9494	CLAMP,LOOP	EA	2	2
4-13	19	PAOZZ	5310015420900	43904	55-7354	NUT,PLAIN,HEXAGON	EA	2	2
4-13	20	PAOZZ	5310015421389	43904	55-7075	WASHER,FLAT	EA	4	4
4-13	21	PAOZZ		43904	55-6996	WASHER,LOCK	EA	2	2
4-13	22	PAOZZ		43904	51-757	BANDWRAP	EA	2	2
4-13	23	PAOZZ	5999015422662	43904	41-3134	STRIP,SHORTING	EA	2	2
4-13	24	PAOZZ	5905015192725	61510	44-9925	RESISTOR,FIXED, COMPOSITION	EA	1	1

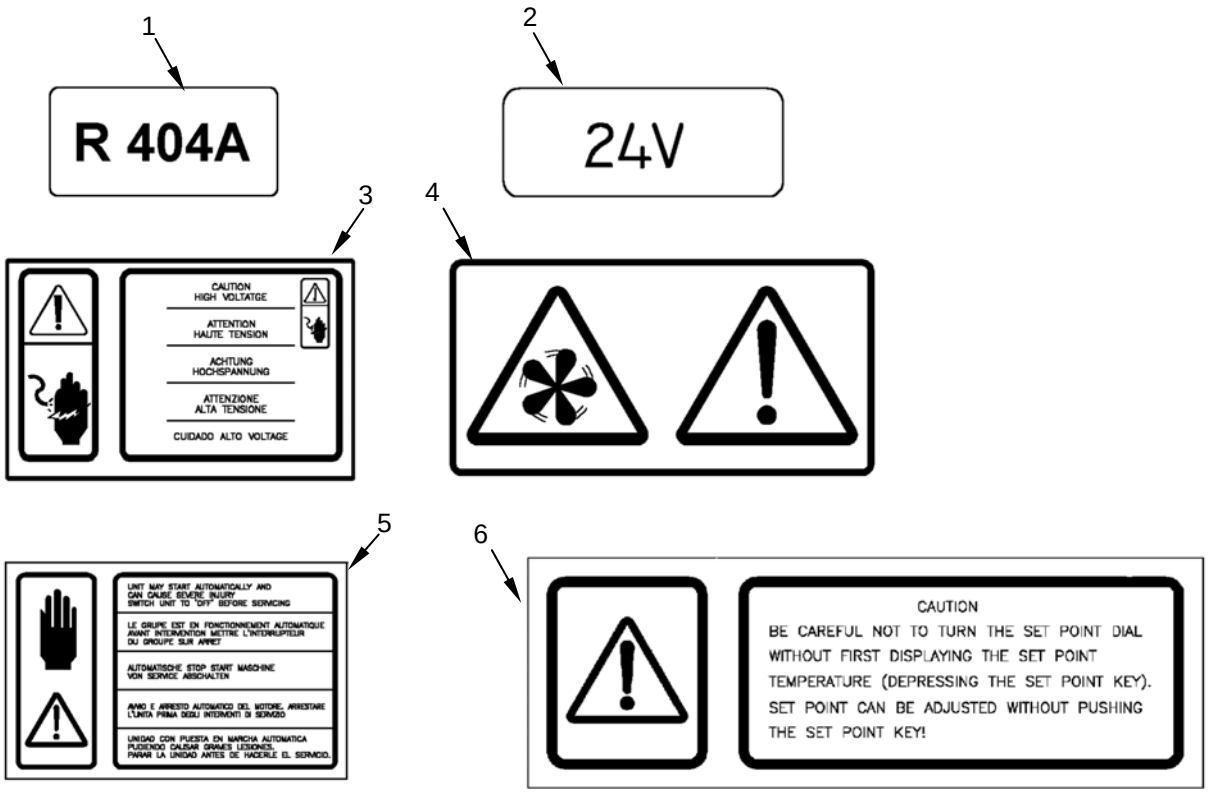


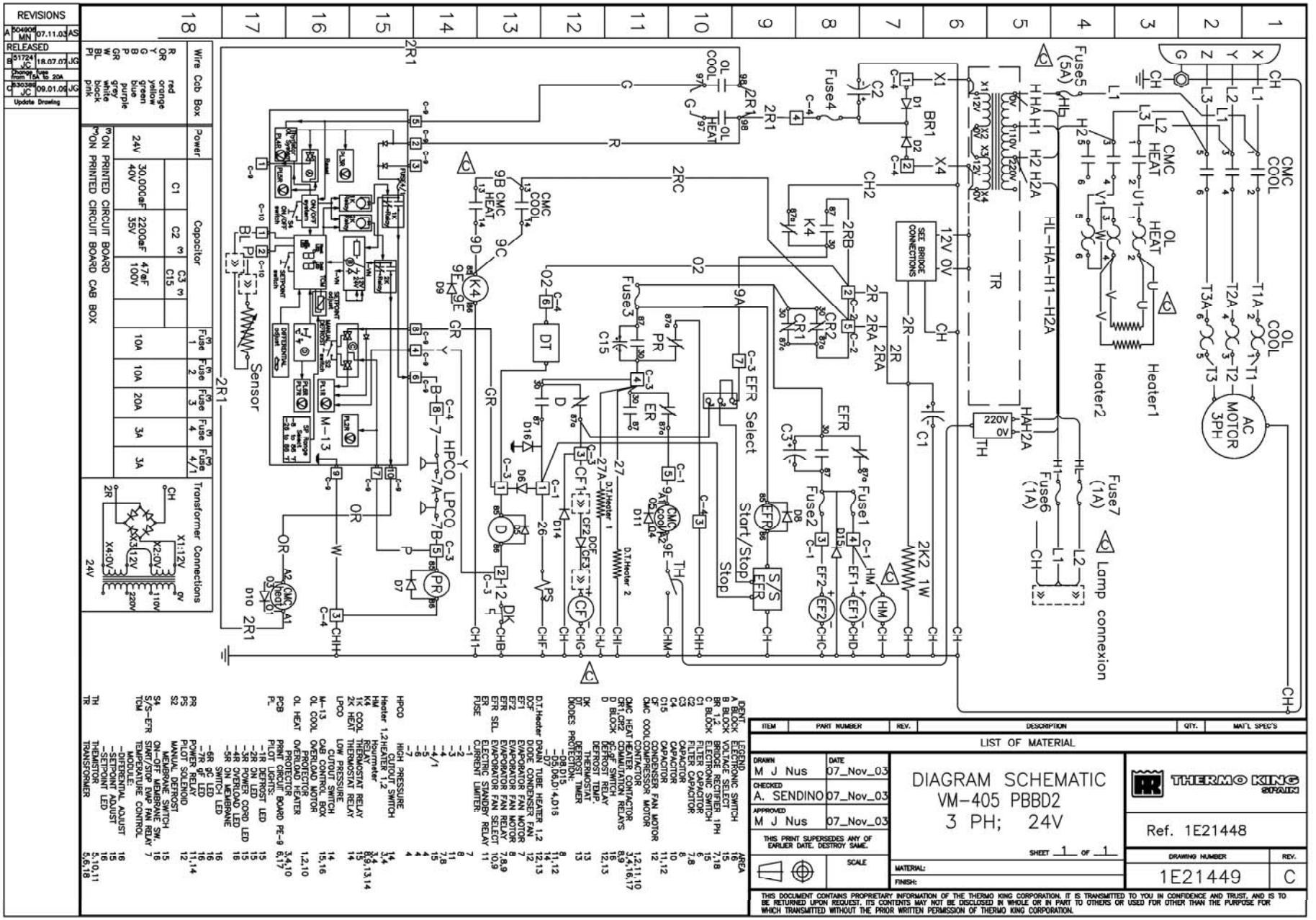
Figure 4-14. RU Nameplates.

Table 4-14. RU Nameplates.

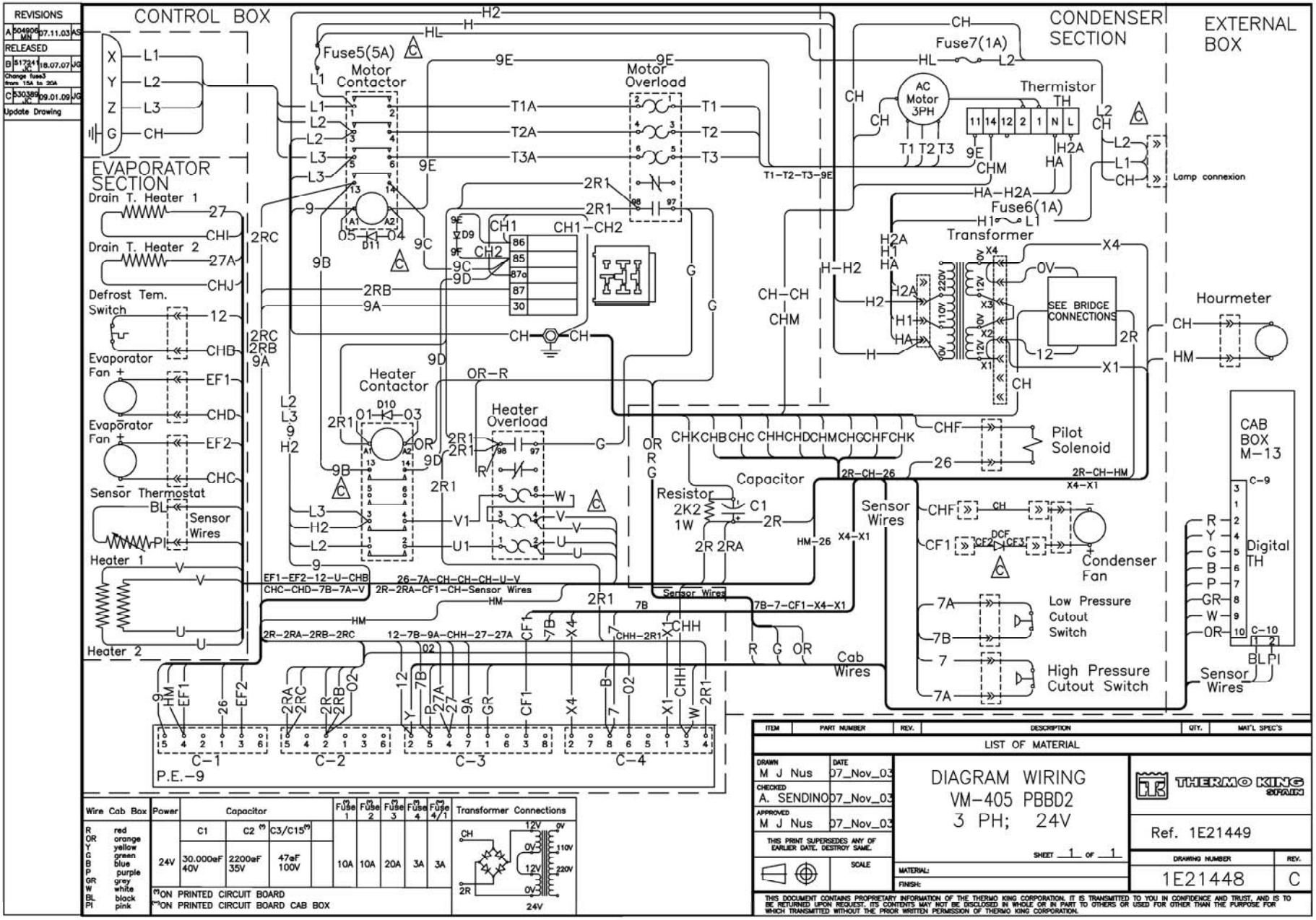
(1)		(2)	(3)	(4)			(5)	(6)	(7)
ILLUS									
FIG NO.	ITEM NO.	SMR	NSN	CAGE	PART NUMBER	DESCRIPTION	UM	QTY PER ASSY	QTY PER EQUIP
4-14	1	PAOZZ	7690015505368	43904	91-7499	MARKER, IDENTIFICATION	EA	1	1
4-14	2	XBOZZ		43904	92-2810	MARKER, IDENTIFICATION	EA	1	1
4-14	3	XBOZZ		43904	92-590	MARKER, IDENTIFICATION	EA	1	1
4-14	4	XBOZZ		43904	92-589	MARKER, IDENTIFICATION	EA	3	3
4-14	5	XBOZZ		43904	92-1664	MARKER, IDENTIFICATION	EA	1	1
4-14	6	XBOZZ		43904	92-3605	MARKER, IDENTIFICATION	EA	1	1

APPENDIX A

SCHEMATICS

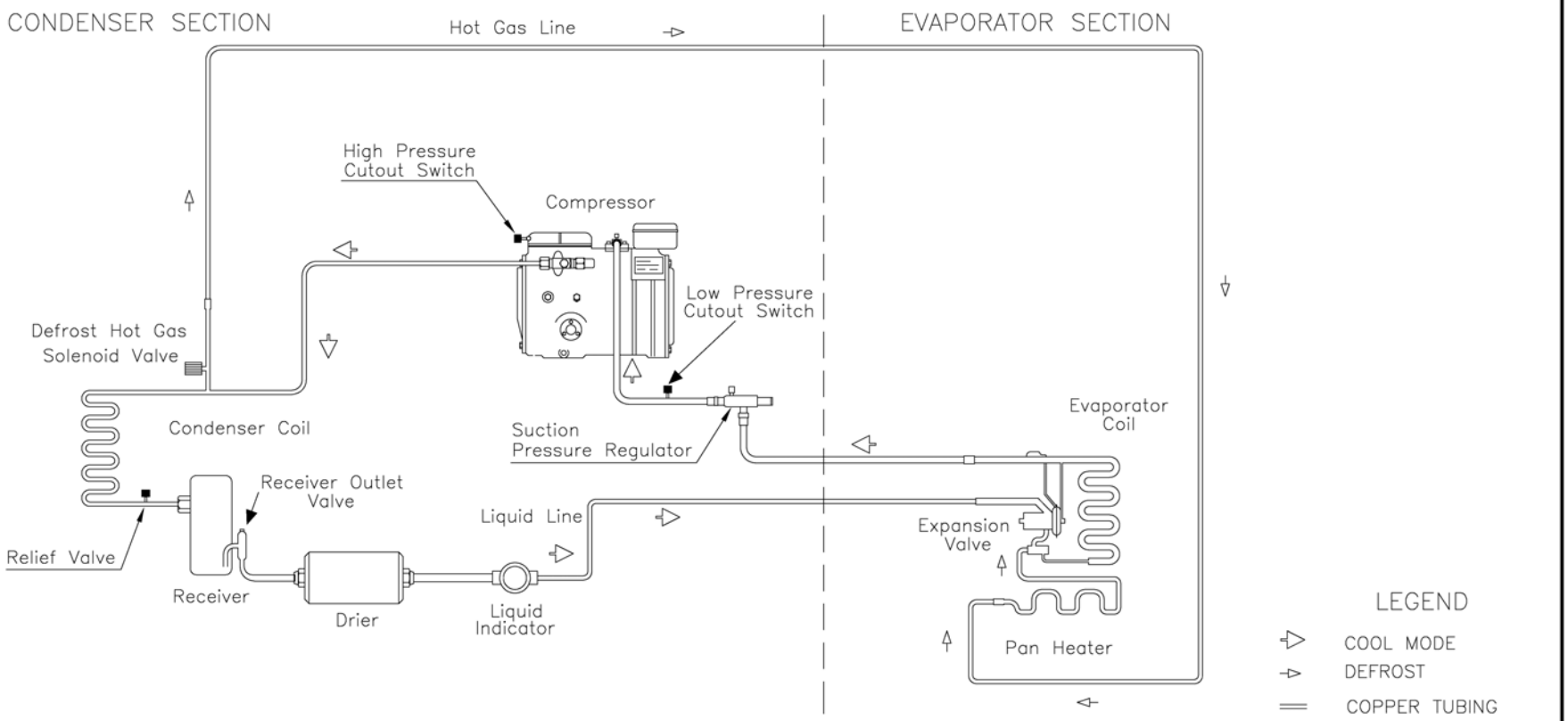


A-1. Schematic Diagram.



A-2. Wiring Diagram

REVISIONS						
ECO	SYM	DESCRIPTION	DATE	BY	CHK	APP
504906	A	RELEASED	17/11/03	AG	AS	JL

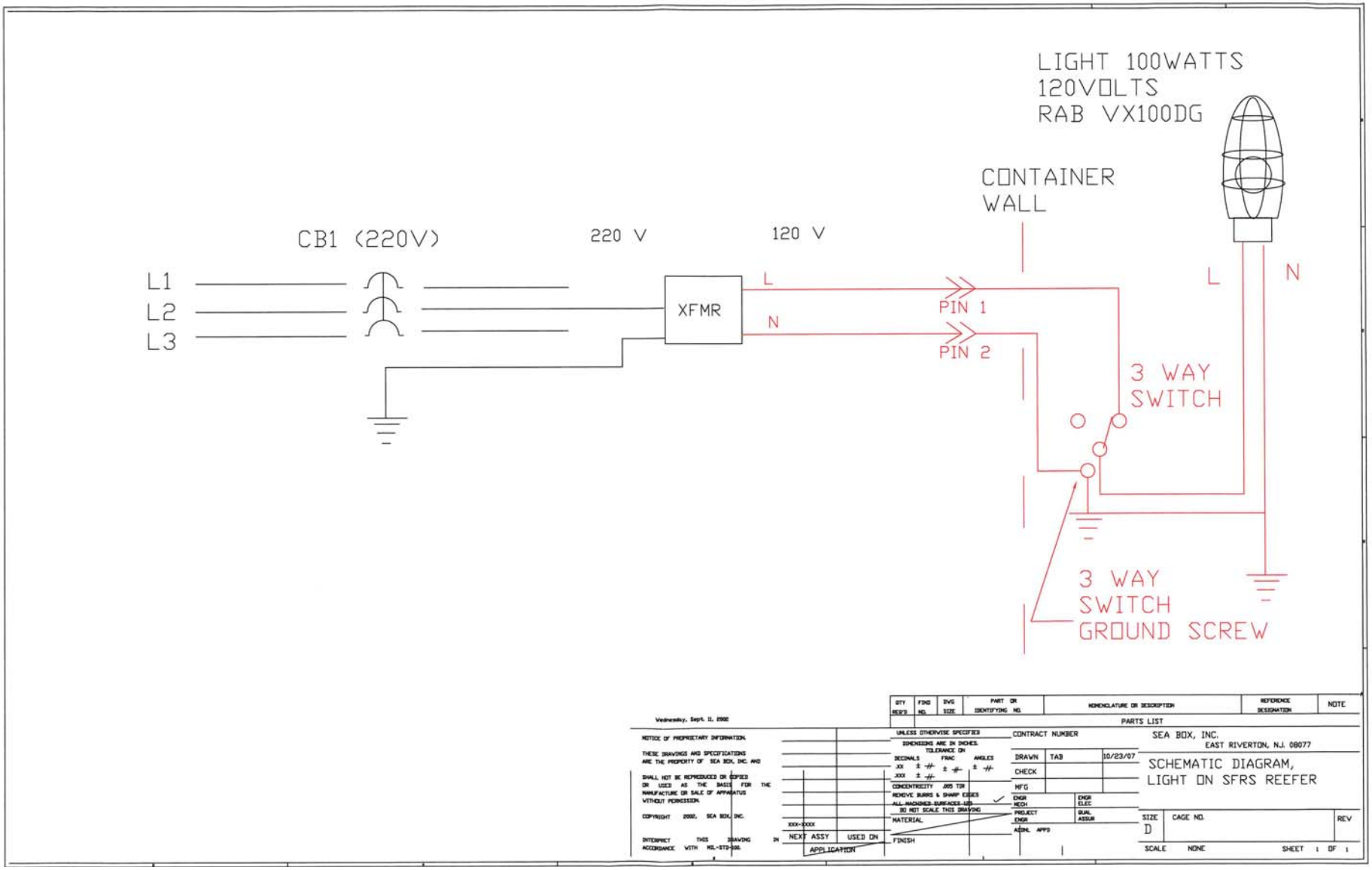


ITEM	PART NUMBER	REV.	DESCRIPTION	QTY.	MAT'L SPEC'S

LIST OF MATERIAL

DRAWN: A. GIL	DATE: 17/11/03	REFRIGERATION DIAGRAM VM 405–PBBD2	THERMO KING SPAIN
CHECKED: A. SENDINO	17/11/03		
APPROVED: JORDI L.	14/06/04	SHEET 1 OF 1	DRAWING NUMBER: 1E21507 — REV.: A
THIS PRINT SUPERSEDES ANY OF EARLIER DATE. DESTROY SAME.		MATERIAL:	
SCALE		FINISH:	

A-3. Refrigeration Diagram.



A-4. Lighting Schematic.

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APPENDIX B

MANUFACTURERS

CAGE	MANUFACTURER	CAGE	MANUFACTURER
80298	AAR MANUFACTURING 201 HAYNES ST CADILLAC, MI 49601-1803 1-231-779-4928	0FXA9	SEA BOX INC 802 INDUSTRIAL HIGHWAY RIVERTON, NJ 08077-1910 1-856-303-1101
43904	THERMO KING CORPORATION 1951 OLD HIGHWAY 8 RAMSEY, MN 55112 1-651-633-2820	61510	THERMO KING CORPORATION DBA PHOENIX GLOBAL DISTRIBUTION 314 WEST 90TH ST MINNEAPOLIS, MN 55420-3693 1-952-887-2561
39428	MCMASTER-CARR SUPPLY COMPANY 600 COUNTY LINE RD ELMHURST, IL 60126-2034 1-630-833-0300		