TECHNICAL MANUAL

OPERATOR, UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

WATER PURIFICATION BARGES (NSN 1930-01-234-2165) VOLUME 15 MISCELLANEOUS EQUIPMENT DAYROOM, WORKSHOP, ACCESSES AND SANITATION SYSTEMS

This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content requirements normally associated with the Army technical manuals. This technical manual does, however, contain all essential information required to operate and maintain the equipment

Approved for public release; distribution Is unlimited

*This manual supersedes TM 55-1930-209-14&P-15, 30 January 1989.

HEADQUARTERS, DEPARTMENT OF THE ARMY
15 OCTOBER 1992

WARNINGS AND SAFETY NOTICES

WARNING
DANGEROUS VOLTAGES AND HAZARDOUS MATERIALS
ARE USED IN THIS EQUIPMENT.
DO NOT TAKE CHANCES!

GENERAL WARNINGS

- Always redtag electrical equipment, controls, circuits, and switches before beginning repairs.
- Do not service or adjust high voltage electrical equipment when alone.
- Do not overload circuits.
- Always use authorized, insulated tools and test equipment when working on electrical equipment.
- Remove all jewelry before working on or around electrical equipment with exposed current-carrying areas.
- Do not wear clothing with exposed metal fasteners when working on electrical equipment.
- Always use approved breathing apparatus when working with chemicals.
- Avoid chemical contact with eyes, skin, and clothing.
- Always wear safety glasses, gloves, and rubber aprons when handling chemicals.
- Wear protective clothing and safety glasses as required when working on barge equipment.
- Always wear approved ear protection in noise hazard areas.

SPECIFIC WARNINGS

- Do not connect any new circuit to an existing circuit.
- Do not energize circuits if water condensation is present.
- If any sparks are seen, stop operation immediately. Determine cause and take corrective action.
- Never touch radio antennas of fixed-base radio transmitters. When transmitting, antennas contain high voltage.
- Always use approved breathing apparatus when handling material in multimedia filters and chlorination unit descaling acid crystals. Do not breathe dust from these materials.
- Avoid breathing vapors from coagulant aid chemicals. Use in a well-ventilated area. In case of chemical contact with skin, wash with water. For eyes, immediately flush at eyewash station and obtain medical help as soon as possible.
- Always wear work gloves and shirts with full length buttoned sleeves when handling fuel oil and gasoline.

- Do not smoke or have open flames within 10 feet when handling fuel oil or gas. Only minimum number of personnel necessary to conduct fueling operation is permitted in area.
- Before starting any repairs on compressed air system, always release pressure from air receiver and compressor and open and redtag circuit breakers.
- On air compressor, do not adjust automatic regulator switch (pressure switch) and pilot valve settings.
- To avoid flying particles lodging in eyes, do not use compressed air to 'dust-off' clothing or workspace.
- Stay clear of anchor cables when operating anchor winches.
- Always wear safety glasses or face shield when using power tools.
- Always wear lifevests when on weatherdeck and throughout the barge during storm conditions.
- Lifevests are to be worn at all times aboard workboat.
- Only qualified persons will operate and maintain arc and fuel gas welders.
- When welding, always make sure those working with or near the welder wear proper clothing: heavy, hole-free gloves, heavy shirt, cuffless trousers, high shoes, and cap. Keep clothing dry and free of oil and other flammable substances.
- Use dry heavy canvas drop cloth to cover work area and adjacent deck when arc welding.
- Before welding on bulkheads, deck plating and similar surfaces, always check carefully to make sure that the other side of the surface to be welded does not hide fuel or compressed gas tanks, flammable or hazardous materials, or electrical equipment or wiring.
- When welding, keep your head out of the fumes and make sure area is well ventilated.
- Before welding on surfaces which have been cleaned with cleaning solutions containing chlorinated hydrocarbons, always wash with water, dry and ventilate area thoroughly.
- Use shield with proper filter lens when welding. Do not allow others near welding operations to assist or observe without proper eye protection. This must include side shields during slag chipping operations.
- Warn personnel in area during welding operations not to look at arc or expose themselves to hot spatter or metal.
- In an extreme emergency, when welding is required in void 2 port, shut down chlorination system. Close all valves. Cover the parts of chlorination system not being welded with a heavy canvas drop cloth. Turn on vent 8 and, if available, provide additional forced air ventilation.

- Before welding on fuel oil or sludge tank, make sure tank is gas-free by: 1) removing all liquid from tank, 2) cleaning tank thoroughly, 3) seeing that tank is thoroughly dry, and 4) force ventilating tank.

- Connect arc welding work cable as close to welding area as possible. Work cables connected to barge framework or other locations far from welding site increase the possibility of the welding current passing through lifting chains, crane cables or other possible circuit paths. This can create fire hazards or weaken lifting chains or crane cables until they break or fall.

- Always weld with all doors, portholes, and hatches propped open and necessary ventilation systems operating.

- Take frequent breaks away from the area where you are welding.

- Do not take oxygen and acetylene tanks into confined areas when welding.

- Always use a friction lighter to start oxyacetylene torch.

- Always maintain all welding equipment in proper working condition. If you have any doubts about the safety of any welding equipment, do not use the welder.

ELECTRICAL SHOCK SAFETY STEPS

Five safety steps to follow if someone is the victim of electrical shock.

1. Do not try to pull or grab individual.

2. Turn off electrical power when possible.

3. If you can not turn off electrical power, pull, push, or lift person to safety using a wooden pole, rope, or some other insulating material.

4. Get medical help as soon as possible.

5. After the injured person is free of contact with the source of electrical shock, move the person a short distance away and, if needed, start CPR immediately.

INTRODUCTION TO

TM 55-1930-209-14&P-15

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

1. SCOPE

TM 55-1930-209-14&P covers the Reverse Osmosis Water Purification Barges, Models 300-WPB-1, 300-WPB-2 and 300WPB-3, NSN 1930-01-234-2165. This manual consists of twenty-one volumes.

2. REVERSE OSMOSIS WATER PURIFICATION BARGES

The Reverse Osmosis Water Purification Barges provide up to 300,000 gallons of drinking water per 24 hour period. The drinking water, converted from seawater or brackish water, is for use by a Rapid Deployment Force in a forward area. When needed, the drinking water can be pumped to a shore facility or to another vessel. This manual provides operation and maintenance procedures for all the component systems on the barges.

3. VOLUME 1 -- NORMAL OPERATIONS

This volume provides information and procedures on normal Reverse Osmosis Water Purification Barge operations, including barge movement and deployment, communications and electrical power systems, drinking water production, shutdown, and required operational maintenance. Emergency shutdown procedures are also provided.

4. VOLUME 2 -- SEAWATER SYSTEM

This volume describes operation and maintenance of the seawater system which supplies seawater to the Reverse Osmosis Water Purification Units (ROWPUs) for processing to the air conditioning unit for cooling to the ballast tank for barge trimming to the chlorination unit for priming and cooling, and to the diesel generators for cooling.

5. VOLUME 3 -- REVERSE OSMOSIS WATER PURIFICATION UNIT (ROWPU) SYSTEM

Volume 3 provides operation and maintenance procedures for the ROWPU System which processes seawater or brackish water to produce drinking water. Normally, this system processes seawater supplied by the seawater system (TM 55-1930-209-14&P-2) to create product water. Chlorine is then added to this product water by the chlorination system (TM 55-1930-209-14&P-4). The resultant drinking water is discharged into four storage tanks that are part of the drinking water system (TM 55-1930-209-14&P-5).

6. VOLUME 4 -- CHLORINATION SYSTEM

Operation and maintenance procedures for the chlorination system onboard the Water Purification Barges are contained in this volume. This system produces chlorine in a sodium hypochlorite solution, upon demand, to water processed by the ROWPU system just before the water enters the four drinking water storage tanks.

7. VOLUME 5 -- DRINKING WATER SYSTEM

The drinking water system provides storage for water produced by the ROWPUs and includes pumps and valves to move this water from onboard storage tanks to the shore discharge system, to another vessel, or overboard. The drinking water system also provides a pressurized water supply for drinking and washing onboard the barges.

8. VOLUME 6 -- SHORE DISCHARGE SYSTEM

This volume provides operation and maintenance procedures for the shore discharge system which transfers drinking water from barge storage tanks to holding storage facilities ashore.

9. VOLUME 7 -- COMPRESSED AIR SYSTEM

Volume 7 describes the operation and maintenance of the compressed air system which provides compressed air to five air stations in the ROWPU space, one in the workshop, and one on stem weatherdeck. This system also provides compressed air to two air stations for blowdown of seachests in void 2 starboard and void 4 port. Compressed air is used on the barges to operate air-powered impact tools, to propel air through the shore discharge hose, to blowdown seachest, and for general cleaning blowdown.

10. VOLUME 8 -- FUEL OIL SYSTEM

This volume provides operation and maintenance procedures for the fuel oil system which functions as a centralized receiving storage and distribution system for diesel fuel used for barge operations. This onboard fuel system provides fuel for two 155 kW diesel ship service generators, a 20 kW ship auxiliary generator, two ROWPU high-pressure pump diesel engines, and a fueling station for the barge workboat.

11. VOLUME 9 -- ELECTRICAL POWER SYSTEMS

Operation and maintenance procedures for the two electrical power systems installed aboard the Water Purification Barges are contained in Volume 9. The normal electrical power system generates, controls and distributes all electrical power for operating the water purification system and its auxiliary systems. The emergency electrical system supplies 24 Vdc from a battery bank to 24 Vdc equipment and converts to 24 Vdc through an inverter to 120 Vac to power emergency lighting and equipment.

12. VOLUME 10 -- LIGHTING SYSTEM

Volume 10 contains operation and maintenance procedures for the onboard lighting systems for the Water Purification Barges. This system supplies interior and exterior lighting. Normal and emergency interior lighting is provided in the deckhouse ROWPU space, dayroom, workshop, and voids. Exterior lighting consists of searchlights and floodlights for use at night or during reduced visibility. Lights on the weatherdecks and standard navigation and status lights are for use during operation and towing.

13. VOLUME 11 -- EQUIPMENT MONITORING SYSTEM

This volume provides operation and maintenance procedures for the equipment monitoring system which monitors the operation of several equipment components onboard the Water Purification Barges. This system monitors operating conditions such as amount of drinking water in storage tanks and temperature of diesel engine cooling water. Sensors detect unacceptable operating conditions, the main processor flashes at double intensity and remote alarms (horns, strobe lights and buzzer alert crewmembers that corrective action is necessary.

14. VOLUME 12 -- COMMUNICATIONS SYSTEM

Operation and maintenance procedures for the communications system are provided in Volume 12. This system consists of three separate communications methods, radio communications, foghorn and intercom telephones.

15. VOLUME 13 -- HANDLING EQUIPMENT

This volume contains operation and maintenance procedures for handling equipment used for lifting, transporting and repositioning equipment and materials onboard the barges. The system includes a bridge crane, bow crane and a void 4 trolley hoist.

16. VOLUME 14 -- ANCHOR, MOORING, AND TOWING EQUIPMENT

Volume 14 describes the operation and maintenance procedures for the anchor mooring, and towing equipment on the Water Purification Barges. This equipment provides a method to hold (anchor) the barges in a fixed position offshore, at dockside, or next to another vessel and a method to move the barges from one location to another.

17. VOLUME 15 -- MISCELLANEOUS EQUIPMENT (DAYROOM, WORKSHOP, ACCESSES, AND SANITATION SYSTEMS)

Volume 15 addresses operation and maintenance procedures for miscellaneous equipment installed on the Water Purification Barges. This equipment includes the dayroom on the forward starboard side of deckhouse, the workshop on the forward portside of deckhouse, accesses such as deckhouse doors and portholes and various accesses to and from the voids, and two separate sanitation systems (toilets and bilge). Additional equipment addressed in this volume includes: guard rails, rubber fendering, removable rubber floor mats, eyewash stations, component labels, caution, warning and danger signs, and storage areas.

18. VOLUME 16 -- VENTILATION, HEATING, AND AIR CONDITIONING SYSTEMS

This volume contains operation and maintenance procedures for the deckhouse and voids ventilation systems and the heating and air conditioning (HAC) system installed on the Water Purification Barges. The ventilation system provides fresh air circulation in the deckhouse and voids with 17 hatches and 10 ventilation fans The HAC controls the temperature in the dayroom and deckhouse.

19. VOLUME 17 -- WORKBOAT, LIFESAVING, AND FIREFIGHTING EQUIPMENT

Volume 17 includes procedures for the operation and maintenance of:

a. Workboat -provides water transportation for crew members and visitors, small cargo items, transportation of the messenger line for the shore discharge hose and similar work-related tasks associated with operating the Water Purification Barges.

b. Lifesaving Equipment -installed on the barges and consisting of 2 liferafts, 15 Type II and 24 Type V lifevests and 4 lifesaving rings.

c. Firefighting Equipment -installed on the barges and consisting of Halon 1301 system, 2 CO2 hose reel units, a smoke detector system, 17 portable CO2 fire extinguishers, 5 dry chemical fire extinguishers, 5 self-contained breathing apparatuses, and a portable, engine driven firefighting pump. The workboat also has a 1 O-pound, portable, dry chemical fire extinguisher.

20. VOLUME 18 -- SUPPORTING APPENDICES FOR VOLUMES 1-17.

Volume 18 contains the Maintenance Allocation Chart Components of End hem List, Tools and Test Equipment List, Expendable/Durable Supplies and Materials List and the Repair Parts and Special

All of the information contained in this volume is common to volumes 1-17 and does not appear in each individual volume.

Appendix A in volumes 1-17 provides information unique to each volume. Appendix B in volumes 1-17 provides manufacturers manuals and instructions unique to the system described in each volume. Appendixes C-G are located in Volume 18.

21. VOLUME 19 -PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

    Volume 19 contains PMCS pertinent to all onboard systems for the Reverse Osmosis Water Purification Barges.

22. VOLUME 20 -SUPPLEMENTAL DATA

    Volume 20 contains the Basic Issue Items List, and additional Authorization List for all onboard systems for the Reverse Osmosis Water Purification Barges.

23. VOLUME 21 -WINCH, DOUBLE DRUM, DIESEL

    This volume contains operation and maintenance procedures for the 20-ton double drum diesel engine winch used on the Water Purification Barges. Appendix B of Volume 21 contains the Maintenance Allocation Chart and the Repair Parts and Special Tools List for the winch.

TECHNICAL MANUAL
NO. 55-1930-209-14&P-15

HEADQUARTERS
DEPARTMENT OF THE ARMY,
WASHINGTON D.C., 15 OCTOBER 1992

TECHNICAL MANUAL

OPERATORS', UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

WATER PURIFICATION BARGES (NSN 1930-01-234-2165) VOLUME 15 SEAWATER SYSTEM

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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* Supersedes TM 55-1930-209-14&P-15, 30 January, 1989

TABLE OF CONTENTS
VOLUME 15

TABLE OF CONTENTS (Continued)
VOLUME 15

TABLE OF CONTENTS (Continued)
VOLUME 15

TABLE OF CONTENTS (Continued)
VOLUME 15

TABLE OF CONTENTS (Continued)
VOLUME 15

TABLE OF CONTENTS (Continued)
VOLUME 15

TABLE OF CONTENTS (Continued)
VOLUME 15

LIST OF APPENDICES

NOTE
The following appendices, common to all TM's in this series, are in TM 55-1930-209-14&P-18.

MAINTENANCE ALLOCATION CHART (MAC)
TOOLS AND TEST EQUIPMENT (TTEL)
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (ESML)
REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)
REPAIR PARTS LIST TO FIGURE NUMBER CROSS-REFERENCE LIST

NOTE
The following appendices, common to all TM's in this series, are in TM 55-1930-209-14&P-20.

COMPONENTS OF END ITEM LIST (COEIL) AND BASIC ISSUE ITEMS LIST (BILL)
ADDITIONAL AUTHORIZED LIST (AAL)

LIST OF ILLUSTRATIONS

TABLE OF CONTENTS (Continued)
VOLUME 15
LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1 INTRODUCTION

1-1 Purpose. This technical manual (TM) describes the operation and maintenance of miscellaneous equipment installed onboard Water Purification Barges. Miscellaneous equipment includes dayroom and workshop equipment, Reverse Osmosis Water Purification Unit (ROWPU) space arc welder, accesses, and two sanitation systems. Information is also provided about guard rails, fendering system, removable flooring in ROWPU space, eyewash stations, storage areas, labels, cautions, warnings, and danger signs. Information about other systems onboard is in TM 55-1930-209-14&P-1 thru P-14 and P-16 and P-17. TM 55-1930-209-14&P-18 contains appendices common to all TM's. Location of major components is shown in Figure 1-1.

1-2 Scope. The dayroom, on forward starboard side of the deckhouse, contains the communications system (TM 55-1930-209-14&P-12) and provides a snack and rest area for personnel. The workshop, on forward portside of the deckhouse, contains repair and fabrication tools and equipment. Accesses include deckhouse doors and portholes, and various accesses to and in the voids. Two separate sanitation systems are onboard. The first is the barge's toilets (2) which collect and incinerate human waste. The second is the bilge system which drains, collects, and discharges equipment waste. Additional miscellaneous equipment includes the following:

a. Guard rails around the edges of the weatherdeck and deckhouse top to prevent personnel from falling overboard.

b. Permanent rubber fendering installed on both sides of the barge to protect barge sides when moored or when other vessels are moored alongside.

c. Removable rubber floor mats installed on ROWPU space deck to prevent accidental slipping due to wet decks.

d. Eyewash stations (2) in ROWPU space and in void 2 to provide readily available special equipment for washing out eyes in case chemicals or acids are splashed in the eyes.

e. Component labels to identify components such as valves, motor controllers, gauges, etc.

f. Caution, warning and danger signs throughout the barge to alert personnel.

g. Storage areas designed for storing hardware, spare parts, and tools.

1-3 Warranties and guarantees. Warranty/guarantee information is in Section VI in Chapters 2, 3, and 5.

1-4 Maintenance forms and records. Required maintenance forms and records are explained in DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-5 Destruction of Army materiel to prevent enemy use. This shall be as directed in TM 750-244-3.

1-6 Storage. For storage of this equipment, refer to Section IV in Chapters 2, 3, and 5 and Section III in Chapter 4.

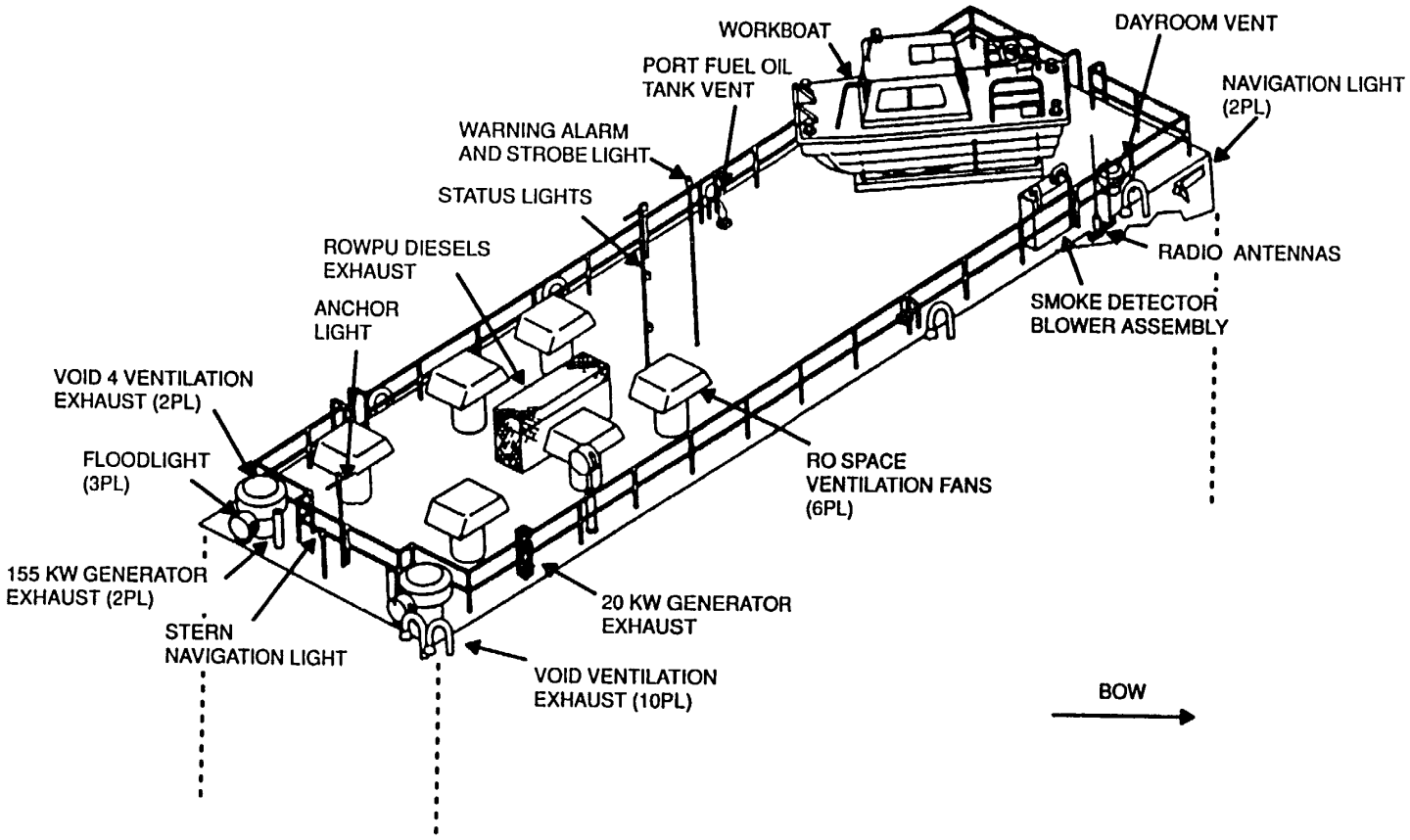


Figure 1-1. Major Components of ROWPU Barge Systems and Equipment - Deckhouse Roof (Sheet 1 of 3)

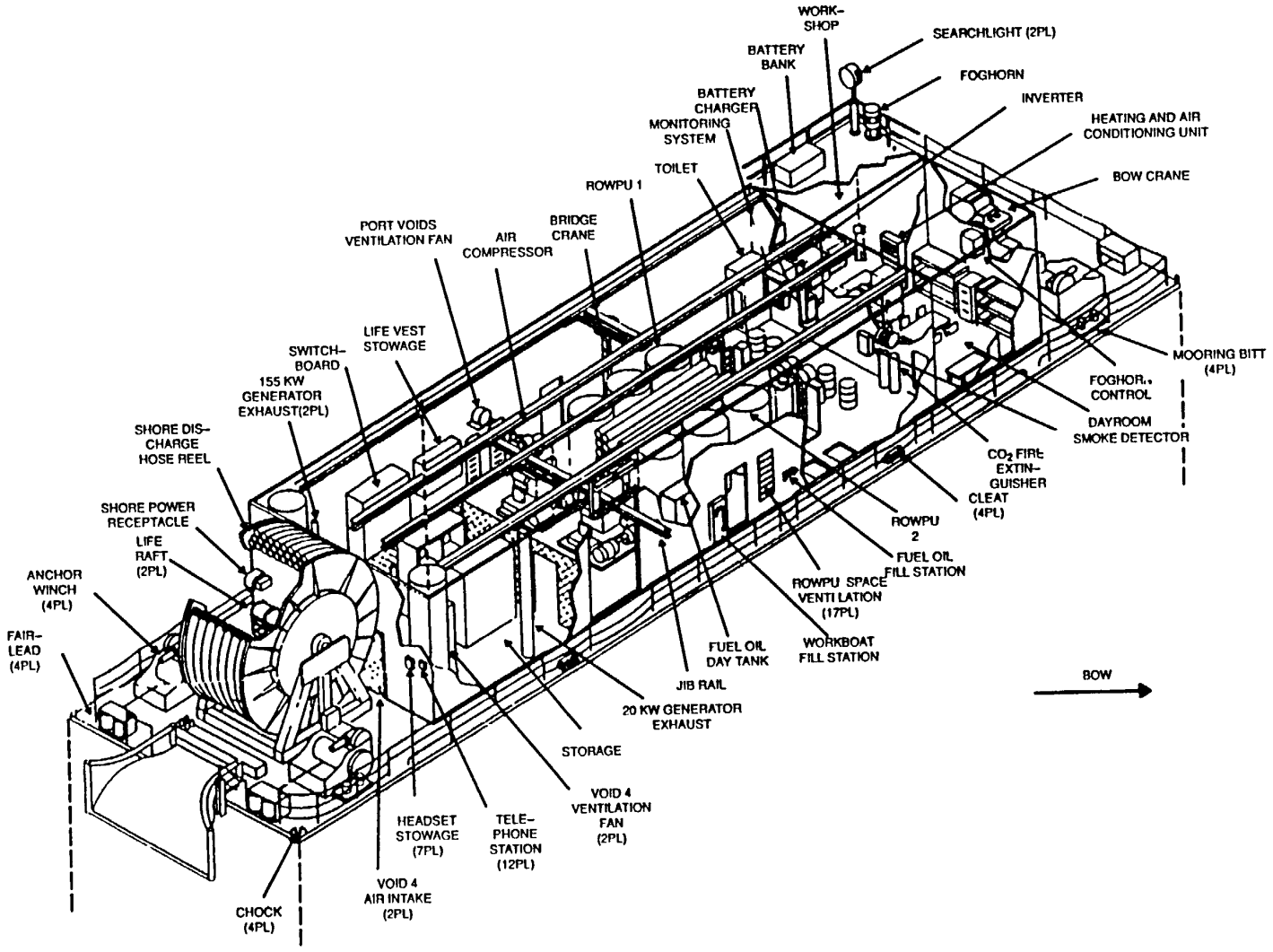


Figure 1-1. Major Components of ROWPU Barge Systems and Equipment - Deckhouse (Sheet 2 of 3)

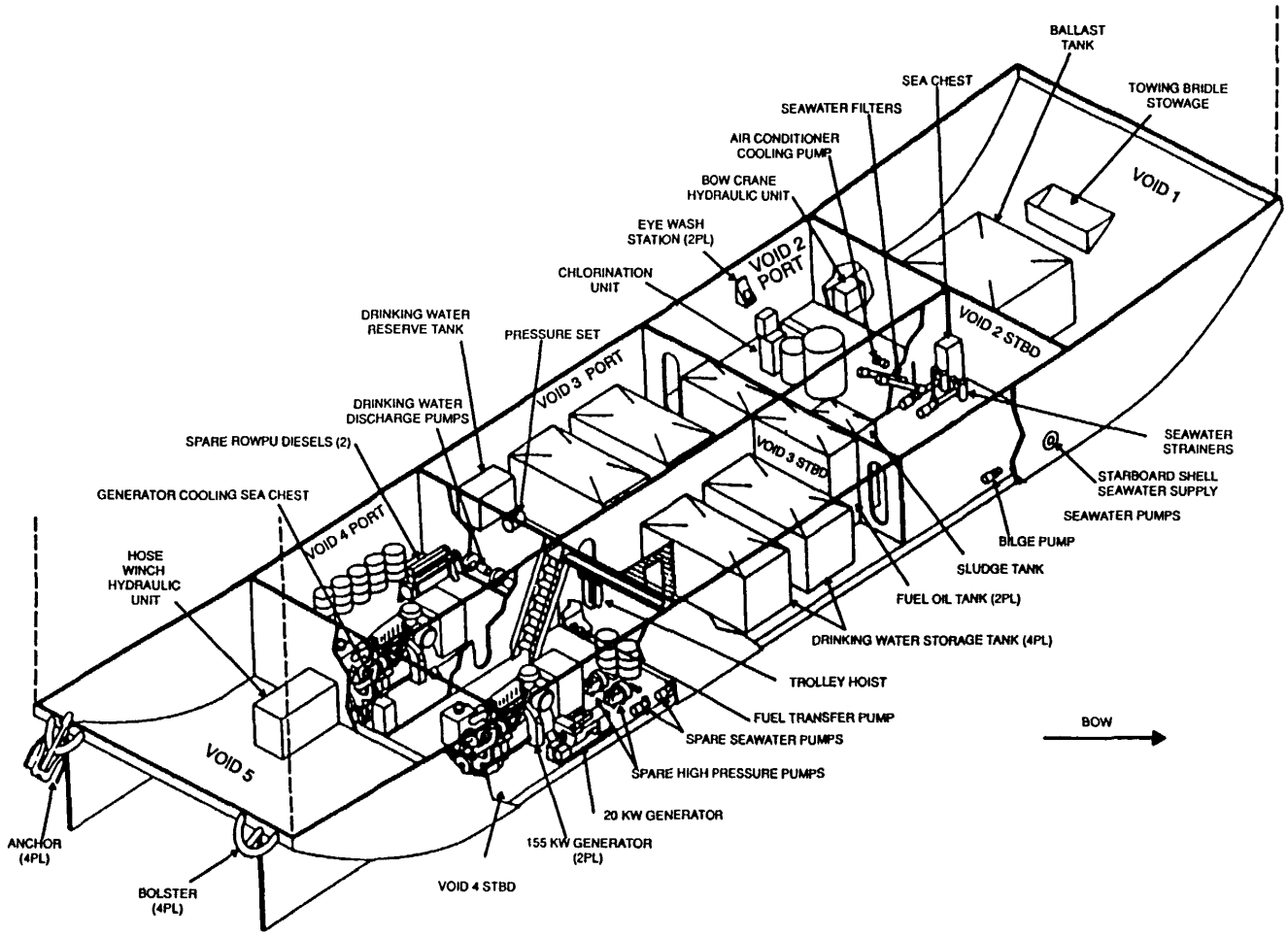


Figure 1-1. Major Components of ROWPU Barge Systems and Equipment - Voids (Sheet 3 of 3)

CHAPTER 2 DAYROOM EQUIPMENT

Section I. Description and data

2-1 Description. Dayroom equipment is shown in Figure 2-1. The equipment includes drinking fountain, hotplate, coffeemaker, refrigerator, range hood, three berthing units with three bunks each, filing cabinet, mess table with six seats, writing table, sink, and radio operator's desk and chair. Communications equipment in the dayroom is discussed in TM 55-1930-209-14&P-12.

2-1.1 Dayroom equipment and its electrical hookup are shown on drawings listed in Appendix A. Additional information on this equipment is in manufacturers' service manuals/instructions in Appendix B.

2-2 Equipment specifications

a. Drinking fountain

Manufacturer	Haws Drinking Faucet Co.
CAGEC	27775
Model no.	HF-4
Color	Gray
Capacity	5 gph
Type	Hand operated, free standing floor type
Compressor size	1/16 Hp, air-cooled
Voltage	115 Vac, 1 Ph, 60 Hz
Amperage	3.9 A
Weight	95 lb
Quantity	1

b. Coffeemaker (coffee brewer)

Manufacturer	The West Bend Co.
CAGEC	93335
Model no.	43536
Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Catalog no.	6159T16
Capacity	12-36 cups
Voltage	115 Vac, 1 Ph, 60 Hz
Quantity	1

c. Hotplate (range)

Manufacturer	The Capitol Products Co.
Wlnstead, CT 06098	
Model no.	UL765
Supplier	W. W. Grainger, Inc.
CAGEC	25795
Catalog no.	5H321
Type	Table top
No. of elements	2
Voltage	115 Vac, 1 Ph, 60 Hz
Material	Steel
Weight	9 1/4 lb
Size	20 in. x 8 3/4 in. x 4 in.
Quantity	1

d. Refrigerator

Manufacturer	Bailey Refrigerator Co.
Model no.	BR-1 6
Capacity	17.41 cu ft
Voltage	115 Vac, 1 Ph, 60 Hz
Materiel	Stainless steel
Quantity	1

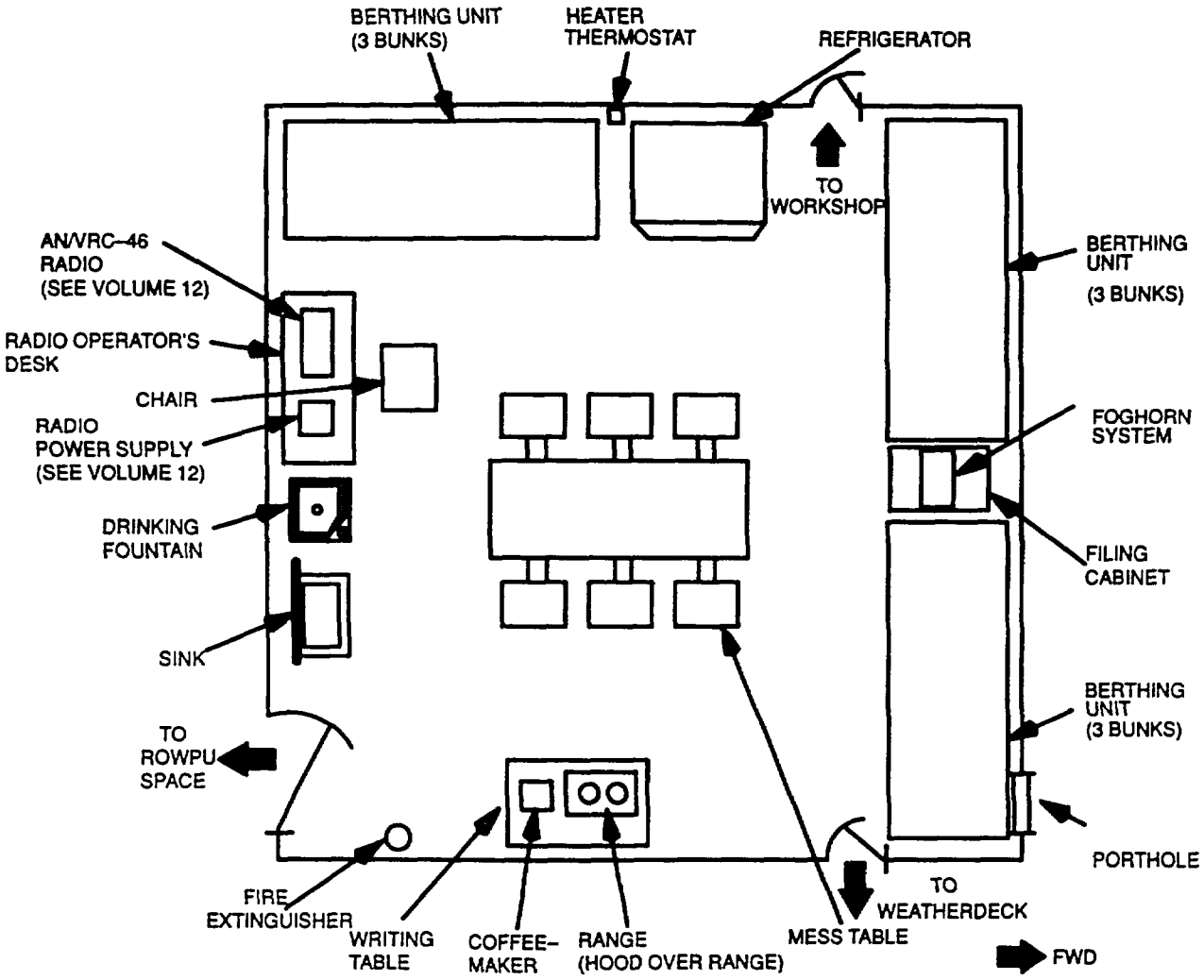


Figure 2-1. Deckhouse Dayroom Arrangement

e.	Range hood	
	Manufacturer	Aubrey Manufacturing, Inc. Union, IL 60180
	Model no.	109-2S/1300S
	Supplier	McMaster-Carr Supply Co.
	CAGEC	39428
	Catalog no.	2159K42
	Type	Nonduct w/light
	Voltage	115 Vac, 1 Ph, 60 Hz
	Filters	One stainless steel and one charcoal
	Size	5 3/8 in. x 7 3/4 in. x 24 in.
	Material	Stainless steel
	Quantity	1
f.	Berthing unit	
	NAVSEA dwg. no.	805-1635533PCI-3T025
	Type	Three tier w/mattress and cover
	Material	Steel
	Quantity	3
g.	Desk	
	NAVSEA dwg. no.	805-1631377
	Type	Radio operator with attached chair
	Material	Aluminum
	Quantity	1
h.	Filing cabinet	
	NAVSEA dwg. no.	S3201-632481, type A
	Drawers	3
	Size	18 in. x 31 in. x 39 3/4 in.
	Material	Steel
	Quantity	1
i.	Mess table	
	NAVSEA dwg. nos.	805-1638931 and 805-163890
	Type	Mess w/6 fixed swivel seats
	Material	Steel
	Quantity	1
j.	Writing table	
	NAVSEA dwg. no.	S3306-638434
	Type	Writing w/drawer
	Material	Steel
	Quantity	1
k.	Sink	
	Supplier	McMaster-Carr Supply Co.
	CAGEC	39428
	Part no.	2719K52
	Type	Basin
	Size	21 3/16 in. x 17 1/8 in. x 6 in.
	Material	Stainless steel
	Quantity	1

l. Paper towel dispenser

Manufacturer	Contico Intemational, Inc. Continental Manufacturing Co. Div.
CAGEC	59562
Part no.	992P
Material	Corrosion resistant steel
Quantity	1

2-3 Items furnished

2-3.1 Components installed as part of the dayroom equipment are listed on the parts list of drawings referenced in Appendix A and in Components of End Item List in Appendix F in TM 55-1930-209-14&P-1 8.

2-3.2 Common and bulk items onboard are listed in Expendable Supplies and Materials List in Appendix E in TM 55-1930-209-14&P-1 8.

2-3.3 Repair parts and special tools onboard are listed in Repair Parts and Special Tools List in Appendix G in TM 55-1930-209-14&P-1 8.

2-4 Items required but not furnished. All required items are furnished.

2-5 Tools and test equipment. Use existing tools and equipment onboard. Complete list of tools and test equipment onboard is in Tools and Test Equipment List in Appendix D in TM 55-1930-209-14&P-18.

Section II. Operating instructions

2-6 Operating controls and indicators. Controls and indicators for the range hood, hotplate, refrigerator and coffeemaker are shown in Figure 2-2. Other than the hand operated bubbler, there are no operating controls on the drinking fountain.

2-7 Prestart procedures

a. Perform before operation checks.

b. Close circuit breaker P13 on switchboard.

c. Close the following power panel 3 circuit breakers:

No.	Circuit breaker identification
6P13	Hotplate
7P13	Drinking fountain
8P13	Coffeemaker
9P13	Refrigerator

d. Make sure drinking water system pressure set is operating.

2-8 Operating procedures

2-8.1 Hotplate

a. Turn one or both burner temperature controls to desired temperature. Both burners (825 watts each) are for heavy duty cooking or fast boil. When a burner is on, its indicator light will be on.

b. Turn burner off when not being used.

2-8.2 Drinking fountain. Operate drinking fountain by pressing bubbler pushbutton.

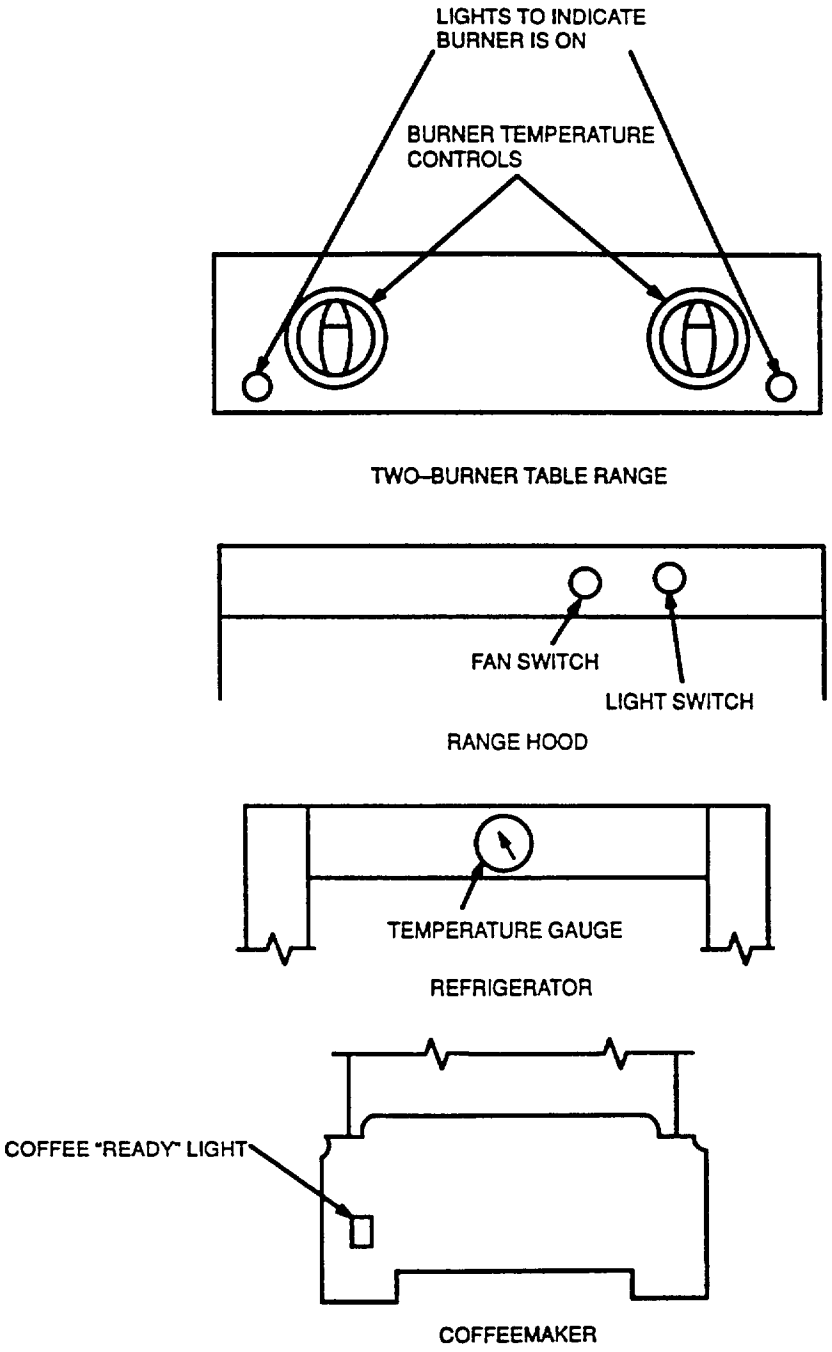


Figure 2-2. Dayroom Equipment Controls/Indicators

2-8.3 Coffeemaker

a. Remove cover, coffee basket and stem.

b. Fill coffeemaker with cold water to desired level as listed in table below.

Water level, in cups	Amount of ground coffee. in cups	
	Strong	Mild
36	31/4	2
30	23/4	1 3/4
24	21/4	1 1/2
18	1 3/4	1 1/4
12	1 1/4	1

c. Place stem in heating unit well and place coffee basket on stem.

d. Fill coffee basket with coffee as indicated above. Do not brew less than 12 nor more than 36 cups.

e. Replace cover and twist to lock in place.

f. Plug cord into coffeemaker receptacle. Coffee will begin perking. When red light comes on, coffee is ready.

g. Before serving coffee, remove cover, basket containing grounds, and stem. Replace cover only. Dispose of coffee grounds. Clean and stow basket and stem.

h. Coffee will remain at serving temperature as long as the coffeemaker is plugged in. When about 3 cups of coffee remain In coffeemaker, unplug it.

2-8.4 Refrigerator. Refrigerator automatically starts when it is plugged into a receptacle. Internal temperatures are preset at the factory and are indicated on the top front of the refrigerator. To turn refrigerator off, unplug it.

2-8.5 Range hood. Use ON/OFF switches on front panel to operate exhaust fan and light.

2-9 Shutdown procedures

a. Unplug coffeemaker and hotplate. Perform after operation services.

b. Under normal operations, drinking fountain and refrigerator are not turned off unless barge is to be placed in long-term storage.

2-9.1 Emergency shutdown

2-9.1.1 General. The barge has two emergency shutdown modes. One mode (system shutdown) shuts down individual systems such as the ventilation system or a diesel high pressure pump, and the other mode (total shutdown) shuts down all barge operating systems.

Both systems are operated by pushing a red button protected by a metal guard. On system shutdowns, this button shuts off either fuel or electrical power to that system only. On total shutdown, this button shuts off all fuel and electrical power to all operating systems.

Emergency system shutdown red buttons are on the ROWPU space starboard bulkhead just aft of the personnel door. These seven emergency system shutoff buttons (Figure 2-3) control shore power, ventilation systems, ROWPU 1 diesel high pressure (HP) pump, ROWPU 2 diesel HP pump, ship auxiliary generator (SAG), ship service generator 2 (SSG2), and ship service generator 1 (SSG1).

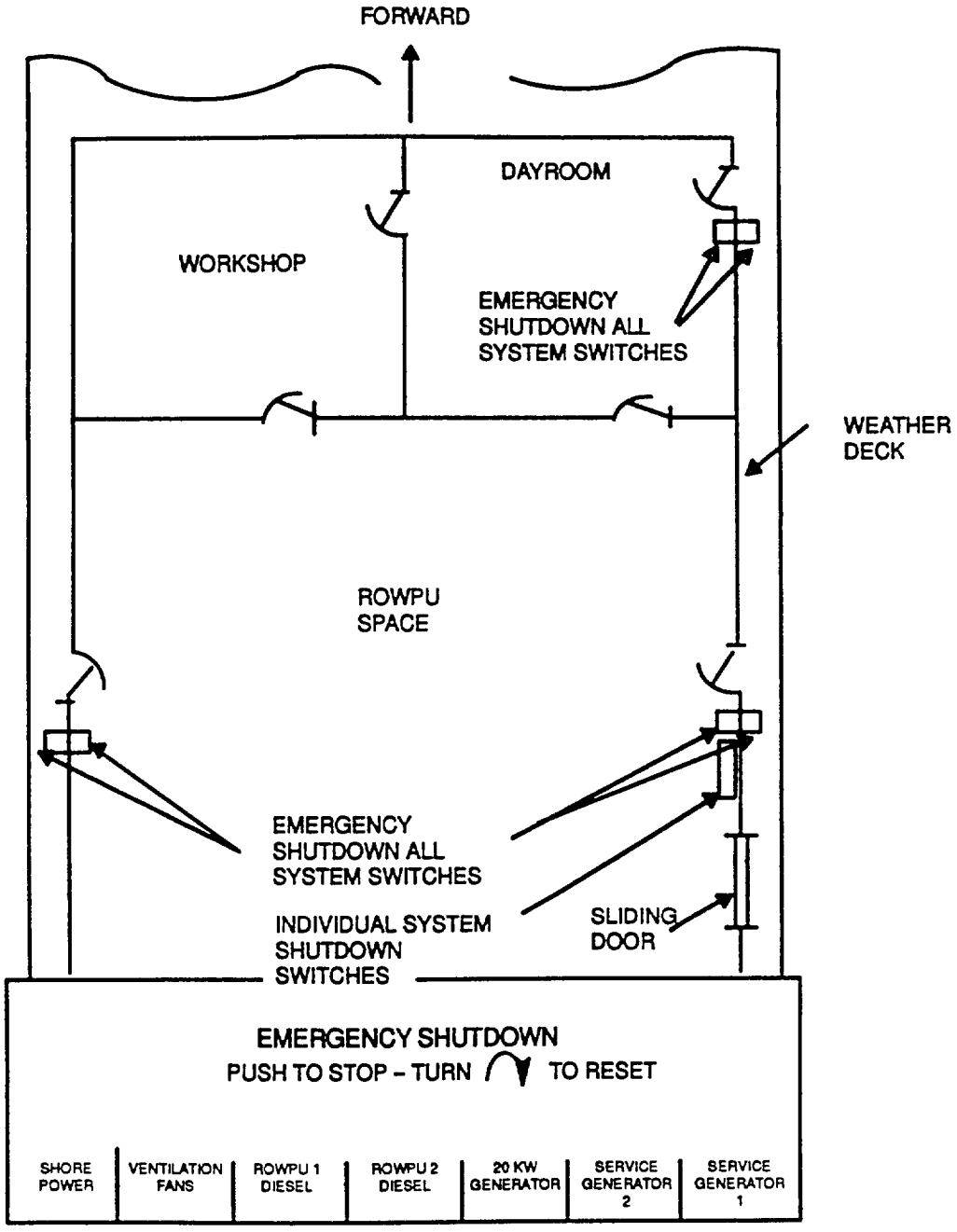


Figure 2-3. Location of Controls for Emergency Shutdown Systems

Emergency total shutdown red buttons are located as follows:

- On ROWPU space starboard bulkhead aft of personnel door above and forward of row of system emergency shutoff buttons.
- Outside ROWPU space starboard door on weatherdeck.
- Outside ROWPU space port door on weatherdeck.
- Inside ROWPU space port door to weatherdeck.
- Outside dayroom door to weatherdeck.
- Inside dayroom door to weatherdeck.

2-9.1.2 Emergency shutdown procedures

a. In an emergency, push the appropriate red button to shut down either a selected system or all operating systems.

b. When emergency situation has been corrected, reset emergency button by turning collar behind button one-quarter turn clockwise. Button will pop out and again be in the ready position.

c. When emergency button is reset, any systems turned off by that emergency button must be restarted with their individual controls.

2-10 Operation under extreme conditions. During freezing temperatures, drain drinking fountain and sink, if necessary.

Section III. Maintenance Instructions

2-11 General

2-11.1 Maintenance concept

2-11.1.1 Unit level and Intermediate Support and Intermediate General Support (IDS/GS) maintenance on dayroom equipment is performed onboard by barge crewmembers whenever possible.

2-11.1.2 Any IDS/IGS maintenance beyond capability of crewmembers is provided by a shore-based area support maintenance unit. This unit also determines if depot support maintenance is required.

2-11.1.3 Intermediate support maintenance is accomplished by replacement of component or major end items.

2-11.1.4 Unless other intermediate support procedures are directed, IDS/IGS maintenance normally is provided by an Army Transportation Corps floating craft intermediate support maintenance unit serving the terminal operating area. Components to be disposed of are processed by this unit.

2-11.1.5 Maintenance Allocation Chart (MAC) is in Appendix C in TM 55-1930-209-14&P-18. For maintenance of other equipment onboard, consult appropriate manual.

2-11.2 Maintenance procedures. Maintenance procedures are presented in the paragraphs that follow: Appendix C, Preventive maintenance; paragraph 2-13, Troubleshooting; and paragraph 2-14, Maintenance procedures.

2-12 Preventive maintenance. See TM 55-1930-209-14&P-15, Appendix C for preventive maintenance checks and services for the dayroom equipment. See TM 55-1930-209-14&P-19 for complete preventive maintenance checks and services for all systems on the ROWPIJ Barge.

2-13 Troubleshooting

2-13.1 Drinking fountain. Troubleshoot according to Chapter IV, Sections II and III in Service Manual: Haws Self-Contained Electric Water Coolers in Appendix B.

2-13.2 Refrigerator. Troubleshoot according to Troubleshooting and Service Chart in Bailey Model BR-16 Refrigerator manual in Appendix B.

2-14 Maintenance procedures

WARNING

When necessary, make sure electrical power and water supply are turned off before performing maintenance. Observe all safety precautions In this manual and manufacturers' service manuals/Instructions.

NOTE

Due to this vessel's mission and crew capabilities, maintenance normally assigned to higher levels may be assigned to crew members.

2-14.1 Hotplate. Replace indicator light bulb, if defective, with a new bulb.

2-14.2 Drinking fountain

2-14.2.1 Installation. See Section 1, Chapter 1, Service Manual: Haws Self-Contained Electric Water Coolers in Appendix B.

2-14.2.2 Adjustments to drinking water temperature and flow

a. Drinking water temperature adjustment. Temperature of the drinking water bubbler stream is regulated by a thermostat in the compressor compartment (Figure 2-4). It is set at the factory to keep the temperature of drinking water at 50/F. If cooler or warmer water is desired, turn the thermostat adjusting screw clockwise to lower (to 47/F minimum) and counterclockwise to raise (to 55/F maximum) temperature.

b. Drinking water flow adjustment. Drinking water bubbler stream is controlled by a pressure regulating valve (Figure 2-4). Normally, only an initial adjustment is required, but the bubbler stream may be adjusted if desired. First make sure the drinking water system is operating normally, then remove bubbler button retaining nut to expose valve adjusting screw. Turn screw clockwise to increase flow and counterclockwise to decrease flow.

2-14.2.3 Maintenance. See Chapter III, Sections I and II in Service Manual: Haws Self-Contained Electric Water Coolers in Appendix B.

2-14.2.4 Repair. See Sections IV and V in Chapter IV of Service Manual: Haws Self-Contained Electric Water Coolers in Appendix B.

2-14.3 Refrigerator

2-14.3.1 Installation. See General Information Section in Bailey Model BR-16 Refrigerator instructions in Appendix B.

2-14.3.2 Maintenance. See Maintenance Section in Bailey Model BR-16 Refrigerator instructions in Appendix B.

2-14.3.3 Repair. See Repair Instructions in Bailey Model BR-16 Refrigerator instructions in Appendix B. Replace light bulb as needed. Replace defective filter drier when needed. Notify IDS/IGS maintenance unit when refrigerator performance indicates additional refrigerant is needed.

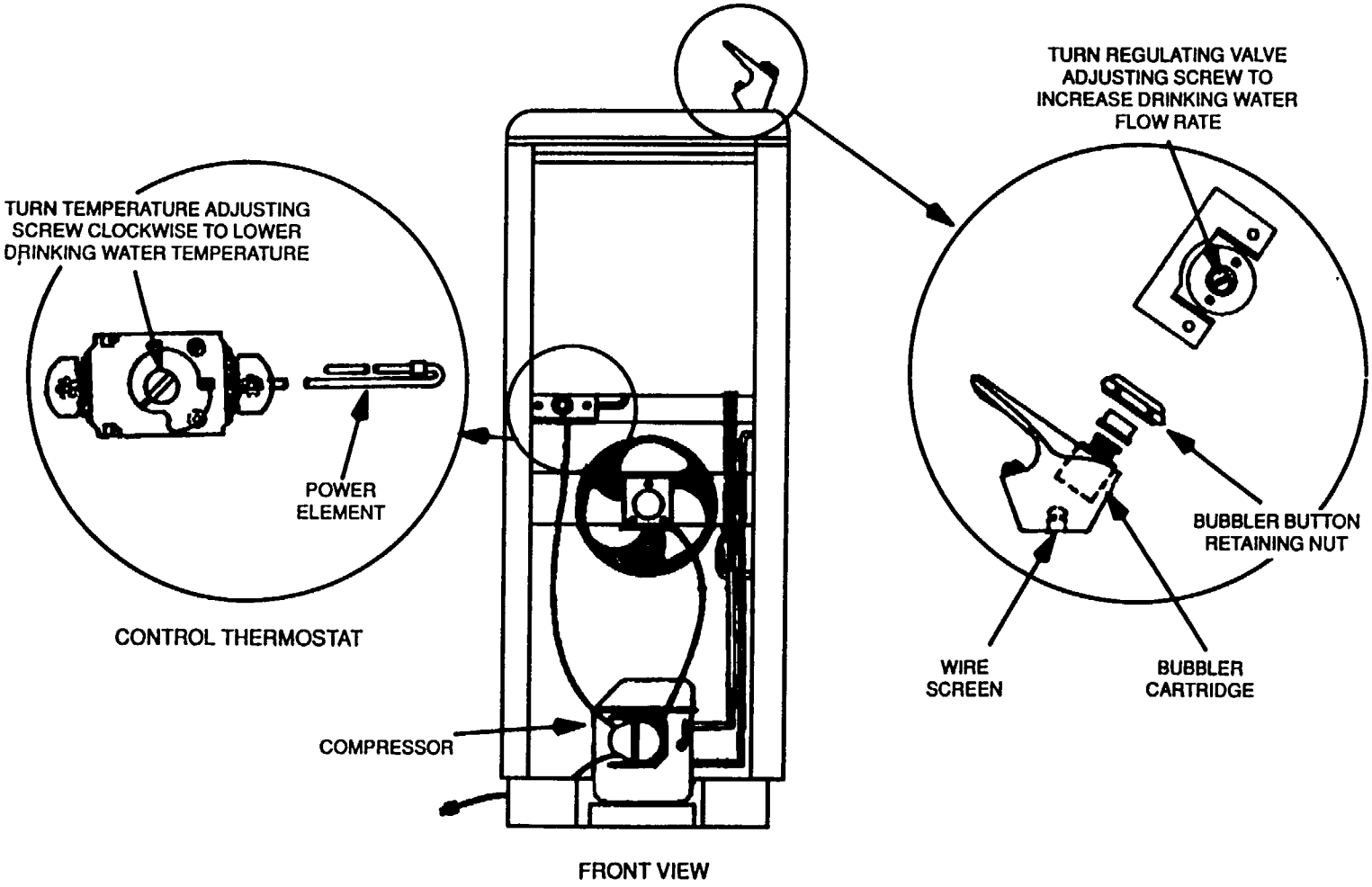


Figure 2-4. Drinking Fountain Adjustments

2-14.4 Range hood

2-14.4.1 Installation. See the Section headed For No Duct Installation in Owner's Manual: Model 109-2S/1300S, No-Duct Range Hood in Appendix B of this TM.

2-14.4.2 Maintenance. See the Section headed Care and Use in Owner's Manual: Model 109-2S11300S, No-Duct Range Hood in Appendix B of this TM for additional information.

2-14.4.3 Repair. Replace bulb in indicator light as follows:

a. Remove lens.
b. Remove bad bulb.
c. Install new bulb.
d. Install lens.

Section IV. Storage

2-15 Short-term storage. If barge is to be taken out of service for more than 7 days but less than 30 days, unplug drinking fountain, hotplate and coffeemaker. Clean and secure equipment. Stow loose items. Make sure electric cord stays with item. Check for damage, corrosion, or pilferage. Repair as necessary.

2-16 Administrative storage. If barge is to be taken out of service for more than 30 days but less than 6 months, barge remains a unit responsibility and shall be maintained by unit personnel. Prepare for storage and inspect as follows:

a. Unplug drinking fountain, hotplate, and coffeemaker. Clean and secure equipment. Touch up paint if necessary. Stow loose items. Make sure electric cord stays with item.

b. When authorized by the bargemaster, perform the following:

(1) Close drinking water system valve DW5 (Barge 1) or DW5A (Barges 2 and 3), which supplies water to drinking fountain. Then remove remote plug (Figure 2-5) to drain water from fountain. Tape plug to fountain.

(2) After cleaning refrigerator, secure door in open position to prevent mildew.

(3) Check for damage, corrosion and pilferage at least monthly. Repair as necessary.

2-17 Long-term storage. If barge is to be taken out of service for 6 months or more, turn it in to depot for preparation and placement into long-term storage. If barge is in administrative storage and is to be taken out of service and placed in depot long-term storage (6 months or more), process dayroom equipment for normal operations before releasing to depot.

a. Perform before operation checks in Appendix C.

b. Check that equipment operates satisfactorily while perform procedures in paragraphs 2-8 and 2-9.

c. Upon successful completion of operation, performing after operation checks in Appendix C.

d. Release dayroom equipment to depot for processing into long-term storage.

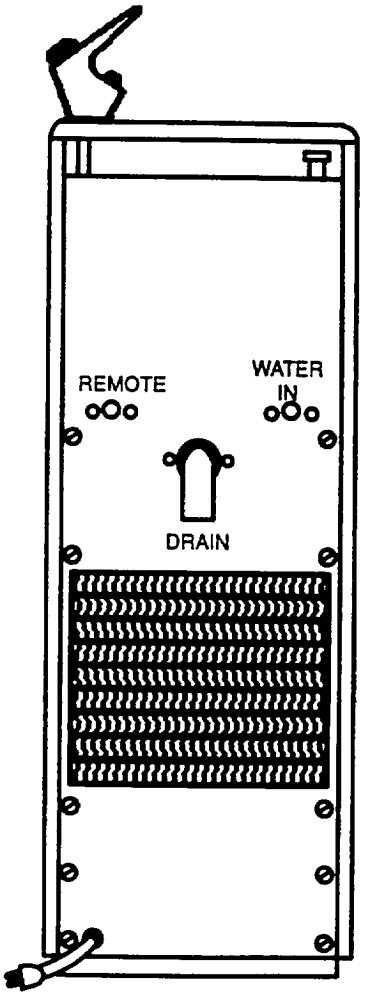


Figure 2-5. Drinking Fountain - Rear View

Section V. Manufacturers' service manuals/instructions

2-18 General. Following manufacturers' service manuals provide additional information on dayroom equipment. A copy of each manual is contained in Appendix B. It may be necessary to refer to both these manuals/instructions and drawings listed in Appendix A while performing the procedures in this TM.

Component	Document title	Manufacturer
Coffeemaker 43536	Automatic Coffeemaker Instructions for Use and Care-Important Safeguards and Warranty	The West Bend Co. 400 W. Washington St. West Bend, WI 53095 (414) 334-5561
Hotplate 5H321	Electrical Cooking Table Range Important Safeguards	The Capital Products Co. 35 Willow St. Winsted, CT 06098 (203) 379-3393
Range hood 109-2S/1300S	Owner's Manual 08176(4-81) Model 109-2S/1300S No-Duct Range Hood	Aubrey Manufacturing, Inc. 6709 Main St. Union, IL 60180 (815) 923-2101
Drinking fountain HF-4	Service Manual Form WC-67, Haws Self-Contained Electric Water Coolers Installation and Maintenance Manual, PMX-254-R1	Haws Drinking Faucet Co. Fourth and Page Sts. P.O. Box 1999 Berkeley, CA 94710 (415) 525-5801
Refrigerator BR-16	Bailey Model BR 16 Refrigerator, Instructions for Installation, Operation and Maintenance - Refrigerator BR16BSSC	Bailey Distributors, Inc. 74 Sullivan St. Brooklyn, NY 11231 (212) 855-3958

Section VI. Manufacturers' warranties/guarantees

2-19 General. Warranty information for dayroom equipment is supplied below:

Component	Manufacturer	Duration	Coverage
Coffeemaker 43536	The West Bend Co. 400 W. Washington St. West Bend, WI 53095 (414) 334-5561	1 year from date of purchase	Material and workmanship
Drinking fountain HF-4	Haws Drinking Faucet Co. Fourth and Page Sts. PO. Box 1999 Berkeley, CA 94710 (415) 525-5801	1 year from date of installation or 18 months after delivery (whichever comes first); 4 years on hermetic unit	Material and workmanship
Range hood 109-2S/1300S	Aubrey Manufacturing, Inc. 6709 Main St. Union, IL 60180 (815) 923-2101	1 year from date of purchase	Material and workmanship
Refrigerator BR-16	Bailey Distributors, Inc. 74 Sullivan St. Brooklyn, NY 11231 (212) 855-3958	1 year from date of purchase	Material and workmanship

CHAPTER 3 WORKSHOP EQUIPMENT AND ROWPU SPACE ARC WELDER

Section I. Description and data

3-1 Description. Workshop equipment shown in Figure 3-1 includes both operational and nonoperational items. Operational equipment includes an arbor press, drill press, and grinder with dust collector. Nonoperational equipment includes stowage bins and workbench with vise. Workshop equipment includes an arc welder in the ROWPU space portside, under the air compressor motor controller near the life preserver stowage box. In addition, the air conditioning unit (TM 55-1930-209-14&P-16), battery charger and inverter, isolating receptacle and 24 Vdc power panel (TM 55-1930-209-14&P-9) are located in the workshop. Workshop equipment, as installed, is shown on drawings listed in Appendix A. Electrical hookup is also shown on drawings listed in Appendix A. Additional information about operational equipment is in the manufacturers' service manuals in Appendix B.

3-2 Equipment specifications

a. Jaw vise

Manufacturer	Reed Mfg. Co.
CAGEC	50171
Part no.	104-S
Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Model no.	5287A3
Jaw width	4 in.
Maximum opening	6 in.
Material	Steel
Quantity	1

b. Drill press (drilling machine)

Manufacturer	Rockwell International
CAGEC	83738
Model no.	17-543
Capacity	5/8-in. cast iron
Motor	1/2 Hp, 1740 rpm, 440 Vac, 3 Ph, 60 Hz
Spindle speed	350-4250 rpm
Quantity	1

c. Grinder

Manufacturer	Baldor Electric Co.
CAGEC	05472
Model no.	8123W-DC8
Specification no.	68-166-13
Type	Pedestal w/dust collector
Frame	524 m
Wheel diameter	8 in.
Motor	3/4 Hp, 3450 rpm, 440 Vac, 3 Ph, 60 Hz
Dust collector	
Part no.	DC8, Series A
Specification no.	34-168-167
Total flow rate	440 cf m
Motor	1/2 Hp, 3600 rpm, 120 Vac, 1 Ph, 60 Hz
Quantity	1

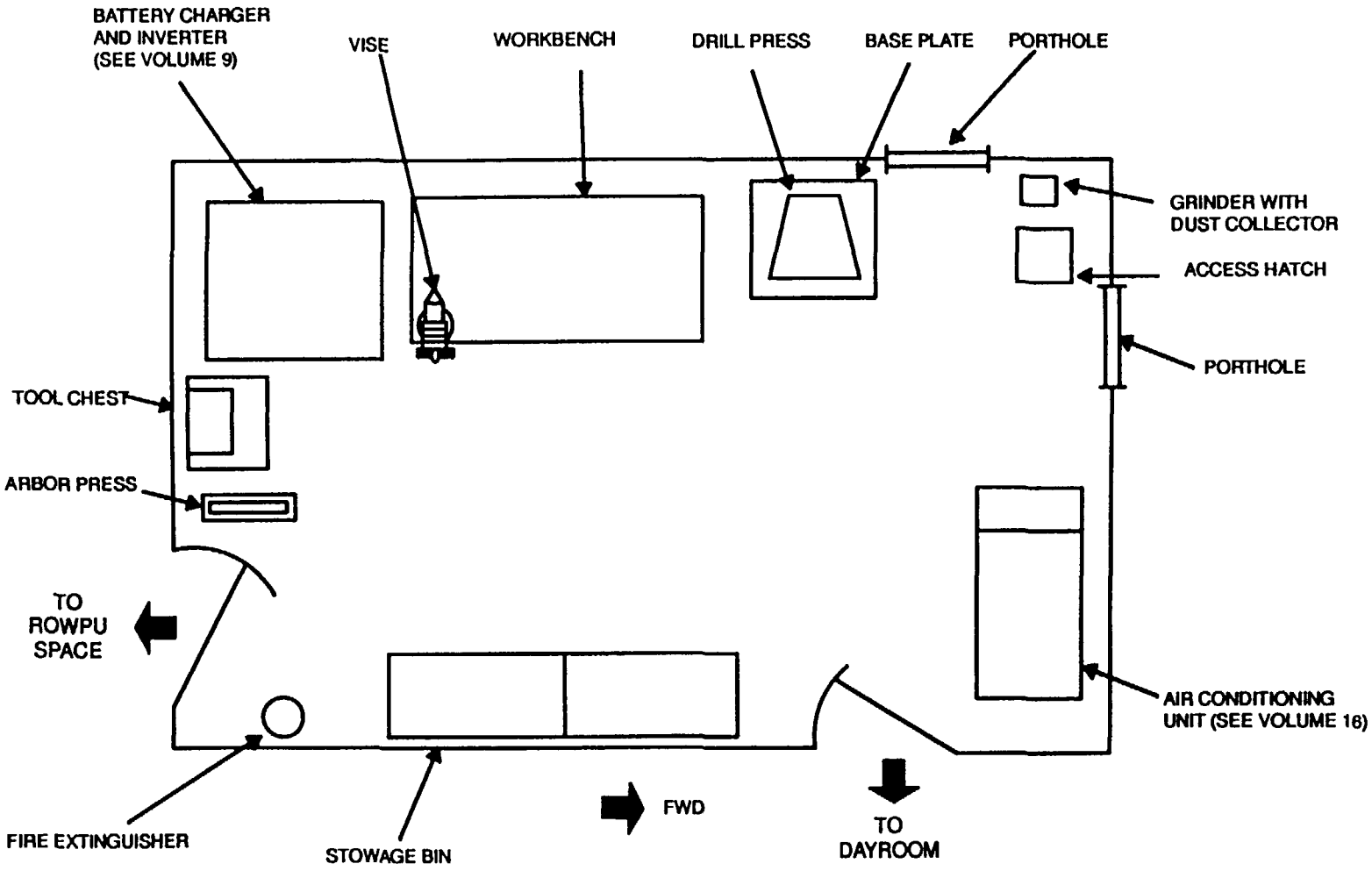


Figure 3-1. Deckhouse Workshop Arrangement

d. Arbor press

Manufacturer	Belco Industries, Inc. FAMCO Machine Division
CAGEC	21482
Model no.	3
Delivered pressure	3 tons
Quantity	1

e. Workbench

Manufacturer	Penco Products, Inc.
CAGEC	90253
Part no.	30430
Size'	
Top length	60 in.
Top width	28 in.
Material	Steel
Quantity	1

f. Stowage bin

NAVSEA dwg. nos.	804-4563098 and 804-4563103
Type	0
Size	36 in. x 18 in. x 84 in.
Quantity	2

g. Arc welder

Manufacturer	Lincoln Electric Co
CAGEC	36232
Model no.	DC-250-MK
Welder size	250
Input voltage	230-460 Vac
Input amperage	32-16 A
Copper wire size (Input and ground)	#14
Fuse size	30 A
Quantity	1

3-3 Items furnished

3-3.1 Components Installed as part of the workshop equipment are listed on the parts list of drawings listed In Appendix A and in Components of End Item List In Appendix F in TM 55-1930-209-14&P-18.

3-3.2 Common and bulk items onboard are listed in Expendable Supplies and Materials List In Appendix E in TM 55-1930-209-14&P-18.

3-3.3 Repair parts and special tools onboard are listed in Repair Parts and Special Tools List in Appendix G in TM 55-1930-209-14&P-18

3-4 Items required but not furnished. All required items are furnished.

3-5 Tools and test equipment. Use existing tools and equipment onboard. A complete list of tools and test equipment onboard is in Tools and Test Equipment List In Appendix D in TM 55-1930-209-14&P-18.

Section II. Operating instructions

3-6 Operating controls and Indicators. Controls and indicators for powered equipment are given as follows. The jaw vise and arbor press are manually operated.

3-6.1 Drill press. Controls and indicators for the drill press are shown in Figure 3-2. Additional information is in Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

3-6.2 Grinder with dust collector. Controls and indicators for the grinder with dust collector are shown in Figure 3-3.

3-6.3 Arc welder. Controls and indicators for the arc welder are shown in Figure 3-4.

3-7 Prestart procedures

3-7.1 Drill press and grinder

a. Perform before operation checks.

b. Close switchboard circuit breaker P5.

c. Close power panel 1 circuit breakers 4P5 for drill press and 8P5 for grinder.

3-7.2 Arc welder

a. Close switchboard circuit breaker P17.

b. With welder off, connect electrode cable to DC negative or DC positive stud as required for your particular application. Connect work cable to other stud.

c. Frame of the welder must be grounded. A stud marked with the ground symbol on starter mounting panel is provided for this purpose. Use good electrical grounding practice when connecting ground.

3-8 Operating procedures

WARNING

Wear safety glasses when using workshop equipment. Do not allow metallic dust or shavings to fall on Inverter or battery charger. Be sure to read and follow all operating instructions and safety precautions In this manual and manufacturers' service manuals and Instructions.

3-8.1 Drill press (Figure 3-2)

WARNING

Wear safety glasses when using drill press.

a. Perform prestart procedures in paragraph 3-7.

b. Select drill size.

c. Use chuck key to install drill bit. Remove chuck key when drill bit is secure.

d. Secure workpiece to table.

e. Turn table adjusting control to adjust table height. Lock table after adjusting height.

i. Use handwheel to make sure depth stop rod will allow drill to come down far enough. Adjust depth stop rod if necessary using depth stop rod locking sleeve.

g. If more than one hole of same size and depth is to be drilled without penetrating workpiece, adjust depth stop rod to obtain desired hole depth. See page 6, Drilling Holes to Depth with Hand Feed Drill Press in Instruction Manual: 17" Variable Speed Drill Press In Appendix B.

h. Push START pushbutton to start drill.

CAUTION

Motor must be running before turning speed control.

i. Set speed control to rpm specified for drill size and material to be drilled while motor is running. Never turn speed control when motor is not running. See page 3-5, Variable Speed Control in Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

WARNING

Feed drill into workplace slowly. Do not force drill Into workplace.

j. Use handwheel to drill hole.

k. When finished drilling, push STOP pushbutton to stop drill press.

l. Remove drill bit using chuck key

m. Remove workpiece from table.

3-8.2 Grinder with dust collector (Figure 3-3)

WARNING

Wear safety glasses when using grinder. Use grinding wheel guard.

a. Perform prestart procedures In paragraph 3-7.1.

b. Make sure dust collector bag is not full. Empty bag if necessary.

c. Turn on grinder by pushing ON/OFF switch to ON.

d. Make sure dust collector is operating by checking that bag inflates.

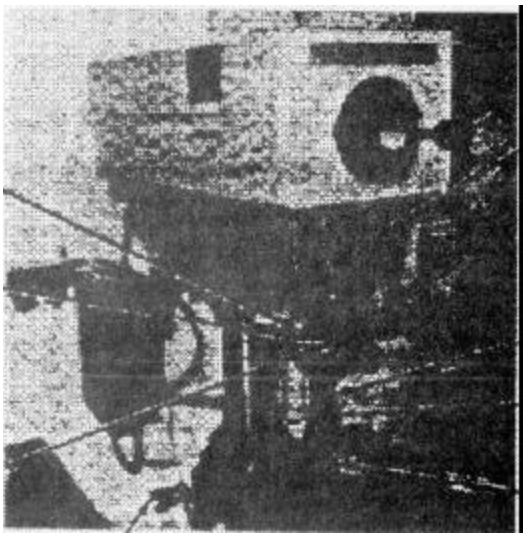
e. Place tool or workpiece to be ground under guard and lay tool or workpiece on tool rest.

WARNING

Do not apply too much force on tool or workpiece while grinding.

f. Lightly place tool or workpiece against grinding wheel.

g. When finished grinding, turn OFF grinder with dust collector by pushing ON/OFF switch to OFF.



START/STOP PUSHBUTTONS
START-STARTS DRILL PRESS
STOP-STOPS DRILL PRESS

QUILL LOCK NUT FOR ADJUSTING QUILL TRAVEL

QUILL SCREW FOR BRINGING BOTH HALVES OF CASTING HEAD TOGETHER TO HOLD QUILL

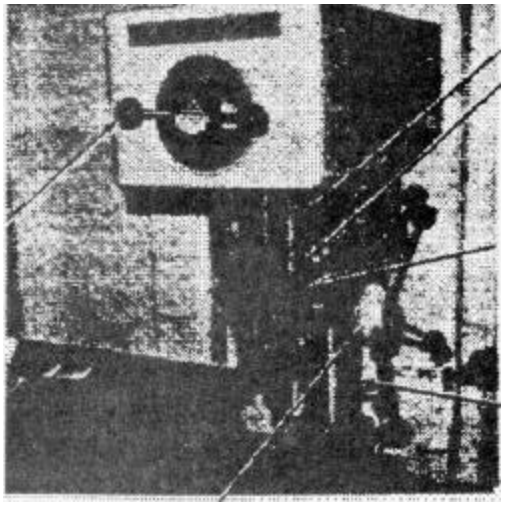
QUILL TIGHTENING LOCK NUT FOR SECURING BOTH HALVES OF CASTING HEAD IN POSITION AFTER ADJUSTING WITH QUILL SCREW

SPINDLE

CHUCK HOLDS DRILL

DRILL BIT

TABLE ADJUSTING CONTROL
FOR ADJUSTING TABLE HEIGHT
AND FOR LOCKING AFTER ADJUSTMENT



DEPTH STOP ROD

DEPTH STOP ROD LOCKING SLEEVE FOR SECURING MICRO-NUT TO PREVENT MOVEMENT

DEPTH STOP ROD MICRO-NUT FOR SETTING DEPTH OF HOLE TO BE DRILLED WHEN MORE THAN ONE HOLE IS TO BE DRILLED

SPEED CONTROL FOR ADJUSTING SPEED OF DRILL WHILE MOTOR IS RUNNING

COLUMN

HANDWHEEL
FOR RAISING OR
LOWERING DRILL

Figure 3-2. Drill Press

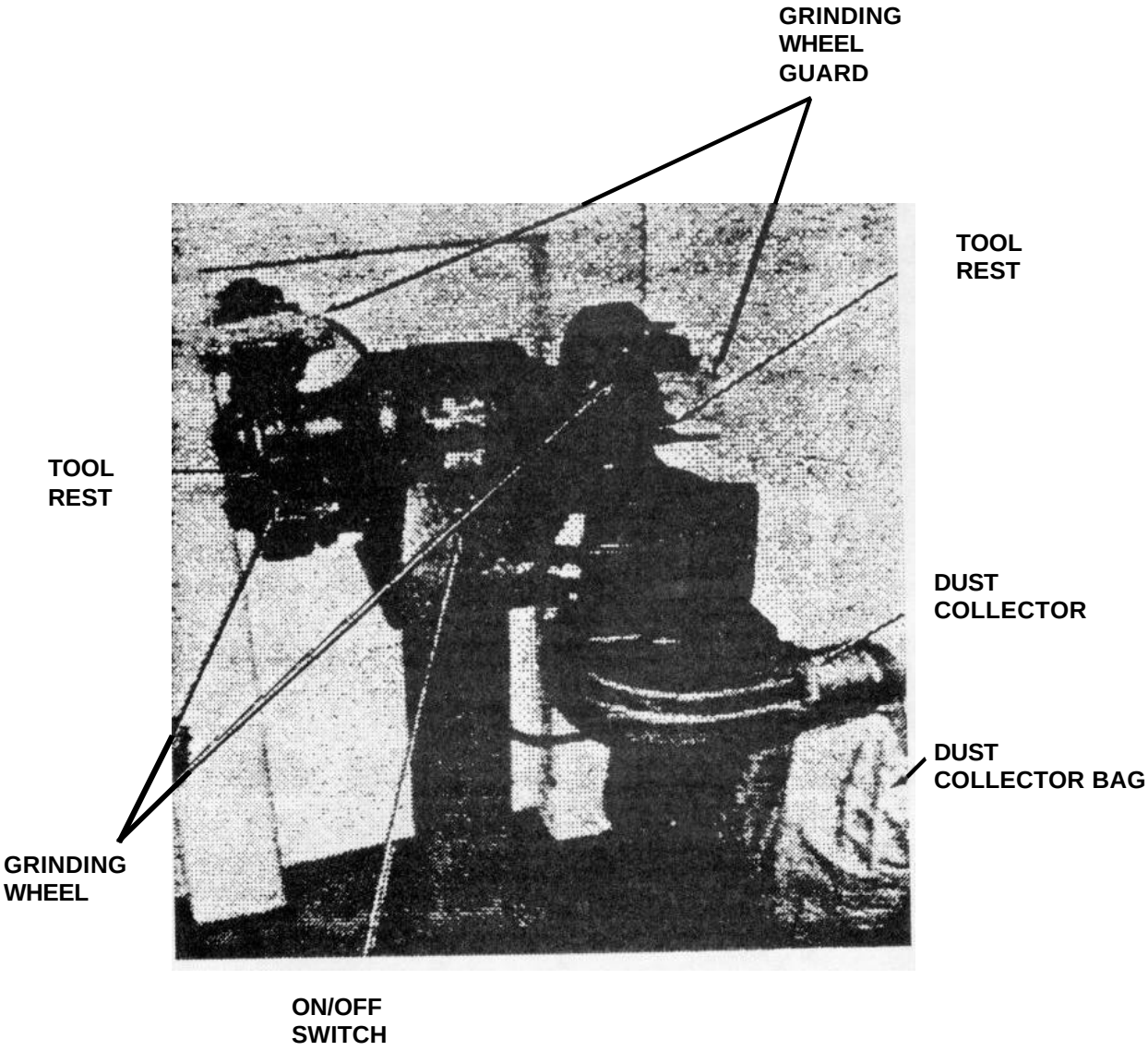


Figure 3-3. Grinder with Dust Collector

Figure 3-4. Arc Welder Controls and Indicators

3-8.3 Arc welder

WARNINGS

- **Only qualified persons operate and maintain arc welders.**
- **Do not let work or ground circuits of arc welder touch any bare skin or wet clothing.**
- **When using welder, always make sure those working with or near the welder wear proper clothing: heavy, hole-free gloves, heavy shirt, cuffless trousers, high shoes and cap. Keep clothing dry and free of oil and other flammable substances.**
- **Use dry heavy canvas drop cloth to cover entire area of physical contact with work and ground when arc welding.**
- **Never dip arc welder's electrode holder in water for cooling.**
- **When arc welding above floor level, be sure to protect yourself against a fall in case of shock.**
- **Before welding on bulkheads, deckplating, and similar surfaces, always check carefully to make sure the other side of the surface to be welded does not hide fuel or compressed gas tanks, flammable or hazardous materials, electrical equipment or wiring.**
- **When welding on any surface, keep your head out of the fumes and make sure area is well ventilated.**
- **Do not weld on surfaces that contain fluorine, zinc, lead, beryllium, cadmium, chromium, stainless steel or mercury. These substances may produce toxic fumes and gases.**
- **Before welding on surfaces that have been cleaned with cleaning solutions containing chlorinated hydrocarbons, always wash with water, dry and ventilate area thoroughly.**
- **Use shield with proper filter lens when welding. Do not allow others near welding operations to assist or observe without proper eye protection including side shields during slag chipping operations.**
- **Warn personnel in area during welding operations not to look at arc or expose themselves to hot spatter or metal.**
- **Do not cut, heat or weld on or near tanks, drums, containers or vents until proper precautions have been taken to see that these procedures will not produce flammable or toxic vapors from substances inside.**
- **Particular caution should be taken when welding on or near fuel oil, toilet and sludge tank vents; chlorination unit; and inhibitors, descalers and coagulants used in reverse osmosis process. Where possible, remove affected tanks, drums, containers or vents and wash area with water. Cover surfaces where leaks or spills may have left hazardous residues with heavy canvas drop cloth and ventilate area thoroughly before proceeding.**
- **When welding on chlorination system or other articles in void 2 port, drain system tanks. Fill tanks with seawater without producing chlorine concentrate. Shut system down and close all valves to the system.**
- **Wash area thoroughly with water, dry and cover rest of system not to be welded with heavy canvas drop cloth. Before proceeding, turn on all possible ventilation. This includes vent fan 8 and any other portable powered ventilation available.**
- **Never weld on gasoline storage tanks or on acetylene, oxygen, Halon or any tank that contains compressed gases.**
- **Never weld on battery units. If you must weld near them, make sure area is well ventilated and batteries are covered with a heavy canvas drop cloth.**

- **Before welding on fuel oil or sludge tank, make sure tank is gas free by:**

  - **Removing all liquid from the tank.**
  - **Cleaning tank thoroughly.**
  - **Seeing that tank is thoroughly dry.**
  - **Force ventilating the tank.**

- **Never weld on submerged part of the hull.**

- **Always have a fire extinguisher handy when welding.**

- **Keep arc welding work cable connected as close to welding area as possible. Work cables connected to barge framework or other locations far from welding area increase the possibility of welding current passing through lifting chains, crane cables or other possible circuit paths. This can create fire hazards or overheat lifting chains or cables until they fail.**

- **Never use compressed air or oxygen for purposes of ventilation.**

- **Always weld with all doors, portholes, and hatches propped open and all available ventilation systems operating.**

- **Take frequent breaks away from area when welding.**

- **Always maintain all welding equipment in proper working condition. If you have any doubts about the safety of any welding equipment, do not use the welder.**

3-8.3.1 Operating procedures for arc welder

NOTE

Arc welder is NEMA-rated for a 30% duty cycle. Duty cycle Is based on a 10 minute period. Therefore it can be operated at full output (250 amperes (Amps)) for 3 minutes out of each 10 minute period without overheating. At 50% duty cycle, the output rating is 200 Amps.

a. Perform prestart procedures according to paragraph 3-7.1.

b. Start welder and check direction of rotation. Proper direction is shown by an arrow on the nameplate. Direction of rotation can be changed by interchanging any two input leads. For two-phase, three-wire input power, interchange two outside leads. Be sure neutral wire is connected to motor neutral, which is the center terminal on the starter. For two-phase, four-wire input power, interchange two leads in the same phase.

c. Use CONTINUOUS VOLTAGE CONTROL to adjust to desired voltage and to obtain exact current required for the job. This control will also vary the open circuit voltage to adjust the arc characteristics to suit different welding applications. The CONTINUOUS VOLTAGE CONTROL dial is divided into equal divisions marked 40 to 60 open circuit volts. Generally, high open circuit voltage from 50 to 60 volts provides a steady, smooth and stable arc for speedy downhand welding. Low open circuit voltage from 40 to 50 volts provides a digging type arc required for overhead and vertical welding.

d. Adjust current using CONTINUOUS CURRENT CONTROL dial to suit your particular welding needs. CONTINUOUS CURRENT CONTROL has a single dial calibrated in Amperes. This control handle also has five pointers corresponding to the five major divisions on the CONTINUOUS VOLTAGE CONTROL dial. When CONTINUOUS VOLTAGE CONTROL dial is set on 55, for example, approximate welding current is indicated by the pointer marked 55 on CONTINUOUS CURRENT CONTROL handle.

3-9 Shutdown procedures

3-9.1 Jaw vise. After using vise, close vise jaws, stow tools and clean work area.

3-9.2 Arbor press. After using arbor press, stow tools and clean work area.

3-9.3 Drill press. After turning off drilling machine, stow drill bit, wipe off drill press, and clean work area.

3-9.4 Grinder with dust collector. After tuning off grinder, empty dust collector, wipe off grinder and dust collector, and clean work area.

3-9.5 Emergency shutdown. See paragraph 2-9.1 for emergency shutdown information and procedures.

3-10 Operation under extreme conditions. If an equipment motor overheats due to hot weather, wait until motor cools and restarts automatically. Restart motor manually if overload trips are used.

Section III. Maintenance instructions

3-11 General

3-11.1 Maintenance concept

3-11.1.1 Unit level and IDS/IGS maintenance on workshop equipment is performed onboard by barge crewmembers whenever possible.

3-11.1.2 Any IDS/IGS maintenance beyond capability of crewmembers is provided by a shore-based area support maintenance unit. This unit also determines if depot support maintenance is required.

3-11.1.3 Intermediate support maintenance is accomplished by replacement of components or major end items.

3-11.1.4 Unless other intermediate support procedures are directed, IDS/IGS maintenance normally is provided by an Army Transportation Corps floating craft intermediate support maintenance unit serving terminal operating area. Components to be disposed of are processed by this unit.

3-11.1.5 MAC data is shown in Appendix C, TM 55-1930-209-14&P-18. For maintenance of other equipment onboard, consult appropriate manual.

3-11.2 Maintenance procedures. Maintenance procedures are presented in the paragraphs that follow:
Appendix C, Preventive maintenance, and paragraph 3-13, Maintenance procedures.

3-12 Preventive maintenance. See TM 55-1930-209-14&P-15, Appendix C for preventive maintenance checks and services for workshop equipment and the arc welder. See TM 55-1930-209-14&P-19 for complete preventive maintenance checks and services for all systems on the ROWPU Barge.

3-13 Maintenance procedures

WARNING

Make sure electric power is off before performing any maintenance. Follow safety precautions in this manual and manufacturers service manuals/instructions.

NOTE

Due to mission and crew capabilities of this vessel, maintenance normally assigned to organizational level or higher may be assigned to operator/crew.

3-13.1 Drill press

3-13.1.1 installation. See page 3, Setting Up in Instruction Manual: 17” Variable Speed Drill Press in Appendix B.

3-13.1.2 Adjustments and calibrations. Make the following adjustments when needed:

a. Spindle return. Adjust spindle return spring according to page 3-3, Adjusting Spindle Return Spring, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

b. Drill (spindle) speed. Adjust drill speed according to page 3-5, Variable Speed Control, Instruction Manual: 17” Variable Speed Drill Press in Appendix B. Calibrate spindle speed according to page 9, Calibrating Spindle Speeds, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

c. Drilling hole to desired depth. Adjust drilling machine to obtain desired hole depth according to page 3-6, Drilling Holes to Depth with Hand Feed Drill Press, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

d. Quill. Adjust quill according to page 6, Quill Adjustments, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

3-13.1.3 Repair

a. Lower spindle assembly replacement. Replace lower spindle assembly according to page 3-5, Changing Lower Spindle Assembly, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

b. Spindle adapter replacement. Replace spindle adapter according to page 3-7, How to Change Spindle Adapters, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

c. Motor and belt replacement. Replace motor and/or belt according to page 3-8, Installing Motor and Belt, Instruction Manual: 17" Variable Speed Drill Press in Appendix B.

3-13.2 Grinder with dust collector

3-13.2.1 Installation. See Installation section in Instruction Manual for Baldor Grinders in Appendix B.

WARNING

Before beginning any repairs on grinder, make sure that power panel 1 circuit breakers 8P5 and 12P13A-2 on receptacle panel are off.

3-13.2.2 Repair. Replace grinding wheel when diameter is reduced to 2" below original size or when cracked. See Instruction Manual for Baldor Grinders in Appendix B.

3-13.3 Arc welder. See Lincoln Welders Operating Manual in Appendix B.

Section IV. Storage

3-14 Short-term storage. If the barge is to be taken out of service for more than 7 days; but less than 30 days, unplug drill press and grinder with dust collector. Close jaws on vise. Clean and secure equipment. Stow loose items. Check for damage, corrosion, and pilferage. Repair as necessary.

3-15 Administrative storage. If barge is to be taken out of service for more than 30 days but less than 6 months, barge remains a unit responsibility and shall be maintained by unit personnel. Prepare for storage and inspect as follows:

a. Unplug drill press and grinder with dust collector. Tape plug to side of drill press and grinder.

b. Close jaws on vise.

c. Clean and secure equipment. Touch up paint if necessary.

d. Stow loose items.

e. Check for damage, corrosion, and pilferage at least monthly. Repair as necessary.

3-16 Long-term storage. If barge is to be taken out of service for 6 months or more, turn it in to depot for preparation and placement into long-term storage. if barge is in administrative storage and is to be taken out of service and placed in depot long-term storage (6 months or more), process workshop equipment for normal operations as specified below before releasing to depot:

a. Perform before operation checks in Appendix C.

b. Check that equipment operates satisfactorily while performing the procedures in paragraphs 3-8 and 3-9.

c. Upon successful completion of operation, perform after operation checks in Appendix C.

d. Release barge to depot for processing into long-term storage.

Section V. Manufacturers' service manuals/instructions

3-17 General. Following list of manufacturers' service manuals/instructions provides additional information on workshop equipment. A copy of each manual/instructions is in Appendix B. It may be necessary to refer to both these manuals and the drawings listed in Appendix A while performing procedures in this TM.

Component	Document title	Manufacturer
Drill press 17-543	Part no. 402-07-651-5009 (4-20-78), Instruction Manual: 17" Variable Speed Drill Press	Rockwell International Power Tool Division 400 N. Lexington Avenue Pittsburgh, PA 15208 (412) 247-3600
Arbor press model 3	Data Sheet 7-B, Arbor Presses-Floor Models-Arbor Press Parts List	FAMCO Machine Division Belco Industries, Inc. 1001-31st Street Kenosha, WI 53140 (414) 654-3516
Grinder with dust collector 8123W-DC8	No. 275J, Instruction Manual for Baldor Grinders	Baldor Electric Co. P.O. Box 2400-T Fort Smith, AR 72902 (501) 646-4711
Arc welder DC-250-MK	1 M-132-F, Lincoln Welders: Operating Manual	Lincoln Electric Co. Cleveland, OH 44117

Section VI. Manufacturers' warranties/guarantees

3-18 General. Information on the warranty/guarantee for workshop equipment is listed below.

Component	Manufacturer	Duration	Coverage
Drilling machine 17-543	Rockwell International Power Tool Division 400 N. Lexington Avenue Pittsburgh, PA 15208 (412) 247-3600	1 year from date of delivery	Materials and workmanship
Grinder with dust collector 8123W-DC8	Baldor Electric Co. Box 2400-T Fort Smith, AR 72902 (501) 646-4711	2 years from date of manufacture or purchase	Materials and workmanship
Arc welder	Lincoln Electric Co. Cleveland, OH 44117	1 year from date of shipment	Materials and workmanship

CHAPTER 4 ACCESSES AND GUARD RAILS

Section I. Description and data

4-1 Description. Barge accesses include deckhouse doors and portholes, accesses to voids, and doors between voids. Accesses to the weatherdeck allow crew and equipment to enter and leave areas of the barge and give protection against adverse weather and sea conditions.

4-1.1 Deckhouse doors and portholes. Deckhouse is fabricated mainly from steel and contains doors and portholes listed in Table 4-1 and shown in Figure 4-1. Deckhouse is shown in drawings listed in Appendix A. Deckhouse also provides openings for crew access, void ventilation system, engine ventilation, engine exhaust, and deckhouse ventilation. Equipment in or on the deckhouse and associated primarily with heating, ventilation, and air conditioning systems is discussed in TM 55-1930-209-14&P-1 6.

4-1.2 Accesses to voids and doors between voids. Void accesses (watertight hatches and soft patches) are on main deck for entrance to the voids below. Manhole covers are installed on void 1 starboard. Manhole covers are also installed on port and starboard sides for access to void 5. Void accesses, doors between voids, and manhole covers are listed in Table 4-2.

4-1.3 Guard rails. Guard rails are installed on the main deck and deckhouse top to prevent crewmembers from falling overboard. Installation is shown on drawings listed in Appendix A.

4-2 Equipment specifications

a. Exterior sliding door

Manufacturer	Mock, Julius and Son, Inc.
CAGEC	6U135
Model No.	M-1 300
Type	Exterior, watertight, sliding door
Clear opening	78 in. x 132 in.
Dogs	14
Material	Steel
Quantity	1

b. Exterior door (starboard side)

Manufacturer	Overbeke-Kain Co.
CAGEC	05370
Model no.	M195DD
Type	Exterior, watertight, right-handed w/frame; 14-in. diameter x 3/4-in. thick lite
Clear opening	24 in. x 60 in.
Dogs	6
Material	Steel
Quantity	2

c. Exterior door (portside)

Manufacturer	Overbeke-Kain Co.
CAGEC	05370
Model no.	M195DD
Type	Exterior, watertight, left-handed w/frame; 14-in. diameter x 3/4-in. thick lite
Clear opening	24 in. x 60 in.
Dogs	6
Material	Steel
Quantity	1

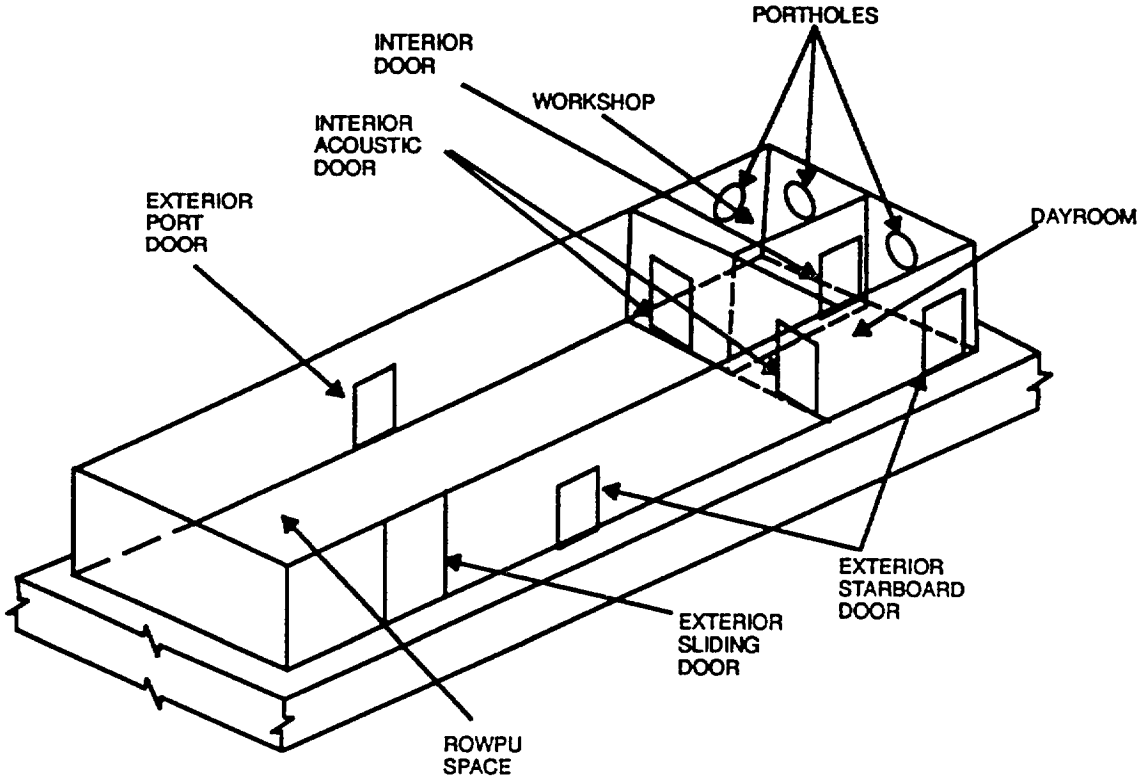


Figure 4-1. Deckhouse Doors and Portholes and Doors between Voids

Table 4-1. Deckhouse Doors and Portholes

Item	Location
Exterior sliding door	Starboard side aft
2 exterior right-hand (starboard) doors	Starboard side - Exit from dayroom to weatherdeck and from ROWPU space to weatherdeck
1 exterior left-hand (port) door	Portside - Exit from ROWPU space to exterior
3 portholes	Two on forward bulkhead, one on workshop port bulkhead
1 interior door	In bulkhead between dayroom and workshop
2 interior acoustic doors	One in bulkhead between dayroom and ROWPU space, one in bulkhead between workshop and ROWPU space

Table 4-2. Accesses to Voids and Doors between Voids

Item	Location
Manhole cover and ladder	Weatherdeck to void 1 starboard Weatherdeck to void 5 port Weatherdeck to void 5 starboard
Void access hatches and ladder	Dayroom deck to void 1 port ROWPU space deck to void 2 port ROWPU space deck to void 2 starboard ROWPU space deck to void 3 port ROWPU space deck to void 3 starboard
Towing bridle access hatch	Bow weatherdeck to void 1
Void right-hand door	Between void 2 port and void 3 port Between void 3 starboard and void 3 port Between void 3 port and void 4 port Between void 4 port and void 4 starboard Between void 4 starboard and void 5
Void left-hand door	Between void 2 starboard and void 3 starboard
Soft patches	ROWPU space dec, access to void 4 port ROWPU space deck access to void 4 starboard inboard (aft) ROWPU space deck access to void 4 starboard outboard (aft) ROWPU space deck access to void 4 port (forward) ROWPU space deck access to void 4 starboard (forward) ROWPU space deck access to void 2 port ROWPU space deck access to void 4 starboard ladder

d. Interior door

Manufacturer	Cornell-Carr Co., Inc.
CAGEC	21204
Model no.	CC2001A
Type	Interior, right-handed, regular bevel
Clear opening	25 in. x 76 in. 1 3/8-in. thick
Material	Steel
Quantity	1

e. Interior acoustic door

Manufacturer	Eckel Industries, Inc., Eckoustic Division
CAGEC	15594
Type	Interior, right-handed, acoustic
Clear opening	26 1/2 in. x 73 1/2 in. 2-in. thick
Quantity	2

f. Porthole (air port)

Manufacturer	BFG Marine Manufacturing and Supply Co., Inc., New York, NY
Model no.	PL-116
Size	18 in. diameter
Dogbolts	4
Material	Bronze w/aluminum cover
Quantity	3

g. Void accesses (hatch)

Manufacturer	Julius Mock and Sons, Inc.
CAGEC	6U135
Part no.	414-E-S
Type	Watertight, flush, quick acting
Clear opening	24 in. x 24 in.
Material	Steel
Quantity	5

h. Right-hand void door

Manufacturer	Kearfott Engineering Co., Inc.
CAGEC	75238
Part no.	KS-30004/RH
Type	Watertight, quick acting
Clear opening	24 in. x 48 in.
Location	Voids 2P to 3P
Material	Steel
Quantity	1

i. Left hand void door

Manufacturer	Kearfott Engineering Co., Inc.
CAGEC	75238
Part no.	KS-3004/LH
Type	Watertight, quick acting
Clear opening	24 in. x 48 in.
Location	Voids 2S to 3S, 3S to 3P, 3P to 4P, 4P to 4S, 4S to 5
Material	Steel
Quantity	5

j. Towing bridle access

Manufacturer	Kearfott Manufacturing Co.
CAGEC	81419
Part no.	KS-40004
Type	Watertight, flush, quick acting, oval
Clear opening	23 in. x 15 in.
Material	Steel
Quantity	1

4-3 Items furnished

4-3.1 Components installed as part of accesses are listed on the parts list of drawings listed in Appendix A and in Components of End Item List in Appendix F in TM 55-1930-209-14&P-18.

4-3.2 Common and bulk items onboard are listed in Expendable Supplies and Materials List in Appendix E in TM 55-1930-209-1 4&P-1 8.

4-3.3 Repair parts and special tools onboard are listed in Repair Parts and Special Tools List in Appendix G in TM 55-1930-209-14&P-18.

4-4 Items required but not furnished. All required items are furnished.

4-5 Tools and test equipment. Use existing tools and equipment onboard. A complete list of tools and test equipment onboard is in Tools and Test Equipment List in Appendix D in TM 55-1930-209-14&P-18.

Section II. Maintenance instructions

4-6 General

4-6.1 Maintenance concept

4-6.1.1 Unit level and IDS/IGS maintenance on accesses is performed onboard by barge crewmembers whenever possible.

4-6.1.2 Any IDS/IGS maintenance beyond capability of crewmembers is provided by a shore-based area support maintenance unit. This unit also determines if depot support maintenance is required.

4-6.1.3 Intermediate support maintenance is accomplished by replacement of components or major end items.

4-6.1.4 Unless other intermediate support procedures are directed, IDS/IGS maintenance normally is provided by an Army Transportation Corps floating craft intermediate support maintenance unit serving terminal operating area. Components to be disposed of are processed by this unit.

4-6.1.5 MAC data is shown in Appendix C, TM 55-1930-209-14&P-18. For maintenance of other equipment onboard, consult appropriate manual.

4-6.2 Maintenance procedures. Maintenance procedures are presented in the paragraphs that follow: paragraph 4-7, Preventive maintenance checks and services, and paragraph 4-8, Maintenance instructions.

4-7 Preventive maintenance checks and services. See TM 55-1930-209-14&P-15, Appendix C for preventive maintenance checks and services for access and doors. See TM 55-1930-209-14&P-19 for complete preventive maintenance checks and services for all systems on the ROWPU Barge.

4-8 Maintenance instructions.

4-8.1 Insulation. Mend rips and tears in insulation by using tape and adhesive.

4-8.2 Exterior doors. Replace grease fittings, jam nuts, gaskets, or hinge assemblies as necessary.

Section III. Storage

4-9 Short-term storage. If barge is taken out of service for more than 7 days but less than 30 days, close and secure all deckhouse exterior and interior doors. Close and secure portholes. Perform weekly inspections and services according to Appendix C.

4-10 Administrative storage. If barge is taken out of service for more than 30 days but less than 6 months, barge remains a unit responsibility and shall be maintained by unit personnel. Perform inspections and services (Appendix C) on a monthly basis.

4-11 Long-term storage. If barge is to be taken out of service for 6 months or more, turn it in to depot for preparation and placement into long-term storage. If barge is in administrative storage and is to be taken out of service and placed in depot long-term storage (6 months or more), perform periodic inspections and services according to Appendix C before releasing to depot for long-term storage.

Section IV. Manufacturer's service manuals/instructions

4-12 General. Following manufacturer's service manual/instructions provide additional information on the accesses. A copy of this manual is in Appendix B. It may be necessary to refer to both this manual and drawings listed in Appendix A while performing the procedures in this manual.

Component	Document title	Manufacturer
Exterior door w/parts lists	Untitled exploded view Cleveland, OH 44146	Overbeke-Kain Co.

CHAPTER 5 SANITATION SYSTEMS

Section I. Description and data

5-1 Description. The barge contains two sanitation systems, the ship's toilets and the bilge system. The two systems are not interconnected.

5-1.1 Ship's toilet functions. The two ship's toilets are located in the ROWPU space; one against the workshop aft bulkhead, the other in an enclosure on the port side near the stern bulkhead. Ship's toilets are self-contained electric incinerating disposal systems that reduce human waste to a substance similar to wood ash. Waste is deposited in the toilets on a waxed paper liner and then incinerated along with the liner in an incineration chamber. This chamber is cooled during and after incineration by a blower system, which vents to the outside.

The incineration process is begun by pushing a foot pedal. Since the toilet uses no water or chemicals, a bowl liner must be used with every operation. Waste deposited on this liner is flushed and incinerated automatically when the pedal is pressed. The indicator lamp on the starboard side lights when the heater is on during the incineration cycle. Incineration cycle lasts about 20 minutes, during which time the heater switches on and off. The blower, which switches on at the same time as the heater, force vents the system. It stays on continuously through the cycle until the incinerator chamber cools to about 140 degrees F. This takes 35 to 45 minutes after the heater and light go off. Onboard installation is shown on the drawing listed in Appendix A.

5-1.2 Bilge system functions. Bilge system, in the voids, collects and removes equipment waste from the barge and keeps the bilges dry.

A bilge pump transfers liquid containing oil to the sludge tank. This oily liquid includes bilge water from the voids, waste lubricating oil from three diesel generators (two ship service generators and one ship auxiliary generator) in void 4 and waste lubricating oil from two ROWPU HP pump diesel engines in ROWPU space. Bilge water from a void is pumped to the sludge tank using a portable hose with foot valve to suck up the bilge water. Waste lubricating oil is pumped to the sludge tank from the generator diesel engine crankcase after a hose is connected between the generator crankcase drain valve (BD16, BD17 or BD18) and avoid 4 suction valve (BD2 or BD10). Waste lubricating oil is pumped to the sludge tank from the HP pump diesel engine crankcase drain valves (BD12 or BD13) and valve (9B19) located between the high pressure pumps.

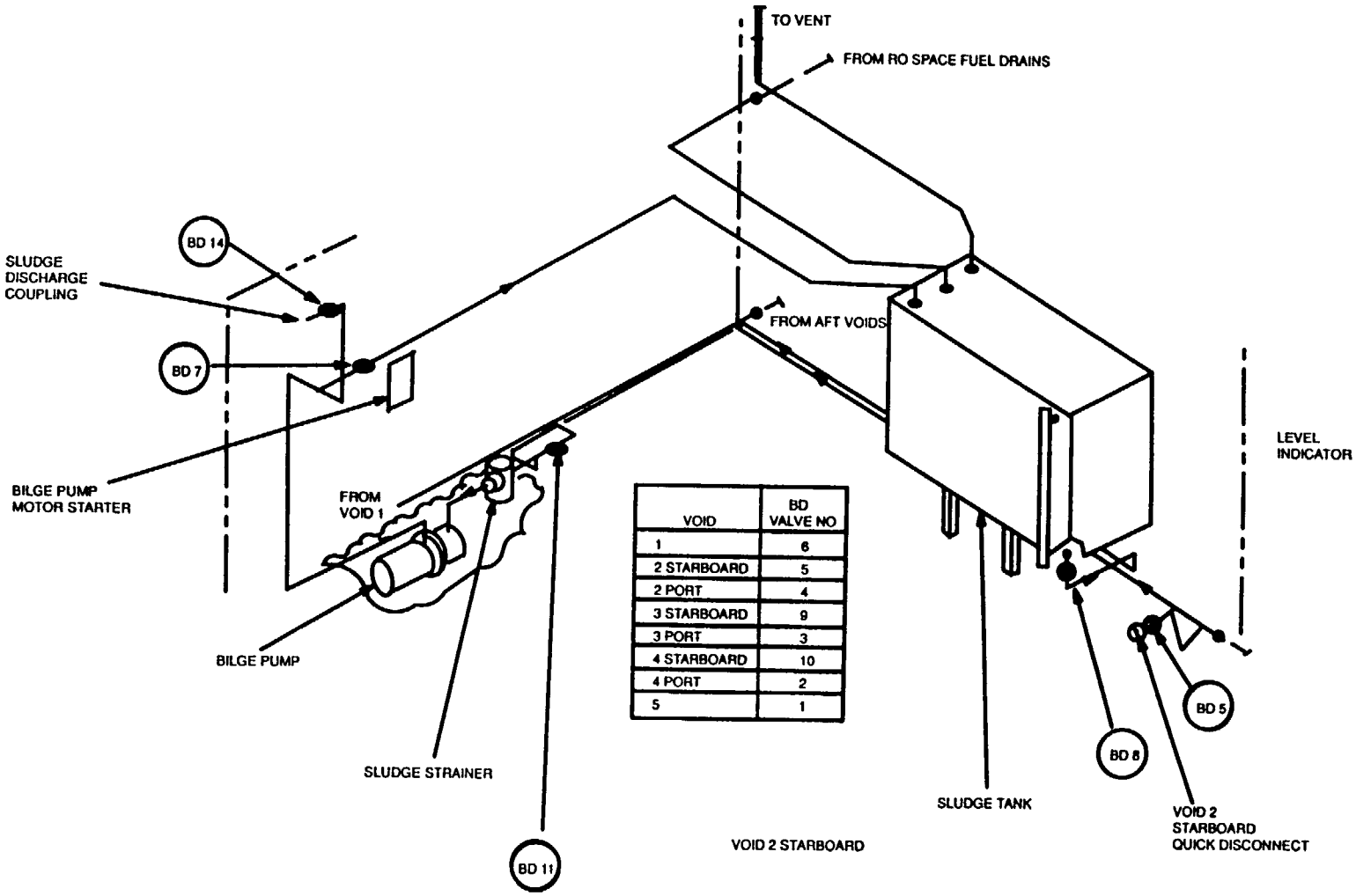
Liquids containing oil are also drained via gravity to the sludge tank. This oily liquid is drained to the sludge tank from two ROWPU HP pump spillage catchment drains, fuel oil day tank spillage catchment drains and fuel oil fill station catchment drain.

The sludge tank holds up to 500 gallons of oil. When this level is reached, the tank's contents must be discharged offboard (to shore facility or other vessel). When the level in the sludge tank reaches the high level switch on liquid level indicator, an alarm flashes on the Equipment Monitoring System (EMS) monitor. Audible and visual alarms are triggered to warn the crew that the sludge tank must be emptied offboard through the shore discharge connection on the starboard weatherdeck. When bilge tank is full, bilge pump must be started and stopped manually using motor controller above the pump in void 2 starboard.

The bilge system also drains nonoily liquids, via gravity, directly overboard from spillage catchment drains and deck drains. This nonoily liquid includes condensation from the workshop heating and air conditioning unit; waste water from dayroom drinking water fountain and sink; drainage from ROWPU spillage catchment drains, liquids from air compressor spillage catchment drain, and liquids that collect on deck.

Spillage catchments also contain liquid spills from fuel oil fill station on weatherdeck starboard, deckhouse top fuel oil port and starboard storage tank and day tank vents, and ship service and ship auxiliary generators. These spillage catchments are manually drained by opening a ball valve and catching the liquid in a container.

Information about location and function of major components is in Figure 5-1 and Table 5-1. The flow of drainage in this system is shown in Figure 5-2. Onboard installation and electrical hookup is shown in drawings listed in Appendix A.



VOID	BD VALVE NO
1	6
2 STARBOARD	5
2 PORT	4
3 STARBOARD	9
3 PORT	3
4 STARBOARD	10
4 PORT	2
5	1

Figure 5-1. Bilge System Major Components

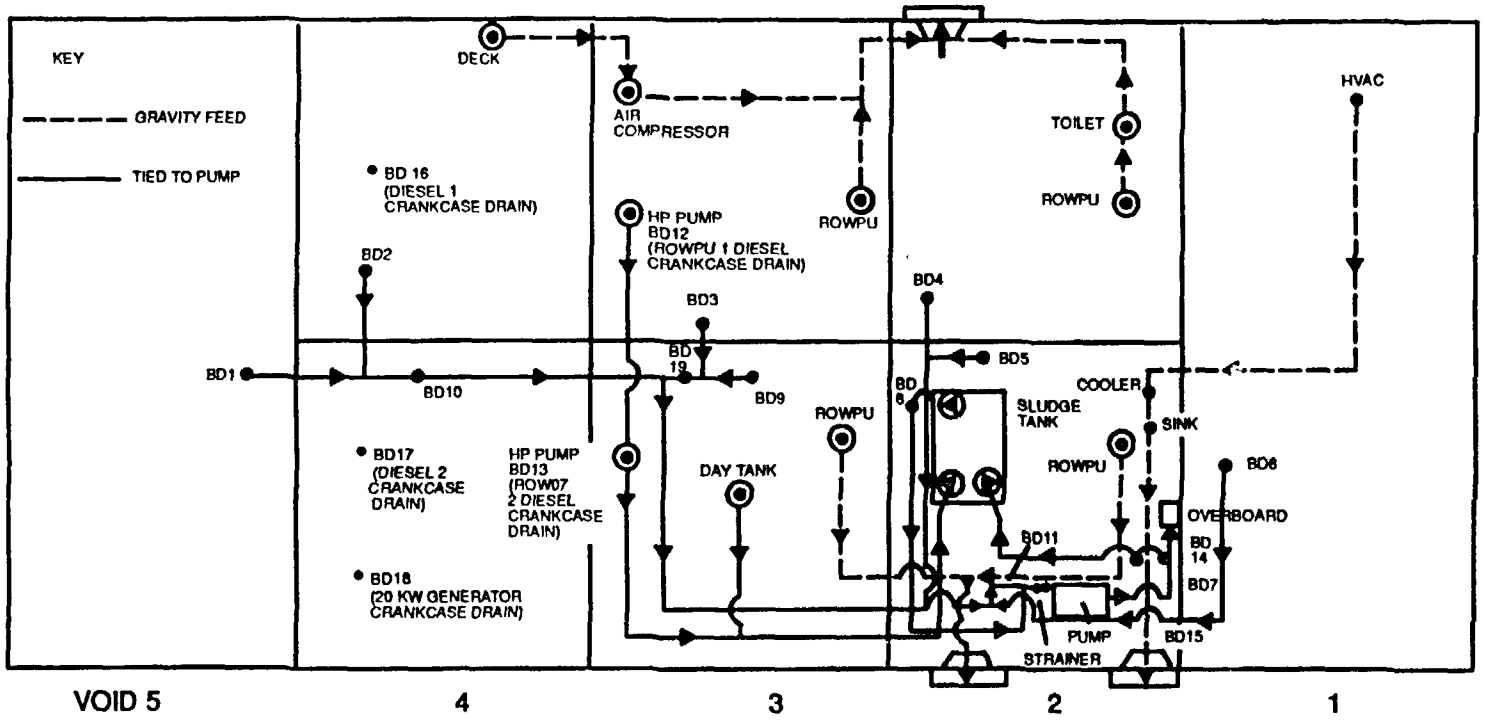


Figure 5-2. Bilge System Flowchart

Table 5-1. Major Components of Bilge System

Component	Function	Location
500-gal sludge tank	Holds bilge water and sludge for discharge to shore or other vessel	Void 2 starboard
Sludge tank visual liquid level indicator	Indicates level of sludge in tank	On sludge tank
Sludge tank liquid high level switch	When level in tank reaches level switch, switch activates EMS alarms alerting crew that sludge tank must be emptied	On liquid level indicator
9 bilge level switches	When level in void reaches level switch, switch activates EMS alarms alerting crew that bilge water in void is too high and must be emptied and problem causing high level eliminated	One in each void except 2 in void 1
Bilge pump	Pumps bilge from voids to sludge tank, from bilge to offboard facility, from sludge tank to offboard facility	Void 2 starboard
Strainer	Protects pump by filtering out foreign materials	Void 2 starboard
Bilge pump motor starter	For manual operation of bilge pump	Void 2 starboard
16 deck drains	Provide gravity feed to sludge tank	6 in ROWPU spillage catchment 6 on deckhouse top 1 in fuel oil day tank spillage catchment 1 in compressor spillage catchment 2 in ROWPU space forward
Spillage catchments	Contain liquid spillage	ROWPU space ROWPUs Air compressor Fuel oil day tank Weatherdeck Fuel oil fill station w/ball drain valve on bottom

Table 5-1. Major Components of Bilge System (continued)

Component	Function	Location
		Deckhouse top
		Port fuel oil storage tank vent
		Starboard fuel oil storage tank vent
		Fuel oil day tank vent
		Void 4 port
		SSG 1
		Void 4 starboard
		SSG 2
		SAG

5-2 Special limitations. Maximum allowable sea state for the operation of the bilge system is Sea State 3.

5-3 Performance characteristics

a. Bilge pump

Type	Positive displacement
Capacity	15 gpm at 25 psi
Motor	
Rating	1 Hp, 1200 rpm, 440 Vac, 3 Ph, 60 Hz

5-4 Equipment specifications

a. Toilet

(1) Incinerating toilet

Manufacturer	Research Products Blankenship
CAGEC	23989
Type	Incinerating electric
Model	WB/TR III
Crew capacity	6
Incineration cycle	18-22 min
Cooling down cycle	35-45 min
Voltage	120 Vac, 3 Ph, 60 Hz
Rating	3.5 kW
Quantity	2

(2) Toilet partition w/hardware

Manufacturer	Continental Columbus Corp.
CAGEC	7K466
Color	Oyster gray
Quantity	2

(3) Terminal vent

Manufacturer	Hayward Manufacturing Co.
CAGEC	73124
Part no.	VT 450
Type	Inverted
Size	4 in. nominal
Connection	Buttweld
Material	Steel
Quantity	1

(4) Toilet tissue holder

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	2880K51
Quantity	2

b. Bilge system

(1) Liquid level indicator with ROLI transmitter indicating scales

Manufacturer	Transamerica DeLaval, Inc. Gems Sensors Division
CAGEC	04034
Part no.	86615
Type	C
Indicating length	50 in. w/high level switch
Size	1 in. NPT
Quantity	1

(2) Pipe trap

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	2964K1
Type	P
Size	1 1/4 in. internal diameter (ID)
Quantity	1

(3) Bilge pump

Manufacturer	Robbins and Myers Ramoy Pump Division
CAGEC	58148
Part no.	35651
Type	Positive displacement
Flow rate	15 gpm at 25 psi
Material	Cast iron
Motor	1 Hp, 1200 rpm, 440 Vac, 3 Ph, 60 Hz

(4) Strainer

Manufacturer	Hayward Mfg. Co., Inc.
Model	Series Number 72
Type	Simplex
Size	1 1/2 in. nominal
Material	Bronze w/basket

(5) Air escape valve

Manufacturer	Robert H. Wager
CAGEC	79128
Part no.	Type 1600T
Type	Air escape
Size	1 in. nominal
Connection	Threaded
Material	Steel
Quantity	1

(6) Bilge level switch

Manufacturer	Transamerica DeLaval Gems Sensors Division
Part no.	43765
Quantity	9

(7) Pump discharge hose

Manufacturer	Parker-Hannifin Corp. Hose Products Division
CAGEC	87373
Part no.	301-16
Length	25 ft
Inside diameter	1 in.
Quantity	3

(8) Gate valve

Specification	ANS B16.34
Type	Type I, Service G
Size	1 in. nominal
Rating	150 lb
Connection	Threaded
Material	Steel
Quantity	3

(9) Swing check valve

Military Specification	MIL-V-18436
Type	Group B, Type III
Size	1 1/2 in. nominal
Rating	150 lb
Connection	Threaded
Material	Steel
Quantity	2

(10) Globe valve

Specification	ANS B16.34
Type	Type II, Service G
Size	1 in. nominal
Rating	150 lb
Connection	Threaded
Material	Steel
Quantity	12

(11) Gate valve

Specification	ANS B16.34
Type	Type I, Service G
Size	1 1/2 in. nominal
Rating	150 lb
Connection	Threaded
Material	Steel
Quantity	2

(12) Gate valve

Manufacturer	William Powell Co.
CAGEC	48422
Part no.	Fig. 502H
Size	1 1/2 in. nominal
Connection	Threaded
Material	Bronze
Quantity	1

(13) Foot valve

Military Specification	MIL-V-16720
Size	1 in. nominal
Connection	Threaded
Material	Brass
Quantity	1

(14) Bilge pump motor controller

Manufacturer	Square D Co., Bell Electric Products Division
CAGEC	81487
Part no.	8558 SBA-21 AFT-440/110V-3PH 60 Hz
Type	Non-reversing w/non-fusible disconnect switch
Rating	5 Hp, 440 Vac, 3 Ph, 60 Hz
Quantity	1 Thermal unit
Part no.	B2.40
Quantity	3

c. Spillage catchment

(1) Deck drains

Manufacturer	Tate Temco, Inc.
CAGEC	09032
Part no.	60-150
Size	1 1/2 in. nominal
Material	Steel
Quantity	16

(2) Ball valve

Manufacturer	Whitey Co.
CAGEC	12623
Part no.	SS-63TF8
Type	2 way
Size	1/2 in. NPT
Material	Corrosion resistant steel
Quantity	4

d. Generator catchment ball valve

Manufacturer	Pittsburgh Brass Manufacturing Co.
CAGEC	92021
Part no.	1/2"-SP-D-12-S-2
Type	2 way
Size	1/2 in. nominal
Material	Steel
Quantity	3

5-5 Items furnished

5-5.1 Toilet and bilge system components installed as part of the barge are listed in the parts list on drawings listed in Appendix A and in Components of End Item List Appendix F in TM 55-1930-209-14&P-18.

5-5.2 Common and bulk items onboard are listed in Expendable Supplies and Materials List in Appendix E in TM 55-1930-209-14&P-18.

5-5.3 Repair parts and special tools onboard are listed in Repair Parts and Special Tools List in Appendix G in TM 55-1930-209-14&P-18.

5-6 Items required but not furnished. All required items are furnished.

5-7 Tools and test equipment. Use existing tools and equipment onboard. A complete list of tools and test equipment onboard is in Tools and Test Equipment List in Appendix D in TM 55-1930-209-14&P-18.

Section II. Operating instructions

5-8 Operating controls and Indicators for bilge system and ship's toilets

Control/Indicator	Figure	Location
Bilge pump motor controller	5-3	Void 2 starboard
Sludge tank liquid level indicator with ROLI transmitter indicating scales	5-4	Void 2 starboard on sludge tank
Modular high level switch	5-4	Void 2 starboard on liquid level indicator
EMS BILGE ALARMS page key	5-5	EMS keyboard
EMS BILGE ALARMS display page	5-6	EMS monitor
EMS SYSTEM STATUS display page	5-7	EMS monitor
Ship's toilet	5-8	ROWPU space port-forward and aft

Information about bilge system valves (Figures 5-1 and 5-2) is in Table 5-2.

Table 5-2. Bilge System Valves

Type	Valve Callout	Location	Label Identification and Valve Function
1-in. globe valve	BD1	Void 5 - starboard of centerline near forward bulkhead	VOID 5 SUCTION: Allows bilge to be pumped from void 5 to sludge tank
1-in. globe valve	BD2	Void 4 port - aft bulkhead near centerline bulkhead	VOID 4 PORT SUCTION: Allows bilge to be pumped from void 4 port to sludge tank
1-in. globe valve	BD3	Void 3 port - aft bulkhead near centerline bulkhead	VOID 3 PORT SUCTION: Allows bilge to be pumped from void 3 port to sludge tank
1-in. globe valve	BD4	Void 2 port - aft bulkhead near centerline bulkhead	VOID 2 PORT SUCTION: Allows bilge to be pumped from void 2 port to sludge tank
1-in. globe valve	BD5	Void 2 starboard - aft bulkhead near centerline bulkhead	VOID 2 STARBOARD SUCTION: Allows bilge to be pumped from void 2 starboard to sludge tank
1-in. globe valve	BD6	Void 1 - starboard of ballast tank near aft bulkhead	VOID 1 SUCTION: Allows bilge to be pumped from void 1 to sludge tank
1-in. globe valve	BD7	Void 2 starboard - near starboard shell in sludge tank intake line	BILGE PUMP DISCHARGE TO SLUDGE TANK: Allows bilge from voids to flow to sludge tank, and for isolation of sludge tank
1 1/2 in. gate valve	BD8	Void 2 starboard - bottom of sludge tank	SLUDGE TANK DRAIN: Allows sludge to be drained from the sludge tank to the discharge connection
1-in. globe valve	BD9	Void 3 starboard - aft bulkhead near centerline bulkhead	VOID 3 STARBOARD SUCTION: Allows bilge to be pumped from void 3 starboard to sludge tank
1-in. globe valve	BD10	Void 4 starboard - aft bulkhead near centerline bulkhead	VOID 4 STARBOARD SUCTION: Allows bilge to be pumped from void 4 starboard to sludge tank
1-in. gate valve	BD11	Void 2 starboard - starboard shell near aft bulkhead	BILGE SUCTION TO PUMP: Allows bilge and fuel oil to be pumped to sludge tank and for isolating bilge pump
1-in. gate valve	BD12	ROWPU space port	ROWPU 1 DIESEL DRAIN: Allows waste lube oil to be drained from port HP pump diesel engine

Table 5-2. Bilge System Valves (Continued)

Type	Valve Callout	Location	Label Identification and Valve Function
1-in. gate valve	BD13	ROWPU space starboard	ROWPU 2 DIESEL DRAIN: Allows waste lube oil to be drained from starboard HP pump diesel engine
1 1/2-in. gate valve	BD14	Weatherdeck starboard side, forward	SLUDGE DISPOSAL: Allows discharge of sludge tank from barge
1 1/2-in. gate valve	BD15	Void 2 - outer shell starboard	DAYROOM WASTE DISCHARGE: Allows for drainage of dayroom, workshop ROWPU drains and deck drains via gravity
1-in. globe valve	BD16	Void 4 port	GENERATOR 1 CRANKCASE DRAIN: Drain valve for draining oil from SSG 1
1-in. globe valve	BD17	Void 4 starboard	GENERATOR 2 CRANKCASE DRAIN: Drain valve for draining oil from SSG 2
1-in. globe valve	BD18	Void 4 port	20 KW GENERATOR CRANKCASE GENERATOR: Drain valve for draining oil from SAG
1-in. globe valve	BD19	ROWPU space between HP pumps	DRAIN TO SLUDGE TANK: Allows waste lube oil to be drained from ROWPU 1 or ROWPU 2 crankcase (on Barges 2 and 3) after hose is connected between BD19 and BD12 or BD13
Four 1/2-in. ball valves	-----	Beneath weatherdeck fuel oil fill station, beneath deckhouse top port and starboard fuel oil storage tank and fuel oil day catchments tank vent, and aft end of SSG 1, SSG 2, and SAG spillage catchments	Drain weatherdeck fuel oil fill station and 3 deckhouse top fuel tank vent spillage catchments

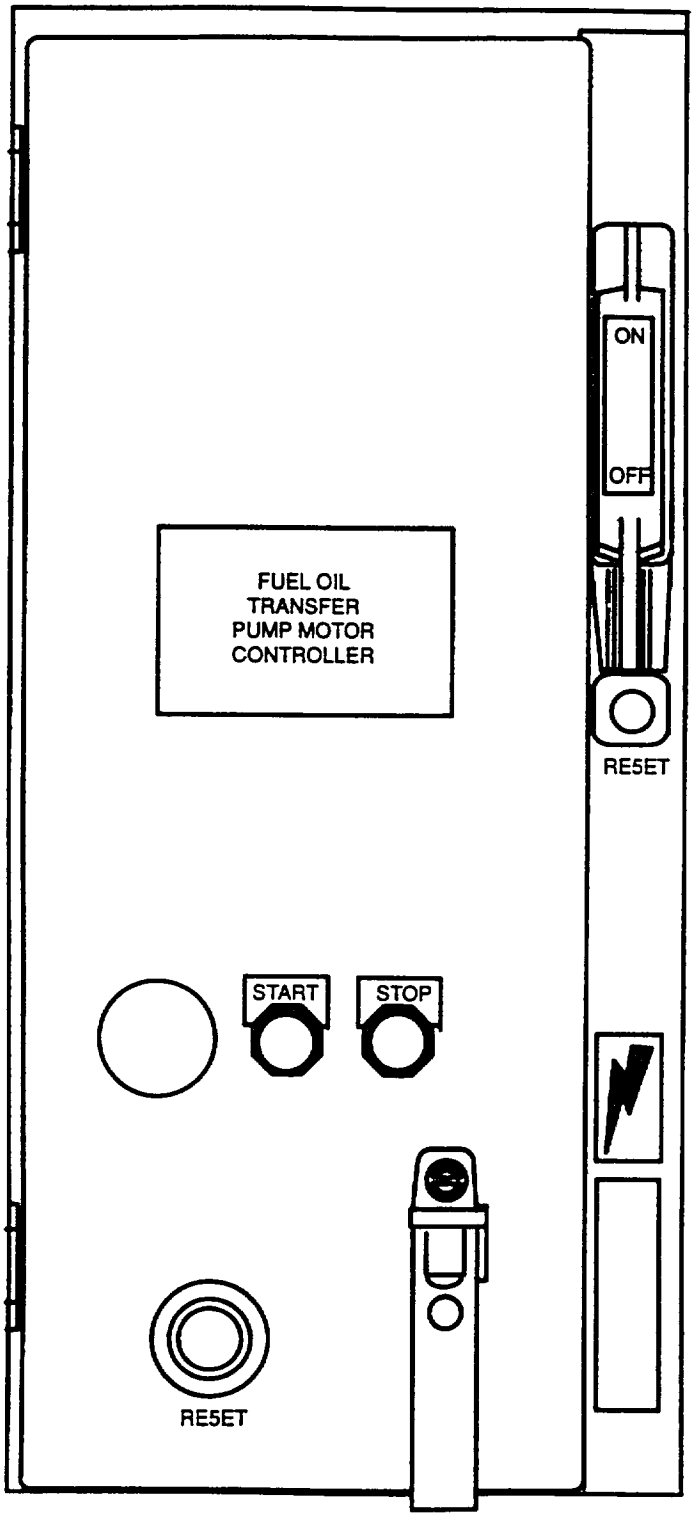
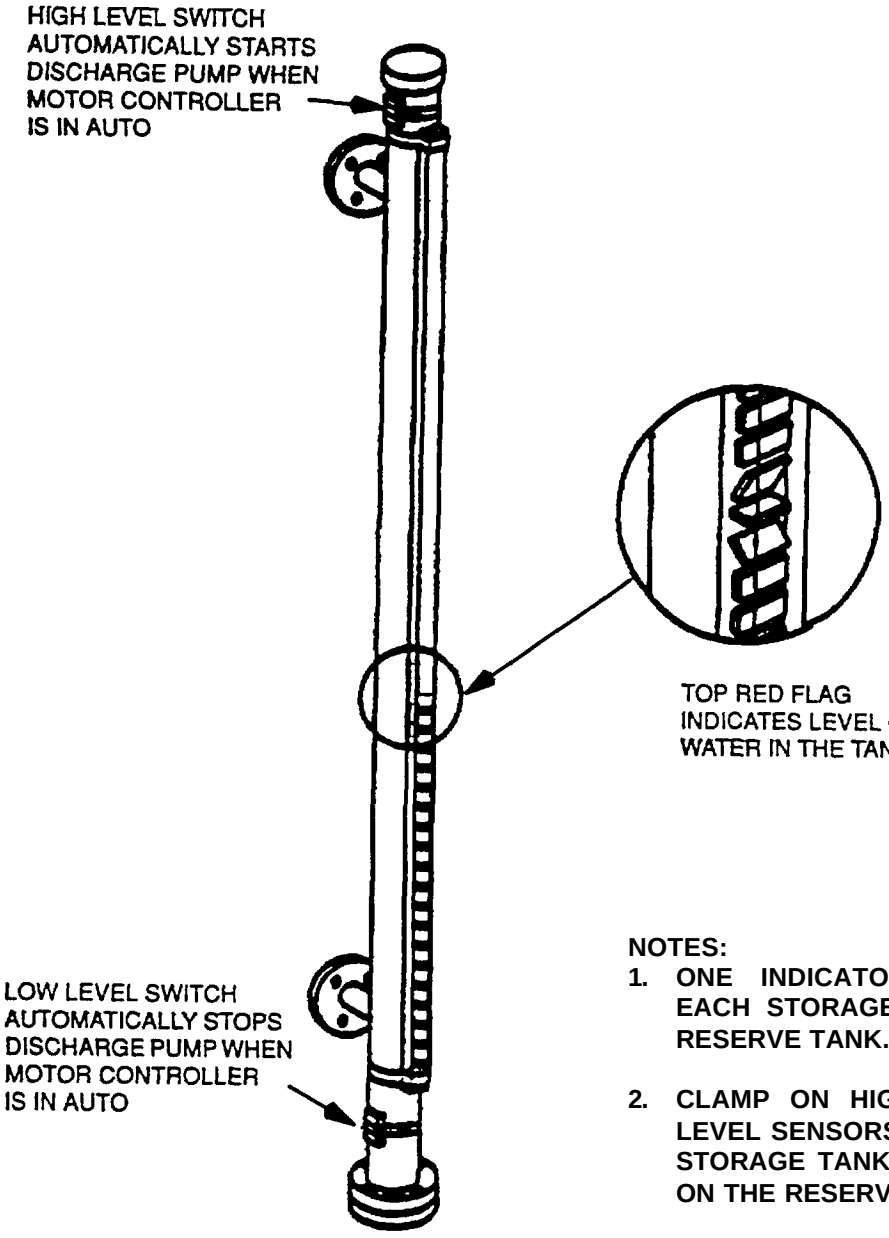


Figure 5-3. Bilge Pump Motor Controller

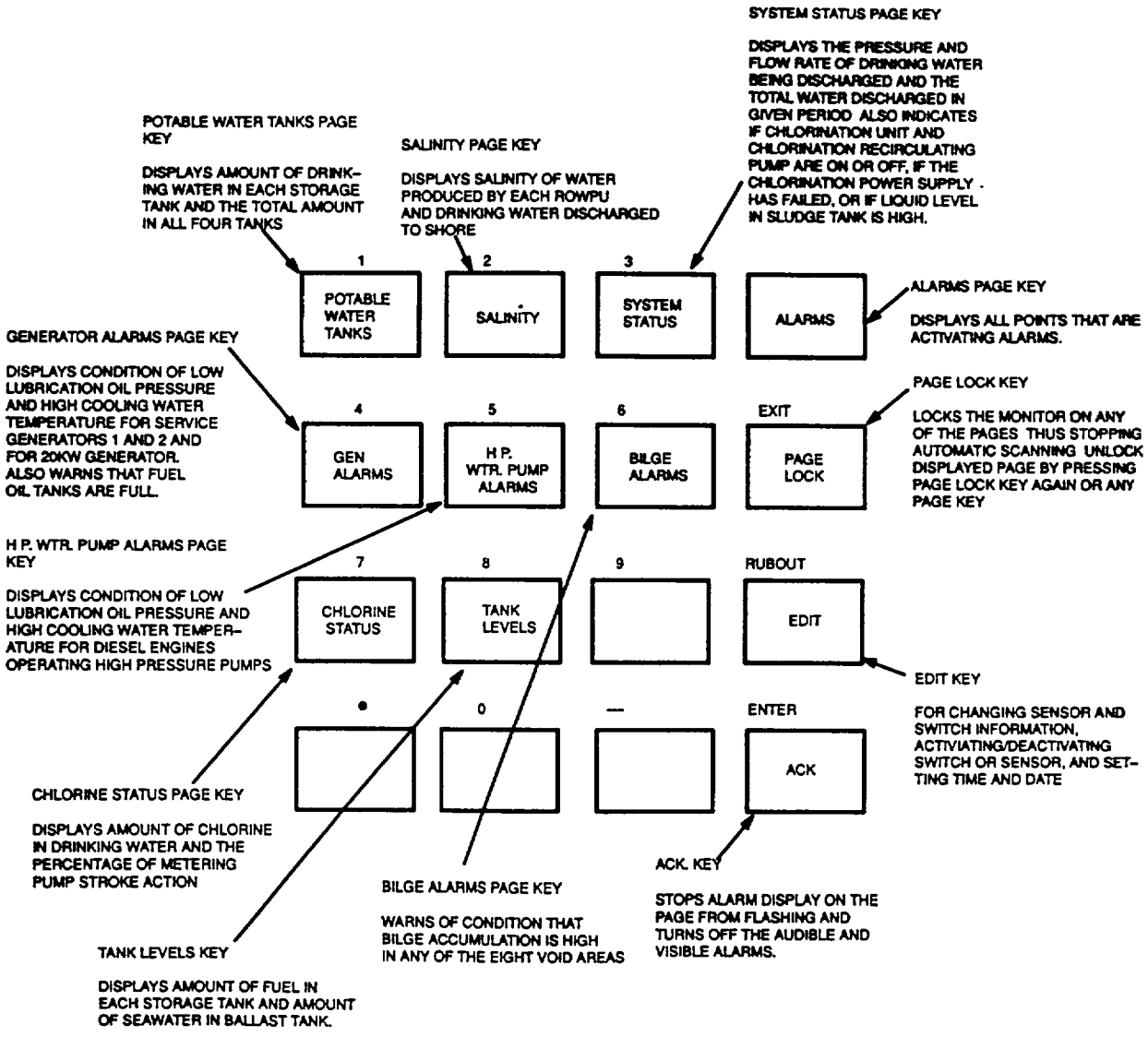


NOTES:

1. **ONE INDICATOR IS LOCATED ON EACH STORAGE TANK AND ON THE RESERVE TANK.**

2. **CLAMP ON HIGH AND LOW LIQUID LEVEL SENSORS ARE USED ON EACH STORAGE TANK, BUT ARE NOT USED ON THE RESERVE TANK.**

Figure 5-4. Tank Visual Level Indicator



NOTE,

ALL PAGE KEYS LIGHT WHEN PRESSED AND WILL FLASH RED WHEN ABNORMAL CONDITIONS EXIST.

Figure 5-5. EMS Bilge Alarms Page Key

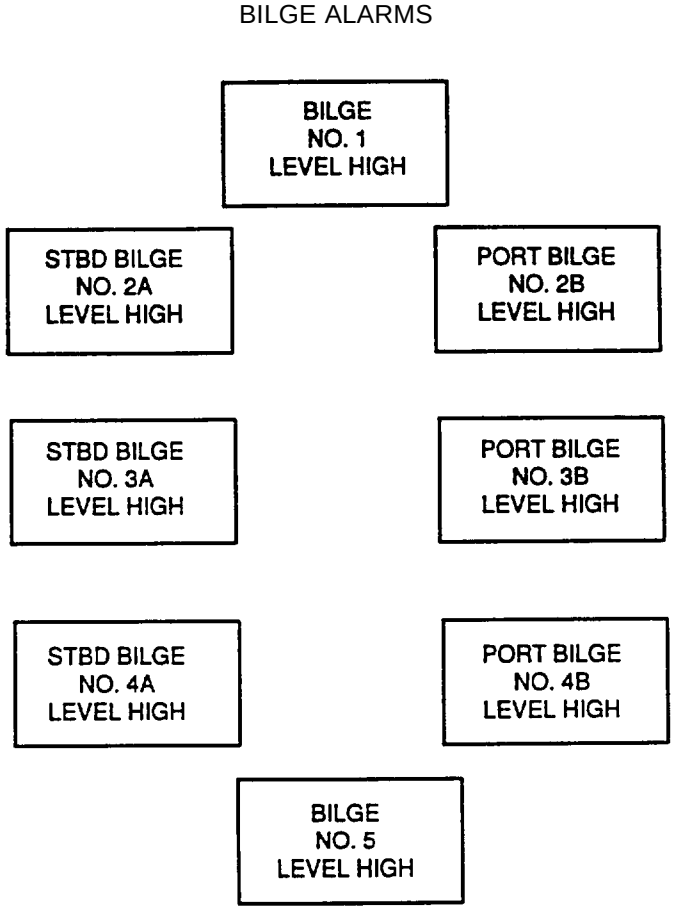


Figure 5-6. EMS Bilge Alarms Display Page

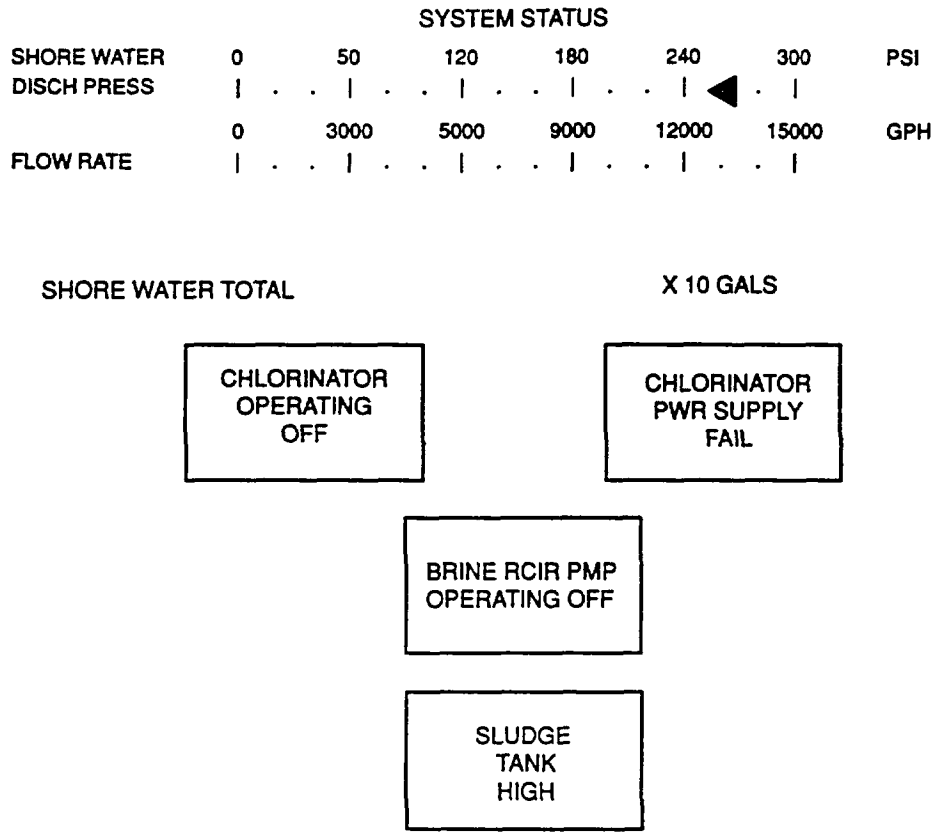
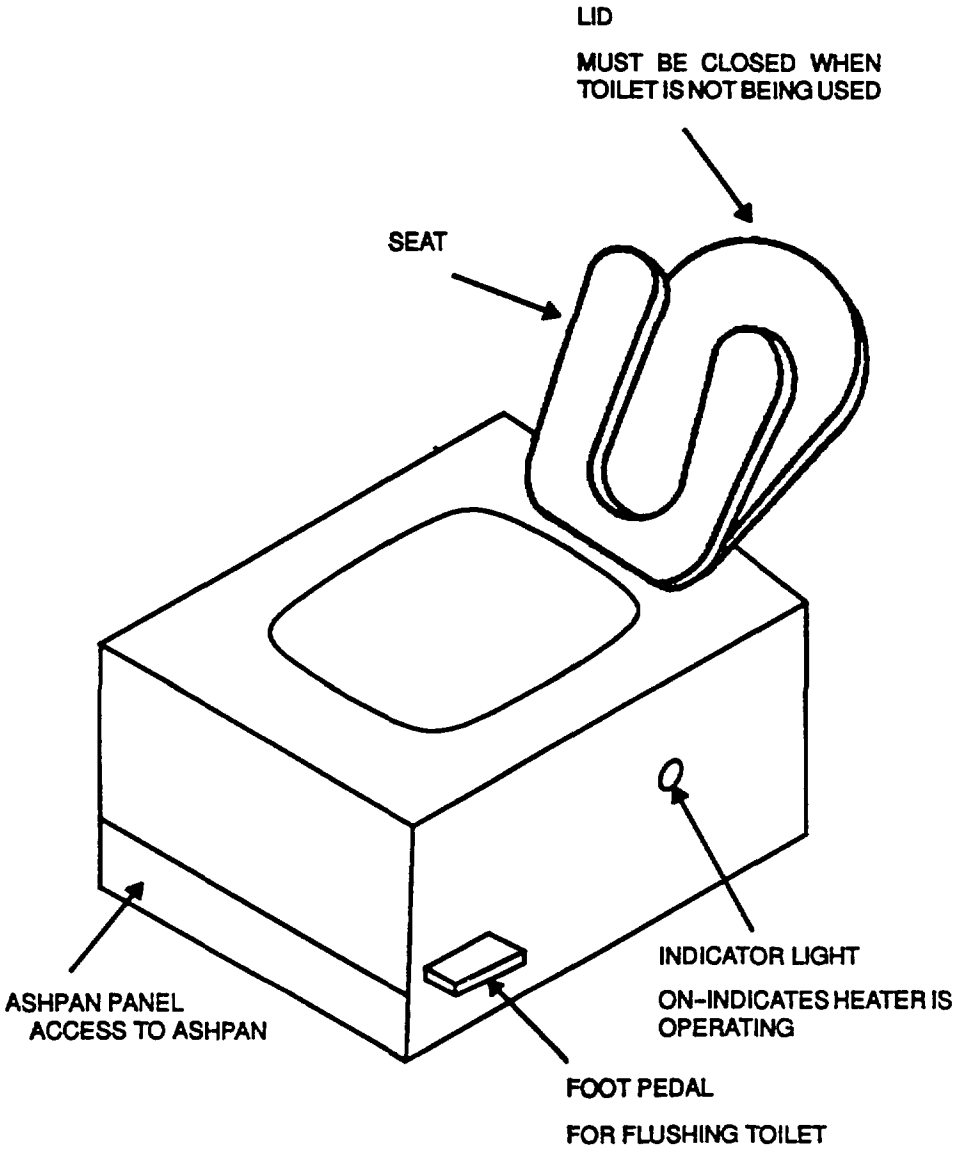


Figure 5-7. EMS System Status Display Page



NOTE:

ALWAYS KEEP LID CLOSED WHEN NOT IN USE. ALWAYS PLACE WAX LINER IN BOWL BEFORE USING. ONLY FLUSH TOILET PAPER AND WAX LINER. THE TOILET CAN BE USED AT ANY TIME EVEN WHILE INCINERATING.

Figure 5-8. Ship's toilets

5-9 Prestart procedures

5-9.1 Ship's toilets. Perform following prestart procedures before operating either of the incinerating toilets:

CAUTION
Do not use toilet when Incinerator Is full. Always keep lid closed when toilet not In use to prevent anything from dropping Into toilet.

a. Make sure power panel 3 circuit breaker 5P13 for forward toilet or 4P13 for aft toilet is closed (ON).

b. Place waxpaper liner in bowl before using toilet

5-9.2 Bilge system. Perform following prestart procedures before operating bilge pump:

WARNING
Maritime regulations prohibit discharge of oil and fuel Into navigable waters. f, by accident or In emergency, discharge oil and fuel are spilled into navigable waters, Immediately notify US Coast Guard (USCG) It In the United States or local authority if In foreign waters.

a. Check liquid level in sludge tank by checking liquid level indicator. If nearly full, drain sludge tank to sludge facility as directed in paragraph 5-10.2.3.

b. Make sure EMS is on and sludge tank level and bilge levels are being monitored.

c. Clean strainer basket if necessary.

d. Make sure valve BD8 is closed.

e. Make sure power panel 1 circuit breaker 12P5 is closed (ON).

5-10 Operating procedures

5-10.1 Ship's toilets

CAUTION
Always place bowl liner In toilet before each use.

a. Place bowl liner in toilet.

b. Deposit waste on liner.

NOTE
Blower is on during Incineration cycle plus another 45 minutes until system cools.

c. Step on foot pedal to start incineration cycle.

5-10.2 Bilge system

a. Operational procedures requiring bilge pump operation include;

(1)Transferring bilge water from voids to sludge tank in paragraph 5-10.2.1.

(2)Bilge transfer to offboard sludge facility in paragraph 5-10.2.2.

(3)Sludge tank draining to sludge facility in paragraph 5-10.2.3.

(4)Draining diesel generator crankcase oil using bilge pump in paragraph 5-10.2.4.

(5)Draining ROWPU 1 and 2 HP pump diesel engine crankcase oil using bilge pump in paragraph 5-10.2.5.

(6)Transferring bilge water from void to void in paragraph 5-10.2.6.

(7)Manual draining of spillage catchments located beneath fuel oil fill station on weatherdeck starboard, deckhouse top fuel oil port and starboard storage tanks and day tank vents, and void 4 SSG and SAG's must be performed by the crew when required. This drain procedure is in paragraph 5-10.2.6.

b. Gravity draining functions that do not require any effort by the crew are:

(1) Nonoily liquid gravity draining from air compressor spillage catchment drain in ROWPU space, two ROWPU spillage catchment port drains in ROWPU space, and forward toilet deck drain in ROWPU space to aft void 2 port shell overboard discharge.

(2) Nonoily liquid gravity draining from heating and air conditioning unit in workshop, drinking water fountain in dayroom, and sink in dayroom to forward void 2 starboard shell overboard discharge.

(3) Nonoily liquid gravity draining from two ROWPU spillage catchment starboard drains and forward starboard deck drain to void 2 starboard overboard discharge.

(4) Oil containing liquid gravity draining -from two ROWPU HP pump spillage catchment drains and fuel oil day tank spillage catchment drain to sludge tank.

5-10.2.1 Transferring bilge water from voids to sludge tank

NOTE

When audible and visual alarms are activated and EMS BILGE ALARMS display page (Figure 5-6) Indicate which void must be drained. When alarms are activated, turn off alarms according to TM 55-1930-209-14&P-11.

a. At void bilge to be drained, connect 25-foot suction hose with foot valve to quick disconnect coupling on bilge suction line and lower foot valve into bilge.

b. Open bilge drain (BD) valve listed below for bilge to be drained. Make sure all others are closed.

Bilge to be drained	Void 1	Void 2 port	Void 2 stbd	Void 3 port	Void 3 stbd	Void 4 port	Void 4 stbd	Void 5
Open valve no.:	6	4	5	3	9	2	10	1

c. Open valves BD7 and BD11. Close valve BD8.

d. On bilge pump motor controller, push main switch ON and press START button.

CAUTION

If monitoring system alarm sounds during operation, sludge tank is full. Bilge pump must be stopped immediately.

e. When bilge is empty, stop bilge pump by pressing STOP button on motor controller.

f. Close valve opened in step b above and disconnect suction hose.

g. Repeat steps a thru f until all bilges are drained.

WARNING
Immediately clean up any spills on decks.

h. Close valve BD11.

5-10.2.2 Transferring void bilge water to sludge facility

WARNING

USCG regulations prohibit discharge of oil, fuel or chemically contaminated water upon the navigable waters and contiguous zones of the United States. If such a discharge causes a film or sheen upon or discoloration on the surface of the water or causes a sludge or emulsion beneath the surface of the water, the USCG must be notified by telephone or radio as soon as contamination takes place. As soon as steps have been taken to stop spillage, the USCG must be contacted again. Anyone violating these regulations is subject to a fine.

a. At bilge to be drained, connect 25-foot suction hose with foot valve to coupling on bilge suction line and lower foot valve into bilge.

b. Open BD valve listed below for bilge to be drained. Make sure all others are dosed.

Bilge to be drained	Void 1	Void 2 port	Void 2 stbd	Void 3 port	Void 3 stbd	Void 4 port	Void 4 stbd	Void 5
Open valve no.:	6	4	5	3	9	2	10	1

c. Connect discharge hose from offboard sludge facility to coupling at valve BD14.

d. Make sure that other end of hose is in sludge disposal facility.

e. Open or close BD valves as follows:

o = open x = closed

BD valve no.	7	8	11	14
Valve position	x	x	o	o

f. On bilge pump motor controller, push main switch ON and press START button.

g. When bilge is empty, stop bilge pump by pressing STOP button on motor controller.

h. Close valve opened in step b above and disconnect suction hose.

i. Repeat steps a, b, f, g and h until all bilges are empty.

WARNING
Immediately clean up any spills on deck.

J. Close valves BD11 and BD14.

k. Disconnect discharge hose at valve BD14 and return to offboard sludge facility.

5-10.2.3 Sludge tank draining to offboard sludge facility.

a. Get discharge hose from off board sludge facility and connect to valve BD14.

b. Place discharge end of hose in sludge disposal facility.

c. Open or close bilge drain valves as follows:

o = open x = closed

BD. valve no.	7	8	11	14
Valve position	x	o	x	o

d. On pump motor controller, push main switch to ON and press START button.

e. When liquid level indicator shows that sludge tank is empty, press STOP button on motor controller.

f. Close valves BD8 and BD14.

g. Disconnect discharge hose from coupling at valve BD14 and return to offboard sludge facility.

WARNING
Immediately clean up any spills on deck.

5-10.2.4 Draining diesel generator crankcase oil using bilge pump

a. Get utility hose from hose rack in void 5.

b. Disconnect crankcase drain valve and void suction valve quick disconnect couplings for generator listed below.

SSG 1 (155 kW), portside aft	SSG 2 (155 kW), starboard aft	SAG (20 kW), starboard aft
BD16 and BD2	BD17 and BD10	BD18 and BD10

c. Connect utility hose to both valve quick disconnects.

d. Open valves after hose is connected.

e. Start bilge pump by pushing START button on bilge pump motor controller.

f. As soon as bilge pump starts, check hose connections.

g. Drain until crankcase is empty and stop pump by pushing STOP button on motor controller.

h. Close valves opened in step b.

i. Disconnect hose and replace caps on quick disconnect couplings.

j. Flush hose clean and return to hose rack in void 5.

k. Clean up spills. If leaking, stop pump by pushing STOP button on motor controller, reconnect hose and restart pump.

5-10.2.5 Draining ROWPU HP pump crankcase using bilge pump

a. On Barge 1, proceed as follows:

(1) Open crankcase drain valve BD12 to drain ROWPU 1 crankcase or BD13 to drain ROWPU 2 crankcase.

b. On Barges 2 and 3, proceed as follows:

(1) Get utility hose from rack in void 5.

(2) Remove cap off of ROWPU 1 crankcase drain valve BD12 or ROWPU 2 crankcase drain valve BD13 and drain to sludge tank valve BD19.

(3) Connect utility hose to both valve quick disconnects.

(4) Open valves after hose is connected.

c. Start bilge pump by pushing START button on bilge pump motor controller.

d. As soon as bilge pump starts, check hose connection for leaks. If leaking, stop pump by pushing STOP button on motor controller, reconnect hose and restart pump.

e. Drain until crankcase is empty and stop pump by pushing STOP button on motor controller.

f. Close valves opened in steps a and b.

g. On Barges 2 and 3, disconnect hose and replace caps on quick disconnect couplings. Flush hose clean and return to hose rack in void 5.

h. Clean up spills.

5-10.2.6 Draining spillage catchments with ban valve

a. Place container under ball valve of spillage catchment listed below to be drained.
   (1) Fuel oil fill station on weatherdeck starboard.
   (2) Port or starboard fuel oil storage tank vent on deckhouse top.
   (3) Fuel oil day tank vent on deckhouse top.
   (4) SSG 1 in void 4 port.
   (5) SSG 2 in void 4 starboard.
   (6) SAG in void 4 starboard.
b. Open ball valve.
c. When draining completed, close ball valve.
d. Clean up spills.
e. Dump container liquid into ROWPU spillage catchment deck drain aft of ROWPU HP pump.

5-10.2.7 Transferring bilge water from void to void

NOTE

When sludge tank Is full and cannot be emptied and bilge water depth in void Is too high, transfer bilge water, when authorized by the bargemaster, to another void using PE-250 portable firefighting pump.

a. Remove PE-250 portable firefighting pump from stowed position in ROWPU space starboard near air compressor.
b. Connect hoses to pump and prepare pump for operation according to Navy technical manual NAVSEA S6225-EM-MMA-010/Model PE-250.
c. Open hatch to void to be emptied and hatch to void to which bilge water is to be transferred.
d. Take suction hose through hatch of void to be emptied and lay hose end in bilge water.
e. Take discharge hose through hatch of void to be filled and lay hose end in bilge.
f. Operate pump according to NAVSEA S6225-EM-MMA-010/Model PE-250.
g. After bilge water is transferred, flush pump and hoses with fresh water and perform after operation maintenance according to NAVSEA S6225-EM-MMA-010/Model PE-250.
h. Return pump and hoses to stowage areas.
i. Close hatches.

5-11 Shutdown procedures for bilge system

a. Push main switch on bilge pump motor controller OFF.
b. Stow suction hose.

5-11.1 Emergency shutdown. See paragraph 2-9.1 for information and procedures on emergency shutdown.

5-12 Operation under extreme conditions

a. Operation in extreme cold. Cold weather lubricants must be used.
b. Operation in extreme heat

(1) Lubricants. Hot weather lubricants must be used.

(2) Motors. Electric motors may have a tendency to run hot, and protective devices will stop the motor to prevent damage. When this happens, allow motor to cool and it will automatically restart.

Section III. Maintenance Instructions

5-13 General

5-13.1 Maintenance concept for sanitation systems

5-13.1.1 Unit level and IDS/IGS maintenance on sanitation systems is performed onboard by crewmembers whenever possible.

5-13.1.2 Any IDS/IGS maintenance beyond capability of crewmembers is provided by a shore-based area support maintenance unit. This unit also determines if depot support maintenance is required.

5-13.1.3 Intermediate support maintenance is accomplished by replacement of components or major end items.

5-13.1.4 Unless other intermediate support maintenance procedures are directed, IDS/IGS maintenance normally is provided by an Army Transportation Corps floating craft intermediate support maintenance unit serving terminal operating area. Components to be disposed of are processed by this unit.

5-13.1.5 MAC data is shown in Appendix C, TM 55-1930-209-14&P-18. For maintenance on other systems onboard, consult appropriate manuals.

5-14 Preventive maintenance checks and services. See TM 55-1930-209-14&P-15, Appendix C for preventive maintenance checks and services for the sanitation system. See TM 55-1930-209-14&P-19 for complete preventive maintenance checks and services for all systems on the ROWPU Barge.

5-15 Troubleshooting ship's sanitation systems

5-15.1 Ship's toilets. If toilet malfunctions, first make sure power panel 3 circuit breaker 5P 13 for forward toilet or 4P13 for aft toilet is closed (ON). Then troubleshoot according to troubleshooting Table on page 7 of Installation Operation Maintenance: Model WB/TR-111 in Appendix B.

5-15.2 Bilge system. Troubleshoot bilge system according to Table 5-3.

5-16 Maintenance procedures

5-16.1 General. Maintenance for these systems consists of disassembling, repairing/replacing, and reassembling items listed In the Repair Parts and Special Tools List in Appendix G in TM 55-1930-209-14&P-18. When performing maintenance, be sure to observe precautions in this manual, manufacturers' manuals and instructions, and the following professional shop practices.

a. Always use new seals and gaskets, same as original, before reassembling components that have been disassembled for repair. Carefully install so as not to damage during assembly.

b. When replacing gaskets, make sure mating surfaces are clean and free of old gasket material, adhesive, oil, or grease. These precautions will ensure a leak-proof joint.

c. When replacing O-rings, make sure all surfaces are clean and free of dirt, grit, or foreign material. Prior to installation, apply a thin coat of silicone grease to O-ring for ease of assembly. Protect O-rings by applying tape over threads, sharp corners, and edges of components in which the O-ring will be placed.

d. When replacing electrical components, follow proper procedures for soldering or crimping connections. Check all grounding. Make sure current carrying members are properly insulated to avoid short-circuiting. Check for abrasions and chafing of insulation on wires and cables. Repair with tape or replace as necessary.

WARNING

Be sure electric power Is off when performing maintenance. Observe safety precautions in this manual and in manufacturer's manuals/instructions.

Table 5-3. Bilge System Troubleshooting

Condition	Possible Cause	Suggested Action
A. Transferring bilge water from voids to sludge tank.		
1. Void 1 bilge water not being transferred to sludge tank	a. Bilge pump circuit breaker 12P5 on power panel 1 open (OFF)	a. Close (ON) circuit breaker
	b. Pump motor controller off	b. Start pump
	c. Fuse in motor controller blown	c. Replace fuse
	d. Pump malfunctioning	d. Troubleshoot pump as given on page 2 Moyno SP Pumps of service manual in Appendix B
	e. Pump motor controller malfunctioning (loose wiring, broken connectors, etc.)	e. Troubleshoot controller as given in TM 55-1930-209-14&P-9
	f. Valve(s) BD6, BD7 and/or BD11 in Figure 5-2 closed	f. Open valve(s)
	g. Strainer clogged	g. Clean strainer basket
	h. Foot valve clogged	h. Clean foot valve
	i. Lines or hose clogged	i. Unclog lines or hose
2. Void 2 port bilge water not being transferred to sludge tank	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD4, BD7 and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h and i in Condition 1	c. See g, h and i in Condition 1
3. Void 2 starboard bilge water not being transferred to sludge tank	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD5, BD7 and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h, and i in Condition 1	c. See g, h, and i in Condition 1

Table 5-3. Bilge System Troubleshooting (continued)

Condition	Possible Cause	Suggested Action
4. Void 3 port bilge water not being transferred to sludge tank during draining operation	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD3, BD7 void and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h, and i in Condition 1	c. See g, h, and i in Condition 1
5. Void 3 bilge water not being transfered to sludge tank	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD7, BD9 and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h, and i in Condition 1	c. See g, h, and i in Condition 1
6. Void 4 port bilge water not being transferred to sludge tank	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD2, BD7 and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h, and in Condition 1	c. See g, h, and i in Condition 1
7. Void 4 starboard bilge water not being transferred to sludge tank	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD7, BD10 and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h, and i in Condition 1	c. See g, h, and i in Condition 1
8. Void 5 bilge water not being transfered to sludge tank	a. See a thru e in Condition 1	a. See a thru e in Condition 1
	b. Valve(s) BD1, BD7 and/or BD11 in Figure 5-2 closed	b. Open valve(s)
	c. See g, h, and i in Condition 1	c. See g, h, and i in Condition 1

Table 5-3. Bilge System Troubleshooting (continued)

Condition	Possible Cause	Suggested Action
B. Transferring void bilge water to offboard sludge facility		
1. Void 1 bilge water not being transfer-fed to offboard sludge facility	a. See a thru i in Condition A1	a. See a thru i in Condition A1
2. Void 2 thru 5 bilge water not being transferred to offboard sludge facility	a. See a thru c in Condition A2 thru A8 as appropriate	a. See a thru c in Condition A2 thru A8 as appropriate
C. Sludge tank draining to offboard sludge facility		
1. Sludge tank not being emptied	a. See a thru e in Condition A1	a. See a thru e in Condition A1
	b. Valve(s) BD8, BD11 and/or BD14 in Figure 5-2 closed	b. Open valve(s)
	c. Valve BD7 open	c. Close valve
	d. Strainer clogged	d. Clean strainer basket
	e. Lines clogged	e. Unclog lines
D. Draining diesel generator crankcase oil using bilge pump		
1. Crankcase oil not draining from SSG 1	a. See a thru e in Condition A1	a. See a thru e in Condition A1
	b. Valve(s) BD2, BD7 BD11 and/or BD16 closed	b. Open valve(s)
	c. Strainer clogged	c. Clean strainer basket
	d. Lines clogged	d. Unclog lines
2. Crankcase oil not draining from SSG 2	a. See a thru e in Condition A1	a. See a thru e in Condition A1
	b. Valve(s) BD7, BD10, BD11 and/or BD17 closed	b. Open valve(s)
	c. Strainer clogged	c. Clean strainer basket
	d. Lines clogged	d. Unclog lines
3. Crankcase oil not draining from SAG	a. See a thru e in Condition A1	a. See a thru e in Condition A1
	b. Valve(s) BD7, BD10, BD11 and/or BD18 closed	b. Open Valve(s)
	c. Strainer clogged	c. Clean strainer basket
	d. Lines clogged	d. Unclog lines

Table 5-3. Bilge System Troubleshooting (continued)

Condition	Possible Cause	Suggested Action
E. Draining ROWPU HP pump crankcase using bilge pump		
1. Crankcase oil not draining from ROWPU I HP pump	a. See a thru e in Condition A1	a. See a thru e in Condition A1
	b. Valve(s) BD7, BD11, BD12 and/or BD19 closed	b. Open valve(s)
	c. Strainer clogged	c. Clean strainer basket
	d. Lines clogged	d. Unclog lines
2. Crankcase oil not draining from ROWPU 2 HP pump	a. See a thru e in Condition A1	a. See a thru e in Condition A1
	b. Valve(s) BD7, BD11, BD13 and/or BD19 closed	b. Open valve(s)
	c. Strainer clogged	c. Clean strainer basket
	d. Lines clogged	d. Unclog lines
F. Transferring bilge water from void to void		
1. Bilge water not being transferred	a. See Table 5-1 in NAVSEA S6225-EM-MMA- 010/Model PE-250	a. See Table 5-1 in NAVSEA S6225-EM-MMA-010/Model PE-250
G. Nonoily liquid gravity draining through overboard discharge		
1. Air compressor spillage catchment drain, ROWPU spillage catchment two port forward drains, and/or toilet deck drain not draining through port shell overboard discharge	a. Drains clogged	a. Clean drains
	b. Drain lines clogged	b. Unclog drain lines
2. Heating and air conditioning unit, drinking water fountain and/or sink not draining through forward starboard shell void 2 overboard discharge	a. Valve BD15 closed	a. Open valve
	b. Drains clogged	b. Clean drains
	c. Drain lines clogged	c. Unclog drain lines

Table 5-3. Bilge System Troubleshooting (continued)

Condition	Possible Cause	Suggested Action
3. Forward starboard deck drain and/or ROWPU spillage catchment two starboard forward drains not draining through aft starboard shell void 2 overboard discharge	a. Drains clogged	a. Clean drains
	b. Drain lines clogged	b. Unclog drains
H. Oily liquid gravity draining to sludge tank		
1. ROWPU spillage catchment aft port and/or starboard and/or day tank spillage catchment drains not draining to sludge tank	a. Drains clogged	a. Clean drains
	b. Drain lines clogged	b. Unclog drains

5-16.2 Ship's toilet repair

WARNING
Be sure electrical power is shut off before performing maintenance on ship's toilet.
Be sure toilet is cool before making repairs.

a. Open (OFF) power panel 3 circuit breaker 5P13 for forward toilet or 4P13 for aft toilet. Redtag circuit breaker with:

"WARNING - DO NOT ACTIVATE. REPAIRS BEING MADE."

b. Remove and clean ashpan.
c. Remove top and bowl section to gain access to electrical control box. Remove control box cover.
d. Replace following, when necessary, according to Installation Operation Maintenance: Model WB/TR-111 manual in Appendix B.
   (1) Heater
   (2) Control thermostat
   (3) Safety thermostat
   (4) Catalyst
   (5) Indicator light
e. Upon completion of repair, install electrical control box cover.
f. Install bowl and top sections.

g. Install ashpan.
h. Close (ON) power panel 3 circuit breaker 5P13 for forward toilet or 4P13 for aft toilet tagged in step a.
i. Remove red tag.
j. Check toilet for normal operation. Troubleshoot according to paragraph 5-15.1 if necessary.

5-16.3 Bilge system repair

WARNING

Be sure electrical power Is off before performing maintenance on bilge pump. Be sure pump Is cool before making repairs.

5-16.3.1 Bilge pump repair

a. Open (OFF) power panel 1 circuit breaker 12P5. Redtag circuit breaker “REPAIRS BEING MADE - DO NOT ACTIVATE."
b. Close valves BD7, BD11 and BD14 (Figure 5-2).
c. Place container under piping and disconnect piping.
d. Disassemble, repair, and reassemble pump according to Moyno SP Pumps Service Manual in Appendix B. Repair parts are listed in Appendix G.
e. Connect piping.
f. Remove red tag warning and close (ON) power panel 1 bilge pump circuit breaker 12P5.
g. Start and check that pump operates normally.
h. Record repair in maintenance logbook.
i. Dump liquid in container into aft drain in ROWPU spillage catchment.

5-16.3.2 Strainer basket cleaning or replacement

a. Loosen yoke screw until yoke swings free.
b. Pull basket handle straight up to remove basket. Go to step c to clean basket or to step d to install new basket.

CAUTION

Do NOT have basket well open for more than 10 minutes. Diverter plug does not completely cut off water and water will seep Into open well.

c. Clean basket as follows:
   (1) On weatherdeck, clean basket with soft brush and flush with drinking water.
   (2) Use compressed air to dislodge difficult particles.
   (3) Flush with drinking water.
   (4) Wipe interior of basket with clean cloth before replacing basket.

CAUTION

Do NOT use any petroleum based products to clean basket. Be careful not to damage basket. Do not use wire brush.

d. Lower basket into well.
e. Swing yoke over basket well until end fits over stud.
f. Check O-rings on cover. Replace if damaged.
g. Be sure O-rings on cover rest in machined grooves before tightening yoke screw securely. Do NOT overtighten.

5-16.3.3 Valve replacement. Replace or repair worn or damaged valve in accordance with TM 55-507.

Section IV. Storage

5-17 Short-term storage. If barge is taken out of service for more than 7 days but less than 30 days, follow shutdown procedures below. Inspect for damage, corrosion, and pilferage.

5-17.1 Ship's toilet

a. Dispose of ashes and wipe ashpan clean.
b. Clean bowl section with a mild soap.
c. Wipe entire unit clean.
d. Close bowl lid.
e. Open power panel 3 circuit breakers 5P13 for forward toilet or 4P13 for aft toilet.

NOTE
Valve numbers are the same as In Figure 5-2.

5-17.2 Bilge system

a. Perform after operation preventive maintenance procedures in Appendix C.
b. Open (OFF) bilge pump power panel 1 circuit breaker 12P5.
c. Make sure valves BD7, BD8, and BD11 are closed.

5-18 Administrative storage. If barge is taken out of service for more than 30 days but less than 6 months, barge remains a unit responsibility and shall be maintained by unit personnel. Perform periodic inspections and services according to Appendix C.

5-18.1 Ship's toilet. If not used in administrative storage, process as specified in paragraph 5-18.1.1 and inspect according to paragraph 5-18.1.2.

5-18.1.1 Storage

a. Perform steps a thru e in paragraph 5-17.1.
b. Clean ventline elbow.
c. Clean blower housing and wheels.
d. Secure door.

5-18.1.2 Inspection. If not used during storage, inspect at least every 30 days. Check for corrosion, damage, and pilferage.

5-18.2 Bilge system. If not used in administrative storage, process and inspect.

NOTE
Valve numbers are the same as callouts in Figure 5-2.

5-18.2.1 Storage

a. Perform after operation preventive maintenance checks.
b. Perform the following when authorized by bargemaster:
   (1) Drain sludge tank.
   (2) Drain spillage catchments beneath fuel oil fill station on weatherdeck starboard, deckhouse top fuel oil port and starboard storage tank and day tank vents, and void 4 ship service and ship auxiliary generators.
   (3) Drain bilge pumps and all piping by opening lines at lowest point. Be sure to provide pans where necessary before opening line.
   (4) Cap off tank vent.
c. Open (OFF) bilge pump power panel 1 circuit breaker 12P5.
d. Remove and clean strainer basket. Install cleaned or new basket.
e. Clean fuel transfer pump's painted metal surfaces with a clean, lint-free cloth moistened with cleaning solvent (P-D-600, Type II). Scrub off hard deposits with a bristle brush dipped in solvent. Dry surfaces with a clean, lint-free cloth.
f. Clean sludge tank liquid level indicators with a clean, lint-free cloth.
g. Thoroughly clean all other external surfaces including spillage catchments to remove any corrosion or other foreign matter. Remove any corrosion by wire brushing or sanding. Clean all surfaces except electrical parts with soapy water and stiff bristle brush, then flush with clean water. Clean fuel transfer pump motor starter by wiping with a clean cloth moistened with silicone spray lubricant or similar substance.
h. Touch up paint as necessary to prevent further corrosion; match surrounding areas in accordance with TB 4-0144. Do not paint threads or label plates.

5-18.2.2 Inspection. If not used during storage, inspect bilge system every 30 days. Check for corrosion, damage, and pilferage. Correct as necessary.

5-19 Long-term storage. If barge is to be taken out of service for 6 months or more, turn it in to depot for preparation and placement into long-term storage. If barge is in administrative storage and is to be taken out of service and placed in depot long-term storage (6 months or more), process equipment for normal operations according to paragraph 5-19.1 or 5-19.2, before releasing to depot.

5-19.1 Ship's toilet

a. Perform before operation checks in Appendix C.
b. Check that toilet operates satisfactorily while performing procedure in paragraph 5-10.1.
c. Perform steps a thru e in paragraph 5-17.1.
d. Clean ventline elbow.
e. Clean blower housing and wheels.
f. After successful completion of inspection, release barge to depot for long-term storage.

5-19.2 Bilge system

a. Perform before operation checks in Appendix C.

b. Check that equipment operates satisfactorily while performing procedures in paragraphs 5-10.2.

c. Perform after operation checks in Appendix C.

d. Upon successful completion of operation, release barge to depot for long-term storage.

Section V. Manufacturers' service manuals/Instructions

5-20 General. Manufacturers' service manuals/instructions listed below provide additional information on the sanitation systems. A copy of each manual is in Appendix B. It may be necessary to refer to both these manuals/instructions and the drawings listed in Appendix A while performing the procedures in this volume.

Component	Document title	Manufacturer
Incinerating toilet	Installation Operation Maintenance: Model WB/TR-111	Research Products Blankenship Dallas, TX 75220 (215) 358-4238
Sludge tank air escape valve 1600T	Tank Air Escape Valve Model 1600	Robert H. Wager Co., Inc. Passaic Ave. Chatham, NJ 07928 (201) 635-9200
Strainer, simplex series # 72	Hayward Simplex Strainers, Model 72	Hayward Industrial Products, Inc. 900 Fairmount Ave. Elizabeth, NJ 07207
Bilge pump 35651	Service Manual, Moyno SP Pumps, Series 356 & 367, Motorized	Robbins-Myers Springfield, OH 45501 (800) 845-1310

Section VI. Manufacturers' warranties/guarantees

5-21 General. Information on the warranty/guarantee for bilge system components is provided below:

Component	Manufacturer	Duration	Coverage
Incinerating toilet WB/TR-111	Research Products Blankenship Dallas, TX 75220 (215) 358-4238	1 year for all components except heater for 6 months	Materials and workmanship
Sludge tank air escape valve 1600T	Robert H. Wager Co., Inc. Passaic Ave. Chatham, NJ 07928 (201) 635-9200.	1 year from date of ship-ment	Materials and workmanship
Bilge pump 35651	Robbins-Myers Springfield, OH 45501 (800) 845-3039	1 year from date of ship-ment	Materials and workmanship

CHAPTER 6 ADDITIONAL MISCELLANEOUS EQUIPMENT

Section I. Description and data

6-1 Description. Additional miscellaneous equipment installed onboard includes two eyewash stations, guard rails, permanent rubber fendering, removable rubber floor in ROWPU space, and storage areas located throughout the barge. Component identification labels, component functional labels, operational placards and notices, cautions, warnings, and danger signs are posted throughout the barge to aid the crew in operating the barge.

6-1.1 Eyewash stations. One eyewash station is in the ROWPU space on the port bulkhead forward near ROWPU 1 control station. Another eyewash station is in void 2 port near the chlorination unit. Eyewash stations are for immediate flushing of eyes when chemicals are accidentally splashed into the eye. Eyewash station installation is shown on drawings listed in Appendix A.

6-1.2 Guard rails. To prevent personnel from falling overboard, guard rails are located around the edge of the main deck and deckhouse top. Guard rails installation is shown on drawings listed in Appendix A.

6-1.3 Fendering system. To prevent damage to the barge when moored or from approaching vessels, fenders are installed on both sides of the barge. This rubberfendering, as installed on the barge, is shown on drawing listed in Appendix A.

6-1.4 Removable deck covering. To prevent accidental slipping due to wet deck in the ROWPU space, a removable vinyl deck covering is installed around the ROWPU installation. On Barges 2 and 3, each individual mat is labeled with a number for ease of reinstallation. When the mat is laid down, the mat label number must be opposite the matching structural label number. The removable rubber floor, as installed on the barge, is shown on drawing listed in Appendix A.

6-1.5 Storage areas. Storage areas for storing repair parts, consumables, hoses, etc., are located throughout the barge. Storage arrangement is shown on drawing listed in Appendix A.

6-1.6 Component identification and functional labels. Labels identifying components, such as COAGULANT PUMP, SEAWATER PUMP 1, OIL PRESSURE, START, STOP, are located throughout the barge to help the crew in locating, identifying and operating components. Labels, as installed (including location) on the barge, are shown on Drawing 13226E1893 listed in Appendix A.

6-1.7 Operational instruction placards. Operational instruction placards for the barge systems are located throughout the barge to help the crew operate the barge systems. Copies of these instructional placards, including location, are available on drawings listed in Appendix A.

6-1.8 Notice, caution, warning, and danger signs. These signs are posted throughout the barge to ensure crew safety and prevent damage to equipment. Signs, as installed, are shown on drawing listed in Appendix A.

6-2 Equipment specifications

a. Eyewash station

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	5388T65
Type	Portable, self-contained
Capacity	6 gal
Quantity	2

b. Guard rail

(1) Safety link snap

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	3933T18
Length	4 3/4 in.
Material	Steel
Quantity	18

(2) Wire rope

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	3447T43
Type	6x42, Fibercore
Size	3/8 in.
Material	Galvanized steel
Quantity	As required

(3) Shackle

Military Specification	MIL-S-24214
Type	Type II, Grade A, Class 2
Material	Galvanized steel
Size	1/4 in.
Quantity	6
Size	3/8 in.
Quantity	36
Size	1/2 in.
Quantity	18

(4) Jaw and eye turnbuckle

Federal specification	FF-T-791
Type	Type I, Class 8
Size	3/8 in.
Material	Galvanized steel
Quantity	30

(5) Wire rope thimble

Federal specification	FF-T-276
Type	Type II
Size	3/8 in.
Material	Galvanized steel
Quantity	42

(6) Pin

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	98404A150
Type	Self locking, quick release, ring grip
Material	Stainless steel
Quantity	19

c. Removable floor covering

(1) Unk matting

Manufacturer	Material Flow, Inc.
CAGEC	13171
Part no.	839450BK
Sizes	Quantity
3ft x 1 ft4in.	1
7ft x2ft	2
8 ft x1 ft 6 in.	1
8ft x2ft	1
9ft x2ft	1
9ft x3ft	1
10ft x2ft	4
11ft x2ft	1
12ft x2ft	1
Material	Vinyl

(2) Unk matting

Manufacturer	Material Flow, Inc.
CAGEC	13171
Part no.	839451BK
Sizes	Quantity
7ftx3ft	1
8ftx3ft	2
11ftx3ft	1
13ftx3ft	1
15ftx3ft	1

d. Storage area

(1) Strap assembly

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	3722T27
Size	A = 72 in., B = 30 in., 2 in. W w/NAR hooks and 3722T21 buckle
Quantity	22

(2) Strap assembly

Supplier	McMaster-Carr Supply Co.
CAGEC	39428
Part no.	3722T27
Size	A = 18 ft, B =2 ft 2 in. W w/NAR hooks and 3722T21 buckle

6-3 Items furnished

6-3.1 Components installed as part of the workshop equipment are listed on the parts list of drawings referenced in Appendix A of this TM and in the Components of End Item List in Appendix F in TM 55-1930-209-14&P-18.

6-3.2 Common and bulk items onboard are listed in the Expendable Supplies and Materials List in Appendix E in TM 55-1930-209-14&P-18.

6-3.3 Repair parts and special tools onboard are listed in the Repair Parts and Special Tools List in Appendix G in TM 55-1930-209-14&P-1 8.

6-4 Items required but not furnished. All required items are furnished.

6-5 Tools and test equipment. Use existing tools and equipment onboard. A complete list of tools and test equipment onboard is in the Tools and Test Equipment List in Appendix D in TM 55- 1930-209-14&P-18.

Section II. Operating Instructions

6-6 Eyewash station. Use eyewash station as given on the procedures attached to the station.

6-7 Removable floor. When reinstalling each mat, make sure numbered label on mat and on structure are opposite each other.

6-8 Storage areas. Always return items to the designated storage area. Refer to the onboard storage plan when in doubt as to where item should be stored. Storage area letter designations, locations, and types are listed below:

Storage Area	Location	Type
A (Workshop)	Inboard bulkhead	Shelving
B (ROWPU space)	Aft	Shelving and open storage area in caged area, including rack for storing ROWPU media filter hoisting rig
C (Void 2 port)	Forward bulkhead, aft bulkhead and aft of chlorination unit	Drum storage racks
D (Void 3 starboard)	Aft	Storage rack and open space in caged area
E (Void 4 starboard)	Forward bulkhead	Drum storage rack
F (Void 4 port)	Shell	Drum storage rack
G (Void 5)	Aft	Storage rack
H (Void 1)	Starboard	Storage rack for storing two diesel engine mufflers and open storage area
I (Void 2 starboard)	Shell	Drum storage rack

6-9 Operation under extreme conditions. During freezing temperatures, drain eyewash stations in ROWPU space and void 2 port.

Section III. Maintenance instructions

6-10 General

6-10.1 Maintenance concept

6-10.1.1 Unit level and IDS/IGS maintenance on dayroom equipment is performed onboard by barge crewmembers whenever possible.

6-10.1.2 Any IDS/IGS maintenance beyond capability of crewmembers is provided by a shore-based area support maintenance unit. This unit also determines if depot support maintenance is required.

6-10.1.3 Intermediate support maintenance is accomplished by replacement of components or major end items.

6-10.1.4 Unless other intermediate support procedures are directed, IDS/IGS maintenance normally is provided by an Army Transportation Corps floating craft intermediate support maintenance unit serving terminal operating area. Components to be disposed of are processed by this unit.

6-10.1.5 MAC data is shown in Appendix C, TM 55-1930-209-14&P-18. For maintenance of other equipment onboard, consult appropriate manual.

6-10.2 Maintenance procedures. Maintenance procedures are presented in the paragraphs that follow: Appendix NO TAG, Preventive maintenance.

6-11 Preventive maintenance checks and services. See TM 55-1930-209-14&P-15, Appendix NO TAG for preventive maintenance checks and services for Miscellaneous equipment. See TM 55-1930-209-14&P-19 for complete preventive maintenance checks and services for all systems on the ROWPU Barge.

Section IV. Storage

6-12 Short-term storage. If the barge is to be taken out of service for more than 7 days but less than 30 days, empty eyewash stations. Return parts to storage. Inventory stored items and provide list to bargemaster. Check for damage, corrosion or pilferage weekly. Repair as necessary.

6-13 Administrative storage. If barge is to be taken out of service for more than 30 days but less than 6 months, barge remains a unit responsibility and shall be maintained by unit personnel. Prepare for storage as given in paragraph 6-12. Check for damage, corrosion, and pilferage at least monthly. Repair as necessary.

6-14 Long-term storage. If barge is to be taken out of service for 6 months or more, turn it in to depot for preparation and placement into long-term storage. If barge is in administrative storage and is to be taken out of service and placed in depot long-term storage (6 months or more), process dayroom equipment as given in paragraph 6-12 before releasing to depot.

APPENDIX A

REFERENCES

A-1 Drawings

US Army Belvoir Research, Development and Engineering Center (97403)

13226E1892	ROWPU/Barge Arrangement
13226E1893	List of Label Plates
13226E1895	Placard, Operational Instruction, Fuel System
13226E1897	Placard, Operational Instruction, Drinking Water System
13226E1899	Placard, Operational Instruction, Seawater System
13226E1900	ROWPU Installation
13226E1902	Accesses to Voids and Ladders
13226E1904	Placard, Operational Instruction, ROWPU
13226E1905	Mooring System
13226E1906	Deck House
13226E1909	Guard Rails
13226E1910	Dayroom and Work shop Structure
13226E1911	Generators Cooling System
13226E1912	Bilge System and Drains
13226E1913	Placard, Operational Instruction, Bilge System and Drains
13226E1914	Miscellaneous Foundations
13226E1915	Life Saving Fire Extinguishing Equipment
13226E1916	Spillage Catchments
13226E1917	Bridge Crane System
13226E1918	Towing Arrangement
13226E1919	Ship Toilet
13226E1921	Placard, Operational Instruction, Compressed Air System
13226E1922	Diesel Generators and Foundations
13226E1923	Chlorination System
13226E1924	Crane and Personnel Boat Foundation
13226E1925	Storage Arrangement
13226E1928	Alarm/Casualty Monitoring System
13226E1929	Shore Discharge Hose Reel Installation
13226E1930	Dayroom and Workshop Arrangement
13226E1931	Heating and Air Conditioning, Dayroom and Workshop
13226E1932	Electrical Power Schematic Diagram
13226E1933	Communication System
13226E1935	Electrical Power System Layout
13226E1941	Placard, Operational Instruction, Chlorination System
13226E1942	Ballast System
13226E1946	Removable Floor Covering
13226E1950	Fendering System
13226E1951	Caution, Warming and Danger Signs

A-2 Demolition to Prevent Enemy Use

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use

A-3 Cleaning

Fed Spec P-D-680	Metal Cleaning Solvent for Army Use

A-4 Maintenance

DA PAM 738-750	The Army Maintenance Management System (TAMMS)
NAVSEA S6225-EM-MMA-010/MODEL PE-250	Installation, Operation, Maintenance and Repair Insurrections with Parts List: Portable Fire Fighting Service Gasoline Engine Driven Centrifugal Pump PE-250
TM 55-503	Marine Salvage and Hull Repair
TB 43-0144	Painting of Vessels

APPENDIX B

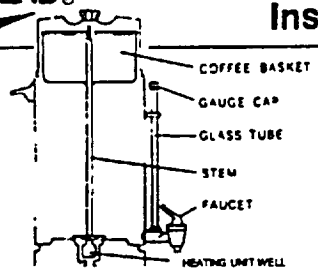
MANUFACTURERS' SERVICE MANUALS/INSTRUCTIONS

Component	Document Title	Manufacturer
Coffeemaker	Instruction for Use and Care	West Bend
No-Duet Range Hood	Owners Manual Service Parts List	Aubrey Manufacturing, Inc.
Electric Water Coolers	Service Manual	Haws Drinking Faucet Co.
Refrigerator (Model BR-1 6)	Instructions for the Installation, Operation, and Maintenance	Bailey Distributors, Inc.
Variable Speed Drill Press, 1'	Instruction Manual	Rockwell
Arbor Presses, Floor Models	Date Sheet No. 7-B	Famco Machine Division
Grinders	Instruction Manual	Baldor
Arc Welding Power Source, AC Motor Driven DC	Operating Manual IM-132-F	Lincoln Electric Co.
Electric Incinerating Disposal System	Installation, Operation, and Maintenance Manual	Research Products Blankenship
Tank Air Escape Valves	Model 1600	Robert H. Wager, Co.
SP Pumps	Service Manual	Robbins Myers
Strainers	Model 72	Hayward Industrial

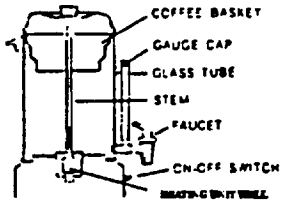
AUTOMATIC COFFEEMAKER

Instructions for Use and Care

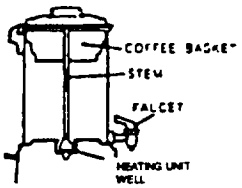
40 to 100-CUP Model No. 33600



25 to 55-CUP Model No. 13500



12 to 36-CUP Model No. 43536



INSTRUCTIONS FOR MAKING COFFEE

1. Before using the first time, dean coffeemaker thoroughly. Refer to **Regular Cleaning instructions** below.

DO NOT IMMERSE COFFEEMAKER IN WATER

2. Always use coffeemaker on a dry, level surface. Be sure hands are dry.

3. With basket and stem removed, fill coffeemaker with COLD water. Marks on inside of coffeemaker show water levels

4. Press stem into heating unit "well" in bottom of coffeemaker, put basket on stem; put electric perk grind coffee in basket. **Do not** let any coffee fall into stem. **Do not** use "drip" grind coffee. Follow proper chart below for amount to use. Spread evenly in basket (Use standard cup measures as used to measure flour, sugar to measure coffee)

100-cup Model

WATER LEVEL	MEASURE OF GROUND COFFEE	
	Strong	Mild
100 cups	10 cups	7 V2 cops
80 caps	8 caps	6 cups
60 caps	6 caps	4 1/2 cups
40 caps	4 cups	3 cups

Do not make less than 40 or more than 100 caps of coffee at one time.

56-cup Model

WATER LEVEL	MEASURE OF GROUND COFFEE	
	Strong	Mild
55 caps	6 cups	4 cups
45 caps	S cups	3 V1/4 cups
35 cups	3 1/4 cups	2 14 caps
25 cups	2 213 caps	2 ups

Do not make less than 25 or more than 55 cups of coffee at one time.

36- cap Model

WATER LEVEL	MEASURE OF GROUND COFFEE	
	Strong	Mild
36 cups	31/1 cups	2 cups
30 cups	21/4 cups	11/4 cups
24 cups	21/4 cups	11/2 cups
18 cups	11/4 cups 1	11/4 cups
18 cups	11/4 cups	1 cups

Do not make less than 12 or more than 36 cups of coffee at one time

5. Put cover on coffee maker and plug into 120 volt ac grounded electric outlet ONLY. Your coffeemaker has a short cord as a safety precaution If you must use an extension cod, be careful not to become entangled with the cord. The electrical rating of the extension cord should be the same or more than the wattage of the coffeemaker (wattage is stamped on coffeemaker base) This also applies when using an automatic timing device for the No 43536 12 to 36-Cup model Twist the "lock-on lid" in place on coffeemaker. To minimize coffee spills, especially if coffeemaker is accidentally tipped over, make sure cover has been turned clockwise until it is complete y locked into the slots. NOTE the arrows on the cover for correct turning. Care should still be used when moving the coffeemaker, as the lock-on lid temporarily prevents most coffee from spilling if perk is tipped over

6. The coffeemaker will stop perking automatically (Each cup requires no longer than t minute brewing time). Coffee is ready when light in base glows. Coffee will remain at serving temperature as long as coffeemaker is plugged in (and/or if switch is "ON"). Before serving use a hot pad to unlock (No. 43536) or remove cover, stem, and basket containing grounds. If not removed. bitter oils front the extracted grounds will drip into coffee. Replace cover. When replacing the lock-on lid on Model No 43536, again, make sure it is completely locked into the handle slots

7. For cup-on-saucer filling, press faucet handle down. Release handle when filled. For a continuous flow when filling a coffee server, lift handle straight up until it locks into open position. Lower handle when server is filled.

8. When about three cups of coffee remain in coffeemaker (or when coffee can no longer be seen in glass gauge), unplug cord from wall outlet (and/or turn switch "OFF").

9. To reheat cold coffee, simply plug in coffeemaker (and/or turn switch "ON"). Be sure basket and stem are removed. There must be at least 6 cups of coffee in coffeemaker to reheat

INSTRUCTIONS FOR CLEANING COFFEEMAKER

Regular Cleaning - after each use

- Unplug coffeemaker
- **Do not** immerse coffeemaker in water.
- **Do not** let water contact electrical parts in base.
- **Clean inside of coffeemaker** by filling with hot water to about one third its capacity. Add detergent and wash with a sponge or cloth. Scour the heating unit "well" (into which stem fits) with a nylon pad such as Dobie or Scotch-Brite Cookware Scrub'n Sponge-'. Rinse thoroughly with dear hot water

- **Clean faucet** by letting clear hot water run through it, white moving handle up and down. Keep faucet in closed position when not in use.

- **Clean basket, stem and cover** in hot soapy water. Rinse thoroughly. Do not dean cover in a dishwasher. Aluminum will permanently discolor.

- **Clean glass "coffee-level" gauge** (100-cup and 55-cup Models) with the brush provided. Unscrew the gauge cap and remove the glass tube. Clean tube in hot soapy water. Rinse thoroughly. Replace. The brush may also be used to dean the stem.

- **Clean outside of coffeemaker** with a damp cloth, then polish with a dry cloth. Sterling silver polish maybe wed. Do not use scouring pads or powders.

Special Cleaning - every 2 weeks

- If coffeemaker is used daily. a special cleaning every 7 weeks (in addition to regular cleaning) is necessary to thoroughly dean the heating well If the heating well is not kept clean, the performance of the coffeemaker be affected

- Fill coffeemaker with 1 quart each of cold water and white distilled vinegar. Put empty basket and stem in coffeemaker. Cover and plug in (and/or turn "ON "). Let coffeemaker run through perking cycle. Let stand 20 minutes. Turn "OFF"" and/or unplug. Drain coffeemaker and cool (The vinegar and water solution may be saved for future cleaning, Label container of solution indicating its contents and its use. Add an additional 1 to 2 cups of vinegar to the solution when reusing, for thorough cleaning.

- Add a small amount of hot soapy water to coffeemaker and scour interior and heating well with a nylon scouring pad. Drain wash basket and stem.

- Unscrew faucet handle. Move brush up and down through faucet. Then insert brush through opening inside coffeemaker to clean faucet connection. Replace faucet handle. Wash faucet handle in hot soapy waster and rinse.

- Rinse inside of coffeemaker and parts thoroughly with clean hot water. Then dry.

- **Do not** use a baking soda solution, it will discolor and pit the aluminum.

Your coffeemaker needs no special care other than cleaning. If servicing becomes necessary, please take your coffeemaker to an authorized West Bend service center. Do not attempt to repair it yourself.

UNPACKING INSTRUCTIONS:

Remove hood from the carton carefully to avoid marring the finish. Lay the hood on its back and remove both the grease and charcoal tillers by pushing back against the pressure springs until filer is clear of the channel, then lift the filters out, and leave them out until hood Is installed Remove protective plastic wrap from charcoal filter

Your hood can be easily installed over a range by fastening it to an overhead cabinet or fastening it to the wall behind the range. We recommend that the bottom of the range hood be no more than 21-24 inches above the cooking surface.

FOR DUCTED HOOD INSTALLATION:

(1) Determine the Following for Your Particular Size and Type of Hood

A Determine which dimensions apply to your installation (See dimensioned diagram on back peg or take measurements from hood). Location of mounting holes, duct connection, electrical connection.

B. Determine the type of ducting. 7 Round or 3 % x 10

C. Determine whether horizontal or vertical discharge will be used. (Top or Back)

D. Determine where electrical connections will be brought to hood (Top or Back)

2) Installation

A. Brig duct down through .cabinet or through back wall as determined in 1 above.

B. Bring electrical wiring (Romex BX, -etc.) through cabinet or wall at location as determined from 1 D above.

C. For Under Cabinet installation: Install mounting screws at 4 locations on undercabinet leaving the head of the screw extending 1/4 Inch below the cabinet.

D. Remove filters. electrical box cover, and electrical knockout. (Duct knockout where necessary). Install damper and connect BX or Romex to electrical knockout using appropriate fitting. Be sure power is off before making electrical connections.

E. Place hood in position (using keyhole shaped holes) and lighten screws.

F. Replace electric box and filters, install light bulb, turn on power and installation Is complete.

FOR NO DUCT INSTALLATION:

Installation of a no duct hood is identical to the installation of a ducted hood above except items 18, 1C & 2A.

Ducted and Ductless

RANGE HOODS

CARE AND USE

PROPER CARE OF YOUR HOOD

Your Range Hood is a fine kitchen appliance. it precision-engineered and fabricated by specialist. ad Is designed o give you the utmost in convenience and satisfaction.

YOUR DUCTED HOOD HAS ONE GREASE FILTER. A NO-DUCT HOOD HAS TWO FILTERS - A GREASE FILTER AND AN ACTIVATED CHARCOAL FILTER.

GREASE FILTER - This permanent-type filter is heavy mesh aluminum, and is designed to trap grease which formerly would be deposited on your kitchen walls. The manufacturer recommends that the grease filter be cleaned once a week. IMPORTANT - When cooking sea foods and other foods with high grease and odor content, wash filter immediately when you are through cooking. To clean filter, immerse in hot, soapy water or grease removing detergent in the sink or in your automatic dishwasher.

FURTHER 'CARE AND USE TIPS

1. For best results, at your hood blower 10-15 minutes before cooking to start good circulation of air in the kitchen.
2. Oil he motor at least once a year. Use S.A.E. - 20 off only! To oil: Fist remove filters. Second. pull electric motor plug. Then remove mount assembly by unscrewing the sheet metal screws. Oil motor, then replace elements.

SERVICE PARTS LIST

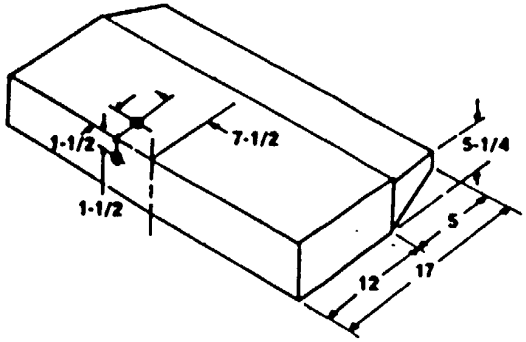
Order by Part number not Index number

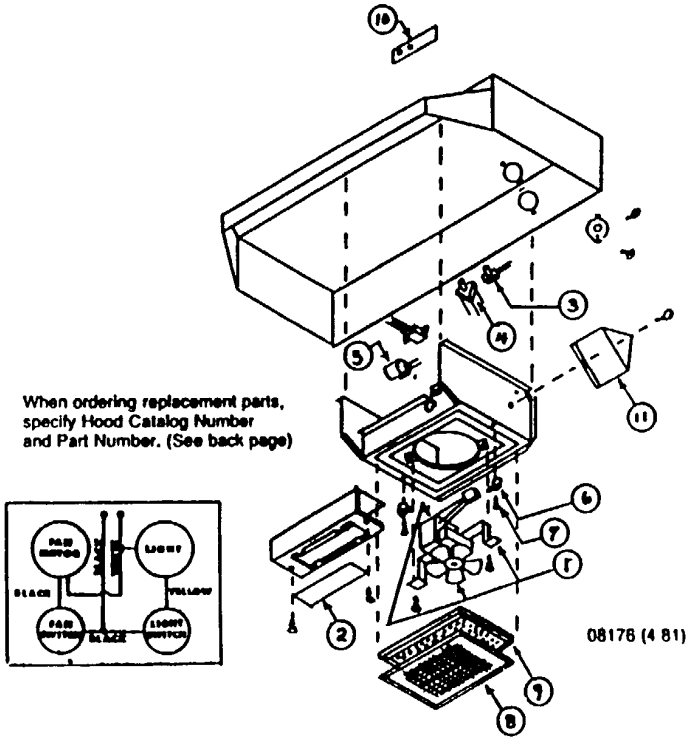
INDEX NO.	PART NO.	DESCRIPTION
1	75603	MOTOR. BLADE & BRACKET ASSEMBLY (25161 Motor Bar, 02200-32 Motor, 06112 Fan Blade)
2	06276	LENS
3	02136	LIGHT SWITCH
4	02161	FAN SWITCH
5	02158	LAMP SOCKET
6	06282 (2)	FILTER RETAINER
7	05135 (2)	POP RIVET
8	06124-01	FILTER. GREASE
9	10128-03	FILTER. CHARCOAL
10	06231-02	(NAMEPLATE DECAL) FOR 1300S
	06231	(NAMEPLATE DECAL) FOR 109-2S
11	20126	ELECTRIC BOX COVER

OWNER'S MANUAL

MODEL 109-2S/1300S

NO DUCT RANGE HOOD





NORFOLK SHIPBUILDING &
DRY DOCK

SERVICE MANUAL

FLOYD E. ADAMS & ASSOC. INC
P. O. BOX 9169
RICHMOND VA. 23227
PHONE (804) 353-2912

HAWS

self-contained
ELECTRIC
WATER
COOLERS

HAWS DRINKING FAUCET COMPANY
GENERAL OFFICES: Fourth and Page Streets · Berkeley, California 94710
CABLE: "HAWSCO" Berkeley, California, USA * TELEX 336-358

INTRODUCTION
INDEX

INTRODUCTION

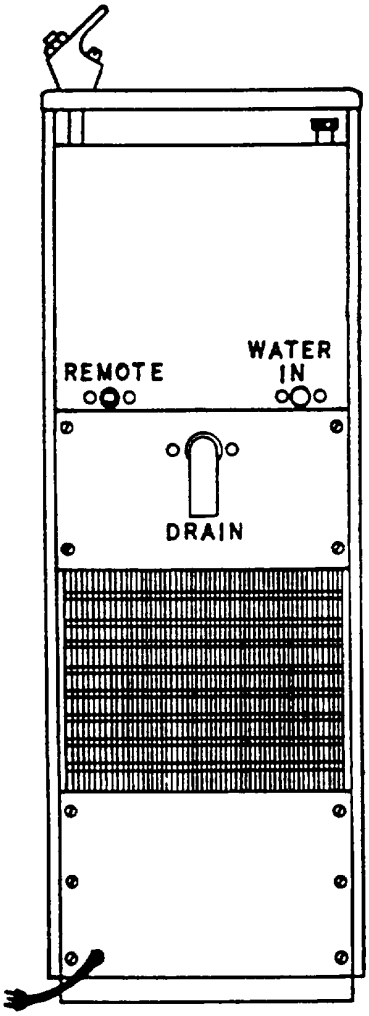
This manual is prepared as a guide to the periodic inspection and general servicing of our hermetically sealed Electric Water coolers. It is limited to service in the field and to all parts external of the refrigeration system itself. A cooler in warranty with an internal refrigeration defect must be repaired at a factory authorized repair station, the address of which will be supplied by us upon request.

INDEX

CHAPTER I - GENERAL DATA

SECTION I - INSTALLATION CHECK POINTS

Improper installation may cause irregularity in performance. The following points should be checked and corrected as necessary.



REAR VIEW

1. LOCATION

If floor is uneven, level cabinet. For proper ventilation a minimum of four (4) inches must be allowed on both sides of cabinet of all Models. The same clearance must also be provided in the cabinet rear on Models with condenser or louvers in this area. The location must be free from periodic freezing conditions however temporary.

2. PLUMBING

The cooler drain should be connected to an open or vented drain. Coolers supplied with a tailpiece require a slip joint connection. Others require piping to the 1-1/4" F. P. T. connection. NOTE - there is no internal trap in cooler.

The 3/8" inlet water connection should be connected to the building supply line. All water piping should be clean and rust resistant to prevent fouling of drinking water. Apply pipe compound sparingly. Avoid the use of lead or oil based compounds. End of pipe runs should be avoided. A hand shut-off valve and union should be installed in supply line near cooler to aid in later cooler servicing without having to close main supply valve: Follow local plumbing codes.

Installation of a water strainer between cooler and shut-off valve is recommended in all cases.

If water pressures exceed 80 lbs. a water regulator with a setting of 40 lbs. is required in water supply ahead of cooler.

In areas where "water hammer" is present in the water supply, install a water regulator and an approved sealed air chamber to prevent vibration or water line rupture.

The "Remote" connection can be used as an auxiliary cold water supply or for draining and flushing the water system.

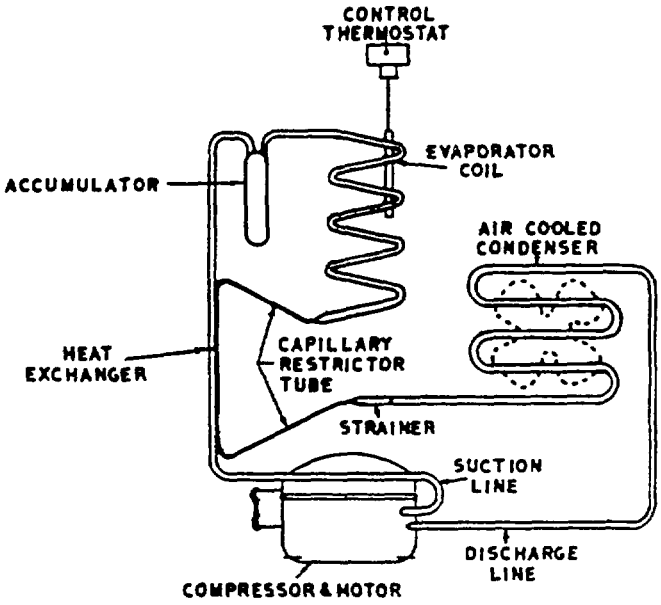
3. REFRIGERATION

The refrigeration system is completely installed, properly charged with refrigerant, and tested at the factory. Liquid and suction service shut-off valves, when provided, are open in shipment.

4. ELECTRICAL

The water cooler is a factory-wired unit. It must connect to the type of electrical current and voltage stamped on the model plate.

SECTION II - EXPLANATION OF THE REFRIGERATION SYSTEM



SCHEMATIC - REFRIGERATION

When the temperature of the water in the cooler rises above a predetermined level, contacts of the controlling thermostat close, causing the refrigeration compressor and condenser fan motor to start. As the refrigerant passes through the system a change of state results. It leaves the compress- or as a hot high pressure vapor and passes through the condenser where it is converted to a high pressure liquid by the removal of heat. The refrigerant then passes through the strainer and capillary restrictor tube into the evaporator as a low pressure liquid. In the evaporator, the refrigerant begins to boil as a cold low pressure vapor. The compressor suction removes this vapor and compresses it to a hot high pressure vapor and the start of a new cycle.

When the desired temperature is attained, the contacts of the controlling thermostat open causing the compressor and fan motor to stop. The refrigerant continues to flow from the condenser, through the strainer and capillary restrictor tube to the evaporator due to the pressure differences in the system. This action will continue until the pressures equalize.

The refrigerant has a tendency to collect and condense at the coldest part of the system while the compressor is off. Therefore an accumulator is used to trap the excess liquid refrigerant. When the compressor starts, it becomes necessary to draw off the refrigerant from the accumulator as a vapor, compress and condense it before cooling can resume.

The refrigeration system of the water cooler is hermetically sealed and critically charged with refrigerant. Too much or too little refrigerant is detrimental to the operation. The system has been dried to a high degree, 10 PPM (Parts Per .Million). Under normal conditions the refrigeration system should not be disturbed.

CHAPTER II - DETAILED DESCRIPTION

SECTION I DESCRIPTION OF THE COMPONENT PARTS OF THE REFRIGERATION SYSTEM

1 - Compressor And Motor Assembly
2 - Condenser
    Air Cooled
    Water Cooled
3 - Strainer - Refrigerant
4 - Capillory Tube
5 - Evaporator Coil
6 - Accumulator
7 - Thermostat

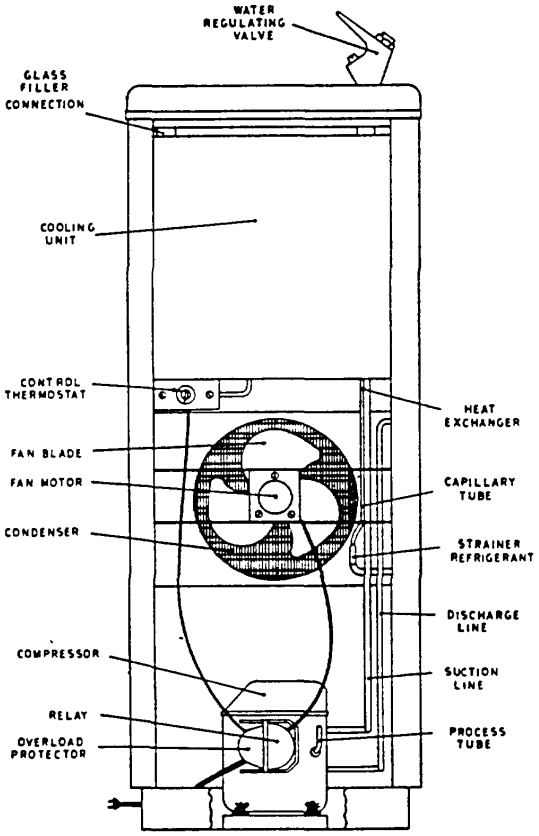
SECTION II DESCRIPTION OF CABINET REMOVAL

1 - Cooling Unit
    Tank Type Cooler Assembly
    Coil-on-Coil Cooler Assembly
    Shell Type Cooler Assembly
2 - Drain or Precooler
3 - Water Regulating Valve

SECTION III DESCRIPTION OF CABINET REMOVAL

1 - Full Wrap-Around Cabinet
2 - Wrap-Around With Front Panel Removable
3 - Panel Type Cabinet
4 - Wall Hung And Semi-Recessed Models

SECTION I - DESCRIPTION OF THE COMPONENT PARTS OF THE REFRIGERATION SYSTEM



FRONT VIEW

The refrigeration system and related component parts consist of the following:

1 - Compressor and Motor Assembly
2 - Condenser: Air Cooled
    Water Cooled
3 - Strainer - Refrigerant
4 - Capillary Tube
5 - Evaporator Coil
6 - Accumulator
7 - Thermostat

1. COMPRESSOR AND MOTOR ASSEMBLY

The compressor and motor assembly is located in the machine compartment of the water cooler. The assembly is suspended on springs, inside an all welded steel housing and is lubricated by a wax-free dehydrated oil. The compressor assembly is provided with an external electrical terminal enclosure, located on the side of the housing.

The electrical terminal enclosure has a high impact, fire resistant cover. The relay and overload are mounted in this enclosure.

When supplied, the relay operates in the starting of the compressor motor and disconnects the starting winding when the motor reaches its proper speed

The overload protector, retained against the compressor housing, is of the automatic reset type and breaks the circuit within a few seconds if the compressor fails to start. The circuit will also be interrupted if the compressor overheats during operation.

'When required a capacitor is used on some water coolers to increase the starting torque of the compressor motor and/or aid its operation.

2. CONDENSER

As the refrigerant passes through the condenser, heat is removed, causing the refrigerant to cool and condense to a high pressure liquid. The principle means of removing heat is by natural or forced convection air or water.

(a) Air-Cooled Condenser - The static condenser depends upon its large exposed surface area and natural convection air in a favorable

ambient for the removal of heat. Occasionally, a small fan is used for more efficient cooling.

With the forced convection condenser a high capacity fan is used to force the air through the condenser enabling a more rapid heat transfer and a smaller condenser design.

(b) Water-Cooled Condenser - Water Cooled condensers are used in areas of adverse environment. They are made of a double coil, refrigerant and water, bonded together for heat transfer. A water metering valve controlled by the operating conditions of the refrigeration system, regulates the flow of water through the water coil.

3. STRAINER - REFRIGERANT

The refrigerant strainer is a part of the liquid line and is located at the outlet from the condenser. The strainer is used to guard against blockage of the capillary tube.

4. CAPILLARY TUBE

The small bore capillary tube restricts refrigerant flow and creates the pressure difference in the refrigeration system. When bonded to the suction line, it acts as a heat exchanger giving the refrigerant a secondary cooling effect before entering the evaporator.

5. EVAPORATOR COIL

The evaporator coil is solder bonded to the water cooling tank or coil and is a part of the cooling unit. The evaporator coil transfers the heat from the water to the refrigerant causing it to boil as a low temperature vapor.

6. ACCUMULATOR

The accumulator is a part of the cooling unit. It acts as a trap allowing only refrigerant in a gaseous state to return to the compressor.

7. THERMOSTAT

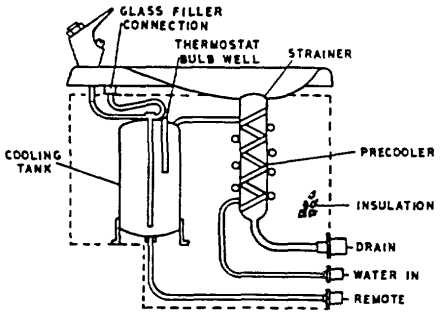
The thermostat, located in the compressor compartment, controls the water temperature by starting and stopping of the compressor as required.

This is accomplished by the power element inserted in the bulb well of the cooling unit.

The power element of the thermostat is filled with a volatile refrigerant which exerts a force when warmed and relieves a force when cooled. This action causes the electrical contacts to open and close.

Some coolers are provided with an extra thermostat wired in series with the control thermostat. This thermostat has a lower setting to prevent freezing of the water system should the control thermostat fail. There is no adjustment provided with this freeze protection thermostat.

SECTION II - DESCRIPTION OF WATER SYSTEM

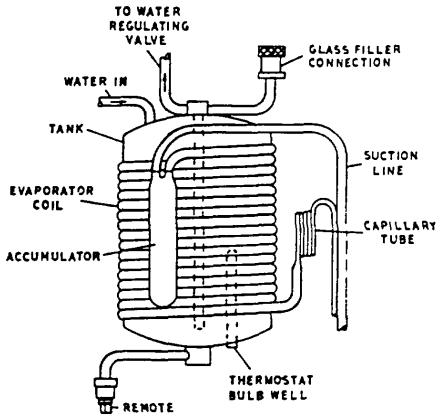


SCHEMATIC-WATER CIRCUIT

1. COOLING UNIT

The cooler assembly is located in a sealed and insulated enclosure of the water cooler. The basic types of the cooler assembly designs are the tank, coil-on-coil and shell.

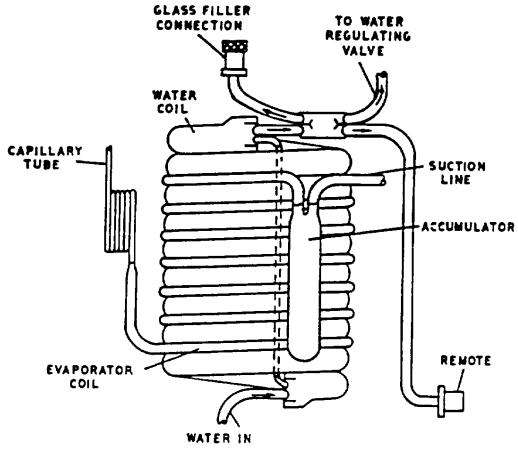
(a) Tank Type Cooling Assembly - The tank type cooler assembly has the evaporator solder bonded to the exterior of the tank. The ac-



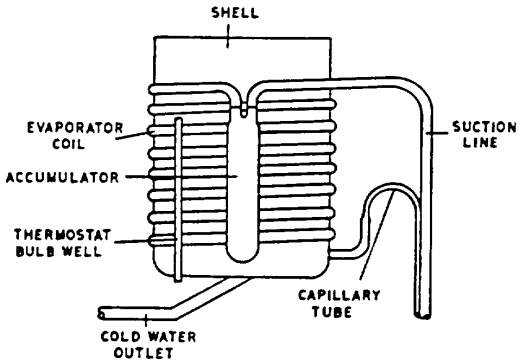
TANK TYPE COOLING UNIT

cumulator is a part of the cooler assembly. The tank has a water inlet and a water outlet connected to the water regulating valve and glass filler. It also has a thermostat bulb

well located inside the tank. A remote connection at the bottom of the tank may be used as an auxiliary cold water source or as a means of flushing the tank. Incoming water enters the top of the tank. Cold water is drawn from the bottom of the tank by the use of a pick-up tube. After leaving the tank, the water is distributed to the bubbler valve and glass filler.



COIL ON COIL COOLING UNIT



SHELL TYPE COOLING UNIT

(b) Coil-On-Coil Cooler Assembly - The coil-on-coil cooler assembly is composed of water coil with the evaporator coil wrapped around it and all solder bonded together. The accumulator is a part of the cooling assembly. Water enters the bottom of the water coil and displaces air which may be present. The water, upon leaving the water coil, is distributed to the water regulating valve, glass filler and remote connection.

(c) Shell Type Cooler Assembly - The shell type cooler assembly is used for bottle water coolers. It consists of a shell with the evaporator coil externally solder bonded. The accumulator is a part of the cooler assembly. A normal water level is automatically maintained in the shell by the inverted bottle. As cold water is drawn from the bottom of the shell, the air seal covering the neck of the bottle is exposed and allows additional water to enter the shell.

2. DRAIN OR PRECOOLER

A drain is provided to direct the flow of waste water from the bowl of the cabinet to the drain connection in the cooler. A rubber gasket is provided between the cabinet top and the drain tube to prevent external leakage of the waste water.

Larger capacity coolers use a precooler which acts as a heat exchanger. The waste water absorbs heat from the incoming water before entering the cooling unit. The precooler is a specially constructed drain with the water coil solder bonded to the exterior and an internal runner solder bonded to direct the flow of waste water to the inside wall of the drain.

3. WATER REGULATING VALVE

Water from the cooling assembly travels to the water regulating valve which dispenses a properly metered flow of water for drinking. There are several different types of water regulating valves in common use. One type commonly found is a complete unit, mounted on the cabinet top, known as a bubbler valve.

With the wide range of water regulating valves, specific information regarding each valve can be had on request. Please give model, style, and serial number with this request.

SECTION III - DESCRIPTION OF CABINET REMOVAL

When necessary to enter the cabinet the following procedure is recommended:

1. FULL WRAP-AROUND CABINET

1 - Disconnect drain plumbing.

2 - Remove water regulating valve.

3 - Remove two screws from back of cabinet top, when provided. Lift the back and pull forward. This disengages front pins.

4 - Remove four screws from cabinet base.
5 - Grasp cabinet shell at bottom and pull upward.

NOTE - Thermostat may be adjusted without removing cabinet by inserting screwdriver through a hole provided in the cabinet side.

2. WRAP-AROUND WITH REMOVABLE FRONT PANEL

1 - The front panel can be removed for internal servicing by loosening two screws at bottom of front panel. Raise panel slightly and pull forward and down to disengage from top.
2 - To remove the cabinet top, turn off water supply and remove the water nozzle from bubbler guard. Remove two screws in the front and two screws in back of cabinet; the top can now be lifted off.
3 - When the entire cabinet is to be removed, the external plumbing to the cooler must be disconnected. Block the cooling unit box in position and remove the four screws from the front and four screws from the back at the base of the cooling box. Remove the three nuts located on each side of cabinet base. The cabinet can now be lifted from its position.
4 - Lift top from position and slide panels up.

3. PANEL TYPE CABINET

1 - Remove two screws at bottom of front panel for internal servicing.
2 - Raise panel slightly and pull forward and down to disengage from top.
3 - Side panels can be removed by first removing bubbler valve and screws holding top.

4. WALL HUNG AND SEMI-RECESSED MODELS

1 - Remove thumbscrews from base; cabinet will slide down and off.

CHAPTER III - GENERAL MAINTENANCE

SECTION I - NORMAL MAINTENANCE

After the water cooler is installed and operating properly, very little maintenance is required. No oiling is necessary on hermetic units as both compressor and fan motor are permanently oiled. With open type belt driven units, oiling of the motor twice a year is required. Cleanliness of equipment is most important.

The air cooled ;condenser, located in the machine compartment of the cooler, requires periodic inspection. Any accumulation of lint or dust in air passages requires removal. Dirty condensers can be cleaned with a non-metallic brush, air hose or vacuum cleaner.

Periodic cleaning of the drain or precooler is also required. To clean, remove strainer from cabinet top, and clean internally with a non-metallic brush.

The stainless top is easily cleaned. Metal polish will restore luster. The side panels can be washed and polished with a soft cloth.

CAUTION - FREEZING TEMPERATURES- To prevent serious damage to the water cooler, all water must be drained when cooler is exposed to freezing temperatures.

After the water supply has been turned off, remove the remote plug, depress bubbler valve. This will drain the tank type cooling unit. When the water regulating valve is mounted inside of the cabinet, the entire valve should be disconnected. This will permit the water to drain from the "Remote" fitting.

Water coolers with the coil-on-coil type cooling unit, can be drained by blowing the water coil with low pressure air.

Water must also be drained from water cooled condensers. Remove both inlet and outlet water connections from water supply and blow the water coil with low pressure air.

SECTION II - GENERAL SERVICING

1. WATER SYSTEM

Rusty pipes, sediment deposits in the water and pipe sealing compound often create problems in the water system of the cooler. When these conditions are suspected, flush the water supply and install a water strainer ahead of cooler.

Water flow blockage in the water system is first noticable at the bubbler nozzle. For procedures to correct this problem, see Chapter IV Section II.

2. REFRIGERATION SYSTEM

Improper installation of the water cooler, by blocking the entrance or discharge of condenser air, often creates problems in the refrigeration system. Dirt, lint and dust on the condenser fins can cause similar problems of erratic compressor operation, warm outlet water, and overload protector and/or starting relay failure on the compressor.

Restricted air flow through the condenser causes abnormally high head pressures since heat dissapation is reduced. This imposes a greater load on the compressor motor and may cause the overload to trip.

Similar conditions can arise with the water-cooled condenser when the water flow is restricted, or the condenser water metering valve is out of adjustment. To test the efficiency of the condenser, check the inlet and outlet water temperatures with a thermometer. The temperature difference should never be more than 250 F.

3. NOISE

The water cooler is normally free of excessive noise. The compressor motor assembly is suspended on four springs within the welded steel housing. The fan motor mounting bracket is rigidly secured. The fan blade is mounted on the fan motor shaft with a rubber washer to minimize noise transmission to the cooler. If the fan blade is damaged, it should be replaced rather than repaired or re-aligned. The compressor or fan motor should be replaced if either develops an unusual noise.

4. CONTINUOUS OPERATION

The refrigeration system has been designed to operate on the demands of the thermostat. If the demands of the thermostat are not met, the unit will continue to operate. This condition can occur if the unit has....

1 - Short in the electrical system
2 - Fused electrical contacts in the thermostat
3 - Moisture in the system
4 - Plugged refrigerant strainer
5 - Undercharge of refrigerant
6 - A broken discharge tube in the compressor.

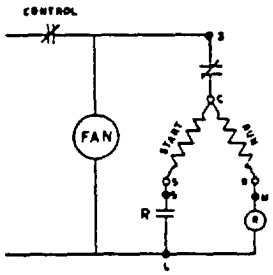
CHAPTER IV - TROUBLE SHOOTING

SECTION I - ELECTRICAL AND REFRIGERATION

1. GENERAL

Before attempting to trouble shoot the refrigeration system, determine the demand made upon the cooler. How much water is being dispensed and how frequently. Examine the installation and determine if proper ventilation has been allowed. The location is important since the cooler should never be near a steam line, hot air ventilator or high wattage electrical system. Check the electrical supply to cooler. When these procedures fail to remedy the trouble, the following will be necessary.

2. ELECTRICAL



SCHEMATIC -ELECTRICAL

To test the electrical components, it is necessary to remove the front panel or wrap-around cabinet to provide access to the machinery compartment.

Problem - Compressor will not run.

Condition - The water cooler is dispensing warm water (over 600 F) and the compressor fails to start.

Solution - Electrical Supply

Test electrical supply since there may be a blown fuse.

Solution - Thermostat

With electrical supply off, test for continuity with an ohmmeter across the two terminals of the thermostat. Failure of continuity test indicates the power element has lost its charge. Replace thermostat.

Solution Wiring

With electrical supply off, carefully inspect wiring for burnt insulation since it is an indication of a short. Always replace poor or defective wiring.

Condition - Fan motor operates, but compressor fails to start. With electrical power off, proceed as follows.

Solution - Overload

Touch the compressor with your hand. If abnormally warm the compressor may be "off" due to overheating and the overload has tripped. Inspect and clean the condenser as it may be the cause of this condition. After waiting ten minutes for compressor to cool. restore electrical power and check for compressor operation. When compressor is cool to the touch, a continuity test with an ohmmeter should be made across the terminals of the overload. Failure of continuity test indicates a faulty overload. Replace with exact factory replacement.

Solution - Relay

The relay can be tested by the substitution method. Remove and replace with factory replacement.

Solution - Capacitor

When used, the capacitor can be tested by the substitution method. Remove and replace with factory replacement capacitor of the same rating.

Solution - Compressor

After testing the electrical components and the compressor fails to run, the compressor motor or the refrigeration system may have a defect. The water cooler in warranty should be repaired at an authorized repair station.

Condition - With water flowing and electrical supply on, the compressor is cycling on the overload (has an intermittent clicking sound) and the fan motor will not run, indicates the fan motor is inoperative, since it is wired in parallel with the compressor motor.

Solution - Fan Motor

Disconnect electrical supply and turn fan by hand. The fan must rotate freely. Any evidence of binding or the motor will not run, replace fan motor.

Problem - Compressor runs, but will not refrigerate.
Condition - The compressor and fan motor runs with little or no refrigeration effect.

Solution - Clogged Condenser
Air cooled condensers must be kept free of lint, dust, or other material for proper operation. A dirty condenser restricts the air flow, thereby reducing the capacity of the cooler.

Solution - Plumbing
Inspect the plumbing carefully for proper connections. Water supply must be connected to the "Water In" connection.

Solution - Compressor
With the compressor running continuously, will not cycle, or with no refrigeration effect, the compressor or other refrigeration component may be defective. The water cooler in warranty should be repaired at a factory authorized repair station.

SECTION II - TROUBLE SHOOTING OF THE WATER SYSTEM

The following is a list of possible conditions which may be encountered in trouble shooting the water system.

1 - Problem - Restricted or No Water Flow

Solution A - Water Supply Valve
Check water supply line valve or valves. Be sure they are fully open.

Solution B - Water Pressure
Check water line pressure. It should be between 20 and 80 PSI. If above 80 PSI a pressure regulator with a setting of 40 PSI should be installed.

Solution C - Plumbing Connections
Check for proper plumbing connections to cooler. The "Remote" connection must never be connected to a waste line.

Solution D - Water Line Strainer
Remove and clean water line strainer when installed. Reverse flush the cooling unit, if line strainer is not used, by transferring the water inlet line to the "Remote" connection and allowing the reverse flow of water to emerge from the "Water In" connection. After flushing, return piping to original connections.

Solution E - Water Regulating Valve Strainer
Clean or replace the water regulating valve strainer screen located in the base of the valve. The entire assembly must be removed to gain access to this strainer.

Solution F - Water Regulating Valve Adjustment
Water regulating valves of the adjustable type have a replaceable cartridge. In the top of this cartridge there is a slotted adjusting screw. Turning the adjusting screw clockwise increases the water stream, counter-clockwise reduces the water stream. This operation can be accomplished without removing the cartridge.
Self Adjusting water regulating valves should follow Solutions "B" and "'D".

Solution G -Freeze Up
Open "Remote" connection, with water supply valve fully open. No flow indicates the cooling unit is frozen. Disconnect the electrical supply from cooler and allow the unit to remain in a warm ambient until it thaws. Recheck refrigeration system and related controls. Correct any malfunction before energizing the cooler. Check the cooling unit for any rupture or leaks. After draining the cooling unit, repair any break found by soldering or replacement.

2 Problem - Continuous Water Flow

Solution A - Valve Binding
Check water regulating valve and linkage for free operation. Lubricate all binding parts with a tasteless, odorless light grease.

Solution B - Specific Instructions
Specific instructions regarding the water regulating valve can be had on request. Model, style, and serial number, found on Model Plate, should be furnished to fulfil this request.

3 - Problem - Improper Drainage.

Solution A -Drain Strainer
Inspect the strainer attached to cabinet top. Waste may collect at this point and stop. the flow.

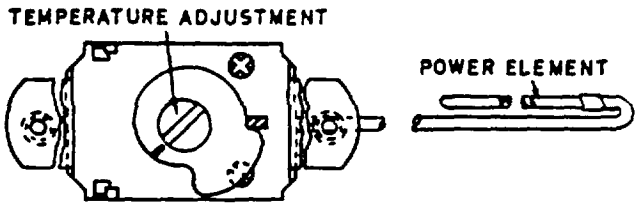
Solution B - Cooler Drain Line
Remove the drain strainer from the cabinet top and probe the drain line for possible blockage.

Solution C - Building Drain
Remove the drain connection from water cooler. Observe the cabinet top. If water drains with piping removed, the building drain line is plugged or improperly vented.

SECTION III - ADJUSTMENT

1. CONTROLLING THERMOSTAT

Most controlling thermostats are provided with an adjustment between the temperature at 470°F. and 55°F. Turning the adjustment clockwise lowers drinking water temperature. Thermostats are factory adjusted to deliver 50°F. water temperature.



CONTROL THERMOSTAT

2. WATER REGULATING VALVE

The water regulating valve is sensitive to water line pressure. Under normal conditions adjustable valves require only an initial adjustment. Water regulating valves of the self-adjusting type need no adjustment, but erratic operation may be found when water pressures are sub-normal or above normal. When water pressures exceed 80 PSI, a water pressure regulator should be installed in the water supply line ahead of the cooler and adjusted to 40 PSI.

SECTION IV - FIELD REPLACEABLE PARTS

The parts listed below should be field replaced.

WATER REGULATING VALVE

Turn off water supply and relieve the water pressure. Remove water regulating valve and replace. Due to the variety of water regulating valve s, specific instructions regarding a valve can be had on request. Please give model, style, and serial number information found on Model Plate with this request.

STRAINER - DRAIN

Unscrew or snap strainer from drain.

CABINET TOP AND SIDE PANELS

Remove and replace as explained in Chapter II, Section m.

TEMPERATURE CONTROL

The controlling thermostat is mounted in the machinery compartment. Disconnect the power supply and detach thermostat. Remove power element from bulb well on cooling unit.

FAN AND MOTOR ASSEMBLY

Turn off electrical supply. Remove fan and motor 'assembly. NOTE - Handle fan blade with care. Mis-alignment can cause noise and/or motor failure.

COMPRESSOR OVERLOAD PROTECTOR AND RELAY

Disconnect power supply and remove compressor terminal cover. Replace relay and overload with exact factory replacement.

COMPRESSOR CAPACITOR

Remove and replace with factory replacement.

CONDENSER WATER REGULATING VALVE

Turn off water supply and replace with factory replacement unit.

SECTION V - AUTHORIZED REPAIR STATION

The hermetic refrigeration system of a cooler in warranty must never be opened in the field. Such repair work should be done at an authorized repair station.

If warranty has expired, the components of the refrigeration system can be field replaced. Extreme care has to be taken in cleanliness, dehydration, evacuation and charging of the system. Cleanliness is most important in servicing the system, since dirt can contaminate or cause a restricted flow of refrigerant through the system.

Maximum care is maintained in the production of the cooler to assure a moisture level of 10 PPM or less. Moisture cannot be tolerated in the system, since it has an oxidizing effect on the refrigeration parts or may freeze the capillary exit blocking the flow of the refrigerant.

Precautions are also taken in manufacture to exclude air and non-condensibles from the system. The system is swept with a refrigerant vapor and evacuated to 250 microns.

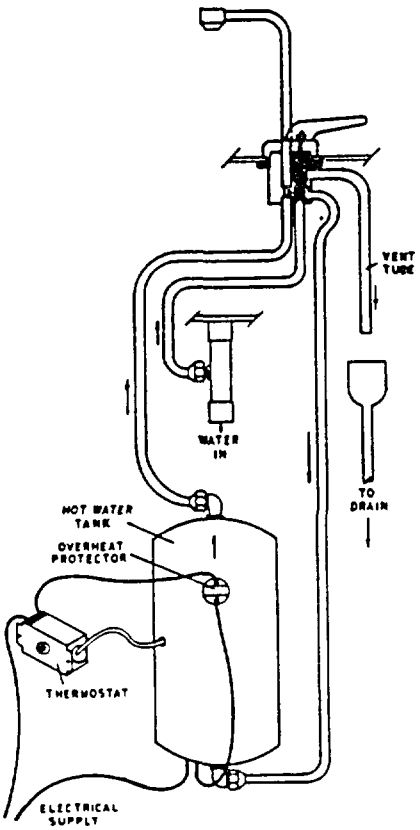
Charging of the system with refrigerant is critical. An overcharge causes the suction line to frost or sweat and may cause damage to the compressor.

The service man attempting to service the refrigeration system in the field should have a vacuum pump capable of pumping down to 100 microns, a vacuum gauge capable of reading 10 microns, a Halogen leak detector capable of sensing a refrigerant leak of 0.10 ounces per year, a charging system capable of charging within 0. 10 ounces by weight and a thorough knowledge of the refrigeration system.

It is highly recommended therefore, to have the cooler with an internal refrigeration defect repaired at an authorized repair station.

CHAPTER V - ACCESSORY ITEMS

SECTION I - HOT WATER SYSTEMS



PRESSURE HOT WATER SYSTEM

Since all supply water has air and gases in solution, which are released when heated, the hot water system must be vented to relieve these gases. This is accomplished through the use of a double seating hot water valve. When the valve is closed to line pressure, the area above the seat and the hot water supply line is open to the atmosphere, therefore no relief valve is required.

1. DESCRIPTION OF THE HOT WATER CIRCUIT

Pressure Type - A tee in the "Water In" connection supplies water to the hot water valve. As hot water is dispensed, the vent tube is closed, water flows to the bottom of the heater tank. The pressure of the water forces heated water from the top of the tank and through the dispensing valve.

Bottle Type - Water runs directly from the bottom of the shell type cooling unit to the bottom of the heater tank. Hot water is drawn from the top of the tank when dispensing valve is open.

CAUTION - Do not fill shell above water level normally maintained by the inverted bottle.

A vent in the hot water system allows air and gases common to heated water to escape to the top of the cooling shell. Slits are provided in the bottle ring for escape of these gases to the atmosphere.

CAUTION - When the water cooler is exposed to freezing temperatures, the hot water system must be drained. Connections are provided on the bottom of the heater tank for this purpose.

2. ELECTRICAL HEATING SYSTEM

An electrical heater element immersed in the heater tank is used as the source of heat. The temperature of the water is controlled by an adjustable thermostat, similar to the ones used with the refrigeration system, to control a maximum temperature of 1800F. When provided, an overheat protector is located on the heater tank for thermoprotection.

3. SERVICING THE HOT WATER SYSTEM

Problem - No Hot Water

Solution A - Check the electrical supply to the heating system. When this is not the source of trouble, disconnect electrical supply and test each electrical component individually with an ohmmeter for continuity. Replace part proved defective.

Solution B - Older Type systems have a reset type overheat protector. Reset overheat protector and test thermostat for proper operation.

Problem - Water Too Hot

Solution A - The thermostat located in the machinery compartment is adjustable. Turn adjusting screw clockwise for cooler setting.

Solution B - The hot water tank may be cycling on the overheat protector due to the thermostat setting to high or burnt contacts in the thermostat. With failure in adjustment of thermostat, replace thermostat.

SECTION II - FOOT PEDAL AND LINKAGES

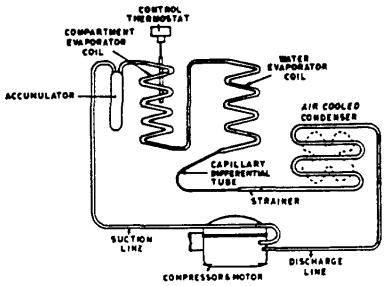
Foot pedal and valve linkages are normally trouble free, as they are made for easy operation and of the simpliest design. Each model cooler has its own foot pedal and linkage design, but however, the maintenance and repair are similar.

When trouble is encountered with a reduced or restricted water flow, the water strainer should first be inspected before any changes are made in the linkage. This is normally the source of trouble.

All linkages are provided with a return spring which is adjustable. When linkage gives evidence of binding or noise In operation, lubricate the trouble spot with a light odorless, tasteless grease.

CHAPTER VI - MISCELLANEOUS COOLERS

SECTION I - COMPARTMENT WATER COOLERS



SCHEMATIC -REFRIGERATION COMPARTMENT-BOTTLE WATER COOLER

1. EXPLANATION OF THE BOTTLE - COMPARTMENT REFRIGERATION SYSTEM

The high pressure liquid refrigerant passes through the capillary tube to the water evaporator. Upon leaving the water evaporator, it travels through a weight check valve, which prevents freezing of the water system, to the compartment evaporator. After circulating through the compartment coil, the refrigerant then passes through the accumulator and back to the compressor. The system is controlled by one thermostat whose power element is strategically located on the side of the compartment evaporator. When the water demands more cooling, the warmer refrigerant vapor passes from the water evaporator through the weight check valve to the compartment evaporator. This in turn warms the power element of the thermostat causing the compressor to start, regardless of the temperature of the compartment. The compressor will also start when the compartment requests cooling and the water temperature is correct.

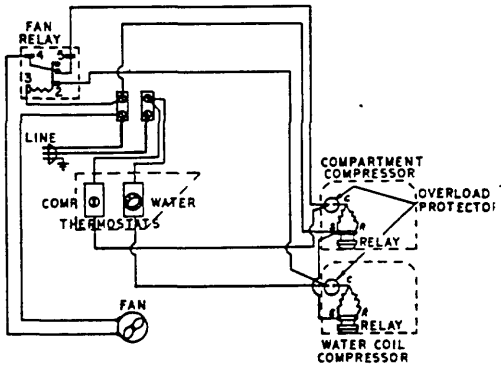
2. EXPLANATION OF THE PRESSURE - COMPARTMENT REFRIGERATION SYSTEM

Early designs of the compartment, pressure water system use a solenoid valve in the water evaporator outlet controlled by a thermostat to prevent freezing of the water cooling system. A capillary tube branching from a specific turn of the water evaporator supplies refrigerant for cooling of the compartment evaporator. When the water requires more cooling, the thermostat contacts close causing the solenoid valve to open and the compressor to start. When the compartment only requires more cooling, its thermostat contacts close causing the compressor to start.

Later models use two refrigeration systems, each operating independently of one another. Each system has its own controlling thermostat to operate and control its system.

Both refrigeration systems share a common air cooled double circuited condenser and use one fan.

A relay is employed to actuate the fan when either system starts.



WIRING DIAGRAM FOR COMPARTMENT PRESSURE WATER COOLER

3. MAINTENANCE

An occasional defrosting of the compartment evaporator is the only difference for general maintenance of the cooler. When defrosting of the compartment is required, disconnect electrical power supply. Remove ice cube trays and place a pan of hot water in the compartment. The door can remain open. Defrosting requires about 15 minutes depending upon the frost build-up. When completed, fill the ice trays with fresh water and connect the electrical supply.

4. SERVICING AND TROUBLE SHOOTING

When trouble is encountered with the compartment water coolers, service procedures mentioned earlier in this manual should be followed.

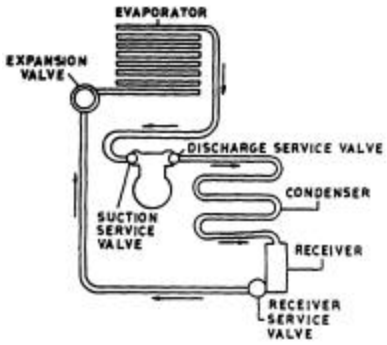
SECTION II - EXPLOSION PROOF COOLERS

Explosion proof water coolers are designed to operate in potentially combustible atmospheres containing inflammable or explosive mixtures of vapors, gases or dust. They meet all requirements as defined in the National Electrical Code and Underwriter's Laboratories for Class I, Groups C and D; Class II, Groups F and G. Therefore, it is necessary to remove the cooler from these conditions to a safe working area before servicing the refrigeration system or electrical components.

The electrical wiring is run through conduit and the combination relay-overload and thermostat are housed in a sealed junction box. To gain access for servicing, a threaded dome cover is provided.

The refrigeration system is of the hermetic type. Service procedures mentioned in previous chapters apply to this cooler.

SECTION III - BELT DRIVEN OR OPEN TYPE REFRIGERATION SYSTEM WATER COOLER



SCHEMATIC-OPEN TYPE REFRIGERATION SYSTEM

1. EXPLANATION

Open or belt driven type refrigeration water coolers are used in areas of odd voltages, D. C. current or other special applications. They are designed for field servicing and all parts of the system are replaceable.

The function of the refrigeration cycle is basically the same as explained in Chapter I, Section II. A thermostatic expansion valve, instead of a capillary tube, is used for metering of the refrigerant to the evaporator.

The major difference between the hermetic and open type refrigeration system is in the compressor and motor assembly. The open system is supplied with a crankshaft-cylinder type compressor, which is driven by an independent motor and V belt. A fan blade mounted on the motor pulley provides cooling air for the condenser.

Service shut-off valves are provided on the suction and discharge sides of the compressor and at the outlet of the receiver. These valves allow the service man to work on the system without the loss of a large amount of refrigerant.

2. MAINTENANCE

Maintenance of the water cooler with an open type refrigeration system should be performed periodically by a competent refrigeration service man. It is vitally important for proper operation and long life of the cooler.

The service man when performing these services should:

1 - Oil Motor
2 - Clean Condenser and check for proper air circulation.
3 - Adjust the V belt tension
4 - Check for refrigerant leaks
5 - Correct refrigerant charge and pressures
6 - Check drinking water temperature and adjust thermostat

CAUTION

When thermostat needs replacing, exact factory replacement should be used. Others may give faulty service.

IMPORTANT - Never return a cooler with an open type refrigeration system to the factory for repairs without specific authorization. The design and assembly of this type cooler is such that all parts can be quickly changed in the field and frequently at less cost than packing, handling and freight in shipment to and from the repair station.

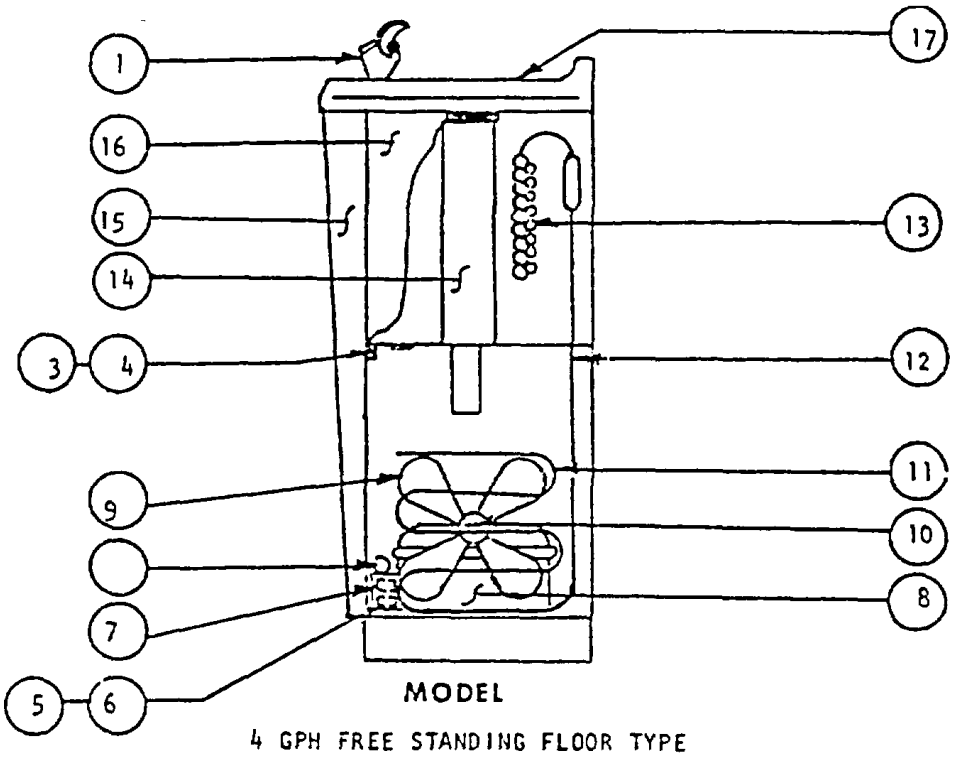
LITHO IN U.S.A.

INSTALLATION AND MAINTENANCE MANUAL

PMX-254-R1

TABLE OF CONTENTS

PARTS LIST



MODEL

4 GPH FREE STANDING FLOOR TYPE

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	B153425	Bubbler, Self Closing	10	B153475	Fan Motor
2			11	C025511	Condenser Assy.
3	A016241	Thermostat	12	A015584	Capillary Tube and Dryer Assy.
4	B153438	Thermostat, Alt. for A016241	13	C025520	Lowside Assy.
5	82611	Relay, Start	14	B153288	Drain Assy.
6	82404	Relay, Alt. for 82611	15	B153235	Front Panel
7	83613	Overload Switch	16	D035267	Cabinet
8	AC16102	Hermetic Compressor	17	D035265	Top, Stainless Steel
9	A016338	Fan Blade			

NOTE:

WHEN REQUESTING REPLACEMENT PARTS, GIVE THE PART NUMBER AND DESCRIPTION, ALSO THE MODEL AND SERIAL NUMBER OF THE COOLER.

INSTALLATION AND MAINTENANCE INSTRUCTION

I. INTRODUCTION

Every facility has been provided to build water coolers of the best material with the most modern equipment.

Each cooler is performance-tested before leaving the factory. All controls, capillary lines, valves, bubblers, and other equipment are properly set for efficient operation. The cooler, tested and checked, is then crated and properly marked for shipment.

II. RECEIVING AND UNCRATING

A. Inspection for Damage - Upon receipt, all coolers should be carefully unpacked and inspected for damage during shipment. If the cooler has been damaged in any way, a claim should be filed against the carrier involved. The damage claim must be filed within 48 hours after the cooler has been received. When filing a damage claim specify: The damage involved and serial number of the cooler. A copy of the claim should be forwarded to the cooler manufacturer to the attention of the shipper.

B. Unpacking Shipments

1. Domestic - Carefully cut all sides of the carton near the bottom. Lift carton straight up and off the water cooler, and lift water cooler from carton bottom.

2. Overseas - Remove the nails that hold the sides of the crate to the base with a nail puller. Then either lift crate off the cooler or remove the nails, with the nail puller from around the top and joints of the crate and dismantle the entire crate. Remove the staples or nails that hold the cart on to the wooden base. Lift the carton off the cooler and remove all waterproofing paper and other wrapping materials. Remove the shipping base.

I. PLUMBING CONNECTIONS

A. Main Drain - A drain fitting is provided on every cooler. Do not reduce the size of the drain line. The drain should be connected first and all joints must be watertight and a drain trap must be installed according to good plumbing practice and regulations.

B. Water Inlet - This fitting is a 3/8" female pipe size. See Roughing-In for location and recommended water supply line.

If the water pressure is greater than 75 P.S.I.G., a pressure reducing valve must be installed.

CAUTION: Floor mounted coolers must set firm and level on the floor to prevent excessive vibration.

For adequate ventilation (air cooled models), a clearance of 4" must be maintained at the back of the cabinet (standard construction) or right sides (facing front of the cabinet) for flush-to-wall type.

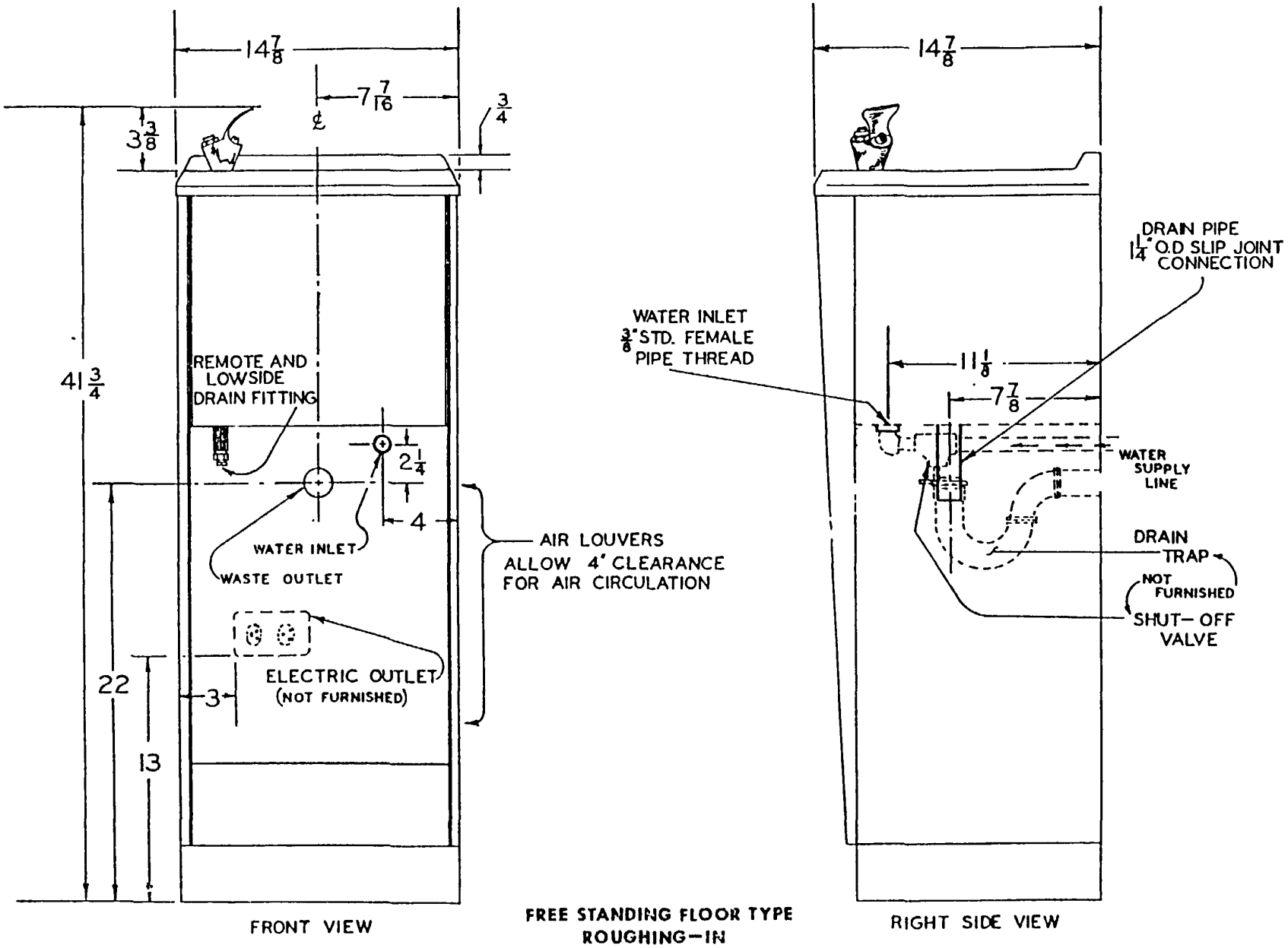
IV. ELECTRICAL CONNECTIONS

A. Current Check - The electrical current must be the same voltage, cycle, and phase as indicated on the serial name plate of the cooler. If these characteristics are not identical, DO NOT PLUG ELECTRICAL CORD. Serious damage could result if this procedure is not followed.

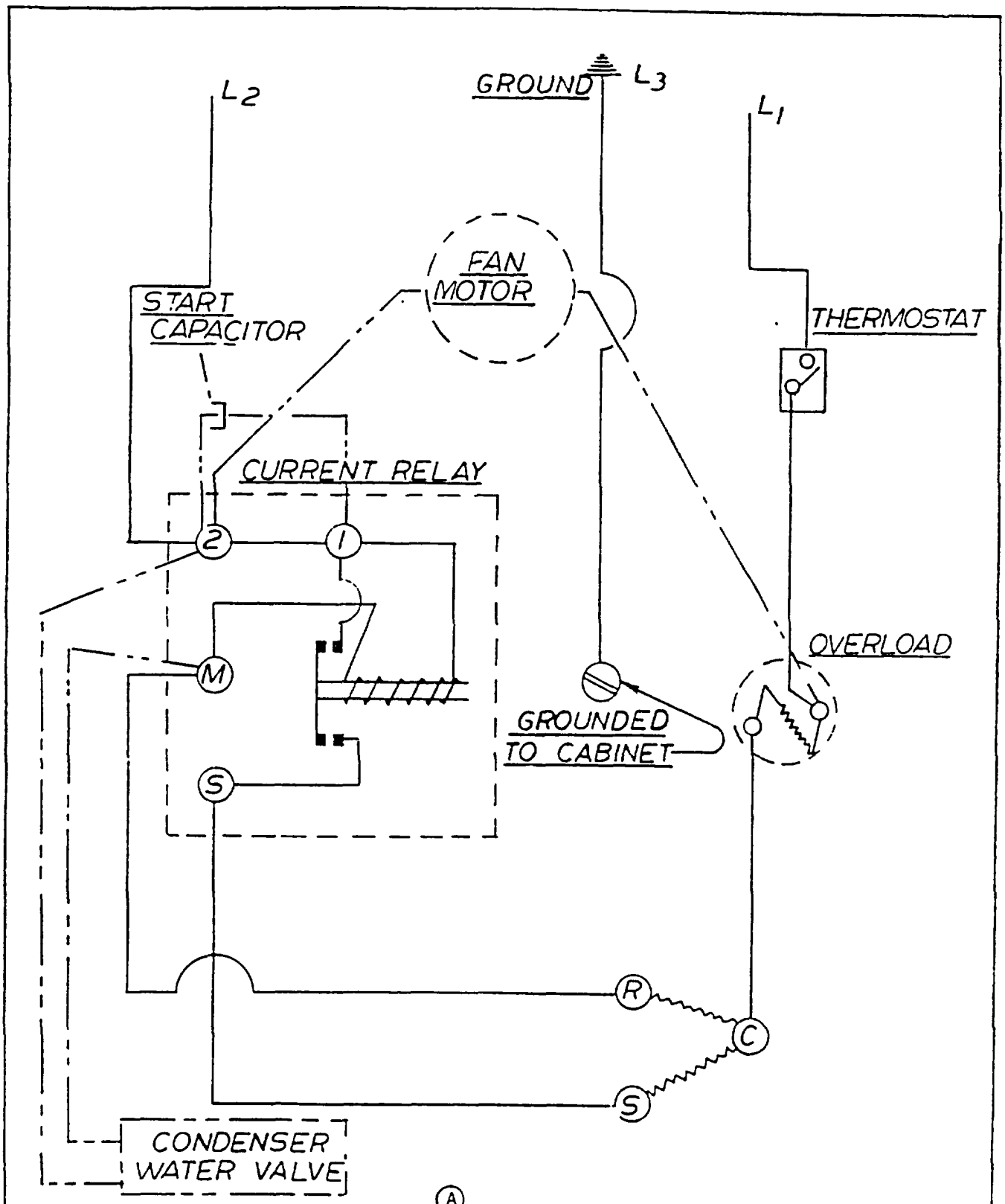
B. Procedure - After checking the electrical characteristics, unwrap the wall cord and plug into the receptacle. The cooler will start to operate on very short cycles until the entire unit is at the proper temperature. The temperature of the water may be regulated by changing the position of the temperature control. The thermostat is factory set and usually does not need to be adjusted.

V. WATER FLOW

A. When the unit has been started, open the bubbler valve to remove the air from the water-containing parts. When all the air has been released, check the height of the drinking water stream. The stream is set at the factory to flow at a desirable height when the water line pressure is between 20 to 75 lbs. P.S.I.G. Should an adjustment be necessary, see Illustration Page.



FREE STANDING FLOOR TYPE ROUGHING-IN

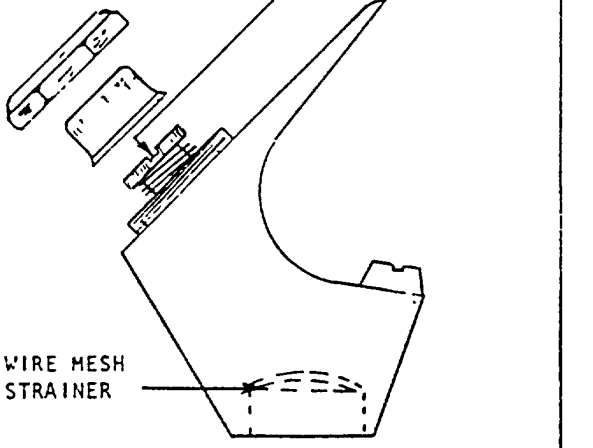


NOTE:
PHANTOM LINES — — — — — — INDICATE AN ADDITION TO THE BASIC CIRCUIT.

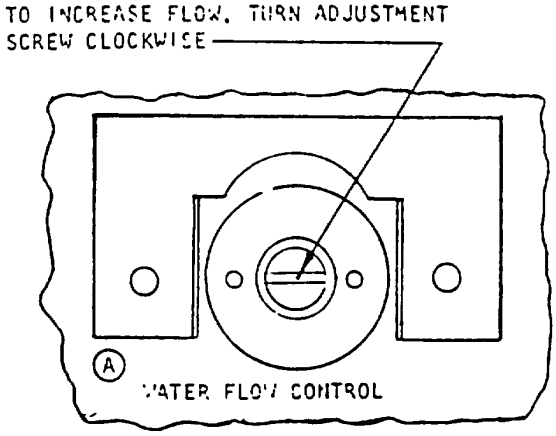
PMX-210

WIRING DIAGRAM

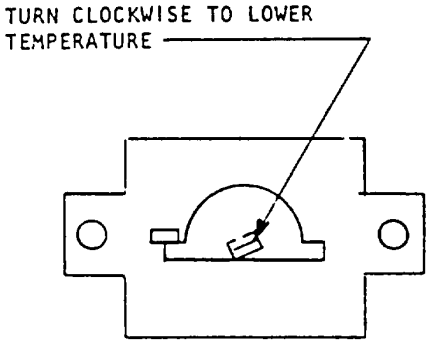
10/73



HAND OPERATED BUBBLER

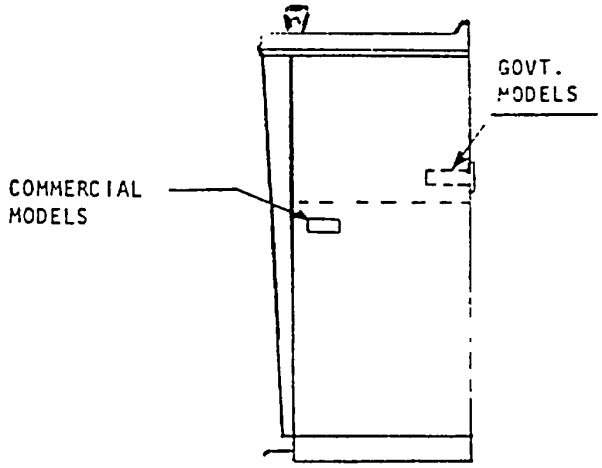


(A) DUAL OPERATED BUBBLER

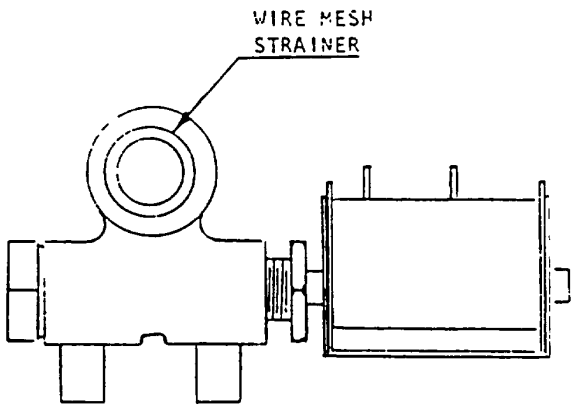


THERMOSTAT

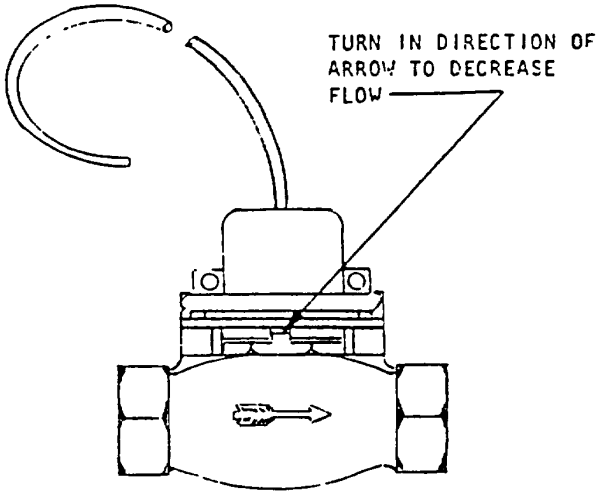
WATER STRAINER LOCATION



DUAL OPERATED MODELS



CONDENSER WATER VALVE (ELECTRIC)



CONDENSER WATER VALVE (PRESSURE)

VI. MAINTENANCE

A. Bubbler - If the bubbler flow rate becomes restricted, shut off water supply, unscrew the bubbler and clean the mesh strainer (See Illustration Page).

B. Thermostat - The thermostat is accessible by removing the front panel and is located on the under side of the compartment shelf. Should malfunctioning of the thermostat be suspected, first check position of control and make sure there is sufficient current and voltage to the cooler. If the contacts are open and the water Is warm, the bellow has lost its gas charge. Replace with a thermostat of the same character. If the contact points are "stuck" closed, make inspection to see If points are burned. If the inspection reveals the points to be burned, the thermostat should be replaced.

Incorrect voltage (voltage that deviates from the standard more than 10) will cause this trouble. The thermostat is factory-set; however, if an adjustment becomes necessary, follow instructions shown. (See Illustration Page.)

C. Overload - There is an overload protector located Inside the terminal cover of the hermetic compressor. This overload will cause the unit to "short-cycle" or "click" if any of the following conditions are present: 1) The condenser Is dirty. 2) The fan will not run. 3) The voltage is too high or too low. Correct the fault and If the unit still falls to operate, replace the overload and relay with new ones of the proper characteristics. Should the unit fail to run, recheck all the electric wiring and check the compressor for shorts.

To check the hermetic compressor for shorts, pull out the cooler plug and with an Ohm Meter. Wheatstone Bridge, or a Resistant Meter, check between each terminal of the hermetic compressor and the hermetic compressor shell. If a short is found, the hermetic compressor must be replaced.

D. Lubrication - Hermetically-sealed motor and compressor units, as well as fan motors, are permanently lubricated and require no further attention. Open type units (belt-driven compressors) should have all bearings checked at least twice a year. This should be done by a competent refrigeration serviceman

E. Care of Exterior - It is recommended, for sanitary reasons, that the cooler top and cabinet be cleaned regularly with a mild cleaning agent.

F. Storage of Cooler - If location of cooler is such that it is subjected to freezing temperatures, care should be taken to completely drain the drinking water storage chamber. Water-cooled models must also have the water condenser coils completely drained.

VII. COOLERS WITH A WATER COOLED CONDENSER MEDIUM

A. There is a condenser water valve provided on all water cooled models. The valve is electrically operated and meters the correct amount of water to the condenser only when the hermetic compressor is running.

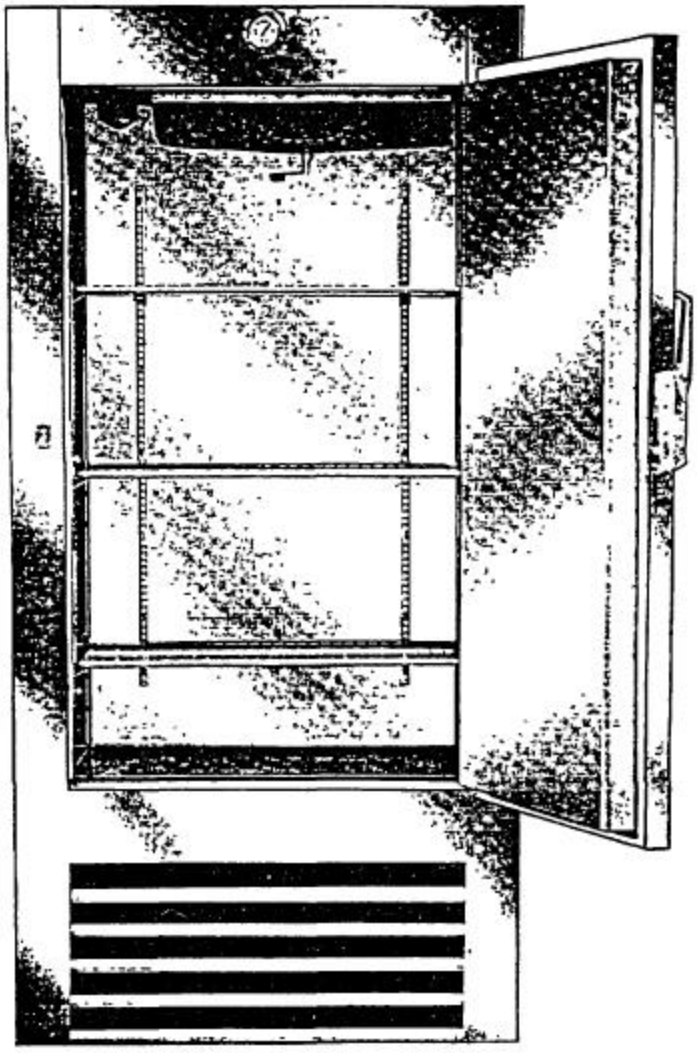
B. The valve has a removable screen that should be cleaned at least twice a year (See Illustration Page). The flow rate is factory set and not adjustable.

C. All models other than those which operate on 115 volts 60 Hz. have a condenser water valve that supplied water to the condenser in proportion to the refrigerant head pressure. This valve can be adjusted (See Illustration Page), but operates automatically and shuts off the water in the condenser when the water cooler is not running.

Ill. FREEZEPROOF PROTECTION

When an anti-freeze thermostat is used as a means to prevent freezing of water in the cooling unit, no attempt should be made to change its setting. If an inspection reveals the thermostat inoperative, it should be replaced.

BAILEY
Model BR-16
REFRIGERATOR



■ This new model, with a net Interior of 15.0 cu. ft has an all-steel frame to provide maximum service under the most rigid marine conditions.

It incorporates many features for easy cleaning and low maintenance. All corners are 1/4" rounded to eliminate hard-to-clean areas. Shelves are removable and the louvered front panel may be removed for easy access to the interior.

The exterior is of 22 gauge No. 4 finish stainless steel with chrome plated hardware to resist nicks and scratches. The Interior is stainless steel and has a dome type light (protected in plastic case) and three plated wire shelves.

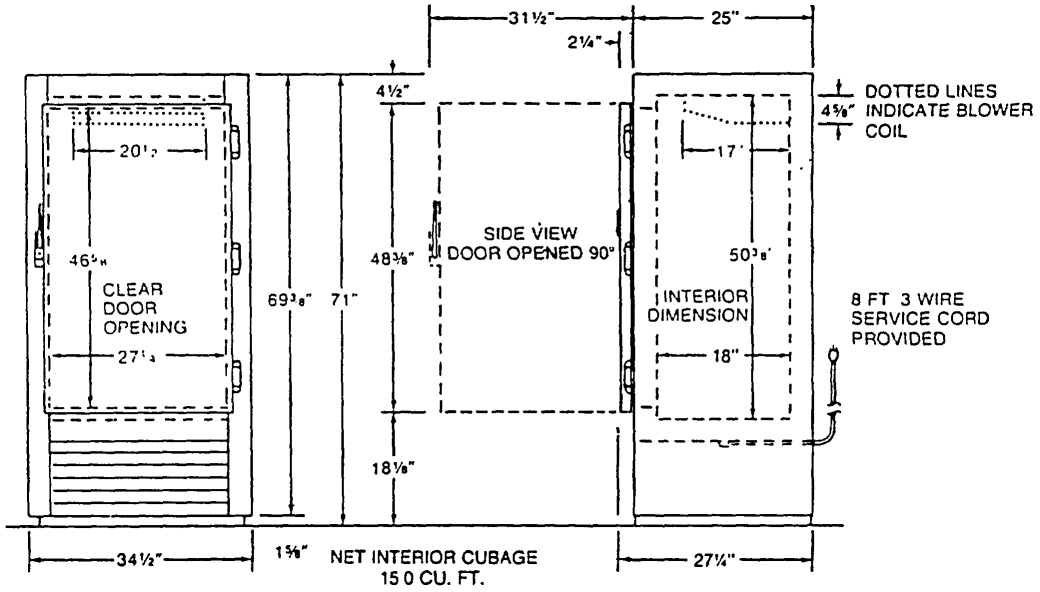
Efficient, dependable cooling is assured with a 1/4 hp condensing unit and 3V" Fiberglas insulation. The unit Is rat-proofed to comply with Public Health regulations. Model Is available with ceiling mounted blower coil.

OTHER REFRIGERATORS from 4 to 102 cu. It.
We have a complete line of standard, portable and undercounter models, all specifically designed for marine use. We can also furnish all of the condensing units, controls, piping, fittings and accessories needed for Installation of remote models.

THE BAILEY LINE also Includes air -conditioners, Ice cubers, water coolers and freezers as well as replacement parts for all units.

SPECIFICATIONS

Exterior	Height		71"
	Width		34 1/2"
	Depth	(incl. door & hardware)	27 1/4"
		(over door open at 90°)	56 1/2"
Interior	Height		50 3/8"
	Width		27 1/2"
	Depth		18"
Shelf Area (incl interior bottom)			13.5 Sq. Ft.
Clear Door Opening			27 1/4" x 46 5/8"
Door Heater			160" of 25 ohms/ft. resistance wire
Unit Cooler Capacity			1350 Btu/hr @ 10° temperature difference
Condensing Unit			1/4 hp, 115v, 60 cy, 1 ph, R12
Condensing Unit Capacity			1998 Btu/hr @ 25° suction temperature in 100° ambient
Interior Light			Automatic, dome type, incandescent 40w
Insulation			#CA-25, 3 1/2" Fiberglas
Interior Surfaces			Stainless Steel
Shelves			3, plated wire, fully adjustable
Electrical Characteristics			115v, 60 cy, 1 ph, 10 amps



BAILEY DISTRIBUTORS, INC.

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Instructions for the Installation, Operation and Maintenance

Refrigerator BR 16BSSC

Your new refrigerated cabinet represents the finest in engineering design, quality of material and craftsmanship effort and, with a minimum of your effort, will provide many years of trouble-free services. Observe carefully and practice faithfully the few, simple instructions prepared by our engineers to insure top performance with minimum service.

GENERAL INFORMATION (All Models)

SELECTING LOCATION - IMPORTANT!

A. Locate the cabinet, allowing at least 4" of space between the back of the cabinet and wall for condenser discharge.

B. Level the cabinet and make certain that shim material be used between the base and any portion of the floor that the base is not contacting. Proper door gasket seal, door alignment and defrost water elimination are assured when the cabinet is installed on a firm, level supporting surface. Follow by applying a smooth continuous bead of construction sealant at the angle formed by the cabinet base and the building floor.

C. Examine the door gasket seal by closing the door(s) on a piece of light paper at intervals of approximately 6" around the perimeter of each door. When the seal is proper, a substantial drag should be felt when attempting to remove the paper with the door completely closed. Each hinge, except the lift-off type, is provided with slotted mounting holes in the wing that is secured to the door. This feature applies or removes gasket pressure on the hinge side of the door. Adjustment of gasket pressure on the lock side of the door is accomplished by adjusting the strike assembly. Each upright freezer or refrigerator door is also fitted with diagonal adjustment straps with the adjustment screws located on the lower edge of the door. This feature is designed expressly for the application of gasket pressure to the two corners of the door opposite the hinges. To apply additional pressure to the lower corner, for instance, tighten the adjustment screw at that corner and loosen the other one accordingly. If, for any reason, it becomes necessary to remove the complete door assembly, remove the screws that secure the hinge to the cabinet exterior. In doing so, the gasket pressure originally applied will not be disturbed.

D. **Electrical Connections:** Check the proposed outlet and make certain that the voltage, phase and current carrying capacity of the circuit from the panel corresponds to the requirements of the cabinet. **Do Not Use An Extension Cord! NOTE: On models that do not contain a plug-in service cord, conduit must be affixed to the junction box provided. A manual disconnect switch must be installed in a convenient location and wired in accordance with existing codes.**

E. **Interior Accessories:** The interior of your cabinet is equipped with heavy wire shelves that can be adjusted very readily to suit your particular requirements. The adjustment slots in the shelf standards are numbered in sequence to assist you in positioning your shelves. Each shelf is heavily plated and lacquered for long life and easy cleaning.

MAINTENANCE

Stainless Steel: Light but frequent cleaning, usually with no more than a damp cloth, then dry with a soft cloth. To eliminate fingerprints, an application of commercial glass cleaner or automobile wax wiped on with a soft cloth till a thin film remains will do a fine job.

Interior Surfaces: From a sanitation standpoint, it is important that the interior of your cabinet be cleaned periodically beginning with the initial installation. Spillage and poorly wrapped packages will tend to cause objectionable odors and, when this condition occurs, cleaning the entire interior with a solution of baking soda and warm water will impart a clean, sweet smell to the storage area. Wipe thoroughly dry after cleaning.

Periodically remove the dirt, dust and lint that will tend to accumulate on the condenser of the condensing unit. This obstruction will materially affect the flow of cool air through

the condenser thereby lowering the efficiency of the system. A brush with stiff bristles will loosen these particles so that they may easily be removed with a vacuum cleaner.

All moving parts have an adequate supply of oil within their housings and generally, require no additional lubrication during the life of the unit.

OPERATION

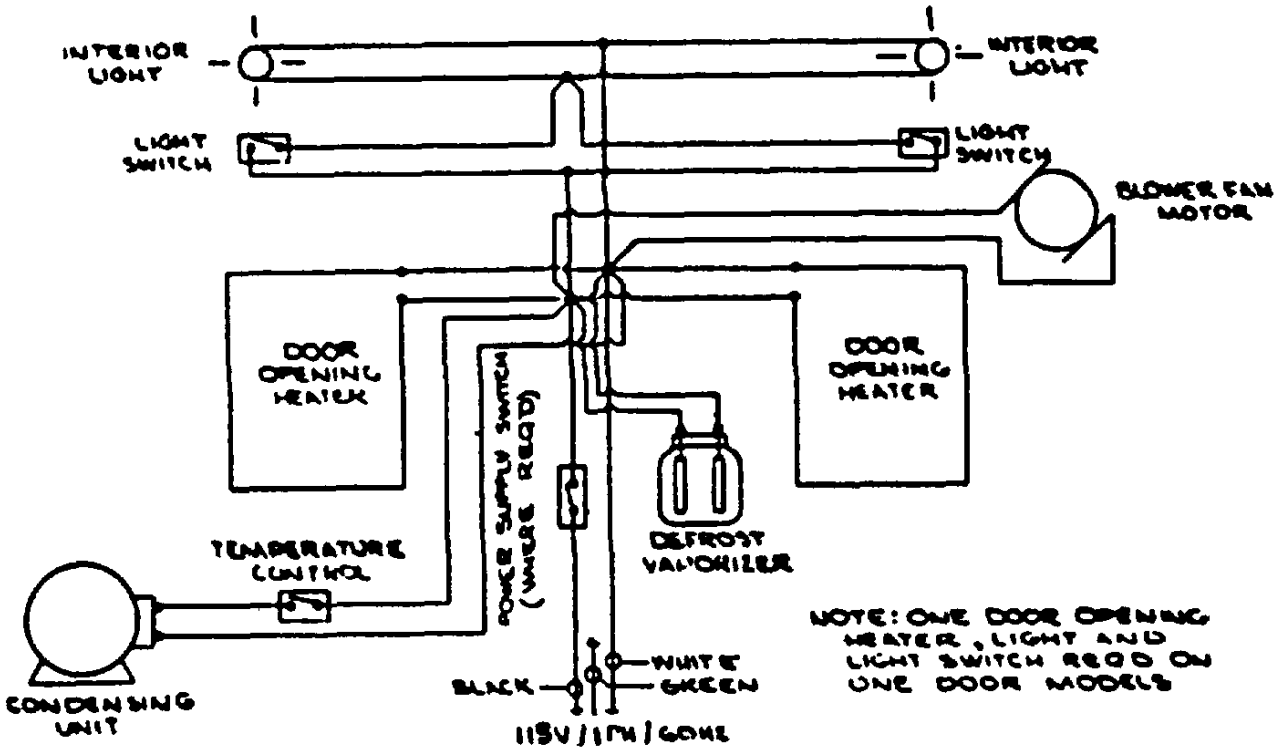
REFRIGERATORS WITH FORCED-AIR UNIT COOLERS (Automatic Defrost):

This refrigerator employs a fin-and-tube evaporator with a fan motor as the cold-producing apparatus.

Defrosting is accomplished automatically each time the condensing unit is on its "off" cycle due to storage temperature air being forced over the evaporator while no evaporation is taking place within the evaporator. The defrost water is discharged then to the vaporizer where it is dissipated by automatic evaporation.

The defrost vaporizer on this cabinet is factory installed for proper operation. If it fails to dissipate the water from the coil, remove the jar, clean it out thoroughly, add one salt tablet, replace the jar, and proper operation will. resume.

WIRING DIAGRAM
ALL FORCED AIR
REFRIGERATORS



REFRIGERATION SYSTEM:

All Bailey units are shipped from the factory with refrigeration valves open and ready to operate, except where condensing units were disconnected for shipping purposes. On condensing units with external springing, hold-down bolts must be loosened before the units are placed into operation.

Temperature controls are factory set and should normally require very little further attention. If temperature adjustments are required, we recommend they be made by your refrigeration service man.

STARTING - READ TAGS ON UNIT:

It is recommended that a competent service man start up and check the installation for leaks and general operation. This system left the factory without leaks; however, it is possible that during shipment some connection might be loosened. All service valves should be checked and must be opened. On remote installation the condensing unit should be located as close as possible to the refrigerator.

If it is necessary to discontinue use of cabinet, with the exception of a capillary system, have unit pumped down and close all valves.

REFRIGERATION CONTROLS:

Temperature controls, when furnished, are located in compressor compartment with sensing bulb located within refrigerator. Control is actuated by temperature at bulb to give quick, accurate response to changes in temperature. Dial evenly calibrated in degrees F for exact settings. Differential is adjustable.

Back pressure controls, when furnished, are factory set at 17 p.s.i. cut out and 35 p.s.i. cut in. These control settings will result in cabinet temperature average of 38°F. under normal conditions. If it becomes necessary to adjust control, the cut in point must never be set lower than 35 p.s.i. or the evaporator will not defrost during the off cycle.

To lower the temperature turn knob to cooler position which will lower the cut off point only. When control is properly set defrost will be automatic.

On freezers, back pressure controls, when furnished, are set to 0 p.s.i. cut out and 10 p.s.i. cut in. These control settings will result in an average temperature of 0°F.

PRODUCT LOADING

Always pack product in refrigerators and freezers so that the air flow is not impeded. The refrigeration of your products depends upon its contact with circulating air. Consequently, great care should be taken not to restrict its flow.

WARRANTY:

All parts of your refrigerator or freezer are covered by a one-year warranty, which is on file at our office. It is not necessary to notify us in any way to validate your warranty.

The Bailey Distributors, Inc. warranty covers only the replacement on parts in exchange for defective parts, F.O.B. Brooklyn, N.Y. (factory). These parts must be returned to our plant, freight prepaid, to determine whether or not the failure was due to defects in material or workmanship.

This warranty is limited to the furnishing of replacement parts only and under no circumstances will a cash or credit reimbursement be issued. Charges for labor or service cannot be made under the terms of this warranty.

When ordering replacement parts, always refer to the model and serial numbers of the cabinet.

MAINTENANCE: GAUGES

Gauges are the only accurate means of determining what is going on inside the unit. No service operations other than the most simple one should be performed without installing gauges.

Description:

There are two types of gauges, and both are necessary:

(1) A pressure gauge for the discharge side of the compressor (also known as "highside" gauge).

(2) A compound gauge for the suction side of the compressor (also known as the "lowside" gauge).

Compound Gauge:

The compound gauge reads from 30 inches of vacuum to 60 pounds pressure. With this gauge installed, it is possible to determine the lowside pressure settings, the vacuum pumping ability of the compressor, when all refrigerant has been removed, to diagnose instruction book.

Pressure Gauge:

The pressure gauge reads from zero pounds to three hundred pounds. It determines the pressure pumping ability of the compressor; leaky discharge valves, air in the system and other points covered in this installation book.

Note: For correct calibration of gauges, before attaching to equipment, the needle should point to zero (0) when the gauge caps are removed in atmospheric pressure.

INSTALLATION OF GAUGES

Gauge installation is not difficult, and the same method is followed in putting on either type.

1. Remove the cap covering the valve stem, being careful not to lose the sealing washers or gaskets.

Installation of Gauges (Continued)

2. Be sure that the valve stem is turned all the way to the left, (counter-clockwise). Note that all attachments are made while the valve is in this position, that is, with the gauge opening closed so that no refrigerant may escape, or air leak into the system.

3. Remove the 1/4” S.A.E. flare cap from the body of the service valve. Note: Some compressors are equipped with 1/8" I.P.S. pipe plug instead of 1/4" S.A.E. Flare Cap. If valve body is equipped with 1/8" I.P.S. pipe plug, screw in 1/8" x 1/44" S.A.E. flare half union coupling.

4. Screw the nut of the connecting tubing on the fitting. With the nut still slightly loose at the gauge, crack the service valve by turning it a fraction of a turn, just enough to let the refrigerant gas force air to the connection, then tighten the gauge immediately. Use a solid wrench or a fixed wrench for turning the valve stem.

5. Turn the stem, clockwise, until the gauge registers.

Start the compressor and read the lowside pressure on the compount gauge, and head pressure on the pressure gauge.

TO REMOVE GAUGES:

1. Close the valve all the way to the left.

2. Loosen the connecting tube, but to release the pressure and take off the gauge.

3. Replace 1/4" S.A.E. Flare Cap. If 1/8” x 1/4" S.A.E. flare half union coupling has been used, remove it and replace 1/8" I.P.S. pipe plug.

SUBJECT: PRESSURE SETTINGS

ADJUSTMENT:

To increase the back pressure, remove the cap and turn the adjustment screw clockwise. To decrease the back pressure, turn the adjustment screw counter clockwise.

Warning:

Freezing in the lowside will occur if the setting is too low.

If this should happen, allow the machine to remain idle for 24 hours, and if no damage has resulted, raise the lowside pressure by adjusting the expansion valve to the correct pressure. A drop in the lowside pressure may also be the result of a loss of refrigerant.

EXPANSION VALVE:

Warning:

Keep the adjustment cap on the valve when the machine is in operation. This prevents moisture from accumulating in the diaphragm.

Never remove the valve or open any part of the system when the compound gauge reads below zero (0) pounds pressure.

TOO LITTLE REFRIGERANT IN THE SYSTEM:

Should a compressor operate too long a period, or too often, it is generally due to the refrigerant supply being low, even though the temperature is cold enough.

A good method of checking the amount of refrigerant is to open, the expansion valve a few turns more than normal. Place a screw driver (metal end) on the refrigerant outlet of the expansion valve, and the handle against the ear, and listen. A lack of refrigerant is indicated by a slight hissing sound. If the amount of refrigerant were normal, the result would be barely noticeable.

When the refrigerant is a little low, the head pressure may be below normal with the machine running; when the supply is very low, the pressure may drop considerably within 10 or 15 minutes after the compressor stops. The suction or back pressure may be higher than normal, while the machine is idle and drop more quickly than it should when the compressor starts, and may continue to be lower than normal with the apparatus in operation.

In any case of low refrigerant, first locate the cause which is almost certain to be a leak (see page for testing for leaks). Do not attempt to add any refrigerant until you have found the leak and have repaired it.

HOW TO ADD
THE REFRIGERANT:

MAKE IT A PRACTICE TO WEIGH THE SERVICE CYLINDER BEFORE AND AFTER ADDING REFRIGERANT. THIS IS THE ONLY WAY TO TELL HOW MUCH REFRIGERANT HAS BEEN ADDED. Inasmuch as the original loss of refrigerant may have resulted in a loss of oil at the same time, check up on the compressor oil supply after several hours.

Be sure the lowside suction valve is turned all the way to the left to close the guage port. Install a tee connection. Put the compound gauge on one end, and connect the far end of this tubing to pound the refrigerant cyclinder. Before tightening the connection finally, crack the service valve to purge the air in the regular way. Attach the pressure gauge to the highside valve.

Warm the refrigerant service cylinder by putting it into a pail of warm water, or by using hot cloths. DO NOT USE A BLOW TORCH. Place the cylinder in an upright position with the valve at the top to admit refrigerant vapor, and not liquid to the compressor crankcase.

Now turn the lowside valve inward, so that the compressor crankcase is opened to the compound gauge and to the tubing which leads to the cylinder for fresh refrigerant. Start the compressor; watch the compound gauge, then open the valve on the service cylinder.

Whenever the compound gauge drops below 28 lbs. open the cylinder valve, whenever this gauge reads about 29 lbs. close the cylinder valve. AIM to keep the compound gauge steady at approximately 28-29 lbs. Don't admit too much refrigerant or admit it rapidly enough to permit the compressor to knock.

Continue to admit the refrigerant vapor in this matter until the compound gauge reads constant between 28-29 lbs., and the pressure gauge shows a reading that corresponds to the room temperature.

Next, close the valve on the service cylinder; let the unit operate long enough to take in the remaining gas from the tube into the compressor; turn the lowside service valve all the way to the left, stop the compressor and remove the service cylinder. Run the machine about 15 minutes and watch the pressure on the highside. If the pressure is too high, indicating that too much refrigerant has been added, crack the connection at pressure gauge and release enough to get correct reading. Then remove the pressure gauge and look over every connection for possible leaks. (For correct head pressure, see name plate. If the room temperature is slightly higher, the pressure will increase slightly and vise versa).

HOW TO PUMP THE REFRIGERANT BACK INTO THE RECEIVER:

Whenever it is necessary to open, or remove for repairs, the expansion valve, expansion coil, or the suction line, all the refrigerant must be pumped back into the receiver and condenser, if it is to be used again after the repairs are completed. The receiver and condenser will hold the entire charge of refrigerant.

Attach a compound gauge to the lowside or suction valve, and a pressure gauge to the highside or discharge shut-off valve, purging the connections in the usual way. After the gauges are attached, turn both valves back one turn for reading; now close the receiver valve to shut-off the receiver from the liquid line going to the expansion valve.

The next step is to start the compressor and run it until the compound gauge shows approximately 5 lbs. This operation pulls the refrigerant all the way around through the system in the direction of the arrows shown in the diagram on the left, and forces into the condenser and receiver.

When this pressure is obtained, it is reasonably certain that all the refrigerant is pumped back into the condenser and receiver.

At this point, the unit can be stopped, and the highside shut-off valve closed to prevent any refrigerant vapor going back into the compressor should the compressor valves leak.

Warning:

Never open a system on a vacuum as air will rush into replace the vacuum and will probably draw some moisture into the system.

With the refrigerant back into the condenser and receiver, any part can be removed from the unit with the exception of the highside shut-off valve, the condenser, and the receiver. These parts still have the refrigerant in them.

HOW TO DISCHARGE EXCESS REFRIGERANT:

Either too much or too little refrigerant will result in improper operation.

Systems with too much refrigerant are somewhat like those with air in the system. THE HEAD PRESSURE BEING TOO HIGH. For correct head pressure, see Name Plate.

If the operating head pressure is too high, stop the machine, if the off head pressure is still higher than the corresponding room temperature, air is In the system. However, if the off room temperature, air is the system. However, if the off pressure drops to normal, the indication is too much refrigerant. This excess liquid reduces the amount of condenser area and overloads the machine causing t to run excessively.

The overload protection may trip; the condenser will be hotter than normal near the top and cooler than normal near the bottom.

In any case, refrigeration will not be satisfactory and the charge must be reduced to the correct amount by discharging the excess refrigerant.

Excess refrigerant is released through the highside service valve. The high pressure gauge must be attached to the highside valve in the regular way to observe the drop in pressure as the refrigerant is removed. The gauge connection of the highside service valve may be opened a little, two or three times in succession until the pressure comes down to a normal corresponding value of the condensing gas pressure and the room temperature in which the cooler is operating.

Open the discharge service valve to release some refrigerant. Don't let too much refrigerant out at a time, because this may discharge more refrigerant than necessary and result in improper operation of the cooler.

REFRIGERANT LEAK TESTS

Testing for Leaks:

In event it is suspected that there is a leak in the system, it will be necessary to check the entire system. This means all tubing connections, valves, receiver, condenser, evaporator, compressor.

The method of testing for leaks in two fold, depending on whether or not the leak occurs on the highside or on the lowside.

The lowside refers to that part of the system constituting the evaporator, suction line, and crankcase up to the intake valve located in the valve plate.

The highside refers to that part of the system extending from the cylinder head, condenser, receiver tank and liquid line up to the expansion valve.

It is evident that before testing for leaks on the lowside, it is necessary to build up a pressure on the lowside. This is done by attaching the pressure gauge at the suction service valve, shutting off the unit, adjusting the expansion valve to a wide open position until sufficient pressure (at least 70 pounds) is built up in the lowside. If the system has been allowed to cool down, 45 to 50 pounds is all that can be obtained.

Soap Test Method:

Place a small piece of shaving soap, or any good soap that will make a heavy lather in a cup; add water to the soap just as you would prepare a lather for shaving; apply the lather with a small brush completely around and over every joint to be tested; hold a light from a torch flashlight in such a manner that the entire joint can be inspected; if there is any leaks, it will be indicated by a formation of small bubbles. (in the event of a leak, repair the leak and repeat the test).

Oil Test Method:

In the event that soap is not available, oil may be substituted for the lather; apply the oil with a small brush, completely around the and over every joint to be tested; If there is any leak, it will be indicated by a formation of small bubbles; where the oil method is used, a heavy grade of oil should be applied to all joints as a light grade will run off before the test can be made. Wipe all traces of oil from the joints after the test had been completed.

Air in the system may be caused by one of two reasons:

1. By carelessness in servicing or charging methods permitting air to enter in the system.

2. By a leak in the lowside when all refrigerant leaks out allowing air to be drawn into the system when operating under a vacuum.

Air is non-condensable under the temperature and pressure conditions existing in refrigerating compressors. Therefore, the air becomes an inert substance which remains in the compressor head and condenser, resulting in: (a) increased discharge pressures and (b) reduced condenser efficiency.

If sufficient air is present, the discharge pressure will become so high that the compressor operation will be overworked forcing the motor overload device to cut out.

To distinguish whether air in system or an overcharge of the refrigerant is causing the trouble it will be relatively easy to determine this by shutting off the unit and allowing it to cool to room temperature. In the case of a refrigerant overcharge, the discharge pressure will return to the normal figure which corresponds the pressure, that is normal for the existing room temperature. However, if air is present, it will be seen that the head pressure does not return to the normal figure when the unit has cooled down to the existing room temperature.

Purging Air:

An excess of refrigerant or the presence of air in the system will necessitate a purging operation. This is accomplished as follows: Disconnect the pressure gauge at discharge service valve, and by opening the discharge valve so that air is allowed to escape slowly,. the service man at this discretion can purge the required amount. This is entirely a matter of judgement and experience.

COMPRESSOR

Testing the Compressor:

If for any reason the compressor is not pumping sufficient gas, it is obvious that poor performance is the result. This can be caused by leaky valves. To ascertain whether the valves are leaking, use the following method;

Vacuum Test:

A compound gauge is installed at the suction service valve. Shut off the suction line after having started the compressor. A hammering sound, coming from the cylinder head, indicates that an excessive amount of oil is being pumped through the compressor. Oil is incompressible and its presence in the cylinder and passing through the valves is the cause of the hammering. The valves are designed to stand this abuse. It nevertheless is undesirable because the oil is gradually being transferred to the condenser and receiver, which means that insufficient oil remains in the crankcase to lubricate the compressor. As soon as the compressor starts to pump oil, the motor should be shut-off for a short period of time, and then restarted and stopped until quiet operation of the compressor is secured.

All during this time, the compound gauge should be given careful attention and when the compressor pumps a 24" to 26" vacuum or more, it is functioning properly. If and when a 24" to 26" vacuum is attained, the motor should be shut off, and the compound gauge carefully watched. In event the loss of vacuum is pronounced, that is, the back pressure readings advance to a pressure within a short period of time, kt is a very good indication of a leaky discharge valve.

REPAIR INSTRUCTIONS

PUMP DOWN OF UNIT

To replace or repair refrigeration system components, it will be necessary to pump the refrigerant out of the evaporator and tubing into the receiver tank of the condensing unit to replace an expansion valve and dehydrator. .To pump down the unit, attach a compound pressure gage to the suction service valve. Close the receiver service valve and allow the compressor to run until the pressure drops to 3 p.s.i. Start and stop unit several times to reach the 3 p.s.i. pressure reading to prevent too fast a pumping effect which will cause excessive foaming of crankcase oil. When the 3 p.s.i. pressure reading is indicated, turn in to close (clockwise) the suction service valve. The replacement parts can now be installed.

PURGING METHOD

After the necessary repairs have been done on the refrigeration system, non-condensible gas such as air has to be removed from the lines and system parts. Air in the condenser will cause excessive high side pressure resulting in long operating periods. To purge air from system, close the suction service valve and loosen the flare nut at the suction valve. Open the receiver service valve slightly to permit Freon vapor to push the air through the system and out at the suction service valve flare nut. The time to complete the purging will be approximately 30 seconds. When the purging is complete, the suction service valve flare nut can be tightened.

REFRIGERANT CHARGING

Charge this system with refrigerant-12 only. The recommended method of charging refrigerant into a refrigerating system of this type is to charge thru the low side (suction side) of the system. Extreme care must be observed so that raw liquid does not enter the compressor and injure the valves. Charge with the refrigerant drum in an upright position only. Allow the compressor to pump refrigerant vapor from the Freon drum being used for the charging operation. Connect a conventional charging manifold with gauges attached to the suction service valve port and Freon drum. Start the compressor and add a little gas at a time to prevent overcharging. To determine the required amount of Freon added to the system, observe the noise level of the expansion valve when charging the system. A hissing noise in the valve indicates a shortage of refrigerant. Add refrigerant until the hissing noise in expansion valve has been eliminated. Close suction service valve port and remove charging hose.

REPAIR INSTRUCTIONS

LEAK TESTING

Leaks in any refrigerating system may be caused by careless usage or during shipment. The smallest leak will eventually cause failure of the refrigerating system. A trace of oil found around a connection indicates that there is a leak at this point and steps should be taken to test and repair it.

A Halide torch is used to detect a leak on a condensing unit Freon 12 refrigerant. It is necessary that the copper heat plate in the torch be red hot during the test. Pass the pick up tube very slowly around all sides of the Joint to be tested. As Freon is heavier than air, it is usually easier to find a leak Just below the suspected area. A change color in the flame from blue to green indicates a leak.

EXPANSION VALVE REPLACEMENT

To replace an expansion valve, the condensing unit has to be pumped down as explained. Care must be taken so that no moisture enters the open lines. Allow the evaporator to defrost and wipe off all moisture around the flare nuts with Carbon Tetrachloride. Replace the valve and tighten down the falre nut. When a system has been opened, it is a safe policy to change the dehydrator at the same time in event some moisture entered the system. Charge the system as explained in refrigerant charging.

The expansion valve for this model is listed on the material list. When replacing an expansion valve, use exact replacement. Keep the adjustment cap on the valve when the machine is in operation. This prevents moisture from accumulating in the diaphragm and freezing.

TEMPERATURE CONTROL REPLACEMENT AND ADJUSTMENT

The control has an adjustment for any slight variation in compartment temperature that may be required. At no time, except for servicing or replacement purposes should the adjustment be moved. The control is pre-set to operate at a specific temperature range.

REPAIR INSTRUCTIONS

The temperature at which the switch opens and closes the circuit is adjustable within the limits of the operating range. The range screw is located on the outside of the case. The range adjustment always sets the point at which the circuit closes and the point at which the circuit opens is governed by the differential.

A change in the setting of the range adjustment raises or lowers both the opening and closing points, and the differential remain constant over the whole operating range.

To change the temperature control, all electrical power to the cabinet should be disconnected. To disconnect the wiring, remove the terminal cover.

DEHYDRATOR REPLACEMENT

The dehydrator is manufactured by Sporlan Valve Co. The dehydrator is placed in the liquid line, and the purpose served is to keep moisture out of the refrigerant circuit. The dehydrator is flare connected to enable easy replacement. The dehydrator is moisture absorbing; and if the refrigerant lines are disconnected for servicing, the dehydrator must be replaced.

To replace a dehydrator, pump down the unit, remove the flare nuts using the same precautions as changing an expansion valve and charge the system. Be sure the flow of liquid through the drier is the same as the arrow indicates on the dehydrator. It should point away from the receiver tank towards the evaporator.

Trouble Shooting and Service Chart

	COMPLAINT	POSSIBLE CAUSE	REPAIR
A	Compressor will not start - no hum	1. Line disconnect switch open. 2. Fuse removed or blown. 3. Overloaded protector tripped. 4. Control stuck in open position. 5. Control off due to cold location. 6. Wiring improper or loose.	1. Close start or disconnect switch. 2. Replace fuse. 3. Refer to electrical section. 4. Repair or replace control. 5. Relocate control. 6. Check wiring against diagram.
B	Compressor will not start - hums but trips on overload protector	1. Improperly wired. 2. Low voltage to unit. 3. Starting capacitor defective. 4. Relay failing to close. 5. Compressor motor has a winding open or shorted. 6. Internal mechanical trouble in compressor. 7. Liquid refrigerant in compressor.	1. Check wiring against diagram. 2. Determine reason and correct. 3. Determine reason and replace. 4. Determine reason and correct, replace if necessary. 5. Replace compressor. 6. Replace compressor. 7. Add crankcase heater and/or accumulator.
C	Compressor starts, but does not switch off of start winding	1. Improperly wired. 2. Low voltage to unit. 3. Relay failing to open. 4. Run capacitor defective. 5. Excessively high discharge pressure. 6. Compressor motor has winding open or shorted. 7. Internal mechanical trouble in compressor (tight).	1. Check wiring against diagram. 2. Determine reason and correct. 3. Determine reason and correct, replace if necessary. 4. Determine reason and replace. 5. Check discharge shut-off valve, possible overcharge, or insufficient cooling on condenser. 6. Replace compressor. 7. Replace compressor.
D	Compressor starts and runs, but short cycles on overload protector	1. Additional current passing through overload protector. 2. Low voltage to unit (or unbalanced if three phase). 3. Overload protector defective. 4. Run capacitor defective. 5. Excessive discharge pressure. 6. Suction pressure too high. 7. Compressor too hot - return gas hot. 8. Compressor motor has a winding shorted.	1. Check wiring diagram. Check for added fan motors, pumps, etc., connected to wrong side of protector. 2. Determine reason and correct. 3. Check current, replace protector. 4. Determine reason and replace. 5. Check ventilation, restrictions in cooling medium, restrictions in refrigeration system. 6. check for possibility of misapplication. Use stronger unit. 7. Check refrigerant charge (fix leak), add if necessary. 8. replace compressor.
E	Unit runs OK, but short cycles on	1. Overload protector. 2. Thermostat. 3. High pressure cut - out due to: a. Insufficient air or water supply. b. Overcharge. c. Air in system. 4. Low pressure cut - out due to: a. Liquid line solenoid leaking. b. Compressor valve leak. c. Undercharge. d. Restriction in expansion device.	1. See D. above. 2. Differential set too close - widen. 3a. Check air or water supply to condenser - correct. 3b. Reduce refrigerant charge. 3c. Purge. 4a. Replace. 4b. Replace. 4c. Fix leak, add refrigerant. 4d. Replace device.

Trouble Shooting and Service Chart

	COMPLAINT	POSSIBLE CAUSE	REPAIR
F	Unit operates long or continuously	1. Shortage of refrigerant. 2. Control contacts stuck or frozen closed. 3. Refrigerated or air conditioned space has excessive lead or poor insulation. 4. system inadequate to handle load. 5. Evaporator cell iced. 6. Restriction in refrigeration system. 7. Dirty condenser. 8. Filter dirty.	1. Fix leak, add charge. 2. Clean contacts or replace control. 3. Determine fault and correct. 4. Replace with larger system. 5. Defrost. 6. Determine location and remove. 7. Clean condenser. 8. Clean or replace.
G	Start capacitor open, shorted, or blown.	1. Relay contacts not operating properly. 2. Prolonged operation on start cycle due to: a. Low voltage to unit. b. Improper relay. c. Starting load too high. 3. Excessive short cycling. 4. Improper capacitor.	1. Clean contacts or replace relay if necessary. 2a. Determine reason and correct. 2b. Replace. 2c. Correct by using pump down arrangement if necessary. 3. Determine reason for short cycling (E above) and correct. 4. Determine correct size & replace.
H	Run capacitor open, shorted, or blown	1. Improper capacitor. 2. Excessively high line voltage (100% of) rated - max).	1. Determine correct size and replace. 2. Determine reason and correct.
I	Relay defective or burned out	1. Incorrect relay. 2. Incorrect mounting angle. 3. Line voltage too high or too low. 4. Excessive short cycling. 5. Relay being influenced by loose vibrating mounting. 6. Incorrect run capacitor.	1. Check and replace. 2. Remount relay in correct position. 3. Determine reason and correct. 4. Determine reason (See E above) and correct. 5. Remount rigidly. 6. Replace with proper capacitor.
J	Space temperature too high	1. Control setting too high. 2. Expansion valve too small. 3. Cooling coils too small. 4. Inadequate air circulation.	1. Reset control. 2. Use larger valve. 3. Add surface or replace. 4. Improve air movement.
K	Suction line frosted or sweating	1. Expansion valve passing excess refrigerant or is oversized. 2. Expansion valve stuck open. 3. Evaporator fan not running. 4. Overcharge of refrigerant.	1. Readjust valve or replace with smaller valve. 2. Clean valve of foreign particles, replace if necessary. 3. Determine reason and correct. 4. Correct charge.
L	Liquid line frosted or sweating	1. Restriction in dehydrator or strainer. 2. Liquid shut-off (king valve) partially closed.	1. Replace part. 2. Open valve fully.
M	Unit noisy	1. Loose parts or mountings. 2. Tubing rattle. 3. Bent fan blade causing vibration. 4. Fan motor bearings worn.	1. Find and tighten. 2. Reform to be free of contact. 3. Replace blade. 4. Replace motor.

PARTS LIST

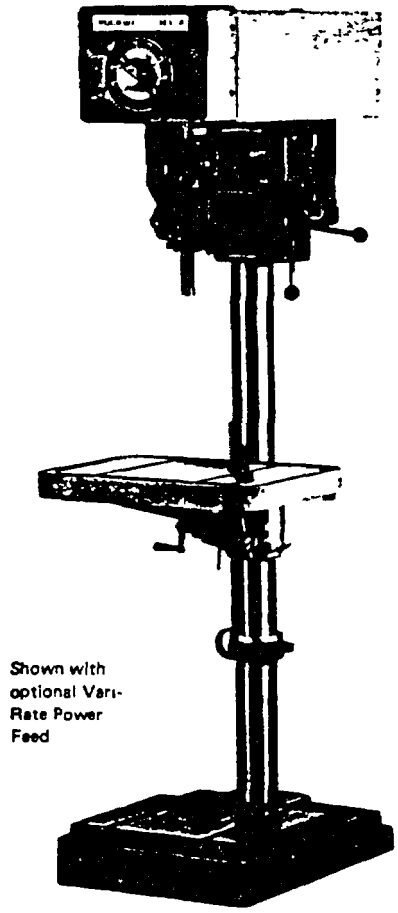
BR16BSSC REFRIGERATOR

QUANTITY	PART	MODEL #
1	Condensing Unit 1/4 H.P.	FBAH-0025-1AA
1	*Relay	040-0090-00
1	*Capacitor	014-0032-00
1	*Overload	071-0369-11
1	*Condenser Fan Motor	050-0243-00.
1	Blower Coil (Evaporator)	CCH-013B
1	Blower Coil Fan Motor	879-250697S-00-0
1	Blower Coil Fan Blade	(Fan blade for above motor)
1	Pressure Control	P70AB
1	Expansion Valve	NIFI/2C
1	Drier	C032
1	NSF Door Gasket	B0041
1	National Handle	59-1105
1	National Strike	59-1106
1	Defrost Vaporizer	DV6N
2	National Hinge	59-229A

*We must have model number of condensing unit which can be found on specification plate on base of condensing unit.

Instruction manual

17"
Variable Speed
Drill Press
(beginning with serial #141-1800)



Shown with optional Vari-Rate Power Feed

Rockwell

The Serial No./Series No. plate is attached to the right side of the machine head casting. Locate this plate and record the Serial No. and Series No. in your manual for future reference.

SERIAL NO._____

SERIES NO. _____

DATE OF PURCHASE _____

PART NO. 402-07-651-5009 Dated 4-20-78

SAFETY RULES FOR ALL TOOLS

As with all power tools there is a certain amount of hazard involved with the operator and his use of the tool. Using the tool with the respect and caution demanded as far as safety precautions are concerned will considerably lessen the possibility of personal Injury. However, If normal safety precautions are overlooked or completely ignored, personal injury to the operator can develop.

There are also certain applications for which this tool was designed. Rockwell strongly recommends that this tool NOT be modified and/or used for any application other than for which It was designed. If you have any questions relative to its application DO NOT use the tool until you have written Rockwell and we have advised you.

ROCKWELL INTERNATIONAL
MANAGER OF PRODUCT SAFETY
POWER TOOL DIVISION
400 NORTH LEXINGTON AVENUE
PITTSBURGH, PENNSYLVANIA 15208

1. KNOW YOUR POWER TOOL. Read the owner's manual carefully. Learn the tools applications and limitations, as well as the specific potential hazards peculiar to it.

2. KEEP GUARDS IN PLACE and in working order.

3. GROUND ALL TOOLS. If tool is equipped with three-prong plug, it should be plugged into a three-hole electrical receptacle. If an adapter is used to accommodate a two-prong receptacle, the adapter lug must be attached to a known ground. Never remove the third prong.

4. REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning It on.

5. KEEP WORK AREA CLEAN. Cluttered areas and benches Invite accidents.

6. AVOID DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.

7. KEEP CHILDREN AND VISITORS AWAY. All children and visitors should be kept a safe distance from work area.

8. MAKE WORKSHOP KIDPROOF - with padlocks, master switches, or by removing starter keys.

9. DON'T FORCE TOOL. It will do the job better and be safer at the rate for which it was designed.

10. USE RIGHT TOOL. Don't force tool or attachment to do a job it was not designed for.

11. WEAR PROPER APPAREL. No loose clothing, gloves, neckties, or jewelry to get caught in moving parts. Non slip footwear is recommended. Wear protective hair covering to contain long hair.

12. USE SAFETY GLASSES. Also use face or dust mask if cutting operation is dusty.

13. SECURE WORK. Use clamps or a vise to hold work, when practical. It's safer than using your hand and frees both hands to operate tool.

14. DON'T OVERREACH. Keep your proper footing and balance at all times.

15. MAINTAIN TOOLS IN TOP CONDITION. Keep tools sharp and clean for best and safest performance Follow instructions for lubricating and changing accessories.

16. DISCONNECT TOOLS before servicing and when .changing accessories such as blades, bits, cutters.

17. USE RECOMMENDED ACCESSORIES. Consult the owner's manual for recommended accessories. The use of Improper accessories may cause hazards.

18. AVOID ACCIDENTAL STARTING. Make sure switch is in "OFF" position before plugging in cord.

19. NEVER STAND ON TOOL. Serious Injury could occur If the tool is tipped or If the cutting tool is accidentally contacted.

20. CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to ensure that It will operate properly and perform Its Intended function - check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect Its operation. A guard or other part that is damaged should be properly repaired or replaced.

21. DIRECTION OF FEED. Feed work into a blade or cutter against the direction of rotation of the blade or cutter only.

22. NEVER LEAVE TOOL RUNNING UNATTENDED. **TURN POWER OFF.** Don't leave tool until It comes to a complete stop.

23. DRUGS. ALCOHOL, MEDICATION. Do not operate tool while under the influence of drugs, alcohol or any medication.

ADDITIONAL SAFETY RULES FOR DRILL PRESSES

1. BE SURE drill bit or cutting told is securely locked in the chuck.

2. BE SURE chuck key is removed from the chuck before turning on power.

3. ADJUST the table or depth stop to avoid drilling into the table.

4. SHUT OFF the power, remove the drill bit or cutting tool, and clean the table before leaving the machine.

5. CAUTION: When practical, use clamps or a vise to secure workpiece to keep the workpiece from rotating with the drill bit or cutting tool.

6. WARNING: For Your Own Safety - Don't wear gloves when operating a drill press.

SETTING UP

Your 17" Variable Speed Drill Press was completely assembled and tested at the factory. When selecting floor space please note that vibration transmitted through inadequately constructed floors by adjacent machinery or other source can impair the accuracy of your machine. Supplied with your drill are four anti-vibration pads and four steel plates. When the drill is moved to it's permanent shop location, position the four anti-vibration pads and the four 1/16" steel plates under each corner of the drill press base, with the steel plates between the pads and the base of the drill. If the machine is to be fastened to the floor, the compressed height to the top of the steel plates should be 5/16".

The head ad table of your drill press have been lowered on the column for convenience in packaging. To raise the head, proceed as follows:

1. Place a block of wood, about 7" long. between the drill press head and the table, as close to the column as possible.

2. Make sure the collar at the bottom of the raising mechanism rack is tight on the column and unlock the table clamp. Then loosen the two bolts, located on the right hand side of the head, that lock the head to the column.

3. Turn the raising mechanism hand crank clockwise to raise the table and head simultaneously.

4. When the table approaches the top of the raising mechanism, lock the table and head to the column. Then loosen the raising mechanism collar and turn the raising mechanism hand crank counter-clockwise. This will slide the rack of the raising mechanism further up the column.

5. Repeat STEPS 2, 3 and 4 until the top of the head is at the desired height. Be sure not to raise the top of the head casting beyond the top end of the column.

6. With the head and table still loose, visually line up the spindle with center of the base and lock the head to the column.

7. Position the table and raising mechanism to the desired position on the column and lock them in place.

The table and all other machined or unpainted surfaces of the drill press are protected with a coating of rust preventive. This coating may be removed with a soft cloth moistened with kerosene (do not use acetone, gasoline or lacquer thinner for this purpose.) After cleaning, cover all unpainted surfaces with a light film of good machine oil.

MOTORS AND SPEEDS

Rockwell $^3/_4$ hp or 1 hp 8 $^1/_2$" frame motors may be used on 17" Drill Presses. However, $^3/_4$ hp motors should not be used for any power feed or variable speed machines when they are intended for full capacities.

With a 1140 rpm motor, spindle speeds between 230 and 2830 rpm can be obtained.

With a 1725 rpm motor, spindle speeds between 350 to 4250 rpm can be obtained

When selecting a motor of any other make, be certain that it has the above specifications and is a NEMA 182 frame motor. Also be sure it is protected against loss of lubricant when operated in a vertical position.

When assembled to the drill press, the motor should turn in a clockwise direction as viewed from the top.

ADJUSTING SPINDLE

RETURN SPRING

For the purpose of automatically returning the spindle upward after a hole has been drilled, a spring is provided enclosed in the case (A) Fig. 1, and is located on the left side of the drill press head. This spring has been properly adjusted at the factory and this adjustment should not be disturbed unless absolutely necessary.

If it should become necessary to adjust it, proceed as follows:

1. Back off the two nuts (B) Fig. 1. NOTE: Do not remove the inside nut from the shaft. The nuts (B) should be backed off just far enough so that the spring housing (A) can be disengaged from the roll pin in the head casting.
2. With a firm hold on the spring housing (A) Fig. 1, disengage it from the pin in the drill press head, by pulling the housing straight out, and turn the housing counterclockwise to increase or clockwise to decrease tension. CAUTION: BE CAREFUL NOT TO BOTTOM THE RETURN SPRING WHILE TURNING THE HOUSING COUNTERCLOCKWISE. THERE SHOULD BE ENOUGH SLACK LEFT IN THE SPRING TO PERMIT LOWERING THE SPINDLE THE FULL AMOUNT OF TRAVEL. Be sure the pin in the drill press head is engaged with the spring housing before releasing grip.
3. Retighten the two nuts (B) Fig. 1. NOTE: Do not over-tighten the inside nut against the spring housing (A) as this may cause binding of the pinion shaft.
4. The tension of the spring can be tested by turning pilot wheel counterclockwise. Be sure quill is not locked while testing.

NOTE: The spindle return spring will lift approximately 40 pounds. When tapping heads, multiple spindles, or other heavy tooling is mounted on the quill or spindle of your machine, the use of our Cat. No. 17-838 Booster Spindle Return Spring Kit, along with the return spring supplied with your drill press, will enable the spindle to lift approximately 80 pounds.

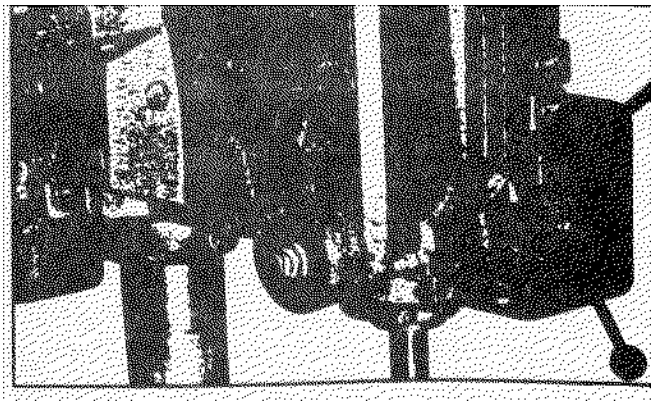


Fig. 1

CONNECTING DRILL PRESS TO POWER SOURCE

A separate electrical circuit should be used for your power tools. This circuit should not be less than #12 wire and should be protected with 20 Amp time lag fuse. If an extension cord is used, use only 3-wire extension cords which have 3-prong grounding type plugs and 3-pole receptacles which accept the tools plug. For distances up to 100 feet use #12 wire. For distance up to 160 feet use #10 wire. Before connecting the motor to the power line, make sure the switch is in the "OFF" position and be sure that the electric current is of the same characteristics as stamped on motor nameplate. All line connections should make good contact. Running on low voltage will injure the motor. Have a registered electrician replace or repair damaged or worn cords immediately.

GROUNDING INSTRUCTIONS - 115 VOLT

This tool must be grounded while in use to protect the operator from electric shock. If the motor supplied with your drill press is wired for 115 Volt, Single Phase it is equipped with an approved 3-conductor cord and 3-prong grounding type plug to fit the proper grounding type receptacle, as shown in Fig. 2. The green conductor in the cord is the grounding wire. Never connect the green wire to a live terminal.

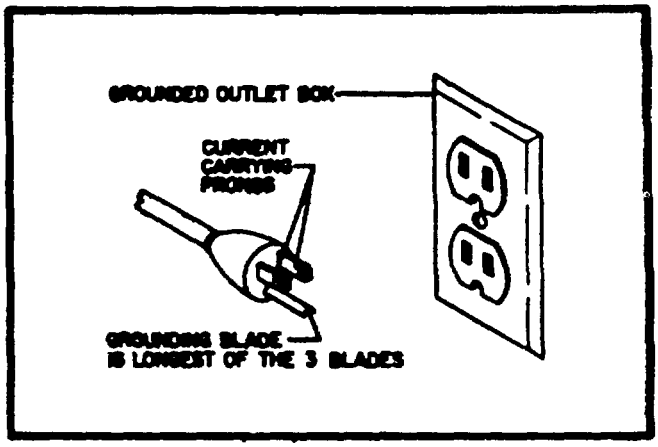


Fig. 2

An adapter, shown in Fig. 3, is available for connecting 3-prong grounding type plugs to 2-prong receptacles. THIS ADAPTER IS NOT APPLICABLE IN CANADA. The green-colored rigid ear, lug, etc., extending from the adapter is the grounding means and must be connected to a permanent ground such as to properly grounded outlet box, as shown in Fig. 3.

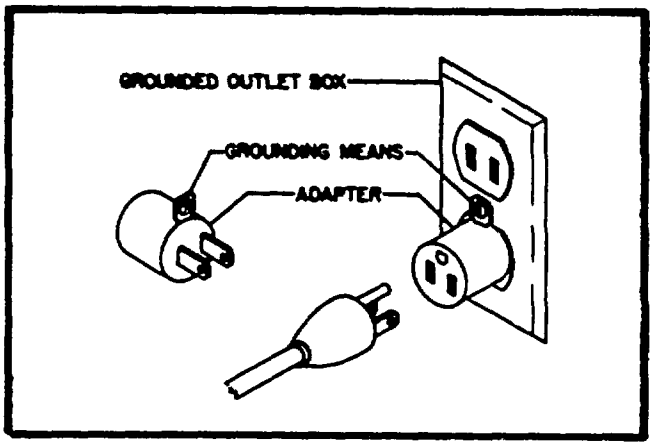


Fig. 3

GROUNDING INSTRUCTIONS - 230 VOLT

If the motor on your machine is wired for 230V single phase, the power cord must be equipped with a plug that has two flat, current-carrying prongs in tandem, and one round or "U"-shaped longer ground prong. This is used only with the proper mating 3-conductor grounding type receptacle, as shown in Fig. 4. When the three-prong plug on your machine is plugged into a grounded 3-conductor receptacle, the long ground prong on the plug contacts first so the machine is properly grounded before electricity reaches it.

THREE PHASE INSTALLATION

If the motor on your machine is wired for 200V, 230V, or 480V three phase, the necessary wiring from the starter to the power source should be completed by a competent electrician.

IMPORTANT: IN ALL CASES, MAKE SURE THE RECEPTACLE IN QUESTION IS PROPERLY GROUNDED. IF YOU ARE NOT SURE HAVE A REGISTERED ELECTRICIAN CHECK THE RECEPTACLE.

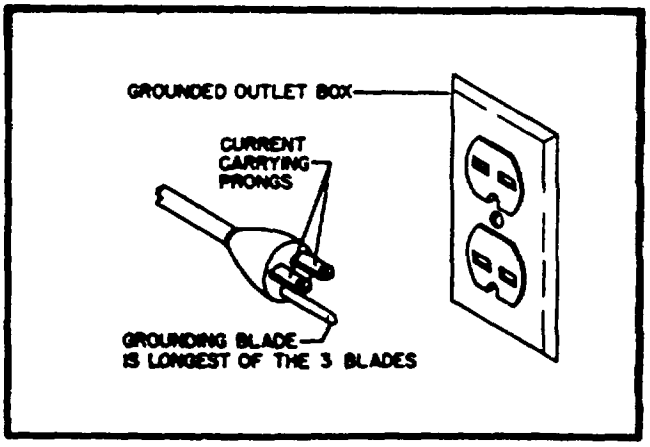


Fig. 4

VARIABLE SPEED CONTROL

The pilot wheel (A) -Fig. 5, for Variable Speed Drive should not be turned except when the motor is running, to avoid putting unnecessary strain on the variable speed drive belt and variable speed drive pulley assembly. The pilot wheel is turned clockwise to make the drill press run faster, and counterclockwise to slow it down.

While changing speeds the pointer (B) Fig. 5, on the speed dial will indicate the speed of the drill press.

A drag plug or "dampener" is provided to restrict the free rotation of the pilot wheel. The drag plug is properly adjusted at the factory so that the drill press will hold a constant speed and will not change speeds even on long production runs, but still the pilot wheel can be turned manually to change speeds as desired. If it ever becomes necessary to change the adjustment, use a long allen wrench and insert it down through the hole located in the top of the guard, as shown in Fig. 6. Turn the set screw (A) Fig. 6, clockwise to increase or counter-clockwise to decrease the "dampener" pressure on the pilot wheel.

CHANGING LOWER SPINDLE ASSEMBLY

To replace the lower spindle assembly or to change drill presses fitted with #2 Morse Taper Spindle to 1/2" capacity key chuck spindle assembly, proceed as follows:

1. Lower the table to allow sufficient space between the table and head to remove the spindle.

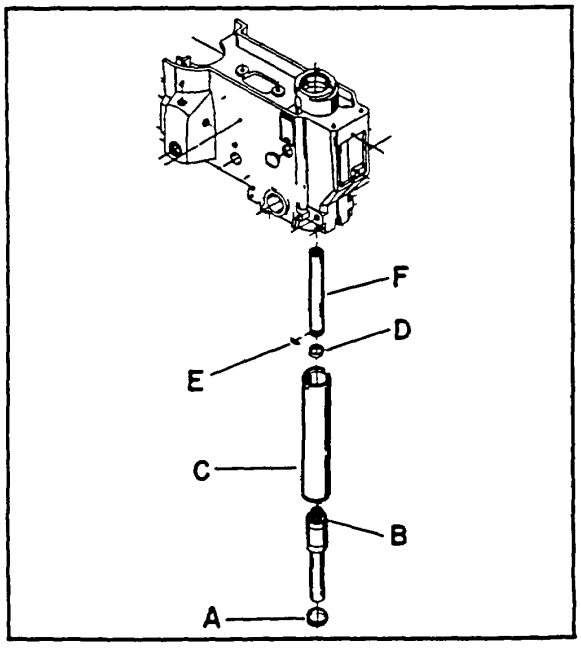


Fig. 7

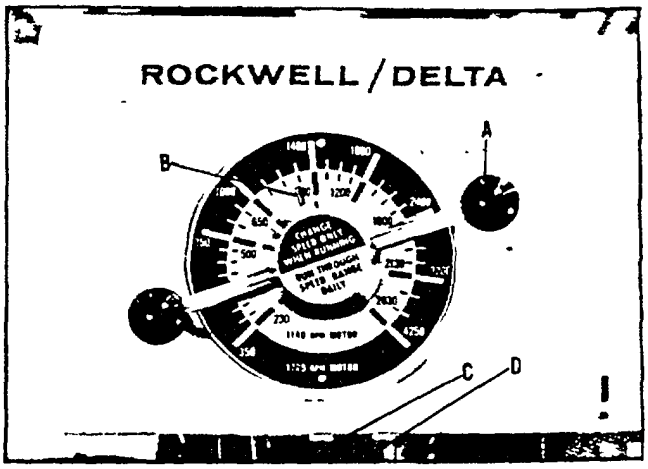


Fig. 5

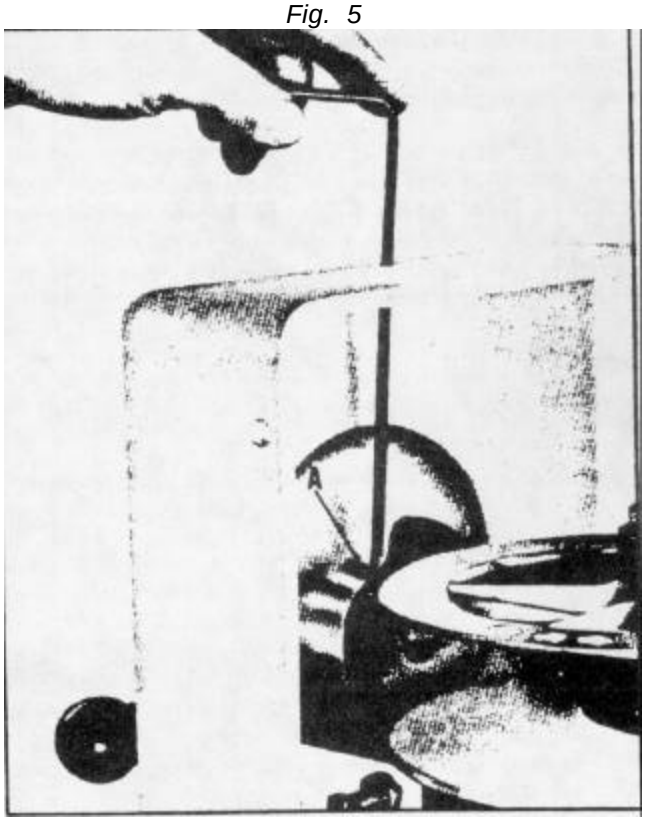


Fig. 6

2. Lower quill approximately 2" to 4" and lock quill locking nut

3. Using a spanner wrench remove bearing closure nut (A), and pull lower spindle (B) out of quill (C) Fig. 7.

4. Remove garter spring (D), and key (E), Fig. 7. Disengage sleeve (F) from spindle.

5. Reassemble in reverse order.

QUILL ADJUSTMENTS

The quill can be locked at any desired point in its travel by tightening the quill locking nut (A) Fig. 8. This is an especially desirable feature for set-up of tooling for production type operations. After considerable use, Play might develop between the quill and the head casting. This play can be eliminated by loosening quill locking nut (A) and lock nut (B) Fig. 8. The screw (C) can then be turned clockwise which will draw the sprit halves of the head casting together to compensate for wear. When the final adjustment is accomplished tighten lock nut (B), Fig. 8.

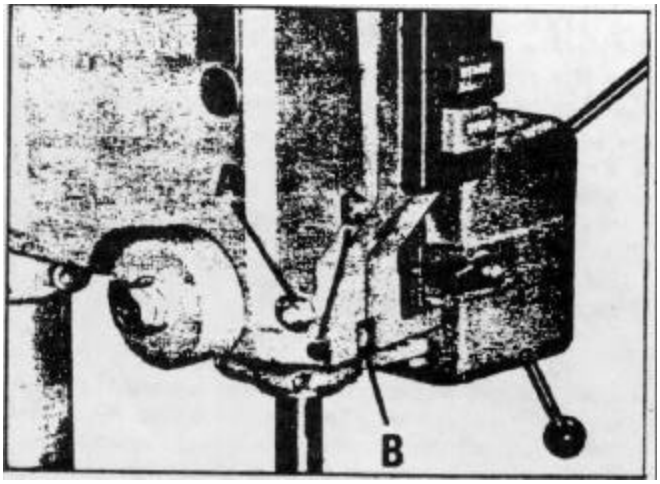


Fig. 8

DRILLING HOLES TO DEPTH WITH HAND FEED DRILL PRESS

When drilling one or two holes to a predetermined depth, the graduations on the face of the depth stop rod (A) Fig. 9, can be used.

When drilling a number of holes to a predetermined depth, or if a more exact setting is required, proceed as follows:

1. Raise the locking sleeve (B) Fig. 9, and turn the micro-nut (C) to the desired position on the stop rod (A).

2. Lower the locking sleeve (B) so it will engage micro-nut (C) Fig. 9. Lock sleeve (B) in place with thumb screw if drill press head is mounted in other than vertical position. When the drill press is mounted with the chuck pointing "up", the locking sleeve (B) and micro-nut (C) Fig. 9, should be reversed on the stop rod (A).

3. When locking sleeve (B) is in place on the micro-nut (C) Fig. 9, the micro-nut can not be turned. When a change in depth is required, the locking sleeve (B) must be raised, and while it is raised, turn the micro-nut (C) the necessary graduation marks. Each mark represents .002". Then lower the locking sleeve (B).

4. The use of the micro-set stop nut will maintain the same hole depth, no matter how many holes are to be drilled. However, we recommend that the hole depth be checked whenever a drill has to be sharpened or changed.

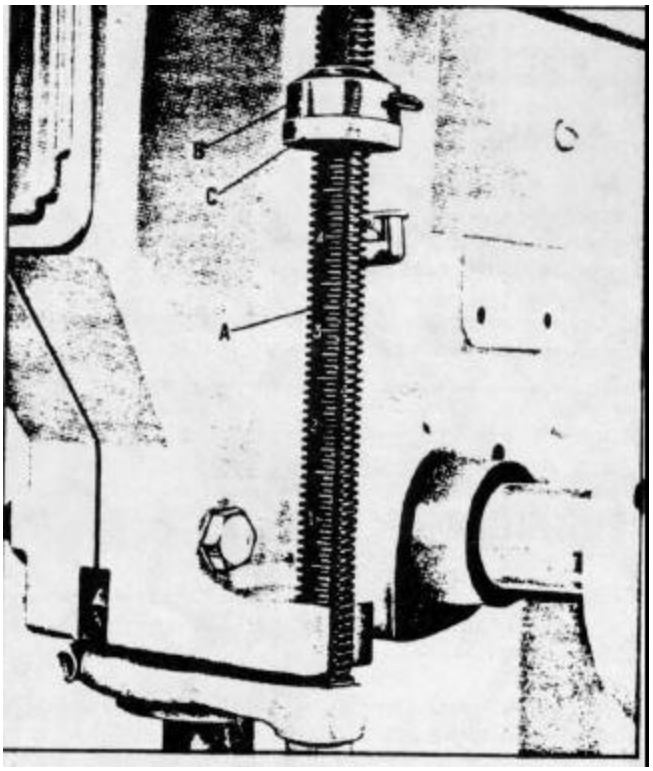


Fig. 9

HOW TO CHANGE SPINDLE ADAPTERS

One of the unique features of 17" Key Chuck Drill Presses is that they come equipped with a lower spindle assembly having a 1 1/16" - 20 thread (A) Fig. 10, and the Cat. No. 15-830 Drill chuck which has a threaded mounting collar (B) Fig. 10. Various spindle adapters, shown in Fig. 11, can also be adapted to the threaded spindle of your 17" key chuck Drill Press. These adapters are available as an accessory.

The spindle adapters, shown in Fig. 11, along with the Cat. No. 15-830 Drill Chuck, shown in Fig. 10, can be used on 17" Morse Taper Drill Presses when the lower spindle cartridge (Part No. 402-07-301-5001 is installed in the drill press instead of the standard #2 Morse Taper Spindle Cartridge.

When removing either the chuck or the spindle adapters, we recommend the use of the Cat. No. 15838 spanner wrench which is supplied with Key Chuck Drill Presses. Turn the locking collar of the adapter or chuck with the spanner wrench while keeping the spindle from turning by either holding belt or holding the chuck with the-chuck key in one of the pilot holes in the nose of the chuck, as shown in Fig. 12.

When attaching adapters to the spindle, it is very important to wipe clean both the spindle taper and taper hole in adapter. Then place the adapter on the spindle and tighten the locking collar (A) Fig. 12.

If in checking the spindle for accuracy, there should be a run out, we suggest that the adapter be removed and turned perhaps one quarter or one-half turn and replaced. This may reduce or eliminate the run out, it may also increase it, in which case, remove the adapter and turn it some more on the spindle.

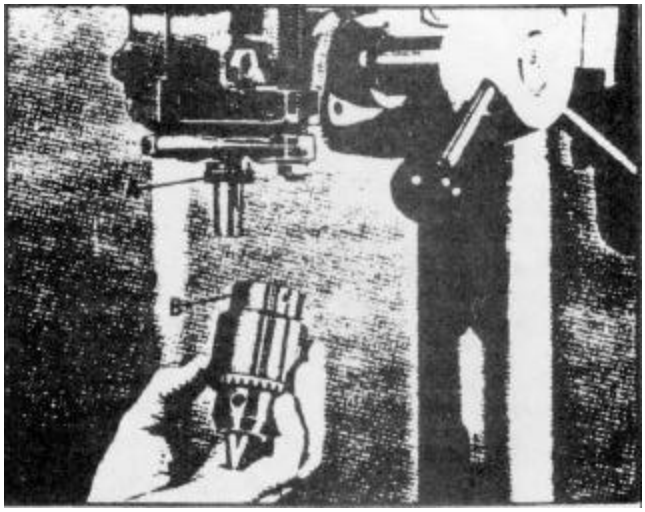


Fig. 10

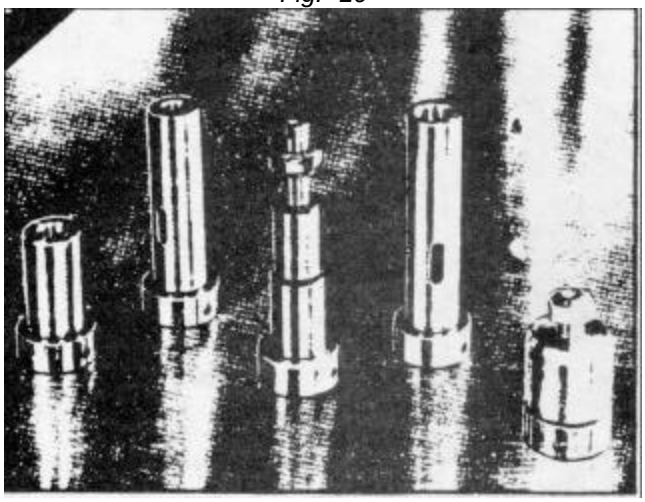


Fig. 11

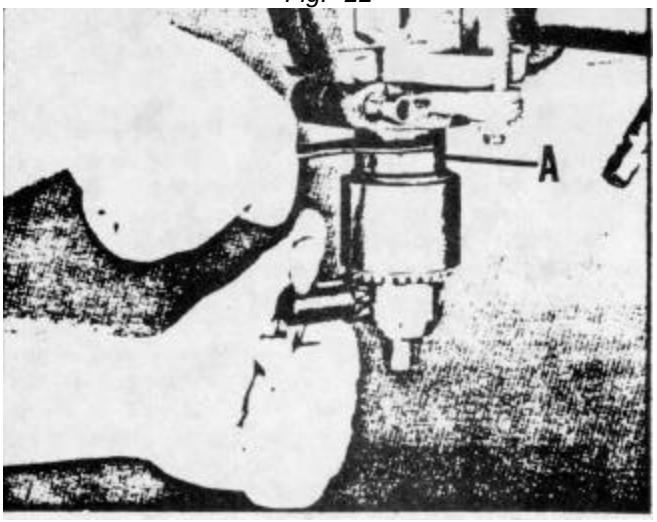


Fig. 12

LUBRICATION

The quill and pinion gear should be lubricated occasionally with medium oil in the oil hole provided on the right hand side of the drill press head.

The spindle return clock spring should be oiled twice a year using light machine oil.

The raising mechanism support collar should be lubricated with medium oil applied to periphery of the column.

The spindle splines should be lubricated every three months with SAE-140 Gear Oil.

NOTE: The bearings of Rockwell motors are grease sealed for life and need no further lubrication. DO NOT USE OIL ON MOTOR.

INSTALLING MOTOR AND BELT

NOTE: When installing a Rockwell 8½" Frame Motor, the No. 41-964 motor pulley that comes with the drill press is used, as this pulley fits the V" shaft of the motor. When a NEMA 182 frame motor is used, the accessory motor pulley, number 41-965 with 7/8" bore must be purchased.

1. Insert the key in the keyway of the motor shaft and place the pulley on the motor shaft until the edge of the pulley sleeve is against the shoulder of the motor shaft.

2. Make sure the key is in place and tighten the, two set screws against the motor shaft.

3. Mount the motor to the motor plate, (A) Fig. 13, using the four 5/16" - 18 x 1" carriage bolts, the speed nuts, the plain washers and the four 5/16" - 18 hex nuts. Tighten the hex nuts only finger tight.

4. Loosen the two screws (C and D) Fig. 13, and also loosen the screw (E) on the right hand side of the head. Set the motor plate 7/8" from the back of the drill press head casting and tighten the three screws.

5. Loosen nut (A) Fig. 14. Then turn the pilot wheel until the pointer (B) Fig. 15, is set to the lowest speed. (350 rpm if a 1750 rpm motor is being used, or 230 rpm if an 1140 rpm motor is being used.) Now tighten nut (A) Fig. 14, just enough so that it adjusts the top half of the spindle pulley downward, until it just touches the lower pulley half. NOTE: This adjustment is made with the belt off.

6. Turn the pilot wheel until the pointer (B) Fig. 15, is set to the highest speed.

7. With a crow bar, raise the front end of the bracket (B) Fig. 14, in order to separate the two halves of the spindle pulley as far as possible. Put the belt on the spindle pulley, jerking it into the pulley to keep the two halves wedged apart, and remove the crowbar.

8. Work the belt onto the motor pulley with one hand, while rotating the spindle pulley with the other hand.

9. It is important that the motor shaft is parallel with the drill press spindle. Place a spirit level in a left to right position, first on the spindle pulley and then on the motor pulley. The bubble should be in the same relative position when testing the motor pulley as when testing the spindle pulley. If an adjustment is necessary, adjust the motor on the motor plate, until the motor shaft and drill press spindle are parallel.

10. Then place the level in front to back position first on the spindle pulley and then on the motor pulley. (Make a mental note of the position of the bubble.) If the motor pulley has to be tilted to the front or rear, loosen the three screws (C, D, E) Fig. 13, and using a crowbar pry out the top or bottom of the motor plate until the motor shaft is in parallel alignment with the drill press spindle. Then tighten the three screws (C, D, E) Fig. 13.

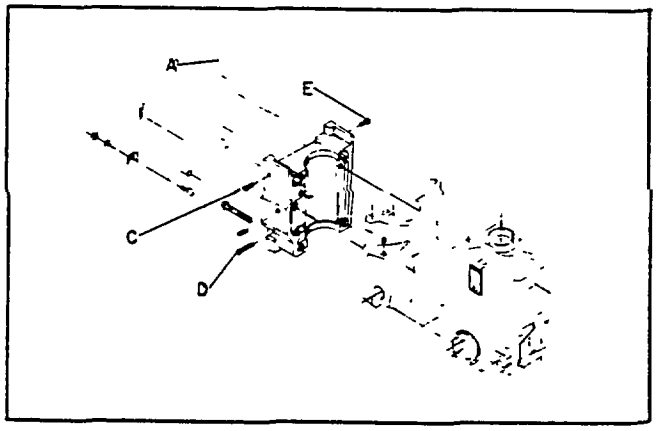


Fig. 13

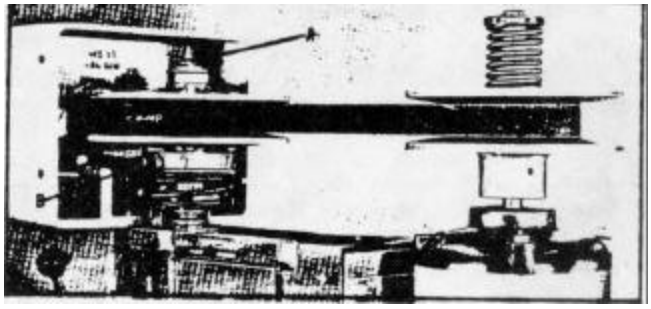


Fig. 14

11. Place the spirit level on the belt midway between the pulleys. If the bubble appears the same as in step 10, the height of the motor pulley is correct.

12. If necessary, adjust the height of the motor pulley on the shaft of the motor. (In some cases, the height of the motor on the motor plate must be changed,. If this is done, repeat steps 9 and 11.)

13. Tighten the four 5/16" - 18 hex nuts mentioned in step 3.

CALIBRATING SPINDLE SPEEDS

1. Turn on the motor and set the pointer (B) Fig. 15, to the lowest speed. (Either 350 or 230 rpm.)

2. Loosen the hex lock nut and then adjust screw (C) Fig. 15, to provide a positive stop for the pointer at the lowest speed. The best way is to turn the screw clockwise (up) until the pointer cannot be turned to the lowest speed, and then turn the screw counter clockwise (down) a little at a time until the pointer is stopped positively, just as it comes to the lowest speed. Tighten the hex lock nut.

3. Increase the speed until the pointer is set at the highest speed. (4250 or 2830 rpm.) Loosen the hex lock nut and adjust the screw (D) Fig. 15, until the spindle pulley is stopped from opening any additional amount, just as the pointer shows 4250 (or 2830) rpm. The pointer will go on past the mark, but there will be no actual change in spindle speeds or pulley opening beyond the movement allowed by stop screw (D), Fig. 15. Tighten the hex nut.

4. With the pointer at the highest speed, the outside circumference of the belt should now protrude about 1/32" beyond the outside circumference of the motor pulley. If the belt does not protrude enough, move the motor plate in toward the head, until the clearance is a little bit less than 7/8", as mentioned in paragraph 4 under INSTALLATING MOTOR AND BELT. If the belt protrudes too much, the clearance between head and motor plate should be increased. (Be sure to keep the motor shaft parallel with the spindle of the drill press.)

5. When greater accuracy is required, a tachometer should be used. Before following steps 1 through 4 above, proceed as follows.

6. Turn on the motor and turn the pilot wheel (A) Fig. 15 counter clockwise, until the tachometer shows a speed of 350 or 230 rpm, depending on whether the motor runs at 1725 or 1140 rpm. Then, without changing speeds, adjust the pilot wheel so that the pointer shows exactly 350 (or 230) rpm. This adjustment is made as follows.

7. Unscrew and remove the two spokes (A) of the pilot wheel shown in Fig. 15. Then loosen the two set screws found in the holes thus exposed in the hub of the pilot wheel and rotate the hub so that pointer (B) indicates the lowest speed on the dial. Tighten the two set screws and replace the two spokes.

8. Follow steps 2, 3 and 4. After completing step 4, check the top speed with the tachometer. If necessary, move the motor plate in to increase the spindle speed as shown on the tachometer or out to decrease it.

9. If the motor plate is moved in or out in step 8, above, the lowest speed will be affected, percentage wise, the same as the highest speed. But the change in fpm will be very slight at the lowest speed setting. No further adjustment of the lowest speed is recommended.

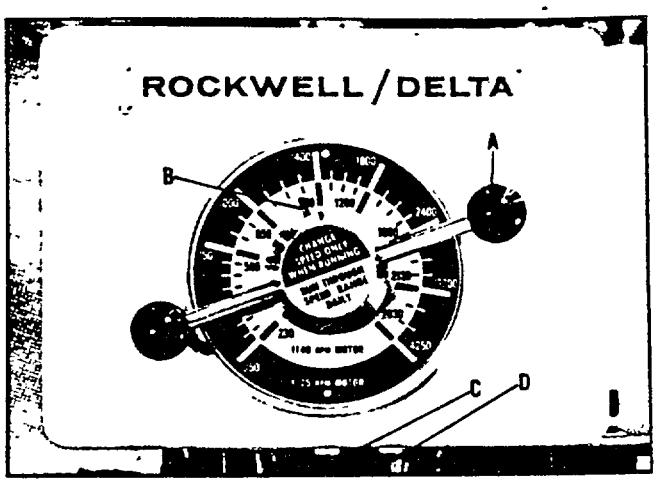


Fig. 15

SPECIAL NOTE

The tension on the belt is governed by the specially engineered spring of the motor pulley. No adjustment is possible to change the belt tension. If the speeds are properly calibrated and the pulleys properly lined up, the correct belt tension will be maintained automatically regardless of normal wear on the belt and the pulleys. This feature provides long belt life by avoiding the slippage which is experienced due to insufficient tension on belt drives which are not fully engineered. The automatic belt tensioning feature also provides longer bearing life in both drill press and motor, because excessive belt tension is avoided.

After a long period of time pulley and belt wear and stretching of the belt may cause a slight change in the speed of the drill press. To compensate for this change in speed, use a tachometer and move the motor toward or away from the spindle pulley until the correct speed is obtained.

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175-25 Horace Harding Expwy.
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Syracuse 13201
700 Marcellus Street
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Phone: (614) 263-0829

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2938 Douglas Road
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Dallas 75247
2934 Iron Ridge Street
Phone: (214) 631-1890

Houston 77018
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2990 S.W. Temple
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Richmond 28230
1705 Dabney Road
Phone: (804) 257-7348

WASHINGTON

Seattle 98101
1918 Minor Avenue
Phone: (206) 622-4576

WISCONSIN

Milwaukee 53222
10700 W. Burleigh Street
Phone: (414) 774-3850

SAN JUAN, PUERTO RICO

Rio Piedras, Puerto Rico 00929
Mail: Box 29268, 65th Infantry Station
Package: Calle Almeria 231
Urban Valencia
Rio Piedras, Puerto Rico
Phone: (809) 763-2245

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ALBERTA

Calgary, Alberta T2G 489
4411 Manitoba Road, S.E.
Phone: (403) 287-0462

BRITISH COLUMBIA

Vancouver, B.C. V5Y 1L4
45 West 7th Avenue
Phone: (604) 879-5622

MANITOBA

Winnipeg, Manitoba R3H OH2
1899 Dublin Avenue
Phone: (204) 786-6886

ONTARIO

Gueph, Ontario N1H 6M7
40 Wellington Street
Phone: (519) 836-2840

London, Ontario N5E 1P7
1025 Hargrieve Road
Phone: (519) 681-0890

Mississauga, Ontario L4V 1J2
6463 Northham Drive
Phone: (416) 577-5630

Ottawa, Ontario K2P 0N9
207 Gilmour Street
Phone: (613) 238-7458

QUEBEC

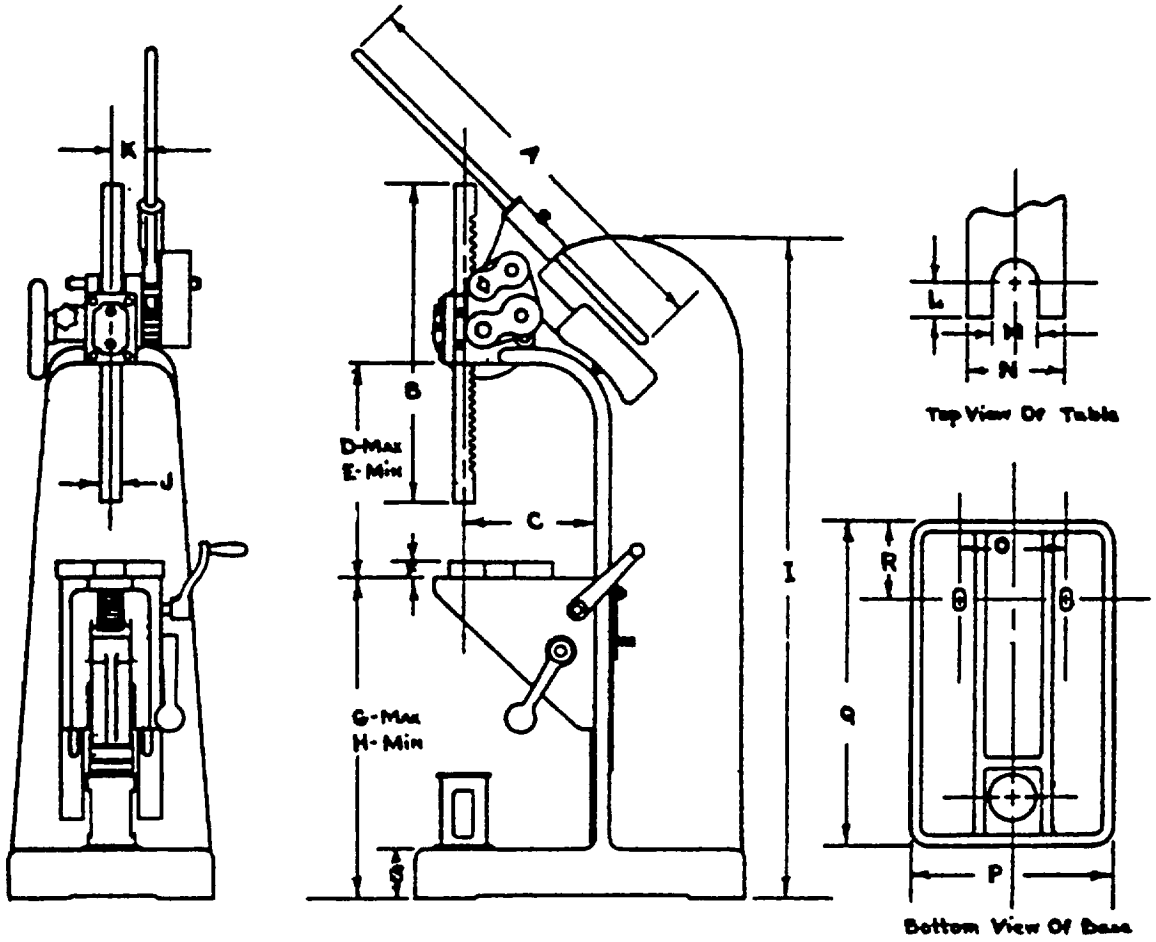
St. Laurent (Montreal), P.Q. H4N 1N2
523 Rue Dealauriers Street
Phone: (514) 336-8772

Quebec, P.Q. G1L 2W7
793 3rd Avenue
Phone: (418) 529-0236

Authorized Rockwell Service Stations are located in all large cities. For the one nearest you, see the classified section in your phone book (under "Tools-Electric").

LITHO U.S.A.

DATA SHEET No. 7-B
ARBOR PRESSES-FLOOR MODELS

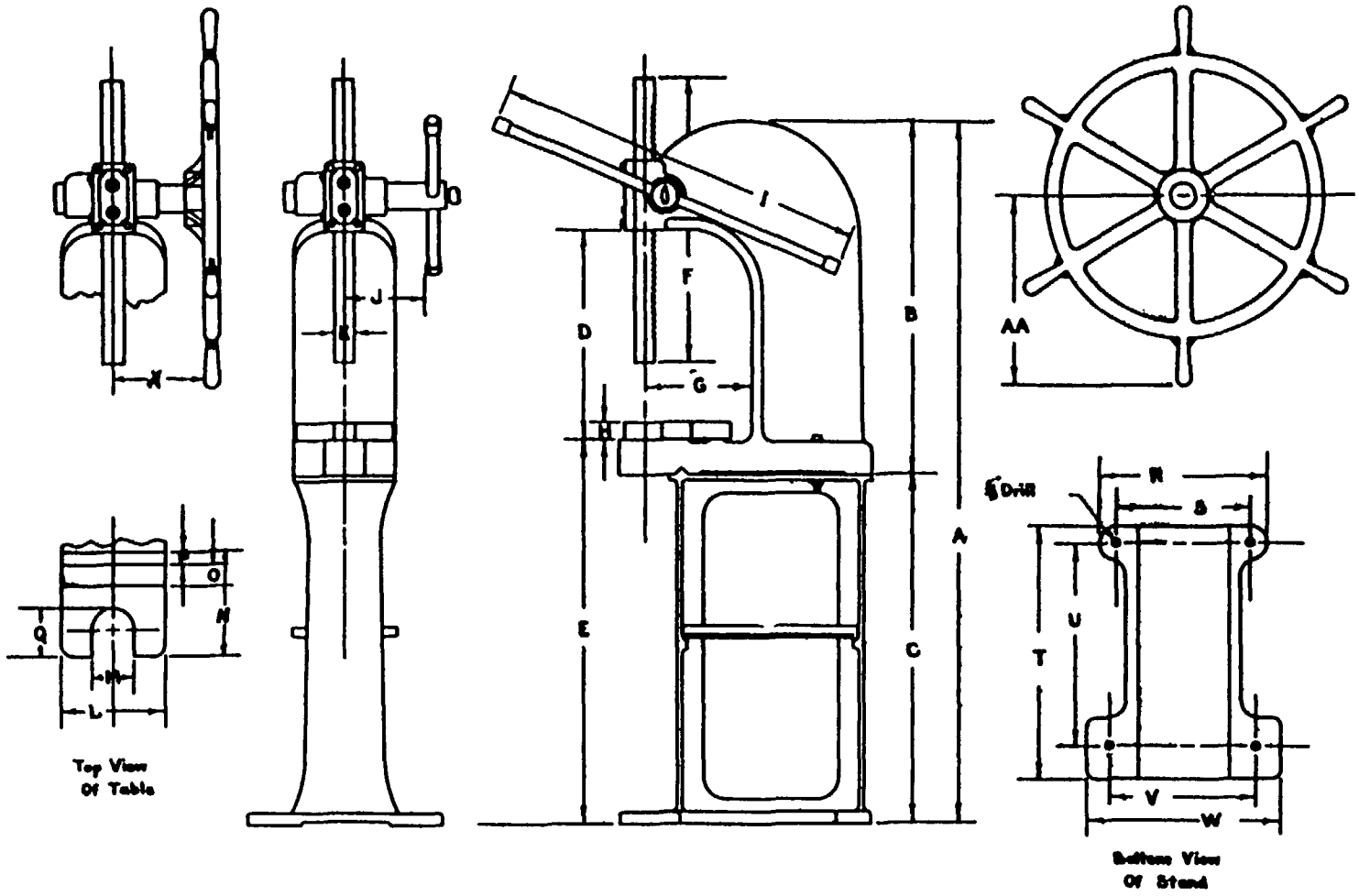


PRESS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	0	P	Q	R	S
5-R	42	24	10 3/4	30	20	1 1/2	33	23	62	2	4 1/8	3 3/8	4 1/2	10	9 1/2	21	31	5 1/2	4
5-C	36	24	10 3/4	30	20	1 1/2	33	23	62	2	4 1/8	3 3/8	4 1/2	10	9 1/2	21	31	5 1/2	4
6-R	42	30	13 1/2	32	22 1/2	1 1/2	33 1/2	24	69	2	4 1/8	3 1/16	4 1/2	10	11	21	34	7 1/2	5
6-0	42	30	13 1/2	32	22 1/2	1 1/2	33 1/2	24	69	2	4 1/8	3 1/16	4 1/2	10	11	21	34	7 1/2	5

(Specifications Subject to Change Without Notice)

famco

ARBOR PRESSES - BENCH MODELS · FLOOR STANDS · PILOT WHEELS



PILOT WHEELS	AA
Small Pilot Wheel for Press No. O-A-1-E	6 1/2
14 Inch Pilot Wheel	10 1/2
24 Inch Pilot Wheel	15 3/4

PLAIN LEVER TYPE ARBOR PRESSES

PRESS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
0	....	10½	....	4⅜	....	7⅛	3⅜	1/8	10	3	3/4	4	1½	3⅜	7/8	1/8	1⅜	....	....	....	....	....	....	2⅜
A	....	10½	....	4⅜	....	7⅛	3⅜	....	10	3	3/4	4	....	3⅜	....	....	....	....	....	....	....	....	....	2⅜
1	....	12	....	5¼	....	9⅛	4¼	1/8	12	3⅜	1	5	1½	4¼	1	1/4	1⅜	....	....	....	....	....	....	3¼
E	....	12	....	5¼	....	9⅛	4¼	....	12	3⅜	1	5	....	4¼	....	....	....	....	....	....	....	....	....	3¼
2	51⅛	17	34½	8⅛	37	14	6⅜	1/4	16	4⅞	1½	6⅜	1⅝	6 5/16	1⅛	1/4	2⅛	11½	9⅛	18	10⅜	10½	14⅛	4⅜
S	51⅛	17	34½	8⅛	37	14	6⅜	....	16	4⅞	1½	6⅜	....	6 5/16	....	....	....	11½	9⅛	18	10⅜	10½	14⅛	4⅜
3	56¼	21⅝	34½	12⅛	37⅜	18	7⅛	1/8	27	5⅜	1⅛	8	2⅜	7½	2	1/8	3	11½	9⅛	18	10⅜	10½	14⅛	5⅜
W	56¼	21⅝	34½	12⅛	37⅜	18	7⅛	....	27	5⅜	1⅛	8	....	7½	....	....	....	11½	9⅛	18	10⅜	10½	14⅛	5⅜
3½	59⅛	29½	29½	17⅛	32⅜	24	9	1⅛	32	7	1⅜	9	3⅜	6⅞	1⅛	1	4	14	11	21⅛	17⅛	12⅜	17	7⅛
4	65½	35	30½	21⅛	34½	30	11⅛	1⅛	42	8½	2	10	5½	11⅛	1⅛	1⅛	6⅛	17	13⅜	28	23⅛	13	17	8⅞
13	55⅛	21	34½	11⅛	37⅛	17	7⅛	....	27	7½	1½	12	6½	8½	....	....	6⅛	11½	9⅛	18	10⅜	10½	14⅛	7⅜
21	58⅛	28⅜	29⅜	18	33⅜	24	7⅛	1/8	27	5⅜	1⅛	8	2½	7⅛	2	1/8	3⅛	14	11	21⅛	17⅛	12⅜	17	5⅜
25	57½	27	30½	12½	34½	20	12⅛	1⅛	32	7½	1⅜	10	3	9⅛	2	1⅛	4	17	13⅜	28	23⅛	13	17	7½
31	62⅛	32⅜	29⅜	25½	33½	30	7⅛	1/8	27	6	1⅜	8	2½	7⅛	2	1/8	3⅛	14	11	21⅛	17⅛	12⅜	17	6⅛
33	58½	28⅛	29½	18⅛	32⅜	24	7⅛	....	27	7½	1⅛	12	6⅛	8½	....	....	6⅜	14	11	21⅛	17⅛	12⅜	17	7⅛

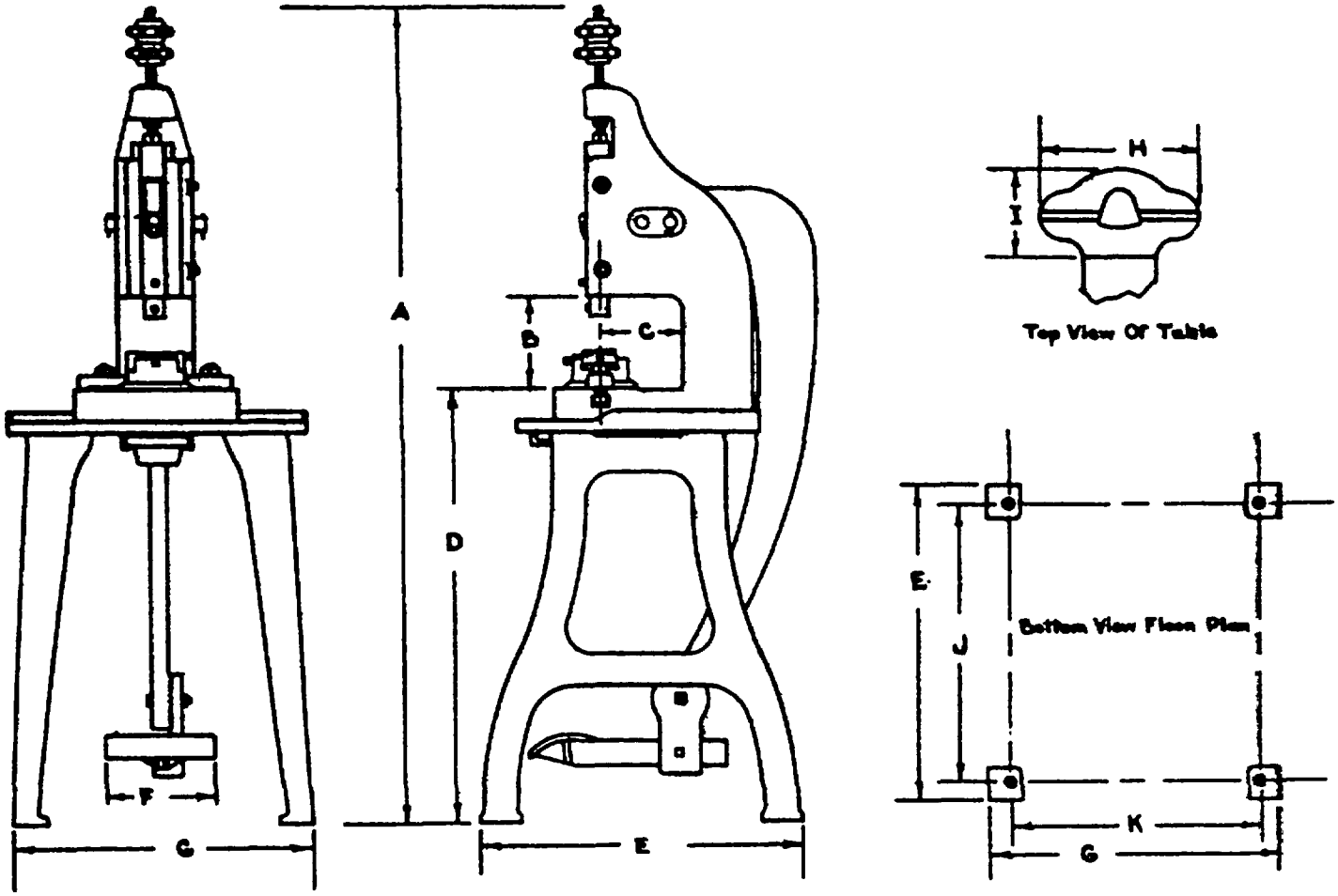
SIMPLE RATCHET TYPE ARBOR PRESSES

3-R	56¼	21⅝	34½	12⅛	37⅜	18	7⅛	1/8	27	3⅞	1⅛	8	2⅜	7½	2	1/8	3	11½	9⅛	18	10⅜	10½	14⅛	
W-R	56¼	21⅝	34½	12⅛	37⅜	18	7⅛	....	27	3⅞	1⅛	8	....	7½	....	....	....	11½	9⅛	18	10⅜	10½	14⅛	
3½-R	59⅛	29⅛	29½	17⅛	32⅜	24	9	1⅛	32	4¼	1⅜	9	3⅜	6⅞	1⅛	1	4	14	11	21⅛	17⅛	12⅜	17	
4-R	65½	35	30½	21⅛	34½	30	11⅛	1⅛	42	5½	2	10	5½	11⅛	1⅛	1⅛	6⅛	17	13⅜	28	23⅛	13	17	
13-R	55⅛	21	34½	11⅛	37⅛	17	7⅛	....	27	3½	1⅛	12	6½	8½	....	....	6⅛	11½	9⅛	18	10⅜	10½	14⅛	
21-R	58⅛	28⅜	29⅜	18	33⅜	24	7⅛	1/8	27	3⅞	1⅛	8	2½	7⅛	2	1/8	3⅛	14	11	21⅛	17⅛	12⅜	17	
25-R	57½	27	30½	12½	34½	20	12⅛	1⅛	32	4⅝	1⅜	10	3	9⅛	2	1⅛	4	17	13⅜	28	23⅛	13	17	
31-R	62⅛	32⅜	29⅜	23½	33½	30	7⅛	1/8	27	3⅛	1⅜	8	2½	7⅛	2	1/8	3⅛	14	11	21⅛	17⅛	12⅜	17	
33-R	58½	28⅛	29½	18⅛	32⅜	24	7⅛	....	27	3⅛	1⅛	12	6⅛	8½	....	....	6⅜	14	11	21⅛	17⅛	12⅜	17	

COMPOUND RATCHET TYPE ARBOR PRESSES

3½-C	59⅛	29⅛	29½	17⅛	32⅜	24	9	1⅛	32	3⅞	1⅛	9	3⅜	6⅞	1⅛	1	4	14	11	21⅛	17⅛	12⅜	17	
4-C	65½	35	30½	21⅛	34½	30	11⅛	1⅛	36	3½	2	10	5½	11⅛	1⅛	1⅛	6⅛	17	13⅜	28	23⅛	13	17	
25-C	57½	27	30½	12⅛	34½	20	12⅛	1⅛	36	3½	1⅜	10	3	9⅛	2	1⅛	4	17	13⅜	28	23⅛	13	17	
31-C	62⅛	32⅜	29⅜	23½	33½	30	7⅛	1/8	32	3⅛	1⅜	8	2½	7⅛	2	1/8	3⅛	14	11	21⅛	17⅛	12⅜	17	

Foot Presses --to $3^{3}/_{4}$ tons



PRESS	A	B	C	D	E	F	G	H	I	J	K
6	49	4	4	31 1/2	22 1/2	4 1/2	19 1/2	6	4	19 1/2	17 1/2
8	57	5 1/2	4	32	22 1/2	4 1/2	19 1/2	11	6	19 1/2	17 1/2
8-S	58 1/2	7	4	32	22 1/2	4 1/2	19 1/2	11	6	19 1/2	17 1/2
10	60	6	3	32 1/2	23 1/2	8	22	12	6 1/2	20 1/2	18 1/2
12	61	7	6	32 1/2	23 1/2	8	22	12	6 1/2	20 1/2	18 1/2
15	63	7 1/2	10	33 1/2	23 1/2	8	22	12	6 1/2	20 1/2	18 1/2
18	66	10	10	33 1/2	23 1/2	8	22	12	6 1/2	20 1/2	18 1/2

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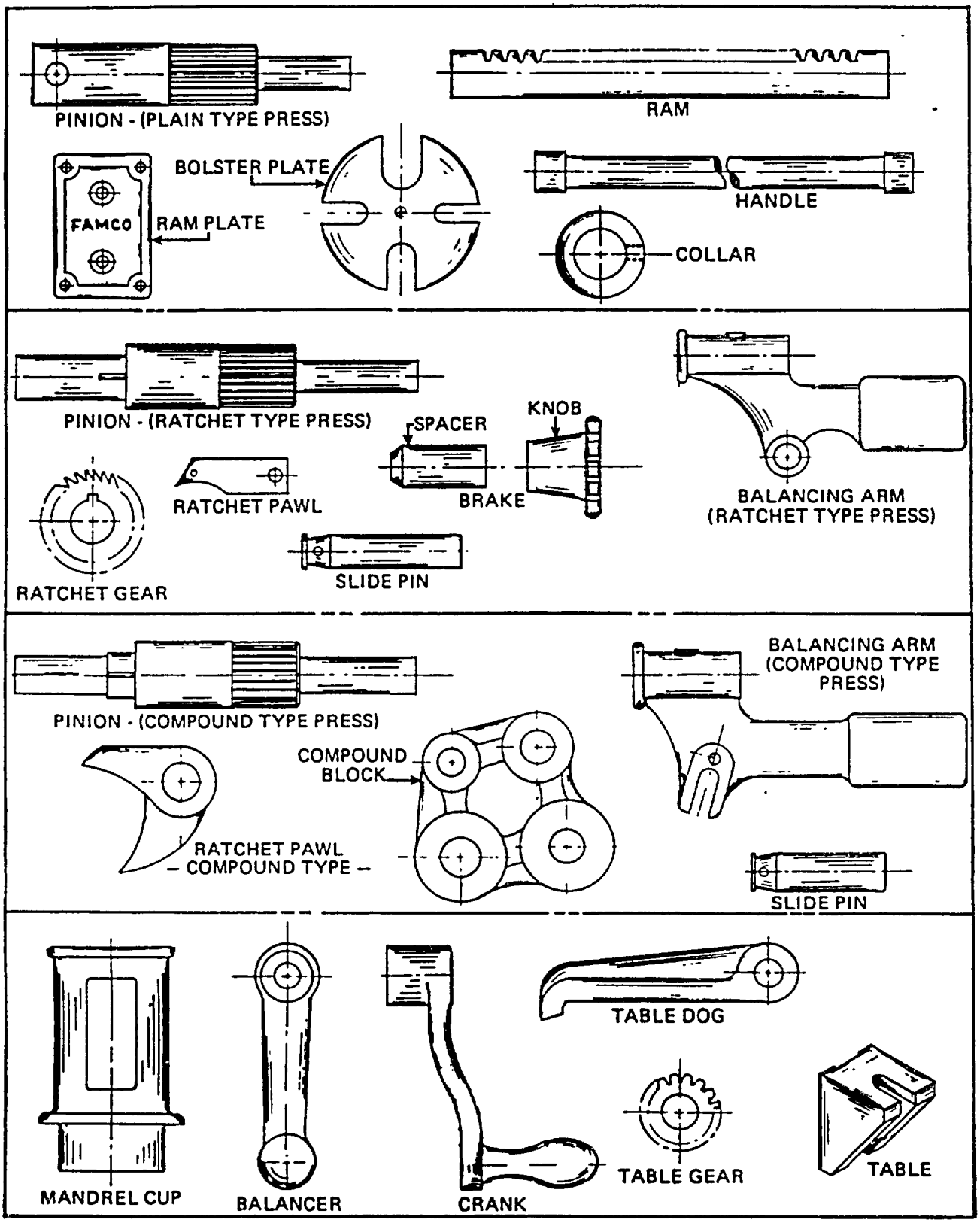


NOTE: ARBOR PRESS MUST BE SECURELY MOUNTED BEFORE USING !

ARBOR PRESS PART NUMBERS

PLAIN LEVER TYPE	O & A		1 & E		2 & S		3 & W		3-1/2	4	13	21	25	31	33
Head (Frame)	AO-1*	* No. A Head - AA-1	A1-1*	* No. E Head - AE-1	A2-1*	* No. S Head - AW-1	A3-1*	* No. W Head - AW-1	A35-1	A4-1	A13-1	A21-1	A25-1	A31-1	A33-1
Ram	AO-2		A1-2		A2-2		A3-2		A35-2	A4-2	A3-2	A21-2	A25-2	A31-2	A21-2
Pinion	AO-3		A1-3		A2-3		A3-3		A35-3	A4-3	A13.3	A3.3	A25-3	A31-3	A13-3
Handle	AO-4		A4-4		A32-4		A3-4		A35-4	A4-4	A3-4	A3-4	A354	A3-4	A3-4
Bolster Plate	AO-5		A1-5		A2-5		A3-5		A35-5	A4-5		A3-5	A4-5	A3-5	
Ram Plate,	AO-6		A1-6		A2-6		A3-6		A35-6	A4-6	A3-6	A3-6	A4-6	A3-6	A3-6
Collar	AO-7		A1-7		A2-7		A3-7		A35-7	A35-7	A3-7	A3-7	A3-7	A2-7	A3-6
Brake Knob									A35-8	A35-8			A25-8	A25-8	
Brake Spacer									A35-9	A35-9			A25-9	A25-9	
Front Gib	AO-11		A1-11		A2-11		A3-11		A35-11	A4-11	A3-11	A3-11	A4-11	A35-11	A3-11
Side Gib					A2-12		A3-12		A35-12	A4-12	A3-12	A3-12	A25-12	A35-12	A3-12

SIMPLE RATCHET TYPE	3-R or W-R		3-1/2R	4-R	5R	6-R	13-R	21-R	25-R	31-R	33-R
Head (Frame)	A3-1	*No. W-R Head - AW-1	A35-1	A4-1	AR5-1	AR6-1	A13-1	A21-1	A25-1	A31-1	A33-1
Ram	A3-2		A35-2	A4-2	AR5-2	A4-2	A3-2	A21-2	A25-2	A31-2	A21-2
Pinion	AR3-3		AR35-3	AR4-3	AR4-3	AR6-3	AR3-3	AR3-3	AR25-3	AR31-3	AR3-3
Handle	AR3-4		AR35-4	AR4-4	AR4-4	AR4-4	AR3-4	AR3-4	AR35-4	AR3-4	AR3-4
Bolster Plate	A3-5		A35-5	A4-5	A4-5	A4-5		A3-5	A4-5	A3-5	
Ran Plate	A3-6		A35-6	A4-6	A4-6	AR6-6	A3-6	A3-6	A4-6	A35-6	A3-6
Collar	A3-7		A35-7	AR5-7	AR5-7	AR5-7	A3-7	A3-7	A35-7	A3-7	A3-7
Brake Knob			A35-8	A35-8	A35-8	A35-8			A25-8	A25-8	
Brake Spacer			A35-9	A35-9	A35-9	A35-9			A25-9	A25-9	
Hand Wheel	AR3-10		AR35-10	AR4-10	AR4-10	AR4-10	AR3-10	AR3-10	AR25-10	AR31-10	AR3-10
Front Gib	A3-11		A35-11	A4-11	A4-11	AR6-11	A3-11	A3-11	A4-11	A35-11	A3-11
Side Gib	A3-12		A35-12	A4-12	AR5-12	AR5-12	A3-12	A3-12	A25-12	A35-12	A3-12
Ratchet Gear	AR3-21		AR35-21	AR4-21	AR4-21	AR4-21	AR3-21	AR3-21	AR35-21	AR3-21	AR3-21
Ratchet Pawl	AR3-22		AR35-22	AR4-22	AR4-22	AR4-22	AR3-22	AR3-22	AR35-22	AR3-22	AR3-22
Balancing Arm	AR3-23		AR35-23	AR4-23	AR4-23	AR4-23	AR3-23	AR3-23	AR25-23	AR3-23	AR3-23
Table					AR5-27	AR6-27					
Table Gear					AR5-28	AR5-28					
Table Dog					AR5-29	AR5-29					
Balancer					AR5-30	AR5-30					
Crank					52-73	52-73					
Mandrel Cup					AR5-32	AR5-32					

COMPOUND RATCHET TYPE	31/2-C	4-C	5-C	6-C	25-C	31-C
Head (Frame)	AC35-1	AC4-1	AC5-1	AC6-1	AC25-1	AC31-1
Ram	AC35-2	AC4-2	AC5-2	AC4-2	AC25-2	AC31-2
Pinion	AC35-3	AC4-3	AC4-3	AC6-3	AC25-3	AC31-3
Handle	AC35-4	AC4-4	AC4-4	AC6-4	AC35-4	AR35-4
Bolster Plate	A35-5	A4-5	A4-5	A4-5	A4-5	A3-5
Ram Plate	A35-6	A4-6	A4-6	AR6-6	A4-6	A35-6
Collar	AC4-7	AC4-7	AC4-7	AC4-7	AC4-7	A35-7
Brake Knob	A35-8	A35-8	A35-8	A35-8	A25-8	A25-
Brake Spacer	A35-9	A35-9	A35-9	A35-9	A25-9	A25-9
Hand Wheel	AR35-10	AR4-10	AR4-10	AR4-10	AR25-10	AR31-10
Front Gib	A35-11	A4-11	A4-11	AR6-11	A4-11	A35-11
Side Gib	A35-12	A4-12	AR5-12	AR5-12	A25-12	A35-12
Compound Block Pin	AC35-16	AC35-16	AC35-16	AC35-16	AC35-16	AC35-16
Dog Stop Pin	AC35-18	AC35-18	AC35-18	AC35-18	AC35-18	AC35-18
Ratchet Gear	AC35-21	AC35-21	AC35-21	AC6-21	AC35-21	AC35-21
Compound Ratchet Pawl	AC35-22	AC35-22	AC35-22	AC35-22	AC35-22	AC35-22
Balancing Arm	AC35-23	AC4-23	AC4-23	AC6-23	AC25-23	AC31-23
Compound Block	AC35-24	AC4-24	AC4-24	AC6-24	AC4-24	AC31-24
Slide Pin (Long)	AC35-25	AC35-25	AC35-25	AC6-25	AC25-25	AC31-25
Slide Pin (Short)	AC35-26	AC35-26	AC35-26	AC6-26	AC35-26	AC31-26
Table			AR5-27	AR6-27		
Table Gear			AR5-28	AR5-28		
Table Dog			AR5-29	AR5-29		
Balancer			AR5-30	AR5-30		
Crank			52-73	52-73		
Mandrel Cup			AR5-32	AR5-32		

INSTRUCTION MANUAL FOR BALDOR GRINDERS

CAUTION

For Your Own Safety Read Instruction Manual Before Operating Grinder

ANY ACCESSORIES OR ATTACHMENTS ADDED TO THIS GRINDER MAY INTRODUCE HAZARDS USE WHEELS MARKED AT OR OVER RPM OF THIS GRINDER (See table below)

GRINDER WHEEL SIZE	ARBOR SIZE	NO LOAD SPEED ON NAMEPLATE
6"	1/2"	1800
6"	1/2"	3600
7"	5/8"	1800
7"	5/8"	3600
8"	3/4"	1800
8"	3/4"	3600
10"	7/8"	1800

REPLACE CRACKED WHEEL IMMEDIATELY ALWAYS USE GUARDS AND EYESHIELDS. DO NOT OVERTIGHTEN WHEEL NUT USE ONLY FLANGES FURNISHED WITH THIS GRINDER.
Always disconnect grinder from the power supply while motor is being connected, or reconnected.

AS WHEELS WEAR ADJUST TOOL REST SUPPORT TO MAINTAIN APPROXIMATELY 1/16 CLEARANCE BETWEEN TOOL REST AND WHEEL GRIND ON PERIPHERY OF WHEELS ONLY.

INSTALLATION

Check grinder nameplate to make certain the rating is correct for the power supply. voltage and frequency.

Mount grinder on solid bench It may be used without bolting down for light work. For heavy work it should be bolted down to the mounting surface. If mounted on pedestal. bolt grinder securely to pedestal and bolt pedestal to floor

The spark arrestor should be adjusted to 1/16" clearance to the wheel.

Adjust tool rest on support to desired position and tighten nut securely. Adjust tool rest support on guard to obtain approximately 1/16 clearance between tool rest and wheel and tighten nut securely.

Adjust eyeshields to position aligning center of eyeshield in line of sight to tool rest

Single phase grinders with wheels up to 8 diameter are equipped with cord and grounding type plug Some single phase grinders are rated dual voltage

They will be connected at the factory for 115 volts unless otherwise noted.

Use Instructions provided to reconnect for a different voltage

All attachment plugs and any receptacles shall be replaced with devices rated for the voltage for which the motor is reconnected.

Three phase grinders are dual voltage and are reconnectable for the proper voltage in the conduit box, using instructions provided. Connect phase sequence for clockwise rotation when viewed from the outside of the left hand wheel.

After making connections make sure they are secured and properly insulated

When starting a grinder for the first time, or after installing a replacement wheel, it is most important that the operator stand aside for at least one minute.

This is the correct practice since grinding wheels can explode if they have received minor cracks from shipping.

OPERATION

Check that switch is on “OFF” position and that wheels rotate freely. Insert plug into receptacle and turn on switch. Grinder should come up to speed smoothly and without vibration.
As grinding wheel wears, periodically adjust spark arrester to maintain 1/16 clearance to wheel.

Also adjust tool rest supports as grinding wheels wear to maintain approximately 1/16 clearance between tool rest and grinding wheel.
Grind on periphery of wheels only.

MAINTENANCE

No maintenance other than replacement of worn wheels is needed. Wheels should be replaced after the diameter is reduced to 2” below original size.
The ball bearings used are lubricated for life and do not require additional lubrication.

Wipe off and dispose of grinding dust to prevent accumulation

SAFETY INSTRUCTIONS

A. GROUNDING INSTRUCTIONS

1. All grounded, cord-connected tools

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

SAFETY INSTRUCTIONS (Continued)

Do not modify the plug provided - if it will not fit the outlet have the proper outlet installed by a qualified electrician.

Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

Check with a qualified electrician or serviceman if the grounding instruction are not completely understood, or if in doubt as to whether the tool is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the tool's plug.

Repair or replace damaged or worn cord immediately.

2. Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating less than 150 volts:

This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in Figure A. The tool has a grounding plug that looks like the plug illustrated in Figure A. A temporary adapter which looks like the adapter illustrated in figure B and C, may be used (except in Canada) to connect this plug to a 2-pole receptacle as shown in Figure B if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. The green colored rigid ear, lug, etc. extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box.

3. Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating between 150-250 volts, inclusive:

This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in Figure D. The tool has a grounding plug that looks like the plug illustrated in Figure D. Make sure the tool is connected to an outlet having the same configuration as the plug. No adapter available or should be used with this tool. If the tool must be reconnected for use on a different type of electric circuit, the reconnection should be made by qualified service personnel: and after reconnection, the tool should comply with all local codes and ordinances.

4 Permanently connected tools:

This tool should be connected to a grounded, metal, permanent wiring system; or to a system having an equipment-grounding conductor.

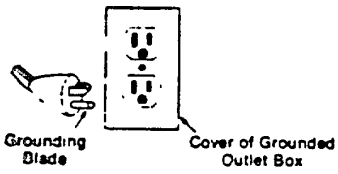


Figure A

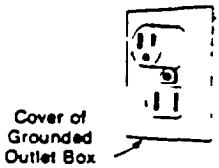


Figure B

Figure C

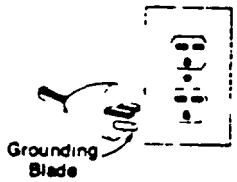


Figure D

B. FOR ALL TOOLS

1. KEEP GUARDS IN PLACE. and in working order.

2. REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on

3. KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents

4. DON'T USE IN DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or expose them to rain Keep work area well lighted.

5. KEEP CHILDREN AND VISITORS AWAY. Remove starter keys and turn off master switches

6. EQUIPMENT or work area when not in use

7. DON T FORCE TOOL. It will do the lob better and safer at the rate for which it was designed.

8. USE RIGHT TOOL. Don't force tool or attachment to do a job it was not designed for.

9. WEAR PROPER APPAREL. No loose clothing, neckties, rings, bracelets, or other jewelry to get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.

10. ALWAYS USE SAFETY GLASSES. Also use lace or dust mask if cutting operation is dusty. Everyday eyeglasses only have impact resistance lenses, they are NOT safety glasses.

11. SECURE WORK. Use clamps or a vise to hold work when practical. It's safer than using your hand and it frees both hands to operate tool.

12. DON T OVERREACH. Keep proper footing and balance at all times.

13. MAINTAIN TOOLS WITH CARE. Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

14. DISCONNECT TOOLS before servicing: when changing accessories such as blades, bits, cutters. etc.

15. AVOID ACCIDENTAL STARTING. Make sure switch is in "OFF" position before plugging in.

16. USE RECOMMENDED ACCESSORIES. Consult the owner's manual for recommended accessories. The use of improper accessories may cause hazards.

17. NEVER STAND ON TOOL. Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted.

18. CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to assure that it will operate properly and perform its intended function - check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.

19 NEVER LEAVE TOOL RUNNING UNATTENDED. Turn power off.

BALDOR

DUST CONTROL ACCESSORY - SERIES "A" INSTALLATION INSTRUCTIONS

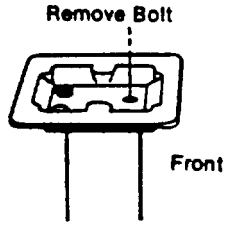


Fig. A.

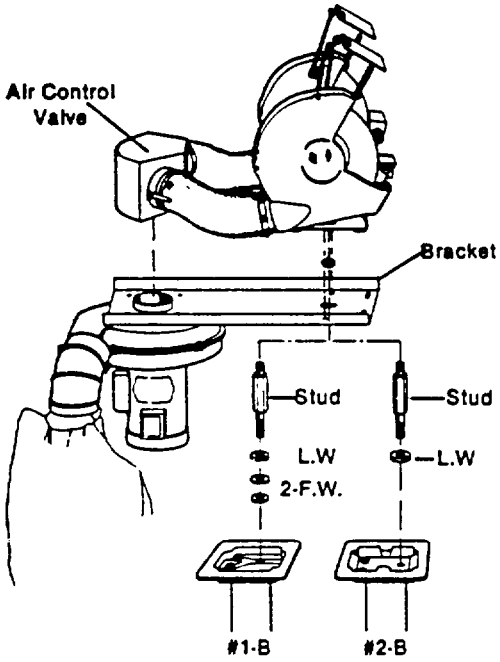


Fig. B.

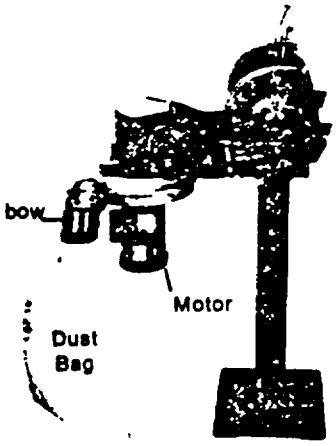


Fig. C.

CAUTION: FOR YOUR OWN SAFETY, READ AND UNDERSTAND INSTRUCTIONS BEFORE PROCEEDING:

1. Pedestal must be bolted securely to the floor before Installation of dust control accessory unit and grinder.

CAUTION: MOUNTING DUST CONTROL UNIT BEFORE BOLTING PEDESTAL TO FLOOR MAY CAUSE PEDESTAL TO TIP OVER.

2. Remove pedestal assembly bolt (Fig. A) located in top mounting plate.

3. Replace pedestal assembly bolt with stud and washers supplied with dust control accessory unit. (Fig. B) NOTE: #1-B for GA20 pedestal, #2-B for GA16 pedestal Tighten stud securely into pedestal.

4. Mount dust collector bracket over stud with motor on bottom side. (Fig. B) Align mounting holes in bracket with those in pedestal. Secure bracket to stud with nut supplied. Proceed to mount grinder to pedestal by locating proper holes and installing grinder to pedestal with mounting bolts supplied.

5. Mount double-inlet air control valve to Inlet of blower unit and secure at base of air control valve. Attach a hose to each inlet and to each grinder exhaust outlet. Secure hoses with clamps supplied.

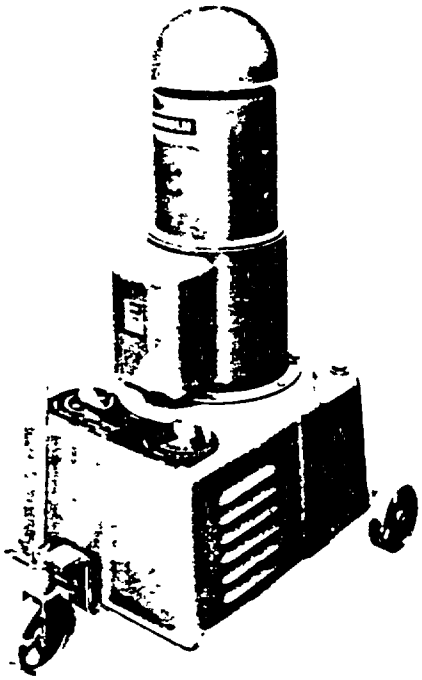
6. Attach elbow to exhaust outlet and attach bag with clamp supplied (Fig. C).

BALDOR
PHONE 501-646-4711
TELEX 53-7425 - TWX 910-723-7650
FORT SMITH, ARKANSAS 72902

OPERATING MANUAL

Lincwelder®
DC-250-MK AND DC-250-MK (Aircraft)

AC Motor Driven DC Arc Welding Power Source



MODELS:

DC-180-MK*
DC-250-M K
DC-250-MK (Aircraft)
SAE-150J*
SAE-150J (Aircraft)*
SAE-200J *
SAE-200J (Aircraft)*
* Discontinued Models

DAMAGE CLAIMS

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

SAFETY DEPENDS ON YOU

Lincoln arc welding equipment is designed and built with safety in mind. However, your overall safety can be increased by proper Installation ... and thoughtful operation on your part. DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS OPERATING MANUAL AND THE ARC WELDING SAFETY PRECAUTIONS ON THE INSIDE FRONT COVER. And, most Importantly, think before you act and be careful.

THE LINCOLN ELECTRIC, COMPANY
World's Largest Manufacturer of Arc Welding Products - Manufacturer of Industrial Motors
Cleveland, Ohio 44117 U.S.A.

ARC WELDING SAFETY PRECAUTIONS

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. READ AND UNDERSTAND BOTH THE SPECIFIC INFORMATION GIVEN IN THE OPERATING MANUAL FOR THE WELDER AND/OR OTHER EQUIPMENT TO BE USED AS WELL AS THE FOLLOWING GENERAL INFORMATION.

1. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR WORK performed only by qualified people.**
2. **ELECTRIC SHOCK can kill.**

Protect yourself from possible dangerous electrical shock:

a. The electrode and work (or ground) circuit are electrically - "hot" when the welder is on Never permit contact between "hot" parts of the circuits and bare skin or wet clothing Wear dry, hole-free gloves to Insulate hands.
b. Always insulate yourself from the work and ground by using dry insulation When welding In damp locations. on metal floors, gratings or scaffolds. and when in positions (such as sitting or lying). make certain the insulation r large enough to cover your full area of physical contact with work and ground.
c. Maintain the electrode holder, work clamp. welding cable and welding machine In good, safe operating condition
d. Never dip the electrode holder In water for cooling.
e. Never simultaneously touch electrically 'hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
f. If using the welder as a power source for mechanized welding, the above precautions also apply for the automatic electrode. electrode reel, welding head, nozzle or semiautomatic welding gun
g. When working above floor level. protect yourself from a fall should you get a shock.
h. Ground the work or metal to be welded to a good electrical ground.
i. Also see Item 7.

3. **FUMES AND GASES can be dangerous to your health.**

a. Welding may produce fumes and gases hazardous to health Avoid breathing these fumes and gases When welding. keep your head out of the fume Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone When welding on galvanized, lead or cadmium plated steel and other metals which produce toxic fumes, even greater care must be taken.
b. Do not weld in locations near Chlorinated hydrocarbon vapors coming from degreasing cleaning or spraying operations The heat and rays of the arc can react with solvent vapors to form phosgene a highly toxic gas and other irritating products
c. Also see Item 8b.

4. **ARC RAYS can Injure eyes and burn skin.**

a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding Filter lens should conform to ANSI Z87.1 standards.
b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
c. Protect other nearby personnel with suitable non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

5. **FIRE OR EXPLOSION can cause death or property damage.**

a. Remove fire hazards well away from the area. If this is not possible cover them to prevent the welding sparks from staffing a fire Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas Have fire extinguisher readily available.
b. Where compressed gases are to be used at the job site. special precautions should be used to prevent hazardous situations Refer to "Safety in Welding and Cutting" (ANSI Standard Z49 1) and the operating information for the equipment being used.
c. When not welding, make certain no part of the electrode circuit is touching the work or ground Accidental contact can cause overheating and create a fire hazard.
d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside They can cause an explosion even though they have been "cleaned " For information purchase "Recommended Safe Practices for the Preparation fur Welding and Cutting of Containers and Piping That Have Held Hazardous Substances". AWS F4 1-80 from the American Welding Society, Miami Florida 33125
e Vent hollow castings or containers before heating. cutting or welding. They may explode
f. Also see Items 6c and 8c.

Additional Safety Precautions

6. **For Welding In General.**

a. Droplets of molten slag and metal are thrown or fall from the welding arc Protect yourself with oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places Always wear safety glasses when in a welding area Use glasses with side shields when near slag chipping operations.
b. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair clothing and tools away from V-belts, gears, fans and all other moving parts when starting operating or repairing equipment.
c. Be sure the work cable is connected to the work as close to the welding area as practical Work cables connected to the building framework or other locations some distance from the welding area Increase the possibility of the welding current passing through lifting chains crane cables or other alternate circuits. This can create tire hazards or overheat lifting chains or cables until they fall.

7. For Electrically Powered Equipment.

a. Disconnect and lock out all electric power sources before doing any work on the equipment.
b. Make the electrical Installation in accordance with the National Electrical Code and all local codes.
c. Properly ground the equipment in accordance with the National Electrical Code and the manufacturers recommendations .

8. For Engine Powered Equipment.

a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.
b. Operate internal combustion engines In open well-ventilated areas or vent the engine exhaust fumes outdoors.
c. Do not add the fuel near an open flame or when the engine is running Stop the engine and if possible, allow It to cool to prevent spilled fuel from Igniting on contact with hot engine parts or electrical sparks Do not spill fuel when filling tank It fuel is spilled wipe it up and do not start engine until fumes have been eliminated.
d. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work disconnect the spark plug wires distributor cap or magneto wire as appropriate.
e. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

For more detailed Information It Is strongly recommended that you purchase a copy of "Safety in Welding & Cutting" - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040 Miami, Florida 33135.

INSTALLATION

Locate the welder in a clean. dry place where there is free circulation of air.

Be sure the voltage, phase and frequency of the input power is as specified on the welder nameplate.

Dual and triple input voltage machines (230/460 and 220/380/440-50 hertz) are shipped with the motor leads disconnected but with the higher voltage heater links in place and the lower voltage heater links tied to the starter. Connect the motor leads and the appropriate heater links as indicated on the instructions inside the starter cover.
Have a qualified electrician connect 3 phase AC power to the starter in accordance with the National Electrical Code. all local codes and the wiring diagram glued to the inside of the starter cover.

Recommended Input Wire, Ground Wire and Fuse Sizes Based on National Electrical Code. For 60 Hertz. 3 Phase Welders at 50s% Duty Cycle Rating

Welder Size	Voltage Input	Input Ampere Rating (at200 A.30V Output)	Copper Wire Size Type 75° C in Conduit 3 Input Wires	1 Ground Wires	Fuse Size Ampers (Super Lag)
250	230	32	#10	#10	60
	460	16	#14	#14	30
	575	128	#14	#14	25

The frame of the welder must be grounded. :A stud marked with the symbol ⏚ located on the starter mounting panel is provided for this purpose. See the National Electrical Code for details on proper grounding methods. (If an old machine does not have a grounding stud, connect the grounding wire to an unpainted frame screw or bolt.)

Start the welder and check the direction of rotation. Proper direction as shown by an arrow on the nameplate. On 3 phase machines the direction of rotation can be changed by interchanging any two input leads For two phase. 3 wire Input power. interchange the two outside leads. Be sure the neutral wire is connected to the motor neutral. which is the center terminal on the starter. For two phase. 4 wire input power. interchange two leads in the same phase

NOTE: When changing the voltage connection for any machine above code 4835 and bel6w code 3050. the heater links must be changed. See page 7 to determine which heater links must be installed. On machines with a code number between 3050 and 4835. the heater links do not have to be changed when changing the voltage connection as long as the connection on the wiring diagram inside the starter cover of these machines Is used

OPERATION

RECOMMENDED OUTPUT CABLES

Machine Size in Amperes	Recommended Copper Cable Sizes at 30% Duty Cycle — Cable Sizes of Combined Lengths of Electrode and Work Cable			
	0 to 100	100 to 150	150 to 200	200 to 250'
180	4	3	2	1
250	3	2	1	1/0

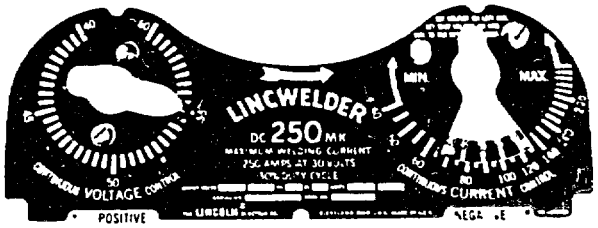
ELECTRODE POLARITY

With the welder off connect the electrode cable to the DC negative or DC positive stud as required for your particular application. Connect the wo4k cable to the other stud.

DUTY CYCLE

These welders are NEMA rated for a 30% duty cycle. Duty cycle is based on a 10 minute period. Therefore, they can be operated at a full output (either 250 or 180 amps) for 3 minutes out of each 10 minute period without over heating. At 50% duty cycle the output rating is 200 amps for the DC-250 & SAE-200J models or 145 amps for the DC-180 & SAE-152J models.

CONTROL OF WELDING CURRENT



Continuous Current Control

The continuous current control provides the major adjustment of welding current to suit your particular applications The continuous current control has a single dial calibrated in amperes. The control handle has five pointers corresponding to the five major divisions on the Continuous Voltage Control dial When the Continuous Voltage Control dial is set on 55. for example. the approximate welding current is indicated by the pointer marked 55 on the Current Control handle.

Continuous Voltage Control

The Continuous Voltage Control is both the fine current control and voltage control of your welder. With this control

it is possible to obtain the exact current you require. Also. by means of this control. you can vary the open circuit voltage to adjust the arc characteristics to suit different welding applications.

The Continuous Voltage Control dial is divided into equal divisions marked 40 to 60 open circuit volts. Generally the high open circuit voltage from 50 to 60 volts provides a steady. smooth and stable arc desirable for speedy downhand welding. The low open circuit voltage from 50 to 40 volts provides a digging type arc required for overhead and vertical welding.

How to Set the Controls

Example: Assume you want to make a vertical up weld using a $^{5}/_{32}$" electrode at about 135 amps. A snappy digging arc (medium low open circuit voltage) is required to give the best control of the arc in the whipping technique that must be used.

1. Set the Continuous Voltage Control to about 45.
2. Set the Continuous Current Control to read 135 amperes under the pointer marked 45.
3. Strike the arc
4. If the arc is too weak, turn the Voltage control up for higher voltage and higher current If a still higher current is required. turn the Current Control up 10 or 20 amperes. In the final adjustment be certain the Voltage control is still set for the lower part of the scale to provide the snappy arc recommended for vertical welding.

LINCONTROL® (Accessory)

The Lincontrol is a foot operated current control for welding light gage material. All "Aircraft" models are equipped with the required wiring to operate with the Lincontrol. All other models can easily be adapted for operating with the Lincontrol by installing a receptacle (S-7588-1) and a special rheostat (M-5090-K). Write for IM-113-A for further information.

MAINTENANCE

WARNING: Have qualified personnel do the maintenance work and trouble shooting. Turn the input power off using the disconnect switch at the fuse box before working inside the machine.

BEARINGS

Your welder is equipped with double-shielded ball bearings having sufficient grease to last indefinitely under normal conditions. Where the welder is used constantly or in excessively dirty locations. it may be necessary to add one ounce of grease per year to the bottom bearing and one half ounce to the top bearing.

When greasing the bearings, use a good grade of bearing grease. Keep all dirt out of the area. Wipe the fittings clean and use clean grease and equipment. More failures are caused by dirt introduced during greasing than from insufficient grease.

When replacing the bearings check the bearing cage for excessive wear.

COMMUTATOR AND BRUSHES

The generator brushes are properly adjusted when the welder is shipped They require no particular attention DO NOT SHIFT THE BRUSHES or adjust the rocker setting

Periodically inspect the commutators and brushes by removing the commutator covers. DO NOT remove or replace these covers while the machine is running.

Commutators require little attention. However, if they are black or appear uneven, have an experienced maintenance man clean them with fine sand paper or a commutator stone. Never use emery cloth or paper for this purpose.

Replace brushes when they wear within $^{1}/_{4}$" of the pigtail. A complete set of replacement brushes should be kept on hand. Lincoln brushes have a curved face to fit the commutator. Seat these brushes by lightly stoning the commutator as the armature rotates at full speed until contact is made across the full face of the brushes After stoning blow out the dust with low pressure air

WARNING: Uncovered rotating equipment can be dangerous. Use care so your hands, hair, clothing or tools do not catch in the rotating parts. Protect yourself from particles that may be thrown out by the rotating armature when stoning the commutator.

PREVENTIVE MAINTENANCE

1. Turn the welder off at the fuse box before doing work inside the machine. See page 2 for additional safety precautions
2. Blow out the welder and controls with an air hole once every two months. In particularly dirty location, this cleaning may be necessary every week. Use low pressure air to avoid driving dirt into the insulation.
3. Inspect the starter every six months. Brush any accumulation of dust out of the starter.
4. Rotate the Current Control through its entire range twice each morning This cleans the contacts to lessen the possibility of the contact "freezing". Do not do this while welding.
5. Keep electrode and work connections tight.

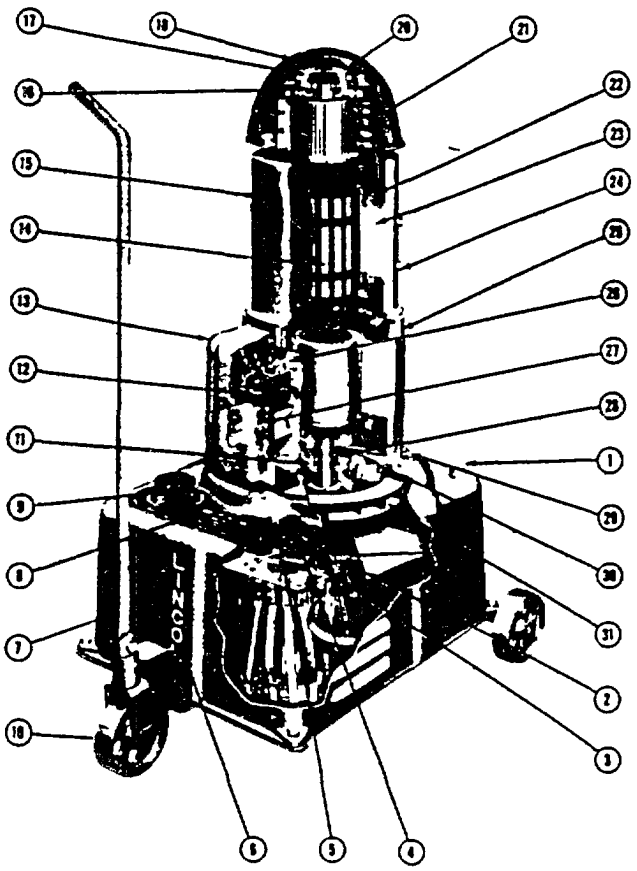
TROUBLE SHOOTING

WARNING: Have maintenance personnel do the maintenance work and trouble shooting. Turn the input power off using disconnect switch at the fuse box before working inside the machine.

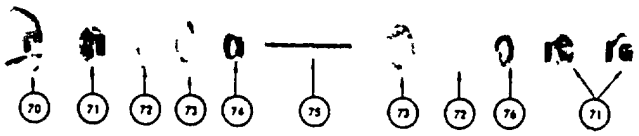
TROUBLE	CAUSES	WHAT TO DO
Machine fails to start.	Power circuit may be dead.	Look for open switch, fuses removed from clips or blown
	Power circuit may be single phased.	Look for one blown fuse or one dead line.
	Machine may be jammed.	See that armature turns over easily by hand, and look for foreign material in air gap.
	Overload heater links may be tripped.	When machine has had time to cool press start button to reset links and to start the welder.
	Power line voltage not suitable for the motor, or input voltage too low.	Check line voltage and make sure it agrees with nameplate voltage. If voltage is too low have power company check for line losses.
Motor trips off the line.	Power circuit may be single phased.	Check for one blown fuse or dead line.
	Welder may be operating above current capacity.	Check load against nameplate.
	Welding leads may be too long or too small. in cross-section.	See Table on page 3.
	Ventilation may be impaired.	Make sure that the space under dome is open and that the louvers in base are clear of any obstructions that would interfere with normal ventilation of the machine.
	Motor input voltage too low.	Motor supply voltages should not fall below 90% of normal voltage. Have power company check transformer and line capacity. If supply lines are too long or too small they should be corrected. (Se Table on page 3.)
	Welder may be connected for 460V and running on 230V.	Check the connection for proper voltage.
Welding arc is loud and spatters excessively.	Current setting may be too high.	Check setting and current output with ammeter.
	Polarity may be wrong.	Check polarity against recommended polarity for electrode being used.
Welder starts but fails to generate current.	Wrong rotation.	Check rotation with the arrow on nameplate. If wrong rotation, change the direction as follows: a. for three-phase---change any two leads. b. for two-phase, 3 wire---change two outside leads but be sure neutral power line is connected to the motor neutral (center terminal on the starter). c. for two-phase, 4 wire—change two leads in the same phase.
	Generator brushes may be loose or missing.	Be sure that all brushes bear on the commutator and have proper spring tension.
	Series field and armature circuit may be open.	Check circuit with ringer or volunteer.
	Poor welding lead connections.	Make sure all connections at work and machine are tight and that there are no breaks in the welding leads.
	Broken circuit in current control.	Replace current control.
	Open rheostat.	To check for open rheostat, turn voltage to maximum. If welder generates at maximum rheostat setting but not below, replace rheostat.
Machine fails to hold heat constantly.	Rough or dirty commutator.	Commutator should be trued or cleaned.
	Brushes may be worn down to limit of adjustments or life.	Replace or readjust brushes.
	Brush springs may have lost adjustments or may be broken.	Replace springs.
	Field circuit may have variable resistance connection or intermittent open-circuit due to loose connection or broken wire.	Check field circuit with ammeter to discover varying current.
	Electrode lead or work lead connections may be poor.	Tighten all connections.
	Wrong grade of brushes may have been installed on generator.	DC-180-MK and 150J use Brush T-6968 (Lincoln part number) DC-250-MK and 200J use Brush T-7554.
	Field rheostat may be making poor contact and overheating.	Inspect rheostat and clean. If the rheostat finger is loose replace rheostat.
	Brush rocker may be loose or out of adjustment.	Be sure the mark, half on the rocker and half on the bearing cage, is aligned. 

WELDER ASSEMBLY

WHEN ORDERING PARTS GIVE: Item No., Part Name, Parts List No., and welder Code.



OUTPUT STUDS
Parts List P-37-F



ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Output Stud Assembly, Includes All Below	2
70	Weld Nut, Hex Head	1
71	Brass Jam Nut	3
72	Plain Washer	2
73	Insulating Washer	2
74	Insulating Bushing	1
75	Stud	1
76	Lockwasher	1

DC-180-MK & SAE-150J Parts List P-37-C
DC-250-MK & SAE-200J Parts List P-37-D

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Complete Control Box, Includes Items 1 through 9	
1	Output Stud Assembly	2
	Output Stud Assembly Parts	See P-37-F
2	Stabilizer	1
	Hex Head Screw, Stabilizer Mounting	2
	Spacer, Stabilizer Mounting	2
3	Selector Switch	1
4	Selector Switch Handle	1
	Pin, Handle to Switch Shaft	1
5	Selector Switch Stop Screw	1
6	Lincoln Transfer	1
7	Control Box	1
	Control Box Base	1
8	Nameplate	1
	Self Tapping Screw, Nameplate Mounting	5
9	Rheostat	1
	Rheostat Handle	1
	Set Screw, Handle to Rheostat Shaft	1
	Receptacle, (Aircraft Models Only)	1
10	Dolly Assembly	1
11	Inner Dust cap	1
12	Starter	See page 6.
13	Starter Cover	1
14+	Armature Complete	1
15	DC Frame	1
	DC Frame With Coils and Poles	1
16	Top Bearing, Slotted, Note 1	1
	Top Bearing, Note 1	1
17	Bearing Cage and Rocker Assembly, Note 2	1
	Clamping Ring, Note 2	1
18	Top Shield	1
	Top Shield Fiber	1
20	Thrust Washer (Not Used With Slotted Bearing)	1
	Cage)	
21	Brusholder, New Style, Note 3	2
	Brusholder Parts	See P-25-N
21	Brusholder, Old Style, Note 3	2
	Brusholder Parts	See P-37-G
	Brush	8
22	Main Pole Coil	2
23	Main Pole Piece	2
	Interpole Coil and Pole Piece (Pair)	1
	Interpole Coil Spec	
	Lead Shield (4-5/8"x3-3/4" x 1/16")	1
24	Hex Head Screw, Main Pole to Frame	4
	Hex Head Screw, Interpole to Frame	4
25+	Stator With Coils	1
	Stator bolt	2
26	Starter Mounting Plate	1
27	Starter Thermal Link	See page 6.
28	Bottom Bearing	1
	Bearing Spacer	1
29	Grease Pipe	1
	Pipe Cap	1
30	Bottom Bracket	1
31	Blower	1
	Blower Washer	1
	Blower Nut	1
	Note 1: Slotted bearing fits all models. Plain bearings fits models not equipped with slotted bearing cage. (1956)	
	Note 2: Replace with new assembly plus damping ring. Use slotted bearing with new assembly.	
	Note 3: New and old style brusholders are interchangeable. However, both brusholders on one machine must be the same style.	(1953)

REPLACEMENT STARTERS

Starters S-6929 and S-8253 have been discontinued. For replacement starters, order the new type S-13527. If it is to replace either of the older types, also order "Item 13 - Starter Cover" and "Item 26 Starter Mounting Plate" (see page 7).

To identify each type Allen-Bradley starter, here are the code breaks and physical differences.

	Obsolete Starter S-6929 Below Code 1400 to 1949	Obsolete Starter S-8253 Code 1400 to 6150 1949 to 1967	Current Starter S-13527 Above Code 6150 1967 to -
Post (solder pot) Diameter	9/32"	3/16"	7/32"
Post (solder pot) Height	Metal Strip to Terminal	Green Bakelite	Metal Strip to Overload Relay
A-B Thermal Element	Type "O"	Type "A"	-

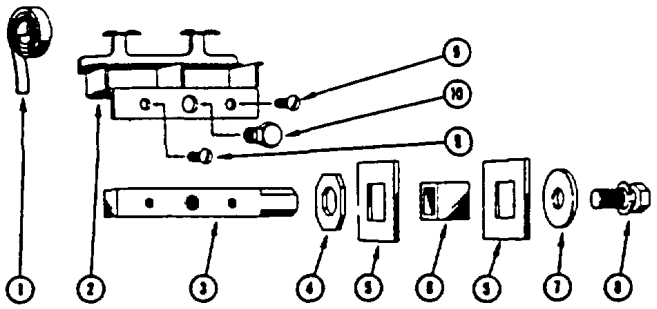
For adequate protection each starter must have the proper heater links as indicated in these tables.

FOR STARTER S-6929			
Model	**Volts**	**Stamped**	**Part No.**
SAE-200J	220	1	S-6879-1
SAE-200J	440	2	S-6879-2
SAE-200J	550	3	S-6879-3
SAE-200J	220	4	S-6879-4
SAE-200J	440	5	S-6879-5
SAE-200J	550	6	S-6879-6

FOR STARTERS S-13527				
Model	**Volts**	**Color**	**Stamped**	**Part No.**
All	220 or 230	Scarlet	-14	S-8254-14
	440 or 460	Orange	-15	S-8254-15
	550 or 575	Green	-16	S-8254-16
	380	Black	-12	S-8254-12
	500	Orange	-15	S-8254-15

FOR STARTER S-8253				
Model	**Volts**	**Color**	**Stamped**	**Part No.**
SAE-200J & DC-250-MK	220	Brown	11	S-8254-11
SAE-200J & DC-250-MK	440	Black	12	S-8254-12
SAE-200J & DC-250-MK	550	Blue	13	S-8254-13
SAE-150J & DC-180-MK	220	Scarlet	14	S-8254-14
SAE-150J & DC-180-MK	440	Orange	15	S-8254-15
SAE-150J & DC-180-MK	550	Green	16	S-8254-16

BRUSH HOLDER - NEW - STYLE
Parts List P-25-N



ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Brusholder Assembly Includes:	1
1	Spring	4
2	Brusholder Bracket	1
3	Stud	1
4	Stud Washer	1
5	Insulating Washer	2
6	Insulating Bushing	1
7	Plain Washer	1
8	Sems Hex Head Cap Screw	1
9	Round Head Cap Screw	2
10	Hex Head Cap Screw	1

NOTE: New and Old style Brush holders are interchangeable. However both Brush holders on one machine must be the same type. For Old brush parts (Parts List P-37-G) contact a Lincoln authorized Field Service Shop.

HOW TO ORDER REPLACEMENT PARTS

Order parts from Lincoln offices or from the Authorized Field Service Shops listed in the “Service Directory”. Give the following information:

(a) From the nameplate - machine model, code and serial numbers.
(b) From this manual - part name, item number, quantity required and the number of the list used to get this information.

Any items indented in the “Parts Name” column are included in the assembly under which they are listed. The indented items may be ordered separately. If the entire assembly is needed, do *not* order the indented parts.

GUARANTEE

The Lincoln electric Company, the Seller, warrants all new equipment except engines and accessories thereof against defects in workmanship and material for a period of one year from date of shipment, provided the equipment has been properly cared for, and operated under normal conditions. Engines and engine accessories are warranted free from defects for a period of ninety days from the date of shipment.

If the Buyer gives the Seller written notice of any defects in equipment or electrode or flux within any period of warranty and the Seller’s inspection confirms the existence of such defects, then the Seller shall correct the defect or defects at its option, either by repair or replacement F.O.B. its own factory or other place as designated by the Seller. The remedy provided Buyer herein for breach of Seller’s warranty shall be exclusive.

No expense, liability or responsibility will be assumed by the Seller for repairs made outside of the Seller’s factory without written authority from the Seller.

The Seller shall not be liable for any consequential damages in case of any failure to meet the conditions of any warranty. The liability of the Seller arising out of the supplying of said equipment or electrode or its use by the Buyer, whether on warranties or otherwise, shall not in any case exceed the cost of correcting defects in equipment or replacing defective electrode in accordance with the above guarantee. Upon the expiration of any period of warranty, all such liability shall terminate.

The foregoing guarantees and remedies are exclusive and except as above set forth. There are no guarantees or warranties with respect to engines, accessories, equipment, electrodes, or flux, either express or arising by operation of law or trade usage or otherwise implied, including without limitation the warranty of merchantability, all such warranties being waived by the Buyer.

LINCOLN ELECTRIC

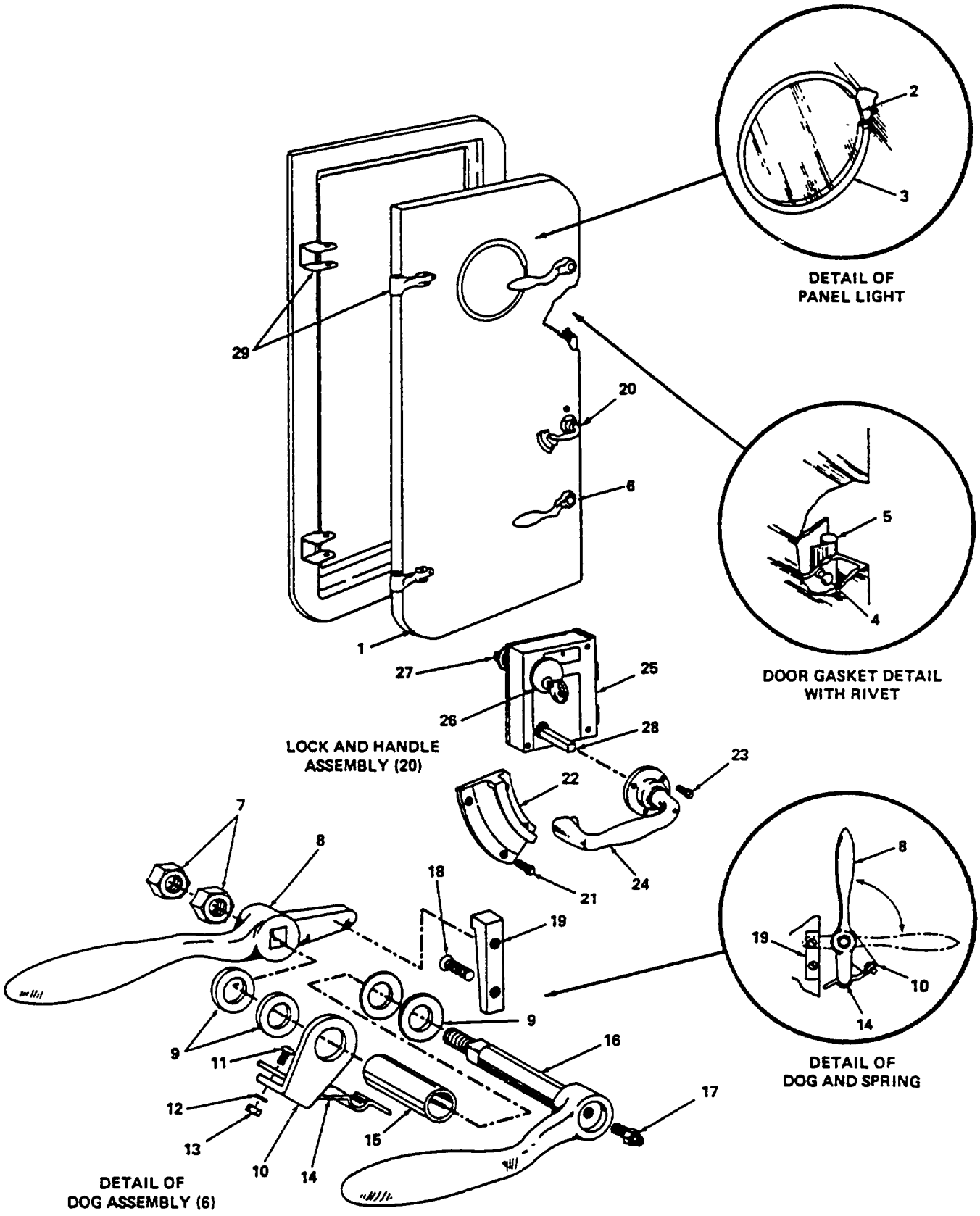
THE LINCOLN ELECTRIC COMPANY

World’s Largest Manufacturer of Arc welding Products • Manufacturer of Industrial Motors

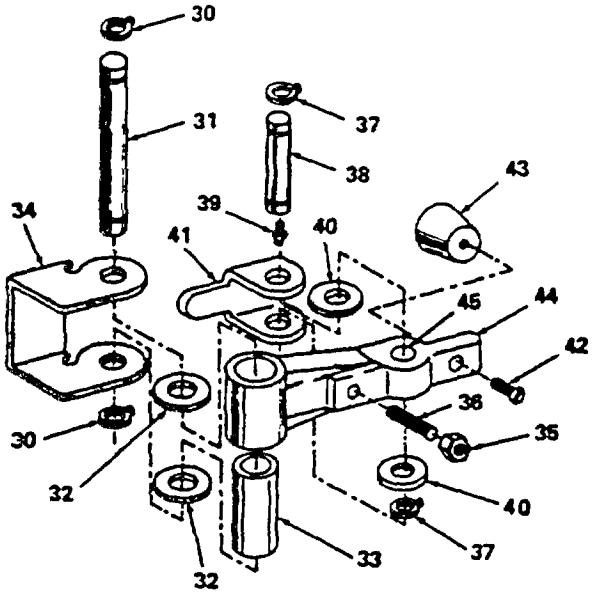
Cleveland, Ohio 44117 U.S.A.

Branch Offices, Field Services Shops and Distributing Agencies in All Principal Cities
LINCOLN ELECTRIC CO., (Australia) Pty., Ltd., Sydney 2211, Australia
LINCOLN ELECTRIC CO., of Canada, Ltd., Toronto M4G 2B9, Canada
LINCOLN ELECTRIC CO., (Europe) S.A., Rouen 76120, France

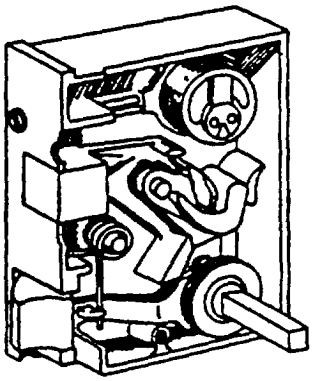
Export Representatives
ARMCO INTERNATIONAL - DIV. OF ARMCO STEEL CORP., Middletown, Ohio, U.S.A.



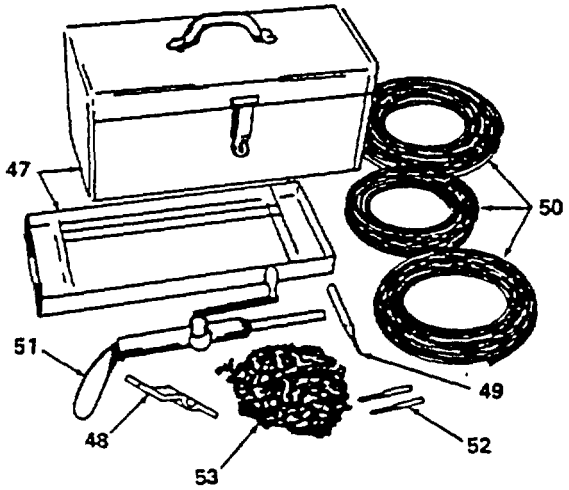
THE OVERBEKE - KAIN CO.
CLEVELAND. OHIO 44146



DETAIL OF ADJUSTABLE HINGE ASSEMBLY (29)



DETAIL OF LOCK WITH COVER REMOVED



REPAIR KIT (46)

THE OVERBEKE - KAIN CO.
CLEVELAND, OHIO 44146

PARTS LIST			
INDEX NO.	**PART NUMBER**	**DESCRIPTION**	**UNITS PER ASSY**
	M51DB	DOOR AND FRAME ASSEMBLY	
1	M195D	. DOOR ASSEMBLY, Round corner	1
2	1397A2-GL 1397A3-GL	. . LIGHT, Panel, 1/4" plat glass, 8" or 10" diameter	1
3	10248	. . RETAINER, Light, neoprene or rubber	1
4	2771-0613	. . MONOBOLT, 3/16", Mild Steel	AR
5	2761A-NE	. . GASKET	16 ft
6	M77C1-MS	. DOG ASSEMBLY	2
7		. . NUT, Hex jam, 5/8-11, Brass	2
8	1B1-MB	. . DOG, Inside	1
9	333A2-BR	. . WASHER	4
10	3A1-MS	. . BRACKET, Spring	1
11		. . SCREW, Rd hd cap, 1/4-20 X 5/8", Bras	2
12		. . WASHER, Lock, 1/4", Bronze	2
13		. . NUT, Hex, 1/420, Brass	2
14	4A1-SS	. . SPRING, Clip	1
15	11A1-MS	. . FERRULE, Dog	1
16	4C1-MB	. . HANDLE, Dog, outside	1
17	1641-8	. . FITTING, Gra	1
18		. . SCREW, Flat hd, 1/420 X 1/2" (For aluminum doors only)	2
19	78A1-MS	. . WEDGE, Dog	1
20	1381-MB	. LOCK AND HANDLE ASSEMBLY	1
21		. . SCREW, Flat hd, 8-32 X 1/2", Brass	14
22	548C1	. . QUADRANT	2
23		. . SCREW, Flat hd, 1/4-20 X 1-1/2", Brass	3
24	27C1-BR	. . HANDLE	2
25	112D-MB	. . LOCK, Mortise	1
26	#1152	. . . CYLINDER, Key (includes trim ring) US 10 Bronze	1
27	S-1052	. . . CYLINDER, Thumb turn (includes trim ring), US10 Bronze	1
28	505A1-BR	. . SPINDLE	1
29	M66C1-MS	. ADJUSTABLE HINGE ASSEMBLY	2
30	#5100-62H	. . RING, Snap, CRES	2
31	41A3-SS	. . PIN, Frame	1
32	32A1-OL	. . WASHER	2
33	10A3	. . BUSHING	1
34	328A-MS	. . PAD, Frame (Welded to frame)	1
35		. . NUT, Hex, 3/8-16, CRES	1
36		. . SCREW, 3/8-16 X 1-1/2" Soc, set, CRES	1
37	#5100-62	. . RING, Snap, CRES	2
38	41A2-SS	. . PIN, Door	1
39	1641	. . FITTING, Grease	1
40		. . WASHER, Standard, Brass	4
41	327A	. . PAD, Door (Welded to door)	1
42		. . SCREW, Flat hd, 1/4-20 X 1-1/4", Brass	1
43	1469A-NE	. . STOPPER, Rubber	1
44	1481A1-MS	. . BLADE, Hinge (Includes 10A1-BZ Bushing)	1
45	10A1-B7	. . BUSHING, Bronze	1
48	67A	REPAIR KIT	1
47	K-20	. BOX, Tool	1
48	4A1-SS	. SPRING, Clip	4
49	36A1	. PUNCH	1
50	2761A-NE	. GASKET	60 ft
51	2700HD	. GUN, For Monobolt Rivet	1
52	10	. DRILL	2
53	2771-0613	. RIVET, Monobolt, 3/16, Mild Steel	300

NOTE: When ordering, specify door model number and whether door is mild steel or aluminum.

THE OVERBEKE - KAIN CO.
CLEVELAND, OHIO 44146

THE OVERBEKE-KAIN CO.

20905 AURORA ROAD
CLEVELAND, OHIO 44146
(FOR 26" x 66" DOORS)

2761-A-NE HOLLOW TYPE 'NEOPRENE GASKET 60-65 DURO

SIDE VIEW

TOP VIEW

(ACTUAL SIZE)

****

PHD-603N-1A SPONGE RUBBER CORE BRIDGEPORT GASKET
(9/16" DIA. WITH 5/8" LEG)

SIDE VIEW

TOP VIEW

(ACTUAL SIZE)

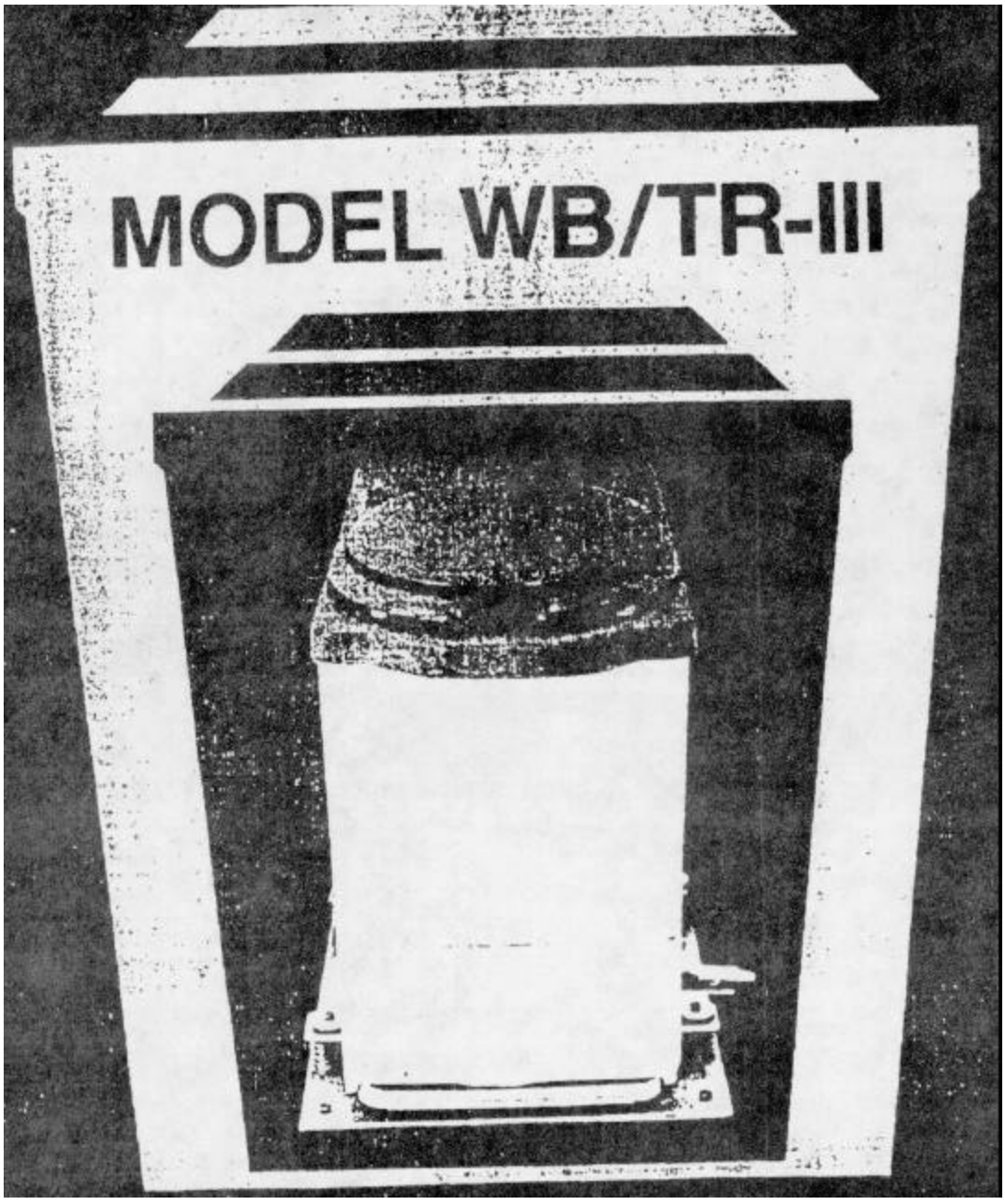
****

PLEASE NOTE: THE 2761-A-NE GASKET REPLACES THE PHD-603N-1A BRIDGEPORT GASKET FOR DOORS MADE PRIOR TO 1971. HOWEVER, THE PHD-6030N-1A BRIDGEPORT GASKET IS AVAILABLE WHICH IS PRICED ON THE ATTACHED COST SHEET.

INSTALLATION

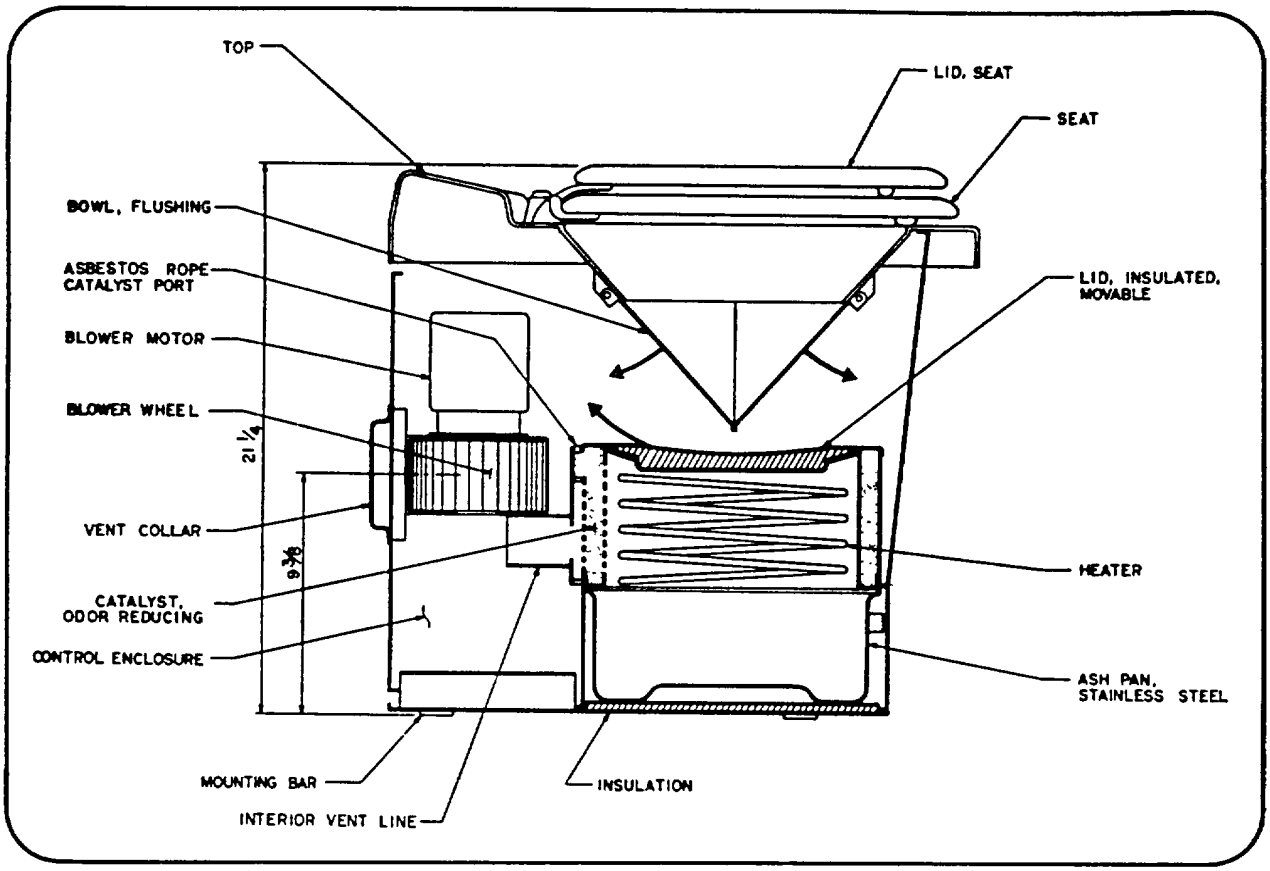
OPERATION

MAINTENANCE



ELECTRIC INCINERATING TOILET FOR USE ON UNINSPECTED VESSELS

TYPE III



WHAT IS INCINOLET?

INCINOLET is an electric incinerating disposal system. It uses no water nor chemicals. has no pipes. requires no central disposal system. and needs only a source of electric power for its complete operation.

INCINOLET reduces human waste to an odorless. bacteria-free ash similar to wood ash. The ash is the inorganic residue from the human waste and may be disposed of in a manner similar to the disposal of wood ash.

INCINOLET will operate at a maximum roll angle and pitch angle of 30%.

WHAT INCINOLET WILL DO AND WON'T DO.

INCINOLET will incinerate human waste. both solids and urine. toilet paper. and sanitary napkins. INCINOLET may be used at anytime-even while incinerating a prior waste deposit. provided its capacity is not exceeded.

INCINOLET will not incinerate cans. bottles, and neither should it be used to incinerate highly combustible products. such as oily rags.

INCINOLET will serve a number of people equal to its rated capacity. INCINOLET should not be installed where the number of persons to be served will exceed its capacity.

NOTE: INCINOLET SHOULD NOT BE INSTALLED AT ANY LOCATION WHICH MAY BECOME EXPLOSIVE OR REQUIRING, EXPLOSION-PROOF COMPONENTS OR WIRING.

GENERAL OPERATION.

The INCINOLET is waterless. In order to provide a sanitary system. the INCINOLET toilet makes use of a wax paper liner placed in the -

bowl prior to each and every use. Waste deposited in the paper bowl liner is thereby flushed into the incinerator by stepping on the footpedal. The INCINOLET toilet is designed to use the paper liner and if the paper liner is not used, the INCINOLET toilet will not properly function. As a matter of fact, failure to use the bowl liner with each and every use voids the warranty.

Model TR Series features automatic circuitry utilizing a reset automatic timer actuated upon foot-pedal flushing. The incineration cycle is automatically reset with each flushing; for example, if the Model WB-III Toilet is used during the incineration of a prior waste deposit, a new incineration cycle would be initiated automatically

RATING

The average incineration cycle is twenty minutes, and the unit may be used at any time including that during the incineration cycle up to the point that the incinerator chamber is full. The capacity rating is. therefore. related to the number of uses which the unit will accommodate in a given two-hour interval. Accordingly. the following capacity applies.

Model TR Toilet Series 6 persons

EMISSION CONTROL

The INCINOLET Incorporates an emission control section in the form of heat-activated catalyst (CANDOR) which is incorporated between the inner and outer incinerator walls. The odor control section is filled with white catalyst pellets through which is drawn the gaseous effluent from the incineration process.

CANDOR is a true catalyst. that is. it does not enter into the chemical reaction and, hence. is not used up. The pellets may. however. be gradually eroded and crushed as a result of expansion and contraction during heating and cooling cycles. The catalyst may. therefore. require replenishment from time to time, for example, with heavy usage, once or twice a year.

If INCINOLET is installed where vibration or shock is a factor, isolation mounting must be provided to prevent excessive mechanical erosion of the catalyst pellets.

If properly installed and used, the INCINOLET emission control system effectively removes smoke and odor from the ventline effluent. A condition contrary to this implies improper use or installation or operation of the system and should be corrected.

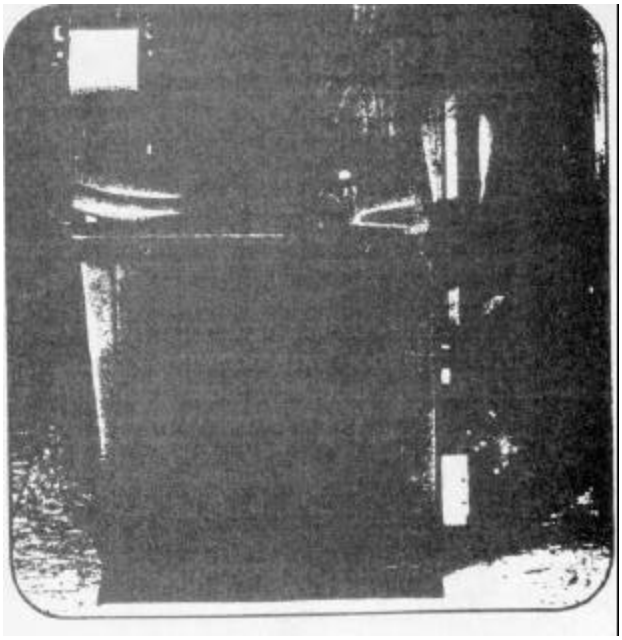
VENTING

All INCINOLET models are force-vented by means of a blower which comes on simultaneously with the heater, remains on during the incineration cycle plus an additional interval after heater cut-off. Under normal circumstances, all INCINOLET models are vented to the atmosphere to carry off heat as well as moisture generated during the evaporation of liquid waste.

Satisfactory INCINOLET installations require the proper venting of the unit, both inside as well as outside the toilet enclosure. The ventline must terminate in a manner such that no backdrafts down the ventline are produced. The vent must also terminate into an area which is sufficiently large to allow diffusion of the ventline effluent. The ventline may be mounted through or within the wall.

Ventline should be terminated above the top deck. A ventline which induces airflow up the vent pipe as well as preventing entry of rain should be used The turbine, Pullman or hat-type vent cap are all examples.

The blower wheel and ventline must be cleaned at suitable intervals, usually on a 90 day basis.



MANIFOLD VENTING

Manifold venting of two or more units through a single, enlarged ventline is acceptable ONLY if an inline blower of sufficient volume is installed downstream from the toilets to be in operation in conjunction with either or both toilets. The volume of the downstream blower must be sufficient to provide 200 CFM through each unit with the unit blowers on. An example: two units in tandem will require an inline blower volume of 100 CFM.

Size of ventline also increases with the number of units in manifold. For each pair of units add two inches to the diameter of the vent pipe and manifold. For example. two units require a six inch ventline whereas four units require an eight in, h ventline.
CONSULT MANUFACTURER

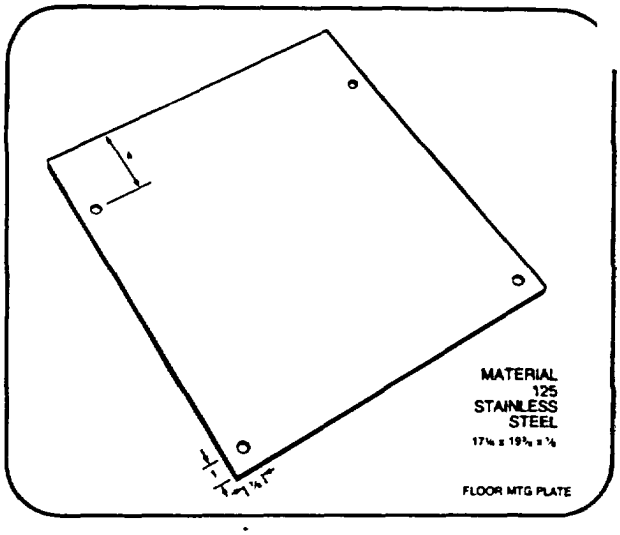
INSTALLATION

INSTRUCTIONS AS TO USE SHOULD BE CLEARLY VISIBLE. IF NECESSARY. THE POTENTIAL USER SHOULD BE SHOWN PERSONALLY HOW TO USE THE BOWL LINER AND HOW TO FLUSH.

1. Hang Bowl Liner Holder.

Allow adequate space for the particular ventline configuration required as well as the necessary space for use and for flushing the INCINOLET.

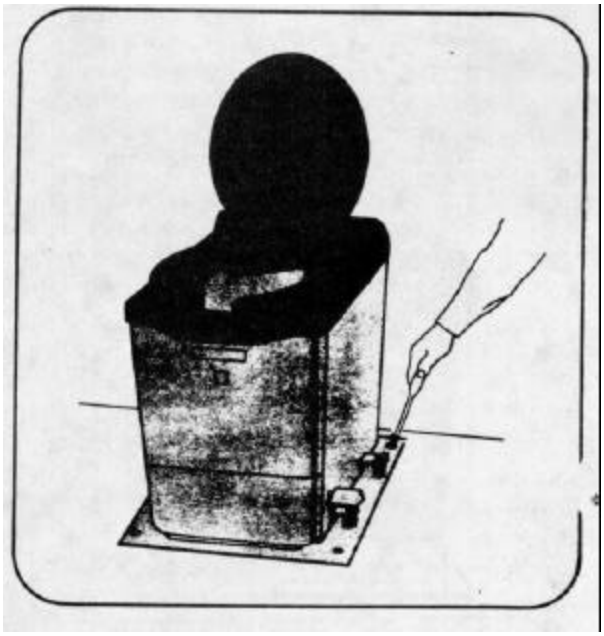
2. Bolt Mounting Plate To Floor.



Mounting plate must be leveled to offset effect of any camber.

UNIT MUST REST ON ISOLATION MOUNTING.

Caulk or otherwise seal the plate away from the deck to prevent accumulation of dirt and moisture beneath the plate.



3. Wire the INCINOLET in accordance with the wiring diagram shown in this manual. Metal conduit and junction box must be used in accordance with Underwriters Laboratory and Canadian Standard Association requirements. NOTE: Unit is grounded through the green ground wire at the rear of the unit. DO NOT install nor use the unit without providing adequate ground according to this method. CAUTION: UNIT MUST BE GROUNDED by means of conduit and ground wire. Unit must be wired through 30 amp fuse or circuit breaker.

INSTALL VENTLINE.

4. Ventline is 4 inch diameter. single-wall construction. and should be of corrosion resistant material such as galvanized metal or stainless steel. Flexible. heavy-duty. Neoprene coated line may also be used. provided stainless steel hose clamps are used at each end of the line to prevent leakage. Ventline joints within the toilet room must be taped or otherwise sealed to prevent leakage. Use caulking or tape around each ventline joint including the elbow.

NOTE: DO NOT TERMINATE VENTLINE NEAR A WINDOW OR FRESH AIR INTAKE

5. After installation, with electric power applied, test the circuit by initiating the incineration cycle.

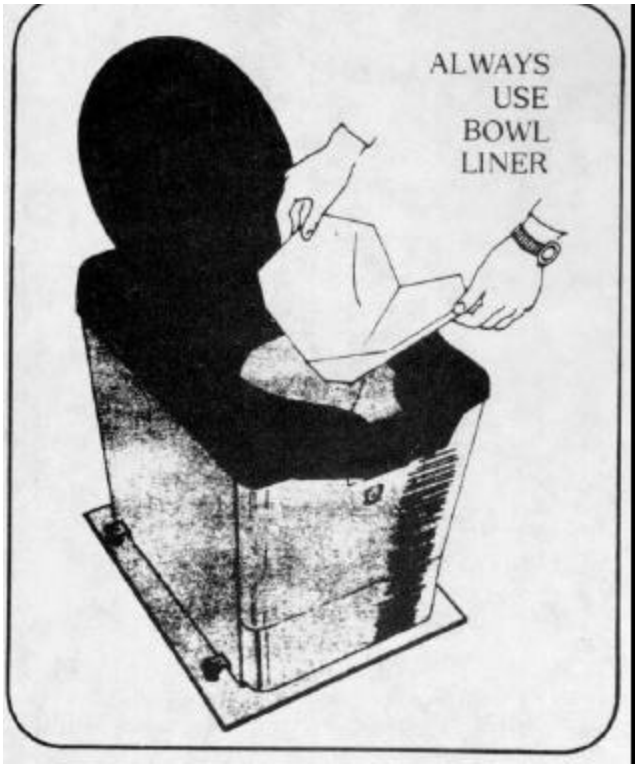
a. Heater warms.
b. Blower comes on.
c. Indicator light comes on.

OPERATION

HOW TO USE.

To use the INCINOLET properly:

1. ALWAYS PLACE WAX PAPER LINER IN THE BOWL BEFORE EACH AND EVERY USE.
2. Flush toilet by stepping on the footpedal. Incineration starts automatically on footpedal flushing.



TYPICAL CYCLE.

Length of incineration cycle may vary somewhat, depending upon the amount of waste, room temperature. heater wattage, voltage and whether incinerator is already hot from a prior cycle.

The following are typical conditions of an incineration cycle:

1. The indicator light, directly across the heater terminals, will be "ON" or "OFF," depending upon whether the thermostat is closed or open. The heater-thermostat is actuated for approximately 60 minutes. Heater will not be on during the entire "actuated" period but will be "ON" and "OFF."
2. The blower will be on continuously throughout the incineration cycle, plus about 45 minutes thereafter, or until the entire system cools.

INCINERATION OF SOLIDS.

The incineration of a solids deposit will generally require more than one incineration cycle. The INCINOLET is designed to provide additional cycles of short duration following the evaporation of the urine.

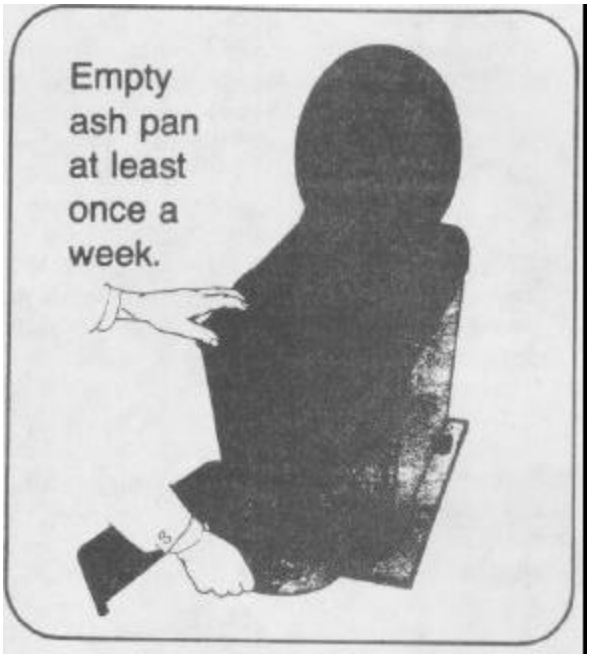
SERVICING

INCINOLET requires a very minimum of service:

1. **Ashpan should be emptied weekly.** Good practice is to empty the ashpan on a given day of the week, for example, each Monday or Friday. In cases of heavy usage, ashpan may require emptying more frequently, while in cases of only very occasional usage, the ashpan may require emptying less frequently. The ash within the INCINOLET ashpan is innocuous, bacteria-free and may be disposed of in a manner similar to that for wood ash. Ashpan must not be deformed.

2. **The bowl section** must be occasionally cleaned with the use of mild soapy water. Be sure to remove any build up of wax from lower portions of the bowl. This wax will cause the bowl liner to fall improperly into the incinerator chamber, perhaps tilting or dumping waste across the heater which causes excessive corrosion and short life.

3. **The blower housing and wheel** must be cleaned at least once every 90 days. First, remove voltage from unit. To remove the blower and wheel, loosen the rear panel, remove the screws holding the blower motor and wheel in place, then pull the assembly free of the blower housing.



CAUTION: UNDER NO CIRCUMSTANCES USE WATER OR STEAM TO HOSE DOWN UNIT.

Using a stiff brush, for example, a toothbrush, remove any build up of grease, wax, dust, and dirt. Also remove a similar build up within the blower housing itself.

4. **Clean the ventline elbow** next to the unit, first by removing the elbow and then cleaning with warm soap water or a stiff brush.

5. **The interior of the housing** should be cleaned every 90 days of bits and pieces of paper which fall to the exterior of the incinerator chamber. To do this, remove the four screws holding the top and bowl, then lifting the top section out of the way, thereby exposing the interior of the housing. Remove the paper pieces.

PARTS REPLACEMENT

Before replacing any part or making any continuity measurements, voltage must be removed from the unit.
Remove ashpan.
Remove top and bowl section.
For electrical parts inspection, remove the cover from the control box. All electrical parts are accessible. Inspect for loose wiring or wiring harness holding the relay closed.

HEATER REPLACEMENT.

Disconnect the terminals of the heater leads by first removing the hex locknuts. Carefully remove the asbestos sealing rope about the heater cold ends coming through the wall of the incinerator chamber as this packing rope will be reused. Remove the 1/4 inch bolts holding the heater brackets in place so that the brackets and heater are now free to be removed through the front of the incinerator chamber. Install the new heater in exact reverse order.

CAUTION: When replacing the hex locknuts on the heater terminals, use two end wrenches, one for the locknut and one for the terminal stud coming from the heater. Be sure that the locknut is tight against the terminal without twisting the heater stud and breaking the seal of the heater.

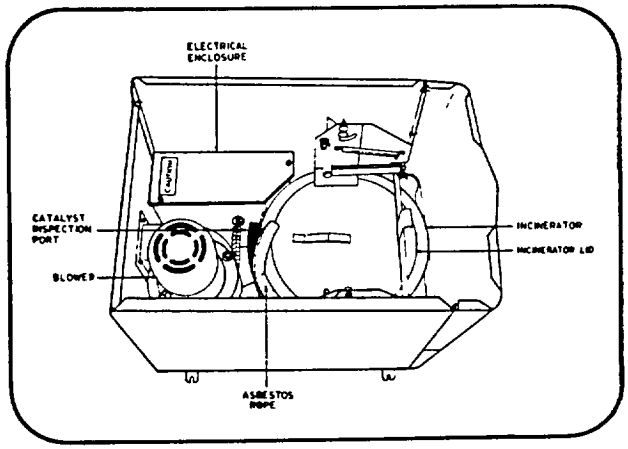
Good practice is to replace the control thermostat (L-290) along with a new heater in order to insure proper incineration control.

THERMOSTAT REPLACEMENT

Both control thermostat (L-290) and blower thermostat (F-140) are located in the lower portion of the incinerator chamber to the rear of the ashpan. Both are replaced from the back by removing two screws. Replacement thermostats are furnished with the necessary wiring and terminals. When replacing thermostats make certain to use the same number of gaskets under the mounting flange.

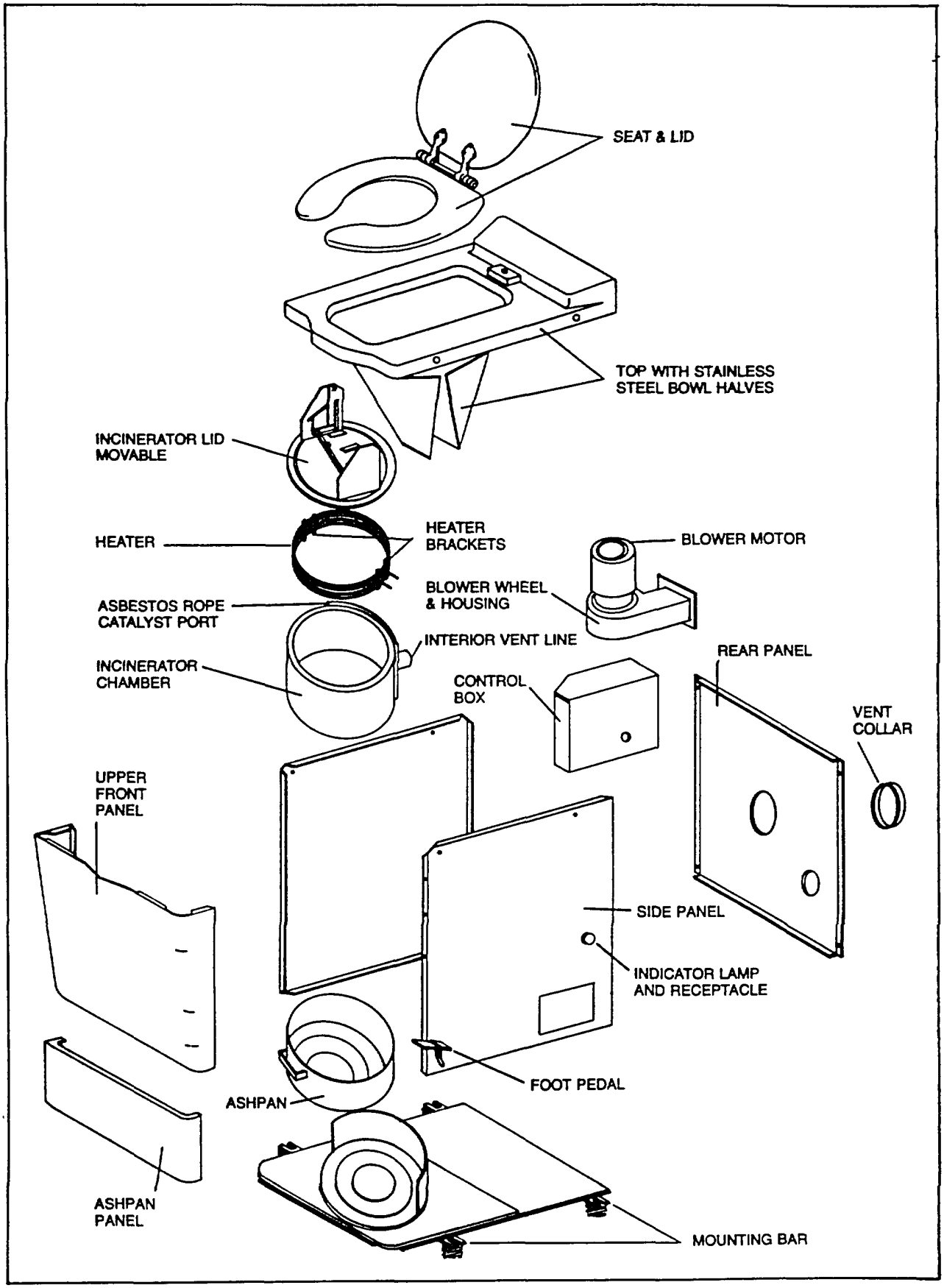
CATALYST REPLACEMENT

The catalyst inspection port, located at the upper rear portion of the incinerator chamber, is closed by means of an asbestos rope. To inspect the level of catalyst, remove the rope. If the level of the catalyst is quite low, say 1 inch or more below the level of the top of the port, fill the port with replacement catalyst, working it to the left and right beyond the extremes of the port by means of a screwdriver to insure that all parts of the catalyst container are full of the catalyst. Use sufficient catalyst to fill all parts as well as the port itself to within about 1/4 of an inch of the top of the port. Then replace the asbestos rope, packing it securely in place.



TROUBLESHOOTING

SYMPTOM	WHAT TO MEASURE AND LOOK FOR	CAUSE AND REMEDY
Heater will not heat, light and blower on.	Measure voltage across heater. 1. Voltage to heater. 2. No voltage to heater.	 Heater burned out. Replace. Loose wire to heater. Reset timer inoperative. Replace Relay arm held open by wiring. Relieve. Defective thermostat.
Blower not on, heater and light on.	Measure voltage across blower. 1. Voltage to blower. 2. No voltage to socket.	 Blower wheel binding. Loosen or Loose wire. Reconnect. held open by wiring. Relieve.
Light not on, heater and blower on.	Measure voltage across light socket. 1. Voltage to socket. 2. No voltage to blower.	 Bulb burned out. Replace Loose wire. Reconnect.
Total System Inoperative. (No light, blower or heater.)	Measure voltage to the unit at the switch box. If fuse or circuit breaker open, measure for grounded condition. If the unit is not grounded and the heater is operational, suspect the start switch. MS start switch may not be actuated by the flush lever.	Determine cause for ground condition: burned out heater, loose wire, etc. Adjust spring leaf to contact MS switch when footpedal is depressed
Blower goes off when heater and light go off. NOTE: Blower should stay on from 35 to 45 minutes after the heater and light go off in order to assure proper cooling.	ITS (blower) thermostat not closing properly.	Replace ITS thermostat. Always inspect for loose wire. Also, inspect the relay arm to make certain the wiring is not preventing its closing to start the blower.
Blower goes off or 5 minutes after the incineration cycle starts.	This condition may occur if a 115 volt blower is wired across 230 volts.	Verify that the blower is actually a 115 for loose wire. Also, inspect the relay determine whether the blower is actually across 230 volts. If so, rewire to connect blower across 115 volts.
System operative only while foot pedal depressed. Blower, light, heater go off when foot pedal released.	Reset timer inoperative.	Rearrange wiring to make certain that Replace timer otherwise. First, lubricate gears, however.
Heater cycles off and on continuously. NOTE: Blower should stay on from 35 to 45 minutes after the heater and light go off, in order to assure proper cooling	Inspect relay arms 1. Measure reset timer cycle. 2. Determine if spring actuating leaf is holding MS start switch in closed position 3. Measure continuity through MS start switch when footpedal not depressed 4. Relay contacts may be welded together. This indicates a short or grounded condition.	Rearrange wiring to make certain that the relay is not held closed. Adjust internal selector to 9 or 0, lubricate gears of clock drive. Replace reset timer if inoperative. Relieve pressure against the MS start switch by rearranging the actuating leaf Replace MS switch MS switch if it remains closed. Determine cause for short or ground After this has been found, either replace the relay or polish relay contacts with fine emery cloth.
Heating cycle too short.	Apply this standard test: place eight ounces water in cleaned ashpan. Start the incineration cycle. Heater should be on from 18 to 22 minutes for toilet. Inspect reset timer internal selector. Should be set on 9 or 0	Replace TS (heater) thermostat if cycle less than 20 minutes. If the reset timer is properly set already, rest timer is inoperative and should be replaced. First lubricate gears.
Blower runs continuously. NOTE: In very warm locations, blower may be on for as much as 60 minutes after heater is off. Pan should be warm to touch when blower goes off.	Remove ashpan and allow an additional 30 minutes for cooing period. If blower is still on, either ITS (blower) thermostat is inoperative or relay arm is being held down. 1. ITS thermostat should be open. 2. If ITS thermostat is closed:	 Relay arm being held down by wiring across it. Rearrange wire. Replace ITS thermostat.
Odor within toilet room.	BOWL LINER NOT USED. ASHPAN TOO FULL OF ASH. Ventline not sealed. Blower wheel and venting system clogged. Solids not property incinerated. Blower cuts off too soon.	PLACE LINER IN BOWL PRIOR TO EACH USE. EMPTY ASHPAN REGULARLY - at least weekly. Seal each joint within the room. Clean bower wheel. Make test as outlined earlier and replace thermostat if required. Correct as outlined earlier.
Odor outside.	Same as above Incinerator lid hanging open Catalyst low	Same as above Inspect and repair. Add catalyst to the catalyst container


SEAT & LID
TOP WITH STAINLESS STEEL BOWL HALVES
INCINERATOR LID MOVABLE
HEATER
HEATER BRACKETS
BLOWER MOTOR
BLOWER WHEEL & HOUSING
ASBESTOS ROPE CATALYST PORT
INTERIOR VENT LINE
INCINERATOR CHAMBER
CONTROL BOX
REAR PANEL
VENT COLLAR
UPPER FRONT PANEL
SIDE PANEL
INDICATOR LAMP AND RECEPTACLE
FOOT PEDAL
ASHPAN
ASHPAN PANEL
MOUNTING BAR

TYPICAL OPERATION

INCINERATION cycle is started by the MS SWITCH which is actuated by the flushing action. At the NO position power is supplied the relay coil, thereby closing the relay switches which continue to supply power after MS returns to NC position. As relay switches are now closed, reset timer starts, cycle begins.

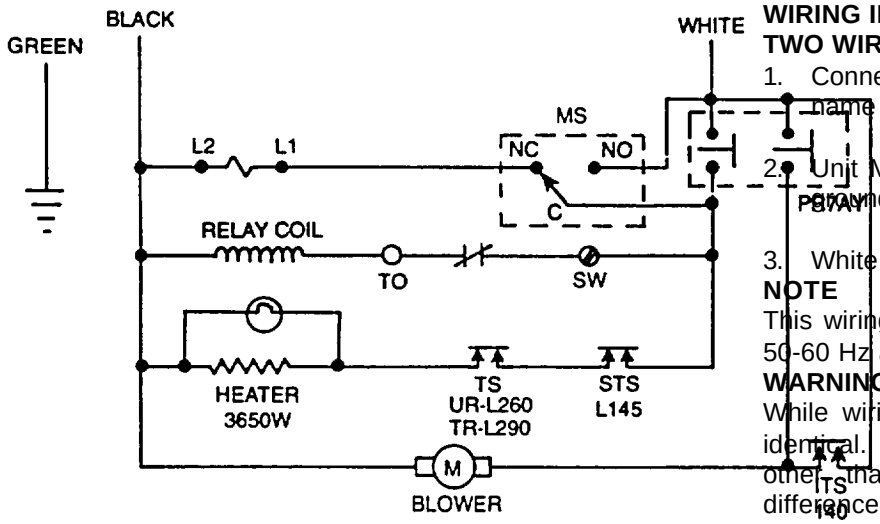
After urine is evaporated plus 7 to 10 minutes, TS thermostat opens, cutting off heater. However, as reset timer is set for 60 minutes approximately, heater will again come on in 6 or 7 minutes, after TS thermostat has closed. At the end of the timing cycle, timer switch opens, relay opens, and heating ceases. Blower stays on, because the ITS thermostat is now closed, until incinerator chamber cools to 140°F approximately.

If the unit is flushed while in cycle, the timer resets itself to provide a complete cycle from that instant.

Safety thermostat opens only upon excessive heat build-up within toilet housing.

DEFINITION OF SYMBOLS

MS - Start switch, NC.
PR7AX - Holding relay, DPST
L1, L2, TO, SW - Reset Timer Terminals
TS- Control Thermostat, NC
ITS - Blower Thermostat, NO
STS - Safety Thermostat, NC



WIRING INSTRUCTIONS FOR TWO WIRE

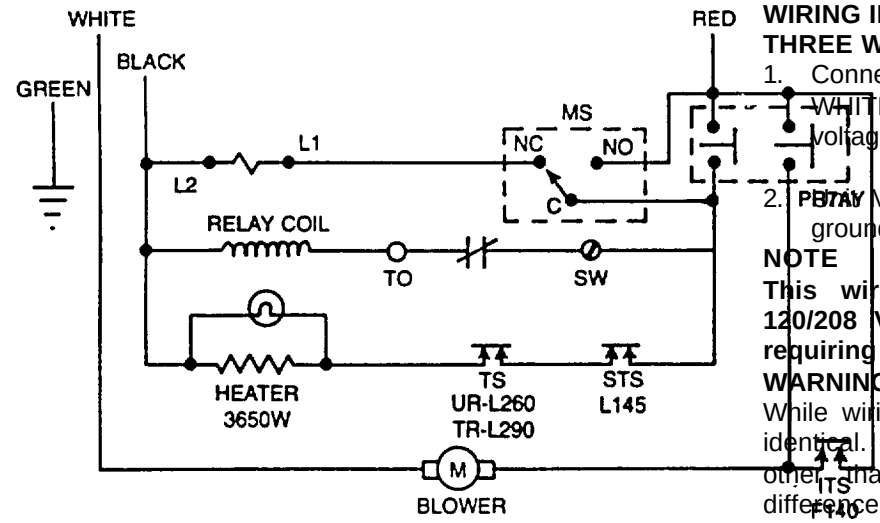
1. Connect BLACK & WHITE leads to power. See name plate on rear panel for voltage.
2. Unit MUST be grounded through metal conduit and ground wire.
3. White is considered neutral.

NOTE

This wiring diagram applies to units requiring 120 VAC, 50-60 Hz as well as those requiring 240 VAC 50-60 Hz.

WARNING

While wiring for each of the two units noted above is identical. DO NOT operate a specific unit on any voltage other than that indicated on the unit. owing to differences in circuit components.
WHITE is considered
NEUTRAL FOR 120 VAC only.



WIRING INSTRUCTIONS FOR THREE WIRE

1. Connect RED & BLACK leads to 208 or 240 vac. WHITE to neutral. See name plate on rear panel for voltage.
2. Unit MUST be grounded through metal conduit and ground wire.

NOTE

This wiring diagram applies to units requiring 120/208 VAC. 50-60 Hz supply as well as those requiring 120/240 VAC, 50-60 Hz supply.

WARNING

While wiring for each of the two units noted above Is identical. DO NOT operate a specific unit on any voltage other than that indicated on the unit. owing to differences in circuit components.
WHITE is considered NEUTRAL

SPECIAL CONSULTATION AND ENGINEERING SERVICE.

Research Products can furnish consultation and engineering service on a fee plus expense basis for any application any where. If the application which you have in mind requires special venting configuration or unusual mounting or usage aspects, and requires on the spot study and recommendation, please contact us.

FACTORY REPAIR AND REMANUFACTURING SERVICE.

Research Products maintains a repair and remanufacturing division where various INCINOLET models can be rebuilt to current production standards at a fraction of the cost of a new unit. Under this program the customer prepays the unit to us and accepts the unit from us on a collect freight basis. Under the remanufacturing program the unit is inspected, steam cleaned, sandblasted. repainted where necessary, worn parts replaced (labor only) and tested, and reboxed all for a single fee Remanufactured units carry twelve months warranty.

INCINOLET is guaranteed for one year against defects of material and workmanship except the heater which is guaranteed for ix months Terms and conditions are given in the warranty.

Manufactured under one or more of the following patents and trademarks:

CAN 666,013	U.S. 3,139,626	U S. 3.890,653
CAN 742,389	U S. 3,169,497	U.S. 3,890,654
CAN 742,783	U.S. 3,251,070	U.S. 3,921,227
CAN 769,336	U.S. 3.297,858	U.S. 3,943,579
CAN 883,503	U S. 3,331,338	**TRADEMARKS:**
CAN 997,103	U.S. 3,474,468	CAN 148857
U.S. 2,671,906	U.S. 3,496,578	US 804983
U.S. 2,732,564	U.S. 3,533,364	U.S. 818544
U.S. 3,020,559	U.S. 3,649,970	U.S. 866356

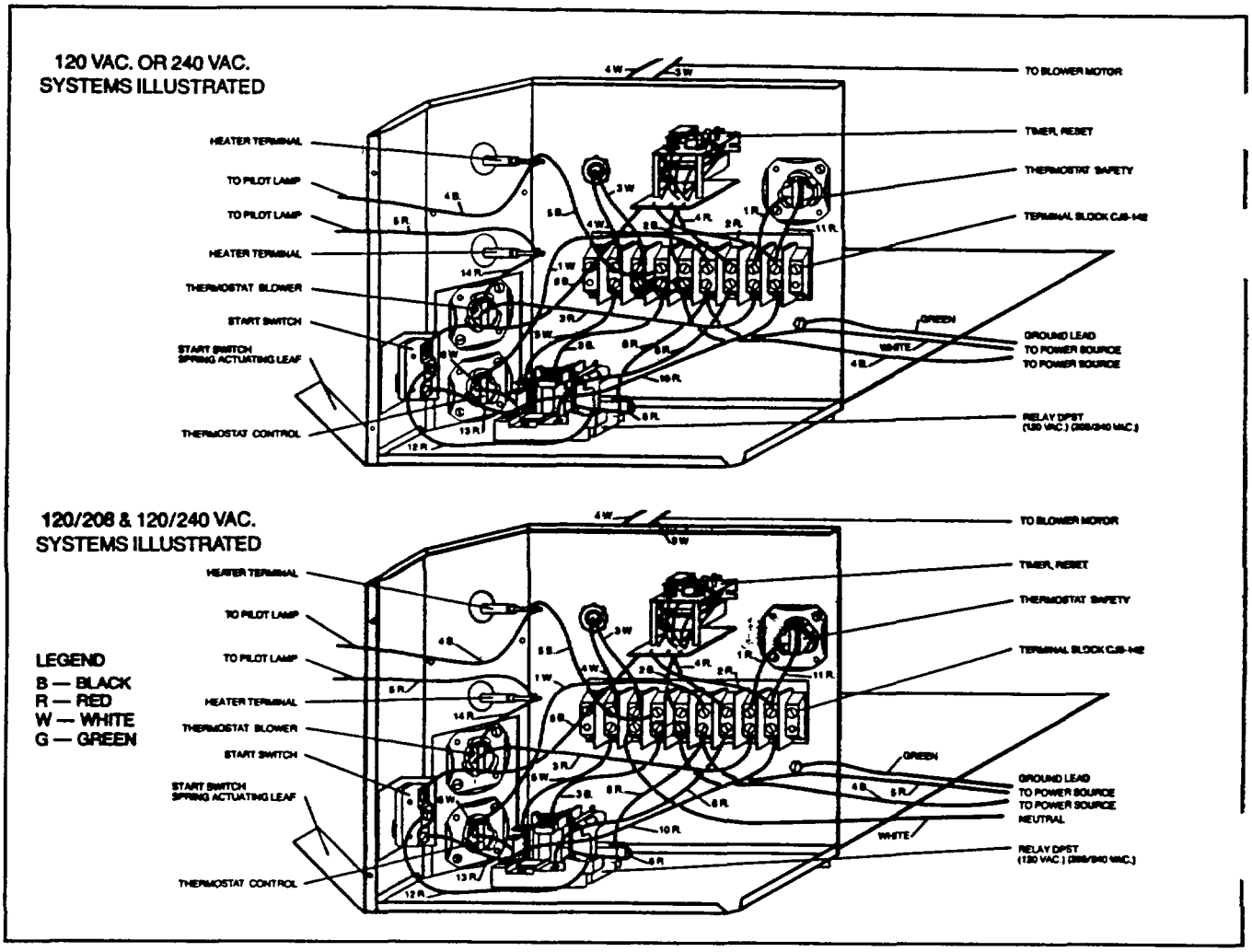
Other Canadian, U.S., and foreign patents, issued or pending, may apply

NOTE: The EPA standards state that in freshwater lakes, freshwater reservoirs or other freshwater impoundments whose inlets or outlets are such as to prevent the ingress or egress by .vessel traffic subject to this regulation, or in rivers not capable of navigation by interstate vessel traffic subject to this regulation, marine sanitation devices certified by the U S. Coast Guard installed on all vessels shall be designed and operated to prevent the overboard discharge of sewage, treated or untreated, or of any waste derived from sewage The EPA standards further state that this shall not be construed to prohibit the carriage of Coast Guard-certified flow-through treatment devices which have been secured so as to prevent such discharges They also state that waters where a Coast Guard certified marine sanitation device permitting discharge is allowed include coastal waters and estuaries, the Great Lakes and interconnected waterways, freshwater lakes and impoundments accessible through locks, and other flowing waters that are navigable interstate by vessels subject to this regulation (40 CFR 140 3).

RPB

BLANKENSHIP

CONTROL ENCLOSURE



PARTS NUMBER	NAME
100167	Seat & Lid, painted to order, hardware
500007	Top, of painted steel with stainless steel bowl halves
500185	Incinerator Lid, complete
100190	Heater, 3.65 kw., 240 v., hermetic sealed, heavy duty
100191	Heater, 3.65 kw., 208 v, hermetic sealed, heavy duty
100193	Heater, 3.0 kw., 120 v, hermetic sealed, heavy duty
900009	Bracket Set, heater, (bolt, nut, bracket)
100176	Relay, DPST, 208/240 vac
100208	Relay, DSPT, 120 vac
100206	Relay, DPST, 110 vdc
100246	Start Switch, heavy duty
100184	Timer, Automatic Reset, 240 v.
100216	Timer, Automatic Reset, 120 v.

PARTS NUMBER	NAME
100247	Indicator Lamp Receptacle
100180	Indicator Lamp
100106	Thermostat, Control, TS, Teflon wire, connectors, soldered
100147	Thermostat, Safety, STS, Teflon Wire, Connectors, soldered
100105	Thermostat, Blower, ITS, Teflon wire, connectors, soldered
100181	Blower Motor, 120 vac, 3000 rpm
100250	Blower Motor, 240 vac, 3000 rpm
100182	Blower Wheel
100221	Blower Housing
510104	Ashpan, Stainless Steel, 16 ga.
100197	Bowl Liners: Packaged 200/box (Minimum order 3 boxes)
100205	Catalyst, Mesh Y4-8, per pound -
910011	Support Springs, Stainless Steel, unit

Tank Air Escape Valves

Model 1600

Description: Model 1600 Wager Tank Air Escapes consist of a body (of any material) equipped with a 30 x 30 mesh monel flame screen and a VY x Y4 mesh monel protecting screen, separated by a spacer ring. These parts are held in place on the body by means of a monel cap and #316 stainless steel screws.

Connections are either screwed IPS, flanged ASA or weld type as required.

Although somewhat similar in design to the Wager Inverted Vent Check Valves, these Tank Air Escapes are not equipped with a ball float.

Function: Wager Tank Air Escapes serve to allow the free passage of air into tanks, dry cargo holds, or storage spaces ... and prevent vacuum or pressure buildup during pumping operations. Since these valves have no float for automatic closing, they should be placed in locations which are not accessible to sea water. The fine monel flame screen protects tank fluids or dry cargo dust from igniting In the event of deck fires and prevents the entrance of insects into areas serviced by these valves.

A coarse monel Protecting Screen, separated from the Flame Screen by a spacer ring, prevents any mechanical damage to the Flame Screen and acts as a deterrent to clogging this inner screen with paint.

Features:

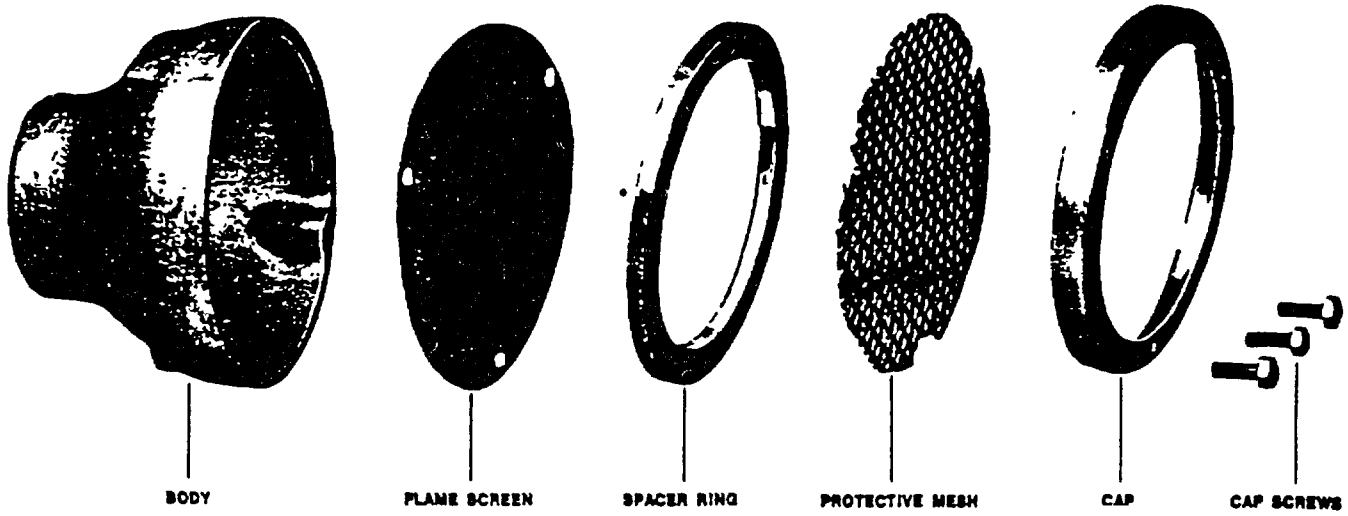
1—OPEN AREA RATIO: Meets latest requirements for ABS, USMA, USCG and U.S. Navy.

2—ACCESSIBILITY OF PARTS: Removal of the cap screws facilitates cleaning, inspection and/or replacement

3—RESISTANCE TO CORROSION: Monel and Stain-less Steel are used for trim insuring long life.

4—BODY MATERIAL: Steel, Stainless Steel, Cast Iron or Bronze.

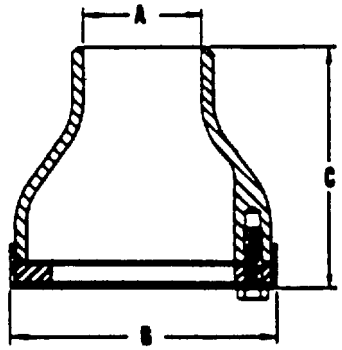
Exploded View



Robert H. Wager Co., Inc.-Passaic Ave., Chatham, N.J. 07928 · Tel. 201-635-9200

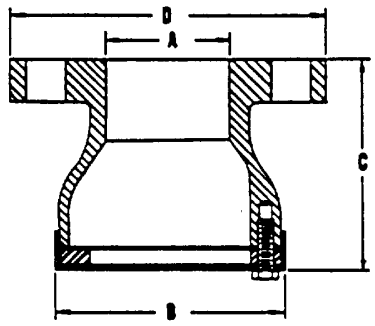
Tank Air Escape Valves

Weld Type 1600-W



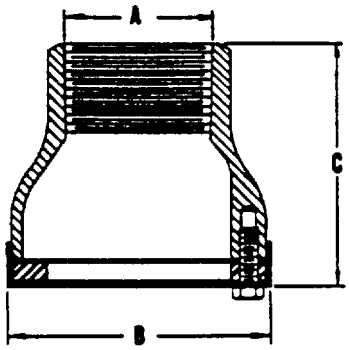
A	1-1/2	2	2-1/2	3	3/1-2	4	5	6	8	10	12
B	3-5/8	4-1/2	5-3/8	6-1/4	-	7-1/4	10-1/4	11-1/2	14-1/2	17-1/8	23-3/4
C	3-11/32	3-11/32	3-27/32	-	4-11/32	7-3/4	8-3/4	9-3/4	12-3/4	15-1/8	
W_2	2-1/2	3-1/4	4-1/4	5	-	6-1/2	25-1/2	35	62	88	195

Flanged Type 1600-F



A	1-1/2	2	2-1/2	3	3-1/2	4	5	6	8	10	12
B	3-6/8	4-1/2	5-3/8	6-1/4	-	7-1/4	10-1/4	11-1/2	14-1/2	17-1/8	23-3/4
C	3-11/32	3-11/32	3-27/32	3-27/32	-	4-11/32	7-3/4	8-3/4	9-3/4	12-3/4	15-1/8
D	5	6	7	7-1/2	-	9	10	11	13-1/2	16	19
W_2	5-1/2	9-1/4	10	13	-	10-1/2	41	53	87	129	260

Threaded Type 1600-T



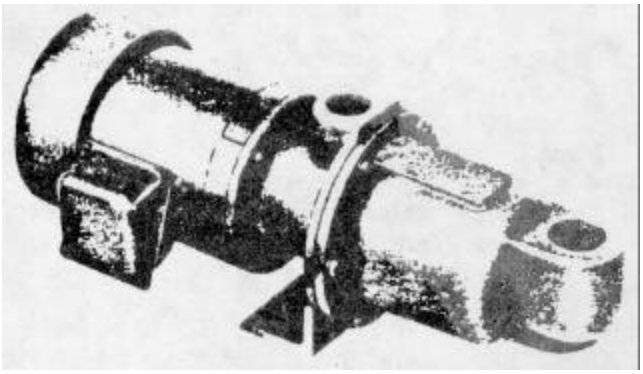
A	1-1/2	2	2-1/2	3	3-1/2	4	5	6	8	10	12
B	3-5/8	4-1/2	5-3/8	6-1/4	-	7-1/4	10-1/4	11-1/2	14-1/2	17-1/8	23-3/4
C	3-11/32	3-11/32	3-27/32	3-27/32	-	4-11/32	7-3/4	8-3/4	9-3/4	12-3/4	15-1/8
W2	2-1/2	3-1/4	4-1/4	5	-	6-1/2	25-1/2	36	62	88	195

SERVICE MANUAL
MOYNO® SP PUMPS
SERIES 356 & 367 MOTORIZED
MODELS 35651 & 36751

DESIGN FEATURES

Housing:	Cast iron
Pump Rotor:	AISI 416 stainless steel
Pump Stator:	NBR
Seal-	NBR (Nitrile)
Motcr Shaft:	Mechanical (carbon/ceramic)
Motor:	3 phase; 1 HP, 208/2301460V for Series 356; 2 HP, 2301460 V for Series 367; 60 Hertz, 1725 rpm, totally enclosed

Note: Alternate elastomers available. Refer to Repair/ Conversion kit numbers, page 4



INSTALLATION

Mounting Position. Pump may be mounted in any position. When mounting vertically, it is necessary to keep bearings above seals to prevent possible seal leakage into bearings Pre-Wetting. Prior to connecting pump, wet pump elements and mechanical seal by adding fluid to be pumped into suction and discharge ports Turn pump over several times in a clockwise direction to work fluid into pump elements Piping. Piping to pump should be self-supporting to avoid excessive strain on pump housings. See Table 1 for suction and discharge port sizes of each pump model.

Use pipe "dope" or tape to facilitate disassembly and to provide seal on pipe connections.

Electrical. Follow the wiring diagram on the motor nameplate or inside the terminal box for the proper connections. The wiring should be direct and conform to local electrical codes Check power connections for proper voltage. Voltage variations must not exceed + 10% of nameplate voltage. Motors do not have overload protection.

To prevent damage to pump, pump rotation must be clockwise when facing pump from motor end.

OPERATION

Self-Priming. With wetted pumping elements, the pump Is capable of 25 ft. suction lift with pipe size equal to port size. Be sure suction lines are air tight or pump will not self prime.

DO NOT RUN DRY. Unit depends on liquid pumped for lubrication. For proper lubrication, flow rate should be at least 10% of rated capacity.

• Moyno Is a registered trademark of Robbins & Myers, Inc.

Pressure and Temperature Limits. See Table 1 for maximum discharge pressure of each model Unit is suitable for service at temperatures shown in Table 2.

Storage. Always drain pump for extended storage periods by removing bottom drain plug. To drain Model 36751 remove suction housing bolts and loosen suction housing

Caution: Suction pressure should never be greater than discharge pressure.

Table 1. Pump Data

Pump Model	**35651**	**36751**
Suction Port (NPT)	1-1/2	2
Discharge Port (NPT)	1-1/4	1-1/4
Voltage Rating (VAC)	2301460	230/460
Discharge Pressure (psig) (maximum)	50	50

NOTE: $\frac{\text{SSU}}{\text{specific gravity}} = 5 \times \text{CP}$ (approximate)

Table 2. Temperature Limits

Elastomer	Temperature Limits
*NBR	10°-160°F
*EPDM	100°-210°F
*FPM	10°-240°F

*NBR = Nitrile
EPDM = Ethylene-Propylene-Diene Terpolymer
FPM = Fluoroelastomer

TROUBLE SHOOTING

WARNING: Before making adjustments disconnect power source and thoroughly bleed pressure from system. Failure to do so could result In electric shock or serious bodily harm.

Failure To Pump.

1. Motor will not start: Check power supply. Voltage must be t 10% of nameplate rating when motor is in locked rotor condition.
2. Motor runs and thermally kicks out: Check for excessive pressure. Increase ventilation to motor. Do not use less than #14 wire size.
3. Stator torn; possible excessive pressure: Replace stator, check pressure at discharge port.
4. Flexible joint broken; possible excessive pressure: Replace joint, check pressure at discharge port.
5. Wrong rotation: Rotation must be clockwise when facing pump from motor end. Reverse the connections of any two line leads to the motor.
6. Excessive suction lift or vacuum.

Pump Overloads.

1. Excessive discharge pressure: Check pressure at discharge port for maximum ratings given in Table 1.
2. Fluid viscosity too high: Limit fluid viscosity to 100 CP or 500 SSU.

Noisy Operation.

1. Excessive suction lift or vacuum: Maximum suction lift is 25 feet for water.
2. Suction line too small: Check pipe size. Be sure lines are free from obstructions.
3. Pump cavitates: Pump speed is 1725 rpm. Viscosity of fluid should not exceed 100 CP or 500 SSU.
4. Flexible joint worn: Replace joint. Check pressure at discharge port.
5. Insufficient mounting: Mount to be secure to a firm base. Vibration induced noise can be reduced by using mount pads and short sections of hose on suction and discharge ports.

Seal Leakage.

1. Leakage at startup: If leakage is slight, allow pump to run several hours to let faces run in.
2. Persistent seal leakage: Faces may be cracked from freezing or thermal shock. Replace seal.

Pump Will Not Prime.

1. Air leak on suction side: Check pipe connections.

PUMP DISASSEMBLY

WARNING: Before disassembling pump, disconnect power source and thoroughly bleed pressure from system. Failure to do so could result in electric shock or serious bodily harm.

1. Disconnect power source.
2. Remove suction and discharge piping.
3. Remove screws (112) holding suction housing (2) to discharge housing (1). Remove suction housing (2) and stator (21).
4. Rotor (22) can be detached from flexible joint (24) by using a punch to remove rotor pin (45). Support joint when removing pin.
5. Flexible joint (24) can be removed from motor shaft by using a punch through the discharge port to remove shaft pin (46).
6. Carefully slide mechanical seal (69) off motor shaft.
7. Remove discharge housing (1) from motor (70) by removing screws (112A and 112C) and washers (215).
8. Carefully pry seal seat out of discharge housing (1). If any part of mechanical seal (69) is worn or broken, the complete assembly should be replaced. Seal components are matched parts and not interchangeable.
9. Remove slinger ring (77).

PUMP ASSEMBLY

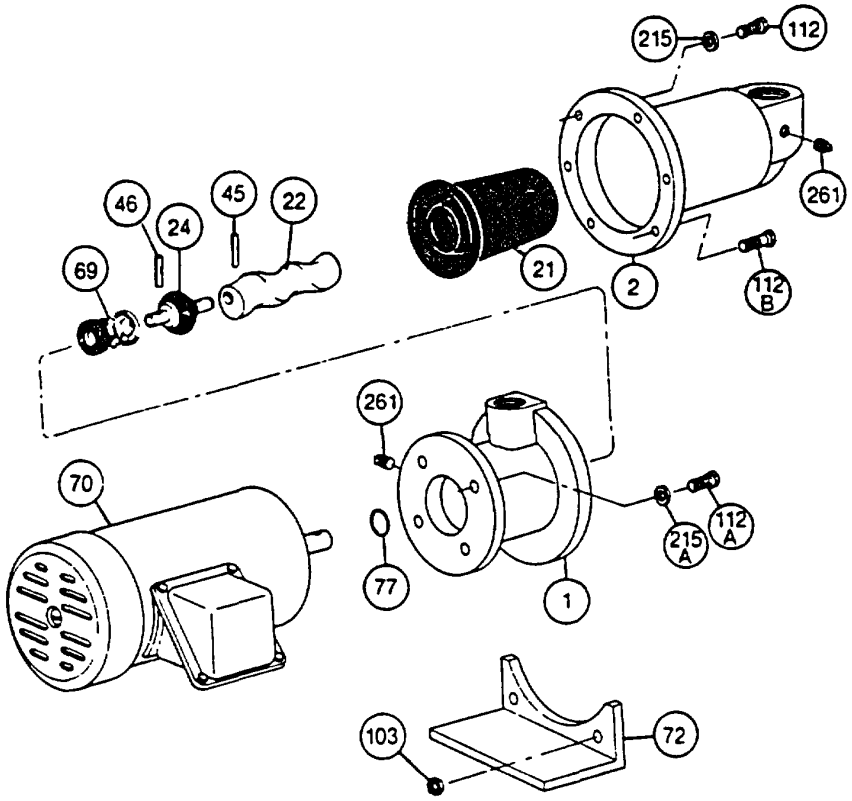
1. Replace slinger ring (77).
2. Attach discharge housing (1) to motor (70) using lock washers (215) and body screws (112A).
3. Install mechanical seal (69) using the following procedures:
   a. Clean and oil sealing faces using light oil (not grease).

Caution: Do not use oil on EPDM parts. Substitute glycerin or soap and water.

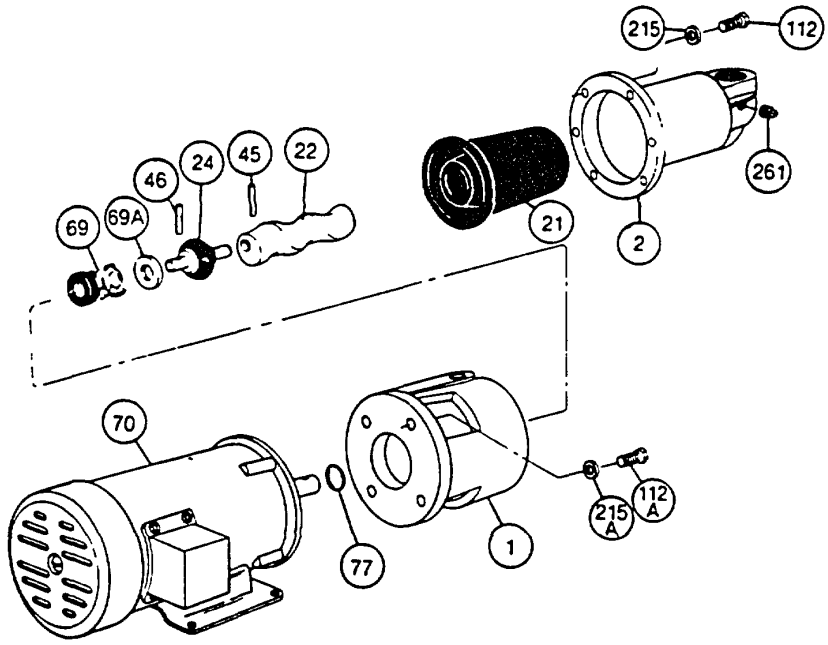
   b. Oil the outer surface of seal seat, and push assembly over motor shaft into the bore of the discharge housing (1) seating it firmly and squarely.
   c. After cleaning and oiling the shaft, slide the seal body along the shaft until It meets the seal seat.
   d. Install seat spring and spring retainer on shaft.
4. On model 36751, position seal spacer (69A) on motor shaft with slots away from seal (69).
5. Pin flexible joint (24) to motor shaft with shaft pin (46) using a punch through the discharge port.
6. Pin rotor (22) to flexible joint using rotor pin (45). Support joint while installing pin.
7. Slide stator (21) on rotor (22) carefully locating stator flange in housing groove.
8. Secure stator (21) and suction housing (2) to discharge housing (1) using screws (112).
9. Proceed as in installation instructions.

When ordering parts, please specify pump model number, pump serial number, part number, part description and quantity.

MODEL 35651



MODEL 36751



PARTS LIST

Item No.	Description	Pump Model Numbers	
		35651	36751
1	Discharge Housing	350-0632-000	340-0951-000
2	Suction Housing	350-0280-000	350-0302-000
*21	Stator	330.1596-000	330-1139-002
*22	Rotor	320-6392-000	330-2042-000
24	Flexible Joint	320-1618-000	320-1749-000
45	Rotor Pin	320-4069-003	320-4439-002
46	Shaft Pin	320-4069-003	320-4439-001
*69	Mechanical Seal	320-3945-000	320-1750-000
69A	Seal Spacer		320-1737-000
70	Motor	300-4445-000	300-2802-001
72	Motor Support	300-4446-000	
77	Slinger Ring	320-6385-000	
103	Nuts (2 req.)	614-0010-111 (3/8-16)	
112	Screw, Hex Hd	619-1530-161 (3/8-16 x 1) (4 req.)	619-1530-161 (3/8-16 x 1) (6 req.)
112A	Screw, Hex Hd (4 req.)	619-1530-161 (3/8-16 x 1)	619-1550-161 (1/2-13 x 1)
112B	Screw, Hex Hd (2 req.)	320-6918-000 (3/8-16 x 1-3/4)	
215	Lock Washer	623-0010-411 (3/8) (4 req.)	623-0010-411 (3/8) (6 req.)
215A	Lock Washer (4 req.)	623-0010-411 (3/8)	623-0010-431 (1/2)
281	Pipe Plug	610-0120-011 (1/8 NPT)	

*Recommended spare parts.

REPAIR/CONVERSION KIT NUMBERS

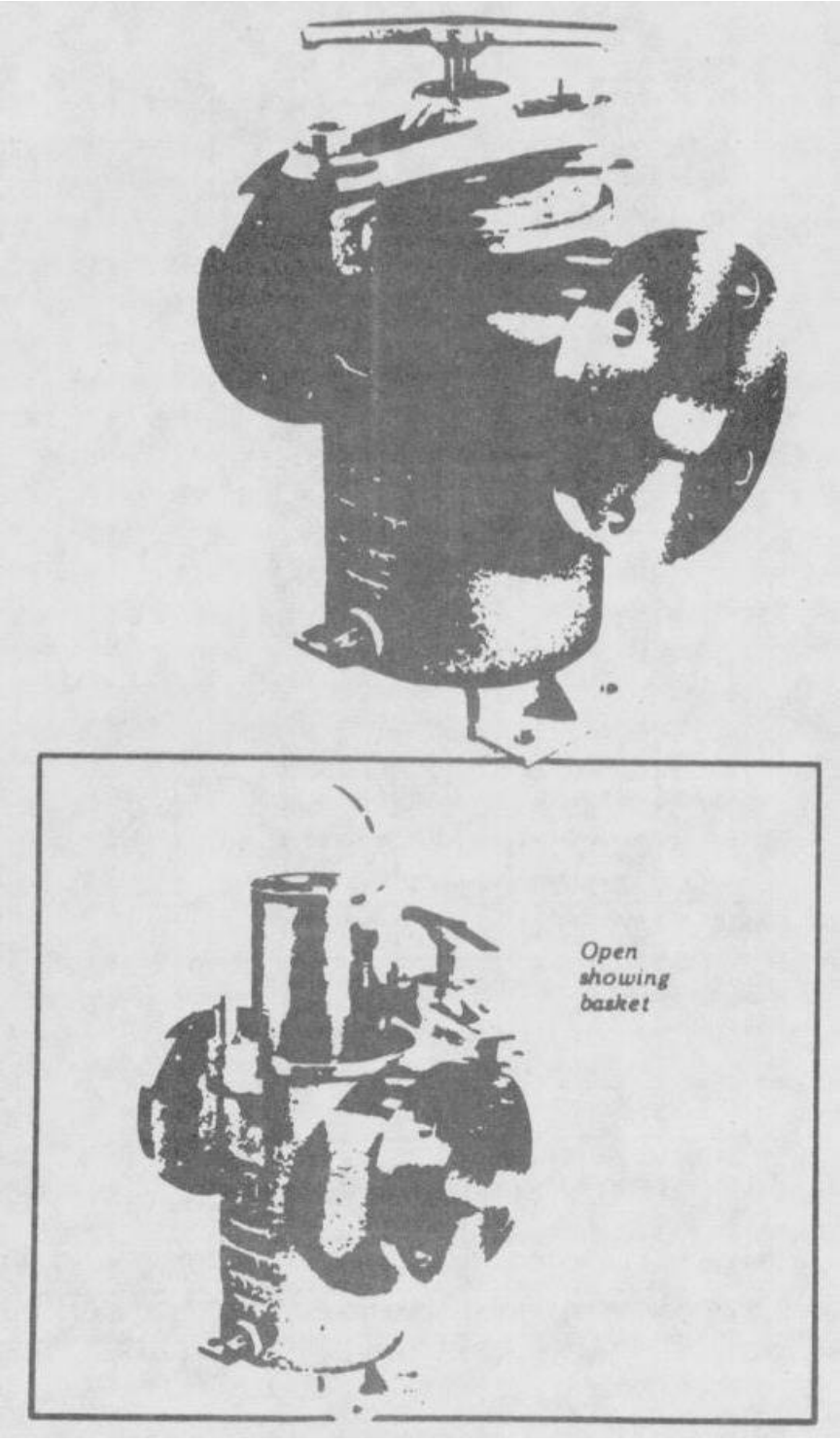
Item No.	Description	356 Series			367 Series		
		NBR	EPDM	FPM	NBR	EPDM	FPM
—	Kit No.	311-9123-000	311-9125-000	311-9126-000	311-9060-000	311-9036-000	311-9124-000
21	• Stator	330-1596-000	330-4508-000	330-4600-000	330-1139-002	330-4511-000	330-4601-000
24	• Joint	320-1618-000	320-6508-000	320-6509-000	320-1749-000	320-6378-000	320 6515-000
69	• Seal	320-3945-000	320-6380-000	320-6510-000	320-1750-000	320-6390-000	320 6517-000
46	• Pin (Shaft)	320-4069-003			320-4439-001		
45	• Pin (Rotor)	320-4069-003			320-4439-002		

*NBR = Nitrile
EPDM = Ethylene-Propylene-Diene Terpolymer
FPM = Fluoroelastomer

**For further information, call 800-845-1310;
in Ohio, call 513-327-3039.**

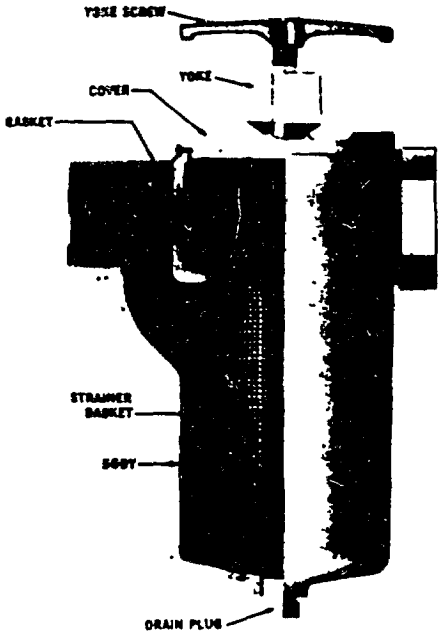
Hayward®
Simplex Strainers
Sizes from 3/8” to 8”

Model 72



Model 72

Hayward®
Simplex Strainers



Type	All Wetted Parts	Exterior Trim	Baskets	Cover Gaskets
Iron	ASTM A-126 Class 30 bodies, bonnets and covers. Bronze Diverter Plug	Ductile iron	Brass, SS or Monel	Buna-N
Bronze	ASTM B-62 valve bronze	Ductile iron	Buss-ss or Monel	
Stainless Steel	ASTM A-351 Grade CF-8M Type 316	Ductile iron	SS or Monel	Viton-A
Carbon Steel	ASTM A-216 Grade WCB carbon steel	Ductile iron	SS or Monel	Buna-N

Material	Pressure Rating	End Connections	
	At 75°F	Screwed	Flanged
Iron	200 psi WOG	NPT Threads	125 lbs. ANSI Dimension
Bronze	200 psi WOG	NPT Threads	150 lbs. ANSI Dimensions
Stainless Steel	200 psi WOG	NPT Threads	150 lbs. MSS Dimensions
Carbon Steel	200 psi WOG	NPT Threads	150 lbs. ANSI Dimensions

Materials shown are standard.

Hayward®
Simplex Strainers

Model 72

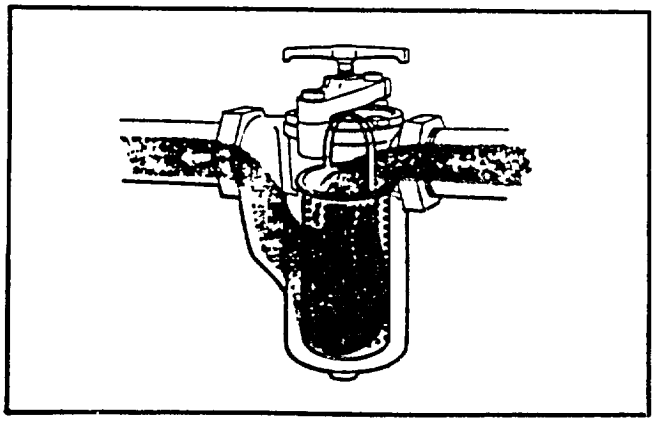
Sizes from 3/8” to 8”

Available in iron, Bronze, Stainless, Carbon Steel

Model No. 72 is the industry standard simplex basket strainer for industrial use where temporary shutdown for cleaning is possible.

A few of the reasons for its popularity are, first, the unusually large basket capacity. The free straining area is at least 6 times the cross-sectional pipe area (even more in some sizes) Next, no tools are needed to open the cover. The quick opening, swinging yoke can be disassembled and the basket removed in seconds. On sizes 4" and larger, a special cover clamp is provided to distribute the seating pressure and to insure positive seating of the cover. Another feature Is a threaded drain on each size (fitted with a plug). This can be used as a backwash connection, if desired. Sizes 2" and larger are provided with legs for bolting to the floor.

Wall thickness’ are exceptionally heavy. We have not stinted on weight to save material costs. The basket seats are precision machined to give a tight seal and prevent any material from by-passing the basket. Every strainer Is hydrostatically tested at 1 1/2 times its maximum rated pressure. The Hayward No. 72 is a top quality, heavy-duty unit. There is no better single basket strainer made.

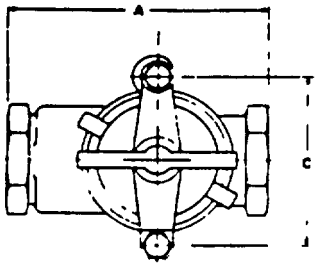


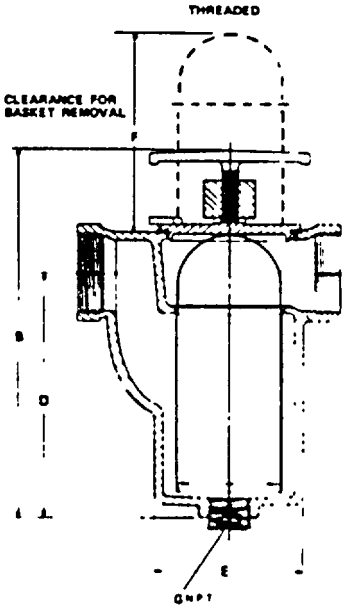
Hayward®
Simplex Strainers Model 72

Dimensions

Threaded

Pipe Sizes: 3/8" - 1/2" - 3/4" - 1" - 1-1/4" - 1-1/2" - 2" - 2-1/2" - 3"





	Pipe Size	Net Weight (lbs.) Iron	Bronze	Stain-less	Carbon Steel	A	B	C	D	E	F	G
THREADED	3/8	4	4	-	-	4	6 1/8	2 1/8	4	2 3/8	5 1/8	1/8
	1/2	4	4	-	-	4	6 3/8	2 1/8	4	2 3/8	5 1/8	1/8
	3/4	7	8	-	-	5 3/8	8 3/8	4	5	3 1/16	6 1/8	1/2
	1	7	8	7	7	5 1/8	8 1/8	4	5	3 1/16	6 1/8	1/2
	1 1/4	12	13	-	-	6 3/4	9 1/8	4 7/8	5 7/8	3 7/8	7	1/2
	1 1/2	15	16	16	15	7 1/8	11	4 7/8	7 1/8	4	8 1/8	3/4
	2	28	32	31	36	8 3/4	13 3/8	6 3/4	7 3/4	5 1/8	9 1/8	1 1/4
	2 1/2	42	49	51	52	10 1/2	14 7/8	8	8 1/8	6 3/8	10 3/4	1 1/2
	3	52	60	60	60	11 1/8	17	8	11 1/4	6 1/8	13 1/4	1 1/2

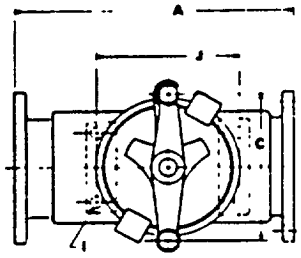
These dimensions are for reference only. For installation purposes, request certified drawings. Dimensions are in inches.

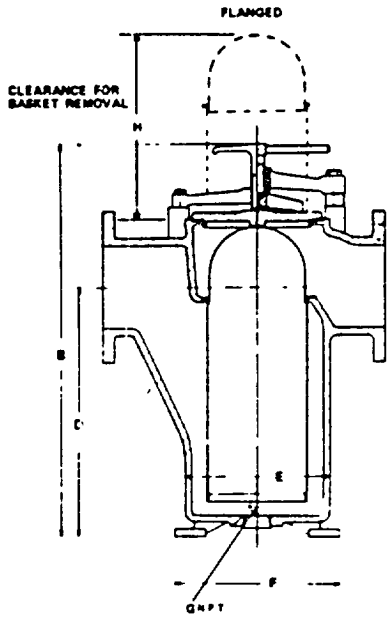
3628 6-11

Hayward®
Simplex Strainers Model 72

Dimensions

Threaded
Pipe Sizes: 2” - 2-1/2” - 3” - 4” - 5” - 6” - 8”





	Pipe Size	Net Weight (lbs.) Iron	Bronze	Stain-less	Carbon Steel	A	B	C	D	E	F	G	H	I	J
THREADED	2	36 1/2	49	36	36	10 1/2	13 3/4	6 3/4	7 5/8	5 1/8	6 1/4	3/8	9 1/8	3/8	5 1/2
	2 1/2	54	64	63	63	11 1/8	15 1/8	8	/ 3/4	6 3/8	7 5/8	3/8	10 3/4	7/16	6 1/2
	3	76	85	-	-	13 1/8	18	8	10 1/8	6 1/2	8	1/2	13 1/4	7/16	7
	4	125	140	-	-	16 3/4	19 7/8	10 3/4	10 3/4	3 5/8	11 3/8	1/2	13 1/2	9/16	10
	4	-	-	130	130	17 1/4	19 7/8	10 3/4	10 3/4	9 1/8	11 3/8	1/2	13 1/2	9/16	10
	5	170	182	-	-	18 1/8	25 1/8	10 3/4	15 1/4	10	11 3/8	1/2	18 1/2	9/16	10
	6	200	270	235	235	19 1/8	28 1/8	10 3/4	183/8	10	11 3/8	1/2	22	9/16	10
	8	500	600	550	550	27	40 1/2	-	27	13 3/4	17 1/2	1/2	28 1/4	9/16	15 3/4

APPENDIX C

Preventive maintenance checks and services (PMCS) for the Miscellaneous Equipment (Dayroom, Workshop, Accesses and Sanitation Systems)

C-1 Introduction to PMACS

NOTE

TM 55-1930-209-14&P-19 contains PMCS for all systems on the ROWPU Barge. This appendix contains only PMICS for the Miscellaneous Equipment (Dayroom, Workshop, Accesses and Sanitation Systems)

a. General.

(1) Systematic (B) before, (D) during, (A) after, and scheduled periodic PMCS are essential to ensure that the Reverse Osmosis Water Purification Barge Is in operational readiness at all times. The purpose of the PMCS program is to discover and correct deficiencies and malfunctions before they cause serious damage or failure of the barges and their support systems. An effective PMCS program requires that operators report all unusual conditions noticed before, during and after operation as well as while performing periodic PMCS. All deficiencies and malfunctions discovered during maintenance inspections must be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

(2) A schedule for preventive maintenance inspections and service should be established and adhered to. When operating under unusual conditions, such as extreme heat or cold, it may be necessary to perform PMCS more frequently.

(3) The PMCS items have been arranged and numbered in a logical sequence to provide for greater efficiency and the least amount of downtime required for maintenance.

b. PMCS columnar entries.

(1) Item Number Column. Checks and services are numbered in chronological order regardless of interval. This column is used as a source of item numbers for the 'Item Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

(2) Interval Column. The interval columns tell you when to do a certain check or service: before, during, or after operation. Sometimes a dot may be placed in more than one interval column which would mean you should do the check or service at each of those intervals.

(3) Item to Be Inspected Column. This column lists the common name of the item to be inspected such as 'Air Filters."

(4) Procedures Column. This column tells you how to do the required checks and services. Carefully follow these instructions.

(5) Equipment is Not Ready/Available if Column. This column tells you when and why your equipment cannot be used.

NOTE

The terms "Ready/Available" and "Mission Capable" refer to the same status: equipment is on hand and is able to perform Its combat missions. (See DA PAM 738-750).

(6) Increased Inspections. Perform weekly as well as Before Operations PMCS if:

(a) You are the assigned operator and have not operated the item since the last weekly PMCS.

(b) You are operating the item for the first time.

(7) Leakage definitions. In checking for fluid leaks, the following leakage definitions apply to all ROWPU barges and barge equipment, product water, and seawater leakage by class type.

(a) Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

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

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

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). However, then fluid level or operating pressure of the item being checked/inspected must be considered. When in doubt, notify the shift leader or bargemaster. When operating with Class I or Class II leaks, continue to check fluid levels as required by PMCS and operating instructions.

(8) The following fuel and hazardous material leakage procedures apply for any fuel, chemical, or bilge system.

WARNING

Class I, II or III leaks or seepage occurring in a fuel, chemical, or bilge container, tank, line, piping, or valve can cause fire or health hazards.

(a) If any leaks or seepage from a fuel, chemical, or bilge container, tank, or fluid line is detected, it must be immediately reported to the shift leader or bargemaster for corrective action.

(b) To prevent combustible or toxic fumes from collecting or contaminated material from spilling, exercise extreme caution after detecting leaks or seepage of flammable or hazardous material.

c. Continuous operation. When equipment must be kept in continuous operation for extended periods of time, check and service only those items that can be checked and serviced without disturbing operations. Perform complete checks and services when the equipment can be shut down.

d. Maintenance log. Always record the time and date of PMCS, any deficiencies noted, and corrective action taken in the PMCS log book.

C-2 Major components. Miscellaneous equipment includes the Dayroom Equipment, Workshop Equipment, Accesses System, Sanitation System, Bilge System and Eyewash Stations.

C-3 Miscellaneous equipment description

C-3.1 Dayroom Equipment. This equipment includes a drinking fountain, hotplate, coffeemaker, refrigerator, range hood three berthing units with three bunks each, filing cabinet, mess table with six seats, writing table, sink, and radio operator's desk and chair.

C-3.2 Workshop equipment. Operational equipment includes an arbor press, drill press, and grinder with dust' collector. Nonoperational equipment Includes stowage bins and workbench with vise. The workshop includes an arc welder in the ROWPU space portside, under the air compressor motor controller near the life preserver stowage box.

C-3.3 Accesses system. This system includes deckhouse doors and portholes, accesses to voids, and doors behind voids. Accesses to the weatherdeck allow crew and equipment to enter and leave areas of the barge and give protection against adverse weather and sea conditions.

C-3.4 Sanitation systems. The barge contains two sanitation systems, the ship's toilets and the bilge system. The two systems are not interconnected.

C-3.4.1 Ship's toilet. The ship's two toilets are located in the ROWPU space; one against the workshop aft bulkhead, the other in an enclosure on the port side near the stem bulkhead. Ship's toilets are self-contained electric incinerating disposal systems that reduce human waste to a substance similar to wood ash. Waste is deposited in the toilets on a waxed paper liner and then incinerated along with the liner in an incineration chamber. This chamber is cooled during and after incineration by a blower system, which vents to the outside.

The incineration process is begun by pushing a foot pedal. Since the toilet uses no water or chemicals, a bowl liner must be used with every operation. Waste deposited on this liner Is flushed and Incinerated automatically when the pedal is pressed. The indicator lamp on the starboard side lights when the heater is on during the incineration cycle. Incineration cycle lasts about 20 minutes, during which time the heater switches on and off. The blower, which switches on at the same time as the heater, force vents the system. It stays on continuously through the cycle until the incinerator chamber cools to about 140 degrees F. This takes 35 to 45 minutes after the heater and light go off.

C-3.5 Bilge system. The bilge system, in the voids, collects and removes equipment waste from the barge and keeps the bilges dry.

A bilge pump transfers liquid containing oil to the sludge tank. This oily liquid Includes bilge water from the voids, waste lubricating oil from three diesel generators (two ship service generators and one ship auxiliary generator) in void 4 and waste lubricating oil from two ROWPU HP pump diesel engines In ROWPU space. Bilge water from a void is pumped to the sludge tank using a portable hose with foot valve to suck up the bilge water. Waste lubricating oil is pumped to the sludge tank from the generator diesel engine crankcase after a hose is connected between the generator crankcase drain valve (BD16, BD17 or BD18) and avoid 4 suction valve (BD2 or BD10). Waste lubricating oil is pumped to the sludge tank from the HP pump diesel engine crankcase drain valves (BD12 or BD13) and valve (BD19) located between the high pressure pumps.

C-3.6 Bilge system. The bilge system, In the voids, collects and removes equipment waste from the barge and keeps the bilges dry.

A bilge pump transfers liquid containing oil to the sludge tank. This oily liquid includes bilge water from the voids, waste lubricating oil from three diesel generators (two ship service generators and one ship auxiliary generator) in void 4 and waste lubricating oil from two ROWPU HP pump diesel engines in ROWPU space. Bilge water from a void is pumped to the sludge tank using a portable hose with foot valve to suck up the bilge water. Waste lubricating oil is pumped to the sludge tank from the generator diesel engine crankcase after a hose is connected between the generator crankcase drain valve (BD16, BD17 or BD18) and avoid 4 suction valve (BD2 or BD10). Waste lubricating oil Is pumped to the sludge tank from the HP pump diesel engine crankcase drain valves (BD12 or BD13) and valve (BD19) located between the high pressure pumps.

Section I.

Table C-1. Preventive Maintenance Checks and Services for Miscellaneous Equipment

B - Before
D - During
A - After

D - Daily
W - Weekly
M - Monthly

Q - Quarterly
S - Semiannually
A - Annually

ITEM NO.	INTERVAL									ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF
	B	D	A	D	W	M	Q	S	A			
										MISCELLANEOUS EQUIPMENT		
											WARNING **Be sure that electrical power Is OFF before performing any maintenance on electrical systems. Redtag appropriate switches and circuit breakers with: "WARNING - DO NOT ACTIVATE. REPAIRS BEING MADE."** **Observe all safety precautions listed at the beginning of this manual.**	
											WARNING **Do not Immerse coffeemaker nor hot plate in water.**	
1	•			•						Dayroom Equipment	a. Check that all exterior surfaces of appliances, including range hood, are clean and grease-free.	
	•			•							b. Check that inside of refrigerator and coffeemaker are clean. Clean with soapy water and sponge.	
	•			•							c. Make sure that all plugs are firmly seated in receptacles labeled for use with equipment.	
	•			•							d. Make sure hot plate and coffeemaker are secured to table top.	
		•		•							e. Make sure loose equipment has been stowed properly.	
		•		•							f. Make sure refrigerator temperature gauge indicates normal operating temperature.	
		•		•							g. Check indicator lights for proper operation. Replace bulbs as necessary.	
		•		•							h: Check for loose cables and loose or missing securements and fasteners. Tighten or replace as necessary.	

Table C-1. Preventive Maintenance Checks and Services for Miscellaneous Equipment (Continued)

B - Before D - During A - After
D - Daily W - Weekly M - Monthly
Q - Quarterly S - Semiannually A - Annually

ITEM NO.	INTERVAL									ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF
	B	D	A	D	W	M	Q	S	A			
				•							i. Check all equipment for dirt or grime, rust, corrosion, and worn or chipped paint Wipe or scrub dean with household detergents; remove rust and corrosion by wire brushing, scraping, or chipping. Immediately paint cleaned areas with zinc chromate primer and finish paint to match surrounding area in accordance with TB 43-0144. DO NOT paint threads or labels.	
2										Workshop Equipment	**WARNING** **Be sure that electrical power Is OFF before performing any maintenance on electrical system. Redtag appropriate switches and circuit breakers with: "WARNING - DO NOT ACTIVATE. REPAIRS BEING MADE." Observe all safety precautions listed at the beginning of this manual.**	
											WARNING **DO NOT operate power tools If cords are frayed or operating controls are defective.**	
	•		•			•					a. Check for frayed or loose cords and damaged or loose power cables, electric outlet receptacles, and switches. Replace as necessary.	Cords and cables frayed or damaged.
	•		•			•					b. Check for loose or missing fasteners and securements. Tighten or replace as necessary.	Fasteners and securements missing.
	•		•	•							c. Make sure equipment and work areas are clean and free of foreign objects.	
	•				•						d. Check that power plugs are properly seated in dedicated receptacles.	
		•									e. Check that correct speed and depth adjustment are selected on drill press.	
	•										f. Make sure that all chucks, adjusting keys, or wrenches are removed from drills, grinders, or other power tools before turning these tools ON.	

Table C-1. Preventive Maintenance Checks and Services for Miscellaneous Equipment (Continued)

B - Before D - Daily Q - Quarterly
D - During W - Weekly S - Semiannually
A - After M - Monthly A - Annually

ITEM NO.	INTERVAL									ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF
	B	D	A	D	W	M	Q	S	A			
		•									g. Make sure that the item being drilled, ground, pressed, or welded is being held securely in place.	
		•		•	•						h. Check that indicator lights are operating properly. Replace bulbs as necessary.	
		•									i. With welder started, but before welding, rotate current control through its entire range to lessen the possibility of contact freezing.	
	•		•			•					j. Check that arc welder electrode and work connections are tight. Tighten as necessary.	
											WARNING **Grinding wheels can explode if they have received minor cracks when shipped or during replacement. When starting a grinder for the first time or after installing a replacement wheel, the operator must stand to one side of the grinder for 1 minute after turning it ON.**	
	•		•			•					k. Check grinder wheel for wear. Replace after diameter is reduced to 2 inches below original size.	Grinder wheel is reduced to 2 inches below normal size.
			•			•					l. Check safety guard and vacuum bag for proper operation. Repair or replace as necessary.	Safety guard missing or inoperable.
			•			•					m. Remove rust or corrosion. Touch up paint in accordance with TB 43-0144.	
3		•								Accesses System	a. Visually check accesses for damage or defects which could impair effectiveness and operability of doors, hatches, or portholes, etc. Repair as necessary.	
			•			•					b. Remove rust and corrosion. Touch up paint in accordance with TB 43-0144 as necessary. DO NOT paint threads or labels.	

Table C-1. Preventive Maintenance Checks and Services for Miscellaneous Equipment (Continued)

B - Before D - Daily Q - Quarterly
D - During W - Weekly S - Semiannually
A - After M - Monthly A - Annually

ITEM NO.	INTERVAL									ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF
	B	D	A	D	W	M	Q	S	A			
4										Sanitation System		
										Ship's Toilet	**CAUTION** **Two toilets are onboard, one forward and one aft In the ROWPU space. Do not use toilet when incinerator is full. Always keep lid closed when toilet is not in use to prevent anything from dropping into toilet.**	
	•		•		•						a. Wipe components clean and check for damage. Repair as necessary.	
	•	•	•								b. Check that bowl wax liners and tissue paper are available.	
	•		•	•							c. Make sure incinerator ashpan is not full. Empty if necessary.	
	•										d. Perform prestart operations: 1) Make sure power panel 3 circuit breaker 5P13 for forward toilet or 4P13 for aft toilet is closed (ON). 2) Place waxpaper liner in bowl before using toilet.	
											CAUTION **The Incinerating toilets will incinerate human waste, both solids and urine, toilet paper, and sanitary napkins. Toilets may be used at any time, even while Incinerating a prior waste deposit, provided toilet capacity Is not exceeded. The Incinerating toilet will NOT Incinerate cans or bottles and should NOT be used to Incinerate highly combustible products, such as oily rags.**	
		•									e. After stepping on foot pedal, make sure incineration cycle starts.	
	•	•									f. Make sure blower comes on.	
			•								g. Close incinerating toilet lid after each use.	
			•	•							h. Make sure toilet and cubicle are clean.	

Table C-1. Preventive Maintenance Checks and Services for Miscellaneous Equipment (Continued)

B - Before D - During A - After
D - Daily W - Weekly M - Monthly
Q - Quarterly S - Semiannually A - Annually

ITEM NO.	INTERVAL									ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF
	B	D	A	D	W	M	Q	S	A			
			•			•					i. Remove rust and corrosion. Touch up paint in accordance with TB 43-0144 as necessary. Do not paint threads or labels.	
5	•		•	•						Bilge System	a. Wipe all components dean, especially sludge tank liquid level indicator glass cover.	
	•		•		•						b. Check for leaks and damaged or missing securements and fasteners. Repair, replace and/or tighten If required.	Class Ill leaks.
	•				•						c. Check wiring for loose connections and frayed cables. Secure, repair, or replace cables as necessary.	Cables frayed.
	•				•						d. Check that strainer basket is clean and properly installed. Clean or replace basket as follows: 1) Loosen yoke screw until free yoke swings free. 2) Pull basket handle straight up to remove basket. Go to step 3 to clean and step 4 to replace basket. **CAUTION** **Do NOT have basket well open for more than 10 minutes. Diverter plug does not completely cut off water and water will seep into open well.** 3) Clean basket as follows: **CAUTION** **Do NOT use any petroleum based products to clean basket Be careful not to damage basket Do not use wire brush.** - On weatherdeck, clean basket with soft brush and flush with drinking water. - Use compressed air to dislodge difficult particles. - Flush with drinking water. - Wipe interior of basket with clean cloth before replacing basket.	

Table C-1. Preventive Maintenance Checks and Services for Miscellaneous Equipment (Continued)

B - Before D - During A - After
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ITEM NO.	INTERVAL									ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF
	B	D	A	D	W	M	Q	S	A			
											4) Lower basket into well.	
											5) Swing yoke over basket well until end fits over stud.	
											6) Check O-rings on cover. Replace if damaged.	
											7) Be sure O-rings on cover rest in machined groves before tightening yoke screw securely. Do NOT over-tighten.	
		•			•						e. Check that foot valve is not dogged. Clean if necessary.	
	•	•	•								f. Inform shift leader of unusual noises or overheating of bilge pump motor which may indicate a pending malfunction.	Bilge pump motor overheating
			•								g. Log and report all corrective actions taken and their locations to shift leader.	
			•			•					h. Remove rust and corrosion. Touch up paint in accordance with TB 43-0144 as necessary Do not paint threads or labels.	
6	•		•		•					Eyewash Stations	a. Wipe eyewash stations clean.	
											b. Check water level. Add water if neces-sary.	Water level low
											c. Remove rust and corrosion. Touch up paint in accordance with TB 43-0144 as necessary. Do not paint threads and labels.	

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
06925

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 55-1930-209-14&P-15	15 OCTOBER 1992	WATER PURIFICATION BARGE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2 910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER
JOHN DOE, PFC (269) 317-7111

SIGN HERE John Doe
JOHN DOE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.
DRSTS-M Overprint 1, 1 Nov 80

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

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4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter= 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 Meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = 0.35 ounce
1 dekagram = 10 Grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fluid ounce
1 deciliter = 10 centiliters = 3.38 fluid ounces
1 liter = 10 deciliters = 33.81 fluid ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 27.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq millimeters = .155 sq. inch
1 sq. decimeter= 100 sq centimeters = 125.5 sq. inches
1 sq. meter (centare) = 100 sq decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. decimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pounds-inches	newton-meters	.11296			

Temperature (Exact)

°F Fahrenheit Temperature 5/9 (after subtracting 32) Celsius Temperature °C

PIN: 065366-000