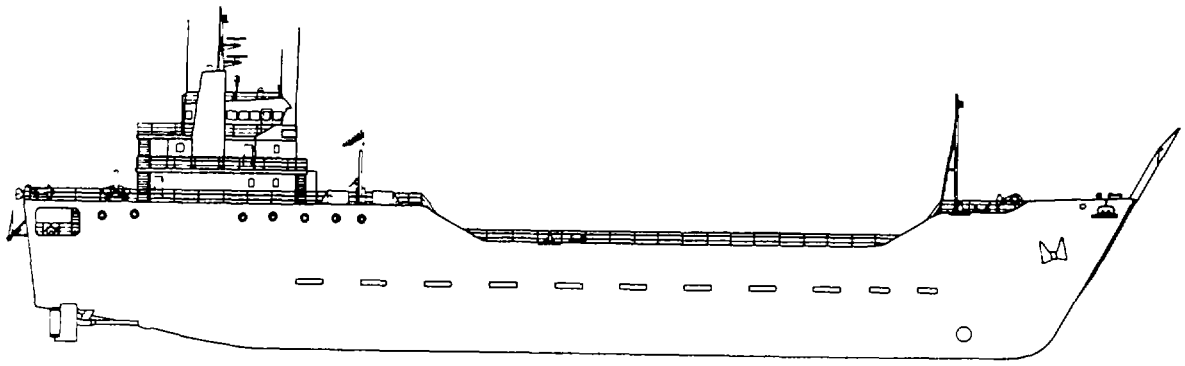
TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

LOGISTICS SUPPORT VESSEL (LSV)

NSN 1915-01-153-8801



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2-299 and 2-300	2-299 and 2-300
.....	2-300.1 through 2-300.6
2-579 and 2-580	2-579 and 2-580
.....	2-580.1 and 2-580.2
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B-37 through B-42	B-37 through B-42
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1-17 through 1-20	1-17 through 1-20
2-297/(2-298 blank)	2-297/(2-298 blank)
A-1 and A-2	A-1 and A-2
	A-2.1/(A-2.2 blank)
	B-8.1/(B-8.2 blank)
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	B-135 and B-136
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B-39 and B-40	B-39 and B-40
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B-67 and B-68	B-67 and B-68
B-91 and B-92	B-91 and B-92
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B-33 and B-34	B-33 and B-34

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WARNINGS

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FIRST AID DATA

- Specific **WARNINGS** appear in this manual immediately preceding the text to which they apply. They are summarized and paraphrased here for emphasis along with additional **WARNINGS** of a general nature, which are considered necessary to ensure safe equipment operation. All operators and maintenance personnel should review these **WARNINGS** before attempting to operate or maintain the equipment described in this manual.

- Safety Precautions. **WARNINGS** and **CAUTIONS** appearing throughout this technical manual are important to personnel and equipment safety. All **WARNINGS** and **CAUTIONS** must be thoroughly reviewed and understood prior to operating, maintaining or troubleshooting any item on the vessel. **WARNINGS**, **CAUTIONS** and **NOTES** are defined as follows:

WARNING

Identifies an operating or maintenance procedure, practice, condition, statement, etc., which if not strictly followed could result in death or serious injury to personnel.

CAUTION

Identifies an operating or maintenance procedure, practice, condition, or statement, etc., which if not strictly followed could result in destruction of, or damage to equipment, or serious impairment of system operation.

NOTE

Notes are used to highlight certain operating or maintenance conditions or statements which are essential but not of known hazardous nature as indicated by warnings and cautions.

- In addition to the specific safety precautions prescribed in this manual and other publications, operating personnel must continuously exercise good judgment and employ common sense to prevent equipment damage and injury to personnel.

WARNING - EQUIPMENT ALTERATION

Unauthorized modifications, alterations or installation of or to this equipment is prohibited and is in violation of AR 750-10. Any such unauthorized modifications, alterations or installations could result in death, injury or damage to the equipment.

WARNING

ELECTRIC SHOCK HAZARDS

- Electric powered equipment and lighting systems present a serious electric shock hazard.
- Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.
- Disconnect and tag power supply to equipment and lighting systems before servicing or performing maintenance.
- Avoid electrical shock by connecting all power tools and appliances to grounded, three-prong electrical outlets.
- When working on electronic equipment, ground all capacitors after turning off power, and reduce the hazard of current flowing through the body by keeping one hand away from the equipment whenever possible.
- Remove rings and watches prior to performing maintenance or troubleshooting electrical equipment.
- Never work on electrical equipment alone. Always have a second person nearby who is familiar with equipment operation and hazards and who is competent to administer first aid.

WARNING

FLAMMABLE LIQUID AND COMBUSTIBLE VAPOR HAZARDS

- Gasoline, Fuel Oil, Lubricating Oil, Grease, Paint, Paint Thinner, Cleaning Solvents and other combustible liquids present a serious fire hazard.
- Always store combustible liquids in approved containers and in their designated compartments on deck storage locations.
- When refueling and defueling the vessel, ensure appropriate signs are posted in visible locations and warnings are announced over the vessel's public address system. Smoking must be prohibited throughout the vessel during refueling and defueling operations.
- Avoid the accumulation of combustible vapors in confined spaces. Failure to properly ventilate confined spaces increases the risk of explosion.

WARNING

MOVING MACHINERY HAZARDS

- Moving machinery parts create a potential for serious injury and death. Exercise extreme caution when using or working near operating machinery.
- Disable or lockout controls and switches and tag before performing inspections or maintenance on equipment which could be turned on by accident.
- Never wear loose fitting clothing or jewelry when operating or performing maintenance. Clothing and jewelry can become entangled with moving parts and cause serious injury or death.
- Never operate machinery with protective guards and shields removed. Removing shields and guards expose the operator to unnecessary risk and danger.

WARNING

CAUSTIC AND CORROSIVE CHEMICAL HAZARDS

- Caustic and corrosive chemicals (such as battery electrolite, bromine, chlorine, etc.) can cause serious burns to eyes or exposed areas of skin.
- Always wear eye protection and protective clothing when working with caustic and corrosive chemicals.
- If chemicals accidentally contact skin or eyes, immediately flush with large quantities of water and seek medical attention.

WARNING

HIGH PRESSURE HYDRAULIC SYSTEM HAZARDS

- Hydraulic systems can cause serious injuries if high pressure lines or equipment fail.
- Avoid standing near operating hydraulic systems, if possible, to avoid high pressure fluid in the event of equipment failure.

WARNING

FIRE SUPPRESSANT HAZARDS

- Fire suppressant chemicals displace oxygen and present a serious risk of death by suffocation.
- Personnel must immediately evacuate compartments or areas in which fire suppressant agents will be dispersed.
- Personnel should not enter space in which fire suppressant chemicals have been dispersed without donning an oxygen breathing apparatus (OBA) or until space has been declared safe.

WARNING

RADIO FREQUENCY HAZARD

- Electromagnetic radiation has the potential for serious injury or death.
- Avoid placing the body in the path of radiation emissions.

WARNING

POWER TOOL HAZARDS

- Improper use of power tools and failure to follow accepted safety practices increase the risk of accidental injuries.
- Always use power tools for their designed purpose and wear eye protection when operating any power tool.

NOTE

For instructions on first aid (including artificial respiration), refer to FM 21-11 "First Aid for Soldiers."

TECHNICAL MANUAL

NO. 55-1915-200-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 11 April 1988

Operator's Manual
FOR

LOGISTICS SUPPORT VESSEL (LSV)
NSN 1915-01-153-8801

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You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or email your letter, DA Form 2028, or DA Form 2028-2 direct to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, Rock Island, IL 61299-7630. The email address is amsta-ac-nml@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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CHAPTER I

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE. This is an operator's manual for the Logistics Support Vessel (LSV) shown in FICURE 1-1. The LSV is designed to transport dry cargo in ocean, coastal, and inland waterways.

1-2. MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS).

1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs). If your LSV needs improvement, let us know. Send us an EIR. You the user are the only one who can tell what you don't like about the equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at, Commander, U.S. Army Tank-automotive and Armaments Command, AMSTA-LC-CIP-WT (Tech Pubs Control Point), Rock Island, IL 61299-7630. We'll send you a reply.

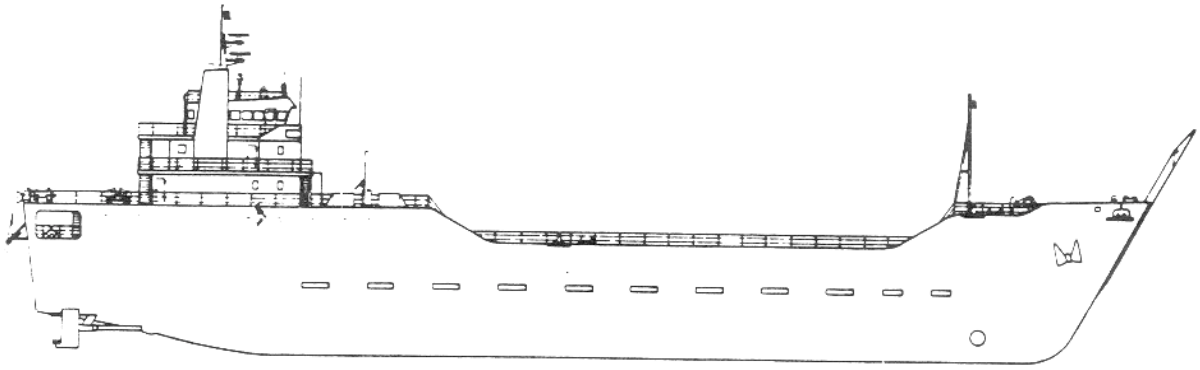


FIGURE 1-1. Logistics Support Vessel.

1-4. NOMENCLATURE CROSS-REFERFNCE LIST.

COMMON NAME	OFFICIAL NOMENCLATURE
Main Engine	Main Engine 16-645-E6
Reduction Gearbox	Reverse Reduction Gearbox WAV 630-2240
Emergency Generator	3304-B Caterpillar DITA Emergency Generator Engine Set, 90 kW
Bow Thruster Engine	3306-B Caterpillar DITA Bow Thruster Engine Set
Bow Thruster	Bow Thruster S-152-L
Desalinator	SW1000, Series IV Reverse Osmosis Desalinator
Fire Pump	Fire Pump, Aurora Model 344A-BF
Ballast Pump	Ballast Pump, Aurora Model 411
Bilge Pump	Bilge Pump Aurora Model 344A-1BF
Gyrocompass	Gyrocompass, MK 27, Mod 1 Equipment
Gyrocompass Transmission Unit	MK 37, Mod E Transmission Unit and Power Transfer Unit
Gyropilot	Gyropilot, SRP 680
Generator Set Engine	3406-B Ship's Service Generator Set Engine, 250 kW
Liferaft Davit	Davit, (Liferaft) Model AMS200
Global Positioning System (GPS) (Satellite Navigator)	Satellite Signals Navigation Set AN/WRN-6(V)

1-5. LIST OF ABBREVIATIONS.

AC	Air Conditioner
AT	Automatic Trip
BKR	Breaker
DIST	Distribution
DITA	Direct Injection Turbo Aftercooled
kVA	Kilovolt Ampere
kW	Kilowatt
LSV	Logistics Support Vessel
P	Phase
SP	Shore Power

1-6. GLOSSARY.

ABEAM	Directional term meaning at a right angle to the centerline or keel of a vessel.
AFT or AFTER	At, near, or toward the stern.
AGROUND	Resting on the bottom (refers only to floating craft).
ALOFT	Above the upper deck, as up in the rigging.
AMIDSHIPS	Usually in the line of the keel, but sometimes halfway between bow and stern; often contracted to "midships."
ANCHOR	Iron device so shaped as to grip the bottom and hold a vessel at her berth by the chain or line attached.
ASTERN	Behind the vessel; in the direction of the stern.
ATHWARTSHIPS	At right angles to the fore-and-aft line of a vessel; across the vessel in a direction at right angles to the keel.
AWEIGH	The position of the anchor when it is raised clear of the ground.
BALLAST	Any solid or liquid weight placed in a ship to increase the draft, to change the trim, or to regulate the stability.
BEAM	The measure from side to side of a ship at the widest point.
BERTH	The place where the vessel lies.

1-6. GLOSSARY. - CONT

BILGE	The lowest interior position of a ship; the water that accumulates in the bilge is called bilge water.
BINNACLE	A compass stand made of nonmagnetic material, serving also to illuminate and protect the compass.
BITTER END	Last end of a line or inboard end of an anchor cable secured to bitt.
BITTS	Pair of heavy posts, set vertically in a deck or on a pier, to which mooring or towing lines are fastened.
BLOCK	Grooved pulley or sheave in a frame or shell provided with a hook, eye, or strap, by which it may be attached.
BOW	The forward part of a vessel.
BOW ANCHORS	Two heavy anchors carried in the forward part of the vessel and ordinarily used in anchoring.
BRIDGE	Raised athwartships platform from which a vessel is steered and navigated.
BULKHEAD	Partition dividing the interior of a vessel into various compartments.
BULWARK	Light plating or wooden extension of the hull above an exposed deck, furnishing protection against weather and loss of material or personnel.
CAGED	Spring loaded action like a ball point pen, pushing CAGING button down and releasing, Gyro becomes caged.
CHAFE	To wear down by rubbing the surface of a line against a solid object.
CHAFING GEAR	A guard of canvas, line, or similar material placed around spars, lines, or rigging to prevent wear.
CHAIN LOCKER	Compartment below the main deck which receives the anchor chain.
CHAIN PIPE	Casting through which the anchor chain passes below deck.

1-6. GLOSSARY. - CONT

CHOCKS	Heavy fittings with round or oval holes secured to the deck or fitted in a vessel's bulwark, through which hawsers and lines are passed; also blocks of wood for supporting boats and weights.
CLEAT	Wood or metal fitting that has two projecting horns to which a line is secured.
COAMING	Sidewall of a hatch projecting above the deck around the perimeter of the hatch to prevent water from going below.
DANFORTH ANCHOR	Stockless anchor, easy to handle and stow.
DAVITS	Small cranes on a vessel that are used to hoist and lower boats.
DEADLIGHTS	Strong shutters that screw down upon air portholes and keep out water in heavy weather.
DIESEL ENGINE	Type of internal-combustion engine in which air is compressed to a temperature sufficiently high to ignite fuel injected directly into the cylinder.
DOGS	Small, bent metal fittings used to secure watertight doors, hatch covers and manhole covers; to close and fasten as tight as possible.
DOUBLE-BOTTOM TANKS	Watertight tanks formed by placing steel plating a few feet above the skin or outer bottom for the purpose of protecting a vessel if the outer bottom is damaged; used to store oil and water.
DRAFT	Single load of cargo; also refers to a vessel's depth below the waterline.
ENGINE ROOM	Compartment containing the propulsion machinery of a vessel.
ENSIGN	Flag; the emblem of a vessel's nationality.
ESTIMATE	An opinion or judgment of the nature, character, or quality of something.
FAIRLEAD	Fittings or devices used in preserving the direction of line, chain, or wire so that it may be delivered fairly, or on a straight lead, to the sheave or drum.
FATHOM	Unit of measure equal to 6 feet.

1-6. GLOSSARY. - CONT

FENDERS	Pieces of material, usually pliable, hung over the side of a vessel or boat to protect the sides.
FIRE-MAIN SYSTEM	Permanent fire-control installation for an entire vessel consisting of water pipes, plugs to which hoses are attached, pumps, valves, and controls.
FLAGSTAFF	Small vertical spar at the stern on which the ensign is hoisted while a vessel is at anchor.
FORE	Parts of a vessel at or adjacent to the bow; also parts between the midship section and stern.
FORE and AFT	Lengthwise of a ship.
FORECASTLE (fo'c'sle)	The upper deck forward of the foremast and included in the bow area.
FREEBOARD	Distance from the waterline to the top of the main deck, measured amidships.
FREEING PORTS	Large openings in a vessel's bulwark that are used to free the decks of large quantities of excess water.
GALLEY	A vessel's kitchen.
GANGPLANK	Passageway or ladder up a ship's side.
GENERAL ALARM SYSTEM	System of electrically operated gongs, controlled from the bridge and engine room, which calls the crew for general quarters and emergencies.
GIMBAL RINGS	A device consisting of two rings mounted on axes at right angles to each other so that an object, such as a ship's compass, will remain suspended in a horizontal plane between them, regardless of the motion of the ship.
GROUND TACKLE	Anchor gear.
GYPSY	Drum like portion of the windlass, used for taking in line or chain.
HATCH	Opening in a deck giving access to cargo holds.
HAWSEPIPES	Iron castings in a bow of a vessel through which anchor chains run.
HAWSER	Line greater than 5-inch circumference used for mooring or towing.

1-6. GLOSSARY. - CONT

HEADWAY	A vessel's motion forward or ahead.
HEEL	To list over or lean to one side; a vessel is said to turn on her heel when she turns in a short space.
HELM	The mechanism by which a vessel is steered.
HOLD	Space between the lowermost deck and the bottom of a vessel that is used for the stowage of ballast, cargo, and stores.
HULL	Framework of a vessel, including all decks, but exclusive of masts, yards, riggings, and all outfit or equipment.
JACOB'S LADDER	A ladder made of flexible materials for sides to permit rolling for stowage.
KEEL	The timber or series of connected plates running from stem to sternpost on the bottom of the centerline of a vessel.
KNOT	Measure of speed equal to one nautical mile per hour.
KORT NOZZLE	A short metal tunnel, in which the propeller turns, to concentrate its thrust.
LEADLINE	Weighted line with markings which indicate the depth of water.
LEEWARD	Away from the wind.
LIFE PRESERVER	An apparatus of buoyant material, usually kapok, designed to keep a soldier afloat.
LIFE RAFT	Raft kept buoyant by cylindrical air chambers, designed to keep survivors of a disaster afloat for rescue.
LIFE RING	Cork ring covered with canvas that is designed to support a soldier in water.
LINE-THROWING GUNS	Guns used for the purposes of throwing lines, attached to an eye in the shank of the projectile, from one vessel to another or to the shore; may be mounted or shoulder-type.
LIST	The inclination of a vessel to one side; as a list to port or a list to starboard.

1-6. GLOSSARY. - CONT

LOCKER	A box, or compartment to stow things in.
MAGNETIC COMPASS	Direction indicating instrument which seeks magnetic north.
MAIN DECK	First complete deck running the full length of a vessel.
MAST	Long pole or spar which sustains yards, booms, other rigging, navigation lights, antennae, and radar scanner.
MESS	Group of persons eating together; the meal so taken; to supply with messes or to eat them.
MIDSHIPS	See AMIDSHIPS.
MOLDED	Term used to indicate the general form and dimensions of the hull as determined by the lines to the inside of the shell plating.
MOORED	Lying with both anchors down; also tied to a pier or anchor buoy.
MOORING LINES	Cables or lines used to tie up a vessel.
PAD EYE	Metal eye permanently secured to a deck or bulkhead, to which lines and cables may be secured.
PORT	Left side of a vessel looking forward; opening in a ship's side; harbor for embarkation and discharge of cargo.
POTABLE WATER	Drinkable water, meeting standards set by the US Public Health Service.
PYROMETER	An electrical thermometer for measuring high temperatures.
PYROTECHNICS LOCKER	Pertains to stowage area for ship's flares.
QUARTER	General area from the middle of a vessel to the extreme stern.
RANGE LIGHT	A white light on the mast in the forward part of a vessel.
REVERSE OSMOSIS	A process for reducing dissolved solids, including salt, in water. This process produces potable water from seawater.

1-6. GLOSSARY. - CONT

RUDDER	Flat structure hung vertically on the sternpost, just aft of the screw, and used to steer a vessel by offering resistance to the water when turned to an angle with the centerline.
RUNNING LIGHTS	All lights required to be shown by a vessel that is under way.
SCANTLINGS	The dimensions of the structural parts of a vessel, as frames, plates, and girders.
SCOPE	Length of anchor chain or cable to which a vessel is riding.
SCREW	Propeller, located at a vessel's stern.
SCUPPERS	Small drains in a vessel's bulwark which are located near the deck.
SHAFT	Rod transmitting power from a vessel's engine to its screw.
SHEAVE	Wheel inside a block.
SICK BAY	A vessel's medical clinic.
SLEW	To twist around on its axis.
SNUB	To stop a chain or hawser suddenly.
SOUNDING PIPE	Pipe from an upper deck to a lower compartment or tank to measure height of water or liquid in a compartment or tank. One for each area to be sounded. Terminates with a screw plug.
SOUNDINGS	Depth of water surrounding a vessel which is determined by use of leadline or other equipment.
STARBOARD	Right side of a vessel looking forward.
STEM	The vertical or nearly vertical forward extension of the keel, to which the forward ends of the strakes are attached.
STERN	The after end of a vessel.
STOW	To put away, to lock up for safekeeping.
STRAKE	Continuous line of plates running from bow to stern that contributes to a vessel's skin.

1-6. GLOSSARY. - CONT

SUMP	Pit at the lowest point in a circulating or drainage system.
TANDEM	One behind the other.
TRIM	Difference in draft at the bow and stern of a vessel; manner in which a vessel floats on the water, whether on an even keel or down by the head or stern; shipshape; to adjust a vessel's position in the water by arranging ballast and cargo, to arrange for sailing; to assume, or cause a vessel to assume, a certain position, or trim, in the water.
WILDCAT	Sprocket portion of windlass designed to engage the links of anchor chain.
WHEEL	The instrument attached to the rudder by which a vessel is steered.
WINCH	Hoisting machine used for loading and discharging cargo or for hauling in lines.
WINDLASS	Apparatus in which horizontal or vertical drums or wheels are operated by means of a steam engine or motor for handling heavy anchor chains and hawsers.
WINGS	Platforms on either side of the bridge.
YARDARM	Outer quarter of a horizontal spar attached to the mast athwartships, equipped with blocks for reeving signal halyards.

Section II. EQUIPMENT DESCRIPTION

1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

1-7.1. Characteristics. The LSV is designed to carry 2,000 short tons of vehicles, containers and/or general cargo.

1-7.2. Capabilities. The LSV is capable of self-delivery to overseas locations, has a maximum range of 8350 nautical miles, can land and retract from undeveloped coastlines under full load, and can deliver cargo to terminal areas not accessible to deep draft vessels.

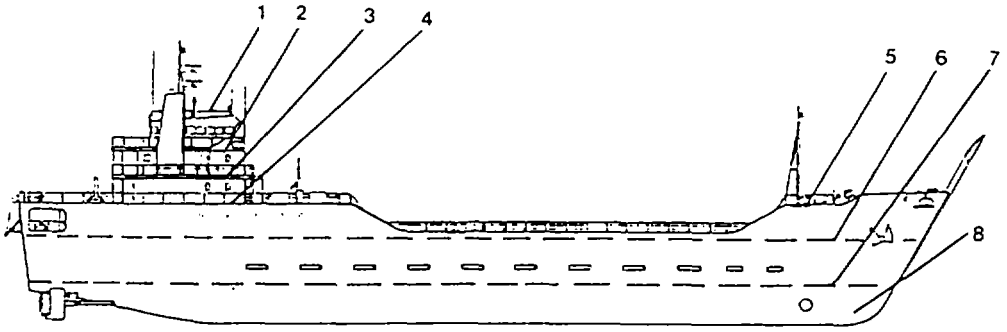
1-7.3. Features. The LSV features discharge and backloading of other ships and provides roll on/roll off delivery for portable equipment.

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. External and internal illustrations show the location of major components and compartments of the LSV.

1-8.1. LSV Decks. FIGURE 1-2 shows the relationship of the decks on the LSV. From top to bottom these decks include: Pilothouse top, Bridge Deck, Officer's Deck, Poop Deck, Forecastle Deck, Mezzanine Deck, Main Deck, and Below Main Deck.

1-8.2. LSV External Features. FIGURE 1-3 shows the LSV in three sheets from an external view. Sheet 1 shows a profile, Sheet 2 is a top view of the after portion, and Sheet 3 is the top forward section.

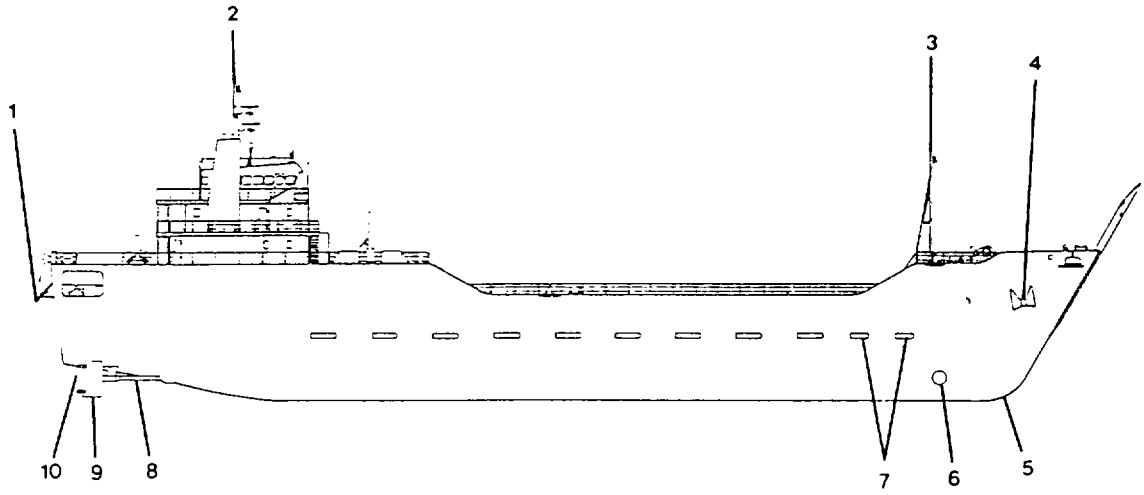
1-8.2.1. LSV External Features Profile. Items shown on Sheet 1 of FIGURE 1-3, LSV External Features Profile, are described as follows:



LEGEND

1. PILOTHOUSE TOP
2. BRIDGE DECK
3. OFFICER'S DECK
4. POOP DECK
5. FORECASTLE DECK
6. MEZZANIINE DECK
7, MAIN DECK
8. BELOW MAAIN DECK

FIGURE 1-2. LSV Decks.



LEGEND

1. STERN ANCHOR (PORT SIDE)
2. MAST
3. FOREMAST
4. BOW ANCHOR (PORT AND STARBOARD)
5. HULL
6. BOW THRUSTER TUNNEL
7. CARGO DECK SELF-BAILING PORTS
8. PROPELLER SHAFT (PORT AND STARBOARD)
9. KORT NOZZLES (PORT AND STARBOARD)
10. RUDDER (PORT AND STARBOARD)

FIGURE 1-3. LSV External Features Profile (Sheet 1 of 3).

1-8.2.1.1. Stern Anchor (Portside). Danforth type anchor (1) weighing 4,369 lbs. and stowed on a pipe rack.

1-8.2.1.2. Mast. The mast (2) is used to support communications and radar antennas, navigational antennae, and navigation lights.

1-8.2.1.3. Foremast. The foremast (3) is used to support navigation lights and second mount hailer.

1-8.2.1.4. Bow Anchors (Port and Starboard). Danforth type anchors (4) weighing 4,369 lbs. each.

1-8.2.1.5. Hull. The hull (5) is all steel having continuous sealtight welding with full continuity of structural members.

1-8.2.1.6. Bow Thruster Tunnel. The bow thruster tunnel (6) houses the bow thruster water set which is used for close quarter maneuvering.

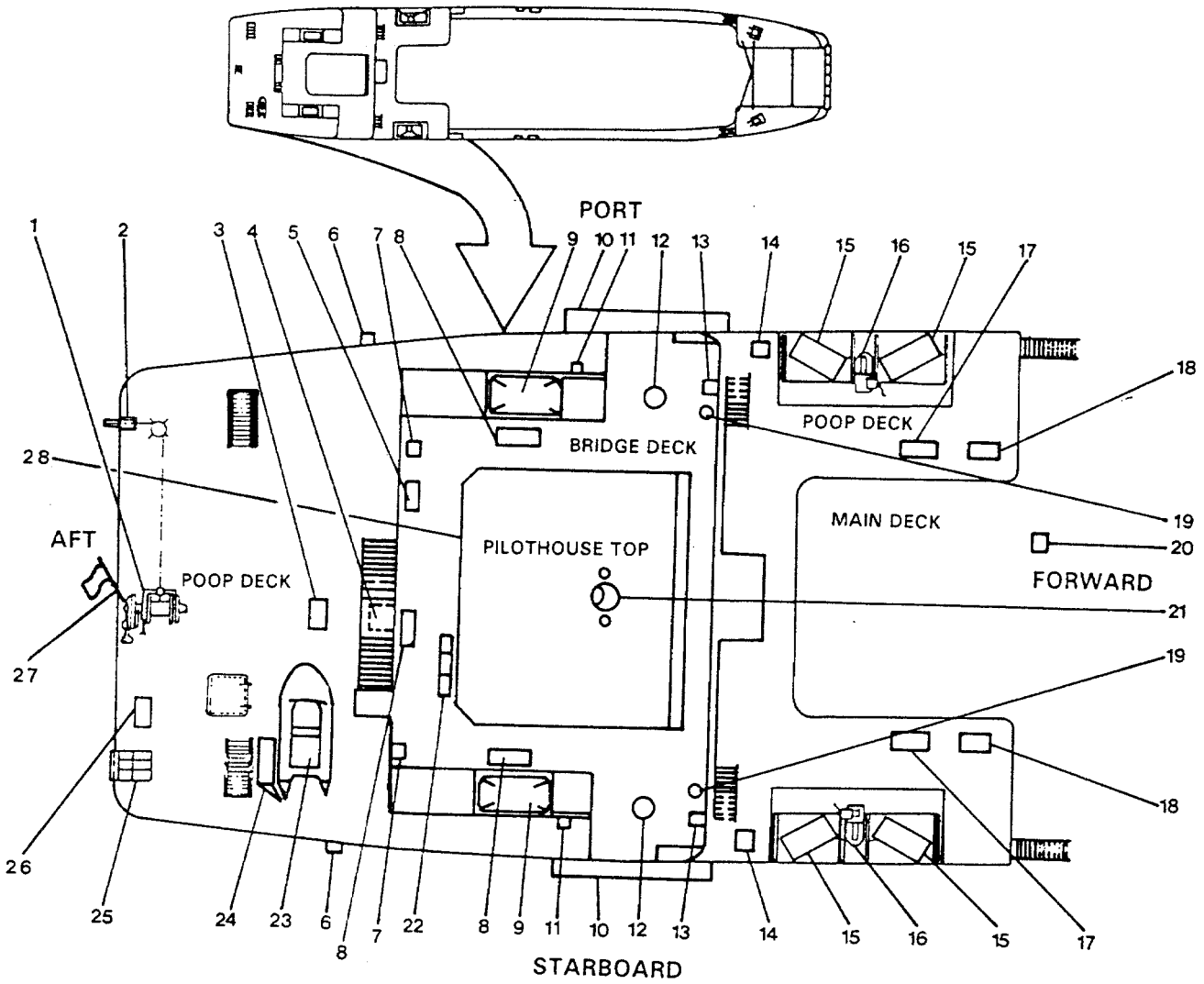
1-8.2.1.7. Cargo Deck Self-Bailing Ports. Openings (7) located on main deck for drainage.

1-8.2.1.8. Propeller Shafts (Port and Starboard). Shafts (8) of solid forged steel that transfer power to the propellers.

1-8.2.1.9. Kort Nozzles (Port and Starboard). Steel tunnels (9) that concentrate the thrust of the enclosed fixed pitch propellers.

1-8.2.1.10. Rudders (Port and Starboard). Each kort nozzle has three semibalanced, streamlined rudders (10). Rudders are welded steel, watertight, with drain and vent plugs for testing and draining.

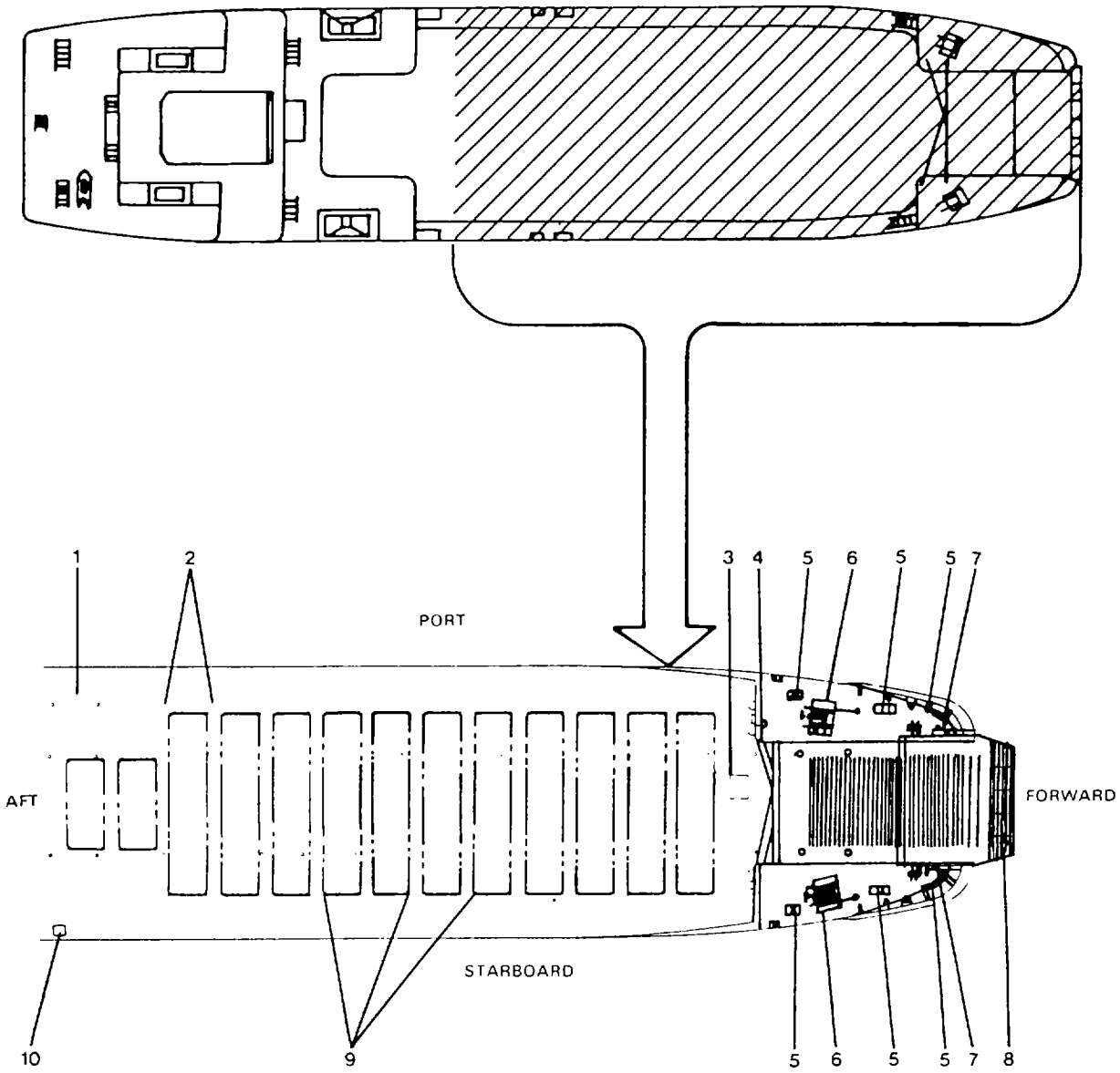
1-8.2.2. LSV External Features Top View, Aft. FIGURE 1-3 (Sheet 2) shows the LSV after portion from a top view. External features shown are described as follows:



LEGEND

1. STERN ANCHOR WINCH
2. UNIVERSAL FAIRLEAD
3. SHORE POWER REEL
4. SHORE POWER CONNECTION
5. SIGNAL FLAG LOCKER
6. SHORE POWER CABLE ROLLERS
7. SOUND POWERED TELEPHONE
8. PYROTECHNIICS LOCKER
9. FUNNELS
10. GANGPLANIK
11. INTRUSION/FIRE ALARK
12. PELORUS
13. SEARCH LIGHT CONTROL BOX
14. DAVIT (GANGPLANK) DAVIT STAND
15. LIFE RAFTS
16. DAVIT (LIFE RAFTI
17. JACOBS LADDERS
18. STORAGE BOXES
19. SEARCHLIGHTS
20. ENGINE ACCESS PANEL
21. MAGNETIC COMPASS
22. BATTERY CHARGER WITH BATTERIES
23. RESCUE/WORK BOAT
24. DAVIT (RESCUE/WORK BOAT)
25. RESCUE/WORK BOAT FUEL STORAGE
26. LINE LOCKER
27. FLAGSTAFF
28. COUNTERMEASURE WASHDOWN SYSTEM

FIGURE 1-3. LSV External Features Top View - AFT (Sheet 2 of 3).



LEGEND
1. CARGO DECK
2. CARGO LASHING SOCKETS
3. BOW THRUSTER ACCESS PANEL
4. SOUND POWERED TELEPHONE
5. MOORING BITS
6. WINDLASS AND BOW RAMP WINCH
7. RAMP SHEAVE ASSEMBLY
8. BOW RAMP
9. CONTAINER SOCKETS
10. ENGINE ROOM ESCAPE HATCH

FIGURE 1-3. LSV External Features (Sheet 3 of 3).

1-8.2.2.1. Stern Anchor Winch. A drum winch containing 1200 feet of wire rope for the stern anchor.

1-8.2.2.2. Universal Fairlead. Device located on the stern over which the stern anchor cable passes and is held in place and prevented from snagging or chaffing.

1-8.2.2.3. Shore Power Reel. The shore power reel is used to store the cable used to take electrical power from shore. The reel holds 150 feet of cable.

1-8.2.2.4. Shore Power Connection. The shore power connection is a watertight receptacle for 460 volt, 3 phase, 300 amp, shore power via the ship's shore power cable.

1-8.2.2.5. Signal Flag Locker. The signal flag locker stores the flags used for visual communication.

1-8.2.2.6. Shore Power Cable Rollers. The shore power cable rollers allow reduced friction of movement when the shore power cable is drawn from the ship for connection to shore power source.

1-8.2.2.7. Sound Powered Telephone. Sound powered telephones are used for internal ship's communication.

1-8.2.2.8. Pyrotechnics Locker. The pyrotechnics locker is a storage area for ship's flares.

1-8.2.2.9. Funnels. Port and starboard exhaust for main engine room.

1-8.2.2.10. Gangplank. The gangplank is an aluminum ladder which is mounted flush to the ship's hull when stored for sea. The gangplank contains a swivel mount and is rotated outward from the hull to permit access to the poop deck from shore or other ships.

1-8.2.2.11. Intrusion/Fire Alarm Panel. This panel provides warning indication of a ship fire or an unauthorized entrance to the radio room.

1-8.2.2.12. Pelorus. Contains gyrocompass bearing repeaters. The repeaters are driven by the ship's gyrocompass.

1-8.2.2.13. Searchlight Control Box. Watertight box containing control panel for searchlight. Panel has ON/OFF, focus, and overtemp test controls.

1-8.2.2.14. Davit (Gangplank/Davit Stand. A pneumatically operated davit used to extend and elevate the gangplank to shore or another ship. This davit may be installed in a davit stand provided on either side.

1-8.2.2.15. Liferafts. Four 25-man liferafts with a davit, are located two port and two starboard.

1-8.2.2.16. Davit (Liferaft). Davits used to lower and retrieve liferafts, port and starboard.

1-8.2.2.17. Jacobs Ladders. A flexible ladder which can be lowered over the side for overboard operations.

1-8.2.2.18. Storage Boxes . General equipment storage area, port and starboard.

1-8.2.2.19. Searchlights. Two 1000 watt Xenon searchlights located port and starboard on the bridge deck, normally operated for high intensity illumination and navigational assistance.

1-8.2.2.20. Engine Access Panel. Removable waterproof deck panel for access to the engine room for installation and removal of equipment.

Panel is located on main deck above the port main engine.

1-8.2.2.21. Magnetic Compass. Ship's magnetic compass installed on a periscope binnacle. Periscope is displayed in the pilothouse.

1-8.2.2.22. Battery Charger with Batteries. The General Alarm System, their associated charging device and 24 Vdc batteries.

1-8.2.2.23. Rescue/Work Boat. A rigid inflatable 15 foot, 5 inch boat equipped with a 30 hp outboard engine.

1-8.2.2.24. Davit (Rescue/Work Boat). This is an electrically operated davit used to unload ships stores or to deploy/retrieve the rescue/workboat.

1-8.2.2.25. Rescue/Work Boat Fuel Storage. Fuel for the boat is in 5 gallon containers stored on a quick jettison device.

1-8.2.2.26. Line Locker. Metal locker used for stowage of line.

1-8.2.2.27. Flagstaff. Vertical spar at the stern on which the ensign is displayed when the ship is moored or at anchor.

1-8.2.2.28. Countermeasure Washdown System. Piping system to washdown superstructure in a nuclear, biological or chemical attack.

1-8.2.3. LSV External Features Top View, Forward. FIGURE 1-3, Sheet 3 shows the LSV external features forward.

1-8.2.3.1. Cargo Deck. Comprises 10,500 square feet of clear, selfbailing cargo area capable of supporting 2,000 short tons of vehicles, containers, and/or general cargo.

1-8.2.3.2. Cargo Lashing Sockets. Sockets built into the cargo deck for lashing down cargo.

1-8.2.3.3. Bow Thruster Access Panel. Waterproof deck panel for removal and installation of equipment in the bow thruster compartment. Panel is located on main deck above bow thruster engine.

1-8.2.3.4. Sound Powered Telephone. Sound powered telephones are used for internal ship's communication.

1-8.2.3.5. Mooring Bitts. Thick metal posts attached to the deck and used for mooring the ship with lines and hawsers.

1-8.2.3.6. Windlass and Bow Ramp Winch. Bow anchor windlass (port and starboard) is electro-hydraulic powered. An extended shaft drives the wildcat and gypsy. A clutch assembly is provided on the inboard extended shaft to act as an emergency bow ramp winch. The bow ramp winches are independently driven cable drum assemblies operated by a common control valve and hydraulic supply.

1-8.2.3.7. Ramp Sheave Assembly. Multiple pulleys that route wire rope to provide a mechanical advantage for raising and lowering the bow ramp.

1-8.2.3.8. Bow Ramp. Hinged to main deck, deployed by a sheave and wire rope system between the ramp and the ship's structure.

1-8.2.3.9. Container Sockets. Sockets built into the cargo deck for securing containers.

1-8.2.3.10. Engine Room Escape Hatch. A panel used to provide exit from the engine room to the main deck in case of emergency.

1-8.3. LSV Internal Features. Figure 1-2 shows the relationship of the decks. The following paragraphs will describe the internal features of these decks including: Bridge Deck (Pilot house), Officers Deck, Poop Deck,

the Pilot House Top Deck and the Forecastle Deck.

1-8.3.1. Bridge Deck (Pilothouse). The pilothouse is located on the Bridge Deck and is the command center of the vessel. It contains the following major components as shown in FIGURE 1-4.

1-8.3.1.1. Wind Direction and Speed Indicator. Indicator for wind speed and direction, mounted on aft bulkhead.

1-8.3.1.2. Clinometer (Trim). A device (similar to a carpenter's level) which indicates, by means of a bubble in a tube of liquid, the amount of ship's pitch or trim.

1-8.3.1.3. Chart Table. Located against the aft bulkhead behind the steering stand.

1-8.3.1.4. Clinometer (Heel). Same as clinometer (Trim) except it indicates degree of ship's roll or heel.

1-8.3.1.5. Emergency Radio (Buoyant). Floating radio set to be used in an emergency.

1-8.3.1.6. Open Scale Repeater. Gyrocompass repeater placed on the port side of the pilothouse with ON/OFF control and dimmer switch.

1-8.3.1.7. Radar. Provides navigational information.

1-8.3.1.8. General Alarm Contactor. Master switch for activating the General Alarm System.

1-8.3.1.9. Navigation Lights Control Panel. Provides selective control of electrical power to all navigational lights on the vessel.

1-8.3.1.10. Sound Powered Telephone. Sound powered telephones are used for internal ship's communication.

1-8.3.1.11. Blinker Light Control Key. Telegraph type key for flashing the blinker lights on the mast. Used for sending messages to other ships/ stations.

1-8.3.1.12. Whistle Control Switch. Used to select "At-will" or "Automatic" mode for the ship's whistle.

1-8.3.1.13. Magnetic Compass Reflector Periscope. Part of the magnetic compass located on the wheelhouse top. Allows the helms soldier to observe the magnetic compass through reflector mirrors housed in a periscope.

1-8.3.1.14. Rudder Angle Indicator. Indicates actual position of ship's port and starboard rudders.

1-8.3.1.15. Steering Stand. The steer-ing stand contains the followup unit (wheel), gyropilot heading selector and control amplifier, steering selector panel, rudder order indicator, and non-followup levers (joysticks).

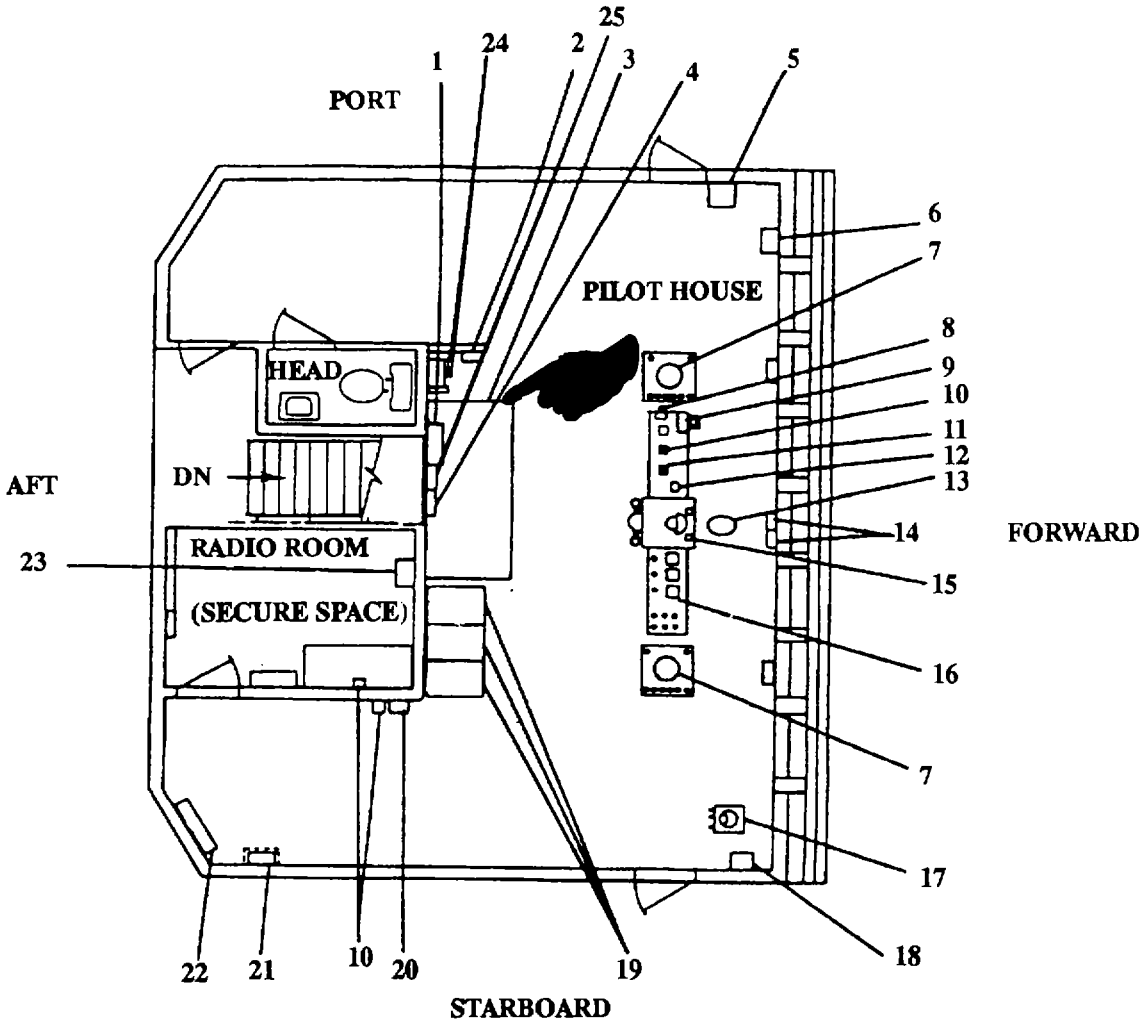
1-8.3.1.16. Pilothouse Console. The pilothouse console contains throttle and directional controls for main engines and bow thruster engine, engine order telegraph system, attendance monitor system, fire pump control and engine and machinery monitoring.

1-8-3.1.17. Gyrocompass. The MK 27 MOD 1 Gyrocompass is located on the star-board side of the pilothouse.

1-8.3.1.18. Portable Radio Battery Charger. Device used to recharge and maintain charge of portable two-way radios used by crew members.

1-8.3.1.19. File Cabinets. Located against the aft bulkhead.

1-8-3.1.20. Fire/Smoke Alarm Box. Master panel for vessel fire and smoke alarm system.



LEGEND

1. WIND DIRECTION AND SPEED INDICATOR
2. CUNOMETER (TRIM)
3. CHART TABLE
4. CLINOMETER (HEEL)
S. EMERGENCY RADIO (BUOYANT)
6. OPEN SCALE REPEATER
7. RADAR
B. GENERAL ALARM CONTACTOR
9. NAVIGATION LIGHTS CONTROL PANEL
10. SOUND POWERED TELEPHONE
11. BLINKER LIGHT CONTROL KEY
12. WHISTLE CONTROL SWITCH
13. MAGNETIC COMPASS REFLECTOR PERISCOPE
14. RUDDER ANGLE INDICATOR
15. STEERING STAND
16. PILOTHOUSE CONSOLE
17. GYROCOMPASS
18. RORTABLE RADIO BATTERY CHARGER
19. FILE CABINETS
20. FIRE/SMOKE ALARM BOX
21. FOWER TRANSFER UNIT
22. BATTERY CHARGE CONTROL
23. INTRUSION/FIRE ALARM PANEL
24. GLOBAL POSITIONING SYSTEM RECEIVER
25. GLOBAL POSITIONING SYSTEM DISPLAY UNIT

1-8.3.1.21. Power Transfer Unit. The power transfer unit is a component of the gyrocompass system.

1-8.3.1.22. Battery Charge Control. Controls general alarm battery charger system.

1-8.3.1.23. Intrusion/Fire Alarm Panel. Located inside the Radio Room to provide warning of fire or unauthorized entrance into the Radio Room.

1-8.3.1.24. Global Positioning System Receiver. Receives signals from three or more satellites and performs calculations to determine the vessel's latitude and longitude.

1-8.3.1.25. Global Positioning System Display Unit. Displays navigational information provided by the receiver.

1-8.3.2. Officers Deck The Officers Deck (FIGURE 1-5) contains the sickbay, officers quarters, and masters quarters.

1-8.3.2.1. Sickbay. The sickbay is located on the after port side of the officers deck. Space is provided for two bed patients. It is furnished as shown in FIGURE 1-6 with a refrigerator (1), locker (2), two beds (3), nightstand (4), shower (5), commode (6), sink (7), chair (8), and desk (9).

1-8.3.2.2. Officers Quarters. Five officer staterooms are furnished as shown in FIGURE 1-7. Each space contains a locker (1), bed (2), sink (3), chair (4), desk (5), and safe (6). One room is provided with a separate shower (9) and commode (10). The remaining four rooms share a shower (9) and commode (10). The remaining four rooms share a shower (9) and commode (10) between each pair of rooms. A watchcall/assistance needed panel (7) is located in two of the rooms. A sound powered telephone (8) is provided in each room.

1-8.3.2.3. Masters Quarters. The Vessel Master's suite is furnished as shown in FIGURE 1-8. It contains a bed (1), safe (2), night table (3), coffeemaker (4), cabinet (5), chair (6), sound powered telephone (7), refrigerator (8), desk (9), file cabinet (10), shower (11), sink(12), head (13), commode (14), and locker (15).

1-8.3.3. Poop Deck. The poop deck, FIGURE 1-9, contains the galley (3) and stores areas (1), crew's mess and recreation room (2), and the officers mess and lounge (4).

1-8.3.3.1. Galley and Stores. The galley and stores areas, FIGURE 1-10, contain the furnishings and equipment necessary for food service operations. Other equipment located in these areas include: searchlight power supply (1), a watertight door to the weather deck (2), and sound powered telephone (21).

1-8.3.3.2. Crew's Mess and Recreation Room Equipment. This compartment contains furnishings and equipment as shown in FIGURE 1-11. Three tables (3) and 18 chairs (2) are provided for crew seating. on an aft table are located the coffee urn (4), a milk dispenser (5), a microwave oven (6), and a toaster (7). Storage cabinets are located beneath the table (8). A refrigerator (9) is also provided.

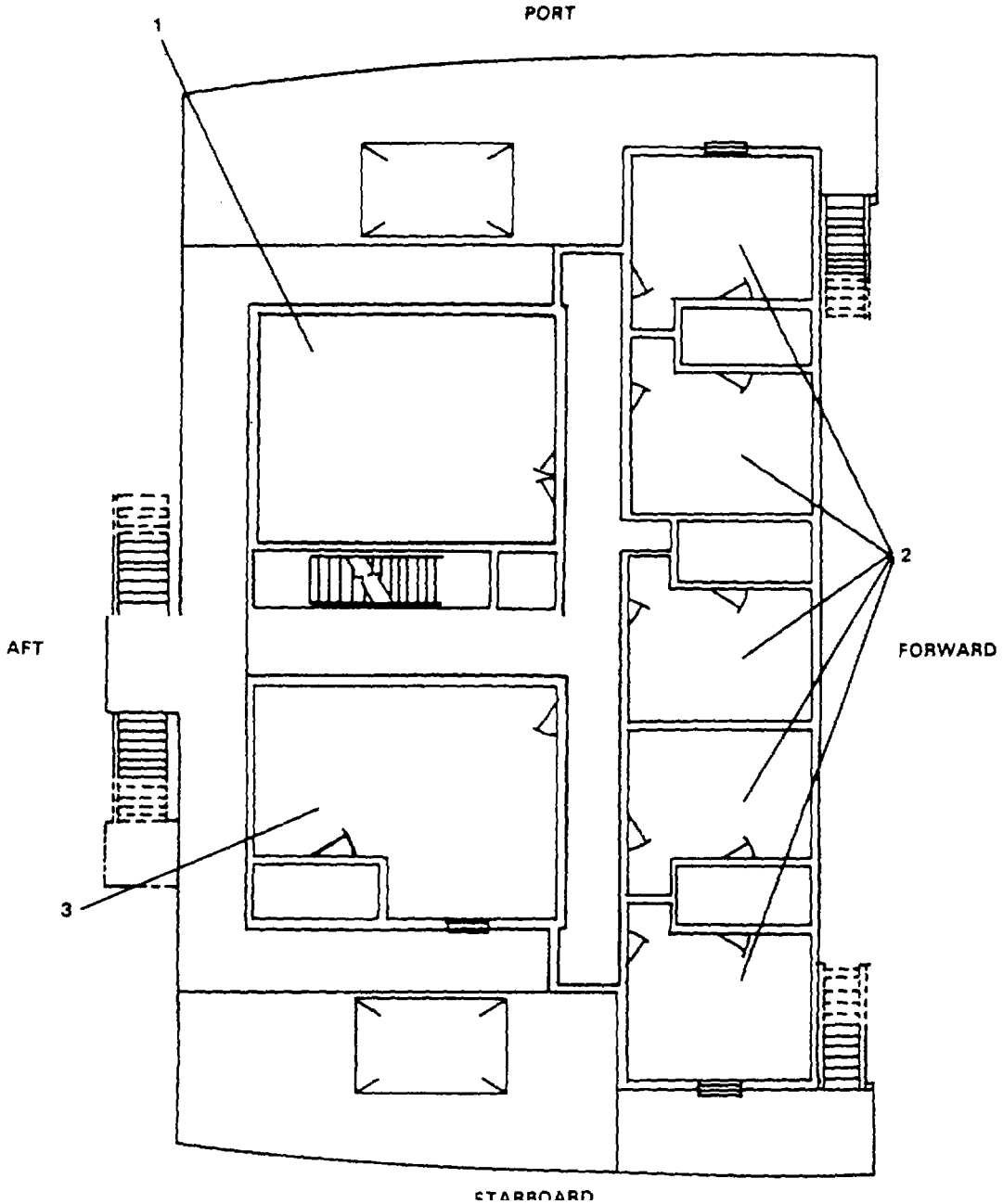
1-8.3.3.3. Officer's Mess and Lounge. This compartment contains furnishings and equipment as shown in FIGURE 1-12. A table (8) with six chairs (7) is provided. On and under a side table are located a refrigerator (2), toaster (3), coffee maker (4), microwave oven (5), and a safe (6). The key locker (9) is on the aft bulkhead. A portable radio battery charger and storage rack (10) are located on the starboard bulkhead.

1-8.3.3.4. Mezzanine Deck The mezzanine decks are located above each side of the main deck. Major components are shown in FIGURE 1-13.

1-8.3.3.4.1. Stern Anchor. A Danforth type anchor weighing 4,369 pounds is stowed on a pipe frame.

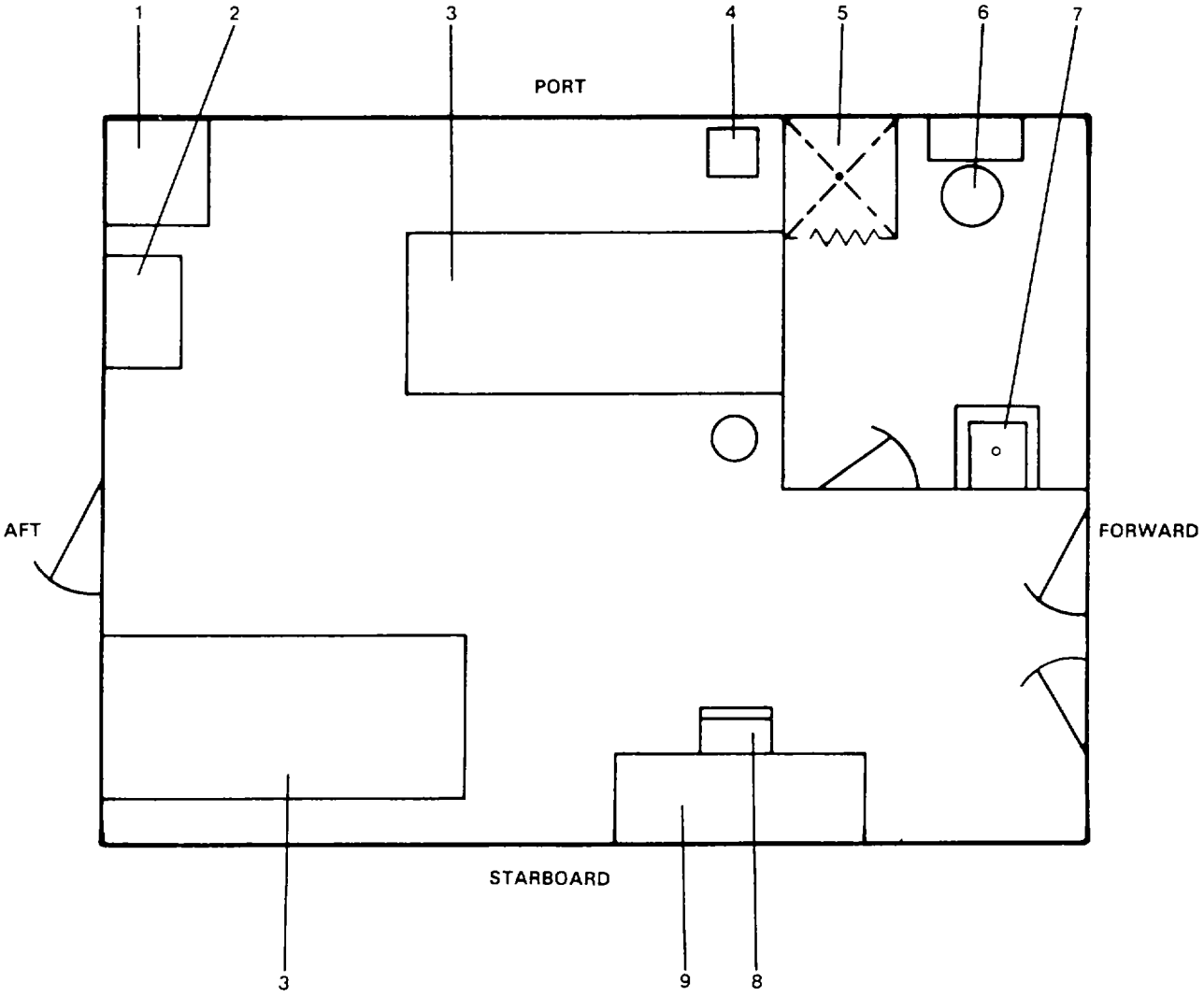
1-8.3.3.4.2. Mooring Station. There are two ship's mooring stations; one port and one starboard.

1-8.3.3.4.3. Mooring Bitts. Thick metal posts attached to the deck and used for mooring the vessel with lines and hawsers.



LEGEND
1. SICKBAY
2. OFFICERS QUARTERS
3. MASTERS QUARTERS

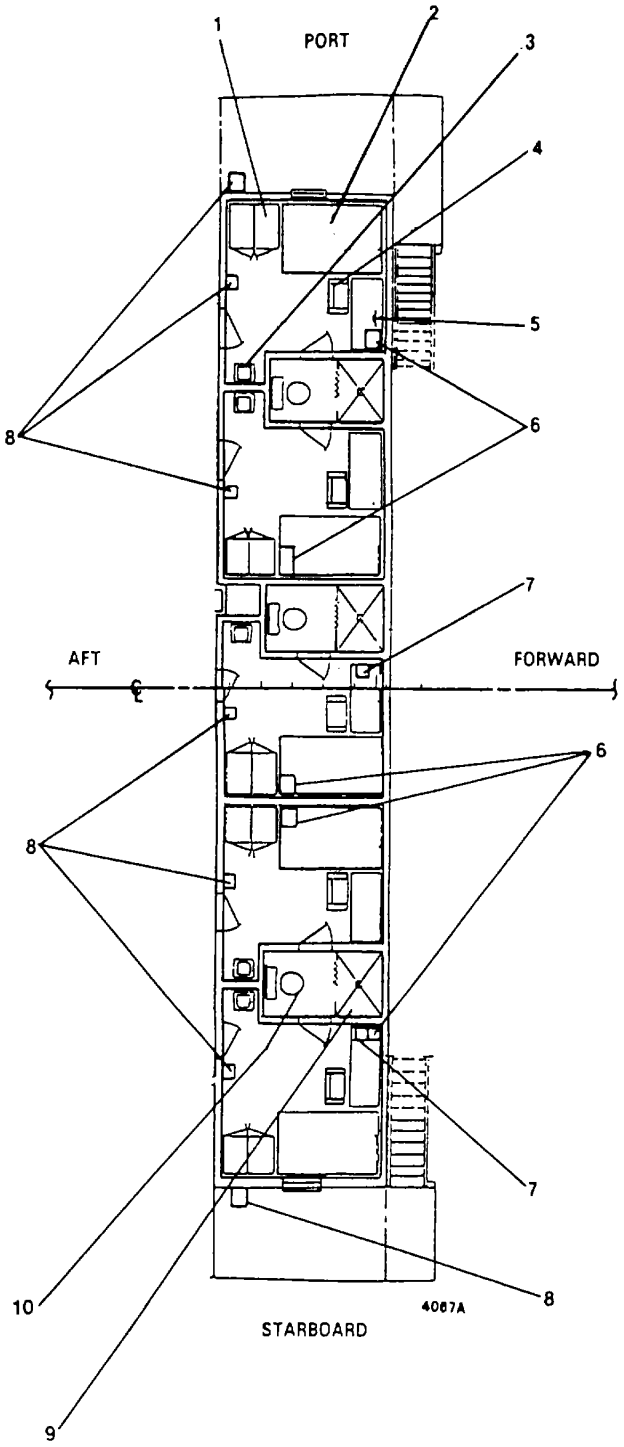
FIGURE 1-5. Officers Deck.



LEGEND

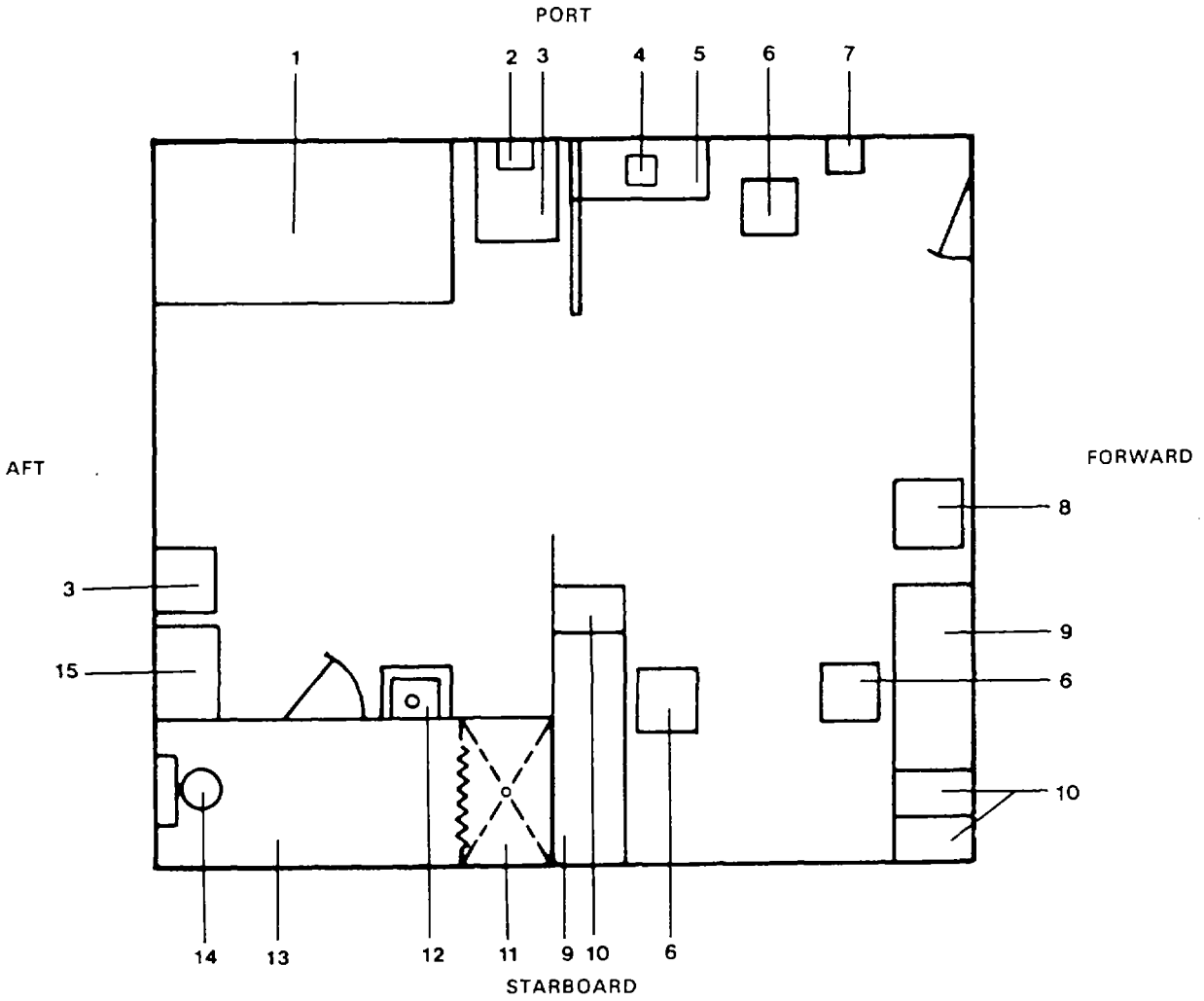
1. REGRIGERATOR
2. LOCKER
3. BED
4. NIGHTSTAND
5. SHOWER
6. COMMODE
7. SINK
8. CHAIR
9. DESK

FIGURE 1-6. Sickbay.



LEGEND

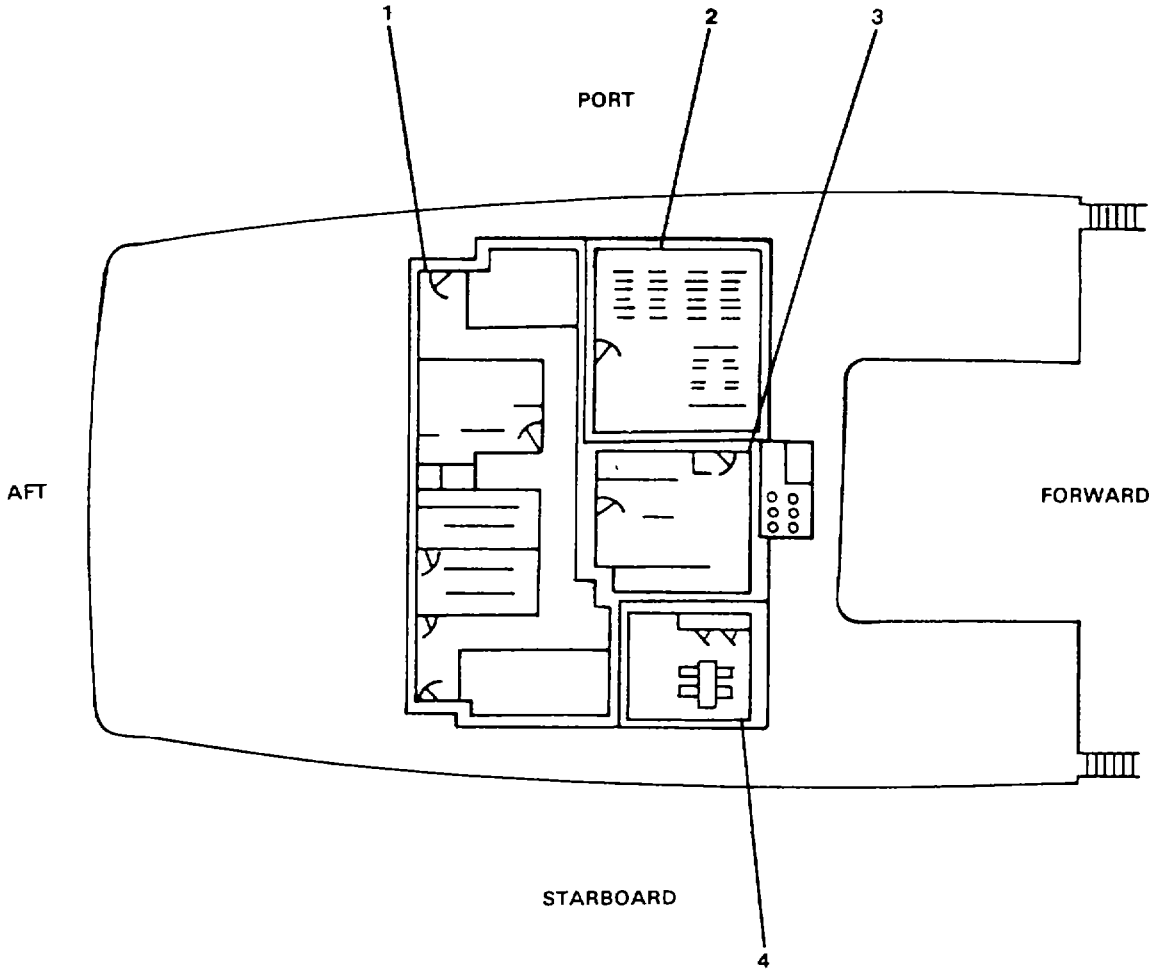
FIGURE 1-7. Officers Quarters.



LEGEND

1. BED
2 SAFE
3. NIGHT TABLE
4. COFFEEMAKER
5. CABINET
6. CHAIR
7. SOUND POWERED TELEPHONE
8. REFRIGERATOR
9. DESK
10. FILE CABINET
11. SHOWER
12. SINK
13. HEAD
14. COMMODE
15. LOCKER

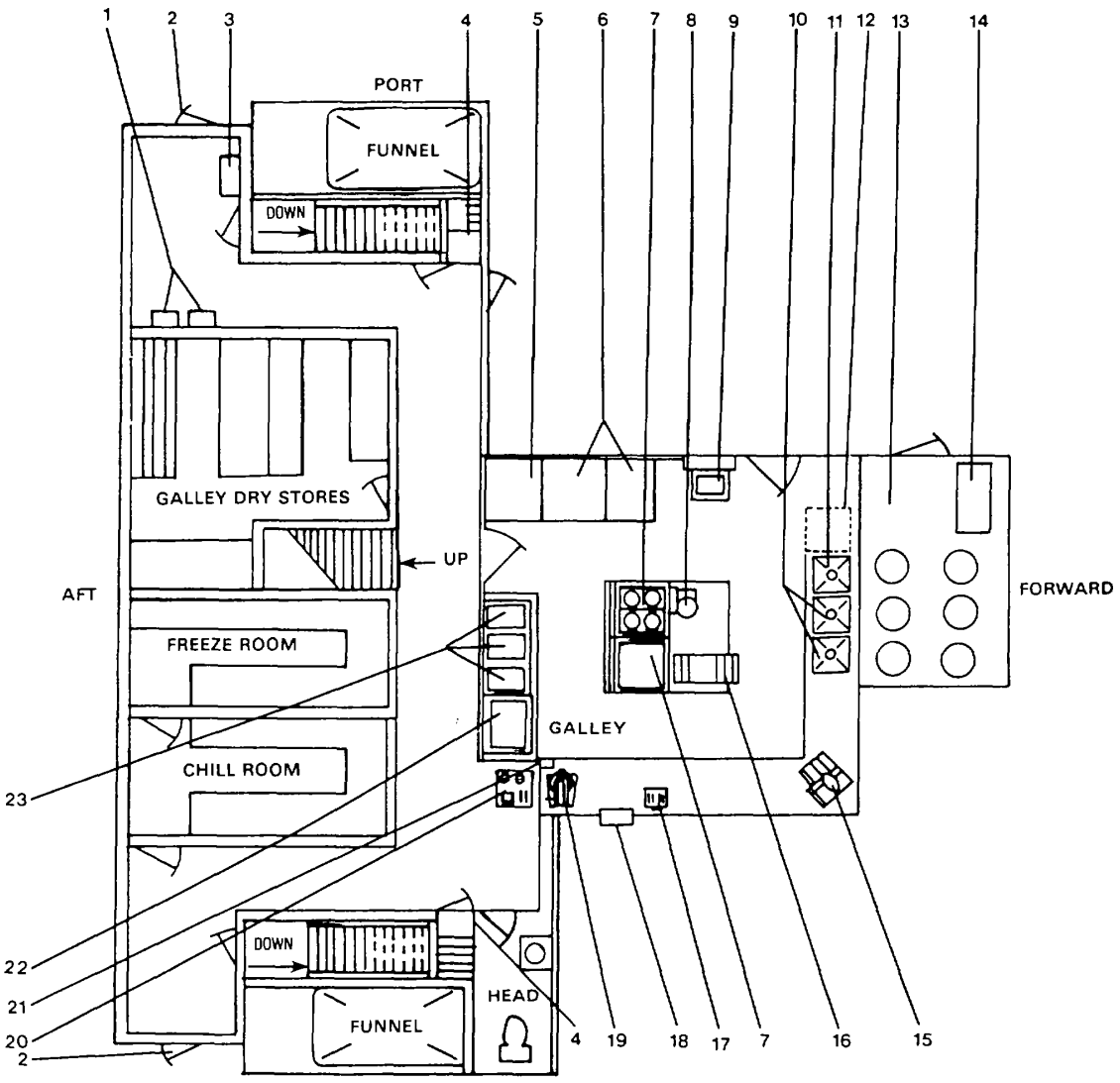
FIGURE 1-8. Masters Quarters.



LEGEND

1. STORES
2. CREW'S MESS AND RECREATION ROOM
3. GALLEY
4. OFFICER'S MESS AND LOUNGE

FIGURE 1-9. Poop Deck.

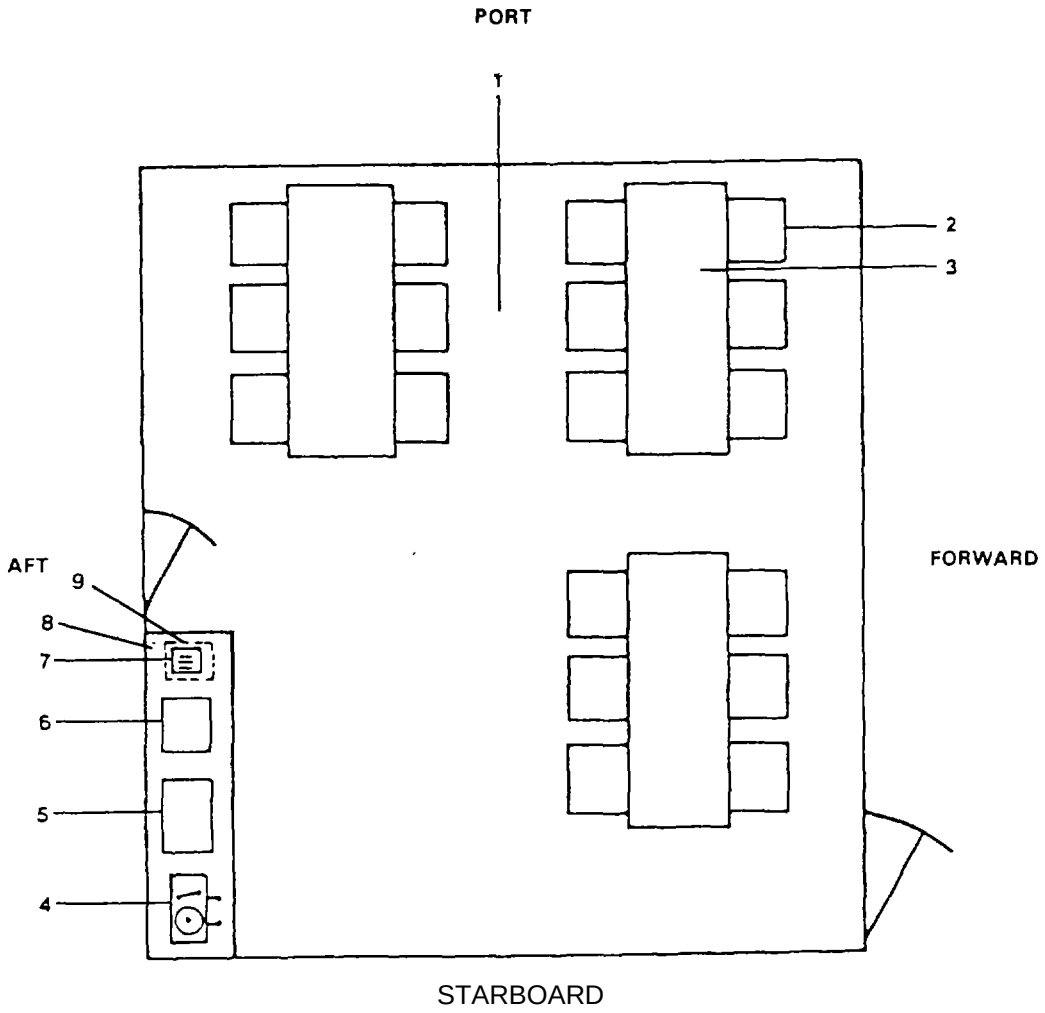


STARBOARD

LEGEND

1. SEARCHLIGHT POWER SUPPLY
2. DOOR TO WEATHER DECK
3. ICE MACHINE
4. STORAGE LOCKER
5. FREEZER
6. REFRIGERATOR
7. RANGE
8. STEAM KETTLE
9. SINK
10. PRE-RINSE SPRAY ASSEMBLY
11. DISPOSER
12. DISHWASHER
13. GARBAGE STOWAGE/CANS
14. WASTE COMPACTOR
15. SLICER
16. FRYER
17. TOASTER
18. PASSING WINDOW
19. MIXER
20. DISH/UTENSIL SERVICE
21. SOUND POWERED TELEPHONE
22. COLD FOOD SERVICE
23. HOT FOOD SERVICE

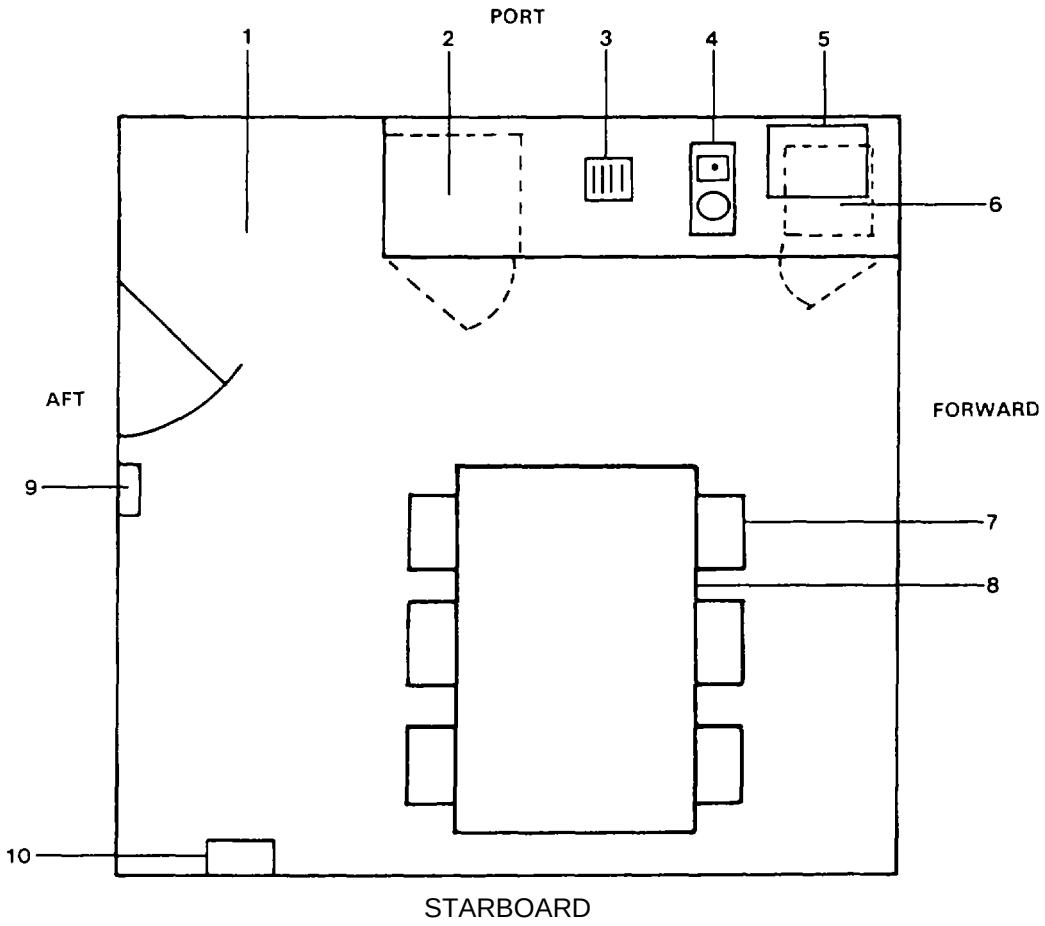
FIGURE 1-10. Galley and Stores.



LEGEND

1. CREW'S MESS
2. CHAIR
3. TABLE
4. COFFEE URN
5. MILK DISPENSER
6. MICROWAVE OVEN
7. TOASTER
8. TABLE WITH STORAGE CABINETS BENEATH
9. REFRIGERATOR

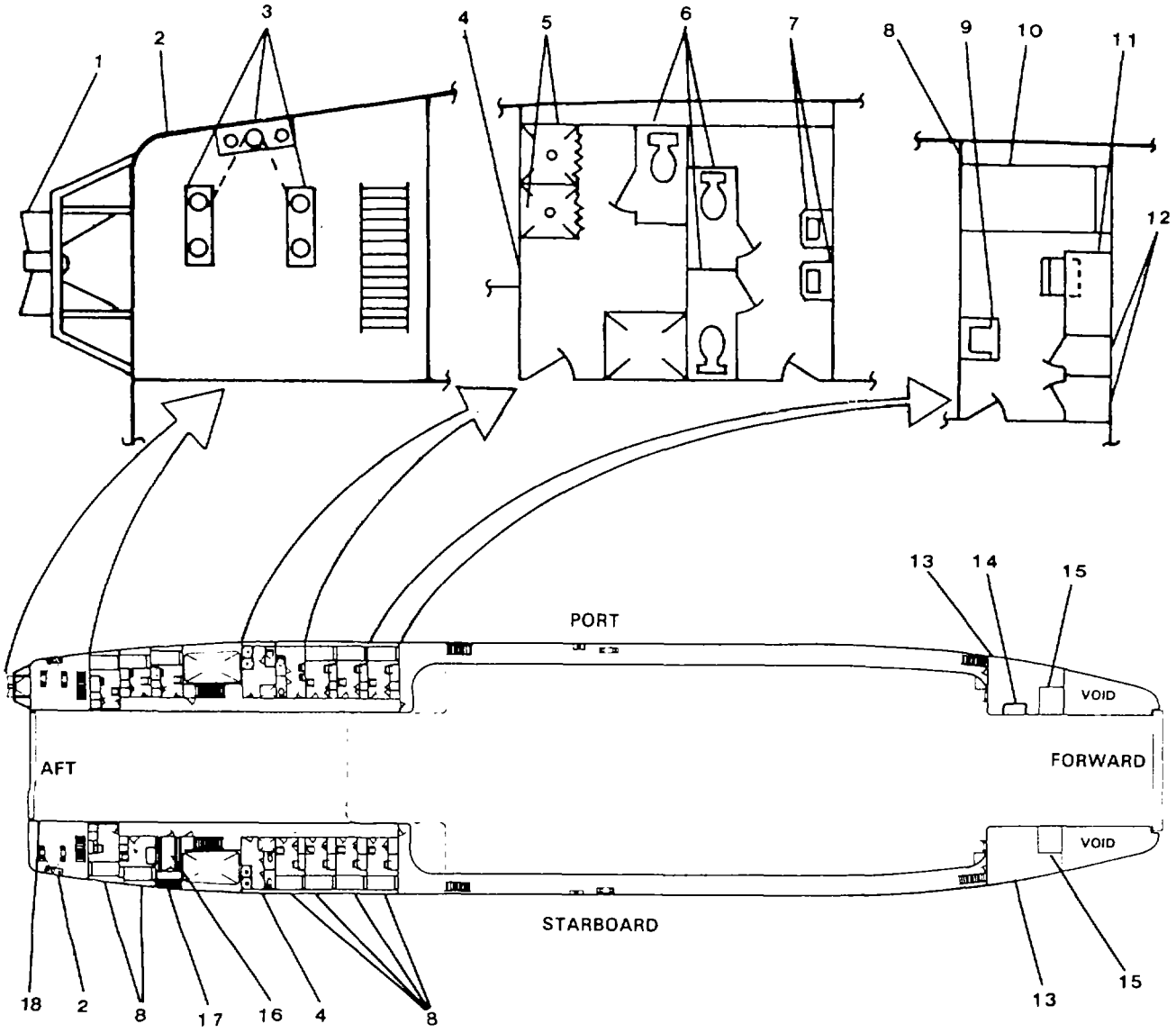
FIGURE 1-11. Crew's Mess and Recreation Room.



LEGEND

1. OFFICER'S MESS
2. REFRIGERATOR (UNDER)
3. TOASTER
4. COFFEE MAKER
5. MICROWAVE OVEN
6. SAFE (UNDER)
7. CHAIR
8. TABLE
9. KEY LOCKER
10. PORTABLE RADIO BATTERY CHARGER AND STORAGE RACK

FIGURE 1-12. Officer's Mess and Lounge.



LEGEND:

1. STERN ANCHOR
2. MOORING STATION
3. MOORING BITS
4. CREW HEAD
5. SHOWER
6. COMMODE
7. SINK
8. CREW QUARTERS
9. CHAIR
10. BUNK BEDS
11. DESK
12. LOCKER
13. BOW RAMP MACHINERY ROOM
14. BOW RAMP WINCH HYDRAULIC PUMPITANK
15. CHAIN LOCKER
16. LINEN LOCKER
17. CLEANING GEAR LOCKER
18. SOUND POWERED TELEPHONE

FIGURE 1-13. Mezzanine Deck.

1-8.3.3.4.4. Crew Head. Crew latrine facilities contain showers (5), commodes (6), and sinks (7). There are two on the port side and one on the starboard side.

1-8.3.3.4.5. Crew Quarters. Two-person living quarters (8), with chair (9), bunk beds (10), desk (11), and locker (12). There are 12 such rooms on the vessel, six port and six starboard.

1-8.3.3.4.6. Bow Ramp Machinery Room. Spaces on port and starboard side (13) containing equipment to raise and lower the bow ramp and operate the bow anchor windlass.

1-8.3.3.4.7. Bow Ramp Winch Hydraulic Pump/Tank. Hydraulic pump and tank (14) for the bow ramp winch, located in the port side Bow Ramp Machinery Room.

1-8.3.3.4.8. Chain Locker. Upper and lower sections (15) of the bow anchor chain storage locker.

1-8.3.3.4.9. Linen Locker. Stowage on starboard side for bed linen (16).

1-8.3.3.4.10. Cleaning Gear Locker. Stowage for mops, brooms, buckets, and cleaning gear (17).

1-8.3.3.4.11. Sound Powered Telephone (18). See paragraph 1-8.1.2.7.

1-8.3.5. Main Deck. FIGURE 1-14, Sheets 1 through 7, show the compartments located on the main deck.

1-8.3.5.1. Main Deck, After Port Side. Sheet 1 of FIGURE 1-14 shows the compartments on the main deck, after port side. These include the Damage Control Locker (1), Boatswain's Storeroom (2), Laundry (3), Physical Fitness Room (4), and Arms Control Room (5).

1-8.3.5.1.1. Damage Control Locker.
Stowage compartment for equipment and materials required to make vessel emergency repairs. A listing of these equipments/tools can be found in Table 1-1.

1-8.3.5.1.2. Boatswain's Storeroom.
Stowage compartment for spare lines, rope, chains, and other deck maintenance equipment.

1-8.3.5.1.3. Laundry. The ship's laundry houses 2 heavy-duty washing machines rated at 2.5 cubic feet, 16 gallon capacity. The laundry also contains two heavy duty dryers rated at 6 cubic foot capacity. Both washer and dryer loads are rated at approximately 14 pounds and will vary according to the fabric density of the material being laundered.

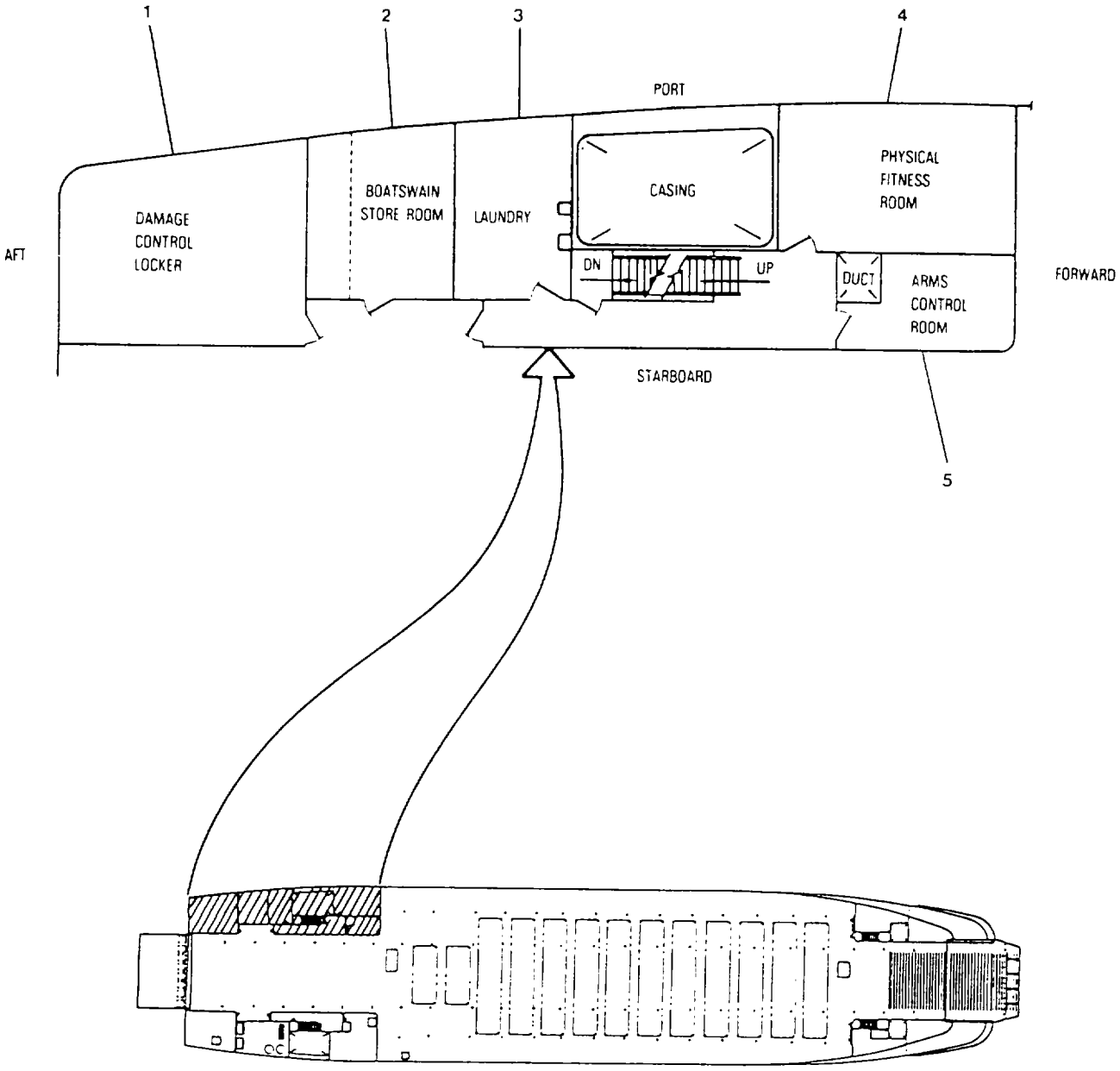
1-8.3.5.1.4. Physical Fitness Room.
Contains space and equipment for crew's exercise.

1-8.3.5.1.5. Arms Control Room. Space to provide stowage and security for weapons and ammunition.

1-8.3.5.2. Main Deck, Forward. Sheet 2 of FIGURE 1-14 shows the compartments on the main deck forward section, and the port (1) and starboard (8) deck storerooms.

1-8.3.5.2.1. Deck Storeroom, Port and Starboard. The Port Deck Storeroom provides a ship's general storage area containing a general alarm bell (2) and the bow thruster lubricating oil tank (3). The Starboard Deck Storeroom provides a general storage area containing a safety storage cabinet (7) and a fire alarm pull station (9). This compartment also houses CO2 (4) and Halon 1301 cylinders (6), pressure switch, thermal switch (5), and associated piping which provide a fire extinguishing capability for the Starboard Deck Storeroom and Bow Thruster Compartment.

1-8.3.5.3. Main Deck, After Starboard.
Sheet 3, FIGURE 1-14, shows the Engineer's Workshop, one of the compartments on the main deck, after starboard



LEGEND

1. DAMAGE CONTROL LOCKER
2. BOATSWAIN STORE ROOM
3. LAUNDRY
4. PHYSICALFITNESS ROOM
5. ARMS CONTROL ROOM

FIGURE 1-14. Main Deck After Port Side (Sheet 1 of 7).

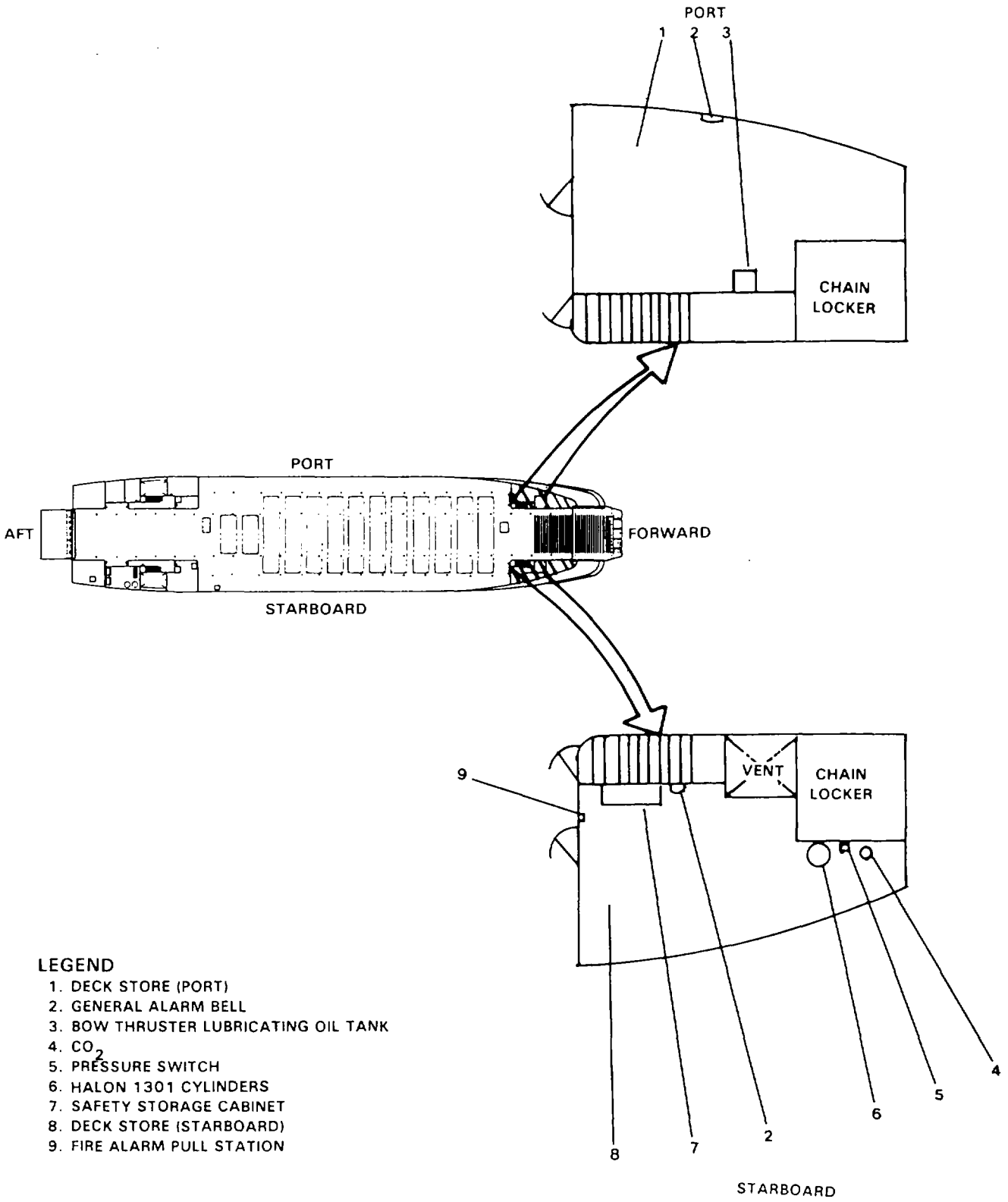
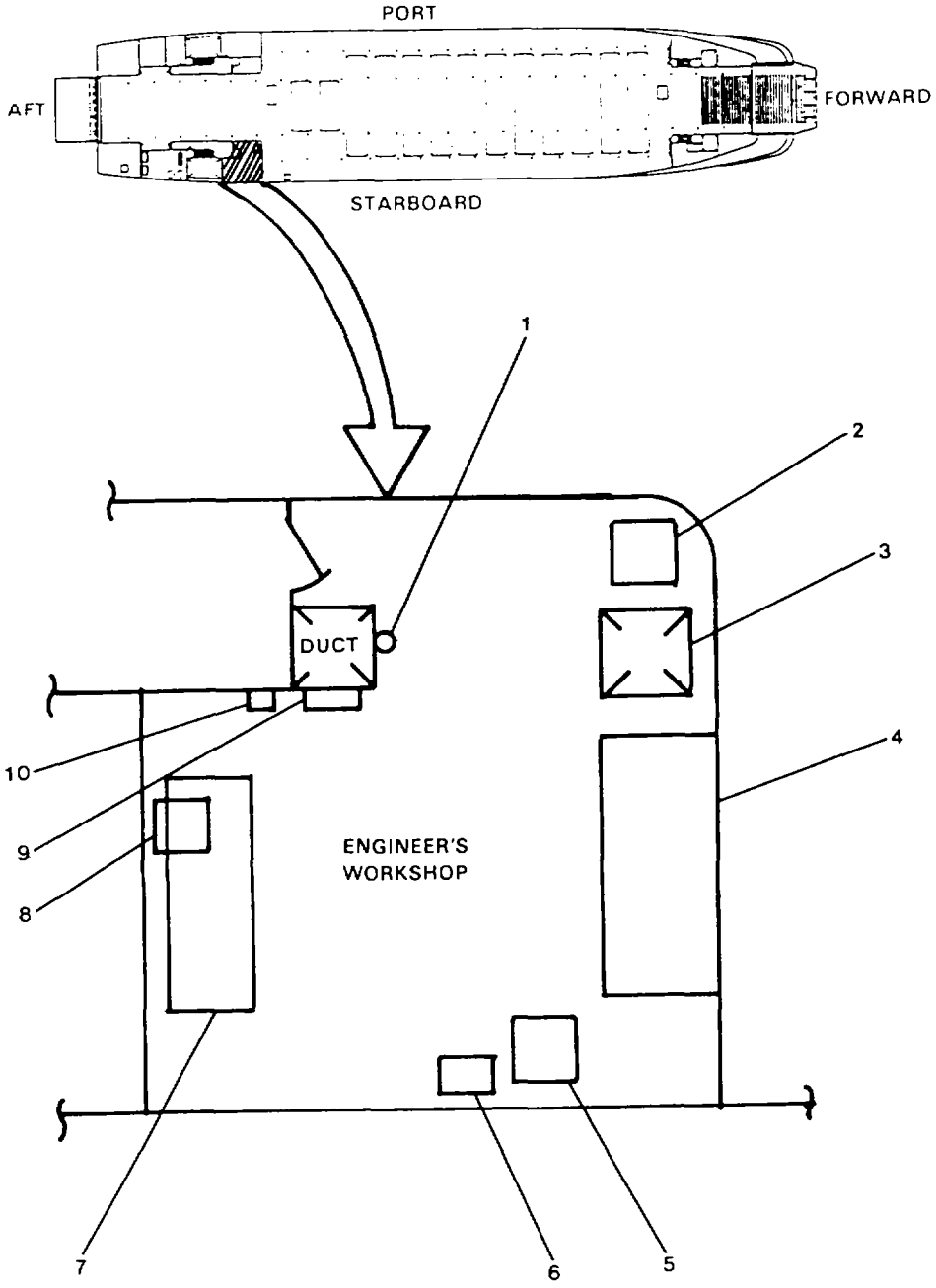


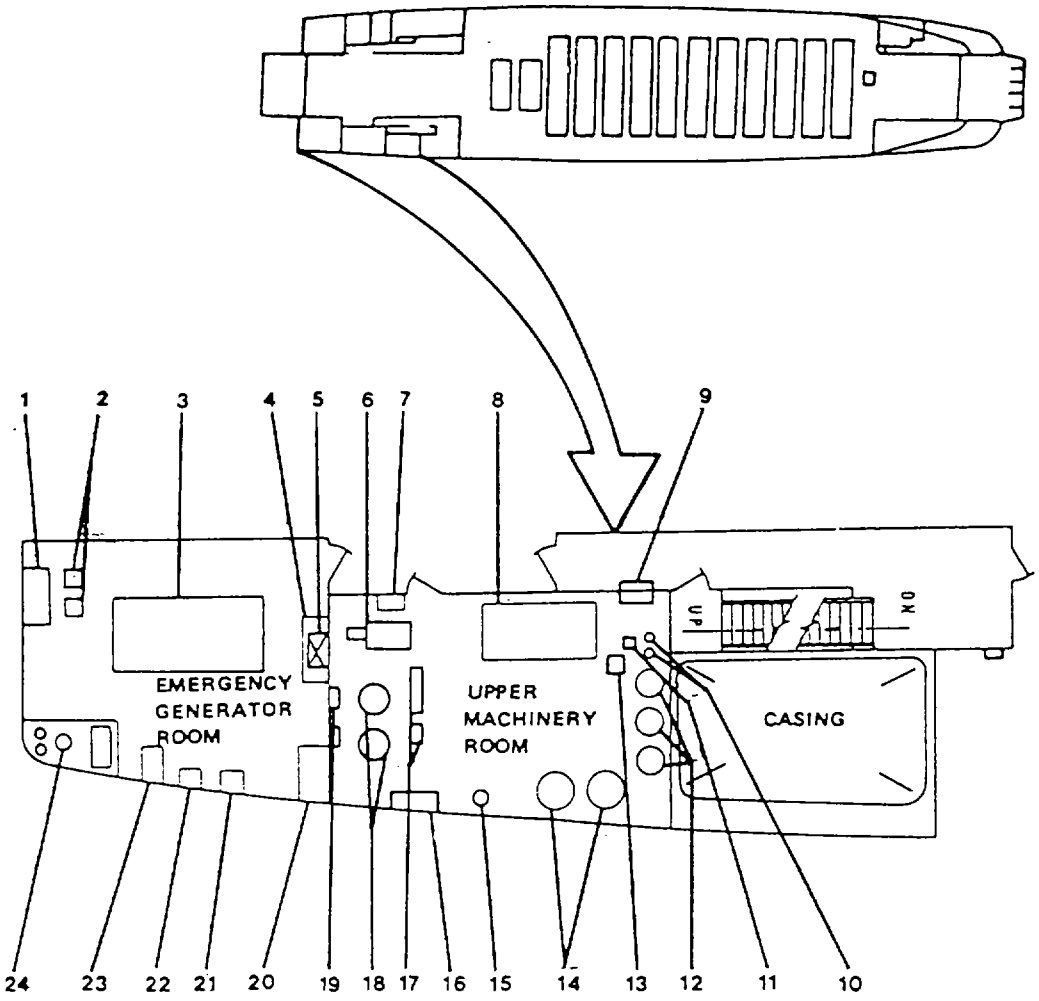
FIGURE 1-14. Main Deck, Forward (Sheet 2 of 7).



LEGEND

1. FIRE EXTINGUISHER
2. ARC WELDING MACHINE
3. ENGINE ROOM HATCH
4. TABLE WITH VISE
5. DRILL PRESS
6. TOOL CHEST
7. LATHE
8. SPACE HEATER
9. GRINDER
10. WATCH CALL/ASSISTANCE NEEDED PANEL

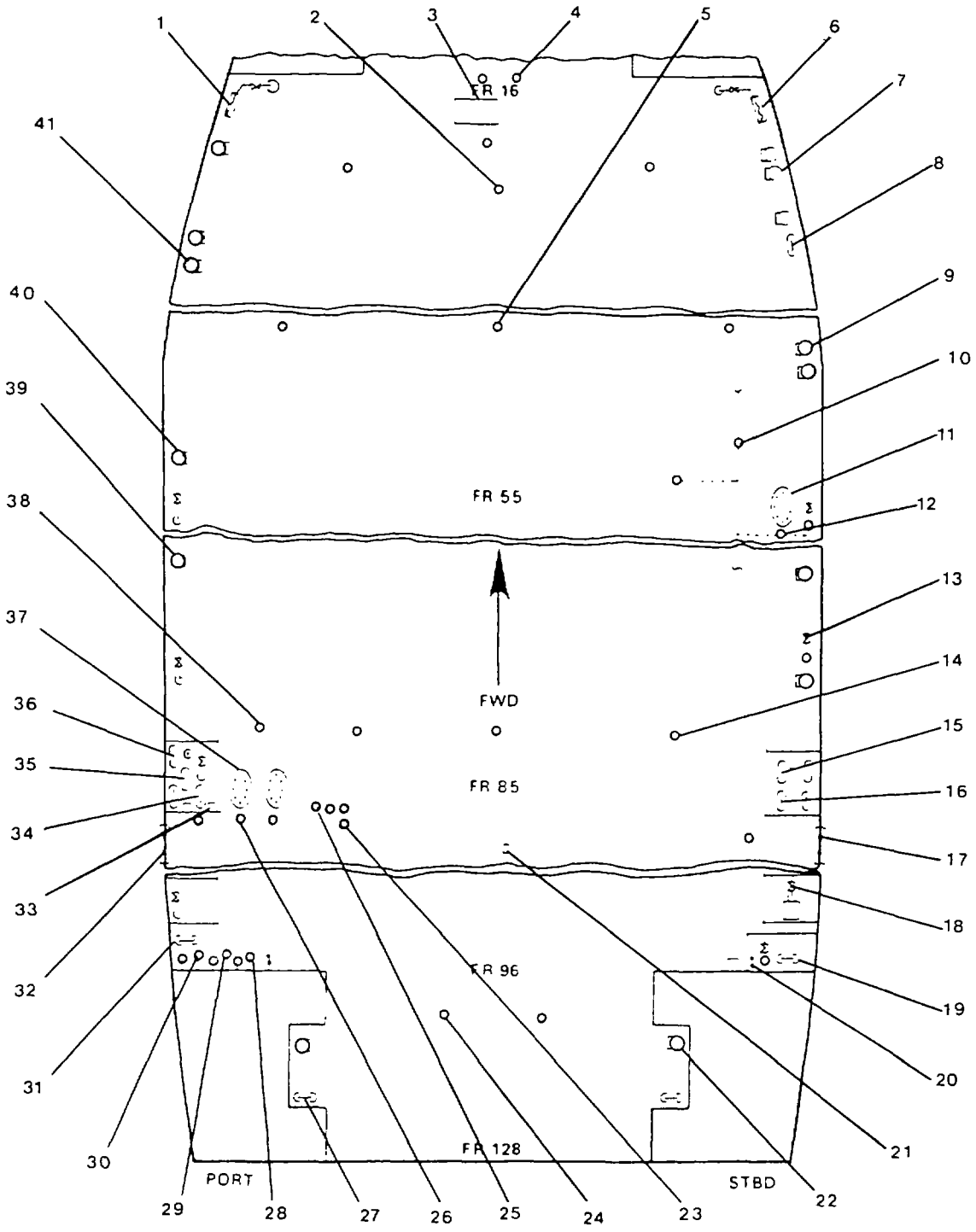
FIGURE 1-14. Main Deck, After Starboard (Sheet 3 of 7).



LEGEND

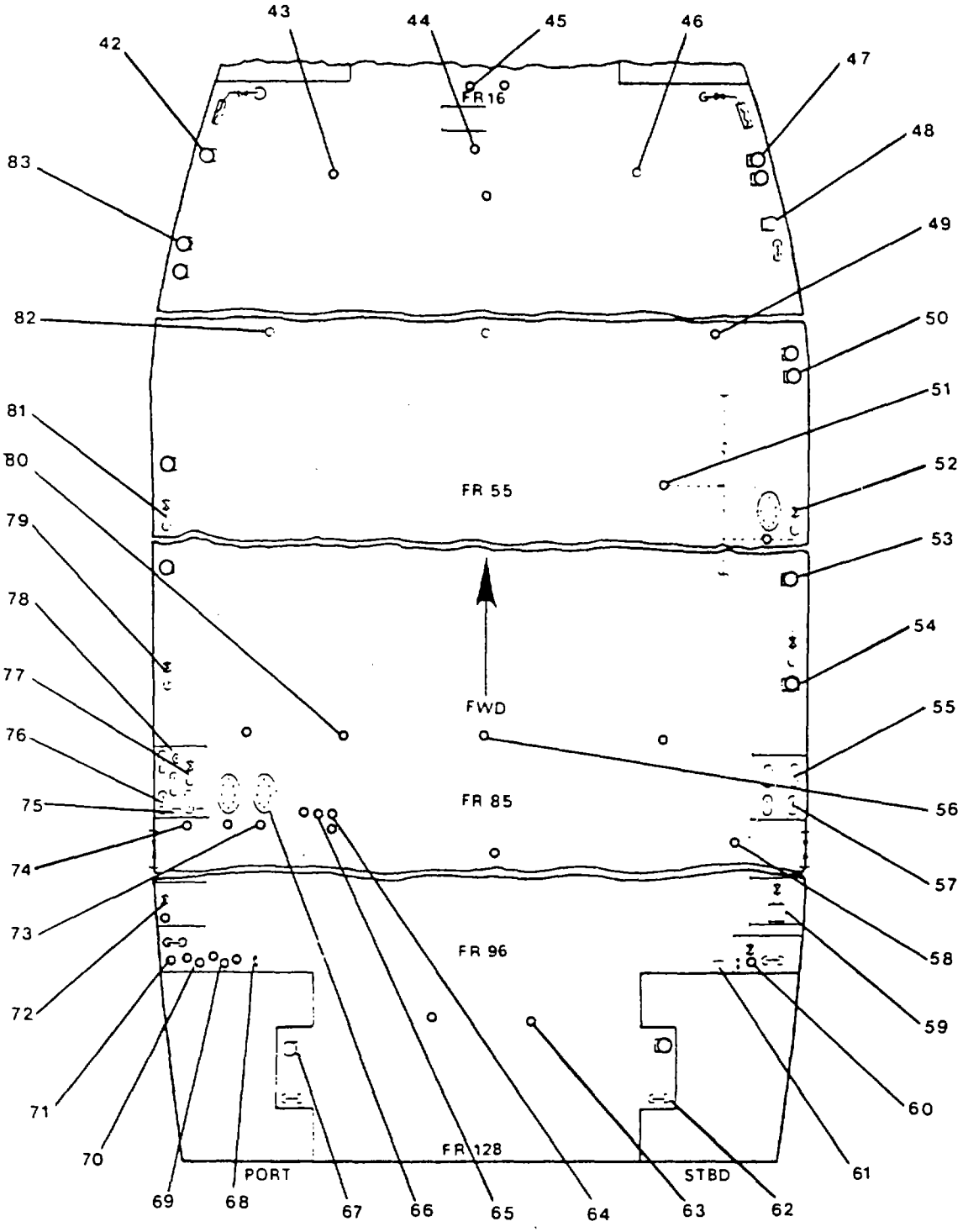
1. BATTERY CHARGER
2. BATTERIES
3. EMERGENCY GENERATOR
4. EMERGENCY GENERATOR SWITCHBOARD
5. SOUND POWERED TELEPHONE
6. CHILL WATER CIRCULATING PUMP
7. CHILL WATER CIRCULATING PUMP CONTROL PANEL
8. AIR CONDITIONING COMPRESSORS
9. LIGHTING PANEL U
10. CO2 CYLINDERS
11. SPACE HEATER CONTROL PANEL
12. HALON CYLINDERS
13. SPACE HEATER
14. HOT WATER HEATERS
15. HOT WATER CIRCULATING PUMP
16. POWER PANEL P2
17. REMOTE CONTROL FOR HYDRAULIC SLIDING DOOR IN ENGINE ROOM
18. WALK-IN FREEZER & COOLER COMPRESSORS
19. WALK-IN FREEZER & COOLER COMPRESSORS JUNCTION BOXES
20. EMERGENCY GENERATOR DAY FUEL TANK
21. STERN ANCHOR WINCH AUXILIARY MOTOR CONTROLLER
22. STERN RAMP WINCH MOTOR CONTROLLER
23. TRANSFORMER
24. HYDRAULIC PUMPS AND TANK FOR STERN ANCHOR WINDLASS/RAMP WINCH

FIGURE 1-14. Main Deck, After Starboard (Sheet 4 of 7).



MAIN DECK ARRANGEMENT

FIGURE 1-14. Main Deck, Cargo (Sheet 5 of 7).



MAIN DECK ARRANGEMENT

FIGURE 1-14. Main Deck, Cargo (Sheet 6 of 7).

LEGEND

1. MAIN DECK FIRE STATION PORT SIDE
2. #1 CENTERLINE BALLAST TANK SOUNDING TUBE
3. REMOVABLE HATCH
4. REACH ROD CONNECTION TO FORE PEAK TANK
   BILGE SUCTION ISOLATION VALVE
5. #1 CENTERLINE VOID TANK SOUNDING TUBE
6. MAIN DECK FIRE STATION STBD SIDE
7. #1 CENTERLINE BALLAST TANK VENT
8. BOW THRUSTER DAY TANK VENT
9. #2 STBD VOID TANK VENT
10. REACH ROD CONNECTION TO FWD MAIN DECK
    FIRE STATION ISOLATION VALVES
11. REMOVABLE MANHOLE COVER
12. REACH ROD CONNECTION TO MAIN DECK FIRE
    STATION STBD SIDE MID SHIPS ISOLATION VALVE
13. POTABLE WATER FILL STATION STBD SIDE
14. #2 STBD VOID TANK SOUNDING TUBE
15. #1 CENTERLINE FUEL OIL STORAGE TANK VENT
16. #2 CENTERLINE FUEL OIL STORAGE TANK VENT
17. MAIN DECK GANGWAY STBD SIDE
18. FIRE MAIN HOSE CONNECTION STBD SIDE
19. SLUDGE TANK VENT
20. FRESH WATER BIBB COCK
21. #1 CENTERLINE FUEL OIL STORAGE TANK SOUNDING TUBE
22. #2 STBD BALLAST TANK VENT
23. REACH ROD CONNECTION TO MAIN ENGINE
    FUEL OIL DAY TANK ISOLATION VALVE
24. #2 PORT BALLAST TANK SOUNDING TUBE
25. REACH ROD CONNECTION TO #1 PORT FUEL OIL
    STORAGE TANK ISOLATION VALVE
26. FUEL OIL SETTLING TANK SOUNDING TUBE
27. STEERING COMPARTMENT VENT
28. LUBE OIL STORAGE TANK VENT
29. GEAR OIL STORAGE TANK VENT
30. LUBE OIL SETTLING TANK VENT
31. HYDRAULIC OIL STORAGE TANK VENT
32. MAIN DECK GANGWAY PORT SIDE
33. #1 FUEL OIL TRANSFER PUMP REMOTE START/
    STOP SWITCH
34. #2 PORT FUEL OIL STORAGE TANK VENT
35. MAIN ENGINE FUEL OIL DAY TANK VENT
36. #1 PORT FUEL OIL STORAGE TANK VENT
37. REMOVABLE MANHOLE COVER
38. #1 PORT FUEL OIL STORAGE TANK SOUNDING
    TUBE
39. PORT POTABLE WATER TANK VENT
40. #2 PORT VOID TANK VENT
41. #1 CENTERLINE VOID TANK VENT
42. #1 PORT BALLAST TANK VENT
43. #1 PORT BALLAST TANK SOUNDING TUBE
44. REACH ROD CONNECTION TO BOW THRUSTER
    DAY TANK FUEL OIL OUTLET VALVE
45. FORE PEAK VOID TANK SOUNDING TUBE
46. #1 STBD BALLAST TANK SOUNDING TUBE
47. #1 STBD BALLAST TANK VENT
48. #1 STBD VOID TANK VENT
49. #1 STBD VOID TANK SOUNDING TUBE
50. #2 CENTERLINE VOID TANK VENT
51. REACH ROD CONNECTION TO MAIN DECK FIRE
    MAIN STATION PORT SIDE MID SHIPS ISOLATION
    VALVE
52. MAIN DECK FIRE STATION STBD SIDE MID SHIPS
53. STBD POTABLE WATER TANK VENT
54. COFFERDAM VENT
55. #1 STBD FUEL OIL STORAGE TANK VENT
56. #2 CENTERLINE VOID TANK SOUNDING TUBE
57. #2 STBD FUEL OIL STORAGE TANK VENT
58. #1 STBD FUEL OIL STORAGE TANK SOUNDING
    TUBE
59. ENGINE ROOM ESCAPE HATCH
60. SLUDGE PUMP DISCHARGE HOSE CONNECTION
61. SLUDGE PUMP REMOTE START/STOP SWITCH
62. STEERING COMPARTMENT VENT
63. #2 STBD BALLAST TANK SOUNDING TUBE
64. REACH ROD CONNECTION TO #1 STBD FUEL OIL
    STORAGE TANK ISOLATION VALVE
65. REACH ROD CONNECTION TO #1 CENTERLINE
    FUEL OIL STORAGE TANK ISOLATION VALVE
66. REMOVABLE MANHOLE COVER
67. #2 PORT BALLAST TANK VENT
68. FRESH WATER BIBB COCK
69. LUBE OIL STORAGE TANK FILL PIPE
70. GEAR OIL STORAGE TANK FILL PIPE
71. HYDRAULIC OIL STORAGE TANK FILL PIPE
72. FIRE MAIN HOSE CONNECTION PORT SIDE
73. MAIN ENGINE FUEL OIL DAY TANK SOUNDING TUBE
74. REACH ROD CONNECTION TO FUEL OIL SETTLING TANK ISOLATION VALVE
75. #2 FUEL OIL TRANSFER PUMP REMOTE START/STOP SWITCH
76. FUEL OIL SETTLING TANK VENT
77. FUELING STATION HOSE CONNECTION
78. MAIN ENGINE FUEL OIL DAY TANK FILL PIPE
79. POTABLE WATER FILL STATION PORT SIDE
80. #2 PORT VOID TANK SOUNDING TUBE
81. MAIN DECK FIRE STATION PORT SIDE MID SHIPS
82. #1 PORT VOID TANK SOUNDING TUBE
83. #1 PORT VOID TANK VENT

FIGURE 1-14. Main Deck. Cargo (Sheet 7 Of 7).

Table 1-1. Equipment/Tools Located in the Damage Control Locker.

Description	Quantity
Ax, Fire, Pickhead, 6 lb.	1
Bar, Wrecking, 30", Size 4, Type 5, Class 1	1
Blades, Hand Hacksaw 12", 24 teeth per inch	2
Blades, Hand Hacksaw 12", 18 teeth per inch	2
Blower, Ventilating, Portable	2
Bolt Cutter	1
Box Tool	1
Breathing Apparatus, Oxygen	2
Canister, Oxygen Generating, Breathing Apparatus	24
Chisel, Cape, Hand	1
Chisel, Cold, Hand	1
Coveralls, Safety, Heat Protection	4
Crowbar, Pinchpoint	1
Damage Control, Shoring, and Plugging Kits	1
Detector Kit, Chemical Agent	2
Detector Kit, Carbon Monoxide Colormetric	2
10 lb. Dry Chemical Fire Extinguisher	10
Eductor, Bilge, 4" (Ejector, Jet)	1
Frame, Hand, Hacksaw	1
Glove Shells, Firemans, Aluminized	4 pairs
Cloves, Inserts	4 pairs
Hammer, Hand, Machinist's Ball Peen, 24 oz.	1
Hammer, Hand, Ships Machinist's, 5 lbs.	1
Hatchet, Half	1
Hood, Firemans, Aluminum	4
Lamp, Flame, Safety	2
Oxygen Alarm, Gas	2
Paper, Chemical Agent Detector	6 boxes
Pliers, Diagonal, Cutting, Plain, Regular Nose 6"	1
Pliers, Lineman's, w/Side Cutters, 8" lg., Plain Handle	1
Pliers, Slip Joint, Straight Nose, 6" lg	1
Pump Unit, Centrifugal, Electric, Submersible	1
Punch, Drive Pin, Extra Long Point 1/8", Point 8" lg.	1
Punch, Drive Pin, Extra Long Point, 1/4", Point 8" lg.	1
Punch, Drive Pin, Extra Long Point, 3/8" Point, 8" lg.	1
Saw, Hand, Crosscut, Straight Back, 26" lg.	1
Screwdriver, Flat Tip, 4" lg, 1/4" Normal Tip Width	1
Screwdriver, Flat Tip, 8" lg, 3/8", Normal Tip Width	1
Shears, General Purpose	1
Tool Kit, Electrical Repair	2
Wrench, Box Adjustable, 8" lg, 1/4 to 1" cap.	1
Wrench, Open End, Adjustable, 9-1/2" to 10-1/2" lg.	1
Wrench, Open End, Adjustable, 11-1/2" to 12-1/2" lg.	1
Wrench, Open End, Adjustable, 5-1/2" to 6-1/2" lg.	1
Wrench, Pipe, Adjustable, Heavy Duty, Aluminum Handle 19"	1
Wrench, Pipe, Adjustable, Heavy Duty, 36" lg., 3-1/2 cap.	1
Wrench, Spanner, For 1" to 3" Diameter Hose	12

side. This space contains equipment used by engineering personnel for ship's equipment repairs and maintenance. Equipment in this space include the arc welding machine (2), table with vise (4), drill press (5), grinder (9), and lathe (7). Also in this space are a watchcall/assistance needed panel (10), fire extinguisher (1), tool chest (6), a space heater, (8) and a watertight hatch (3) to the engine room.

1-8.3.5.4. Main Deck, After Starboard.
Sheet 4, FIGURE 1-14 shows 2 compartments on the main deck, after starboard side. These compartments are the Upper Machinery Room, and the Emergency Generator Room.

1-8.3.5.4.1. Upper Machinery Room.
Located in this space is ship's engineering auxiliary equipment. Included are chilled water circulating pumps (6) and chill water circulating pump control panel (7), air conditioning compressors (8), lighting panel L3 (9), three 550 lb capacity cylinders (12) containing 432 lb of HALON 1301 agent with associated CO2 cylinders (10) for engine room fire extinguishing, space heater (13) and control panel, two 80 gallon hot water heaters (14), hot water circulating pump (15), power panel P2 (16), the remote control for the Hydraulic Sliding Door in the Engine Room (17), and compressors (18) and junction boxes for the galley walkin freezer and cooler (19).

1-8.3.5.4.2. Emergency Generator Room.
In addition to the emergency generator (3), this space contains the emergency generator fuel tank (20), switchboard (4), stern anchor winch auxiliary motor controller (21), stern ramp winch motor controller (22), a transformer (23), hydraulic pumps and tank for the stern anchor windlass/ramp winch (24), batteries (2) and battery charger (1).

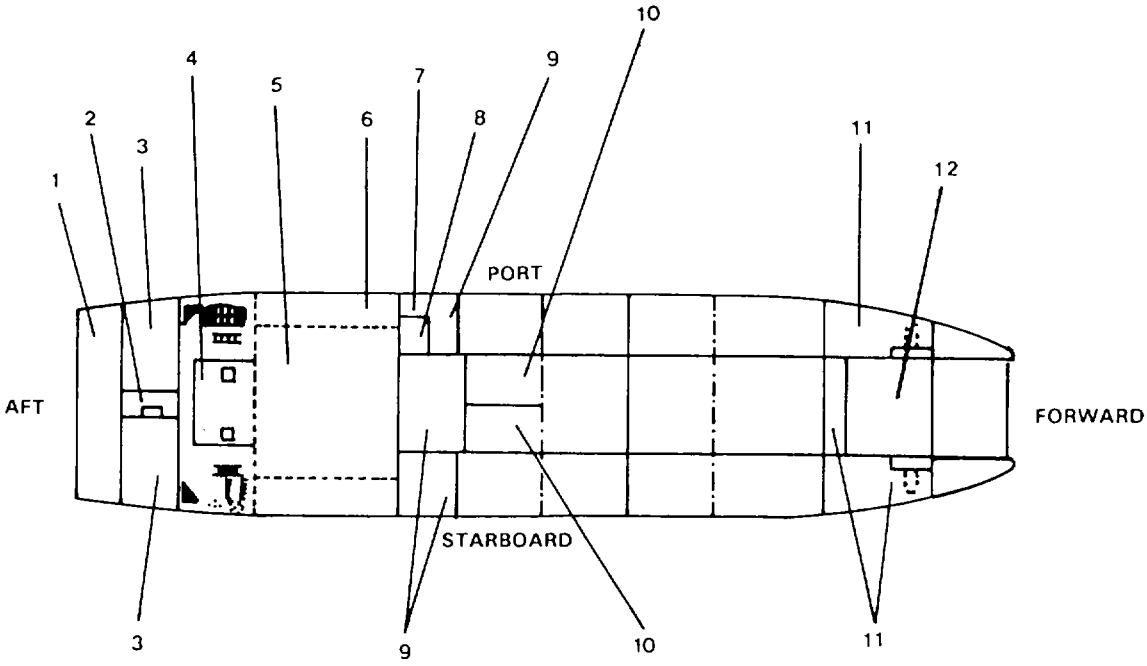
1-8.3.5.5. Main Deck, Cargo. Sheets 5 and 6, FIGURE 1-14 show the items located on the cargo deck.

1-8.3.6. Below Main Deck. The area below the main deck, FIGURE 1-15, includes the following compartments: steering gear compartment (1), passageway to steering compartment (2), engine room (5), engine room control center (4), and the bow thruster compartment (12). Also located below the main deck are: Number 1 Ballast Tank (Port Center and Starboard) (11), Potable Water Tanks (port and starboard) (10), Number 1 Fuel Oil Tank (port, starboard and center) (9), Fuel Oil Settling Tank (7), Fuel Oil Day Tank (8), Number 2 Fuel Oil Tanks (port, starboard, and center) (6), and Number 2 Ballast Tank (port and starboard) (3).

1-8.3.6.1. Steering Gear Compartment.
This compartment, shown in FIGURE 1-16, contains the major equipment associated with the steering system: three rudder stocks each for the port and starboard rudders (1). Hydraulic cylinders control movement of the rudders to steer the ship. Also in this space are a space heater (2) and space heater control panel (3).

1-8.3.6.2. Passageway to Steering Gear Compartment.
This compartment, shown in FIGURE 1-17, provides access from the Engine Room to the Steering Gear Compartment and contains: an Emergency Steering Station (1) and emergency transfer panels (2) which provide emergency operation of the ship's steering system independent of Pilothouse control; an open scale repeater (3) for ship's heading; an emergency fire pump (7) and control panel (4); steering pump hydraulic unit (9) and power panels (8); and a sound powered telephone (6). The hydraulically operated watertight door (5) on the forward bulkhead may be operated from the upper machinery room (close only).

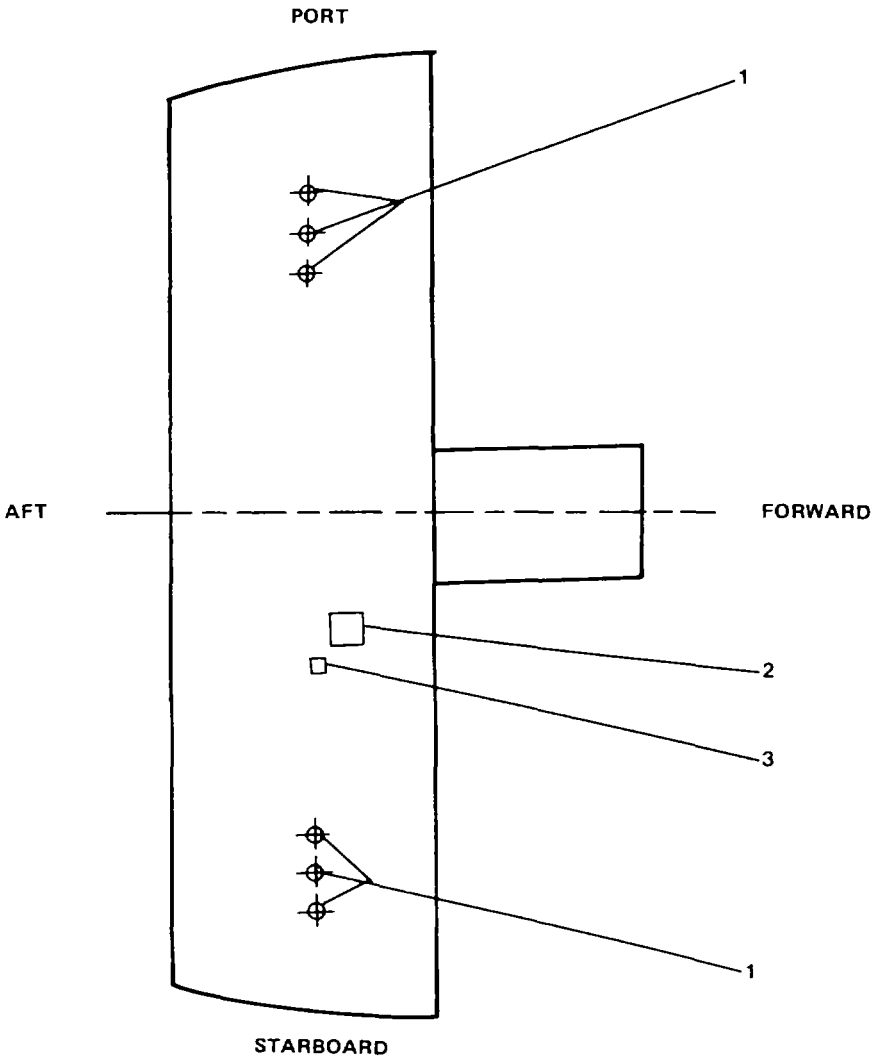
1-8.3.6.3. Engine Room, Port Side.
Major components located on the port side of the engine room are shown in



LEGEND

1. STEERING GEAR COMPARTMENT
2. PASSAGEWAY TO STEERING GEAR COMPARTMENT
3. NUMBER 2 BALLAST TANK (PORT & STARBOARD)
4. ENGINE ROOM CONTROL CENTER
5. ENGINE ROOM
6. NUMBER 2 FUEL OIL TANK (PORT. STARBOARD) BELOW ENGINE ROOM
7. FUEL OIL SETTLING TANK
8. FUEL OIL DAY TANK
9. NUMBER 1 FUEL OIL TANK IPORT, CENTER. STARBOARD)
10. POTABLE WATER TANK IPORT & STARBOARD)
11. NUMBER 1 BALLAST TANK (PORT. CENTER, CENTER STARBOARD)
12. BOW THRUSTER COMPARTMENT

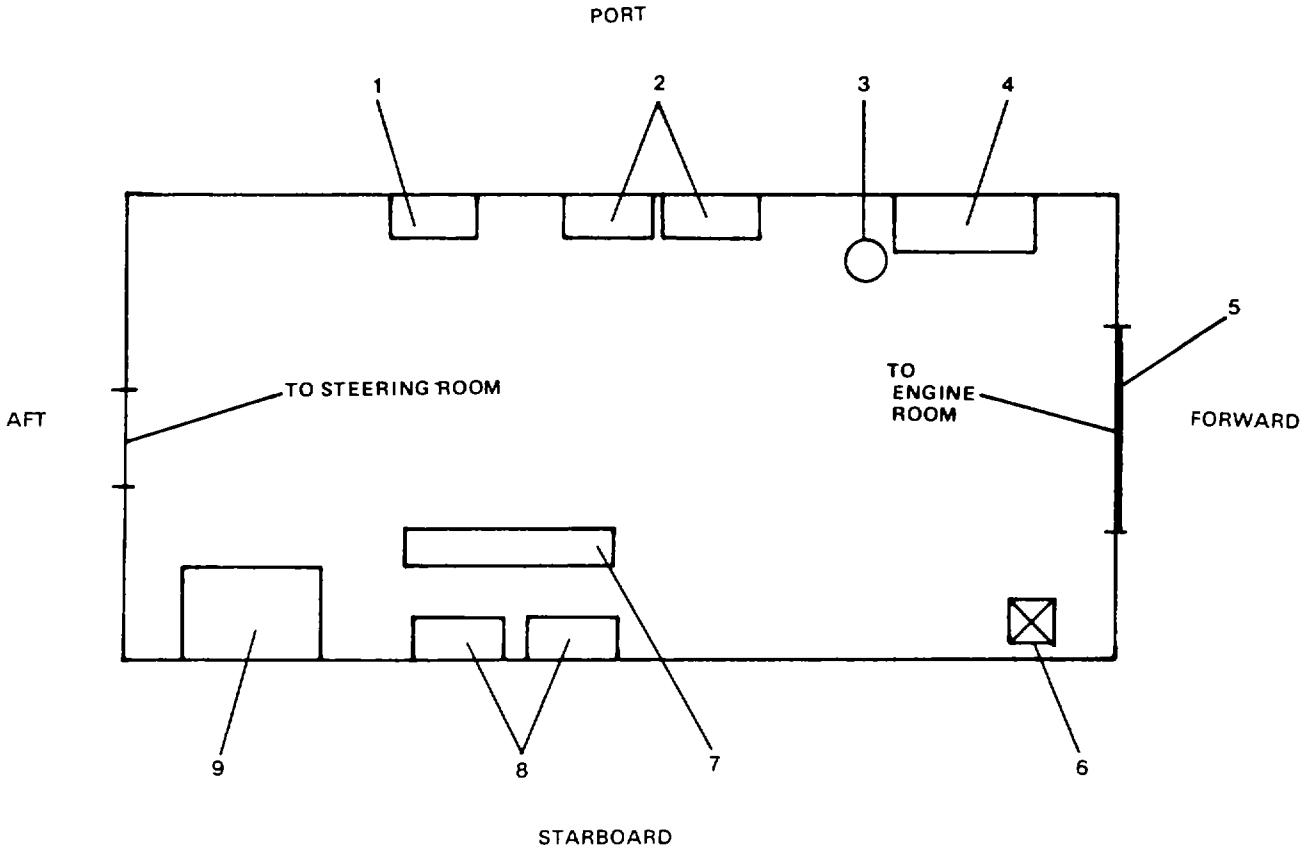
FIGURE 1-15. Below Main Deck.



LEGEND

1. RUDDER STOCKS
2. SPACE HEATER
3. SPACE HEATER POWER PANEL

FIGURE 1-16. Steering Gear Compartment.



LEGEND

1. EMERGENCY STEERING STATION
2. EMERGENCY TRANSFER PANELS
3. OPEN SCALE REPEATER
4. EMERGENCY FIRE PUMP POWER PANEL
5. HYDRAULICALLY OPERATED WATERTIGHT DOOR
6. SOUND POWERED TELEPHONE
7. EMERGENCY FIRE PUMP
8. STEERING PUMP POWER PANELS
9. STEERING PUMP HYDRAULIC UNIT

FIGURE 1-17. Passageway to Steering Gear Compartment.

FIGURE 1-18, Sheet 1 and are described in the following paragraphs.

1-8.3.6.3.1 Hydraulic Oil Storage Tank. Provides storage for hydraulic oil.

1-8.3.6.3.2. Lubricating Oil Transfer Pump. Transfers lubrication oil to the engine.

1-8.3.6.3.3. Gear Oil Cooling Pump. Pumps water through heat exchanger to cool reduction gear hydraulic oil.

1-8.3.6.3.4. Main Engine and Generator Engine Lubricating Oil Storage Tank. Provides storage for engine lubricating oil.

1-8.3.6.3.5. Gear Lubricating Oil Storage Tank. Provides storage for gear lubricating oil.

1-8.3.6.3.6. Lubricating Oil Setting Tank. Provides a tank for settling out impurities contained in lubricating oil.

1-8.3.6.3.7. Work Bench. Provides work space and a base for the grinder and vise.

1-8.3.6.3.8. Grinder. JBG-6A bench grinder attached to the work bench.

1-8.3.6.6.9. Vise. Located near the forward edge of the work bench.

1-8.3.6.3.10. Utility Air Outlet. Provides air for pneumatic tools.

1-8.3.6.3.11. Parts Cleaner. Cleaning solvent and circulating pump to clean parts while performing repairs.

1-8.3.6.3.12. Lubricating Oil Purifier Control Panel. Provides ON/OFF electrical control for the lubricating oil purifier.

1-8.3.6.3.13. No. 2 Fuel Oil Purifier Control Panel. Provides ON/OFF electrical control for the No. 2 fuel oil purifier.

1-8.3.6.3.14. No. 1 Fuel Oil Purifier Control Panel. Provides ON/OFF electrical control for the No. 1 fuel oil purifier.

1-8.3.6.3.15. Lubricating Oil Purifier. Purifies lubricating oil for all diesel engines.

1-8.3.6.3.16. No. 2 Fuel Oil Purifier. Removes contaminants from the diesel fuel oil.

1-8.3.6.3.17. No. 1 Fuel Oil Purifier. Removes contaminants from the diesel fuel oil.

1-8.3.6.3.18. Fuel Oil Settling Tank.
Fuel oil tank provided to allow water and other contaminants to settle to the bottom.

1-8.3.6.3.19. Main Engine and Ship Service Diesel Generator Fuel Oil Day Tank. Feed tank for main engines and ship service diesel generators.

1-8.3.6.3.20. Fuel Oil Transfer Pump.
One of two rotary pumps normally used to transfer fuel oil from the fuel oil settling tank or one of the six fuel oil storage tanks to either: (1) a day tank that services the main engines and ship's service diesel generators; (2) a day tank that services the bow thruster; and/or (3) a third day tank that services the emergency diesel generator.

1-8.3.6.3.21. Port Main Engine Circulating Pump Control Panel. Provides ON/OFF electrical control for the port main engine circulating pump.

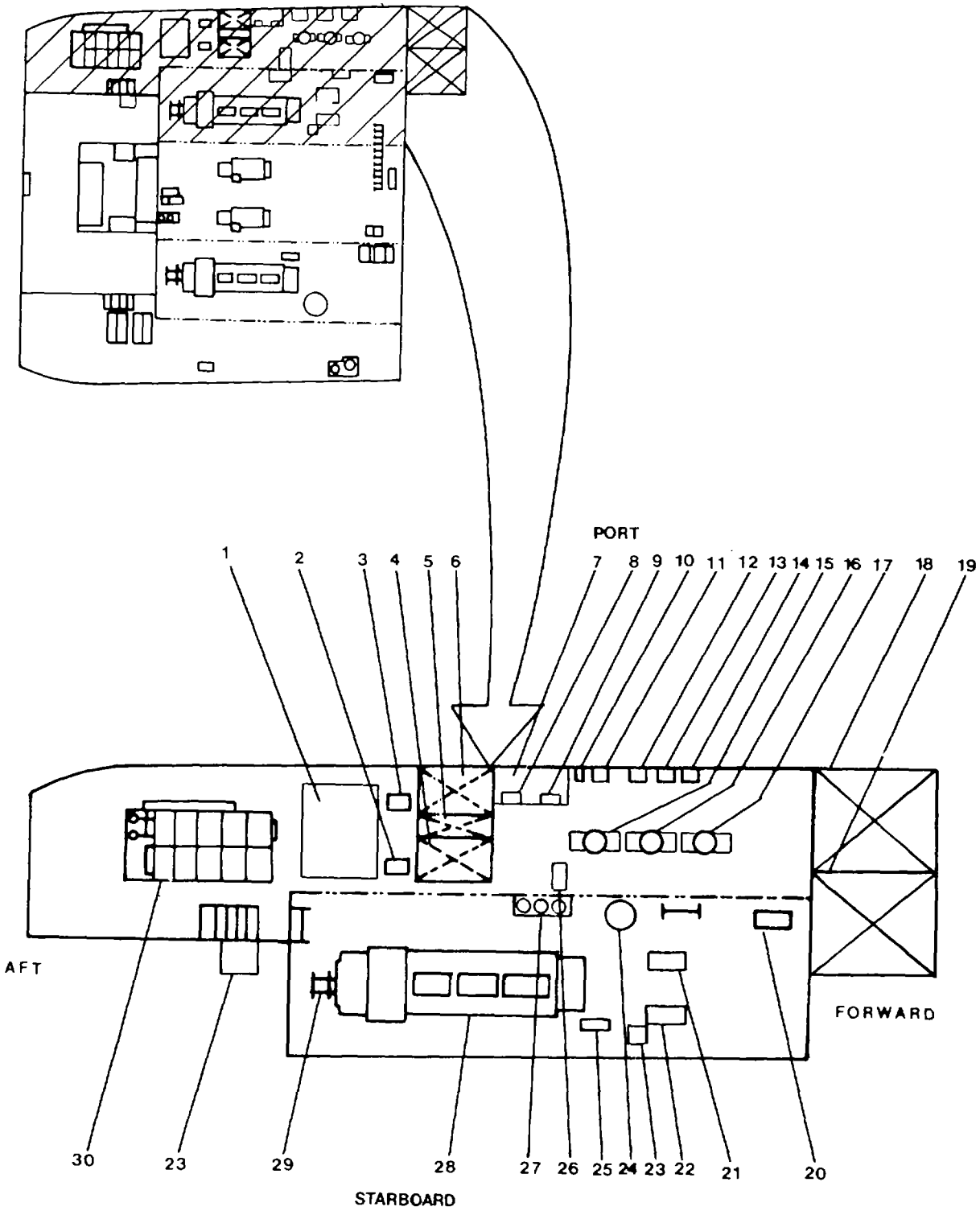


FIGURE 1-18. Engine Room Port Side (Sheet 1 of 6).

LEGEND

1. HYDRAULIC OIL STORAGE.
2. LUBRICATING OIL TRANSFER PUMP.
3. GEAR OIL COOLING PUMP.
4. MAIN ENGINE AND GENERATOR ENGINE. LUBRICATING OIL STORAGE TANK.
5. GEAR LUBRICATING OIL STORAGE TANK.
6. LUBRICATING OIL SETTLING TANK.
7. WORK BENCH.
8. GRINDER.
9. VISE.
10. UTILITY AIR OUTLET.
11. PARTS CLEANER.
12. LUBRICATING OIL PURIFIER CONTROL. PANEL.
13. NO. 2 FUEL OIL PURIFIER CONTROL PANEL.
14. NO. 1 FUEL OIL PURIFIER CONTROL PANEL.
15. LUBRICATING OIL PURIFIER.
16. NO. 2 FUEL OIL PURIFIER.
17. NO. 1 FUEL OIL PURIFIER.
18. FUEL OIL SETTLING TANK.
19. MAIN ENGINE AND SHIP SERVICE DIESEL. GENERATOR FUEL OIL DAY TANK.
20. FUEL OIL TRANSFER PUMP.
21. PORT MAIN ENGINE CIRCULATING PUMP. CONTROL PANEL.
22. PORT MAIN ENGINE SUMP HEATER. CONTROL PANEL.
23. SPACE HEATER.
24. PORT MAIN ENGINE LUBRICATING OIL. FILTER.
25. FUEL OIL PRIMING PUMP.
26. PORT MAIN ENGINE PRE-LUBRICATION OIL. PUMP.
27. PORT MAIN ENGINE FUEL FILTER.
28. PORT MAIN ENGINE.
29. REDUCTION GEAR.
30. MARINE SANITATION DEVICE

FIGURE 1-18. Engine Room (Sheet 2 of 6).

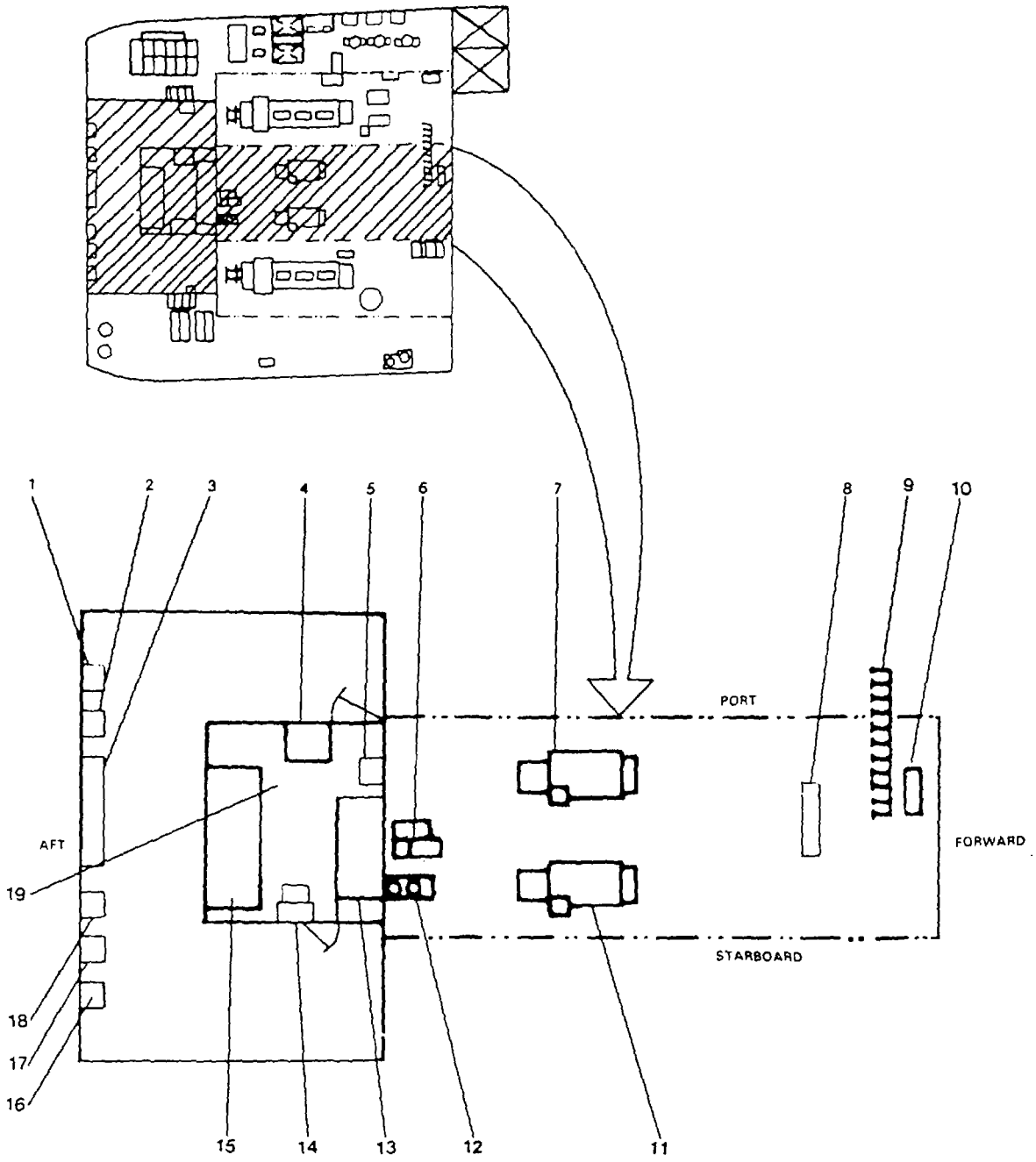


FIGURE 1-18. Engine Room Center (Sheet 3 of 6).

LEGEND

1. ENGINE ROOM LIGHTING PANEL
2. ENGINE ROOM SPACE HEATERS POWER PANEL
3. HYDRAULIC WATERTIGHT DOOR
4. SWITCHBOARD
5. SOUND POWERED TELEPHONE
6. OILY WATER SEPARATOR
7. PORT SHIP SERVICE DIESEL GENERATOR
8. CLINOMETER (HEEL)
9. BILGE MANIFOLD
10. BILGE PUMP
11. STARBOARD SHIP SERVICE DIESEL GENERATOR
12. SLUDGE PUMP
13. ENGINE ROOM CONSOLE
14. CONTROL ROOM AIR CONDITIONER
15. MOTOR CONTROL CENTER
16. 30 KVA TRANSFORMER
17. 75 KVA TRANSFORMER
18. 112½ KVA TRANSFORMER
19. ENGINE CONTROL ROOM

FFIGURE 1-18. Engine Room (Sheet 4 of 6).

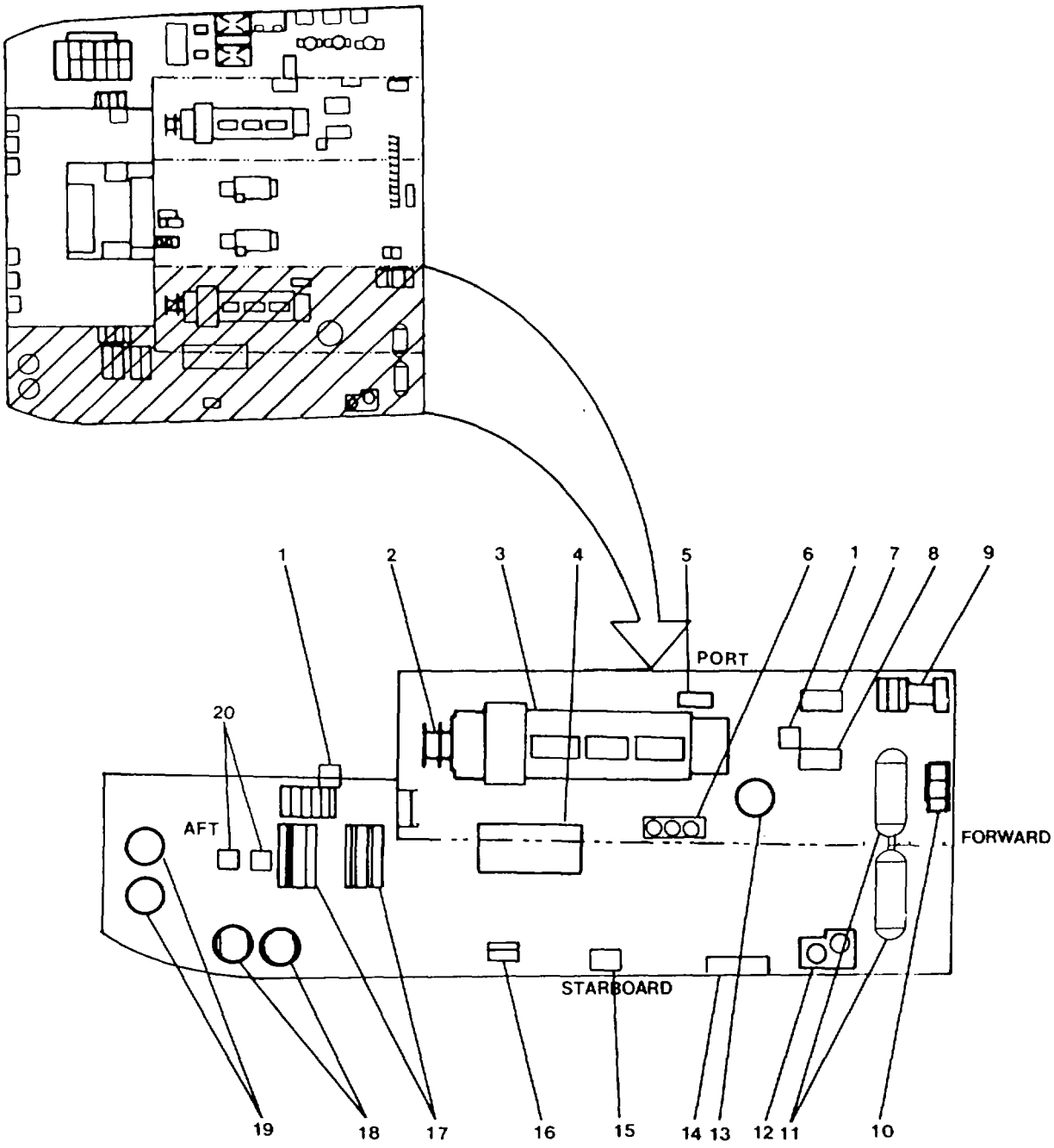


FIGURE 1-18. Engine Room Starboard Side (Sheet 5 of 6).

LEGEND

1. SPACE HEATER
2. REDUCTION GEAR
3. STARBOARD MAIN ENGINE
4. STORAGE BIN
5. STARBOARD MAIN ENGINE PRE-LUBRICATION OIL PUMP
6. STARBOARD MAIN ENGINE FUEL FILTER
7. STARBOARD MAIN ENGINE SUMP HEATER CONTROL PANEL
8. STARBOARD MAIN ENGINE CIRCULATING PUMP CONTROL PANEL
9. BALLAST PUMP
10. FIRE/BILGE PUMP
11. AIR RECEIVERS
12. AIR COMPRESSORS
13. STARBOARD MAIN ENGINE LUBRICATING OIL FILTER
14. CLINOMETER {TRIM)
15. GEAR OIL COOLING PUMP
16. SEAWATER CONDENSER PUMP
17. DESALINATION PLANT
18. BROMINATION SYSTEM
19. POTABLE WATER PRESSURE SET
20. DESALINATION PLANT FEED PUMP/MOTORS

FIGURE 1-18. Engine Room (Sheet 6 of 6).

1-8.3.6.3.22. Port Main Engine Sump Heater Control Panel. Provides ON/OFF electrical control for the port main engine sump heater.

1-8.3.6.3.23. Space Heater. Provides heated air for personnel comfort.

1-8.3.6.3.24. Port Main Engine Lubricating Oil Filter. Filters lubricating oil for the port main engine.

1-8.3.6.3.25. Fuel Oil Priming Pump. Used to flood the main engine fuel oil system for starting.

1-8.3.6.3.26. Port Main Engine Pre-Lubrication Oil Pump. Pumps oil to the port main engine for pre-lubrication.

1-8.3.6.3.27. Port Main Engine Fuel Filter. Filters diesel fuel oil for the port main engine.

1-8.3.6.3.28. Port Main Engine. One of two 16 cylinder, direct injection turbo aftercooled (DITA) diesel engines.

1-8.3.6.3.29. Reduction Gear. Transfers power from the port main engine to the port propeller shaft with a 3.5 to 1 ratio, and is reversible.

1-8.3.6.3.30. Marine Sanitation Device. The Red Fox Type II sewage treatment equipment is a biological aerobic (bacteria and air) system. Liquid waste and solid waste are removed from the water being treated by bacteria naturally contained in the sewage.

1-8.3.6.4. Engine Room, Center. Major components in and around the center section of the engine room are shown in FIGURE 1-18, Sheet 3, and are described in the following paragraphs.

1-8.3.6.4.1. Engine Room Lighting Panel. Provides electrical power distribution to lighting, receptacles, and various other equipment and devices in the engine room.

1-8.3.6.4.2. Engine Room Space Heaters Power Panel. Provides electrical power distribution to space heaters located in the engine room, steering gear room, damage control locker, physical fitness room, boatswain storeroom, arms control room, and the laundry room.

1-8.3.6.4.3. Hydraulic Watertight Door. Hydraulic operated sliding door to provide isolation for the engine room in the event of fire or flooding. It can be operated manually from local positions on each side of the bulkhead and from a remote position (close only) located in the Upper Machinery Room on the main deck.

1-8.3.6.4.4. Switchboard. The main switchboard includes generator sections for control, paralleling, and power distribution from both 440 and 120 volts ac.

1-8.3.6.4.5. Sound Powered Telephone. For interior communications within the vessel.

1-8.3.6.4.6. Oily Water Separator. Removes oil from bilge water as a pollution safeguard.

1-8.3.6.4.7. Port Ship Service Diesel Generator. One of two 6 cylinder DITA diesel engine driven generators, each of which supplies 250 kW of electrical power to the vessel. This generator is started by an electric motor.

1-8.3.6.4.8. Clinometer (Heel). A device (similar to a carpenter's level) which indicates, by means of a bubble in a tube of liquid, the amount of ship's roll or heel.

1-8.3.6.4.9. Bilge Manifold. A large manifold pipe with valves to the bilge areas.

1-8.3.6.4.10. Bilge Pump. Removes water from bilge.

1-8.3.6.4.11. Starboard Ship Service Diesel Generator. Same as the port ship service diesel generator except started by an air motor.

1-8.3.6.4.12. Sludge Pump. Pumps waste oil from the sludge tank below it to an international hose connection on the main deck, starboard side for convenient disposal.

1-8.3.6.4.13. Engine Room Console. Centralized location for throttle control, engine indicators, and gauges for main propulsion system.

1-8.3.6.4.14. Control Room Air Conditioning Unit. Independent air conditioning unit for engine room control center.

1-8.3.6.4.15. Motor Control Center. The motor control center is located in the engine control room and houses vital machinery motor controllers and their indicators in a central location for ease of operation and monitoring.

1-8.3.6.4.16. 30 kVA Transformer. Converts 460 volts electrical power to 230 volts for use by the main engine sump heaters.

1-8.3.6.4.17. 75 kVA Transformer. 208/120 volts for distribution by the galley and mess deck power panel.

1-8.3.6.4.18. 1121 kVA Transformer. Converts 460 volts electrical power to 208/120 volts for lighting distribution panels in the engine room, on the main deck, officer's deck, and in the pilot house.

1-8.3.6.4.19. Engine Room Control Center. Compartment housing the engine room console (ERC), main switchboard, and the engine room motor control panel.

1-8.3.6.5. Engine Room, Starboard Side. Major components located on the starboard side of the engine room are shown in FIGURE 1-18, Sheet 5, and are described in the following paragraphs.

1-8.3.6.5.1. Space Heater. Provides heated air for personnel comfort.

1-8.3.6.5.2. Reduction Gear. Transfers power from the starboard main engine to the starboard propeller shaft with a 3.5 to 1 ratio, and is reversible.

1-8.3.6.5.3. Starboard Main Engine. One of two 16 cylinder, direct injection turbo aftercooled (DITA) diesel engines.

1-8.3.6.5.4. Storage Bin. Compartmentized storage cabinet for spare parts.

1-8.3.6.5.5. Starboard Main Engine Pre-Lubrication Oil Pump. Pumps oil to the starboard main engine for prelubrication.

1-8.3.6.5.6. Starboard Main Engine Fuel Filter. Filters diesel fuel oil for the starboard main engine.

1-8.3.6.5.7. Starboard Main Engine Sump Heater Control Panel. Provides ON/OFF electrical control for the starboard main engine sump heater.

1-8.3.6.5.8. Starboard Main Engine Circulating Pump Control Panel. Provides ON/OFF electrical control for the starboard main engine circulating pump.

1-8.3.6.5.9. Ballast Pump. Pumps sea water to ballast tanks for stability.

1-8.3.6.5.10. Fire/Bilge Pump. Supplies pressure for fire system.

1-8.3.6.5.11. Air Receivers. Air tanks for storage of compressed air for the compressed air system.

1-8.3.6.5.12. Air Compressors. Source for the compressed air system.

1-8.3.6.5.13. Starboard Main Engine Lubricating Oil Filter. Filters lubricating oil for the starboard main engine.

1-8.3.6.5.14. Clinometer (Trim). Same as clinometer (heel), except that it indicates the degree of ship's pitch or trim.

1-8.3.6.5.15. Gear Oil Cooling Pump.
Pumps water through heat exchanger to cool reduction gear hydraulic oil.

1-8.3.6.5.16. Seawater Condenser Pump.
Pump seawater for the chill water consenser of the air conditioning system.

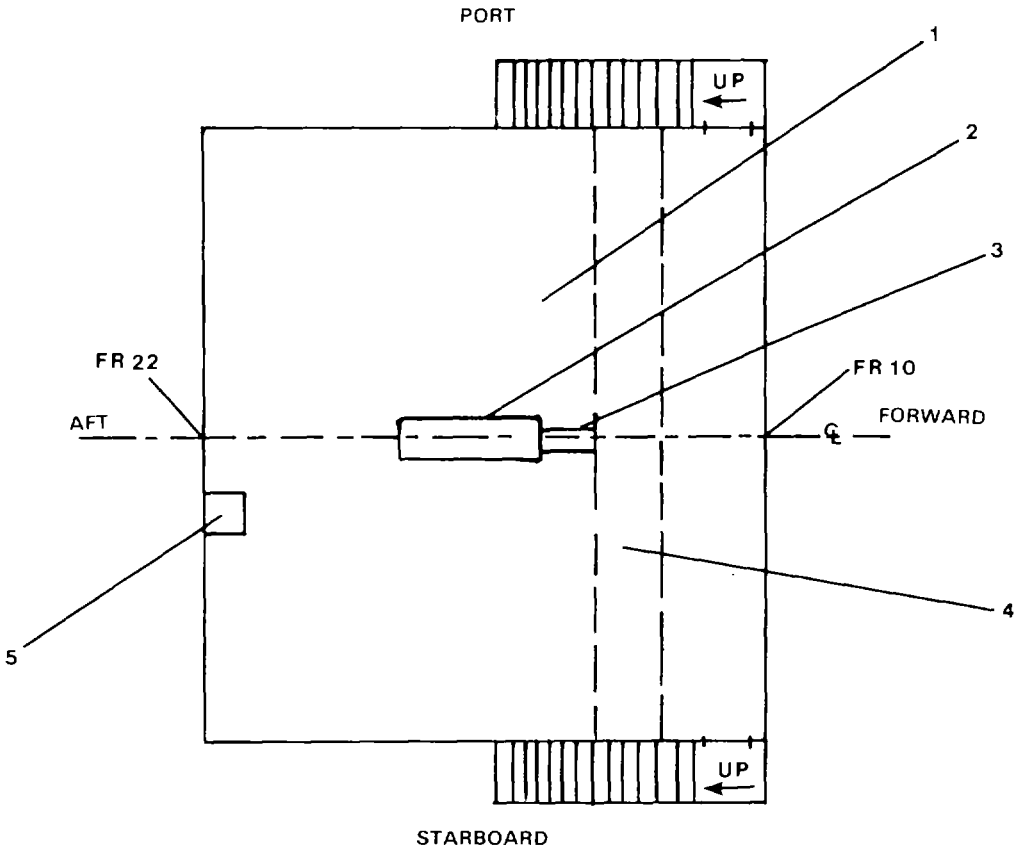
1-8.3.6.5.17. Desalination Plant. Converts sea water to fresh water at a flow rate of 1000 gallons per day.

1-8.3.6.5.18. Bromination System. Automatic proportioning bromine feeder which disinfects water as it is being transferred from the desalination plant to storage tanks.

1-8.3.6.5.19. Potable Water Pressure Set. Provides pressure for the potable water system.

1-8.3.6.5.20. Desalination Plant Feed Pump/Motors. Supplies feed water to the desalination plants.

1-8.3.6.6. Bow Thruster Compartment. FIGURE 1-19 (1) shows the Bow Thruster Compartment and major equipments. Included in this space are the Bow Thruster unit (3), used for close quarter maneuvering; the diesel engine (2) for the bow thruster; the day fuel tank (5) to supply diesel fuel for the engine; and the bow thruster tunnel (4).



LEGEND

1. BOW THRUSTER COMPARTMENT
2. BOW THRUSTER ENGINE
3. BOW THRUSTER
4. BOW THRUSTER TUNNEL
5. BOW THRUSTER ENGINE DAY FUEL TANK

FIGURE 1-19. Bow Thruster Compartment.

1-9. EQUIPMENT DATA.

Length Overall	272.75 Feet (83.13 Meters)
Length Between Perpendiculars	256.0 Feet (78.03 Meters)
Beam, Maximum Molded	60.0 Feet (18.29 Meters)
Depth to Main Deck, at Side, Main Molded	16.50 Feet (5.03 Meters)
Draft, Design, Molded	16.50 Feet (5.03 Meters)
Draft, Scantling, Molded	12.0 Feet (3.66 Meters)
Mean Draft, Lightship Molded	5.75 Feet (1.75 Meters)
Displacement, at Design Draft	4,199 Long Tons (4267.28 Metric Tons)
Ship Brake Horsepower	3,900 hp (3900 hp.)
Service Speed	11.61 Knots (21.5 Kilometers/Hour)
Minimum Cruising Radius	8,350 Nautical Miles (15,464 Kilometers)
Cargo Deck Area	10,684 Square Feet (993.5 Square Meters)
Maximum Cargo Load	2,000 Short Tons (1814 Metric Tons)
Fuel Oil Capacity	524 Long Tons (532.4 Metric Tons) 167,680 Gallons (634,668.8 Liters)
Potable Water Capacity	33,000 Gallons (124,887 Liters)
Salt Water Ballast	1,631 Long Tons (1657.52 Metric Tons)

NOTE

Equipment data for individual components may be found in TM 55-1915-200-24&P

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-10. GENERAL. The following paragraphs provide the technical principles of operation of the LSV systems.

1-10.1. Power Generation System. The power generation system provides primary and emergency electrical power (FIGURE 1-20). Primary power is provided by two diesel engine driven ship's service generators and is routed to the main and emergency switchboards for distribution to various locations (FIGURE 121). The engine room lighting panel L1 (1), main engine circulating pump panel (6), main engine sump heater panel (14), and the engine room space heater panel (17) are located in the engine room. The motor control center (20) is located in the engine control room. The port main deck lighting panel L-2 (2) is located in the port passageway of the main deck. The starboard main deck lighting panel L-3 (3) is located in the starboard passageway of the main deck. The upper machinery room power panel P-2 (18) is located in the upper machinery room. The emergency generator room power panel P-3 (16) and the load center panel (7) are located in the emergency generator room. The forward power panel P-1 (19) and forward lighting panel L-6 (21) are located in the port hydraulic machinery room of the mezzanine deck. The poop deck power panel P-5 (15) is located in the center passageway of the poop deck. The officers deck lighting panel L-4 (4) is located in the center passageway of the officers deck. The galley power distribution panels 7A and 7B (13) are located in the galley. The pilothouse lighting panel L-5 (5) and the pilothouse emergency panel EP-2 (8) are located on the inboard port bulkhead of the pilothouse. The radio room panel EP-1 (11), filter panel EP-1 (12), and the electronic emergency panel (10) are located in the radio room. The navigation lights panel (9) is located on the port side of the pilothouse console. Emergency electrical power is provided by an emergency generator and is distributed through the emergency switchboard to allow continued operation of essential systems and equipment during loss of primary power. In port, the LSV receives shore power through a cable connected to the shore terminal box.

1-10.1.1. Ship's Service Diesel Generator Engine. Two generator set engines power individual ship's service generators, which provide primary electrical power throughout the LSV. One diesel generator is air started; the other is electrically started. Engine control is provided from the engine room console.

1-10.1.2. Ship's Service Generator.

Two 250 kW generators provide 440 volts, 3 phase, 60 hertz ship's service power. Each generator is capable of providing 110 percent of the necessary sea load for the propulsion and safety of the ship and preservation of cargo under normal operation. The generators may be operated in parallel; however, normal operation has one generator on line and the other in reserve.

1-10.1.3. Main Switchboard. The main switchboard provides generator selection, and power distribution for both primary and secondary power. Primary power consists of 440 Vac supplied by the ship's service generator or from shore facility sources. Secondary power is 120 Vac, 60 hertz, supplied from the main switchboard through stepdown transformers.

1-10.1.4. Emergency Switchboard. The emergency switchboard normally receives primary power from the main

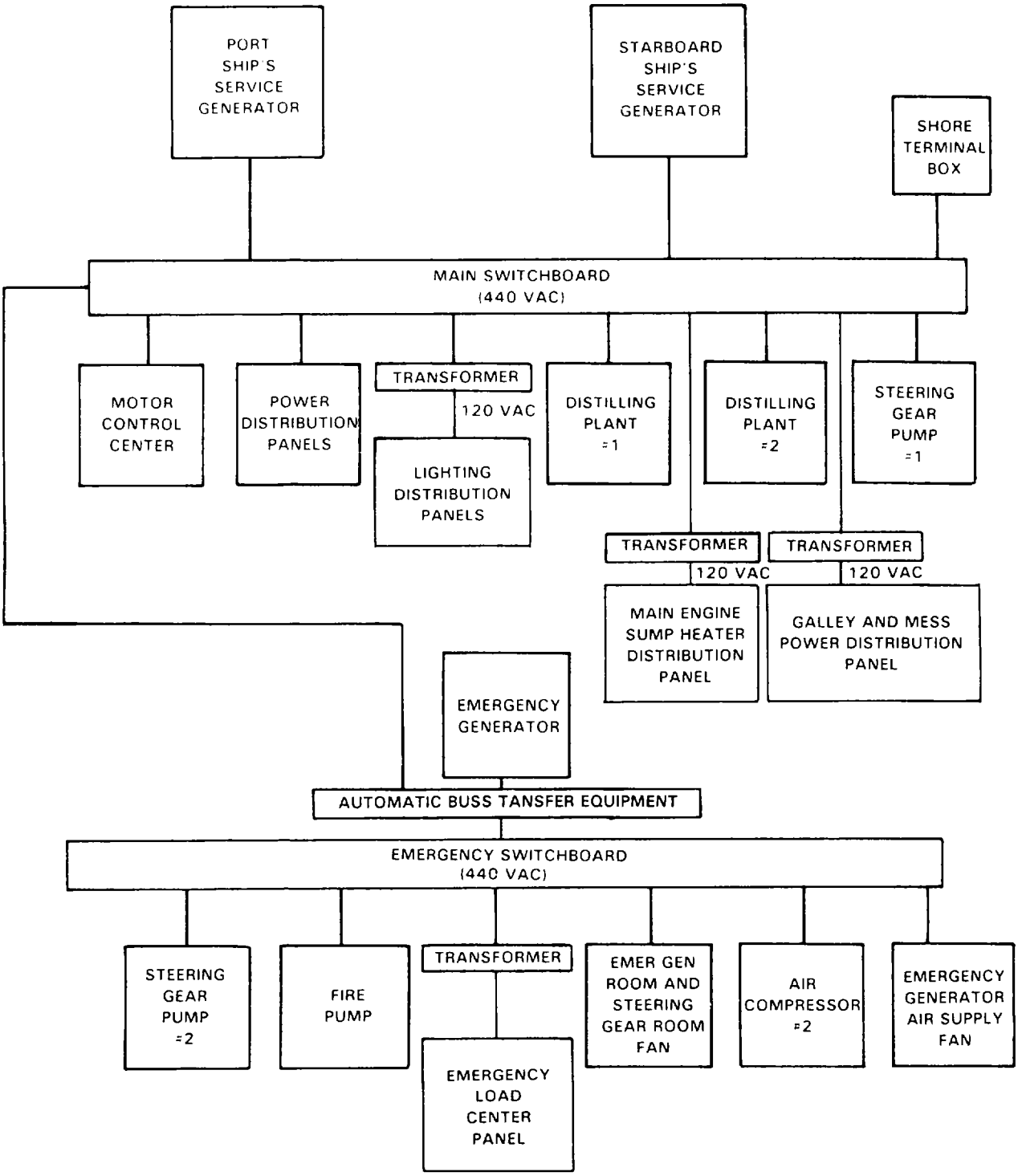
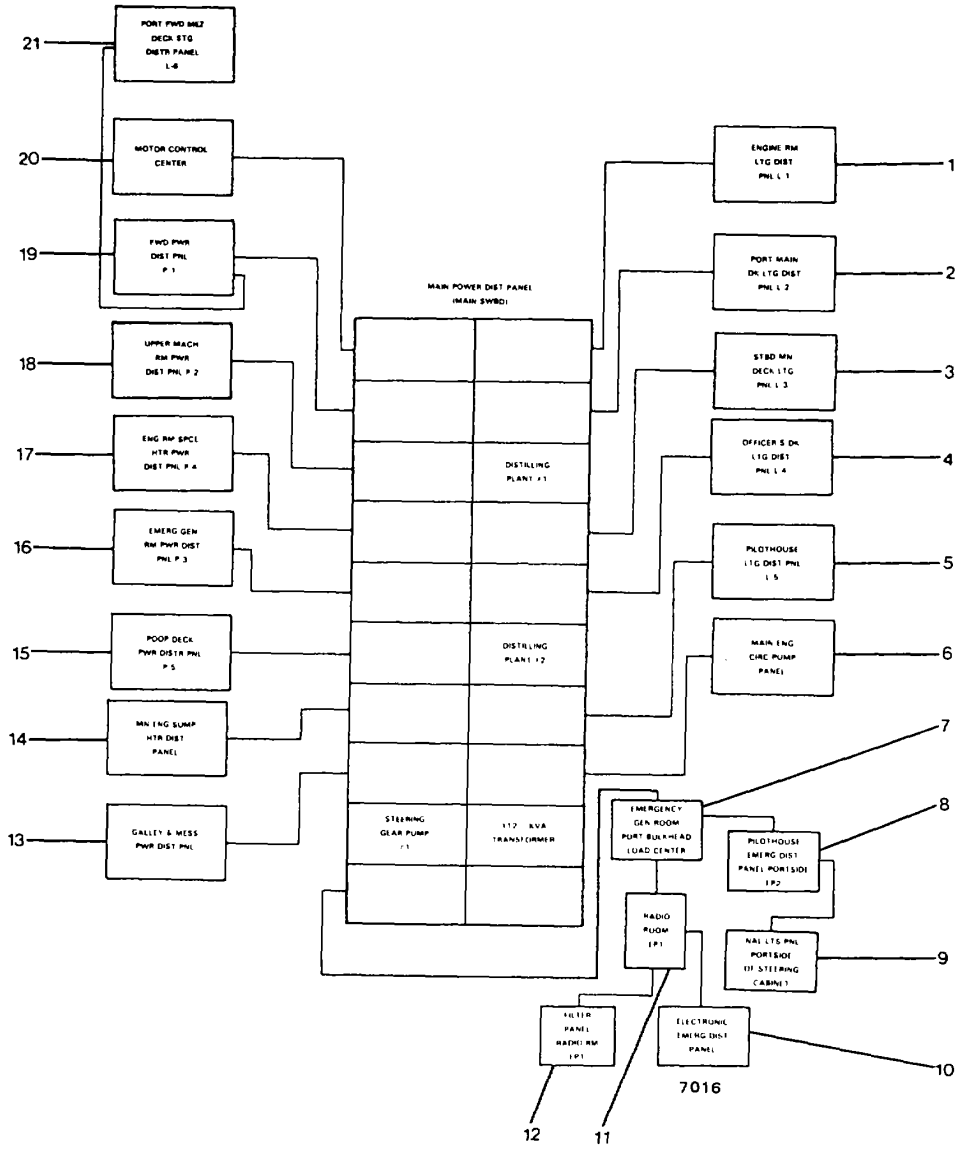


FIGURE 1-20. Power Generation System.



LEGEND

1. ENGINE ROOM LIGHTING PANEL L-1
2. PORT MAIN DECK LIGHTING PANEL L-2
3. STARBOARD MAIN DECK LIGHTING PANEL L-3
4. OFFICERS DECK LIGHTING PANEL L-4
5. PILOTHOUSE LIGHTING PANEL L-5
6. MAIN ENGINE CIRCULATING PUMP PANEL
7. LOAD CENTER PANEL
8. PILOTHOUSE EMERGENCY PANEL EP-2
9. NAVIGATION LIGHTS PANEL
10. ELECTRONIC EMERGENCY PANEL
11. RADIO ROOM PANEL EP-1
12. FILTER PANEL EP-1
13. GALLEY POWER DISTRIBUTION PANELS 7A AND 7B
14. MAIN ENGINE SUMP HEATER PANEL
15. POOP DECK POWER PANEL P-5
16. EMERGENCY GENERATOR ROOM POWER PANEL P-3
17. ENGINE ROOM SPACE HEATER PANEL
18. UPPER MACHINERY ROOM POWER PANEL P-2
19. FORWARD POWER PANEL P-1
20. MOTOR CONTROL CENTER
21. FORWARD LIGHTING PANEL L-6

FIGURE 1-21. Main Power Distribution Switchboard.

switchboard and distributes primary and secondary power to vital equipment. Upon loss of power from the main switchboard, automatic bus transfer equipment within the emergency switchboard isolates the switchboard and allows power to be supplied by the emergency generator.

1-10.1.5. Emergency Diesel Generator Engine. The emergency diesel generator set engine powers the emergency generator. This engine is completely independent and has its own lubrication oil and cooling systems. The engine is electrically started. The automatic bus transfer equipment automatically starts this engine upon failure of the ship's service systems.

1-10.1.6. Emergency Generator. The emergency generator provides power to the emergency switchboard within 45 seconds of a ship's service systems power failure. One 90 kW generator, completely independent from ship's service, is provided for emergency power.

1-10.1.7. Shore Terminal Box. This box provides connections for 300 amperes shore power service. It also has provisions for attaching a cable to shore and a cable to another craft in tandem. The shore power circuit breaker within the main switchboard is interlocked with the ship's system generator circuit breakers to prevent both sources from supplying power to the switchboard at the same time.

1-10.2. Environmental Control System. This system provides the LSV living compartments and specified work spaces with air conditioning and heating. Other work spaces and storage spaces are provided with forced air ventilation and heating.

1-10.2.1. Air Conditioning and Heating. The LSV compartments providing air conditioning and heating are:

a. Pilothouse, Damage Control Central, and Radio Room on the bridge deck (FIGURE 1-22).

b. Officer's staterooms, and Sickbay on the officer's deck (FIGURE 1-23).

c. Crew's Mess and Recreation Room; Officer's Mess and Lounge; and Galley on the poop deck (FIGURE 1-24).

d. Crew's Quarters and Sanitary Spaces on the mezzanine deck (FIGURE 1-25).

e. Passageways throughout and Engine Control Room below decks.

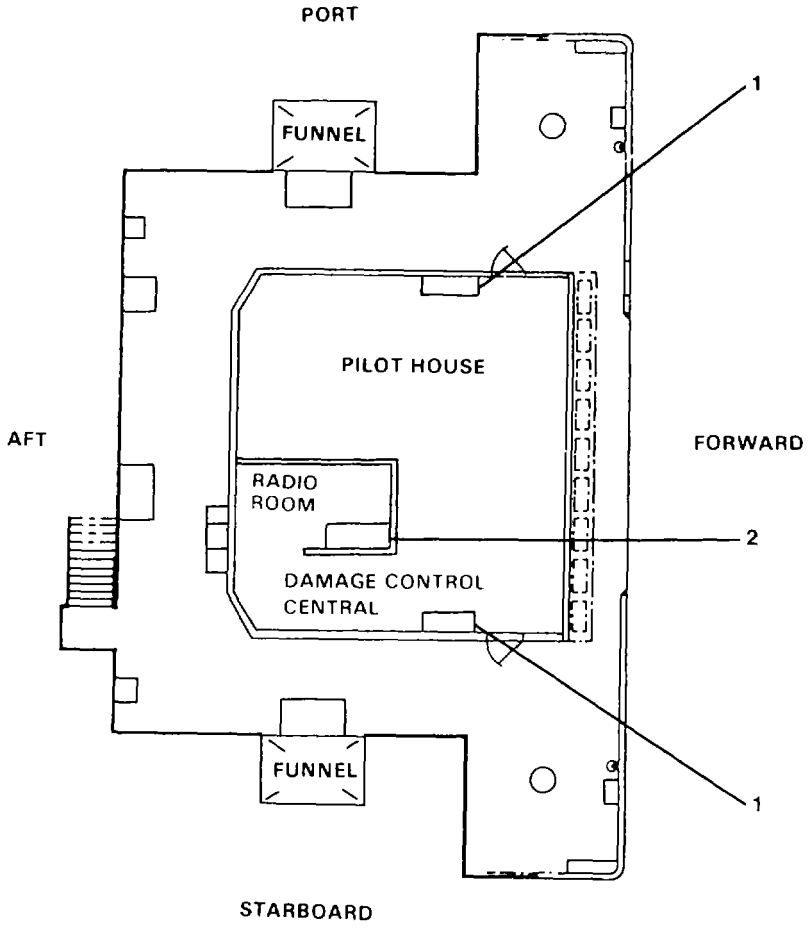
1-10.2.2. Forced Air Ventilation and Heating. (FIGURES 1-26, 1-27, and 1-28) In addition to air conditioning and heating, specified areas on the bridge deck, officer's deck, poop deck, and mezzanine deck are provided with forced air supply and exhaust ducting. The LSV compartments provided with only forced air ventilation and heating are:

a. Laundry Room, Physical Fitness Room, Workshops, Emergency Generator Space, and Weapons Lockers on the main deck.

b. Engine Room, Steering Gear Compartment, and Bow Thruster Space below deck.

c. Storage Spaces.

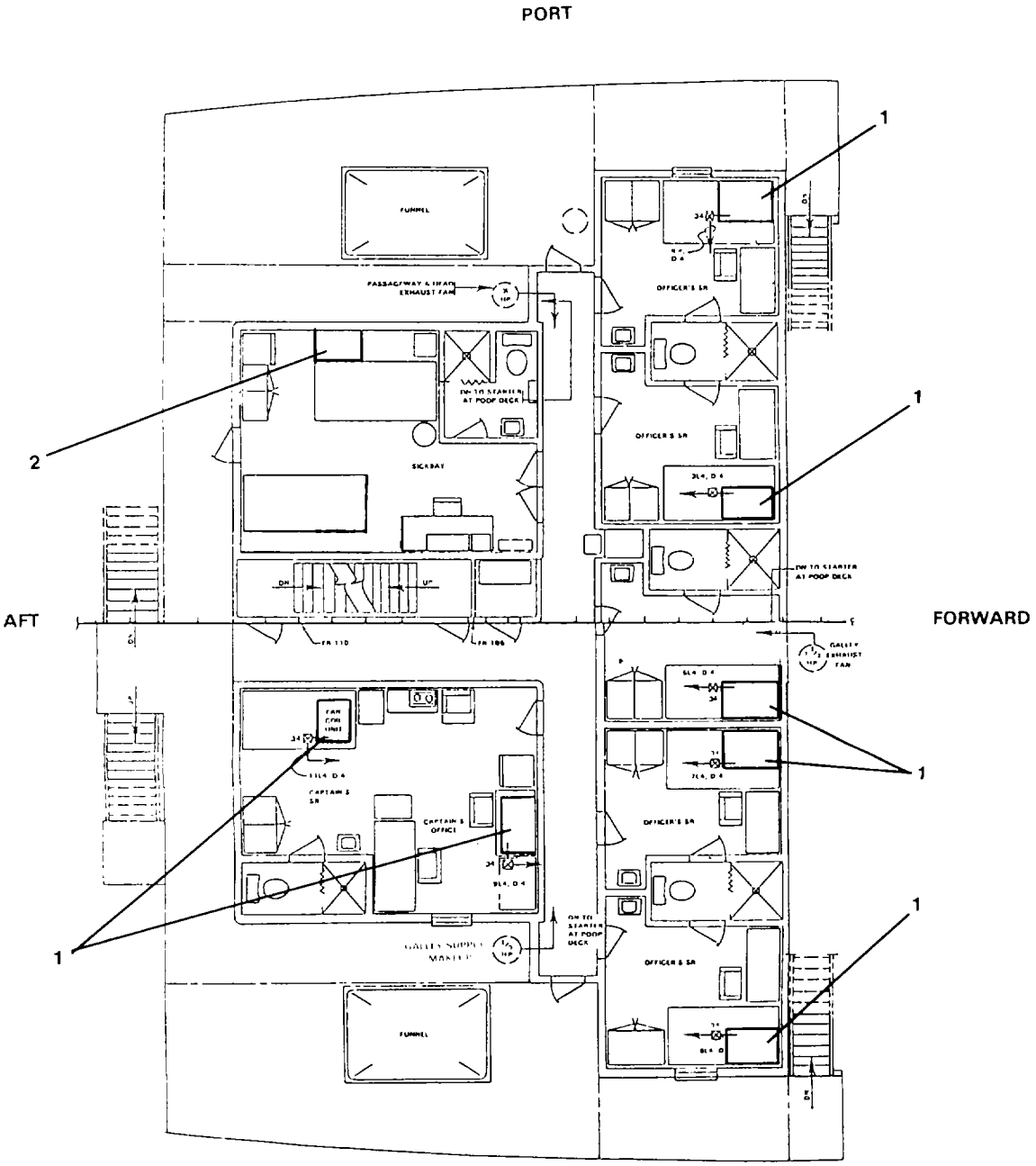
1-10.2.3. Air Conditioning System. Air Conditioning is provided by a 30ton chilled water package containing two compressors, two condensers and one chiller (FIGURE 1-29). A centrifugal pump is used to circulate the chilled water through its piping system. Each compartment having air conditioning has a cooling coil and fan unit to circulate the cool air. Heating strips are used at the fan units to provide heating if required. All air conditioned compartments have thermostat controls. Compartments with air ventilation have the heating strips built into the air supply fan and a control switch.



LEGEND

1. 42 VF 5-4 2 FAN COIL UNIT, 2 KW, 600 CFM
2. 42 CG 3-4 15 FAN COIL UNIT, 1.5 KW, 300 CFM

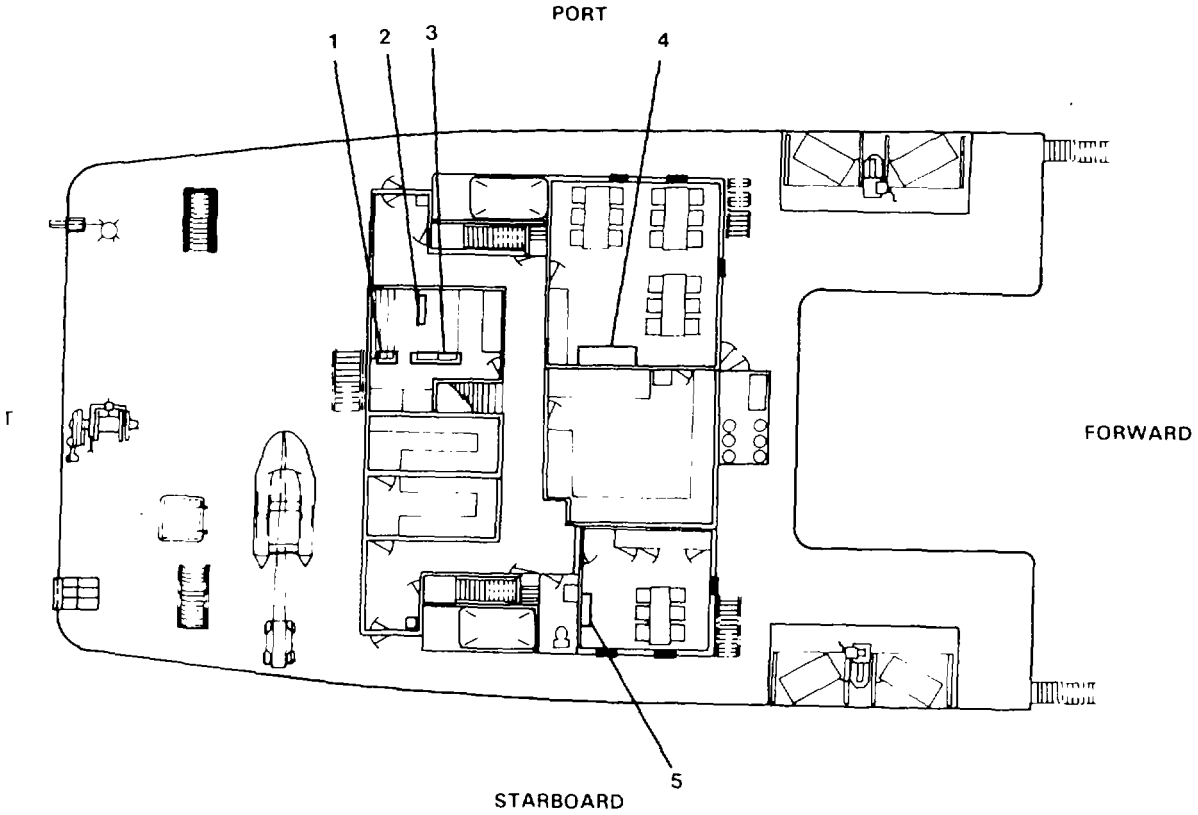
FIGURE 1-22. Bridge Deck Air Conditioning and Heating Units.



LEGEND

1. 42 CG 24-1 FAN COIL UNIT. 1 KW 200 CFM
2. 42 CG 34-15 FAN COIL UNIT. 1.5 KW. 300 CFM

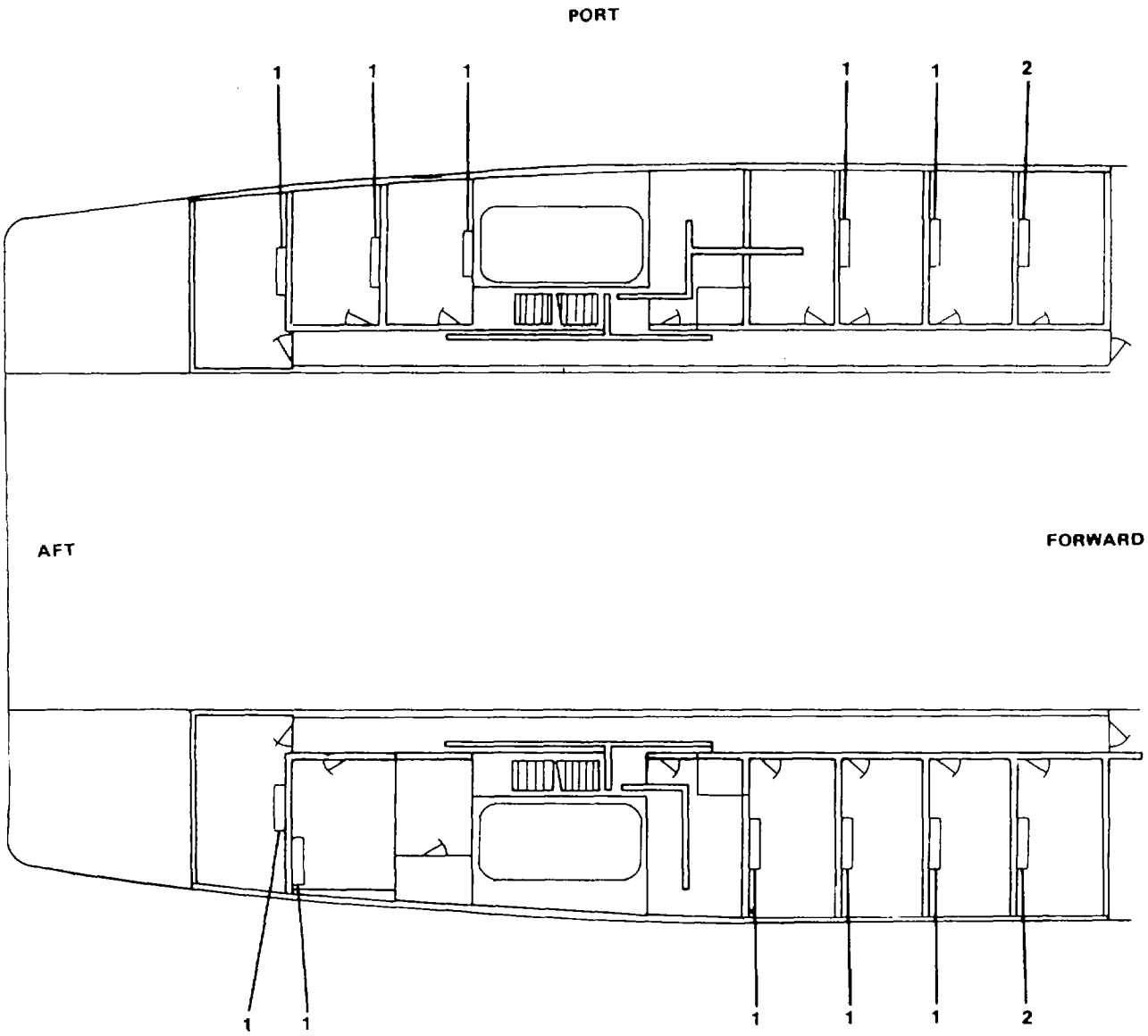
FIGURE 1-23. Officer's Deck Air Conditioning and Heating Units.



LEGEND

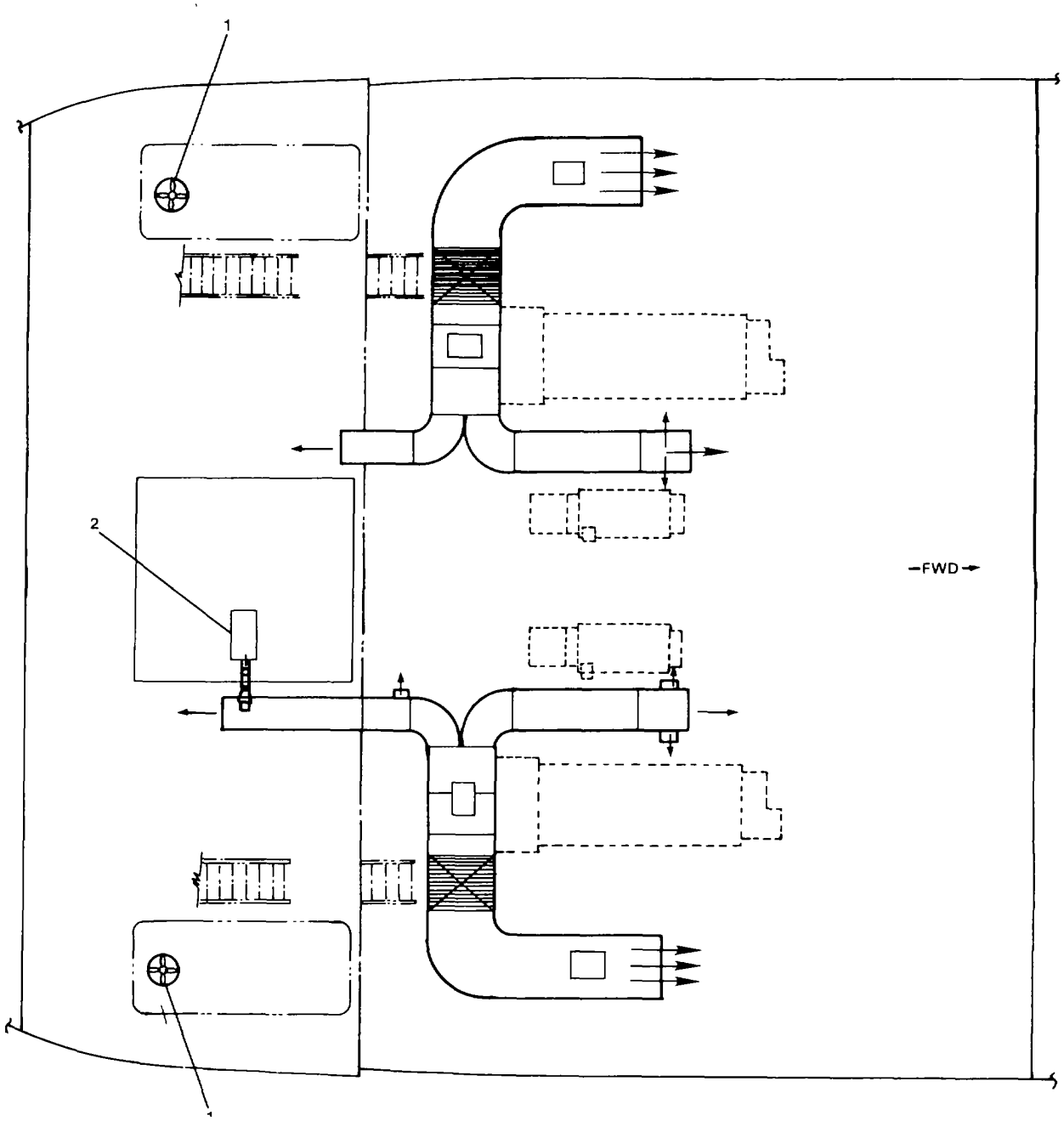
1. 39BA-050 AIR HANDLING UNIT. 3 HP. 460V. 30 1600 CFM
2. TFZU DH.1 22 KW HEATER. 2 STAGE
3. TFZU DH-2 22 KW HEATER, 2 STAGE
4. 42 VF7-4-3 FAN COIL UNIT. 3 KW, 1000 CFM
5. 42 VR5-4-2 FAN COIL UNIT, 2 KW. 600 CFM

FIGURE 1-24. Poop Deck Air Conditioning and Heating Units.



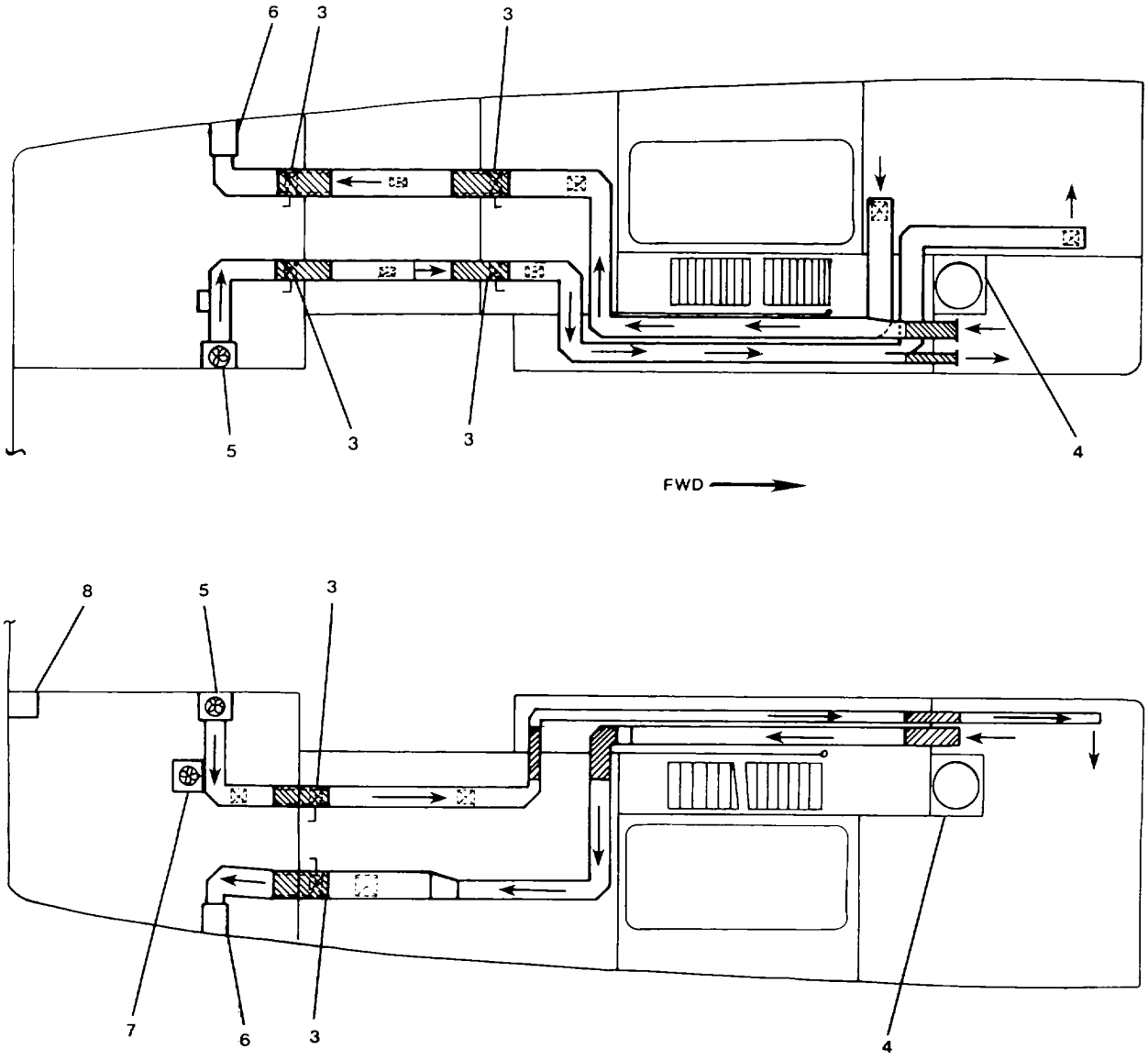
LEGEND
1. 42 VF 2-4-1 FAN COIL UNIT, 1 KW, 200 CFM
2. 42 VF 3-4-1 FAN COIL UNIT, 1 KW, 300 CFM

FIGURE 1-25. Mezzanine Deck Air Conditioning and Heating Units.



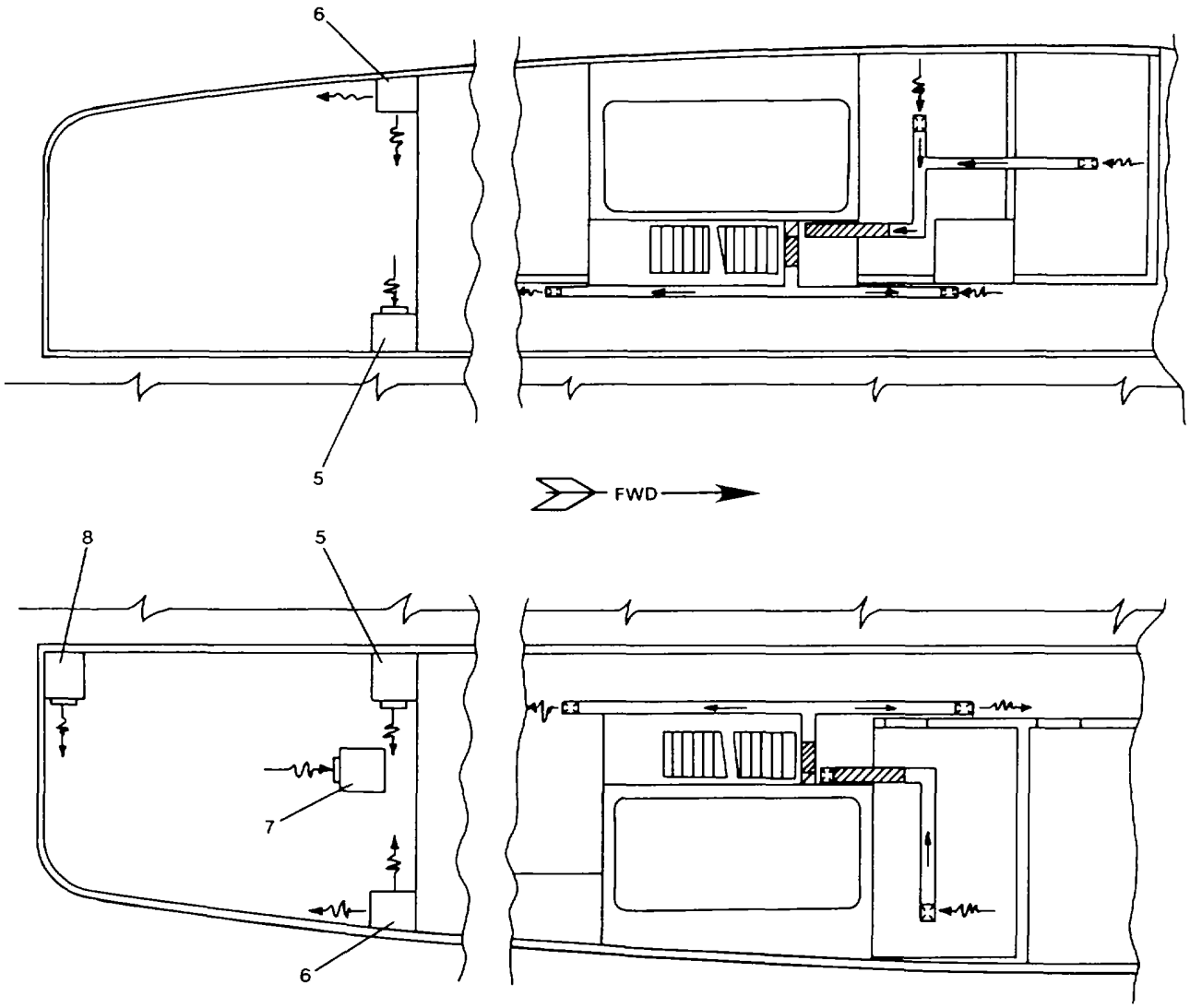
ENGINE ROOM VENTILATION SYSTEM

FIGURE 1-26. Ventilation Ducting - Engine Room (Sheet 1 of 6).



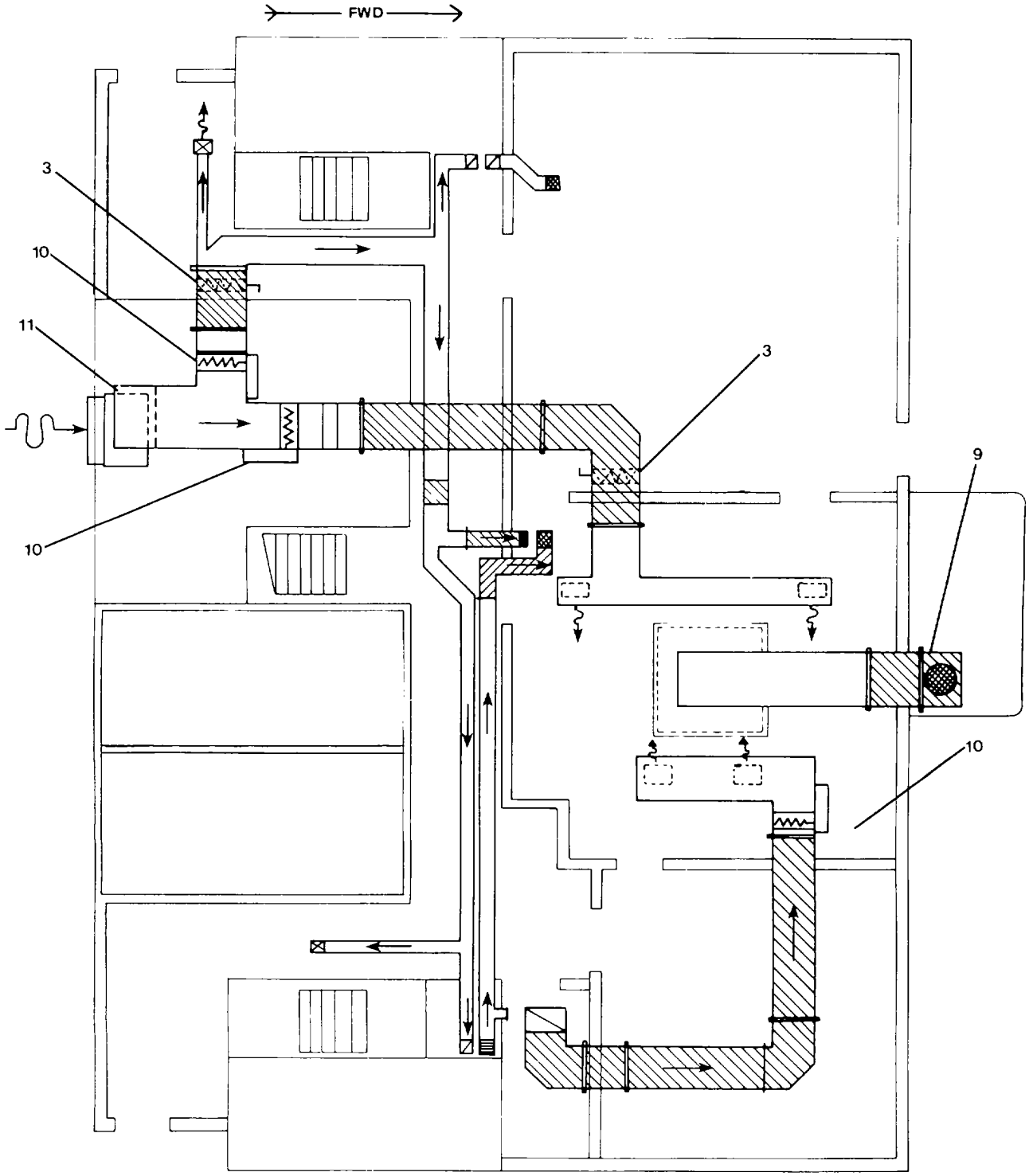
MAIN DECK VENTILATION SYSTEM

FIGURE 1-26. Ventilation Ducting - Main Deck (Sheet 2 of 6).



MEZZANINE DECK

FIGURE 1-26. Ventilation Ducting - Mezzanine Deck (Sheet 3 of 6).



POOP DECK

FIGURE 1-26. Ventilation Ducting - Poop Deck (Sheet 4 of 6).

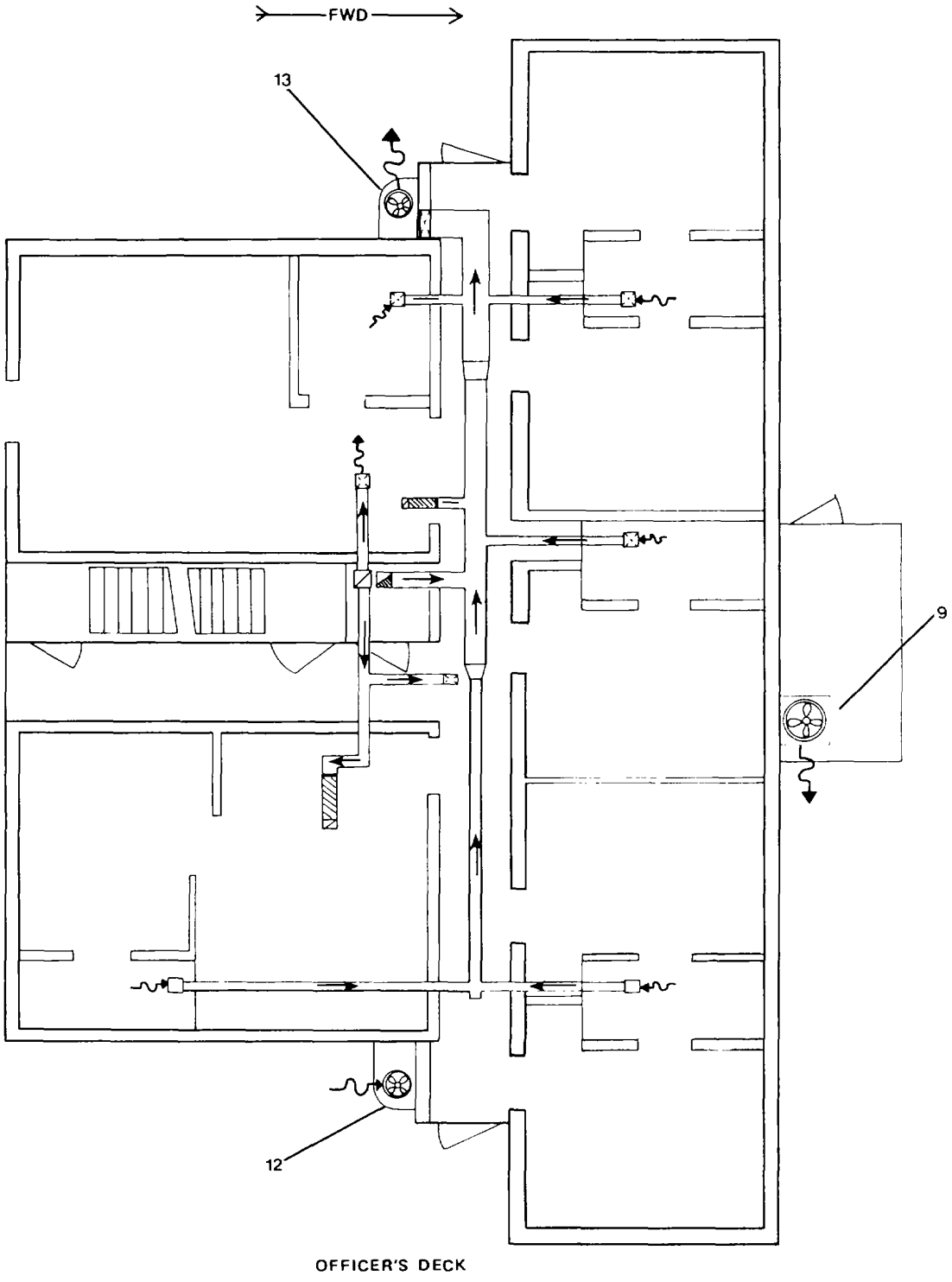
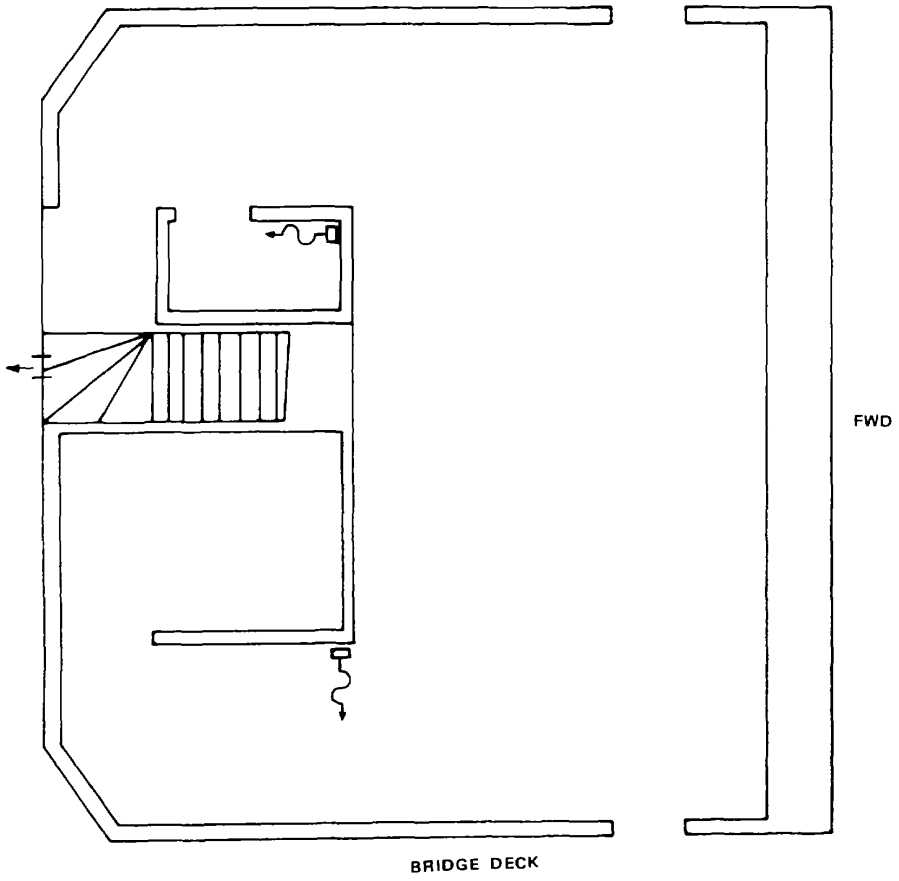


FIGURE 1-26. Ventilation Ducting - Officer's Deck (Sheet 5 of 6).



LEGEND

1. ENGINE ROOM EXHAUST FANS, LOCATED IN ENGINE EXHAUST UPTAKE SPACE
2. ENGINE ROOM CONTROL CONSOLE AIR CONDITIONER
3. MANUALLY OPERATED FIRE DAMPERS EQUIPPED WITH FUSIBLE LINK THAT MELTS AT ABOUT 160°F AND ALLOWS SPRING TENSION TO CLOSE THE DAMPER
4. ENGINE ROOM VENTILATION SUPPLY FANS LOCATED ON MAIN DECK
5. MAIN DECK AND STEERING COMPARTMENT SUPPLY FANS LOCATED ON MEZZANINE DECK
6. MAIN DECK NATURAL EXHAUST OUTLET LOCATED ON MEZZANINE DECK
7. EMERGENCY DIESEL GENERATOR ROOM VENTILATION SUPPLY FAN LOCATED ON MEZZANINE DECK
8. EMERGENCY DIESEL GENERATOR ROOM NATURAL EXHAUST LOCATED ON MEZZANINE DECK
9. GALLY EXHAUST FAN LOCATED ON OFFICERS DECK
10. VENTILATION DUCT HEATER UNIT
11. CHILL WATER AIR CONDITIONER
12. GALLY MAKE UP SUPPLY AIR FAN
13. PASSAGEWAY AND HEAD EXHAUST FAN

FIGURE 1-26. Ventilation Ducting - Bridge Deck (Sheet 6 of 6).

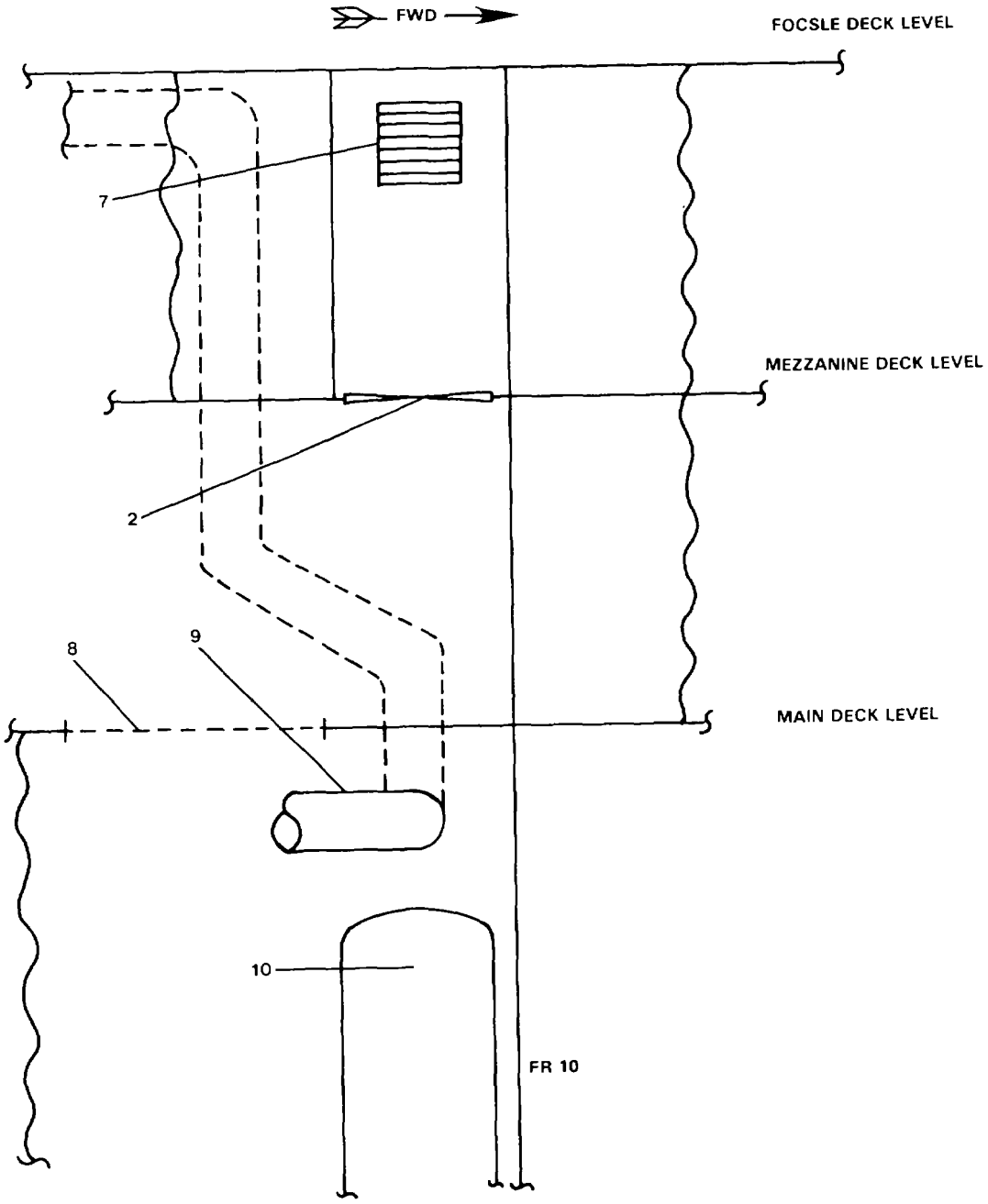
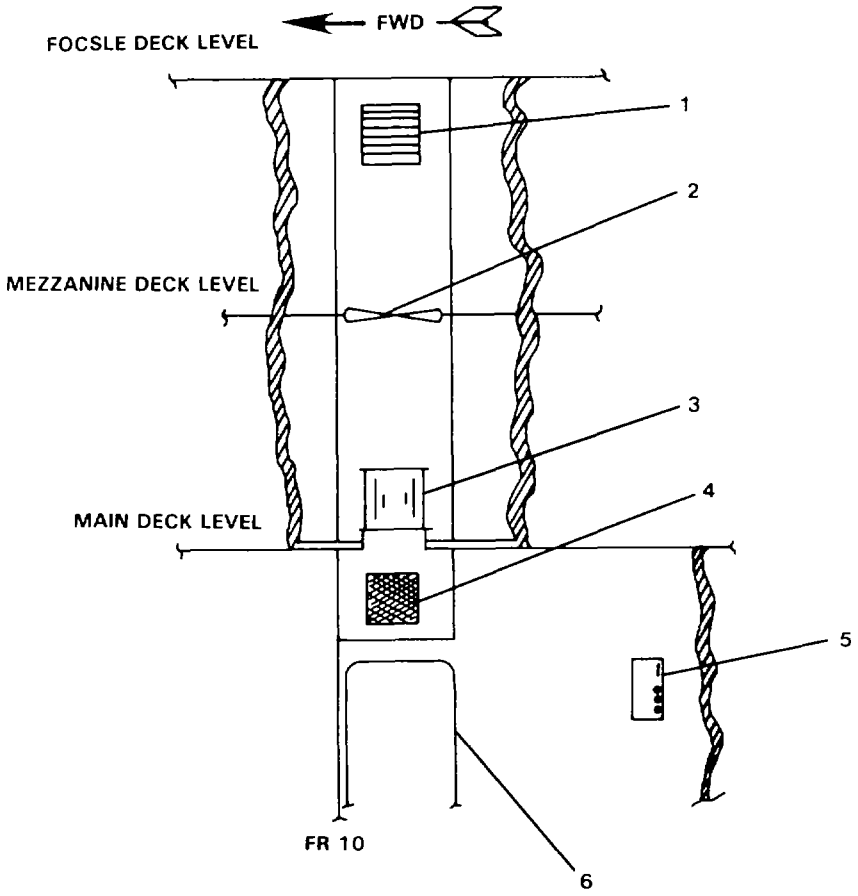


FIGURE 1-27. Bow Thruster Room Ventilation (Sheet 1 of 2).

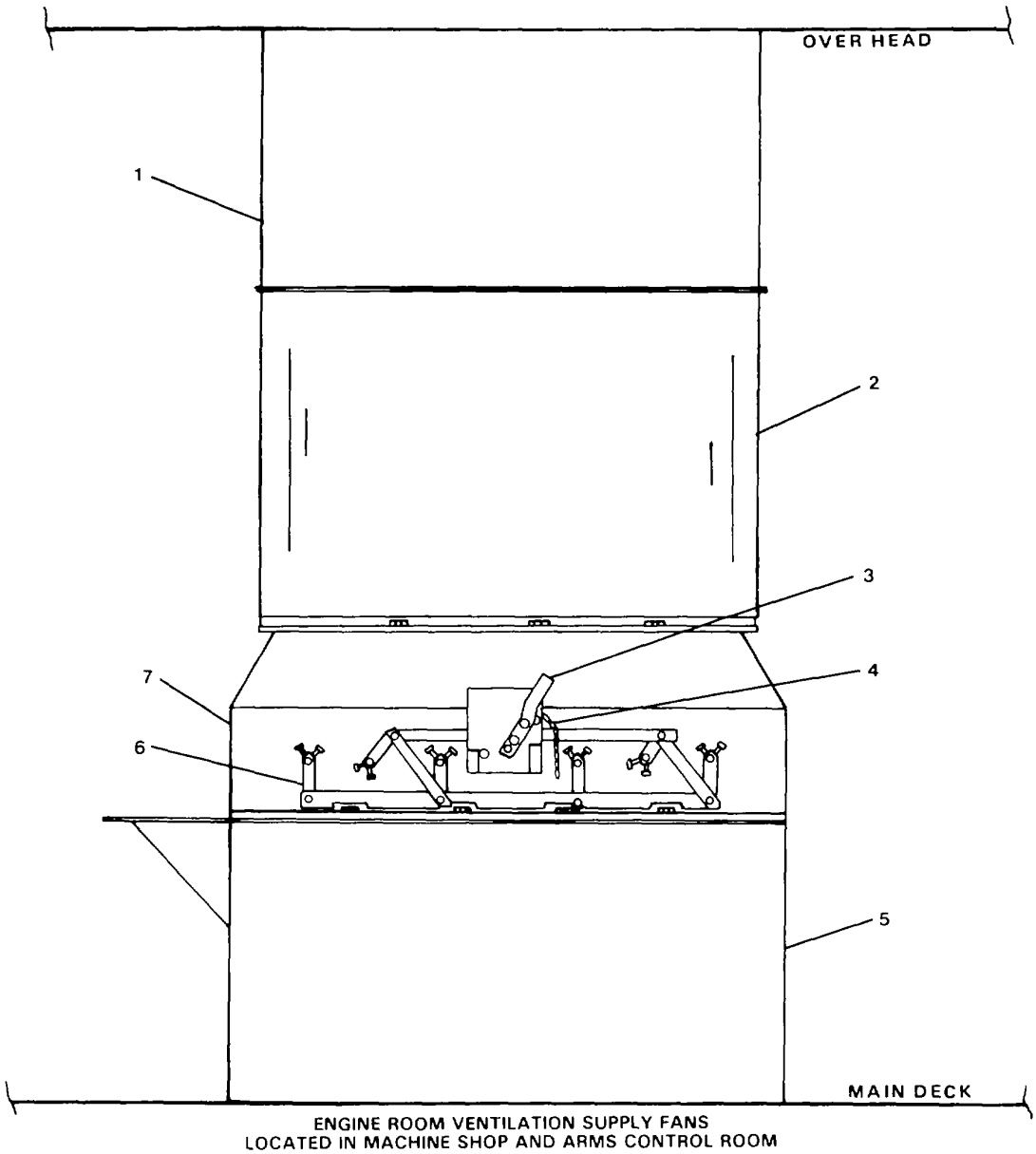


BOW THRUSTER ROOM VENTILATION SUPPLY
ELEVATION VIEW, CENTER LINE LOOKING TO STBD

LEGEND

1. BOW THRUSTER COMPARTMENT SUPPLY AIR INTAKE EQUIPPED WITH FIXED LOUVERS AND BUG SCREEN
2. MEZZANINE DECK CUTOUT
3. BOW THRUSTER COMPARTMENT SUPPLY FAN
4. BOW THRUSTER COMPARTMENT SUPPLY AIR INLET
5. BOW THRUSTER SUPPLY FAN CONTROLLER
6. BOW THRUSTER COMPARTMENT DOORWAY STBD SIDE
7. BOW THRUSTER COMPARTMENT NATURAL VENTILATION EXHAUST AIR OUTLET EQUIPPED WITH LOUVERS AND BIRD SCREEN
8. MAIN DECK CUTOUT FOR HATCH
9. BOW THRUSTER ENGINE EXHAUST PIPE
10. BOW THRUSTER COMPARTMENT DOORWAY PORT SIDE

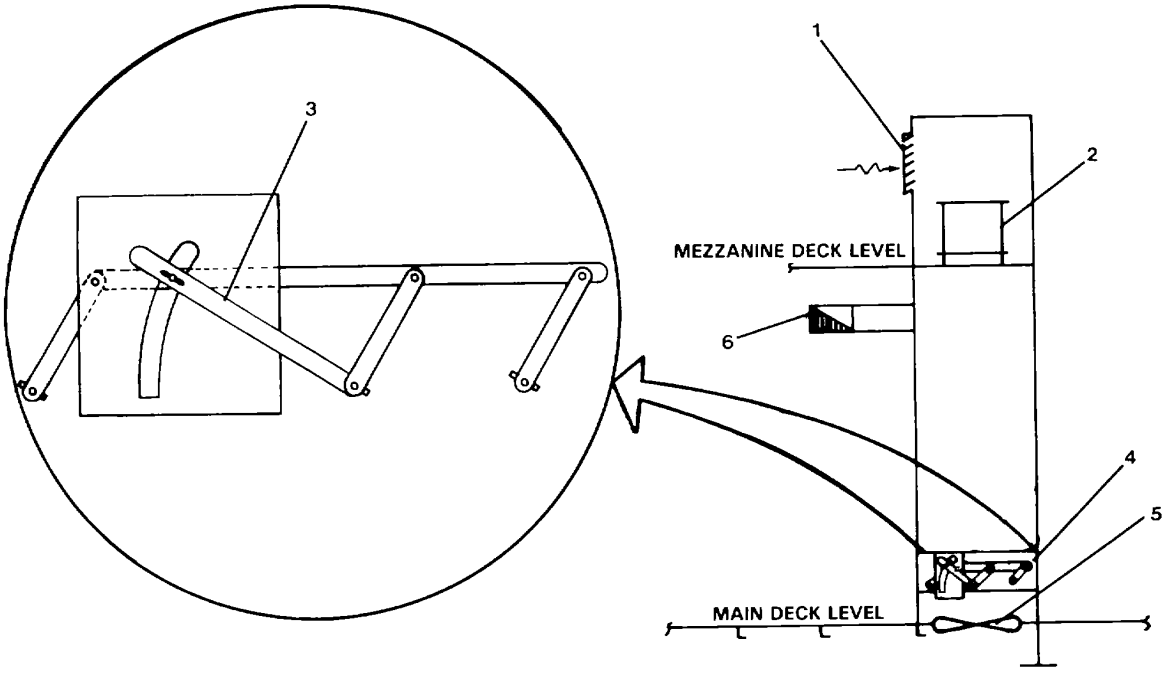
FIGURE 1-27. Bow Thruster Room Ventilation (Sheet 2 of 2).



LEGEND

1. INTAKE AIR VENT DUCT
2. FAN AND MOTOR HOUSING
3. DAMPER CONTROL LEVER
4. TOGGLE PIN AND RETAINER CHAIN
5. DISCHARGE AIR VENT
6. DAMPER OPERATOR LINKAGE
7. DAMPER HOUSING ASSEMBLY

FIGURE 1-28. Supply Fans - Engine Room Ventilation (Sheet 1 of 2).

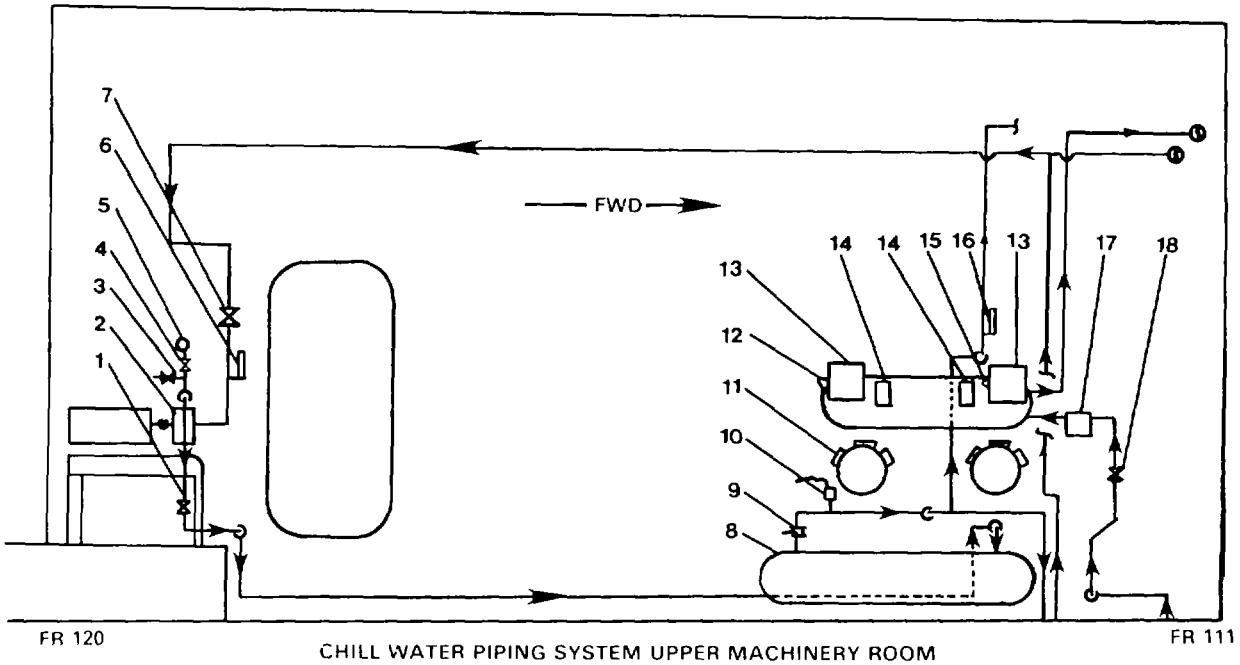


MAIN DECK VENTILATION SUPPLY FAN STBD SIDE
ELEVATION VIEW, INBOARD SIDE EMERGENCY GENERATOR
ROOM LOOKING AFT

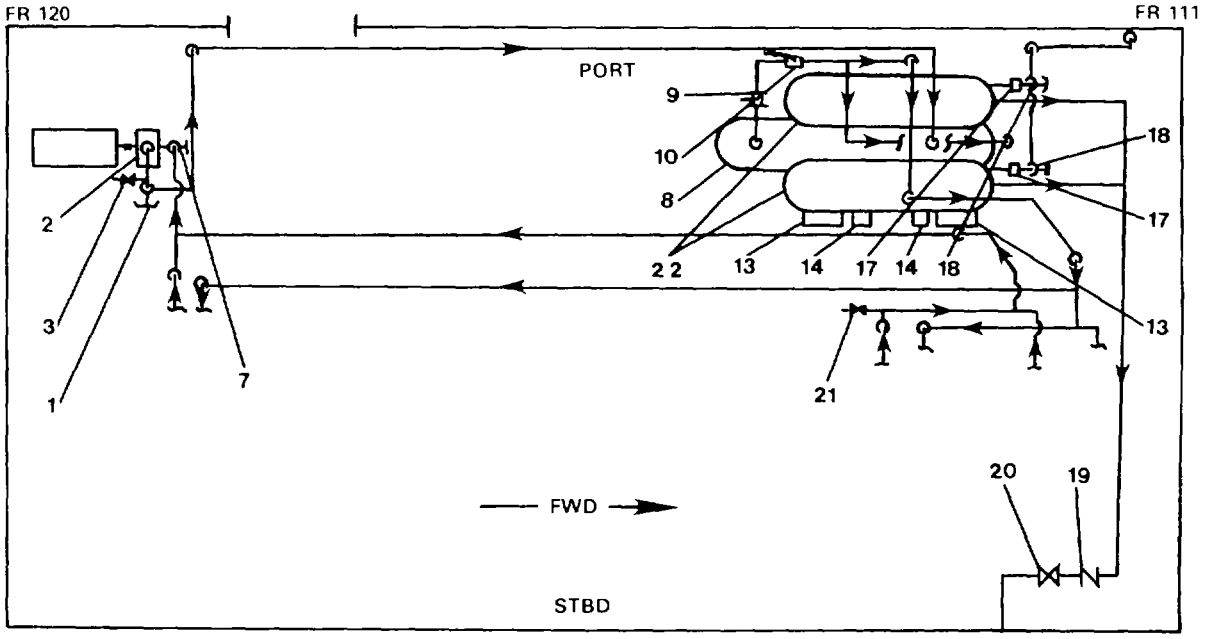
LEGEND

1. SUPPLY FAN AIR INLET LOCATED ON MEZZANINE DECK
2. MAIN DECK. STBD SIDE. VENTILATION SUPPLY FAN
3. DAMPER CONTROL LEVER AND LINKAGE
4. CONTROL DAMPER FOR STEERING COMPARTMENT
5. DECK CUTOUT FOR AIR ACCESS TO STEERING COMPARTMENT LOCATED BELOW
6. VENTILATION DUCT GOING FWD

FIGURE 1-28. Supply Fans - Main Deck (Sheet 2 of 2).

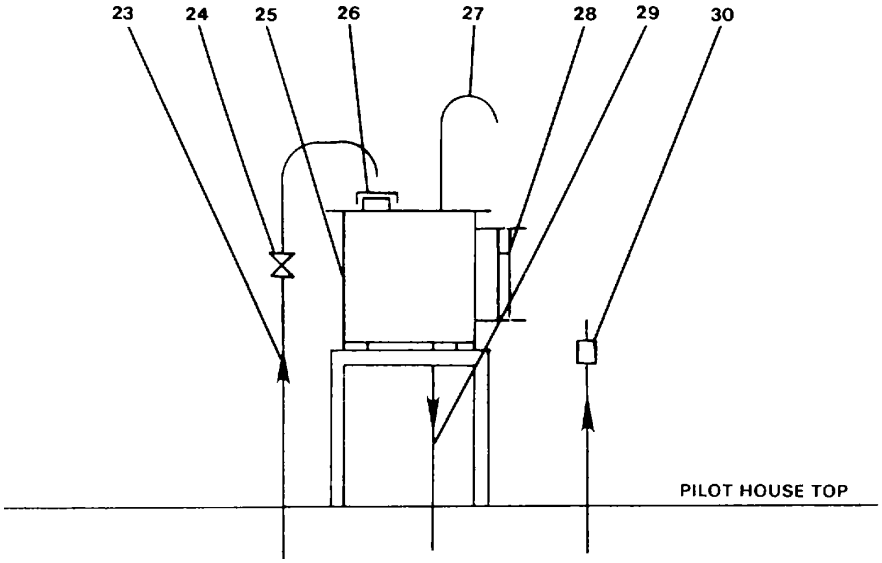


CHILL WATER PIPING SYSTEM UPPER MACHINERY ROOM
LATERAL VIEW LOOKING FROM STBD TO INBOARD



CHILL WATER SYSTEM UPPER MACHINERY ROOM
PLAN VIEW LOOKING DOWN

FIGURE 1-29. Chilled Water Piping System - Upper Machinery Room (Sheet 1 of 2).



CHILL WATER EXPANSION TANK
LOCATED ON TOP OF PILOT HOUSE

LEGEND

1. CHILL WATER CIRCULATING PUMP DISCHARGE VALVE
2. CHILL WATER CIRCULATING PUMP AND MOTOR
3. PUMP VENT VALVE
4. PRESSURE GAUGE CUTOUT VALVE
5. PRESSURE GAUGE (0-100 PSI)
6. THERMOMETER -400 TO , 1000F
7. CHILL WATER CIRCULATING PUMP SUCTION VALVE
8. CHILLER BARREL
9. CHILL WATER DISCHARGE VALVE FROM CHILLER BARREL
10. WATER FLOW SWITCH
11 #2 REFRIGERANT COMPRESSOR
12. #2 REFRIGERANT COMPRESSOR OFF/ON SWITCH
13. REFRIGERANT COMPRESSOR CONTROL PANELS
14. CHILL WATER TEMPERATURE CONTROL THERMOSTAT
15. #1 REFRIGERANT COMPRESSOR OFF/ON SWITCH
16. THERMOMETER (-20° TO +150°F)
17. WATER REGULATING VALVE
18. REFRIGERANT CONDENSER SEA WATER INLET VALVE
19. SWING CHECK VALVE
20. REFRIGERANT CONDENSER SEA WATER OVERBOARD DISCHARGE VALVE
21. CHILL WATER PIPING SYSTEM TEST CONNECTION
22. REFRIGERANT CONDENSERS
23. EXPANSION TANK FILL PIPE FROM POTABLE WATER SYSTEM
24. EXPANSION TANK FILL VALVE
25. CHILL WATER EXPANSION TANK
26. EXPANSION TANK FILL PORT
27. EXPANSION TANK VENT PIPE
28. EXPANSION TANK SIGHT GLASS LEVEL INDICATOR
29. CHILL WATER EXPANSION TANK DISCHARGE PIPE TO CHILL WATER PIPING SYSTEM
30. CHILL WATER PIPING SYSTEM VENT VALVE

FIGURE 1-29. Chilled Water Piping System - Expansion Tank (Sheet 2 of 2).

1-10.2.3.1. 30-ton R.L. Chiller Package Model LM2-WC30-6S. The chilled water package generates and distributes chilled water to all space air conditioning units via the chilled water piping system. The chilled water package is a nominal 30-ton, dual circuit refrigerant to cooling water plant designed for complete automatic operation. The two refrigeration systems of the package comprise two compressors, two cleanable sea water condensers, two individual sets of controls, and one dual circuit liquid chiller barrel. The design of the package is such that mechanical or electrical failure in one refrigerant circuit will not affect operation of the other circuit.

1-10.2.3.2. 30-Ton Dual Circuit Chiller. The chiller circulates water to be cooled around refrigerant tubes for cooling. The chiller is of the shell and tube type with two separate refrigerant circuits. Water to be cooled is circulated through the shell and cold refrigerant flows through the inner tubes. The fresh water system is charged with a 35% (65 gallon) Ethylene Glycol mixture down to 0°F. The approximate system total volume is 200 gallons of liquid. The hand valve is located on the suction side of the chilled water pump. By use of this valve, some of the system mixture can be drawn off and tested with a hydrometer. The systems solution is protected to 0°F.

1-10.2.3.3. 15-Ton 460 Volt Compressor. The compressor withdraws refrigerant gas from the evaporator and delivers it to the condenser at an increased temperature and pressure. This temperature is such that refrigerant heat can be absorbed by sea water at ordinary temperatures. The drive motor turns the compressor by means of a common crankshaft.

1-10.2.3.4. Control Box Assembly. The control box assembly controls and monitors chiller package operation. It contains starting controls and a high pressure control switch which stops the compressor in the event of excessive pressure in the high side of the system. A low pressure control switch stops the compressor in the event of low pressure in the low side of the system.

1-10.2.3.5. 15-Ton Sea Water Condensers. The condensers are heat exchangers in which the compressed high temperature refrigerant gas is lowered in temperature and condensed to a liquid. Sea water is pumped through the tubes absorbing the heat given off by the refrigerant and then back overboard.

1-10.2.3.6. Water Regulating Valve. The water regulating valve automatically controls the sea water flow through the condenser to maintain a relatively constant condensing pressure and temperature. This valve is actuated by the refrigerant high (discharge) pressure in the condenser and must be adjusted to maintain the required condensing pressure and to restrict water flow when the compressor is stopped. The water regulating valve is located in the condenser sea water inlet line.

1-10.2.4. Model 39BA-050 Air Handling Unit. This air handling unit provides cooling, heating and positive pressure for the galley and passageway areas of the officers deck, poop deck, bridge deck, and mezzanine decks. The system passes outside air through the chilled water coil using a continuously operating blower. Chilled water at 40°F is circulated through the coil from the chiller package and reduces the 95°F entering air to approximately 57°F.

This conditioned air is then circulated through the duct system.

1-10.2.5. Model TFZU 22 kW Heater. The 22 kW heaters are duct mounted heating sources. The heaters are controlled by two stage heating thermostats. The first stage, 7 kW,

provides 280F temperature rise across the heating element. Both stages, 22 kW, provide an 870F rise. One 22 kW heater supplies warm air to all passageway areas. The other 22 kW heater supplies warm air to the galley.

1-10.2.6. Model TFZU 12 kW Heater. This is the heating source in the duct around the exhaust hood in the galley. A wall-mounted thermostat energizes the first stage when the galley temperature falls below the thermostat set point. A duct-mounted thermostat energizes the second stage when the ambient temperature entering the heater falls below 35°F. The first stage, 6 kW provides a 32°F temperature rise across the heating element. Both stages, 12 kW, provide a 64°F rise across the elements.

1-10.2.7. Model 44-12-DG2 Fan Motor. These fan motors provide ventilation to the main deck supply, shaft passageway, work shop and machine spaces.

1-10.2.8. Model 38-20-WH3 Fan Motor. This fan motor provides ventilation for the bow thruster room.

1-10.2.9. Model 44-16-DK2 Fan Motor. This fan motor provides ventilation for the emergency generator room.

1-10.2.10. Model 52-16-T12 Fan Motor. This fan motor provides ventilation for the galley exhaust.

1-10.2.11. Model 52-12-TF2 Fan Motor. These fan motors provide ventilation for the passageway and head exhaust and the galley.

1-10.2.12. 42VF and 42CG Series Fan Coil Units. The fan coil units provide cooling and heating to the spaces in which they are located. Chilled water pumped from the chiller package enters the coil of these units at approximately 40°F. Warm air from the space to be conditioned is blown across the chilled water coil and reduced in temperature approximately 16°F. The blower assembly provides the moving force for circulating the air through the fan coil from the conditioned space. These units contain heating elements which heat circulated air to provide a temperature rise of approximately 28°F.

1-10.2.13. 42DD-4 Air Handling Unit. The control room air handling unit is a straight cooling unit which provides air conditioning for a specific area. Chilled water is pumped through the coil of the air handling unit from the chilled water piping system at approximately 40°F. Warm air from the space to be conditioned is blown over the coil and reduced in temperature approximately 16°F. The water flow through the cooling coil is controlled by a three way water regulating valve.

1-10.2.14. Electric Space Heaters. These space heaters provide forced air heating. These heaters use motor and fan blades to force air across the electric heating element to circulate the warm air. With the power applied and the thermostat set to the desired temperature the unit cycles automatically.

1-10.2.15. Model TFZU-3 kW Heater. This heater provides pilothouse window de-icing and defrosting. It also supplements the pilothouse heating system. The de-icer/defroster is switch controlled. For supplemental heating, this unit is thermostatically controlled. Forced warmed air is supplied to each window on the forward bulkhead of the pilothouse from a register located in the overhead of the window frame. When either the manual switch or thermostat is energized, the blower associated with the heater starts and forces air over the 3 kW heating element. The heating element energizes when it senses the air flow, and increases the temperature of the air flowing over the coils. Hot air is then forced out of the registers over the windows.

1-10.3. Gyrocompass. The gyrocompass provides heading information to the pilothouse for steering the ship. The heading is also sent to repeaters at several ship locations and is the source for the ship gyropilot. The master compass is provided with a viewing window and a dial, for viewing ship's heading. An electronic control provides for control and monitoring of the gyrocompass and the routing of heading to ship's repeaters. The outputs of the gyrocompass, with the repeater switch on, are applied to the MK 37 MOD E power transmitter, via the switching unit. The power transmitter distributes the gyrocompass outputs to the repeaters. The switching unit drives the step repeaters.

1-10.4. MK 37 MOD E Power Transmitter. The power transmitter receives data from the MK 27 Mod 1 Gyrocompass system, amplifies the data, and transmits it to gyrocompass repeaters. The repeater assembly receives and amplifies the signal from the gyrocompass; and the transmission assembly distributes the amplified compass data to the repeaters.

1-10.5. Compass Repeater. The compass repeaters provide remote indications of the ship's heading as determined by the gyrocompass. The repeater receives heading signals from the gyrocompass via the MK 37 MOD E power transmitter. A dc step motor responds to signals sent from the gyrocompass switching unit via the power transmitter. The dc step motor is geared to a compass card which provides a readout of ship's heading. The compass repeaters are turned on by the repeater switch on the compass control panel.

1-10.6. Centralized Control and Monitoring System (CCMS). The CCMS provides for the centralization of the control and monitoring functions for the main propulsion power train, selected pumps, and vital alarms. Pilothouse and engine room throttle control is possible without intervention of engine room personnel. Primary control is from the pilothouse console (PHC) with one person at the engine room console (ERC). The system permits one person to observe all important operating conditions and initiate many functions from the ERC. A diagram of the CCMS is provided in FO-1.

1-10.6.1. Engine Room Console (ERC). The ERC provides a centralized engine room location for: controlling propulsion and bow thruster direction and speed; monitoring propulsion machinery operating conditions; monitoring machinery alarm conditions; communicating propeller shaft speed and direction; alerting non-duty engineering personnel of engine room alarm conditions and calling personnel for watch; and monitoring ERC operator alertness. These functions are provided to the ERC via interfaces to: the dual throttle control system, the monitoring system, the engineer's alarm system, the EOT system, the watch call/assistance needed system, and the attendance monitor system.

1-10.6.2. Pilothouse Console (PHC). The PHC provides control and monitoring of the main propulsion power train during usual ship operating and maneuvering conditions without intervention of engine room personnel. The PHC also provides a centralized pilothouse location for: controlling bow thruster direction and speed; monitoring machinery alarm conditions; communicating propeller shaft speed and direction; and main engine shutdown if a vital malfunction occurs. These functions are provided to the PHC via interfaces with the dual throttle control system, the monitoring system, the engineer's alarm system, the EOT system, and the main engine automatic shutdown system.

1-10.6.3. Throttle Control System. The throttle control system provides pneumatic throttle and direction control for propulsion and bow thruster engine at the ERC and PHC. The system

contains three each throttle and direction control valves for propulsion engine and bow thruster engine on the ERC and PHC. The ERC contains a pilot-air valve for ERC control of the system or transfer of control air to the PHC. The PHC contains a pushbutton valve for control air at the PHC.

1-10.6.4. Monitoring System. The monitoring system enables operators at the ERC and PHC to monitor propulsion machinery without several persons constantly observing machinery conditions. The system consists of the pressure monitoring system, the temperature monitoring system and the engine exhaust monitoring system.

1-10.6.4.1. Pressure Monitoring System. The pressure monitoring system provides the ERC operator with the means of observing machinery pressure on direct reading gauges from a single location.

1-10.6.4.2. Temperature Monitoring System. The temperature monitoring system (pyrometers) allows the ERC operator to observe machinery temperature on direct reading gauges from a single location. The system consists of resistive temperature detectors mounted on the machinery and signal condition panels mounted in the pyrometer panel. The temperature detectors transmit a voltage representative of temperature. The signal conditioners convert the voltage to a temperature reading for display on the meters.

1-10.6.4.3. Engine Exhaust Temperature System. The engine exhaust temperature system (pyrometers) displays main engine cylinder exhaust temperatures. Thermocouplers mounted in the engine exhaust ports transmit a temperature to pyrometers contained on the console.

1-10.6.5. Alarm System. The alarm system informs the operator of a malfunction of monitored engine room equipment. Conditions monitored include: lubrication oil, exhaust gas and water jacket temperature; lubrication oil, fuel oil, starting air, and cooling water pressure; expansion tank water and fuel oil level; engine overspeed; high bilge level in several locations; system power status; and related conditions. The basic elements of the alarm system are remote sensor elements and ERC alarm cards. The alarm cards monitor sensor elements and activate visual indicators and audible alarm devices when an alarm condition is detected. The alarm system also contains an inhibit circuit to prevent nuisance alarms from occurring when machinery is intentionally shut down. A pushbutton feature is provided to test the indicators and alarm circuitry without interrupting monitoring functions.

1-10.6.6. Engine Automatic Shutdown System. The main engine automatic shutdown system provides for automatic shutdown of the propulsion engine in the event of a vital malfunction which if allowed to continue, would cause extensive damage to the engine. Alarms monitor main engine low lubricating oil pressure and main engine reduction gear low lubricating oil pressure. When either of these alarms is activated, the ERC operator may override the automatic shutdown system. Since the engine does not develop lubrication oil pressure while not running, and the reduction gear also does not develop lubrication oil pressure when the propulsion shaft is not turning, each must be overridden during starting. The main engine low lubrication oil pressure switch is overridden by an engine speed switch until main engine attains operating speed. The main engines are manually shut down through the automatic shutdown circuitry by controls on the ERC. This action will cause the main engine governor to cease supplying fuel to the engine, and automatic shutdown occurs.

1-10.6.7. Engine Order Telegraph (EOT) System. The EOT system communicates the desired propeller shaft speed and direction for each from the PHC to the

ERC when the PHC-78 not in direct control of the main engines. The system consists of a selector switch indicating lamps and bells mounted both at the ERC and at the PHC. The EOT bells ring at both locations if the selector switch at the ERC does not match the position of the selector switch at the PHC or if the PHC EOT selector switch is positioned from one direction to another direction without the shaft coming to a stop. If the positions of the EOT selector switches at both locations are in the same position, the EOT bells are silent.

1-10.6.8. Watchcall/Assistance Needed System. The watchcall/assistance needed system provides remote alarms in various vessel locations which alert personnel in the event the ERC operator does not respond to an alarm within a specific time. The system also provides the means to call an engineer, in a stateroom, to the engineer's turn on watch.

1-10.6.8.1. Watchcall. The watchcall system notifies an engineer of his turn on watch. The system is activated by pressing an engineering call button at the master panel. Depressing the button energizes a relay in the master panel which enables an indication and an audible device at both the ERC and the selected state room panel. Pressing the cancel button at either location will deenergize the relay which inhibits the indications and audible devices.

1-10.6.8.2. Assistance Needed. The assistance needed system notifies offwatch engineers that the ERC operator needs assistance. The system is activated when the ERC alarm system detects an alarm condition and energizes an audible relay. The energized audible relay enables a 30 second delay timer in the master panel. If the ERC alarm is not acknowledged before the timer expires, the assistance needed relay in the master panel energizes. The relay may also be energized by pressing the manual assistance needed button on the master panel. When energized, the assistance needed relay enables indications and audible devices in the engineering mess and the recreation room. The relay is deenergized by depressing the acknowledge (ACK) pushbutton on the ERC or releasing the manual assistance needed pushbutton on the master panel.

1-10.6.9. Attendance Monitor System. The attendance monitor system (also known as the dead man alarm) enables the PHC operator to verify that the ERC operator is attentive. The system is activated by the PHC operator and is timer controlled. Every 30 minutes the ERC operator is given two minutes to respond to an indication and audible call at the ERC. If this is done the timer restarts. If it is not done in the two minutes provided, an alarm sounds at the PHC.

1-10.6.10. Marine Fire and Smoke Detection System. The marine fire and smoke detection system (FO-2) sounds an alarm when fire or smoke is detected. The system consists of a main fire panel, smoke and heat detectors, manual fire alarm stations, and associated alarms. The smoke and heat detectors are arranged in 12 zones throughout the ship. When a fire or smoke condition is detected, the associated detector sends an alarm signal via a junction box to the main fire panel. The alarm panel displays indications of the alarm by zone, sounds alarm bells at the pilot house and engine room, enables audible and strobe alarms on the intrusion fire alarm panels, and enables a visual alarm strobe light in the engine room. If main generator power drops below 95 volts, the system is transferred from main generator power to emergency generator power.

1-10.6.11. Intrusion/Fire Alarm System. The intrusion/fire alarm system indicates unauthorized entry into the secure radio room and arms

control room and provides fire indications. The main panel keypad is used for authorized entry. If the door is opened without the keypad, audible and indicator alarms at the main and remote panels are energized. An audible alarm sounds and strobe alarms light on all panels when a fire alarm signal is received from the main fire alarm panel.

1-10.7. Steering Gear System. The steering gear system is an electrically driven, hydraulically operated system that positions the rudder in response to steering commands. Rudder position commands are input to the steering gear by the movement of a joystick or wheel to generate an electrical signal. The signal operates solenoid activated hydraulic control valves in the hydraulic power unit. The control valves direct the flow of hydraulic fluid from the hydraulic pump to power cylinders attached to the rudder tiller arms which position the rudder. The hydraulic system consists of redundant, electrical-hydraulic power units. Either unit can be selected from the pilothouse.

1-10.8. Main Propulsion System. The main propulsion system is the power source for the main reduction gear and clutch system which transfers the power to the LSV's propellers. The main propulsion system for the LSV consists of two diesel engines. The engines counter-rotate; the port engine rotates counterclockwise, and the starboard engine rotates clockwise. They can be operated together or individually.

1-10.8.1. Engine Monitoring Panel. The engine control cabinet contains indicators which monitor the operation of the main engines. The monitoring panel also monitors cooling water, lubrication oil, fuel oil, start air, and clutch air. The main engines can be started or stopped remotely from the pilothouse console (PHC).

1-10.8.2. Governor. The governor maintains the speed of the main engines at a setting determined by the engine operator. The governor also contains an automatic shutdown feature which is controlled from the Centralized Control and Monitoring System (CCMS). The shutdown solenoid on the governor deenergizes in response to malfunction indications from the CCMS. This cuts off the flow of fuel to the engines. The solenoid also contains a plunger for manual shutdown.

1-10.8.3. Air Starting System. The main engine air starting system provides low pressure air to starting motors during engine startup. When energized, a solenoid valve releases air from a tank to the starting motor. The motor cranks the engine. The air starting system requires low pressure air from the LSV compressed air piping system (FIGURE 1-30). The low pressure air is supplied via a reducer and an automatic oil and water separator.

1-10.8.4. Fuel System. The main engine fuel system receives, filters, and injects fuel into the propulsion engines. The fuel system receives fuel oil from the main engine fuel oil service piping system (FIGURE 1-31).

1-10.8.5. Lubricating Oil System. The main engine lubricating oil system provides oil under pressure to most moving parts of the engine. The lubricating oil system receives oil from and returns oil to the engine sump. Oil is supplied to engine sump from the storage tank via the lubrication oil transfer system (FIGURE 1-32).

1-10.8.6. Cooling System. The main engine cooling system provides cooling water to the main engines. The cooling system receives potable water from the main engine cooling water piping system (FIGURE 1-33). Potable water is drawn into the cooling system by centrifugal pumps, pumped through the engine and discharged back to the main engine cooling water piping system.

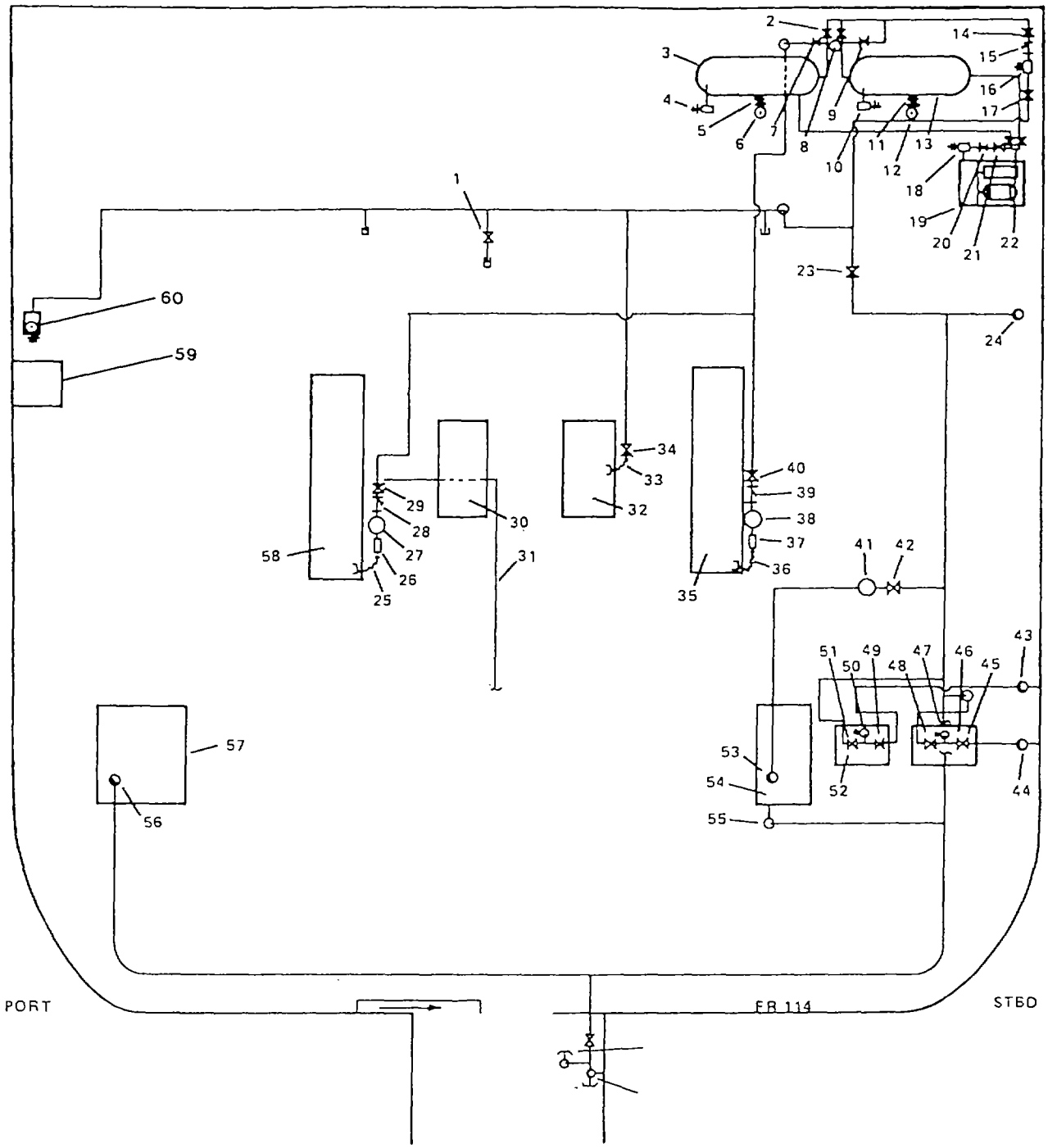
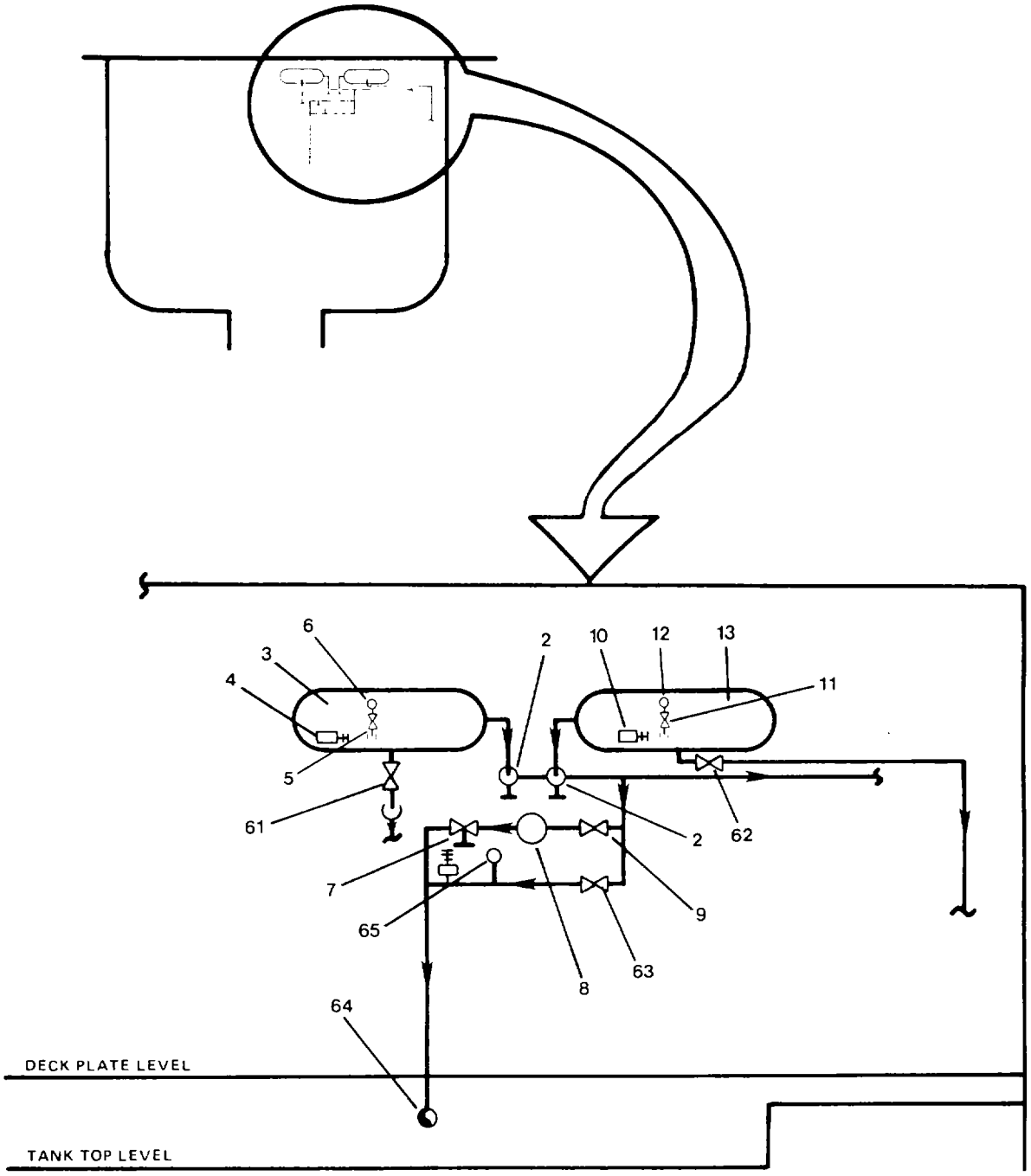


FIGURE 1-30. Compressed Air Piping System - Engine Room (Sheet 1 of 4).



MAIN ENGINE STARTING AIR REDUCING STATION
ENGINE ROOM FWD BULKHEAD FRAME 84 STBD SIDE

FIGURE 1-30. Compressed Air Piping System - Engine Room (Sheet 2 of 4).

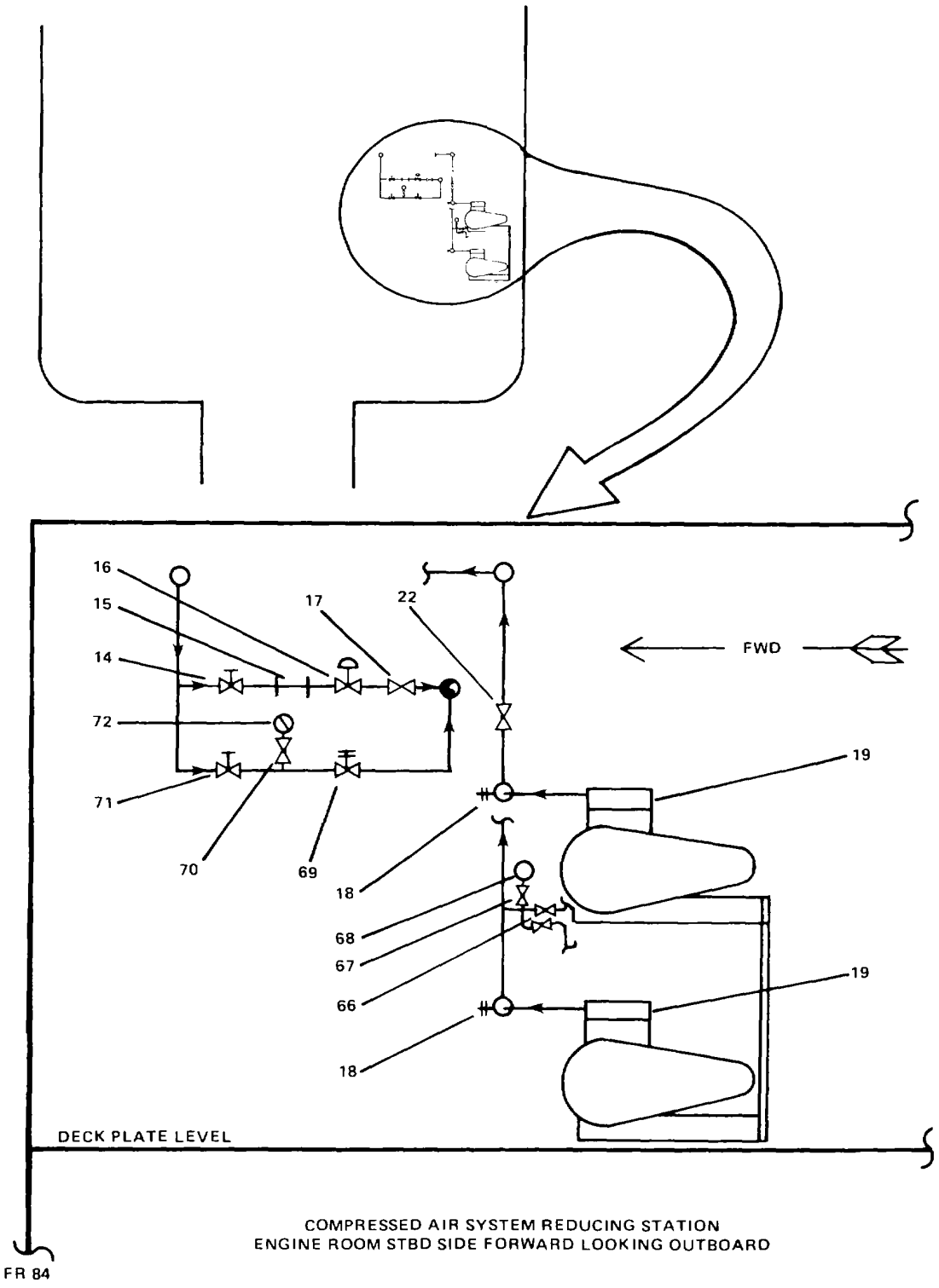
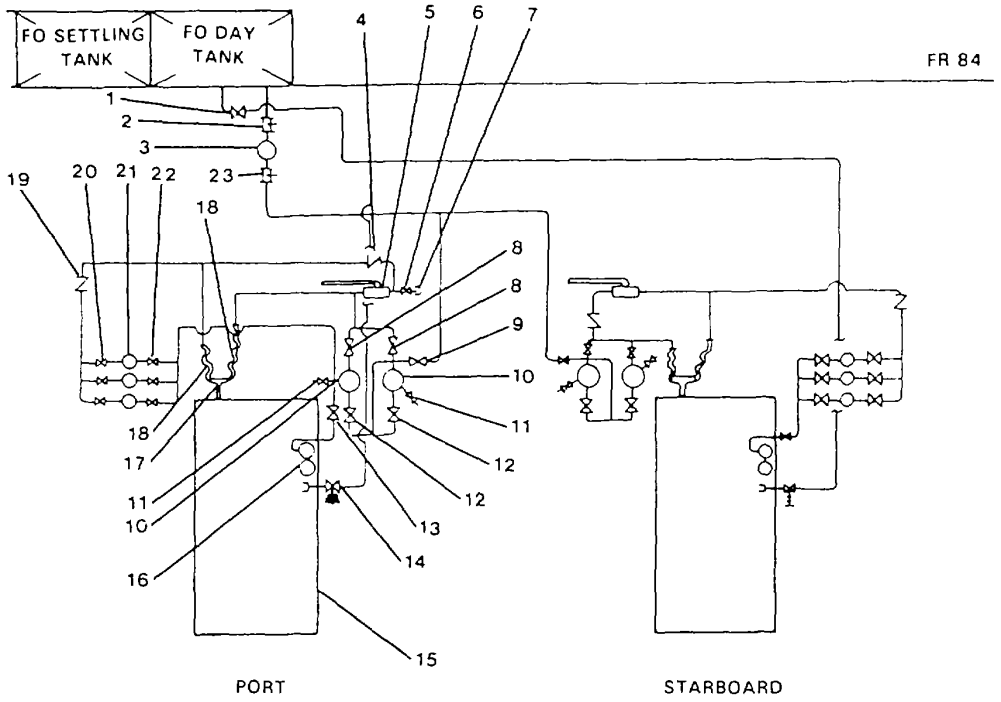


FIGURE 1-30. Compressed Air Piping System - Engine Room (Sheet 3 of 4).

LEGEND

1. RESERVE AIR OUTLET
2. #1 AND #2 AIR RECEIVER OUTLET VALVES
3. #2 AIR RECEIVER
4. #2 AIR RECEIVER PRESSURE RELIEF VALVE SET AT 275 PSI
5. PRESSURE GAUGE CUTOUT VALVE
6. #1 AIR RECEIVER PRESSURE GAUGE 0 TO 300 PSI
7. MAIN ENG STARTING AIR STATION OUTLET VALVE
8. MAIN ENGINE STARTING AIR STATION REDUCING AIR VALVE
9. MAIN ENGINE STARTING AIR STATION INLET VALVE
10. #1 AIR RECEIVER PRESSURE RELIEF VALVE SET AT 275 PSI
11. PRESSURE GAUGE CUTOUT VALVE
12. #1 AIR RECEIVER PRESSURE GAUGE (0 TO 300)
13. #1 AIR RECEIVER
14. COMPRESSED AIR REDUCING STATION INLET VALVE
15. COMPRESSED AIR REDUCING STATION "Y" TYPE STRAINER
16. COMPRESSED AIR REDUCING STATION REDUCING VALVE
17. COMPRESSED AIR REDUCING STATION OUTLET VALVE
18. AIR COMPRESSOR RELIEF VALVE SET AT 275 PSI
19. SHIP SERVICE AIR COMPRESSOR
20. SWING CHECK VALVE
21. SHIP SERVICE AIR COMPRESSOR DISCHARGE VALVE
22. #1 AND #2 AIR RECEIVER INLET VALVES
23. INLINE STOP VALVE
24. COMPRESSED AIR DISCHARGE PIPE TO MAIN DECK
25. FLEXIBLE COUPLING
26. MAIN ENGINE STARTING AIR RELAY VALVE
27. MAIN ENG STARTER LUBRICATOR
28. "Y" TYPE STRAINER
29. PORT MAIN ENGINE STARTING AIR CUTOUT VALVE
30. PORT S.S.D. GENERATOR
31. COMPRESSED AIR DISCHARGE PIPE TO CONTROL AIR STATION
32. STBD S.S.D. GENERATOR
33. FLEXIBLE COUPLING
34. STBD S.S.D. GENERATOR STARTING AIR CUTOUT VALVE
35. STBD MAIN ENGINE
36. FLEXIBLE COUPLING
37. STBD MAIN ENG STARTING AIR RELAY VALVE
38. STBD MAIN ENG STARTER LUBRICATOR
39. "Y" TYPE STRAINER
40. STBD MAIN ENG STARTING AIR CUTOUT VALVE
41. INLINE AIR STRAINER
42. INLINE STOP VALVE
43. LOW SEA CHEST VENT PIPE
44. HIGH SEA CHEST VENT PIPE
45. HIGH SEA CHEST VENT VALVE
46. HIGH SEA CHEST
47. HIGH SEA CHEST BLOW DOWN VALVE
48. INLINE STOP VALVE
49. LOW SEA CHEST VENT VALVE
50. LOW SEA CHEST BLOW DOWN VALVE
51. INLINE STOP VALVE
52. LOW SEA CHEST
53. COMPRESSED AIR DISCHARGE PIPE TO PILOT HOUSE
54. STBD MAIN ENG AND S.S.D. GENERATOR EXHAUST PIPE UPTAKE SPACE
55. UTILITY AIR OUTLET WITH QUICK DISCONNECT
56. COMPRESSED AIR DISCHARGE PIPE TO BRIDGE DECK
57. PORT MAIN ENG AND S.S.D. GENERATOR EXHAUST PIPE UPTAKE SPACE
58. PORT MAIN ENGINE
59. WORK BENCH
60. UTILITY AIR STATION WITH REDUCING VALVE AND GAUGE
61. #2 AIR RECEIVER DRAIN VALVE TO BILGES
62. #1 AIR RECEIVER DRAIN VALVE TO BILGES
63. MAIN ENG STARTING AIR STATION BYPASS VALVE
64. MAIN ENG STARTING AIR DISCHARGE PIPE
65. MAIN ENG STARTING AIR PRESSURE GAUGE 0 TO 300 PSI
66. COMPRESSED AIR DISCHARGE VALVES TO COMPRESSOR CONTROL RELAYS
67. PRESSURE GAUGE CUTOUT VALVES
68. COMPRESSOR DISCHARGE PRESSURE GAUGE 0 TO 300 PSI
69. COMPRESSED AIR REDUCING STATION RELIEF VALVE SET AT 165 PSI
70. PRESSURE GAUGE
71. COMPRESSED AIR REDUCING STATION HAND OPERATED BYPASS VALVE
72. COMPRESSED AIR REDUCING STATION PRESSURE GAUGE (0 TO 300 PSI)
73. INLINE STOP VALVE
74. SKEG SEA CHEST BLOWDOWN VALVE
75. SKEG SEA CHEST VENT VALVE

FIGURE 1-30. Compressed Air Piping System - Engine Room (Sheet 4 of 4).



LEGEND:

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL DAY TANK OUTLET VALVE
3. WATER TRAP
4. SWING CHECK VALVE
5. HAND OPERATED PRIMING VALVE
6. FAUCET CUTOUT VALVE
7. FAUCET
8. FUEL OIL STRAINER OUTLET VALVES
9. INLINE STOP VALVE
10. FUEL OIL STRAINER
11. FUEL OIL STRAINER HOUSING DRAIN VALVE
12. FUEL OIL STRAINER INLET VALVES
13. INLINE STOP VALVE
14. RETURN FUEL PRESSURE REGULATING VALVE
15. MAIN ENGINE
16. ENGINE MOUNTED DUPLEX FUEL OIL FILTER
17. MAIN ENGINE FUEL OIL PUMP
18. FLEXIBLE HOSE CONNECTION
19. SWING CHECK VALVE
20. RACOR FUEL OIL FILTER INLET VALVES
21. RACOR FUEL OIL FILTERS
22. RACOR FUEL OIL FILTER OUTLET VALVES
23. INLINE STOP VALVE

FIGURE 1-31. Main Engine Fuel Oil Service Piping System.

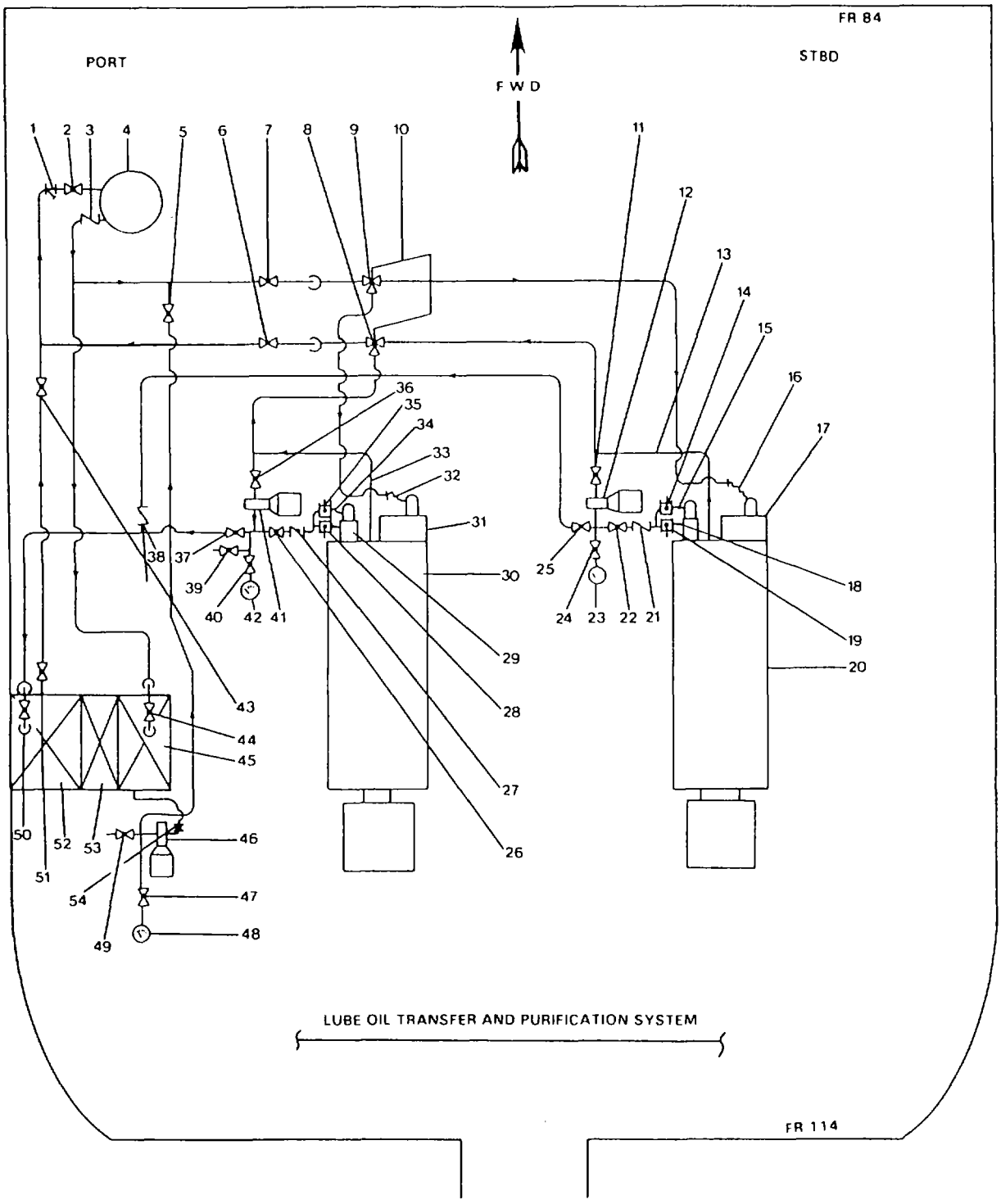


FIGURE 1-32. Lubricating Oil Transfer and Purification Piping System (Sheet 1 of 2).

LEGEND

1. Y TYPE STRAINER
2. LUBE OIL PURIFIER SUCTION VALVE
3. SWING CHECK VALVE
4. LUBE OIL PURIFIER
5. LUBE OIL TRANSFER PUMP DISCHARGE VALVE
6. INLINE STOP VALVE
7. INLINE STOP VALVE
8. THREE WAY SELECTOR VALVE
9. THREE WAY SELECTOR VALVE
10. THREE WAY SELECTOR VALVE OPERATING LEVER
11. STBD PRELUBE PUMP SUCTION VALVE
12. STBD PRELUBE PUMP AND MOTOR
13. STBD MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
14. DISCHARGE VALVE TO STBD MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
15. FLEXIBLE COUPLING
16. FLEXIBLE COUPLING
17. STBD MAIN ENGINE LUBE OIL STRAINER
18. FLEXIBLE COUPLING
19. DISCHARGE VALVE TO STBD MAIN ENGINE LUBRICATING SYSTEM
20. STBD MAIN ENGINE
21. SWING CHECK VALVE
22. STBD PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
23. DISCHARGE PRESSURE GAUGE (0-200 PSI)
24. PRESSURE GAUGE CUTOUT VALVE
25. STBD PRELUBE DISCHARGE VALVE TO LUBE OIL SETTLING TANK
26. PORT PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
27. SWING CHECK VALVE
28. DISCHARGE VALVE TO PORT MAIN ENGINE LUBRICATING SYSTEM
29. FLEXIBLE COUPLING
30. PORT MAIN ENGINE
31. PORT MAIN ENGINE LUBE OIL STRAINER
32. FLEXIBLE COUPLING
33. PORT MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
34. FLEXIBLE COUPLING
35. DISCHARGE VALVE TO PORT MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
36. PORT PRELUBE PUMP SUCTION VALVE
37. PORT PRELUBE PUMP DISCHARGE VALVE TO LUBE OIL SETTLING VALVE
38. SWING CHECK VALVE
39. DRAIN COCK
40. PRESSURE GAUGE CUTOUT VALVE
41. PORT PRELUBE PUMP AND MOTOR
42. PORT PRELUBE DISCHARGE PRESSURE GAUGE 10 TO-200 PSI)
43. INLINE STOP VALVE
44. LUBE OIL STORAGE TANK INLET VALVE
45. LUBE OIL STORAGE TANK
46. LUBE OIL TRANSFER PUMP AND MOTOR
47. PRESSURE GAUGE CUTOUT VALVE
48. LUBE OIL TRANSFER PUMP DISCHARGE PRESSURE GAUGE
49. LUBE FAUCET DISCHARGE VALVE
50. LUBE OIL SETTLING TANK INLET VALVE
51. LUBE OIL SETTLING TANK OUTLET VALVE
52. LUBE OIL SETTLING TANK
53. GEAR OIL STORAGE TANK
54. LUBE OIL TRANSFER SUCTION VALVE

FIGURE 1-32. Lubricating Oil Transfer and Purification Piping System (Sheet 2 of 2).

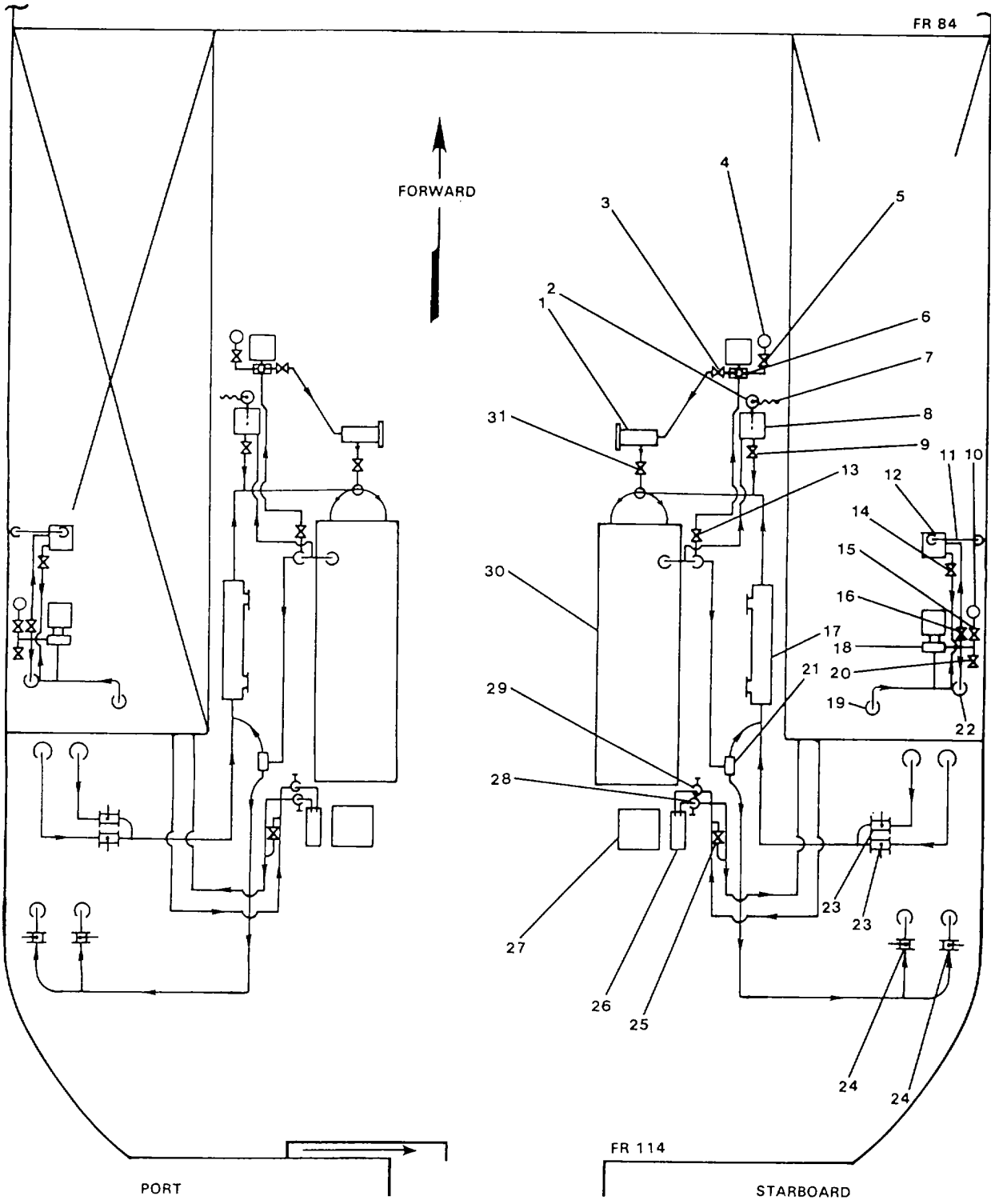


FIGURE 1-33. Main Engine Cooling Water Piping System (Sheet 1 of 2).

LEGEND:

1. MAIN ENGINE PREHEATER
2. COOLING WATER EXPANSION TANK LOW LEVEL ALARM
3. PREHEATER CIRCULATING PUMP DISCHARGE VALVE
4. PREHEATER CIRCULATING PUMP DISCHARGE PRESSURE GAUGE (0 TO 200 PSI)
5. GAUGE CUTOUT VALVE
6. PREHEATER CIRCULATING PUMP AND MOTOR
7. LOW LEVEL ALARM ELECTRICAL LEAD
8. COOLING WATER EXPANSION TANK
9. EXPANSION TANK DISCHARGE VALVE
10. REDUCTION GEAR COOLING WATER PUMP DISCHARGE PRESSURE GAUGE (0 TO 100 PSI)
11. EXPANSION TANK OVERFLOW PIP TO BILGES
12. REDUCTION GEAR COOLING WATER EXPANSION TANK
13. PREHEATER CIRCULATING PUMP SUCTION VALVE
14. REDUCTION GEAR COOLING WATER EXPANSION TANK DISCHARGE VALVE
15. PRESSURE GAUGE CUTOUT VALVE
16. REDUCTION GEAR COOLING WATER SYSTEM VENT VALVE
17. MAIN ENGINE LUBE OIL COOLER
18. REDUCTION GEAR COOLING WATER PUMP AND MOTOR
19. REDUCTION GEAR COOLING WATER SUCTION PIP FROM KEEL COOLERS
20. DRAIN COCK
21. THERMOSTATICALLY OPERATED KEEL COOLER BYPASS VALVE (AMOT)
22. REDUCTION GEAR COOLING WATER PUMP DISCHARGE PIPE
23. MAIN ENGINE COOLING WATER SUCTION VALVES FROM KEEL COOLER
24. MAIN ENGINE COOLING WATER DISCHARGE VALVES TO KEEL COOLER
25. REDUCTION GEAR COOLING WATER BYPASS VALVE
26. REDUCTION GEAR LUBE OIL COOLER
27. MAIN ENGINE REDUCTION GEAR
28. REDUCTION GEAR COOLING WATER SUCTION VALVE FROM KEEL COOLER
29. REDUCTION GEAR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
30. MAIN ENGINE
31. MAIN ENGINE PREHEATER SUCTION VALVE

FIGURE 1-33. Main Engine Cooling Water Piping System (Sheet 2 of 2).

1-10.9. Reverse Reduction Gear and Clutch System. The reverse reduction gear provides power transfer from the main engine to the propeller shaft. The system consists of a reverse reduction gear box and lubricating oil cooling pump.

1-10.9.1. Reverse Reduction Gear. The reverse reduction gear reduces the engine output revolutions per minute (RPM) and reverses its direction of rotation to the propeller shaft. Direction of rotation and clutch operation are controlled by each engine's throttle control on the control consoles.

1-10.9.2. Reduction Gear Lubricating Oil Cooling Pump. The reduction gear lubricating oil cooling pump cools the reduction gear cooling oil via water drawn from the keel cooler. The pump is activated by a switch on the control panel.

1-10.10. Bow Thruster Power System. The bow thruster power system powers the bow thruster water set system. The bow thruster power system consists of a diesel engine and a marine reduction gear coupled to a right angle submersible gear box. The gear box allows port or starboard operation of the bow thruster water set system.

1-10.10.1. Instrument Panel Group and Electrical System. The engine instrument panel group and electrical system monitors engine operation and provides engine controls. The instrument panel group monitors fuel pressure, lubricating oil pressure, engine speed, and cooling water temperature via gauges. The electrical system junction box monitors engine overspeed, low lubricating oil pressure, and coolant over temperature indications, which will automatically cause the fuel shutoff solenoid to cut off engine fuel. The emergency engine stop switch, also on the junction box, supplies power to the air shutoff and fuel shutoff solenoids to shut off the engine and prevent it from being restarted.

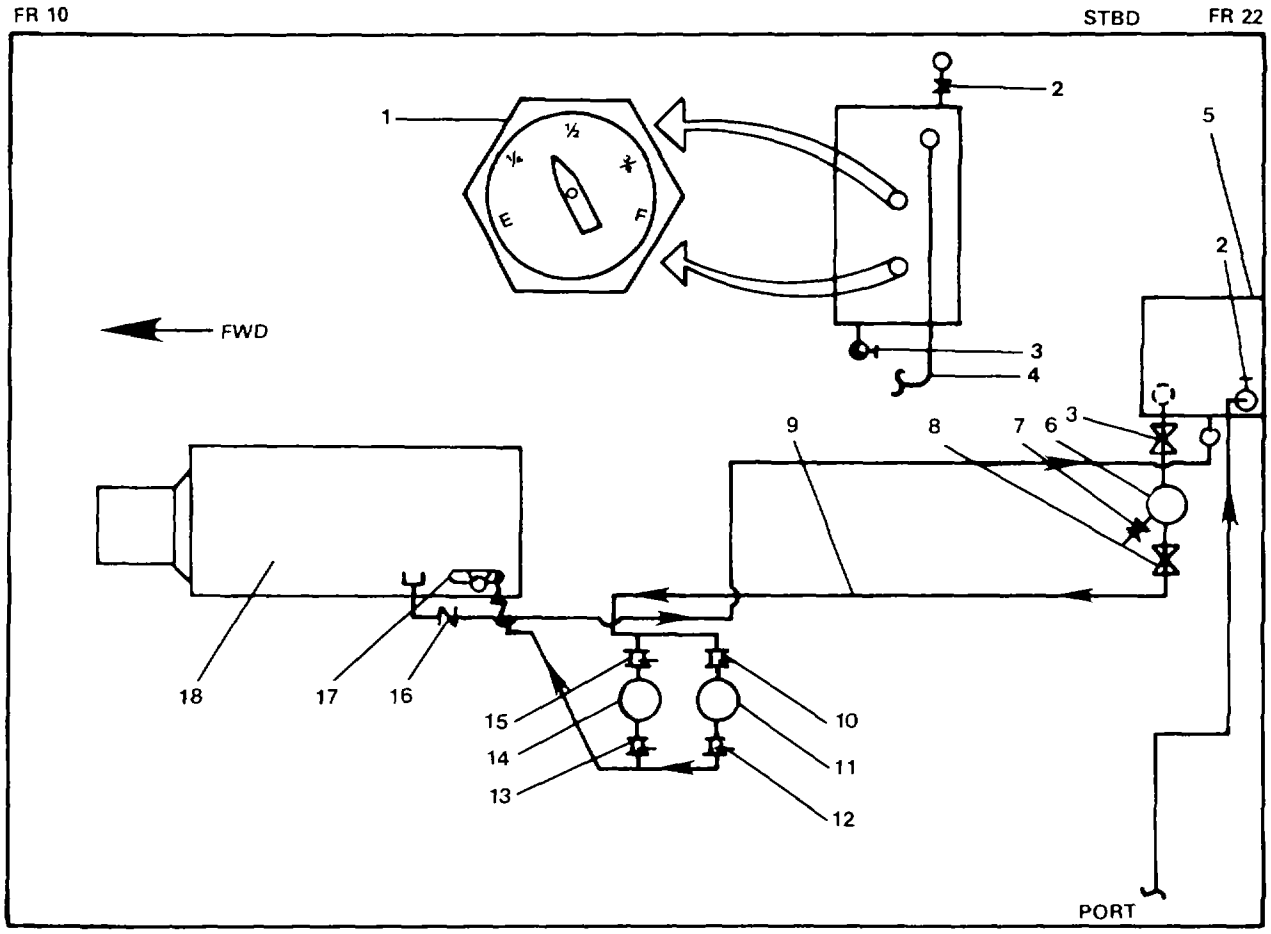
1-10.10.2. Air Starting System. The bow thruster engine air starting system provides low pressure air to a starting motor during engine startup. When activated, the air start control valve releases air to the relay valve which controls the flow of air to the air starting motor. The motor cranks the engine. The air starting system receives air from the compressed air piping system (FIGURE 1-30).

1-10.10.3. Fuel System and Governor. The bow thruster engine fuel system receives, filters, and injects fuel into the bow thruster engine. The governor maintains the speed of the bow thruster engine at a predetermined setting and provides the means to shut down the engine should a malfunction occur. The fuel system receives fuel oil from the bow thruster day tank via the bow thruster engine fuel oil service piping system (FIGURE 1-34). Unused fuel is returned to the day tank via the bow thruster engine fuel oil service piping system.

1-10.10.4. Lubrication System. The bow thruster lubrication system provides lubricating oil under pressure to most moving parts of the bow thruster engine. The lubricating oil is received, filtered, cooled, and pumped through the bow thruster engine. Return oil from the engine is routed back to the engine oil sump. Oil is supplied to the engine oil sump via the lubrication oil transfer system (FIGURE 1-32).

1-10.10.5. Cooling System. The bow thruster cooling system provides cooling water to the bow thruster engines. The cooling system receives potable water from the bow thruster engine cooling water piping system (FIGURE 1-35).

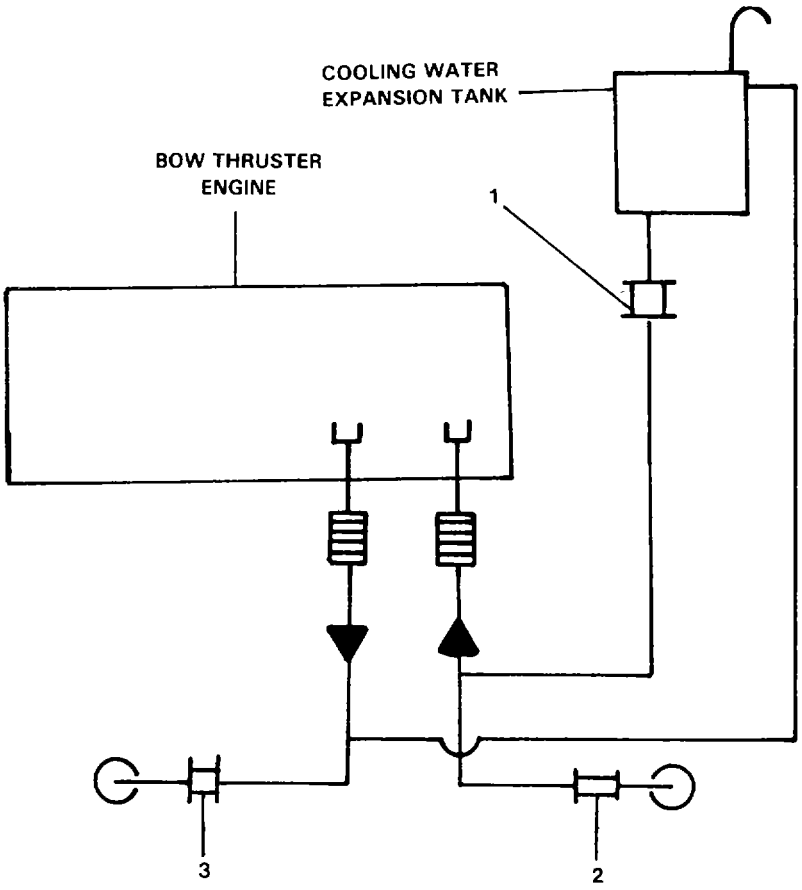
1-10.10.6. Marine Drive. The bow thruster receives power from the bow thruster engine via the twin-disc marine drive reduction gear and articulated shaft. The articulated



LEGEND

1. TANK LEVEL INDICATORS
2. DAY TANK FILL VALVE
3. FUEL OIL DAY TANK OUTLET VALVE
4. FUEL OIL RETURN DISCHARGE PIPE
5. DAY TANK
6. WATER TRAP
7. WATER TRAP DRAIN VALVE
8. INLINE STOP VALVE
9. FUEL OIL SERVICE SYSTEM SUCTION PIPE
10. FUEL FILTER INLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER OUTLET VALVE
13. FUEL OIL FILTER OUTLET VALVE
14. FUEL OIL FILTER
15. FUEL OIL FILTER INLET VALVE
16. SWING CHECK VALVE
17. FUEL OIL PRIMING PUMP
18. BOW THRUSTER ENGINE

FIGURE 1-34. Bow Thruster Engine Fuel Oil Service Piping System.



LEGEND

1. COOLING WATER EXPANSION TANK DISCHARGE VALVE
2. COOLING WATER SUCTION VALVE FROM KEEL COOLER
3. COOLING WATER DISCHARGE VALVE TO KEEL COOLERS

FIGURE 1-35. Bow Thruster Engine Cooling Piping System.

shaft turns the drive flange assembly of the bow thruster and compensates for the offset between the gear box and bow thruster. The marine drive changes direction via hydraulically controlled clutches. The marine drive clutches and bow thruster shaft brakes are pneumatically actuated via controls located on the PHC and ERC. The shaft brake, when actuated, prevents the propeller and marine drive from turning when not in use.

1-10.11. Bow Thruster Water Set System. The bow thruster water set system delivers athwartships thrust at the bow for close quarter maneuvering. The bow thruster functions as an onboard maneuvering system to provide immediate maneuvers without the aid of supporting vessels. The bow thruster can be used when docking, in an emergency situation, such as impending collision, or in station keeping. The system is installed in the bow thruster tunnel with the bow thruster propeller forcing water through the tunnel in either direction to provide the required thrust. Direction of thrust is determined by the rotational direction of the propeller. The bow thruster water set system receives drive torque from the articulated shaft which is part of the bow thruster power generation system.

1-10.12. Bow Anchor Windlass and Bow Ramp Winch System. The bow anchor windlass and bow ramp winch system raises and lowers the bow anchors and the bow ramp. The system consists of the bow anchor windlass, bow ramp winch, and the bow ramp. The bow anchor windlass and bow ramp winch systems are hydraulically powered.

1-10.12.1. Bow Anchor Windlass. The port and starboard bow anchor windlass assemblies raise and lower the bow anchor. They are operated by individual port and starboard control valves at each assembly. The control valves control direction and rotation speed of chain-hauling wildcats, which in turn haul in or pay out anchor chain. Auxiliary clutches transfer power to outboard gypsies providing pulling power during mooring and for operating the port and starboard bow ramp winch drums in the event of bow ramp winch failure. The bow anchor windlass receives hydraulic power from the bow anchor windlass hydraulic piping system.

1-10.12.2. Bow Ramp Winch. The port and starboard bow ramp winch assemblies raise and lower the bow ramp. They are operated by a single control valve, at the port winch assembly. The control valve controls direction and rotation speed of both port and starboard ramp winch drums, which in turn haul in or pay out port and starboard wire ropes connected to each side of the bow ramp. As the wire ropes are hauled in, the ramp raises. When they are payed out, the ramp lowers. Auxiliary clutches on the port and starboard bow anchor windlasses can be engaged to drive the bow ramp winch drums, providing a backup source of power for operating the bow ramp, in case of bow ramp hydraulic failure. The bow ramp winch receives hydraulic power from the bow ramp hydraulic piping system.

1-10.12.3. Bow Ramp. The bow ramp, when lowered, forms a bridge into the vessel allowing vehicle and cargo loading and unloading. The ramp's outermost section is hinged, allowing the ramp to adjust to beach or dock, thus providing smooth vehicle passage. When fully closed, the bow ramp contacts a gasket system along the vessel's bottom and sides forming a watertight seal. It is secured in its upright closed position by two manually operated upper locking bars and four manually operated ratchet dogs. Port and starboard chains support the ramp in its lowered position.

1-10.13. Stern Anchor and Stern Ramp Winch System. The stern anchor and stern ramp winch system raises and lowers the stern anchor and the stern

ramp. The system consists of stern anchor winch, stern ramp winch, and the stern ramp. The stern anchor and stern ramp winches are hydraulically powered.

1-10.13.1. Stern Anchor Winch. The stern anchor winch assembly raises and lowers the stern anchor. Electric and hydraulic controls located on the winch control direction and rotation speed of the main drum, which in turn hauls in or pays out wire rope attached to the anchor. The stern anchor winch, through a system of fairleads, is capable of retracting the fully loaded vessel from a beach. Additionally, the auxiliary drum provides a pulling force for operating the stern ramp via a fairlead and wire rope system passing through and below the poop deck. The stern anchor windlass receives hydraulic power from the stern anchor winch hydraulic piping system.

1-10.13.2. Stern Ramp (Jigger) Winch. The stern ramp winch, also referred to as the jigger winch, raises and lowers the stern ramp. Using a hydraulic ram, it transfers pulling force through a series of sheaves and wire ropes to the port and starboard sides of the stern ramp. Hauling in and paying out the wire rope raises and lowers the ramp when the ram is actuated via the hydraulic control valve located on the starboard aft mooring station. In the event of stern ramp (jigger) winch failure, the stern ramp can be operated using the stern anchor winch auxiliary drum and wire rope. The stern ramp winch receives hydraulic power from the stern ramp hydraulic piping system.

1-10.13.3. Stern Ramp. The stern ramp, when lowered, forms a bridge to the vessel allowing vehicle and cargo loading and unloading. It is raised and lowered by the stern ramp winch. The stern ramp is hinged to the main deck and, when fully closed, contacts the sides of the vessel and extends upward to the poop deck. It is secured in the upright position by four manually operated ratchet dogs and is restrained in its opened position by port and starboard chains.

1-10.14. Commissary Equipment. Commissary equipment provides for chilled and frozen food storage, food preparation, food service, waste disposal and sanitization, and galley exhaust and fire protection. Chilled and frozen food storage units are free standing refrigeration units. Food preparation units are free standing steam kettles, ranges, microwave ovens, fryers, and associated equipment. Food service units are free standing drop-in cold and drop-in hot units; and free standing milk dispenser, and coffee maker. Waste disposal and sanitization is provided by separate disposal and sanitization equipment. Both units tie into the LSV marine sanitization piping system. Galley air exhaust and fire protection is provided by an exhaust hood tied to ducting and an exhaust fan which is part of the environmental control system. Fire protection within the exhaust hood is provided by a freestanding wet chemical system.

1-10.15. Fire Fighting System. The fire fighting system provides fire stations and specialized chemical fire suppression systems and equipment throughout the vessel. The fire fighting system consists of Halon fire suppression systems, fire stations, fire fighting equipment and countermeasure washdown system.

1-10.15.1. Halon 1301 Fire Suppression System. The Halon system provides fire suppression where highly flammable materials are located. These areas are the engine room, bow thruster room, emergency generator room, and the paint locker. The system extinguishes fires in affected compartments by flooding the compartment with Halon 1301 agent. The system is actuated by various types of actuators depending on the location

of the compartment. There is a 25-second delay during which the siren sounds, warning personnel to evacuate the protected area. Pressure switches interconnected with the electrical system are activated during the delay for ventilation and equipment shutdown. Upon discharge, the halon cylinders will release and "flood" the designated compartment in approximately 10 seconds.

1-10.15.2. Fire Stations. Fire stations provide water for fire suppression throughout the ship. Fire stations consist of fire plugs connected to the fire/bilge system (FIGURE 1-36) or fire main piping system (FIGURE 1-37). Installed at each fire station is an all-purpose nozzle.

1-10.15.3. Carbon Dioxide Equipment. Carbon dioxide (CO2) systems provide fire suppression in areas that present unusual fire hazards. When released from the cylinder, C02 liquid rapidly expands to about 450 times its stored volume. This rapid expansion causes the liquid to become C02 gas. Because it is heavier than air, the CO2 gas will settle to blanket and extinguish the fire.

1-10.15.4. Oxygen Breathing Apparatus (OBA). The oxygen breathing apparatus provides oxygen to the wearer for entering smoke filled compartments to fight fires. When activated, a chlorate candle within the apparatus generates oxygen and supplies it to the breathing bag. Chemicals within the canister remove moisture and carbon dioxide from the exhaled air and return the remainder of the air to the breathing bag. A pressure relief valve vents excess pressure from the breathing bag.

1-10.15.5. Dry Chemical Extinguishers. Dry chemical extinguishers provide fire suppression for chemicals and liquids that are difficult to extinguish. They dispense a powder that interrupts the chemical reaction of the fire. The dry chemicals suspend fine particles in the fire to screen the fire from oxygen and fuel sources, thereby extinguishing the fire.

1-10.15.6. Submersible Pumps. Submersible pumps provide a portable means of pumping out water-filled compartments. A centrifugal pump is driven by a constant speed electric motor contained within the pump and enclosed in a water-jacket for cooling. The pump is intended to be fully immersed in the water it is pumping.

1-10.15.7. Eductor Bilge 4" Ejector Set. The Eductor bilge 4" ejector set is a jet-type pump which can pump liquids containing small particles of foreign matter. The pump has no moving parts and does not require electricity.

1-10.15.8. Ventilating Portable Blower GE-V8. The ventilating portable blower provides portable ventilation to confined spaces. The blower is a gasoline engine driven device. It contains a fan enclosed in a shroud and a flexible hose.

1-10.15.9. Portable Fire Pump. The portable fire pump provides high pressure water as a backup source for the fire stations and is also portable. It draws water from the sea (or other sources) and pumps it through hoses and nozzles under high pressure for fire fighting. It can also be used for large volume pumping at low pressure for damage control work. The centrifugal gas engine portable fire fighting pump is powered by a gasoline driven engine, with a battery powered electrical starter and a backup pullstarter.

1-10.15.10. Countermeasure Washdown System. The countermeasure washdown system (FIGURE 1-38) uses fire station 12 to provide an umbrella of water over the superstructures in case of nuclear, biological, or chemical (NBC) attack. Fire main seawater is directed through a piping system in the handrail of the

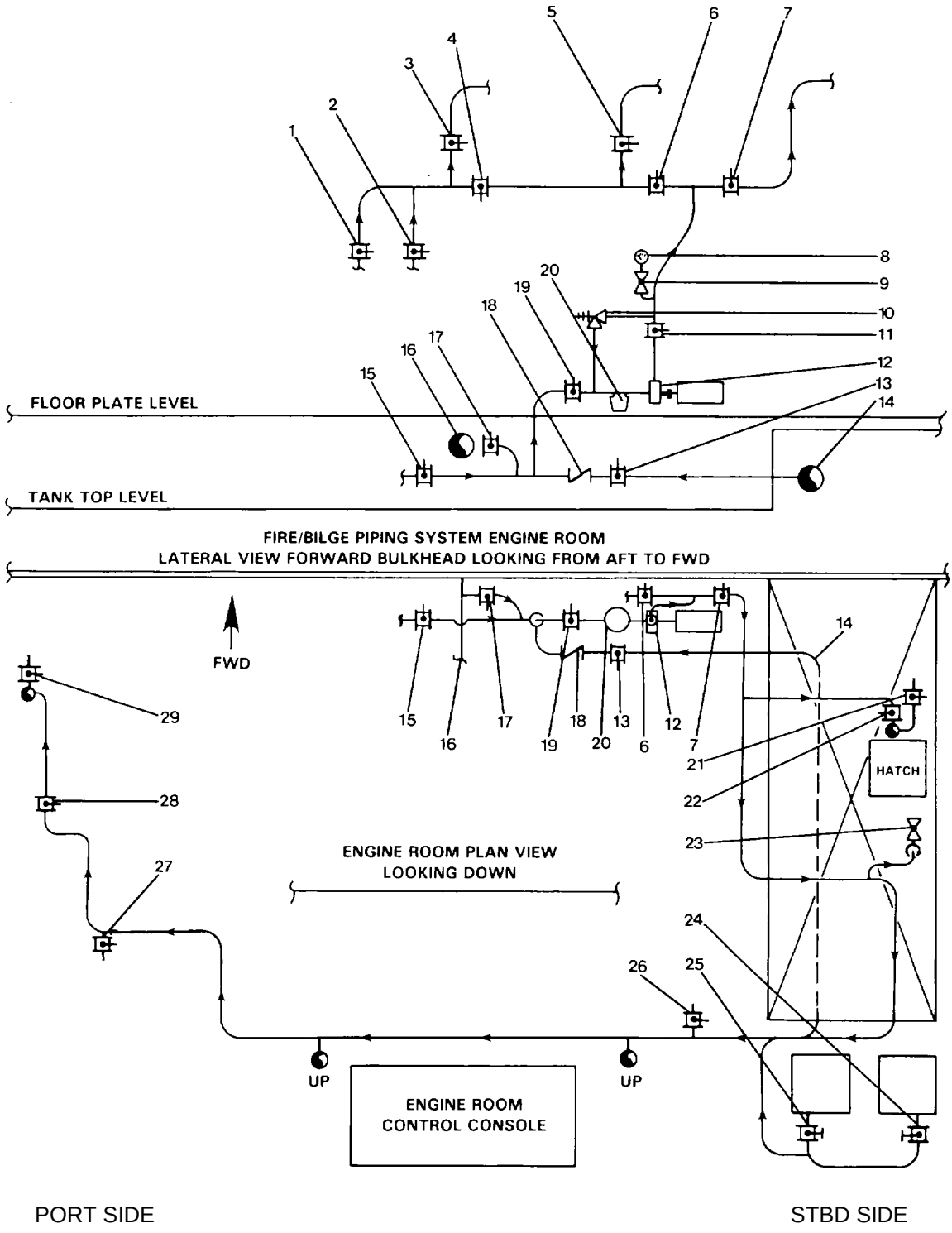
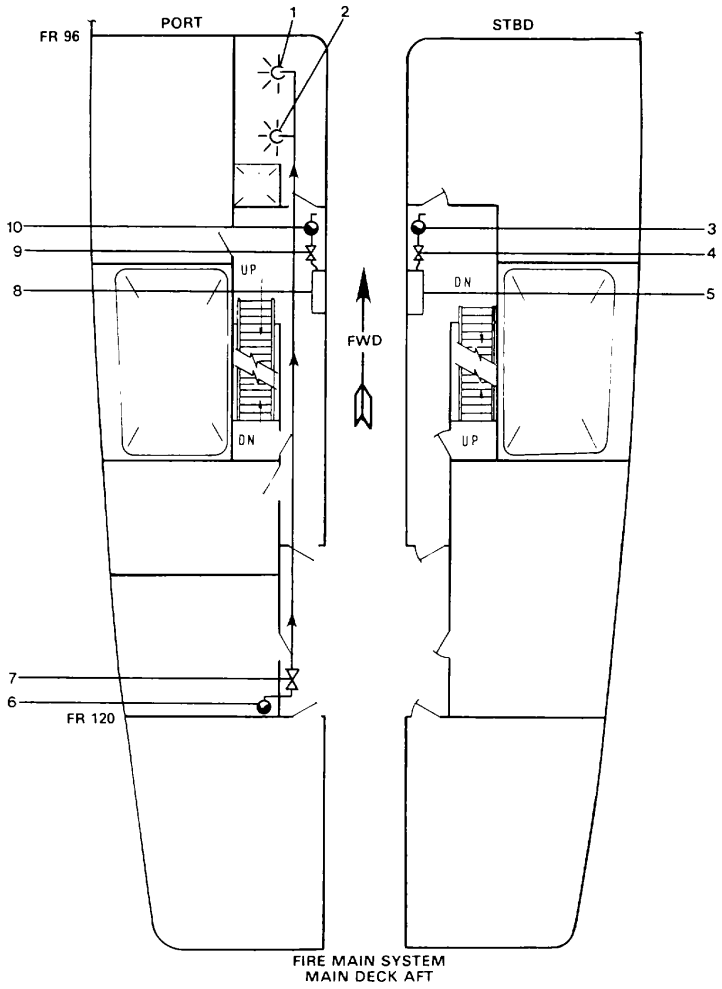


FIGURE 1-36. Fire/Bilge Piping System - Engine Room (Sheet 1 of 2).

LEGEND

1. BILGE/BALLAST PUMP DISCHARGE VALVE
2. BILGE/BALLAST PUMP DISCHARGE VALVE
3. DISCHARGE VALVE TO SLUDGE TANK
4. INLINE STOP VALVE
5. OVERBOARD DISCHARGE VALVE
6. INLINE STOP VALVE
7. DISCHARGE VALVE TO FIRE MAIN
8. DISCHARGE PRESSURE GAUGE 10 To 200 PSI)
9. DISCHARGE PRESSURE GAUGE CUTOUT VALVE
10. PRESSURE RELIEF VALVE
11. FIRE/BILGE PUMP DISCHARGE VALVE
12. FIRE/BILGE PUMP AND MOTOR
13. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
14. FIRE/BILGE PUMP SEA WATER SUCTION PIPE
15. SUCTION VALVE FROM BILGE MANIFOLD
16. BALLAST MAIN PIPE
17. SUCTION VALVE FROM BALLAST MAIN PIPE
18. SWING CHECK VALVE
19. FIRE/BILGE PUMP SUCTION VALVE
20. FIRE/BILGE PUMP SUCTION STRAINER
21. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK STBD SIDE
22. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION STBD SIDE
23. ENGINE ROOM FIRE STATION CUTOUT VALVE
24. HIGH SEA CHEST CUTOUT VALVE
25. LOW SEA CHEST CUTOUT VALVE
26. FIRE MAIN PIPING SYSTEM DRAIN VALVE
27. FIRE MAIN PIPING SYSTEM DRAIN VALVE
28. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION PORT SIDE
29. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK PORT SIDE

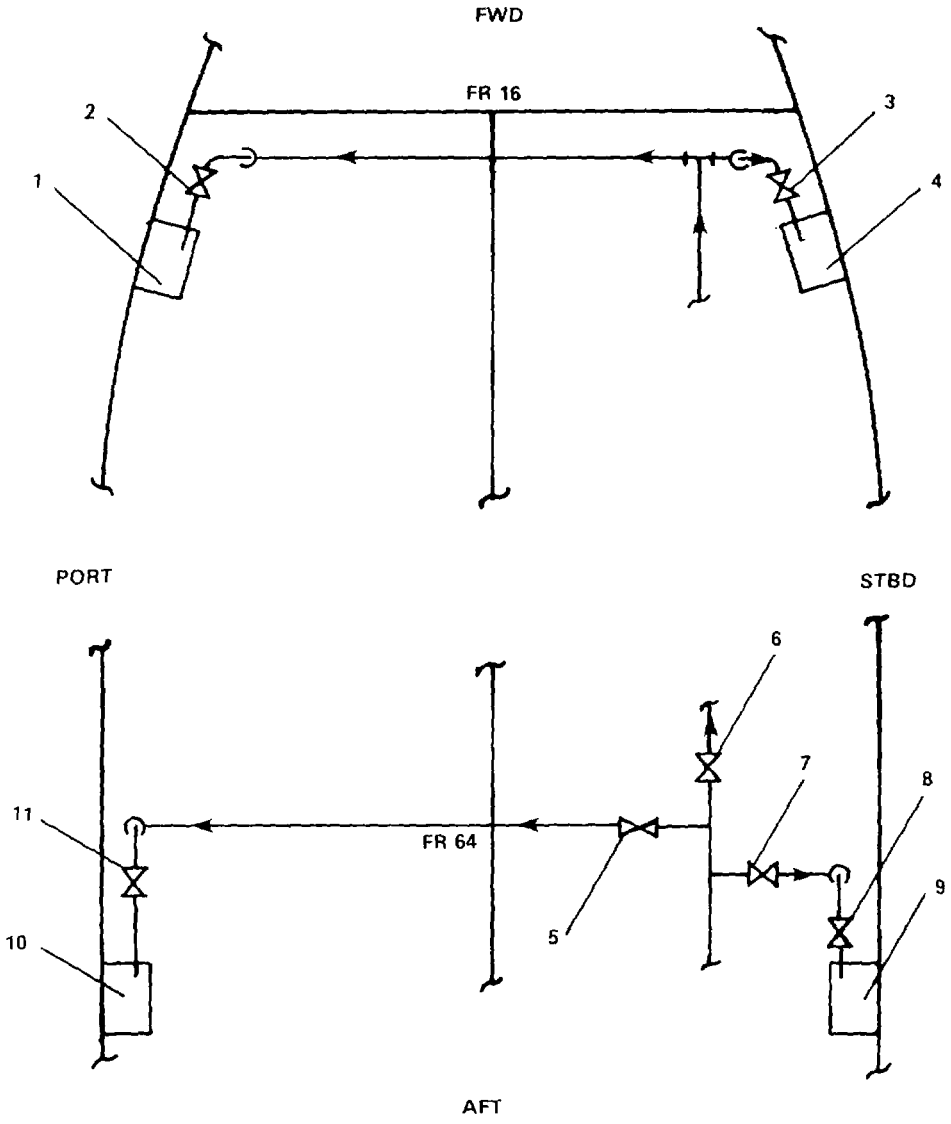
FIGURE 1-36. Fire/Bilge Piping System - Engine Room (Sheet 2 of 2).



LEGEND

1. SPRINKLER HEAD
2. SPRINKLER HEAD
3. FIRE MAIN CUTOUT VALVE FROM ENGINE ROOM STBD SIDE
4. FIRE STATION CUTOUT VALVE
5. FIRE STATION HOSE 75 FOOT LENGTH (TYPICAL)
6. EMERGENCY FIRE PUMP DISCHARGE PIPE
7. SPRINKLER SYSTEM CUTOUT VALVE
8. FIRE STATION HOSE 75 FOOT LENGTH (TYPICAL)
9. FIRE STATION CUTOUT VALVE
10. FIRE MAIN CUTOUT VALVE FROM ENGINE ROOM PORT SIDE

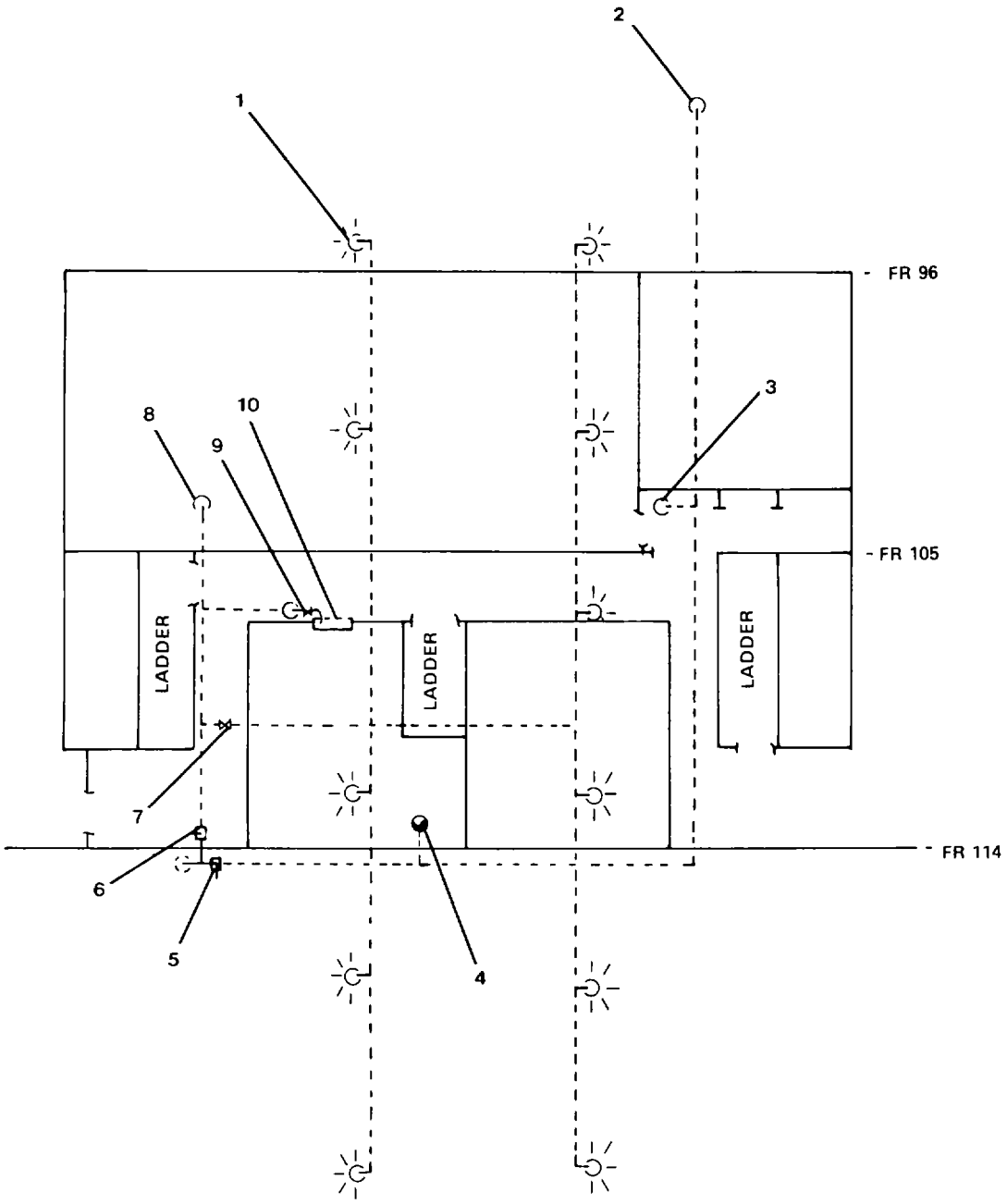
FIGURE 1-37. Fire Main Piping System - Outside Engine Room (Sheet 1 of 5).



LEGEND

1. FIRE STATION PORT SIDE
2. FIRE STATION CUTOUT VALVE
3. FIRE STATION CUTOUT VALVE
4. FIRE STATION STBD SIDE
5. FIRE MAIN CUTOUT VALVE TO PORT SIDE FIRE STATION
6. FIRE MAIN CUTOUT VALVE TO FWD FIRE STATIONS
7. FIRE MAIN CUTOUT VALVE TO STBD SIDE FIRE STATION
8. FIRE STATION CUTOUT VALVE
9. FIRE STATION STBD SIDE
10. FIRE STATION PORT SIDE
11. FIRE STATION CUTOUT VALVE

FIGURE 1-37. Fire Main Piping System - Outside Engine Room (Sheet 2 of 5).



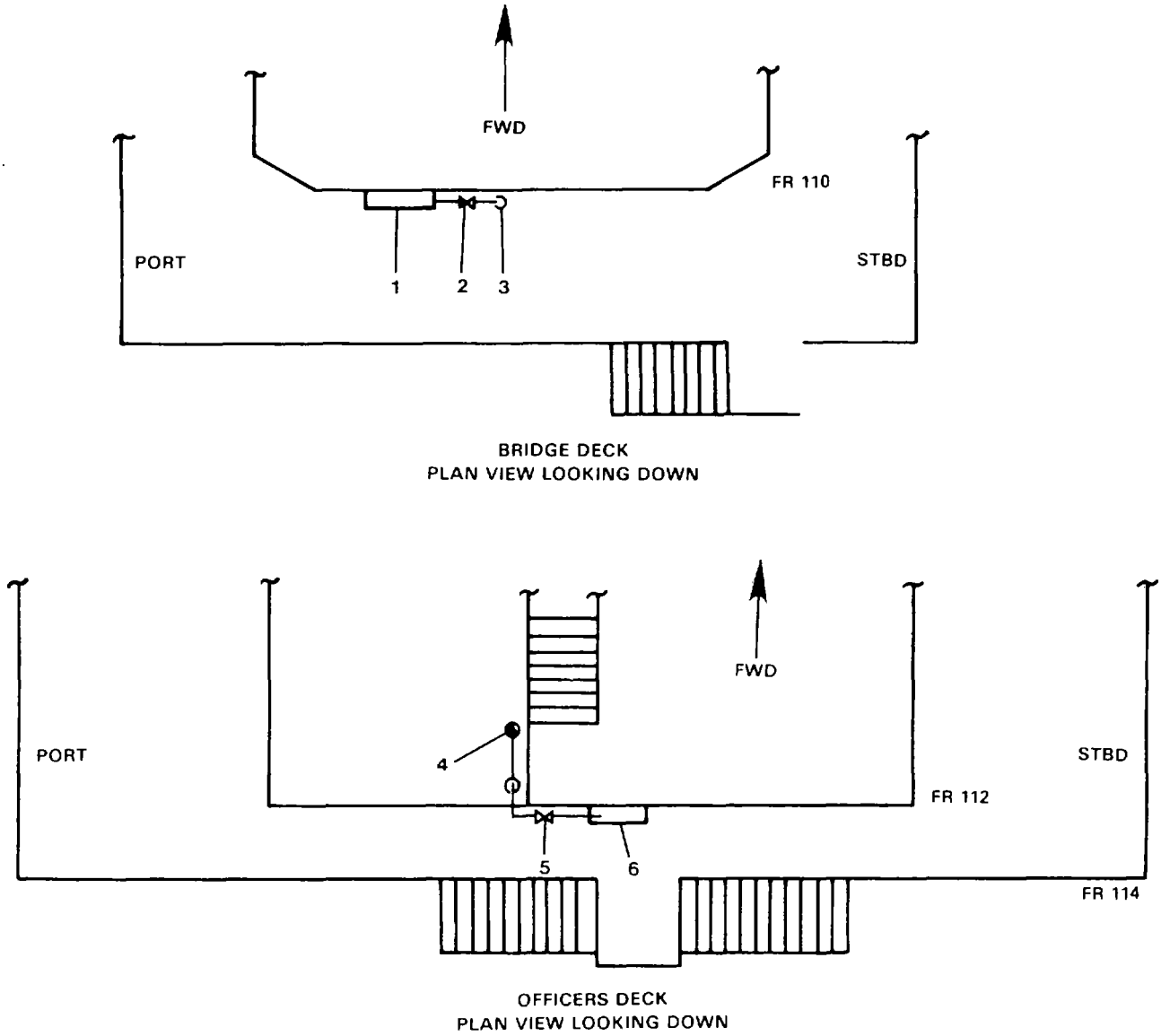
FIRE MAIN SPRINKLER SYSTEM
BELOW POOP DECK
PLAN VIEW LOOKING DOWN

FIGURE 1-37. Fire Main Piping System - Outside Engine Room (Sheet 3 of 5).

LEGEND

1. SPRINKLER HEAD (TYPICAL)
2. FIRE MAIN DOWN TO MAIN DECK FIRE STATIONS
3. FIRE MAIN DOWN TO FIRE STATION ON MEZZANINE DECK STBD SIDE
4. FIRE MAIN UP TO FIRE STATION ON OFFICERS DECK AFT BULK HEAD
5. FIRE MAIN ISOLATION VALVE
6. FIRE MAIN ISOLATION VALVE
7. FIRE MAIN DISCHARGE VALVE TO SPRINKLER SYSTEM
8. FIRE MAIN DOWN TO MEZZANINE DECK PORT SIDE
9. FIRE STATION CUTOUT VALVE
10. FIRE STATION HOSE 75 FOOT LENGTH (TYPICAL)

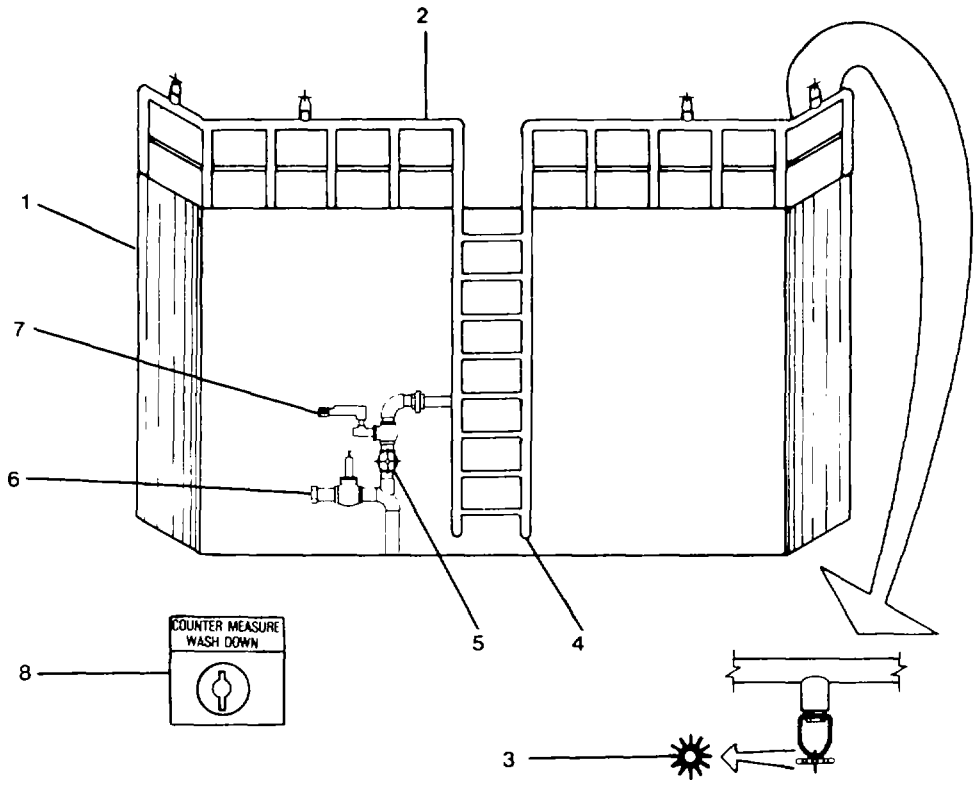
FIGURE 1-37. Fire Main Piping System - Outside Engine Room (Sheet 4 of 5).



LEGEND

1. FIRE STATION WITH 50 FEET OF HOSE
2. FIRE STATION CUTOUT VALVE
3. FIRE MAIN UP FROM OFFICERS DECK
4. FIRE MAIN UP TO FIRE STATION ON BRIDGE DECK
5. FIRE STATION CUTOUT VALVE
6. FIRE STATION WITH 50 FEET OF HOSE

FIGURE 1-37. Fire Main Piping System - Outside Engine Room (Sheet 5 of 5).



LEGEND

1.	AFT PILOTHOUSE	5.	MANUAL VALVE
2.	WASHDOWN PIPING	6.	FIRE STATION #12
3.	SPRINKLER HEAD	7.	SOLENOID OPERATED VALVE
4.	DRAIN VALVE	8.	KEY OPERATED SWITCH IN PILOTHOUSE

FIGURE 1-38. Countermeasure Washdown System.

weather deck above the pilothouse. Twelve sprinkler heads direct the water to wash down the superstructure. The system is activated by a key operated switch in the pilothouse.

1-10.16. Gyropilot. The gyropilot is an automatic steering control system which uses heading information from the ship gyrocompass to control the ships steering gear. The gyropilot energizes solenoids, part of the vessel's steering control group, to maintain selected heading. The gyropilot heading selector combines the functions of a heading selector with a gyrocompass repeater. The heading selector contains controls that permit the selection of operating mode and desired heading. The gyropilot control amplifier processes the signals from the gyropilot heading selector and the rudder repeatback unit to develop steering signals which are sent to the steering group solenoids. This provides rudder control. The gyropilot rudder repeatback unit sends signals from the steering group, providing rudder position information, back to the control amplifier.

1-10.17. Magnetic Compass. The magnetic compass provides heading information using a reflector compass mounted in a periscope binnacle. The binnacle is mounted on the pilothouse top with the periscope extending into the pilothouse located underneath. A reflection of the compass card is projected through the center of the binnacle. The compass can be read from either the pilothouse or pilothouse top. A toggle switch and rheostat control provide power to two lamps located in the binnacle.

1-10.18. Refrigeration Units. Refrigeration units maintain the temperature in the chill room and the freeze room. Each room has an independent refrigeration unit. One unit keeps the chill room at 340F and the other keeps the freeze room at 100F. The refrigeration units are thermostatically controlled to turn on when the temperature in the room rises 20 to 40F.

1-10.19. Navigation Lighting System. The navigation lighting system provides the appropriate exterior lights for safe navigation. The system is controlled from the navigation light panel in the pilothouse. The navigation light panel receives 120 Vac from the emergency distribution panel, EP2.

1-10.20. Sound Powered Telephone System The sound-powered telephone system provides voice communications throughout the ship. The sound-powered telephone system contains fixed phone stations and portable units. Since the system is powered by voice only, it is functional even with the loss of all ships power.

1-10.21. Electrical System. The electrical system distributes primary, secondary, and emergency power throughout the ship. The primary power is received from the power generation system ships service generators and routed via the main ship service switchboard to ship service power and lighting panel. Primary power is provided to a transformer, stepped down to 120 Vac for lighting and receptacles and routed to lighting panels in the engine room; main deck, port and starboard; officers deck, and pilothouse. Primary power at 440 Vac and secondary power at 120 Vac is provided to machinery and work spaces via several distribution panels. Essential engineering equipment and systems tied into the emergency switchboard normally receive power from the main switchboard via automatic bus transfer equipment. When primary power is lost, the essential engineering equipment receives power from the emergency generator. When tied to shore power the ship distribution is the same as provided for primary power.

1-10.22. Piping Systems. Functional descriptions of the various vessel piping systems are provided in the following paragraphs.

1-10.22.1. Fire/Bilge Piping System. The fire/bilge piping system provides fire fighting water by taking water from a sea chest and discharging it through the fire main for use at the various fireplugs and sprinkler systems throughout the vessel. System control is maintained through a combination of flanges/valves as shown in FIGURE 1-36 (engine room) and FIGURE 1-37 (outside engine room). The fire/bilge piping system contains an emergency fire pump controlled at the pilothouse console and a fire and bilge pump controlled at the engine room motor control center. The system can be aligned so that the emergency fire pump is connected to the ballast piping system to deballast the ship or the fire and bilge pump is connected to the bilge/ballast system to pump the bilges.

1-10.22.2. Ballast Piping System. The ballast piping system regulates ship stability by transferring sea water to and from strategic points on the vessel. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-39. The system draws water from the seachest and distributes it to the selected ballast tank or draws water from the ballast tank and discharges it overboard. The ballast pump is controlled at the engine room motor control center. The system can be aligned so that the ballast pump is connected to the bilge/ballast piping system to pump the bilges.

1-10.22.3. Bilge/Ballast Piping System. The bilge/ballast piping system removes accumulated water from the bilges. System control is maintained through a combination of flanges/valves as shown in FIGURE 1-40. The system contains two pumps that are controlled at the engine room motor control center. The system can be aligned so that the bilge/ ballast pumps are connected to the ballast piping system to deballast the vessel.

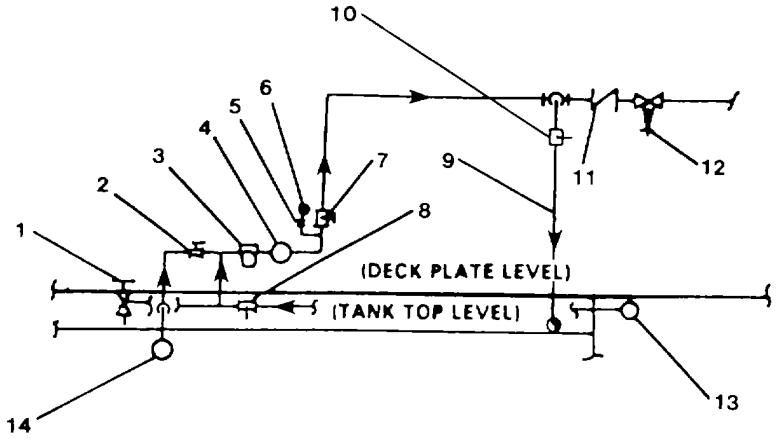
1-10.22.4 Dirty Oil/Oily Bilge Piping System. The dirty oil/oily bilge piping TM 55-1915-200-10 system provides a central collection, storage and discharge system for used lubricating oil, contaminated fuel oil, and oily bilge water. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-41. The sludge pump is controlled from the engine room motor control center.

1-10.22.5. Fuel Oil Transfer Piping System. The fuel oil transfer piping system replenishes engine and generator fuel oil supply by transferring fuel oil from storage tanks to day tanks. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-42. Fuel oil can be transferred between any storage tank and day tank. The two fuel oil transfer pumps are controlled at the engine room motor control center.

1-10.22.6. Main Engine Fuel Oil Service Piping System. The main engine fuel oil service piping system supplies the main engines with fuel oil from the day tank. System control is maintained through a combination of flanges/ valves as shown on FIGURE 1-31. Once primed, the engine ejector pump draws the fuel into the engine.

1-10.22.7. Ship's Service Diesel Generator Fuel Service Piping System. The ship's service diesel generator fuel service piping system supplies the ship's service diesel generator with fuel oil from the day tank. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-43. Once primed, the engine ejector pump drains the fuel into the engine.

1-10.22.8. Bow Thruster Engine Fuel Oil Service Piping System. The bow thruster engine fuel oil service piping system supplies the bow thruster engine with fuel oil from the day tank. System control is maintained through a combination of flanges/valves as shown in FIGURE 1-34. Once primed, the



BALLAST PIPING SYSTEM ENGINE ROOM
FORWARD BULKHEAD
LATERAL VIEW LOOKING FROM AFT TO FORWARD

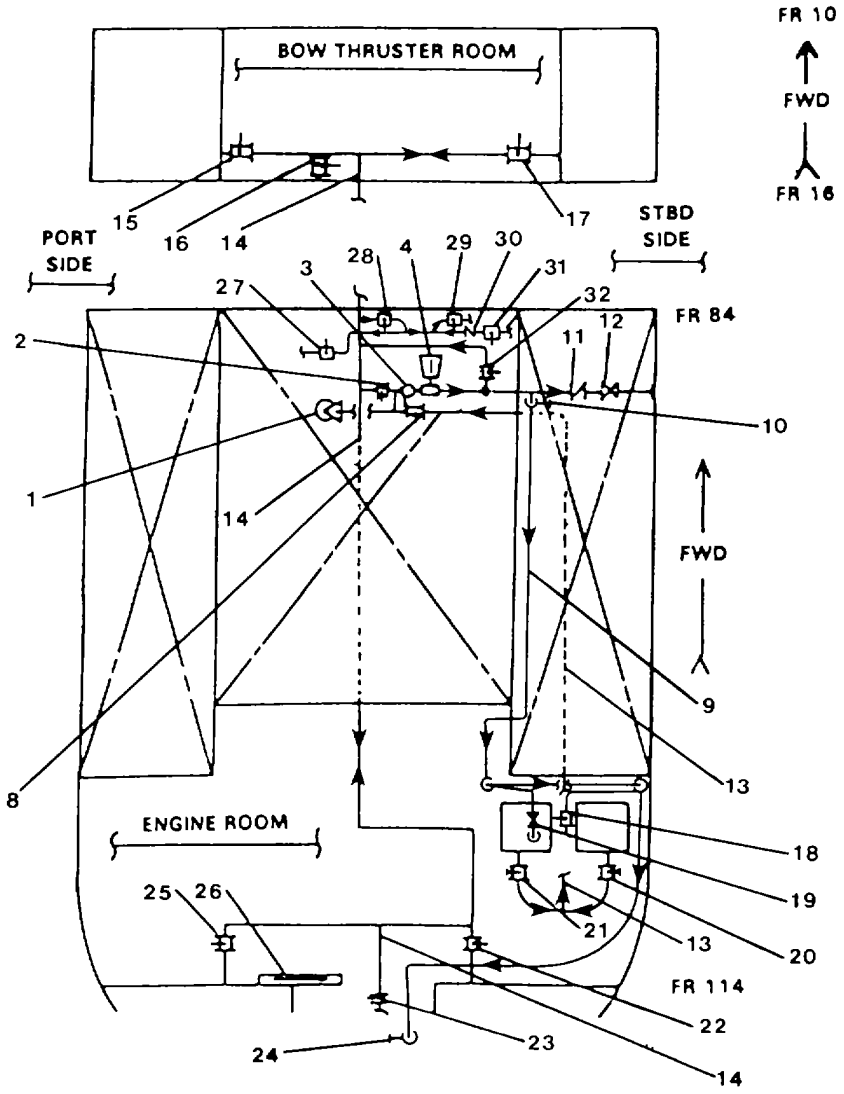


FIGURE 1-39. Ballast Piping System (Sheet 1 of 2).

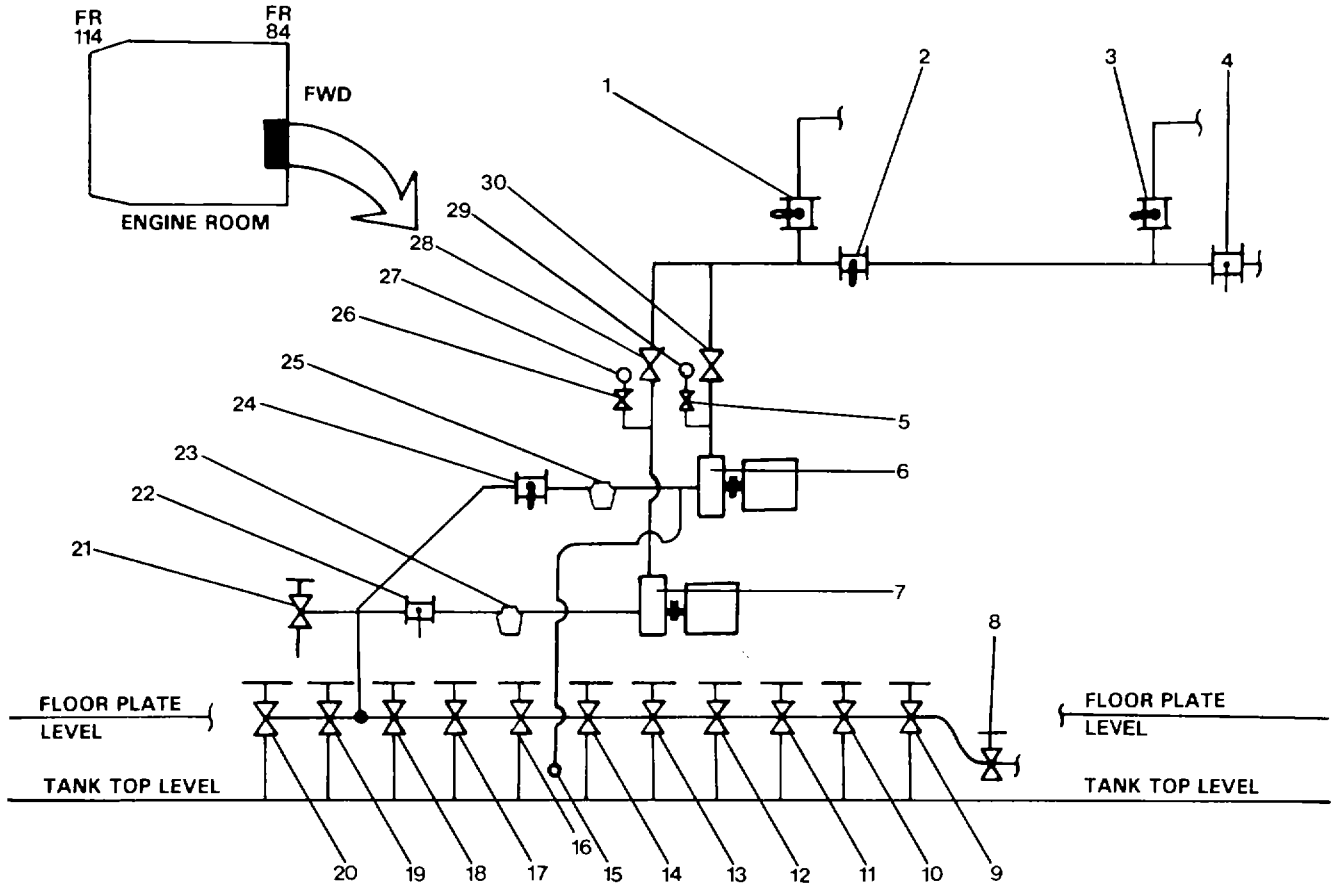
LEGEND

1. EMERGENCY BILGE SUCTION VALVE
2. BALLAST PUMP SUCTION VALVE
3. BALLAST PUMP SUCTION STRAINER
4. BALLAST PUMP AND MOTOR
5. PRESSURE GAUGE CUTOUT VALVE
6. PRESSURE GAGE (0 TO 300 PSI)
7. BALLAST PUMP DISCHARGE VALVE

S. BALLAST PUMP SEA WATER SUCTION VALVE

9. SEA CHEST BLOWDOWN DISCHARGE PIPE
10. SEA CHEST BLOWDOWN SUPPLY VALVE
11. SWING CHECK VALVE
12. BALLAST OVERBOARD VALVE
13. BALLAST PUMP SEAWATER SUCTION PIPE
14. BALLAST MAIN PIPE
15. #1 BALLAST TANK PORT SUCTION AND DISCHARGE VALVE
16. #1 BALLAST TANK CENTER LINE SUCTION AND DISCHARGE VALVE
17. $1 BALLAST TANK STBD SUCTION AND DISCHARGE VALVE
18. HIGH SEA CHEST BLOWDOWN VALVE
19. LOW SEA CHEST BLOWDOWN VALVE
20. HIGH SEA CHEST CUTOUT VALVE
21. LOW SEA CHEST CUTOUT VALVE
22. 12 BALLAST TANK STBD SUCTION AND DISCHARGE VALVE
23. EMERGENCY FIRE PUMP SUCTION VALVE TO BALLAST MAIN
24. BLOWDOWN VALVE TO SEA CHEST LOCATED IN SKEG
25. BALLAST TANK PORT SUCTION AND DISCHARGE VALVE
26. HYDRAULIC OPERATED DOOR
27. BILGE/BALLAST PUMP SUCTION VALVE TO BALLAST MAIN
28. CROSS CONNECT VALVE BETWEEN BILGE PIPING AND BALLAST MAIN
29. FIRE.BILGE PUMP SUCTION VALVE
30. SWING CHECK VALVE
31. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
32. BALLAST PUMP DISCHARGE VALVE TO BALLASTMAIN

FIGURE 1-39. Ballast Piping System (Sheet 2 of 2).

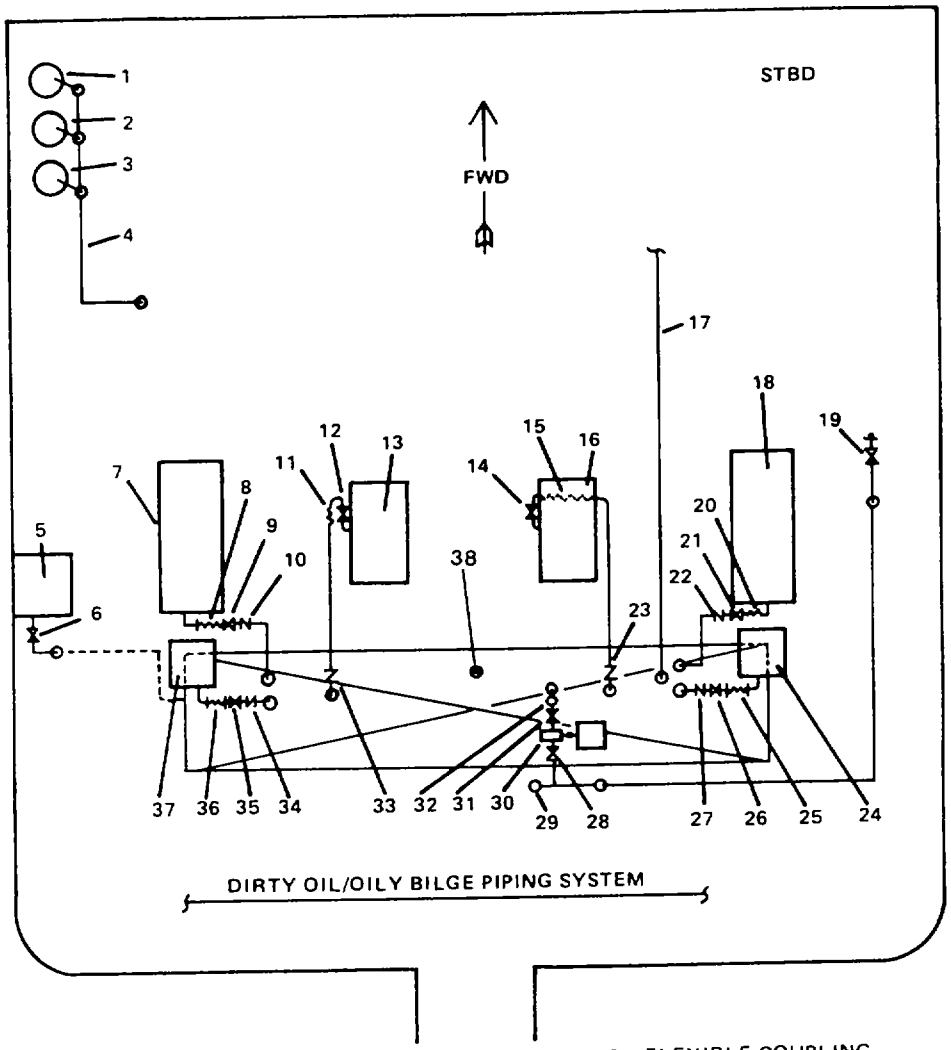


BILGE/BALLAST PIPING SYSTEM
ENGINE ROOM FORWARD BULKHEAD
LATERAL VIEW LOOKING FROM AFT TO FORWARD

LEGEND

1. PUMP DISCHARGE VALVE TO SLUDGE TANK
2. IN LINE STOP VALVE
3. PUMP DISCHARGE OVERBOARD VALVE
4. DISCHARGE VALVE FROM FIRE/BILGE PUMP
5. PRESSURE GAGE CUTOUT VALVE
6. BILGE/BALLAST PUMP
7. BILGE/BALLAST PUMP
B. BALLAST MAIN SUCTION VALVE
9. 2 VOID TANK STBD SUCTION VALVE
10. 1 VOID TANK STBD SUCTION VALVE
11. FORWARD PEAK TANK SUCTION VALVE
12. 1 VOID TANK CENTER LINE SUCTION VALVE
13. 2 VOID TANK CENTERLINE SUCTION VALVE
14. BOW THRUSTER ROOM SUCTION VALVE
15. FRESH WATER PRIMING LINE TO BILGE PUMP
16. 1 VOID TANK PORT SUCTION VALVE
17. 2 VOID TANK PORT SUCTION VALVE
18. ENGINE ROOM BILGE SUCTION STBD AFT
19. AFT PASSAGE WAY BILGE SUCTION
20. ENGINE ROOM BILGE SUCTION PORT AFT
21. INDEPENDENT BILGE SUCTION VALVE
22. BILGE PUMP SUCTION VALVE
23. BILGE PUMP SUCTION STRAINER
24. BILGE PUMP SUCTION VALVE
25. BILGE PUMP SUCTION STRAINER
26. PRESSURE GAUGE CUTOUT VALVE
27. DISCHARGE PRESSURE GAUGE (0-200 PSI)
28. BILGE PUMP DISCHARGE VALVE
29. DISCHARGE PRESSURE GAUGE 10-200 PSI)
30. BILGE PUMP DISCHARGE VALVE

FIGURE 1-40. Bilge/Ballast Piping System.



LEGEND

1. FUEL OIL PURIFIER
2. FUEL OIL PURIFIER
3. LUBE OIL PURIFIER
4. PURIFIER DISCHARGE PIPE TO SLUDGE TANK
5. LUBE OIL SETTLING TANK
6. LUBE OIL SETTLING TANK DISCHARGE VALVE TO SLUDGE TANK
7. PORT MAIN ENGINE
8. FLEXIBLE COUPLING
9. PORT MAIN ENGINE LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
10. SWING CHECK VALVE
11. FLEXIBLE COUPLING
12. PORT S.S.D. GENERATOR LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
13. PORT S.S.D. GENERATOR
14. STBD S.S.D. GENERATOR LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
15. FLEXIBLE COUPLING
16. STBD S.S.D. GENERATOR
17. OILY BILGE DISCHARGE PIPE TO SLUDGE TANK
18. STBD MAIN ENGINE
19. SLUDGE TANK DISCHARGE VALVE AND INTERNATIONAL HOSE CONNECTION LOCATED ON MAIN DECK
20. FLEXIBLE COUPLING
21. STBD MAIN ENGINE LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
22. SWING CHECK VALVE
23. SWING CHECK VALVE
24. STBD REDUCTION GEAR
25. FLEXIBLE COUPLING
26. STBD REDUCTION GEAR SUMP DISCHARGE VALVE TO SLUDGE TANK
27. SWING CHECK VALVE
28. SLUDGE PUMP DISCHARGE VALVE
29. DISCHARGE PRESSURE GAUGE
30. SLUDGE PUMP AND MOTOR
31. SLUDGE PUMP SUCTION VALVE
32. SLUDGE PUMP SUCTION STRAINER
33. SWING CHECK VALVE
34. SWING CHECK VALVE
35. PORT REDUCTION GEAR SUMP DISCHARGE VALVE TO SLUDGE TANK
36. FLEXIBLE COUPLING
37. PORT REDUCTION GEAR
38. SOUNDING TUBE

FIGURE 1-41. Dirty Oil/Oily Bilge Piping System.

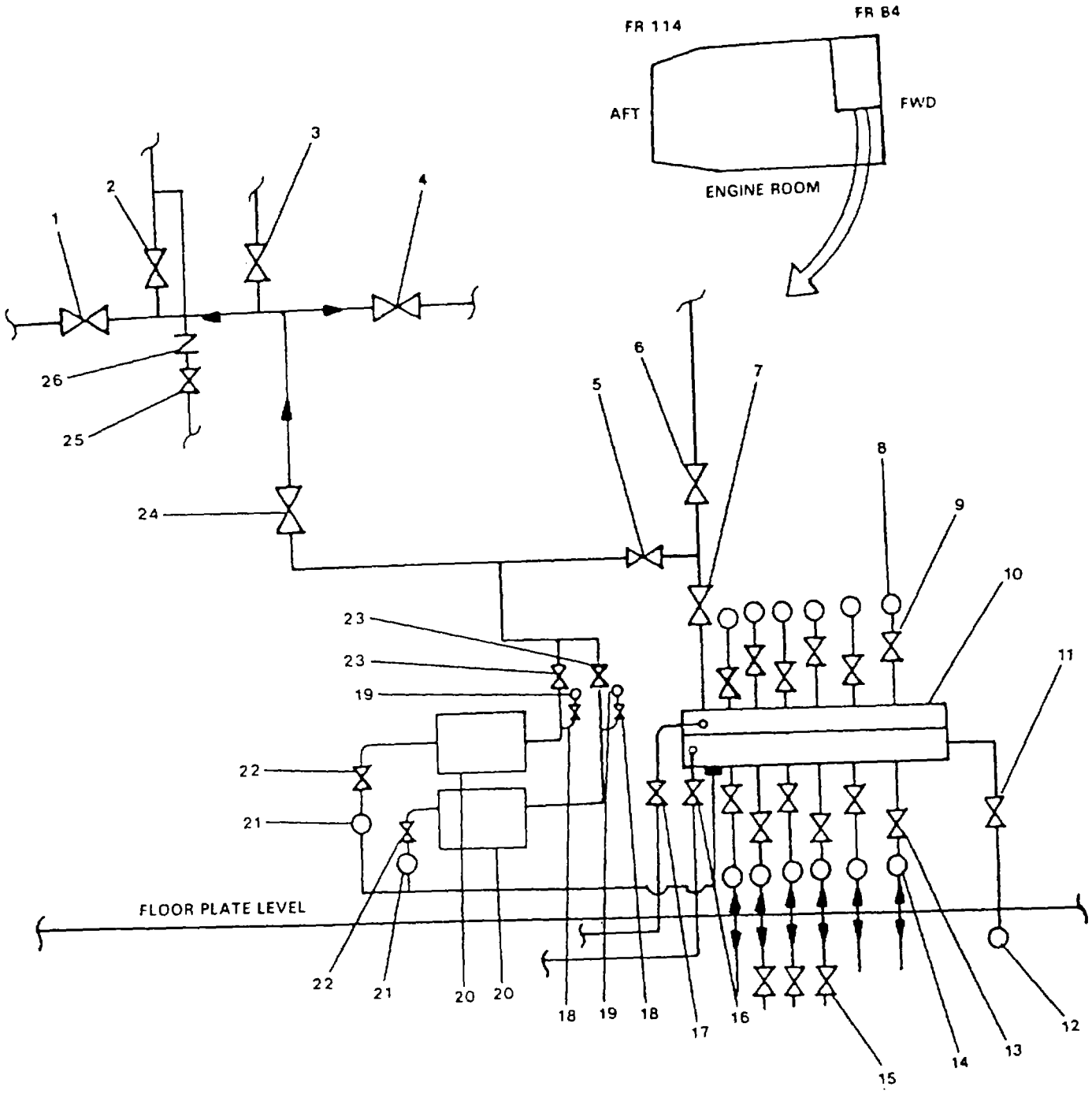
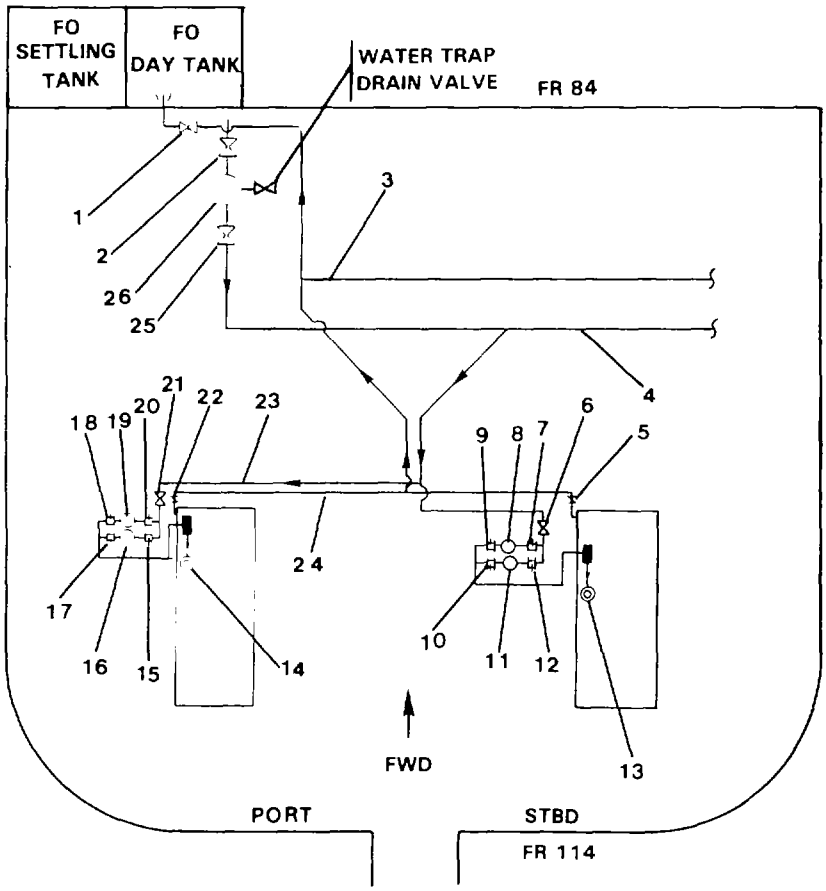


FIGURE 1-42. Fuel Oil Transfer Piping System (Sheet 1 of 2)

LEGEND

1. DISCHARGE VALVE TO FUEL OIL SETTLING TANK
2. DISCHARGE VALVE TO MAIN ENGINE FUEL OIL DAY TANK
3. DISCHARGE VALVE TO BOW THRUSTER DAY TANK
4. DISCHARGE VALVE TO EMERGENCY GENERATOR DAY TANK
5. INLINE STOP VALVE
6. DISCHARGE AND SUCTION VALVE TO AND FROM FUELING STATION LOCATED ON MAIN DECK
7. DISCHARGE VALVE TO FUEL OIL MANIFOLD
8. MANIFOLD DISCHARGE PIPE (TYP)
9. MANIFOLD DISCHARGE VALVE (TYP)
10. FUEL OIL TRANSFER MANIFOLD
11. MAIN ENGINE DAY TANK SUCTION VALVE
12. FUEL OIL SERVICE MAIN PIPE
13. MANIFOLD SUCTION VALVE (TYP)
14. MANIFOLD SUCTION PIPE (TYP)
15. FORWARD FUEL OIL STORAGE TANK ISOLATION VALVE
16. FUEL OIL PURIFIER SUCTION VALVE
17. FUEL OIL PURIFIER DISCHARGE VALVE
18. PRESSURE GAGE CUTOUT VALVE
19. DISCHARGE PRESSURE GAGE
20. FUEL OIL TRANSFER PUMP
21. FUEL OIL TRANSFER PUMP SUCTION STRAINER
22. FUEL OIL TRANSFER PUMP SUCTION VALVE
23. FUEL OIL TRANSFER PUMP DISCHARGE VALVE
24. INLINE STOP VALVE
25. FUEL OIL DISCHARGE VALVE TO MAIN ENGINE/S.S.D. GENERATOR DAY TANK
26. SWING CHECK VALVE

FIGURE 1-42. Fuel Oil Transfer Piping System (Sheet 2 of 2).



LEGEND

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL HEADER INLET VALVE
3. RETURN FUEL OIL HEADER PIPE
4. FUEL OIL SUPPLY HEADER PIPE
5. SWING CHECK VALVE
6. GENERATOR FUEL OIL SUPPLY VALVE
7. FUEL OIL FILTER INLET VALVE
8. FUEL OIL FILTER
9. FUEL OIL FILTER OUTLET VALVE
10. FUEL OIL FILTER OUTLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER INLET VALVE
13. FUEL OIL PRIMING PUMP
14. FUEL OIL PRIMING PUMP
15. FUEL OIL FILTER INLET VALVE
16. FUEL OIL FILTER
17. FUEL OIL FILTER OUTLET VALVE
18. FUEL OIL FILTER OUTLET VALVE
19. FUEL OIL FILTER
20. FUEL OIL FILTER INLET VALVE
21. GENERATOR FUEL OIL SUPPLY VALVE
22. SWING CHECK VALVE
23. FUEL OIL SUPPLY PIPE
24. FUEL OIL RETURN PIPE
25. INLINE STOP VALVE
26. WATER TRAP

FIGURE 1-43. Ship's Service Diesel Generator Fuel Oil Service Piping System.

engine ejector pump draws the fuel into the engine.

1-10.22.9. Emergency Generator Fuel Oil Service Piping System. The emergency generator fuel oil service piping system supplies the emergency generator with fuel oil from the day tank. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-44. Once primed, the engine ejector pump draws the fuel into the engine.

1-10.22.10. Fuel Oil Purification Piping System. The fuel oil purification piping system removes contaminants from fuel oil by pumping the fuel oil through purifiers. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-45. The two fuel oil purifiers are controlled from the engine room motor control center.

1-10.22.11. Lubricating Oil Transfer and Purification Piping System. The lubricating oil transfer and purification system supplies clean lubricating oil for proper operation of the main engines. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-32. The system transfers lubricating oil from the storage tank to the main engine sumps. It can also route the lubricating oil through the purifier to remove contaminants. The lubricating oil transfer pump and purifier are both controlled at the engine room motor control center.

1-10.22.12. Stern Tube Lubricating Piping System. The stern tube lubricating piping system lubricates the stern tube by transferring sea water to the water lubricated bearing. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-46. The two stern tube lubricating pumps are controlled at the pumps.

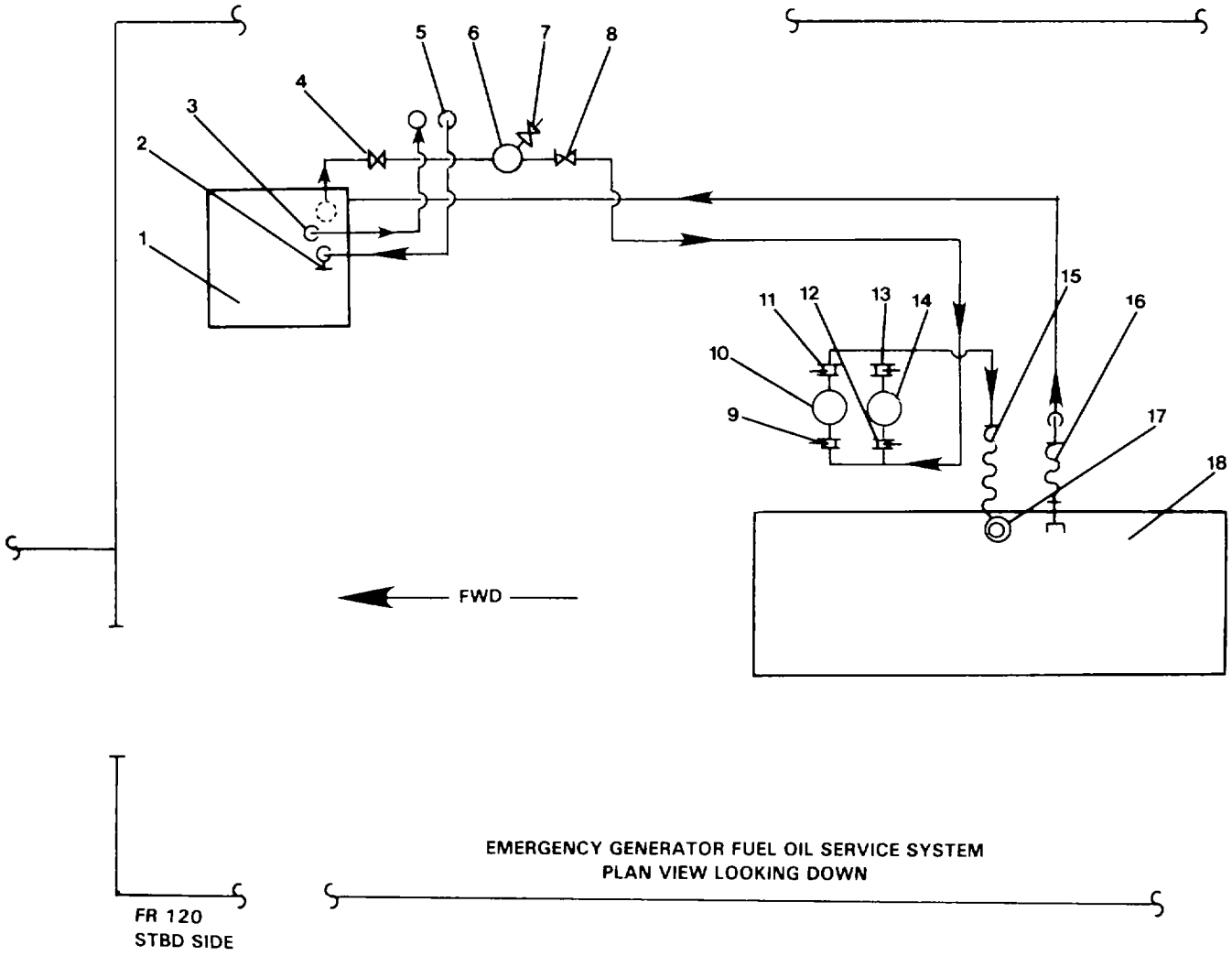
1-10.22.13. Oily Water Separator Piping System. The oily water separator piping system prevents contamination of outside TM 55-1915-200-10 sea water by removing oil from the bilge water before it is discharged overboard. System control is maintained through a combination of flanges/valves as shown in FIGURE 1-47. The oily water separator piping system removes the oil from the bilge water, transfers the oil to the sludge tank, and discharges the bilge water overboard.

1-10.22.14. Marine Sanitation Piping System. The marine sanitation piping system prevents contamination of outside sea water by decomposing solids in sewage before the sewage is discharged overboard. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-48. The marine sanitation device uses natural bacteria and air agitation to decompose solids in the sewage. The decomposed sewage is then treated with chlorine before it is discharged overboard. Controls for the marine sanitation device are located on the unit.

1-10.22.15. Reverse Osmosis Desalinator Piping System. The reverse osmosis desalinator piping system provides freshwater by removing salt and impurities from sea water. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-49. The distilling plant controls are located on the unit and the feedwater boost pumps are controlled from the engine room motor control center.

1-10.22.16. Potable Water Bromination Piping System. The potable water bromination piping system disinfects potable water by adding a predetermined quantity of bromide. System control is maintained through a combination of flanges/valves as shown on FIGURE 150. The bromination unit controls are located on the unit.

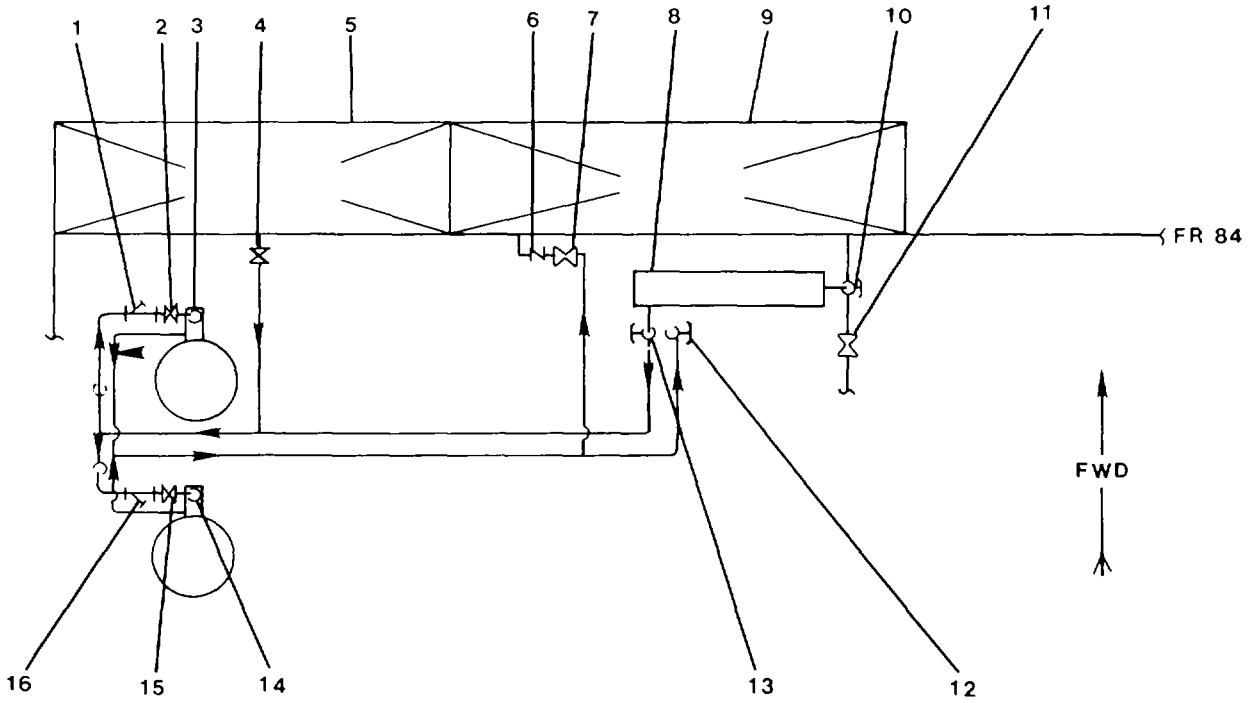
1-10.22.17. Potable Water Piping System. The potable water piping system provides hot and cold, fresh water throughout the vessel. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-51



LEGEND

1. EMERGENCY GENERATOR FUEL OIL DAY TANK
2. FUEL OIL DISCHARGE VALVE TO DAY TANK FROM ENGINE ROOM
3. DAY TANK VENT PIPE TO MAIN DECK
4. FUEL OIL DAY TANK OUTLET VALVE TO EMERGENCY GENERATOR
5. FUEL OIL SUPPLY PIPE FROM ENGINE ROOM
6. WATER TRAP
7. WATER TRAP OFF VALVE
8. INLINE STOP VALVE
9. FUEL OIL FILTER INLET VALVE
10. RACOR FUEL OIL FILTER
11. FUEL OIL FILTER OUTLET VALVE
12. FUEL OIL FILTER INLET VALVE
13. FUEL OIL FILTER OUTLET VALVE
14. RACOR FUEL OIL FILTER
15. FLEXIBLE COUPLING
16. FLEXIBLE COUPLING
17. FUEL OIL PRIMING PUMP
18. EMERGENCY GENERATOR

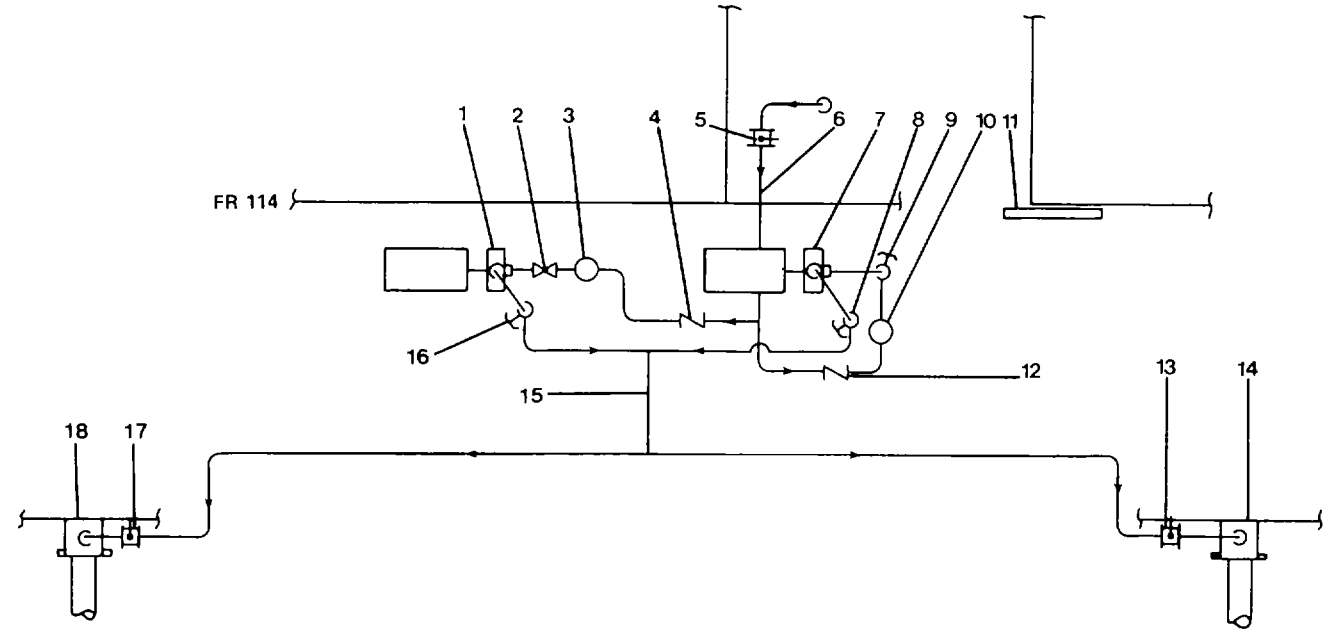
FIGURE 1-44. Emergency Generator Fuel Oil Service Piping System.



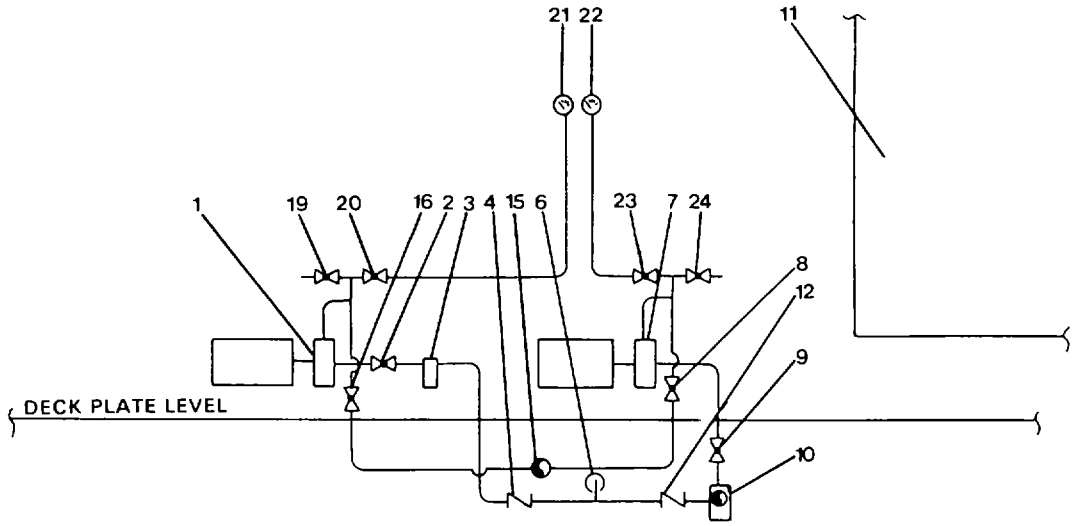
LEGEND

1 "Y" TYPE SUCTION STRAINER
2 1F.O. PURIFIER SUCTION VALVE
3. 1F O.PURIFIER
4. F.O. PURIFIER SUCTION VALVE FROM F.O. SETTLING TANK
5 FUEL OIL SETTLING TANK
6 SWING CHECK VALVE
7 F.O TRANSFER DISCHARGE VALVE TO F.O. DAY TANK
8 F O. TRANSFER MANIFOLD
9 FUEL OIL SERVICE TANK
10. F.O. MANIFOLD SUCTION VALVE FROM F.O. DAY TANK
11. F.O. SERVICE SYSTEM CUTOUT VALVE
12. F.O. PURIFIER DISCHARGE VALVE TO F.O. MANIFOLD
13. F.O. PURIFIER SUCTION VALVE FROM F.O. MANIFOLD
14. 2 F.O. PURIFIER
15. 2 F.O. PURIFIER SUCTION VALVE
16. "Y" TYPE SUCTION STRAINER

FIGURE 1-45. Fuel Oil Purification Piping System.



STERN TUBE LUBRICATION PIPING SYSTEM
ENGINE ROOM AFT BULKHEAD FRAME 114 LOOKING DOWN



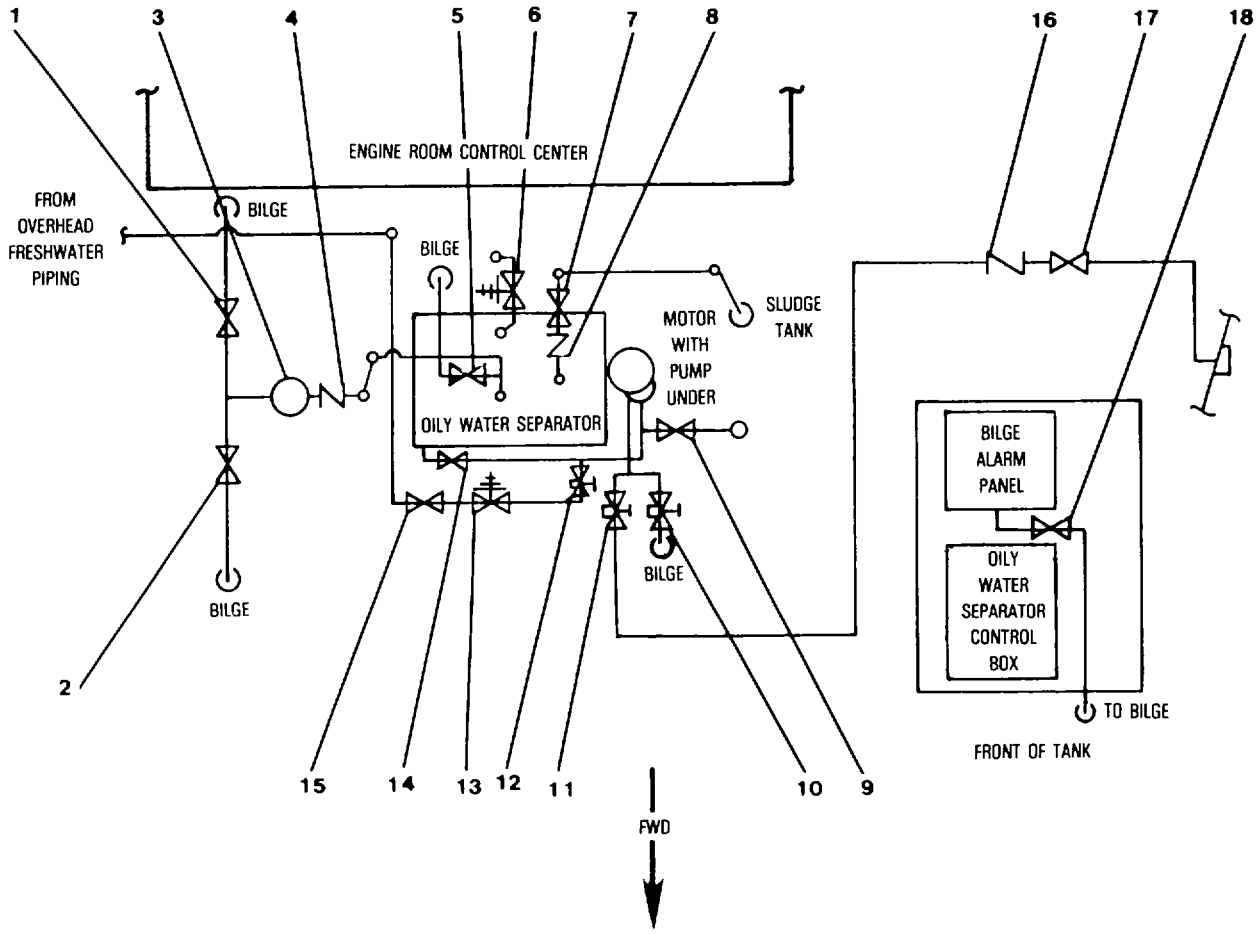
STERN TUBE LUBRICATION PIPING SYSTEM
ELEVATION VIEW AFT BULKHEAD ENGINE ROOM
CENTER LINE LOOKING AFT

FIGURE 1-46. Stern Tube Lubricating Piping System (Sheet 1 of 2).

LEGEND

1. STBD STERN TUBE LUBRICATION PUMP AND MOTOR
2. STBD STERN TUBE LUBRICATION PUMP SUCTION VALVE
3. SUCTION STRAINER
4. SWING CHECK VALVE
5. SEA CHEST SUCTION VALVE
6. STERN TUBE LUBRICATING PUMP SUCTION PIPE
7. PORT STERN TUBE LUBRICATING PUMP AND MOTOR
8. PORT STERN TUBE LUBRICATING PUMP DISCHARGE VALVE
9. PORT STERN TUBE LUBRICATING PUMP SUCTION VALVE
10. SUCTION STRAINER
11. HYDRAULIC OPERATED DOOR
12. SWING CHECK VALVE
13. INLINE STOP VALVE
14. PORT STERN TUBE
15. STERN TUBE LUBRICATING PUMP PIPE
16. STBD STERN TUBE LUBRICATING PUMP DISCHARGE VALVE
17. INLINE STOP VALVE
18. STBD STERN TUBE
19. STBD STERN TUBE LUBRICATING PUMP VALVE
20. PRESSURE GAUGE CUTOUT VALVE
21. PRESSURE GAUGE (0 TO 100)
22. PRESSURE GAUGE (O TO 100)
23. PRESSURE GAUGE CUTOUT VALVE
24. PORT STERN TUBE LUBRICATING PUMP VALVE

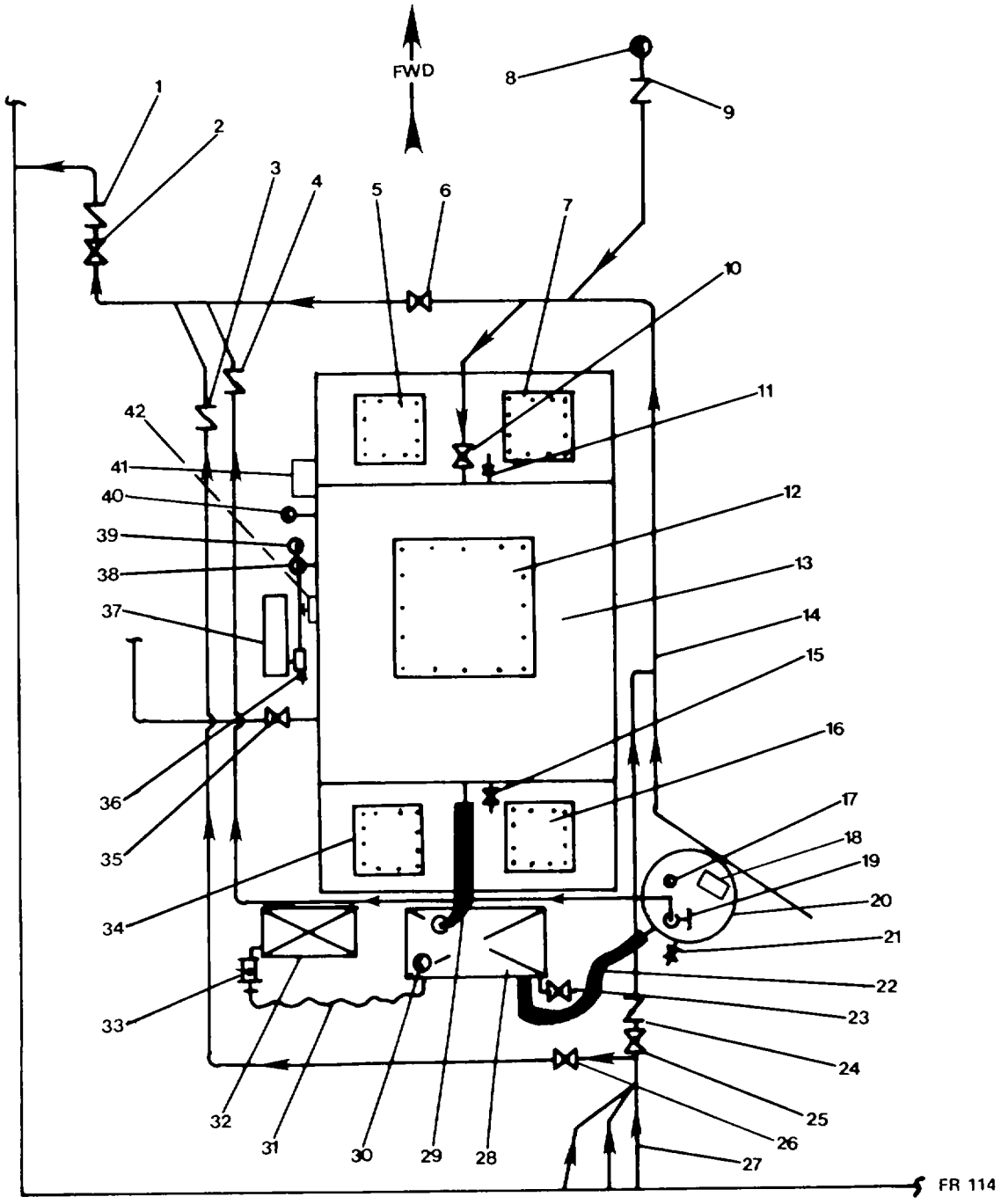
FIGURE 1-46. Stern Tube Lubricating Piping System (Sheet 2 of 2).



LEGEND

1. OILY WATER SEPARATOR BILGE SUCTION VALVE.AFT
2. OILY WATER SEPARATOR BILGE SUCTION VALVE, FORWARD
3. SUCTION STRAINER
4. SWING CHECK VALVE
5. MANUAL BACKFLUSH DISCHARGE VALVE TO BILGE
6. PRESSURE RELIEF VALVE
7. DISCHARGE VALVE TO SLUDGE TANK
8. SWING CHECK VALVE
9. SAMPLE VALVE
10. SOLENOID OPERATED RECIRCULATION VALVE TO BILGES
11. SOLENOID OPERATED OVERBOARD DISCHARGE VALVE
12. SOLENOID OPERATED ON MANUAL BACKFLUSH VALVE
13. BACKFLUSH PRESSURE REDUCING VALVE
14. OIL CONTENT METER FLUSH VALVE
15. FRESHWATER INLET VALVE TO BACK FLUSH SYSTEM
16. SWING CHECK VALVE
17. OVERBOARD DISCHARGE VALVE
18. DISCHARGE VALVE TO OIL CONTENT METER

FIGURE 1-47. Oily Water Separator Piping System.



MARINE SANITATION DEVICE
ENGINE ROOM PORT SIDE AFT
PLAN VIEW LOOKING DOWN

FIGURE 1-48. Marine Sanitation Piping System (Sheet 1 of 2).

LEGEND

1. SWING CHECK VALVE
2. MARINE SANITATION DEVICE OVERBOARD DISCHARGE VALVE
3. SWING CHECK VALVE
4. SWING CHECK VALVE
5. REMOVABLE INSPECTION COVER
6. MARINE SANITATION DEVICE SEWAGE BYPASS VALVE
7. REMOVABLE INSPECTION COVER
8. SEWAGE INLET PIPE
9. SWING CHECK VALVE
10. MARINE SANITATION DEVICE SEWAGE INLET VALVE
11. VENT VALVE
12. REMOVABLE INSPECTION COVER
13. MARINE SANITATION DEVICE
14. SEWAGE INLET PIPE
15. VENT VALVE
16. REMOVABLE INSPECTION COVER
17. MARINE SANITATION DEVICE OVERBOARD SUMP PUMP VENT
18. MARINE SANITATION DEVICE SUMP PUMP POWER CONTROL PANEL
19. MARINE SANITATION DEVICE OVERBOARD SUMP PUMP DISCHARGE VALVE
20. MARINE SANITATION DEVICE SUMP PUMP/HOLDING TANK
21. OVERBOARD SUMP PUMP HOLDING TANK DRAIN VALVE
22. CHLORINE CONTACT TANK DISCHARGE HOSE TO SUMP PUMP HOLDING TANK
23. CHLORINE CONTACT TANK DRAIN VALVE
24. SWING CHECK VALVE
25. LAUNDRY AND GALLEY DRAIN INLET VALVE
26. LAUNDRY AND GALLEY DRAIN BYPASS VALVE
27. LAUNDRY AND GALLEY DRAIN PIPES
28. CHLORINE CONTACT TANK
29. MARINE SANITATION DEVICE DISCHARGE HOSE TO CHLORINE CONTACT TANK
30. CHLORINE CONTACT TANK VENT PIPE
31. CHLORINE FEED HOSE TO CHLORINE CONTACT TANK
32. CHLORINE HOLDING TANK
33. CHLORINE DISCHARGE CONTROL VALVE
34. REMOVABLE INSPECTION COVER
35. FRESHWATER FILL AND FLUSHING INLET VALVE
36. AGITATION AIR INLET RELIEF VALVE
37. AGITATION AIR BLOWER
38. AGITATION AIR INLET VALVE
39. AGITATION AIR PRESSURE GAUGE 0-30 PSI
40. MARINE SANITATION DEVICE VENT PIPE
41. BLOWER MOTOR CONTROL PANEL
42. DRAIN VALVE

FIGURE 1-48. Marine Sanitation Piping System (Sheet 2 of 2).

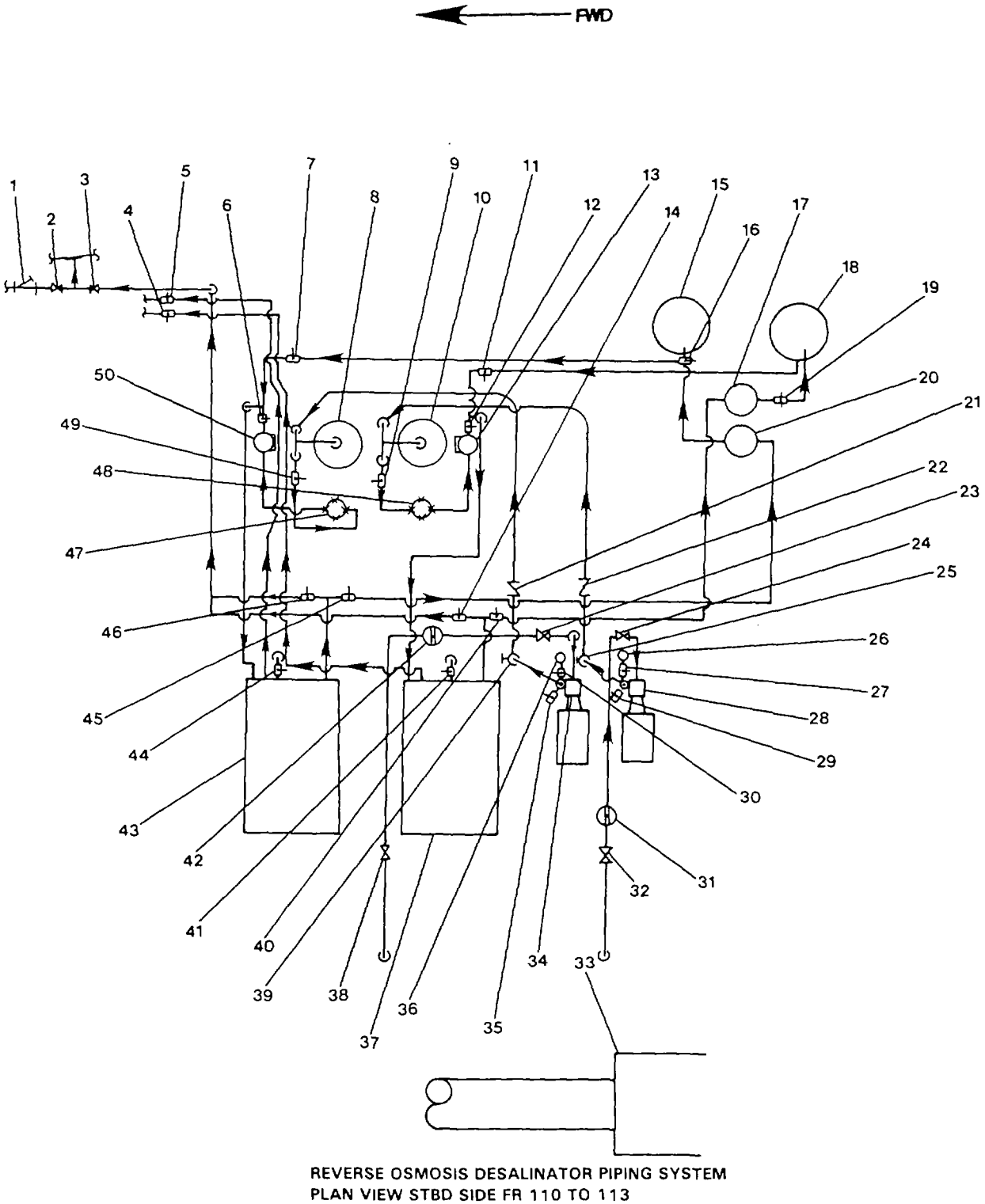


FIGURE 1-49. Reverse Osmosis Desalinator Piping System (Sheet 1 of 3).

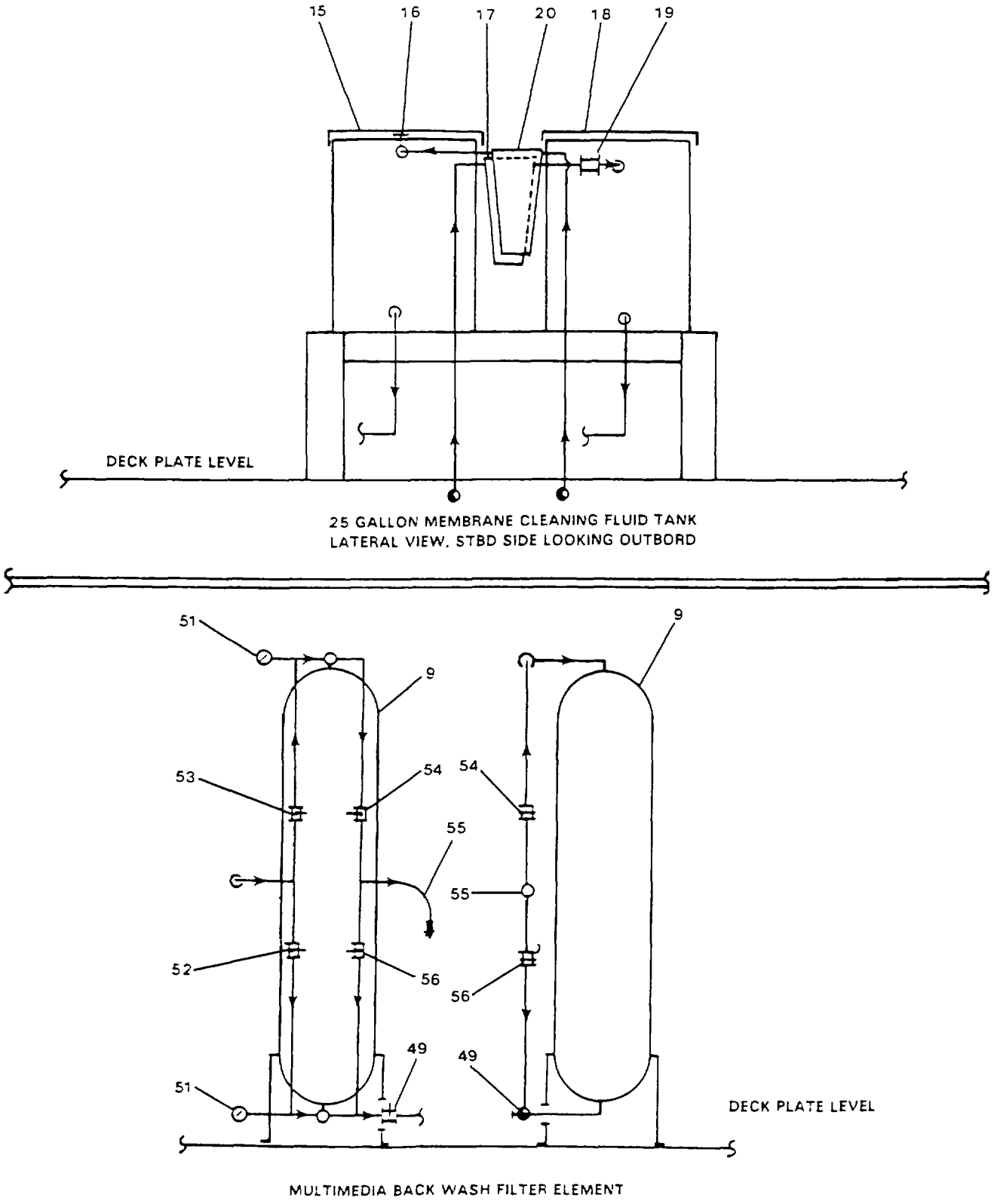
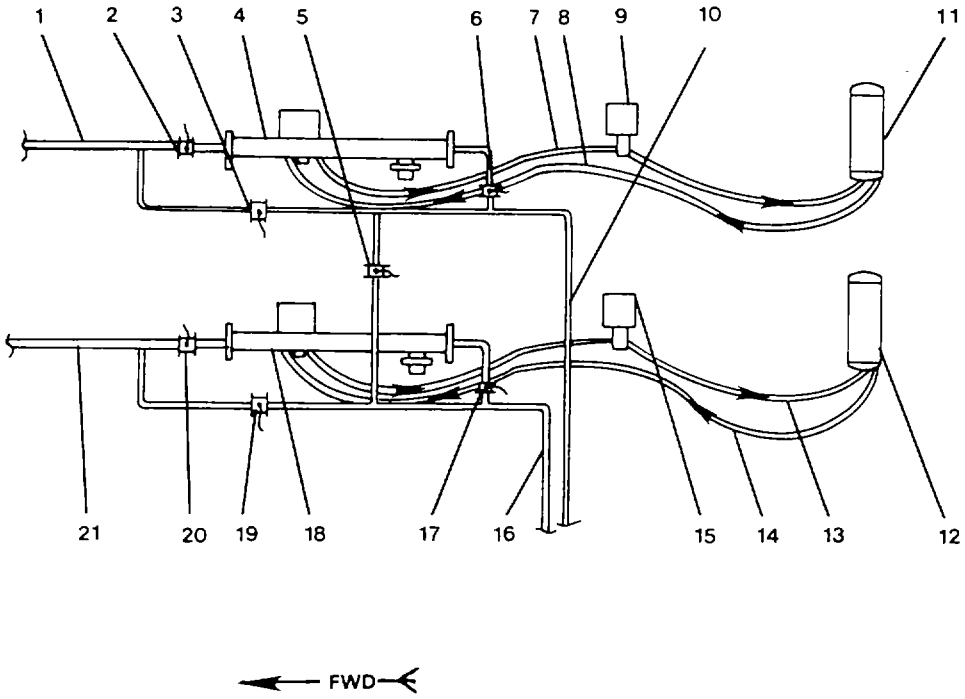


FIGURE 1-49. Reverse Osmosis Desalinator Piping System (Sheet 2 of 3).

LEGEND

1. Y TYPE SWING CHECK VALVE
2. MACHINE SHOP DECK DRAIN STOP VALVE
3. BRINE DISCHARGE OVERBOARD VALVE
4. #2 DESALINATOR PRODUCT WATER DISCHARGE VALVE TO STORAGE TANK
5. #1 DESALINATOR PRODUCT WATER DISCHARGE VALVE TO STORAGE TANK
6. 5 MICRON FILTER OUTLET VALVE
7. #1 MEMBRANE CLEANING FLUID TANK OUTLET VALVE
8. #1 MULTIMEDIA BACKWASH FILTER
9. #2 MULTIMEDIA BACKWASH FILTER OUTLET VALVE
10. #2 MULTIMEDIA BACKWASH FILTER
11. #2 MEMBRANE CLEANING FLUID TANK OUTLET VALVE
12. 5 MICRON FILTER OUTLET VALVE
13. 5 MICRON FILTER
14. #2 DESALINATOR BRINE DISCHARGE TO OVERBOARD VALVE
15. #1 MEMBRANE CLEANING FLUID TANK
16. #1 MEMBRANE CLEANING FLUID TANK INLET VALVE
17. 5 MICRON FILTER
18. #2 MEMBRANE CLEANING FLUID TANK
19. #2 MEMBRANE CLEANING FLUID TANK INLET VALVE
20. 5 MICRON FILTER
21. SWING CHECK VALVE
22. SWING CHECK VALVE
23. #1 SALTWATER FEED PUMP SUCTION VALVE
24. #2 SALTWATER FEED PUMP SUCTION VALVE
25. #2 SALTWATER FEED PUMP DISCHARGE VALVE
26. PRESSURE GAUGE (0 TO 100 PSI)
27. PRESSURE GAUGE CUTOUT VALVE
28. #2 SALTWATER FEED PUMP AND MOTOR
29. PUMP VENT VALVE
30. PRESSURE GAUGE CUTOUT VALVE
31. PUMP SUCTION STRAINER
32. #2 SALTWATER FEED PUMP SEAWATER SUCTION VALVE
33. STBD MAIN PROPULSION SHAFT
34. #1 SALTWATER FEED PUMP AND MOTOR
35. PUMP VENT VALVE
36. PRESSURE GAUGE (0 TO 100 PSI)
37. #2 DESALINATOR
38. #1 SALTWATER FEED PUMP SEAWATER SUCTION VALVE
39. #1 SALTWATER FEED PUMP DISCHARGE VALVE
40. #2 DESALINATOR BRINE DISCHARGE VALVE TO #2 MEMBRANE CLEANING FLUID TANK
41. #2 DESALINATOR PRODUCT TO DRAIN VALVE
42. PUMP SUCTION STRAINER
43. #1 DESALINATOR
44. #1 DESALINATOR PRODUCT TO DRAIN VALVE
45. #1 DESALINATOR BRINE DISCHARGE VALVE TO #1 MEMBRANE CLEANING FLUID TANK
46. #1 DESALINATOR BRINE DISCHARGE TO OVERBOARD VALVE
47. OIL/WATER SEPARATOR
48. OIL/WATER SEPARATOR
49. #1 MULTIMEDIA BACKWASH FILTER OUTLET VALVE
50. 5 MICRON FILTER
51. PRESSURE GAUGE 0-100 PSI
52. MULTIMEDIA DIRECTIONAL FLOW CONTROL VALVES
53. MULTIMEDIA DIRECTIONAL FLOW CONTROL VALVE
54. MULTIMEDIA DIRECTIONAL FLOW CONTROL VALVE
55. MULTIMEDIA DRAIN
56. MULTIMEDIA DIRECTIONAL FLOW CONTROL VALVE

FIGURE 1-49, Reverse Osmosis Desalinator Piping System (Sheet 3 of 3)



ELEVATION VIEW. FRAME III, STBD SIDE LOOKING OUTBOARD .

LEGEND

1. #1 DISCHARGE PIPE TO POTABLE WATERTANK
2. #1 BY-PASS HEADER OUTLET VALVE
3. #1 BY-PASS HEADER BY-PASS VALVE
4. #1 BY-PASS HEADER ASSEMBLY
5. BY-PASS HEADER CROSS CONNECT VALVE
6. #1 BY-PASS HEADER INLET VALVE
7. #1 BROMINE FEEDER ASSEMBLY INLET HOSE
8. #1 BROMINE FEEDER ASSEMBLY OUTLET HOSE
9. #1 SOLENOID VALVE
10. #1 REVERSE OSMOSIS DISCHARGE PIPE
11. #1 BROMINE FEEDER ASSEMBLY
12. #2 BROMINE FEEDER ASSEMBLY
13. #2 BROMINE FEEDER ASSEMBLY INLET TUBE
14. #2 BROMINE FEEDER ASSEMBLY OUTLET TUBE
15. #2 SOLENOID VALVE
16. #2 REVERSE OSMOSIS DISCHARGE PIPE
17. #2 BY-PASS HEADER INLET VALVE
18. #2 BY-PASS HEADER ASSEMBLY
19. #2 BY-PASS HEADER BY-PASS VALVE
20. #2 BY-PASS HEADER OUTLET VALVE
21. #2 DISCHARGE PIPE TO POTABLE WATER TANK

FIGURE 1-50. Potable Water Bromination Piping System.

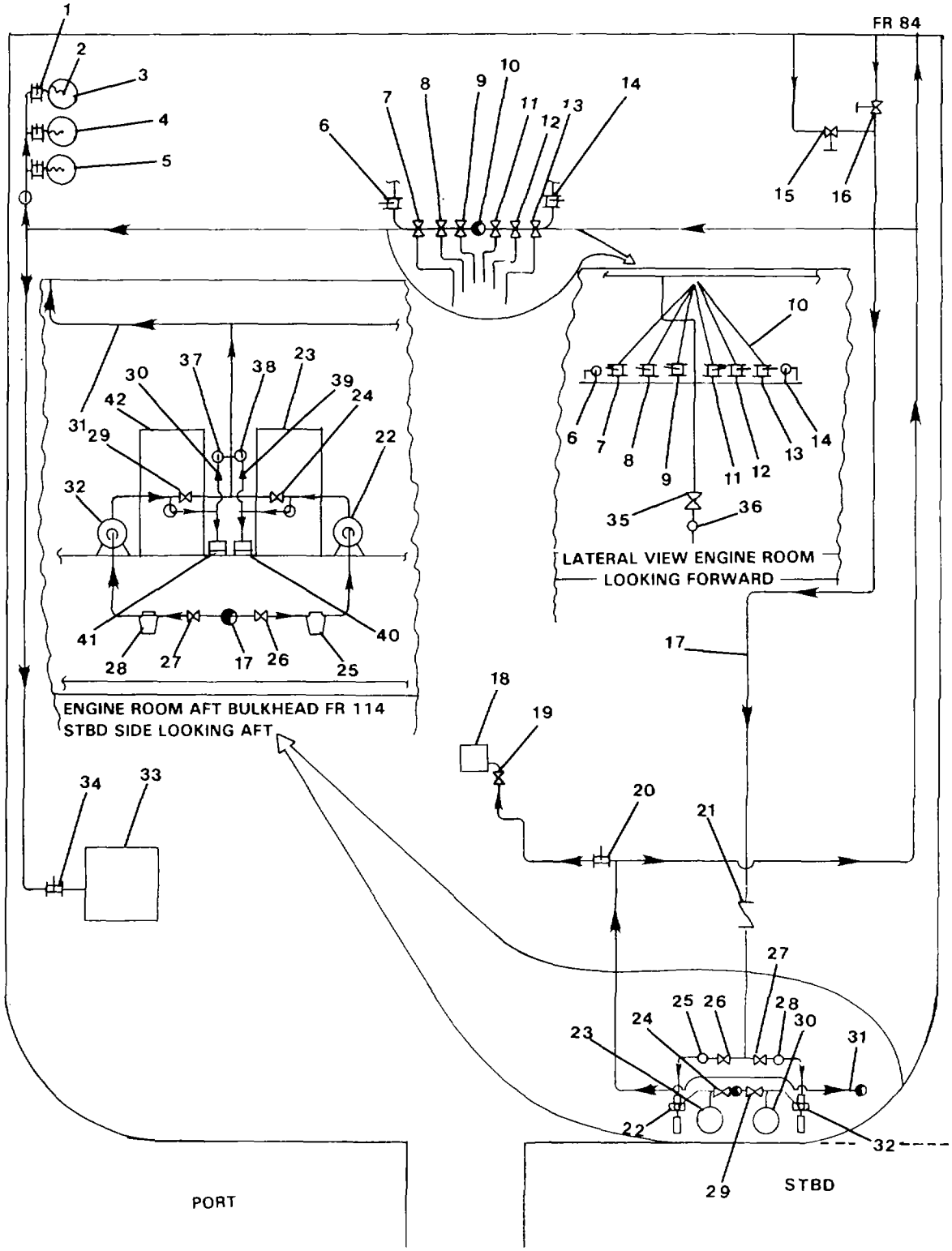


FIGURE 1-51. Portable Water Piping System - Engine Room (Sheet of 2)

LEGEND

1., POTABLE WATER DISCHARGE VALVE TO LUBE OIL AND FUEL OIL PURIFIERS (TYP)
2., FLEXIBLE COUPLING FROM POTABLE WATER DISCHARGE VALVE TO LUBE OIL AND FUEL OIL PURIFIER'S (TYP)
3., # 1 FUEL OIL PURIFIER
4., #2 FUEL OIL PURIFIER
5., LUBE OIL PURIFIER
6., POTABLE WATER DISCHARGE VALVE TO BILGE PUMP PRIMING LINE
7., POTABLE WATER DISCHARGE VALVE TO PORT REDUCTION GEAR EXPANSION TANK
8., POTABLE WATER DISCHARGE VALVE TO PORT MAIN ENGINE EXPANSION TANK
9., POTABLE WATER DISCHARGE VALVE TO PORT S.S.D., GENERATOR EXPANSION TANK
10., ENGINE COOLING WATER FILL MANIFOLD
11., POTABLE WATER DISCHARGE VALVE TO STBD S.S.D., GENERATOR EXPANSION TANK
12., POTABLE WATER DISCHARGE VALVE TO STBD MAIN ENGINE EXPANSION TANK
13., POTABLE WATER DISCHARGE VALVE TO STBD REDUCTION GEAR EXPANSION TANK
14., POTABLE WATER DISCHARGE VALVE TO BALLAST PUMP PRIMING PUMP
15., SUCTION VALVE FROM PORT POTABLE WATER TANK
16., SUCTION VALVE FROM STBD POTABLE WATER TANK
17., POTABLE WATER SUCTION PIPE
18., OILY WATER SEPARATOR
19., POTABLE WATER DISCHARGE VALVE TO OILY WATER SEPARATOR BACK FLUSH SYSTEM
20., INLINE STOP VALVE
21., SWING CHECK VALVE
22., #2 POTABLE WATER PUMP
23., #-2 POTABLE WATER PRESSURE TANK
24., #2 POTABLE WATER PUMP DISCHARGE VALVE
25., #2 POTABLE WATER PUMP SUCTION STRAINER
26., #2 POTABLE WATER PUMP SUCTION VALVE
27., #1 POTABLE WATER PUMP SUCTION VALVE
28. #1 POTABLE WATER PUMP SUCTION STRAINER
29., #1 POTABLE WATER PUMP DISCHARGE VALVE
30., #1 POTABLE WATER PRESSURE TANK
31., POTABLE WATER DISCHARGE PIPE TO UPPER MACHINERY ROOM
32., #1 POTABLE WATER PUMP
33., MARINE SANITATION DEVICE HOLDING TANK
34., POTABLE WATER FLUSHING VALVE TO MARINE SANITATION DEVICE HOLDING TANK
35., POTABLE WATER FAUCET DISCHARGE VALVE
36., POTABLE WATER FAUCET
37., #1 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE
38., #2 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE
39., #2 POTABLE WATER PUMP DISCHARGEPRESSURE GAUGE LINE
40., # 2 POTABLE WATER PUMP PRESSURE STAT
41., #1 POTABLE WATER PUMP PRESSURE STAT
42., #1 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE LINE

FIGURE 1-51. Potable Water Piping System - Engine Room (Sheet 2 of 2).

(
engine room) and FIGURE 1-52 (upper machinery room).

1-10.22.18. Chilled Water Piping System. The chilled water piping system provides air conditioning by cycling chilled water through the environmental control system blower coils. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-29.

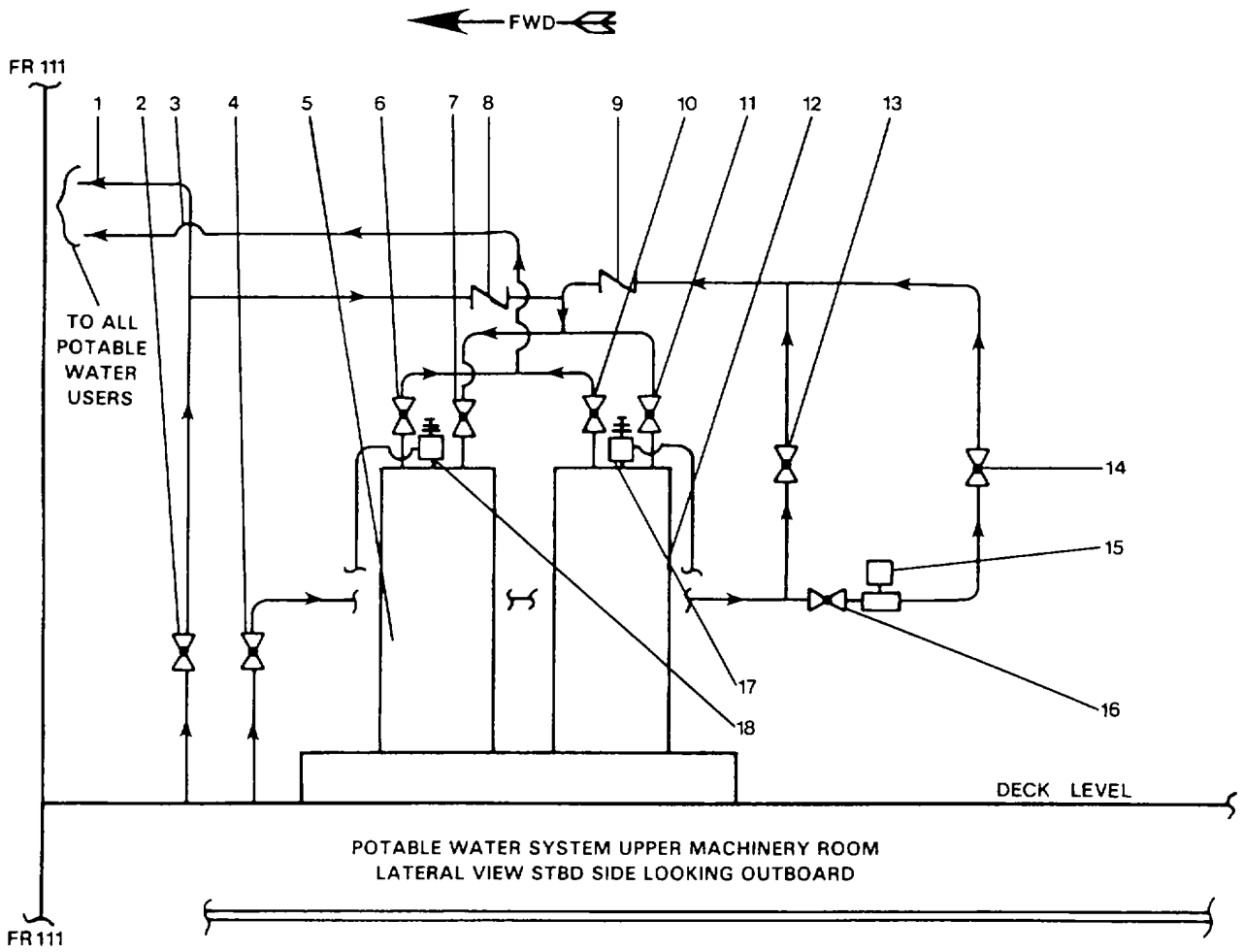
1-10.22.19. Condenser Salt Water Circulating Piping System. The condenser salt water circulating piping system cools the refrigerant gas in the environmental control system chiller plant. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-53. Sea water pumped through the condenser absorbs heat to cool the refrigerant.

1-10.22.20. Compressed Air Piping System. The compressed air piping system delivers the air pressure required for engine starting and other uses. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-30 (engine room) and FIGURE 1-54 (main deck and above). The compressed air piping system consists of two compressors that deliver compressed air to two 240 gallon air receivers at 270 pounds per square inch (psi). This air pressure passes through a reducer to 150 psi, through an automatic oil and water separator and then to the points of usage. In the engine room, the compressed air is used for main engine and ship's service diesel engine starting air. Piping of the compresed air is routed to the bow thruster compartment to air start the bow thruster engine. Compressed air is also delivered to port and starboard stations on the poop deck, officer's deck, and bridge deck and to two outlets in the engineer's workshop. It is also routed to three air stations on the main deck where the pressure is reduced to 100 psi. Compressors are equipped with automatic START/STOP switches adjusted to turn on at 245 psi and off at 270 psi.

1-10.22.21. Main Engine Cooling Water Piping System. The main engine cooling water piping system extracts heat from the main engines by pumping potable water through the engines. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-33. The main engine cooling water piping system receives potable water from the potable water piping system. Potable water is drawn from the expansion into the cooling system by centrifugal pumps, pumped through the engine and discharged through an external cooling system. The external cooling system cools the discharge water via a keel cooler. The keel cooler is located outside the vessel hull.

1-10.22.22. Ship's Service Diesel Generator Cooling Water Piping System. The ship's service diesel generator cooling water piping system extracts heat from the ship's service diesel generators by pumping potable water through the generators. System control is maintained through a combination of flanges/valves as shown on FIGURE 1-55. The ship's service diesel generator cooling water piping system receives potable water from the potable water piping system. Potable water is drawn into the cooling system by centrifugal pumps, pumped through the engine and discharged through an external cooling system. The external cooling system cools the discharge water via a keel cooler. The keel cooler is located outside the vessel hull.

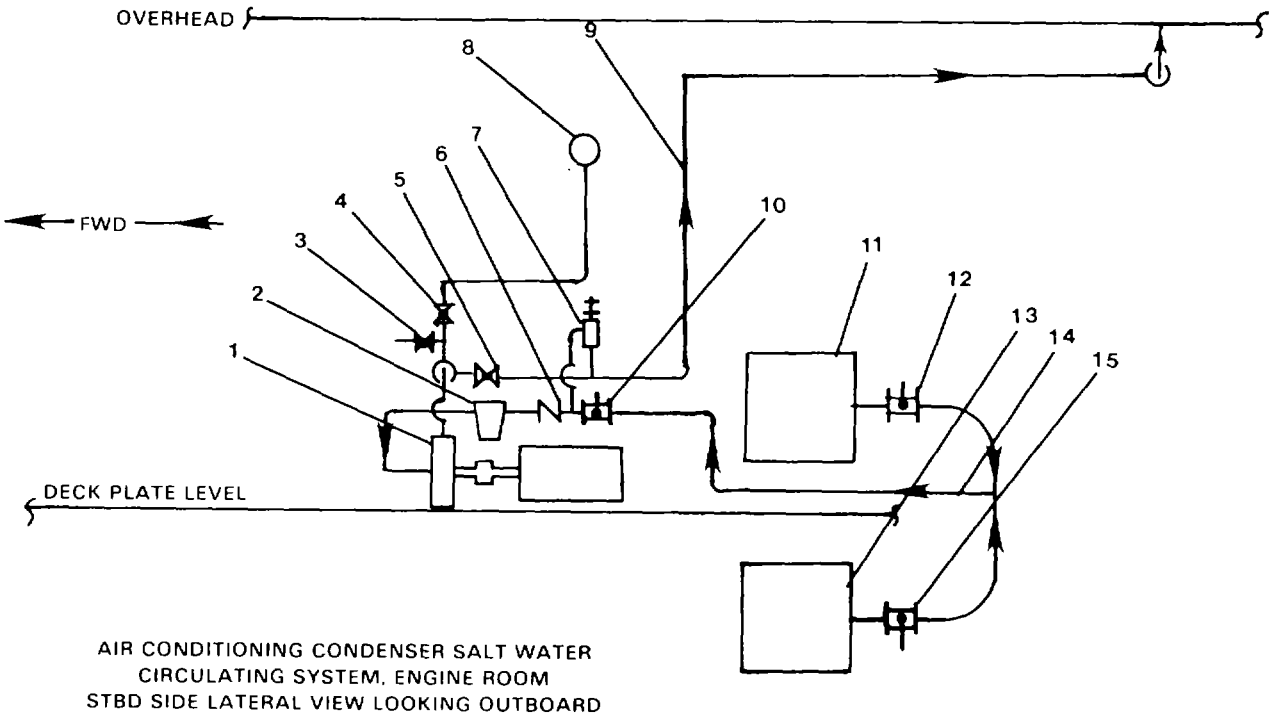
1-10.22.23. Bow Thruster Engine Cooling Water Piping System. The bow thruster engine cooling water piping system extracts heat from the bow thruster engine by pumping potable water through the engine. System control is maintained through a combination of flanges/valves as shown on



LEGEND

1. POTABLE WATER DISCHARGE PIPE
2. POTABLE WATER DISCHARGE VALVE FROM ENGINE ROOM
3. HOT WATER DISCHARGE PIPE
4. HOT WATER RETURN VALVE FROM ENGINE ROOM
5. # 1 WATER HEATER
6. # 1 WATER HEATER DISCHARGE VALVE
7. # 1 WATER HEATER INLET VALVE
8. SWING CHECK VALVE
9. SWING CHECK VALVE
10. # 2 WATER HEATER DISCHARGE VALVE
11. # 2 WATER HEATER INLET VALVE
12. # 2 WATER HEATER
13. HOT WATER CIRCULATING PUMP BYPASS VALVE
14. HOT WATER CIRCULATING PUMP DISCHARGE VALVE
15. HOT WATER CIRCULATING PUMP
16. HOT WATER CIRCULATING PUMP SUCTION VALVE
17. # 2 WATER HEATER PRESSURE RELIEF VALVE SET AT 125 PSI
18. # 1 WATER HEATER PRESSURE RELIEF VALVE SET AT 125 PSI

FIGURE 1-52. Potable Water Piping System - Upper Machinery Room.

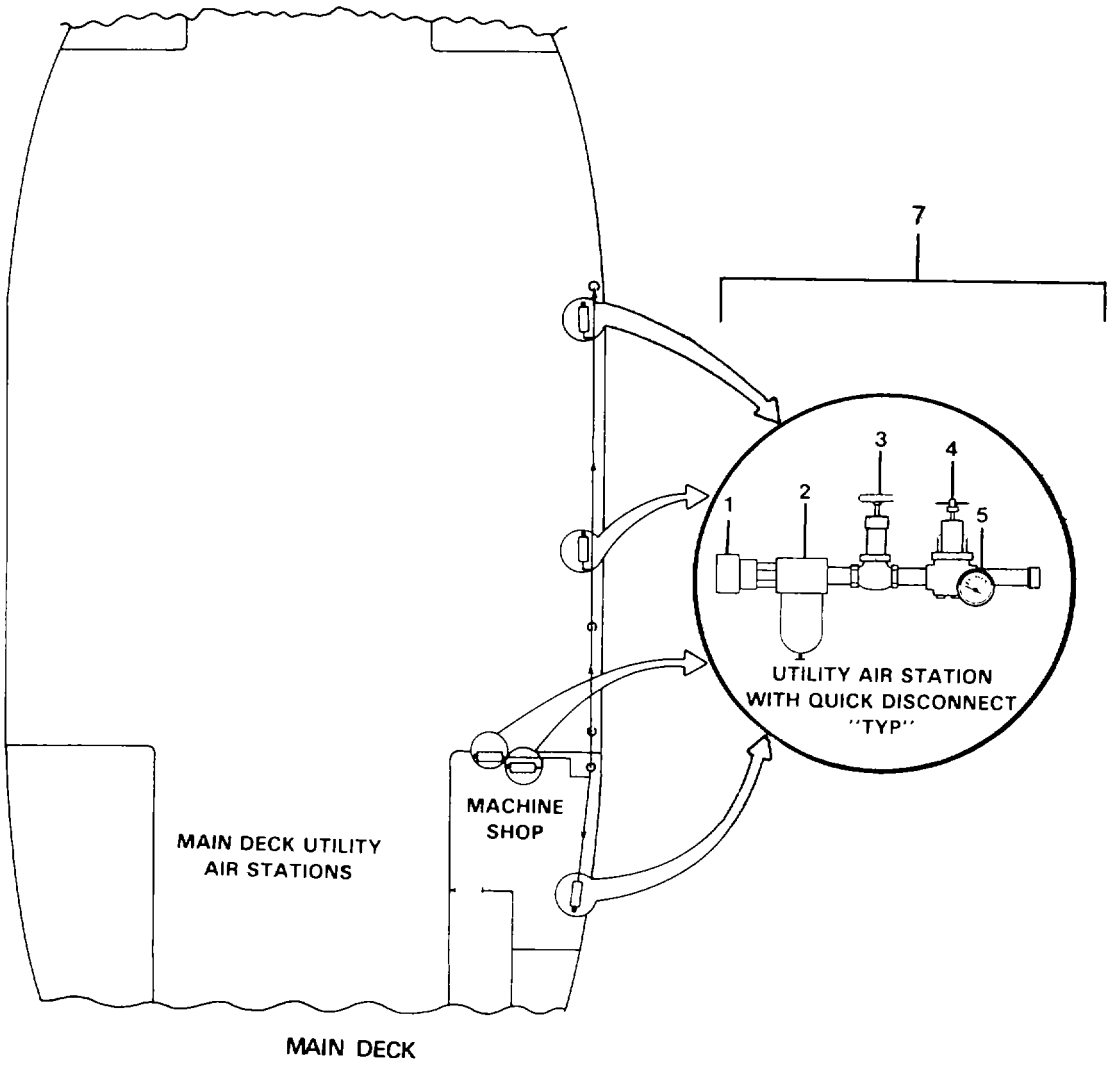


AIR CONDITIONING CONDENSER SALT WATER CIRCULATING SYSTEM, ENGINE ROOM STBD SIDE LATERAL VIEW LOOKING OUTBOARD

LEGEND

1. CONDENSER SALT WATER CIRCULATING PUMP DISCHARGE AND MOTOR
2. SUCTION STRAINER
3. PUMP VENT VALVE
4. PRESSURE GAUGE CUTOUT VALVE
5. SALT WATER CIRCULATING PUMP DISCHARGE VALVE
6. SWING CHECK VALVE
7. PRESSURE RELIEF VALVE
8. DISCHARGE PRESSURE GAUGE 0-200 PSI
9. SALT WATER CIRCULATING PUMP PIPE TO UPPER MACHINERY ROOM
10. SALT WATER CIRCULATING PUMP SUCTION VALVE
11. HIGH SEA CHEST
12. HIGH SEA CHEST CUTOUT VALVE
13. LOW SEA CHEST
14. SALT WATER CIRCULATING PUMP SUCTION PIPE
15. LOW SEA CHEST CUTOUT VALVE

FIGURE 1-53. Condenser Salt Water Circulating Piping System.

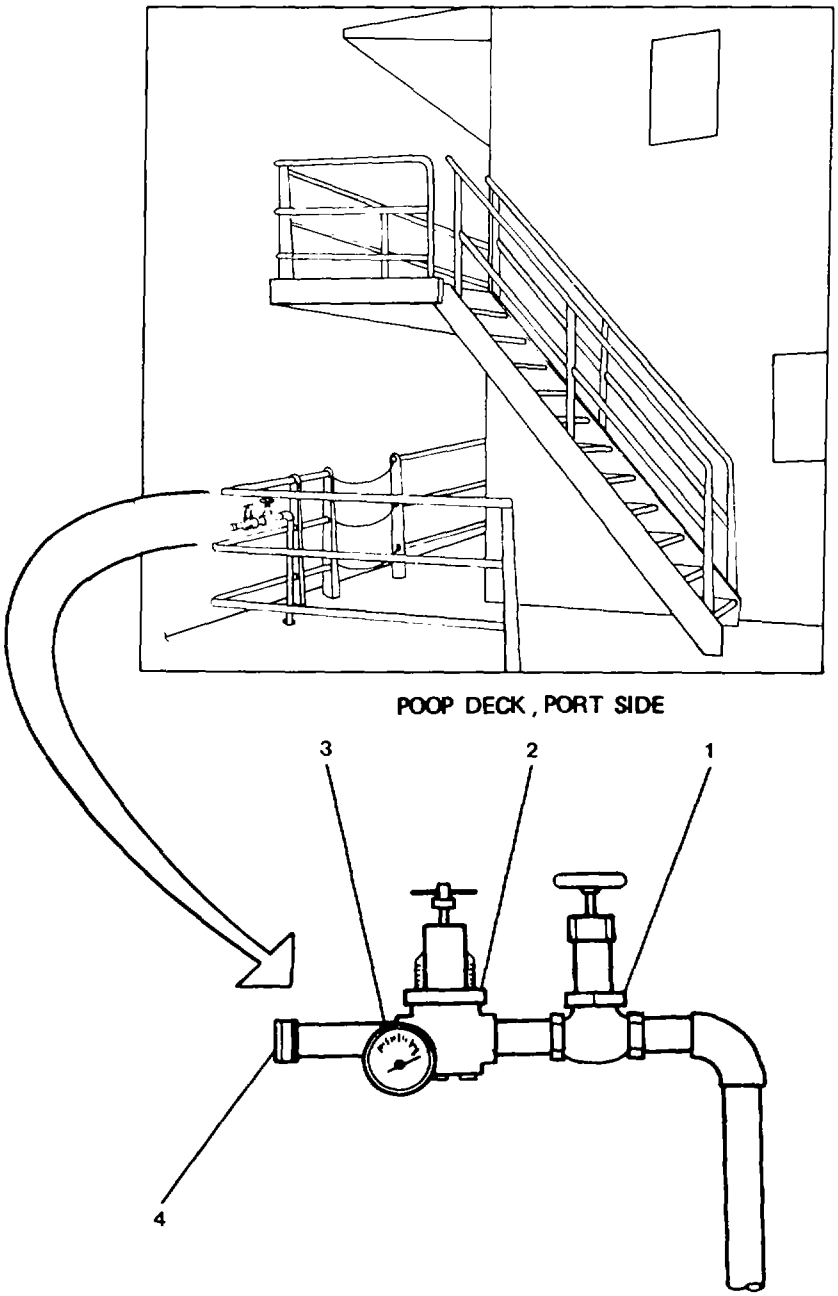


MAIN DECK

LEGEND

1. QUICK DISCONNECT
2. AIR/WATER FILTER SEPARATOR
3. AIR STOP VALVE
4. COMPRESSED AIR REDUCING VALVE
5. PRESSURE GAUGE 0-200 PSI
6. COMPRESSED AIR TO BOW THRUSTER ROOM
7. UTILITY AIR STATION (TYP)

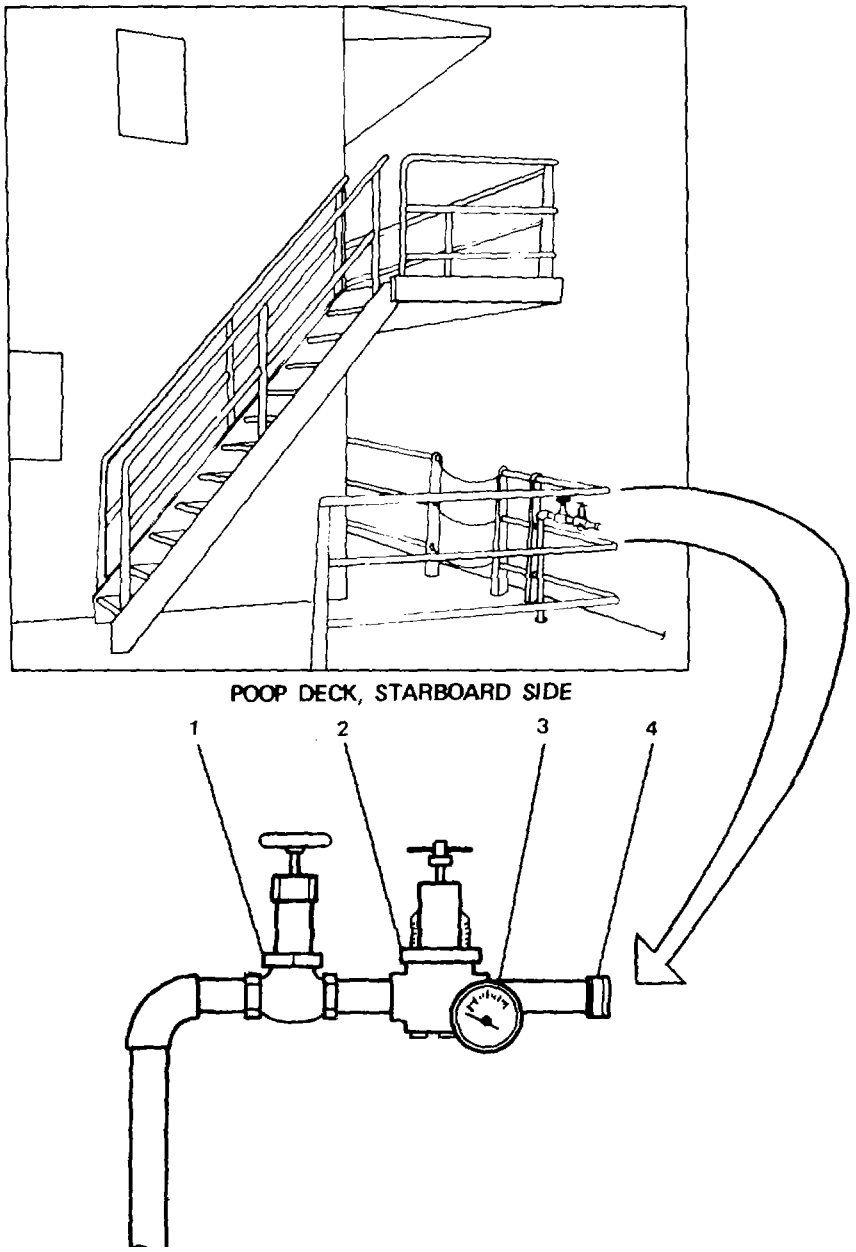
FIGURE 1-54. Compressed Air Piping System - Main Deck and Above (Sheet 1 of 6).



LEGEND

1. VALVE
2. REDUCING VALVE
3. PRESSURE GAGE 0-200 PSI
4. QUICK DISCONNECT

FIGURE 1-54. Compressed Air Piping System - Main Deck and Above (Sheet 2 of 6).



LEGEND

1. VALVE
2. REDUCING VALVE
3. PRESSURE GAGE 0-200 PSI
4. QUICK DISCONNECT

FIGURE 1-54. Compressed Air Piping System - Main Deck and Above (Sheet 3 of 6).

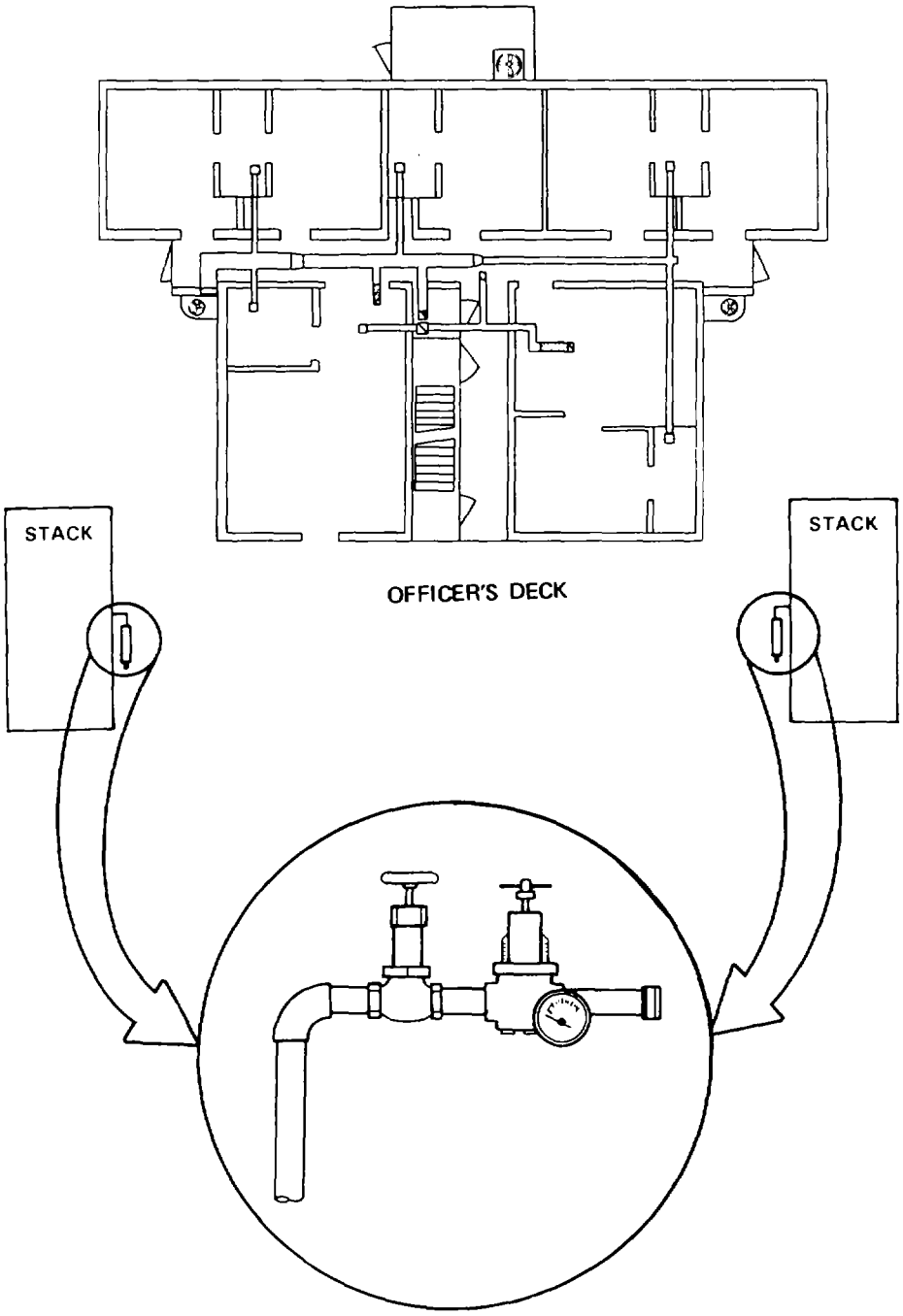


FIGURE 1-54. Compressed Air Piping System - Main Deck and Above (Sheet 4 of 6).

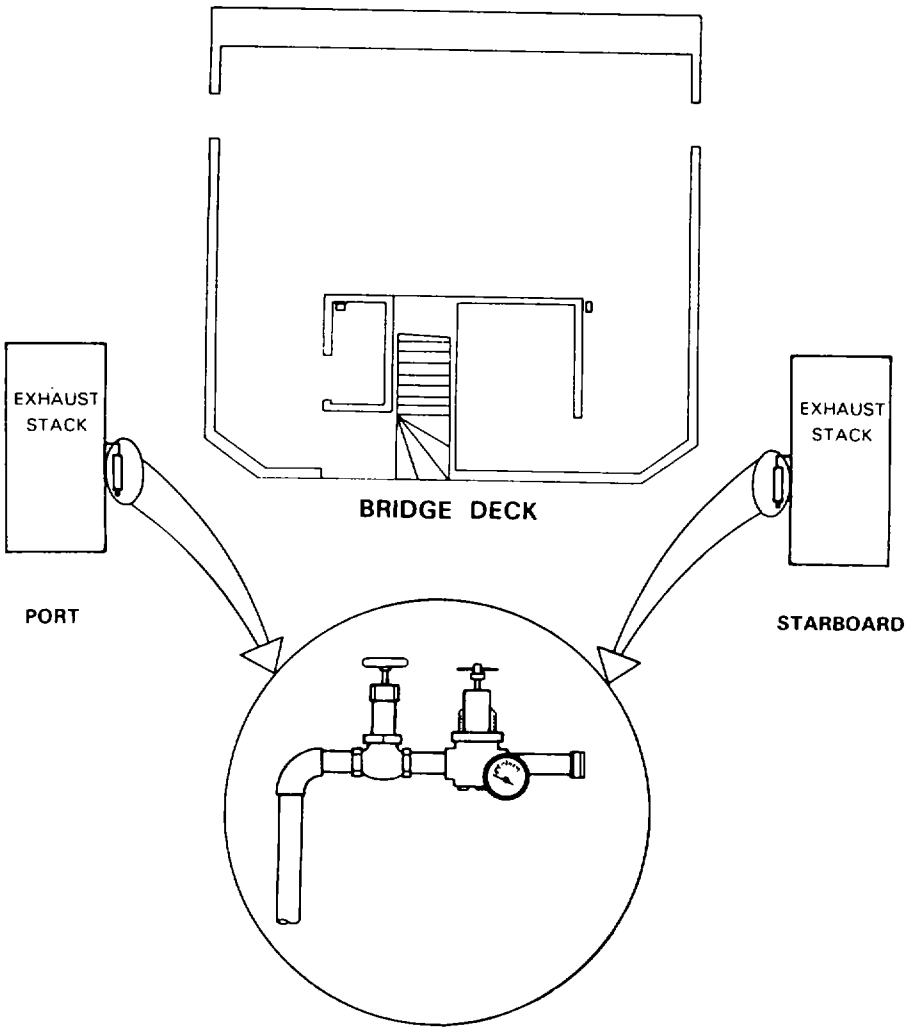
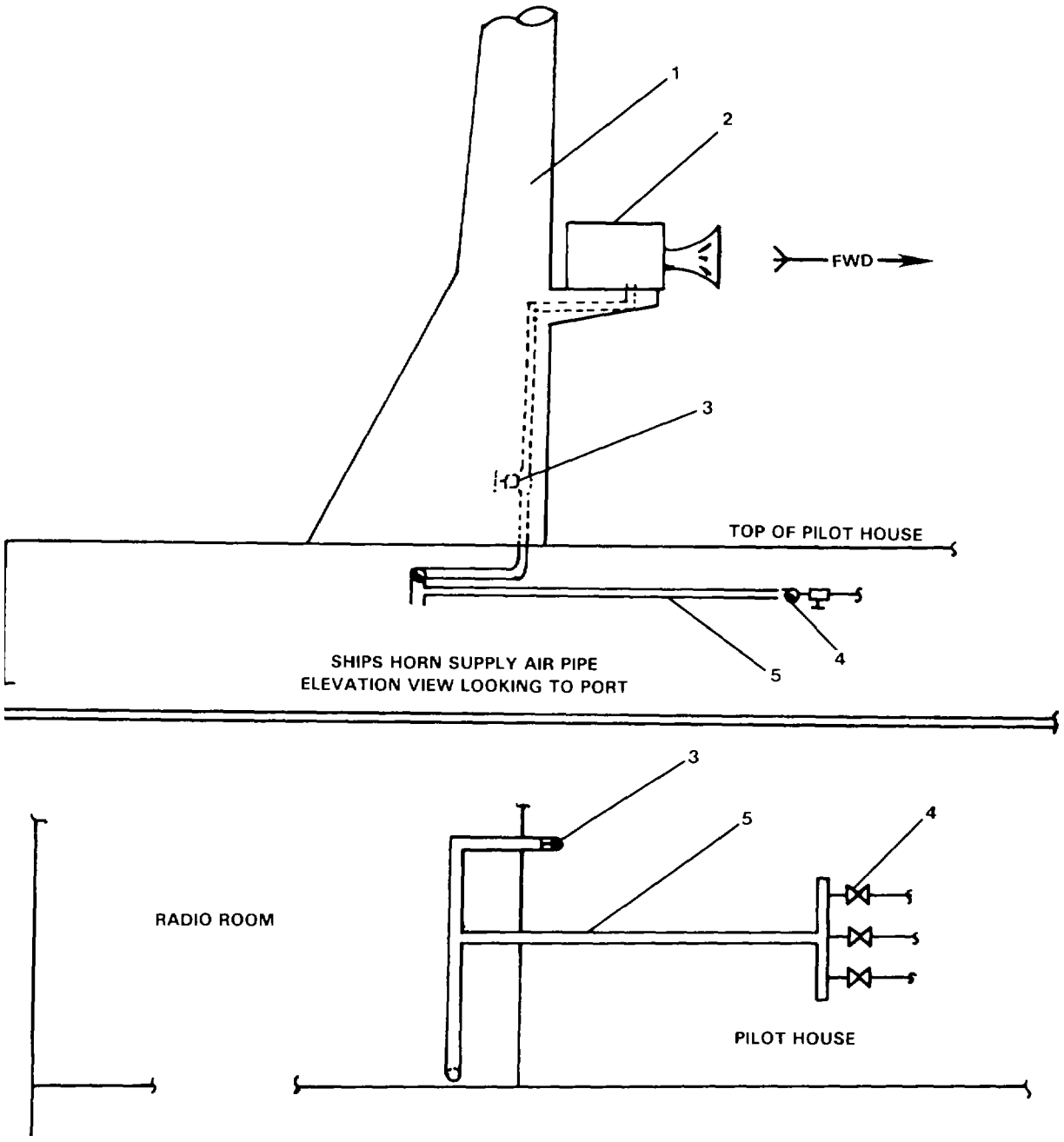


FIGURE 1-54. Compressed Air Piping System - Main Deck and Above. (Sheet 5 of 6).



PLAN VIEW PILOT HOUSE
WINDSHIELD WIPER AIR SUPPLY

LEGEND

1. SHIPS MAIN MAST
2. SHIPS HORN
3. SHIPS HORN AIR SUPPLY CUTOUT VALVE
4. WINDSHIELD WIPER AIR CONTROL VALVE
5. WINDSHIELD WIPER AIR SUPPLY PIPE

FIGURE 1-54. Compressed Air Piping System - Main Deck and Above. (Sheet 6 of 6).

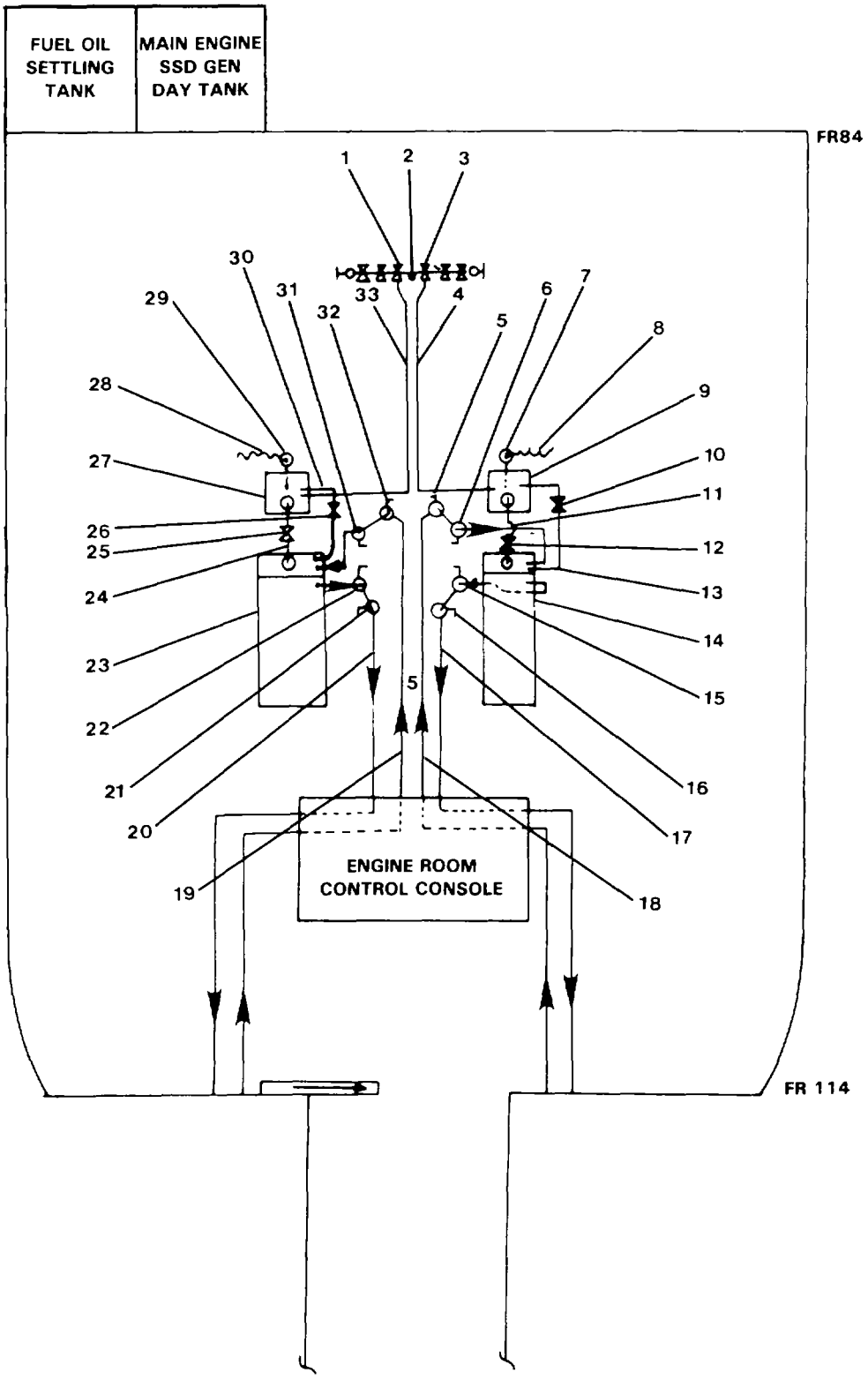


FIGURE 1-55. Ship's Service Diesel Generator Cooling Water Piping System (Sheet 1 of 2).

LEGEND

1. FRESH WATER FILL VALVE TO PORT GENERATOR EXPANSION TANK
2. FRESH WATER DISTRIBUTION MANIFOLD
3. FRESH WATER FILL VALVE TO STBD GENERATOR EXPANSION TANK
4. FRESH WATER FILL PIPE TO STBD GENERATOR EXPANSION TANK
5. STBD GENERATOR COOLING WATER SUCTION VALVE FROM COOLING COILS IN BALLAST TANK
6. STBD GENERATOR COOLING WATER SUCTION VALVE FROM KEEL COOLERS
7. STBD GENERATOR COOLING WATER LOW LEVEL ALARM
8. ELECTRICAL LEAD TO GENERATOR ALARM PANEL
9. STBD GENERATOR COOLING WATER EXPANSION TANK
10. STBD GENERATOR COOLING WATER VENT VALVE
11. COOLING WATER DISCHARGE PIPE FROM EXPANSION TANK TO GENERATOR
12. COOLING WATER DISCHARGE VALVE FROM EXPANSION TANK TO GENERATOR
13. STBD GENERATOR COOLING WATER VENT PIPE
14. STBD GENERATOR
15. STBD GENERATOR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
16. STBD GENERATOR COOLING WATER DISCHARGE VALVE TO COOLING COILS IN BALLAST TANK
17. STBD GENERATOR COOLING WATER PIPE TO COOLING COILS IN BALLAST TANK
18. STBD GENERATOR COOLING WATER PIPE FROM COOLING COILS IN BALLAST TANK
19. PORT GENERATOR COOLING WATER PIPE FROM COOLING COILS IN BALLAST TANK
20. PORT GENERATOR COOLING WATER PIPE TO COOLING COILS IN BALLAST TANK
21. PORT GENERATOR COOLING WATER DISCHARGE VALVE TO COOLING COILS IN BALLAST TANK
22. PORT GENERATOR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
23. PORT GENERATOR
24. COOLING WATER DISCHARGE PIPE FROM EXPANSION TANK TO GENERATOR
25. COOLING WATER DISCHARGE VALVE FROM EXPANSION TANK TO GENERATOR
26. PORT GENERATOR COOLING WATER VENT VALVE
27. PORT GENERATOR COOLING WATER EXPANSION TANK
28. ELECTRICAL LEAD TO GENERATOR ALARM PANEL
29. PORT GENERATOR COOLING WATER LOW LEVEL ALARM
30. PORT GENERATOR COOLING WATER VENT PIPE
31. PORT GENERATOR COOLING WATER SUCTION VALVE FROM KEEL COOLER
32. PORT GENERATOR COOLING WATER SUCTION VALVE FROM COOLING COILS IN BALLAST TANK
33. FRESH WATER FILL PIPE TO PORT GENERATOR EXPANSION TANK

FIGURE 1-55. Ship's Service Diesel Generator Cooling Water Piping System (Sheet 2 of 2).

FIGURE 1-35. The bow thruster engine cooling water piping system receives potable water from the potable water piping system. The cooling system pumps the potable water through the engine, aftercooler and turbocharger to the keel cooler, located outside the hull of the vessel. From the keel vessel. From the keel cooler, the coolant goes to an expansion tank then back to the engine components which completes the cycle.

1-10.22.24. Bow Ramp Hydraulic Piping System. The bow ramp hydraulic piping system provides the hydraulic fuild to operate the bow ramp. System control is maintained through a combination of hydraulic valves. The hydraulic pump draws hydraulic fluid from the reservoir and pumps it through the control valve to drive the hydraulic motor.

1-10.22.25. Bow Anchor Windlass Hydraulic Piping System. The bow anchor windlass hydraulic piping system provides the hydraulic fluid to haul in or pay out the bow anchor chain. System control is maintained through a combination of hydraulic valves. The hydraulic pump draws hydraulic fluid from the reservoir and pumps it through the control valve to drive the hydraulic motor.

1-10.22.26. Stern Ramp Hydraulic Piping System. The stern ramp hydraulic piping system provides the hydraulic fluid to raise or lower the stern ramp. System control is maintained through a combination of hydraulic valves. The hydraulic pump draws hydraulic fluid from the reservoir and pumps it through the control valve to drive the hydraulic motor. The stern ramp hydraulic piping system can be aligned to provide hydraulic fluid to the stern anchor winch.

1-10.22.27. Stern Anchor Winch Hydraulic Piping System. The stern anchor winch hydraulic piping system provides the hydraulic fluid to haul in or pay out the stern anchor chain. System control is maintained through a combination of hydraulic valves. The hydraulic pump draws hydraulic fluid from the reservoir and pumps it through the control valve to drive the hydraulic motor.

1-10.23. Propeller Shaft, Propeller and Shaft Brake. The propeller shaft transfers power provided by the main reduction gear and clutch to the propeller which converts it to thrust required to move the vessel. The shaft brake stops and holds the propeller shaft when no torque is applied. The propeller shaft transfers torque from the main reduction gear and clutch to the propeller. The propeller converts this torque to the thrust needed to move the vessel. The shaft is connected to the main reduction gear via the propeller shaft flange. The shaft is lubricated by water from the stern tube lubrication piping system. The air actuated shaft brake provides the means of stopping the propeller shaft rotation when torque is removed from the shaft. The brake is automatically actuated. Shaft locks allow manual locking of each shaft.

1-10.24. Doors, Hatches, and Scuttles Doors, hatches and scuttles provide access to spaces and either privacy, security, or watertight/firetight integrity. Interior doors primarily provide access between above main deck interior spaces where security or watertight integrity is not a concern. Watertight doors provide access to interior spaces from weather spaces and to compartments where watertight integrity is a requirement. Hatches provide access to below main deck areas. Hatches offer watertight integrity when closed and dogged. When open, hatches allow transfer of equipment and personnel between decks. Scuttles provide emergency or restricted access to below deck

engineering spaces. A sliding watertight door between the engineering spaces and the steering gear compartment also provides watertight integrity to the engineering spaces. This door is a vertical standing hydraulically operated door.

1-10.25. Work Boat/Liferafts. The work boat functions as the utility small craft for operations such as sea rescue and personnel transport. The inflated outboard-motor-driven work boat is deployed and retrieved by an electrical winch davit. Liferafts are self contained container stowed craft that provide personnel evacuation when abandoning ship. They are deployed by gravity activated davits that contain a centrifugal brake to control the rate of descent. They also have a float-free system that automatically releases the raft and inflates it if the ship sinks.

1-10.26. Machine Shop Equipment. Machine shop equipment provides for TM 55-1915-200-10 general machining, threading, grinding, drilling and welding functions. To perform these functions the machine shop contains an arc welder, drill press, lathe, and bench grinder. The machine shop also contains a wet/dry vacuum cleaner for general cleanup .

1-10.27. Laundry Equipment. Laundry equipment provides the means to wash and dry clothing. A washer and dryer are provided for this purpose. The washer draws potable water from the potable water piping system and disposes of soiled water through the marine sanitation piping system.

1-10.28. Windows and Ports. Windows and ports provide visibility. The pilothouse front windows are sloped inward at the bottom to prevent glare. The front windows also have three electric windshield wipers to provide visibility from the helm and the radar screens during inclement weather.

CHAPTER 2

OPERATING INSTRUCTIONS

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

2-1. GENERAL. Operator's controls and indicators are functionally explained in Table 2-1. Each control and indicator for the LSV is listed. An associated illustration is given with call-outs corresponding to the item number in Table 2-1. The control or indicator is described from the point of view of the operator. Names of items called out in the table correspond to labels that are located on the actual equipment. Where practical the exact words or numbers located on the gauge, dial, button or switch are illustrated to assist the operator in locating and properly operating the equipment or system. However, the operator should understand that a vessel's life cycle is quite lengthy and replacement controls or indicator's may vary slightly from those originally installed or described herein. The FUNCTION column of this tale does not describe readings that an operator is likely to encounter. Instead, brief functions of the control or indicator are addressed.

2-1.1. Table Arrangement. Table 2-1 is laid out in a space by space arrangement starting in the pilothouse and working down through the ship. Key shipboard control centers are described initially. All Controls and indicators in the pilothouse are discussed first, followed by the engine room control center. Other machinery space controls and indicators located on weather decks are described after living spaces and finally the electrical distribution panels and power panels are described. Power distribution and power panels are discussed last in order to assist the operator in easily locating all power panels in order to perform the PMCS and Operating Procedures that follow Table 2-1.

2-1.2. Locating Controls and Indicators. To locate a particular control and indicator, it will be necessary to go to the alphabetical index located at the back of this manual. The specific piece of equipment will be listed there and subordinate headings for control and indicator will list the figure number for that specific piece of equipment. Figures and the associated tabular information are located together.

Table 2-1. Description of Operator's Controls and Indicators

Key	Control or Indicator	Function
Pilothouse Steering Cabinet (FIGURE) 2-1)		
1	Rudder Order	Indicates rudder angle relative to ships centerline in degrees.
2	Dimmer	Controls brilliance of rudder order indicator lighting.
3	Ship's Helm	Provides rudder position commands to the steering gear.
4	SPERRY AUTOPILOT	2 amp. circuit breaker for autopilot system.
5	SPERRY AUTOPILOT	2 amp. circuit breaker for autopilot system.
6	RUDDER ORDER INDICATOR	2 amp. circuit breaker for rudder order indicator.
7	#2 PORT F. U. AMP.	2 amp. circuit breaker for follow-up amplifier.
8	#2 STBD F. U. AMP.	2 amp. circuit breaker for follow-up amplifier.
9	#1 STBD F. U. AMP.	2 amp. circuit breaker for follow-up amplifier.
10	#1 PORT F U. AMP.	2 amp. circuit breaker for follow-up amplifier.
11	R.A.I.	2 amp. circuit breaker for rudder angle indicator.
12	AUTOPILOT/MAIN	5 amp. circuit breaker for autopilot system.
13	PORT STEER. FAILURE DETECTOR	2 amp. circuit breaker for port steering failure detector.
14	STBD STEER. FAILURE DETECTOR	2 amp. circuit breaker for starboard steering failure detector.
15	STBD RUDDER NON-FOLLOWUP	Controls starboard rudder operation.
16	Sonalert	Audible warning device.

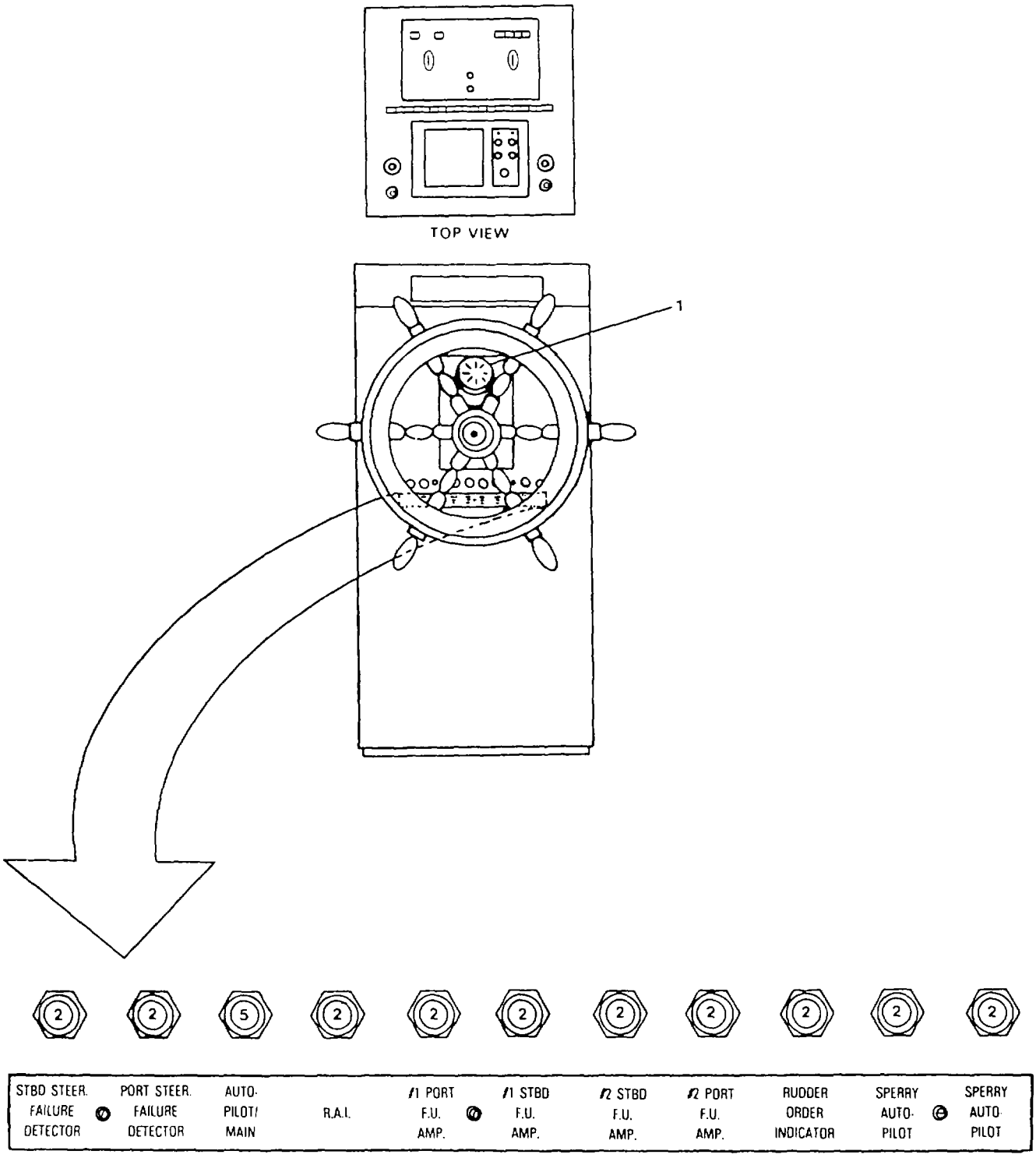


FIGURE 2-1. Pilothouse Steering Cabinet (Sheet 1 of 4).

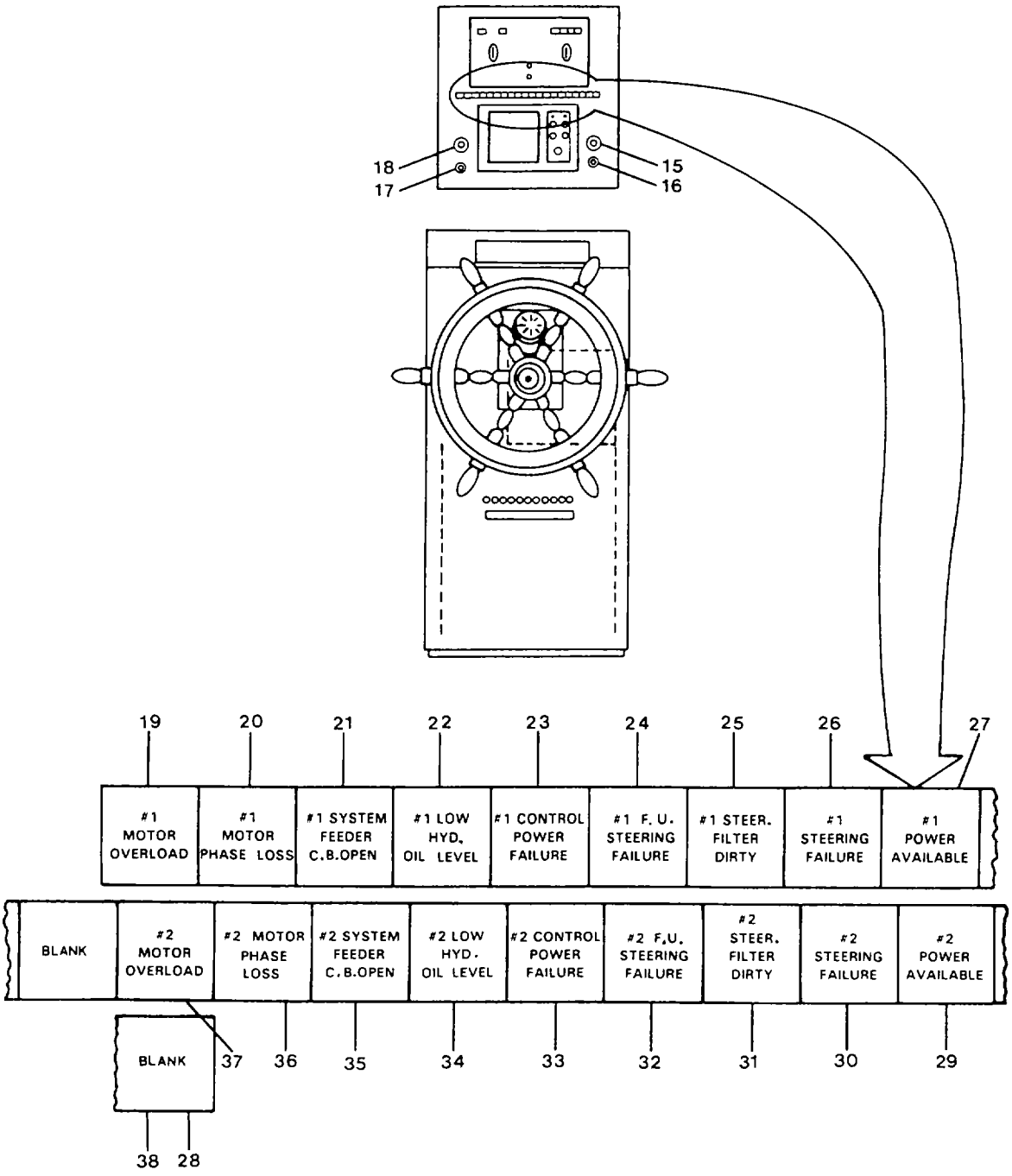


FIGURE 2-1. Pilothouse Steering Cabinet (Sheet 2 of 4).

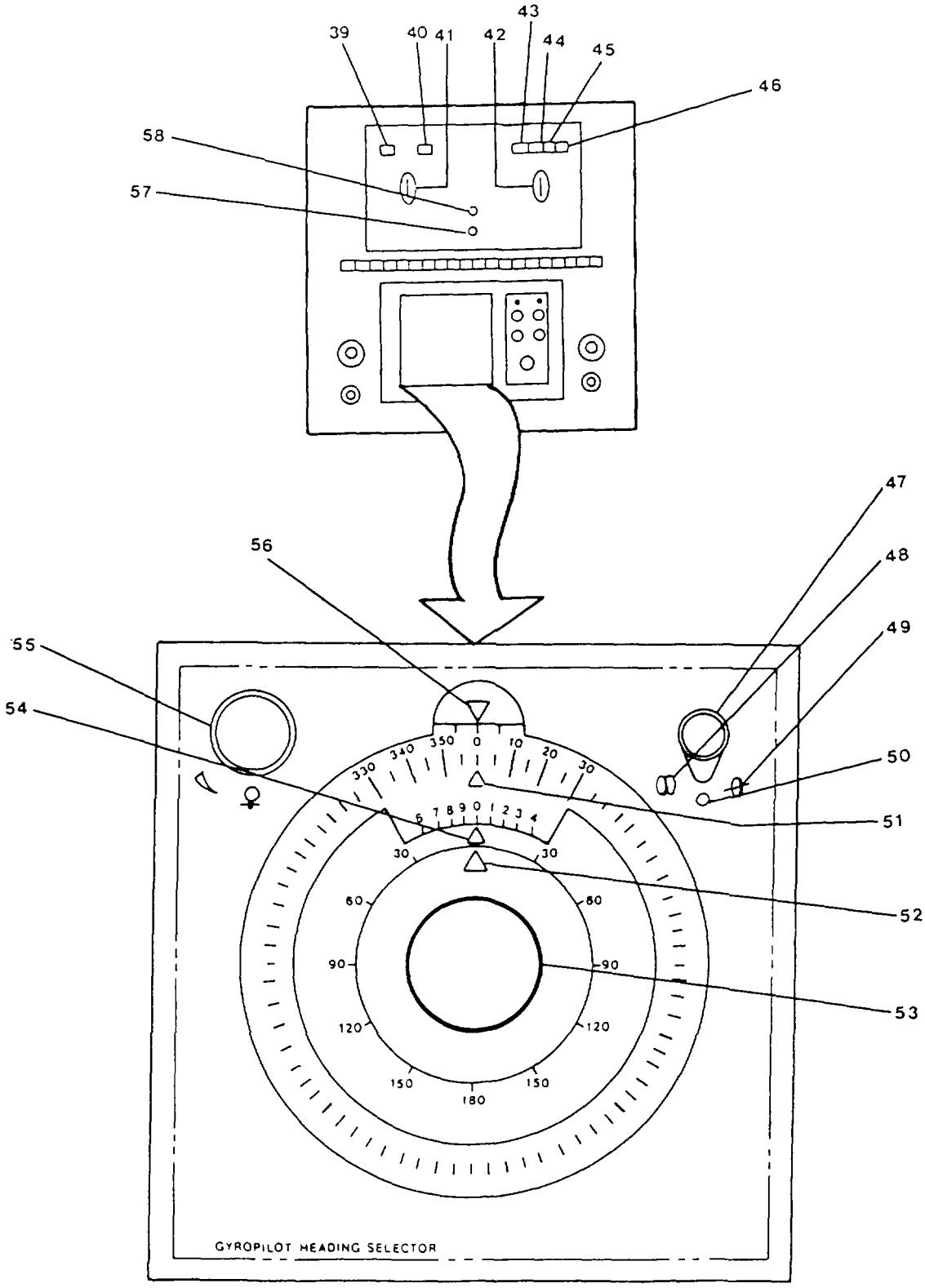


FIGURE 2-1. Pilothouse Steering Cabinet (Sheet 3 of 4).

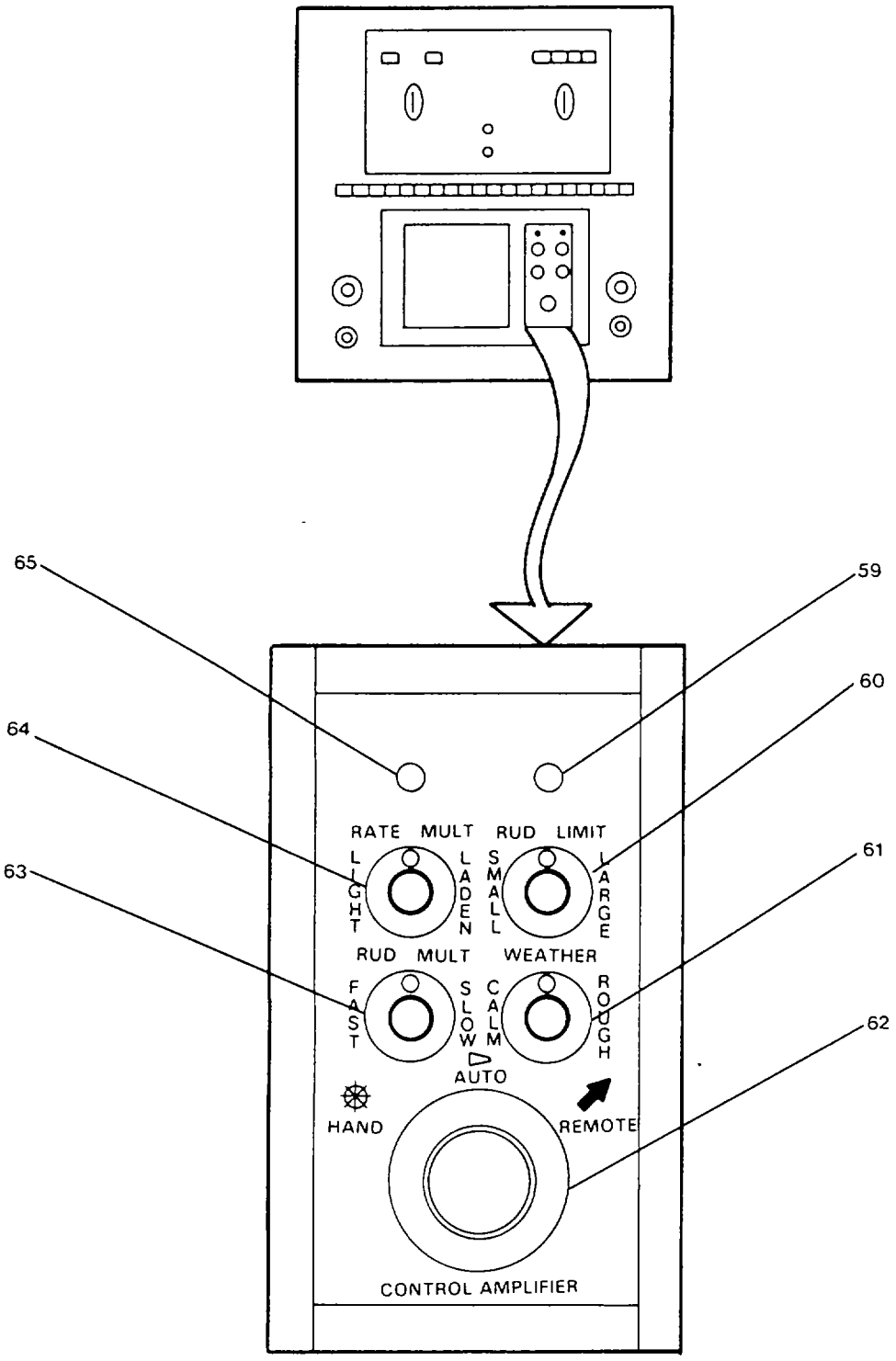


FIGURE 2-1. Pilothouse Steering Cabinet (Sheet 4 of 4)

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Pilothouse Steering Cabinet (FIGURE 2-1) - continued	
17	Alarm ACK	When depressed, silences audible alarm.
18	PORT RUDDER NON-FOLLOWUP	Controls port rudder operation.
19	#1 MOTOR OVERLOAD	Lights red indicating motor overload.
20	#1 MOTOR PHASE LOSS	Lights red indicating #1 motor phase loss.
21	#1 SYSTEM FEEDER C.B. OPEN	Lights red indicating #1 system feeder circuit breaker open.
22	#1 LOW HYD. OIL LEVEL	Lights red indicating #1 low hydraulic oil level.
23	#1 CONTROL POWER FAILURE	Lights red indicating #1 control power failure.
24	#1 F.U. STEERING FAILURE	Lights red indicating failure of follow-up steering system.
25	#1 STEERING FILTER DIRTY	Lights red indicating #1 hydraulic system filter dirty.
26	#1 STEERING FAILURE	Lights red indicating #1 steering failure.
27	#1 POWER AVAILABLE	Lights green indicating #1 power available.
28	Blank	
29	#2 POWER AVAILABLE	Lights green indicating #2 hydraulic system power available.
30	#2 STEERING FAILURE	Lights red indicating #2 steering failure.
31	#2 STEERING FILTER DIRTY	Lights red indicating dirty filter in #2 steering system hydraulics.
32	#2 F.U. STEERING FAILURE	Lights red indicating follow-up steering failure.
33	#2 CONTROL POWER FAILURE	Lights red indicating #2 control power failure.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Pilothouse Steering Cabinet (FIGURE 2-1) - continued	
34	#2 LOW HYD. OIL LEVEL	Lights red indicating #2 low hydraulic oil level.
35	#2 SYSTEM FEEDER C.B. OPEN	Lights red indicating #2 system feeder circuit breaker open.
36	#2 MOTOR PHASE LOSS	Lights red indicating #2 motor phase loss.
37	#2 MOTOR OVERLOAD	Lights red indicating #2 motor overload.
38	Blank	
39	#1 Pump Running	Lights green indicating port hydraulic system is operating.
40	#2 Pump Running	Lights green indicating starboard hydraulic system is operating.
41	Pump Selector	Selects #1 or #2 hydraulic system.
42	Mode Selector	Positioned to select follow-up, non-follow-up, off, or autopilot mode.
43	FOLLOW UP	Lights green indicating steering control with ship's helm.
44	NONFOLLOW UP	Lights green indicating rudder control and steering using joysticks.
45	OFF	Lights red indicating no steering mode available at Pilothouse Steering Console.
46	AUTOPILOT	Lights green indicating that autopilot is selected and control of ship steering is with the autopilot.
47	Mode Selector Three	Selects magnetic (TMS), gyro, or Position synchronize gyrocompass position.
48	Magnetic mode	Position for transmitting magnetic compass input.
49	Gyrocompass mode	Will use the gyrocompass operation input.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Pilothouse Steering Cabinet (FIGURE 2-1) - continued	
50	Synchronize Mode	Provides manual synchronization of the compass repeater to the gyrocompass.
51	Movable True Heading Order Pointer	Pointer is controlled by heading selector control. When rotated, selects a new heading to steer.
52	Relative Heading Change	Indicates relative heading change Scale order, graduated in five degree increments between 0 and 180 degrees.
53	Heading Selector Knob	Rotated to select new true heading (outer scale) or relative heading change (inner scale).
54	Vernier Heading Scale	Indicates heading, graduated in 1 degree increments between 1 and 10 degrees.
55	Dimmer Control	Controls illumination. Dims control amplifier and system components.
56	Course Heading Index (Lubber Line)	Indicates compass heading.
57	DIMMER (Switch)	Controls illumination of steering selector panel.
58	LAMP TEST (Pushbutton)	Tests steering panel lighting.
59	Starboard Rudder Indicator	Lights green to indicate starboard rudder order.
60	RUD LIMIT Control	Limits rudder angle between 5 and 45 degrees.
61	WEATHER Control	System operates at reduced sensitivity (calibrated increments of 0 to 5 degrees to control amount of heading error or yaw before sensitivity is automatically increased) until vessel's heading or yaw is beyond the setting, at which point sensitivity is automatically increased to correct vessel's position within the low sensitivity region. This control is adjusted to reduce ineffective rudder activity in bad weather.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Pilothouse Steering Cabinet (FIGURE 2-1) - continued	
62	Mode Switch HAND AUTO REMOTE	 Positioned to HAND for hand-electric steering. Positioned to AUTO for automatic steering using the gyrocompass. Positioned to REMOTE for steering at remote station. Only AUTO functions with basic system.
	NOTE **Rudder Multipler may be set to higher valves at low ship speed for better performance, but should be kept low to prevent ship's wandering.**	
63	RUD MULT	Rudder Multiplier control settings between 1 (minimum gain) and 3 (maximum gain) vary gain of Rudder Order Computer to provide control of ratio between one degree of rudder per degree of heading error and three degrees of rudder per degree of heading error. Higher settings causes immediate vessel response to heading error by increasing rudder angles.
64	RATE MULT	Positioned to control the heading error rate (damping or counter rudder) gain level for best heading keeping and heading changing. Provides up to a 2 to 1 ratio of rate gain over the value set during installation. It is used to compensate for load changes; a light ship needs less counter rudder.
65	Port Rudder Indicator	Lights red to indicate port rudder order.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Gyrocompass Mark 27 Mod 1 Electronic Control Panel (FIGURE 2-2)		
1	Caged Button	Depressed cages gyrocompass.
2	Viewing Window	Allows gyrocompass heading check.
3	Level Meter	Indicates title of gyroscope spin axis; two minutes per division.
4	FOLLOW-UP ALARM Lamp	Should this light illuminate, the gyrocompass would lose one axis of freedom and could no longer be considered a gyroscope.
5	POWER Lamp	Lights red to indicate power available to compass circuits.
6	DIMMER Control	Controls illumination level of compass card on master compass.
7	MODE SELECTOR	SLEW Position energizes all circuits except gyroscope motor and repeaters; in START position gyroscope is brought up to speed; in RUN position, TILT/AZIMUTH switch is not energized; in MANUAL LEVEL position, TILT/AZIMUTH switch is energized; in AUTO LEVEL position, gyroscope is brought to approximate level position. OFF position turns system off.
8	8 AMP DC Fuse	Protects internal power supply.
9	TILT/AZIMUTH	Controls gyrocompass direction of rotation and supplies tilt signal.
10	1 AMP AC Fuse	Protects 120 volt circuit.
11	1 AMP RPTR Fuse	Protects repeater internal power supply.
12	RPTR Switch	Applies power to repeaters.
13	LATITUDE Control	Compensates for ship's latitude system.

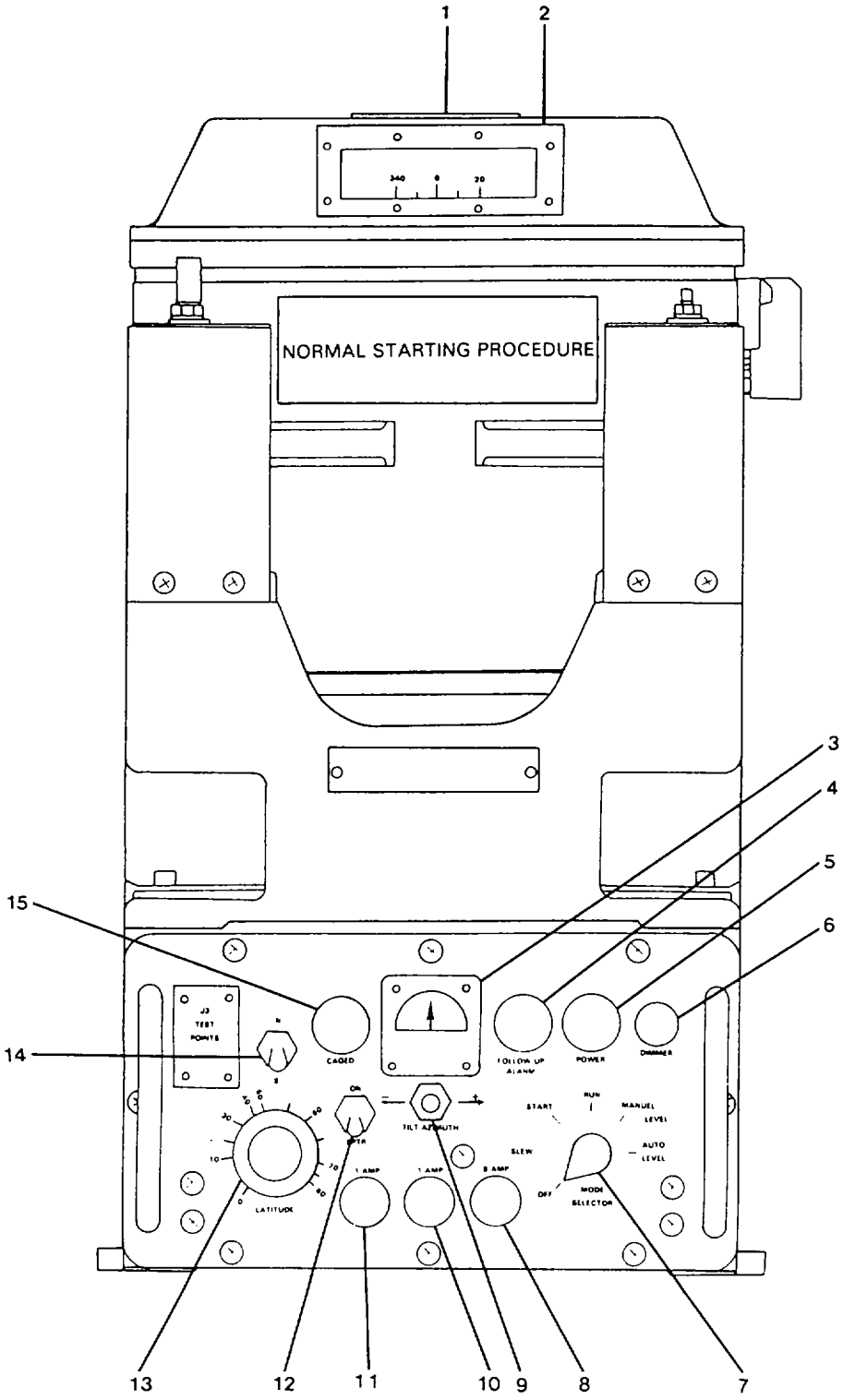


FIGURE 2-2. Gyrocompass Mark 27 Mod 1 Electronic Control Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Gyrocompass Mark 27 Mod 1 Electronic Control Panel (FIGURE 2-2) - continued		
14	N-S Switch	Set for north or south latitude depending upon ship's location and changes the pickoff winding through which the DC current flows.
15	CAGED Lamp	Lights red to indicate gyroscope is caged.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Mark 37 MOD E Transmission Unit (FIGURE 2-3)		
1	POWER	Indicates Transmission Unit AC power on.
2	F1	Fuse (8 amp) protects Transmission Unit AC input power circuit.
3	ON-OFF POWER	Controls ship's AC input power to Transmission Unit.
4	Repeater Switches A2S1	Control of DC (B+) power to each step Through A2S12 repeater load.
5	Repeater Fuses A2F1 Through A2F12 (1 AMP)	Protect B+ power circuit to each repeater load.

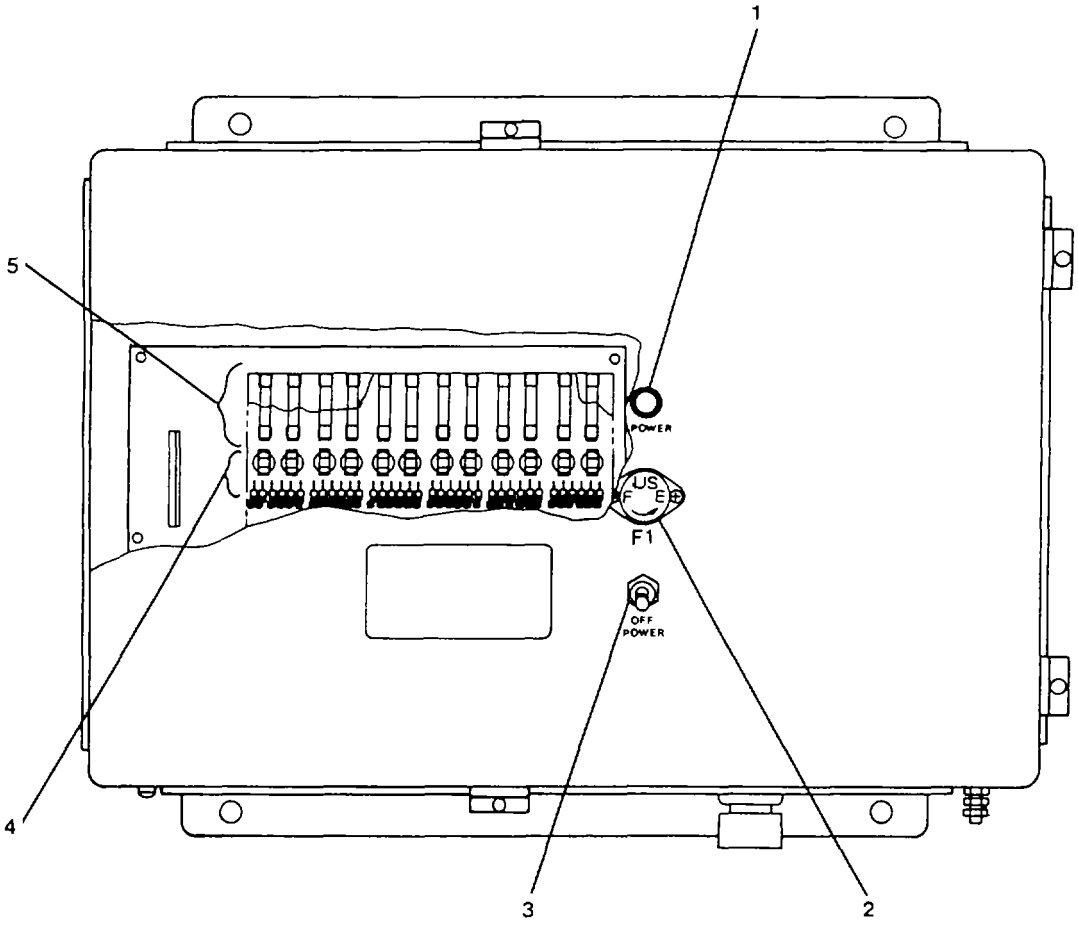
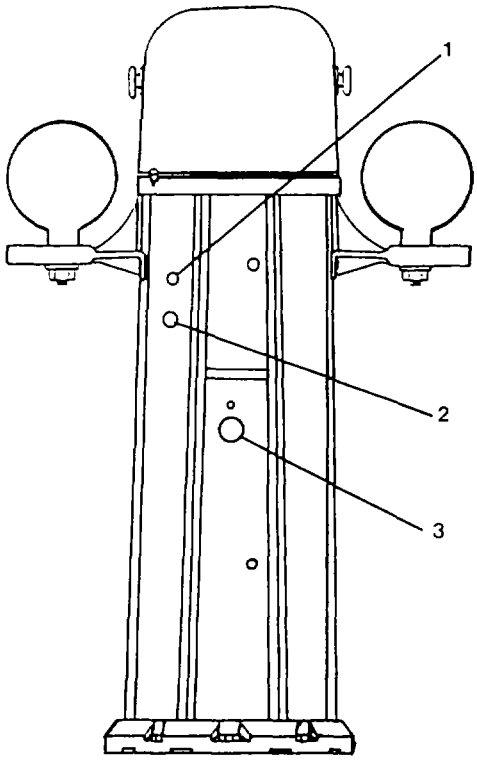


FIGURE 2-3. Mark 37 Mod E Transmission Unit.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Magnetic Compass and Periscope Binnacle (FIGURE 2-4)		
1	Toggle Switch	Controls binnacle light.
2	Rheostat	Controls binnacle light brightness.
3	Mirror Adjusting Knobs	Adjusts and locks in place reflecting mirror.
4	Viewing Window	Window for viewing compass.
5	Mirror Adjusting Knobs	Adjusts and locks in place reflecting mirror.
6	Mirror View Window	Viewing reflected compass face.



VIEWING AFT

FIGURE 2-4. Magnetic Compass and Periscope Binnacle (Sheet 1 of 2).

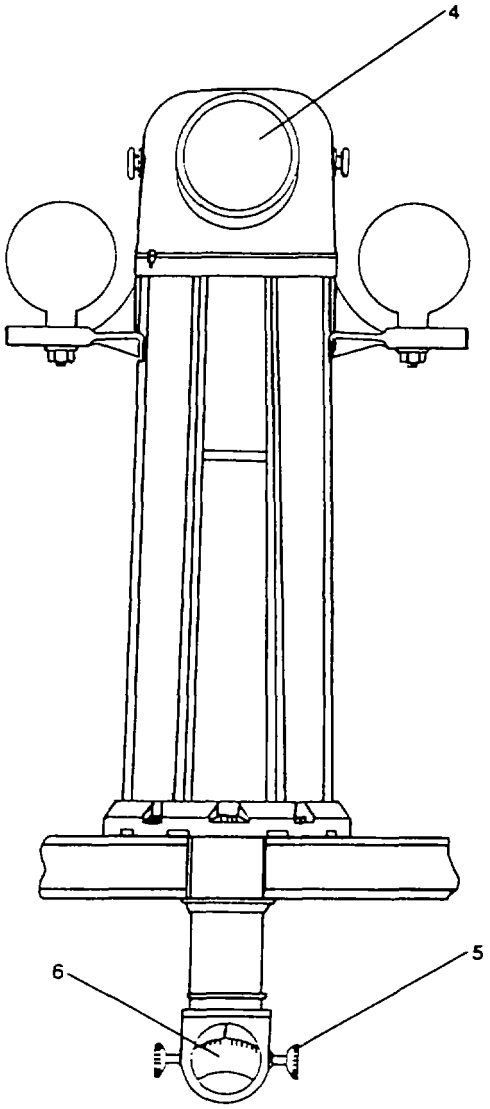


FIGURE 2-4. Magnetic Compass and Periscope Binnacle (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Open-Scale Compass Repeater (FIGURE 2-5	
1	Dimmer	Controls illumination level of compass repeater.
2	ON/OFF Switch Under Watertight Cover	Covers compass synchronizer control on/off switch.
3	Lubber Line	Indicates one-degree increments when read against repeater card.
4	Synchronizer Knob	Adjust/synchronizes repeater reading manually only when synchronizer control is off.
5	Repeater Card	Read directly against lubber line.
6	Mask	Has cutouts for ten-degree repeater card markings and notches for five-degree repeater card markings.

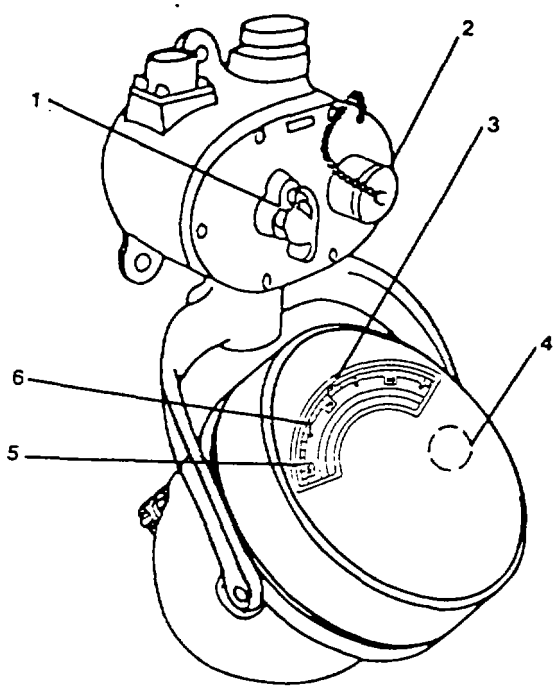


FIGURE 2-5. Open Scale Compass Repeater.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Standard Bearing Repeater (FIGURE 2-6)		
1	Lubber Line	Indicates heading when read against repeater card.
2	Repeater Card	Read against lubber line to indicate heading.
3	Synchronizer Knob	Synchronizes repeater with master gyrocompass.
4	Dimmer	Controls illumination of compass repeater.

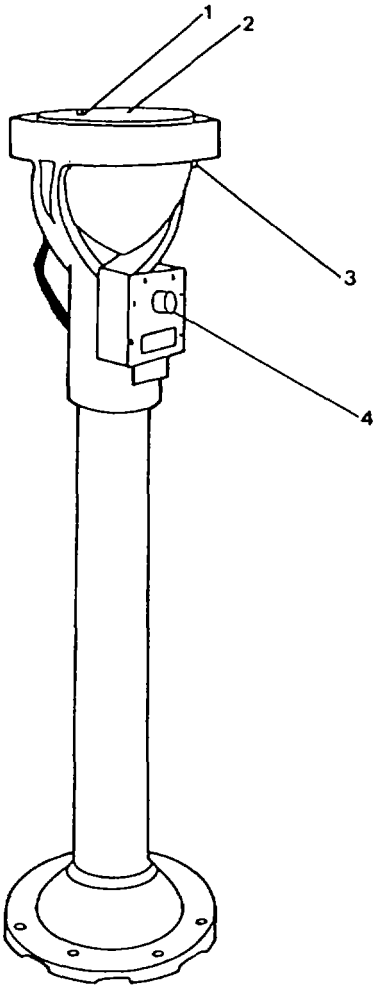


FIGURE 2-6. Standard Bearing Repeater.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Windshield Wiper Controls (FIGURE 2-7)		
1	Port Wiper Control	The port control valve will turn the windshield wiper ON and OFF, and control speed.
2	C/L Wiper Control	The centerline control valve will turn the windshield wiper ON and OFF, and control speed.
3	STBD Wiper Control	The starboard control valve will turn the windshield wiper ON and OFF, and control speed.

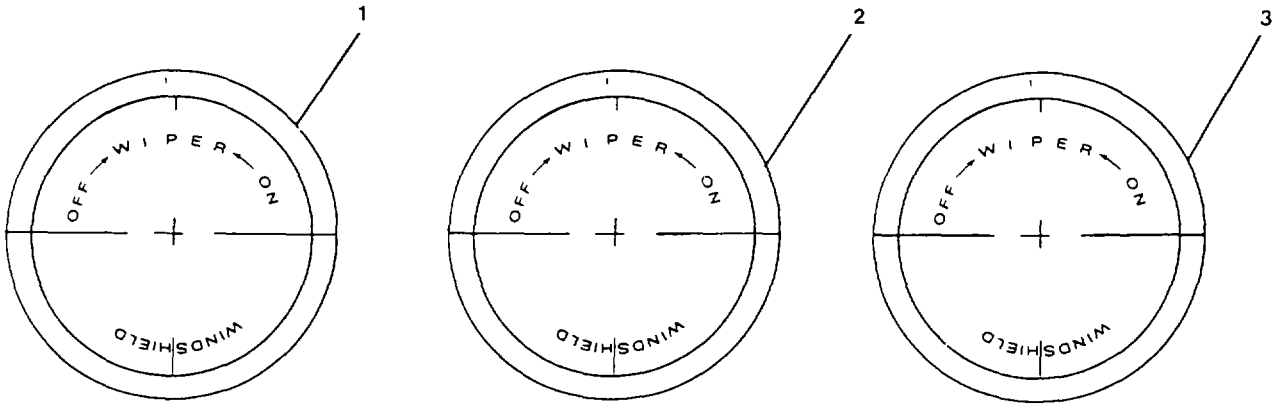


FIGURE 2-7. Windshield Wipers.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	1 kW Xenon Searchlight (FIGURE 2-8)	
1	OFF-START Switch	Turn searchlight on by moving switch handle to START and releasing. Move switch to OFF to turn light off.
2	BEAM FOCUS Switch	Hold switch in BEAM or FOCUS position until beam is desired diameter.
3	Manual Focus Knob	Focused fore and aft along the axis of the reflector by means of the manual focus knob beneath the drum without the use of tools.
4	Horizontal Lock Clamp Screw	Secured with the clamp screw on the foundation lock.
5	Lever Handle	Twist the lever handle to tilt beam up or down. Point lever handle in the desired horizontal direction.
6	Lock	Locks lever in desired position.
7	TEST Switch	Actuate this switch when beam is ON to test OVER-TEMP indicator lamp.
8	OVER-TEMP Indicator Light	Indicates searchlight is overheated. Use searchlight for short periods in emergency conditions only until source of trouble is corrected.
9	AMMETER	Indicates lamp current.
10	ELAPSED TIME	Indicates lamp burning time.
11	ON-OFF-RESET	Disconnects power to the unit for maintenance.

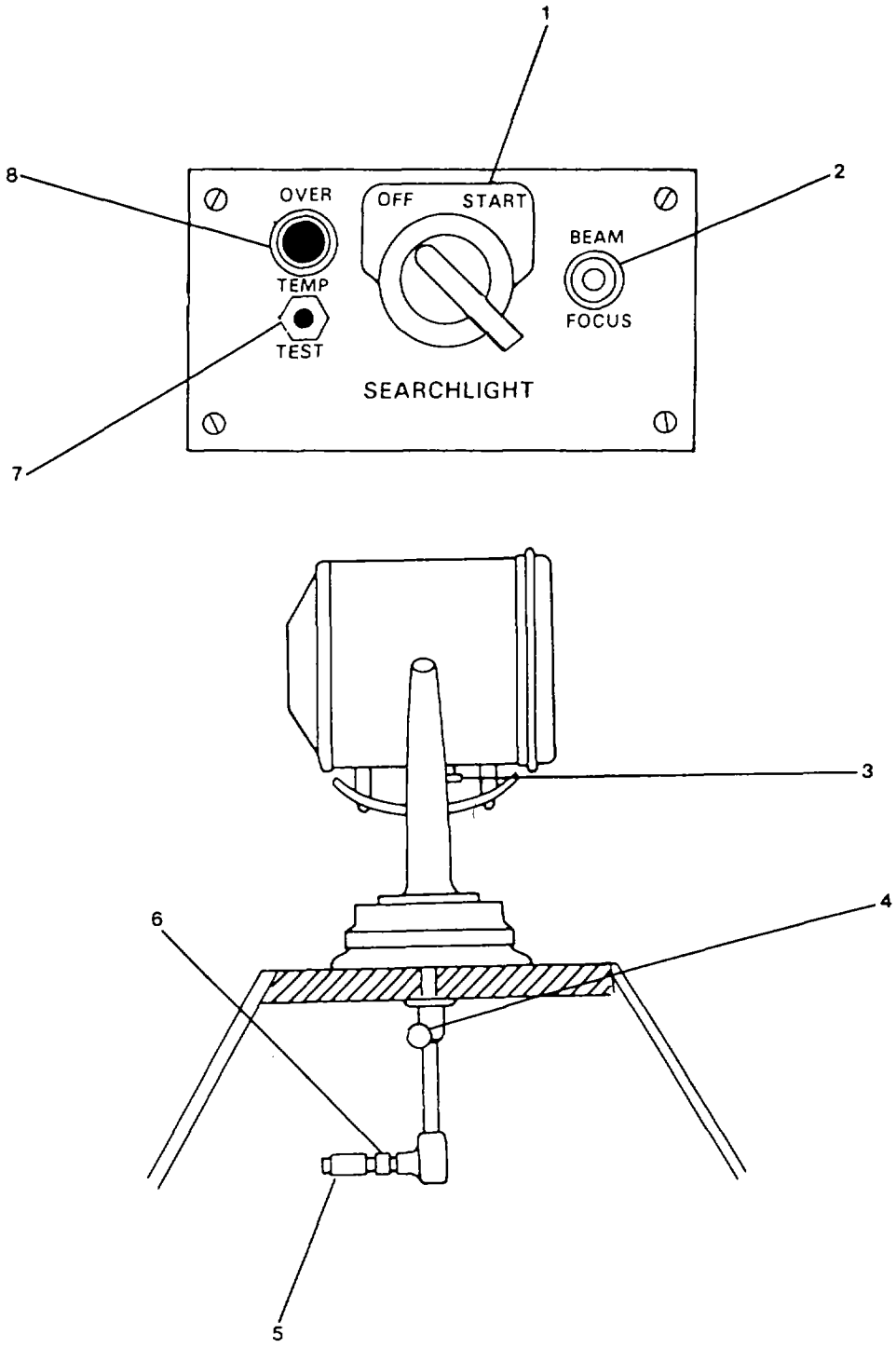


FIGURE 2-8. 1kW Xenon Searchlight (Sheet 1 of 2).

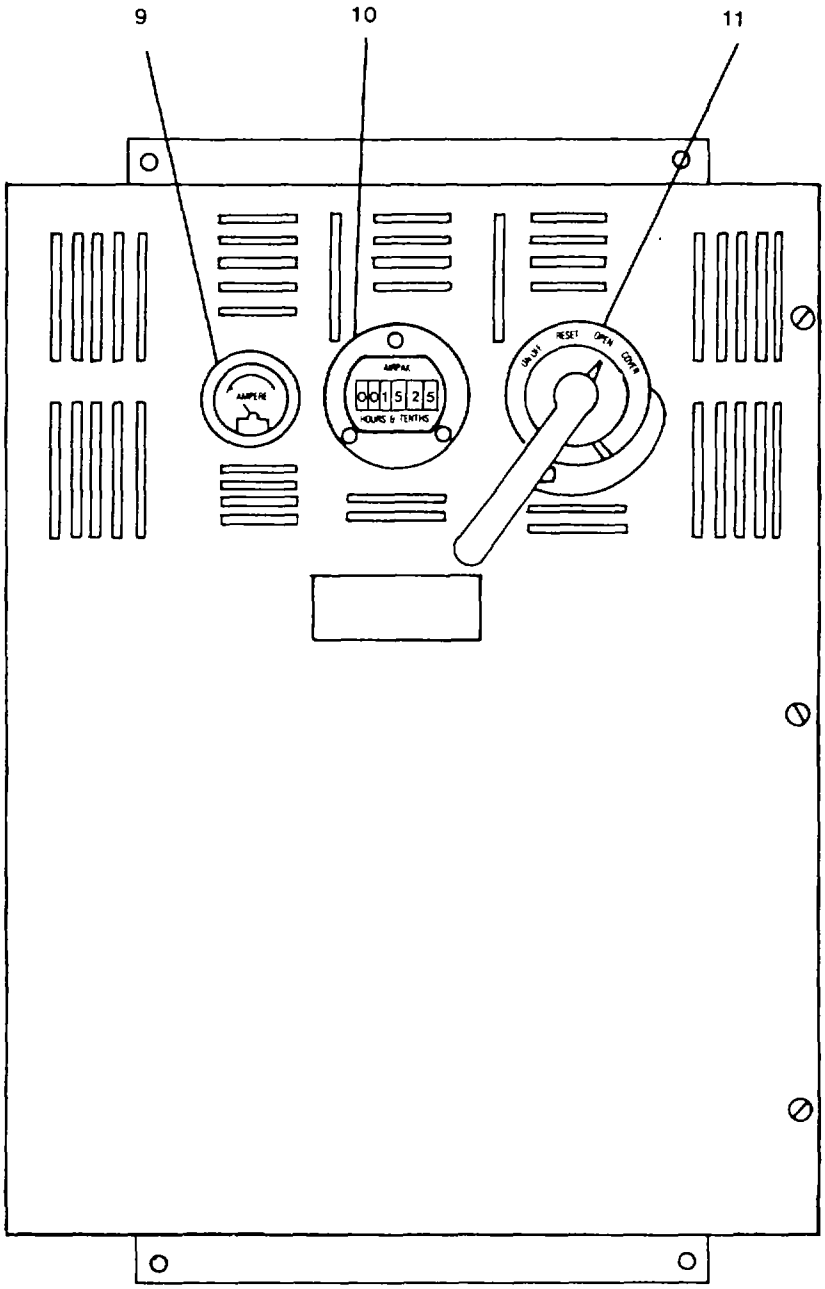


FIGURE 2-8. 1kW Xenon Searchlight (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Pilothouse Console (FIGURE 2-9)	
1	PORT MAIN ENG LEVER	Controls speed and direction of port main engine.
2	STBD MAIN ENG LEVER	Controls speed and direction of stbd main engine.
3	STBD E.O.T.	Communicates desired propeller shaft speed and direction from Pilothouse Console (PHC) to the Engine Room Console (ERC). See FIGURE 2-10 for indicator press to activate attendance monitor system.
4	ATTENDANCE POWER ON	Press to activate Attendance monitor system.
5	ENGINEER NOT IN ATTENDANCE	ERC operator has not acknowledged the attendance monitor.
6	BOW THRUSTER LEVER	Controls speed and direction of bow thruster engine.
7	Sonalert	Audible alarm for failure to report.
8	ATTENDANCE MONITOR	Visual alarm for failure to report.
9	AUDIBLE TEST	Tests alarm horn.
10	LAMP TEST	Tests console lights.
11	ACK	Alarm acknowledge pushbutton.
12	PME STOP, SME STOP	Port and starboard main engine STOP pushbuttons.
13	PME EMERG. STOP, SME EMERG. STOP	Port and starboard main engine EMERG STOP pushbuttons.
14	S.M.E. REDUCE POWER	Reduce power for high lube oil temperature or high exhaust gas temperature.

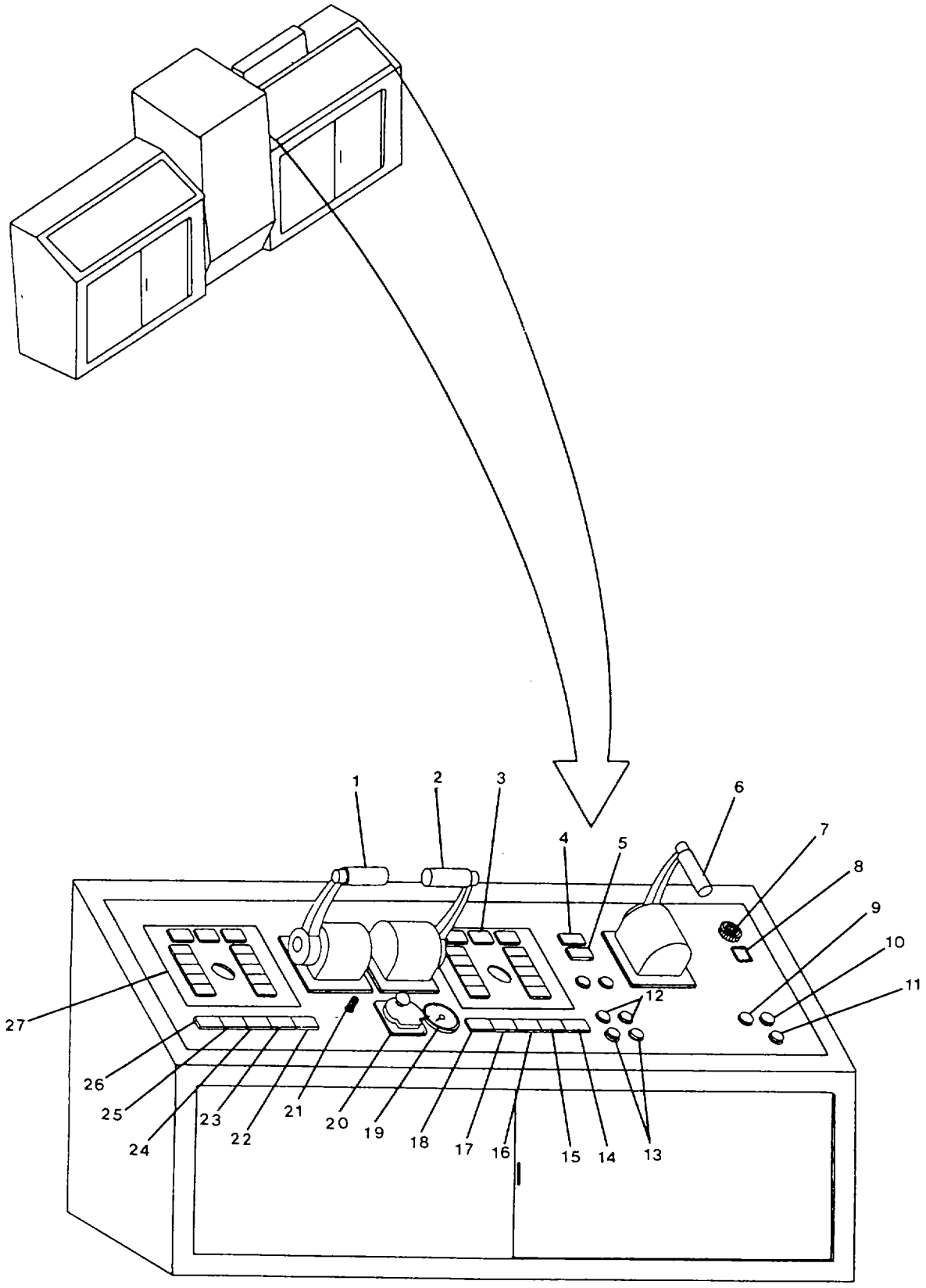


FIGURE 2-9. Pilothouse Console (Sheet 1 of 4).

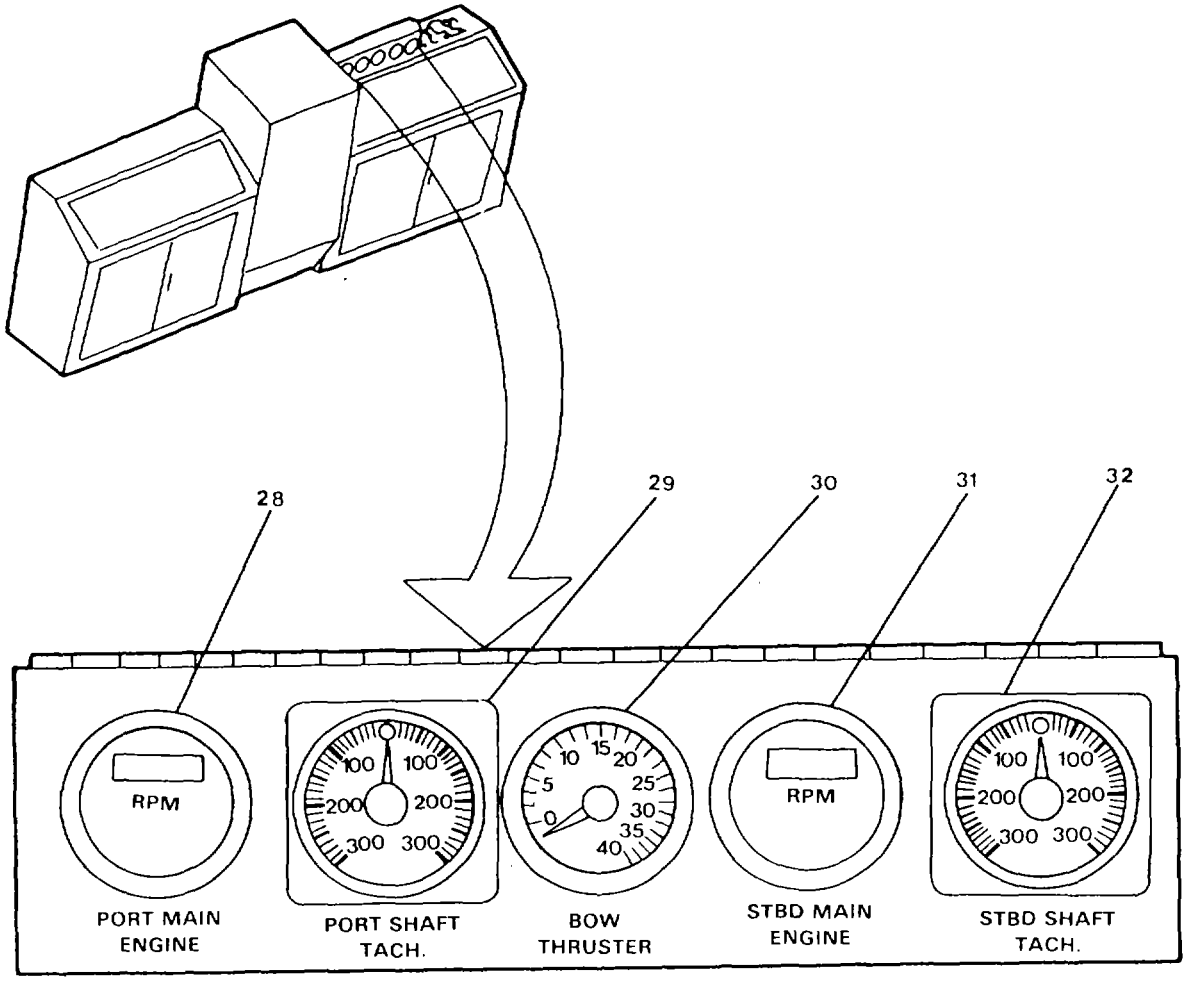


FIGURE 2-9. Pilothouse Console (Sheet 2 of 4).

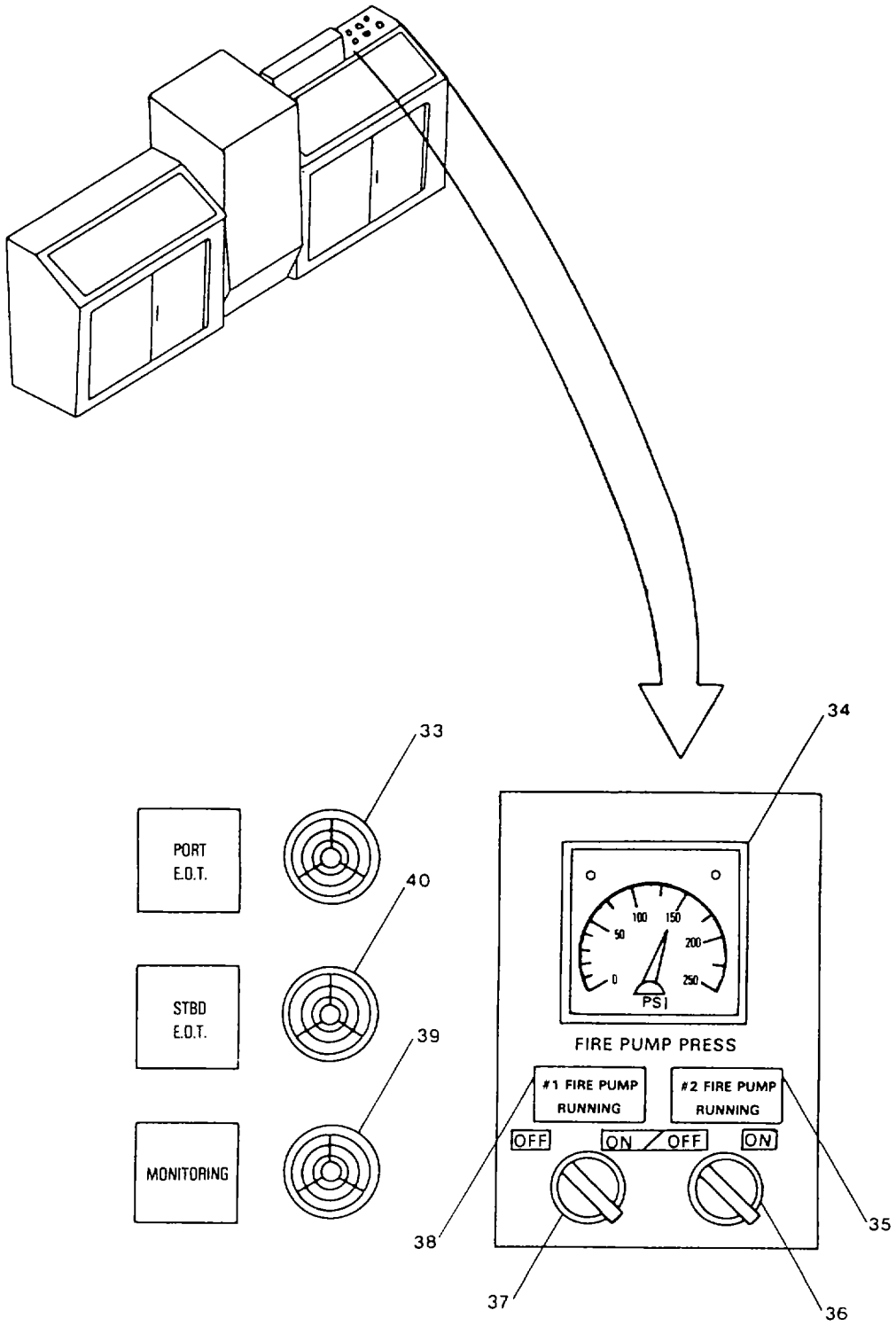


FIGURE 2-9. Pilothouse Console (Sheet 3 of 4).

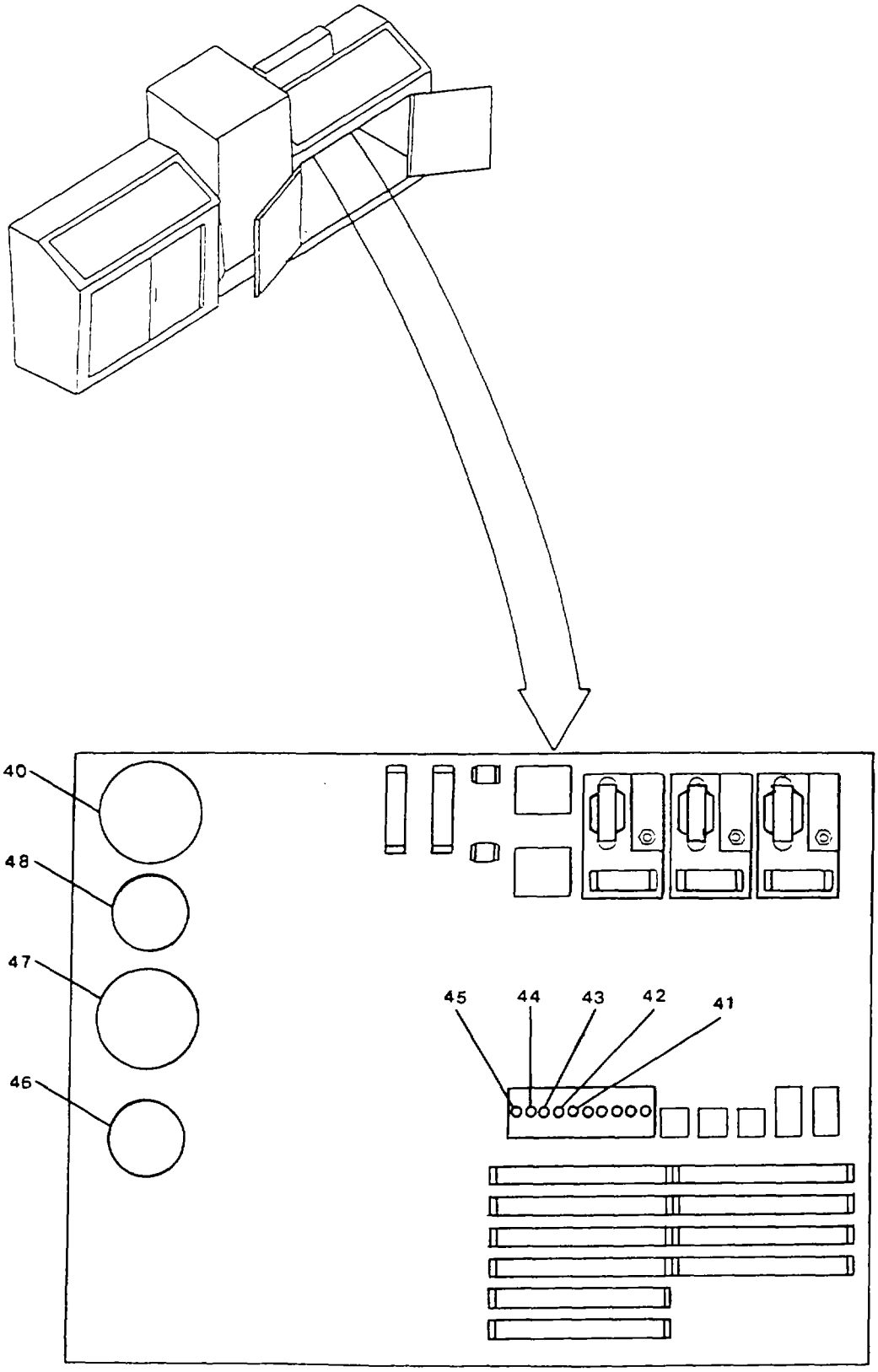


FIGURE 2-9. Pilothouse Console (Sheet 4 of 4).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Pilothouse Console (FIGURE 2-9) - continued	
15	HIGH BILGE	Indicates high water level in bilges.
16	S.M.E. LOW STARTING AIR	Indicates low air pressure.
17	S.M.E. STOPPED	Starboard main engine stopped.
18	S.M.E. VITAL	Indicates possible low lube oil pressure, low jacket water temperature, over speed, or high lube oil temperature.
19	Pressure	Control air pressure meter.
20	Transfer Valve	Transfers pneumatic control to ERC.
21	DIMMER	Regulates panel illumination level.
22	P.M.E. REDUCE POWER	Reduce power for high lube oil temperature or high exhaust gas temperature.
23	LOW CONTROL AIR	Indicates low control air pressure.
24	P.M.E. LOW STARTING AIR	Indicates low starting air pressure.
25	P.M.E. STOPPED	Indicates port engine has shut down automatically.
26	P.M.E. VITAL	Indicates possible low lube oil pressure, low jacket water temperature, overspeed, low lube oil pressure or high lube oil temperature.
27	PORT E.O.T.	Communicates desired propeller shaft speed and direction from PHC to the ERC. See FIGURE 2-10 for indicator.
28	PORT MAIN ENGINE	Port main engine tachometer.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Pilothouse Console (FIGURE 2-9) - continued		
29	PORT SHAFT TACH.	Port shaft tachometer.
30	BOW THRUSTER	Bow thruster tachometer.
31	STBD MAIN ENGINE	Starboard main engine tachometer.
32	STBD SHAFT TACH.	Starboard shaft tachometer.
33	PORT E.O.T.	Sonalert audible device, port E.O.T. with red light.
34	FIRE PUMP PRESS Gauge	Indicator of fire main pressure.
35	#2 FIRE PUMP RUNNING	Indicates #2 fire pump running.
36	OFF-ON Switch	Selects #2 fire pump.
37	OFF-ON Switch	Selects #1 fire pump.
38	#1 FIRE PUMP RUNNING	Indicates #1 fire pump running.
39	MONITORING	Sonalert audible device for engine alarm panel with red light.
40	STBD E.O.T.	Sonalert audible device starboard E.O.T. with red light.
41	BELL 6"	Rings when port E.O.T. fails.
42	Circuit Breaker (5A/DC)	Protects stbd E.O.T. power failure circuit.
43	Circuit Breaker (5A/DC)	Protect port E.O.T. power failure circuit.
44	Circuit Breaker (2A/AC)	Protects attendance monitor circuit.
45	Circuit Breaker (2A/AC)	Protects stbd E.O.T. system.
46	Circuit Break (2A/AC)	Protects port E.O.T. system.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Pilothouse Console (FIGURE 2-9) - continued		
47	Bell 4"	Rings for stbd wrong direction malfunction.
48	Bell 6"	Rings when stbd E.O.T. fails.
49	Bell 4"	Rings for port wrong direction malfunction.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Order Telegraph (EOT) (FIGURE 2-10)	
		NOTE **There are Port and Starboard Engine Order Telegraph Panels on the Engine Room Console (ERC) and the Pilothouse Console (PHC). Both panels are identical and used to communicate pilothouse instructions to the engine control room when the pilothouse is not in direct**
1	FINISHED WITH ENGINE	Indicates order to shut engine down. Indicator lamp (white).
2	STOP	Indicates order to STOP engine (white).
3	STANDBY	Indicates order for STANDBY condition. Indicator lamp (white).

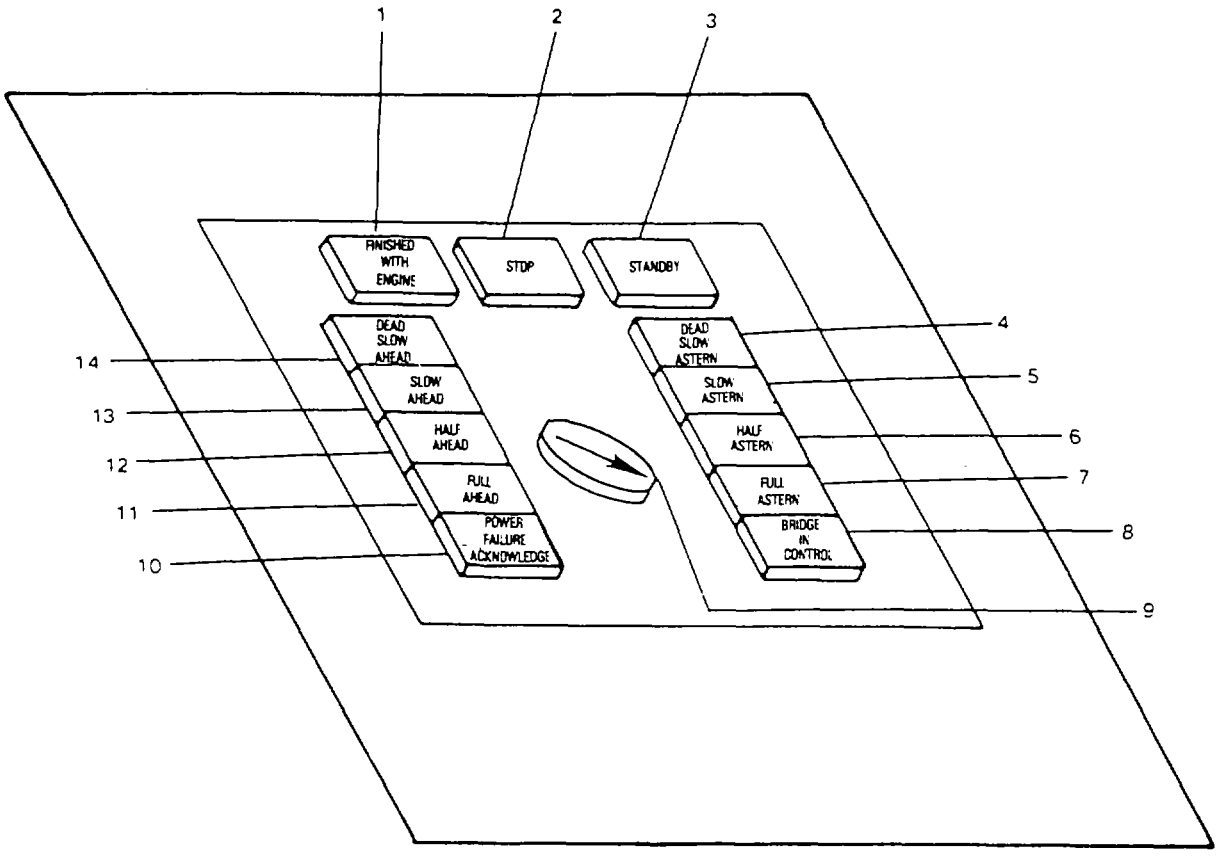


FIGURE 2-10. Engine Order Telegraph (EOT).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Order Telegraph (EOT) (FIGURE 2-10) - continued	
4	DEAD SLOW ASTERN	Indicates order of DEAD SLOW ASTERN. Indicator lamp (white).
5	SLOW ASTERN	Indicates order of SLOW speed ASTERN. Indicator lamp (white).
6	HALF ASTERN	Indicates order for HALF speed ASTERN. Indicator lamp (white).
7	FULL ASTERN	Indicates order of FULL speed ASTERN. Indicator lamp (white).
8	BRIDGE IN CONTROL	Indicates Pilothouse is in control of engine speed and direction. Indicator lamp (white).
9	E.O.T. Selector Switch	Selects desired engine order to the engine room. When placed in a new position, corresponding indicator on the ERC lights and EOT bell rings at both locations. When ERC places selector switch in the corresponding position, bells will be silenced. Indicator will remain on.
10	POWER FAILURE ACKNOWLEDGE	Indicates a power failure in EOT system. Indicator Lamp (red).
11	FULL AHEAD	Indicates order of FULL speed AHEAD. Indicator lamp (white).
12	HALF AHEAD	Indicates order of HALF speed AHEAD. Indicator lamp (white).
13	SLOW AHEAD	Indicates order of SLOW speed AHEAD. Indicator lamp (white).
14	DEAD SLOW AHEAD	Indicates order of DEAD SLOW speed AHEAD. Indicator lamp (white).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Aerovane Wind Transmitter (FIGURE 2-11)		
1	WIND SPEED	Displays wind speed in knots.
2	WIND DIRECTION	Displays wind direction.
3	Dimmer Knob	The indicators are equipped with a knob on the front panel which, when turned clockwise, will increase the dial illumination. The full extreme counterclockwise position of the knob is the OFF position.

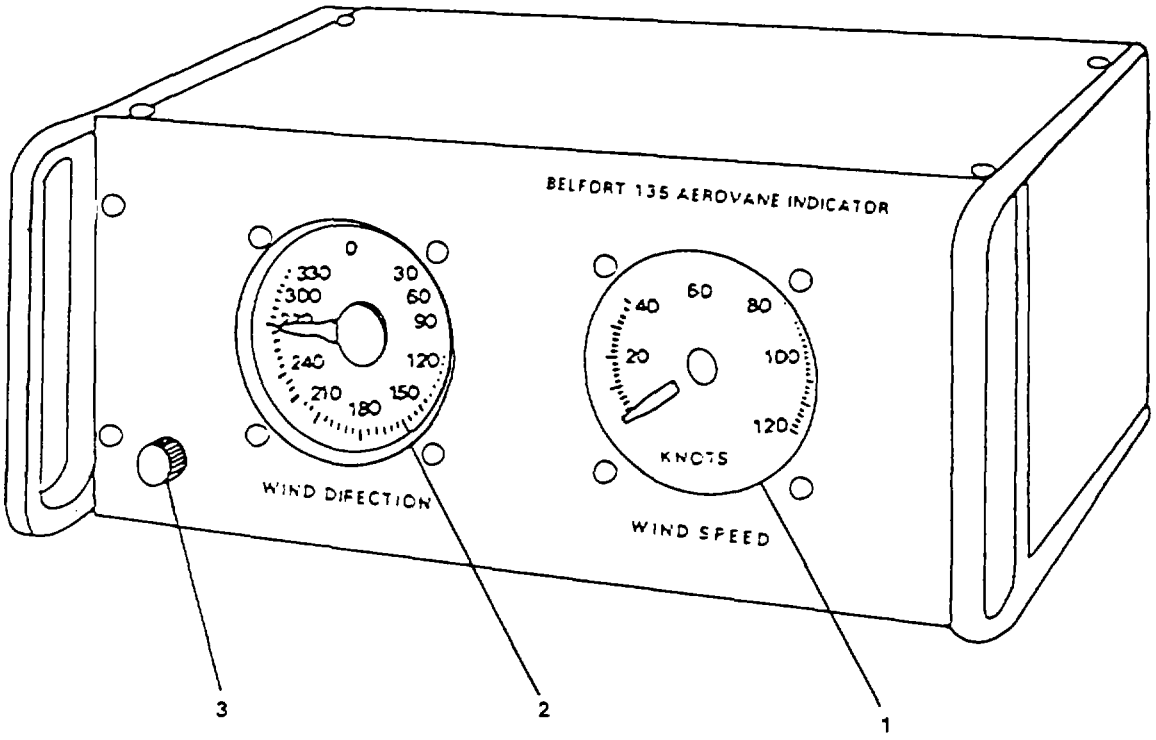


FIGURE 2-11. Aerovane Wind Transmitter.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Navigation Light Panel (FIGURE 2-12)	
1	Audible Alarm	Audible tone alarm that sounds when navigation light burns out and circuit is broken.
2	PORT SIDE LGT ON	Green indicator light that is on when port side running light circuit is closed.
3	STBD SIDE LGT ON	Green indicator light that is on when starboard side running light circuit is closed.

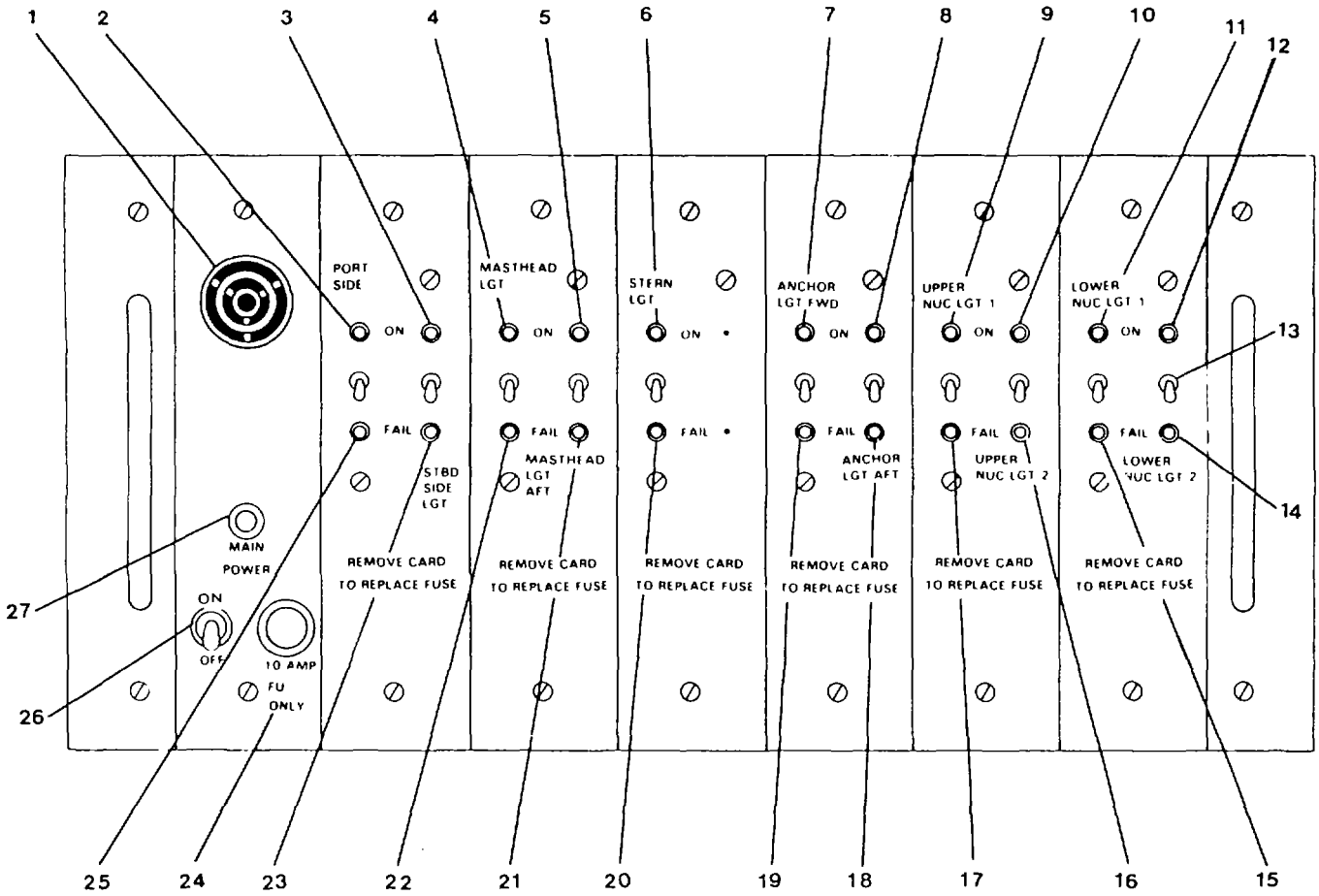


FIGURE 2-12. Navigation Light Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Navigation Light Panel (FIGURE 2-12) - continued		
4	MASTHEAD LGT ON	Green indicator light that is on when forward masthead light circuit is closed.
5	MASTHEAD LGT AFT ON	Green indicator light that is on when aft masthead light circuit is closed.
6	STERN LGT ON	Green indicator light that is on when stern light circuit is closed.
7	ANCHOR LGT FWD ON	Green indicator light that is on when forward anchor light circuit is closed.
8	ANCHOR LGT AFT ON	Green indicator light that is on when aft anchor light circuit is closed.
9	UPPER NUC LGT 1 ON	Green indicator light that is on when upper not under command light number 1 circuit is closed.
10	UPPER NUC LGT 2 ON	Green indicator light that is on when upper not under command light number 2 circuit is closed.
11	LOWER NUC LGT 1 ON	Green indicator light that is on when lower not under command light number 1 circuit is closed.
12	LOWER NUC LGT 2 ON	Green indicator light that is on when lower not under command light number 2 circuit is closed.
13	Toggle Switch	Two position switches for on or fail position for each light. Toggle is placed in FAIL position to silence alarm, or for light to be off. Place in ON position to turn light on.
14	LOWER NUC LGT 2 FAIL	Red indicator light that is on when lower not under command light number 2 circuit is open.
15	LOWER NUC LGT 1 FAIL	Red indicator light that is on when lower not under command light number 1 circuit is open.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Navigation Light Panel (FIGURE 2-12) - continued	
16	UPPER NUC LGT 2 FAIL	Red indicator light that is on when lower not under command light number 1 circuit is open.
17	UPPER NUC LGT 1 FAIL	Red indicator light that is on when upper not under command light number 1 circuit is open.
18	ANCHOR LGT AFT FAIL	Red indicator light that is on when aft anchor light circuit is open.
19	ANCHOR LGT FWD FAIL	Red indicator light that is on when forward anchor light circuit is open.
20	STERN LGT FAIL	Red indicator light that is on when the stern light circuit is open.
21	MASTHEAD LGT AFT FAIL	Red indicator light that is on when the stern light circuit is open.
22	MASTHEAD LGT FAIL	Red indicator light that is on when the forward masthead light circuit is open.
23	STBD SIDE LGT FAIL	Red indicator light that is on when the starboard running light circuit is open.
24	10 AMP FU ONLY	10 amp fuse that protects panel circuitry.
25	PORT SIDE FAIL	Red indicator light is on when the port side running light circuit is open.
26	ON-OFF Toggle Switch	Two position toggle switch for power ON or power OFF to the navigation lights panel.
27	MAIN POWER	Lights amber when power is available to the navigation lights panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Marine Fire Detector Panel (FIGURE 2-13)	
1	Alarm Bell	Rings when pilothouse smoke or thermal alarm has activated.
2	Horn and Strobe Alarm	Activates upon detection of a manual smoke or thermal alarm in engine room. Horn and strobe alarm can be silenced at main control panel only.
3	PANEL RESET	Provides system lamp test and resets system after alarm has been silenced.
4	ALARM SILENCE Pushbutton	Silences audible fire alarm.
5	TROUBLE SILENCE Pushbutton	Silences trouble alarm.
	NOTE **Red lights indicate fire in the zone and amber lights indicate trouble.**	
6	ZONE 7 STBD-BOW STORAGE & PAINT LOCKER	Indicates fire or trouble in STBD bow storage and paint locker.
7	ALARM TEST	Indicates activation of a zone test switch.
8	ZONE 8 STBD AFT MISC SPACES	Indicates fire or trouble in STBD aft miscellaneous spaces.
9	ZONE 10 ENGINE ROOM	Indicates fire or trouble in engine room.
10	ZONE 12 STEERING COMPARTMENT & PASSAGEWAY	Indicates fire or trouble in steering compartment and passageway.
11	SPARE	Spare
12	ZONE 11 CONTROL ROOM	Indicates fire or trouble in control room.

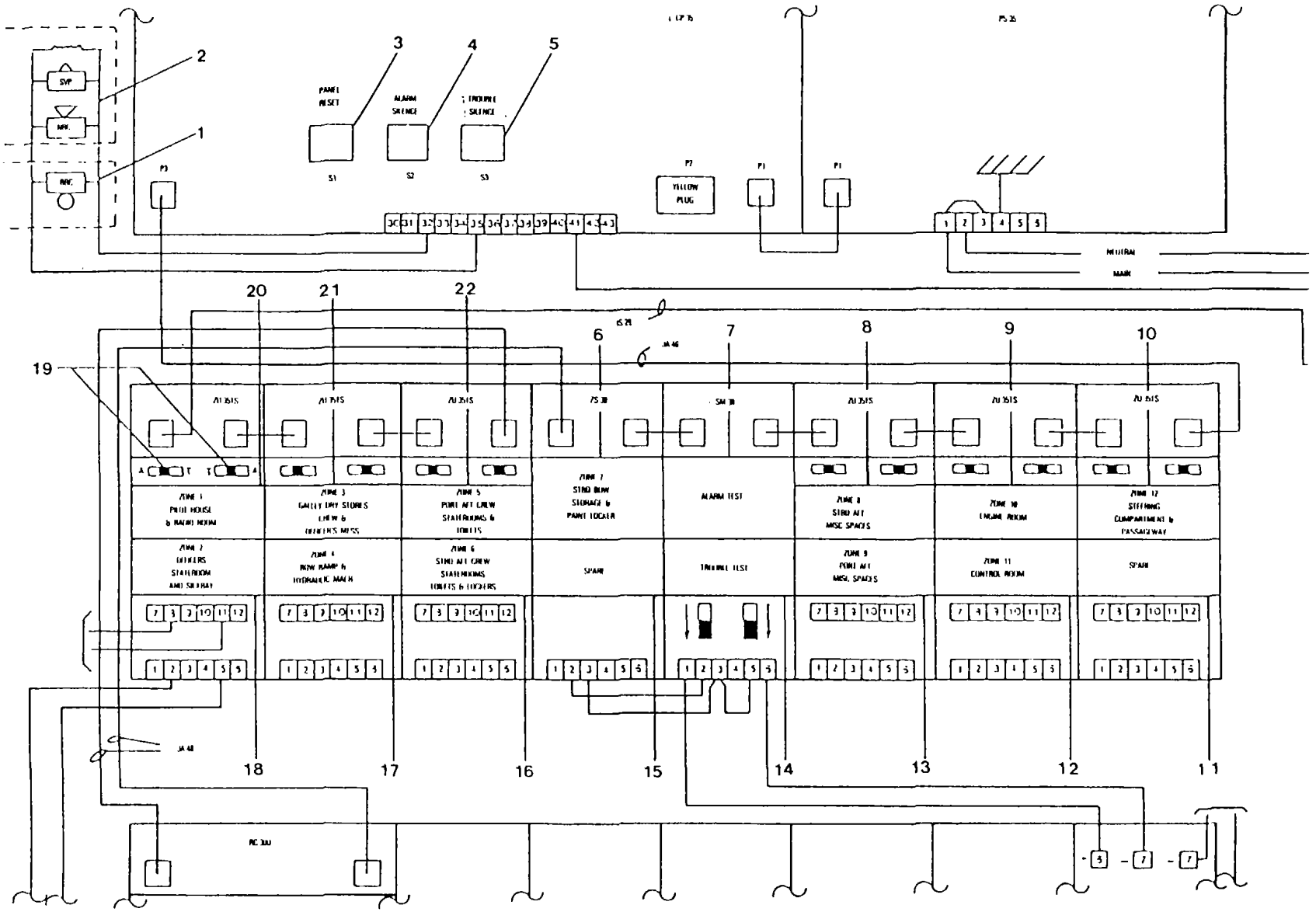


FIGURE 2-13. Marine Fire Detector Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Marine Fire Detector System (FIGURE 2-13) - continued	
13	ZONE 9 PORT AFT MISC SPACES	Indicates fire or trouble in port aft miscellaneous spaces.
14	TROUBLE TEST	Indicates activation of a zone trouble test switch.
15	SPARE	Spare
16	ZONE 6 STBD AFT CREW STATEROOMS TOILETS & LOCKERS	Indicates fire or trouble in STBD aft crew staterooms toilets and lockers.
17	ZONE 4 BOW RAMP & HYDRAULIC MACH	Indicates fire or trouble in bow ramp and hydraulic machinery room.
18	ZONE 2 OFFICERS STATEROOMS & SICK BAY	Indicates fire or trouble in officers stateroom & sickbay.
19	Alarm and Trouble Test	Provides test of alarm and trouble Switchescircuits for each zone (typical).
20	ZONE 1 PILOTHOUSE & RADIO ROOM	Indicates fire or trouble in pilothouse and radio room.
21	ZONE 3 GALLEY-DRYSTORES CREW & OFFICERS MESS	Indicates fire or trouble in galley/drystores, crew and officers mess.
22	ZONE 5 PORT AFT CREW STATEROOM & TOILETS	Light indicates fire or trouble in port aft crew staterooms and toilets.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Intrusion and Fire Alarm Main Panel (FIGURE 2-14)	
1	Code Pad	Key pad used for code entry.
2	Status Light	
	NORMAL	Lights (green) when in normal mode.
	ARM	Lights (red) when set to alarm for intrusion.
	BY-PASS	Lights (amber) when door open for length period, such as maintenance.
3	Audible/Strobe	Audible and visual alarm.
4	LAMP TEST	Yellow pushbutton to test panel lights.
5	FIRE Lamp	Indicates fire alarm (red light).
6	Blank	Blank red light panel.
7	Fuse	8 amp fuse protects printed circuit board.
8	Fuse	2 amp fuse protects input power circuit.
9	SYSTEM ON BATTERY	Indicates main panel is on battery power (red light).
10	SECURE AREA	Indicates an intrusion alarm (red light).

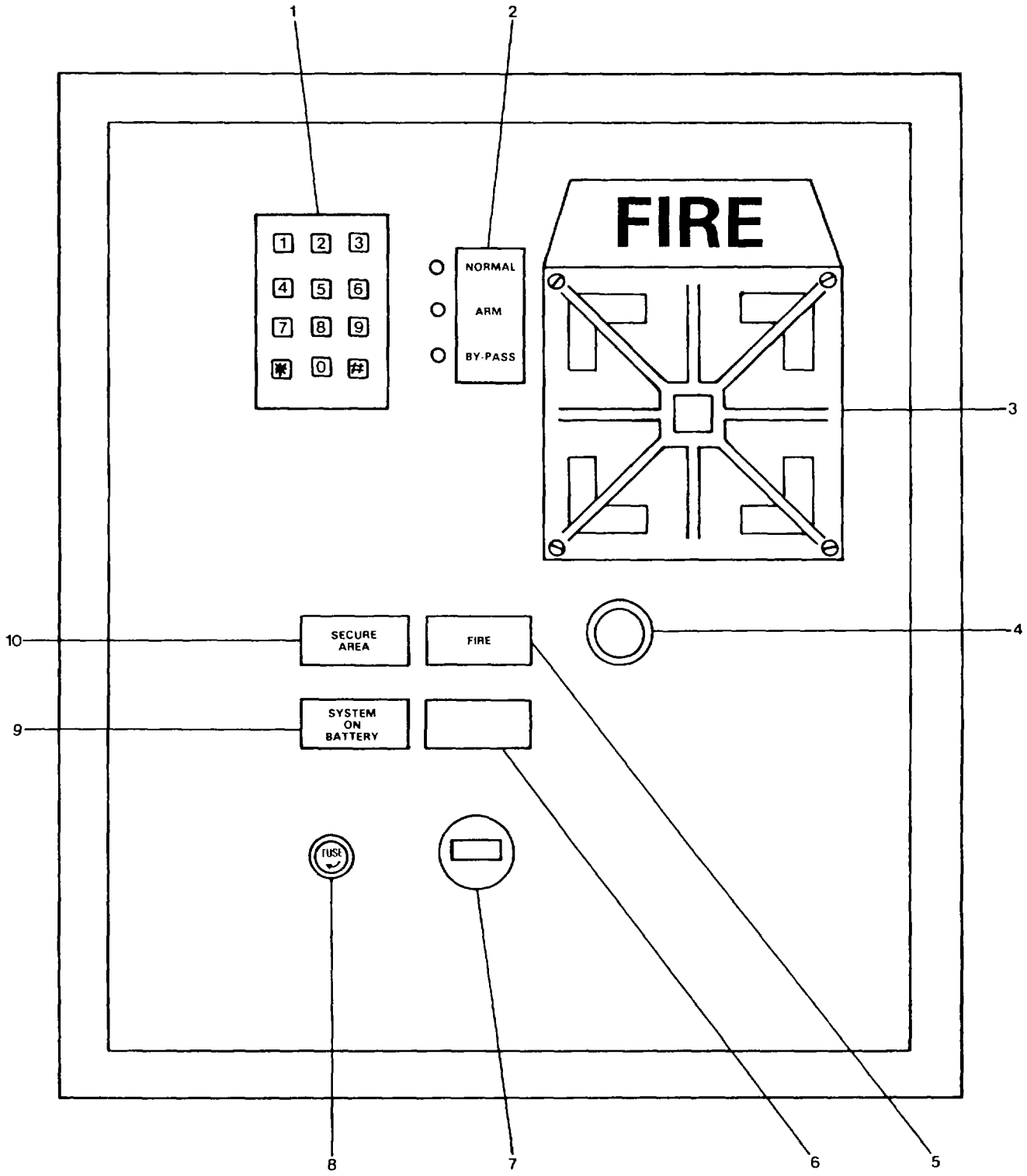


FIGURE 2-14. Intrusion and Fire Alarm Main Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Intrusion and Fire Alarm Remote Panel (FIGURE 2-15)		
1	Speaker	Provides an audible alarm signal.
2	SYSTEM ON BATTERY Lamp	Indicates Main Panel has gone to battery power.
3	Lamp Test Button	Used to test lamps for operation.
4	FIRE Lamp	Indicates a fire alarm.
5	SECURE AREA Lamp	Indicates an intrusion alarm.

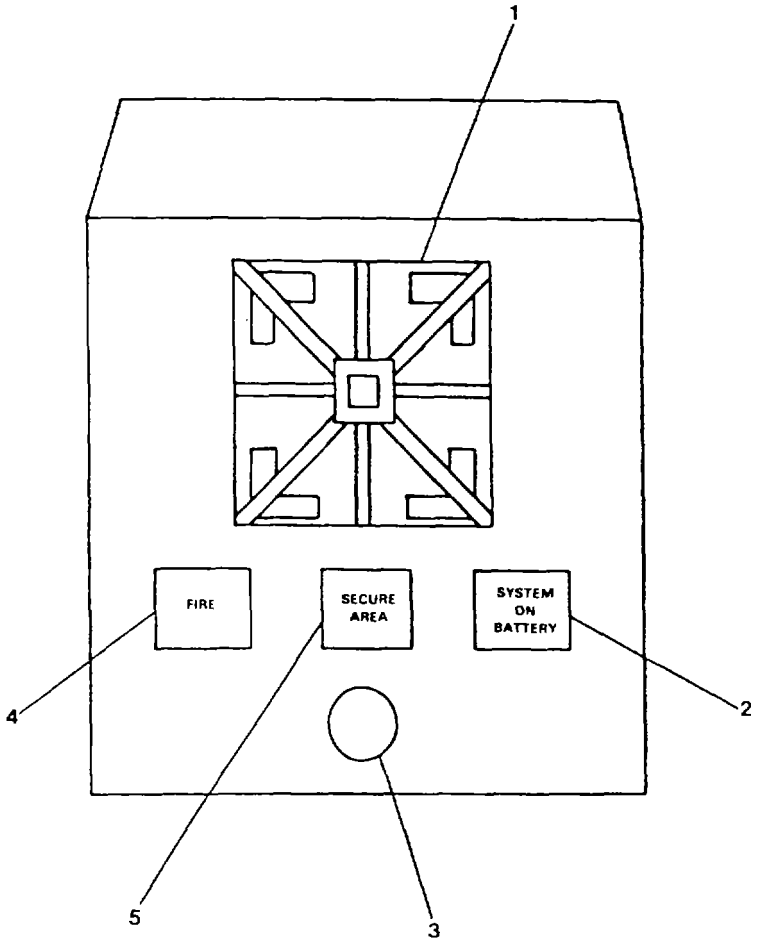


FIGURE 2-15. Intrusion and Fire Alarm Remote Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16)	
1	PORT MAIN ENGINE LUBE OIL PRESSURE	Indicates pressure of lubricating oil to port main engine.
2	PORT MAIN ENGINE LUBE OIL TEMP.	Indicates temperature of lubricating oil of port main engine.
3	PORT MAIN ENGINE JACKET WATER PRESS.	Indicates pressure of fresh water coolant circulating in water jacket of port main engine.
4	PORT MAIN ENGINE JACKET WATER TEMP.	Indicates temperature of fresh water coolant circulating in jacket of port main engine.
5	PORT MAIN ENGINE FUEL OIL PRESSURE	Indicates fuel pressure to port main engine.
6	PORT MAIN ENGINE START AIR PRESS.	Indicates air pressure to air starting motor of port main engine.
7	GEN. NO. 2 LOW STARTING AIR PRESS.	Indicates air pressure to air starting motor of number two generator diesel motor.
8	GEN. NO. 2 FUEL OIL PRESSURE	Indicates pressure of fuel oil to number two generator diesel motor.
9	GEN. NO. 2 JACKET WATER TEMP.	Indicates temperature of fresh water coolant circulating in the water jacket of number two generator diesel engine.
10	GEN. NO. 2 JACKET WATER PRESS.	Indicates pressure of fresh water coolant circulating in water jacket of the number two generator diesel engine.
11	GEN. NO. 2 LUBE OIL TEMP.	Indicates temperature of lubricating oil of number two generator diesel engine.
12	GEN. NO. 2 LUBE OIL PRESS.	Indicates pressure of lubricating oil of number two generator diesel engine.

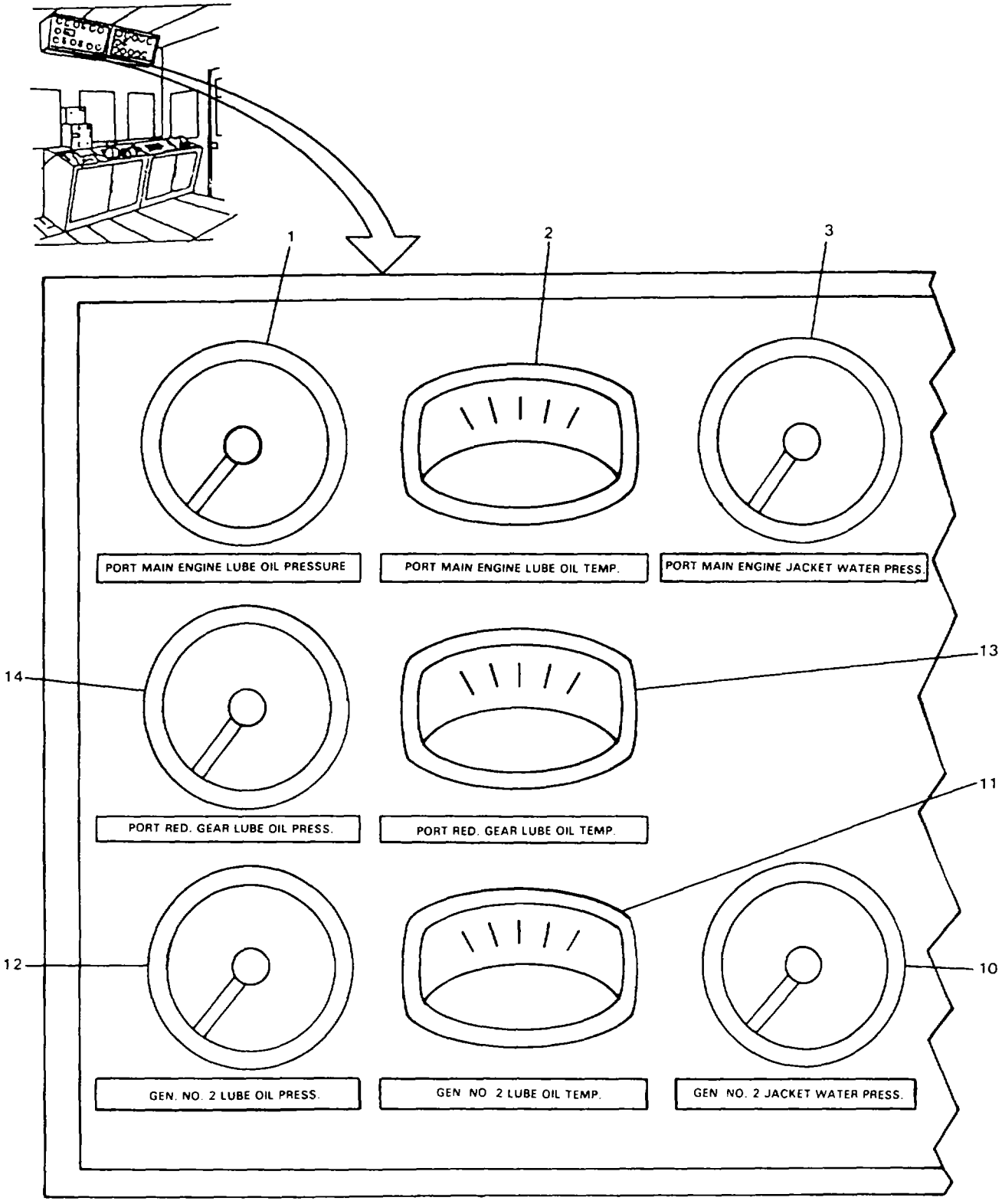


FIGURE 2-16. Engine Room Console (Sheet 1 of 10).

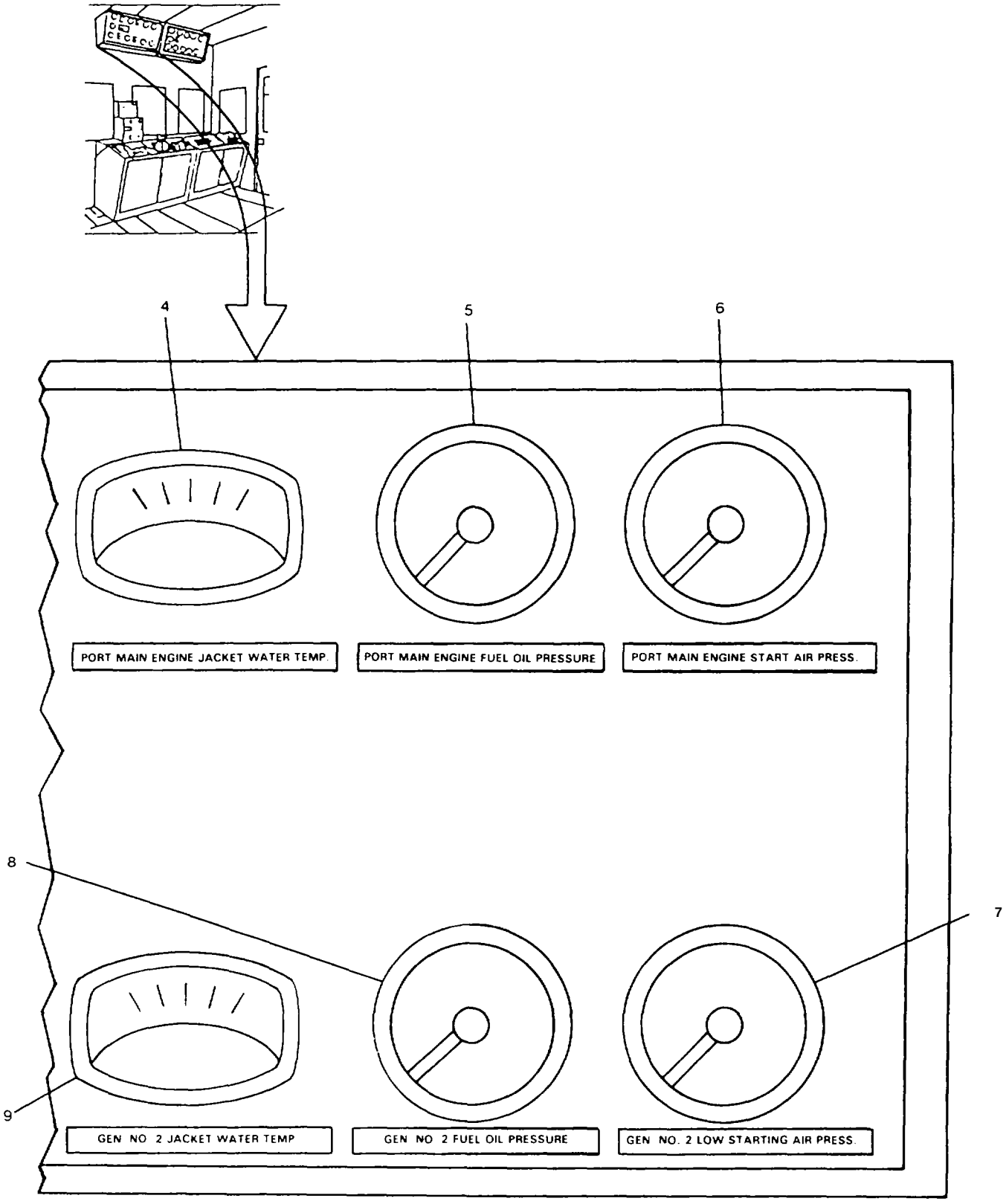


FIGURE 2-16. Engine Room Console (Sheet 2 of 10).

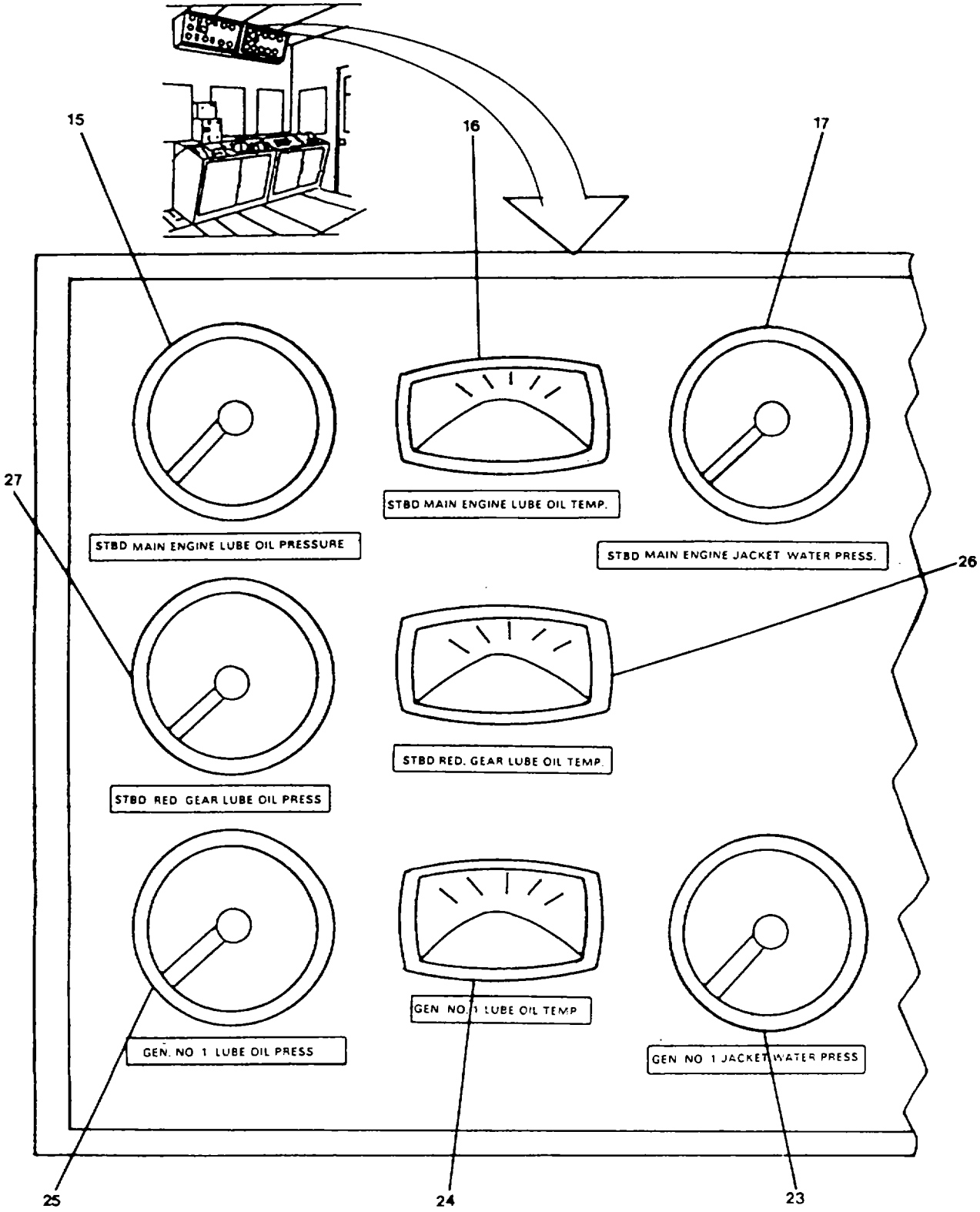


FIGURE 2-16. Engine Room Console (Sheet 3 of 10).

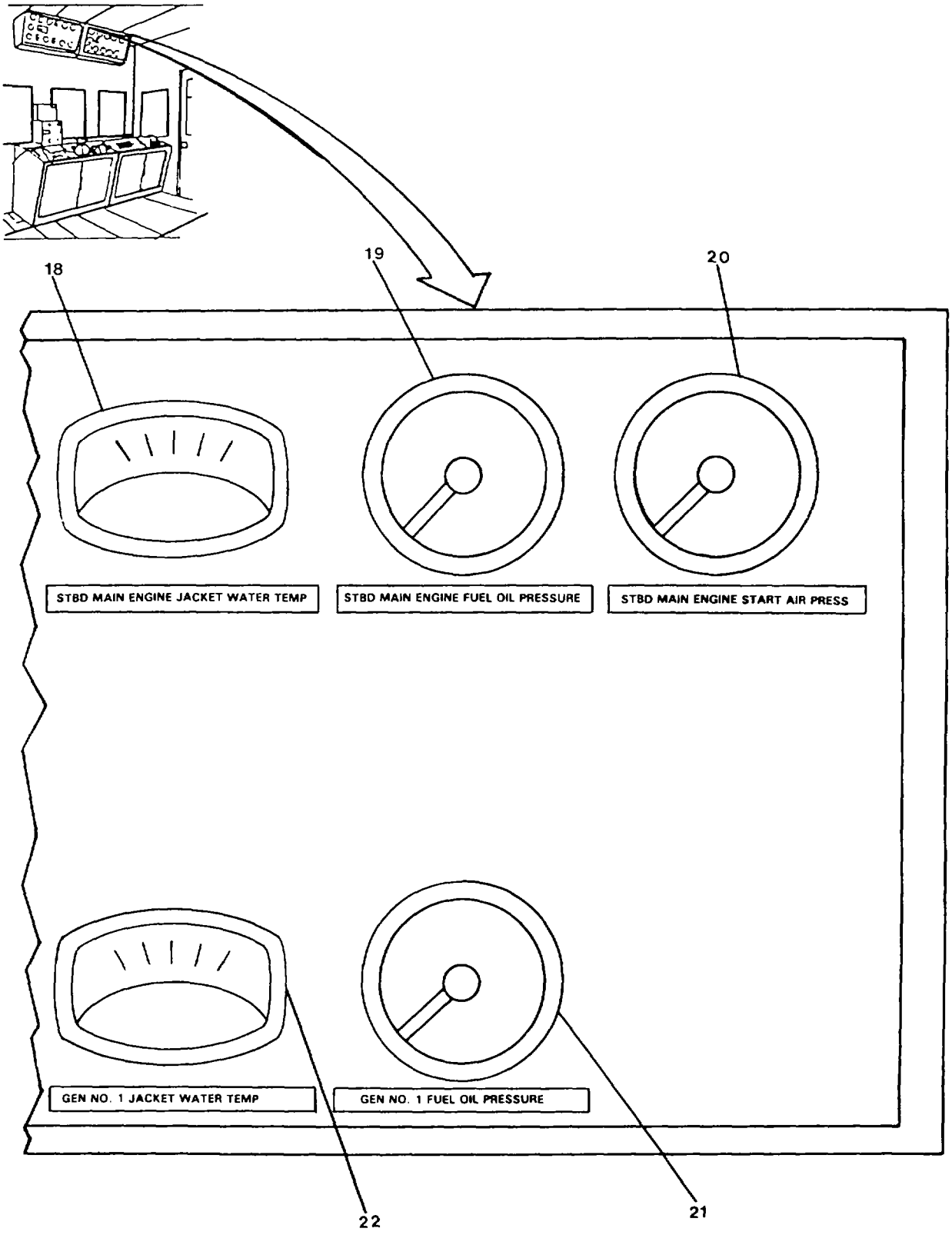


FIGURE 2-16. Engine Room Console (Sheet 4 of 10).

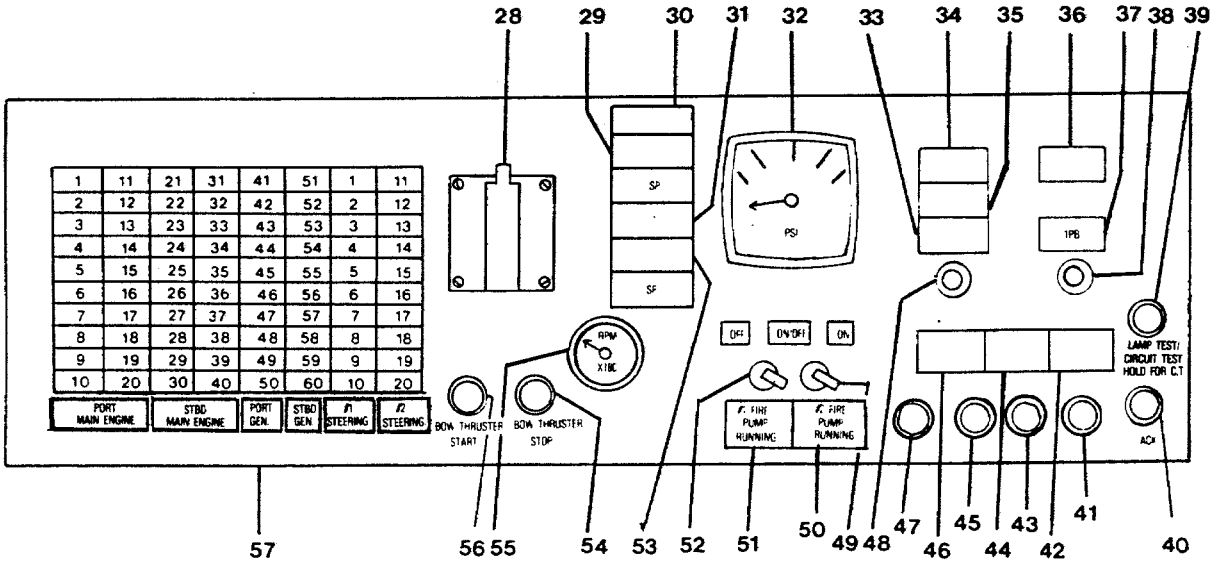


FIGURE 2-16. Engine Room Console (Sheet 5 of 10).

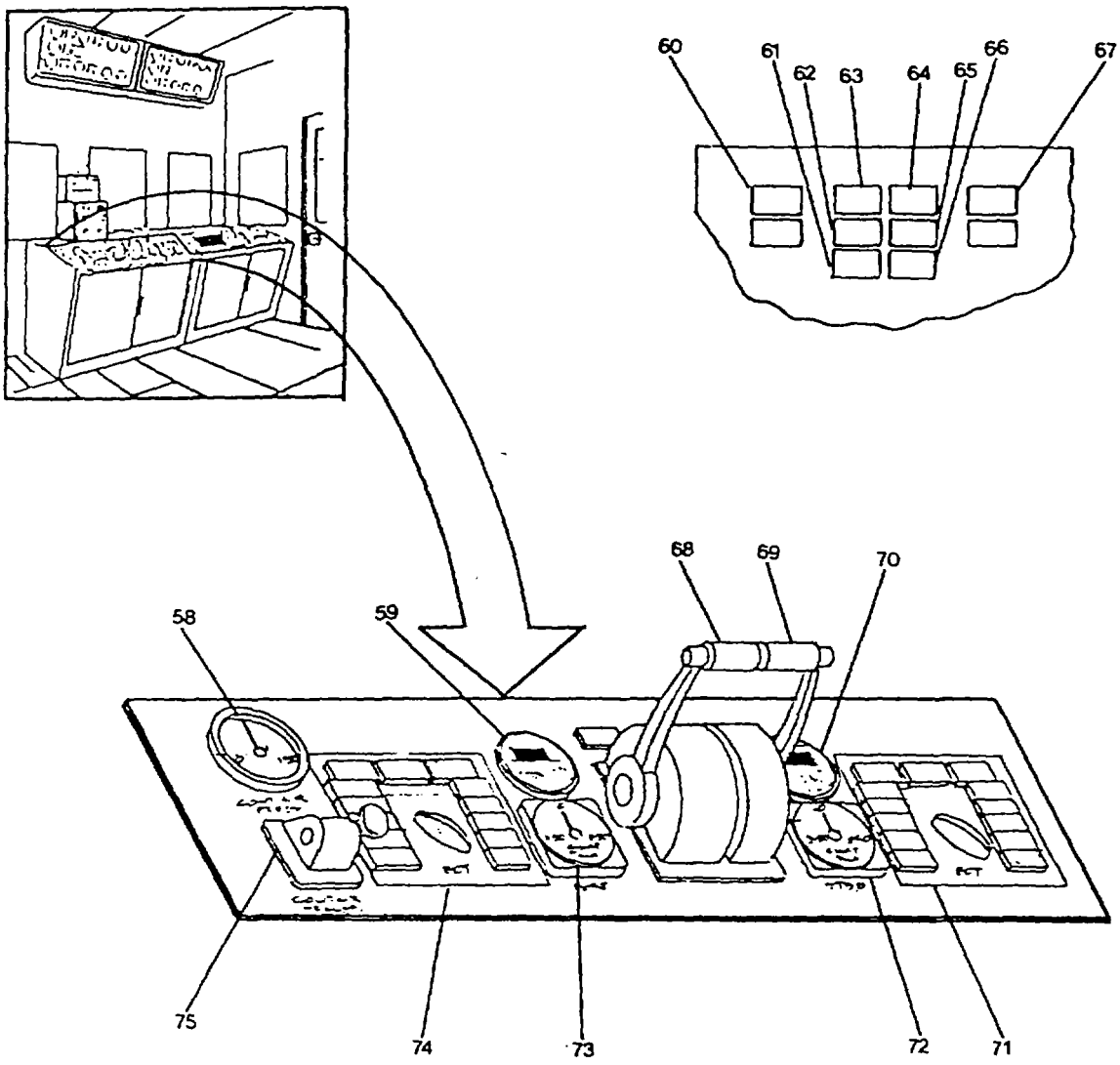


FIGURE 2-16. Engine Room Console (Sheet 6 of 10).

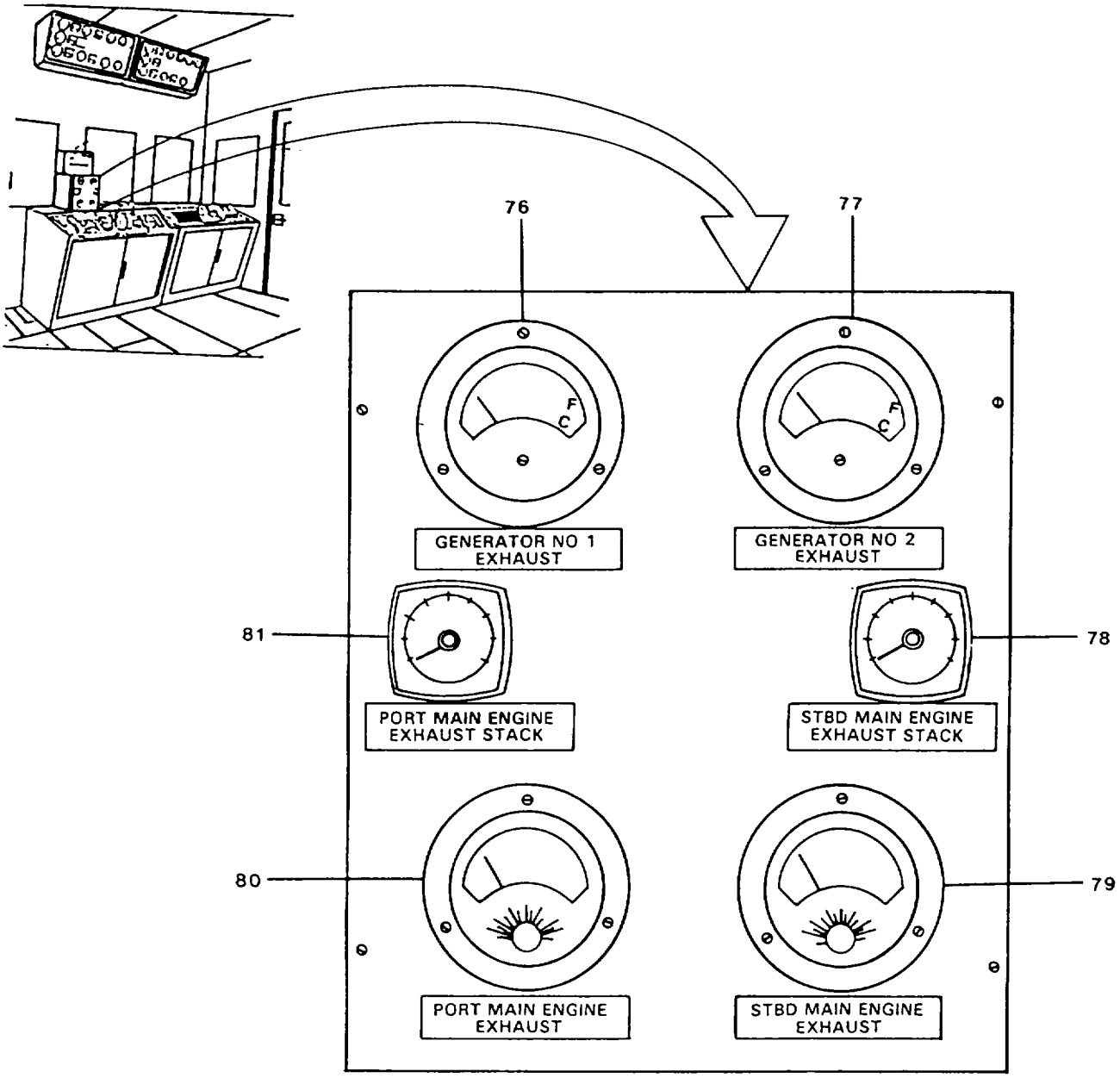


FIGURE 2-16. Engine Room Console (Sheet 7 of 10).

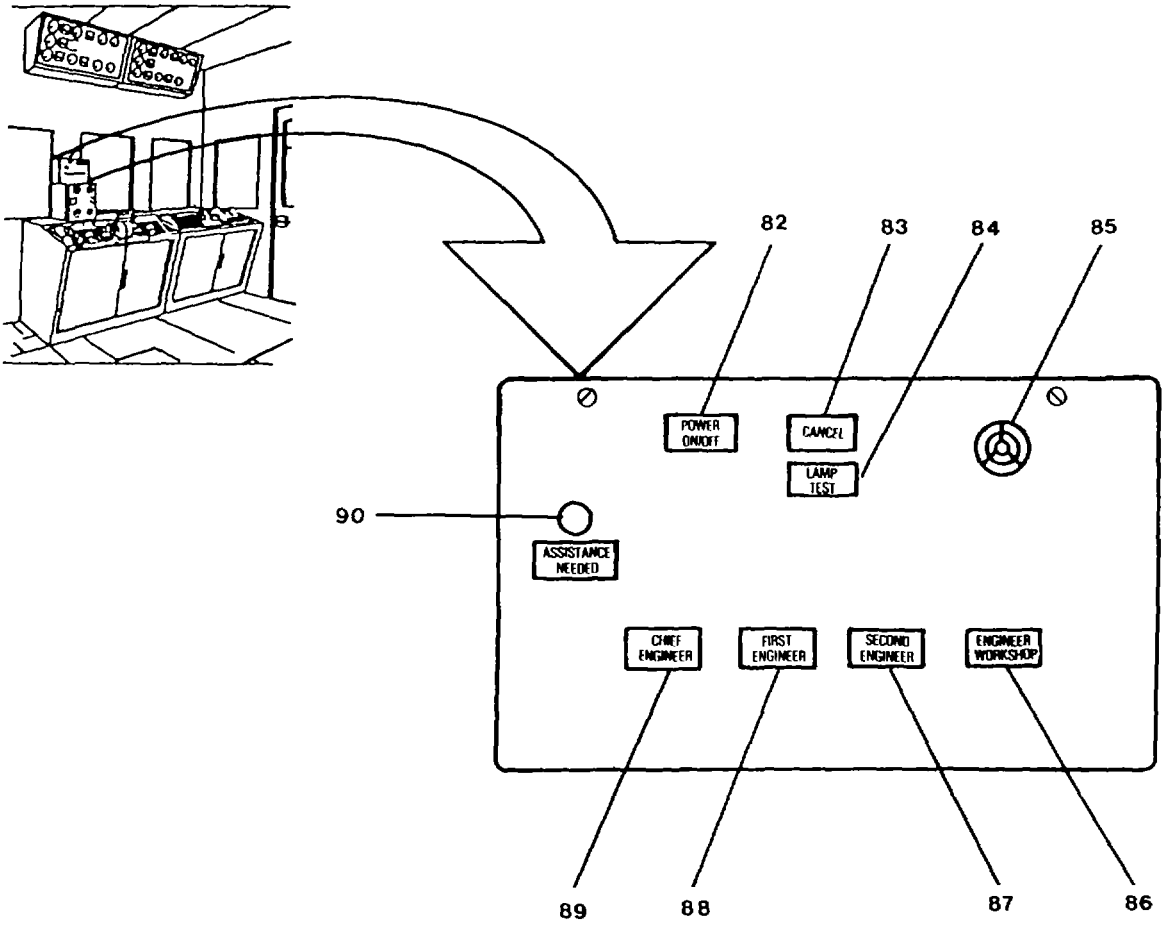


FIGURE 2-16. Engine Room Console (Sheet 8 of 10).

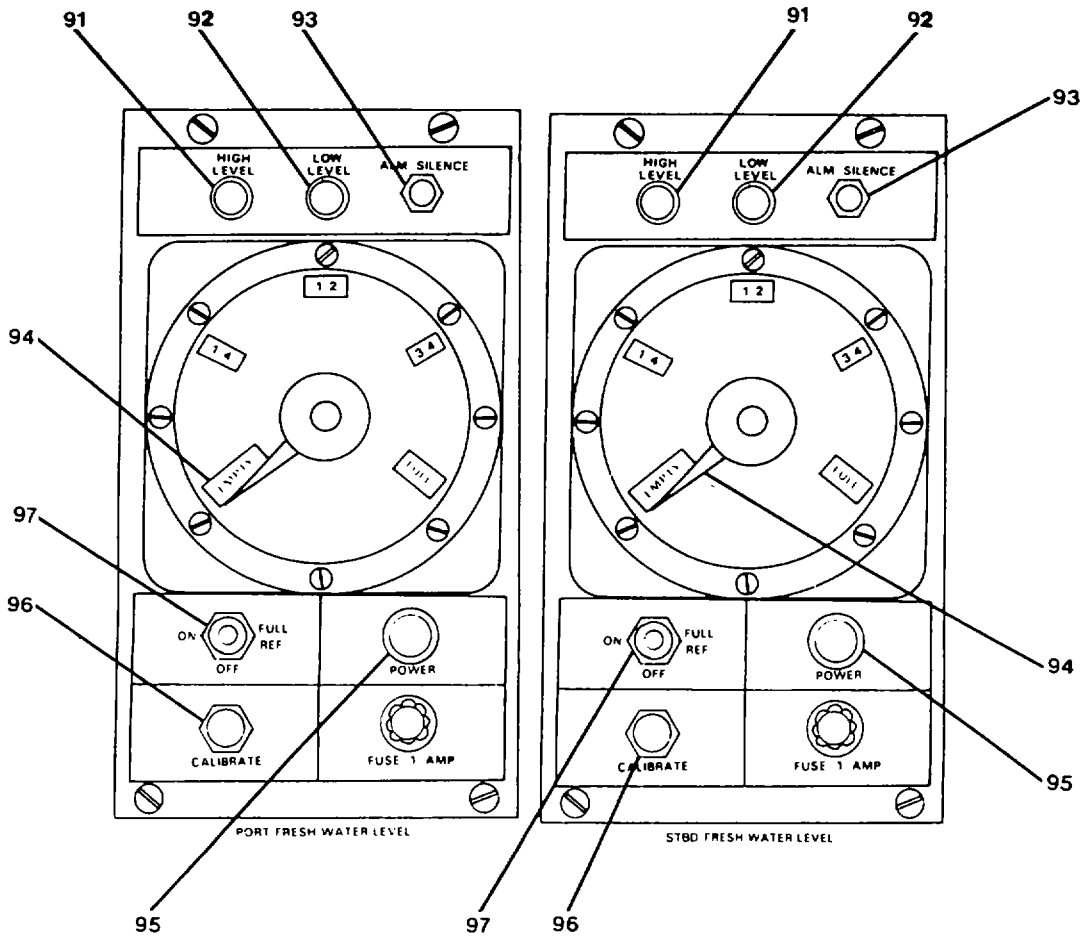
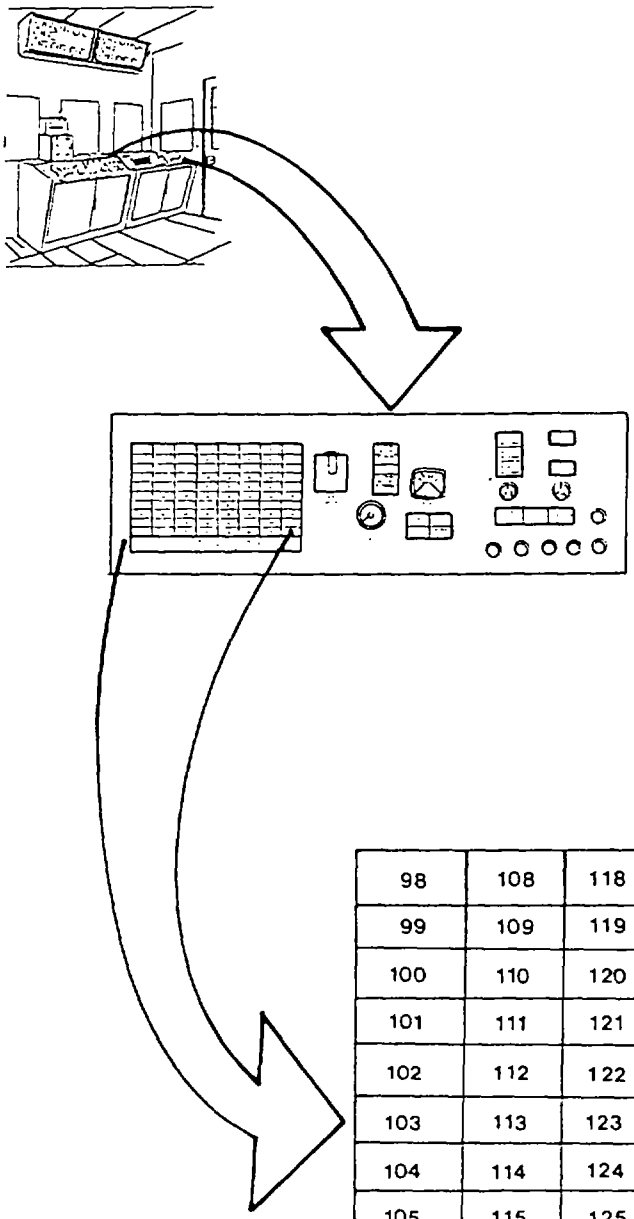


FIGURE 2-16. Engine Room Console (Sheet 9 of 10).



98	108	118	128	138	148	158	168
99	109	119	129	139	149	159	169
100	110	120	130	140	150	160	170
101	111	121	131	141	151	161	171
102	112	122	132	142	152	162	172
103	113	123	133	143	153	163	173
104	114	124	134	144	154	164	174
105	115	125	135	145	155	165	175
106	116	126	136	146	156	166	176
107	117	127	137	147	157	167	177
PORT MAIN ENGINE		STBD MAIN ENGINE		PORT GEN	STBD GEN	#1 STEERING	#2 STEERING

FIGURE 2-16. Engine Room Console (Sheet 10 of 10).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
13	PORT RED. GEAR LUBE OIL TEMP.	Indicates temperature of lubricating oil of port main engine reduction gear.
14	PORT RED. GEAR LUBE OIL PRESS.	Indicates pressure of lubricating oil of port main engine reduction gear.
15	STBD MAIN ENGINE LUBE OIL PRESSURE	Indicates pressure of lubricating oil of starboard main engine.
16	STBD MAIN ENGINE LUBE OIL TEMP.	Indicates temperature of lubricating oil of starboard main engine.
17	STBD MAIN ENGINE JACKET WATER PRESS.	Indicates pressure of fresh water coolant circulating in the water jacket of starboard main engine.
18	STBD MAIN ENGINE JACKET WATER TEMP.	Indicates temperature of fresh water coolant circulating in the water jacket of starboard main engine.
19	STBD MAIN ENGINE FUEL OIL PRESSURE	Indicates pressure of fuel to starboard main engine.
20	STBD MAIN ENGINE START AIR PRESS.	Indicates air pressure to air starting motor of the starboard main engine.
21	GEN. NO. 1 FUEL OIL PRESSURE	Indicates pressure of fuel oil to number generator diesel motor.
22	GEN. NO. 1 JACKET WATER TEMP.	Indicates temperature of the fresh water coolant circulating in water jacket of the number one generator diesel engine.
23	GEN. NO. 1 JACKET WATER PRESS.	Indicates pressure of fresh water coolant circulating in water jacket of number one generator diesel engine.
24	GEN. NO. 1 LUBE OIL TEMP.	Indicates temperature of lubricating oil of number one generator diesel engine.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
25	GEN. NO. 1 LUBE OIL PRESS.	Indicates pressure of lubricating oil of number one generator diesel engine.
26	STBD RED. GEAR LUBE OIL TEMP.	Indicates temperature of the lubricating oil of starboard main engine reduction gear.
27	STBD RED. GEAR LUBE OIL PRESS.	Indicates pressure of lubricating oil of starboard main engine reduction gear.
28	BOW THRUSTER CONTROL LEVER	Engages bow thruster clutch and increases the speed of bow thruster in either starboard or port direction.
29	#1 STEERING SYSTEM POWER AVAILABLE	Indicates steering power is available from number #1 system, (green).
30	#1 STEERING PUMP RUNNING	Indicates the #1 steering pump is running, (green).
31	#2 STEERING PUMP RUNNING	Indicates #2 steering pump is running, (green).
32	FIRE GAUGE PRESSURE	Indicates water pressure in fire main system.
33	#2 BILGE PUMP RUNNING	Indicates number 2 bilge pump is running, (green).
34	FUEL OIL SERVICE PUMP RUNNING	Indicates fuel oil transfer service pump is running, (green).
35	#1 BILGE PUMP RUNNING	Indicates bilge pump number 1 is running, (green).
36	EMERGENCY GENERATOR RUNNING	Indicates emergency generator is running, (green).
37	ATTENDANCE MONITOR ACK	Acknowledge attendance monitor alert from pilothouse, (red).
38	Sonalert Audible Warning Device	Audible device of attendance monitor.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
39	LAMP TEST/CIRCUIT TEST HOLD FOR C.T.	Tests all lamps on the engine room console (ERC).
40	ACK.	Silences the audible devices of the assistance needed system. Acknowledges alarm panel conditions and silences audible device.
41	S.G.E. STOP	Stops the number two generator, (red).
42	STEERING ALARM SYSTEM POWER	Indicates the steering alarm system power is on, (green).
43	S.G.E. START	Starts the number two generator, (green).
44	AUTO SHUTDOWN SYSTEM POWER	Indicates automatic shutdown system power is on, (green).
45	P.G.E. STOP	Stops the number one generator, (red).
46	ALARM SYSTEM POWER	Indicates alarm system is powered.
47	P.G.E. START	Starts the number one generator, (green).
48	Sonalert	Audible device of alarm system power.
49	OFF-ON	Turns number 2 fire pump ON or OFF.
50	#2 FIRE PUMP RUNNING	Indicates the number 2 fire pump is running, (red).
51	#1 FIRE PUMP RUNNING	Indicates number 1 fire pump running, (red).
52	OFF-ON	Turns number 1 fire pump ON or OFF.
53	#2 STEERING SYSTEM POWER AVAILABLE	Indicates steering power is available from #2 system (green).
54	BOW THRUSTER STOP	Stops bow thruster engine, (red pushbutton).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
55	B.T. TACH	Indicates bow thruster engine RPM.
56	BOW THRUSTER START	Starts bow thruster engine, (green pushbutton).
57	Alarm Panel	Indicates system malfunctions of the main engines, the main generator, and the steering systems. (See FIGURE 2-16, Sheet 10 of 10.)
58	CONT AIR PRESS.	Indicates the psi reading of the Indicator (not labeled control air pressure system. on ship)
59	PORT MAIN ENGINE TACH.	Indicates port engine RPM.
60	PORT AUTO SHUTDOWN OVERRIDE	Port main engine OVERRIDE indicator light.
61	P.M.E. EMERGENCY STOP	Actuates the emergency stop system of the port main engine.
62	P.M.E. STOP	Stops the port main engine.
63	PORT MAIN ENGINE RUNNING	Indicates port main engine running, (green).
64	STBD MAIN ENGINE RUNNING	Indicates starboard main engine running, (green).
65	S.M.E. STOP	Stops the starboard main engine.
66	S.M.E. EMERGENCY STOP	Actuates the emergency stop system of the starboard main engine.
67	STBD AUTO SHUTDOWN OVERRIDE	Indicates starboard main engine override.
68	Port Throttle Control Lever	Controls speed and direction of the port engine.
69	Starboard Throttle Control Lever	Controls speed and direction of the starboard engine.
70	STBD MAIN ENGINE TACH.	Indicates starboard engine RPM.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
71	EOT STBD (See separate panel)	The engine order telegraph (EOT) system is used to communicate the desired propeller shaft speed and direction for each shaft, from the pilothouse console (PHC) to the engine room console (ERC) when the PHC is not in direct control of the propulsion plant. (See FIGURE 2-10.)
72	SHAFT RPM STBD	Indicates RPM of the starboard shaft.
73	SHAFT RPM PORT	Indicates RPM of the port shaft.
74	EOT PORT	See Figure 2-10. (See separate panel)
75	CONTAIR TRANSF	Transfers pneumatic control to the pilothouse console.
76	GENERATOR NO. 1 EXHAUST	Indicates the temperature of number 1 generator exhaust.
77	GENERATOR NO. 2 EXHAUST	Indicates the temperature of number 2 generator exhaust.
78	STBD MAIN ENGINE EXHAUST STACK	Indicates the temperature of starboard main engine exhaust stack.
79	STBD MAIN ENGINE EXHAUST	Indicates temperature of starboard main engine exhaust manifold.
80	PORT MAIN ENGINE EXHAUST	Indicates temperature of starboard main engine exhaust manifold
81	PORT MAIN ENGINE EXHAUST STACK	Indicates temperature of port main engine exhaust stack.
82	POWER ON/OFF	Turns power ON or OFF to master watchcall and assistance needed panel. When the power is ON the pushbutton will be illuminated.
83	CANCEL	Silences audible device and turns off illuminated call button at both the master watchcall and assistance needed panel and called engineer's stateroom panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Console (FIGURE 2-16) - continued		
84	LAMP TEST	Causes all alarm indicators to illuminate.
85	Sonalert	Audible device of the master panel, sounds when any of the engineer's call buttons or ASSISTANCE NEEDED pushbutton is activated. When CANCEL pushbutton or engineer's WATCH CALL (PUSH TO TALK) button is pushed the audible device will be silenced. When activated by ASSISTANCE NEEDED relay of the engine room console, it can only be silenced by pushing the ACKNOWLEDGE pushbutton at the engine room console (43).
86	ENGINEER WORKSHOP	When pushed, the call button will light and the audible device sound on the master panel. The ENGINEER WORKSHOP panel call button will light and audible device will sound.
87	SECOND ENGINEER	When pushed, the call button will light and the audible device sound on the master panel. The SECOND ENGINEER's stateroom panel call button will light and the audible device will also sound.
88	FIRST ENGINEER	When pushed, the call button will light and the audible device sound on the master panel. The FIRST ENGINEER's stateroom panel call button will light and the audible device will also sound.
89	CHIEF ENGINEER	When pushed, the call button will light and the audible device sound on the master panel. The CHIEF ENGINEER's stateroom panel call button will light and the audible device will also sound.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Console (FIGURE 2-16) - continued		
90	ASSISTANCE NEEDED	When an alarm is detected at the ERC, the audible relay is energized automatically. The operator at the ERC presses the acknowledge pushbutton to de-energize the audible device. If the operator at the ERC is unable to acknowledge an alarm for a period longer than 30 seconds, the Assistance Needed relays will energize. Assistance Needed indicators and sounding of the audible devices will activate at all engineering stateroom Watchcall/Assistance Needed panels and in passageways near the engineering mess and recreation room. The alarm can only be silenced by depressing the Acknowledge pushbuton at the ERC. The Assistance Needed system may also be activated by depressing the Assistance Needed pushbutton on the master panel.
91	HIGH LEVEL	Indicates high level of water in fresh water tank.
92	LOW LEVEL	Indicates low level of water in fresh water tank.
93	ALM. SILENCE	Pushbutton silences audible alarm.
94	Level Indicator	Indicates current water level in fresh water tank.
95	POWER	Indicates power is on for water level indicator.
96	CALIBRATE	Adjusts needle for accurate readings.
97	ON-OFF-FULL REF	ON activates indicator, OFF deactivates indicator, and FULL REF causes needle to go to FULL.
98	P.M.E. LOW OIL PRESS. AUTO SHUTDOWN	Light illuminates at 9 psi.
99	P.M.E. HIGH OIL TEMP.	Light illuminates at 210° F.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Console (FIGURE 2-16) - continued		
100	P.M.E. HIGH JACKET WATER TEMP.	Light illuminates at 190°F.
101	P.M.E. LOW EXPANSION TANK LEVEL	Light illuminates at low water level in expansion tank.
102	P.M.E. LOW FUEL OIL PRESS.	Fuel oil pressure - 15 psi.
103	P.M.E. HIGH EXHAUST STACK TEMP.	Indicates high exhaust gas temp at 9500F.
104	SPARE	
105	P.M.E. OVERSPEED	Port main engine overspeed condition.
106	P.M.E. STOPPED	Port main engine stopped by speed switch.
107	P.M.E. LOW STARTING AIR PRESS.	Light illuminates at 150 psi.
108	P.R.G. LOW OIL PRESS. AUTO SHUTDOWN	Light illuminates at 185 psi.
109	P.R.G. HIGH OIL TEMP.	Light illuminates at 185°F.
110	LOW CTRL AIR SUPPLY	Light illuminates at 110 psi.
111	AUTO SHUTDOWN SYSTEM ELECTRIC POWER	Loss of 24 VDC.
112	ALARM SYS. ELECTRIC POWER	Loss of 24 VDC.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
113	HIGH BILGE ENGINE ROOM	High engine room bilge level.
114	HIGH BILGE STEERING ROOM	High bilge in steering compartment.
115	HIGH BILGE BOW THRUSTER COMPARTMENT	High bilge in bow thruster compartment.
116	SPARE	
117	SPARE	
118	S.M.E. LOW OIL PRESS. AUTO SHUTDOWN	Light illuminates at 9 psi.
119	S.M.E. HIGH OIL TEMP.	Light illuminates at 210°F.
120	S.M.E. HIGH JACKET WATER TEMP.	Light illuminates at 190°F.
121	S.M.E. LOW EXPANSION TANK LEVEL	Low expansion tank level.
122	S.M.E. LOW FUEL OIL PRESS.	Light illuminates at 15 psi.
123	S.M.E. HIGH EXHAUST STACK TEMP.	Light illuminates at 950°F.
124	SPARE	Spare.
125	S.M.E. OVERSPEED	Starboard main engine overspeed condition.
126	S.M.E. STOPPED	Starboard main engine stopped by speed switch.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Console (FIGURE 2-16) - continued		
127	S.M.E. LOW STARTING AIR PRESSURE	Light illuminates at 150 psi.
128	S.R.G. LOW OIL PRESS. AUTO SHUTDOWN	Light illuminates at 180 psi.
129	S.R.G. HIGH OIL TEMP.	Light illuminates at 185°F.
130	FIRE	From fire panel.
131	AUTO SHUTDOWN SYSTEM ELECTRIC POWER	Loss of 24 VDC.
132	HIGH FUEL LEVEL DAY TANK	High fuel oil level.
133	LOW FUEL LEVEL DAY TANK	Low fuel oil level.
134	HIGH FUEL LEVEL SETTLING TANK	High fuel oil level.
135	LOW FUEL LEVEL SETTLING TANK	Low fuel oil level.
136	SPARE	Spare.
137	SPARE	Spare.
138	P.G.E. LOW OIL PRESS.	Oil pressure 30 psi.
139	P.G.E. HIGH OIL TEMP.	Oil temperature 210°F.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
140	P.G.E. LOW JACKET WATER PRESS.	Water pressure 10 psi.
141	P.G.E. HIGH JACK WATER TEMP.	Water temperature 190°F.
142	P.G.E. LOW EXPANSION TANK LEVEL	Water level low.
143	P.G.E. LOW FUEL OIL PRESS.	Fuel oil pressure 15 psi.
144	P.G.E. HIGH EXHAUST TEMP.	Exhaust gas temperature 950° F
145	P.G.E. OVERSPEED	#1 Generator engine in overspeed condition.
146	SPR. OPEN IN ARMORY	Sprinkler opened by heat sensor in armory.
147	HIGH TEMP. IN ARMORY	Indication of high temperature in armory.
148	S.G.E. LOW OIL PRESS.	Oil pressure 30 psi.
149	S.G.E. HIGH OIL TEMP.	Oil temperature 210°F.
150	S.G.E. LOW JACKET WATER PRESS.	Water pressure 10 psi.
151	S.G.E. HIGH JACKET WATER TEMP.	Water temperature 190°F.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
152	S.G.E. LOW EXPANSION TANK LEVEL	Expansion tank water level is low.
153	S.G.E. LOW FUEL OIL PRESS.	Fuel oil pressure 15 psi.
154	S.G.E. HIGH EXHAUST TEMP.	Exhaust gas temperature 950°F.
155	S.G.E. OVERSPEED	#2 Generator engine in overspeed condition.
156	#2 S.G.E. LOW STARTING AIR PRESS.	Air pressure 150 psi.
157	RADIO ROOM INTRUSION	Radio room entrance alarm has been actuated.
158	NO. 1 MOTOR OVERLOAD	Motor has an overload sensed by the motor controller.
159	NO. 1 MOTOR PHASE LOSS	Indicates the voltage between any two phases is low.
160	NO. 1 SYSTEM FEEDER C.B. OPEN	Failure of feeder circuit in Feedback Unit.
161	NO. 1 LOW HYDRAULIC OIL LEVEL	#1 Hydraulic system oil level is low.
162	NO. 1 CONTROL POWER FAILURE	Loss of 115 VAC.
163	NO. 1 FOLLOW-UP STEERING FAILURE	Failure of follow-up steering system.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Engine Room Console (FIGURE 2-16) - continued	
164	NO. 1 STEERING FILTER DIRTY	Hydraulic filter should be replaced.
165	NO. 1 STEERING FAILURE	#1 Hydraulic system failure.
166	SPARE	Spare.
167	SPARE	Spare.
168	NO. 2 MOTOR OVERLOAD	Motor has an overload sensed by the motor controller.
169	NO. 2 MOTOR PHASE LOSS	Indicates the voltage between any two phases is below an acceptable value.
170	NO. 2 SYSTEM FEEDER C.B. OPEN	Failure of feeder circuit in Feed-back Unit.
171	NO. 2 LOW HYDRAULIC OIL LEVEL	#2 System hydraulic oil level is low.
172	NO. 2 CONTROL POWER FAILURE	Loss of 115 VAC.
173	NO. 2 FOLLOW-UP STEERING FAILURE	Failure of follow-up steering system.
174	NO. 2 STEERING FILTER DIRTY	Hydraulic filter should be replaced.
175	NO. 2 STEERING FAILURE	#2 Hydraulic system failure.
176	SPARE	Spare.
177	SPARE	Spare.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Stateroom Watchcall and Assistance Needed Panel (FIGURE 2-16)		
1	WATCH CALL (PUSH TO ACK) Illuminated Push Button.	Lights when call button on the master panel is pressed for that particular stateroom. Engineer called will push the stateroom WATCH CALL (PUSH TO ACK) button to acknowledge.
2	ASSISTANCE NEEDED Indicator Lamp	Lights when either the operator at the engine room console presses the ASSISTANCE NEEDED pushbutton on the master watchcall and assistance needed panel or the ASSISTANCE NEEDED indicator light will be activated if the engine room operator fails to or is unable to acknowledge an alarm from the engine room console alarm panel.
3	Sonalert	Audible device of the stateroom panel sounds when either the WATCH CALL or the ASSISTANCE NEEDED call button is activated. When the WATCH CALL (PUSH TO ACK) is pushed to acknowledge the call, the audible device will be silenced. On ASSISTANCE NEEDED, the audible device can only be silenced by pushing the ACKNOWLEDGE pushbutton at the engine room console (FIGURE 2-16, Sheet 9 of 10).
4	LAMP TEST	Depressing the LAMP TEST pushbutton causes all alarm indicators to illuminate.

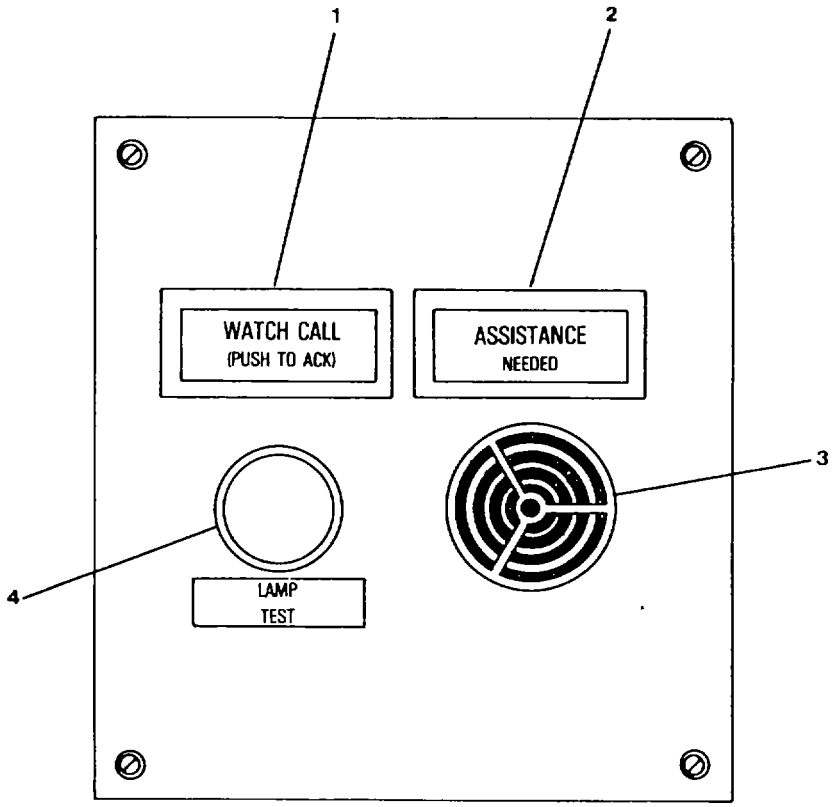


FIGURE 2-17. Stateroom Watchcall and Assistance Needed Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (FIGURE 2-18)		
1	Circuit Breaker (15 Amp)	Protects #1 port fuel oil transfer pump motor from amperage overload.
2	Circuit Breaker (15 Amp)	Protects #2 port fuel oil transfer pump motor from amperage overload.
3	Circuit Breaker (15 Amp)	Protects port engine room exhaust fan from amperage overload.
4	Circuit Breaker (15 Amp)	Protects starboard engine room exhaust fan from amperage overload.
5	SLOW RUN	Green light indicates port engine room supply fan is in slow running mode.
6	Circuit Breaker (40 Amp)	Protects port engine room supply fan from amperage overload.
7	Reset Pushbutton	Resets slow run contacts of port engine room supply fan motor controller.
8	Reset Pushbutton	Resets fast run contacts of port engine room supply fan motor controller.
9	STOP SLOW FAST	Switches port engine room supply fan motor to slow, stop, or fast run condition.
10	UV RESET	Resets port engine room supply fan motor controller after under voltage condition (loss of power or low voltage).
11	FAST RUN	Green light indicates port engine room supply fan motor in fast running mode.
12	Reset Pushbutton	Resets contacts of starboard engine room exhaust fan motor controller.
13	STOP	Pushbutton to STOP starboard engine room exhaust fan motor.

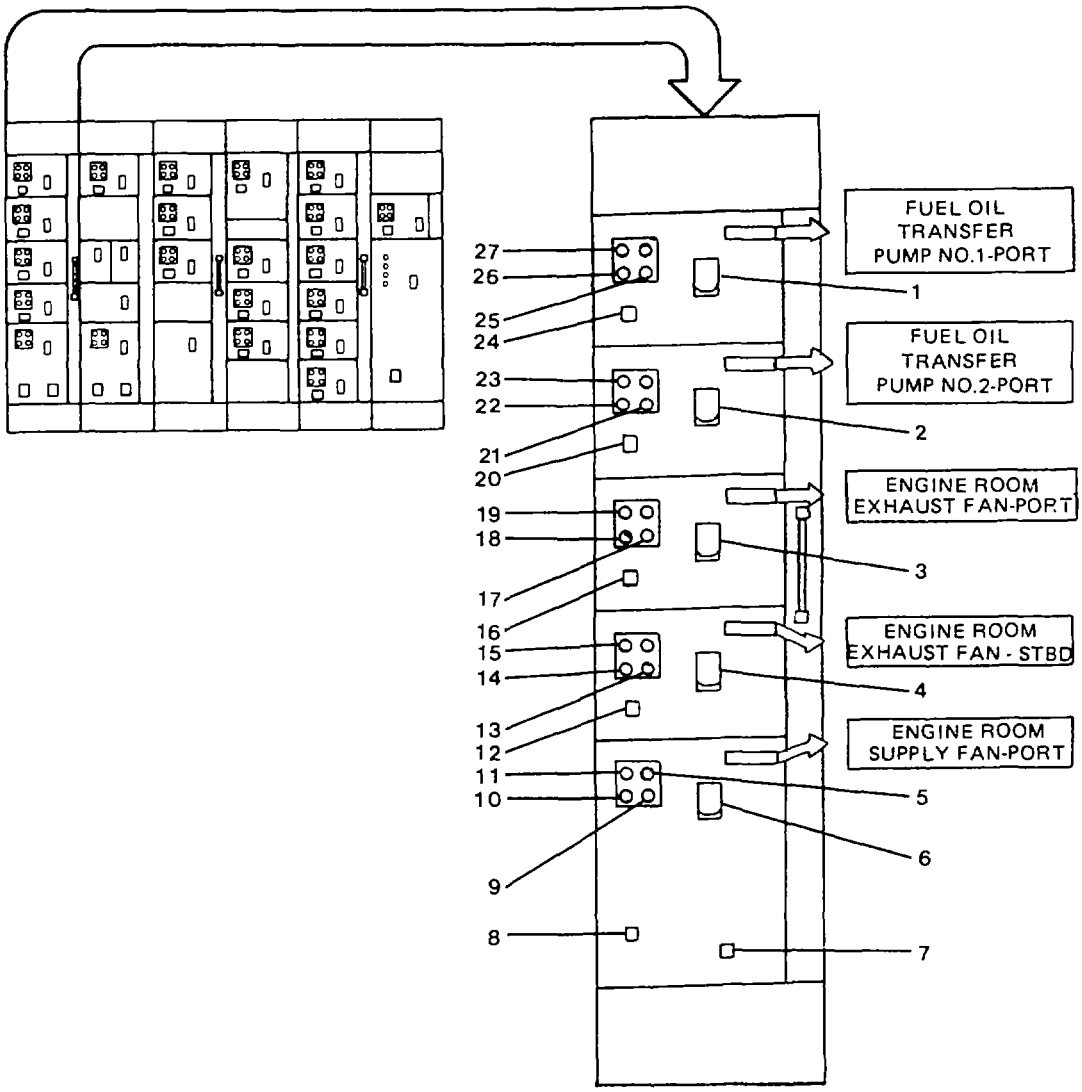


FIGURE 2-18. Engine Room Motor Control Center (Sheet 1 of 6).

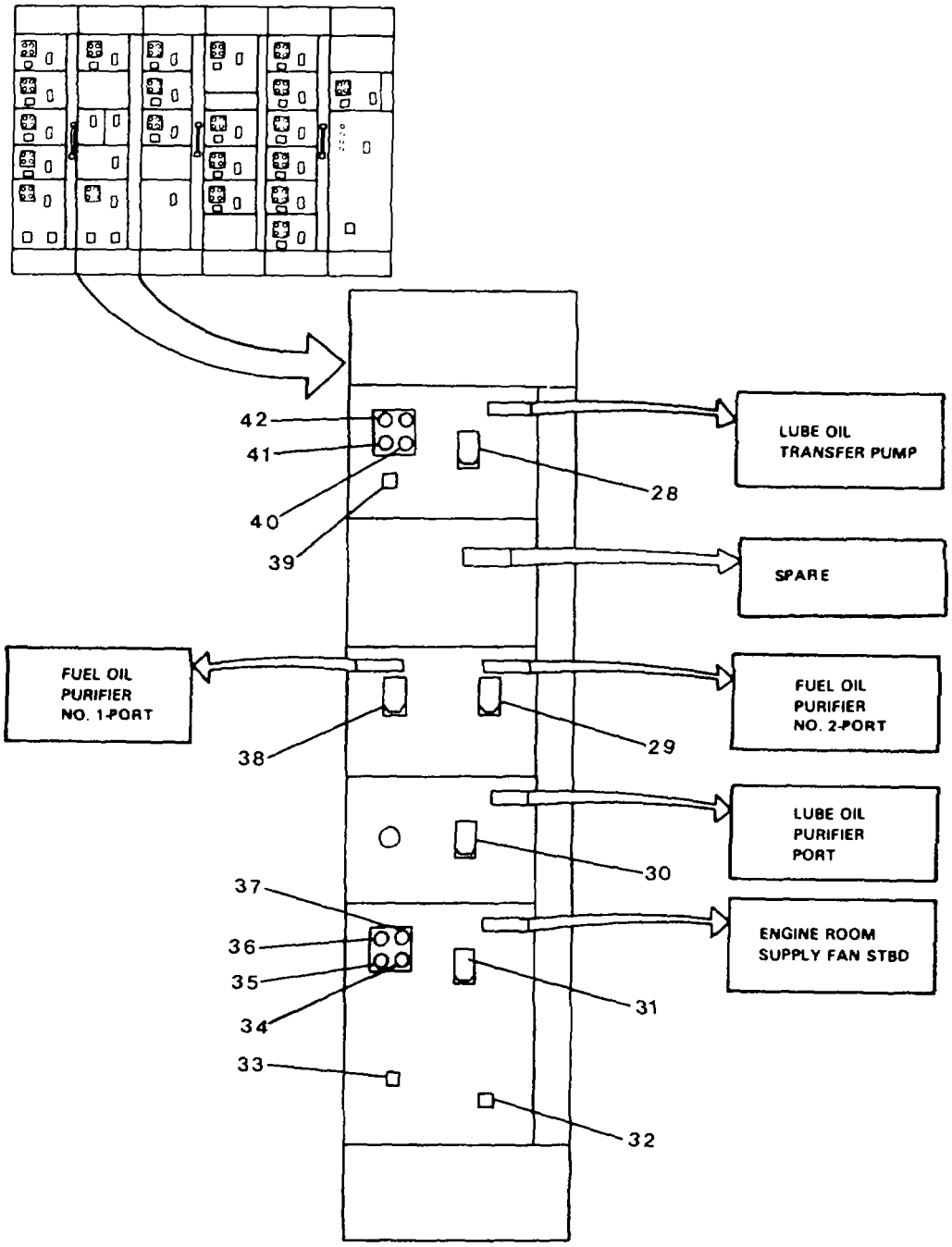


FIGURE 2-18. Engine Room Motor Control Center (Sheet 2 of 6).

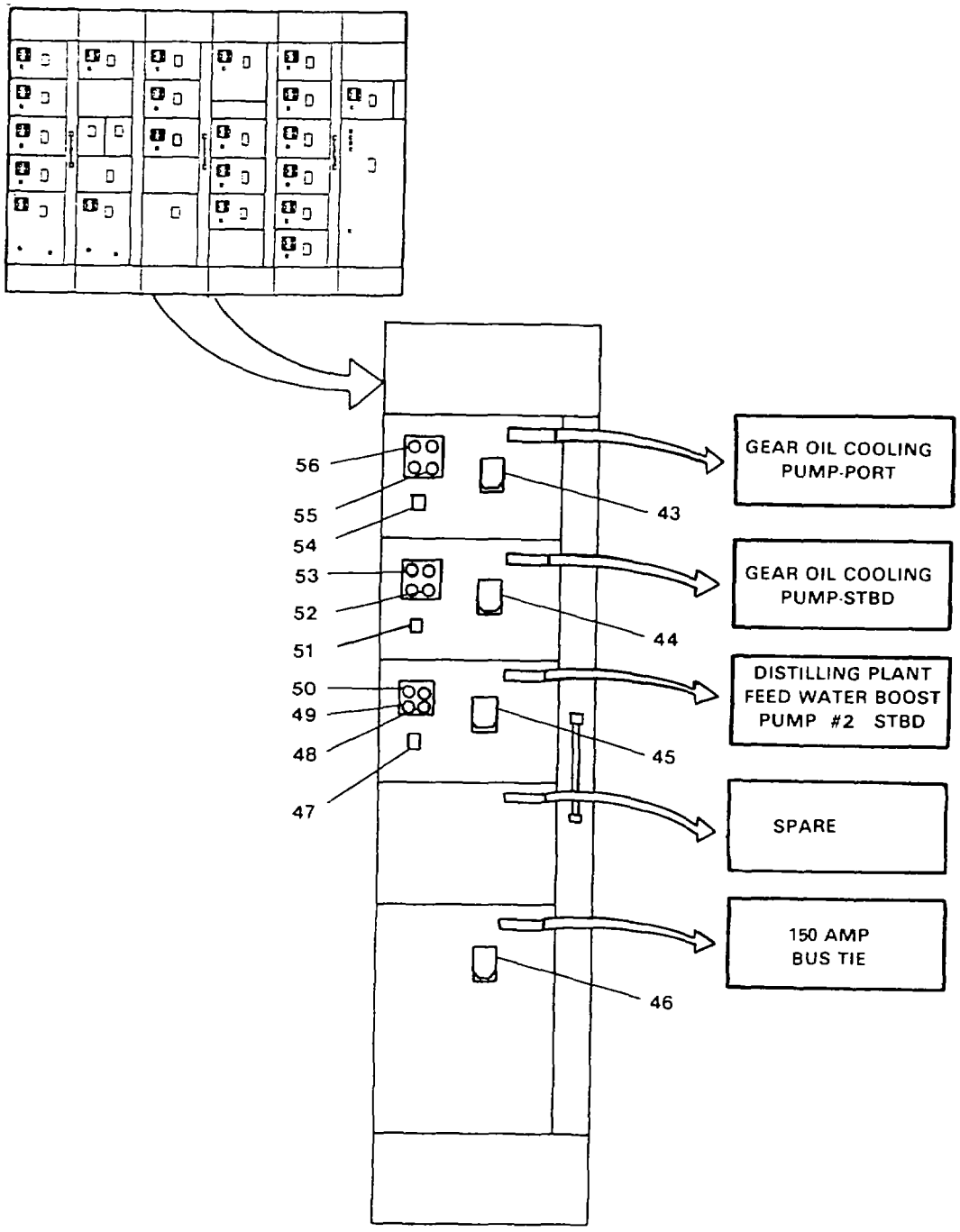


FIGURE 2-18. Engine Room Motor Control Center (Sheet 3 of 6).

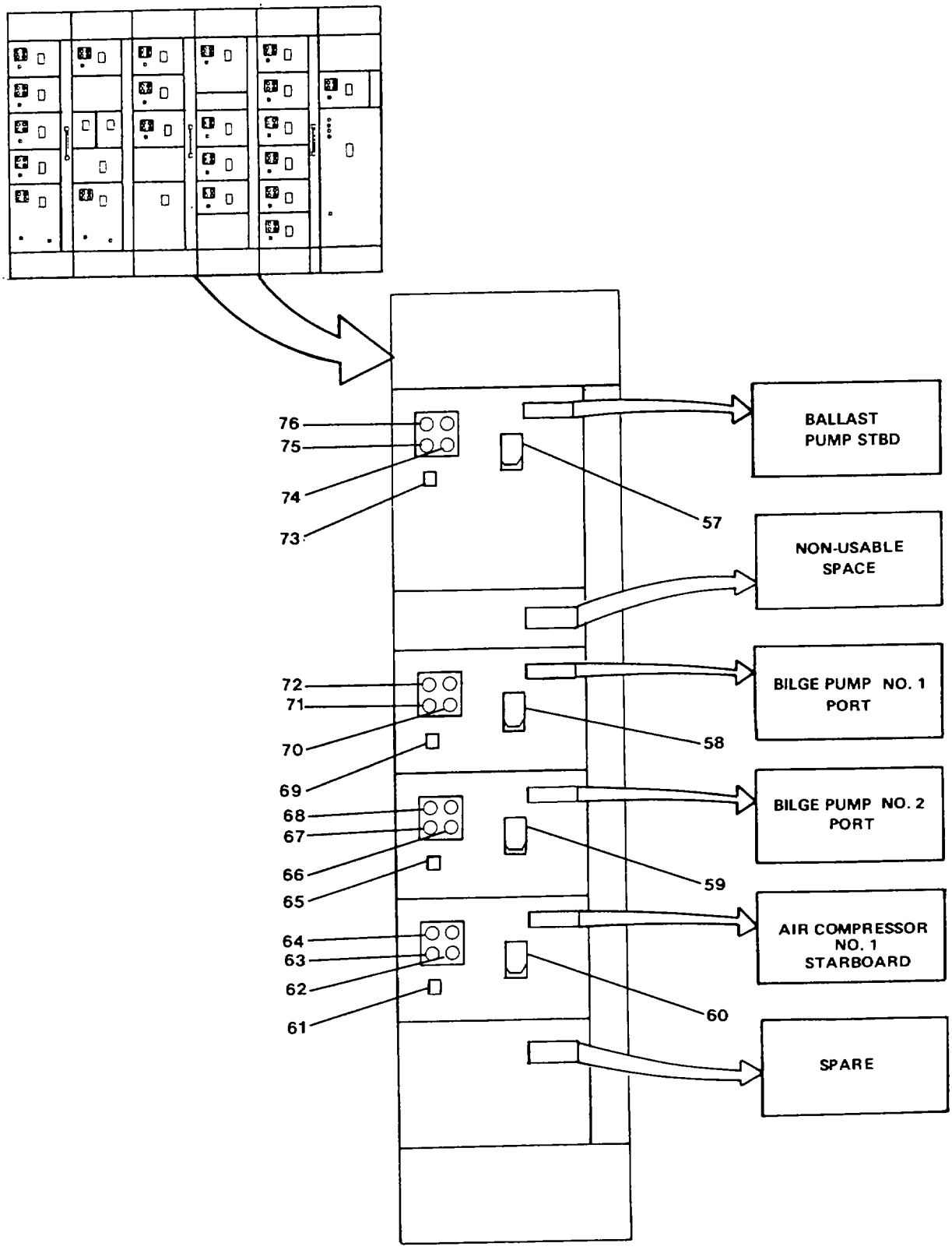


FIGURE 2-18. Engine Room Motor Control Center (Sheet 4 of 6).

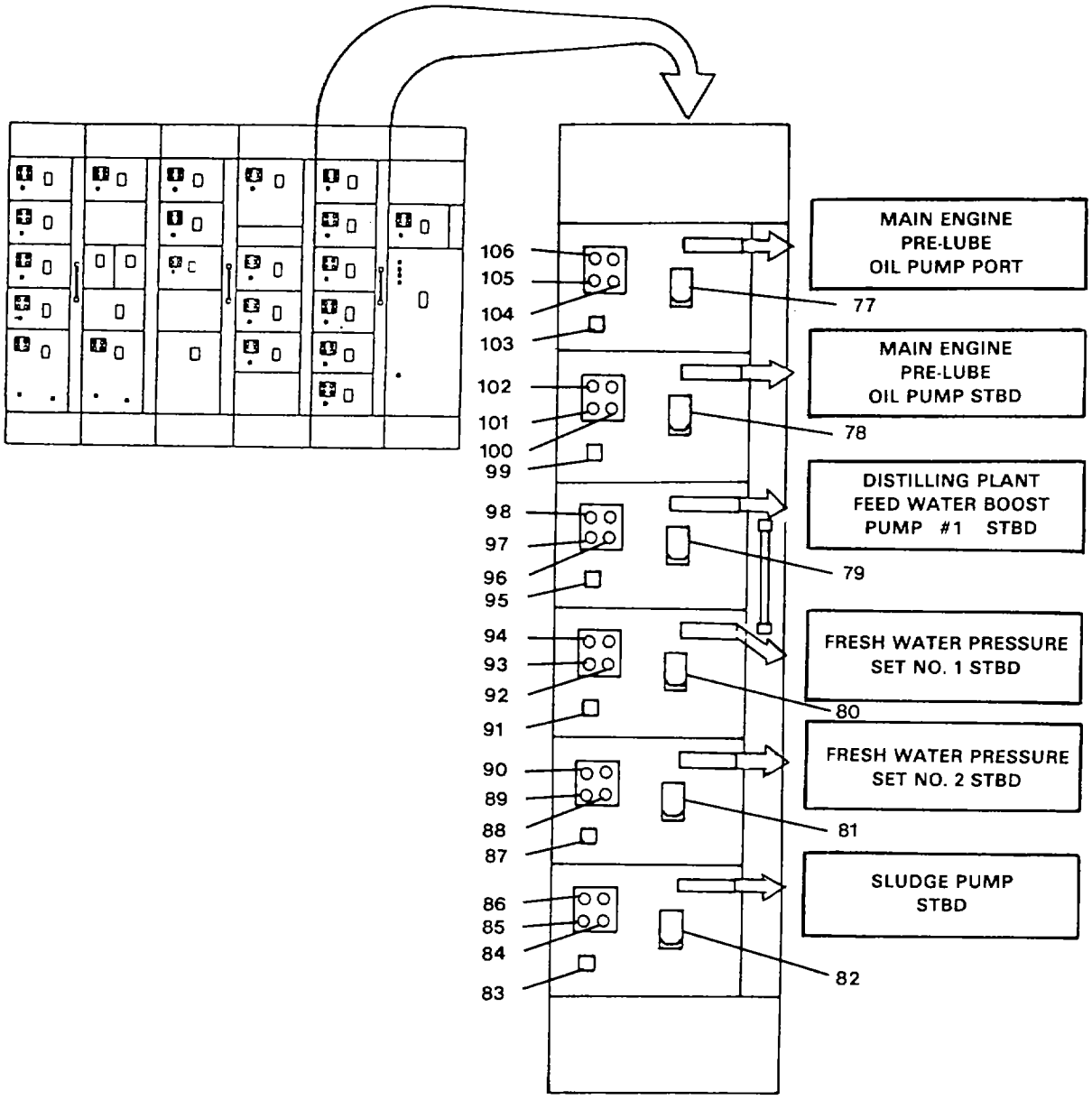


FIGURE 2-18. Engine Room Motor Control Center (Sheet 5 of 6).

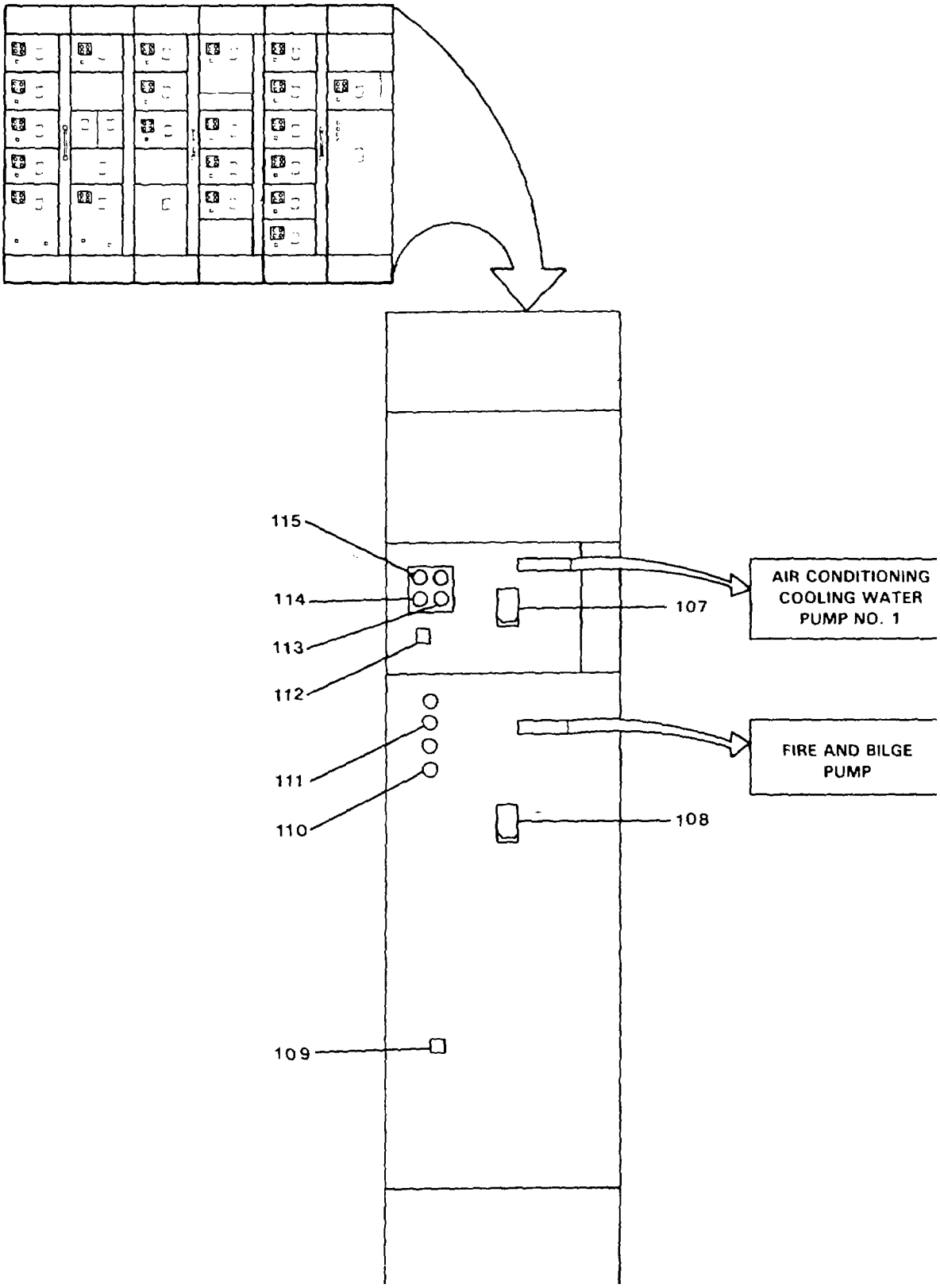


FIGURE 2-18. Engine Room Motor Control Center (Sheet 6 of 6).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
14	START	Pushbutton to START starboard engine room exhaust fan motor.
15	ON	Green light indicates starboard exhaust fan motor running.
16	Reset Pushbutton	Resets contacts of port engine room exhaust fan motor controller.
17	STOP	Pushbutton to STOP port engine room exhaust fan motor.
18	START	Pushbutton to START port engine room exhaust fan motor.
19	ON	Green light indicates port engine room exhaust fan motor running.
20	Reset Pushbutton	Resets contacts of #2 port fuel oil transfer pump motor controller.
21	STOP	Pushbutton to STOP #2 port fuel oil transfer pump motor.
22	START	Pushbutton to START #2 port fuel oil transfer pump motor.
23	ON	Green light indicates #2 port fuel oil transfer pump motor running.
24	Reset Pushbutton	Resets contacts of #1 port fuel oil transfer pump motor controller.
25	STOP	Pushbutton to STOP #1 port fuel oil transfer pump motor.
26	START	Pushbutton to START #1 port fuel oil transfer pump motor.
27	ON	Green light indicates #1 port fuel oil transfer pump motor running.
28	Circuit Breaker (15 Amp)	Protects lubricating oil transfer pump motor from amperage overload.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
29	Circuit Breaker	Protects #2 port fuel oil purifier (15 Amp) motor from amperage overload.
30	Circuit Breaker	Protects port lubricating oil (15 Amp) purifier pump motor from amperage overload.
31	Circuit Breaker	Protects starboard engine room (40 Amp) supply fan motor from amperage overload.
32	Reset Pushbutton	Resets slow run contacts of starboard engine room supply fan motor controller.
33	Reset Pushbutton	Resets fast run contacts of starboard engine room supply fan motor controller.
34	STOP SLOW FAST	Switches starboard engine room supply fan motor to slow, stop, or fast run condition.
35	UV RESET	Resets starboard engine room supply fan motor controller after Under Voltage condition (loss of power or low voltage).
36	FAST RUN	Green light indicates starboard engine room supply fan motor in fast running mode.
37	SLOW RUN	Green light indicates starboard engine room supply fan motor in slow running mode.
38	Circuit Breaker	Protects #1 port fuel oil purifier (15 Amp) motor from amperage overload. 39 Reset Pushbutton Resets contacts of lubricating oil transfer pump motor controller.
40	STOP	Pushbutton to STOP lubricating oil transfer pump motor.
41	START	Pushbutton to START lubricating oil transfer pump motor.

Table 2-1. Description of Operator's-Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
42	ON	Green light indicates lubricating oil transfer pump motor running.
43	Circuit Breaker (15 Amp)	Protects port gear oil cooling pump motor from amperage overload.
44	Circuit Breaker	Protects starboard gear oil (15 Amp) cooling pump motor from amperage overload.
45	Circuit Breaker (15 Amp)	Protects distilling plant pump motor.
46	Circuit Breaker (150 Amp)	Protects connection between ship's service generator bus to emergency generator bus for normal operation. Failure of both ship's service generators will open circuit breaker. Emergency generator will only operate mandatory emergency motor controllers.
47	Reset Pushbutton	Resets contacts of distilling plant motor controller.
48	Stop Pushbutton	Shuts down distilling plant.
49	Start Pushbutton	Activates distilling plant.
50	ON	Green light indicates distilling plant pump is running.
51	Reset Pushbutton	Resets contacts of starboard gear oil cooling pump motor controller.
52	HAND-OFF-AUTO	Three position switch, starboard gear oil cooling pump motor. HAND position provides continuous operation of pump motor. OFF position will stop the pump. AUTO allows lubricating oil temperature to start and stop the starboard gear oil cooling pump as required.
53	ON	Green light indicates starboard gear oil cooling pump running.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
54	Reset Pushbutton	Resets contacts of port gear oil cooling pump motor controller.
55	HAND-OFF-AUTO	Three position switch, port gear oil cooling pump motor. HAND position provides continuous operation of pump motor. OFF position will stop the pump. AUTO allows lubricating oil temperature to start and stop the port gear oil cooling pump as required.
56	ON	Green light indicates port gear oil cooling pump running.
57	Circuit Breaker (70 Amp)	Protects STBD ballast pump motor from amperage overload.
58	Circuit Breaker (110 Amp)	Protects port #1 bilge pump motor from amperage overload.
59	Circuit Breaker (110 Amp)	Protects port #2 bilge pump motor from amperage overload.
60	Circuit Breaker (25 Amp)	Protects starboard #1 air compressor motor from amperage overload.
61	Reset Pushbutton	Resets contacts of air compressor motor controller.
62	HAND-OFF-AUTO	Three position selector switch. HAND position turns air compressor motor on for continuous operation, OFF turns motor off, and AUTO allows air demand to start and stop compressor motor as required.
63	UV RESET	Resets #1 starboard air compressor motor controller after under voltage condition (loss of power or low voltage).
64	ON	Green light indicates it starboard air compressor motor running.
65	Reset Pushbutton	Resets contacts of port #2 bilge pump motor controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
66	STOP	Pushbutton to STOP port #2 bilge pump motor.
67	START	Pushbutton to START port i2 bilge pump motor.
68	ON	Green light indicates port #2 bilge pump motor running.
69	Reset Pushbutton	Resets contacts of port #1 bilge pump motor controller.
70	STOP	Pushbutton to STOP port t1 bilge pump motor.
71	START	Pushbutton to START port #1 bilge pump motor.
72	ON	Green light indicates port #1 bilge pump motor running.
73	Reset Pushbutton	Resets contacts of starboard ballast pump motor controller.
74	STOP	Pushbutton to STOP starboard ballast pump motor.
75	START	Pushbutton to START starboard ballast pump motor.
76	ON	Green light indicates starboard ballast pump motor running.
77	Circuit Breaker (15 Amp)	Protects port main engine prelubricating oil pump motor.
78	Circuit Breaker (15 Amp)	Protects starboard main engine prelubricating oil pump motor.
79	Circuit Breaker (15 Amp)	Protects starboard distilling plant feed water booster pump motor.
80	Circuit Breaker	Protects starboard fresh water (15 Amp) pressure set #1 motor.

Table 2-1. Description of Operator's Controls and Indicators - COUT

Key	Control or Indicator	Function
	Engine Room Motor Control Center (Figure 2-18) - continued	
81	Circuit Breaker (15 Amp)	Protects starboard fresh water pressure set #2 motor.
82	Circuit Breaker (15 Amp)	Protects starboard sludge pump motor.
83	Reset Pushbutton	Resets contacts of starboard sludge pump motor controller.
84	STOP	Pushbutton to STOP starboard sludge pump motor.
85	START	Pushbutton to START starboard sludge pump motor.
86	ON	Green light indicates starboard sludge pump motor running.
87	Reset Pushbutton	Resets contacts of number 2 starboard fresh water pressure set pump motor.
88	HAND-OFF-AUTO	Three position switch, fresh water pressure set #2 STBD. HAND position provides continuous operation, OFF turns motor off, and AUTO allows water demand to start and stop pressure set pump motor as required.
89	W RESET	Resets number 2 starboard fresh water pressure set motor controller after under voltage condition (loss of power or low voltage).
90	ON	Green light indicates number 2 starboard fresh water pressure set motor running.
91	Reset Pushbutton	Resets contacts of number 1 starboard fresh water pressure set pump motor.
92	HAND-OFF-AUTO	Three position switch, fresh water pressure set #1 STBD. HAND position provides continuous operation, OFF turns motor off, and AUTO allows water demand to start and stop pressure set pump motor as required.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
93	W RESET	Resets number 1 starboard fresh water pressure set motor controller after under voltage condition (loss of power or low voltage).
94	ON	Green light indicates number 1 starboard fresh water pressure set motor running.
95	Reset Pushbutton	Resets contacts of starboard distilling plant feed water booster pump motor controller.
96	STOP	Pushbutton to STOP starboard distilling plant feed water booster pump motor.
97	START	Pushbutton to START starboard distilling plant feed water booster pump motor.
98	ON	Green light indicates starboard distilling plant feed water booster pump motor running.
99	Reset Pushbutton	Resets contacts of starboard main engine prelubricating oil pump motor controller.
100	STOP	Pushbutton to STOP starboard main engine prelubricating oil pump motor.
101	START	Pushbutton to START starboard main engine prelubricating oil pump motor.
102	ON	Green light indicates starboard main engine prelubricating oil pump motor running.
103	Reset Pushbutton	Resets contacts of port main engine prelubricating oil pump motor controller.
104	STOP	Pushbutton to STOP port main engine prelubricating oil pump motor.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
105	START	Pushbutton to START port main engine prelubricating oil pump motor.
106	ON	Green light indicates port main engine prelubricating oil pump motor running.
107	Circuit Breaker (20 Amp)	Protects salt water circulating pump no. 1 for air conditioning system motor from amperage overload.
108	Circuit Breaker (110 Amp)	Protects fire and bilge pump motor from amperage overload.
109	Reset Pushbutton	Resets contacts of fire and bilge pump motor controller.
110	OFF-ON	Two position switch to turn fire and bilge pump motor OFF or ON.
111	RUN	Green light indicates fire and bilge pump running.
112	Reset Pushbutton	Resets contacts of salt water circulating pump for air conditioning system motor controller.
113	STOP	Pushbutton to STOP salt water circulating pump for air conditioning system motor.
114	START	Pushbutton to START salt water circulating pump for air conditioning system motor.
115	ON	Green light indicates salt water circulating pump for air conditioning system running.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Engine Room Motor Control Center (Figure 2-18) - continued		
1	A.C. VOLTS Meter	Indicates voltage generated by number 1 generator or the bus.
2	Phase Selector Switch	Selects one of three phases of number 1 generator displayed on A.C. AmpERES meter.
3	A.C. AmpERES	Meter Indicates amperage of phase selector switch of generator number 1.
4	GENERATOR NO. 1 POWER AVAILABLE	Indicates (white light) power available from generator number 1.
5	A.C. KILOWATTS	Meter Indicates amount of kilowatts drawn from number l generator.
6	SHORE POWER AVAILABLE	Indicates (amber light) shore power is available.
7	HERTZ Meter	Indicates hertz of number 1 or number 2 generator.
8	Selector Switch	Selects number 1 or number 2 generator displayed on hertz meter.
9	A.C. KILOWATTS	Meter Indicates amount of kilowatts drawn from number 2 generator.
10	Phase Selector Switch	Selects one of three phases of number 2 generator displayed on A.C. AmpERES meter.
11	A.C. AmpERES Meter	Indicates amperage of phase as selected by phase selector switch of generator number 2.
12	A.C. VOLTS Meter	Indicates voltage generated by number 2 generator.
13	BUS GEN 2 SWITCH	Selects voltages across phases 1, 2, or 3 of generator number 2, or voltages across phases 1, 2, or 3 of the bus.

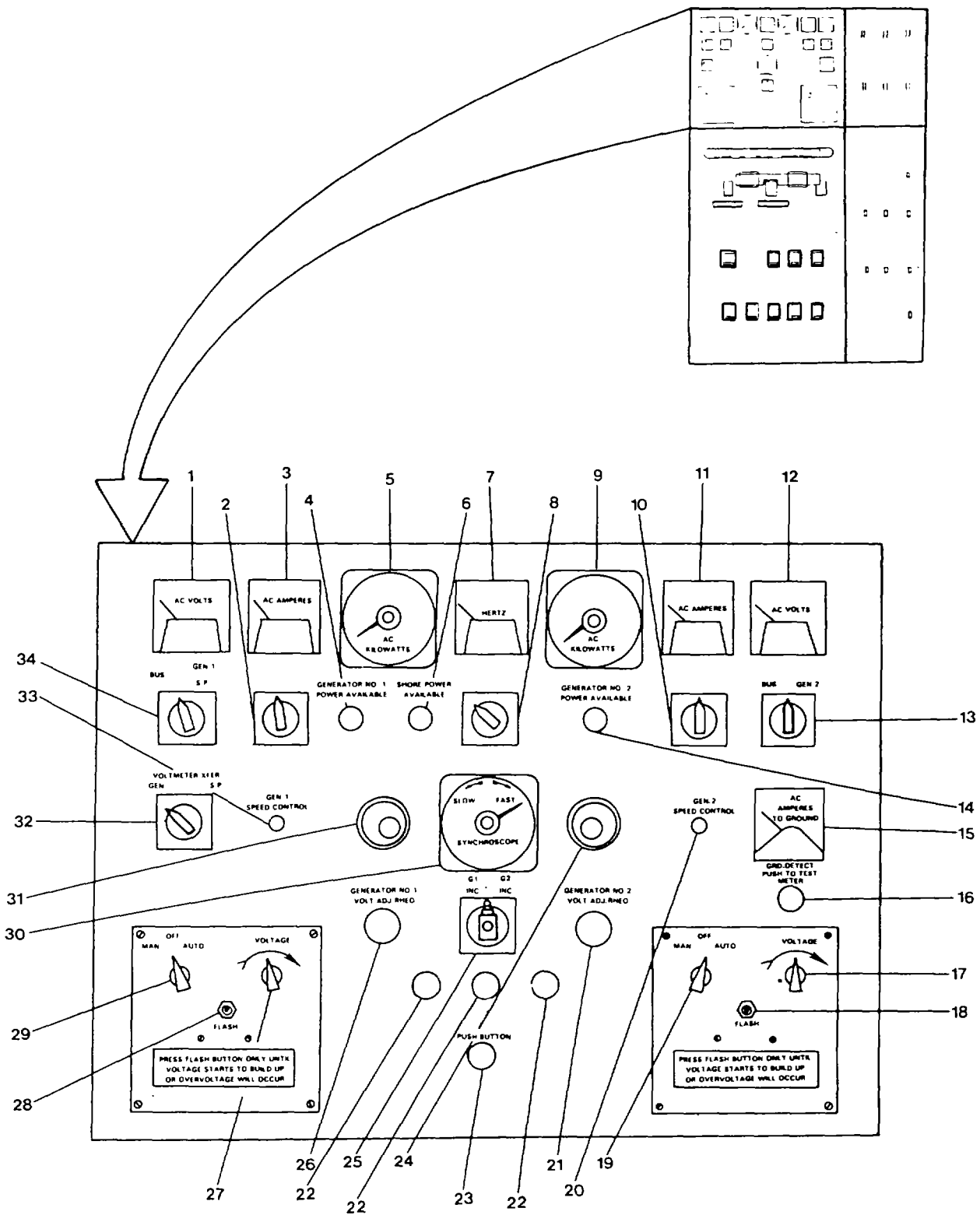


FIGURE 2-19. Main Switchboard (Sheet 1 of 6).

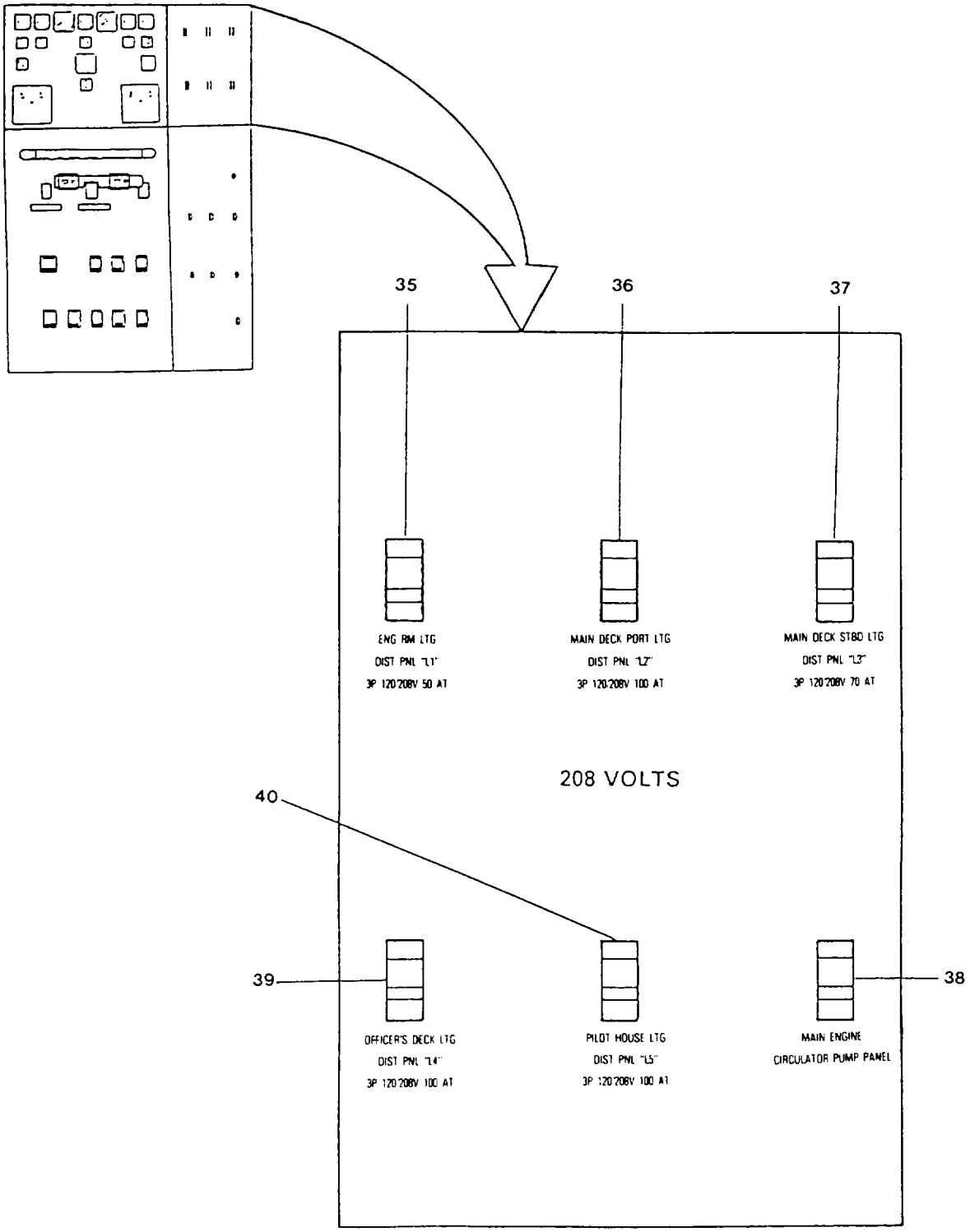


FIGURE 2-19. Main Switchboard (Sheet 2 of 6).

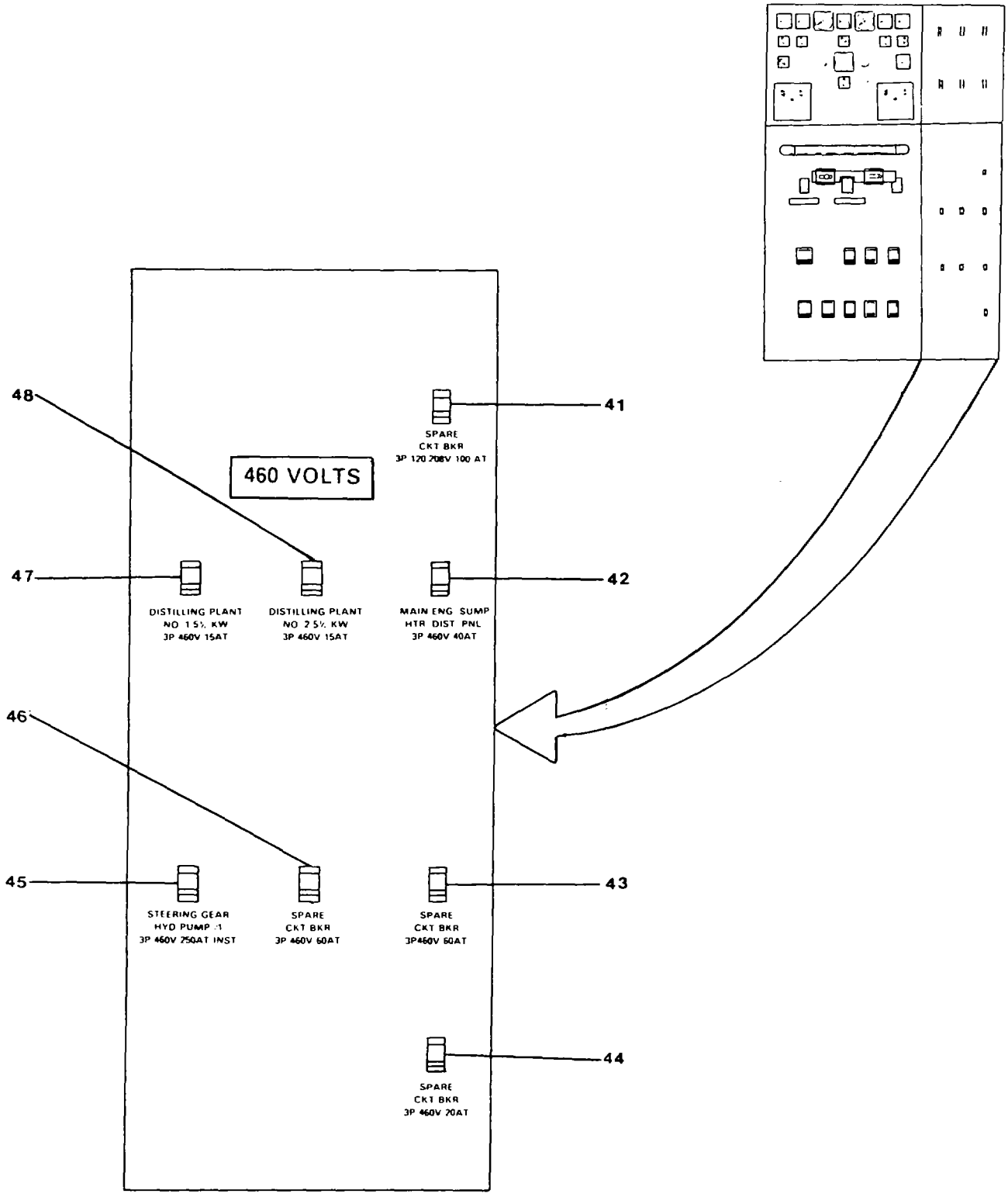


FIGURE 2-19. Main Switchboard (Sheet 3 of 6).

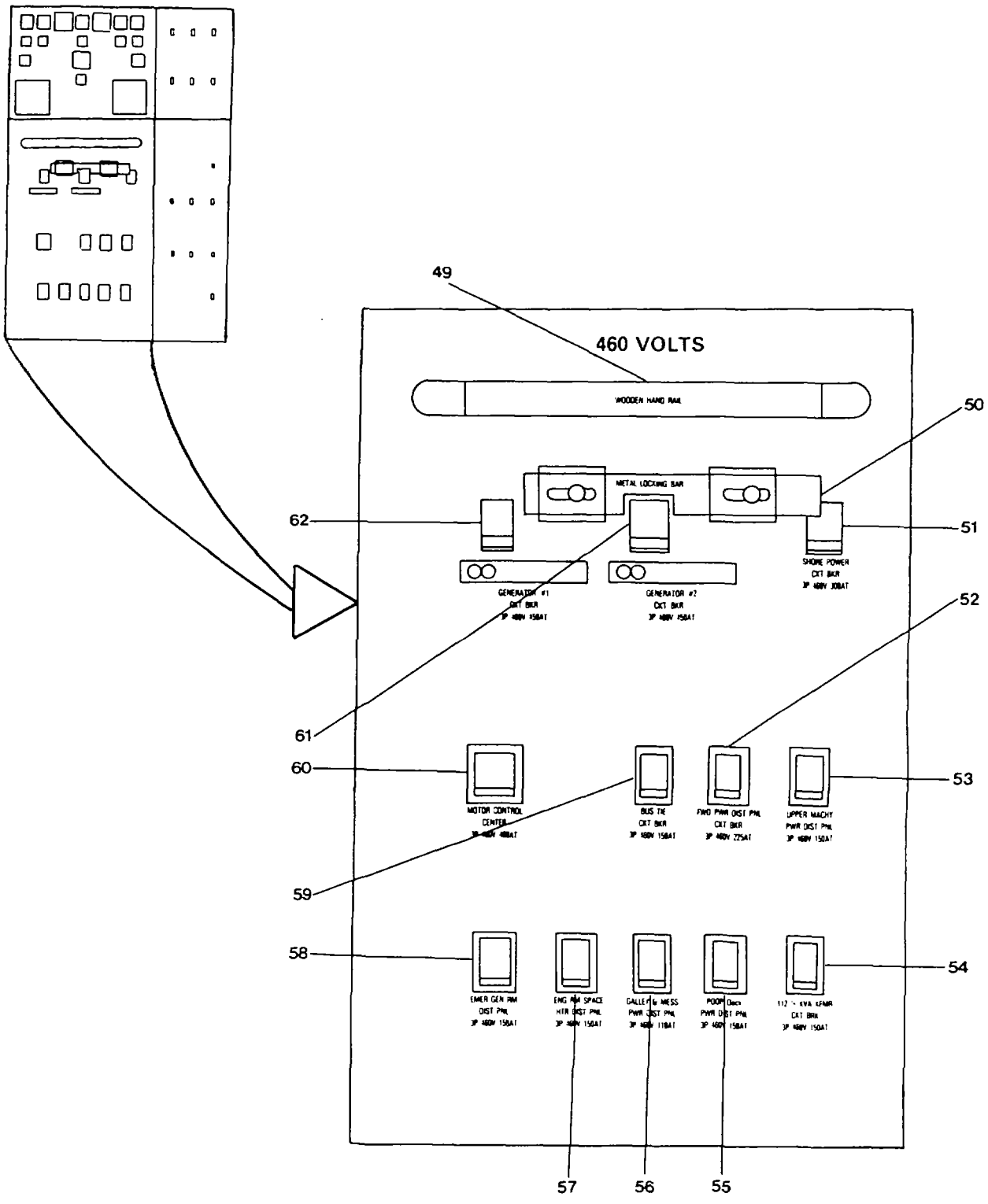


FIGURE 2-19. Main Switchboard (Sheet 4 of 6).

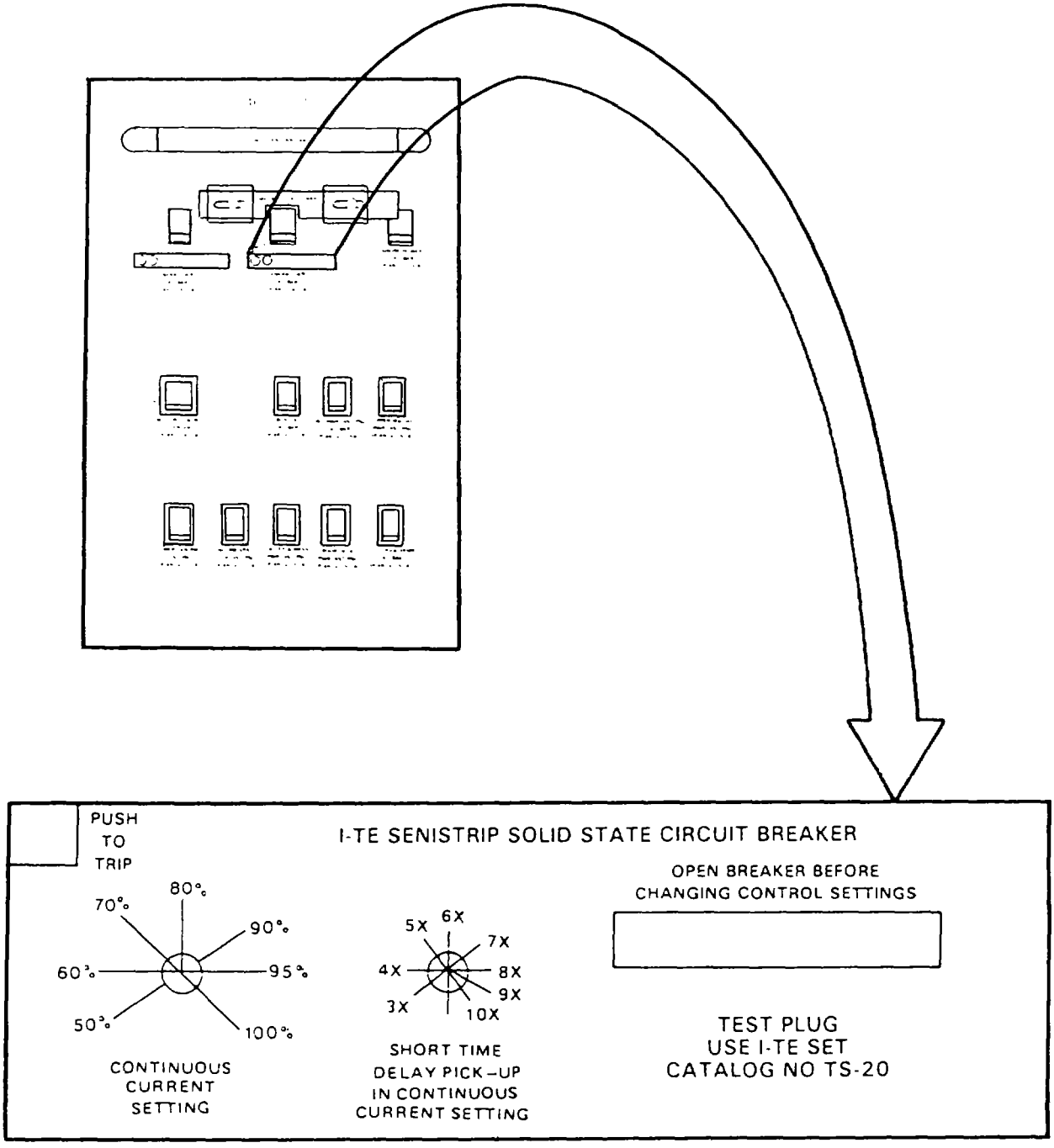


FIGURE 2-19. Main Switchboard (Sheet 5 of 6).

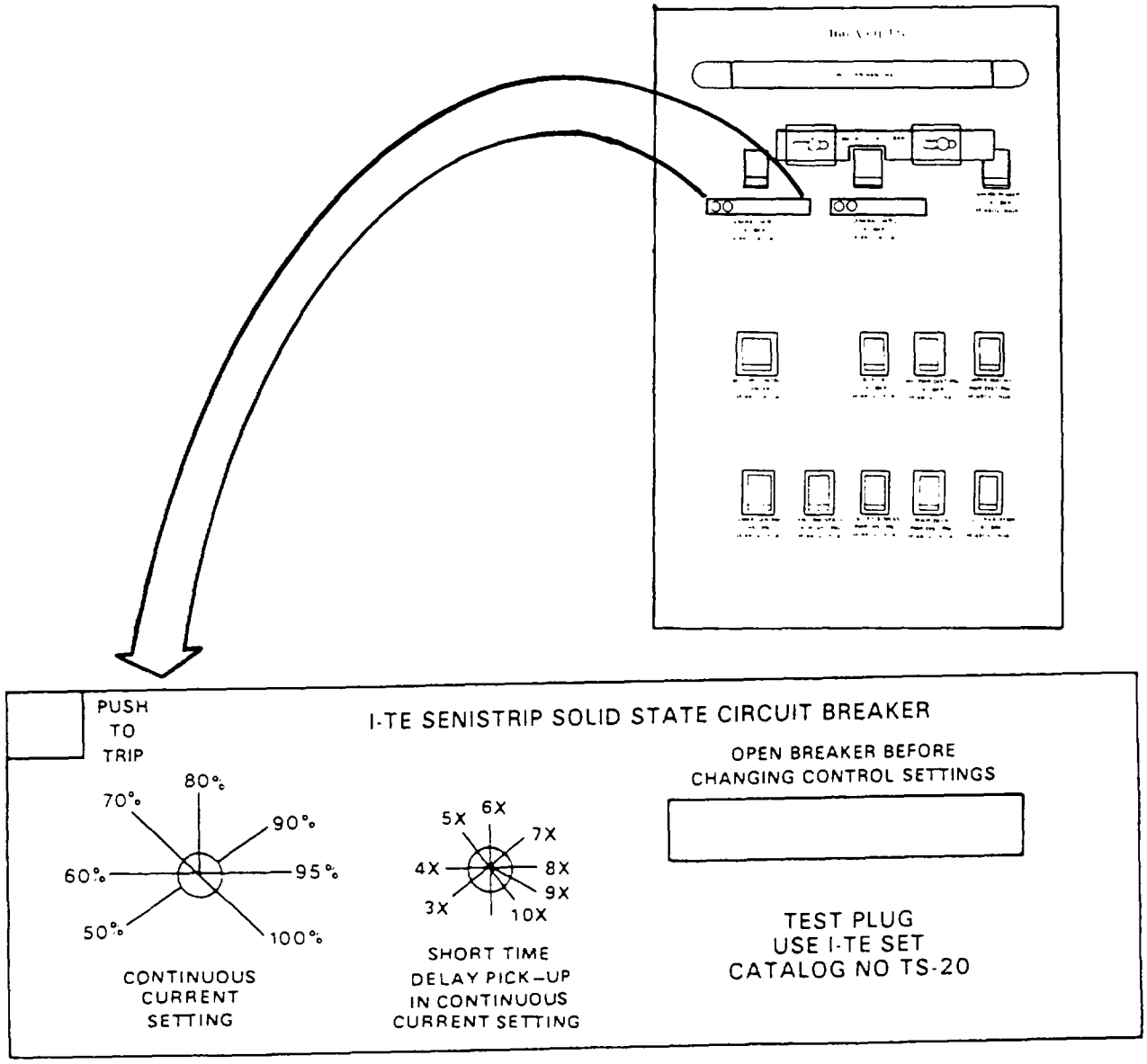


FIGURE 2-19. Main Switchboard (Sheet 6 of 6).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Switchboard (FIGURE 2-19) - continued	
14	GENERATOR NO. 2 POWER AVAILABLE	Indicates (white light) power available from generator number 2.
15	A.C. AMPERES TO GROUND	Indicates undesired ground on circuit, expressed in amperes.
16	GRD DETECT PUSH TO TEST METER	Tests AC amperes to ground meter. Removes meter from circuit to check meter calibration.
17	VOLTAGE	Regulates voltage output for generator number 2.
18	FLASH	Provides voltage until voltage starts to build up in number 2 generator.
19	MAN-OFF-AUTO	Places number 2 generator voltage regulator in MAN (manual) OFF, or AUTO (automatic) position.
20	GEN 2 SPEED CONTROL	Increase or decrease speed of diesel engine driving number 2 generator.
21	GENERATOR NO. 2 VOLTAGE ADJ RHEO	Adjusts output of generator number 2 to output of generator number 1 for parallel operation.
22	White Light Indicator	Indicates ground fault condition on any of three phases of the ship's voltage (generated or shore supplied).
23	PUSHBUTTON	Tests clear lights of three phases of ship's voltage.
24	Synchro Indicator	Blinks (white light) at frequency generator. Steady light indicates generator number 2 in frequency synchronization with generator number 1.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Switchboard (FIGURE 2-19) - continued	
25	GEN #1 INC.	GEN #2 Selects generator number 1 or INC. generator number 2 for display on synchroscope.
26	GENERATOR NO. 1 VOLTAGE ADJ RHEO	Adjusts output of generator number 1 to output of generator number 2 for parallel operation.
27	VOLTAGE	Regulates voltage output for generator number 1.
28	FLASH	Provides voltage until voltage starts to build up in number 1 generator.
29	MAN-OFF-AUTO	Places number 1 generator voltage regulator in MAN (manual) OFF, or AUTO (automatic).
30	SLOW Synchroscope	FAST Indicates frequency of selected generator. Meter indicates frequency is either fast or slow.
31	Synchro Indicator	Blinks (white light) at frequency of generator. A steady light indicates generator number 1 in frequency synchronization with generator number 2.
32	VOLTMETER XFER GEN	Selects generator or shore power. SP
33	GEN 1 SPEED CONTROL	Increase or decrease speed of diesel engine driving number 1 generator.
34	GEN 1 BUS	Selects voltages across phases S.P. 1, 2, or 3 of generator number 1, or shore power. Positions for reading voltages across phases 1, 2 or 3 of the bus.
35	ENG RM LTG DIST PNL "L1" 3P 120/208V 50AT	Provides 3 phase, 120/208 volts with 50 ampere automatic trip circuit protection.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Switchboard (FIGURE 2-19) - continued	
36	MAIN DECK PORT LTG DIST PNL "L2" 3P 120/208V 100AT	Provides 3 phase 120/208 volts, with 100 ampere automatic trip circuit protection.
37	MAIN DECK STBD LTG DIST PNL "L3" 3P 120/208V 70AT	Provides 3 phase 120/208 volts, with 70 ampere automatic trip circuit protection.
38	MAIN ENGINE CIRCULATOR PUMP PANEL	Provides 3 phase 120/208 volts, with 50 ampere automatic trip circuit protection to pump motor controllers.
39	OFFICER'S DECK LTG DIST PNL "L4" 3P 120/208V 100AT	Provides 3 phase 120/208 volts, with 100 ampere automatic trip circuit protection.
40	PILOT HOUSE LTG DIST PNL "L5" 3P 120/208V 100AT	Provides 3 phase 120/208 volts, 100 ampere automatic trip circuit protection.
41	SPARE CKT BKR 3P 120/208V 100AT	Spare circuit breaker if additional distribution panel is required with 100 ampere circuit protection.
42	MAIN ENG SUMP HTR. DIST PNL 3P 460V 40AT	Provides 3 phase 460 volts with 40 ampere circuit protection.
43	SPARE CKT BKR 3P 460V 60AT	Spare circuit breaker if additional distribution panel is required with 60 ampere circuit protection.
44	SPARE CKT BKR 3P 460V 20AT	Spare circuit breaker if additional distribution panel is required with 20 ampere circuit protection.
45	STEERING GEAR HYD PUMP #1 3P 460V 250AT INST	Disconnect switch with 250 ampere instantaneous magnetic trip circuit protection.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Switchboard (FIGURE 2-19) - continued	
46	SPARE CKT BKR 3P 460V 60AT	Spare circuit breaker if additional distribution panel is required with 60 ampere circuit protection.
47	DISTILLING PLANT NO. 1 5 1/2 KW 3P 460V 15AT	Protected by 15 ampere automatic trip circuit protection.
48	DISTILLING PLANT NO. 2 5 1/2 KW 3P 460V 15AT	Protected by 15 ampere automatic trip circuit protection.
49	Wooden Hand Rail	Provides nonconductive hand support for safety.
50	Metal Locking Bar	Prevents activation of generator and shore power circuit breaker at same time.
51	SHORE POWER CKT BKR 3P 460V 300AT	Provides breaker for shore power connection box with 300 ampere automatic circuit protection.
52	FWD PWR DIST PNL CKT BKR 3P 460V 225AT	Provides 225 ampere automatic trip protection.
53	UPPER MACHY PWR DIST PNL 3P 460V 150AT	Provides 150 ampere automatic trip protection.
54	112 1/2 KVA XFMR CKT BKR 3P 460V 150AT	Distributes power to L1, L2, L3, L4, and L5 lighting distribution panels.
55	POOP DECK PWR DIST PNL 3P 460V 150AT	Provides 150 ampere automatic trip protection.
56	GALLEY & MESS PWR DIST PNL 3P 460V 110AT	Provides 110 ampere automatic trip circuit protection.
57	ENG RM SPACE HTR DIST PNL 3P 460V 150A	Provides 150 ampere automatic trip protection.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Switchboard (FIGURE 2-19) - continued	
58	EMER GEN RM DIST PNL 3P 460V 150AT	Provides 150 ampere automatic trip protection.
59	BUS TIE CKT BKR 3P 460V 150AT	Ties ship's service generator bus to emergency generator bus for normal operation. Failure of both ship's service generators will open circuit breaker. Emergency generator will only operate mandatory emergency circuits.
60	MOTOR CONTROL CENTER 3P 460V 400AT	Provides 400 ampere automatic trip protection.
61	GENERATOR #2 CKT BKR 3P 460V 450AT	Provides 450 ampere automatic trip circuit protection.
62	GENERATOR #1 CKT BKR 3P 460V 450AT	Provides 450 ampere automatic trip circuit protection.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Generator Set Engine 90 KW (FIGURE 2-20)	
1	Emergency Stop Switch	Activates engine shut-down.
2	Over Speed Fault Light	Illuminates when an overspeed condition occurs.
3	Fail to Start (Over Crank) Light	Illuminates during an over crank condition.
4	Panel Light	Provides panel illumination.
5	V Meter	Provides alternating current voltage reading.
6	V-A Switch	Selects 1-2, 2-3, or 1-3 phase of generator.
7	A Meter	Provides alternating current amperes.
8	Panel Lights ON/OFF Switch	Controls panel lights.
9	Hz Switch	Controls governor motor speed.
10	Hz Meter	Indicates frequency of generator.
11	Temperature Gauge	Provides water temperature indication.
12	Pressure Gauge	Provides oil pressure indication.
13	Rheostat	Adjusts voltage level.
14	Low Oil Pressure Fault Light	Illuminates when low oil pressure is experienced.
15	Engine Control Switch	Allows manual or automatic operation of engine and generator set.
16	High Coolant Fault Light	Illuminates when engine coolant has overheated.

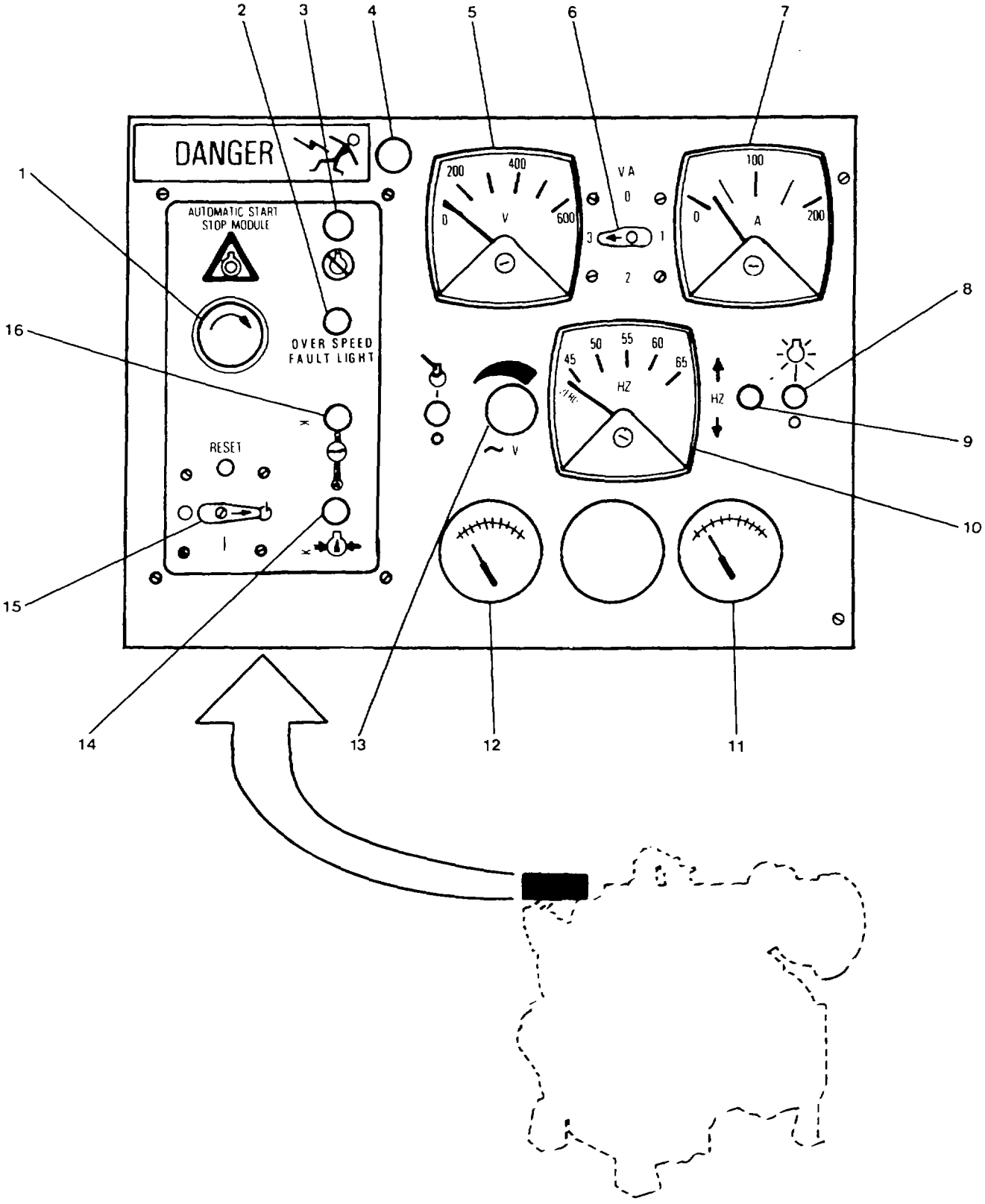


FIGURE 2-20. Generator Set Engine 90 KW.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Emergency Switchboard (FIGURE 2-21)	
1	A.C. VOLTS Meter	Indicates voltage generated by emergency generator.
2	A.C. Volts Switch	Selects 1-2, 2-3 or 1-3 phase of the emergency generator to be displayed on the volt meter.
3	A.C. Amperes Switch	Selects one of three phases of emergency generator displayed on A.C. Amperes meter.
4	A.C. AMPERES Meter	Indicates amperage generated by emergency generator.
5	HERTZ Meter	Indicates hertz of emergency generator.
6	EMG GENERATOR POWER AVAILABLE	Indicates (white light) power available from emergency generator.
7	Clear Indicator Light	Indicates ground fault conditions on any one of three phases of ship's emergency voltage.
8	GND DETECT PUSH TO TEST LAMPS	Tests clear lights of three phases of ship's voltage.
9	EMG GENERATOR CKT BKR OPEN	Indicates (green light) open emergency generator circuit breaker.
10	Pushbutton	Tests light of emergency generator circuit breaker open indicator.
11	GEN CKT BKR CONTROL SWITCH MAN-OFF-AUTO	Controls generator in MAN (manual), OFF, or AUTO (automatic) modes.
12	Pushbutton	Tests light of emergency generator circuit breaker closed indicator.
13	EMG GENERATOR CKT BKR CLOSE	Indicates (red light) closed emergency generator circuit breaker.

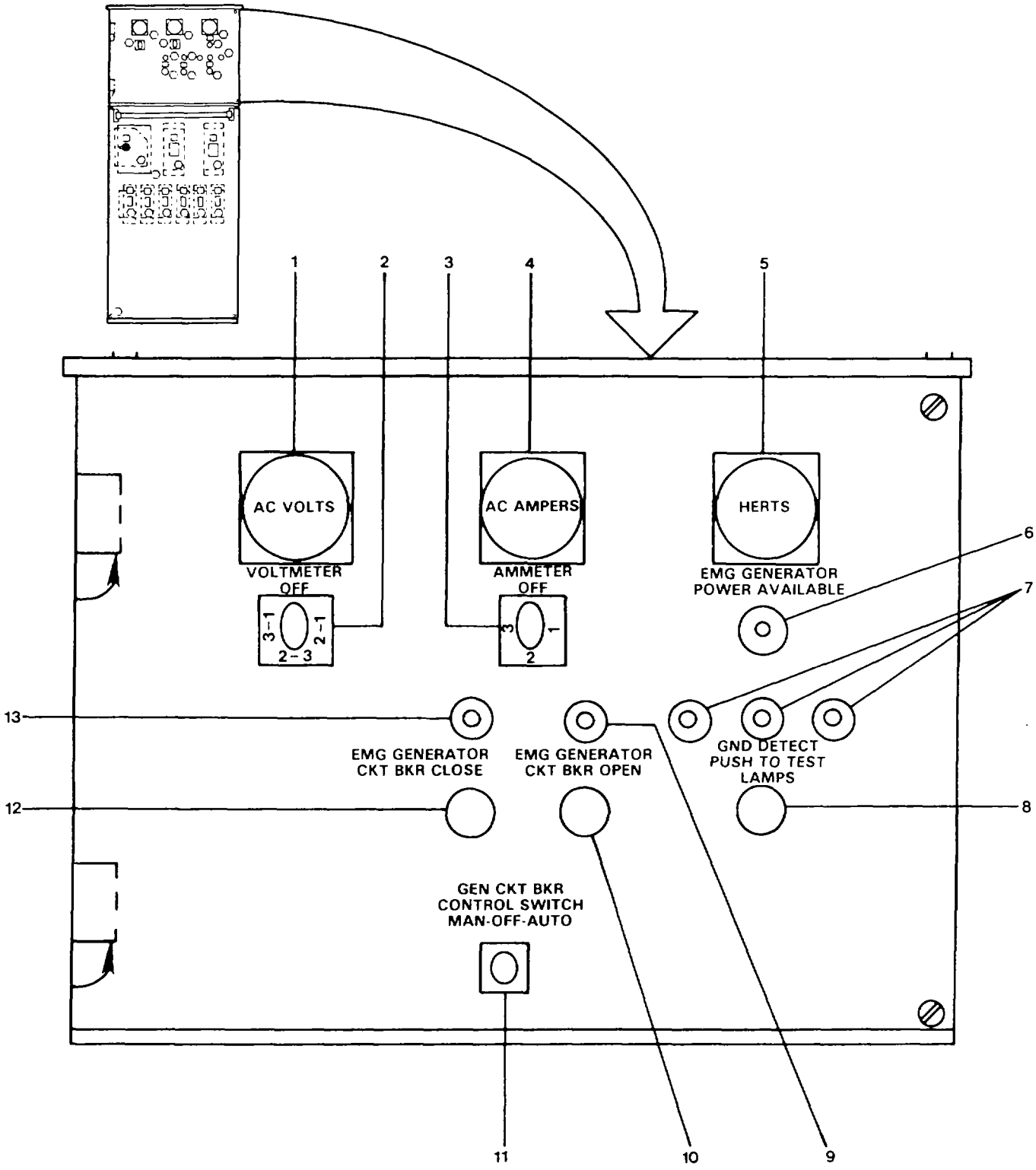


FIGURE 2-21. Emergency Switchboard (Sheet 1 of 2).

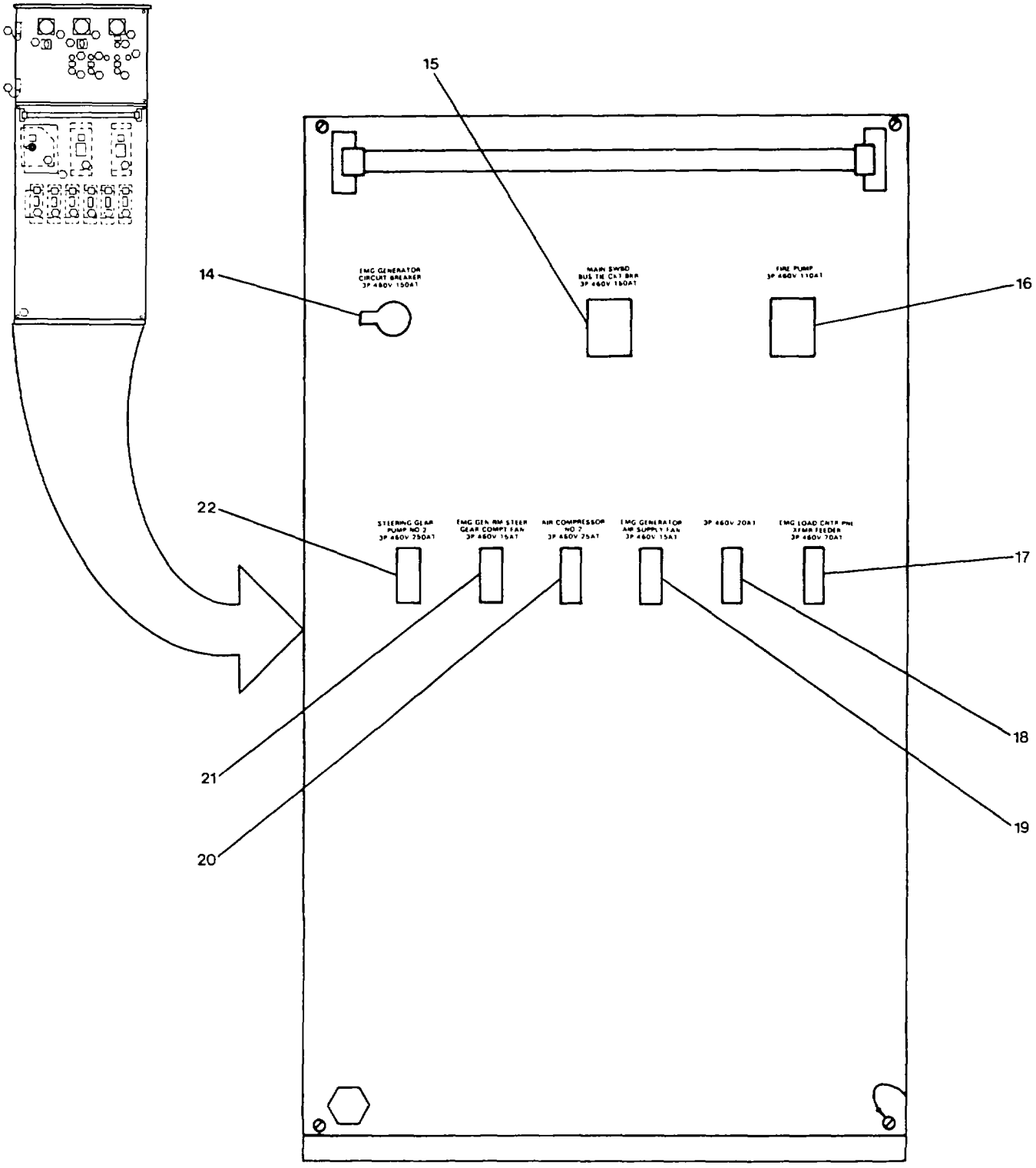


FIGURE 2-21. Emergency Switchboard (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Emergency Switchboard (FIGURE 2-21) - continued	
14	EMG GENERATOR CIRCUIT BREAKER 3P 460V 150AT	Acts as an automatic circuit breaker that on main power failure will open bus from main switchboard, start emergency generator, and close emergency bus when voltage is at correct level.
15	MAIN SWBD BUS TIE CKT BKR 3P 460V 150AT	Ties Main Switchboard bus to emergency generator bus for normal operation. Failure of main switchboard bus will open circuit breaker. Emergency generator will only operate mandatory emergency circuit.
16	FIRE PUMP 3P 460V 11OAT	Provides 3 phase 460 volts with 110 ampere automatic trip circuit breaker.
17	EMG LOAD CNTR PNL XFMR FEEDER 3P 460V 70AT	Provides 3 phase 460 volts with 70 ampere automatic trip circuit protection.
18	3P 460V 20AT	Spare circuit breaker if a circuit is required with 20 ampere circuit protection.
19	EMG GENERATOR AIR SUPPLY FAN 3P 460V 15AT	Provides 3 phase 460 volts with 15 ampere automatic trip circuit protection.
20	AIR COMPRESSOR NO. 2 3P 460V 25AT	Provides 3 phase 460 volts with 25 ampere automatic trip circuit protection.
21	EMG GEN RM STEER GEAR COMP FAN 3P 460V 15AT	Provides 3 phase 460 volts with 15 ampere automatic trip circuit protection.
22	STEERING GEAR PUMP NO. 2 3P 460V 250AT	Provides 3 phase 460 volts with 250 ampere automatic trip circuit protection.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Generator Set Engine 250 KW (FIGURE 2-22)	
1	P.S.I.	Indicates lubricating oil pressure.
2	F°	Indicates lubricating oil temperature.
3	R.P.M.	Indicates engine RPM.
4	P.S.I.	Indicates fuel oil pressure.
5	Emergency Stop Switch	Causes emergency stop of port generator engine.
6	Emergency Stop Switch	Causes emergency stop of starboard generator engine.
7	ON-OFF Switch	Controls starting air pressure to starboard generator engine.

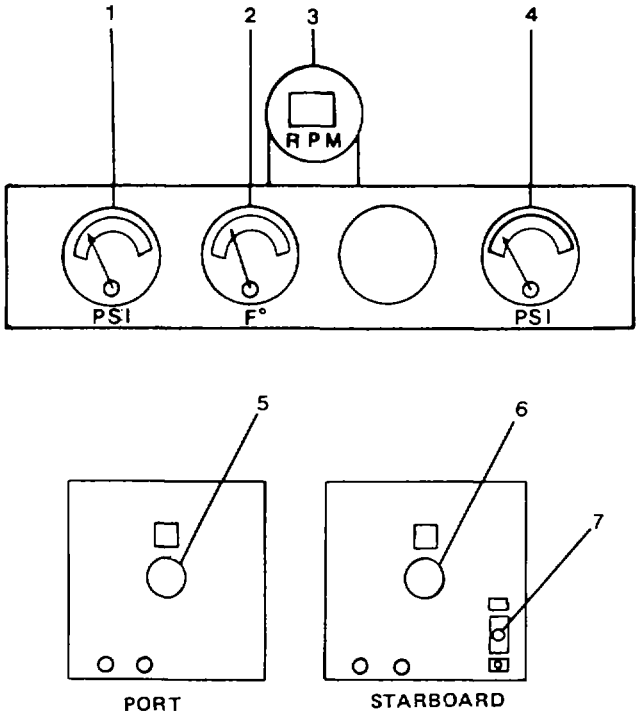


FIGURE 2-22. Generator Set Engine 250 KW Control Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Engine Monitoring Panel (FIGURE 2-23)	
1	REAR MAIN PRESSURE	Gauge indicates oil pressure at rear main bearing of engine.
2	FUSE	Protects circuit to engine running light.
3	ENGINE RUNNING	Red light indicates engine running.
4	PISTON COOLING PRESSURE	Pressure gauge indicates piston cooling oil pressure.
5	FUEL OIL PRESSURE	Pressure gauge indicates engine fuel oil pressure.
6	MASTER SHUTDOWN	Pushbutton must be reset before starting engine.
7	ENGINE OIL TEMPERATURE IN	Thermometer indicates engine oil temperature to lubricating oil cooler.
8	ENGINE OIL TEMPERATURE OUT	Thermometer indicates engine oil temperature from lubricating oil cooler.
9	PORT (or STBD) MAIN ENGINE TACH.	Indicates engine Revolutions Per Minute.
10	WATER PRESSURE RIGHT BANK	Pressure gauge indicates cooling water pressure of engine's right cylinder bank.
11	Cap	Unused gauge spaces, black plastic.
12	WATER PRESSURE LEFT BANK	Pressure gauge indicates cooling water pressure of engine's left cylinder bank.
13	ENGINE WATER TEMPERATURE OUT	Thermometer indicates temperature of cooling water leaving engine.
14	ENGINE WATER TEMPERATURE IN	Thermometer indicates temperature of cooling water entering engine.
15	ENGINE OIL PRESSURE	Pressure gauge indicates engine lubricating oil pump discharge pressure.

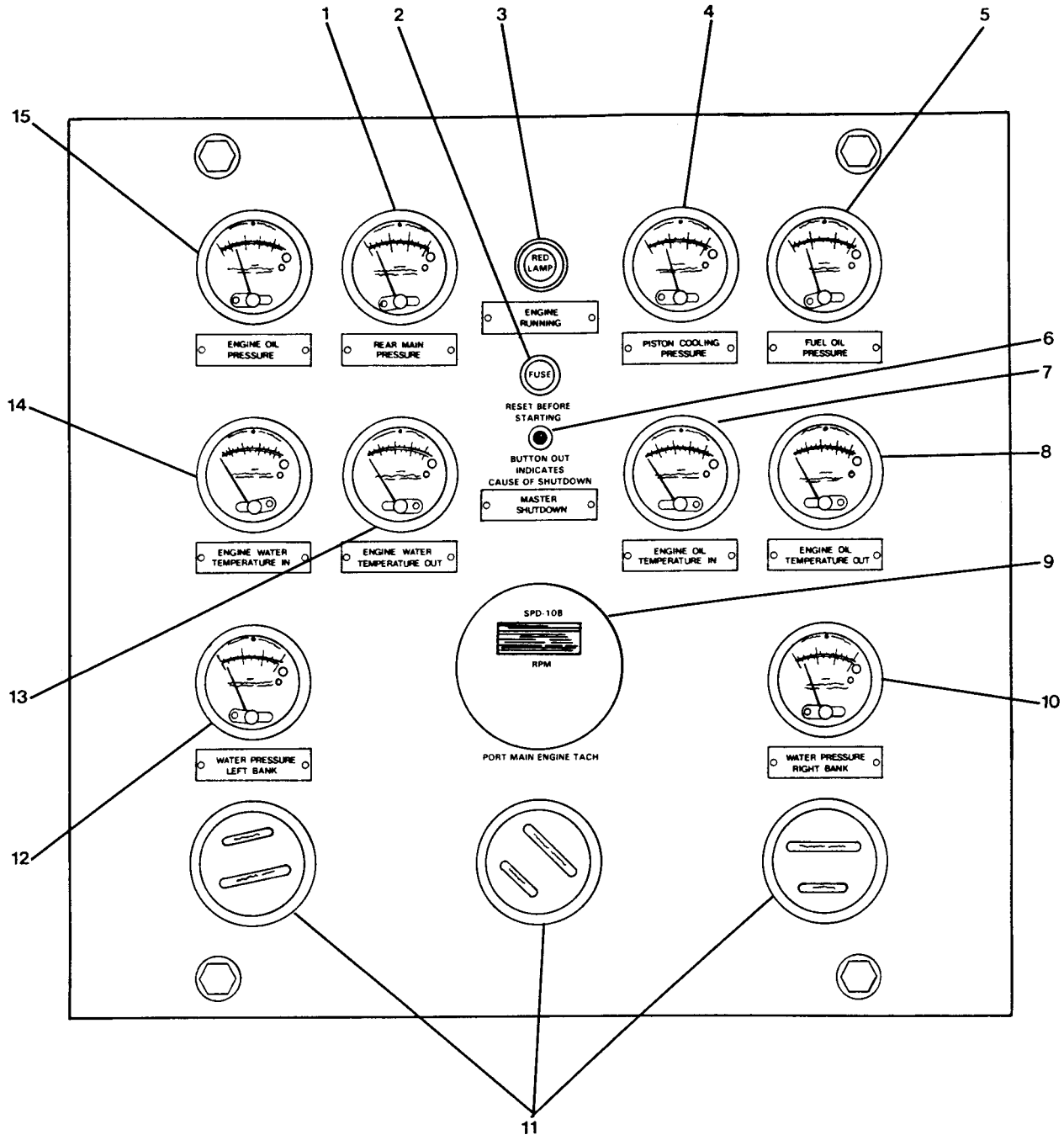


FIGURE 2-23. Main Engine Monitoring Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Main Engine Air Start Panel (FIGURE 2-24)	
1	START	Pushbutton air valve to release starting air pressure to engine's starter motor.
2	AIR PRESSURE	Pressure gauge indicates starting air pressure available.
3	OIL PRESSURE	Bushing for pipe hookup from engine lubricating oil pump discharge pressure.
4	AIR SUPPLY	Bushing for pipe hookup from compressed system.
5	REMOTE START VALVE	Bushing for pipe hookup from remote start position.

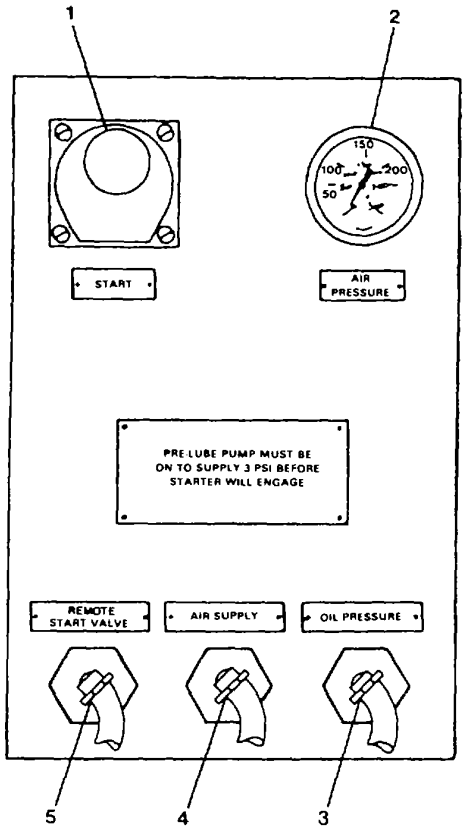


FIGURE 2-24. Main Engine Air Start Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Oily Water Separator (FIGURE 2-25)	
1	Flowmeter	Measures amount of effluent discharge overboard.
2	POWER Indicator	Indicates power is applied to oily water separator suction pump, (white).
3	DEFECT ALARM Indicator	Indicates a malfunction in the system, (amber).
4	OIL ALARM Indicator	Indicates an excessive oil level, (red).
5	CHECK Indicator	Shutdown system and check for defects.
6	ON-OFF	Controls system suction pump.
7	OIL DISCHARGE	Indicates that oil discharge operation is in progress, (amber).
8	AUTO-OFF-MAN	AUTO will automatically process oily water, discharging effluent and discharging accumulated oil to storage tank. OFF will shut down system. MAN (manual) will provide continuous system operation.
9	POWER AVAILABLE	Indicates power is available for system operation.

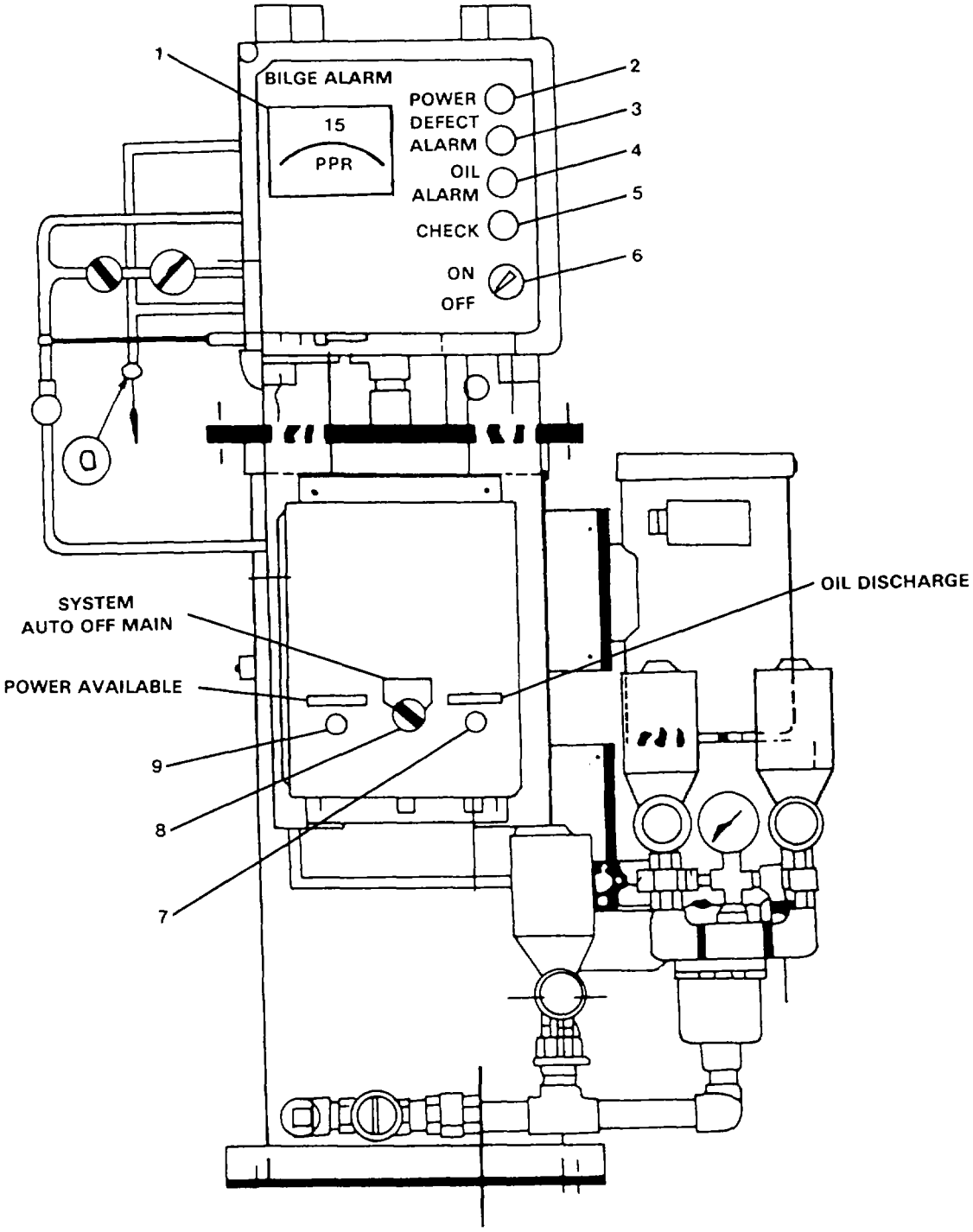


FIGURE 2-25. Oily Water Separator.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Water Purification Panel (FIGURE 2-26)	
1	ON Control	ON button starts system.
2	PRODUCT FLOW Gauge	Product flow gauge indicates continuous readout of potable water flow.
3	HIGH SALINITY Indicator	High salinity indicator lights when salt water exceeds 1,000 milligrams per liter total dissolved solids.
4	REGULATOR	System operating pressure is regulated by pressure regulator control knob.
5	OPERATING PRESS Gauge	Operating pressure gauge indicates reading of system pressure inside membrane pressure vessels.
6	INLET PRESS	Inlet pressure gauge indicates reading of feedwater pressure.
7	OFF Control	OFF control stops system.

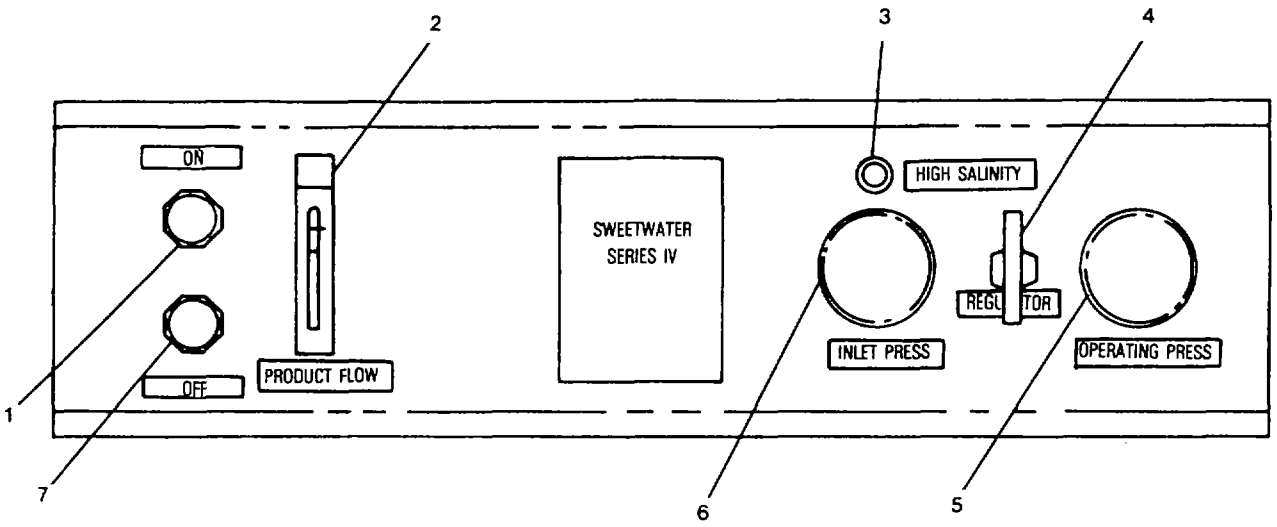


FIGURE 2-26. Water Purification Panel.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Marine Sanitation System (FIGURE 2-27)	
1	START Pushbutton	Starts blower for marine sanitation system, (green).
2	STOP Pushbutton	Stops blower, (red).
3	Indicator Light	Indicates discharge pump running.
4	OFF-ON Control	Provides continuous pump operation.
5	HAND-OFF-AUTO	AUTO position provides automatic discharge pump operation from chlorine contact tank. OFF position stops discharge pump. HAND position provides continuous discharge pump operation.

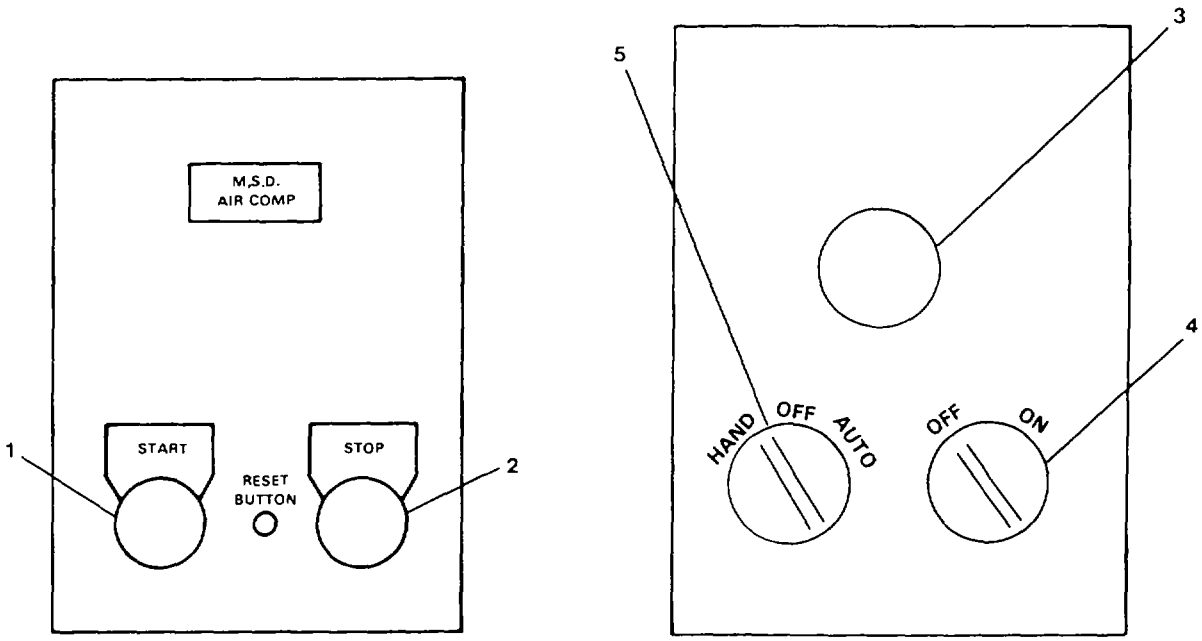


FIGURE 2-27. Marine Sanitation System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Emergency Steering Station (FIGURE 2-28)	
1	PORT RUDDER DEGREES RUDDER ORDER	Indicates the position of the port rudder in relation to center line of ship.
2	STBD RUDDER DEGREES RUDDER ORDER	Indicates position of starboard rudder in relation to center line of ship.
3	STBD NFU	Joystick provides independent starboard rudder movement in non-follow-up mode.
4	PORT NFU	Joystick provides independent port rudder movement in non-follow-up mode.

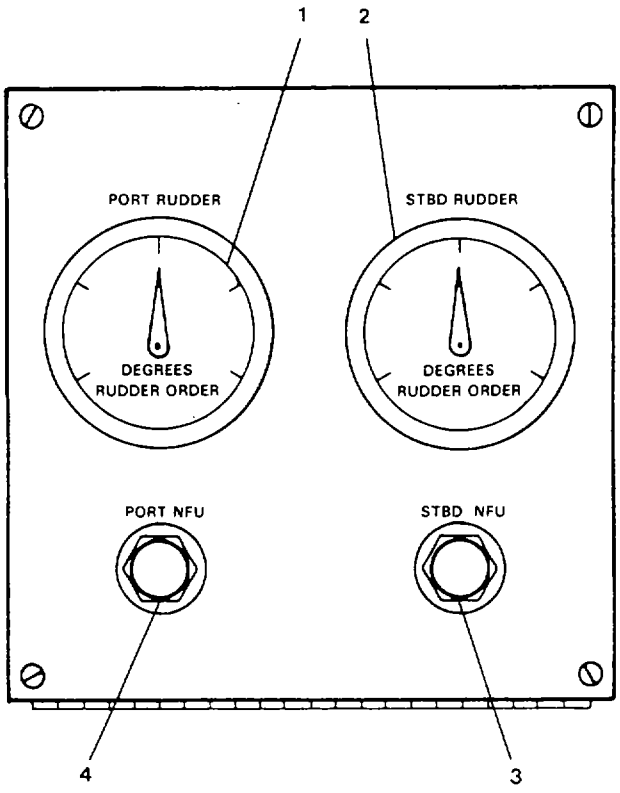


FIGURE 2-28. Emergency Steering System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Emergency Transfer Panel (FIGURE 2-29)	
1	MAIN FUSE 10 AMP	Protects main electrical power of Normal Steering System.
2	EMERGENCY FUSE	Protects emergency electrical 10 AMP power of the Emergency Steering System.
3	ALARM FUSE 5 AMP	Protects Alarm Circuitry.
4	STBD RUDDER STBD SOLENOID ENERGIZED	Indicates starboard rudder operating in starboard direction of power unit #2.
5	STBD RUDDER PORT SOLENOID ENERGIZED	Indicates starboard rudder operating in port direction of #2 power unit.
6	Rotary Switch	Selects normal steering, #1 emergency system or #2 emergency system as required.
7	PORT RUDDER STBD SOLENOID ENERGIZED	Indicates port rudder operating in starboard direction off #1 power unit.
8	PORT RUDDER PORT SOLENOID ENERGIZED	Indicates port rudder operating in port direction off #1 power unit.
9	PORT RUDDER STBD SOLENOID ENERGIZED	Indicates port rudder operating in starboard direction off #2 power unit.
10	PORT RUDDER PORT SOLENOID ENERGIZED	Indicates port rudder operating in port direction off #2 power unit.
11	STBD RUDDER STBD SOLENOID ENERGIZED	Indicates starboard rudder operating in starboard direction off #1 power unit.
12	STBD RUDDER PORT SOLENOID ENERGIZED	Indicates starboard rudder operating in port direction off #1 power unit.
13	HEATER FUSE	Protects system heater. 1 Amp.

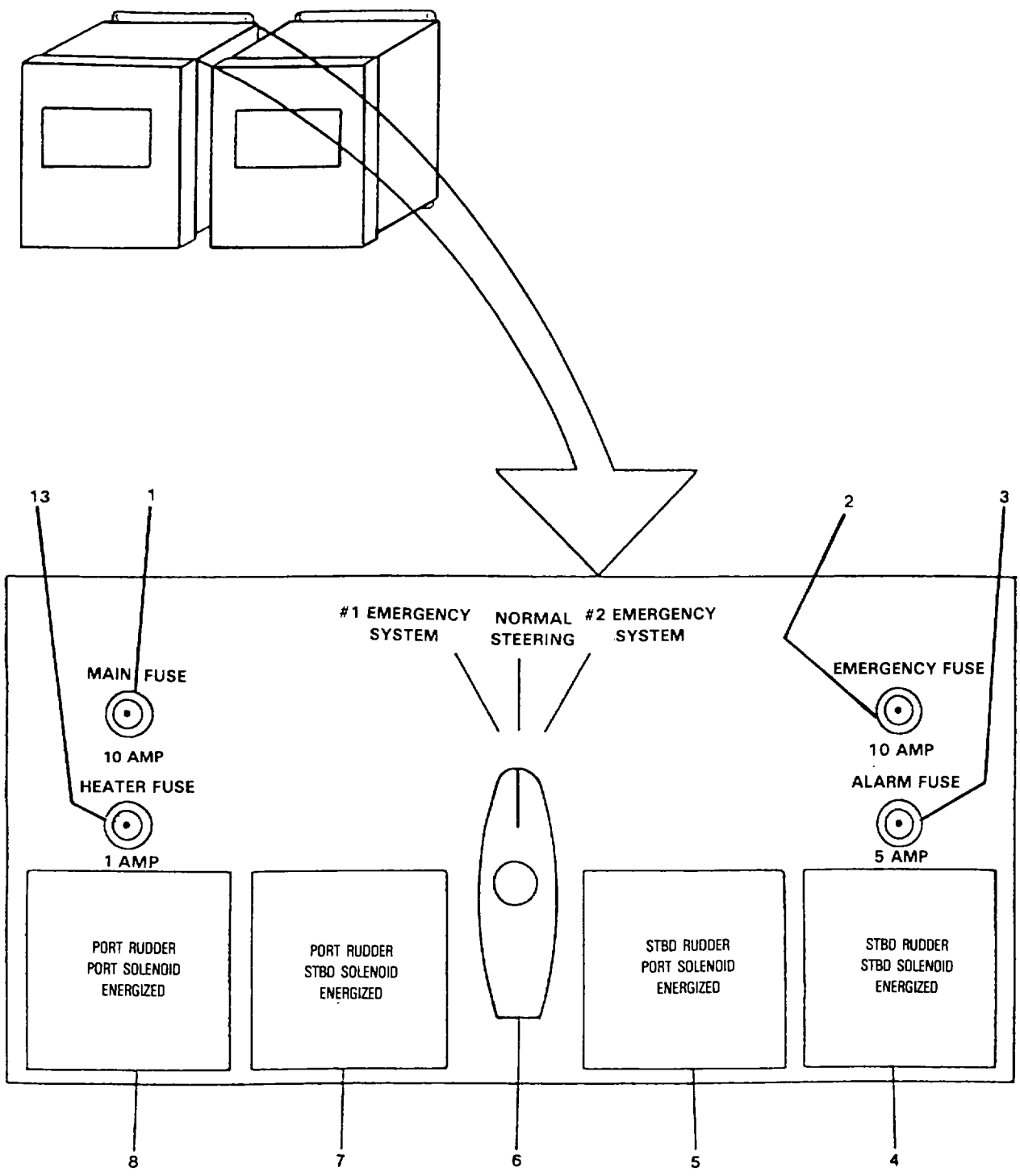


FIGURE 2-29. Emergency Transfer Panel (Sheet 1 of 2).

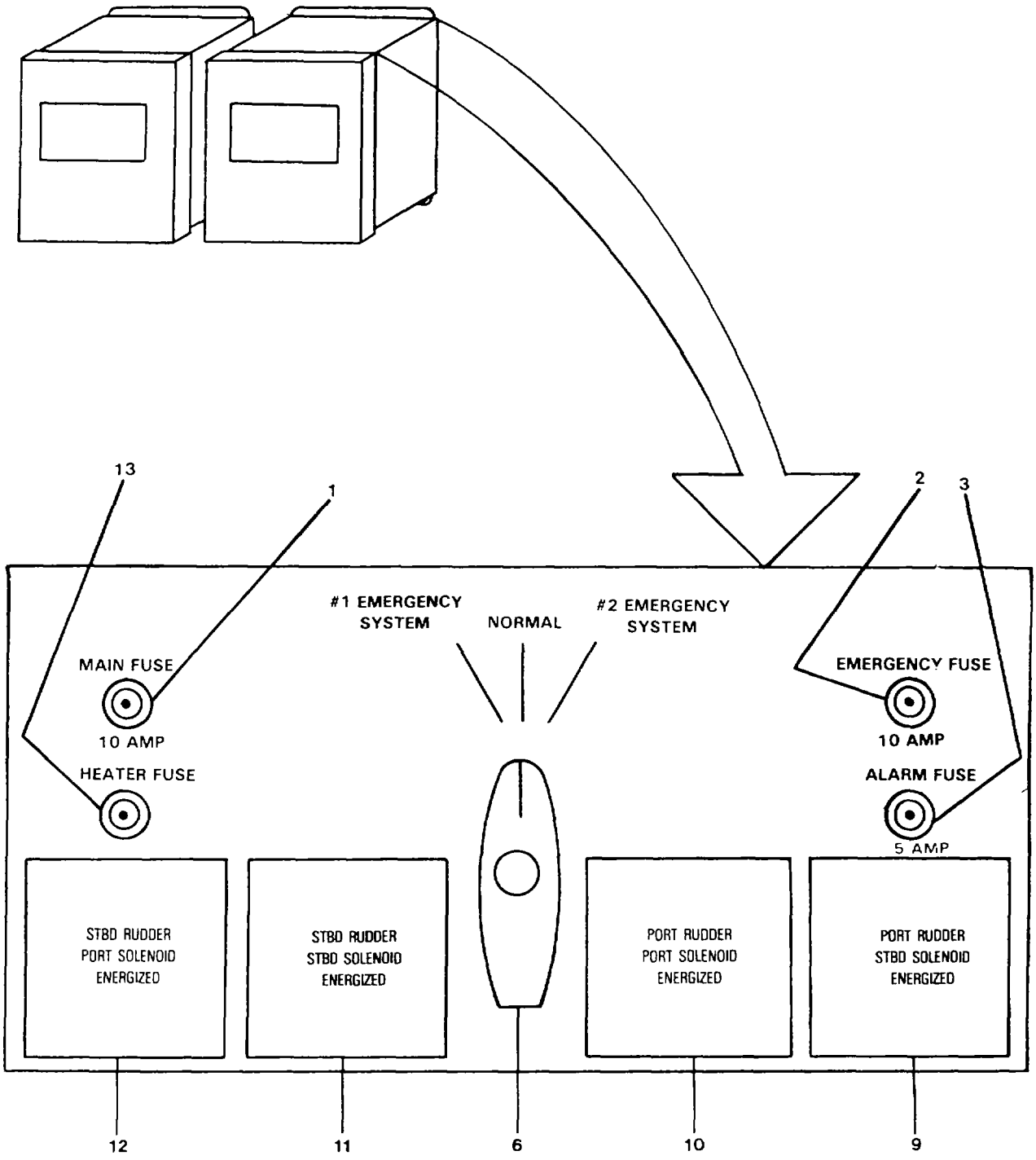


FIGURE 2-29. Emergency Transfer Panel (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Steering Hydraulic Pump Motor Controller (FIGURE 2-30)	
1	ON - OFF Switch	Switch for the main circuit breaker; switch can be locked in the OFF position.
2	RUN	Indicates motor is running, (green).
3	HAND-OFF-AUTO	Three position switch for control of Hydraulic Steering Motor: HAND = On position in local operation. AUTO = Remote operation from the Pilothouse. OFF = Motor not running.
4	Button	Electrical re-set button.

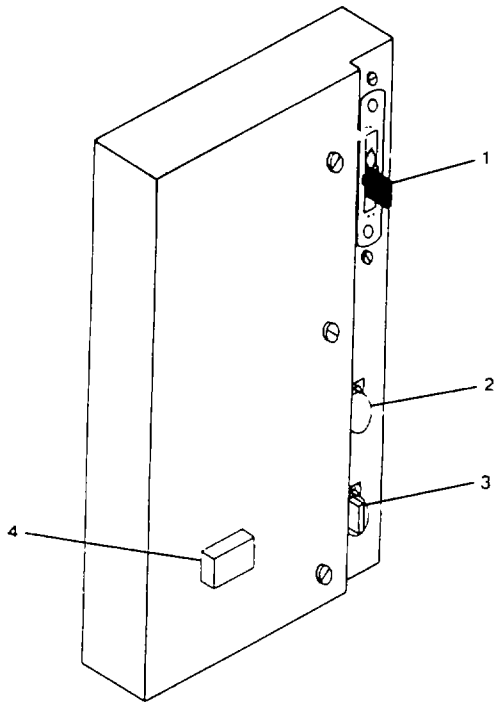


FIGURE 2-30. Steering Hydraulic Pump Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Watertight Door System (FIGURE 2-31)	
1	Pointer Indicator	Indicates the position of the door.
2	Panel Indicator	Shows when the door is fully open or closed.
3	Rotary Hand Pumps	The remote hand pump located at the remote manual control station allows for closing of the door only. Two local hand pumps, one on each side of the bulkhead, allow operation from either side. Reversal of rotation changes the direction of door travel.

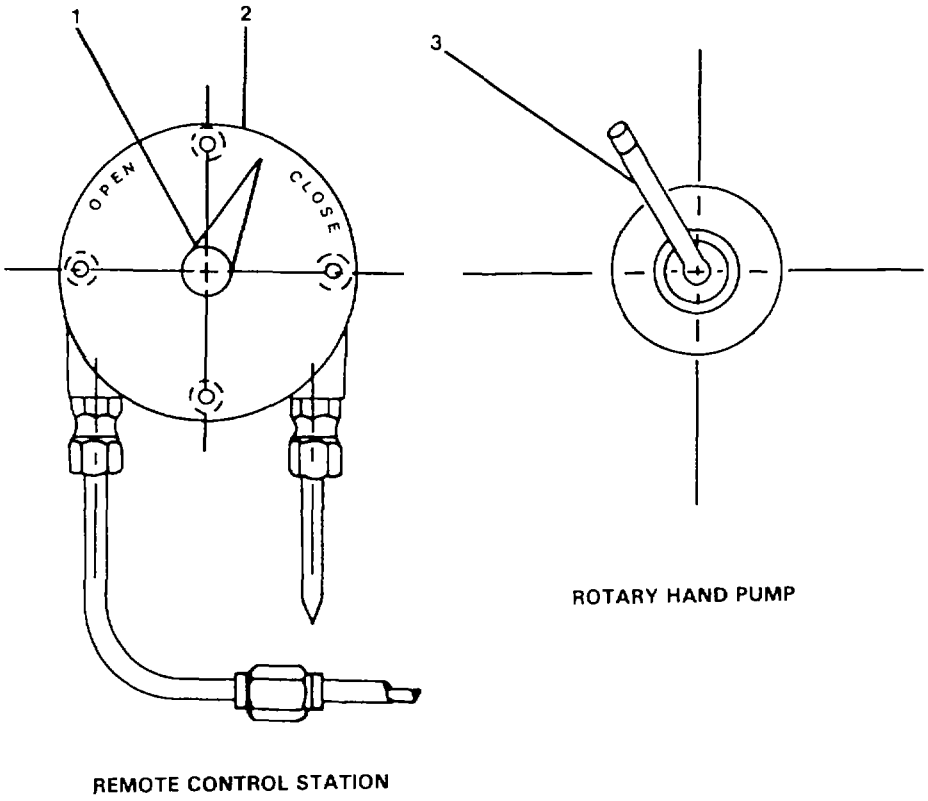


FIGURE 2-31. Watertight Door System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Liferaft Davit (FIGURE 2-32)	
1	Winch Handle (shown on HIGH SPEED RETURN Shaft)	Used on either the HIGH SPEED or the LOW SPEED RETURN shafts to raise and lower davit hook.
2	BRAKE RESET LEVER	Engages the centrifugal brake in either the SET or RELEASE positions. In the SET position the liferaft can only be raised and lowered by using the WINCH HANDLE. In the RELEASE position the liferaft is automatically lowered with the centrifugal break controlling speed of descent.
3	HIGH SPEED RETURN Shaft (shown with the WINCH HANDLE engaged)	Retrieves davit hook in a no load condition.
4	LOW SPEED RETURN Shaft (shown with Winch Handle removed)	Raises and lowers davit hook under load conditions.
5	RELEASE POSITION (shown with Brake Reset Lever in the SET position)	Allows release of brake via the remote brake release cable. Centrifugal brake is engaged.
6	Remote Brake Release Cable (located inside metal housing and shown in the SET position)	Connects to the liferaft's remote release cable. Allows centrifugal brake to be released from the raft.
	NOTE **Before MANUAL BRAKE RELEASE LEVER can be operated, winch handle MUST be removed from HIGH or LOW speed return shaft. When winch handle is on either shaft, an interlocking safety device prevents movement of the MANUAL BRAKE RELEASE LEVER.**	
7	Manual Brake Release Lever (shown in the SET position)	Engages brake in SET position when lowered. Places brake in RELEASE position when raised.
8	Lubrication Order	Provides lubrication information.
9	Davit Boom Tieback	Secures davit boom in stowed position. Must be removed prior to operating davit.

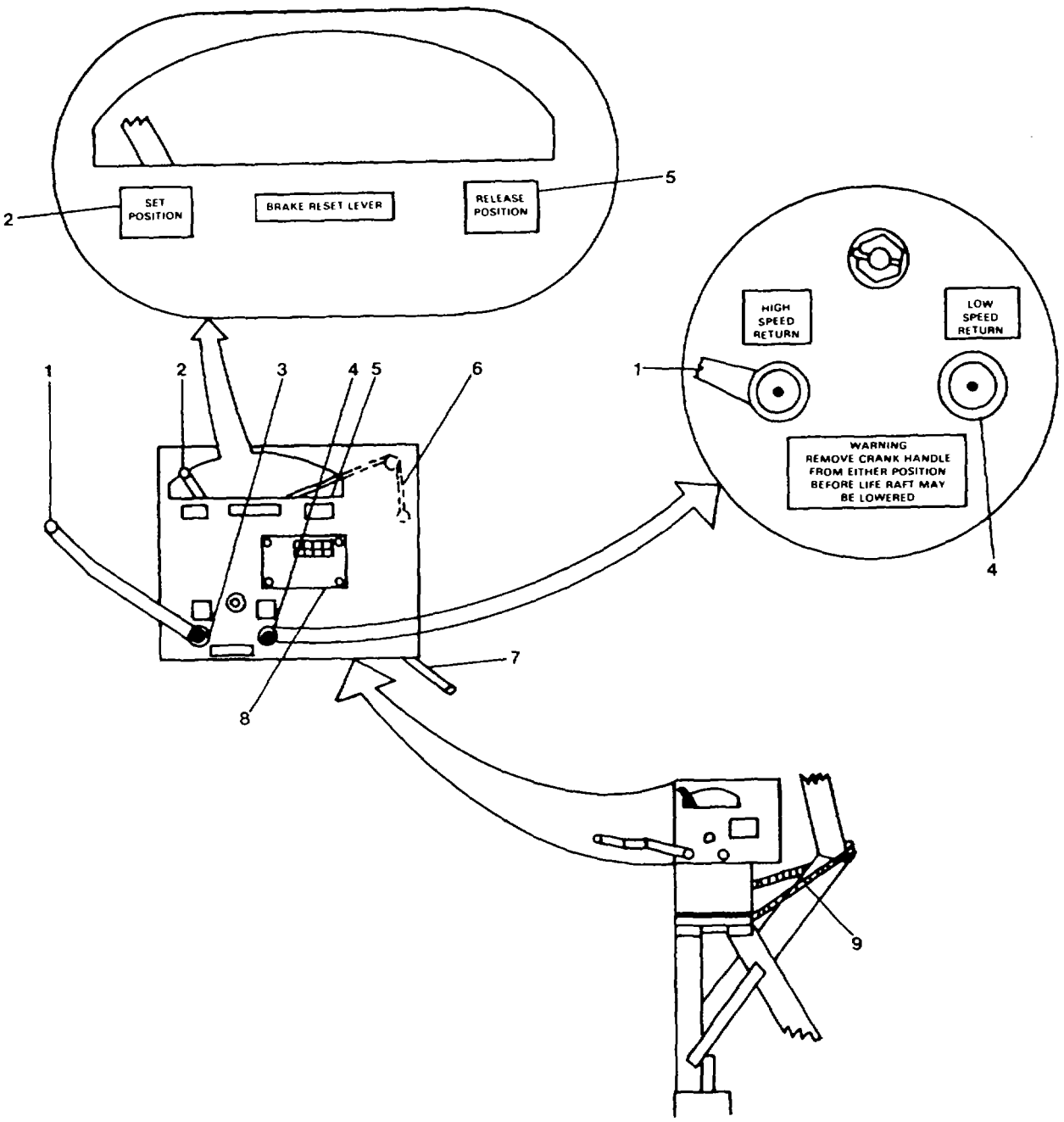


FIGURE 2-32. Liferaft Davit.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Stern Ramp Winch Controls (FIGURE 2-33)	
		NOTE **Controls located in Emergency Generator room, Main Deck, aft.**
1	Push To Reset	Resets contacts after an overvoltage has occurred.
2	RUN	Indicates stern ramp winch hydraulic pump running, (green).
3	START	Depressed turns on stern ramp winch hydraulic pump motor, (black).
4	STOP	Depressed turns OFF stern ramp winch hydraulic pump motor, (red).
5	Manual Control Valve	Connects stern ramp winch hydraulic system to stern anchor winch hydraulic system allowing redundant operation of the stern anchor winch.
6	Pressure Indicator	Indicates stern ramp winch system pressure.
7	Sight Gauge	Reads hydraulic fluid level in reservoir.
		NOTE **Stern ramp winch remote controls are located on the inboard handrail in aft starboard mooring station on Mezzanine Deck.**
8	Control Valve	Moving handle LEFT lowers stern ramp. Moving handle RIGHT raises stern ramp.
9	RUN	Indicates stern ramp hydraulic pump running, (green).
10	STOP	Depressed turns OFF stern ramp winch hydraulic pump motor, (red).
11	START	Depressed turns ON stern ramp winch hydraulic pump motor, (black).

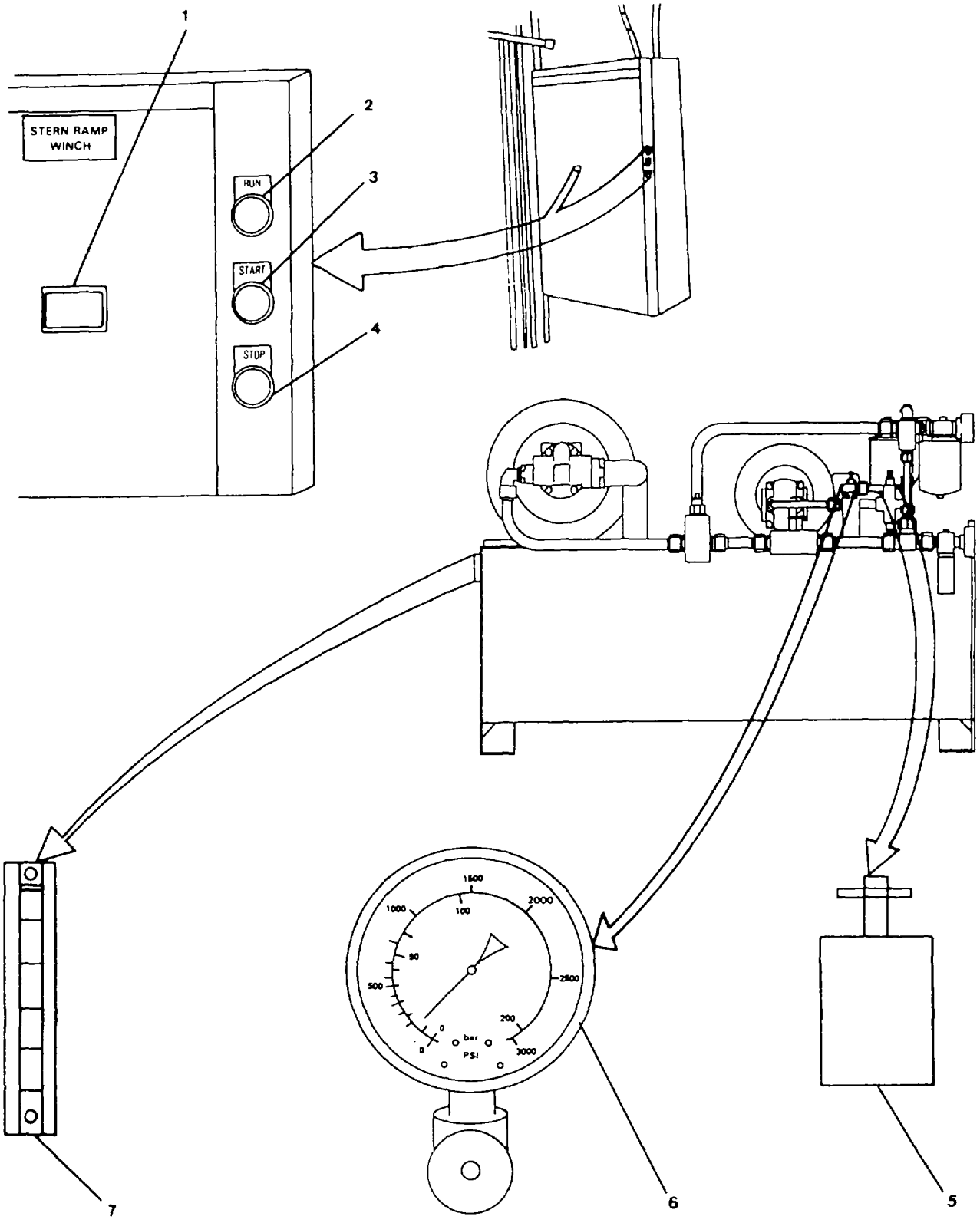


FIGURE 2-33. Stern Ramp Winch Controls (Sheet 1 of 2).

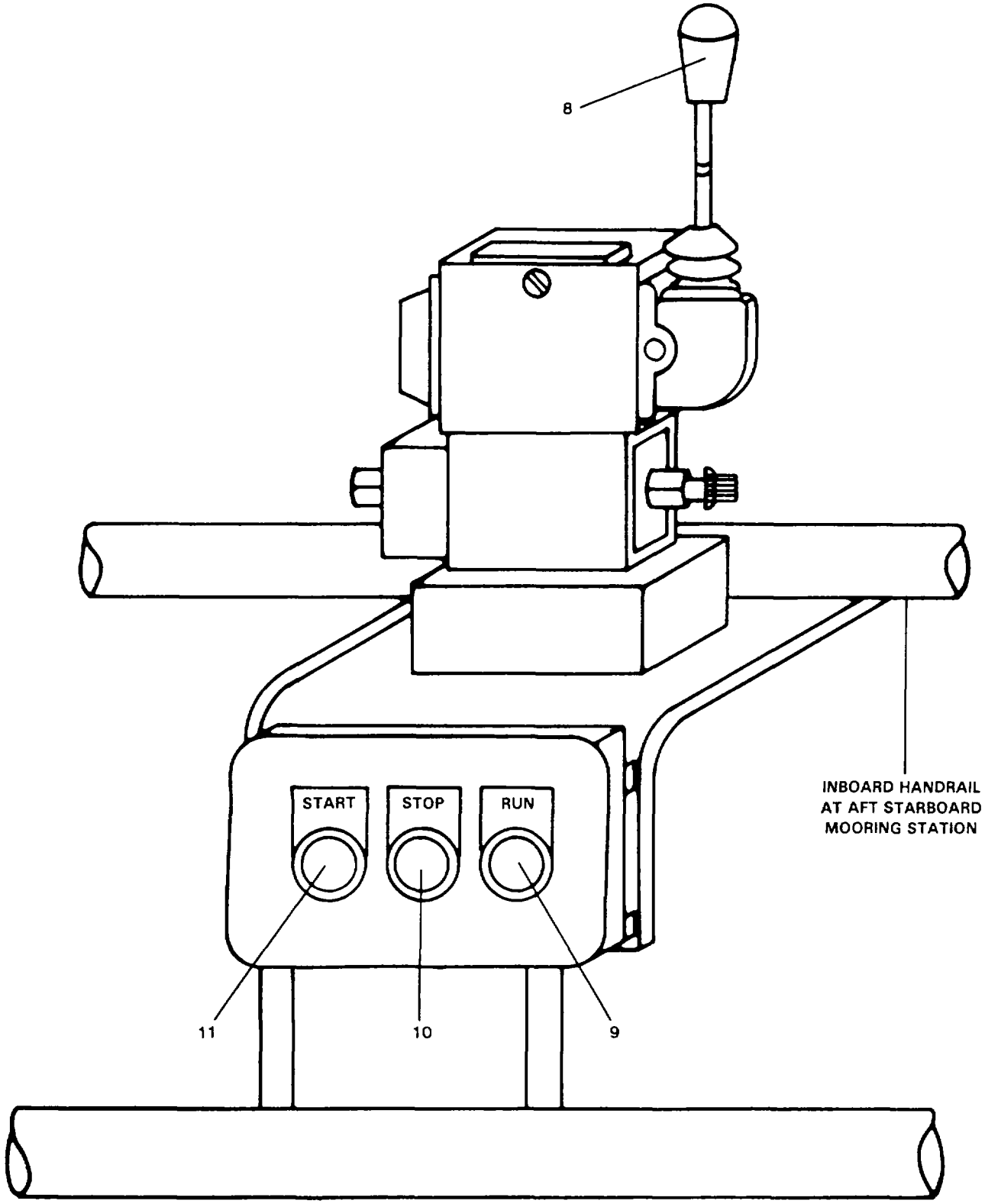


FIGURE 2-33. Stern Ramp Winch Controls (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Stern Ramp Locking Devices (FIGURE 2-34)	
1	Ratchet Dogs	Four ratchet dogs, two port and two starboard side, secure stern ramp in raised position. Ratchet dogs are manually operated and contain ratchet screws either to secure or release stern ramp. Ratchet dogs are disengaged when stern ramp is lowered.
2	Stern Ramp	Stern ramp is lowered with stern ramp jigger winch after releasing port and starboard ratchet dogs. In lowered position, stern ramp serves as a bridge for loading and unloading cargo.
3	Ladder	Attaches to port and starboard edges of mezzanine deck. Provides access to port and starboard ratchet dogs.

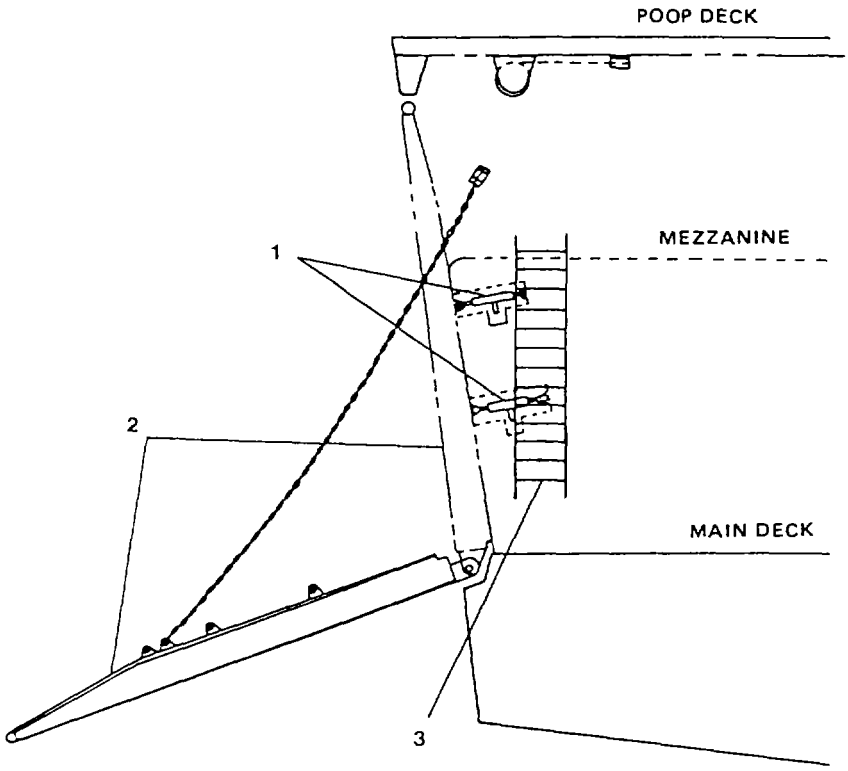


FIGURE 2-34. Stern Ramp Locking Devices.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Stern Anchor and Winch Controls (FIGURE 2-35)	
		NOTE
	Controls located in Emergency Generator Room, Main Deck, aft.	
1	Push To Reset	Resets contacts after an overvoltage has occurred.
2	RUN	Indicates stern anchor winch hydraulic pump running, (green).
3	START	Depressed turns ON stern anchor winch hydraulic pump motor, (black).
4	STOP	Depressed turns OFF stern anchor winch hydraulic pump motor, (red).
5	Manual Control Valve	Connects stern ramp winch hydraulic system to stern anchor winch hydraulic system allowing redundant operation of the stern anchor winch.
6	Pressure Indicator	Indicates stern anchor winch system pressure.
7	Sight Gauge	Reads hydraulic fluid level in reservoir.
		NOTE
	Controls located at winch, poop deck aft.	
8	START	Depressed turns ON stern anchor winch hydraulic pump motor, (black).
9	STOP	Depressed turns OFF stern anchor winch hydraulic pump motor, (red).
10	RUN	Shows stern anchor winch hydraulic pump running, (green).
11	Hydraulic Brake Handle	Engages hydraulic brakes on main spool.

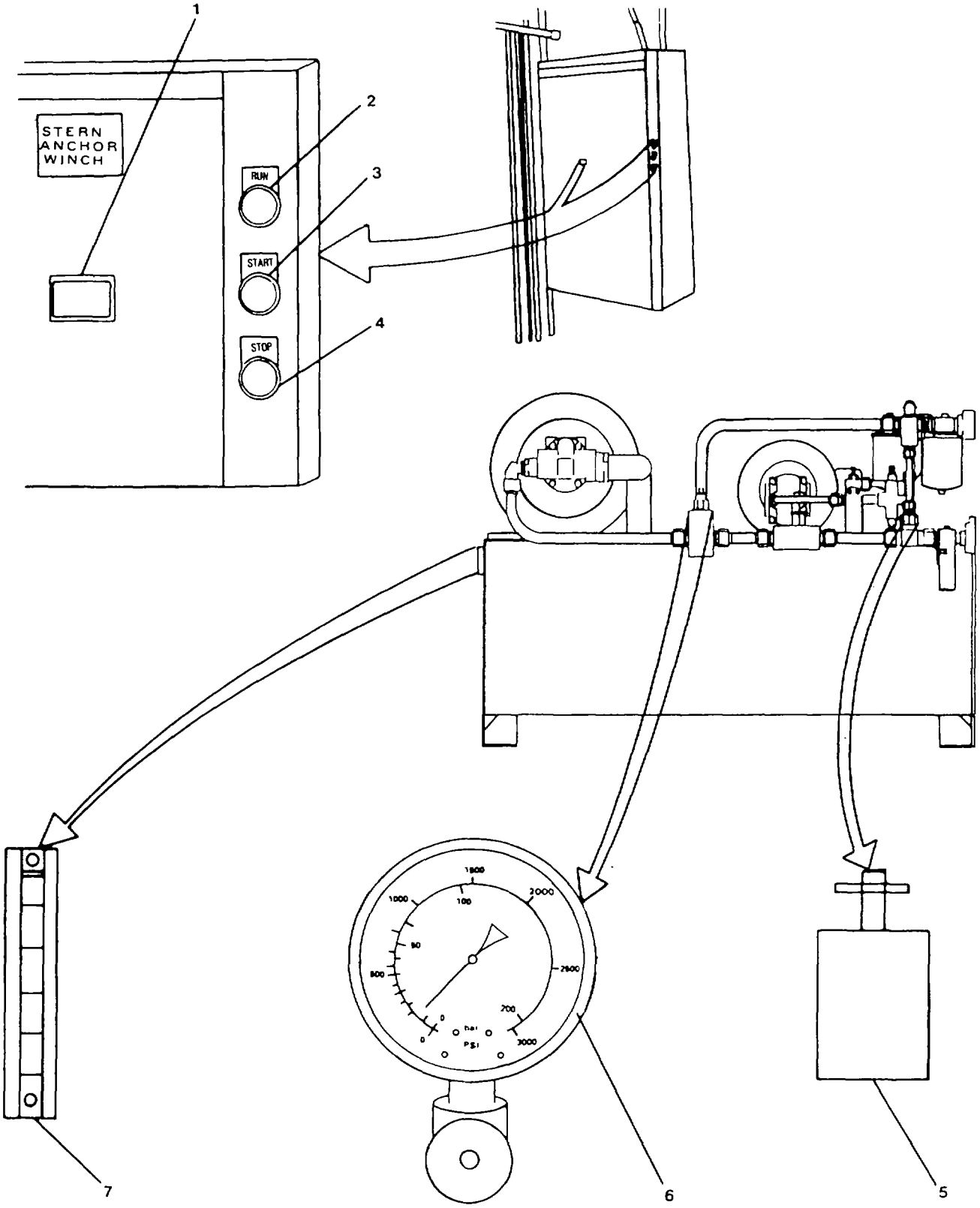


FIGURE 2-35. Stern Anchor Winch (Sheet 1 of 4).

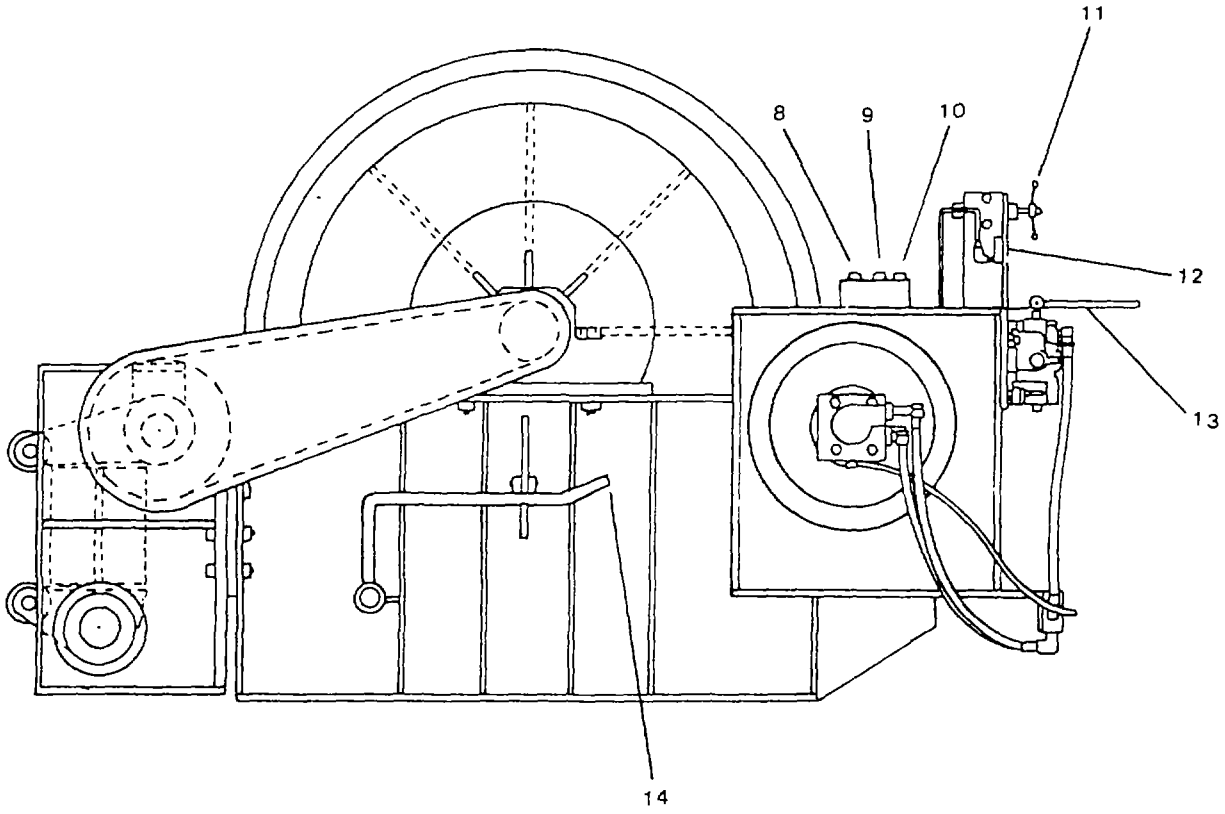


FIGURE 2-35. Stern Anchor Winch (Sheet 2 of 4).

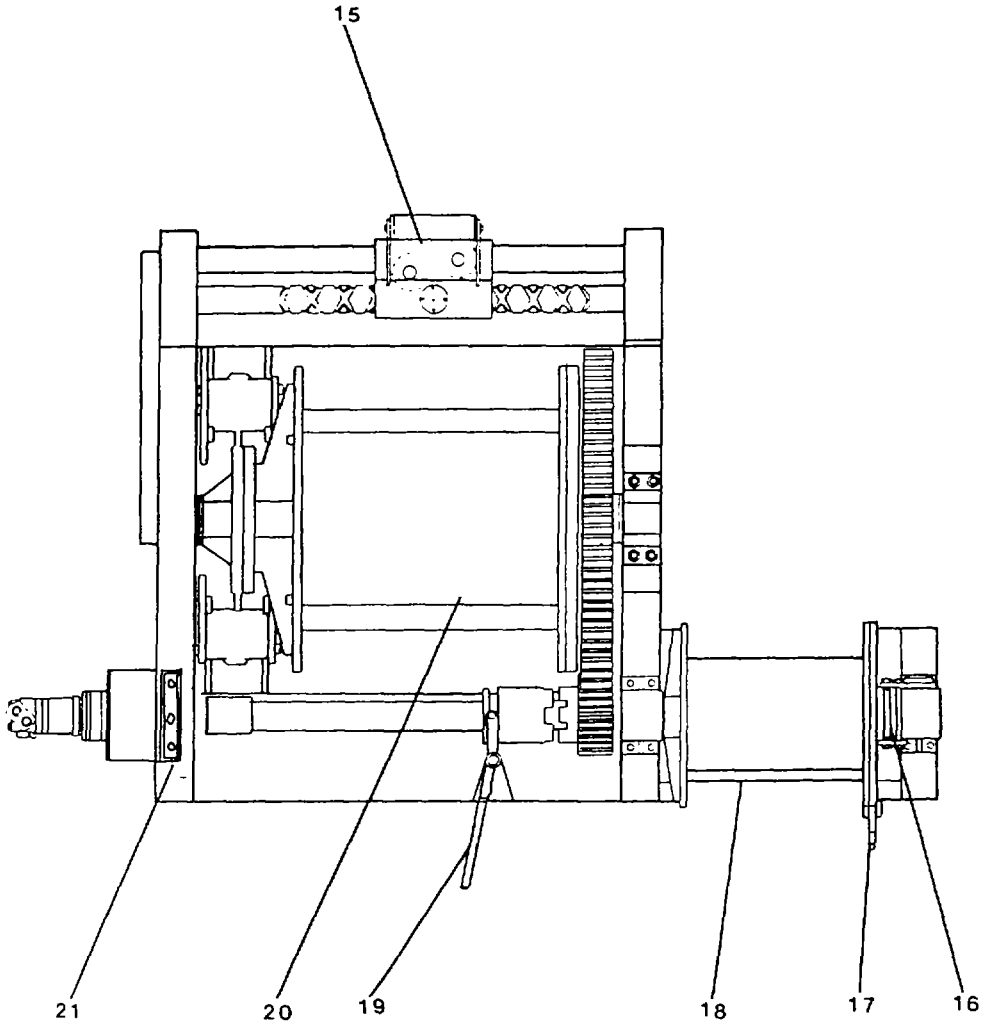


FIGURE 2-35. Stern Anchor Winch (Sheet 3 of 4).

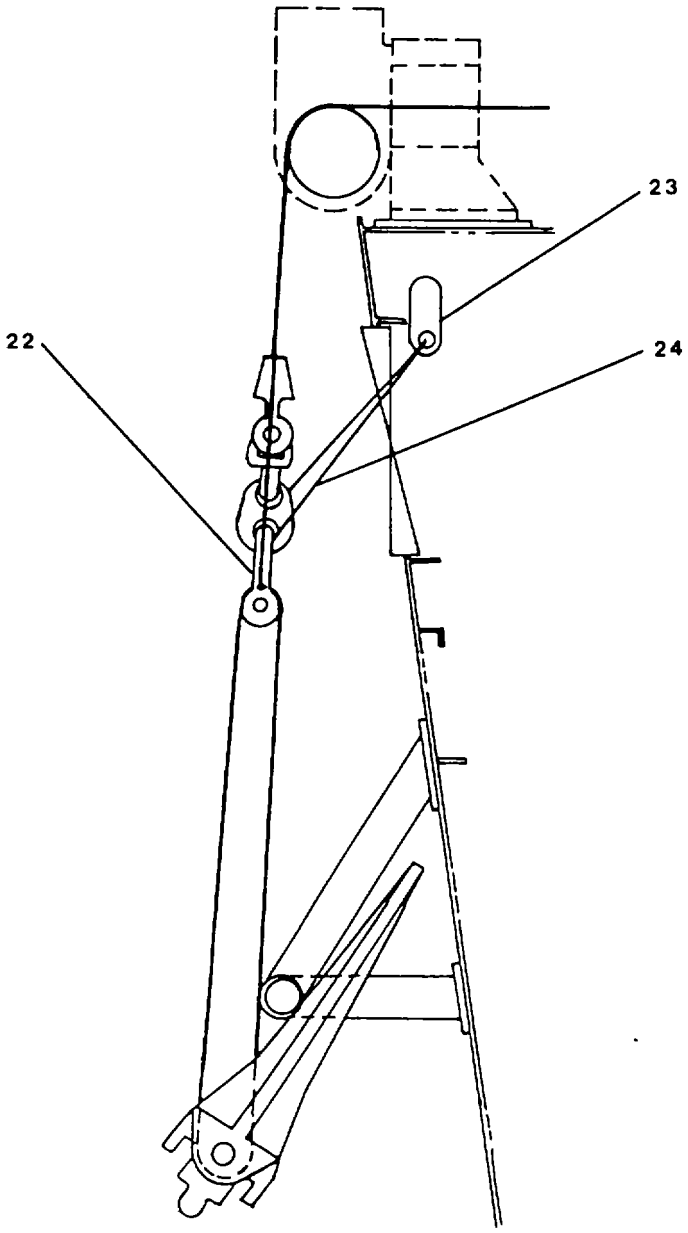


FIGURE 2-35. Stern Anchor Winch (Sheet 4 of 4).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Stern Anchor and Winch Controls (FIGURE 2-35) - continued		
12	Gauge	Indicates hydraulic pressure in manually operated hydraulic brake system.
13	Control Valve	Moving lever UP rotates Main Spool counterclockwise and hauls in anchor. Moving lever DOWN rotates Main Spool clockwise and pays out anchor.
14	Main Spool Dog Handle (Shown in Engaged Position)	Engages main spool dogs, preventing pay out of wire rope.
15	Level Wind Carriage	Layers wire rope onto main spool.
16	Auxiliary Spool Clutch Handle	Engages/disengages auxiliary spool.
17	Auxiliary Spool Dog Handle	Engages/disengages dog preventing pay out of wire rope.
18	Auxiliary Spool	Hauls in/pays out auxiliary wire rope or line.
19	Main Spool Clutch Handle	Engages/disengages main spool.
20	Main Spool	Hauls in/pays out stern anchor wire rope.
21	Electric Controls (Top View)	Turns on/off hydraulic pump motor (see Sheet 2 for side view).
22	Anchor Shackle	Connects anchor to detachable link.
23	Pad Eyes (Inboard and Outboard)	Attachments for Anchor Holdback wire rope.
24	Anchor Holdback Wire Rope	Attaches to pad eyes and supports anchor.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Bow Anchor Windlass Controls and Bow Ramp Winch Controls (FIGURE 2-36)		
	NOTE **Controls located in Hydraulic Machinery Room, Mezzanine Deck, Port Side forward. (Items 1 through 7).**	
1	Filter Condition Indicator	Indicates when bow anchor windlass hydraulic fluid filter needs to be changed.
2	Push To Reset Button	Resets the contacts of the bow anchor windlass motor controller.
3	Green RUN Indicator Light	Indicates bow anchor windlass hydraulic pump motor running.
4	Black START Button	Turns on bow anchor windlass hydraulic pump motor.
5	Red STOP Button	Turns off bow anchor windlass hydraulic pump motor.
6	Hydraulic Pressure Gauge and Snubber	Gauge indicates hydraulic pressure in bow anchor windlass system. Snubber controls fluid flow rate to gauge protecting it from pressure surges.
7	Fluid Level and Temperature Sight Glass	Indicates fluid level and temperature of bow anchor windlass hydraulic fluid.
	NOTE **Bow Anchor Windlass and Bow Ramp Winch assemblies are located on port and starboard sides of forecastle deck.**	
8	Gypsy Clutch Hand Wheel	Disengages gypsy from wildcat.

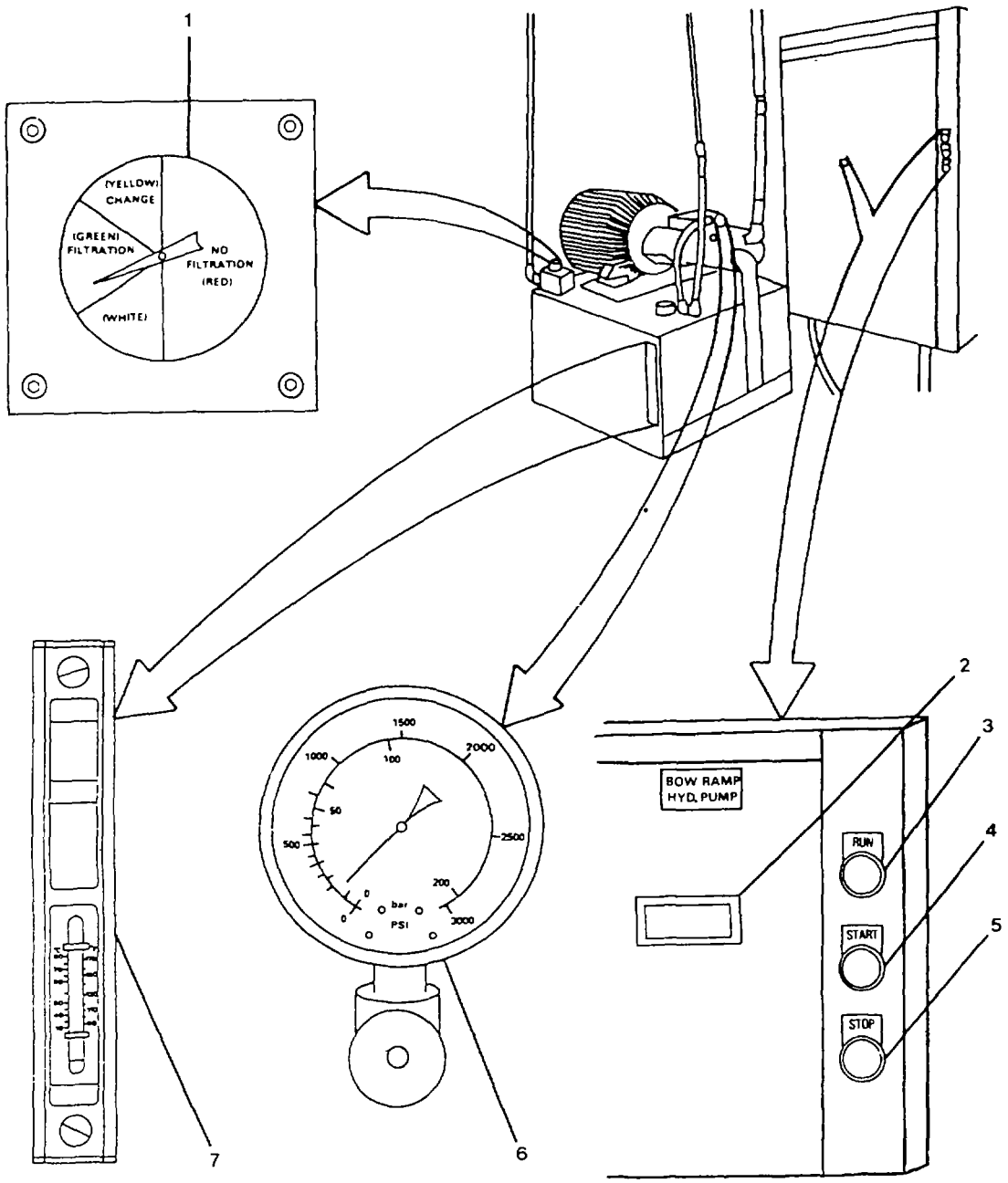


FIGURE 2-36. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 1 of 4).

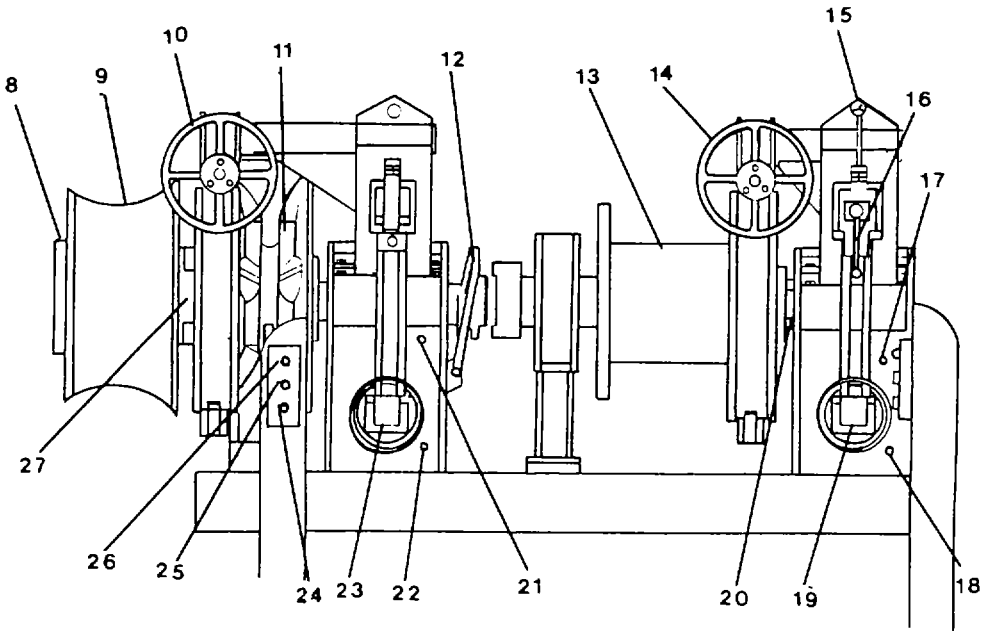


FIGURE 2-36. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 2 of 4).

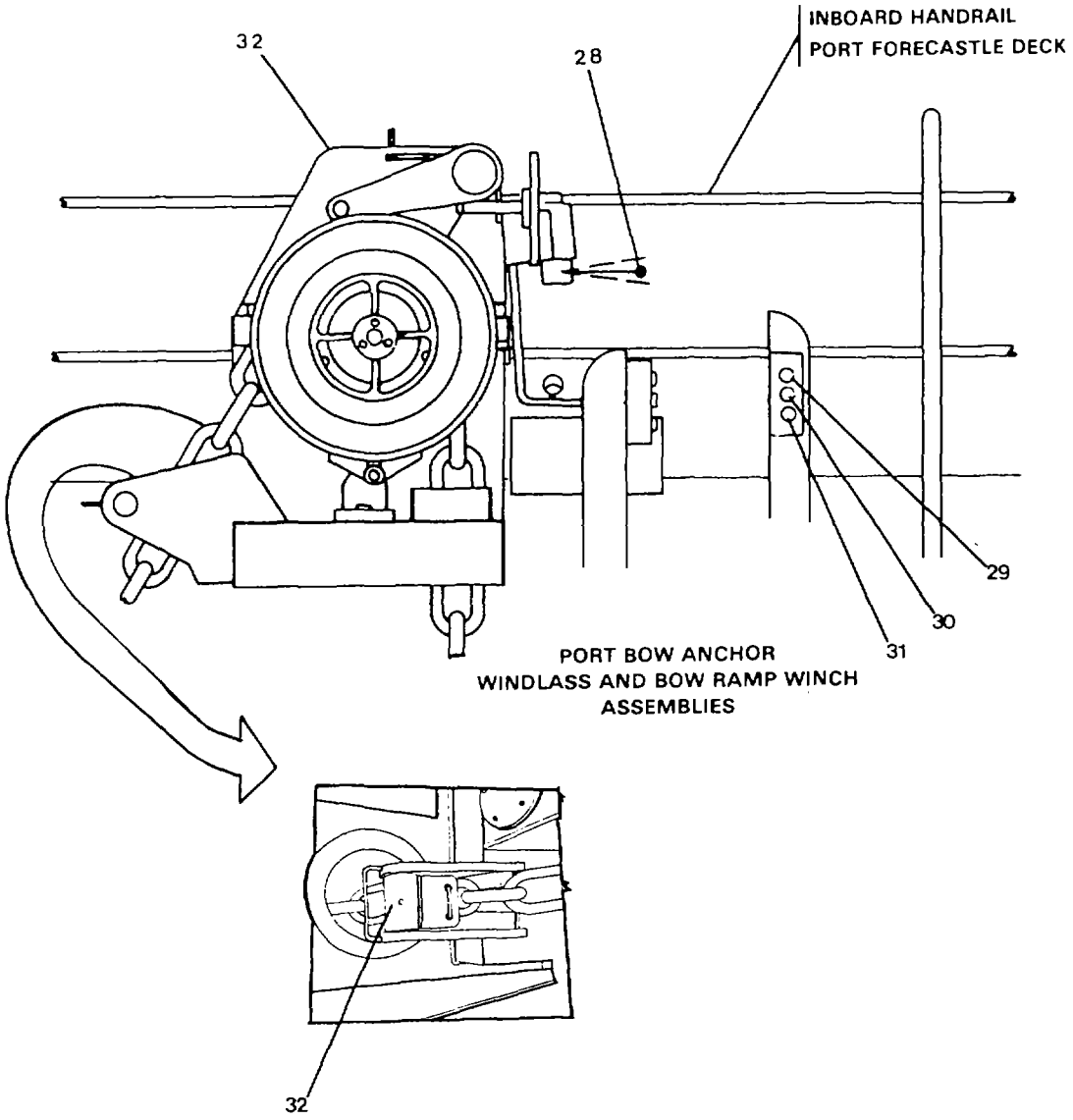


FIGURE 2-36. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 3 of 4).

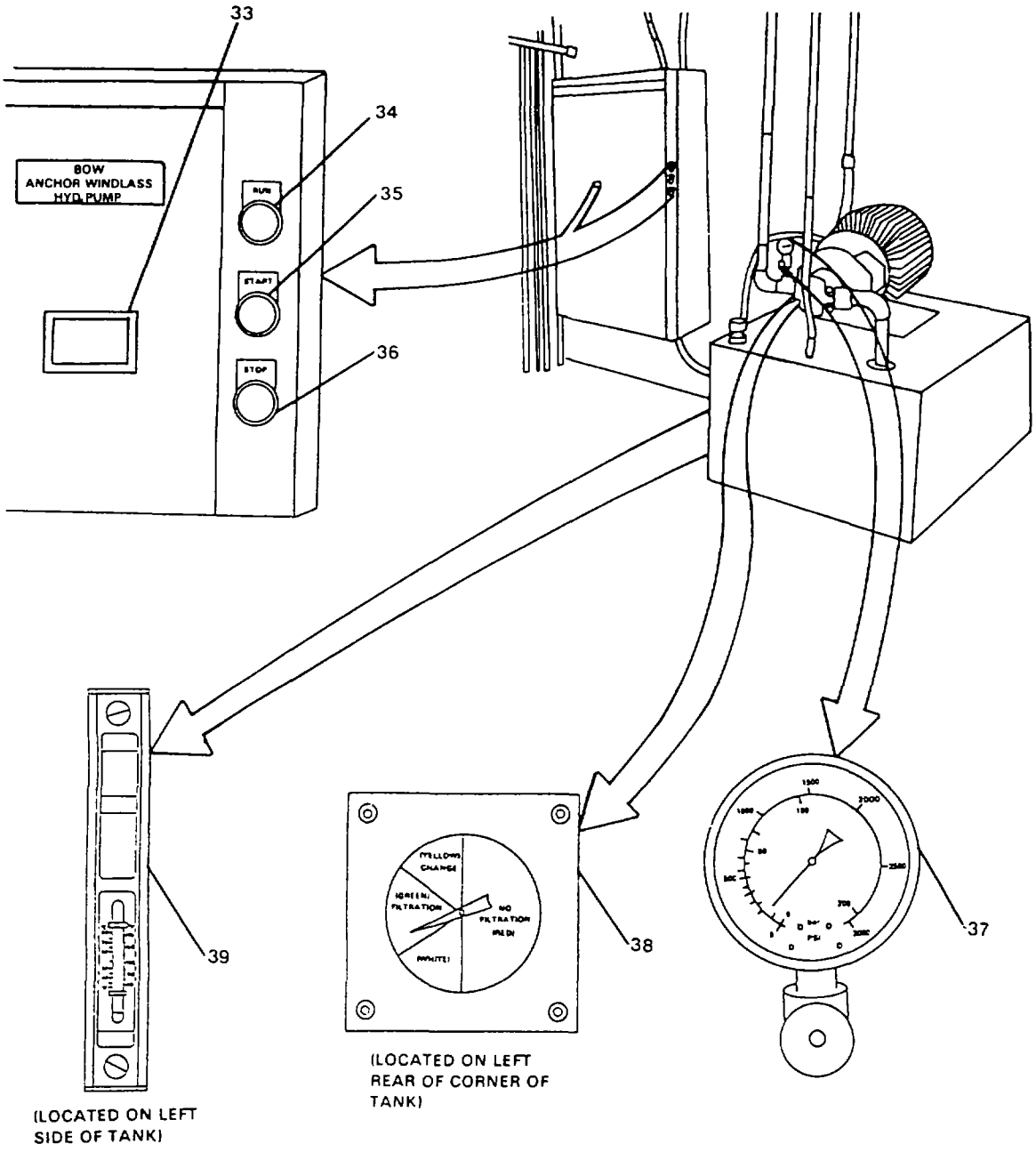


FIGURE 2-36. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 4 of 4).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Bow Anchor Windlass Controls and Bow Ramp Winch Controls (FIGURE 2-36) - continued		
9	Gypsy	Auxiliary rope handling drum used for warping vessel during mooring.
10	Wildcat/Gypsy Handbrake Wheel	Applies brakes on gypsy and wildcat.
11	Wildcat	Hauls in and pays out anchor chain.
12	Clutch	Connects windlass to bow winch drum.
13	Bow Ramp Winch Drum	Hauls in and pays out bow ramp winch wire rope.
14	Bow Ramp Winch Drum Handbrake Wheel	Applies brakes on bow ramp winch drum.
15	Hydraulic Pressure Gauge	Indicates hydraulic pressure in bow ramp winch system.
16	Bow Ramp Winch Control Valve	Moving handle to right hauls in wire rope, raising bow ramp. Moving handle to left pays out wire rope, lowering bow ramp.
17	Bow Ramp Winch Oil Level Inspection Plug	Indicates gearcase full when oil flows out.
18	Bow Ramp Winch Gearcase Drain Plug	Drains gearcase when removed.
19	Bow Ramp Winch Hydraulic Motor with Fail-Safe Brake	Supplies power to bow ramp winch main shaft through worm gear.
20	Clutch	Connects drum to bow ramp winch.
21	Windlass Oil Level Inspection Plug	Indicates gearcase full when oil flows out.
22	Windlass Gearcase Drain Plug	Drains gearcase when removed.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Bow Anchor Windlass Controls and Bow Ramp Winch Controls (FIGURE 2-36) - continued		
23	Windlass Hydraulic Motor with Fail-Safe Brake	Supplies power to bow anchor windlass main shaft through worm gear.
24	Red STOP Button	Turns off bow anchor windlass hydraulic pump motor.
25	Black START Button	Turns on bow anchor windlass hydraulic pump motor.
26	Green RUN Indicator Light	Indicates bow anchor windlass hydraulic pump motor running.
27	Gypsy Clutch	Connects gypsy to windlass.
28	Bow Anchor Windlass Control Valve	Moving handle up pays out anchor chain, lowering anchor. Moving handle down hauls in anchor chain, raising anchor.
29	Green RUN Indicator Light	Indicates bow ramp winch hydraulic pump motor running.
30	Black START Button	Turns on bow ramp winch hydraulic pump motor.
31	Red STOP Button	Turns off bow ramp winch hydraulic pump motor.
32	Chain Stopper	When engaged, prevents anchor chain moving down hawse pipe. When disengaged, permits anchor chain movement downward.
33	Push To Reset Button	Resets the contacts of the bow ramp winch motor controller.
34	Green RUN Indicator Light	Indicates bow ramp winch hydraulic pump motor running.
35	Black START Button	Turns on bow ramp winch hydraulic pump motor.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Bow Anchor Windlass Controls and Bow Ramp Winch Controls (FIGURE 2-36) - continued		
36	Red STOP Button	Turns off bow ramp winch hydraulic pump motor.
37	Hydraulic Pressure Gauge and Snubber	Gauge indicates hydraulic pressure in bow ramp system. Snubber controls fluid flow rate to gauge, protecting it from pressure surges.
38	Filter Condition Indicator (Located on Left Rear Corner of Tank)	Indicates when bow ramp winch hydraulic fluid filter needs to be changed.
39	Fluid Level and Temperature Sight Glass (Located on Left Side of Tank)	Indicates fluid level and temperature of bow ramp winch hydraulic fluid.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Bow Ramp Locking Devices (FIGURE 2-37)	
1	Locking Bar Wheel	Turned counterclockwise releases tension on port and starboard locking bars which raise to unlock bow ramp. Turned clockwise places tension on port and starboard locking bars, securing bow ramp in its raised position.
2	Locking Bar	Port and starboard locking bars fit over lugs and secure bowramp in its raised position. Locking bars can be released from bow ramp, allowing ramp to be lowered only after releasing port and starboard locking bar wheels.
3	Bow Ramp	Bow ramp is lowered by bow ramp winch after releasing port and starboard locking bars and ratchet dogs. In the lowered position, bow ramp serves as a bridge for vehicle and cargo loading and unloading.
4	Ratchet Dogs	Four ratchet dogs (two on port and two on starboard side, in conjunction with two port and starboard locking bars) secure bow ramp in raised position. Ratchet dogs contain ratchet screws which secure or release bow ramp. Ratchet dogs and locking bars are disengaged when bow ramp is lowered.
5	Ladder (Shown on Port Ladder Bracket)	Attaches to port and starboard ladder brackets. Provides operator access to port and starboard ratchet dogs.
6	Ladder Brackets	Provides attachment point for ladder.

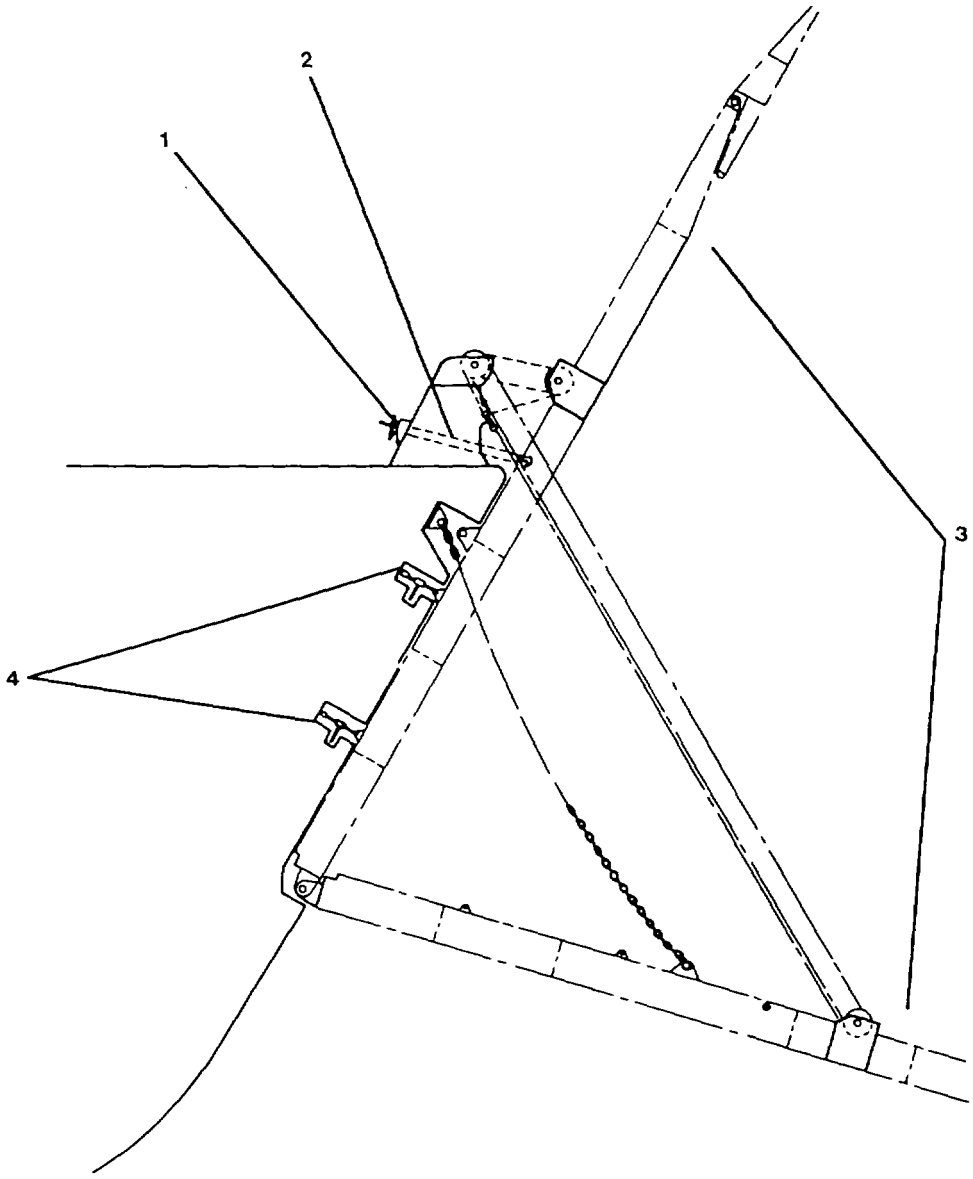


FIGURE 2-37. Bow Ramp Locking Devices (Sheet 1 of 2).

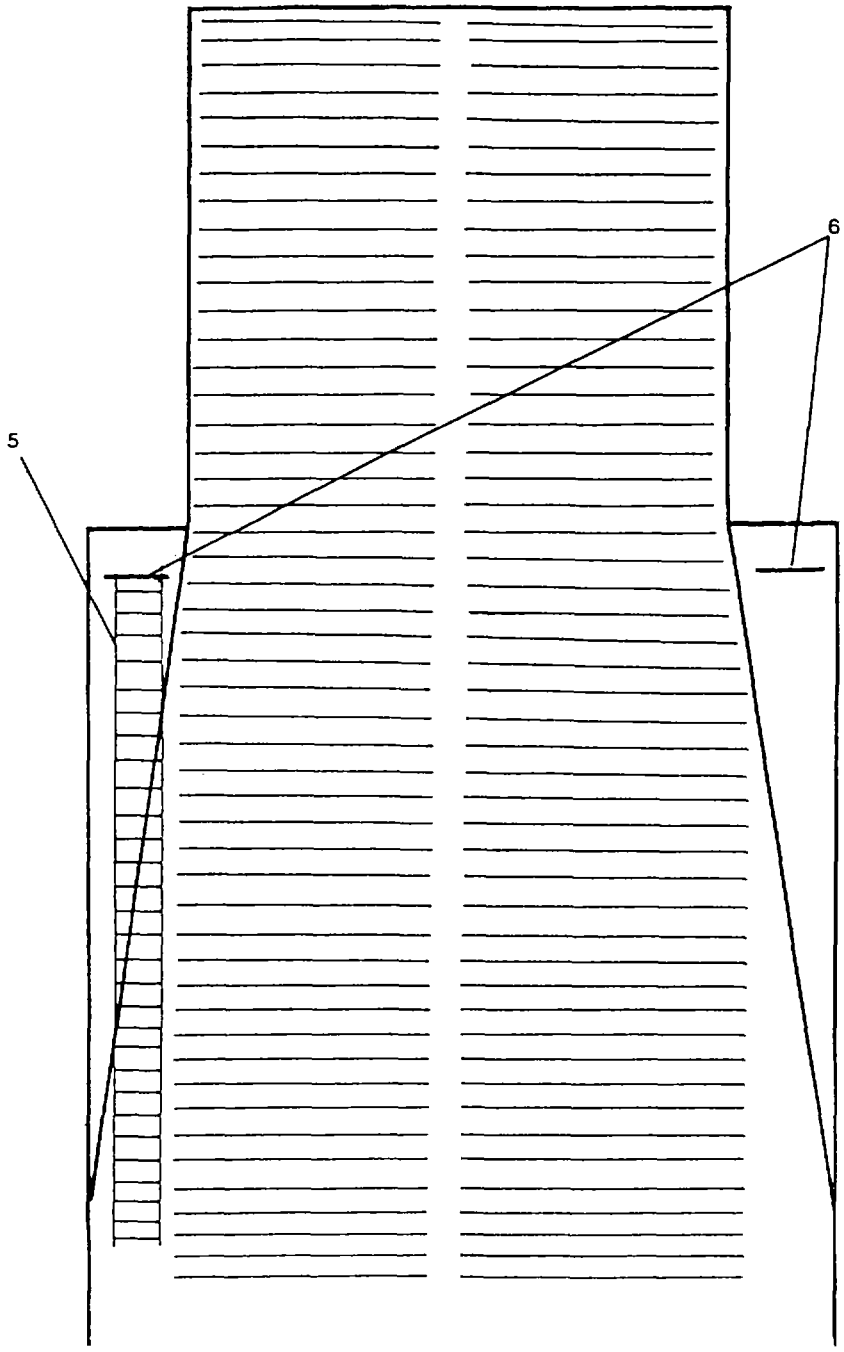


FIGURE 2-37. Bow Ramp Locking Devices (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Telephone, 19 Station (FIGURE 2-38)		
1	Pilot Light	Illuminates when station is called.
2	Selector Switch	Selects station to be called.
3	DIRECTORY Plate	List of shipboard telephone stations.
4	Magneto Handle	Crank handle to call a station.
5	Bell, 6"	Bell will sound when station is called.
6	Handset	Handset receiver.

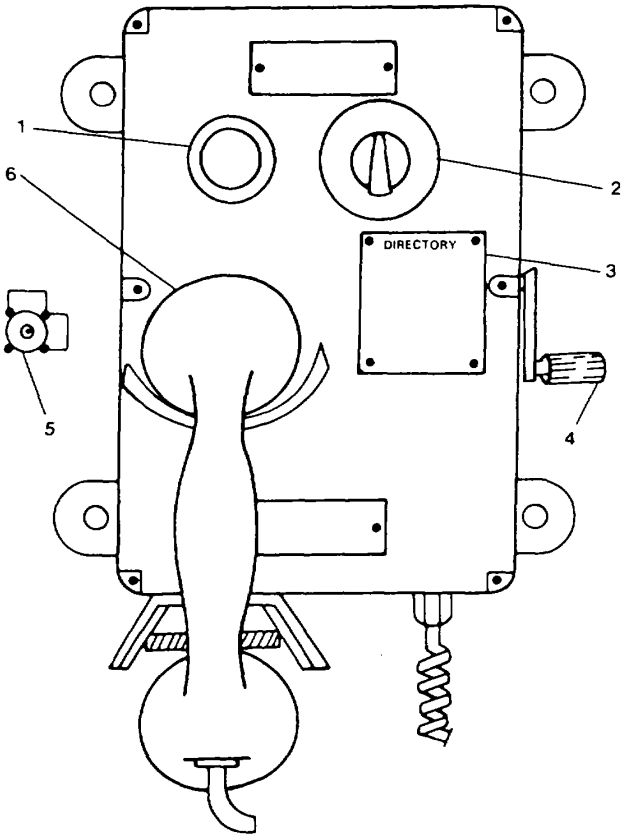


FIGURE 2-38. Telephone, 19 Station (SELR-190).

Table 2-1. Description of Operator's Controls-and Indicators. - CONT

Key	Control or Indicator	Function
Telephone, Sound Powered (FIGURE 2-39)		
1	Handset	Communication instrument.
2	Selector Dial	Outlines available stations.
3	Selector Knob	Selects station to be called.
4	Magneto Handle	Crank handle to call a station.
5	Directory Plate	Lists shipboard telephone stations.

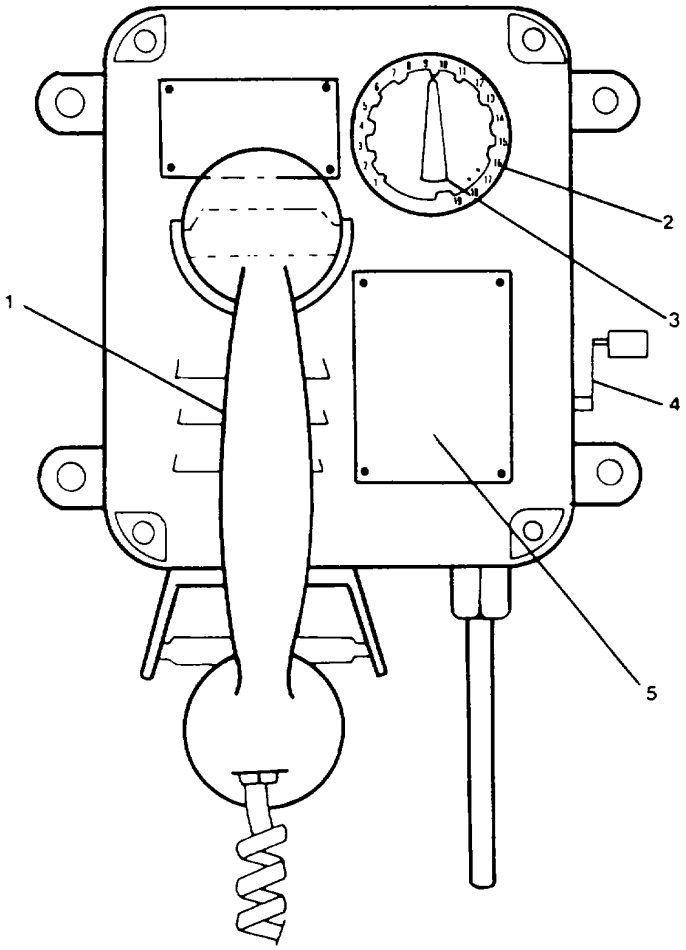


FIGURE 2-39. Telephone, Sound Powered (SW-193).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Watertight Sound Powered Telephone (FIGURE 2-40)		
1	Handset Bracket	Telephone handset stowagebracket.
2	Handset	Communication instrument.
3	Selector Switch	Selects station to be called.
4	Directory Plate	Lists shipboard telephone stations.
5	Retainer Pivot	Locks watertight cover in place.
6	Magneto Handle	Crank handle to call selected station.

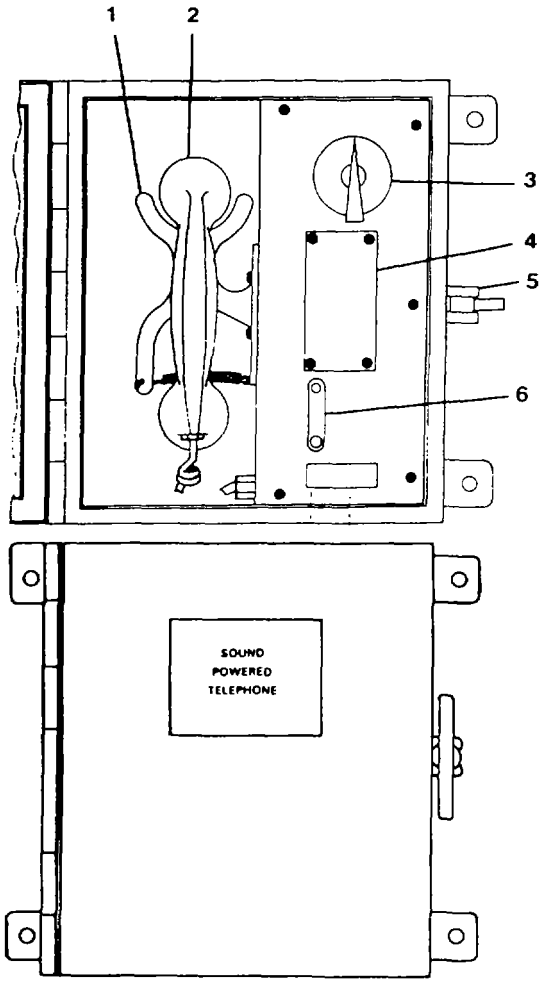


FIGURE 2-40. Watertight Sound Powered Telephone (MWTH-196).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Head Set - Chest Set Sound Powered (FIGURE 2-41)		
1	Upper Arm R.H.	Transmitter mount - right side.
2	Upper Arm L.H.	Transmitter mount - left side.
3	Headband	Overhead holder for receivers.
4	Adjusting Bracket	Directs headset adjustments.
5	Receiver Cradle	Mount for receiver.
6	Transmitter	Sound powered transmitter.
7	Pushbutton	Keys microphone.
8	Mouthpiece	Holder for transmitter.
9	Chest plate	Mounting plate for chest set.
10	Jack Plug and Cable Assembly	Connects Head Set Chest Set to Jack Box.
11	Lower Chest Plate Arm	Lower Chest set mount.
12	Hook	Fastener for wet strap.

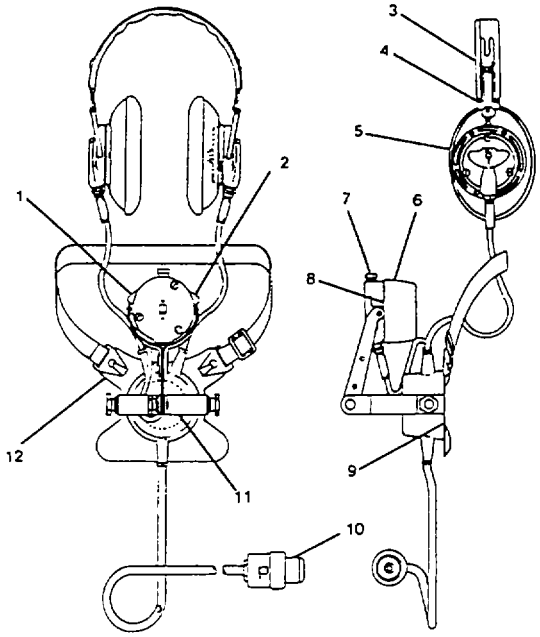


FIGURE 2-41. Chest Set Sound Powered.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Sound Powered Telephone Watertight Rotating Beacon RB-WT (FIGURE 2-42)		
1	Guard	Protector for glass cover.
2	Glass Cover (Amber)	Provides proper illumination.
3	Dome	Cover for rotating lamp.
4	Rotating Beacon	Mounted in engine room and emergency generator room.

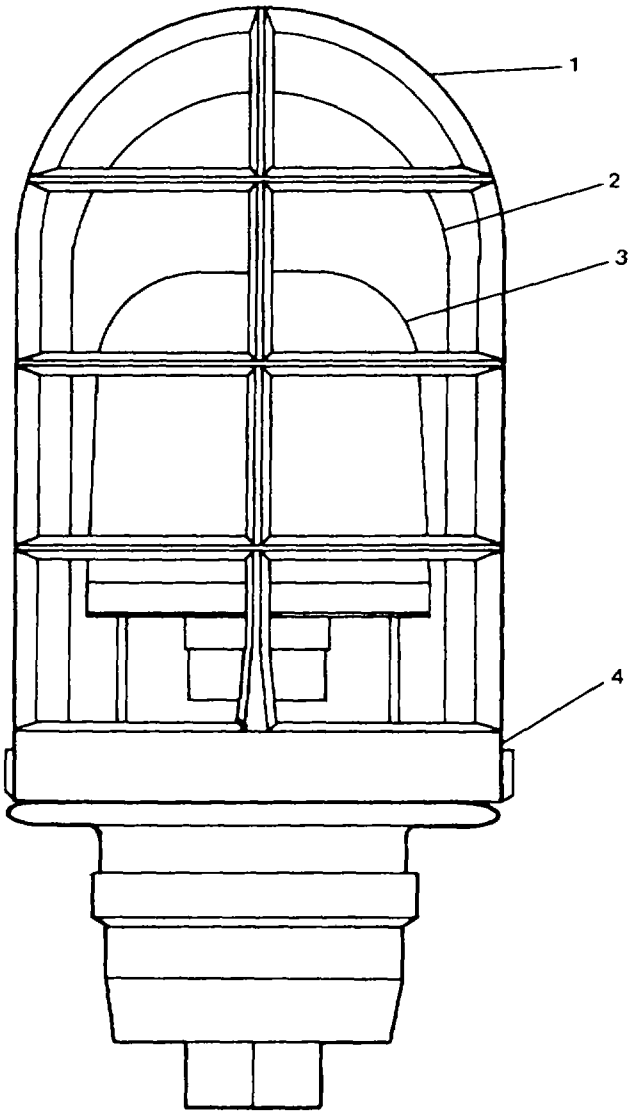
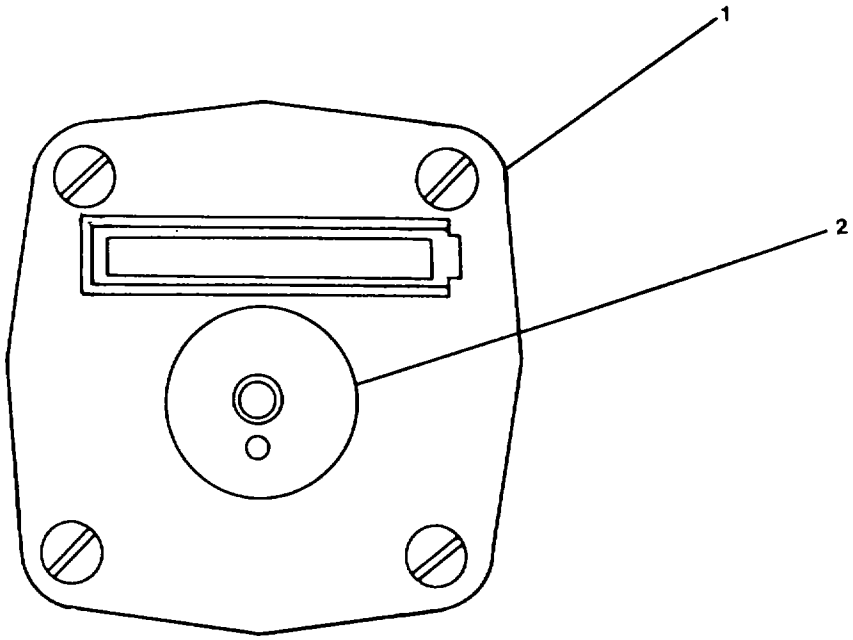


FIGURE 2-42. Sound Powered Telephone Watertight Rotating Beacon (RB-WT).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Sound Powered Telephone Jack Box (FIGURE 2-43)		
1	Jack Box	Watertight jack box for use with sound powered telephone instruments.
2	Jack Box Cover	Accommodates the H39A plug.



2-43. Sound Powered Telephone Jack Box (G-15A).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Surface Pull Box Halon 1301 Fire Suppression System (FIGURE 2-44)		
1	Pull Box - Surface-Type	Consists of two remote manual surface-type pull boxes located on main deck near the engine room stairs.
2	Pull Handle	Used to activate CO_2 which activates Halon release system.
3	Hammer	Used to break glass to expose alarm pull handle.

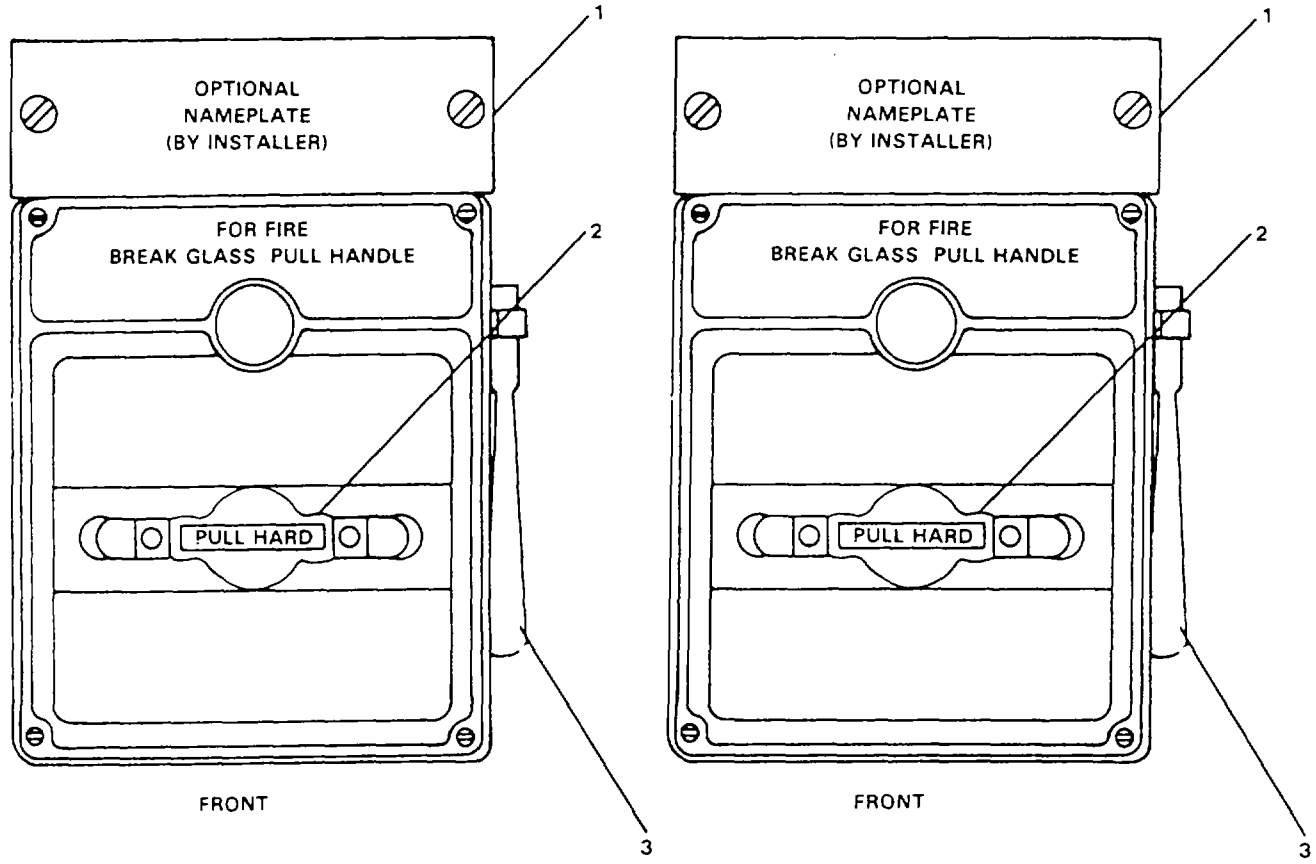


FIGURE 2-44. Surface Pull Box Halon 1301 Fire Suppression System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Water Tight Pull Box Halon 1301 Fire Suppression System (FIGURE 2-45)		
1	Pull Box - Water Tight	Consists of two remote manual surface-type pull boxes located on main deck near bow thruster room stairs at Frame 16.
2	Hammer	Used to break glass to expose alarm pull handle.
3	Pull Handle	Opens cover to expose glass covering alarm pull handle.

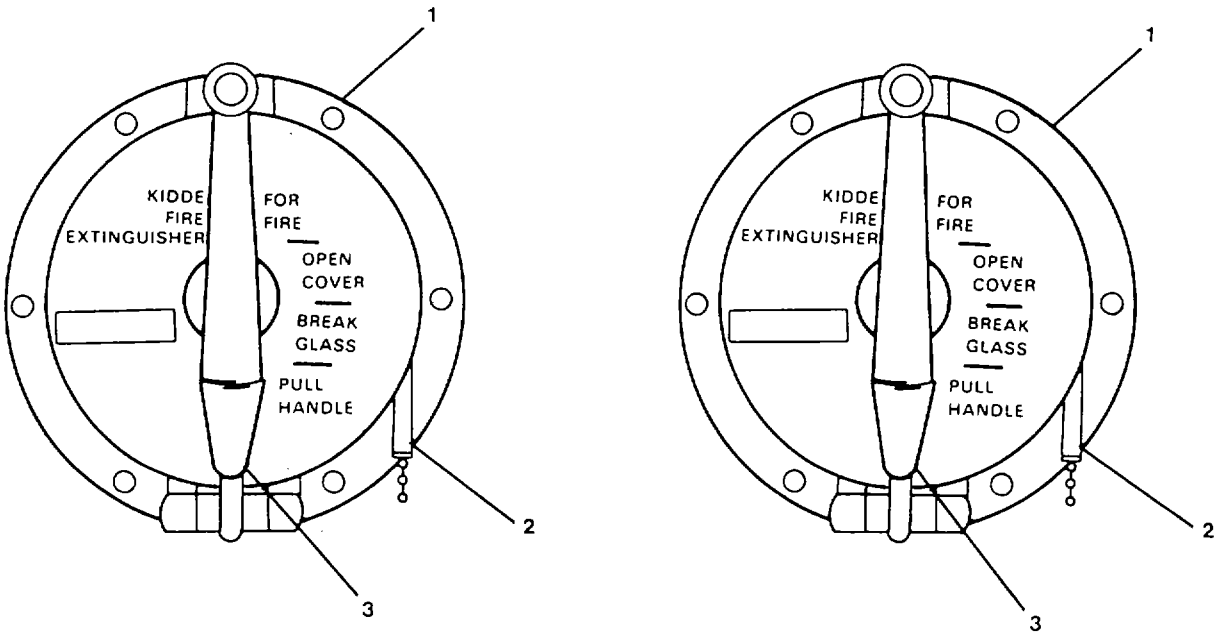


FIGURE 2-45. Watertight Pull Box Halon 1301 Fire Suppression System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Lever Operated Control Halon 1301 Fire Suppression System (FIGURE 2-46)		
1	Lever Operated Control	A lever operated control is mounted on a carbon dioxide (CO2) cylinder at the forward and aft bulkheads in the upper machinery room for engine room and emergency generator room Halon discharge.
2	Lever	Pull up to release CO_2 charge which activates Halon release.
3	Seal Wire	Verifies that system has not been activated. If seal wire is missing or broken, system has been used.
4	Locking Pin	Pull completely out before lever is pulled to release CO_2. Prevents accidental tripping of CO_2 release for Halon system.

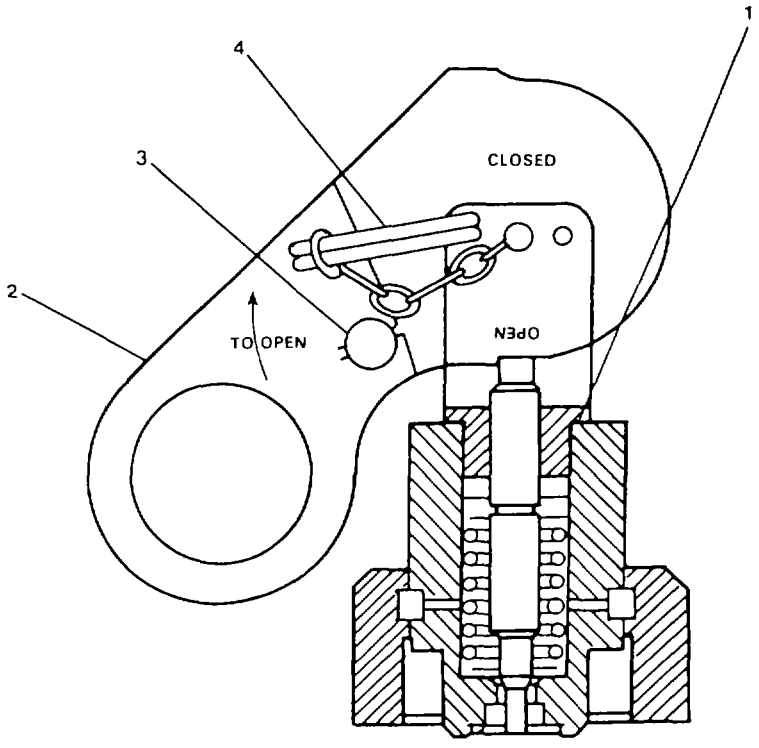


FIGURE 2-46. Lever Operated Control Halon 1301 Fire Suppression System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Portable Fire Pump (FIGURE 2-47)	
1	Pressure Gauge	Indicates pump pressure, or pump vacuum when priming.
2	AMPERES Gauge	Indicates if alternator is charging or discharging.
3	OFF-START-RUN	Switch turns engine off in OFF, allows engine to start in START, and allows engine to run in RUN position and prevents over speed of engine if prime is lost.
4	PRIME	Pushbutton to put pump in priming mode.
5	START	Pushbutton to place engine in starting mode with OFF-START-RUN switch in START position.
6	CHOKE	Controls carburetor fuel/air mixture.
7	SPEED	Controls speed of engine.
8	Water Discharge Valve	In closed position and PRIME pushbutton depressed, pump is in priming mode. In open position, pump can discharge water.
9	Pump Drain Valve	When open, drains water from pump.
10	Manual Priming Inlet Plug	To manually prime pump when lift is greater than 20 feet.
11	Priming Pump Discharge Port	Discharges output of pump.
12	Manual Start Pull Cord	Provides emergency engine starting.
13	External Fuel Tank	Provides fuel for pump engine.

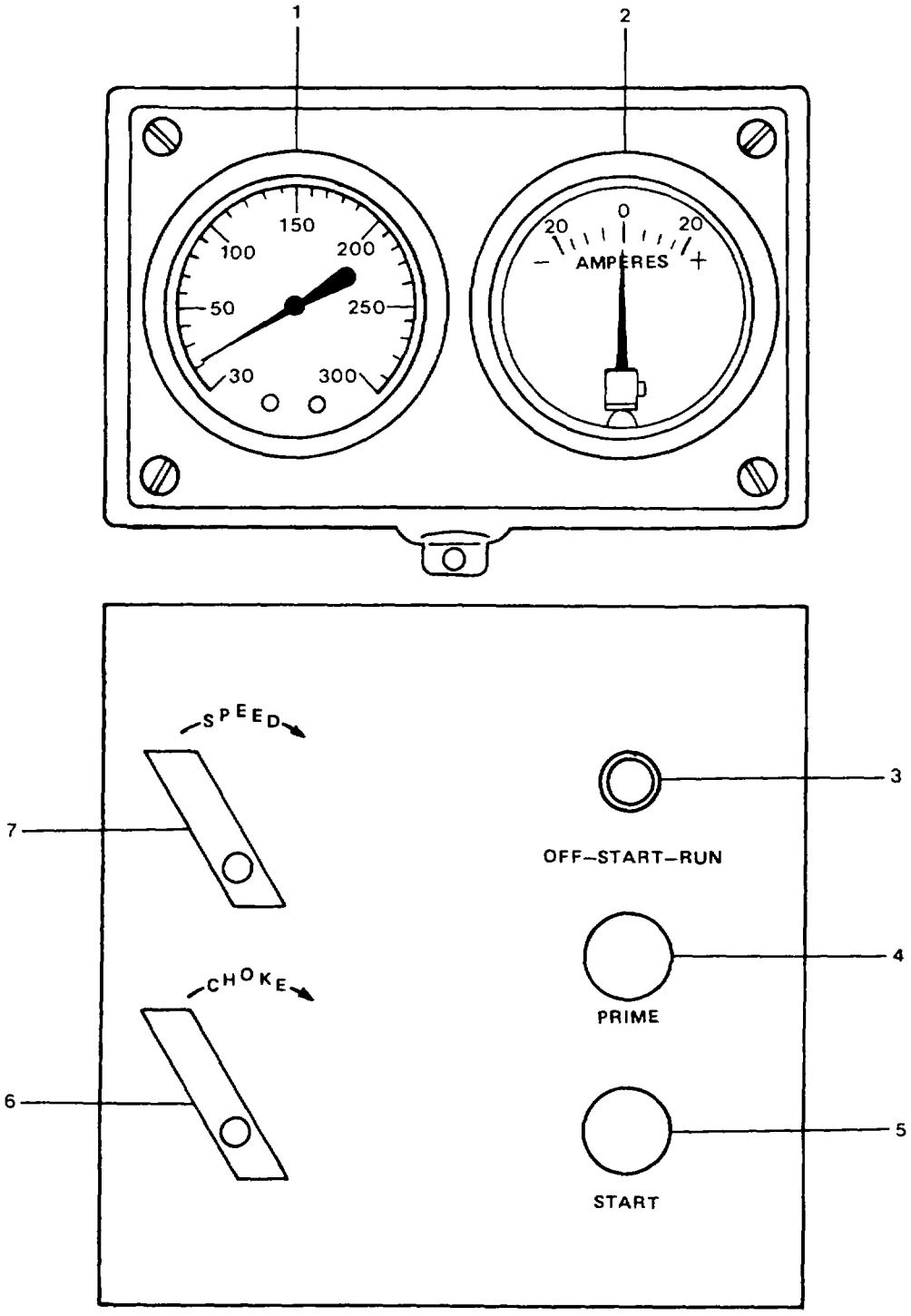
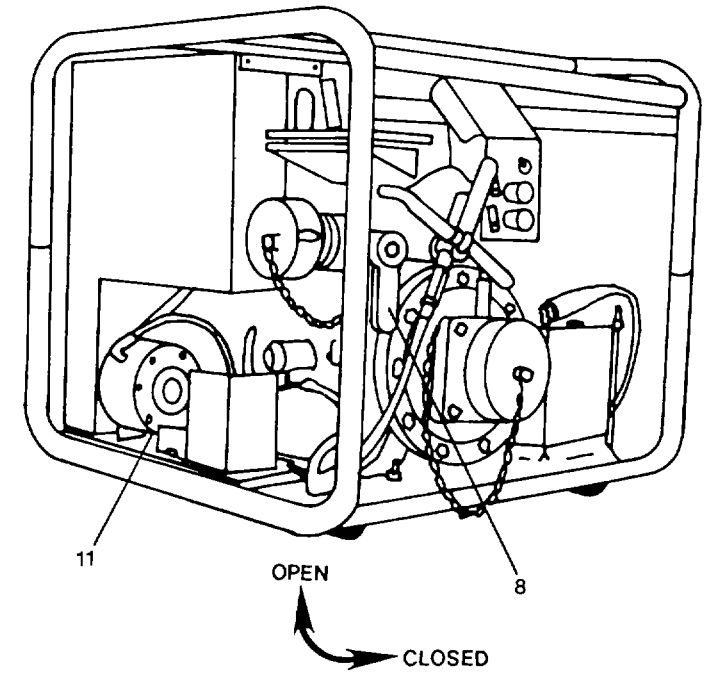


FIGURE 2-47. Portable Fire Pump (Sheet 1 of 3).



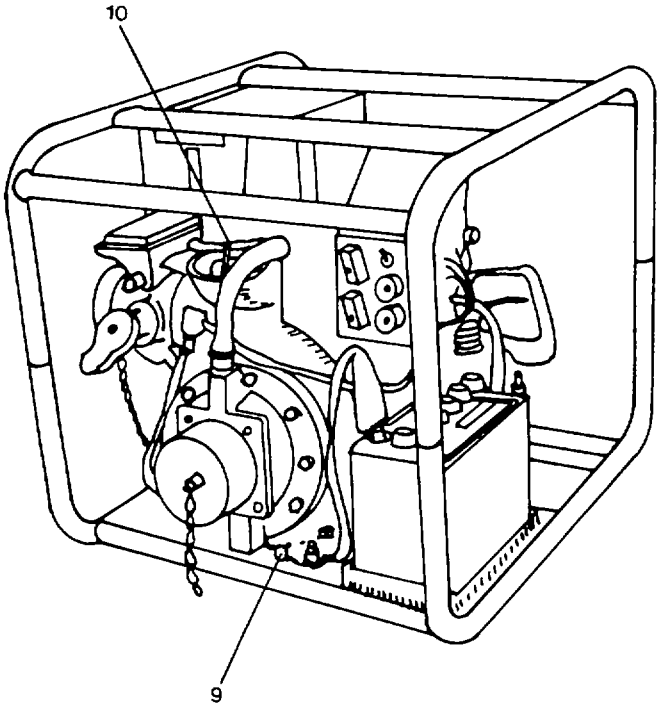


FIGURE 2-47. Portable Fire Pump (Sheet 2 of 3).

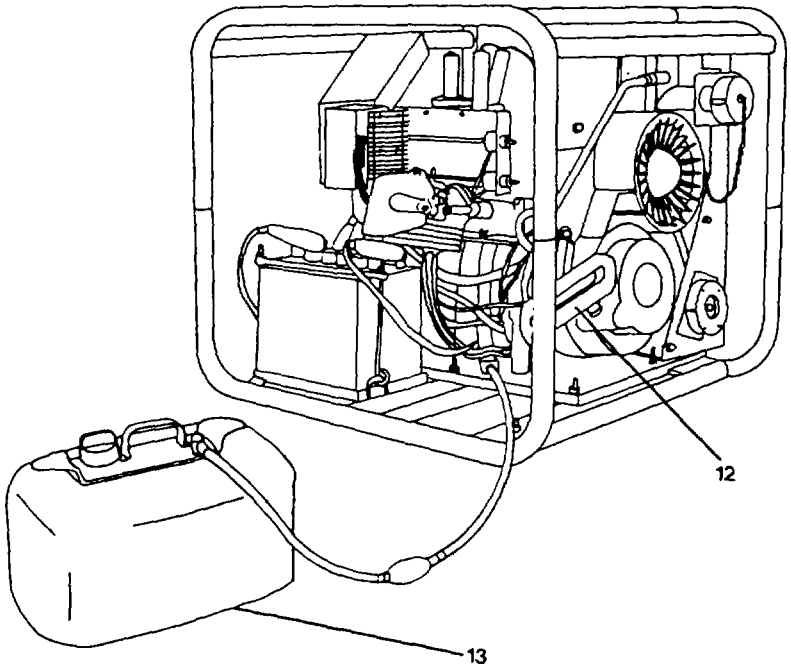


FIGURE 2-47. Portable Fire Pump (Sheet 3 of 3).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Belt Driven Lathe (FIGURE 2-48)	
1	Toll Post Positioning and Clamping Lever	Counterclockwise (CCW) loosens the holder and allows it to be swiveled and placed in 360°. Clockwise (CW) locks the tool holder for operation of the lathe.
2	Tailstock Quill Traverse Hand Wheel	CW advances the quill and CCW retracts the quill.
3	Apron Mounted Lever Switch	Controls the rotation of the spindle, engaged rotation is CCW only.
4	HIGH/LOW Speed Change Lever	Up disengages the haf nut (HIGH) while Down engages the half nut (LOW).
5	Longitudinal/Cross Slide Power Selector	Actuates OUT-UPWARD and IN-DOWN. OUT-UPWARD gives cross-slide travel.
6	Cross Slide Hand Wheel	CW moves the cross slide away from the operator. CCW moves it toward the operator.
7	Carriage Longitudinal Traverse Hand Wheel	CW moves the carriage right; CCW moves the carriage left.
8	Carriage Feed/Thread Selector	Right and left selections only. Right is the lead screw actuation. Left is feed rod operation.
9	Gear Box Quick Change Levers	RIGHT and LEFT and DETENT HOLE engagement. Lever 9a locates the Alpha detents; i.e., A, B, C, D, and E. Lever 9 locates the numeric detents; i.e., 1, 2, 3, 4, 5, 6, 7, and 8.
10	Feed Direction Selector	Up is right-hand carriage travel or cross slide traveling away from the operator. Down is left-hand carriage travel or cross slide traveling toward the operator.
11	Headstock Belt/Pulley Engagement Handle	Moves right and left. Right is belt tighten and left is belt loosen.

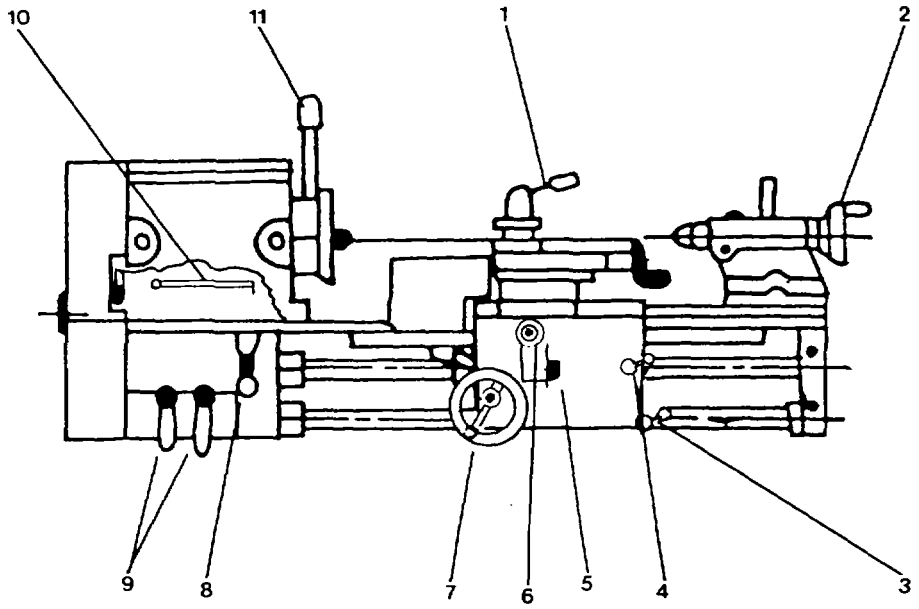


FIGURE 2-48. Belt Driven Lathe 1336 PBD.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Bow Thruster Engine Controls (FIGURE 2-49)	
1	Fuel Pressure Gauge	Indicates fuel pressure in psi or kPa (kilopasculs).
2	Hour Meter	Shows hours that the engine has been run. Meter is total of all run time hours between overhauls.
3	Ignition Pushbutton	Press to manually start Bow Thruster engine.
4	Air Pressure Gauge	Indicates air pressure for starter air.
5	Engine RPM	Indicates RPM of engine in hundreds.
6	Water Temperature Gauge	Indicates temperature of engine cooling water.
7	Oil Pressure Gauge	Indicates engine oil pressure in psi.

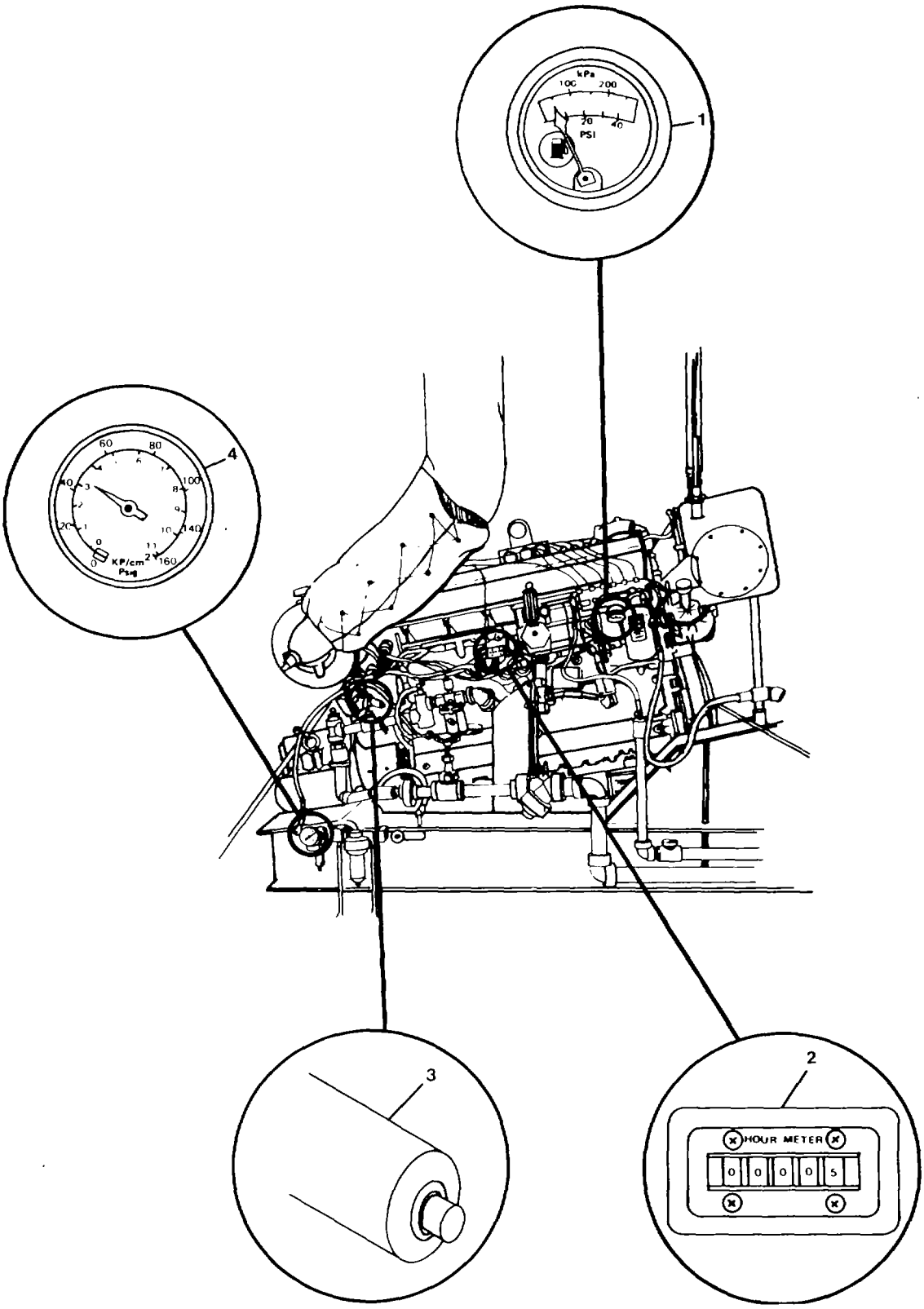


FIGURE 2-49. Bow Thruster Engine Controls (Sheet 1 of 2).

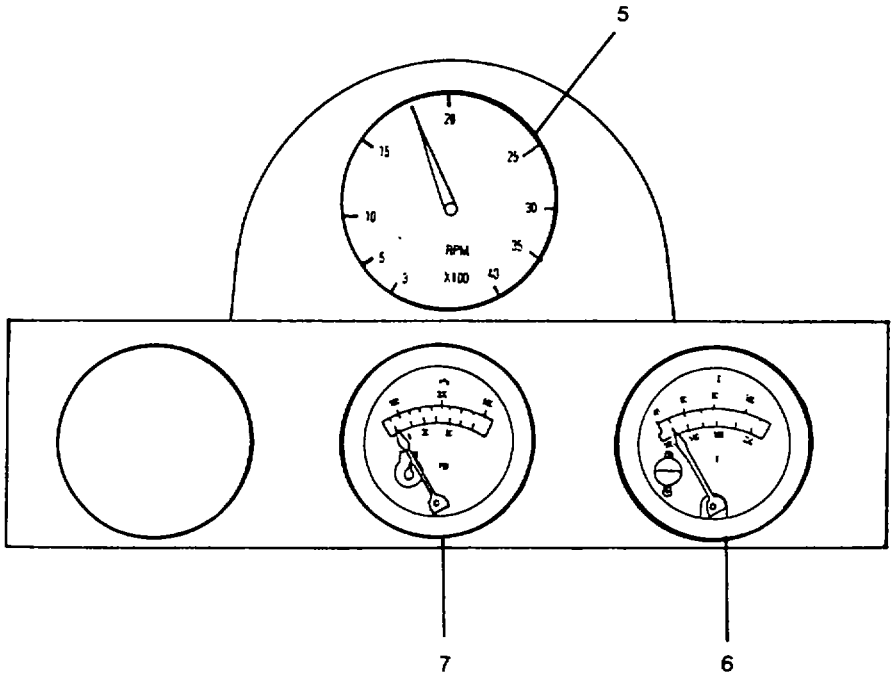


FIGURE 2-49. Bow Thruster Engine Controls (Sheet 2 of 2).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Groen TDB/6 Kettle (FIGURE 2-50)		
1	Pressure Gauge	The pressure gauge reads both positive and vacuum pressure.
2	Safety Valve	If steam pressure in the jacket rises above 50 psi, the safety valve will open.
3	Water Level Gauge Glass	The water level gauge measures the jacket water level.
4	Thermostat	The thermostat controls desired kettle heat settings.
5	Pilot Light	The pilot light indicates that the kettle is heating.

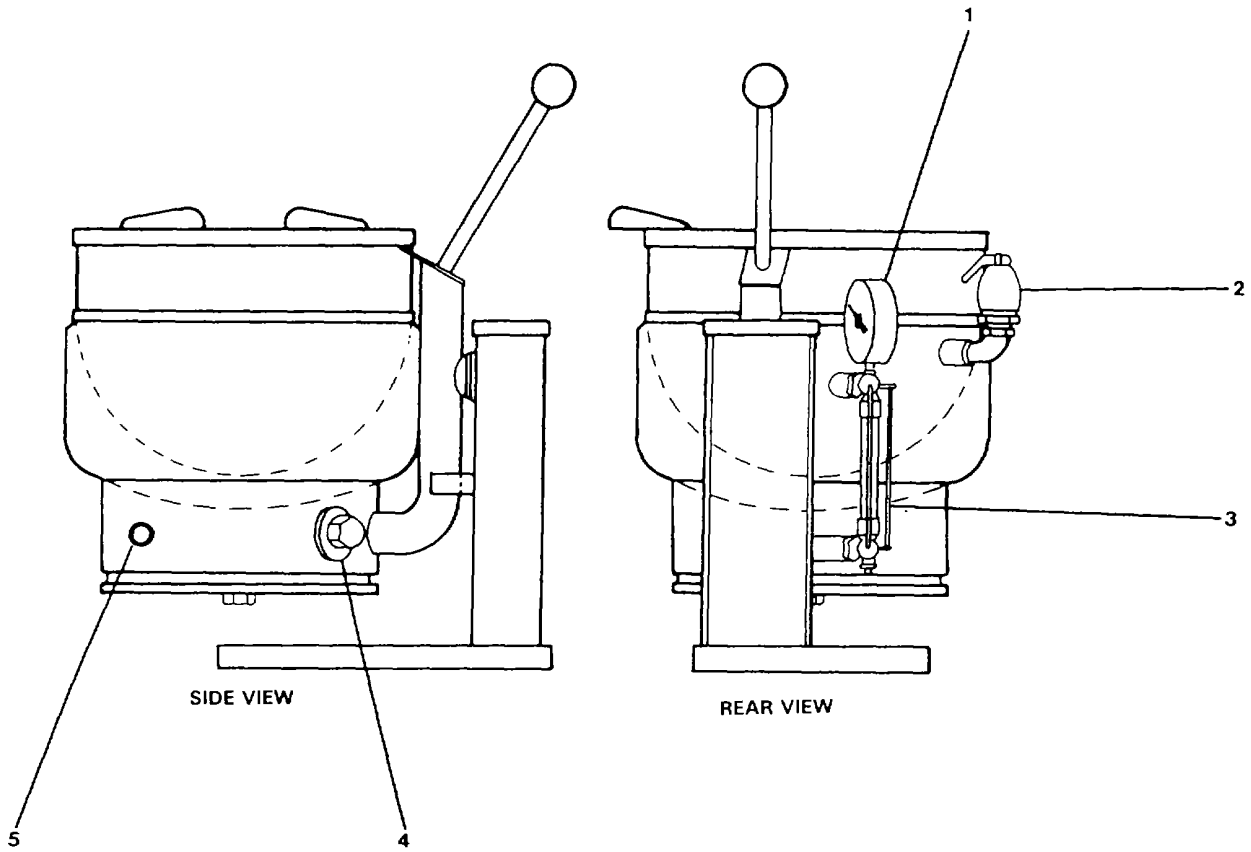


FIGURE 2-50. Groen TBD/6 Kettle.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Marine Counter Fryer MOD C-28M (FIGURE 2-51)		
1	Power Pilot Lamp, Green	When the power switch is on, the power pilot lamp will illuminate.
2	Heat Pilot Lamp, Green	The heat pilot lamp will illuminate indicating power is applied to the heating elements.
3	Overtemp Lamp, Red	The overtemp lamp will illuminate if the oil reaches an overtempera-ture condition.
4	Thermostat	The thermostat is used to select the desired temperature setting, from 200 degrees F to 400 degrees F (settings in 50 degrees F increments).
5	ON-OFF POWER	The power switch energizes the control circuits.
6	Front Oil Drain	Quarter turn of ball valve allows oil to be drained.
7	UPPER FILL MARK	Provides indicator for filling counter fryer.

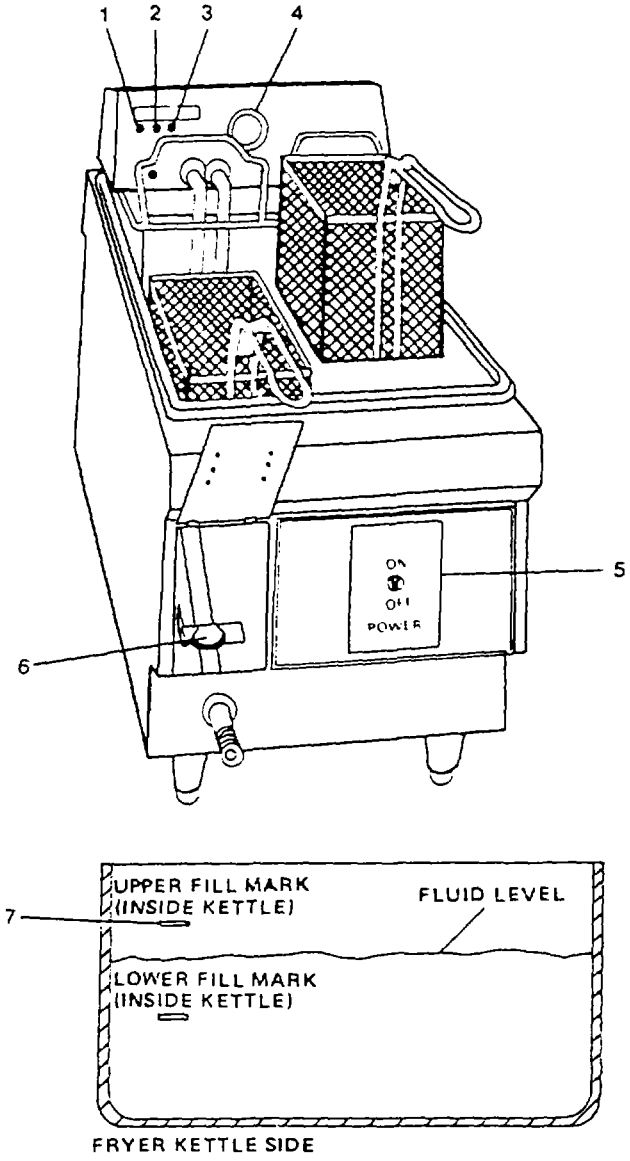


FIGURE 2-51. Marine Counter Fryer MOD C-28M.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Food Mixer #A120 (FIGURE 2-52)		
1	ON-OFF Switch	The ON-OFF switch controls power to the mixer.
2	Bowl Lift Handle	The bowl lift handle is used to raise or lower the bowl.
3	Apron	The apron provides an upper splash shield.
4	Bowl Support	The bowl support provides a base for mounting the bowl.
5	Bowl Lift Slideways	The bowl lift slideways provide a channel for raising and lowering the bowl.
6	Alignment Pin	The alignment pins are used to properly set the bowl on the bowl support.
7	Bowl Clamp	The bowl will be locked in place by rotating the bowl clamps over the ears of the bowl.
8	Agitator	The agitator reaches every part of the batch, rotating on its axis opposite to the direction that it moves around the bowl.
9	Drip Cup	The drip cup will collect any lubricants from the motor.
10	Gear Shift Lever	The gear shift lever provides three mixer speeds, speed 1 (low), speed 2 (medium), and speed 3 (high).
11	Attachment Hub Thumb Screw	The thumb screw is used to secure attachments in the attachment hub.

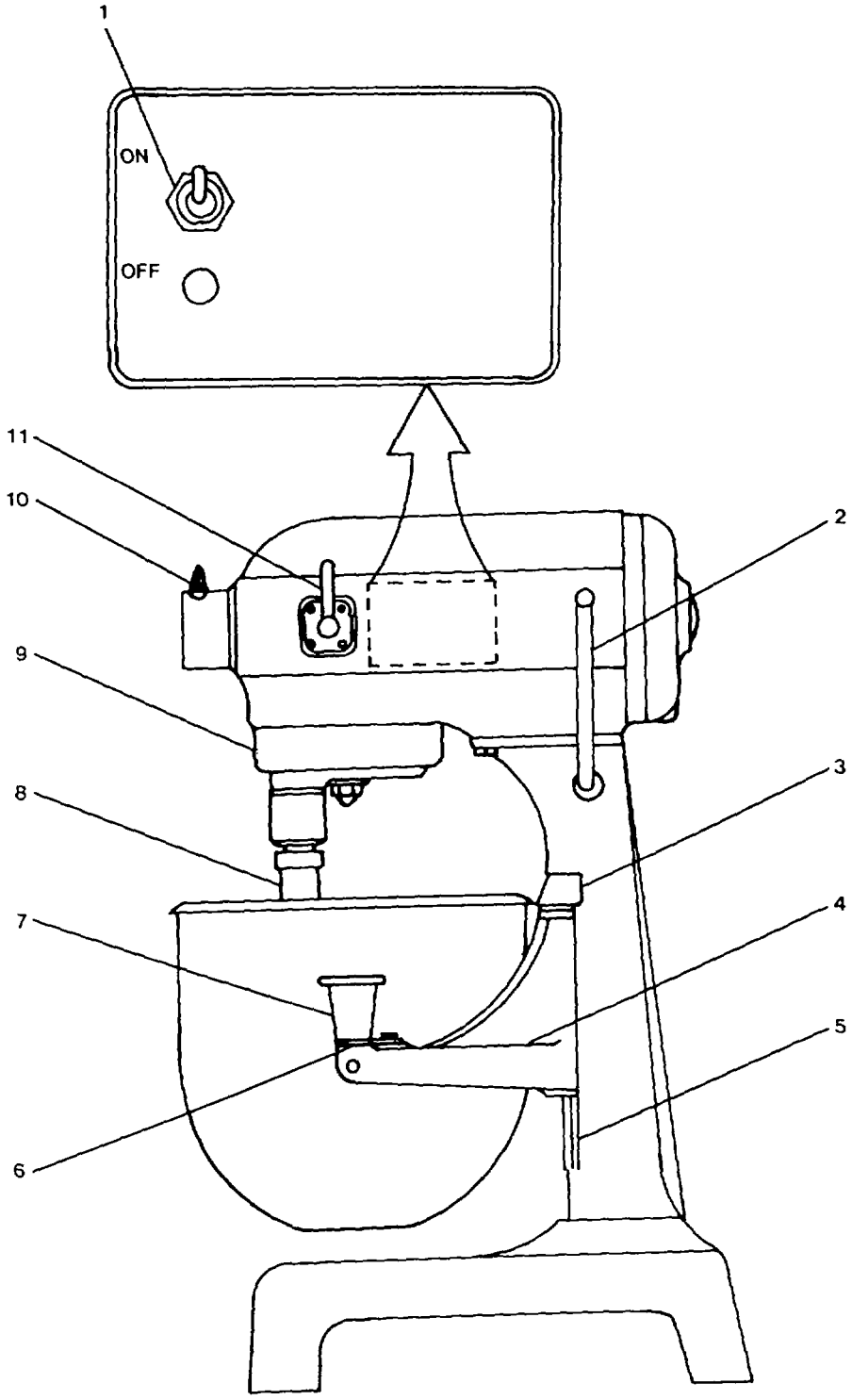


FIGURE 2-52. Food Mixer #A121.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Meat Slicer Model 512 (FIGURE 2-53)		
1	Meat Grip	The meat grip is for holding odd shapes or short end pieces.
2	Carriage	The shape of the carriage and inclined position allows the carriage to be moved back and forth with the right hand while the left hand is free to receive the slices as they come from the knife.
3	Slice Adjusting Dial	The dial adjusts the thickness of the slices cut. The number on the dial indicate actual measurements in .010. For example, when setting the dial at 25, the slice would be 1/4" thick.
4	ON-OFF Switch	The slicer is turned "ON" and "OFF" by the illuminated switch.
5	Sharpener Slot	The sharpener slot provides a mounting position for the slicer knife sharpener.
6	Slicer Knife	The slicer knife cuts the product as it is fed through on the carriage.

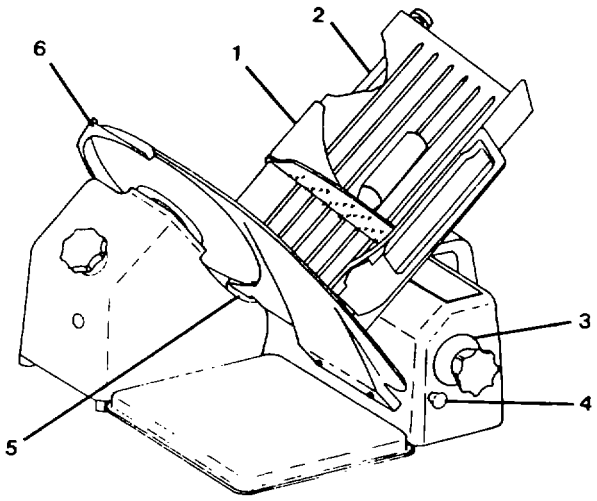


FIGURE 2-53. Meat Slicer Model 512.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Drop-In Food Well Unit (FIGURE 2-54)		
1	Well Pans	The stainless steel well pans are designed to hold hot or cold food at the desired temperature.
2	Indicator Lamps (Red)	Indicator lamps will be on when electrical power is supplying the individual well pan.
3	Thermostats	The thermostat will control electrical power to each well pan electrical unit.

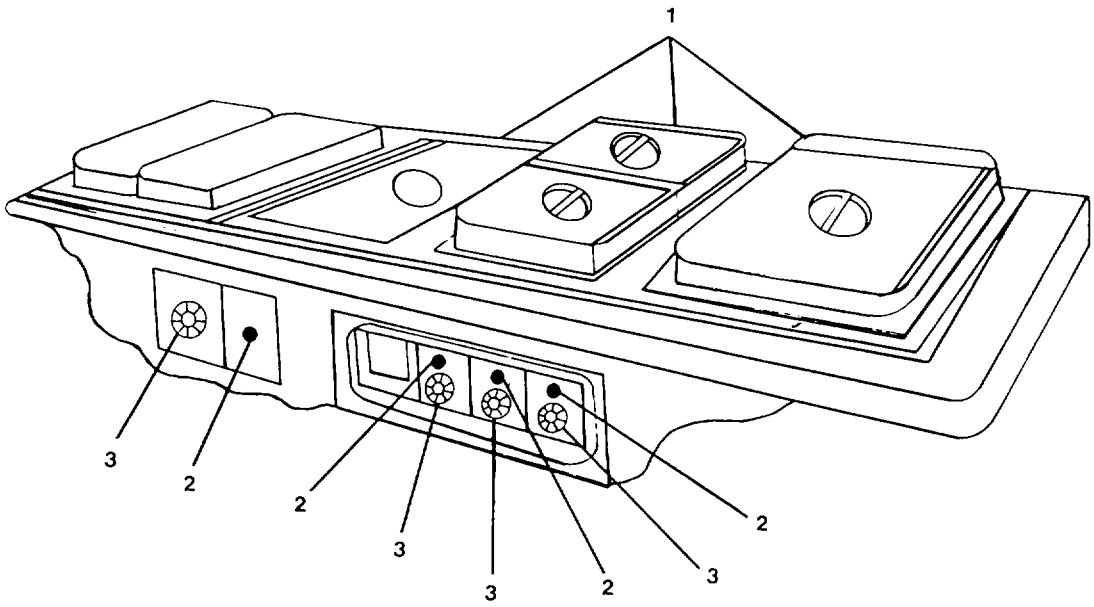


FIGURE 2-54. Drop-In Food Well Unit.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Microwave Oven #SNAC-7TP (FIGURE 2-55)		
1	Button Set	This display will indicate the number of the button, 1-7, in use.
2	Colon	The colon light will flash when the unit is activated. The colon light will also flash and an audible tone will sound if the door is not completely latched and a button has been pushed.
3	Display Indicator	Digital display of time remaining.
4	Pushbuttons	Seven pushbuttons are available for selection of various cooking modes.
5	Oven Door Latch	Secures oven door.

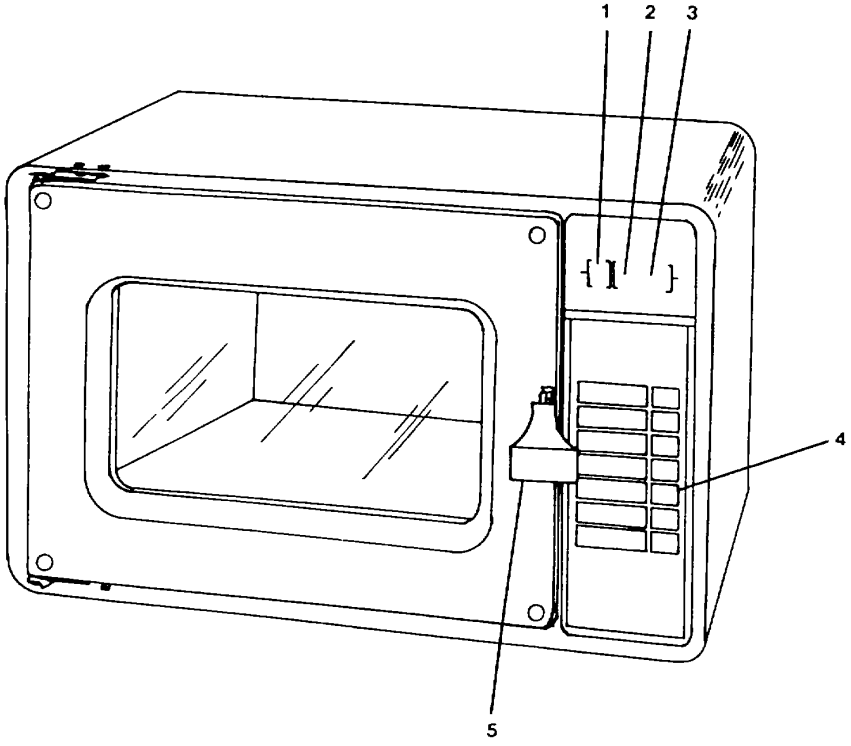


FIGURE 2-55. Microwave Oven #SNAC-7TP.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Coffee Urn BMAC (FIGURE 2-56)	
1	Brew Indicator Light	Brew indicator light is on while coffee is brewing.
2	Pushbutton Timer	Coffee will begin brewing when timer knob is turned to "dial stop" or start button is depressed.
3	Pushbutton Agitation	Coffee is blended by pressing the agitation button for about 20 seconds.
4	Temperature Indicator	Temperature indicator light is on when Dial Thermometer is set.
5	Thermostat	Controls the temperature of brew water and brewed coffee.
6	Inlet Valve	Controls water flow to coffee urn.
7	Dial Thermometer	Coffee should not be brewed until the dial thermometer is in the red brewing region.
8	Gauge Glass	Water should be within 5" of the top of the gauge.

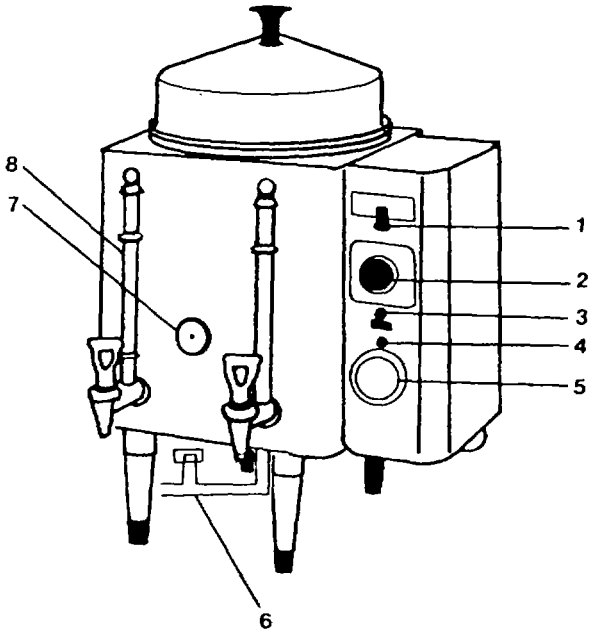
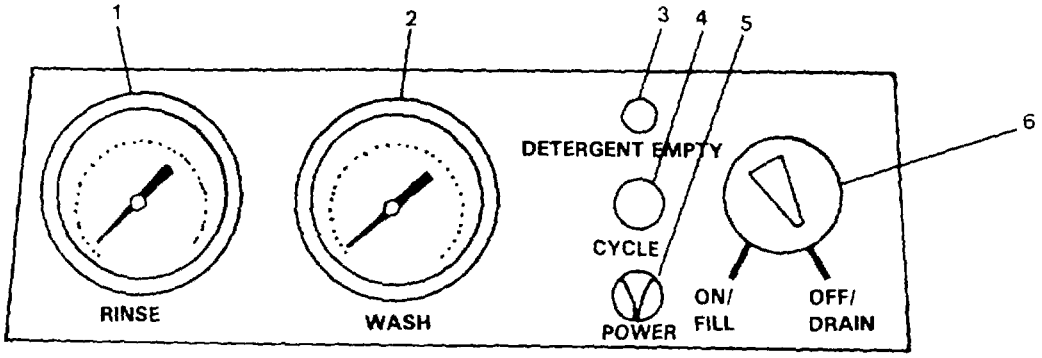


FIGURE 2-56. Coffee Urn BMAC.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Dishwasher #FFW-1 (FIGURE 2-57)		
1	RINSE Thermometer	Used to measure the temperature of the rinse water.
2	WASH Thermometer	Used to measure the temperature of the wash water.
3	DETERGENT EMPTY Light	Flashes when detergent bottle is near empty.
4	CYCLE Light	Indicates that the equipment is in cycle.
5	POWER Light	Indicates that the power is in cycle.
6	ON/FILL-DRAIN/OFF	Used to turn the equipment ON and fill the sump tank at the start of the day and to drain the sump tank and turn the equipment OFF at the end of the day.
7	Normal/Delime	The NORMAL/DELIME switch is used to Control switch from normal operation to delime mode.



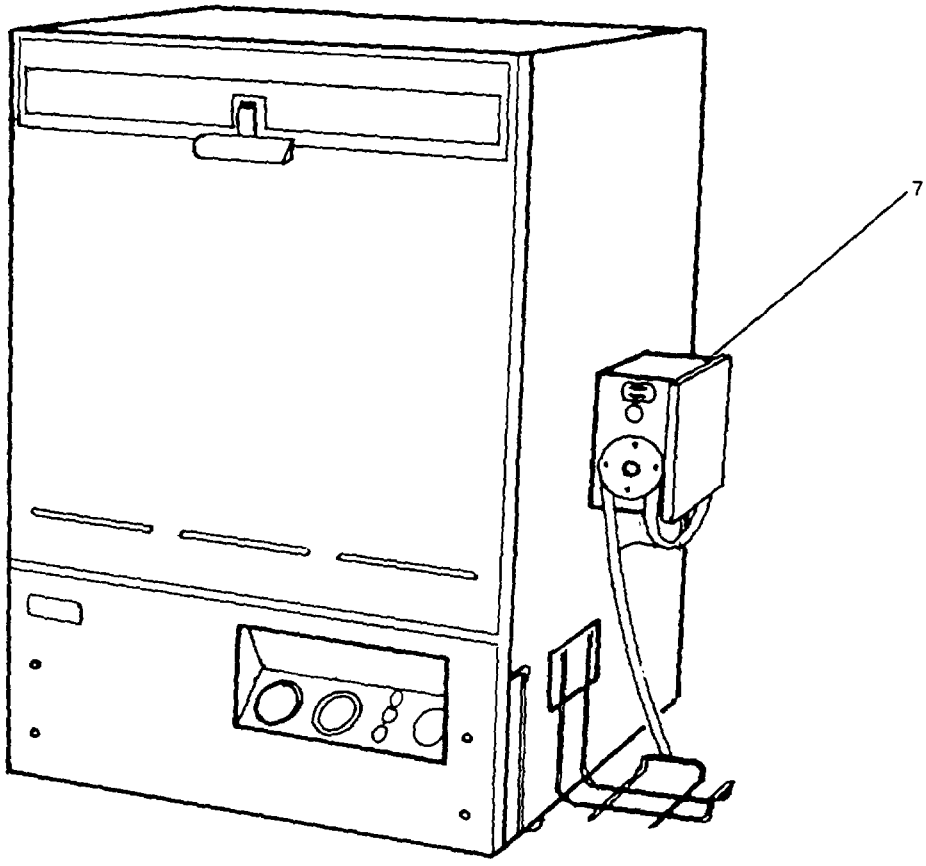


FIGURE 2-57. Dishwasher #FFW-1.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Foodwaste Disposer FD 2/50-2-E-4 (FIGURE 2-58)	
1	3 Position (F-OFF-R) Control Lever	Controller determines operation in forward or reverse mode. With the control lever in the F position, the disposer motor will rotate in the forward mode. With the control lever in the OFF position, the disposer motor will stop. With the control lever in the R position, the disposer motor will rotate in the reverse mode.
2	Control Unit	Unit containing electrical power feed and control of the disposer.

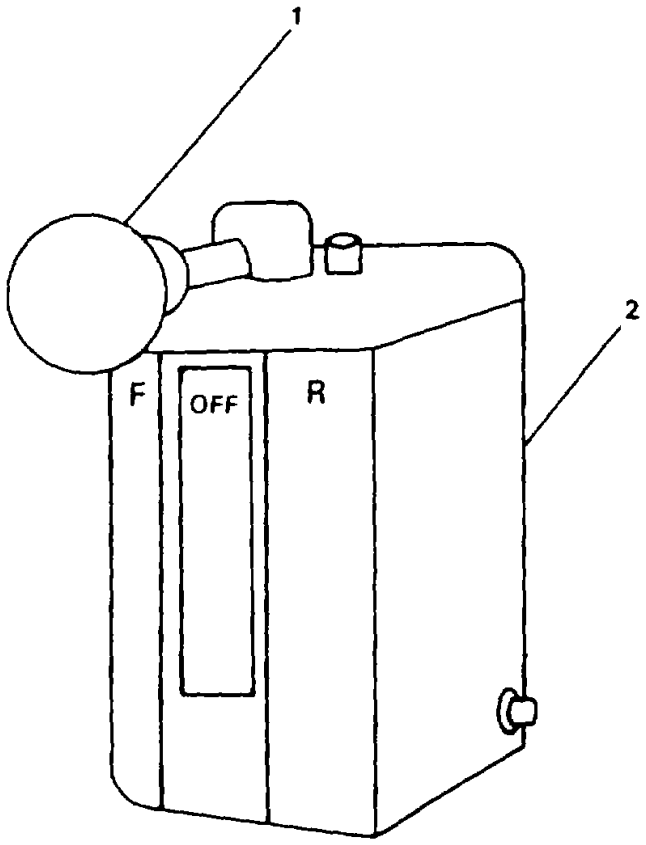


FIGURE 2-58. Foodwater Disposer FD 2/50-2-E-4.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Waste Compactor CTC-1 (FIGURE 2-59)	
1	OFF/ON START Key Switch	A key is required to move the switch from OFF to ON to START. Movement of switch to START actuates the ram for completion of a compactor cycle.
2	Caddy Handle	The caddy handle is inserted into the trash caddy to allow movement of the trash container.
3	Handle Locking Tabs	Secures the caddy handle in the trash caddy.
4	Container/Caddy Latches	Secures the trash caddy to the trash container in the vertical position.

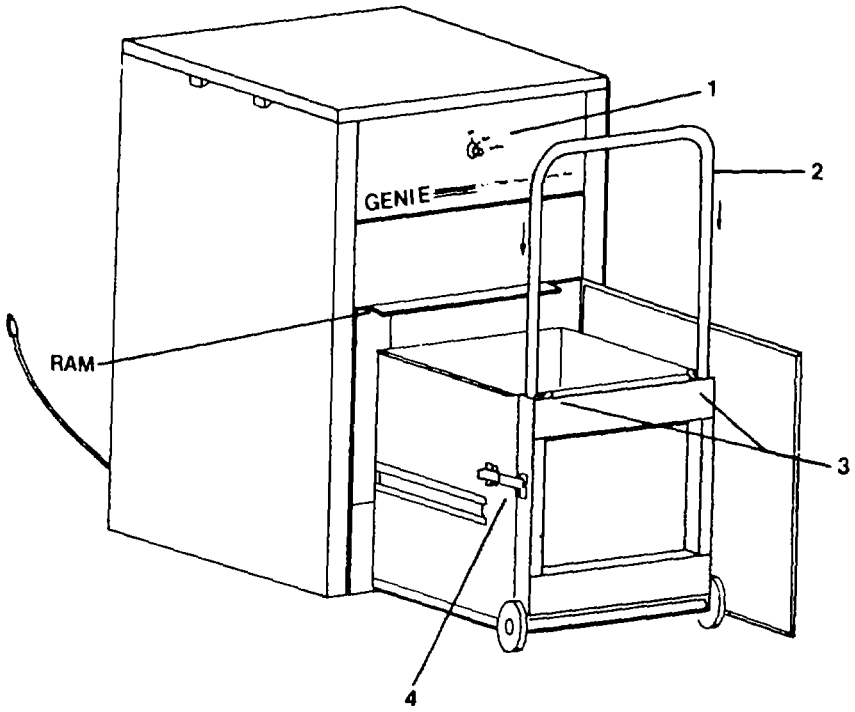


FIGURE 2-59. Waste Compactor GTC-1.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Sanitizing Sink Heater (FIGURE 2-60)	
1	LOW WATER REFILL and RESET Light	Illuminates when water level in heater reservoir is low (red).
2	POWER ON	Comes on when power switch is in ON position (green).
3	Sump Drain Handle	Opens and closes sump drain.
4	ON/OFF/RESET Switch	Controls operation of sanitizing sink heater.
5	Dial Thermometer	Shows temperature of water in heating reservoir.

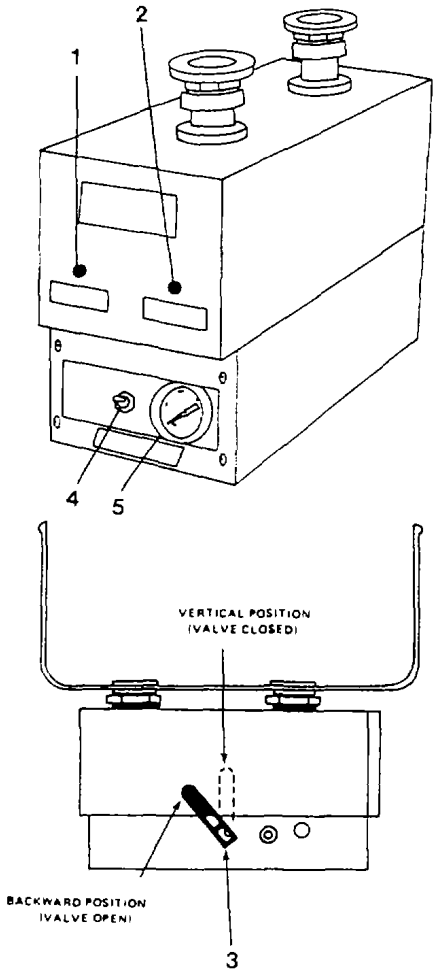


FIGURE 2-60. Sanitizing Sink Heater.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Marine Coffee Maker #QT-20 (FIGURE 2-61)		
1	ON-OFF Switch	The ON-OFF switch controls the heating element in the top warmer.
2	Indicator Light	When indicator light is red, the tap warmer is on.
3	Funnel	Contains the filter and fresh coffee.
4	Coffee Pot	Container for brewed coffee.
5	START Switch	Deflecting the START switch will start a brew cycle and allow water to flow into the tank.
6	Indicator Light	Red light indicates that power is on for the brewer and the bottom warmer is on.
7	ON-OFF Toggle Switch	The ON-OFF toggle switch turns power ON or OFF to the brewer and the bottom warmer.
8	Coffee Pot Guard	Keeps coffee pot on warmer during heavy seas.

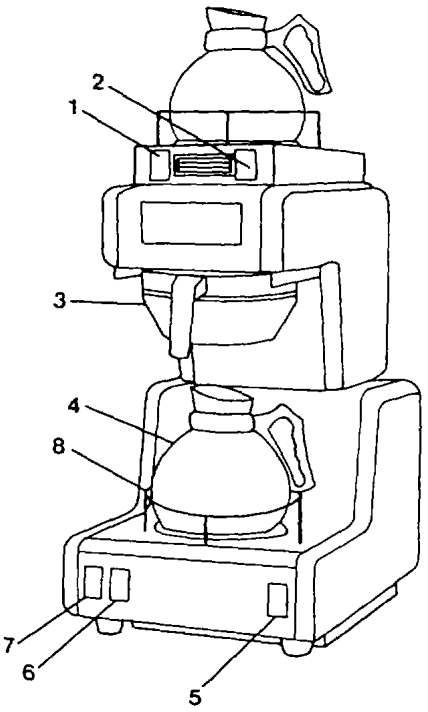


Figure 2-61. Marine Coffee Maker #QT-20

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Milk Dispenser NSF-SK-2 (FIGURE 2-62)	
1	Thermometer	Gives a continuous reading of temperature in the dispenser.
2	Dispensing Valve	Movement of the dispensing valve will discharge milk from the holding container.
3	Thermostat	Allows adjustment of the temperature in the dispenser.

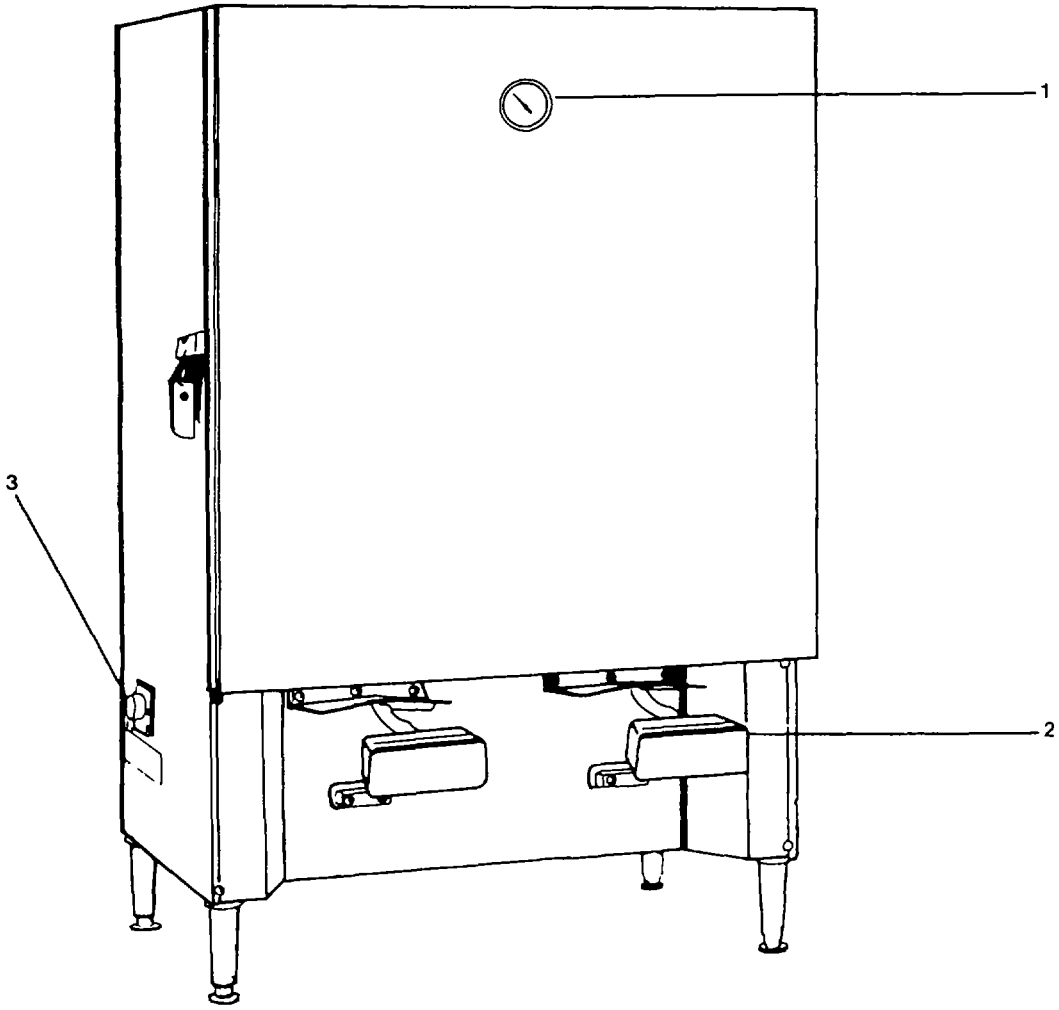


FIGURE 2-62. Milk Dispenser NSF-SK-2.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Toaster 1D2-S (FIGURE 2-63)	
1	Operating Lever	When depressed, activates toaster heating elements while lowering product for toasting.
2	Release Lever	Allows operating lever to be manually released when depressed.
3	Color Selection Knob	Knob to adjust from light to dark to determine color of toast desired.
4	Crumb Tray	The crumb tray is removed for cleaning by pulling straight out.

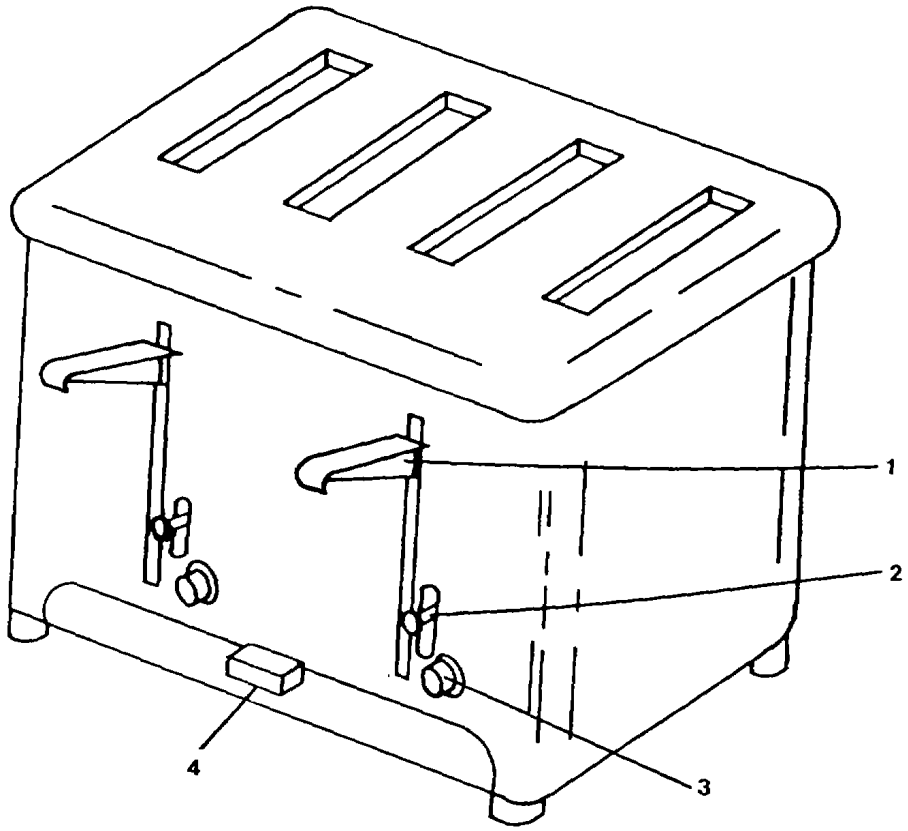


FIGURE 2-63. Toaster 1D2-2.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Marine Range #325-1M and #325-4M (FIGURE 2-64)		
1	Round Speed Unit	Provides four separate heating elements for light duty sauce pans and small stock pots. Temperature range 0-800 degrees F.
2	Grill Plate	Provides heated surface for heavy and light frying. Temperature range 0-550 degrees F.
3	Range	The range is provided with an upper heating unit and a lower heating unit separated by a metal deck. The separate units are controlled by thermostats. Thermostats contain a rod pilot light which is on when the elements are energized.
4	Grill Plate Unit Controls	Automatic thermostats for control of grill plate units. Thermostats contain a red pilot light which is on when the elements are energized.
5	Range Controls	Each heating unit is independently regulated for proper ratio of "top" and "bottom" heat, to suit the product being baked or roasted, by means of two 3-heat switches located in the panel at the right of the range.
6	Automatic Temperature Control	The automatic temperature control establishes the average temperature to be maintained in the range oven.
7	Round Speed Unit Controls	Automatic thermostats for control of top plate units. Thermostats contain a red pilot light which is on when the elements are energized.

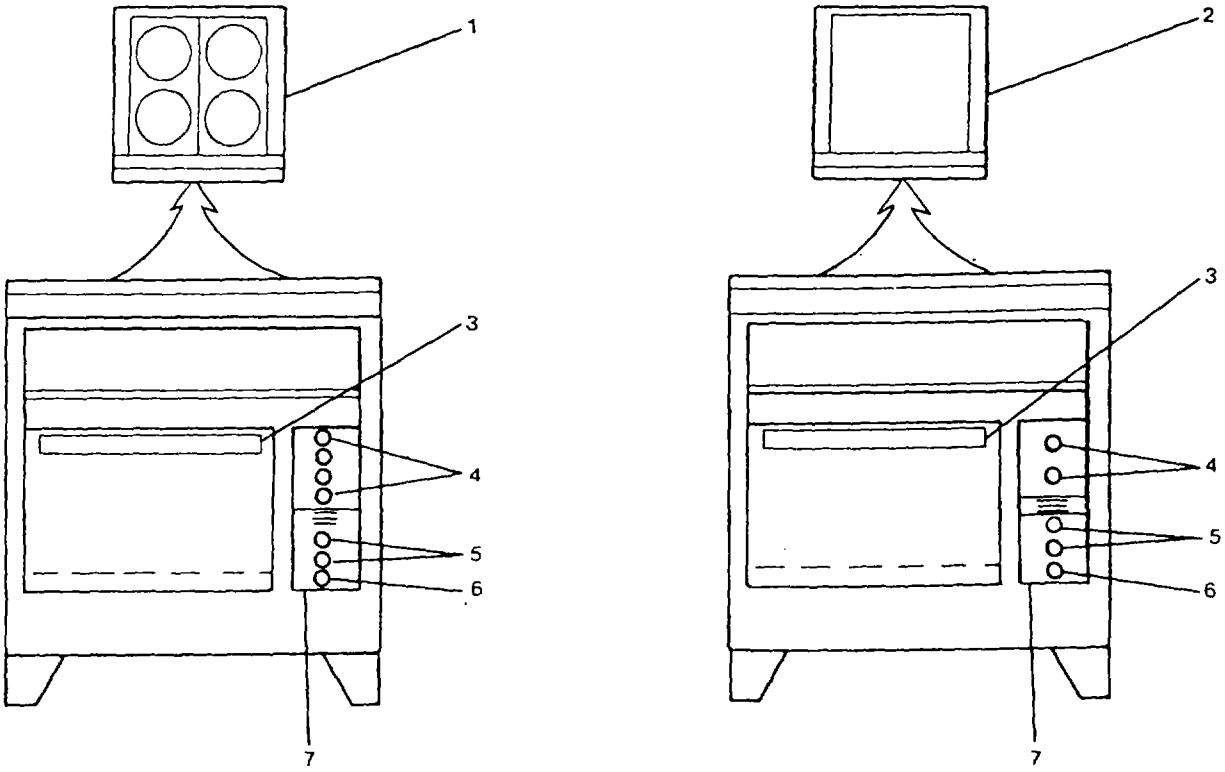


FIGURE 2-64. Marine Range #325-1M and #325-4M.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Exhaust Ventilator Control Cabinet (FIGURE 2-65)	
1	Cabinet Door	Allows access to electrical system controls and the detergent pump system.
2	STOP/START Pushbuttons	START button places ventilator in operation. STOP button stops the ventilator and automatically starts the cleaning cycle.

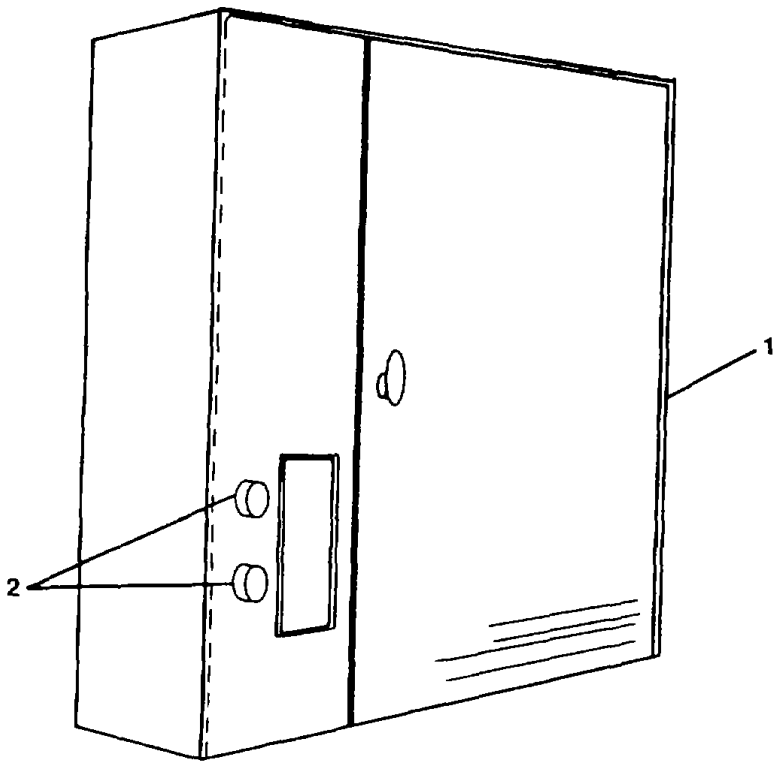


FIGURE 2-65. Exhaust Ventilator Control Cabinet.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Ships Store Refrigeration (FIGURE 2-66)		
1	Power Switch	Applies power to freeze room system when set to up (ON) position. To shut off power, set switch to down (OFF) position.
2	Power Switch	Applies power to chill room system when set to up (ON) position. To shut off power, set switch to down (OFF) position.
3	Compressor	Provides refrigeration to chill room.
4	Crankcase Oil Sight Glasses	Permits observation of crankcase oil levels. Levels, when shut down, should be at or slightly above center line.
5	Compressor	Provides refrigeration to freeze room.
6	In-Line Valve Controls	Provides for closing of liquid refrigerant lines.
7	Liquid Refrigerant Sight Glasses	Permits observation of liquid refrigerant flow.
8	Condenser Unit - Chill Room	Provides continuous condensation of chill room system cycle.
9	Condenser Fan Blades	Provides cooling for condensers.
10	Condenser Unit - Freeze Room	Provides continuous condensation of freeze room system cycle.
11	Unit Coolers	Provides for absorption of heat from chill room and/or freeze room.
12	Thermostats	Controls room temperature by starting and stopping compressors by following settings: Chill Room 34 degrees F Freeze Room -10 degrees F

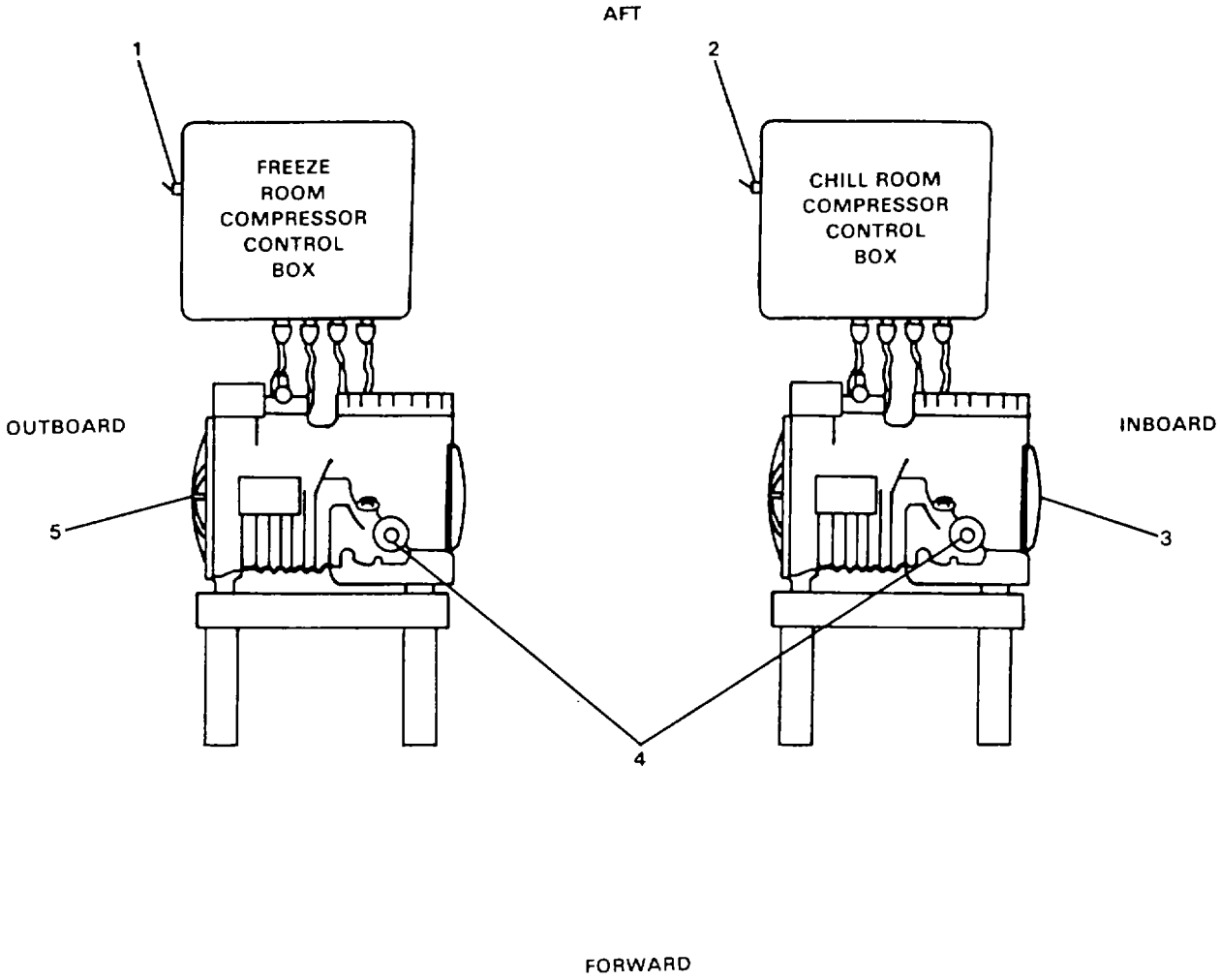


FIGURE 2-66. Ships Store Refrigeration (Sheet 1 of 4).

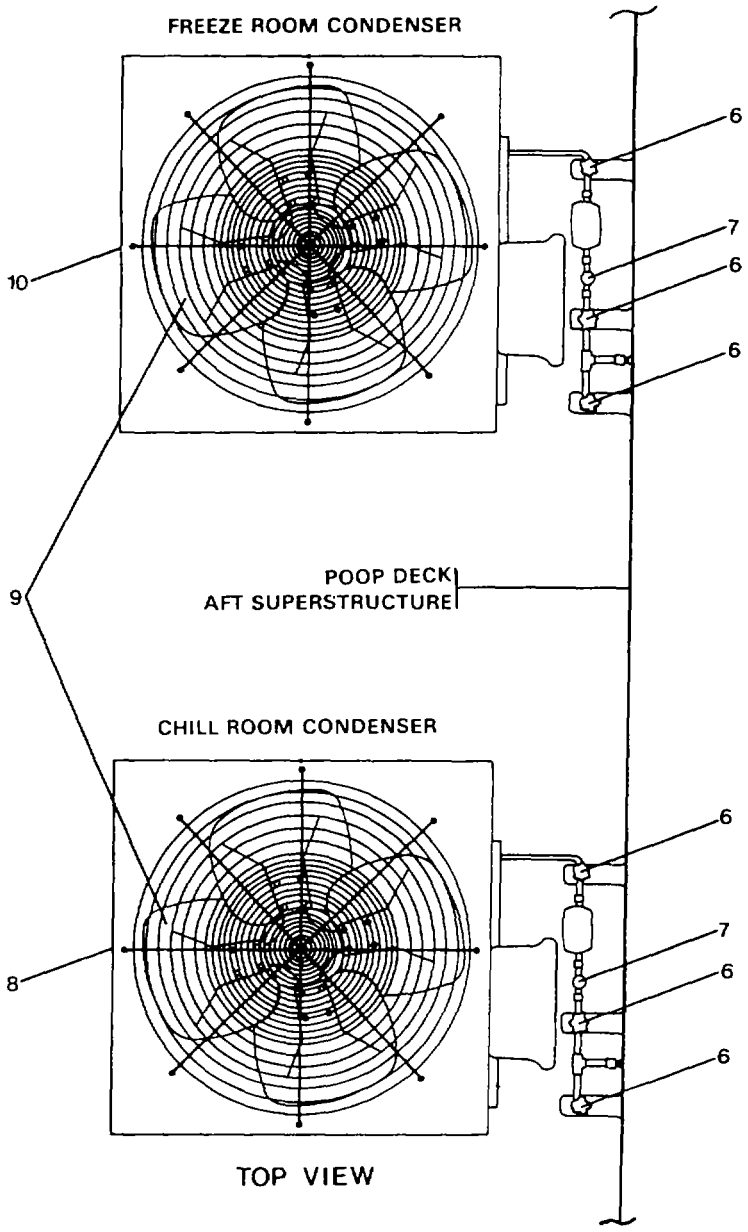


FIGURE 2-66. Ships Store Refrigeration (Sheet 2 of 4).

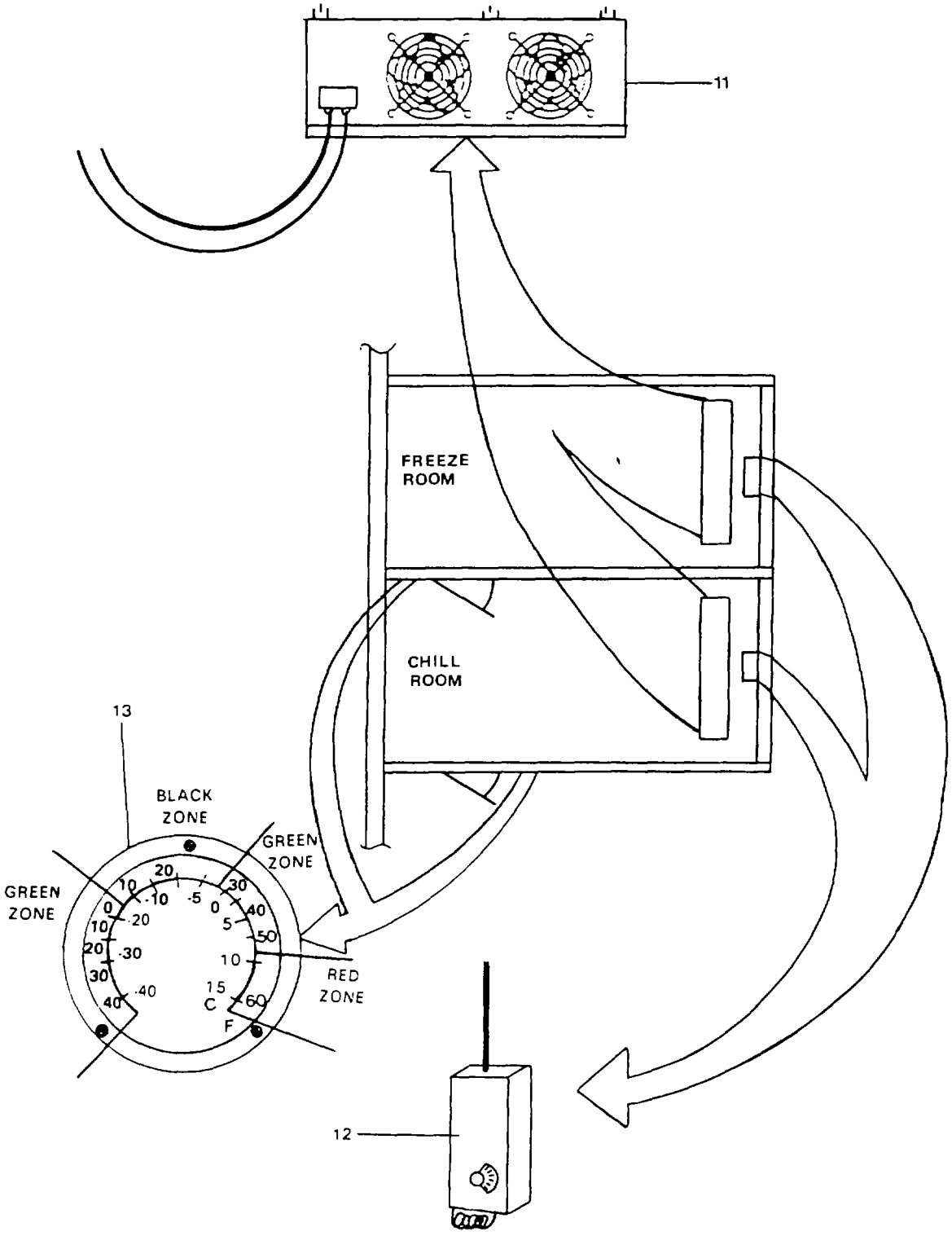


FIGURE 2-66. Ships Store Refrigeration (Sheet 3 of 4).

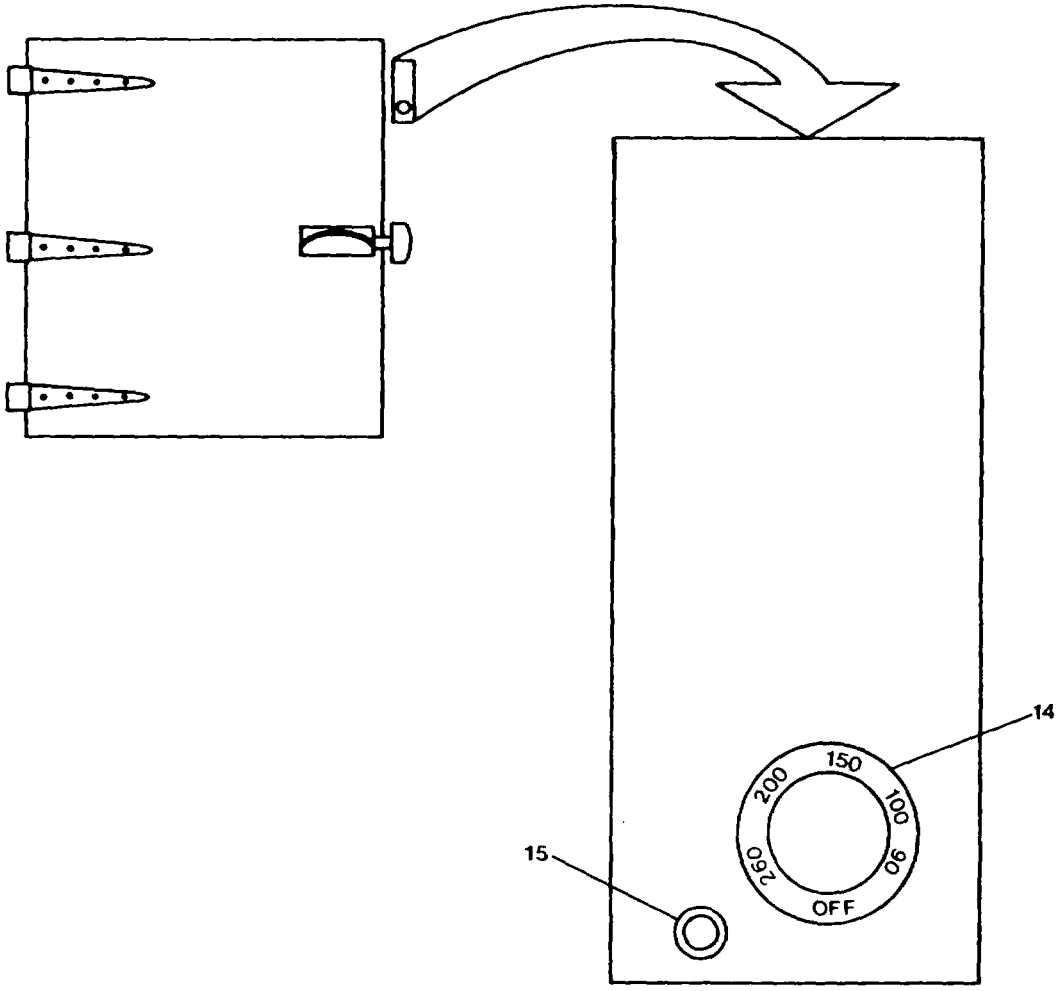


FIGURE 2-66. Ship's Store Refrigeration (Sheet 4 of 4).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Ships Store Refrigeration (FIGURE 2-66) - continued	
13	Thermometers	Provides indication of freeze room and chill room temperature. Temperature is indicated on scale of degrees F and degrees C.
14	Thermostat	Regulates temperature of door gasket.
15	Indicator Light	Illuminates when heater is operating.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Handling Davit Controls (FIGURE 2-67)		
1	Access Cover	Allows access to storage compartment by turning CCW and removing.
2	Storage Compartment	Provides storage area for remote winch control and power cord.
3	Instruction Placard	Placard reads "BOOM SUPPORT PIN MUST BE ENGAGED BEFORE ACTIVATING DAVIT."
4	Boom Support Pin Recess	Recessed stowage for boom support pin.
5	Locking Thumb-Screw	Locks retainer tab on boom support pin, securing boom support pin in its recess.
6	Locking Thumb-Screw	Locks retainer tab on boom support pin, securing boom support pin in the engaged position.
7	115 Volt AC Electrical Power Socket	Provides point for connecting electrical power cord.
8	Electrical Power Cord	Supplies electrical power for winch from vessel's 115 volt AC system.
9	Hole in Boom Support	Receives boom support pin.
10	Boom Support Pin	When placed into hole in boom support, prevents telescoping action, thus supporting davit boom and load. When removed, allows boom support to telescope, which permits lowering of davit boom for stowing.
11	Retainer Tab on Boom Support Pin	When secured by thumb screw, retains boom support pin in either the stowed or engaged position.
12	Remote Electric Winch	Contains electric IN-OFF and Control OFF-OUT switch. Allows operator to move about while controlling winch haul in and pay out operation.

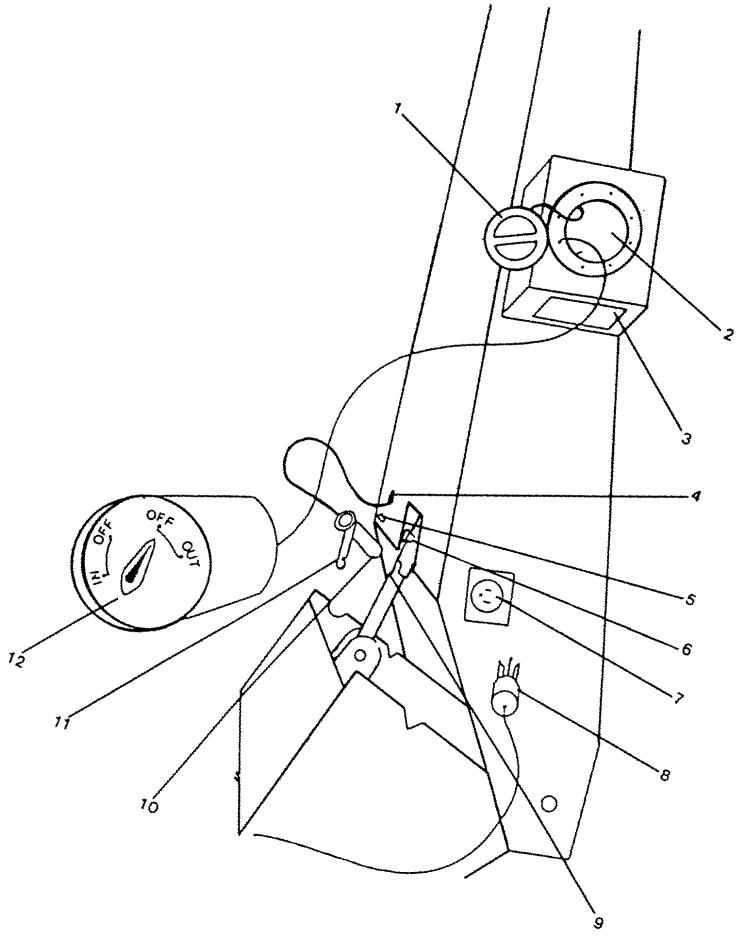


FIGURE 2-67. Handling Davit Controls (Sheet 1 of 2).

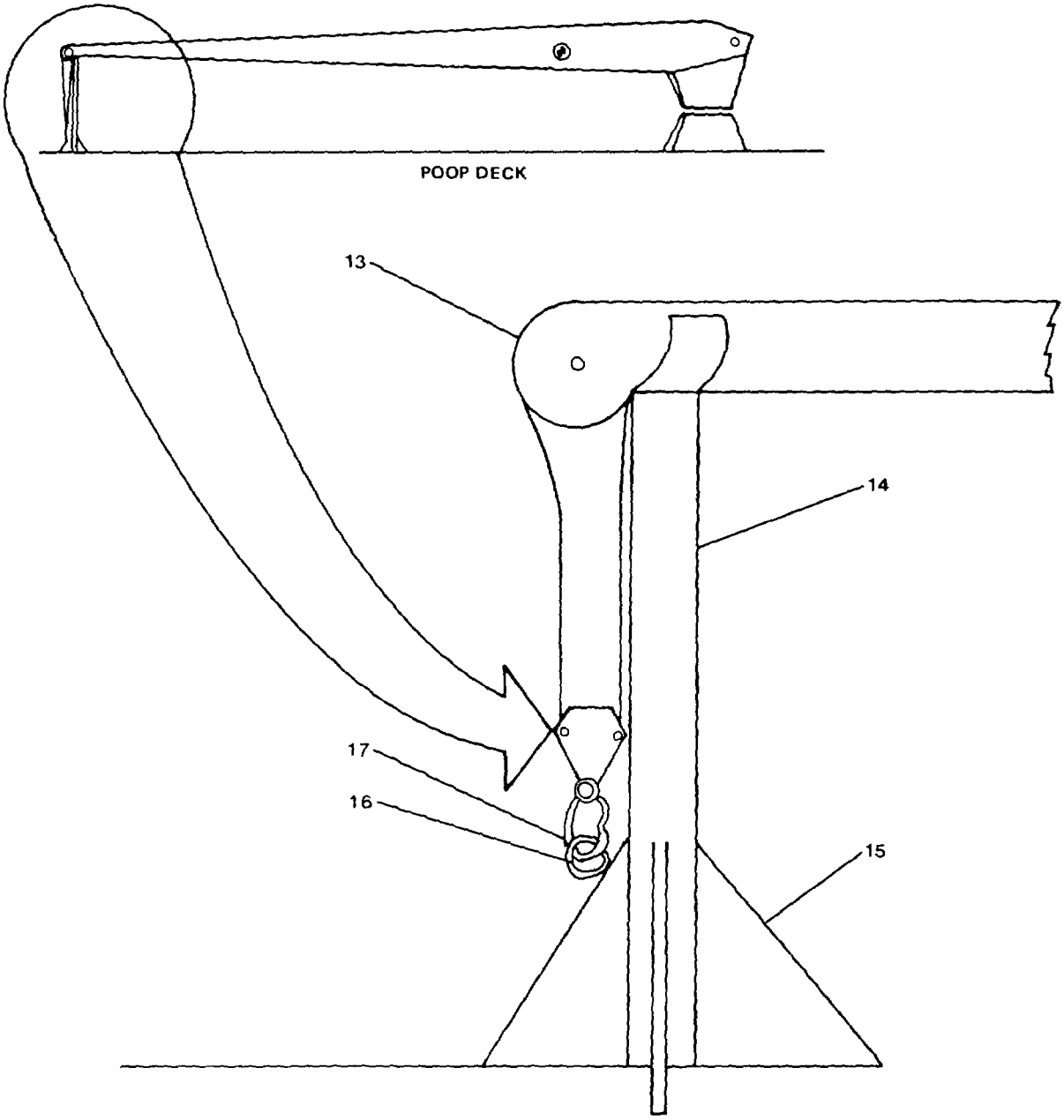


FIGURE 2-67. Handling Davit Controls (Sheet 2 of 2).

Key	Control or Indicator	Function
Handling Davit Controls (FIGURE 2-67) (Continued)		
13	Davit Boom (Stowed Position) and move load.	Elevates to 45 degree angle to lift
14	Davit Boom Rest	Supports davit boom in stowed position.
15	Davit Boom Rest Base	Supports davit boom.
16	Lifting Hook Keeper	Secures lifting hook to davit boom rest base.
17	Davit Boom Lifting Hook	Attaches davit winch cable to load.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Watertight Rotating Beacon (FIGURE 2-68)	
1	Guard	Protector for glass cover.
2	Glass Cover (Amber)	Provides proper illumination.
3	Dome	Cover for rotating lamp.
4	Rotating Beacon	Mounted in engine room and emergency generator room.

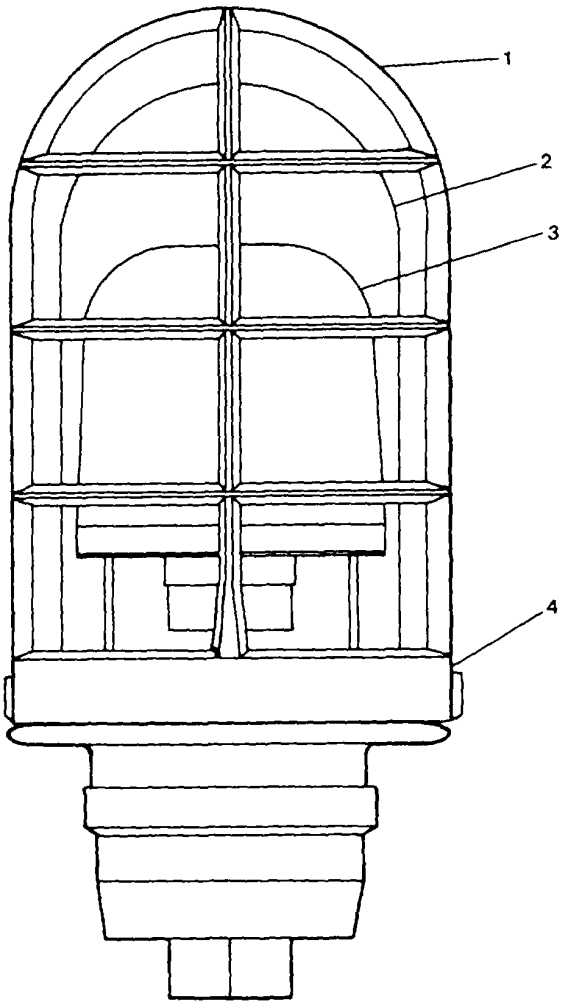


FIGURE 2-68. Watertight Rotating Beacon.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Fire Alarm Box (FIGURE 2-69)	
1	Pull Lever	Used to initiate a fire alarm.

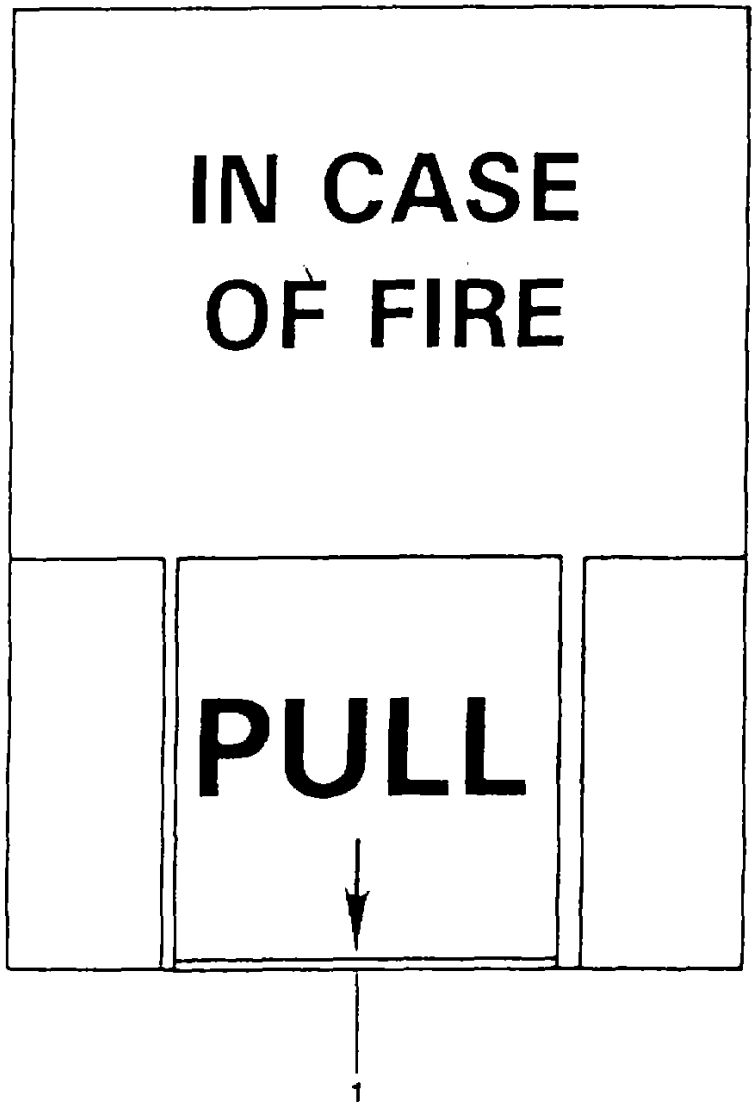


FIGURE 2-69. Fire Alarm Box.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Remote Lamp (FIGURE 2-70)	
1	Red Light Indicator	Used to signal a fire in one of 7 high hazard areas.

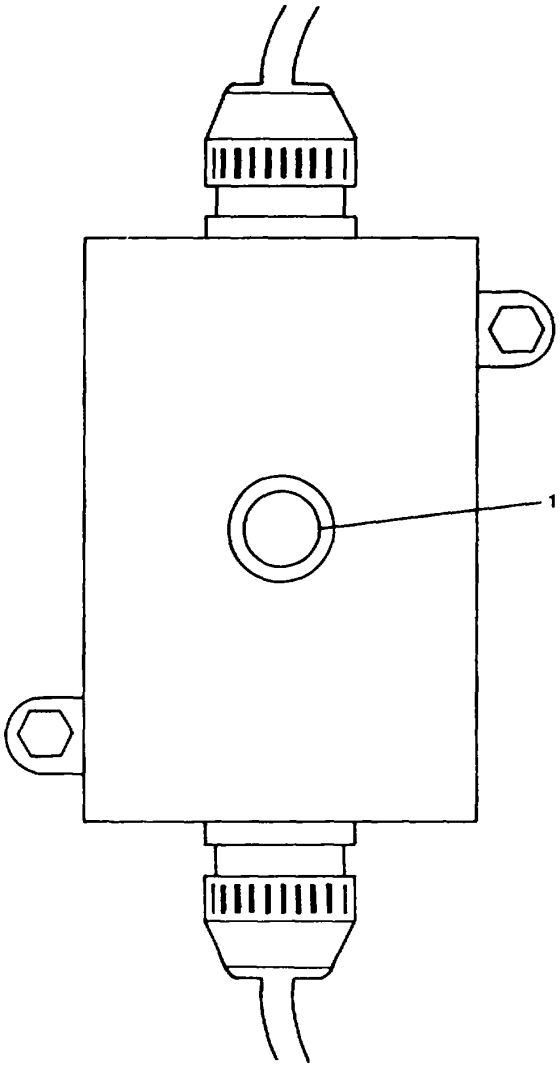


FIGURE 2-70. Remote Lamp.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Firemain and Accessories Controls (FIGURE 2-71)	
1	WYE Gate Valve	Opens/closes water flow to individual hoses.
2	Nozzle Valve	Shut - stops flow of water. Fog - directs water to fog jet. Open - directs water to single stream outlet.
3	Fog Outlet Plug	Provides outlet for attaching 4-foot and 12-foot applicators.
4	Control Valve	Opens/closes water flow to WYE valve.

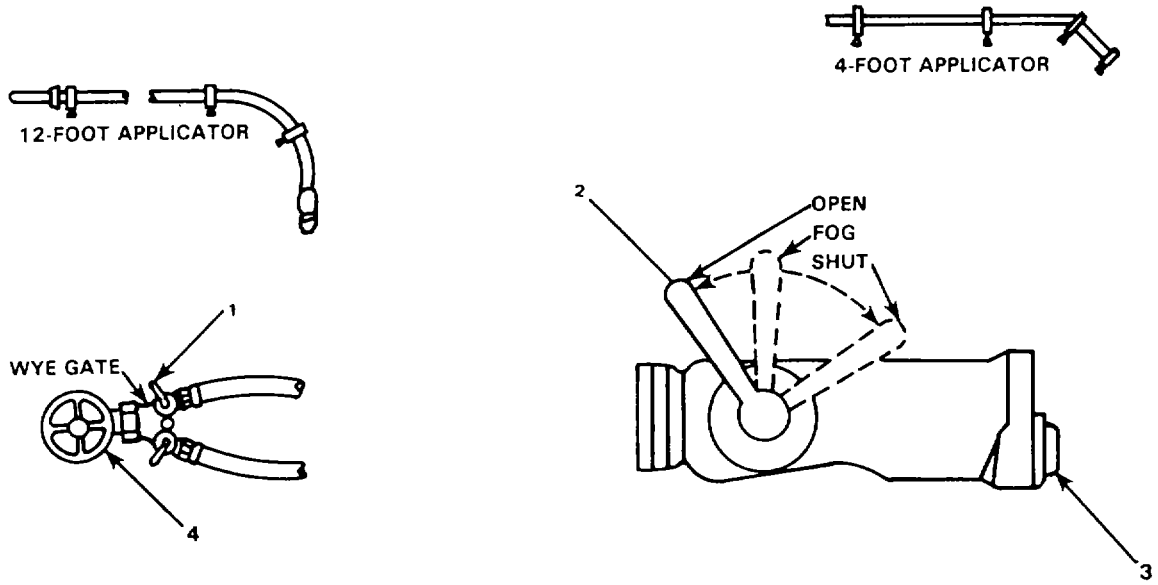


FIGURE 2-71. Firemain and Accessories Controls.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Hose Reel Station Controls (FIGURE 2-72)	
1	Quick Acting Valve	Opens C02 supply to hose and horn.
2	Horn Shutoff Valve	Provides local control of discharge.

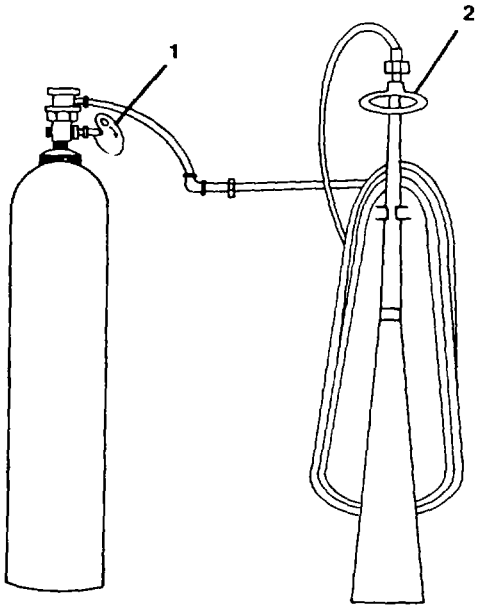


FIGURE 2-72. Hose Reel Station Controls.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Dry Chemical Fire Extinguisher (FIGURE 2-73)	
1	Pull/Pin Visual Seal	Prevents accidental discharge. Visual seal missing or broken indicates tampering.
2	Squeeze Grip	Squeeze to discharge fire-fighting agent.
3	Gauge	Provides visual indication of extinguisher pressure.
4	Hose Nozzle	Directs agent to base of fire.

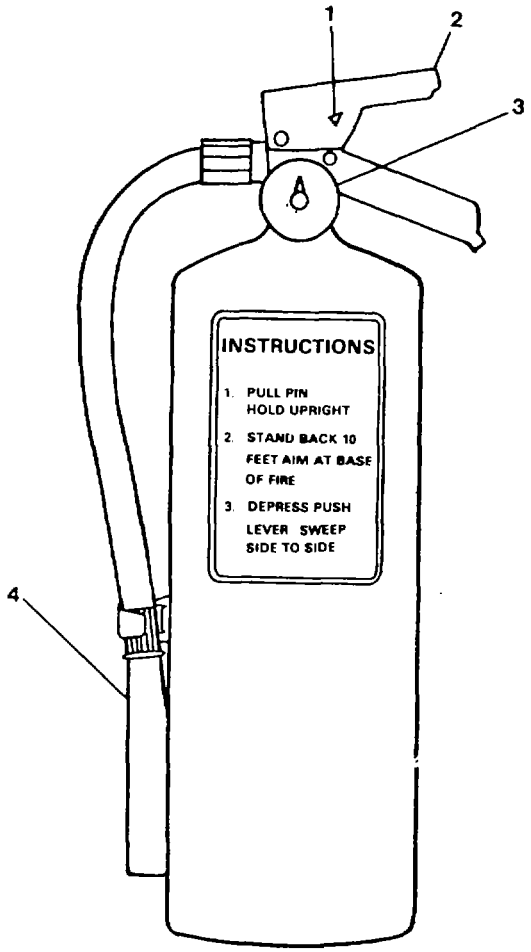


FIGURE 2-73. Dry Chemical Fire Extinguisher.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Oxygen Breathing Apparatus (OBA) (FIGURE 2-74)	
1	Timer	Provides a check of time remaining. Timer's bells will ring for 8-10 seconds continuously.
2	Pressure Relief Valve and Pull Tab	Vents overpressure automatically. Tab provides manual release.
3	Canister Release Tab	Releases canister from harness.
4	Canister Seal	Protects chemicals from moisture until canister is ready for use.
5	Candle Cover	Protects candle when not in use.
6	Lanyard	Releases candle firing pin when pulled.

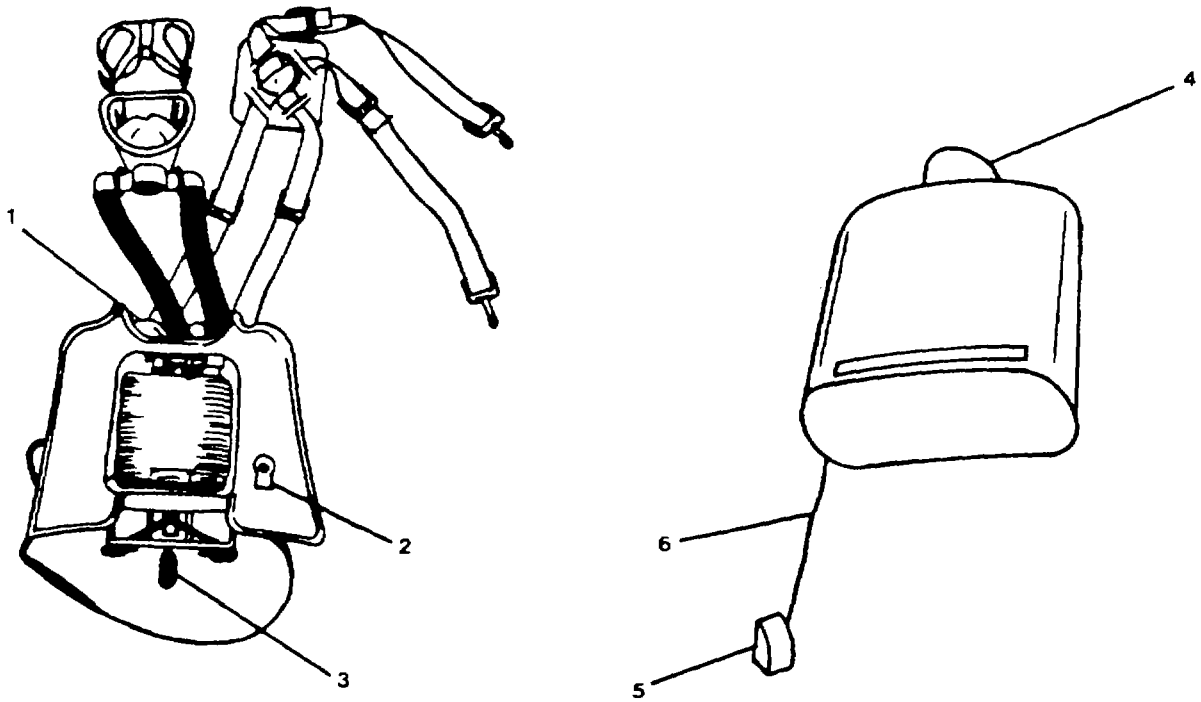


FIGURE 2-74. Oxygen Breathing Apparatus.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Portable Salvage (Fire) Pump (FIGURE 2-75)	
1	Electrical Cable	Connects pump motor to power supply.
2	Handle	Lowers and raises pump.
3	Motor	Submersible pump motor.
4	Discharge Hose Outlet	Connects discharge hose.
5	Strainer	Protects pump from foreign matter.

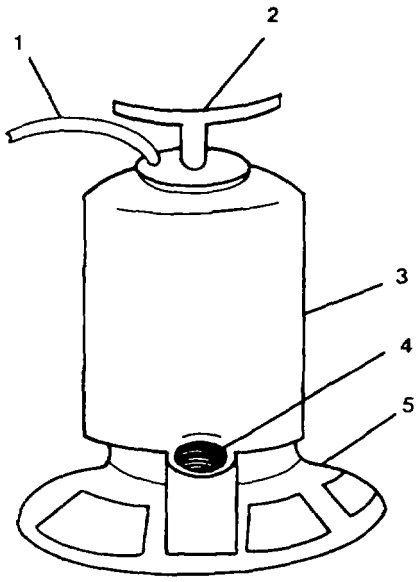


FIGURE 2-75. Portable Salvage (Fire) Pump.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Air Compressor (FIGURE 2-76)	
1.	ON-OFF	Turns power 6N or OFF to motor controller.
2.	RUN	Lights green to indicate air compressor #2 running.
3.	HAND-OFF-AUTO	HAND position provides continuous operation of air compressor 12. OFF position stops air compressor, AUTO position provides automatic operation of air compressor 12.
4.	Pushbutton	Reset pushbutton for motor controller, (blue).

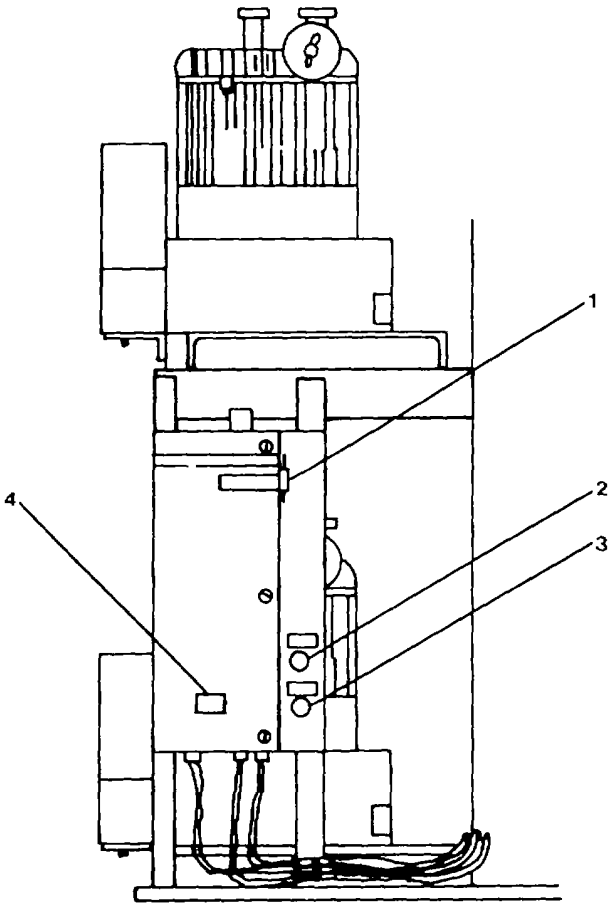


FIGURE 2-76. Air Compressor Set.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Arc Welder (FIGURE 2-77)	
1	CURRENT CONTROL	Indicates output current at NEMA arc voltage.
2	CURRENT DIAL SELECTOR	Switches between A and B range controls on the two Current Control Dial scales.
3	ARC FORCE CONTROL	Calibrated from one to ten. Low settings provide less short circuit current and softer arc. High settings provide higher short circuit arc.
4	Warning Plate	Lists all warnings.
5	RED Power Light	Indicates power is on and electrodes are live.
6	ON/OFF POWER SWITCH	Switches power ON and OFF.
7	Positive Electrode Connection	Connects positive lead from electrode.
8	Negative Electrode Connection	Connects negative lead from electrode.
9	CURRENT CONTROL Switch	Selects between current control at R3R or current control remote.

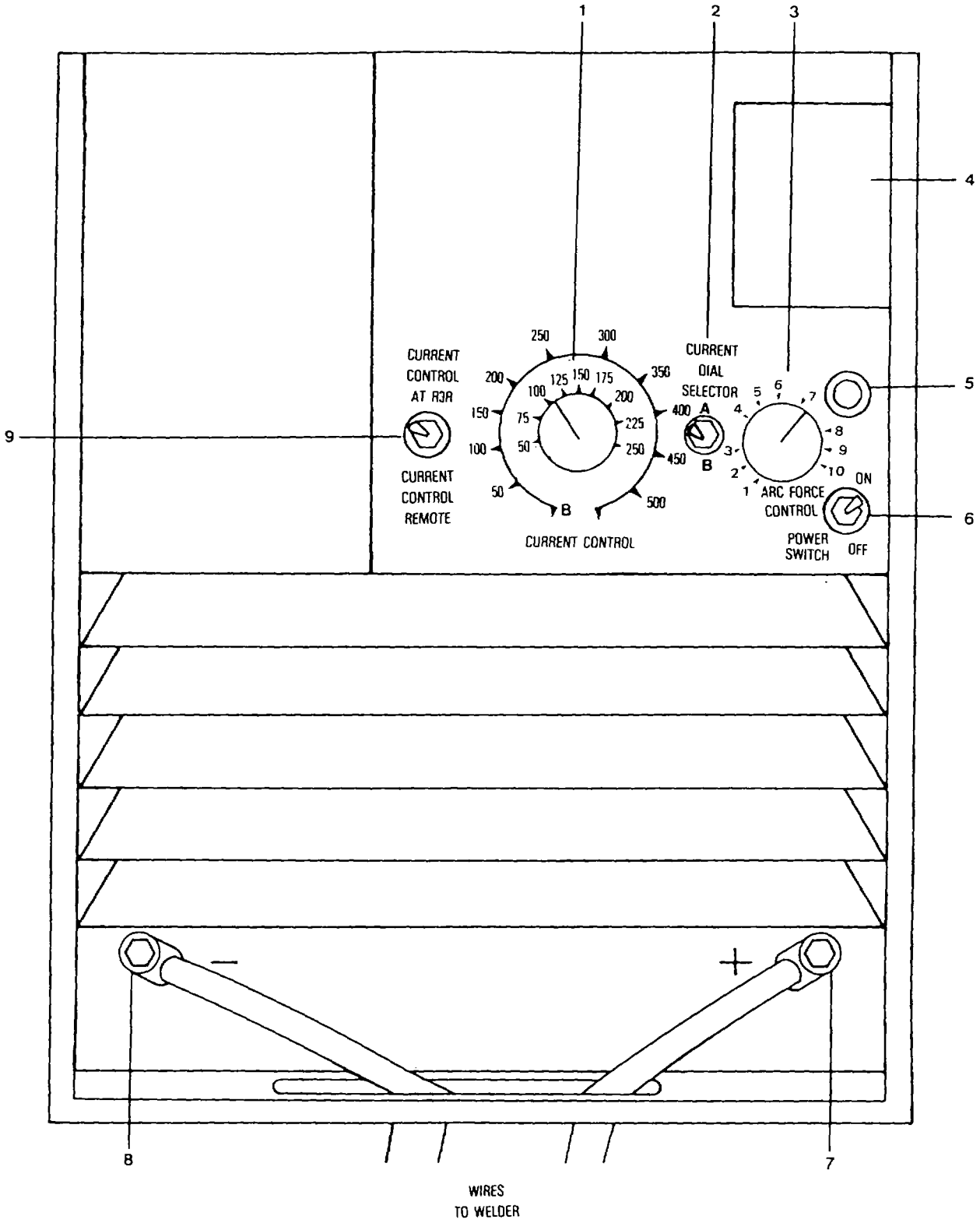


FIGURE 2-77. Arc Welder.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Heating Air Conditioning Ventilation System (FIGURE 2-78)	
1	STOP	Pushbutton (Red) stops circulating pump.
2	START	Pushbutton (Black) starts circulating pump.
3	RUN	Indicator illuminates when system is running.
4	START	Pushbutton starts sea water pump.
5	STOP	Pushbutton stops sea water pump.
6	Compressor Control Switch	Turns each compressor ON or OFF.
7	OFF-HI-MED-LO	Controls speed of air conditioner/ heater fan.
8	WARMER COOLER	Thermostat controls desired temperature.
9	COOL HEAT	Air Selector selects air conditioner or heat as desired.
10	OFF-HI-MED-LO	Controls speed of air conditioner/ heater fan.
11	HEAT OFF COOL	Air Selector selects air conditioning or heat as desired.
12	Thermostat	Controls desired temperature.
13	Thermostat	Controls desired temperature.
14	OFF-HI-MED-LO	Controls speed of air conditioner/ heater fan.
15	Thermostat	Controls desired temperature.
16	ON-OFF	Turns heater ON or OFF.

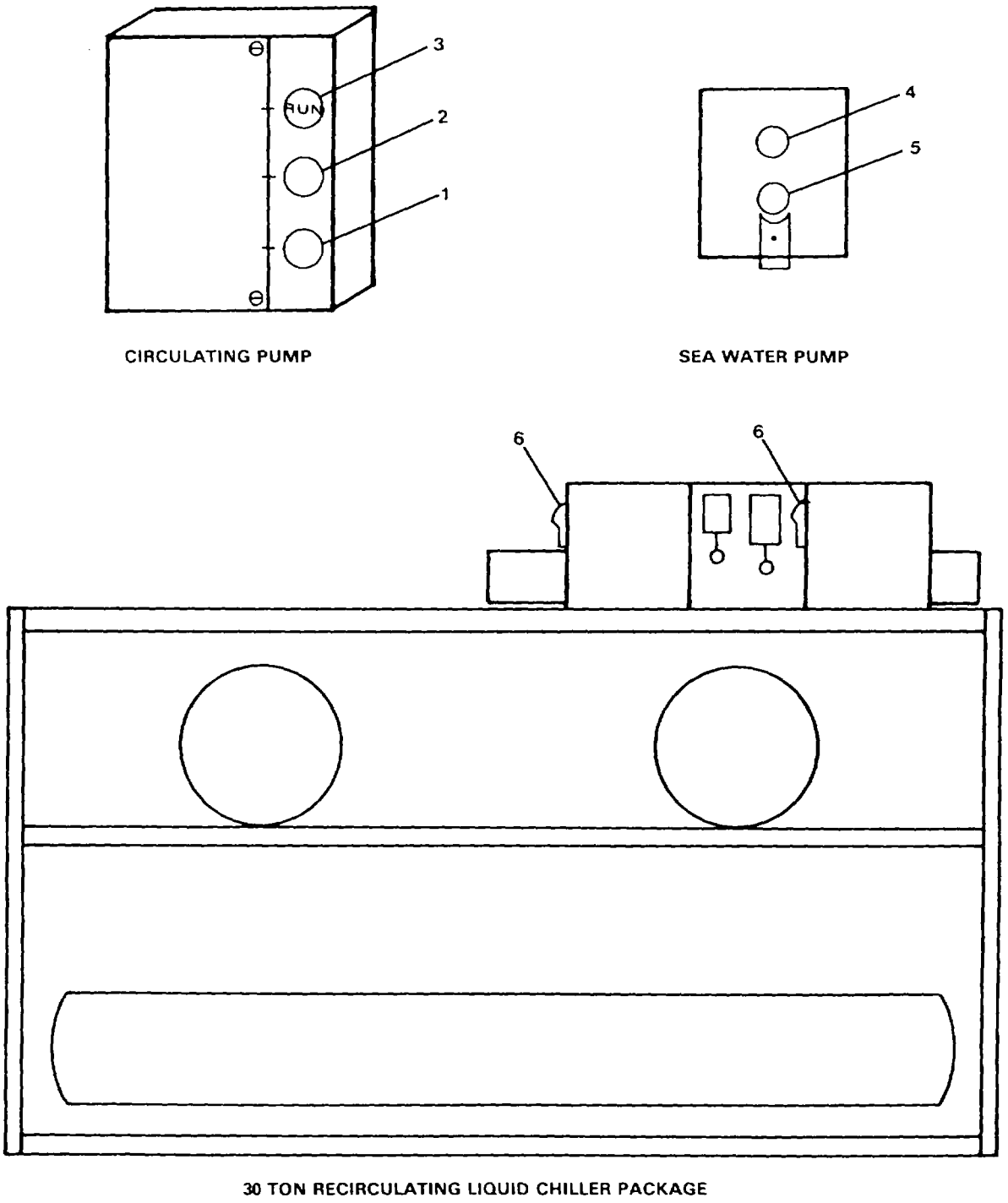
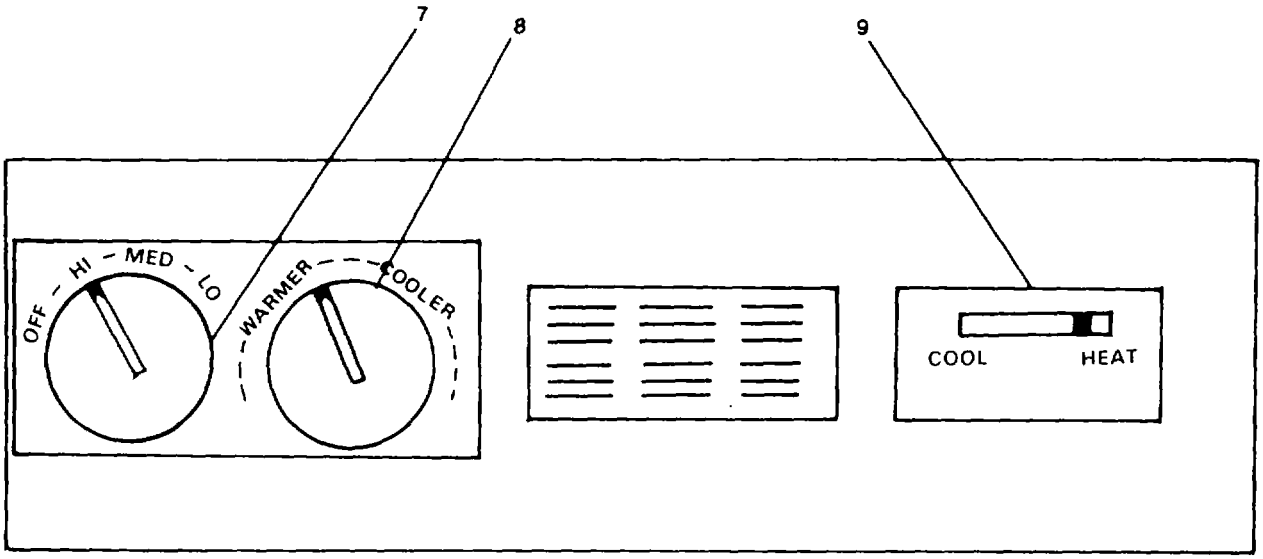
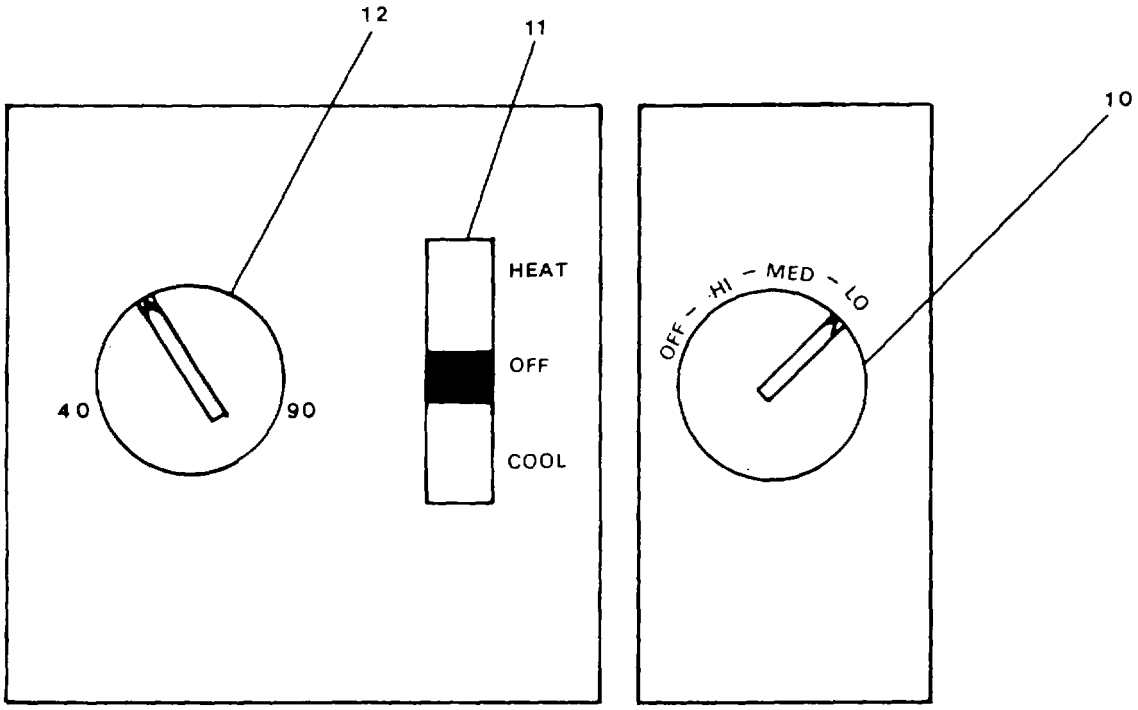


FIGURE 2-78. Heating Air Conditioning Ventilation System (Sheet 1 of 3).



CARRIER 42 VF FAN COIL UNIT CONTROLS
ENLISTED STATEROOM



CARRIER 42 CG FAN COIL UNIT CONTROLS
OFFICER STATEROOM

FIGURE 2-78. Heating Air Conditioning Ventilation System (Sheet 2 of 3).

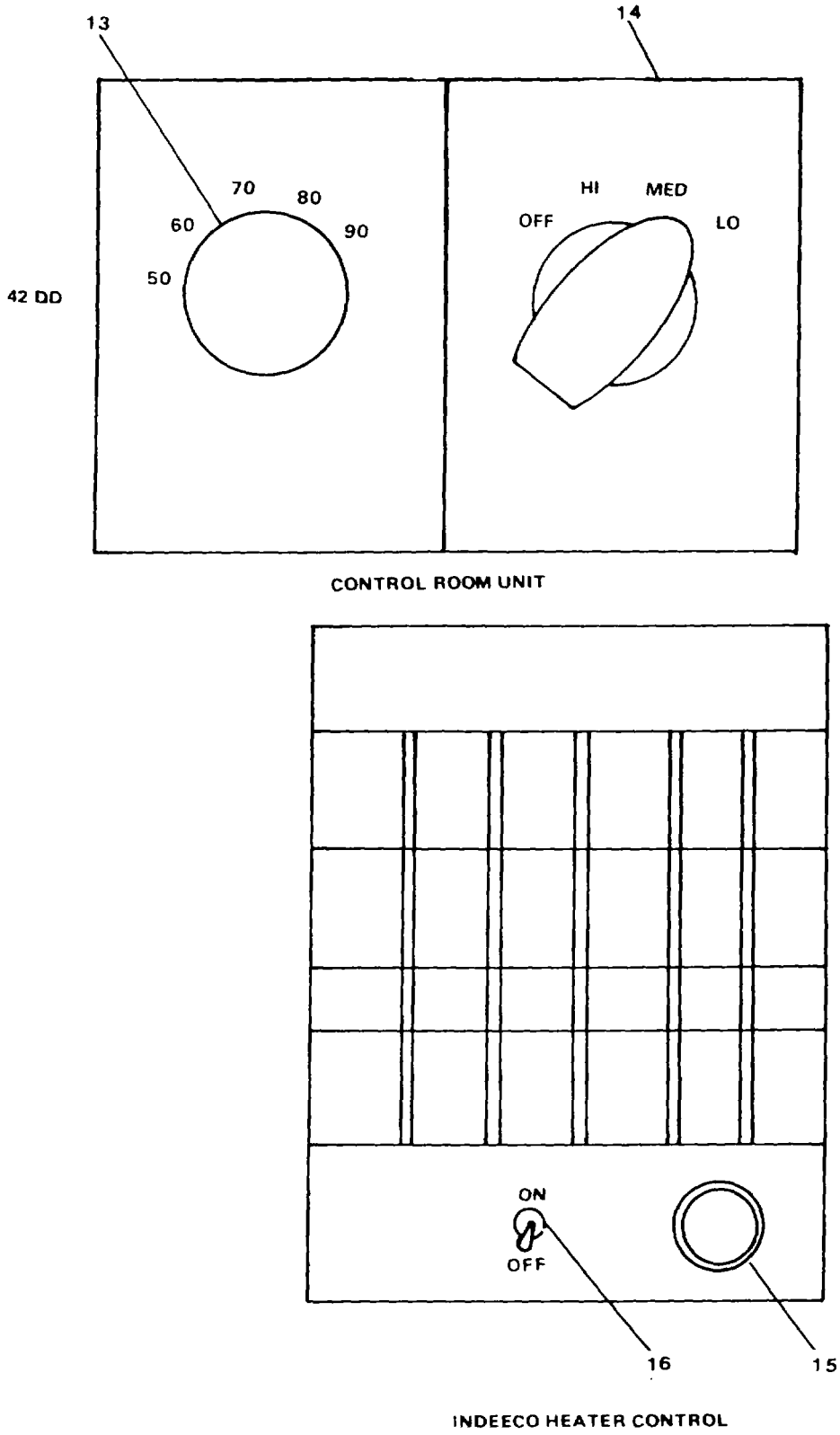


FIGURE 2-78. Heating Air Conditioning Ventilation System (Sheet 3 of 3).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Liferaft Release System (FIGURE 2-79)		
1	Retrieval Line	Enables davit operator to pull back raft hook after raft release.
2	Cable Stop	Prevents damage to davit hook by stopping cable retrieval at sheave.
3	Hook Release Lanyard	Activates automatic raft hook if automatic feature fails.
4	Automatic Raft Hook (Shown Closed Around Raft Lifting Ring)	Disengages as soon as raft is afloat on water.
5	Automatic Raft Hook (Shown Open With Release Lanyard Attached)	If automatic feature fails, hook opens when released lanyard is pulled.
6	Release Handle	First pull on handle releases raft from container and vessel. Second pull on handle releases centrifugal brake permitting raft to descend to water.

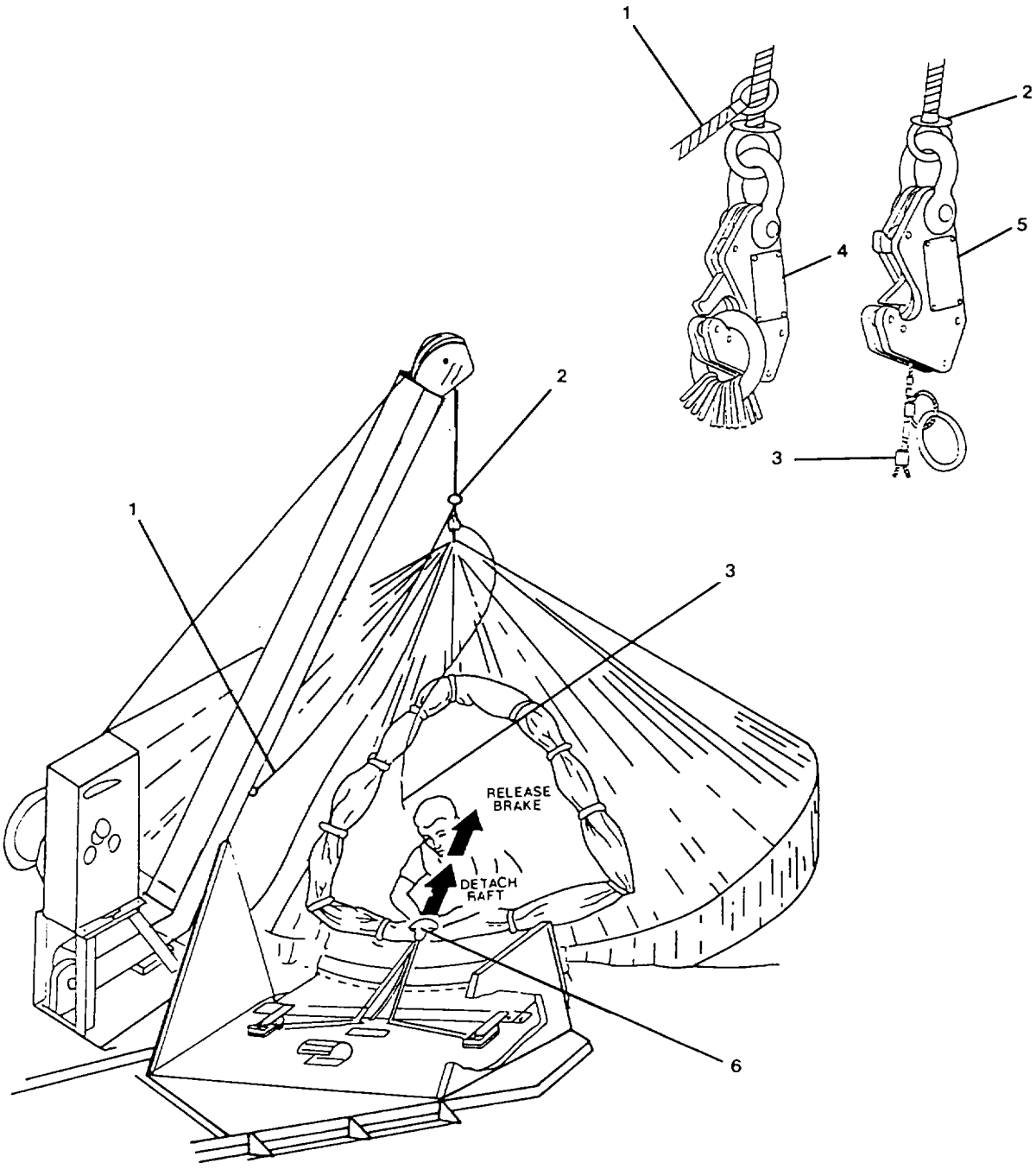


FIGURE 2-79. Liferaft Release System.

Key	Control or Indicator	Function
	Liferaft Deployment System (FIGURE 2-80)	
1	Container Deployment Chain (Shown in Stowed Position)	Provides means of deploying liferaft container from stowed position.
2	Pin Retainer Assembly	Provides means of attaching the liferaft container to the roll frame assembly for davit deployment.
		CAUTION **If pin retainer assembly is not secured to roll frame assembly, liferaft will not deploy properly in davit deployment.**
3	Hairpin	Provides means for readying liferaft container for float-free deployment. Hairpin is normally removed from pin retainer for float-free deployment.
4	Hydrostatic Release	If liferaft has not been davit deployed or manually deployed, the hydrostatic release will deploy the raft at the appropriate depth below the surface.
5	Cylinder Lanyard	Automatically engages the cylinder that inflates the liferaft.
6	Containment Pins	Removed from the stowed positions before deployment (not shown) and inserted in the deployed positions (as shown) for davit deployment.
7	Container Lid Retainer Pins	Secures container cover to container base. Automatically pulled free when container cover is removed.
8	Velcro Cover	Provides access to raft liftring inside.
9	Remote Brake Release Cable	Connects release handle in container bottom to remote brake release cable in liftraft davit.

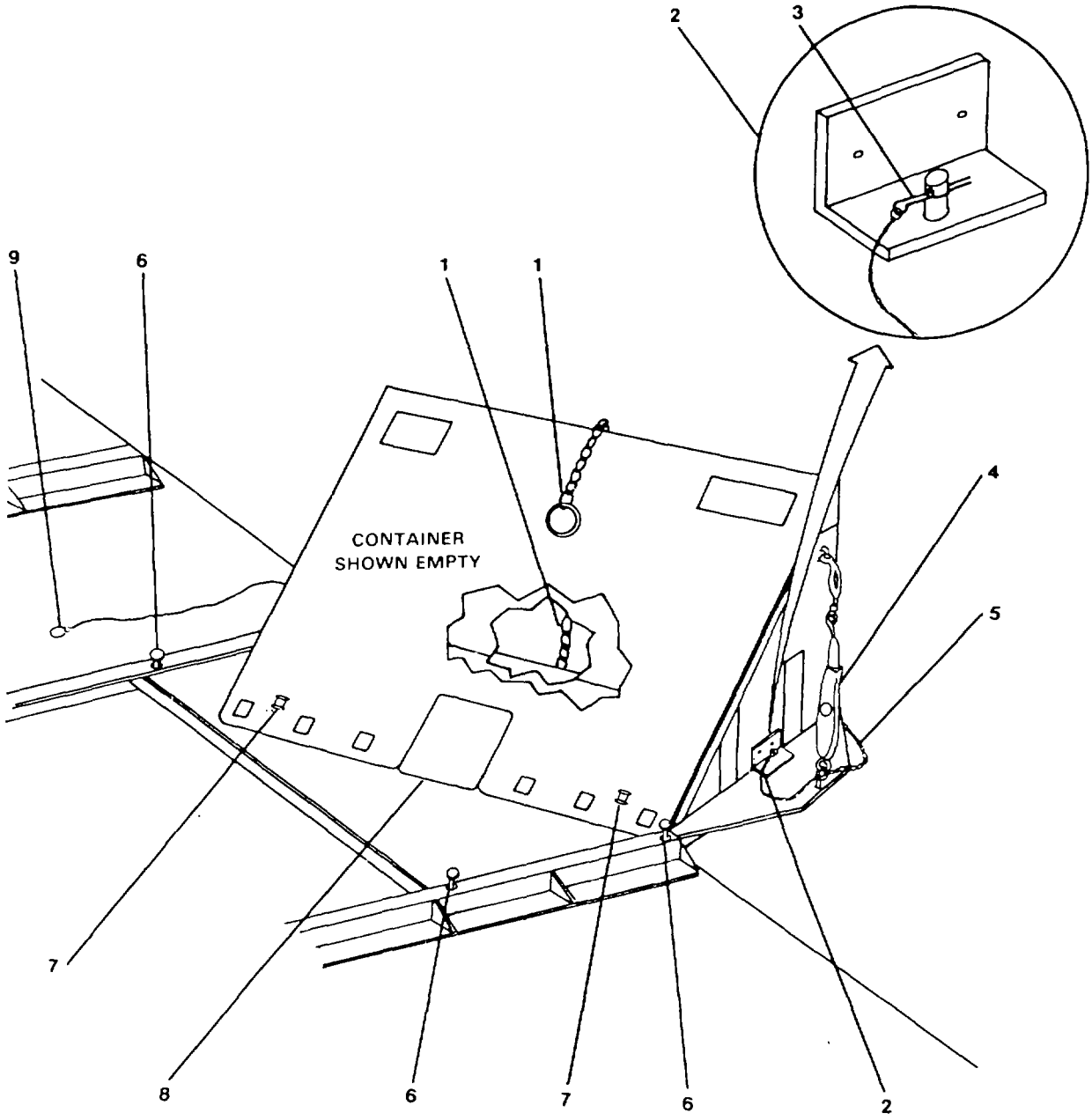


FIGURE 2-80. Liferaft Deployment System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Bench Grinder (FIGURE 2-81)	
		WARNING **Eye protection shield does NOT replace the face-eye protection, operator MUST wear while using this equipment.**
1	Clear Eye Protection	Protects operator from sparks and debris while allowing observation of grinding.
2	Grinder Wheel	Rotating grinder disk.
3	Spark Guards	Protects operator and immediate area from sparks thrown out by grinding.
4	ON/OFF Switch	Controls electrical power to unit.

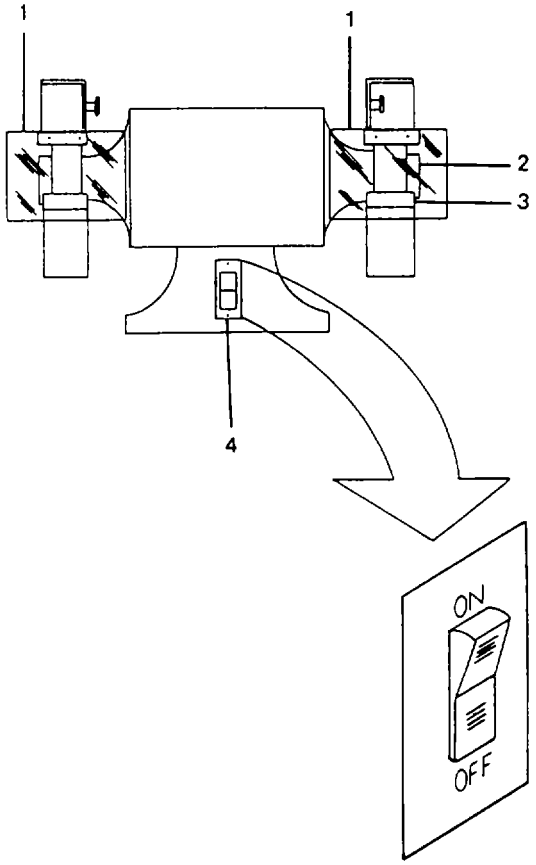


FIGURE 2-81. Bench Grinder, JBG-6A.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Fire Stations (FIGURE 2-82)		
1	Spanner	Tightens or loosens hose and nozzles.
2	Valve	Turns pressurized water ON or OFF.
3	Strainer	Strains debris from water.
4	Nozzle	Directs water by spray or straight stream to fire.

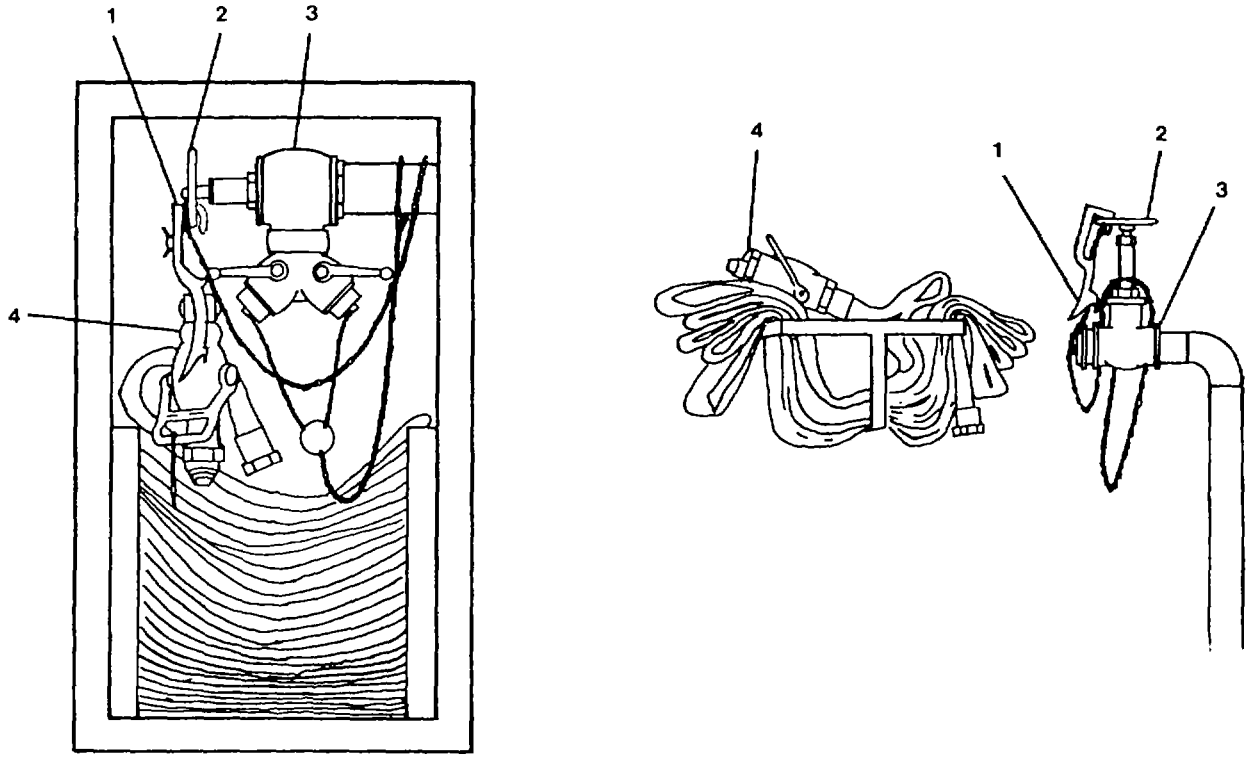


FIGURE 2-82. Fire Stations.

Key	Control or Indicator	Function
START-STOP Motor Controller (FIGURE 2-83)		
1	START	Pushbutton; starts device it controls, (black).
2	STOP	Pushbutton; stops device it controls, (red).

NOTE

This type motor controller is used to control the following pumps:

LUBE OIL XFER PUMP
PORT M/E PRE-LUBE PUMP
STBD M/E PRE-LUBE PUMP
NO. 1 FUEL OIL TRANSFER PUMP
NO. 2 FUEL OIL TRANSFER PUMP
NO. 1 BILGE PUMP
NO. 2 BILGE PUMP
A/C SALT WATER CIRC PUMP
SLUDGE PUMP
DISTILLING PLANT #1 PUMP
DISTILLING PLANT #2 PUMP

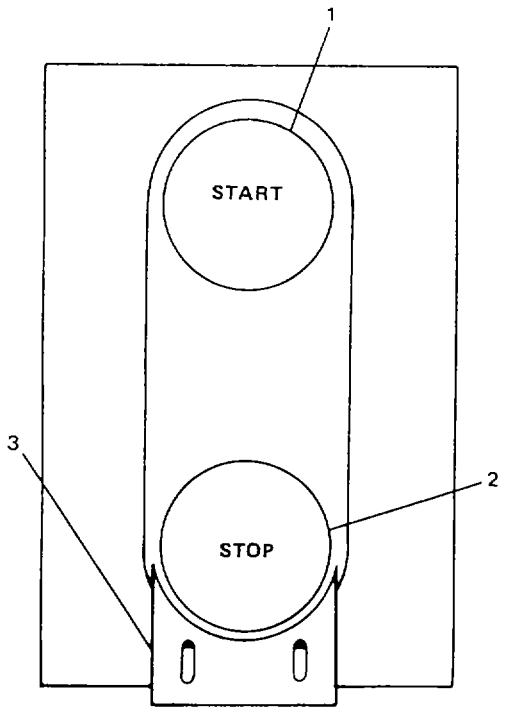


FIGURE 2-83. START-STOP Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Type I Motor Controller (FIGURE 2-84)		
1	ON-OFF	Switch turns power ON or OFF to the motor controller.
2	RUN	Indicator lights green to indicate device is running.
3	START	Pushbutton starts device connected to the motor controller, (black).
4	STOP	Pushbutton stops device connectedto the motor controller, (red).
5	Pushbutton	Reset pushbutton for the motor controller, (blue).

NOTE

This type motor controller is used to control the following equipment:

LUBE OIL PURIFIER
NO. 1/NO. 2 FUEL OIL PURIFIER
D.C. LOCKER EXHAUST FAN
STEERING COMPT SUPPLY FAN
PASSAGE 8 HEAD EXHAUST FAN
BOW THRUSTER SUPPLY FAN

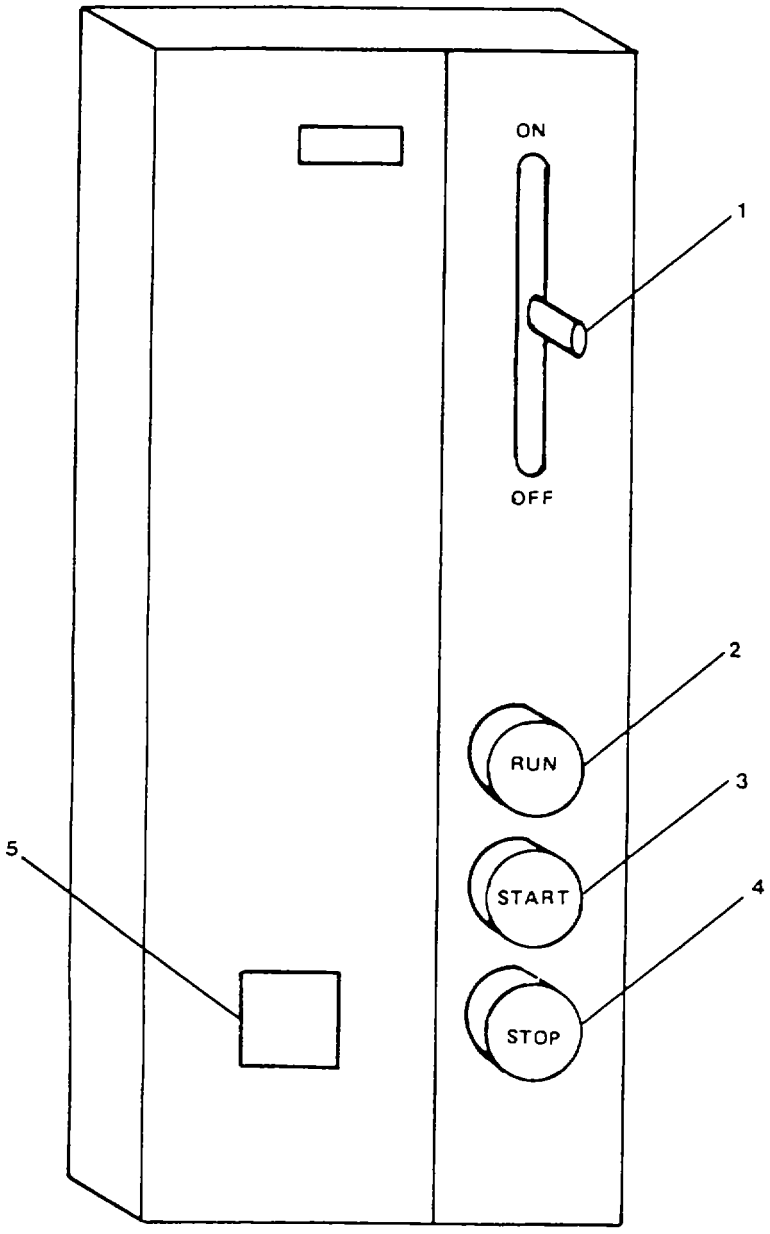


FIGURE 2-84. Type I Motor Controller.

Table 2-1. Description of Operator's Controls-and-Indicators .- CONT

Key	Control or Indicator	Function
Port Main Engine Circulating Pump Motor Controller (FIGURE 2-85)		
1	Pushbutton	Reset pushbutton for the motor controller, (blue).
2	RUN	Indicator lights green indicating port circulating pump is running.
3	HAND-OFF-AUTO	Switch HAND position provides continuous port circulating pump operation. OFF position stops circulating pump. AUTO position provides automatic operation of the port circulating pump.

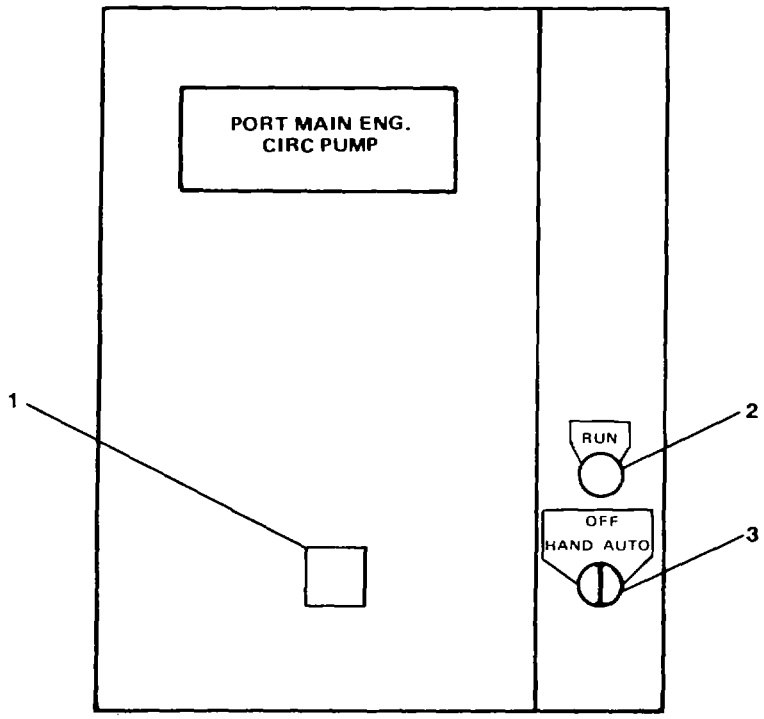


FIGURE 2-85. Port Main Engine Circulating Pump Motor Controller .

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
STBD Main Engine Circulating Pump Motor Controller (FIGURE 2-86)		
1	Pushbutton	Reset pushbutton for the motor controller, (blue).
2	RUN	Indicator lights green indicating starboard circulating pump is running.
3	HAND-OFF-AUTO	Switch HAND position provides continuous starboard circulating pump operation. OFF position stops circulating pump. AUTO position provides automatic operation of the starboard circulating pump.

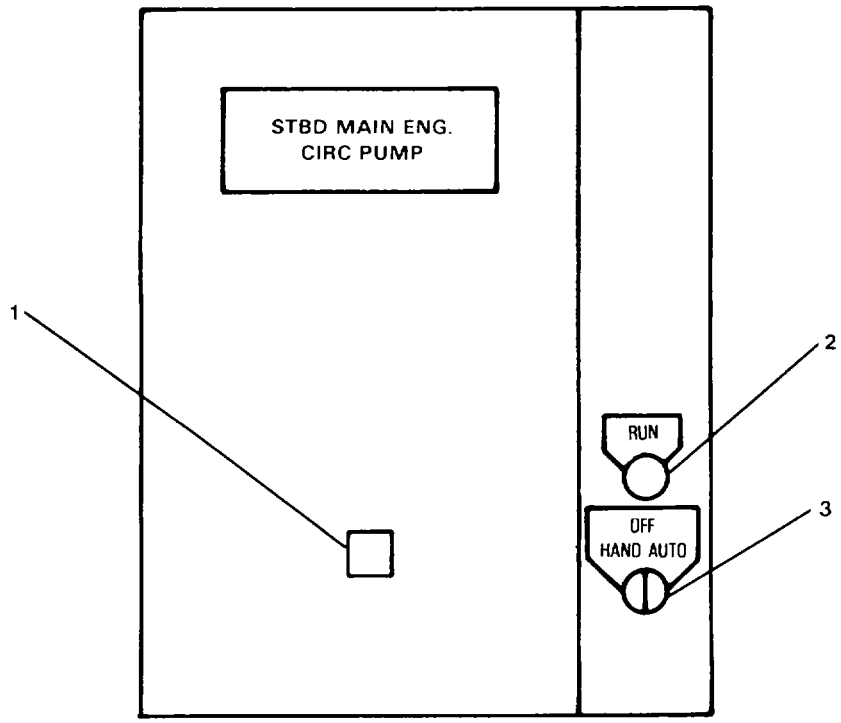


FIGURE 2-86. STBD Main Engine Circulating Pump Motor Controller .

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Port Main Engine Sump Heater Motor Controller (FIGURE 2-87)		
1	RUN	Indicator lights green indicating port main engine sump heater is on.
2	HAND-OFF-AUTO	Switch HAND position provides continuous operation of the port main engine sump heater. OFF position stops sump heater. AUTO position provides automatic operation of the port main engine sump heater.

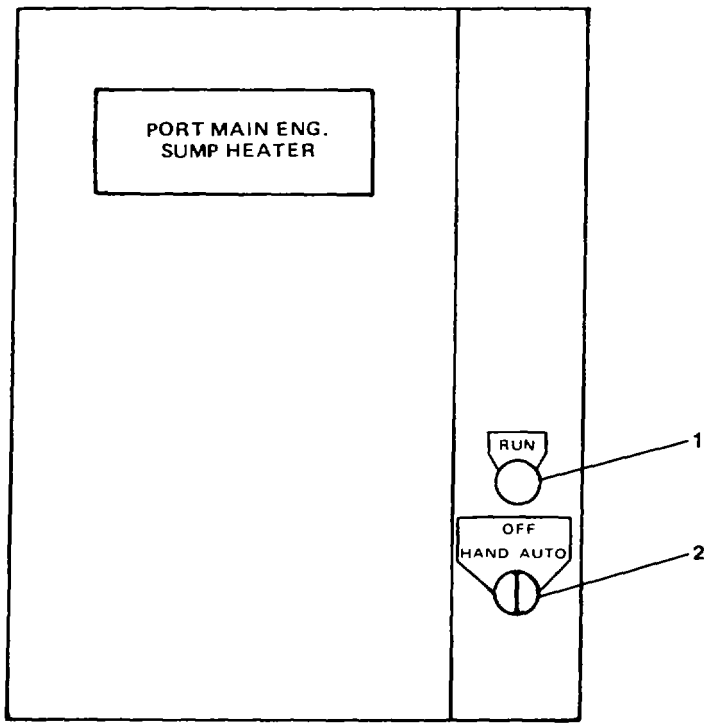


FIGURE 2-87. Port Main Engine Sump Heater Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT.

Key	Control or Indicator	Function
STBD Main Engine Sump Heater Motor Controller (FIGURE 2-88)		
	RUN	Indicator lights green indicating starboard main engine sump heater is on.
2	HAND-OFF-AUTO	Switch HAND position provides continuous operation of the starboard main engine sump heater. OFF position stops sump heater. AUTO position provides automatic operation of the STBD main engine sump heater.

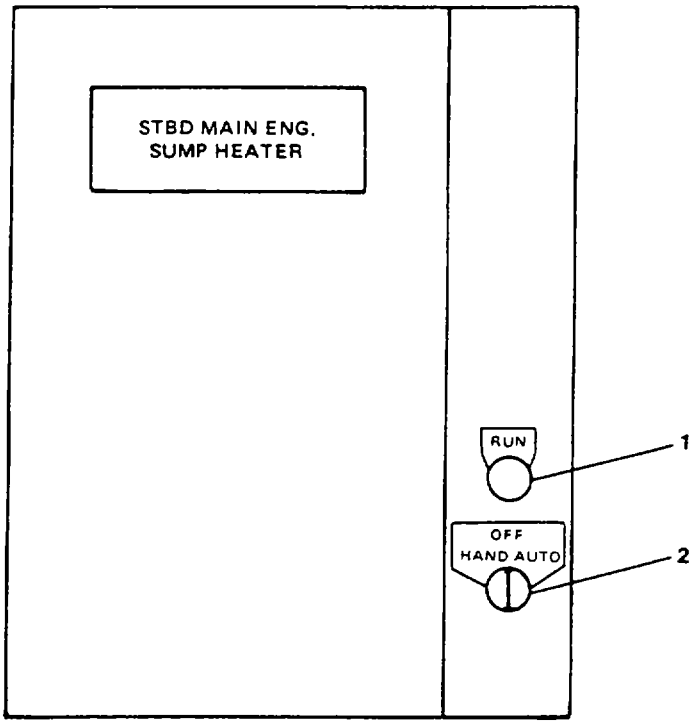


FIGURE 2-88. STBD Main Engine Sump Heater Motor Controller.

Key	Control or Indicator	Function
Air Compressor #2 Motor Controller (FIGURE 2-89)		
1	ON-OFF	Switch turns power ON or OFF to the motor controller.
2	RUN	Indicator lights green to indicate air compressor #2 is running.
3	HAND-OFF-AUTO	Switch HAND position provides continuous air compressor #2 operation. OFF position stops air compressor. AUTO position provides automatic operation of air compressor #2.
4	Pushbutton	Reset pushbutton for the motor controller, (blue).

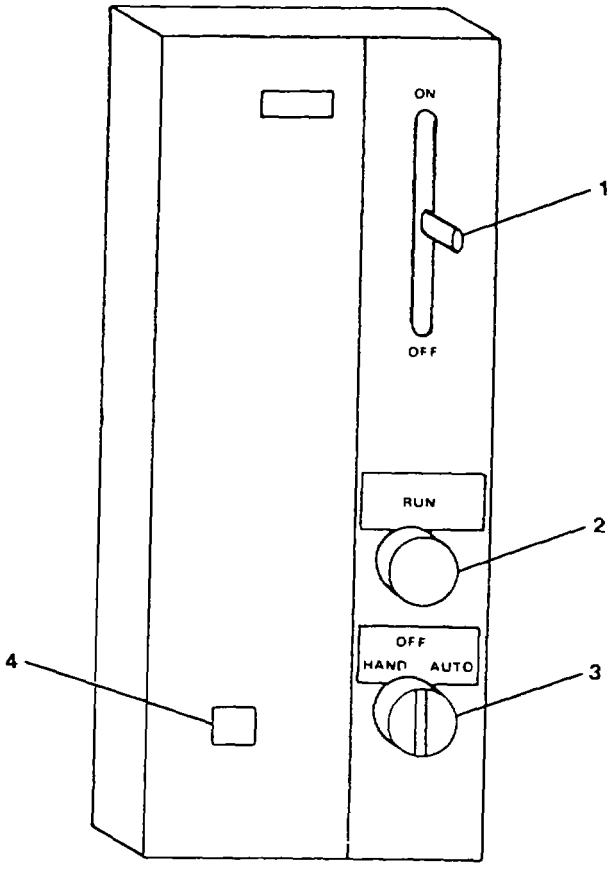


FIGURE 2-89. Air Compressor #2 Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
STBD/PORT Stern Tube Pump Motor Controller (FIGURE 2-90)		
1	HAND-OFF-AUTO	Switch HAND position provides continuous operation of the STBD or PORT stern tube lube pump. OFF position stops the stern tube lube pump. AUTO position provides automatic operation of the stern tube lube pump.
2	Pushbutton	Reset pushbutton for the motor controller, (blue).

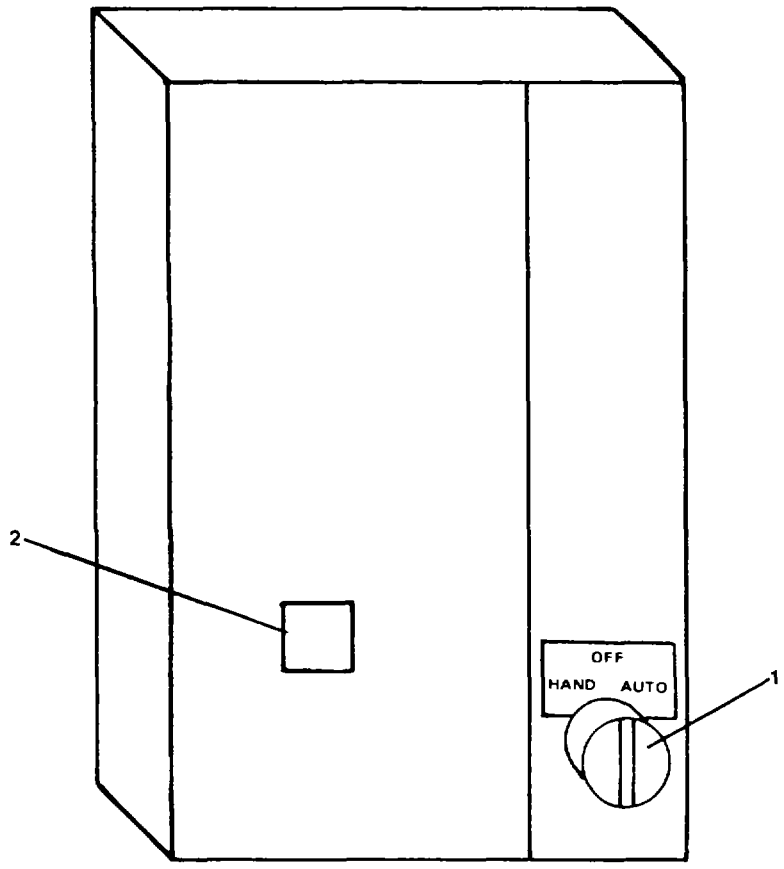


FIGURE 2-90. STBD/Port Stern Tube Lube Pump Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
No. 1/No. 2 Steering Pump Motor Controller (FIGURE 2-91)		
1	ON-OFF	Switch turns power on or OFF to the motor controller.
2	RUN	Indicator lights green to indicate the steering pump is running.
3	HAND-OFF-AUTO	Switch HAND position provides continuous operation of the steering pump. OFF position stops the steering pump. AUTO position provides automatic operation of the steering pump.
4	Pushbutton	Reset pushbutton for the motor controller.

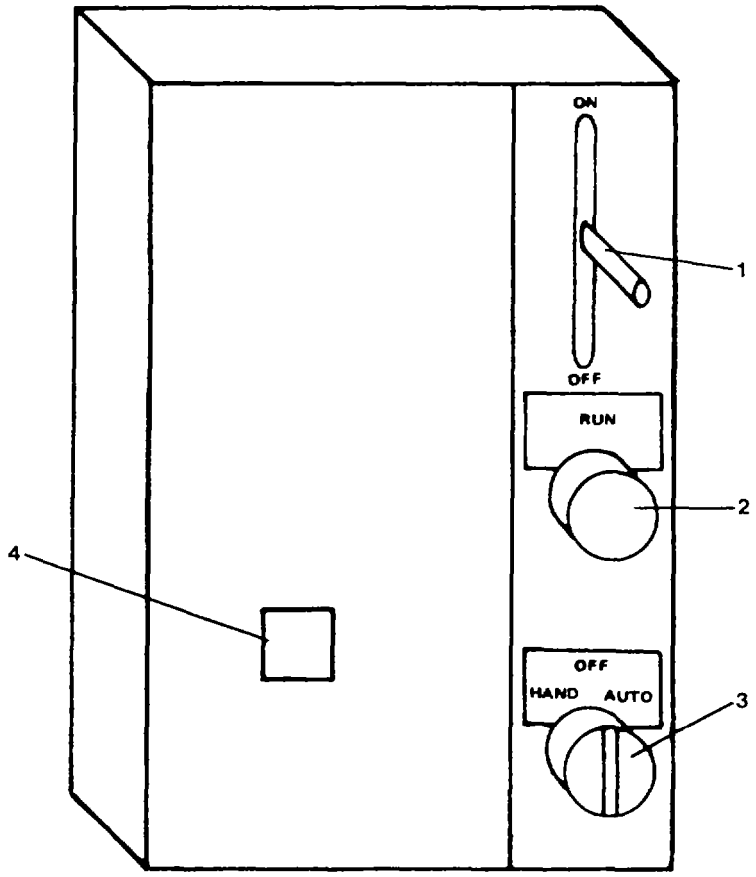


FIGURE 2-91. No. 1/No. 2 Steering Pump Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Emergency Fire Pump Motor Controller (FIGURE 2-92)		
1	ON-OFF	Switch turns power ON or OFF to the motor controller.
2	RUN	Indicator lights green to indicate the emergency fire pump is running.
3	OFF-ON	Switch two-position switch to turn the emergency fire pump OFF or ON.
4	Pushbutton	Reset pushbutton for the motor controller.

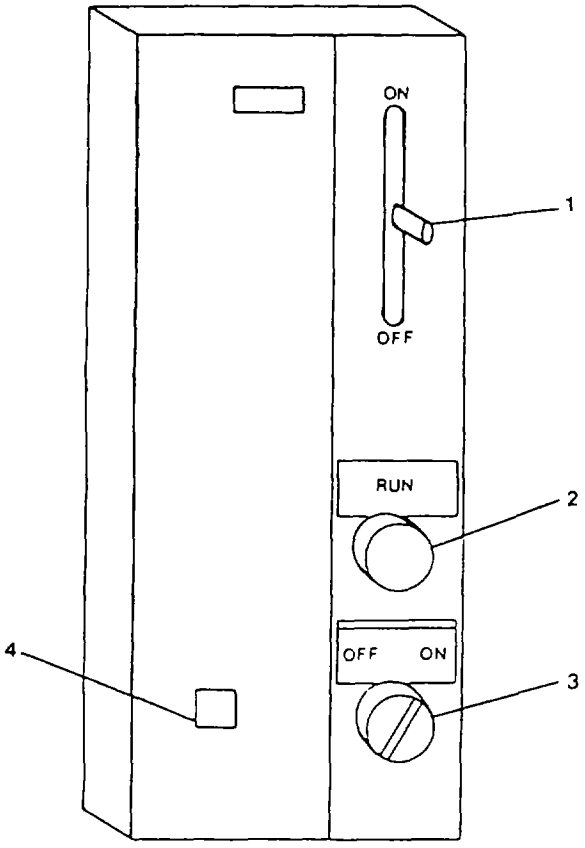


FIGURE 2-92. Emergency Fire Pump Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
A/C Chillwater Pump Motor Controller (FIGURE 2-93)		
1	RUN	Indicator lights green to indicate A/C chillwater pump is running.
2	START	Pushbutton starts A/C chillwater pump, (black).
3	STOP	Pushbutton stops A/C chillwater pump, (red).
4	Pushbutton	Reset pushbutton for the motor controller.

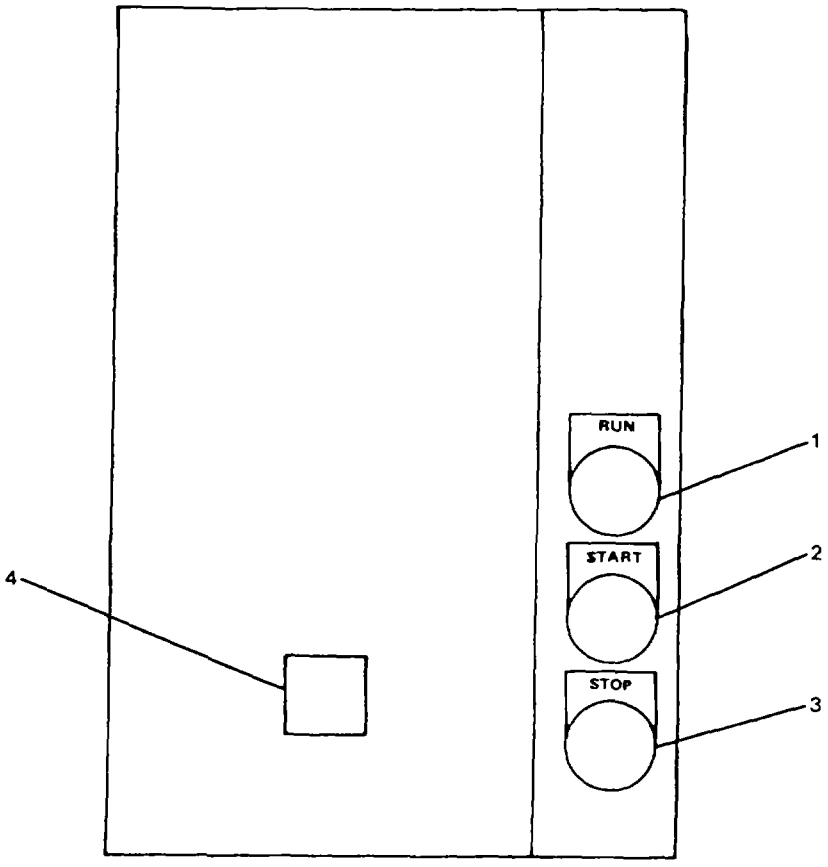


FIGURE 2-93. A/C Chillwater Pump Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Sludge Pump Motor Controller (FIGURE 2-94)		
1	START	Pushbutton starts sludge pump for discharge of sludge to onshore facility, (green).
2	STOP	Pushbutton stops sludge pump operation, (red).
3	Indicator	Lights green to indicate sludge pump is operating.

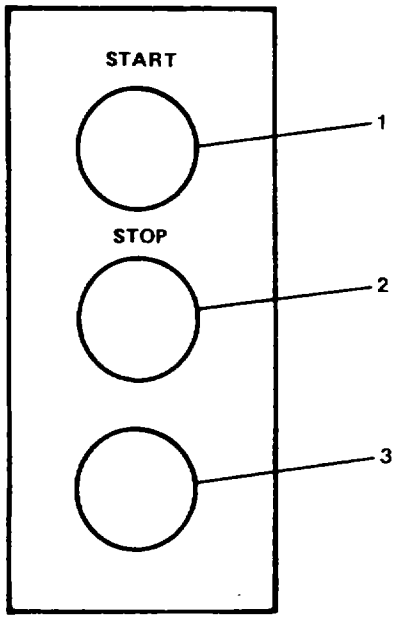


FIGURE 2-94. Sludge Pump Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Fueling Station Main Deck Motor Controllers (FIGURE 2-95)		
1	START	Pushbutton starts No. 2 fuel oil pump, (green).
2	STOP	Pushbutton stops No. 2 fuel oil pump, (red).
3	Indicator	Lights green to indicate No. 2 fuel oil pump is operating.
4	Indicator	Lights green to indicate No. 1 fuel oil pump is operating.
5	STOP	Pushbutton stops No. 1 fuel oil pump, (red).
6	START	Pushbutton starts No. 1 fuel oil pump, (green).

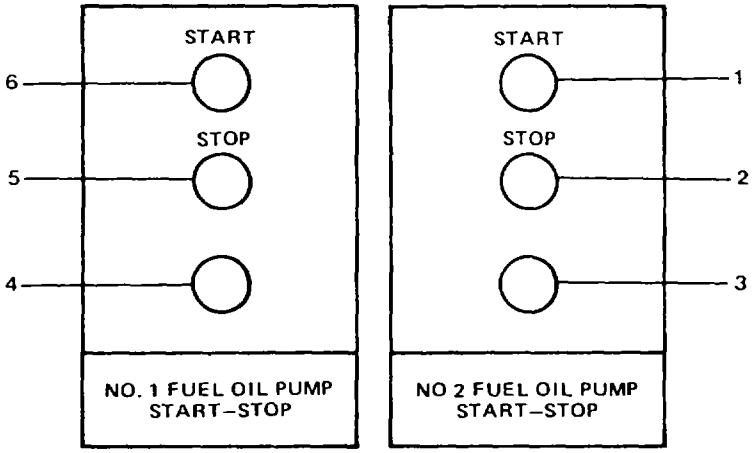


FIGURE 2-95. Fueling Station Main Deck Motor Controllers.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Rotary Switch Motor Controller (FIGURE 2-96)		
1	Rotary Switch	ON-OFF rotary switch. ON marked in the horizontal position. OFF unmarked in the vertical position.

NOTE

This rotary switch is used for the hot water circulating pump and as a light switch in the arms control room, boatswain store room, D.C. locker and other compartments of the LSV.

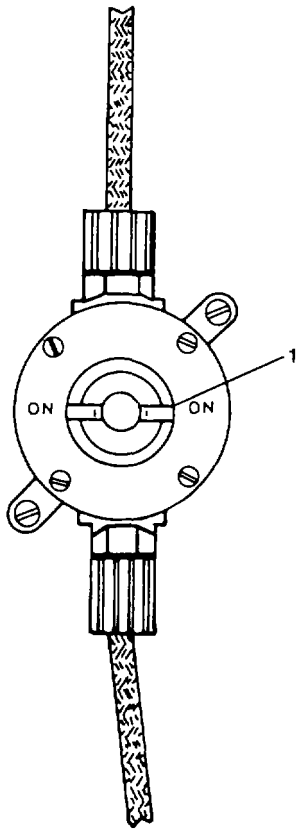


FIGURE 2-96. Rotary Switch Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Type II Motor Controller (FIGURE 2-97)		
1	START	Pushbutton starts device it controls, green).
2	STOP	Pushbutton Stops device it controls, (red).
3	Indicator	Lights green to indicate device is running.

NOTE

This type motor controller is used to control the Stern Ramp Hydraulic Motor and the Stern Anchor Windlass.

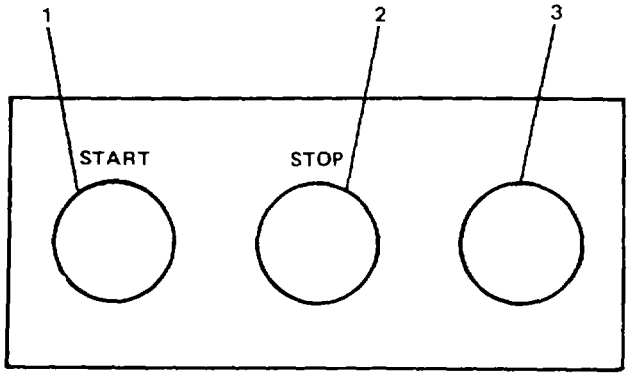


FIGURE 2-97. Type II Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Galley Fan Motor Controller (FIGURE 2-98)		
1	ON-OFF	Switch turns power ON or OFF to the galley fan.
2	RUN	Indicator lights green to indicate the galley fan is running.
3	Pushbutton	Reset pushbutton for the motor controller.

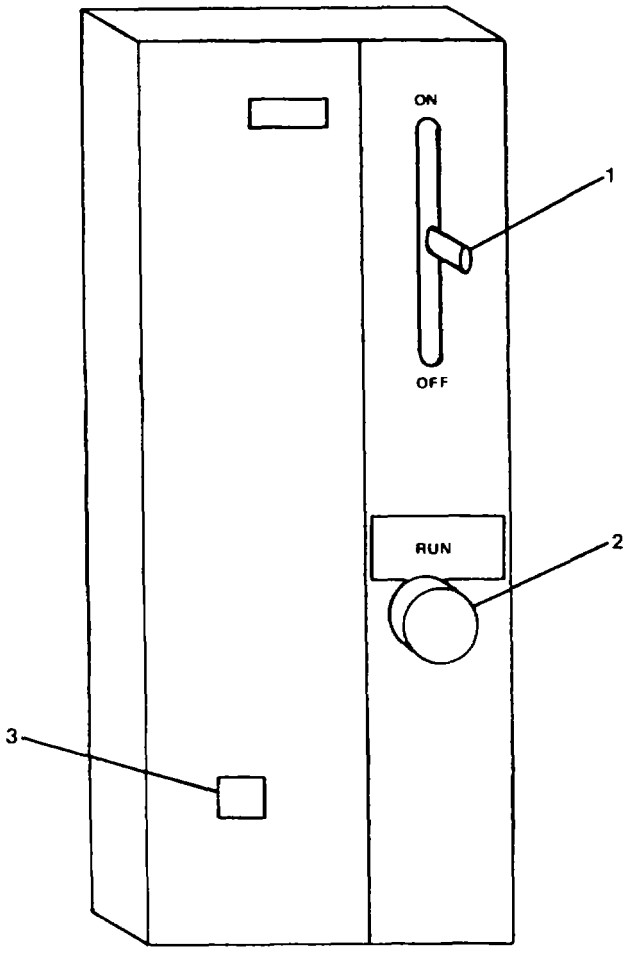


FIGURE 2-98. Galley Fan Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Type IV Motor Controller (FIGURE 2-99)		
1	ON-OFF	Knife Switch turns ON or OFF to the device it controls.

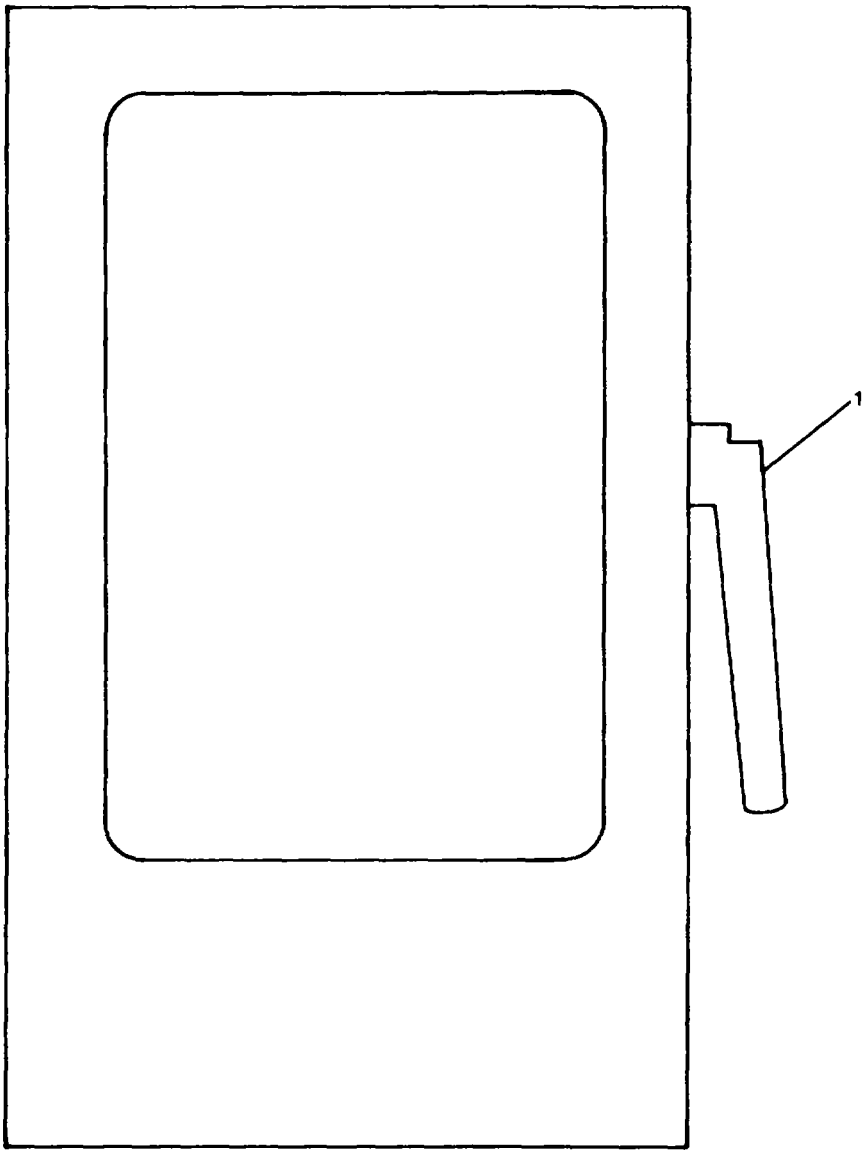


FIGURE 2-99. Type IV Motor Controller.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Countermeasure System (FIGURE 2-100)		
1	Solenoid Valve	Opens to provide firemain water to system.
2	Sprinkler Head	Deflects water in a circular pattern.
3	Drain Valve	Drains water from countermeasure piping system.
4	Manual Valve	Hand operated valve to piping system.
5	Manual Valve	Valve to fire station No. 12.
6	ON/OFF	Switch; electrical key operated switch that controls solenoid valve. (Located in pilothouse on the PORT half bulkhead below the trim clinometer.)

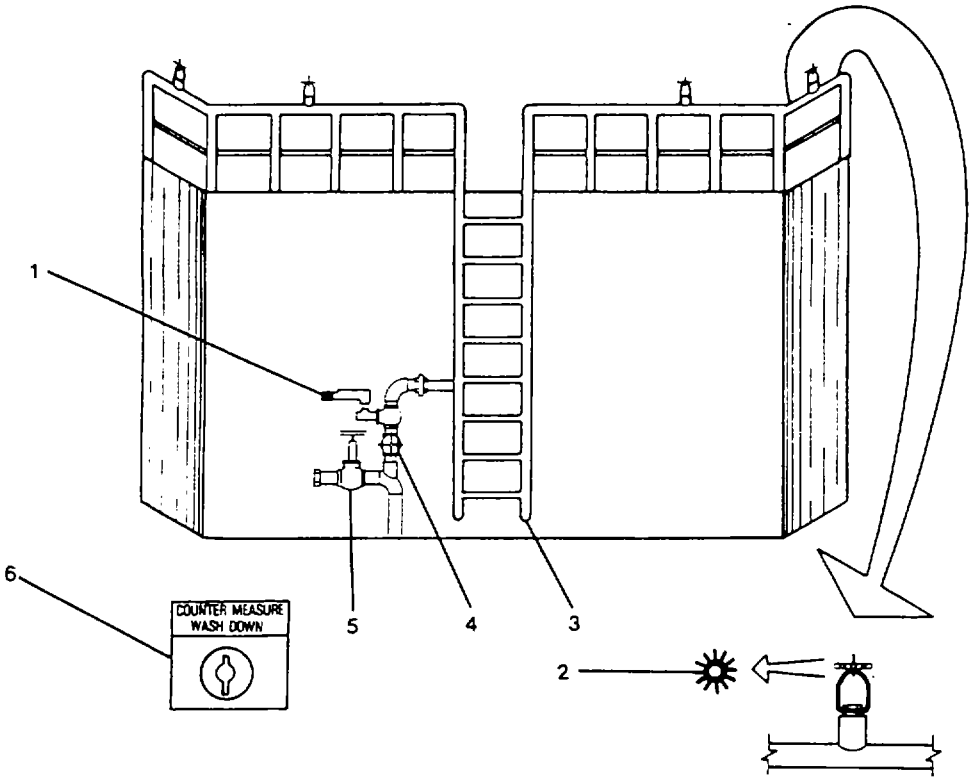


FIGURE 2-100. Countermeasure System.

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
	Power and Lighting Distribution (FIGURE 101)	
1	ENGINE ROOM LIGHTING PANEL L-1	Provides protection for and control of circuits shown on Sheet 2.
2	PORT MAIN DECK LIGHTING DIST PANEL L-2	Provides protection for and control of panel and circuits shown on Sheet 3.
3	STBD MAIN DECK LIGHTING DIST PNL L-3	Provides protection for and control of panel and circuits shown on Sheet 4.
4	OFFICERS DK LTG DIST PANEL L-4	Provides protection for and control of panel and circuits shown on Sheet 5.
5	PILOTHOUSE LIGHTING DISTRIBUTION PANEL L-5	Provides protection for and control of panel and circuits shown on Sheet 6.
6	MAIN ENGINE CIRCULATING PUMP PANEL 115V/208V 30	Provides protection for and control of panel and circuits shown on Sheet 7.
7	LOAD CENTER PANEL 120/208V AC 30 4W	Provides protection for and control of panel and circuit shown on Sheet 8.
8	PANEL EP-2 PILOTHOUSE EMERGENCY 120/208V AC 30 4W	Provides protection for and control of panel and circuits shown on Sheet 9.
9	Navigational Lights Panel	Provides protection for and control of panel and circuits for navigational lighting. See FIGURE 2-12 and associated tabular information.
10	ELECTRONIC EMERGENCY DISTRIBUTION PANEL	Provides protection for and control of panel and circuits shown on Sheet 10.
11	RADIO ROOM EP-1 208V A.C.	Provides protection for and control of panel and circuits shown on Sheet 11.
12	EP-1 FILTER PANEL RADIO ROOM 120V AC 10	Provides protection for and control of panel and circuits shown on Sheet 12.

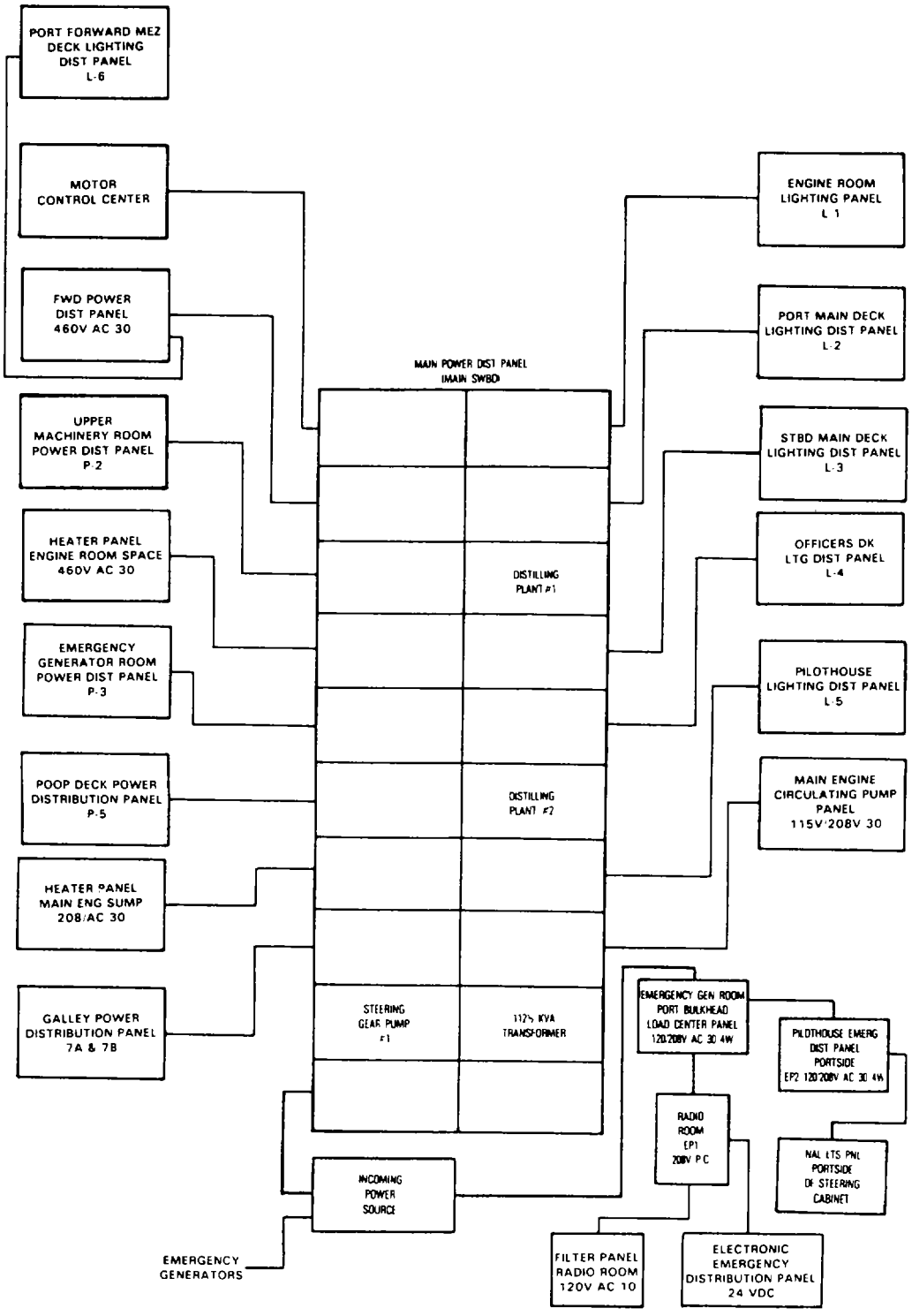
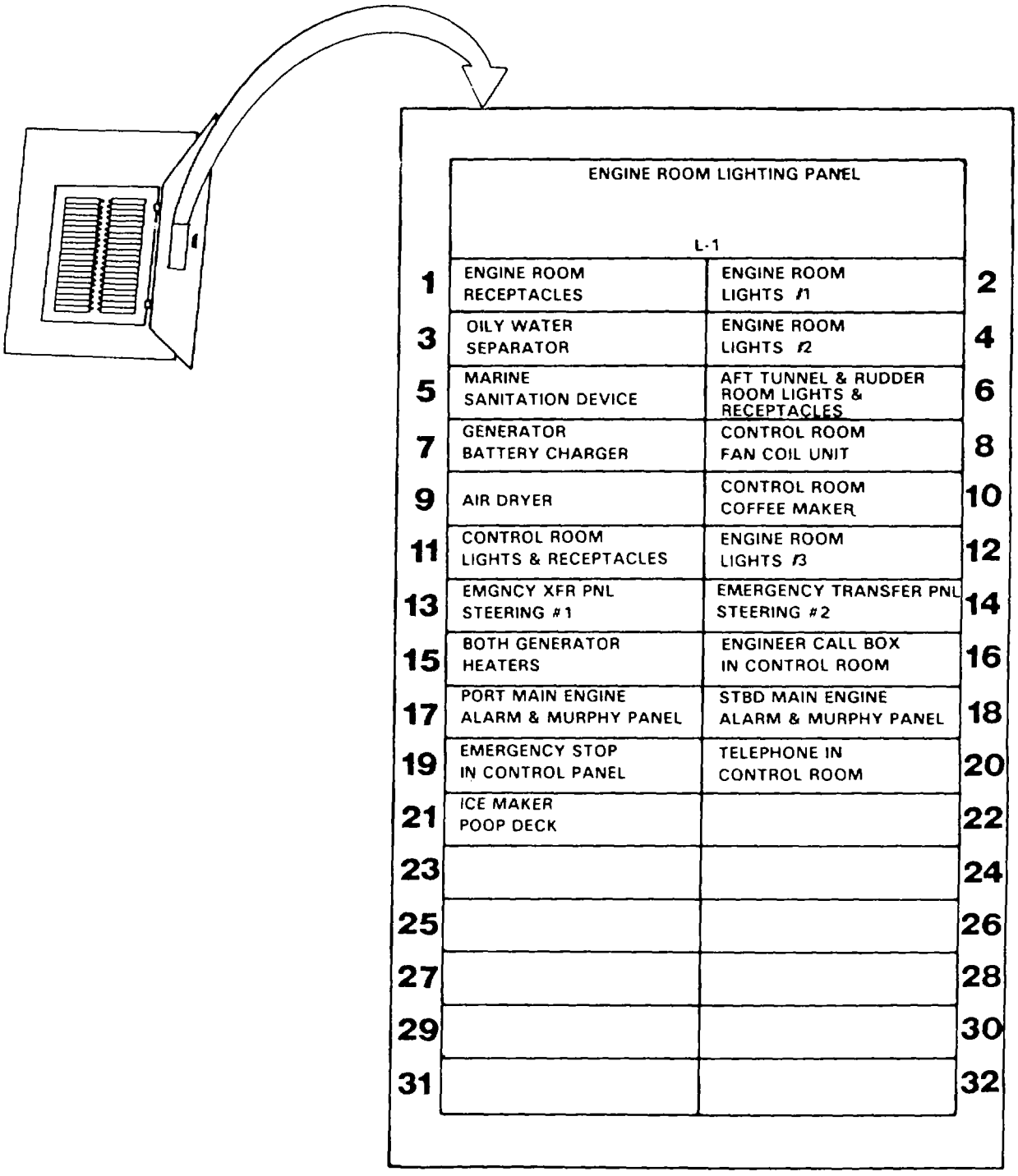


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 1 of 21).

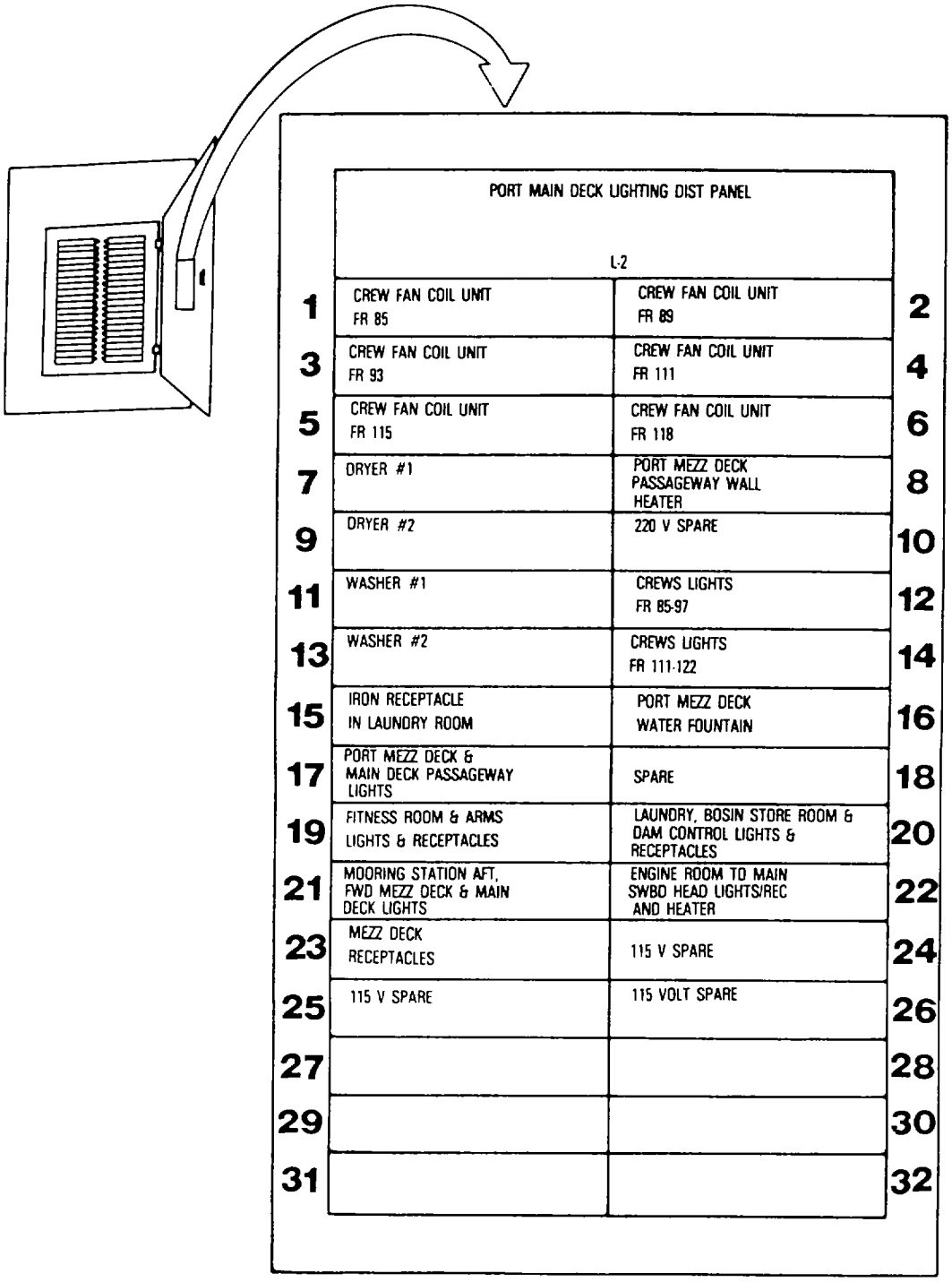


ENGINE ROOM LIGHTING PANEL

L-1

1	ENGINE ROOM RECEPTACLES	ENGINE ROOM LIGHTS #1	2
3	OILY WATER SEPARATOR	ENGINE ROOM LIGHTS #2	4
5	MARINE SANITATION DEVICE	AFT TUNNEL & RUDDER ROOM LIGHTS & RECEPTACLES	6
7	GENERATOR BATTERY CHARGER	CONTROL ROOM FAN COIL UNIT	8
9	AIR DRYER	CONTROL ROOM COFFEE MAKER	10
11	CONTROL ROOM LIGHTS & RECEPTACLES	ENGINE ROOM LIGHTS #3	12
13	EMGNCY XFR PNL STEERING #1	EMERGENCY TRANSFER PNL STEERING #2	14
15	BOTH GENERATOR HEATERS	ENGINEER CALL BOX IN CONTROL ROOM	16
17	PORT MAIN ENGINE ALARM & MURPHY PANEL	STBD MAIN ENGINE ALARM & MURPHY PANEL	18
19	EMERGENCY STOP IN CONTROL PANEL	TELEPHONE IN CONTROL ROOM	20
21	ICE MAKER POOP DECK		22
23			24
25			26
27			28
29			30
31			32

FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 2 of 21).



PORT MAIN DECK LIGHTING DIST PANEL

L-2

1	CREW FAN COIL UNIT FR 85	CREW FAN COIL UNIT FR 89	2
3	CREW FAN COIL UNIT FR 93	CREW FAN COIL UNIT FR 111	4
5	CREW FAN COIL UNIT FR 115	CREW FAN COIL UNIT FR 118	6
7	DRYER #1	PORT MEZZ DECK PASSAGEWAY WALL HEATER	8
9	DRYER #2	220 V SPARE	10
11	WASHER #1	CREWS LIGHTS FR 85-97	12
13	WASHER #2	CREWS LIGHTS FR 111-122	14
15	IRON RECEPTACLE IN LAUNDRY ROOM	PORT MEZZ DECK WATER FOUNTAIN	16
17	PORT MEZZ DECK & MAIN DECK PASSAGEWAY LIGHTS	SPARE	18
19	FITNESS ROOM & ARMS LIGHTS & RECEPTACLES	LAUNDRY, BOSIN STORE ROOM & DAM CONTROL LIGHTS & RECEPTACLES	20
21	MOORING STATION AFT, FWD MEZZ DECK & MAIN DECK LIGHTS	ENGINE ROOM TO MAIN SWBD HEAD LIGHTS/REC AND HEATER	22
23	MEZZ DECK RECEPTACLES	115 V SPARE	24
25	115 V SPARE	115 VOLT SPARE	26
27			28
29			30
31			32

FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 3 of 21).

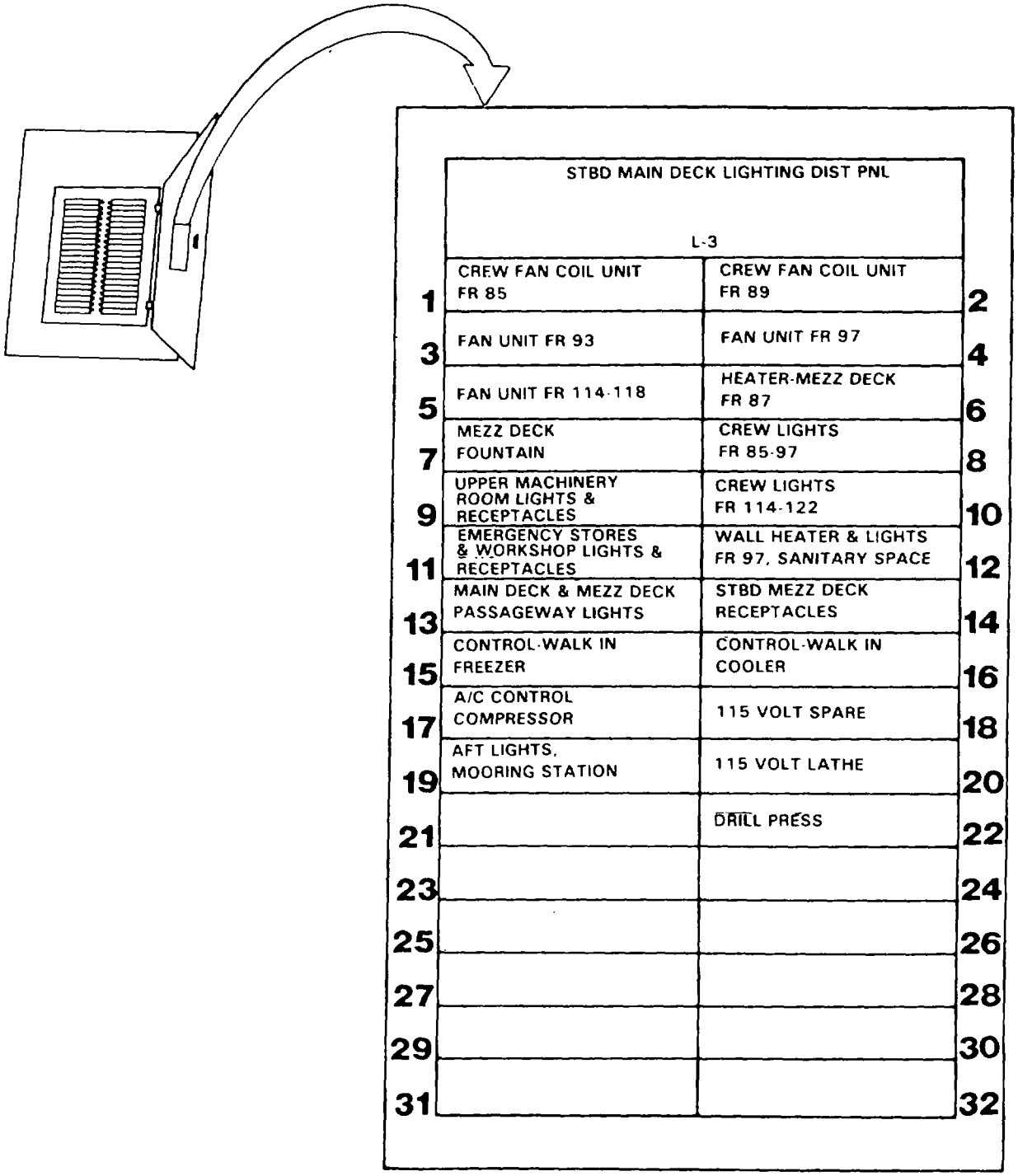


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 4 of 21) .

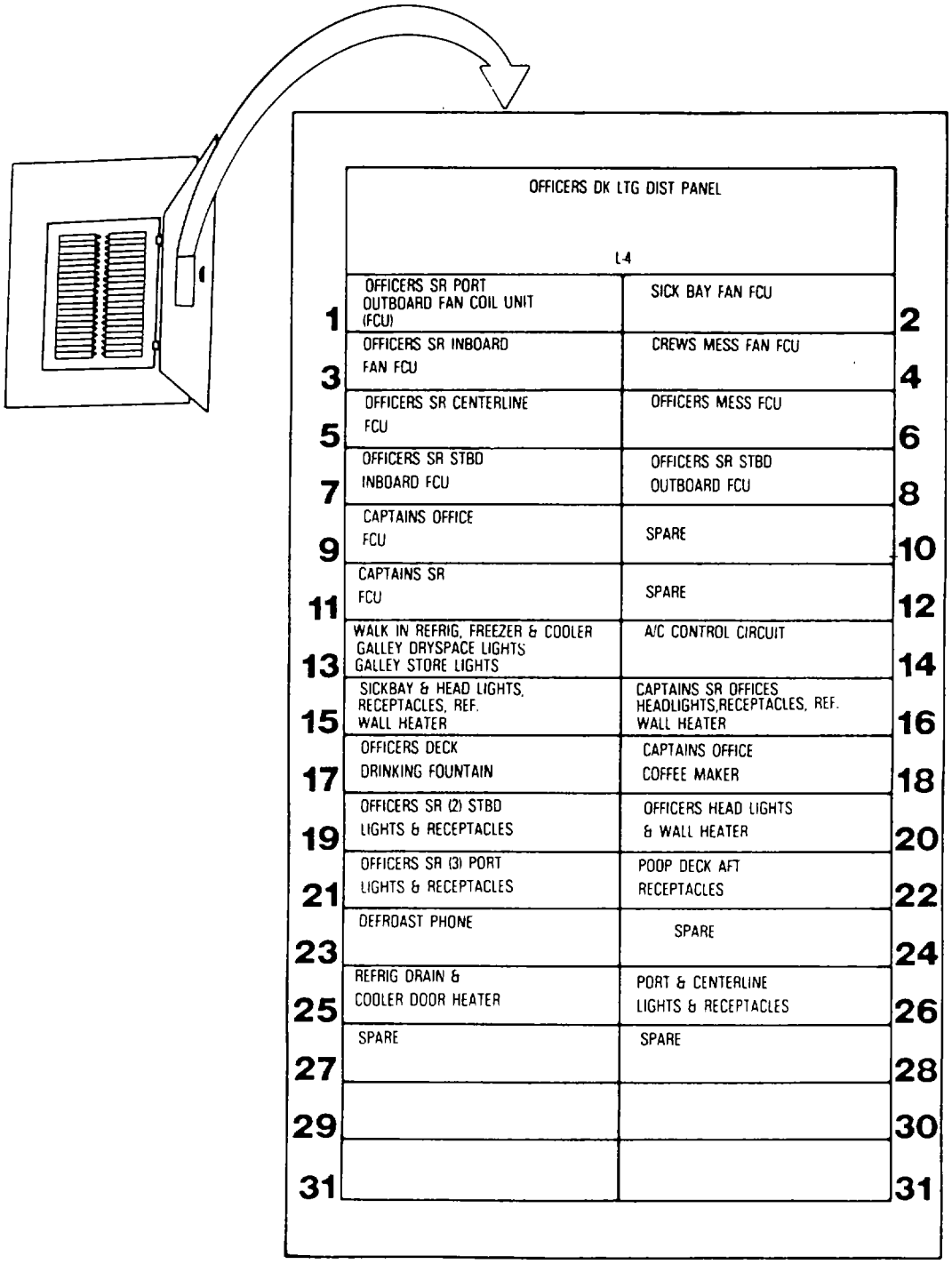
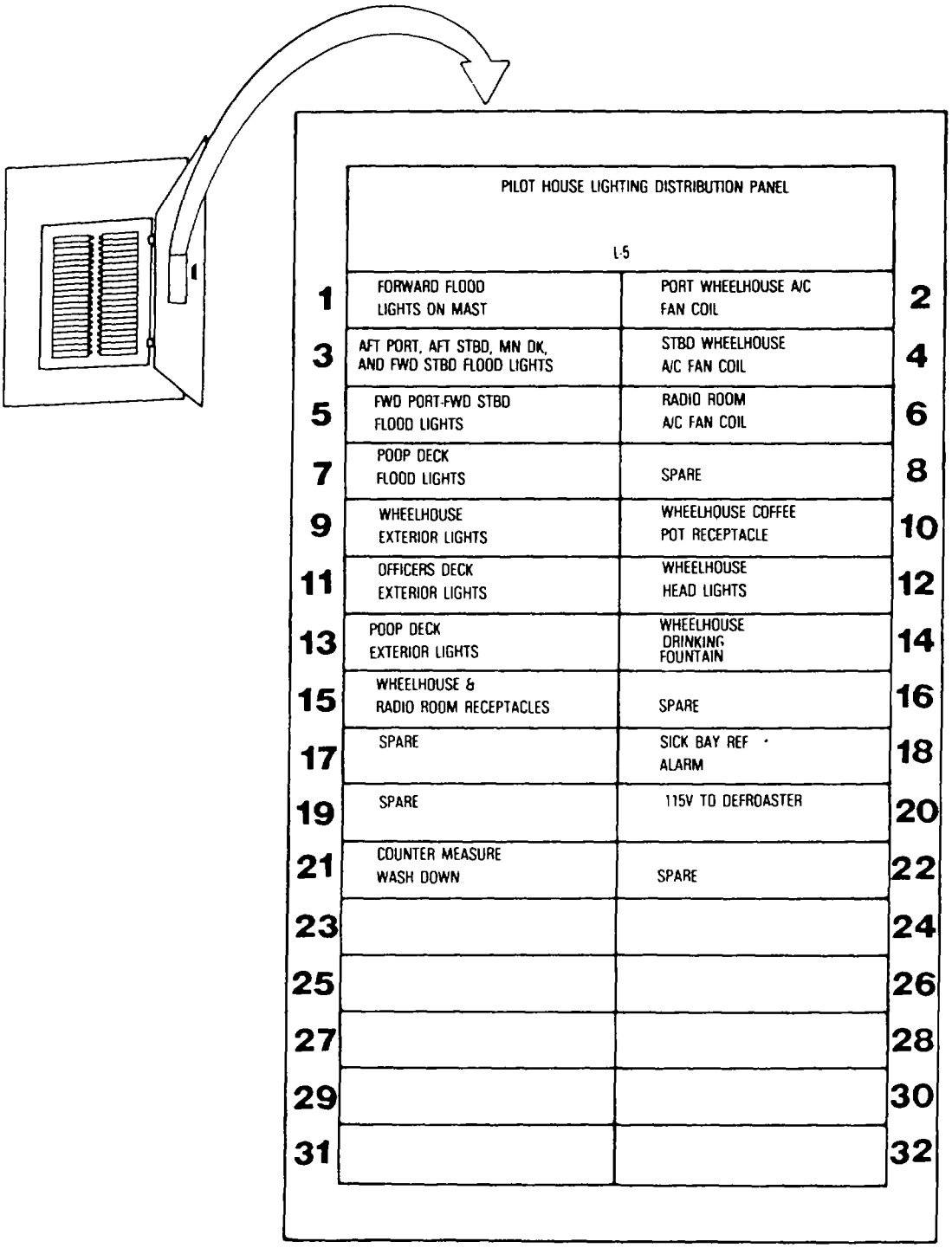


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 5 of 21).

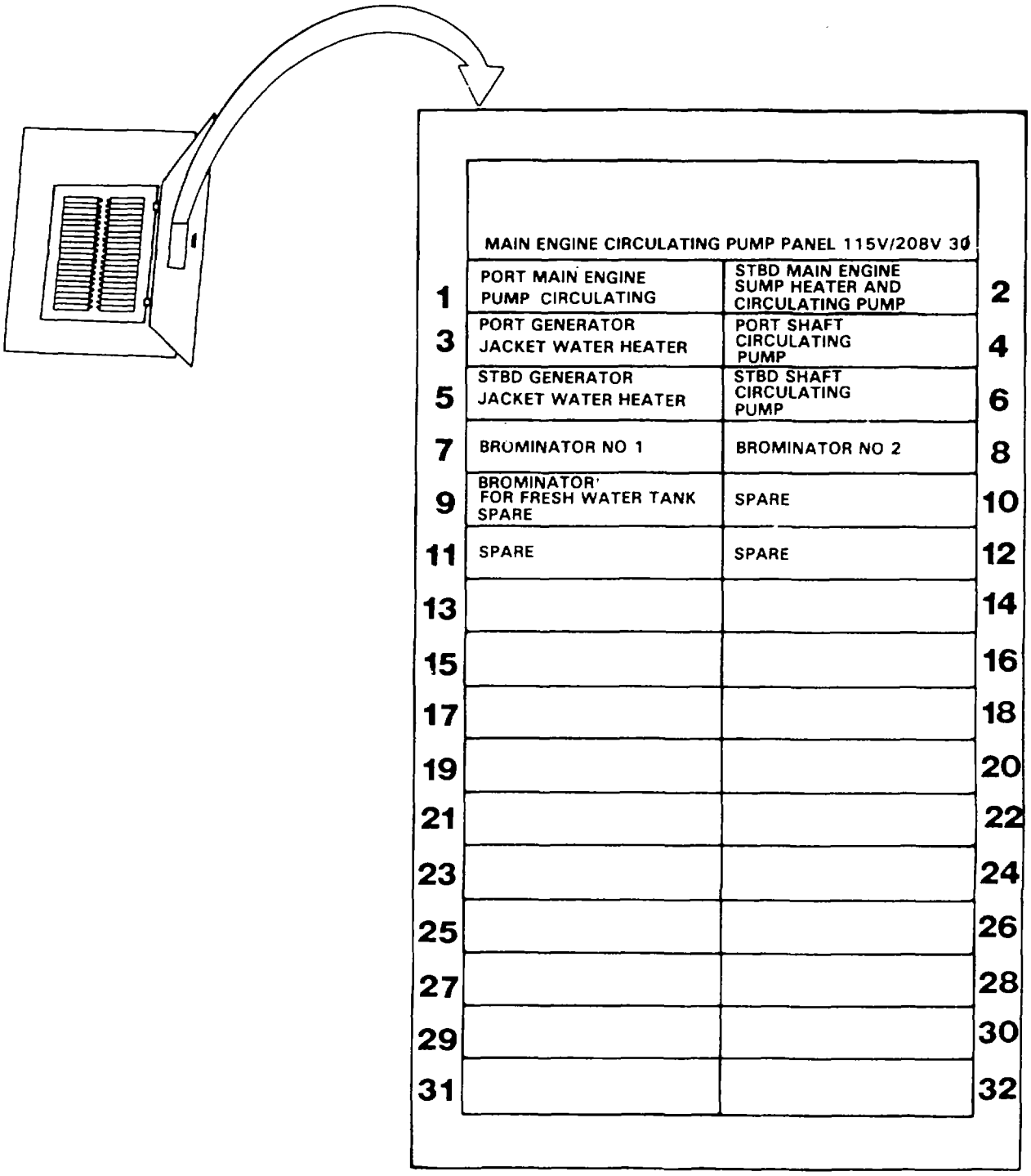


PILOT HOUSE LIGHTING DISTRIBUTION PANEL

L-5

1	FORWARD FLOOD LIGHTS ON MAST	PORT WHEELHOUSE A/C FAN COIL	2
3	AFT PORT, AFT STBD, MN DK, AND FWD STBD FLOOD LIGHTS	STBD WHEELHOUSE A/C FAN COIL	4
5	FWD PORT-FWD STBD FLOOD LIGHTS	RADIO ROOM A/C FAN COIL	6
7	POOP DECK FLOOD LIGHTS	SPARE	8
9	WHEELHOUSE EXTERIOR LIGHTS	WHEELHOUSE COFFEE POT RECEPTACLE	10
11	OFFICERS DECK EXTERIOR LIGHTS	WHEELHOUSE HEAD LIGHTS	12
13	POOP DECK EXTERIOR LIGHTS	WHEELHOUSE DRINKING FOUNTAIN	14
15	WHEELHOUSE & RADIO ROOM RECEPTACLES	SPARE	16
17	SPARE	SICK BAY REF ALARM	18
19	SPARE	115V TO DEFROASTER	20
21	COUNTER MEASURE WASH DOWN	SPARE	22
23			24
25			26
27			28
29			30
31			32

FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 6 of 21).



MAIN ENGINE CIRCULATING PUMP PANEL 115V/208V 30

1	PORT MAIN ENGINE PUMP CIRCULATING	STBD MAIN ENGINE SUMP HEATER AND CIRCULATING PUMP	2
3	PORT GENERATOR JACKET WATER HEATER	PORT SHAFT CIRCULATING PUMP	4
5	STBD GENERATOR JACKET WATER HEATER	STBD SHAFT CIRCULATING PUMP	6
7	BROMINATOR NO 1	BROMINATOR NO 2	8
9	BROMINATOR FOR FRESH WATER TANK SPARE	SPARE	10
11	SPARE	SPARE	12
13			14
15			16
17			18
19			20
21			22
23			24
25			26
27			28
29			30
31			32

FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 7 of 21).

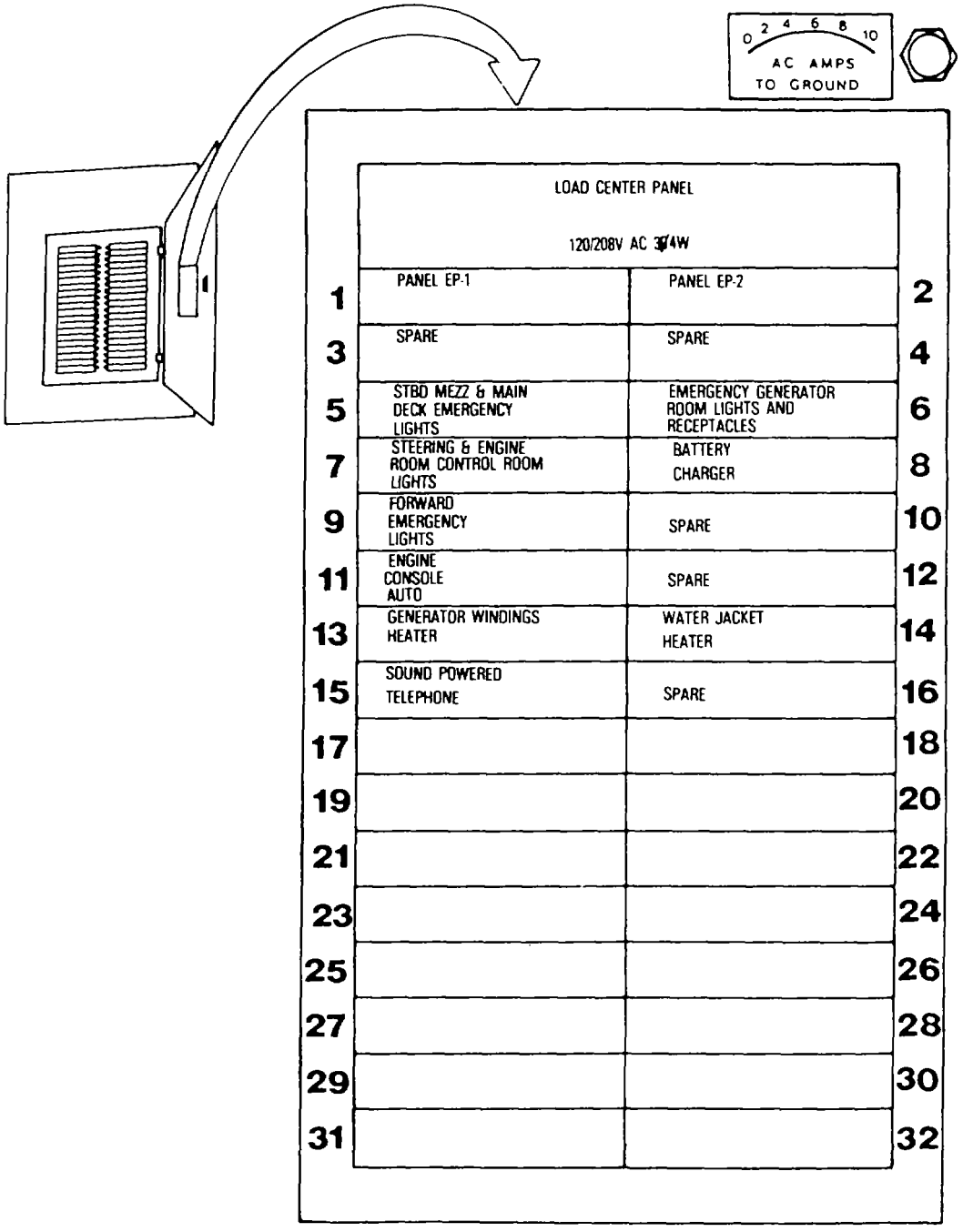
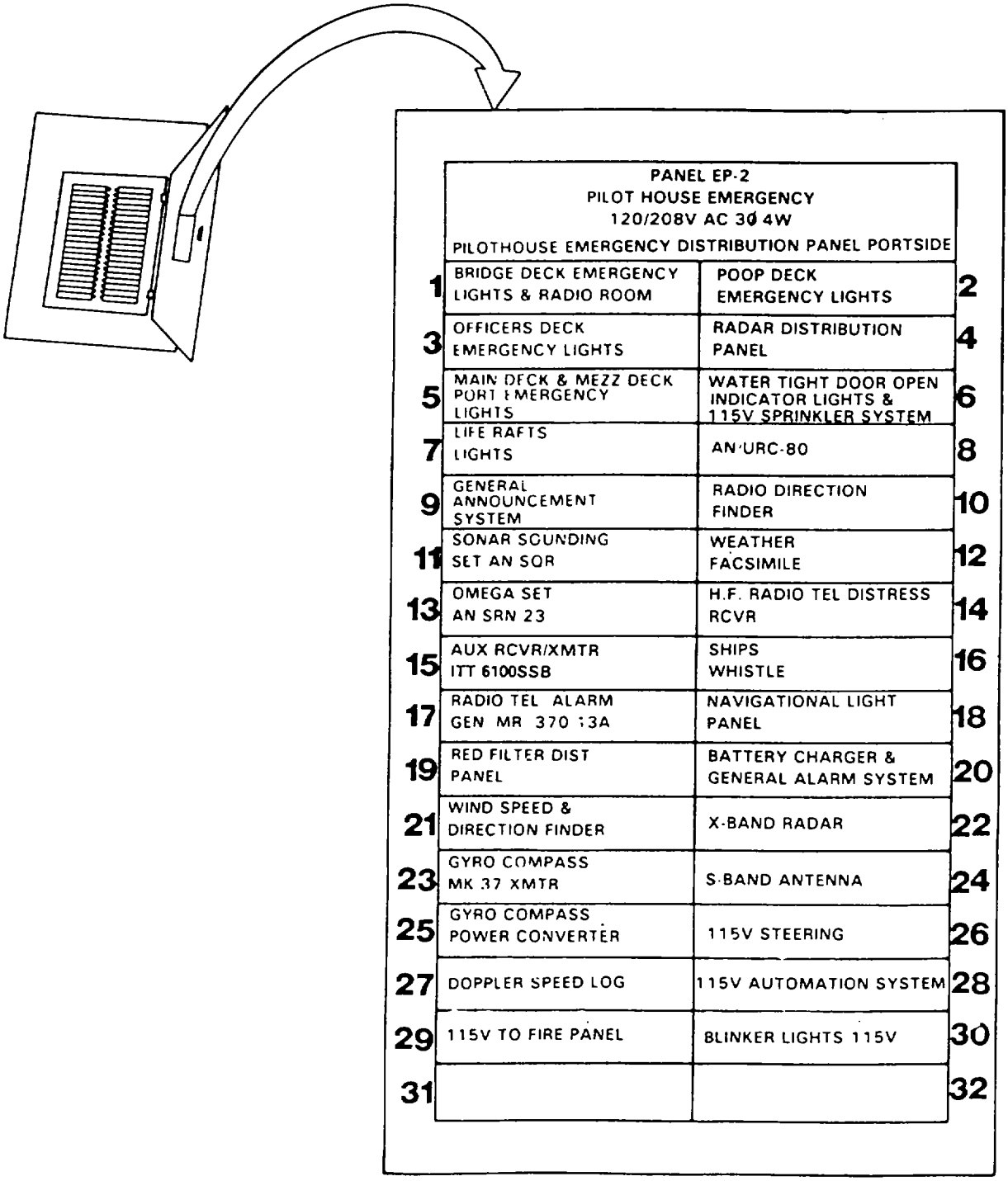


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 8 of 21).



PANEL EP-2
PILOT HOUSE EMERGENCY
120/208V AC 3Ø 4W
PILOTHOUSE EMERGENCY DISTRIBUTION PANEL PORTSIDE

1	BRIDGE DECK EMERGENCY LIGHTS & RADIO ROOM	POOP DECK EMERGENCY LIGHTS	2
3	OFFICERS DECK EMERGENCY LIGHTS	RADAR DISTRIBUTION PANEL	4
5	MAIN DECK & MEZZ DECK PORT EMERGENCY LIGHTS	WATER TIGHT DOOR OPEN INDICATOR LIGHTS & 115V SPRINKLER SYSTEM	6
7	LIFE RAFTS LIGHTS	AN/URC-80	8
9	GENERAL ANNOUNCEMENT SYSTEM	RADIO DIRECTION FINDER	10
11	SONAR SOUNDING SET AN SQR	WEATHER FACSIMILE	12
13	OMEGA SET AN SRN 23	H.F. RADIO TEL DISTRESS RCVR	14
15	AUX RCVR/XMTR ITT 6100SSB	SHIPS WHISTLE	16
17	RADIO TEL ALARM GEN MR 370 13A	NAVIGATIONAL LIGHT PANEL	18
19	RED FILTER DIST PANEL	BATTERY CHARGER & GENERAL ALARM SYSTEM	20
21	WIND SPEED & DIRECTION FINDER	X-BAND RADAR	22
23	GYRO COMPASS MK 37 XMTR	S-BAND ANTENNA	24
25	GYRO COMPASS POWER CONVERTER	115V STEERING	26
27	DOPPLER SPEED LOG	115V AUTOMATION SYSTEM	28
29	115V TO FIRE PANEL	BLINKER LIGHTS 115V	30
31			32

FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 9 of 21).

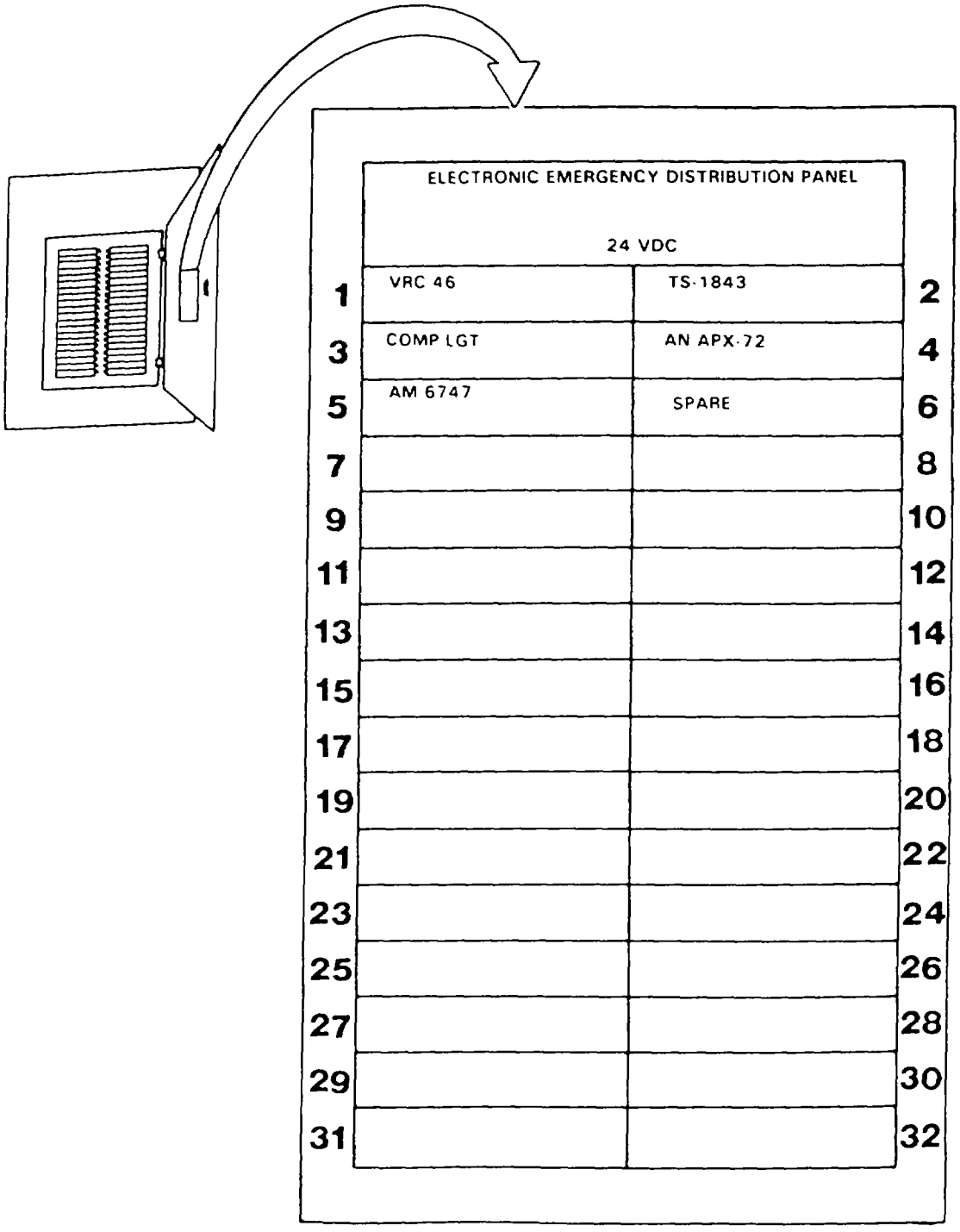


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 10 of 21).

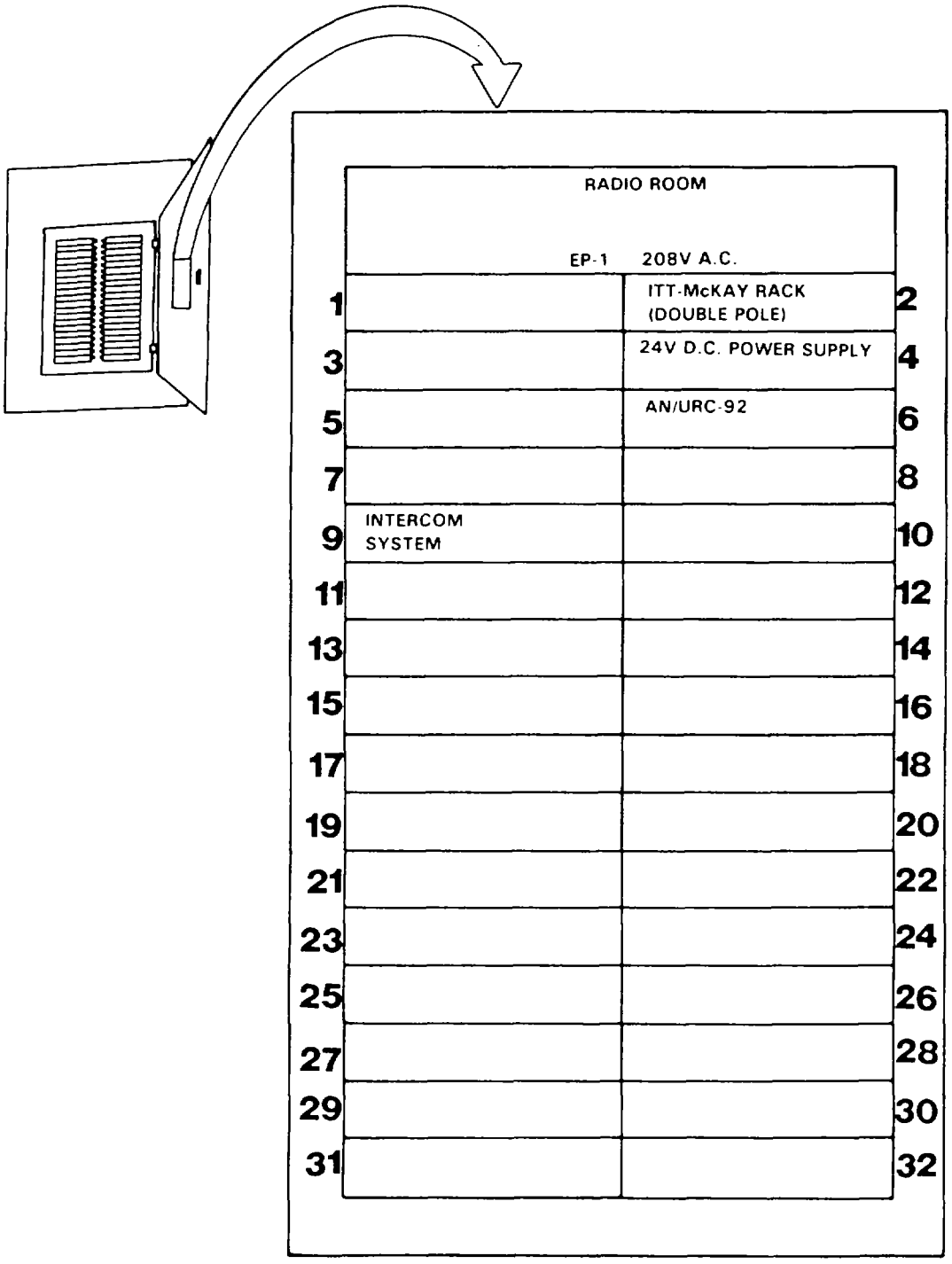


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 11 of 21).

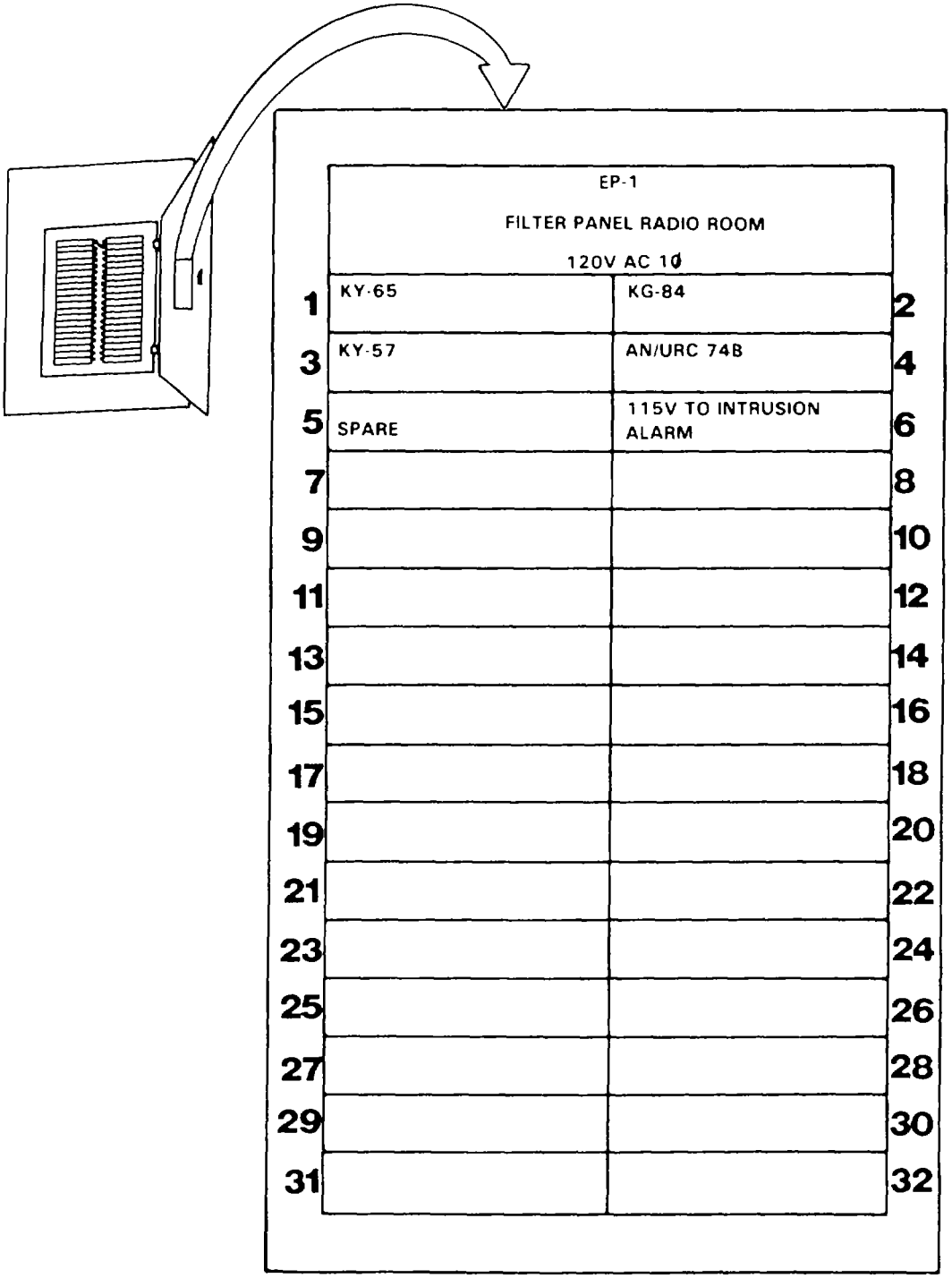


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 12 of 21).

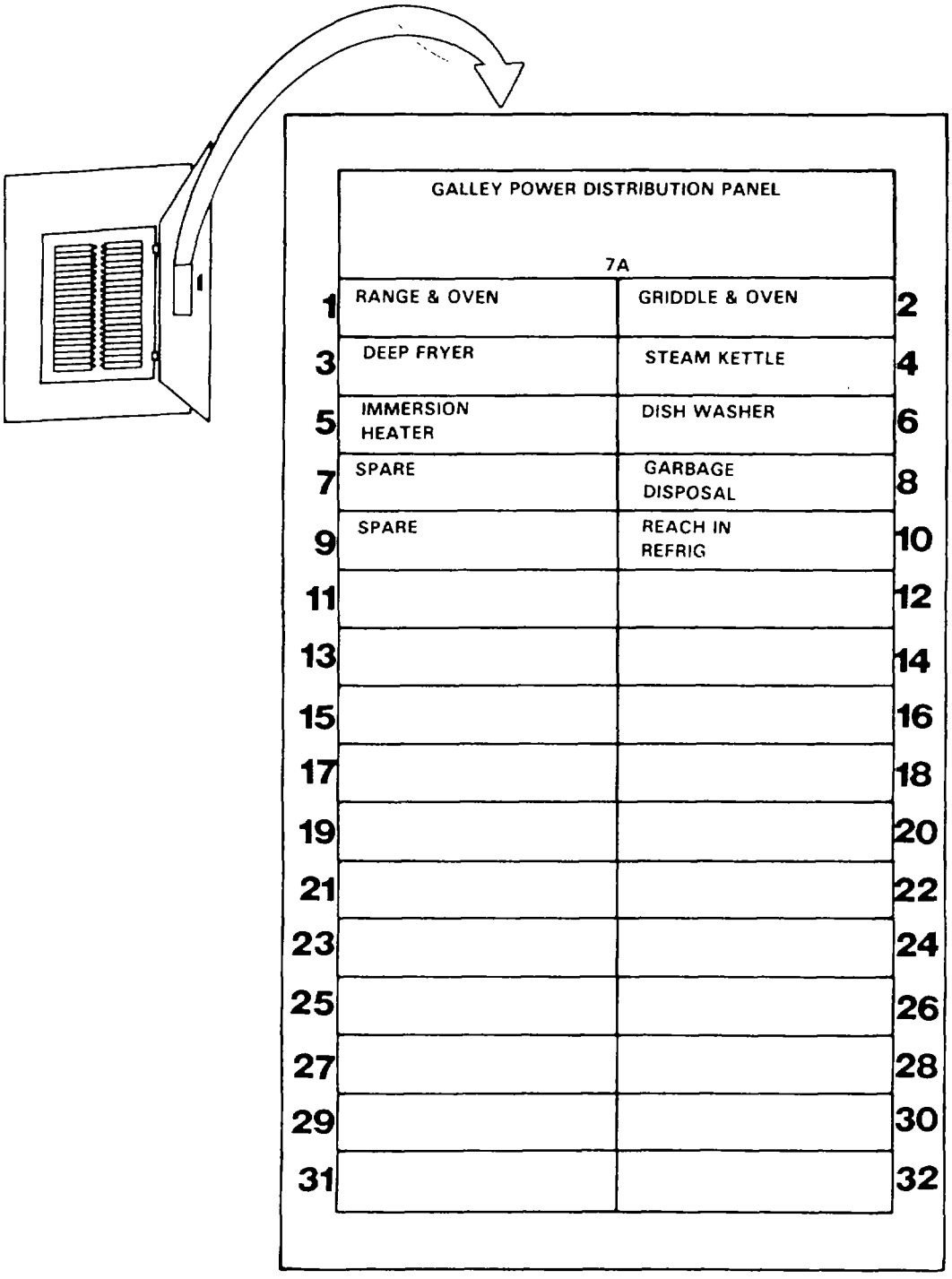


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 13 of 21).

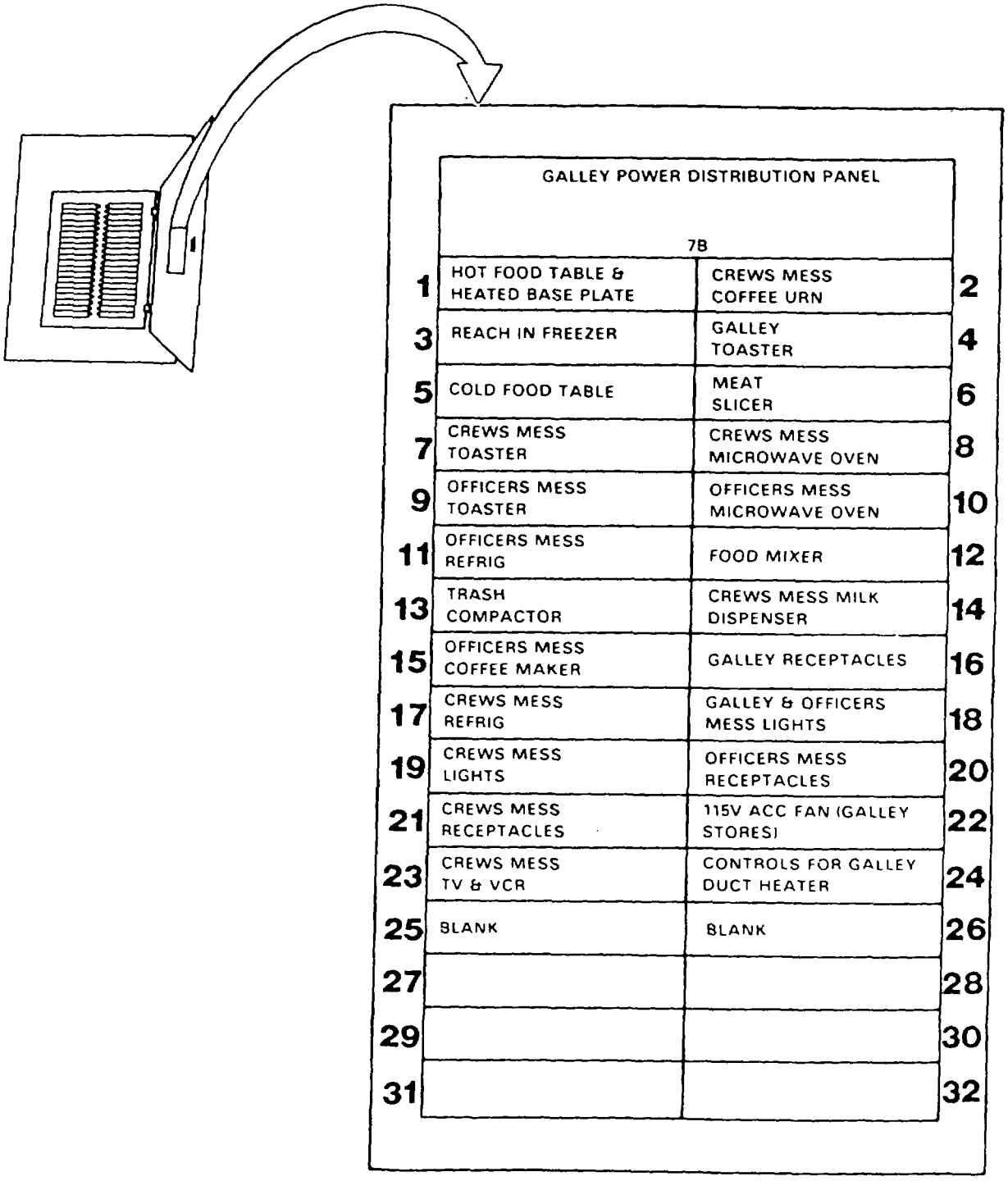


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 14 of 21).

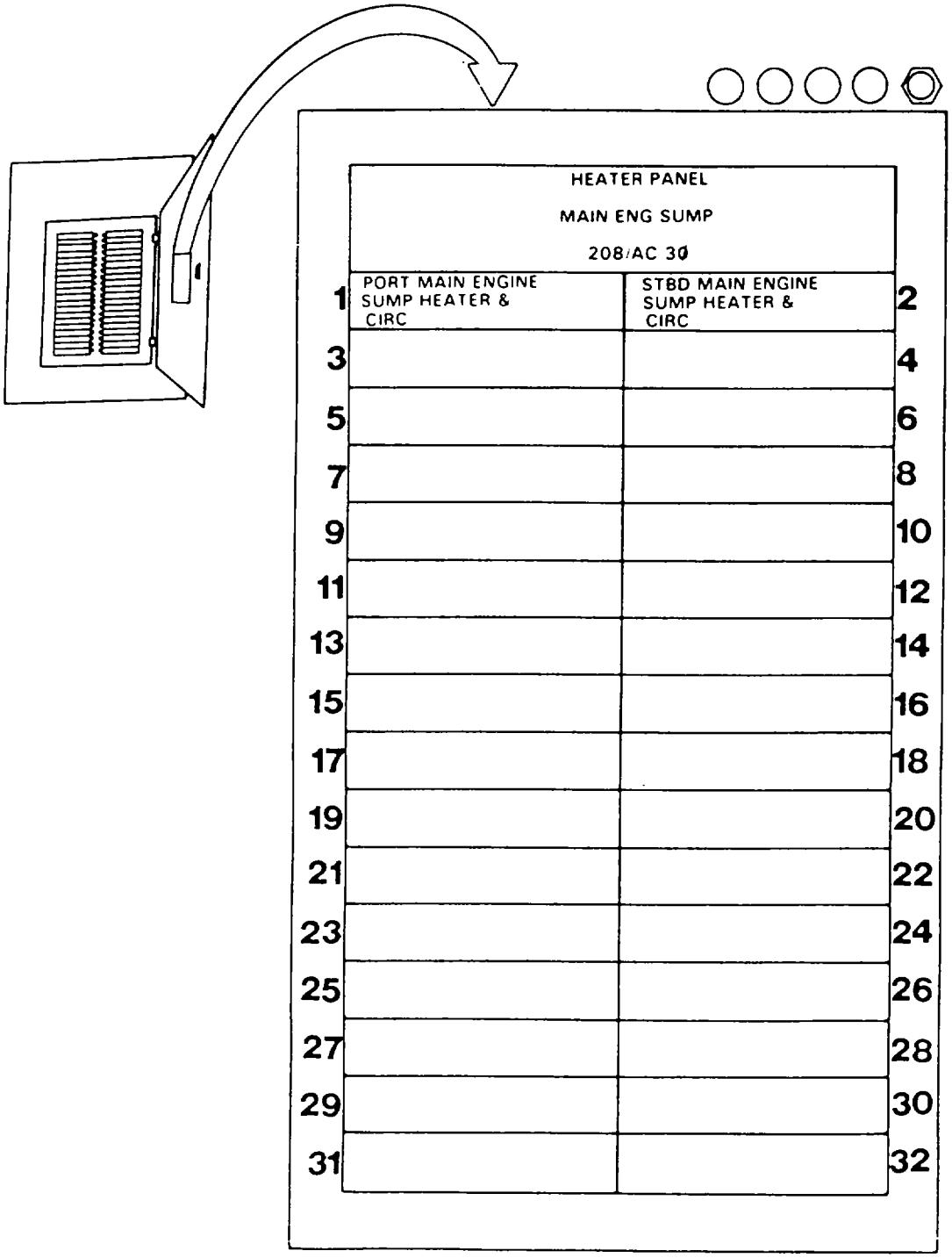


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 15 of 21).

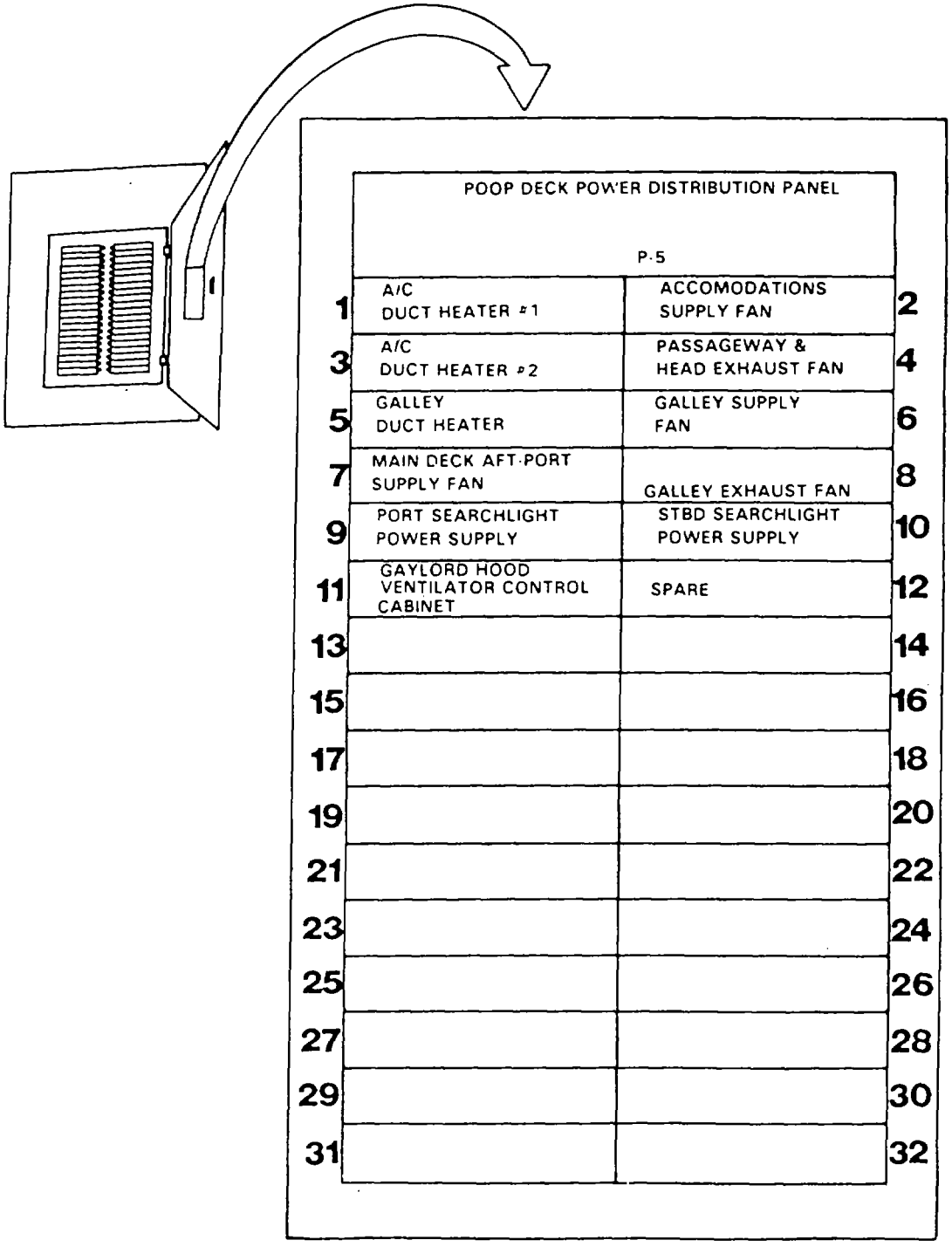


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 16 of 21).

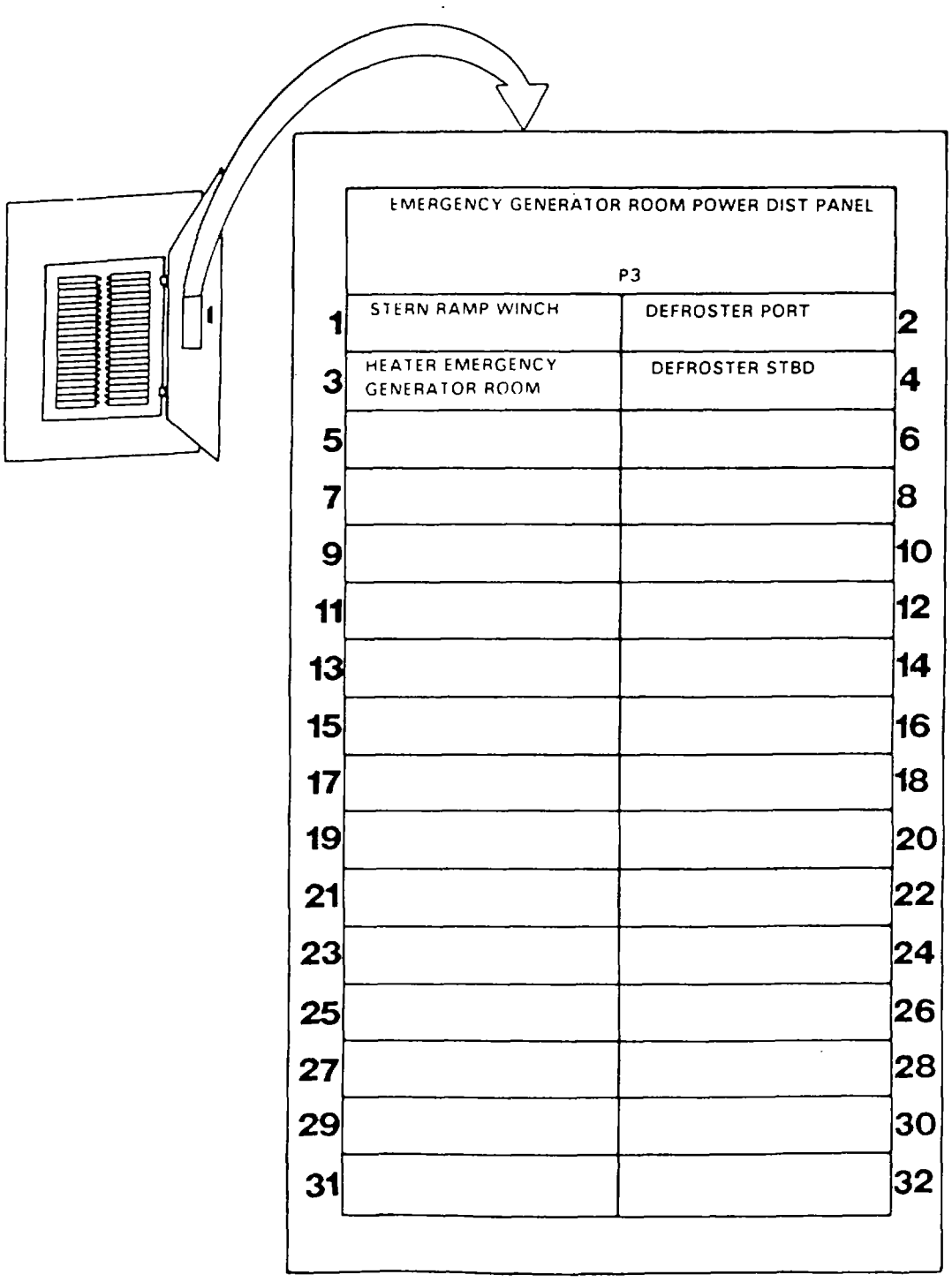


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 17 of 21).

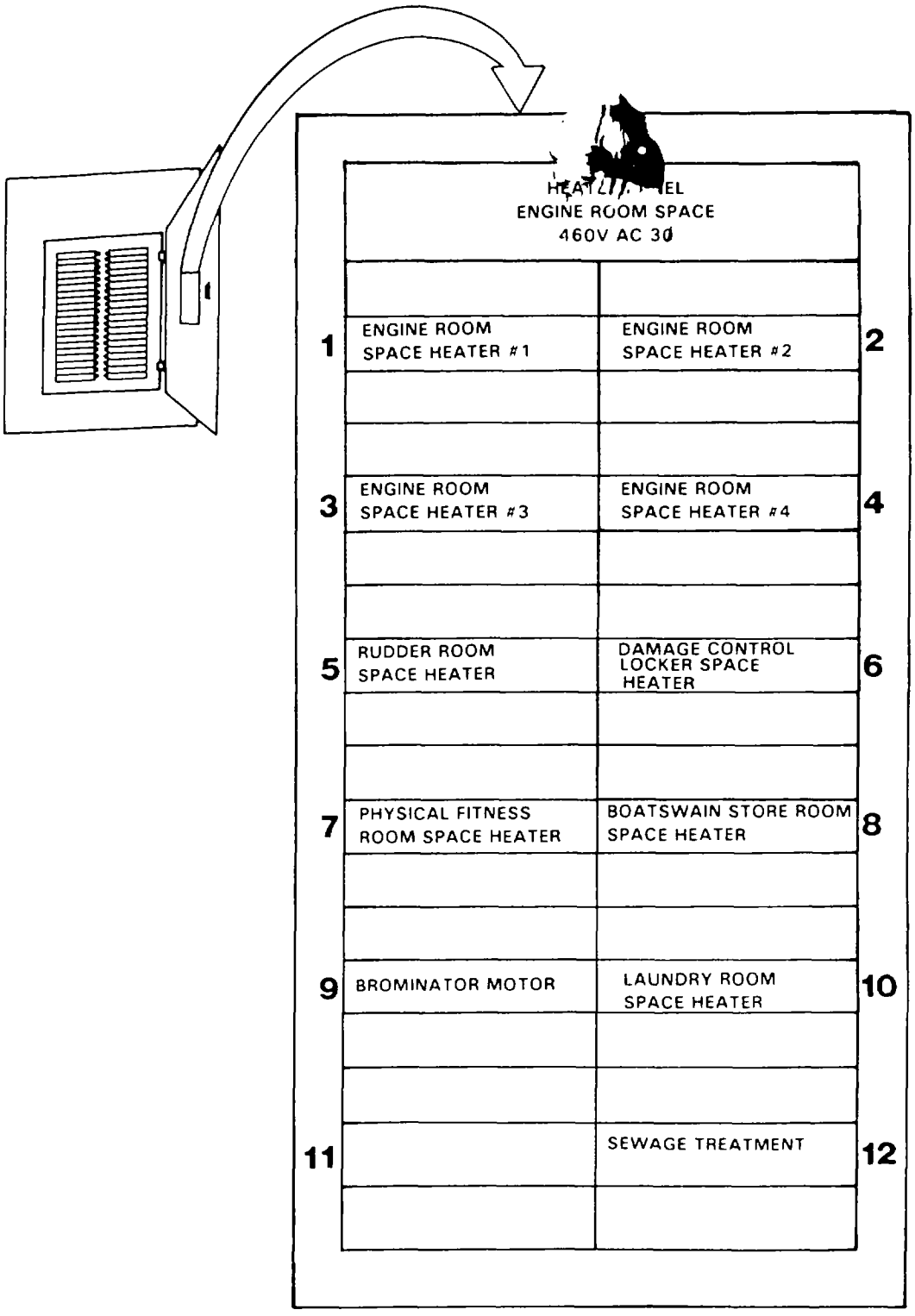


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 18 of 21).

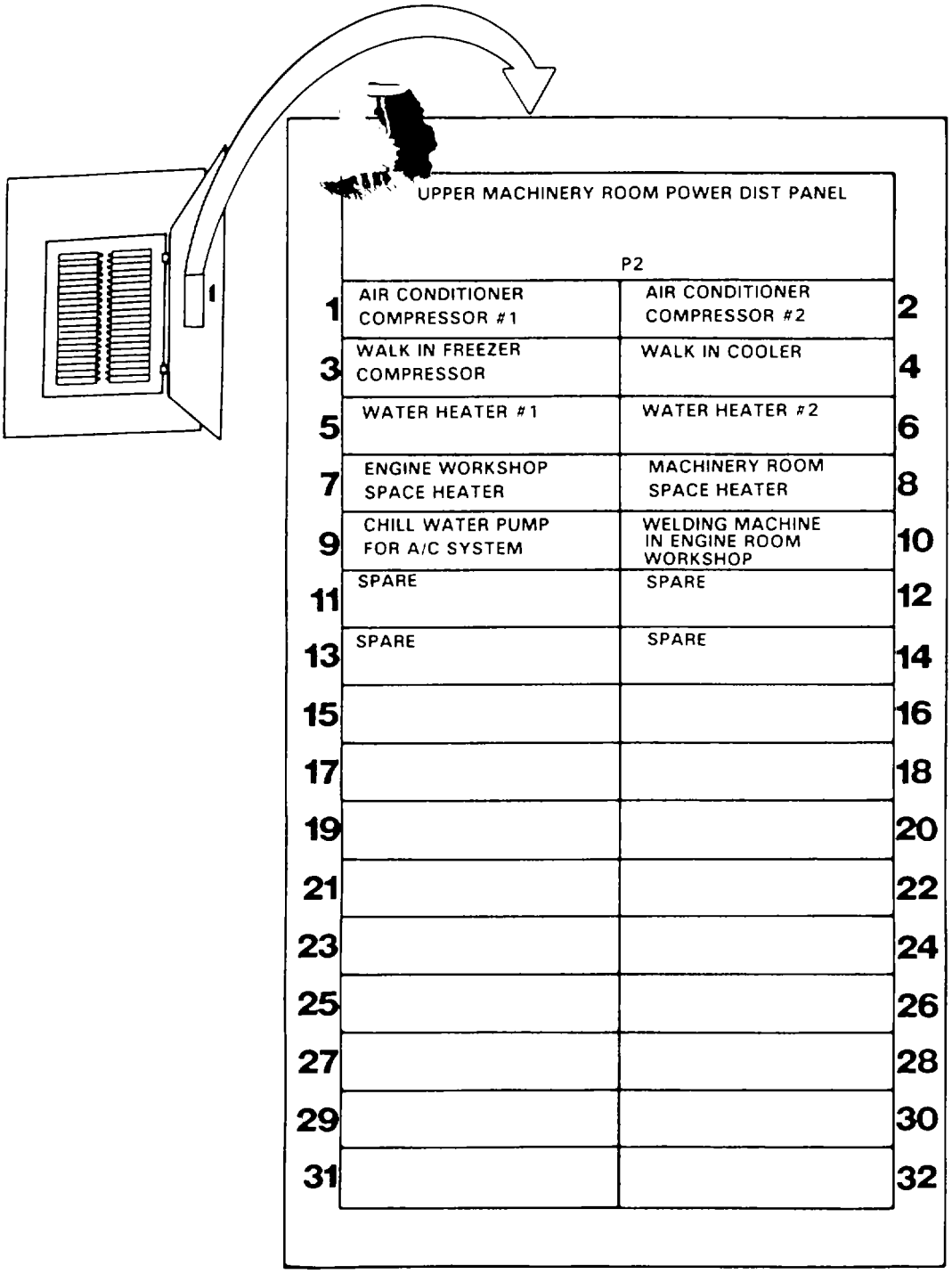


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 19 of 21).

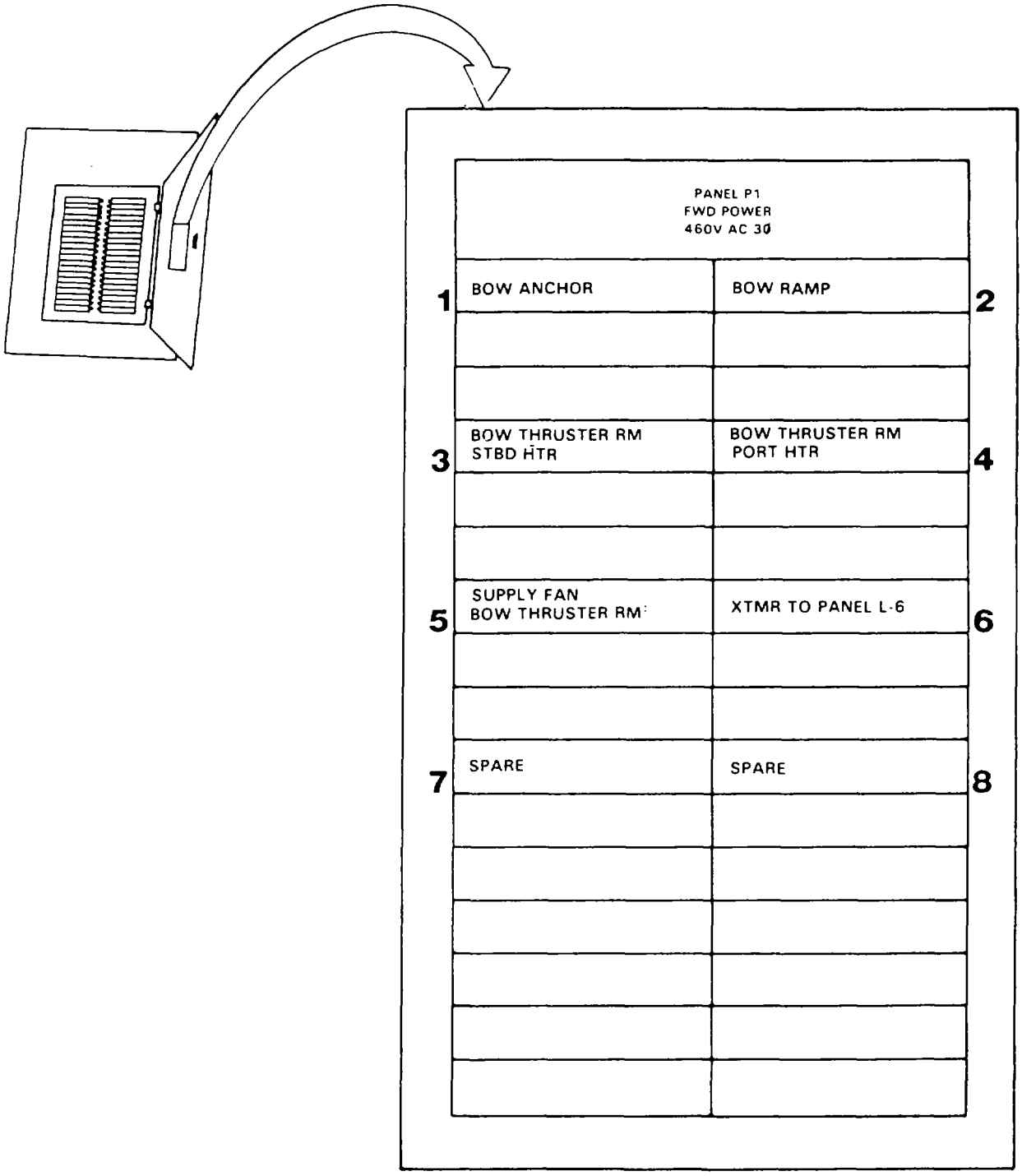


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 20 of 21).

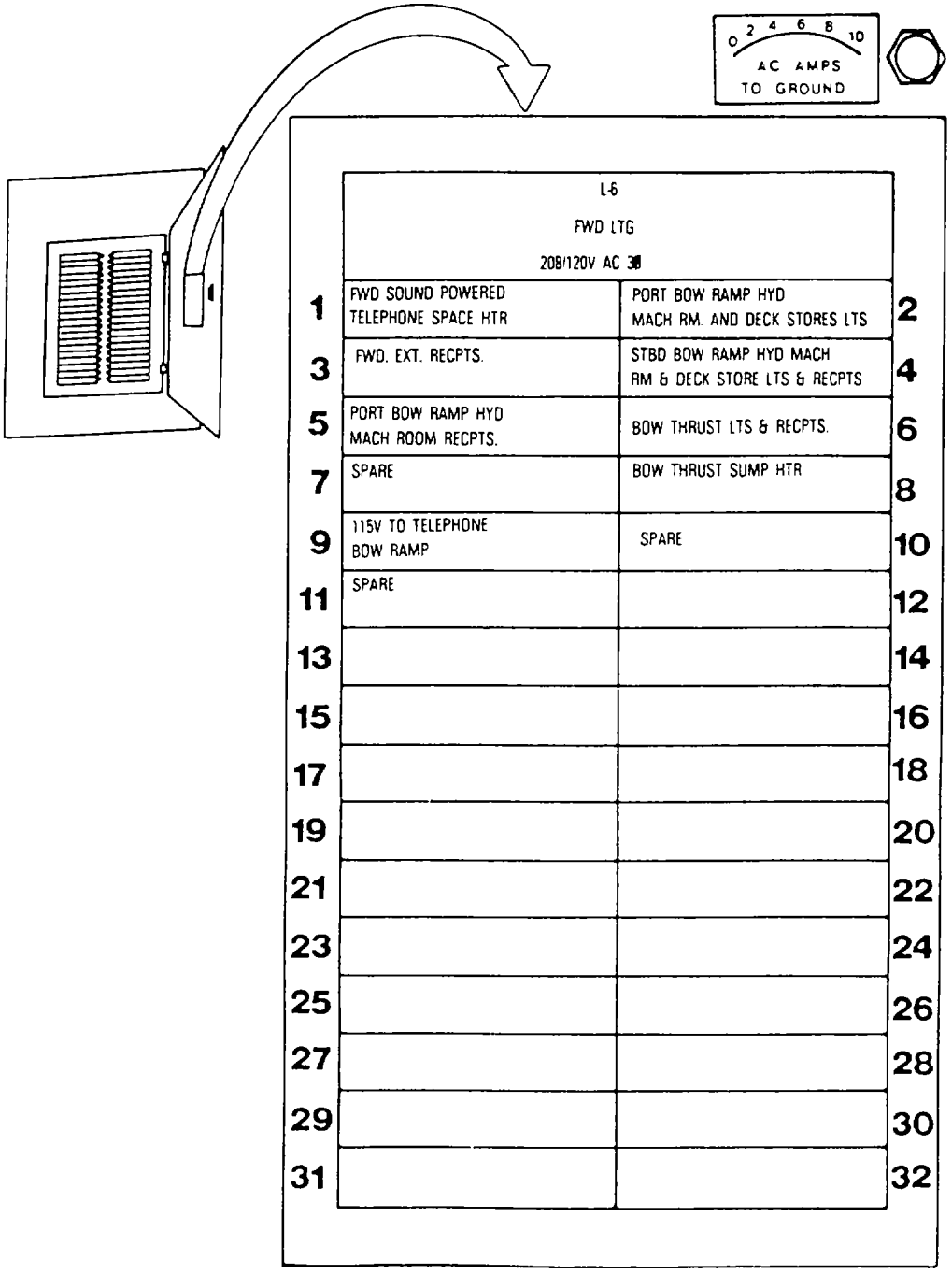


FIGURE 2-101. Power and Lighting Distribution Panels (Sheet 21 of 21).

Table 2-1. Description of Operator's Controls and Indicators - CONT

Key	Control or Indicator	Function
Power and Lighting Distribution (FIGURE 101) - continued		
13	GALLEY POWER DISTRIBUTION PANEL 7A and 7B	Provides protection for and control of panels and circuits shown on Sheets 13 and 14.
14	HEATER PANEL MAIN ENG SUMP 208/AC 30	Provides protection for and control of panel and circuits shown on Sheet 15.
15	POOP DECK POWER DISTRIBUTION PANEL P-5	Provides protection for and control of panel and circuits shown on Sheet 16.
16	EMERGENCY GENERATOR ROOM POWER DIST PANEL P-3	Provides protection for and control of panel and circuits shown on Sheet 17.
17	HEATER PANEL ENGINE ROOM SPACE 460V AC 30	Provides protection for and control of panel and circuits shown on Sheet 18.
18	UPPER MACHINERY ROOM POWER DISTR PANEL P-2	Provides protection for and control of panel and circuits shown on Sheet 19.
19	PANEL Pl FWD POWER 460V AC 30	Provides protection for and control of panel and circuits shown on Sheet 20.
20	MOTOR CONTROL CENTER	Provides protection for and control of panel and circuits (FIGURE 2-18).
21	L-6 FWD LTG 208/120V AC 30	Provides protection for and control of panel and circuits shown on Sheet 21.
22	MAIN POWER DIST PANEL	Provides protection for and control of panel and circuits (FIGURE 2-19).

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-2. PMCS INTRODUCTORY MATERIAL

2-2.1. **GENERAL.** Preventive Maintenance Checks and Services (PMCS) means systemic caring, inspecting and servicing of equipment to keep it in good condition and to prevent breakdowns. As the LSV operator, the mission is to:

a. Be sure to perform PMCS each time the LSV is operated. Always do the PMCS in the so order, so it becomes a habit. After you have had some practice, you will be able to quickly spot anything wrong.

b. Do BEFORE PMCS just before operating the LSV. Pay close attention to WARNINGs, CAUTIONs and NOTEs.

c. Do DURING PMCS while the LSV is being operated. DURING operation means to monitor the LSV and its related components while it is actually being operated. Pay close attention to WARNINGs, CAUTIONs and NOTEs.

d. Do the AFTER PMCS immediately following the LSV operation. Pay close attention to WARNINGs, CAUTIONs and NOTEs.

e. Do WEEKLY PMCS once a week.

f. Do MONTHLY PMCS once a month.

g. Do QUARTERLY PMCS every quarter.

h. Do SEMI ANNUAL PMCS every six (6) months.

i. Do ANNUAL PMCS once a year.

j. Do TRIENNIALLY PMCS once every three (3) years.

k. Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that are discovered before, during or after operation unless you can fix them. Faults that are fixed DO NOT need to be recorded.

l. Be prepared to assist unit maintenance when the LSV is lubricated. Perform any other services when required by unit maintenance.

2-2.2. **PMCS PROCEDURES.**

a. The Preventative Maintenance Checks and Services, Table 2-2, lists inspections and care required to keep the LSV in good operating condition. It is set up in order for BEFORE OPERATION checks to be made as the operator walks around and on the LSV.

b. The “INTERVAL” columns of Table 2-2 tell when to perform a certain check or service.

c. The “CHECK FOR” and “ACTION” columns of Table 2-2 tell how to perform required checks and services. Carefully follow these instructions. If the tools are not available or if the procedure tells you to, notify the supervisor.

NOTE

Terms “ready/available” and “mission capable” refer to the same status: Equipment is on hand and ready to perform its combat missions. (See DA PAM 738-750)

d. The equipment is “PMC” (Partially Mission Capable) column in Table 2-2 tells when the ancillary equipment performance may be degraded but the primary mission of the LSV is not affected.

e. The equipment is “NMC” (Not Mission Capable) column in Table 2-2 tells when the LSV is nonmission capable and why the LSV cannot be used.

f. If the LSV does not perform as required, refer to Chapter 3, Section II, Troubleshooting.

g. If anything looks wrong and it cannot be fixed, write it on a DA Form 2404. IMMEDIATELY report it to the supervisor.

h. When you do the PMCS, always have a rag or two. Following are checks that are common to the entire LSV:

(1) Keep It Clean. Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean while working and as needed. Use dry cleaning solvent (SD-2) on all metal surfaces. Use soap and water when cleaning rubber or plastic material. Upholstery can be cleaned with soap, water and a clean, damp cloth.

(2) Rust and Corrosion. Check the LSV hull and structure for rust and corrosion. If any bare metal or corrosion exists, clean and apply a thin coat of oil. Report it to the supervisor.

(3) Bolts, Nuts and Screws. Check all for obvious looseness, missing, bent or broken condition. All of them cannot be tried with a tool, but look for chipped paint, bare metal or rust around bolt heads. If a bolt, nut or screw is loose, tighten it or report it to the supervisor.

(4) Welds. Check for loose or chipped paint, rust or gaps where parts are welded together. If a bad weld is found, report it to the supervisor.

(5) Electric Wires and Connectors. Look for cracked, frayed or broken insulation, bare wires and loose or broken connectors. Tighten loose connectors. Report any damaged wires to supervisor.

(6) Hoses and Fluid Lines. Look for wear, damage and leaks and make sure clamps and fittings are tight. Wet spots show leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to the supervisor.

i. When you check for “Operating Condition”, look at the component to see if it is serviceable.

2-2.3. **CLEANING AGENTS.**

WARNING

- DO NOT use diesel fuel, gasoline or benzene (benzol) for cleaning.
- DO NOT SMOKE when using cleaning solvent. NEVER USE IT NEAR AN OPEN flame. Be sure there is a fire extinguisher nearby and use cleaning solvent only in well-ventilated places. Flash point of solvent is 138^{o}F (60^{o}C).

- USE CAUTION when using cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

CAUTION

When cleaning engine compartment areas, engine must be COLD (same temperature as ambient air). DO NOT point water or steam directly at any electrical connection. DO NOT use high-pressure water supply system. Damage to engine, electrical system and other components may result.

NOTE

Only use those authorized cleaning solvents or agents listed in Appendix D.

a. Cleaning Engine Compartment Areas.

(1) When using water to clean the engine compartment, always cover alternators and air cleaner inlet using waterproof material. Use water pressure and volume similar to a standard household type water supply system (45-70 psi, 6.5-10.2 kPa).

(2) After cleaning, allow engine to air dry. Do not use compressed air to dry engine. Do not run engine to decrease drying time.

(3) Remove all component covers before starting engine.

b. Treating Mildewed Areas. Scrubbing with a dry brush can clean mildewed canvas. If it is necessary to use water to remove dirt, it should not be used until mildew has been removed. After removing mildew, examine fabric. Look for evidence of deterioration. If canvas has deteriorated, it should be replaced.

CAUTION

Keep cleaning solvents, gasoline and lubricants away from rubber or soft plastic parts since they will cause material to deteriorate.

c. Cleaning Rust or Grease. When cleaning grease buildup or rusty spots, use a cleaning solvent. Apply a thin coat of oil to the affected area.

2-2.4. **LEAKAGE DEFINITIONS FOR OPERATOR PMCS.** It is necessary to know how fluid leakage affects the status of the LSV. Following are types/classes of leakage an operator needs to know to be able to determine the status of the LSV. Learn these leakage definitions and remember – when in doubt, notify the supervisor.

CAUTION

Equipment operation is allowable with minor leakages (Class I or II). Of course, consideration must be given to fluid capacity in the item/system being checked/ inspected. When in doubt, notify the supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required in the PMCS.

Class III leaks should be reported immediately to the supervisor.

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 item being checked/inspected.

c. CLASS III – Leakage of fluid great enough to form drops that fall from item being checked/inspected.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY												EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											NOTE			
											If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shutdown.			
											WARNING			
											Electrical hazards. The electrical system and pneumatic equipment system are dangerous when performing maintenance or inspections. Be sure to observe all warnings to prevent injury or possible death of personnel.			
											CAUTION			
											Equipment operation is allowable with minor leakage (Class I or II). Consider the fluid capacity in the item/system being checked/inspected. When in doubt, notify the section supervisor.			
											When Operating with Class I or Class II leaks, continue to check fluid levels as required in the PMCS.			
											Class III leaks should be reported to your supervisor or unit maintenance.			
											CAUTION			
											Operating the equipment contrary to published instructions will cause damage and possible destruction of the equipment. Always be sure the equipment is operated properly.			
1				X						**External Hull (above waterline)**	Inspect for structural damage.	Repair structural damage, refer to next level of maintenance		Watertight integrity or operational capability is impaired

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
2					X					**External Hull (Below waterline)**	Inspect accessible hull areas from within the hull for flooding.	If inspection reveals hull damage/flooding, refer to next level of maintenance.		Underwater hull is damaged, deteriorated to extent that watertight integrity is compromised.
3	X				X					**Life Lines and Stantions**	Ensure life lines are in good repair, and are secured in place. Visually inspect safety chains for wear and corrosion. Ensure safety chains are utilized.	Repair/replace stantions, life lines, and safety chains as necessary		
4					X					**Doors, hatches/covers - scuttles**	Inspect for proper installation, missing/defective fasteners. Check gasket for proper seal.	Repair/replace gasket/fasteners as necessary. Perform chalk test.		Watertight integrity or operational capability is impaired
5					X					**Mast and Yardarm**	Inspect for mechanical damage to navigational equipment and ensure lights are functional.	Repair/replace as necessary.		Mast is damaged to extent that navigational systems are not properly supported.
6	X									**AN/PSN-11 ANV**	Check for cracked casing and non-power up.	Troubleshoot, repair, evacuate to higher source of maintenance.		Equipment non-operational.
7	X									**ROSS Radio**	Check power supply and conduct a radio check. Inspect antenna for cracks and servicablity.	Troubleshoot, repair, evacuate to higher source of maintenance.		
8	X									**Furuno NAVTEX receiver NX-500**	Check connections on whip antenna, and pre-amp unit.	Clean and inspect terminals. Repair, evacuate to higher source of maintenance.		
9	X									**EPRRB satellite 406**	Check for hidden hazards or obstacles.	Remove hazards/obstacles, test unit.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
10										**1 kW Xenon Searchlight**				
				X						Lamp	Visually inspect lamp for blackening.	If black, replace lamp. Refer to unit maintenance		
											WARNING			
											On initial startup, **DO NOT** energize circuit before first checking to ensure that the protective lamp cover is removed. Use extreme care when performing maintenance work, making adjustments or operating the searchlight, etc., because dangerous high voltage (over 50,000) radio frequency power is used in the lamp starting circuit. Observe all warnings to prevent injury or possible death of personnel.			
											WARNING			
											Do not stand close to searchlight front cover when lamp is lighted. In the event of lamp explosion, the front cover glass could break. Avoid direct exposure from the powerful direct and reflected radiation given off by the lamp. Observe all **CAUTIONS and WARNINGS.**			
				X							Visually inspect for stresses in the quartz.	If stress is detected, replace lamp.		
				X						Reflector	Visually inspect for tarnishing, dirt buildup and corrosion.	Clean as required.		
				X						Front Cover Glass	Visually inspect glass for dirt buildup and defects.	Clean as required.		
				X						Searchlight	Visually inspect the case for damage, dirt buildup and corrosion.	Clean/repair/replace as required.		
11										**Searchlight Power Supply**				

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
11 Cont		X								Fan	Check air flow at exhaust openings when searchlight is turned ON.	If no air flow is detected, troubleshoot, and repair as necessary.	Fan is not operating. Daytime operations only.	
		X								Ammeter	Check ammeter for correct current reading.	Adjust as necessary.	Lamp current is not correct. Daytime operations only.	
				X						Power Supply Case	Visually inspect case for damage, wear and dirt buildup.	Repair damage and wear as necessary. Clean as required.		
					X					Elapsed Time Meter	Check to determine if lamp should be replaced. (Recommended replacement time is **1500 to 1600 hrs** elapsed time).	Replace lamp as needed.		
											NOTE			
											A used lamp should be considered for use in emergency situations. Properly protect, store and identify lamp as a spare.			
12				X						**Navigation Lighting System**	Visually inspect to ensure that all lights operate properly when the perspective light switches on the navigation light panel are in the ON position.	Replace lamps/switches as necessary.		Lights are inoperative. Circuits are defective.
											NOTE			
											The navigation light panel is located in the pilothouse. Refer to Chapter 2, Section I, Figure 2-12 for Operator's Controls and Indicators.			
13	X			X						**Fuel Day Tank (M/E, E/G and B/T) (SET)**	Check the amount of fuel in the day tank. Note any evidence of fuel leaks.	Add fuel as necessary to top off tank.		Class III Leakage is observed.
14	X			X						**Lubrication Oil Tank**	Check Lubrication Oil Level. Note any evidence of oil leaks.	Add oil as necessary.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
15	X			X						**Life Jackets**	Check for rips, oil stains, broken straps, fiber deterioration and hull number of vessel. Check that light and whistle attached to jacket operates and that case is not damaged.	Replace as needed. Match number of life jackets to personnel on board.		Number required not on board
16	X			X						**Immersion Suits**	Check for rips, oil stains, broken straps, fiber deterioration and hull number of vessel. Check that light and whistle attached to suit operates and that zippers function properly.	Replace as needed. Match number of immersion suits to personnel on board		Number required not on board
17	X			X						**Life Rings**	Inspect for damage and proper markings. Check for operational marker lights when turned upright.	Replace as needed		Number of rings required not on board
18								X		**Semi-portable CO2 Fire Extinguishing System**	Inspect for tight mounting, full charge, corroded nozzle, and closed valves with untampered seals. Direct particular attention to extinguisher line and nozzle in the engine room, checking for damage and correct nozzle alignment.	Verify that hydro date has not elapsed. Weigh cylinders and inspect cylinders for visual damage.		
				X							Check that entire system is in good condition and securely mounted. Check extinguisher nozzle to ensure that they are free of obstructions, dirt and corrosion.	Refill/replace used fire extinguishers.		
19				X						**Portable CO2 Fire Extinguishers**	Inspect extinguishers for discharged cylinders, and correct weight. "**HEFT**" the cylinder to prevent the compacting of agent.	Refill/replace used fire extinguishers.		
20					X					**Halon 1301 Fixed Fire Suppression System**	Periodic inspections of the fire suppression system should be made to ensure efficient operation at all times.			

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											NOTE			
											During periods of extreme heat, fire extinguishers may release a portion of their charge through the discharge nozzles. Visually inspect nozzles for evidence of discharge or leaks. Refer to Chapter 2, Section III, Para. 2-5.9.			
											NOTE			
											HALON 1301 is a CFC and must be properly recovered. Releasing pressure from an extinguisher must be done by a certified contractor.			
											NOTE			
											The two (2) Halon 1301 fixed fire suppression systems operate independently and service the main engine room, bowthruster room, emergency generator room and the paint locker. Each system is designed to provide an adequate amount of fire retardant material for the space protected.			
					X					System Components	Check the system components to ensure that accidental damage to equipment has not occurred. Ensure cylinder straps are securely mounted.	Tighten mounting straps.		
					X					Distribution System	Check for obstructions to the overhead discharge nozzles.	Remove obstructions.		
					X					Egress and Control Boxes	Ensure that egress to the extinguisher assembly and all control pull boxes are unobstructed.	Refer to unit maintenance.		
					X					Pressure Gauges	Check extinguisher assembly for proper operating pressure between **200 to 600 PSI.**	Troubleshoot, repair, or refer to higher level of maintenance.		Operating pressures below 200 PSI or above 600 PSI.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
21										**FM-200 Fixed Fire Suppression System in the Engine Room, Bowthruster Room, Paint Locker, and Emergency Generator Room**	**IF EQUIPPED**			
					X					FM-200 Cylinder Pressure	Check pressure gauges for proper operating pressure. For proper operating pressure, the gauge should be in the GREEN area.	Refer to general support (GS) maintenance to have cylinder recharged.		Cylinder pressure gauge indicator not in the GREEN area
					X					FM-200 Cylinder Liquid Level	Ensure liquid level readings are taken IAW **appropriate manufacturer's manual supplied with as-built manuals/drawings.**	If liquid level is low, refer to general support maintenance to have cylinder recharged		Cylinder liquid level low.
					X					Complete FM-200 System	Inspect system components IAW **appropriate manufacturer's manual supplied with as- built manuals/drawings.**	Refer to general support maintenance for repair or service of damaged components		Damaged components to extent to prevent FM-200 system activation
				X						Ventilation Dampers and Closures.	Operate and remove access covers and service engine room supply air dampers (Port and Starboard) and engine room exhaust air dampers (Port and Starboard).	Repair/replace dampers as necessary.		Dampers not operating to extent to prevent area closure for function of FM-200 system.
						X				Steering Gear Compartment Sliding Watertight Door	Operate door to verify operation IAW manufacturer's manual.	Perform maintenance IAW manufacturer's manual		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
							X			FM-200 Pressure Switches	Ensure all diesel engines and powered ventilation system shutdowns are in operation. Manually raise plunger on pressure switch. Verify automatic shutdown of operating engines and ventilation systems. Verify activation of warning lights and warning bell. Reset plunger on pressure switch.	Refer any automatic ventilation or engine shutdown failure to general support maintenance. Repair inoperative warning lights or bell.		Any automatic shutdown failure.
								X		Complete FM-200 Certification	Perform system recertification.	Obtain services of certified technical representative for system recertification.		Certification expires
											NOTE			
											If any part of the FM-200 piping system is removed for maintenance, the system must be tested IAW manufacturer's as-built drawings. The complete system must then be recertified by a certified technical representative.			
22										**Water Washdown System (WWS)**				
				X						Control Valve	Charge fire main to operating pressure, perform visual inspection to verify the Water Washdown System is free of leaks.	Repair control valve.		
					X						Verify fire main is not charged. Inspect control valve handle locking mechanism to ensure it is free and operates properly. Exercise WWS contro valve by unlocking valve handle and operating valve through two (2) openings and closings. Close valve and verify lock is engaged.	If control valve fails to operate, repair or replace valve.		
					X					Strainer Blow Off	Verify fire main is not charged. Exercise WWS strainer blow off through two (2) openings and closings. Ensure strainer blow off is returned to closed position.	Repair/replace strainer blow off valve.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											NOTE			
											If any part of the WWS piping system is removed for maintenance, refer to general support maintenance for system testing. The system must be tested IAW manufacturer's as-built drawings. If system fails to meet test requirements, repair system, and retest system.			
									X	Control Valve, Strainer, and Piping	Perform a flow test. Refer to manufacturer's as-built drawings for system flow requirements.	Refer to general support maintenance if system fails to meet flow requirements. Repair fire and general service pump No.1 and retest.		
											NOTE			
											After system activation, the strainer must be removed, cleaned and reinstalled.			
23						X				**First Aid and Medical Supplies**	Inspect and check the contents in the first aid kit (with itemized list in "SHIP's MEDICAL CHEST - published by the U.S. Health Dept.) for completeness and serviceability. Check for shortage or damage to items and replace. Inventory medical supplies in sick bay.	Replace as required.		Expired/missing medical/first aid supplies.
24				X						**Life Raft (4 each)**		Replace any damaged items exterior to the liferaft		
											WARNING			
											During drills, inspections and service, immediately notify supervisor of any defects. **YOUR LIFE AND THAT OF YOUR CREW** may depend on this equipment in an emergency.			

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											WARNING			
											Servicing must be carried out every 5 years at a USCG approved facility for the **Military MK- IV** liferafts, and every 12 months for the **COTS** liferafts, and comply with the requirements of USCG specification 160.051, Par 6. Crew servicing is limited to visual inspection only.			
											WARNING			
											Use caution when inspecting cylinder lanyard connected to the deck. Accidentally pulling this cable will cause the liferaft to inflate which could injure personnel and damage liferaft.			
				X						Container Exterior, seals, cables, lanyards, hydrostatic release, retainer clips and pins.	Visually inspect container for bad dents or cracks which could leak water. Check cables and lanyards for chafing, cuts or loose connections.	Repair/replace lanyards and cables if defective		Any deficiencies that would keep liferaft from operating properly, expired certification, missing or unreadable labels.
25	X	X	X	X						**Handling Davit (IF EQUIPPED)**	Check davit winch, spool, wire rope and release hook for foreign objects.	Remove foreign objects.		Foreign objects remain wedged or lodged in assemblies.
											Inspect entire davit assembly for deterioration of visible defects.	Document and report any questionable damage or conditions. Refer to next higher level of maintenance for repair.		Damage or conditions which make davit unsafe for use.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
26				X						**Fire Pumps**	Check fire pumps and sea chest valves for proper operation. Check fire pump supply line.			Openings are restricted to an extent that normal operation is hampered 50% or more.
27				X						**Fire pump valve alignment**	Check valves for proper alignment for system operation.			
28						X				**Electrical Wiring**	Visually inspect all accessible electrical cables, connections and harnesses.	Ensure connections and supports are secure, clean and undamaged.		Connections are damaged or contaminated.
											WARNING			
											Do not smoke when observing battery electrolyte level. Batteries give off fumes that can explode. Electrolyte is an acid and can cause personal injury if it comes in contact with the skin or eyes. Wear approved goggles, gloves and apron.			
29				X						**Batteries, terminals and cables**	Inspect batteries, terminals, cables, connections and vent caps for tightness and cleanliness. Check liquid level.	Clean, add distilled water, repair/replace as needed.	Unserviceable cables, caps, or terminals	
				X						Electrolyte	Check electrolyte level with hydrometer	If under standard, then replace battery.	Low hydrometer readings	
30		X			X					**Battery Chargers**	Check battery chargers for proper connections to batteries, and correct DC output.	Tighten connections.		
31	X	X	X							**Engines, Reduction Gear and Oil tanks**	Visually inspect engine crankcases, oil filters, reduction gear and oil tanks for leaks. Direct particular attention to all connections, sealing joints and scuttle gaskets.	Repair leaks.		Class III leaks

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
		X								Oil and Cooling Systems	Conduct visual inspection for oil and cooling system leaks. Direct particular attention to all connections and sealing joints. (Refer to systems piping diagrams, Chapter 2, Section III, Operation Under Usual Conditions, Figures 2-104 and 2-105).	Correct all oil water leaks, document and report discrepancies/damage/ Class III leakage to engineer on watch.		Class III leaks
32		X		X						**Potable Water System**	Conduct visual inspection for water leaks. Direct particular attention to all connections and sealing joints. (Refer to systems piping diagrams, Chapter 2, Section III, Operation Under Usual Conditions Figure 2-113). Check and clean supply line strainer.	Correct all water leaks or document and report discrepancies/damage/Class III leakage to engineer on watch.		Class III leaks
											WARNING			
											Open the ventilators to ensure hull compartments and engine room are clear of fuel fumes. Operate the blowers for at least 5 minutes before starting the engine.			
33	X	X	X							**Engine Accessories and Connections**	Inspect engines, generators, fuel injection pumps and cooling pumps for loose or damaged connections.	Correct all defects.		
34	X									**Generator Set Engine, 250 kW**	Check the engine and generator for debris, foreign objects and loose or broken fittings. Refer to TM 55-1915-203-24.	Remove foreign debris. Repair all loose connections and broken fittings.		Throttle control inoperative
	X									Block Heater	Check block heater for proper operation.			
	X	X								Oil Level	Check engine oil level. Ensure the level on the dipstick is between the add and full marks on the stopped side of the dipstick. Refer to TM 55-1915-203-24.	Add oil as necessary.		Low oil level
	X									Cooling System	Check coolant level. Ensure coolant level in expansion tank is at the full mark in overhead sight glass.	Add coolant as necessary.		
	X									Fuel System	Inspect fuel system for leaks. Check water separator trap.	Repair leaks.		Class III leaks.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X									Air Pressure	Check starting air pressure for minimum of **240 PSI** and service air pressure for a minimum of **150 PSI**.	Troubleshoot and repair.		Low air pressure.
											WARNING			
											Do not smoke when observing battery electrolyte level. Batteries give off fumes that can explode. Electrolyte is an acid and can cause personal injury if it comes in contact with the skin or eyes. Wear approved goggles, gloves and apron.			
				X						Batteries, terminals and cables	Inspect batteries, terminals, cables, connections and vent caps for tightness and cleanliness. Check liquid level.	Clean, add distilled water, replace/repair as needed.	Unserviceable cables, caps, or terminals.	
				X						Electrolyte	Check electrolyte level with hydrometer	If under standard, replace battery.	Low hydrometer readings.	
				X						Battery Charger	Check battery charger for proper operation. Disconnect battery charger before starting the engine if it is not capable of handling a cranking load.	Troubleshoot and repair as necessary.		
	X									Gauges	Check gauges for broken lenses, damaged frames, and brackets.	Repair/replace as necessary.		
		X								Oil Pressure	Check gauge for proper oil pressure (**45 to 70 PSI**).	Troubleshoot and repair as necessary.		Oil pressure less than 45 or greater than 70 PSI.
		X								Fuel Pressure	Check gauge for proper operating fuel pressure, NORMAL pressure (**Green**) range.	Troubleshoot and repair as necessary.		Fuel pressure not in the NORMAL (green) range.
		X								Cooling System	Check gauge for proper operating coolant temperature (**170 degrees to 195 degrees F**).	Troubleshoot and repair as necessary.		Temperature exceeds 195 degrees F.
		X								RPM	Check tachometer gauge for correct engine speed in revolutions per minute (RPM). Refer to Chapter 2, Section III, Para. 2-5.6.1.	Troubleshoot and repair as necessary.		Erratic Engine Speed.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											WARNING			
											Hot oil can cause serious burns. Check oil with engine running at idle.			
		X								Oil Level	Check engine oil level. Maintain oil level between the add and the full marks on the engine running side of the dipstick.	Add oil as necessary.		Low oil level
											NOTE			
											Engine must be stopped before making necessary repairs.			
		X								Leaks	Check engine for water, oil, fuels leaks, and unusual noises.	Troubleshoot and repair as necessary.		Class III leaks, and unusual noises.
			X							Battery Charger	Check that the battery charger is reconnected.	Reconnect battery charger.		
35	X			X						**Main Propulsion Engines**	Check the engines for debris, foreign objects and loose or broken fittings. Refer to TM 55-1915-201-24.	Remove foreign debris. Repair loose or broken fittings.		Throttle control inoperative.
	X									Air Pressure	Check starting air pressure for a minimum of **200 PSI**.	Troubleshoot and repair as necessary.		
	X	X								Oil Level	Check oil level. Level should be between the add and full mark on the engine stopped side of the dipstick. Refer to TM 55-1915-201-24	Add oil as necessary.		Low oil level.
	X	X								Cooling System	Check that coolant level in expansion tank is at the full mark in overhead sight glass.	Add coolant as necessary.		
	X	X								Governor Oil Level	Check that the governor oil level is at the correct level in the sight glass.	Add oil as necessary.		Low oil level.
	X	X								Overspeed Trip	Check that overspeed trip is in running (Latched) position.	Adjust as necessary.		
	X									Engine Idle Adjustment	Check that the governor manual adjusting knob is set in the idle speed position.	Adjust as necessary.		
	X	X								Fuel Oil	Check engine fuel oil supply.	Top off fuel supply as necessary.		
		X								Oil Pressure	Check gauge for proper oil pressure (**40 to 70 PSI**).	Troubleshoot and repair as necessary.		Oil pressure less than 40 PSI or greater than 70 PSI.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
		X								Fuel Pressure	Check fuel pressure gauge for proper fuel pressure (**40 to 50 PSI**).	Troubleshoot and repair as necessary.		
		X								Cooling System	Check gauge for proper operating cooling temperature (**165 to 180 Degrees F**).	Troubleshoot and repair as necessary.		Temperature greater than 180 Degrees F.
	X		X							Oil Level	Check engine oil level. Maintain the oil level between the add and full marks on the dipstick.	Add oil as necessary.		Low oil level.
36	X	X								**Reduction Gear**	Check reduction gear unit for debris, foreign objects and loose or broken fittings. Refer to TM 55-1915-202-24&P	Remove foreign debris. Repair loose or broken fittings.		Debris, foreign objects remain wedged or lodged in components
											NOTE			
											Inspection of the reduction gear unit should be accomplished prior to startup operational checks of the main propulsion engines.			
	X									Oil Level	Check that oil level is filled to upper dipstick mark. Refer to TM 55-1915-202-24&P.	Add oil as required.		Low oil level
	X									Leaks	Inspect reduction gear unit for oil or water leaks.	Repair leaks, refer to unit maintenance.		Class III leaks.
	X			X						Exhaust Stack	Check that exhaust stack is clear.			
	X									Clutch Control	Check that engine speed and clutch control air valve is in neutral position.	Place in neutral.		
	X									Air Transfer Valve	Check that control air transfer valve is in local position.	Place in local position.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											NOTE			
											If the oil pressure gauges do not indicate the proper pressure as specified within **30 seconds, STOP** the engine.			
	X			X						**Start Control**	Start engine and note action of starter mechanism, particularly whether mechanism has adequate cranking speed and whether it engages and disengages without unusual noise when the control is operated. Set throttle so that engine will run at normal warm-up until prescribed operating temperature is reached. If the oil pressure gauges do not indicate the proper pressures as specified within **30 seconds, STOP** the engine. Refer to Chapter 2, Section III, para 2-5.6.1. Check that engines idle and respond to controls satisfactorily by accelerating and decelerating through optimum operating range.	Troubleshoot, repair as necessary.		Unusual noise. Low oil pressure.
37	X	X								**Main reduction Gear and Clutch Subsystem**	Check that oil level is filled to upper dipstick mark.	Add oil as necessary		Low oil level
		X								Water Pump	Check rate of water flow throughout heat exchanger.	Troubleshoot and repair.		High oil temperature.
		X								Oil Pressure	Check for proper oil pressure. Should be between **260 to 280 PSI.**	Troubleshoot and repair as necessary.		Low oil pressure.
	X	X								Oil Level	Check the oil level. Maintain the oil level between the add and full mark on the engine running side of the dipstick.	Add oil as necessary.		Low oil level.
		X								Gearbox	Check for leaks.	Repair leaks.		Class III leaks
		X								Operating Temperature	Check operating temperature. Normal range should be **140 to 160 DEGREES F.**	Troubleshoot and repair as necessary.		Temperature exceeds 160 degrees F.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
38		X								**Propeller and Propeller Shaft**	Check for unusual vibrations.	Troubleshoot and refer to higher level of maintenance for repair or replacement.		Shaft is misaligned or bent. Propeller blades are bent or damaged or cutlass bearing is excessively worn.
39										**Engine Controls and Indicators**				
	X	X	X							Engine Room Console	Inspect the engine console for proper operation of throttle control system, all indicators, pressure monitoring system, engine exhaust temperature system and test alarm indicator lamps for operation. Refer to Chapter 2, Section I, Table 2-1, Figure 2-16.	Troubleshoot, repair/replace as necessary.		
	X	X	X							Pilothouse Console	Inspect the pilothouse console for proper operation of the throttle control system, all indicators and test alarm indicator lamp. Refer to Chapter 2, Section I, Table 2-1, Figure 2-9.	Troubleshoot, repair/replace as necessary.		
40					X					**Steering Gear and Linkage**	Inspect steering gear and linkage for broken or worn parts.	Repair/replace as necessary.		Steering gear does no operate smoothly.
41							X			**Bilge Pumps**	Lubricate motor bearings every 400 hours or 6 months. Lube impeller shaft bearings. Check shaft packing.	Repair/replace as necessary.	One pump inoperative	Both pumps inoperative
42							X			**Ballast Pump**	Visually inspect pumps for leaks, loose connections and damage. Lubricate motor bearings every 6 months. Check Packing Gland.	Repair/replace as necessary.		Pump is inoperative.
43	X	X	X	X						**Sludge Pump**	Visually inspect pumps for leaks, loose connections and damage.	Repair/replace as necessary.		Pump is defective
44	X	X	X	X						**Prelube Oil Pumps**	Visually inspect pumps for leaks, loose connections and damage.	Repair/replace as necessary.	One pump inoperative	Both pumps inoperative

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ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
45							X			**Gear Oil Cooling Pump**	Visually inspect pumps for leaks, loose connections and damage. Lubricate motor bearings and impeller shaft bearings.	Repair/replace as necessary.	One pump inoperative	Both pumps inoperative
46							X			**Lubricating Oil Pump**	Visually inspect pumps for leaks, loose connections and damage. Lubricate motor bearings and impeller shaft bearings.	Repair/replace as necessary.		Pump is inoperative.
47							X			**Fire/Bilge Pump**	Visually inspect pumps for leaks, loose connections and damage. Lubricate motor bearings and impeller shaft bearings.	Repair/replace as necessary.		Pump is inoperative.
48							X			**Fuel Oil Transfer Pumps**	Visually inspect pumps for leaks, loose connections and damage. Lubricate motor bearings and impeller shaft bearings.	Repair/replace as necessary.	One pump inoperative	Both pumps inoperative
49							X			**Emergency Fire Pump**	Visually inspect pumps for leaks, loose connections and damage. Lubricate motor bearings and impeller shaft bearings.	Repair/replace as necessary.		Pump is inoperative.
50					X					**Lubricating Oil Purifier**	Drain worm gear housing oil, clean inside of housing and re-fill to correct level with clean oil (Refer to LO 55-1915-200-12).	Tighten mountings and frame cover as necessary.		
								X			Check the threads on the lock ring and bowl body. Check the bowl spindle radial for wobble. Check buffers and ball bearing housing. Replace friction pads. Check position of coupling disc. Check bushings for wearing seals, shear pin, and impeller shaft. Replace brake plug.	Repair/replace as necessary.		
51					X					**Fuel Oil Purifiers**	Drain worm gear housing oil, clean inside of housing and refill to correct level with clean oil (Refer to LO 55-1915-200-12).	Tighten mountings and frame cover as necessary.		

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ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
								X			Check the threads on the lock ring and bowl body. Check the bowl spindle radial for wobble. Check buffers and ball bearing housing. Replace friction pads. Check position of coupling disc. Check bushings for wearing seals, shear pin, and impeller shaft. Replace brake plug.	Repair/replace as necessary.		
											WARNING			
											Prior to any cleaning of the system involving moving parts, the system should be deactivated by disconnecting the power supply or injury to personnel may result.			
52						X				**Ship Stores Refrigeration**	Inspect condenser coils to make certain that air flow is not hampered and that they are clear of dust and debris.	Remove any debris, clear airflow restrictions, clean coils as necessary.		
					X					Drain Line	Inspect and check that drain lines are open.	Clear of restrictions as necessary.		
				X						Liquid Refrigerant	Check the liquid refrigerant sight glass to make certain that the system is fully charged.	Troubleshoot, repair as necessary. Recharge system.	Absence of liquid refrigerant. Restricted underway time.	
					X					Condenser and Evaporator Fan Motors	Check both the condenser fan motors and evaporator fan motors to make certain that they are operational and that the fans are tight and secure.	Troubleshoot, repair/replace as necessary.	Excessive noise or vibration. Restricted underway time.	
					X					Door Gaskets	Check that door gaskets and breaker strips are clean and not damaged/deteriorated.	Clean, replace/repair as needed.		
53	X									**Arc Welder**	Check air channels and remote control terminal strip for dust or dirt buildup.	Clean as necessary.		
54	X	X								**Compressed Air Subsystem**	Check oil level. Maintain level between high and low marks on bayonet gauge.	Add oil as necessary	Low oil level.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											CAUTION			
											Do not overfill or equipment damage may occur.			
	X	X								Air Receiver	Check air receiver for moisture accumulation.	Drain as necessary.		
	X	X								Air Distribution	Check drop legs and traps in air distribution system for moisture and sediment accumulation.	Drain moisture and remove sediment.		
	X									Compressor	Perform an overall visual inspection and ensure safety guards are in place.	Repair/replace as necessary.		
		X								Condition	Check for any unusual noise or vibration.	Troubleshoot, repair/replace as necessary.	Noise or vibration.	Throttle controls inoperative
		X								Oil Leaks	Check for oil leaks	Repair oil leaks as necessary.	Class III leaks.	Throttle controls inoperative
				X						Safety Valves	Check safety valves for proper operation.	Refer to unit maintenance for repair/replacement	Safety valves inoperative.	Throttle controls inoperative
				X						Distribution System	Check the air distribution system for air leaks.	Repair air leaks as necessary.	Air leaks.	Throttle controls inoperative
55		X								**Machinery Space Ventilation**	Check the operation of the air supply fans and the air exhaust fans.	Troubleshoot, repair as necessary.		Air supply or air exhaust fans inoperable.
56	X	X	X							**Flash Evaporator**	Check for leaks, dirty strainer, broken gauges, and inoperative pumps. Refer to TM 55-1915-207-24&P	Repair/replace as necessary.	Limited underway time.	
		X								Tube Bundles	Check for dirty bundles.	Clean using manufacturer's instructions.	Limited underway time.	
			X							Shell	Check for dirty tube bundles.	Clean using manufacturer's instructions.	Limited underway time.	
					X					Salinity Panel	Check for proper operation of salinity panel.	Repair as needed.	Limited underway time.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
56 cont		X								Salinity light	Check that salinity light is OFF. If the light is ON, all water is being diverted to drain.	Troubleshoot, repair as necessary.	Limited underway time.	
		X								Vacuum Pressure	Check vacuum pressure	Troubleshoot, repair as necessary.	Pressure exceeds 25" Hg.	
57		X								**Oily Water Separator**	Check back flush pressure.	Troubleshoot, repair as necessary.	Pressure exceeds 15 PSI.	
58										**Orca II 165A (If Equipped)**				
		X								Pumps	Check pumps for unusual noise and/or malfunction.	Troubleshoot, repair as necessary.		
						X				Electric motors	Lubricate ball bearings on the drive and fan side of motor.	Repair/replace as necessary.		
							X				Inspect motors for moisture penetration.	Repair/replace as necessary.		
											WARNING			
											High voltages are present in the control panel. **The main breaker should be open (OFF), locked and tagged out before opening control panel.**			
					X					Control Panel	Ensure the interior of the panel is dry and all terminal connections are tight.	Clean the interior and tighten connections as necessary.		
		X			X					Treatment tank and sediment module	Inspect for leaks by observing connections, fittings, and hoses. **The system must be running.**	Tighten all leaking connections. Repair/replace as necessary.		
								X			Inspect the interior and exterior of the tank for corrosion and security of all mountings.	Tighten all loose mountings, and remove any corrosion.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
58 cont								X		Sacrificial anodes	Inspect all anodes	Replace as necessary.		
											WARNING			
											Wear approved goggles, gloves, and apron. Avoid contact with the skin, excessive inhalation of vapor, or splashing in the eyes. In case of emergency, flush affected area with water immediately.			
	X	X								Chlorine Storage	Ensure the system has a continuous supply.	Add chlorine as necessary.		
		X								Solenoid Valves	Observe and listen to valves for proper operation.	Repair/replace as necessary.		
								X			Check valve for cleanliness.	Clean valve internally		
							X			Retention/reduction screen	Check screen for cleanliness.	Clean and flush screen		
										Surge Tank				
		X			X		X			Control Panel	Check for correct operating mode indicating lights. Perform control panel lamp test. Inspect and clean control panel.	Troubleshoot, repair as necessary.		
							X			Collection tank	Flush tank interior. Check low and high level sensor operation.	Repair/replace as necessary.		
								X			Inspect tank interior and exterior. Inspect level sensors.	Repair/replace as necessary. Clean level sensors.		
							X			Electric motors	Inspect motors. Check exterior of motor, and lubricate according to manufacturer's instructions.	Clean exterior. Repair/replace as necessary.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
59		X								**Marine Sanitation System (If Equipped).**	Check that air supply is adequate.	Troubleshoot, repair as necessary.		
											CAUTION			
											Inadequate air supply will deactivate system.			
		X								Chlorine Tank	Check chlorine chemical supply at tank capacity.	Add chemical as necessary.	Chlorine level low. Limited underway time.	
		X									Check that feed house is serviceable	Repair/replace as necessary.		
		X								Discharge Pump	Check that discharge pump operates.	Troubleshoot, repair as necessary.	Defective discharge pump. Limited underway time.	
60										**Generator Set, Engine, 90 kW**				
											WARNING			
											The manual, automatic, stop and off/reset switch on the control panel must be set at "STOP" position when performing maintenance or repair work on a standby generator set. This prevents the unit from starting if a power failure or voltage drop should occur while working on the unit. Failure to comply could result in personal injury or death.			
											NOTE			
											The standby generator set may not be needed very often, but when it is, it is usually under emergency conditions. Maintenance of the standby unit is essential. It must always be maintained in excellent operating condition, ready to work under load at any time.			

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X									Engine	Check the engine, radiator and generator for debris, foreign objects, loose or broken fittings, guards and components. Refer to TM 55-1915-204-24.	Troubleshoot, repair/replace broken or loose guards and components. Remove foreign objects/debris.		Broken parts or foreign objects wedged or lodged in components.
	X									Belts	Inspect for worn, broken or loose belts.	Tighten or replace belts.		Belts are missing or unserviceable.
											WARNING			
											At operating temperature, engine coolant is hot and under pressure. Steam can cause personal injury.			
											WARNING			
											Check coolant level ONLY when engine is stopped and radiator cap is cool enough to touch with your hand.			
											Remove filler cap slowly to relieve pressure.			
											Cooling system conditioner contains alkali. Avoid contact with skin and eyes to prevent personal injury.			
	X									Cooling System	Check for proper level.	Add Coolant as necessary.		Coolant level is low.
	X									Block Heater	Check block heater for proper operation.	Troubleshoot, repair/replace as necessary.		
		X								Leaks	Check for leaks and unusual noises.	Investigate and repair leaks/noise as necessary.		Class III Leaks.
	X									Oil Level	Check that oil level is between the add and full marks on the engine stopped side of the dipstick. Refer to TM 55-1915-204-24	Add oil as necessary.		Oil level is low.
	X									Fuel System	Check for fuel system leaks. Check fuel tank drain system for moisture and sediment. Request engineer's assistance.	Repair leaks. Drain moisture and sediment.		Class III Leaks.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											WARNING			
											Do not smoke when observing battery electrolyte level. Batteries give off fumes that can explode. Electrolyte is an acid and can cause personal injury if it comes in contact with the skin or eyes. Wear approved goggles, gloves and apron.			
				X						Batteries, terminals and cables	Inspect batteries, terminals, cables, connections and vent caps for tightness and cleanliness. Check liquid level.	Clean, add distilled water, replace/repair as needed.		Unserviceable cables, caps, or terminals, low liquid level.
				X						Electrolyte	Check electrolyte level with hydrometer	If under standard then replace battery.		Low hydrometer readings
	X									Gauges	Check the condition of all gauges. Check for broken lenses, damaged frames and brackets.	Repair/replace as necessary.		
	X	X								Battery Charger	Check battery charger for proper operation. Disconnect battery charger before starting the engine if it is not capable of handling a cranking load. Request engineer's assistance.	Troubleshoot and repair as necessary.		
		X								Oil Pressure	Check gauge for proper oil pressure **(35 to 70 PSI).**	Troubleshoot, repair as necessary		Low oil pressure.
		X								Fuel Pressure	Check gauge for proper fuel pressure normal **"GREEN"** range.	Troubleshoot, repair as necessary		Fuel pressure not within NORMAL (Green) range.
		X								Cooling System	Check gauge for proper operating coolant temperature (**170 to 195 Degrees F**).	Troubleshoot, repair as necessary		Temperature exceeds 195 Degrees F.
		X								Engine Speed	Check tachometer gauge for correct engine speed indication in revolutions per minute (RPM).	Troubleshoot, repair as necessary.		Incorrect engine speed.
			X							Switches	Check that all switches are in proper positions. Refer to Chapter 2, Section I, Table 2-1, Figure 2-20.	Place switches in proper position.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
			X							Battery Charger	Check that battery charger is reconnected if previously disconnected. Notify engineer on watch.	Reconnect battery charger.		
61	X									**Bowthruster Engine**	Check the engine for debris, foreign objects and loose or broken fittings. Refer to TM 55-1915-205-24.	Remove foreign objects. Tighten/replace loose or broken fittings.	Debris, foreign objects wedged or lodged in components. Loose or broken fittings. Limited docking ability.	
	X									Block Heater	Check block heater for proper operation.	Troubleshoot, repair/replace as necessary.		
	X									Oil Level	maintain oil level between the add and full marks on the engine stopped side of the dipstick. Refer to TM 55-1915-205-24.	Add oil as necessary.	Low oil level.	
	X	X								Fuel System	Check for fuel leaks.	Repair fuel leaks.	Class III leaks.	
	X									Fuel Oil Day Tank	Check fuel oil day tank. Sight glass should be full.	Add fuel as necessary.		
	X	X								Air Pressure	Check operating air pressure. Should be at **150 PSI**.	Troubleshoot, repair/replace as necessary.	Low air pressure.	
	X									Gauges	Check the condition of all gauges. Check for broken lenses, damaged frames and brackets.	Repair/replace as necessary.		
		X								Oil Pressure	Check gauge for proper oil pressure (35 to 70 PSI).	Troubleshoot, repair as necessary.	Low oil pressure.	
		X								Fuel Pressure	Check gauge for proper fuel pressure normal **"GREEN"** range.	Troubleshoot, repair as necessary	Fuel pressure not within NORMAL (Green) range.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
		X								Cooling System	Check cooling water expansion tank level on tank sight glass indicator. Check gauge for proper operating coolant temperature (170 to 195 Degrees F).	Add coolant as necessary. Troubleshoot, repair as necessary.	Temperature above 195 degrees F.	
											NOTE			
											Expansion tank level should be slightly less than full to allow for expansion.			
	X	X								Leaks	Check for fuel leaks, oil, coolant leaks and unusual noises.	Repair leaks. Troubleshoot and repair noise.	Class III leaks or unusual noises.	
			X							Switches	Check that all switches are in proper positions. Refer to Chapter 2, Section I, Table 2-1, Figure 2-49.	Place switches in proper position.		
		X								Tachometer	Compare tachometer indications to standard bow thruster operations.	Troubleshoot, repair as necessary.		
62	X	X								**Bow Thruster**	Check oil level in lube oil tank. Check machinery oil for leaks.	Add oil as necessary. Investigate and repair oil leaks.	Low oil level.	
	X										Check marine gear oil level on oil level dipstick. Level should be between the add and full marks on the dipstick.	Add oil as necessary.		
					X					Service Hour Meter	Check the indicated number of hours the engine has been operated.	Record reading in the engine historical data log.		
63		X								**Clearview**	Check operation of wipers.	If blades streak, repair/replace.		
64	X			X						**Magnetic Compass**	Check heading on two known courses. Check deviation whenever metal structural changes are made to vessel; or when electronic equipment is added/removed. Check that deviation card is up to date and annual deviation is posted. Ensure deviation card is located in the immediate vicinity of the compass.	Remove bubbles in bowl, update deviation card as necessary.		Magnetic compass is inoperative. Compass will not swing freely in gimbals.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
65										**Gyro Compass**				
		X								Follow-up Alarm Lamp	Check that light is off.	Troubleshoot, repair as necessary.		Power loss to compass.
		X								Caged Lamp	Check that light is off.	Troubleshoot, repair as necessary.		
		X								Latitude Control	Check that control is set at local latitude.	Set control in proper position.		
		X								North-South (N-S) Switch	Check that switch is set is set at proper latitude.	Set switch in proper latitude.		
		X								Level Meter	Normal settled tilt indication.			
		X								Azimuth Card Reading	Check that azimuth reading is within two degrees when settled.	Refer to unit maintenance for repair.		
				X						Card Window	Check for cleanliness	Clean as necessary.		
				X						Fluid Level Viewed in Window	Check that fluid has no bubbles present.	Troubleshoot and repair as required.		Bubbles are present.
				X						Master Compass	Check for oil seepage around any seam or seal.	Troubleshoot and repair as required.		Oil Seepage.
				X						Shock Mounts	Check that binnacle moves freely in its shock mounts.	Free mounts.		
66					X					**Tools, Spare Parts and Equipment**	Check spare parts and equipment belonging to the craft are clean, serviceable and properly mounted and/or stowed.	Clean as necessary. Properly stow.		
											NOTE			
											Before performing preventive maintenance checks and services, review appropriate procedures to ensure that necessary tools, spare parts and equipment are available.			
											NOTE			
											Upon the completion of preventive maintenance checks and services, inventory all tools, repair parts and equipment to ensure proper accountability.			

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
67	X	X								**Electro-hydraulic Steering System**	Check hydraulic pump unit for leaks.	Repair leaks as necessary.		Class III leaks
	X									Hydraulic Reservoir	Check level of fluid.	Refer to unit maintenance for adding fluid.		Hydraulic fluid level low.
		X								Hydraulic Pumps	Check pump set for unusual sounds or malfunctioning. Visually inspect pumps for leaks, loose connections and damage.	Refer to unit maintenance for repair.		Pump malfunctions. Class III leaks.
	X									Rudder	Check that rudder operates full travel port to starboard.	Troubleshoot, refer to higher level of maintenance for repair.		Rudder malfunctions.
68	X	X		X						**Windlass and Bow Ramp Winch**	Check gypsies, wildcat drums, and clutches for foreign objects.	Troubleshoot and repair. Remove foreign objects.	Ramp will not lower. LO/LO operations only.	Ramp will not raise. Foreign objects wedged or lodged in assemblies.
	X		X	X						Gearcase	Check gearcase for oil leaks.	Repair leaks as necessary.	Class III Leaks	Ramp will not raise.
	X	X								Hydraulic Lines	Check hydraulic lines, gauges, fittings and control valves for leaks.	Repair leaks as necessary.	Class III leaks	Ramp will not raise.
	X	X								Hydraulic Fluid Tank	Check fluid level, filter condition and hydraulic pressure.	Add fluid, change filter.	Fluid is low, filter condition indicator in red or if hydraulic pressure exceeds 2000 PSI.	Ramp will not raise.
											NOTE			
											Refer dripping oil and hydraulic leaks to the supervisor.			
69	X	X								**Stern Anchor Winch**	Check spools, gears and clutches for foreign objects.	Remove foreign objects from components.	Foreign objects wedged or lodged in assemblies.	
	X	X								Planetary Reducer	Check planetary reducer for oil leaks.	Repair leaks as necessary.	Class III leaks.	

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ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X	X	X	X						Hydraulic Lines	Check hydraulic lines, fittings and control valves for leaks.	Repair leaks as necessary.	Class III leaks.	
											NOTE			
											Refer dripping oil and hydraulic leaks to supervisor.			
	X	X		X						Hydraulic Fluid Tank	Check fluid level, filter condition and hydraulic pressure.	Add fluid, change filter.	Fluid is low, filter condition indicator in red or if hydraulic pressure exceeds 2000 PSI.	
70	X									**Shore Power Cable/Reel Assembly**	Visually check condition of cable (reeled position). Check for cracked or damaged insulation.	Repair or replace as necessary.		
	X		X								Check condition of cable connection. Ensure connector is protected from moisture, dirt buildup and corrosion.	Remove corrosion and preserve connector as necessary.		
					X						Visually check reel assembly for damage and corrosion.	Remove corrosion, repair damage.		
											NOTE			
											Defer PMCS when shore power operation is in progress.			
	X										Check that gear train is unobstructed.	Remove obstructions.		
71	X				X					**Shore Terminal Box (on vessel)**	Visually check terminal box (exterior) for damage and corrosion. Ensure box is securely fastened.	Clean, repair as necessary.		
72	X		X		X					**Bow Ramp**	Inspect entire ramp and related components including wire rope, ramp hinges, sheave assemblies, locking bars, and ratchet dogs for proper adjustments, damage, or excessive wear.	Refer to supervisor, unit maintenance for repair.	Proper and safe operation is not possible. LO/LO operations only.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
			X		X					Sealing Gasket	Inspect sealing gasket for damage from contact with cargo, or for accumulations of foreign matter such as grit, oil, paint, etc. In addition, the gasket should be checked for cracks or permanent set of more than 50 percent of design compression.	Refer to supervisor, higher level of maintenance for repair/replacement.		With ramp closed, watertight fit is not achieved.
73	X	X			X					**Bow Ramp Winch**	Inspect ramp winch for hydraulic and oil leaks. Refer to TM 55-1915-211-24&P.	Repair leaks as necessary.	Class III leaks. LO/LO Operations only.	
	X										Inspect clutches, drag brakes and automatic brake lining serviceability.	Repair as necessary.		
	X				X						Inspect anchor chain that is VISIBLE for unusual deterioration or visible defects. Complete runout of chain is not required. Inspect only that chain section VISIBLE is in the as-stored condition.	Refer to unit maintenance for repair.		
	X			X							Check oil level in the gear case. Refer to Chapter 2, Section III, Para. 2-5.18.2.	Add oil as necessary.		
74	X		X		X					**Stern Ramp**	Inspect stern ramp and related components including wire rope, hinges, sheave assemblies, hydraulic jigger winch, hydraulic controls and ratchet dogs for proper adjustment, damage, or excessive wear.	Refer to supervisor and unit maintenance.	Evidence exists that proper and unsafe operation is not possible.	
			X		X					Sealing Gasket	Inspect sealing gasket for damage from contact with cargo, or for accumulation of foreign matter such as grit, oil, paint, etc. In addition, the gasket should be checked for cracks or permanent set of more than 50 percent of design compression.	Refer to supervisor, higher level of maintenance for repair/replacement.		With ramp closed, watertight fit is not achieved.

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
75	X	X			X					**Stern Ramp Jigger Winch**	Inspect winch for hydraulic and oil leaks. Refer to TM 55-1915-212-24&P.	Repair leaks as necessary.	Class III leaks.	
				X							Check oil level in the gear case. Refer to Chapter 2, Section III, Para. 2-5.18.2.	Add oil as necessary.		
				X							Inspect cables for serviceability.	Replace cable as necessary.		
76	X		X		X					**Deck Machinery**	Inspect power units and moving parts of capstans for serviceability. Ensure deck machinery is securely mounted and that connections are properly aligned. Check oil level in gear cases. Refer to Chapter 2, Section III, Para. 2-5.17.1	Add oil as necessary. Repair deck machinery as necessary.	Deck machinery non-operational	
77	X									**Groen TOB/6 Kettle**	Check that pressure/vacuum gauge shows a vacuum reading of 20 to 30 inches when the kettle is cold.	Troubleshoot, repair or replace as required.		
	X									Jacket Water Level	Check that water level is between the marks on the gauge glass.	Add water as needed.		
	X									Electrical Wiring	Check that electrical wiring is securely connected. Check for frayed or damaged wiring.	Repair/replace frayed or damaged wiring.	Frayed or damaged wiring.	
	X									Support Housing	Check that interior of housing is clean.	Clean as necessary.		
				X						Safety Valve	Check that safety valve works freely.	Repair/replace safety valve.	Safety valve inoperable.	
78						X				**Marine Reach-in Freezer/Refrigerator**	Inspect condenser coil to make certain that air flow is not hampered and that it is clear of dust and debris.	Clean as necessary. Remove debris.		
											WARNING			
											Prior to any cleaning of the system involving moving parts, the system should be deactivated by disconnecting the power supply cord or personnel injury may result.			
					X					Drain Line	inspect and check drain line to ensure it is not plugged up.	Unplug drain line.		

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ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
				X						Liquid Refrigerant	Check liquid refrigerant sight glass to make certain that the system is fully charged.	Add/recover refrigerant as necessary. Troubleshoot and repair leaks.	System is over/under charged.	
					X					Condenser and Evaporator Fan Motors	Check both the condenser and evaporator fan motors to make certain that they are operational and that the fans are tight and secure.	Repair/replace as necessary.	Unusual noise or vibration	
						X				Door Gaskets	Check that door gaskets and breaker strips are clean. Check door gaskets for dry rot and deterioration.	Clean as necessary. Replace door gasket as necessary.		
79		X								**Milk Dispenser #NSF-SK-2**	Inspect dispenser valves to ensure they are secure on valve holders.	Repair/replace as necessary.		
		X								Compressor	Inspect for proper operation of compressor.	Report abnormal compressor noises to supervisor.	Unusual noise or vibration	
				X						Duct Panel	Inspect air duct panel and beneath unit for restrictions.	Remove restrictions.		
						X				Condenser	Remove rear panel and clean condenser area.	Clean as necessary.		
80	X									**Dishwasher Exhaust Ventilator Control Cabinet**	Check that ventilators are cleaned daily.			
		X								Detergent System Fittings	Check that all fittings are air tight.	Tighten fittings as necessary.		
81										**Hydraulic Watertight Door**				
											CAUTION			
											Do not operate door with low and high pressure shutoff valves closed. This will back-pressure the local hand pump and cause the shaft seals to rupture.			
	X	X								Bleed Off	Check that hydraulic system is bled at all high points to remove trapped air.	Turn bleeder valve handle to release trapped air.		Bleeder valve handles unserviceable.

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ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X									Oil Level	Check oil level in expansion tank. Refer to TM 55-1915-200-14&P.	Add hydraulic oil as necessary.		Low oil level.
	X	X	X		X					Leaks	Check hydraulic system for leaks.	Repair leaks as necessary.		Class III leaks.
											NOTE			
											The local hand crank may need to be rotated very fast to break door loose when initially opened.			
					X					Local Hand Pump	Check that hand crank operates door to full open/closed position.	Troubleshoot and repair as necessary.		Door will not open/close fully.
					X					Remote Hand Pump	Check that hand crank operates properly. Check that the mechanical indicator tracks door positions as remote hand pump is rotated.	Troubleshoot and repair as necessary.		Remote hand pump does not function properly.
82						X				**30-Ton Chiller System**	Check sensing tube for wear, frayed wiring and loose connections.	Repair as necessary.		
	X										Check that electrical panels are closed and secure.	Close and secure as necessary.	Electrical panels cannot be secured.	
	X	X								15-Ton Sea Water Condenser	Check to ensure sea water condenser strainer is unobstructed.	Remove obstructions.	Strainer is obstructed.	
		X									Check condenser pump for leaks.	Repair leaks as necessary.	Class III leaks.	
	X	X								Chilled Water Circulating Pump	Check circulating pump for leaks and unusual noises.	Repair/replace as necessary.	Class III leaks or unusual noise.	
	X	X								Compressors 15-Ton 460v	Check compressor for leaks and unusual noises.	Repair/replace as necessary.	Class III leaks or unusual noise.	
83		X								**Fan Coil Units Cool/Heat**	Check individual room fan coils for leaks and unusual noises.	Troubleshoot and repair as necessary.		
						X				Blower Assembly	Check blower assembly for dust, lint and dirt buildup.	Clean as necessary.		
						X				Air Grille	Check that air grille is unobstructed.	Remove obstructions.		
						X				Filter	Check filter for dust, lint and dirt buildup.	Clean or replace filter.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											Check exterior of unit for wear, damage and corrosion.	Repair as necessary.		
84		X								**Fan Coil Units (Heat Only)**	Check heater units for unusual noises.	Repair as necessary.	Unusual noise or vibration	
						X					Check blower assembly for dust, lint and dirt buildup.	Clean as necessary.		
						X					Check exterior of unit for wear, damage and corrosion.	Repair as necessary.		
85		X								**Air Handling Unit 39BA050**	Check unit for unusual noises and leaks.	Repair as necessary.	Unusual noises.	
						X				Air Grilles	Check all supply and return grilles for dust or dirt buildup and restrictions.	Clean as necessary, remove restrictions.		
						X				Filter	Check filter for dust, lint and dirt buildup.	Replace filter as required.		
86		X								**Engine Control Room Air Handling Unit**	Check for leaks and unusual noises.	Repair as necessary.	Unusual noises.	
						X					Check exterior of unit for wear, damage and corrosion.	Repair as necessary.		
				X						Filter	Check filter for dust, lint and dirt buildup.	Clean/replace as necessary.		
				X						Air Grille	Check all supply and return grilles for dust or dirt buildup and restrictions.	Clean as necessary, remove restrictions.		
87		X								**Heater, Space, Electrical**	Check all space heaters for unusual noises.	Repair as necessary.		
						X					Check unit for dust, lint and dirt buildup.	Clean as necessary.		
						X					Check exterior of unit for wear, damage and corrosion.	Repair/replace as necessary.		
88						X				**Pilothouse Defroster/Heater**	Check that air ducts are unobstructed.	Remove obstructions.		
		X									Check for sufficient supply of heated forced air at air ducts for defroster operation.	Troubleshoot and repair as necessary.		
89	X	X		X						**Proportioning Bromine Feeder**	Check bromine feeder assembly for secure mountings, dirt buildup and corrosion.	Repair/replace as necessary.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY												EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											WARNING			
											The bromine feeder cartridge used in the following procedures contains bromine resin; active ingredient - bromine, 30% by weight.			
											WARNING			
											DO NOT OPEN BROMINE FEEDER CARTRIDGE PACKAGE IN CONFINED AREA. BREATHING VAPORS MAY BE IRRITATING.			
											WARNING			
											INGREDIENTS ARE PERMANENTLY SEALED INSIDE THE FEEDER CARTRIDGE. DO NOT PUNCTURE OR ATTEMPT TO OPEN CARTRIDGE. SHOULD CONTENTS ACCIDENTALLY BE RELEASED, CONTACT WITH RESIN MAY RESULT IN EYE IRRITATION AND SKIN REDNESS.			
											Drainage from cartridge is slightly corrosive. If drainage comes in contact with skin, wash skin with water. Wipe up any spillage.			
											WARNING			
											If either the DPD tablet or pH reagent in the Bromine/Chlorine Test Kit is swallowed, induce vomiting and get medical attention.			
											If gotten into mouth, spit out immediately and rinse mouth immediately with plenty of water.			
											If gotten into eyes, flush eyes immediately for five minutes with plenty of water and get medical attention.			
											If gotten on skin, wipe off gently, then immediately flood affected area with water, using soap freely. If irritation develops, get medical attention.			

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X	X									Check bromine feeder assembly for secure mountings, dirt buildup and corrosion.	Clean/repair as necessary.		
		X								Bypass Header Assembly	Check for leaks from inlet and outlet connections.	Repair leaks as necessary.		
	X										Check for damaged or missing parts.	Repair/replace damaged or missing parts.		
	X	X	X							Time Totalizer	Check that time totalizer operates.	Troubleshoot/repair as necessary.		
		X								Feeder Light	Check that indicator light operates.	Troubleshoot/repair as necessary.		
		X								Cartridge Change	Check that indicator light operates.	Troubleshoot/repair as necessary.		
		X								Test Tap	Check for presence of bromine in water.	Add if necessary		Bromine level low.
		X								Solenoid	Check solenoid valve for leaks at all connections.	Tighten as necessary.		
	X										Check for damaged or missing parts.	Repair/replace damaged or missing parts.		
		X								Feeder Assembly	Check for leaks from inlet and outlet connections.	Repair leaks as necessary.		
	X										Check for damaged or missing parts.	Repair/replace damaged or missing parts.		
	X										Check that top gasket is not worn or damaged.	Replace worn or damaged gasket.		
90	X									**Orbital Drill Press OR-2501F**	Check that safety glasses and dust mask are available and are serviceable.	Replace damaged or missing safety equipment.	Do not operate equipment if safety equipment is not available or unserviceable.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY												EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
											WARNING			
											DO NOT USE HAND BITS WHICH HAVE A SCREW TIP. AT DRILL PRESS SPEEDS THEY TURN INTO THE WOOD SO RAPIDLY AS TO LIFT THE WORK OFF THE TABLE AND WHIRL IT.			
											In changing the speed, turn off the switch and wait until the machine has completely stopped.			
											Remove the chuck key before starting the motor.			
											Never use your hand to hold object while drilling, always screw the object tight on the working table or use the drill press vise to prevent an accident or injury.			
											Keep your hand off the drill bit while drilling.			
	X									Belt and Pulley	Check for worn or frayed belts, frayed electrical wiring or power cord, loose connections, missing bits and pieces, worn or damaged pulleys, dirt buildup and corrosion.	Replace worn or frayed belts, repair frayed electrical cords, loose connections or damaged pulleys. Clean as necessary.	Do not operate equipment if belts are worn, frayed, or electrical connections and wiring are unserviceable.	
	X										Check that spindle and motor pulleys are tight and secure.	Tighten as necessary.		
	X									Table/Crank	Check that table vertical travel is smooth and unobstructed.	Repair as necessary.		
	X										Check that 360 degree table swing is unobstructed.	Remove obstructions.		
	X										Check that table tilts in either direction.	Repair as necessary.		
	X									Spindle	Check that spindle vertical travel is smooth and unobstructed.	Remove obstructions.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
91	X									**Lathe 1336 PBD**	Check that safety glasses and dust mask are available and are serviceable.	Replace damaged or missing safety equipment.	Do not operate equipment if safety equipment is not available or unserviceable.	
											WARNING			
											NEVER wear loose clothing while operating machine tools.			
											ALWAYS wear protective eye wear.			
											ALWAYS lock the tailstock to the bedways.			
											ALWAYS securely lock cutting tools in position.			
											DO NOT change gears or belts while the spindle is turning.			
											DO NOT change feed ranges at high-speed spindle operation. Stopping the spindle rotation for this operation is recommended.			
											DO NOT overload the machine with too heavy a cut.			
											DO NOT attempt to change chucks or perform maintenance on the lathe unless the spindle is stopped.			
											DO NOT clear chips with the fingers.			
	X										Check for worn or frayed belts, frayed electrical wiring or power cord, loose connections, missing bits and pieces, worn or damaged pulleys, dirt buildup and corrosion.	Replace worn or frayed belts, repair frayed electrical cords, loose connections or damaged pulleys. Clean as necessary.	Do not operate equipment if belts are worn, frayed, or electrical connections and wiring are unserviceable.	
	X									Gear Box	Check for loose locking nuts on the input shaft.	Refer to unit maintenance if locking nuts are loose.		

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X									Tension Lever	Visually check that drive belt tension is in correct position.	Place lever in correct position.		
	X										Visually check for damaged or broken gear teeth on all gears.	Refer to unit maintenance for repair/replacement.	Gears are damaged.	
	X										Visually check that quick change levers are in detent holes.	Position quick change levers in detent holes.		
											CAUTION			
											Clean off all metal chips from all oil points before adding oil.			
	X		X							Oil Level	Visually check headstock and carriage oil sight gauges for oil at just below 1-1 mark (high mark).	Add oil as necessary.	Low oil level.	
92	X									**Bench grinder JBG-6A**	Check that safety glasses and dust mask are available and serviceable.	Replace damaged or missing safety equipment.	Do not operate equipment if safety equipment is not available or unserviceable.	
	X									Wheel	Visually check that grinding wheels are serviceable.	Replace unserviceable wheels as necessary.	Unserviceable wheels.	
	X									Tool Rest	Visually check that tool rest is in correct position and securely mounted.	Tighten tool rest in correct position.	Tool rest missing.	
	X									Spark Guard	Visually check that spark guard is clear, undamaged and securely mounted.	Tighten spark guard, replace defective guard.	Spark guard missing or unserviceable.	
93										**Portable Fire Fighting Pump Model PE-250 (If Equipped)**				
	X			X						Suction Hose	Check hose connections for tightness at pump and foot valve strainer. Check gaskets for deterioration and dry rot.	Tighten as necessary. Replace gaskets as necessary.	Connections will not properly attach.	
		X								Discharge Hose	Check hose connections and gaskets at discharge port of pump.	Tighten as necessary. Replace gaskets as necessary.	Connections will not properly attach.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
		X								Exhaust Hose	Check that exhaust hose and gaskets are tight and sealed properly with no leaks.	Tighten as necessary. Replace gaskets as necessary.	Exhaust system leaks.	
											WARNING			
											DO NOT OPERATE PUMP IN CLOSED AREA WITHOUT EXHAUST HOSE CONNECTED AND ROUTED SAFELY TO OUTSIDE FRESH AIR.			
	X									Fuel Line	Check hose connections for proper direction of fuel flow.	Adjust as necessary.	Class III leaks.	
	X									Priming Pump Oil	Check oil level.	Add oil as necessary.	Low oil level.	
				X						Spark Plugs	Check condition of spark plugs.	Replace as necessary.		
				X						Pump Exterior	Visually inspect pump for damage and condition.	Repair damage as necessary.		
	X		X							Fuel Tank	Check level of fuel.	Add fuel as necessary.		
											NOTE			
											Fill gas tank with MIXTURE of two (2) cans of BIA-TC-W oil and six (6) gallons of 090 octane gasoline.			
94										**Portable Fire Fighting Pump Model P-100 (If Equipped)**				
											CAUTION			
											ONLY USE DIESEL FUEL IN THIS PUMP OR DAMAGE TO EQUIPMENT WILL OCCUR.			
	X			X						Suction Hose	Check hose connections for tightness at pump and foot valve strainer. Check gaskets for deterioration and dry rot.	Tighten as necessary. Replace gaskets as necessary.	Connections will not properly attach.	
											NOTE			
											The suction hoses must be supported at the inlet of the pump.			
											Use spanner wrench to tighten all suction hose connections. The slightest air leak will cause the pump to cavitate.			

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
		X								Discharge Hose	Check hose connections and gaskets at discharge port of pump.	Tighten as necessary. Replace gaskets as necessary.	Connections will not properly attach.	
		X								Exhaust Hose	Check that exhaust hose and gaskets are tight and sealed properly with no leaks.	Tighten as necessary. Replace gaskets as necessary.	Exhaust system leaks.	
											WARNING			
											DO NOT OPERATE PUMP IN CLOSED AREA WITHOUT EXHAUST HOSE CONNECTED AND ROUTED SAFELY TO OUTSIDE FRESH AIR.			
	X									Fuel Line	Check hose connections for proper direction of fuel flow.	Adjust as necessary.	Class III leaks.	
	X		X							Engine Oil Level	Check engine oil level using engine oil dipstick.	Add oil as necessary.	Low oil level.	
											NOTE			
											The pump must be on a level surface or a false oil level reading will be obtained (higher than normal).			
											Do not screw in engine oil level dipstick when checking oil level.			
				X						Air Filter	Visually inspect air filter for dirt, dust or deterioration.	Replace filter as necessary.		
				X						Fuel Strainer	Visually inspect fuel strainer.	Clean/replace as necessary.		
	X		X							Fuel Tank	Check fuel level using the fuel level indicator on the tank.	Add fuel as necessary.		
											NOTE			
											Do not fill fuel tank above the red plug in the fuel strainer.			
95	X				X					**Work/Rescue Boat**	Inspect boat for servicablility. Ensure drain plug is installed and boat is inflated properly. Check boat for proper safety equipment, fuel, and VHF radio (handheld or installed). Ensure motor is properly secured to transom and lifting bridle is properly installed.	Inflate/repair/replace as required.	Boat is not properly inflated or drain plug is missing.	

Table 2-2. Operator/Crew Preventative Maintenance Checks and Services B - BEFORE D - DURING A - AFTER W - WEEKLY M - MONTHLY Q - QUARTERLY S/A SEMI ANNUALLY AN - ANNUALLY T/A - TRIENNIALLY													EQUIPMENT NOT READY/AVAILABLE IF	
ITEM NUMBER	B	D	A	W	M	Q	S/A	AN	T/A	ITEMS TO BE INSPECTED	CHECK FOR	ACTION	PMC	NMC
	X				X					Work/Rescue Boat Davit	Visually inspect boom, sheaves, and block for damage. Inspect wire rope for excessive wear or damage, refer to TB 43-0142.	Repair/replace as necessary.	Boom is damaged or excessive wear/damage to wire rope.	

Section III. OPERATION UNDER USUAL CONDITIONS

Section Index (Table of Contents)

Section Index (Table of Contents) - Continued

Section Index (Table of Contents) - Continued

Section Index (Table of Contents) - Continued

Section Index (Table of Contents) - Continued

Section Index (Table of Contents) - Continued

Section III. OPERATION UNDER USUAL CONDITIONS - Continued

2-3. GENERAL. The following information is provided for the guidance of personnel responsible for operation of the LSV. It is essential that operator/crew know how to perform every operation of which the equipment is capable and for coordinating the basic motions to perform the specific tasks for which the LSV was designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

2-4. PREPARATION FOR USE.

a. On Main Switchboard (FIGURE 21 02), set all circuit breakers to the OFF position.

b. On Engine Room Motor Control Center (FIGURE 2-103), set 150 amp bus tie circuit breaker (46, Sheet 3 of 7) to ON position.

NOTE

The 150 amp bus tie circuit breaker (46) connects the main switchboard bus to the emergency switchboard bus for items on the emergency switchboard.

c. Set all other circuit breakers on Engine Room Motor Control Center (FIGURE 2-103, Sheets 1 through 7) to OFF position.

d. On Emergency Generator Control Panel (in emergency generator room, main deck), set engine control switch (15, FIGURE 2-20) to the RESET/OFF position.

e. On Emergency Switchboard (FIGURE 2-21) set all circuit breakers to ON position.

NOTE

Circuit breakers for equipment vital to LSV operation are located on the emergency switchboard bus. They are electrically powered from the main switchboard through circuit breaker/motor operator (14, FIGURE 2-102, Sheet 2 of 2). These systems operate on normal ship power and/or emergency power.

2-5. OPERATING PROCEDURE. The following operating procedures are sequential to allow the vessel master to bring the LSV from a dead in the water mode to a full power underway condition.

Instructions are provided to systematically bring each subsystem/equipment into operation. Each subsystem/equipment will have the before Operator/Crew preventive maintenance checks and services (PMCS) performed as it is prepared for operation. See Table 2-2 in Section II of this chapter.

2-5.1. Power Generation.

a. On Main Switchboard, set MAN/OFF/AUTO switch (29, FIGURE 2-102, Sheet 1 of 7) to the AUTO position.

b. Align Ship's Service Diesel Generator fuel oil service piping system (FIGURE 2-104) to the electric start port generator as follows:

(1) Close all fuel oil manifold valves in fuel oil service piping system.

(2) Open fuel oil header inlet valve (2).

(3) Open in-line STOP valve (25).

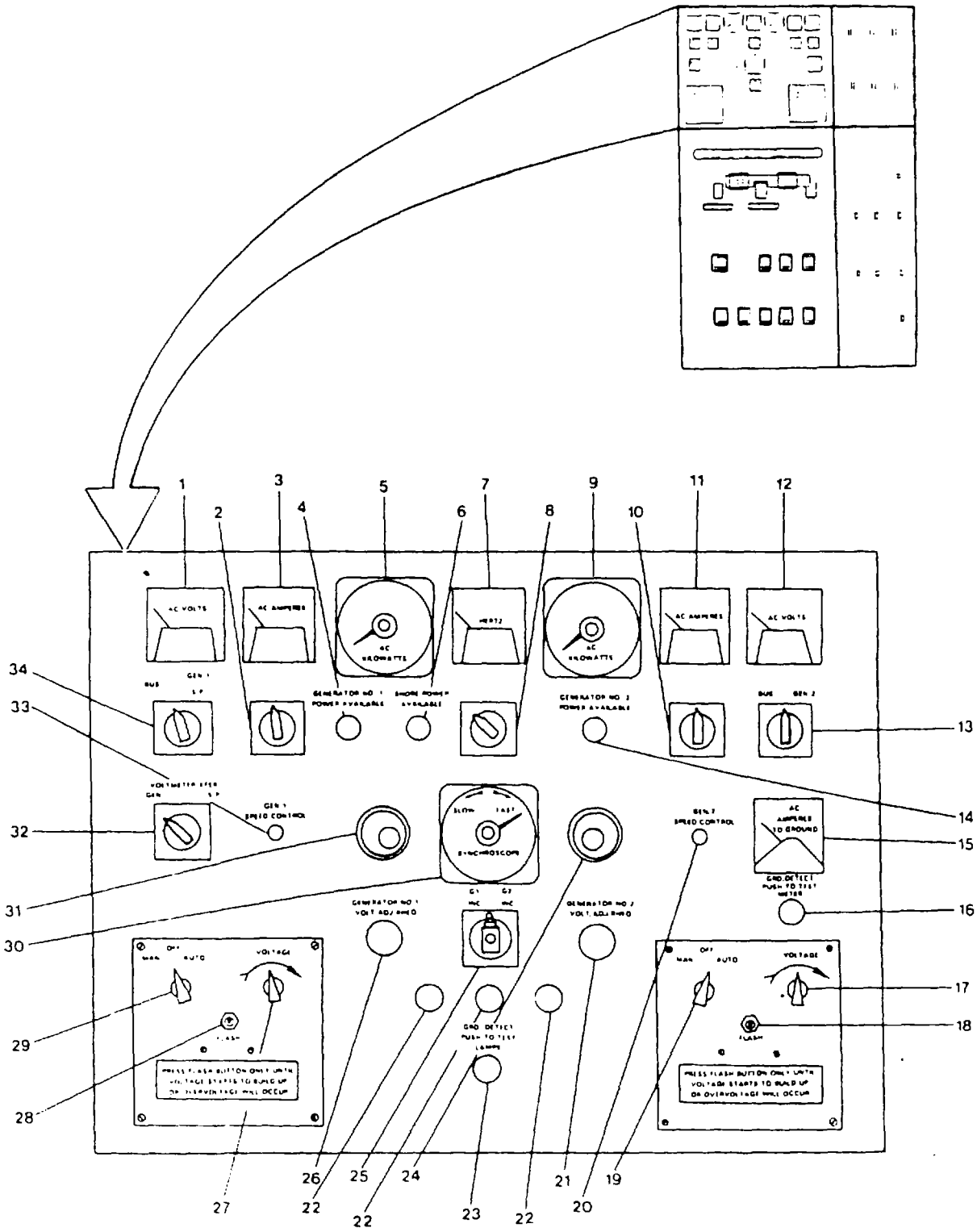


FIGURE 2-102. Main Switchboard (Sheet 1 of 7).

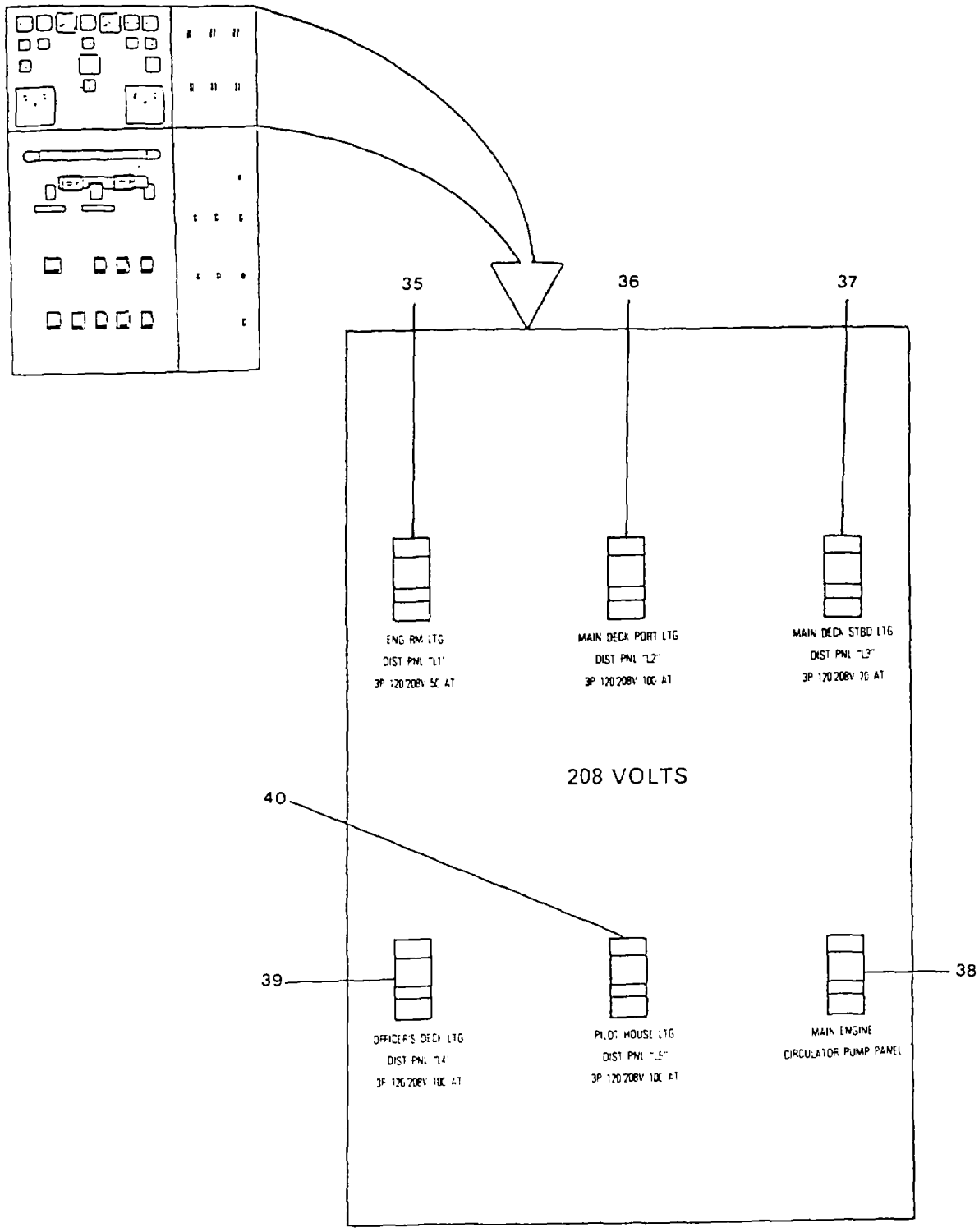


FIGURE 2-102. Main Switchboard (Sheet 2 of 7).

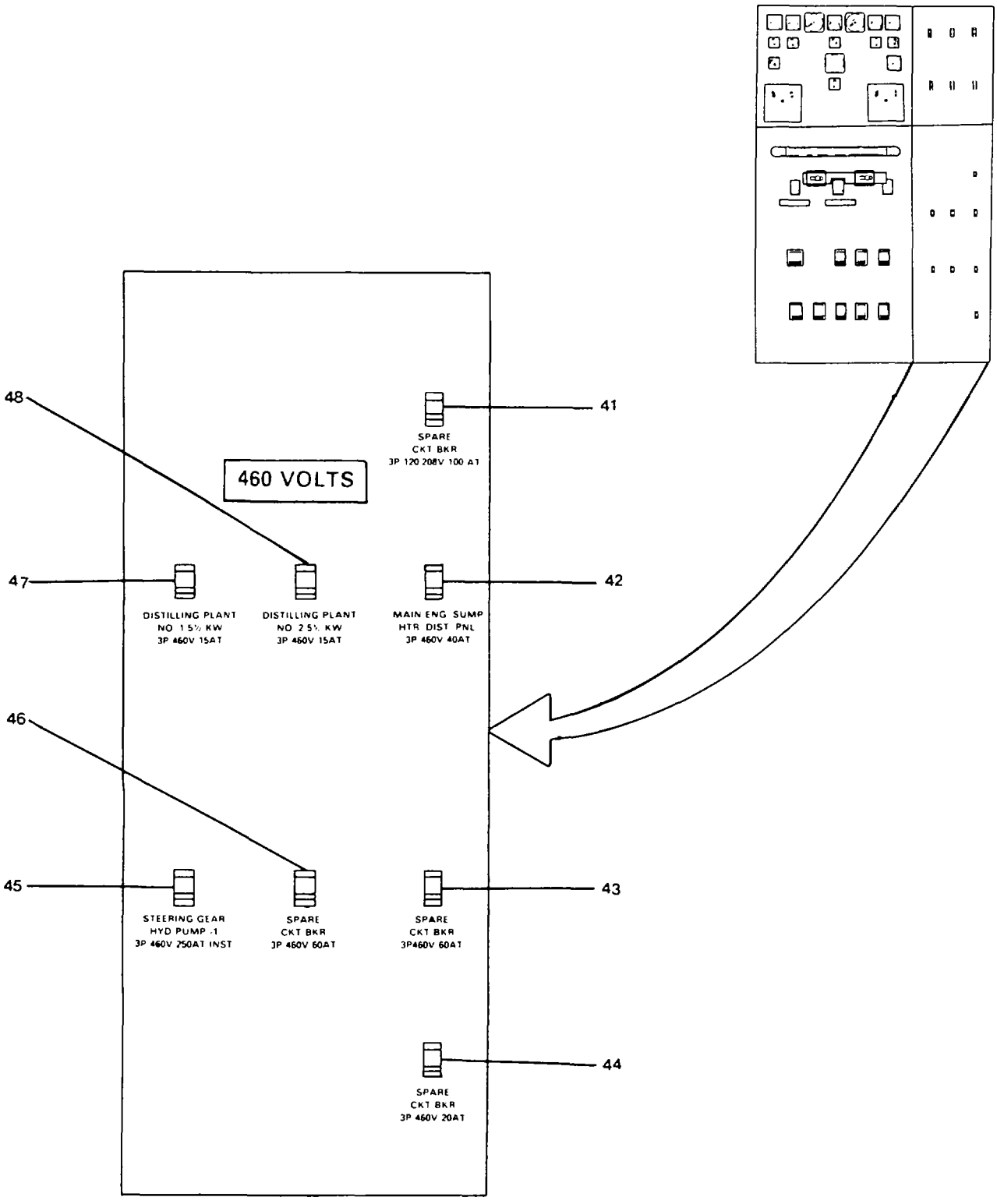


FIGURE 2-102. Main Switchboard (Sheet 3 of 7).

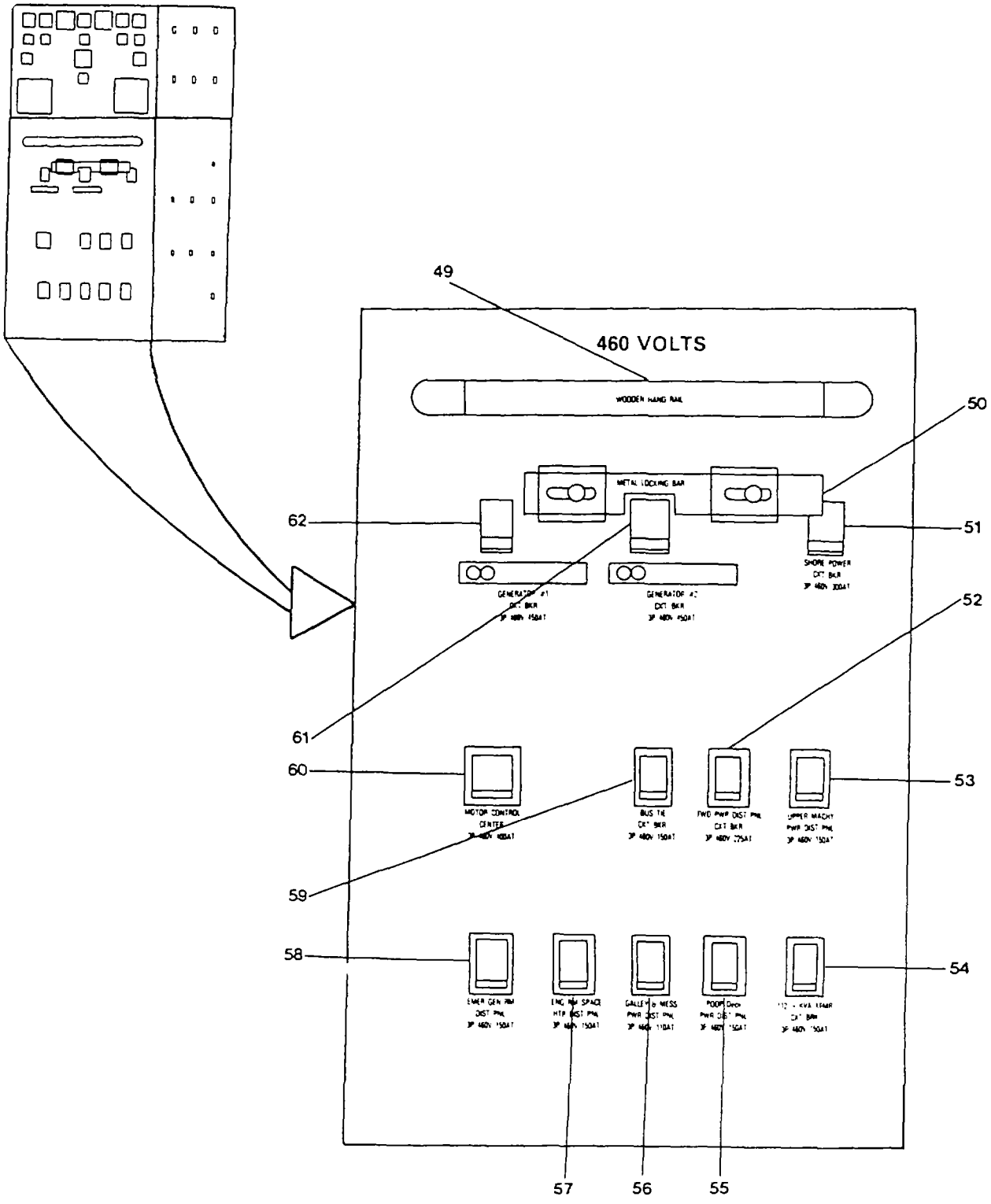


FIGURE 2-102. Main Switchboard (Sheet 4 of 7).

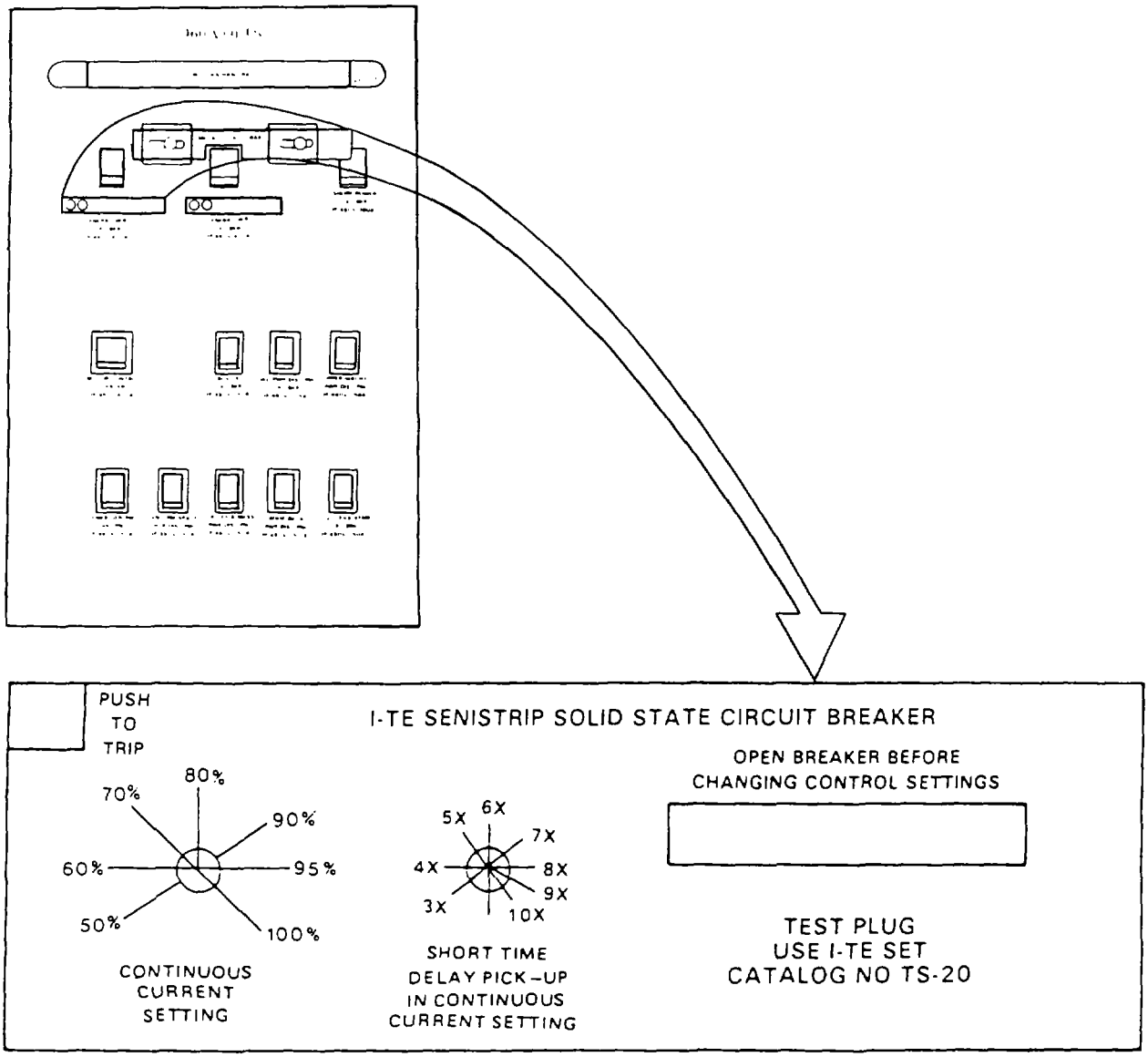


FIGURE 2-102. Main Switchboard (Sheet 5 of 7).

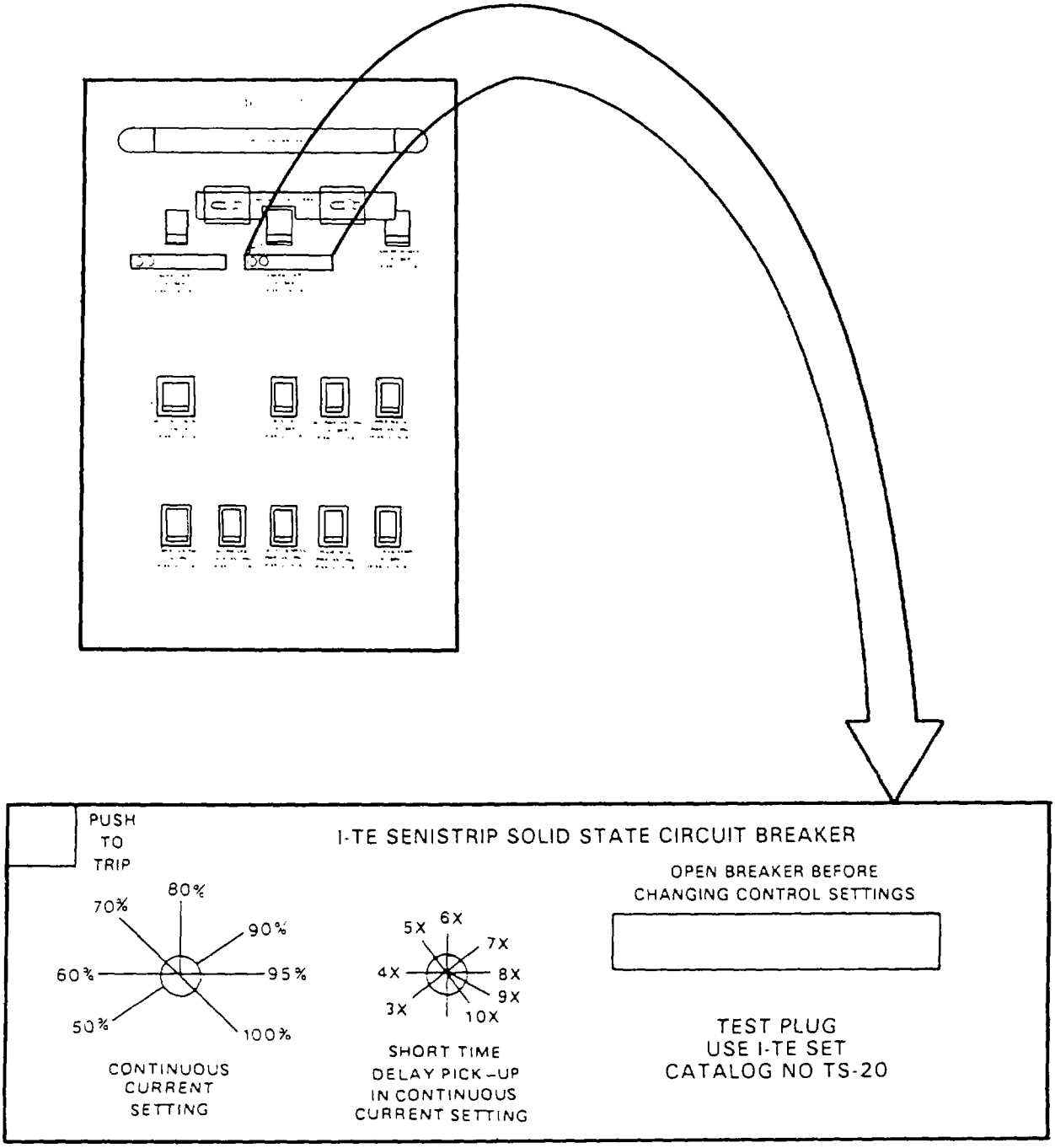


FIGURE 2-102. Main Switchboard (Sheet 6 of 7).

LEGEND

1. A.C. VOLTS METER
2. PHASE SELECTOR SWITCH
3. A.C. AMPERES METER
4. GENERATOR NO. 1 POWER AVAILABLE
5. A.C. KILOWATTS METER
6. SHORE POWER AVAILABLE
7. HERTZ METER
8. SELECTOR SWITCH
9. A.C. KILOWATTS METER
10. PHASE SELECTOR SWITCH
11. A.C. AMPERES METER
12. A.C. VOLTS METER
13. BUS GEN 2 SWITCH
14. GENERATOR NO. 2 POWER AVAILABLE
15. A.C. AMPERES TO GROUND
16. GRD DETECT PUSH TO TEST METER
17. VOLTAGE
18. FLASH
19. MAN OFF AUTO
20. GEN 2 SPEED CONTROL
21. GENERATOR NO. 2 VOLT. ADJ. RHEO
22. WHITE LIGHT INDICATOR
23. PUSHBUTTON
24. SYNCHRO INDICATOR
25. GEN #1 GEN #2
26. GENERATOR NO. 1 VOLT. ADJ. RHEO
27. VOLTAGE
28. FLASH
29. MAN OFF AUTO
30. SLOW FAST SYNCHROSCOPE
31. SYNCHRO INDICATOR
32. VOLTMETER XFER GEN S.P.
33. GEN. 1 SPEED CONTROL
34. GEN. 1 BUS S.P.
35. ENG RM LTG DIST PNL "L1" 2P 120/208V 50AT
36. MAIN DECK PORT LTG DIST PNL "L2" 3P 120/208V 100AT
37. MAIN DECK STBD LTG DIST PNL "L3" 3P 120/208V 70AT
38. ENG RM LIGHT PANEL 3P 120/208V 50AT
39. OFFICER'S DECK LTG DIST PNL "L4" 3P 120/208V 100AT
40. PILOT HOUSE LTG DIST PNL "L5" 3P 120/208V 100AT
41. SPARE CKT BKR 3P 120/208V 100AT
42. MAIN ENG. SUMP HTR. DIST. PNL. 3P 460V 40AT
43. SPARE CKT BKR 3P 460V 60AT
44. SPARE CKT BKR 3P 460V 20AT
45. STEERING GEAR HYD PUMP #1 3P 460V 250AT INST
46. SPARE CKT BKR 3P 460V 60AT
47. DISTILLING PLANT NO. 1 5 1/2 KW 3P 460V 15AT
48. DISTILLING PLANT NO. 2 5 1/2 KW 3P 460V 15AT
49. WOODEN HAND RAIL
50. METAL LOCKING BAR
51. SHORE POWER CKT BKR 3P 460V 300AT
52. FWD. PWR. DIST. PNL. CKT BKR 3P 460V 225AT
53. UPPER MACHY. PWR. DIST. PNL. 3P 460V 150AT
54. 112 1/2 KVA XFMR. CKT BKR 3P 460V 150AT
55. POOP DECK PWR. DIST. PNL. 3P 460V 150AT
56. GALLEY & MESS PWR. DIST. PNL. 3P 460V 110AT
57. ENG. RM. SPACE HTR. DIST. PNL. 3P 460V 150A
58. EMER. GEN. RM. DIST. PNL. 3P 460V 150AT
59. BUS TIE CKT BKR 3P 460V 150AT
60. MOTOR CONTROL CENTER 3P 460V 400AT
61. GENERATOR #2 CKT BKR 3P 460V 450AT
62. GENERATOR #1 CKT BKR 3P 460V 450AT

FIGURE 2-102. Main Switchboard (Sheet 7 of 7).

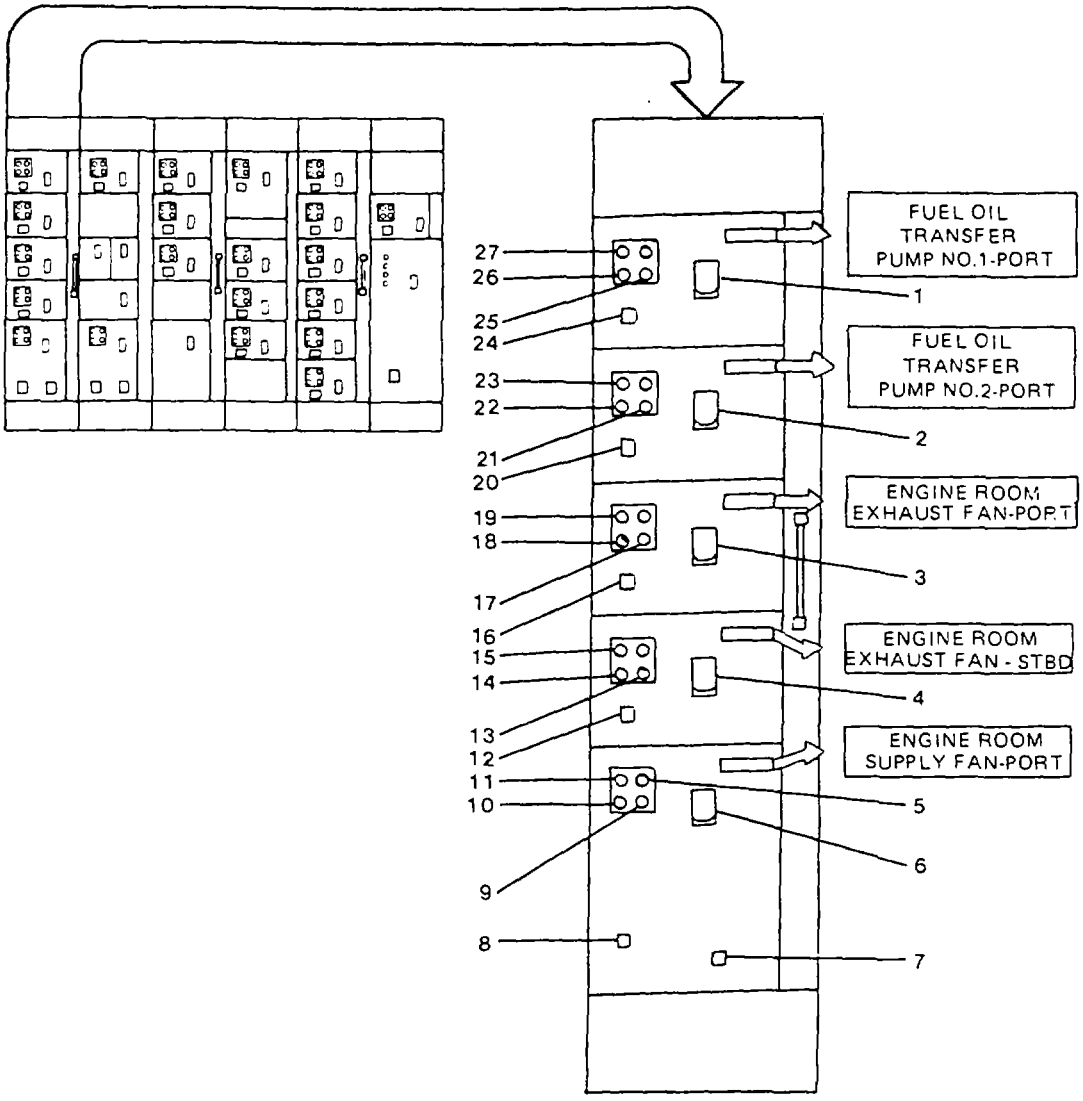


FIGURE 2-103. Engine Room Motor Control Center (Sheet 1 of 7).

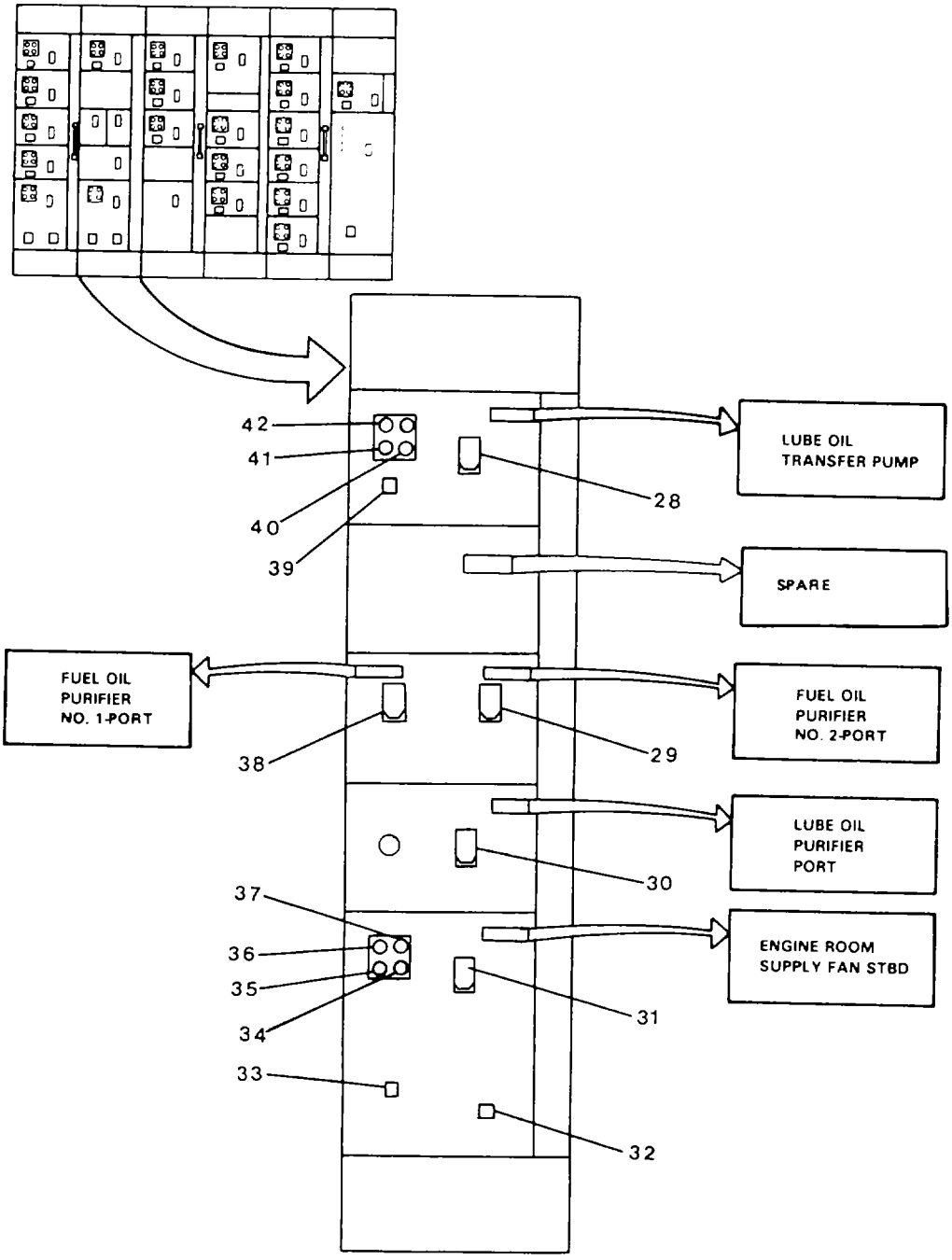


FIGURE 2-103. Engine Room Motor Control Center (Sheet 2 of 7).

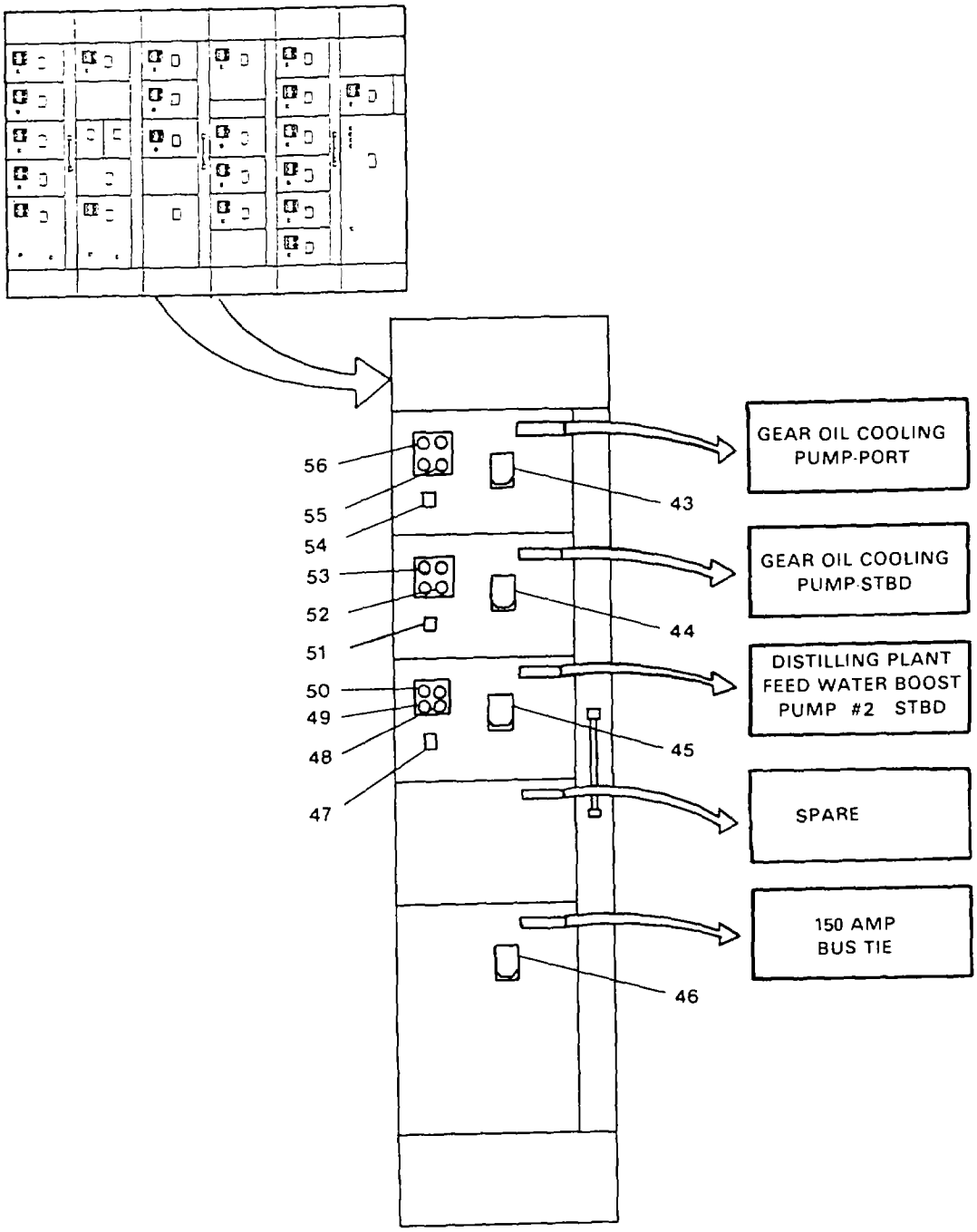


FIGURE 2-103. Engine Room Motor Control Center (Sheet 3 of 7).

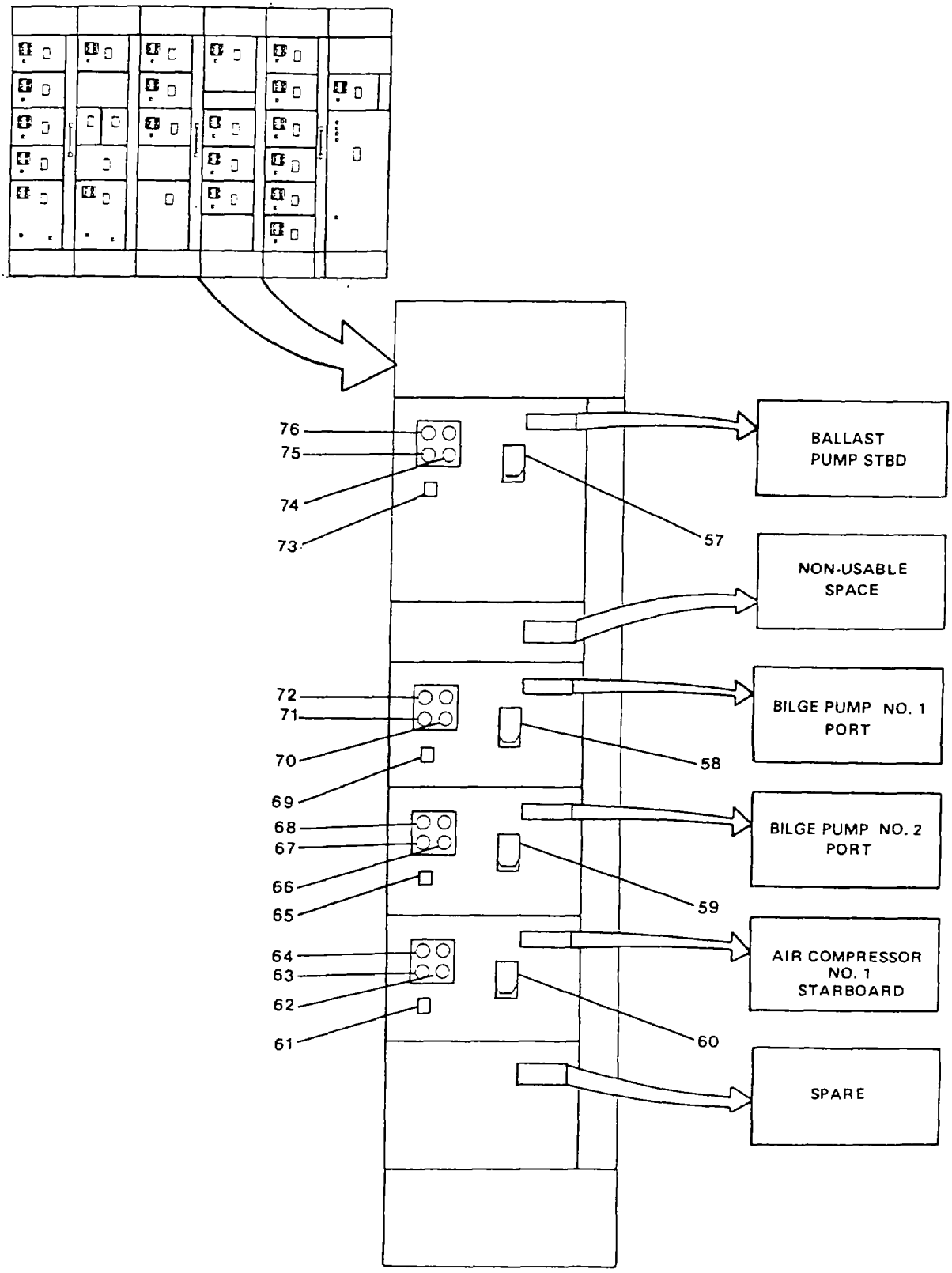


FIGURE 2-103. Engine Room Motor Control Center (Sheet 4 of 7).

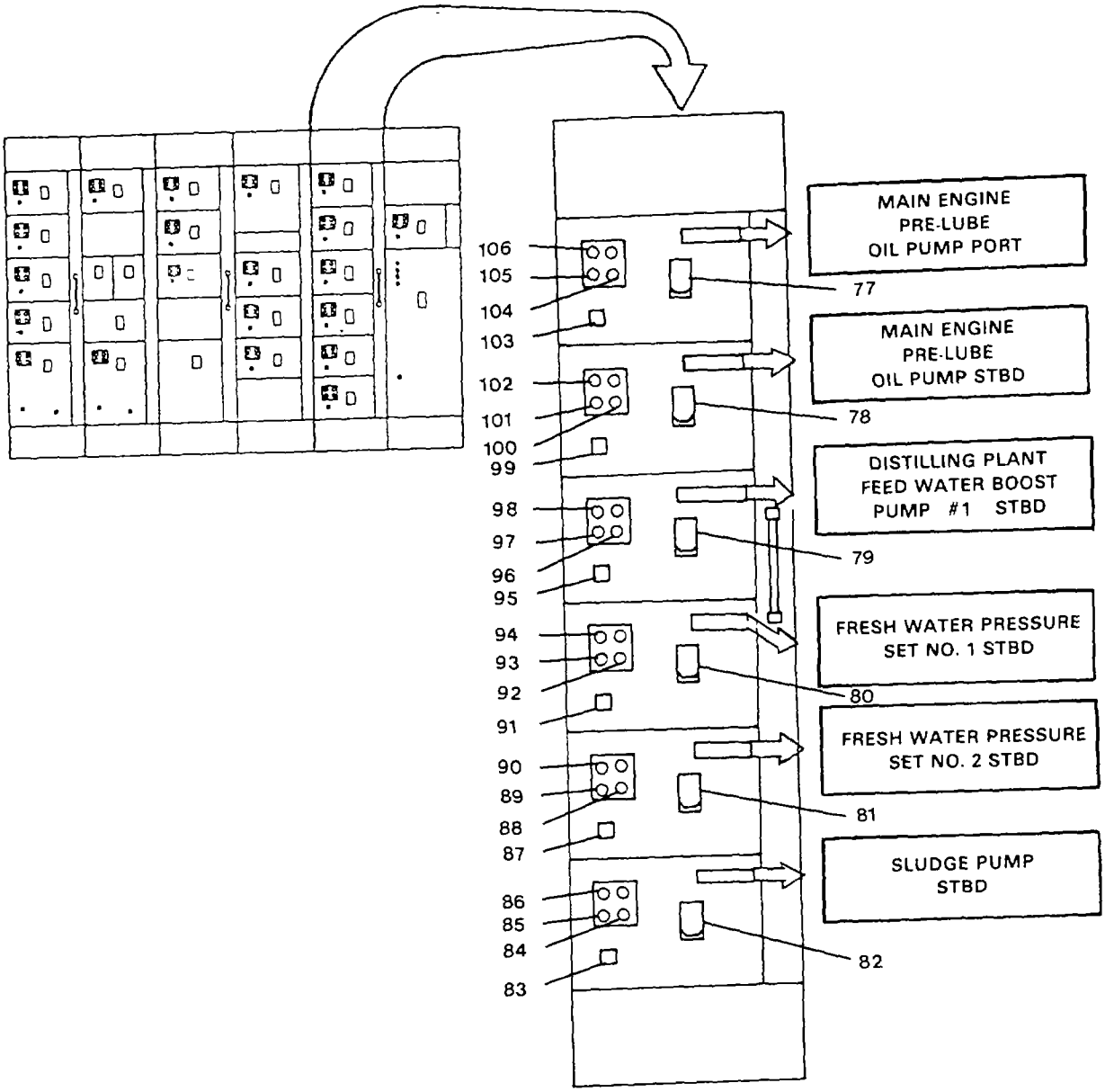


FIGURE 2-103. Engine Room Motor Control Center (Sheet 5 of 7).

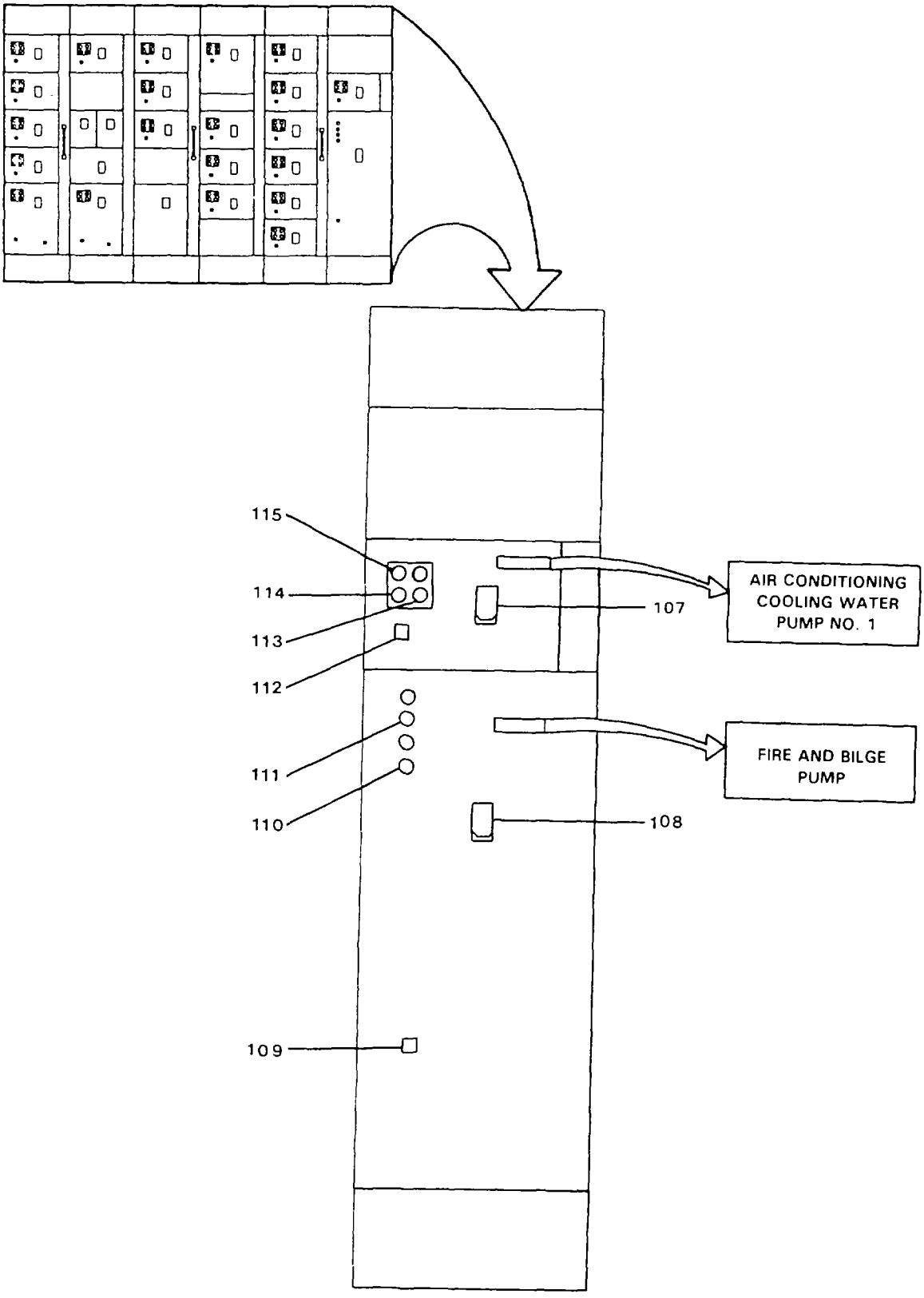
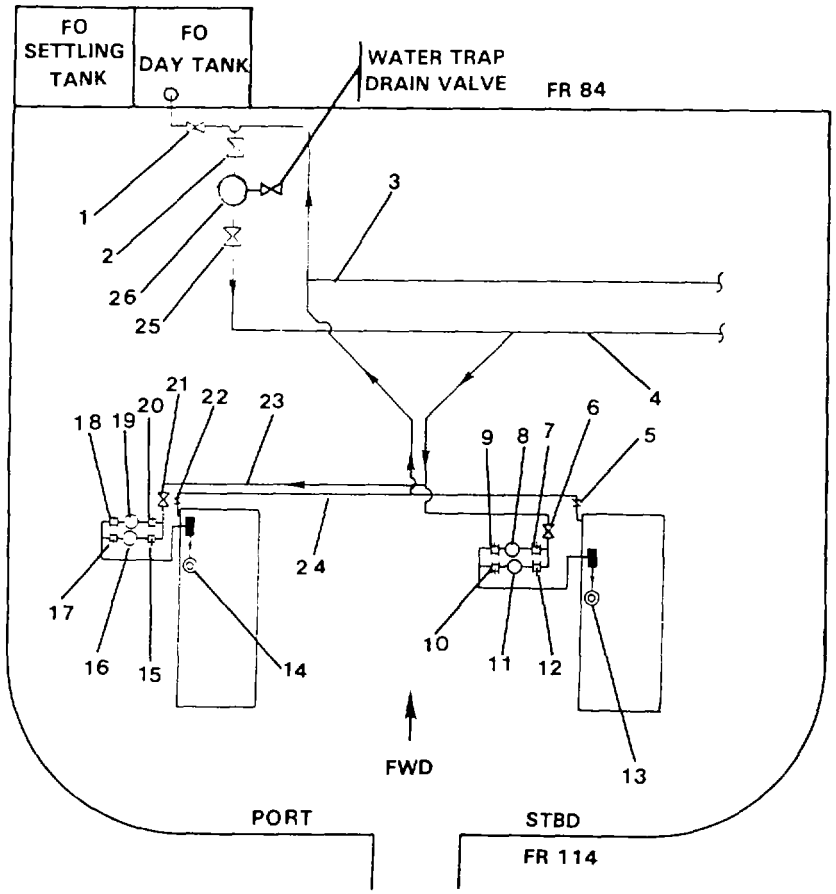


FIGURE 2-103. Engine Room Motor Control Center (Sheet 6 of 7).

LEGEND

1. CIRCUIT BREAKER (15 AMP)
2. CIRCUIT BREAKER (15 AMP)
3. CIRCUIT BREAKER (15 AMP)
4. CIRCUIT BREAKER (15 AMP)
5. SLOW RUN
6. CIRCUIT BREAKER (40 AMP)
7. RESET PUSHBUTTON
8. RESET PUSHBUTTON
9. STOP SLOW FAST
10. UV RESET
11. FAST RUN
12. RESET PUSHBUTTON
13. STOP
14. START
15. ON
16. RESET PUSHBUTTON
17. STOP
18. START
19. ON
20. RESET PUSHBUTTON
21. STOP
22. START
23. ON
24. RESET PUSHBUTTON
25. STOP
26. START
27. ON
28. CIRCUIT BREAKER (15 AMP)
29. CIRCUIT BREAKER (15 AMP)
30. CIRCUIT BREAKER (15 AMP)
31. CIRCUIT BREAKER (40 AMP)
32. RESET PUSHBUTTON
33. RESET PUSHBUTTON
34. STOP SLOW FAST
35. UV RESET
36. FAST RUN
37. SLOW RUN
38. CIRCUIT BREAKER (15 AMP)
39. RESET PUSHBUTTON
40. STOP
41. START
42. ON
43. CIRCUIT BREAKER (15 AMP)
44. CIRCUIT BREAKER (15 AMP)
45. CIRCUIT BREAKER (15 AMP)
46. CIRCUIT BREAKER (150 AMP)
47. RESET PUSHBUTTON
48. STOP PUSHBUTTON
49. START PUSHBUTTON
50. ON
51. RESET PUSHBUTTON
52. HAND-OFF-AUTO
53. ON
54. RESET PUSHBUTTON
55. HAND-OFF-AUTO
56. ON
57. CIRCUIT BREAKER (70 AMP)
58. CIRCUIT BREAKER (110 AMP)
59. CIRCUIT BREAKER (110 AMP)
60. CIRCUIT BREAKER (25 AMP)
61. RESET PUSHBUTTON
62. HAND-OFF-AUTO
63. UV RESET
64. ON
65. RESET PUSHBUTTON
66. STOP
67. START
68. ON
69. RESET PUSHBUTTON
70. STOP
71. START
72. ON
73. RESET PUSHBUTTON
74. STOP
75. START
76. ON
77. CIRCUIT BREAKER (15 AMP)
78. CIRCUIT BREAKER (15 AMP)
79. CIRCUIT BREAKER (15 AMP)
80. CIRCUIT BREAKER (15 AMP)
81. CIRCUIT BREAKER (15 AMP)
82. CIRCUIT BREAKER (15 AMP)
83. RESET PUSHBUTTON
84. STOP
85. START
86. ON
87. RESET PUSHBUTTON
88. HAND-OFF-AUTO
89. UV RESET
90. ON
91. RESET PUSHBUTTON
92. HAND-OFF-AUTO
93. UV RESET
94. ON
95. RESET PUSHBUTTON
96. STOP
97. START
98. ON
99. RESET PUSHBUTTON
100. STOP
101. START
102. ON
103. RESET PUSHBUTTON
104. STOP
105. START
106. ON
107. CIRCUIT BREAKER (20 AMP)
108. CIRCUIT BREAKER (110 AMP)
109. RESET PUSHBUTTON
110. OFF-ON
111. RUN
112. RESET PUSHBUTTON
113. STOP
114. START
115. ON

FIGURE 2-103. Engine Room Motor Control Center (Sheet 7 of 7).



LEGEND

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL HEADER INLET VALVE
3. RETURN FUEL OIL HEADER PIPE
4. FUEL OIL SUPPLY HEADER PIPE
5. SWING CHECK VALVE
6. GENERATOR FUEL OIL SUPPLY VALVE
7. FUEL OIL FILTER INLET VALVE
8. FUEL OIL FILTER
9. FUEL OIL FILTER OUTLET VALVE
10. FUEL OIL FILTER OUTLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER INLET VALVE
13. FUEL OIL PRIMING PUMP
14. FUEL OIL PRIMING PUMP
15. FUEL OIL FILTER INLET VALVE
16. FUEL OIL FILTER
17. FUEL OIL FILTER OUTLET VALVE
18. FUEL OIL FILTER OUTLET VALVE
19. FUEL OIL FILTER
20. FUEL OIL FILTER INLET VALVE
21. GENERATOR FUEL OIL SUPPLY VALVE
22. SWING CHECK VALVE
23. FUEL OIL SUPPLY PIPE
24. FUEL OIL RETURN PIPE
25. INLINE STOP VALVE
26. WATER TRAP

FIGURE 2-104. Ship's Service Diesel Generator Fuel Oil Service Piping System.

(4) Open port generator's fuel oil supply valve (21).

(5) Open fuel oil filter inlet valve (20).

NOTE

Place one fuel oil filter in operation and keep the second as backup.

(6) Open fuel oil filter outlet valve (18).

(7) Open fuel oil discharge valve to day tank.

(8) Flood the Ship Service Diesel Generator fuel system by pumping the hand operated fuel oil priming pump (14) until a slight pressure is indicated on the engine fuel pressure gauge (4, FIGURE 2-22).

c. Align Ship's Service Diesel Generator cooling water piping system (FIGURE 2-105) as follows:

(1) Open port generator cooling water suction valve (31, Sheet 1 of 2) from keel cooler.

(2) Open cooling water discharge valve (25) from expansion tank to generator.

(3) Open port generator cooling water discharge valve (22) to keel cooler.

NOTE

If ship's service diesel generators require extra cooling, suction and discharge valves (32 and 21) to cooling coils located in ballasts tanks may be opened.

d. On STBD side of electric start generator, twist the kill pushbutton (7, FIGURE 2-22) clockwise to ensure it is in the run position.

CAUTION

If oil pressure does not rise to 45 PSI within 15 seconds, stop engine or equipment damage could result. Notify unit maintenance.

e. On Engine Room Console (FIGURE 2-106, Sheet 5 of 12), press and hold PGE start pushbutton (47).

NOTE

If engine fails to start within 30 seconds, release the starter pushbutton. Wait 2 minutes to allow the starter motor to cool before using it again.

f. Allow engine to run 3 to 5 minutes or until water temperature gauge (22, Sheet 4 of 12) begins to rise.

g. On Main Switchboard (FIGURE 2-102, Sheet 1 of 7) set selector switch (8) to GEN. NO. 1.

h. Increase GEN. No. 1 speed control (33) on main switchboard until hertz meter (7) reads 60.

i. Turn GEN. 1 BUS S.P. switch (34) to read phase 1-2.

j. Adjust GENERATOR NO. 1 VOLTAGE ADJ RHEO (26) to read 460 on A.C. VOLTS meter (1).

NOTE

If generator is started with MAN/OFF/AUTO switch (29) in manual position, voltage adjustment is made by VOLTAGE switch (27).

k. Set GENERATOR #1 CKT BKR (62, FIGURE 2-102, Sheet 4 of 7), to ON position.

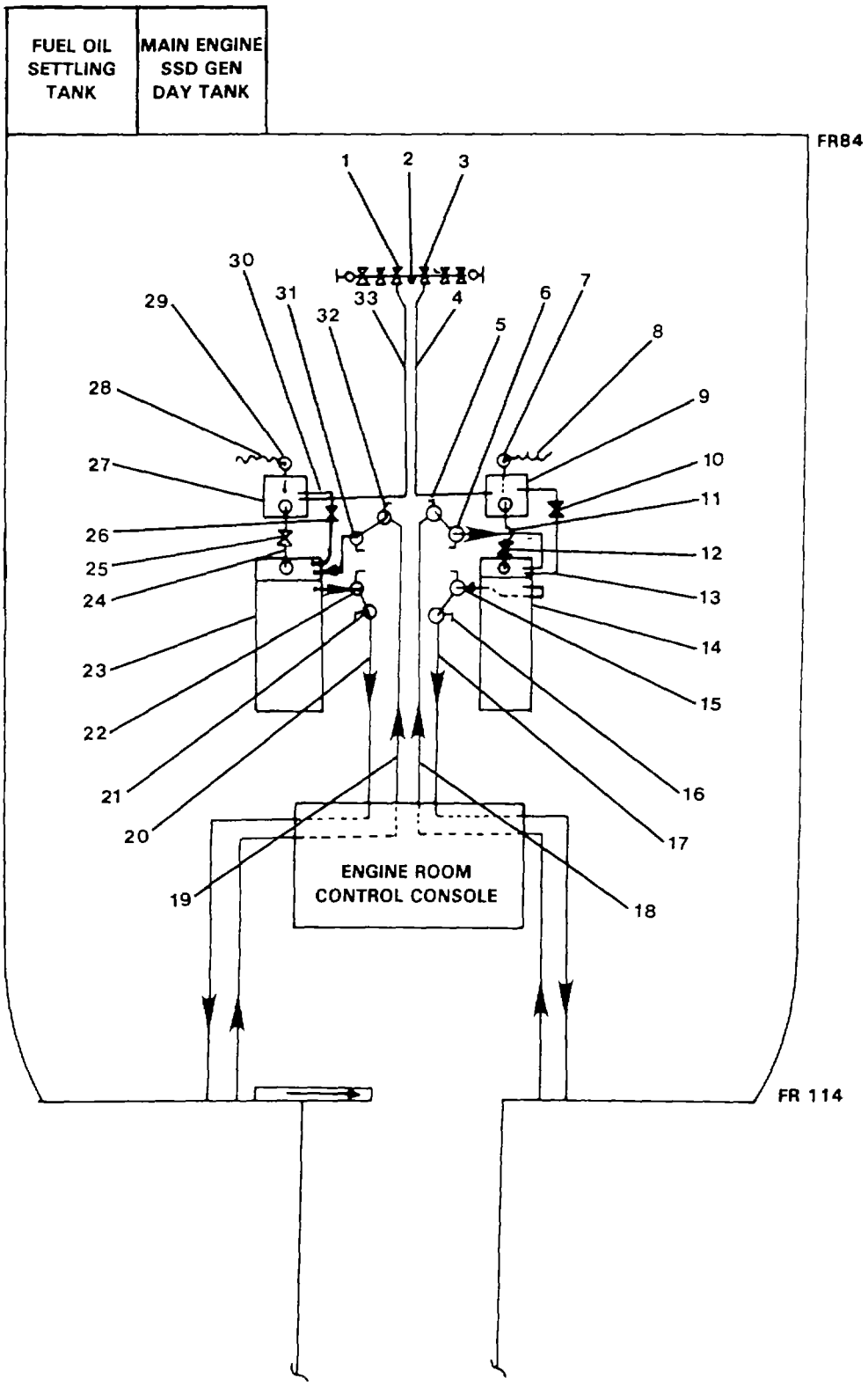


FIGURE 2-105. Ship's Service Diesel Generator Cooling Water Piping System (Sheet 1 of 2).

LEGEND

1. FRESH WATER FILL VALVE TO PORT GENERATOR EXPANSION TANK
2. FRESH WATER DISTRIBUTION MANIFOLD
3. FRESH WATER FILL VALVE TO STBD GENERATOR EXPANSION TANK
4. FRESH WATER FILL PIPE TO STBD GENERATOR EXPANSION TANK
5. STBD GENERATOR COOLING WATER SUCTION VALVE FROM COOLING COILS IN BALLAST TANK
6. STBD GENERATOR COOLING WATER SUCTION VALVE FROM KEEL COOLERS
7. STBD GENERATOR COOLING WATER LOW LEVEL ALARM
8. ELECTRICAL LEAD TO GENERATOR ALARM PANEL
9. STBD GENERATOR COOLING WATER EXPANSION TANK
10. STBD GENERATOR COOLING WATER VENT VALVE
11. COOLING WATER DISCHARGE PIPE FROM EXPANSION TANK TO GENERATOR
12. COOLING WATER DISCHARGE VALVE FROM EXPANSION TANK TO GENERATOR
13. STBD GENERATOR COOLING WATER VENT PIPE
14. STBD GENERATOR
15. STBD GENERATOR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
16. STBD GENERATOR COOLING WATER DISCHARGE VALVE TO COOLING COILS IN BALLAST TANK
17. STBD GENERATOR COOLING WATER PIPE TO COOLING COILS IN BALLAST TANK
18. STBD GENERATOR COOLING WATER PIPE FROM COOLING COILS IN BALLAST TANK
19. PORT GENERATOR COOLING WATER PIPE FROM COOLING COILS IN BALLAST TANK
20. PORT GENERATOR COOLING WATER PIPE TO COOLING COILS IN BALLAST TANK
21. PORT GENERATOR COOLING WATER DISCHARGE VALVE TO COOLING COILS IN BALLAST TANK
22. PORT GENERATOR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
23. PORT GENERATOR
24. COOLING WATER DISCHARGE PIPE FROM EXPANSION TANK TO GENERATOR
25. COOLING WATER DISCHARGE VALVE FROM EXPANSION TANK TO GENERATOR
26. PORT GENERATOR COOLING WATER VENT VALVE
27. PORT GENERATOR COOLING WATER EXPANSION TANK
28. ELECTRICAL LEAD TO GENERATOR ALARM PANEL
29. PORT GENERATOR COOLING WATER LOW LEVEL ALARM
30. PORT GENERATOR COOLING WATER VENT PIPE
31. PORT GENERATOR COOLING WATER SUCTION VALVE FROM KEEL COOLER
32. PORT GENERATOR COOLING WATER SUCTION VALVE FROM COOLING COILS IN BALLAST TANK
33. FRESH WATER FILL PIPE TO PORT GENERATOR EXPANSION TANK

FIGURE 2-105. Ship's Service Diesel Generator Cooling Water Piping System (Sheet 2 of 2).

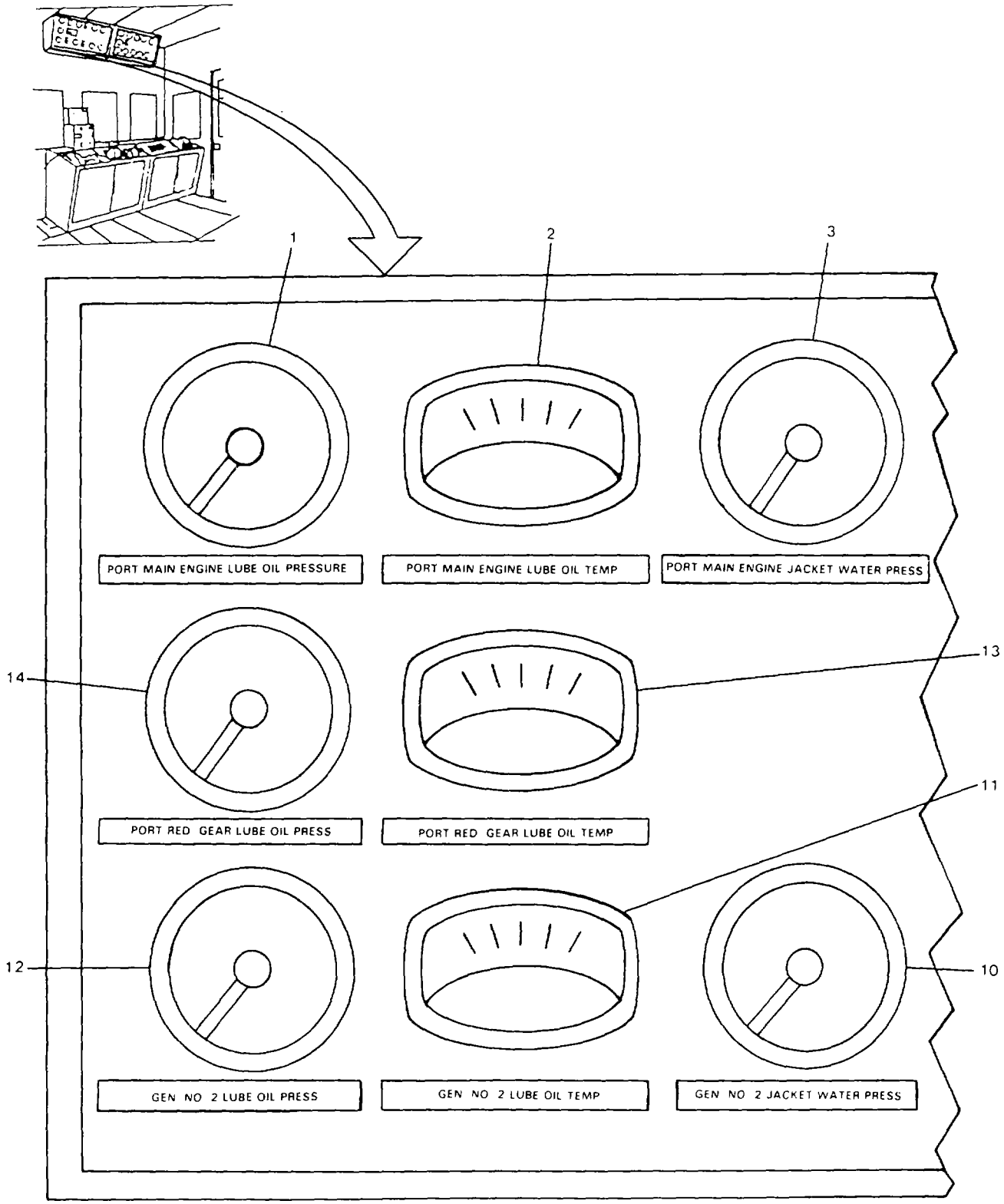


FIGURE 2-106. Engine Room Console (Sheet 1 of 12).

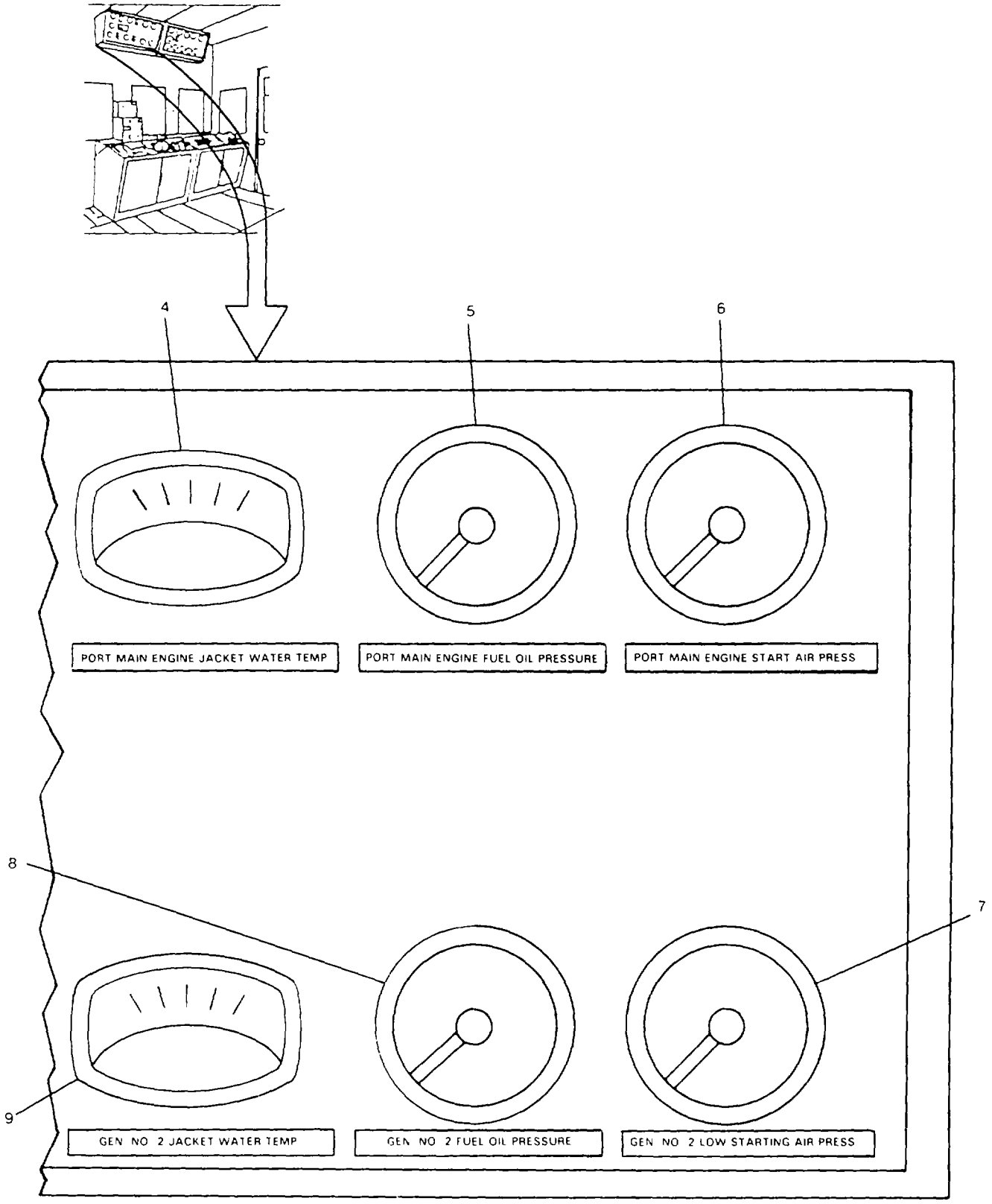


FIGURE 2-106. Engine Room Console (Sheet 2 of 12).

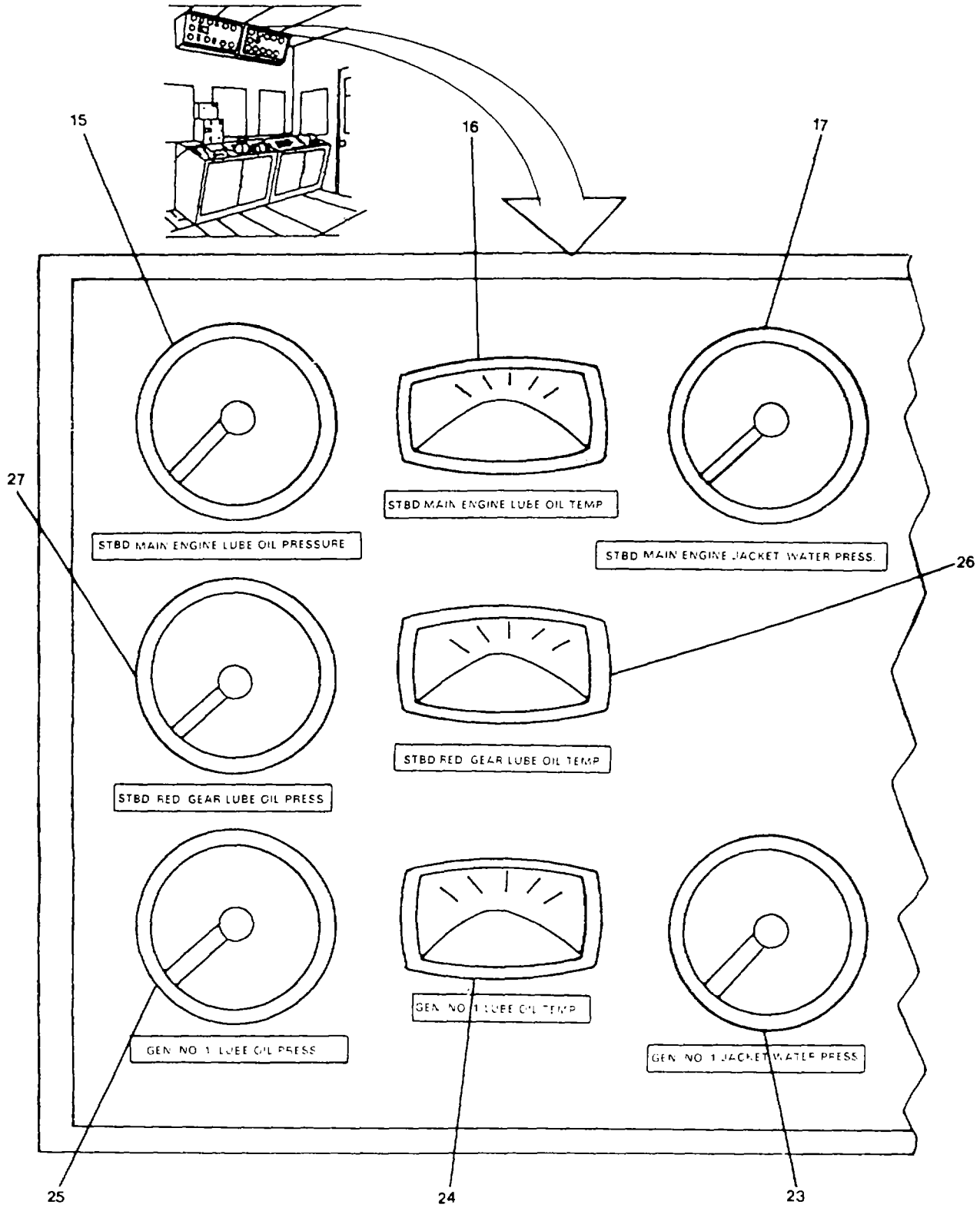


FIGURE 2-106. Engine Room Console (Sheet 3 of 12).

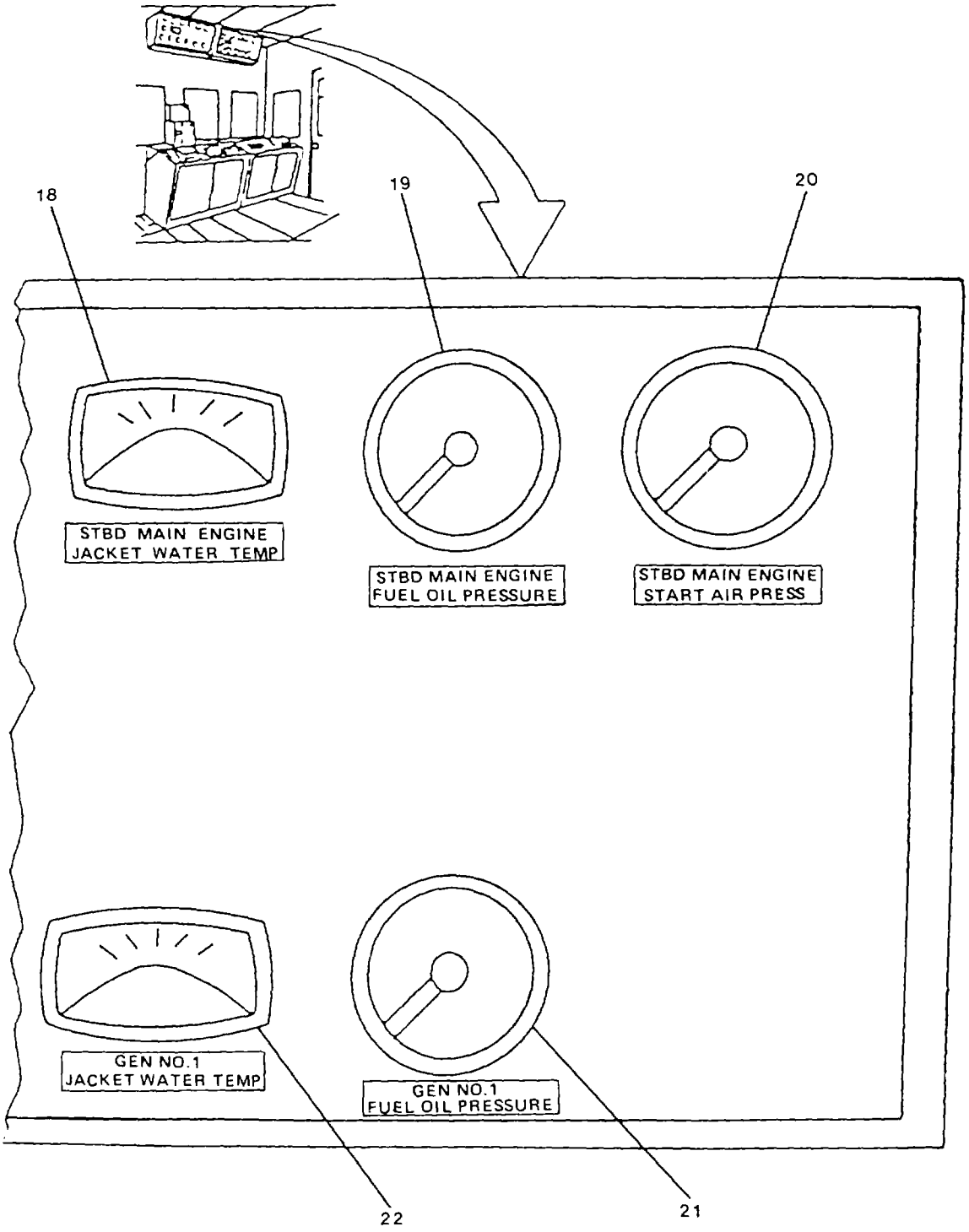


FIGURE 2-106. Engine Room Console (Sheet 4 of 12).

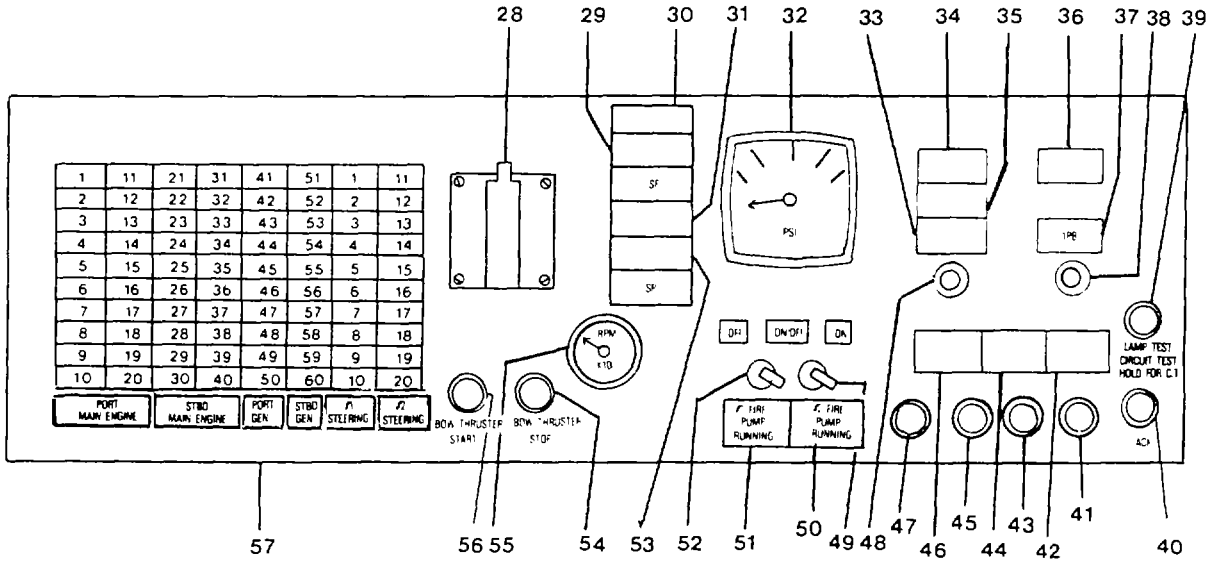


FIGURE 2-106. Engine Room Console (Sheet 5 of 12).

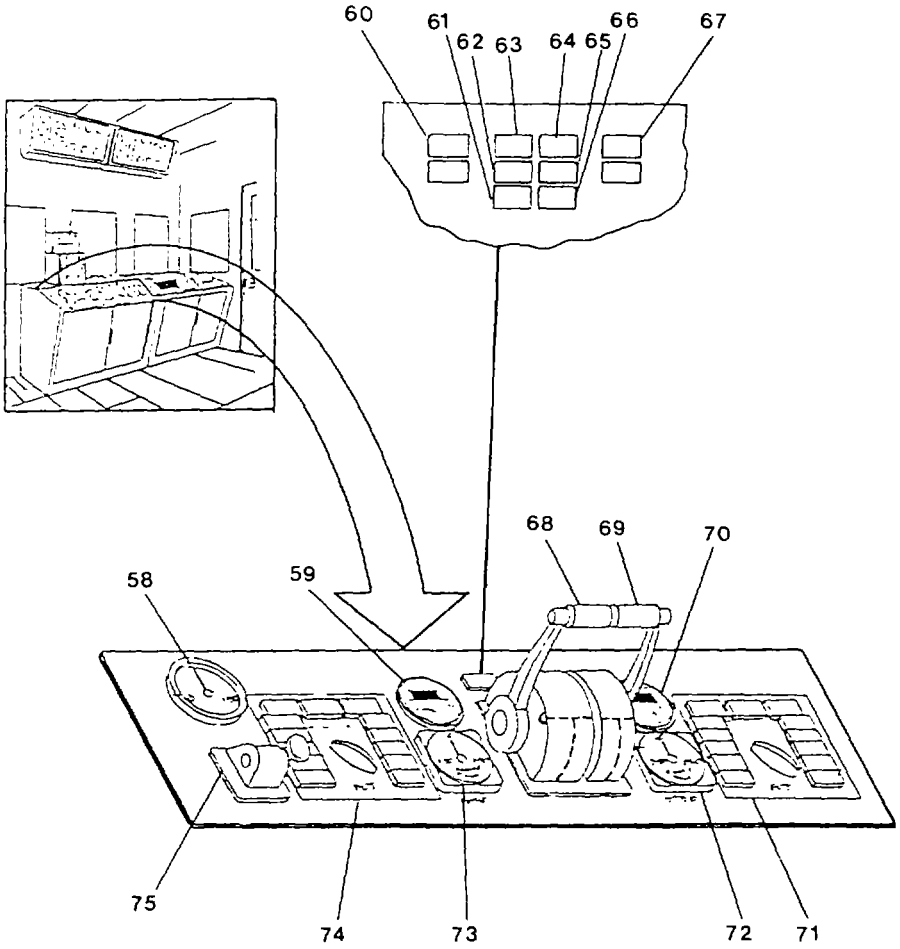


FIGURE 2-106. Engine Room Console (Sheet 6 of 12).

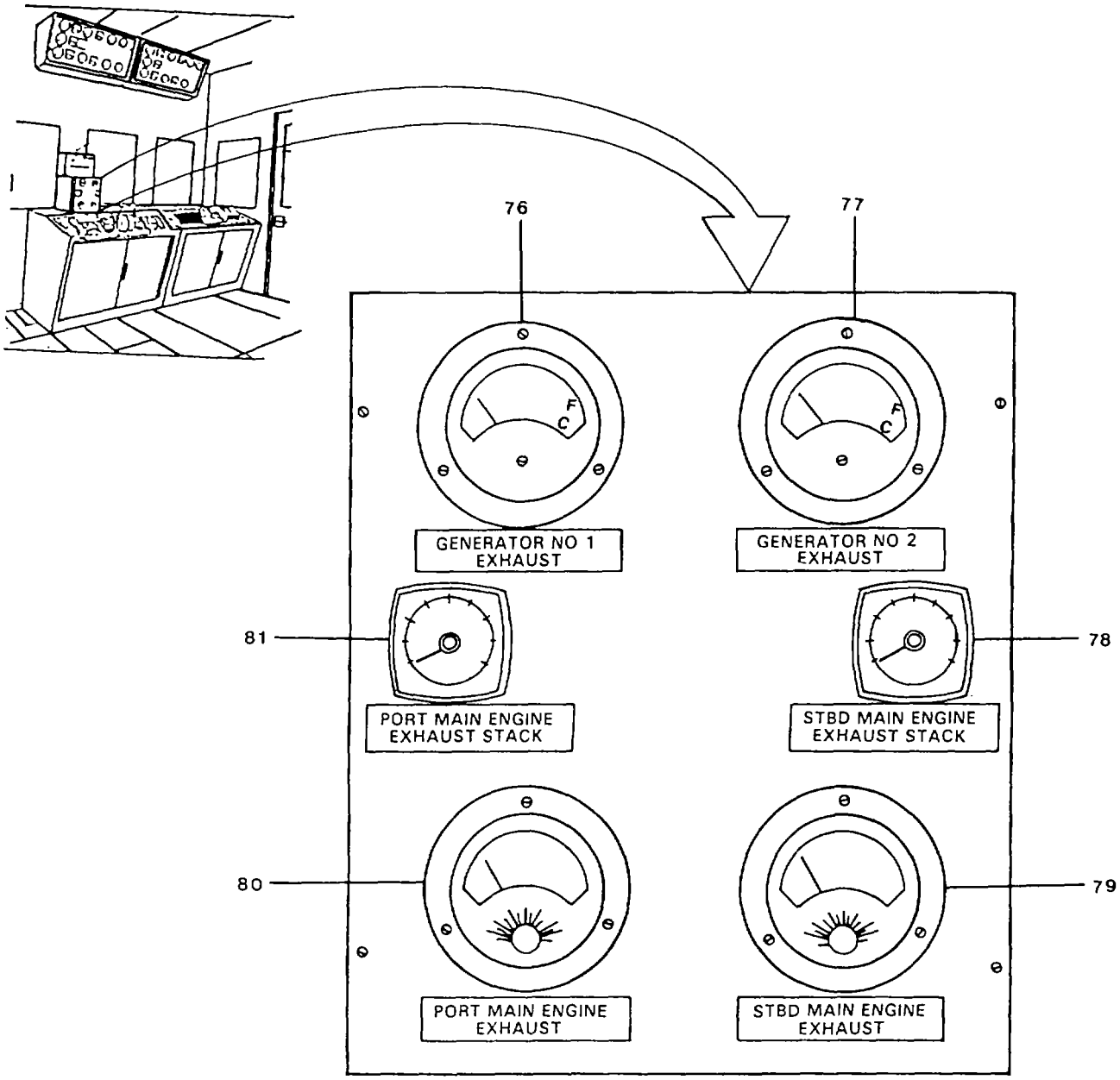


FIGURE 2-106. Engine Room Console (Sheet 7 of 12).

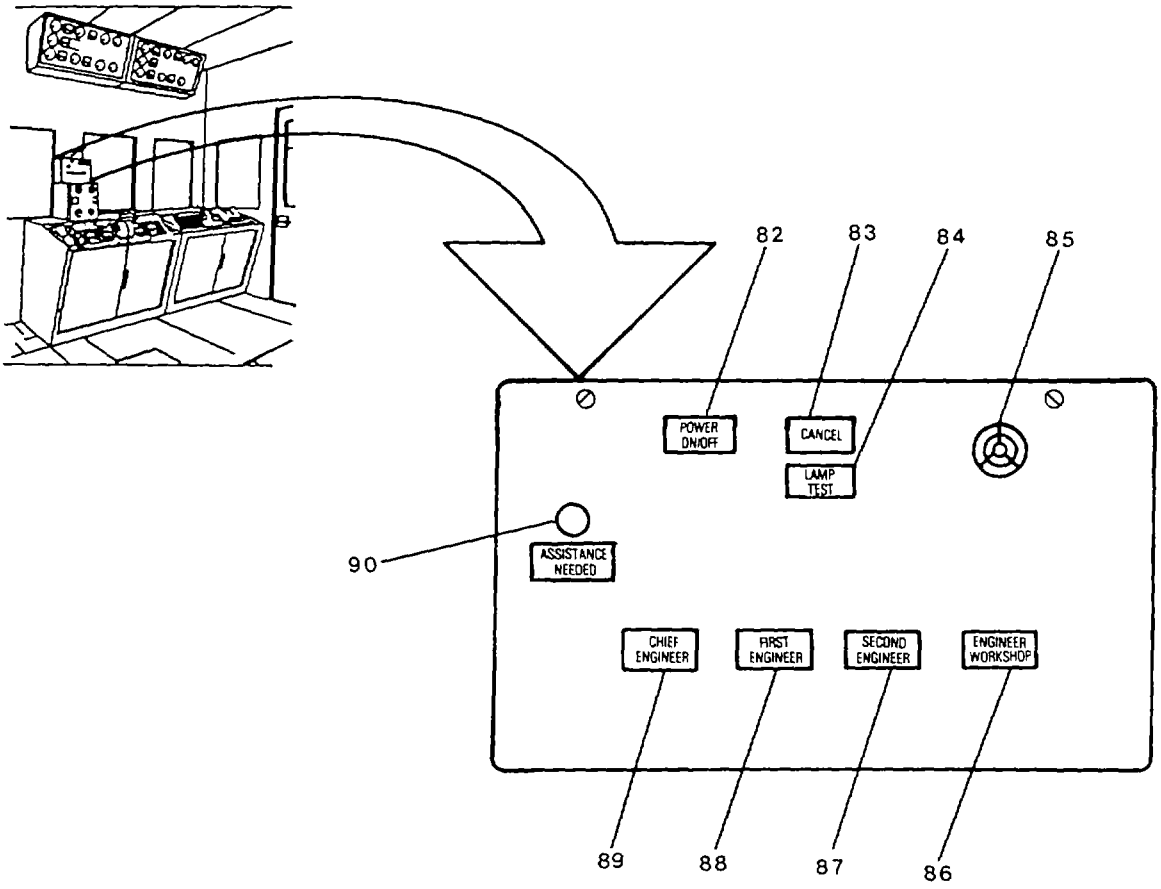


FIGURE 2-106. Engine Room Console (Sheet 8 of 12).

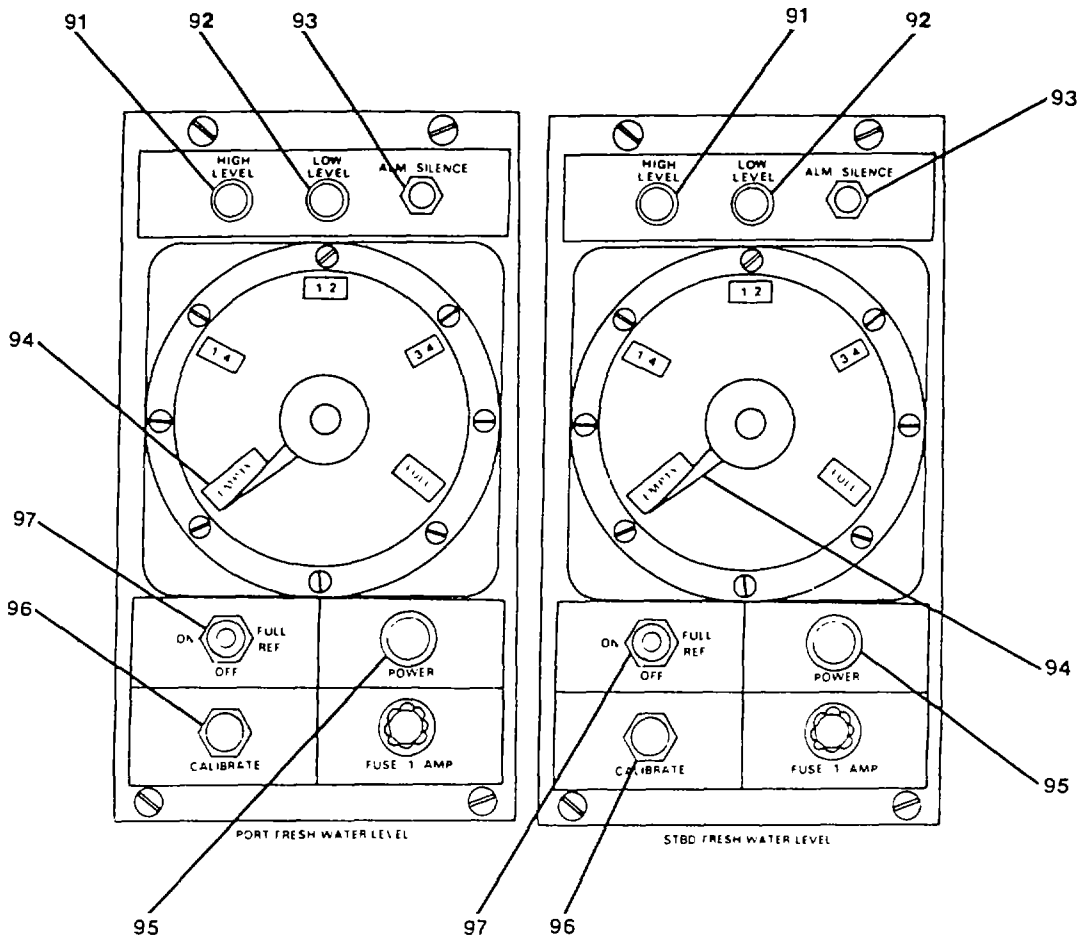
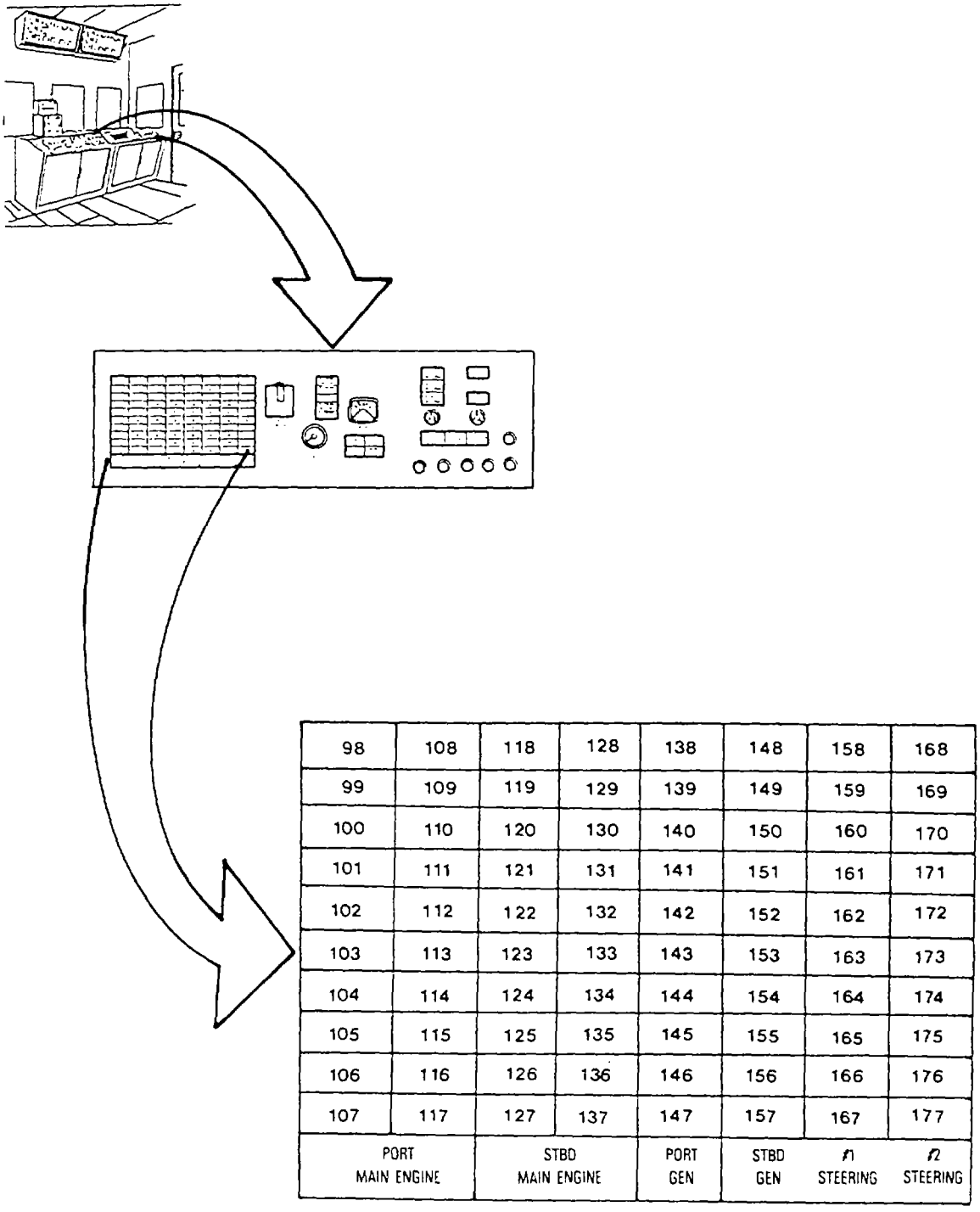


FIGURE 2-106. Engine Room Console (Sheet 9 of 12).



98	108	118	128	138	148	158	168
99	109	119	129	139	149	159	169
100	110	120	130	140	150	160	170
101	111	121	131	141	151	161	171
102	112	122	132	142	152	162	172
103	113	123	133	143	153	163	173
104	114	124	134	144	154	164	174
105	115	125	135	145	155	165	175
106	116	126	136	146	156	166	176
107	117	127	137	147	157	167	177
PORT MAIN ENGINE		STBD MAIN ENGINE		PORT GEN	STBD GEN	#1 STEERING	#2 STEERING

FIGURE 2-106. Engine Room Console (Sheet 10 of 12).

LEGEND

1. PORT MAIN ENGINE LUBE OIL PRESSURE
2. PORT MAIN ENGINE LUBE OIL TEMP.
3. PORT MAIN ENGINE JACKET WATER PRESS
4. PORT MAIN ENGINE JACKET WATER TEMP.
5. PORT MAIN ENGINE FUEL OIL PRESSURE
6. PORT MAIN ENGINE START AIR PRESS.
7. GEN. NO. 2 LOW STARTING AIR PRESS.
8. GEN. NO. 2 FUEL OIL PRESSURE
9. GEN. NO. 2 JACKET WATER TEMP.
10. GEN. NO. 2 JACKET WATER PRESS.
11. STBD GEN. NO. 2 LUBE OIL TEMP.
12. GEN. NO. 2 LUBE OIL PRESS.
13. PORT RED. GEAR LUBE OIL TEMP.
14. PORT RED. GEAR LUBE OIL PRESS.
15. STBD MAIN ENGINE LUBE OIL PRESSURE
16. STBD MAIN ENGINE LUBE OIL TEMP.
17. STBD MAIN ENGINE JACKET WATER PRESS.
18. STBD MAIN ENGINE JACKET WATER TEMP.
19. STBD MAIN ENGINE FUEL OIL PRESSURE
20. STBD MAIN ENGINE START AIR PRESS.
21. GEN. NO. 1 FUEL OIL PRESSURE
22. GEN. NO. 1 JACKET WATER TEMP.
23. GEN. NO. 1 JACKET WATER PRESS.
24. GEN. NO. 1 LUBE OIL TEMP.
25. GEN. NO. 1 LUBE OIL PRESS.
26. STBD RED. GEAR LUBE OIL TEMP.
27. STBD RED. GEAR LUBE OIL PRESS.
28. BOW THRUSTER CONTROL LEVER
29. #1 STEERING SYSTEM POWER AVAILABLE
30. #1 STEERING PUMP RUNNING
31. #2 STEERING PUMP RUNNING
32. FIRE GAUGE PRESSURE
33. #2 BILGE PUMP RUNNING
34. FUEL OIL SERVICE PUMP RUNNING
35. #1 BILGE PUMP RUNNING
36. EMERGENCY GENERATOR RUNNING
37. ATTENDANCE MONITOR ACK
38. SONALERT AUDIBLE WARNING DEVICE
39. LAMP TEST/CIRCUIT TEST HOLD FOR C.T.
40. ACK.
41. S.G.E. STOP
42. STEERING ALARM SYSTEM POWER
43. S.G.E. START
44. AUTO SHUTDOWN SYSTEM POWER
45. P.G.E. STOP
46. ALARM SYSTEM POWER
47. P.G.E. START
48. SONALERT
49. OFF-ON
50. #2 FIRE PUMP RUNNING
51. #1 FIRE PUMP RUNNING
52. OFF-ON
53. #2 STEERING SYSTEM POWER AVAILABLE
54. BOW THRUSTER STOP PUSHBUTTON
55. B.T. TACH INDICATOR
56. BOW THRUSTER START PUSHBUTTON
57. ALARM PANEL
58. CONT AIR PRESS INDICATOR (NOT LABELED ON SHIP)
59. PORT MAIN ENGINE TACH
60. PORT AUTO SHUTDOWN OVERRIDE
61. P.M.E. EMERGENCY STOP
62. P.M.E. STOP
63. PORT MAIN ENGINE RUNNING
64. STBD MAIN ENGINE RUNNING
65. S.M.E. STOP
66. S.M.E. EMERGENCY STOP
67. STBD AUTO SHUTDOWN OVERRIDE
68. PORT THROTTLE CONTROL LEVER
69. STARBOARD THROTTLE CONTROL LEVER
70. STBD MAIN ENGINE TACH
71. EOT PANEL STBD (SEE SEPARATE PANEL)
72. SHAFT RPM STBD
73. SHAFT RPM PORT
74. E.O.T. PORT
75. CONTAIR TRANSF ACTUATOR
76. GENERATOR NO. 1 EXHAUST
77. GENERATOR NO. 2 EXHAUST
78. STBD MAIN ENGINE EXHAUSTS STACK
79. STBD MAIN ENGINE EXHAUST
80. PORT MAIN ENGINE EXHAUST
81. PORT MAIN ENGINE EXHAUST STACK
82. POWER ON/OFF
83. CANCEL
84. LAMP TEST
85. SONALERT

FIGURE 2-106. Engine Room Console (Sheet 11 of 12).

86. ENGINEER WORKSHOP
87. SECOND ENGINEER
88. FIRST ENGINEER
89. CHIEF ENGINEER
90. ASSISTANCE NEEDED
91. HIGH LEVEL
92. LOW LEVEL
93. ALM. SILENCE
94. LEVEL INDICATOR
95. POWER
96. CALIBRATE
97. ON-OFF-FULL REF.
98. P.M.E. LOW OIL PRESS. AUTO SHUTDOWN
99. P.M.E. HIGH OIL TEMP.
100. P.M.E. HIGH JACKET WATER TEMP.
101. P.M.E. LOW EXPANSION TANK LEVEL
102. P.M.E. LOW FUEL OIL PRESS
103. P.M.E. HIGH EXHAUST STACK TEMP.
104. SPARE
105. P.M.E. OVERSPEED
106. P.M.E. STOPPED
107. P.M.E. LOW STARTING AIR PRESS.
108. P.R.G. LOW OIL PRESS. AUTO SHUTDOWN
109. P.R.G. HIGH OIL TEMP.
110. LOW CTRL AIR SUPPLY
111. AUTO SHUTDOWN SYSTEM ELECTRIC POWER
112. ALARM SYS. ELECTRIC POWER
113. HIGH BILGE ENGINE ROOM
114. HIGH BILGE STEERING ROOM
115. HIGH BILGE BOW THRUSTER COMPARTMENT
116. SPARE
117. SPARE
118. S.M.E. LOW OIL PRESS. AUTO SHUTDOWN
119. S.M.E. HIGH OIL TEMP.
120. S.M.E. HIGH JACKET WATER TEMP.
121. S.M.E. LOW EXPANSION TANK LEVEL
122. S.M.E. LOW FUEL OIL PRESS.
123. S.M.E. HIGH EXHAUST STACK TEMP.
124. SPARE
125. S.M.E. OVERSPEED
126. S.M.E. STOPPED
127. S.M.E. LOW STARTING AIR PRESSURE
128. S.R.G. LOW OIL PRESS. AUTO SHUTDOWN
129. S.R.G. HIGH OIL TEMP.
130. FIRE
131. AUTO. SHUTDOWN SYSTEM ELECTRIC POWER
132. HIGH FUEL LEVEL DAY TANK
133. LOW FUEL LEVEL DAY TANK
134. HIGH FUEL LEVEL SETTLING TANK
135. LOW FUEL LEVEL SETTLING TANK
136. SPARE
137. SPARE
138. P.G.E. LOW OIL PRESS.
139. P.G.E. HIGH OIL TEMP.
140. P.G.E. LOW JACKET WATER PRESS.
141. P.G.E. HIGH JACKET WATER TEMP.
142. P.G.E. LOW EXPANSION TANK LEVEL
143. P.G.E. LOW FUEL OIL PRESS.
144. P.G.E. HIGH EXHAUST TEMP.
145. P.G.E. OVERSPEED
146. SPR. OPEN IN ARMORY
147. HIGH TEMP. IN ARMORY
148. S.G.E. LOW OIL PRESS.
149. S.G.E. HIGH OIL TEMP.
150. S.G.E. LOW JACKET WATER PRESS.
151. S.G.E. HIGH JACKET WATER TEMP.
152. S.G.E. LOW EXPANSION TANK LEVEL
153. S.G.E. LOW FUEL OIL PRESS.
154. S.G.E. HIGH EXHAUST TEMP.
155. S.G.E. OVERSPEED
156. NO. 2 S.G.E. LOW STARTING AIR PRESS.
157. RADIO ROOM INTRUSION
158. NO. 1 MOTOR OVERLOAD
159. NO. 1 MOTOR PHASE LOSS
160. NO. 1 SYSTEM FEEDER C.B. OPEN
161. NO. 1 LOW HYDRAULIC OIL LEVEL
162. NO. 1 CONTROL POWER FAILURE
163. NO. 1 FOLLOW-UP STEERING FAILURE
164. NO. 1 STEERING FILTER DIRTY
165. NO. 1 STEERING FAILURE
166. SPARE
167. SPARE
168. NO. 2 MOTOR OVERLOAD
169. NO. 2 MOTOR PHASE LOSS
170. NO. 2 SYSTEM FEEDER C.B. OPEN
171. NO. 2 LOW HYDRAULIC OIL LEVEL
172. NO. 2 CONTROL POWER FAILURE
173. NO. 2 FOLLOW-UP STEERING FAILURE
174. NO. 2 STEERING FILTER DIRTY
175. NO. 2 STEERING FAILURE
176. SPARE
177. SPARE

FIGURE 2-106. Engine Room Console (Sheet 12 of 12).

l. Set circuit breakers (35, 36, 37, 38, 39, and 40, FIGURE 2-102, Sheet 2 of 7) to ON position.

m. Set circuit breakers (42, 45, 47, and 48, FIGURE 2-102, Sheet 3 of 7) to ON position.

n. Set circuit breakers (52, 53, 54, 55, 56, 57, 58, 59, and 60, FIGURE 2-102, Sheet 4 of 7) to ON position.

2-5.2. Firemain Activation.

a. Align fire/bilge pump piping system (FIGURE 2-107) as follows:

(1) Close all valves in fire/bilge pump piping system.

CAUTION

Sea chest cutout valve (25) is to the low sea chest. Its intake from the sea is on the bottom of the hull. If LSV is beached, this sea chest will be blocked. In a beached configuration, high sea chest cutout valve (24) must be used as its intake from the sea is on the side of the hull.

(2) Open low sea chest cutout valve (25, Sheet 1 of 2).

(3) Open sea water suction valve (13).

(4) Open fire/bilge pump suction valve (19).

(5) Open fire/bilge pump discharge valve (11).

(6) Open discharge pressure gauge cutout valve (9).

(7) Open discharge valve (7) to fire main.

b. On Engine Room Motor Control Center (FIGURE 2-103, Sheet 6 of 7), set circuit breaker (108) to ON

c. Turn OFF/ON switch (110) to ON position.

d. Observe pump discharge pressure gauge (32, FIGURE 2-106, Sheet 5 of 12). If no pressure is indicated on gauge (32) within 30 seconds, turn switch (110, FIGURE 2-103, Sheet 6 of 7) to OFF position. Notify unit maintenance.

2-5.3. Compressed Air System-Engine Room.

a. Align Engine Room Compressed Air System (FIGURE 2-108) as follows:

(1) Close all compressed air system valves in engine room.

(2) Open compressor discharge valve (21, Sheet 1 of 4).

(3) Open both receiver inlet valves (22, Sheet 3 of 4).

(4) Open both receiver outlet valves (2, Sheet 2 of 4).

(5) Open pressure gauge cutout valves (5 and 11, Sheet 2 of 4).

(6) Open pressure gauge cutout valves (67 and 70, Sheet 3 of 4).

(7) Open reducing station inlet valve (14, Sheet 3 of 4).

(8) Open reducing station outlet valve (17, Sheet 3 of 4).

(9) Open main engine starting air station inlet valve (9, Sheet 2 of 4).

(10) Open main engine starting air station outlet valve (7, Sheet 2 of 4).

(11) Open inline stop valve (23, Sheet 1 of 4).

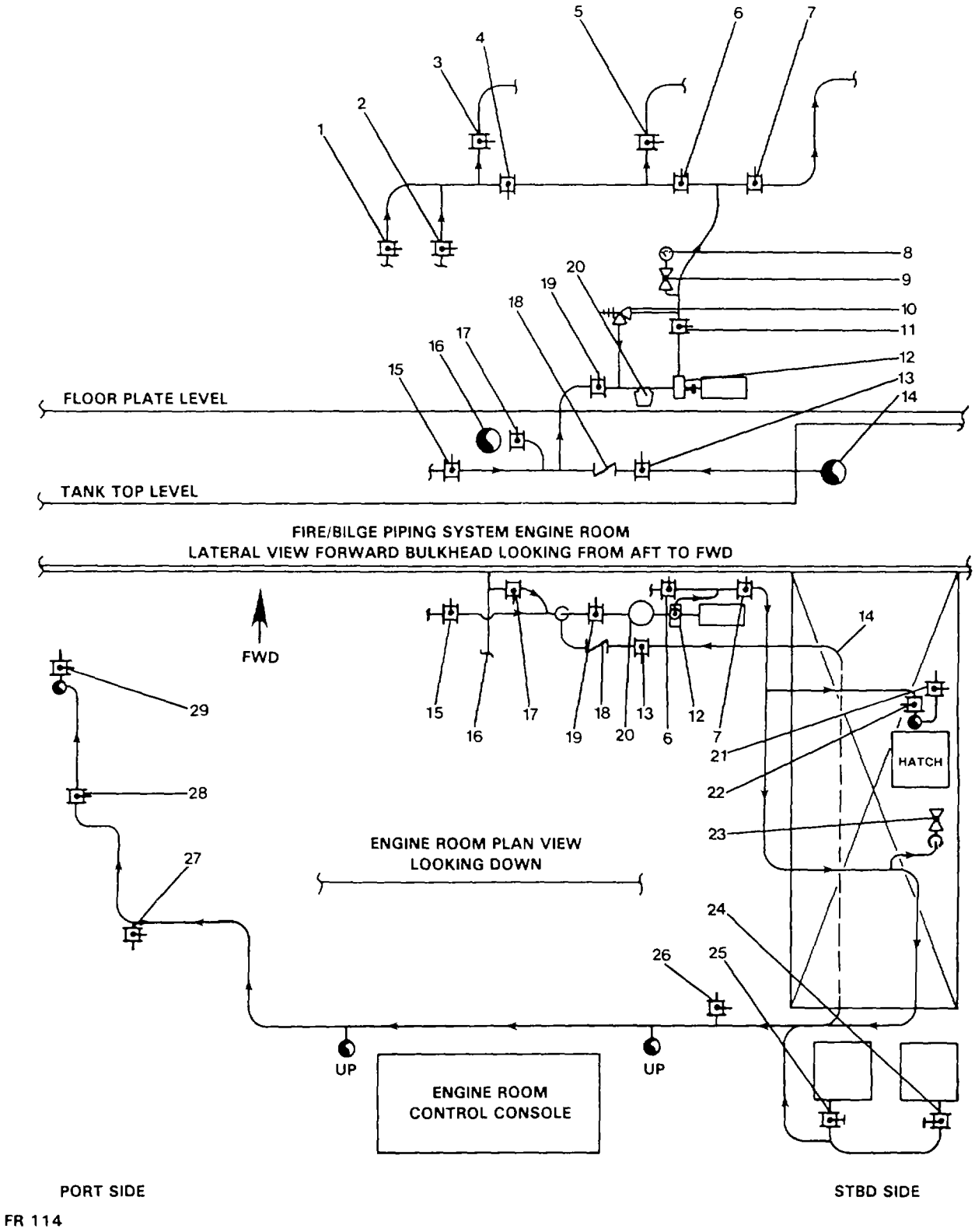


FIGURE 2-107. Fire/Bilge Piping System-Engine Room (Sheet 1 of 2).

LEGEND

1. BILGE/BALLAST PUMP DISCHARGE VALVE
2. BILGE/BALLAST PUMP DISCHARGE VALVE
3. DISCHARGE VALVE TO SLUDGE TANK
4. INLINE STOP VALVE
5. OVERBOARD DISCHARGE VALVE
6. INLINE STOP VALVE
7. DISCHARGE VALVE TO FIRE MAIN
8. DISCHARGE PRESSURE GAUGE (0 To 200 PSI)
9. DISCHARGE PRESSURE GAUGE CUTOUT VALVE
10. PRESSURE RELIEF VALVE
11. FIRE/BILGE PUMP DISCHARGE VALVE
12. FIRE/BILGE PUMP AND MOTOR
13. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
14. FIRE/BILGE PUMP SEA WATER SUCTION PIPE
15. SUCTION VALVE FROM BILGE MANIFOLD
16. BALLAST MAIN PIPE
17. SUCTION VALVE FROM BALLAST MAIN PIPE
18. SWING CHECK VALVE
19. FIRE/BILGE PUMP SUCTION VALVE
20. FIRE/BILGE PUMP SUCTION STRAINER
21. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK STBD SIDE
22. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION STBD SIDE
23. ENGINE ROOM FIRE STATION CUTOUT VALVE
24. HIGH SEA CHEST CUTOUT VALVE
25. LOW SEA CHEST CUTOUT VALVE
26. FIRE MAIN PIPING SYSTEM DRAIN VALVE
27. FIRE MAIN PIPING SYSTEM DRAIN VALVE
28. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION PORT SIDE
29. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK PORT SIDE

FIGURE 2-107. Fire/Bilge Piping System - Engine Room (Sheet 2 of 2).

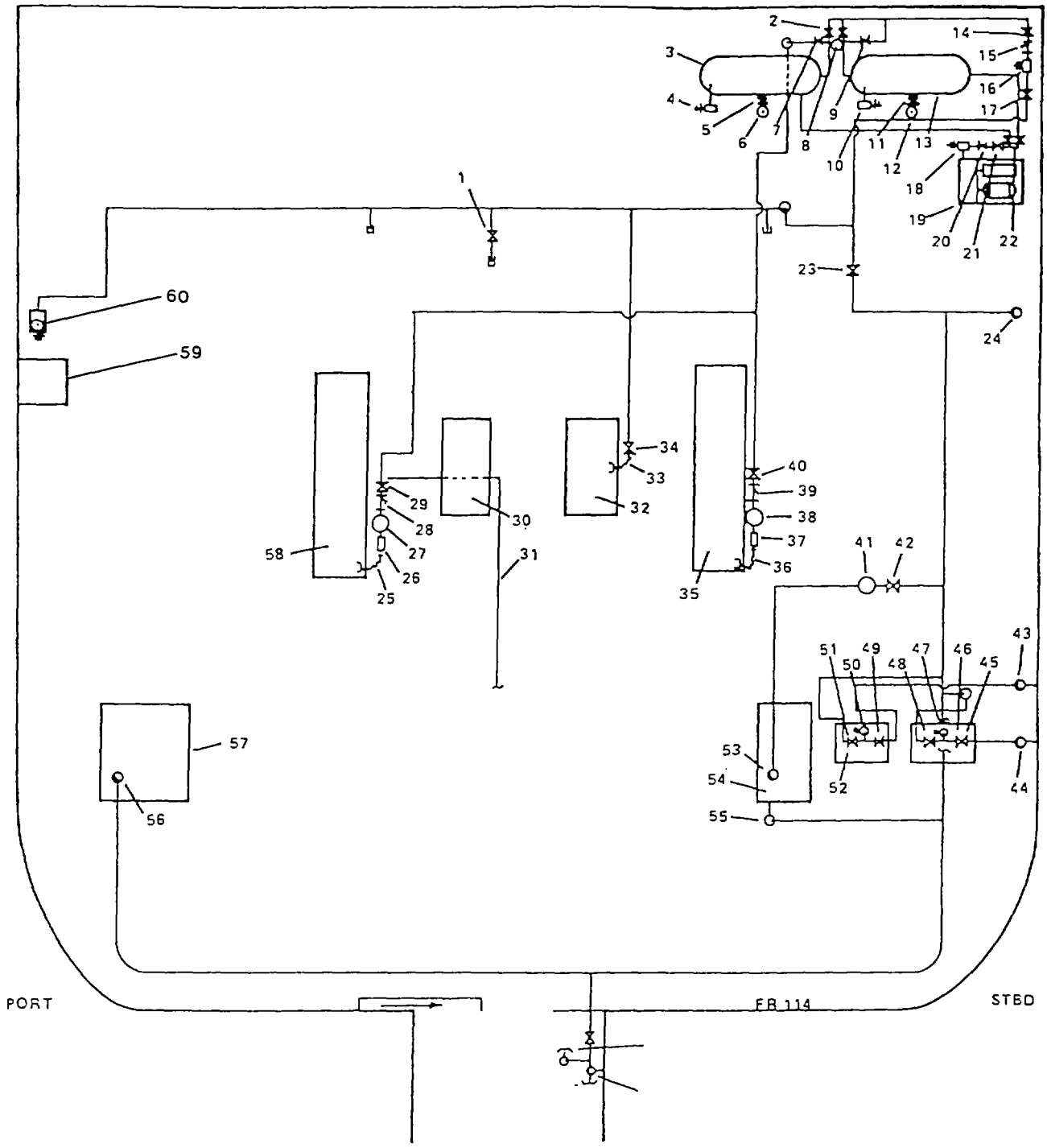
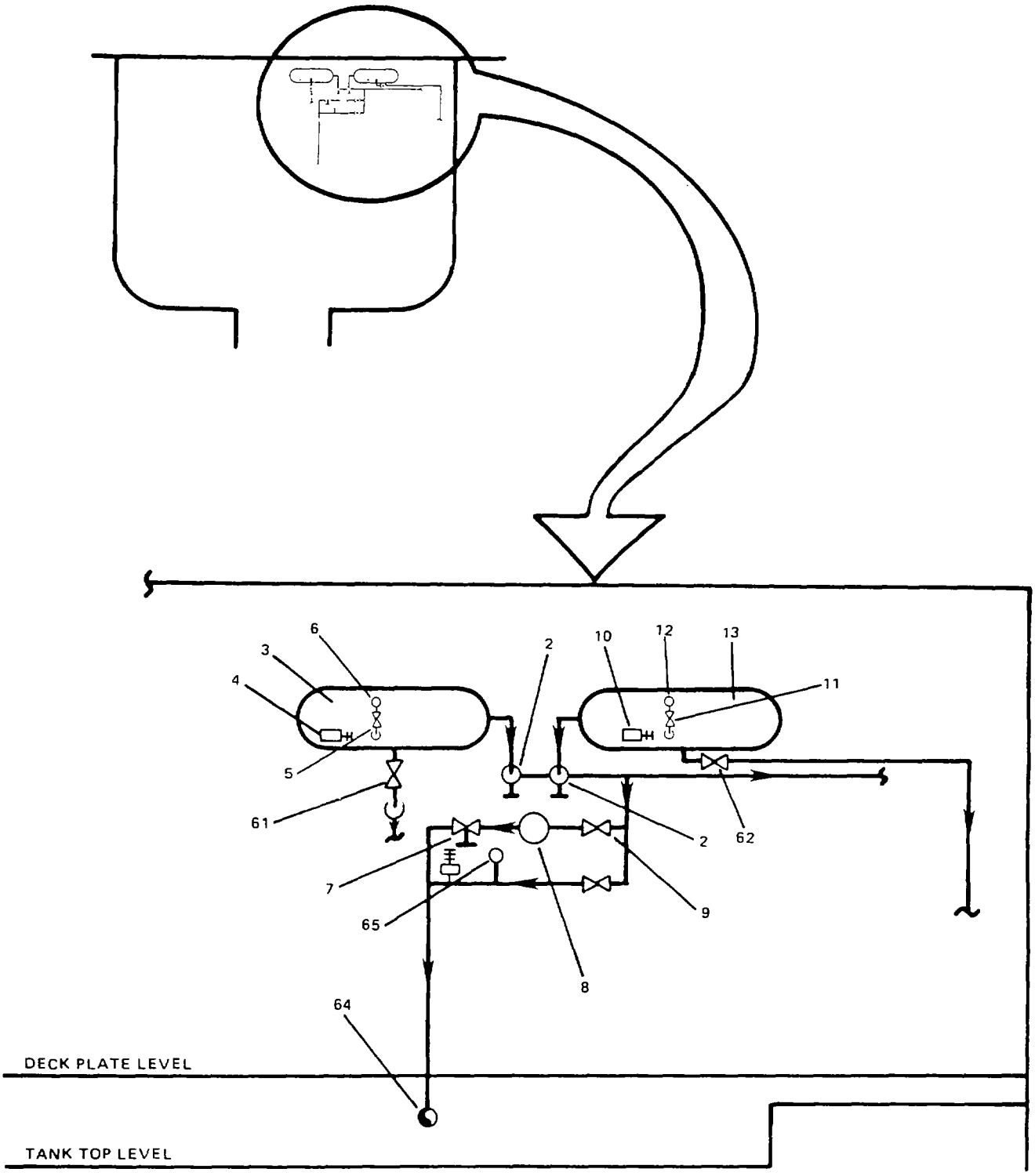


FIGURE 2-108. Compressed Air Piping System-Engine Room (Sheet 1 of 4).



MAIN ENGINE STARTING AIR REDUCING STATION
ENGINE ROOM FWD BULKHEAD FRAME 84 STBD SIDE

FIGURE 2-108. Compressed Air Piping System-Engine Room (Sheet 2 of 4).

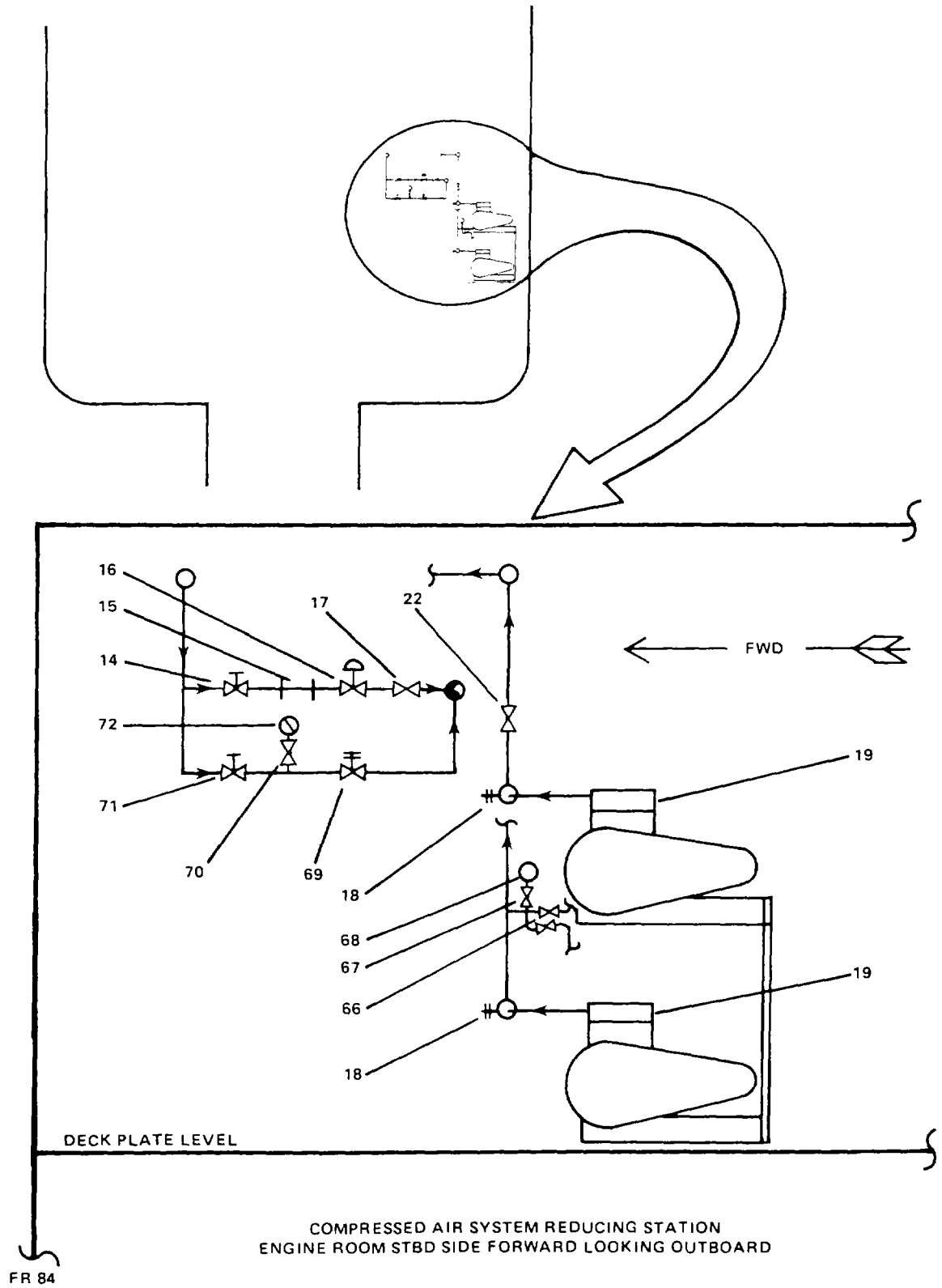


FIGURE 2-108. Compressed Air Piping System-Engine Room (Sheet 3 of 4).

LEGEND

1. RESERVE AIR OUTLET
2. #1 AND #2 AIR RECEIVER OUTLET VALVES
3. #2 AIR RECEIVER
4. #2 AIR RECEIVER PRESSURE RELIEF VALVE SET AT 275 PSI
5. PRESSURE GAUGE CUTOUT VALVE
6. #1 AIR RECEIVER PRESSURE GAUGE 0 TO 300 PSI
7. MAIN ENG STARTING AIR STATION OUTLET VALVE
8. MAIN ENGINE STARTING AIR STATION REDUCING AIR VALVE
9. MAIN ENGINE STARTING AIR STATION INLET VALVE
10. #1 AIR RECEIVER PRESSURE RELIEF VALVE SET AT 275 PSI
11. PRESSURE GAUGE CUTOUT VALVE
12. #1 AIR RECEIVER PRESSURE GAUGE (0 TO 300)
13. #1 AIR RECEIVER
14. COMPRESSED AIR REDUCING STATION INLET VALVE
15. COMPRESSED AIR REDUCING STATION "Y" TYPE STRAINER
16. COMPRESSED AIR REDUCING STATION REDUCING VALVE
17. COMPRESSED AIR REDUCING STATION OUTLET VALVE
18. AIR COMPRESSOR RELIEF VALVE SET AT 275 PSI
19. SHIP SERVICE AIR COMPRESSOR
20. SWING CHECK VALVE
21. SHIP SERVICE AIR COMPRESSOR DISCHARGE VALVE
22. #1 AND #2 AIR RECEIVER INLET VALVES
23. INLINE STOP VALVE
24. COMPRESSED AIR DISCHARGE PIPE TO MAIN DECK
25. FLEXIBLE COUPLING
26. MAIN ENGINE STARTING AIR RELAY VALVE
27. MAIN ENG STARTER LUBRICATOR
28. "Y" TYPE STRAINER
29. PORT MAIN ENGINE STARTING AIR CUTOUT VALVE
30. PORT S.S.D. GENERATOR
31. COMPRESSED AIR DISCHARGE PIPE TO CONTROL AIR STATION
32. STBD S.S.D. GENERATOR
33. FLEXIBLE COUPLING
34. STBD S.S.D. GENERATOR STARTING AIR CUTOUT VALVE
35. STBD MAIN ENGINE
36. FLEXIBLE COUPLING
37. STBD MAIN ENG STARTING AIR RELAY VALVE
38. STBD MAIN ENG STARTER LUBRICATOR
39. "Y" TYPE STRAINER
40. STBD MAIN ENG STARTING AIR CUTOUT VALVE
41. INLINE AIR STRAINER
42. INLINE STOP VALVE
43. LOW SEA CHEST VENT PIPE
44. HIGH SEA CHEST VENT PIPE
45. HIGH SEA CHEST VENT VALVE
46. HIGH SEA CHEST
47. HIGH SEA CHEST BLOW DOWN VALVE
48. INLINE STOP VALVE
49. LOW SEA CHEST VENT VALVE
50. LOW SEA CHEST BLOW DOWN VALVE
51. INLINE STOP VALVE
52. LOW SEA CHEST
53. COMPRESSED AIR DISCHARGE PIPE TO PILOT HOUSE
54. STBD MAIN ENG AND S.S.D. GENERATOR EXHAUST PIPE UPTAKE SPACE
55. UTILITY AIR OUTLET WITH QUICK DISCONNECT
56. COMPRESSED AIR DISCHARGE PIPE TO BRIDGE DECK
57. PORT MAIN ENG AND S.S.D. GENERATOR EXHAUST PIPE UPTAKE SPACE
58. PORT MAIN ENGINE
59. WORK BENCH
60. UTILITY AIR STATION WITH REDUCING VALVE AND GAUGE
61. #2 AIR RECEIVER DRAIN VALVE TO BILGES
62. #1 AIR RECEIVER DRAIN VALVE TO BILGES
63. MAIN ENG STARTING AIR STATION BYPASS VALVE
64. MAIN ENG STARTING AIR DISCHARGE PIPE
65. MAIN ENG STARTING AIR PRESSURE GAUGE 0 TO 300 PSI
66. COMPRESSED AIR DISCHARGE VALVES TO COMPRESSOR CONTROL RELAYS
67. PRESSURE GAUGE CUTOUT VALVES
68. COMPRESSOR DISCHARGE PRESSURE GAUGE 0 TO 300 PSI
69. COMPRESSED AIR REDUCING STATION RELIEF VALVE SET AT 165 PSI
70. PRESSURE GAUGE
71. COMPRESSED AIR REDUCING STATION HAND OPERATED BYPASS VALVE
72. COMPRESSED AIR REDUCING STATION PRESSURE GAUGE (0 TO 300 PSI)
73. INLINE STOP VALVE
74. SKEG SEA CHEST BLOWDOWN VALVE
75. SKEG SEA CHEST VENT VALVE

FIGURE 2-108. Compressed Air Piping System - Engine Room (Sheet 4 of 4).

(12) Open inline stop valve (42, Sheet 1 of 4).

(13) On motor control center, set air compressor #1 circuit breaker (60, FIGURE 2-103, Sheet 4 of 7) to ON position.

(14) Turn HAND-OFF-AUTO switch (62, Sheet 4 of 7) to AUTO position.

(15) Observe main engine starting air pressure gauge (65, FIGURE 2-108, Sheet 2 of 4). Starting air pressure should read 250 psi.

(16) Observe reducing station (FIGURE 2-108) air receiver gauges (6 and 12, Sheet 2 of 4). Air receivers are fully charged at 250 psi.

b. Control Air Activation.

(1) Observe compressed air reducing station (FIGURE 2-108) pressure gauge (72, Sheet 3 of 4). Reduced pressure should read 150 psi.

(2) Open control air inlet valves (3 and 4, FIGURE 2-109).

(3) Open air drier inlet valve (1).

(4) Observe air reducer gauges (2 and 5) for 150 psi.

2-5.4. Life Support System.

2-5.4.1. Ventilation.

a. Set engine room exhaust fan port circuit breaker (3, FIGURE 2-103, Sheet 1 of 7) on Motor Control Center to the ON position.

b. Press engine room exhaust fan port START pushbutton (18, Sheet 1 of 7).

c. Set engine room exhaust fan starboard circuit breaker (4) to the ON position.

d. Press engine room exhaust fan starboard START pushbutton (14).

e. Set engine room supply fan port circuit breaker (6) to the ON position.

f. Set engine room supply fan port to SLOW or FAST position (9).

g. Set engine room supply fan starboard circuit breaker (31, Sheet 2 of 7) to the ON position.

h. Set engine room supply fan starboard STOP, SLOW, FAST switch (34, Sheet 2 of 7).

2-5.4.1.1. Chilled Water System.

a. Set all thermostats to desired temperature setting.

b. Align Air Conditioning salt water circulating piping (FIGURE 2-110) as follows:

(1) Open low sea chest cutout valve (15).

(2) Open salt water circulating pump suction valve (10).

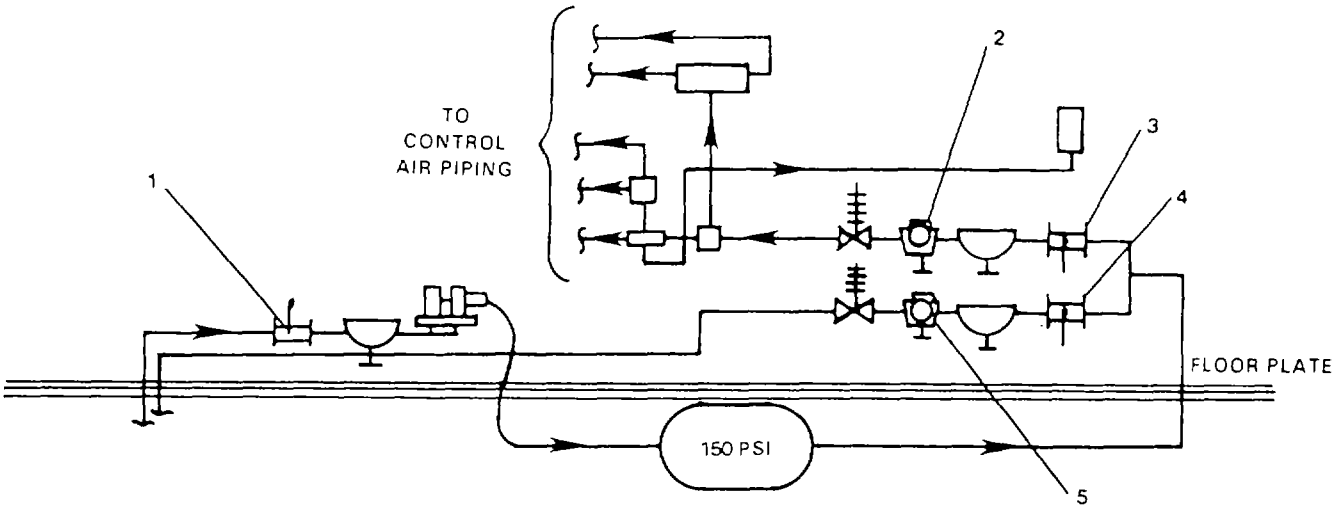
(3) Open pressure gauge cutout valve (4).

(4) Open salt water circulating pump discharge valve (5).

(5) Open refrigerant condenser sea water inlet valve (18, FIGURE 2-111).

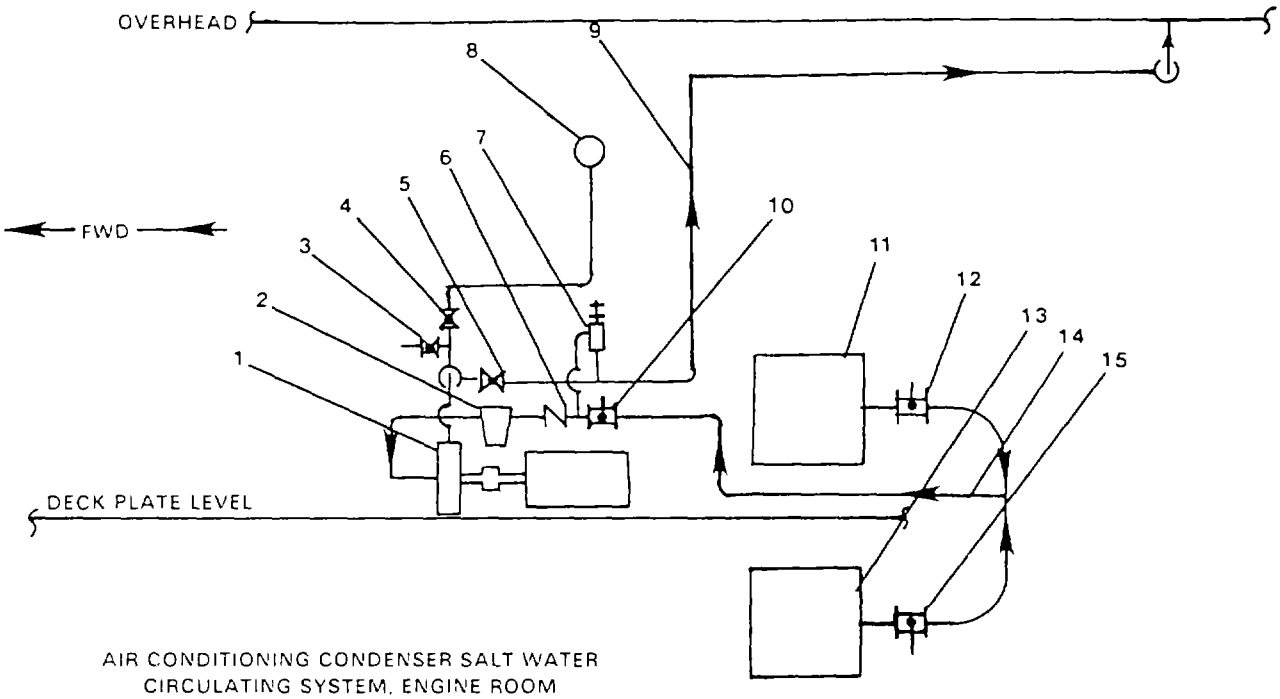
(6) Open refrigerant condenser sea water overboard discharge valve (20).

(7) Set AIR CONDITIONING COOLING WATER PUMP NO. 1 circuit breaker (107, FIGURE 2-103, Sheet 6 of 7) to ON position on Engine Room Motor Control Center.



LEGEND
1. AIR DRYER INLET VALVE
2. AIR REDUCER GAUGE
3. CONTROL AIR INLET VALVE
4. CONTROL AIR INLET VALVE
5. AIR REDUCER GAUGE

FIGURE 2-109. Control Air Piping System.

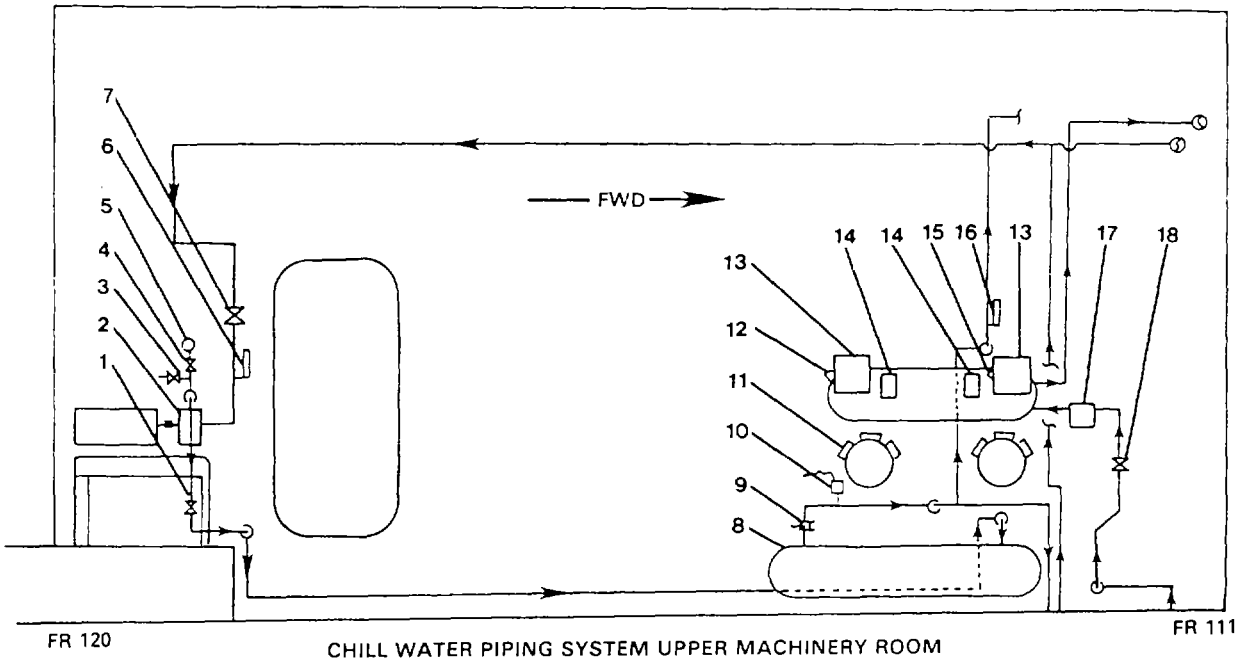


AIR CONDITIONING CONDENSER SALT WATER CIRCULATING SYSTEM, ENGINE ROOM STBD SIDE LATERAL VIEW LOOKING OUTBOARD

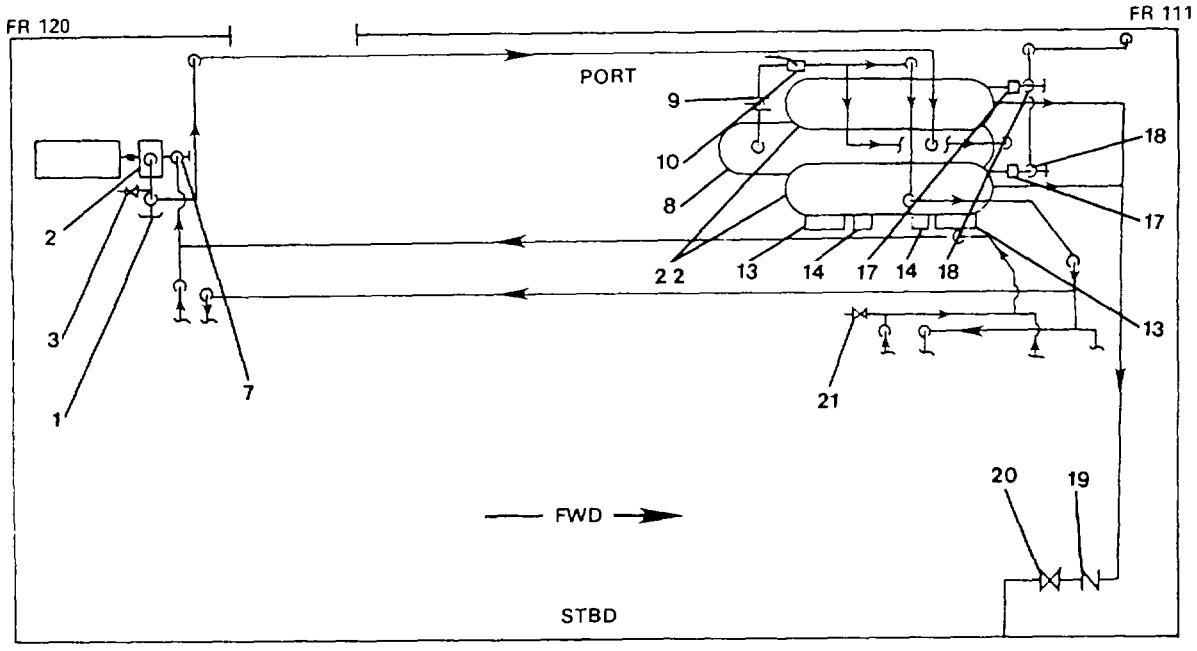
LEGEND

1. CONDENSER SALT WATER CIRCULATING PUMP AND MOTOR
2. SUCTION STRAINER
3. PUMP VENT VALVE
4. PRESSURE GAUGE CUTOUT VALVE
5. SALT WATER CIRCULATING PUMP DISCHARGE VALVE
6. SWING CHECK VALVE
7. PRESSURE RELIEF VALVE
8. DISCHARGE PRESSURE GAUGE 0-200 PSI
9. SALT WATER CIRCULATING PUMP DISCHARGE PIPE TO UPPER MACHINERY ROOM
10. SALT WATER CIRCULATING PUMP SUCTION VALVE
11. HIGH SEA CHEST
12. HIGH SEA CHEST CUTOUT VALVE
13. LOW SEA CHEST
14. SALT WATER CIRCULATING PUMP SUCTION PIPE
15. LOW SEA CHEST CUTOUT VALVE

FIGURE 2-110. Condenser Salt Water Circulating Piping System.

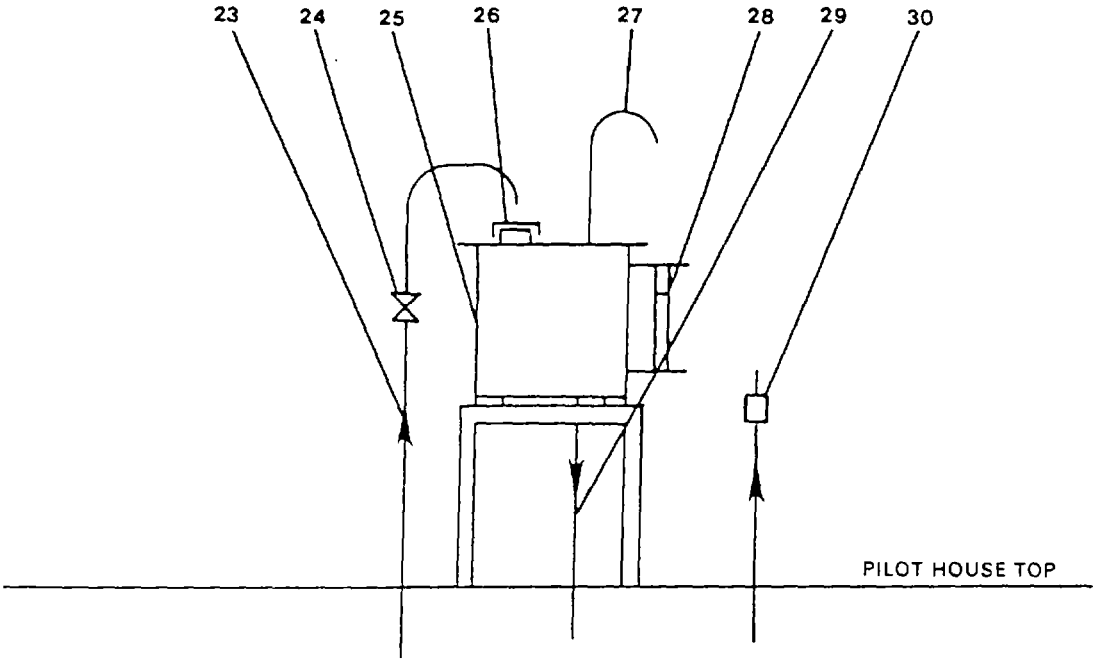


CHILL WATER PIPING SYSTEM UPPER MACHINERY ROOM
LATERAL VIEW LOOKING FROM STBD TO INBOARD



CHILL WATER SYSTEM UPPER MACHINERY ROOM
PLAN VIEW LOOKING DOWN

FIGURE 2-111. Chilled Water Piping System (Sheet 1 of 2)



CHILL WATER EXPANSION TANK
LOCATED ON TOP OF PILOT HOUSE

LEGEND

1. CHILL WATER CIRCULATING PUMP DISCHARGE VALVE
2. CHILL WATER CIRCULATING PUMP AND MOTOR
3. PUMP VENT VALVE
4. PRESSURE GAUGE CUTOUT VALVE
5. PRESSURE GAUGE (0-100 PSI)
6. THERMOMETER -40° TO + 100°F
7. CHILL WATER CIRCULATING PUMP SUCTION VALVE
8. CHILLER BARREL
9. CHILL WATER DISCHARGE VALVE FROM CHILLER BARREL
10. WATER FLOW SWITCH
11. #2 REFRIGERANT COMPRESSOR
12. #2 REFRIGERANT COMPRESSOR OFF/ON SWITCH
13. REFRIGERANT COMPRESSOR CONTROL PANELS
14. CHILL WATER TEMPERATURE CONTROL THERMOSTAT
15. #1 REFRIGERANT COMPRESSOR OFF/ON SWITCH
16. THERMOMETER (-20° TO + 150°F)
17. WATER REGULATING VALVE
18. REFRIGERANT CONDENSER SEA WATER INLET VALVE
19. SWING CHECK VALVE
20. REFRIGERANT CONDENSER SEA WATER OVERBOARD DISCHARGE VALVE
21. CHILL WATER PIPING SYSTEM TEST CONNECTION
22. REFRIGERANT CONDENSERS
23. EXPANSION TANK FILL PIPE FROM POTABLE WATER SYSTEM
24. EXPANSION TANK FILL VALVE
25. CHILL WATER EXPANSION TANK
26. EXPANSION TANK FILL PORT
27. EXPANSION TANK VENT PIPE
28. EXPANSION TANK SIGHT GLASS LEVEL INDICATOR
29. CHILL WATER EXPANSION TANK DISCHARGE PIPE TO CHILL WATER PIPING SYSTEM
30. CHILL WATER PIPING SYSTEM VENT VALVE

FIGURE 2-111. Chilled Water Piping System (Sheet 2 of 2).

(8) Press AIR CONDITIONING COOLING WATER PUMP NO. 1 start button (114).

(9) Observe discharge pressure gauge (8, FIGURE 2-110).

NOTE

If no pressure is indicated within 30 seconds, press stop button (113, FIGURE 2-103, Sheet 6 of 7). Refer chilled water system to unit maintenance.

c. Align chill water piping system (FIGURE 2-111) as follows:

(1) Open chill water circulating pump suction valve (7).

(2) Open pressure gauge cutout valve (4).

(3) Open chill water circulating pump discharge valve (1).

(4) Open chill water discharge valve (9) from chiller barrel.

(5) Set circuit breaker (9, FIGURE 2-101, Sheet 16 of 21) on P2 panel to the ON position.

(6) Set chill water circulating pump OFF/ON switch (2, FIGURE 2-111, Sheet 1 of 2) to ON position.

(7) Observe pressure gauge (5, Sheet 1 of 2).

NOTE

If no pressure is indicated within 30 seconds, press OFF/ON switch (2, FIGURE 2-112, Sheet 1 of 2) to OFF position. Refer chill water circulating pump to unit maintenance.

2-5.4.1.2. Heating/Air Conditioning Officer Staterooms.

a. Select heat or cool mode (11, FIGURE 2-112, Sheet 1 of 2), as necessary.

b. Turn thermostat (12) to desired temperature.

c. Turn fan selector (10) to high, medium, or low speed.

2-5.4.1.3. Heating/Air Conditioning Enlisted Staterooms and Pilothouse.

a. Select heat or cool mode (9, FIGURE 2-112, Sheet 1 of 2), as necessary.

b. Turn thermostat (8) to desired temperature.

c. Turn fan selector (7) to high, medium, or low speed.

2-5.4.1.4. Air Conditioning Control Room.

a. Turn thermostat (14, FIGURE 2-112, Sheet 2 of 2) to desired temperature.

b. Turn fan selector (13) to high, medium, or low speed.

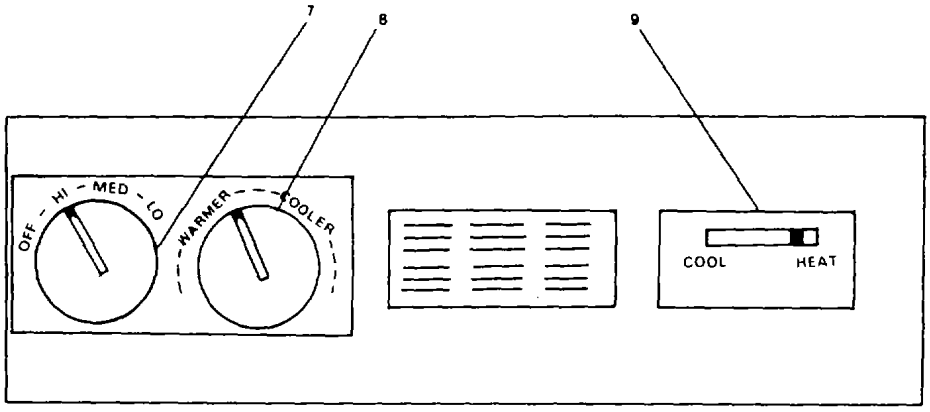
2-5.4.1.5. Heater Operation.

a. Turn thermostat (15, FIGURE 2-112, Sheet 2 of 2), to desired temperature.

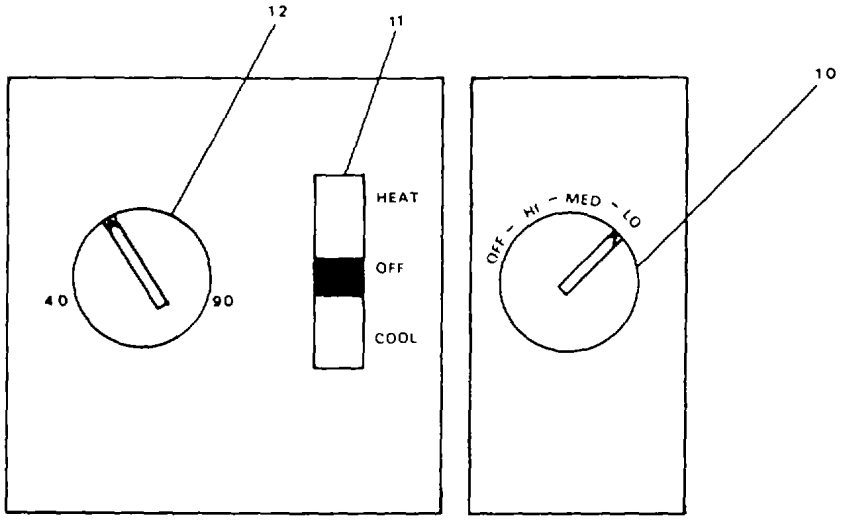
b. Turn ON-OFF switch (16) to ON.

2-5.4.2. Potable Water System. (FIGURES 2-113 and 2-114)

a. Close all valves in potable water piping system.



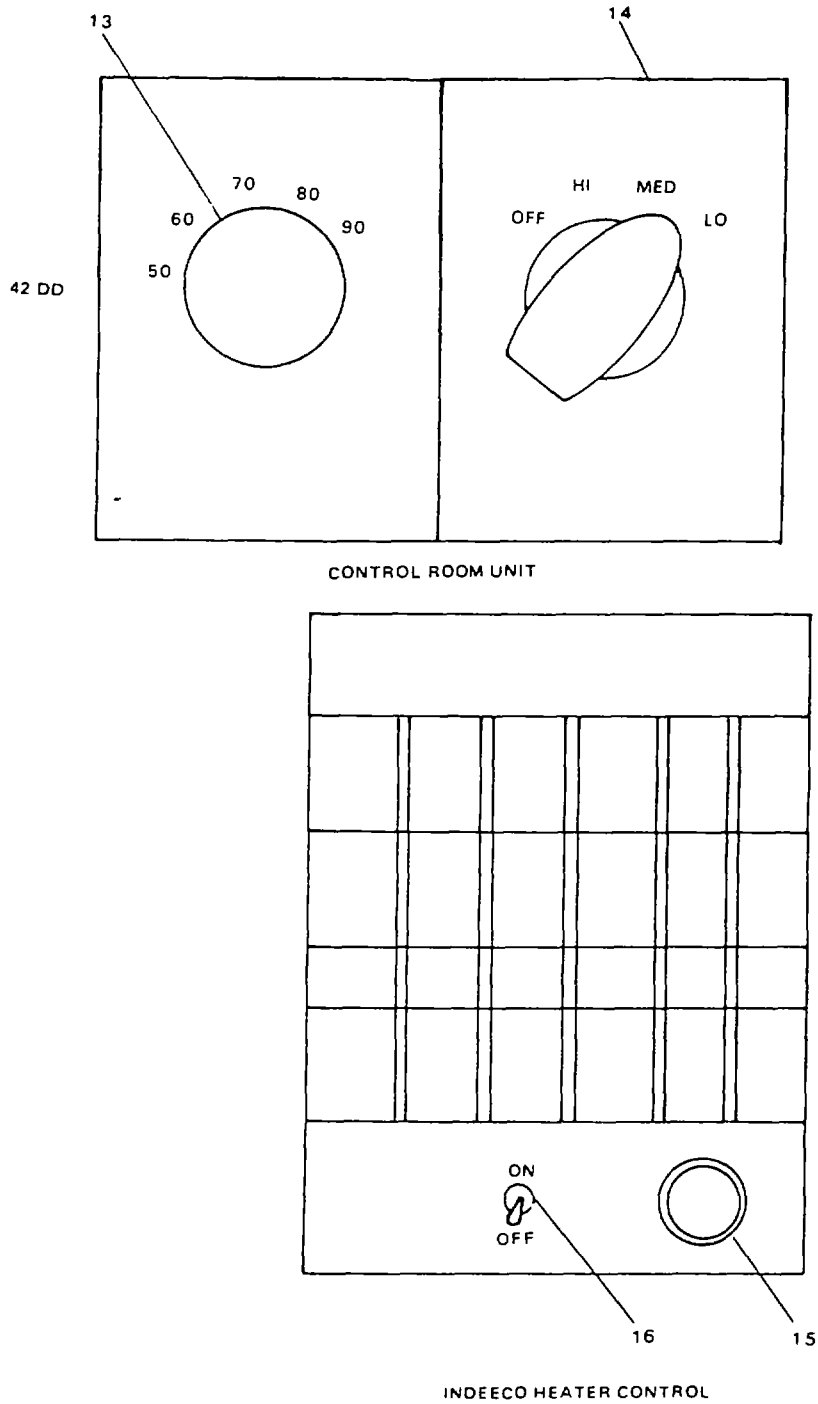
CARRIER 42 VF FAN COIL UNIT CONTROLS
ENLISTED STATEROOM



CARRIER 42 CG FAN COIL UNIT CONTROLS
OFFICER STATEROOM

LEGEND
7. OFF-HI-MED-LO SWITCH
8. THERMOSTAT
9. AIR SELECTOR
10. OFF-HI-MED-LO SWITCH
11. AIR SELECTOR
12. THERMOSTAT

FIGURE 2-112. Heating Air Conditioning Ventilation System (Sheet 1 of 2) .



LEGEND
13. OFF-HI-MED-LO SWITCH
14. THERMOSTAT
15. THERMOSTAT
16. ON-OFF SWITCH

FIGURE 2-112. Heating Air Conditioning Ventilation System (Sheet 2 of 2).

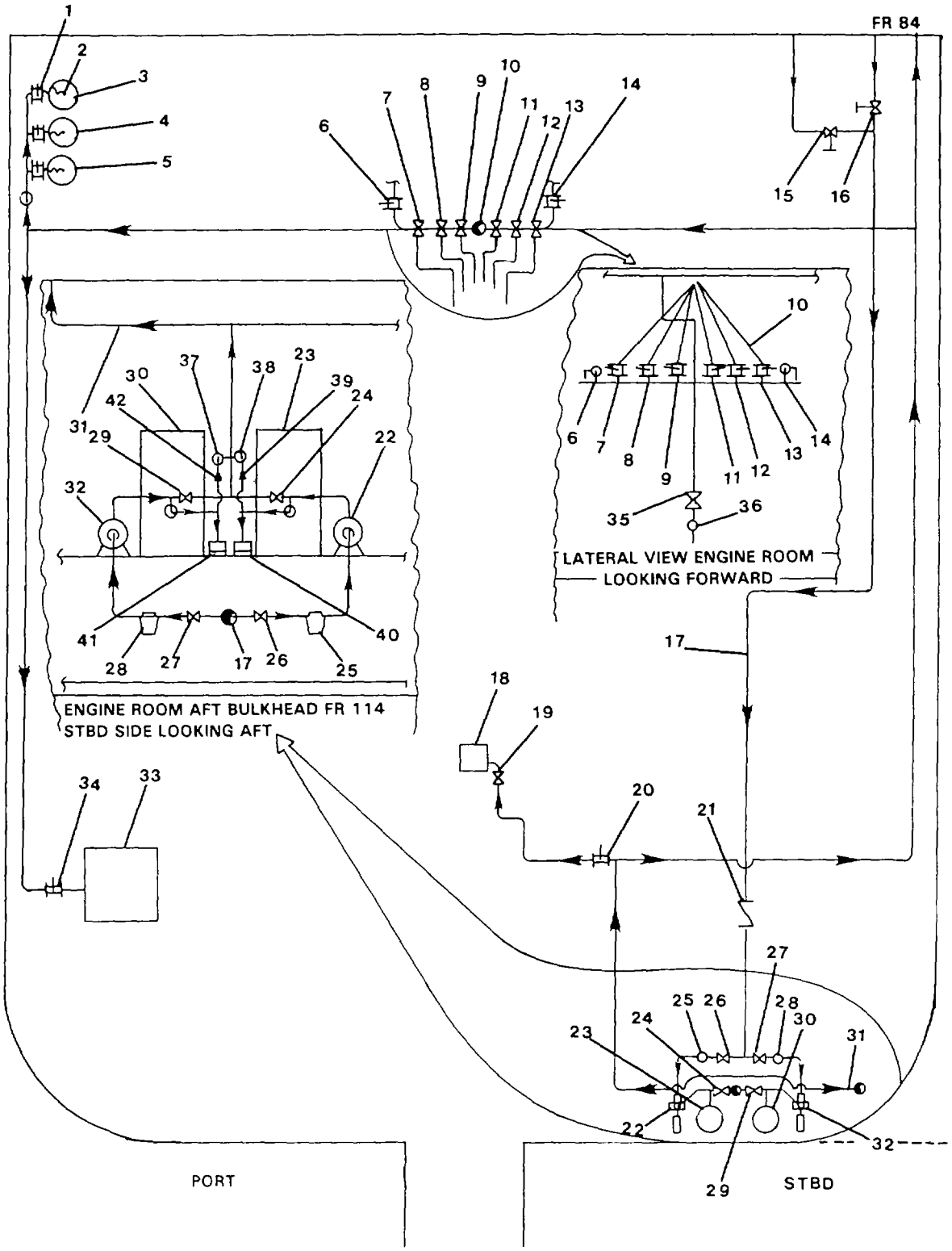
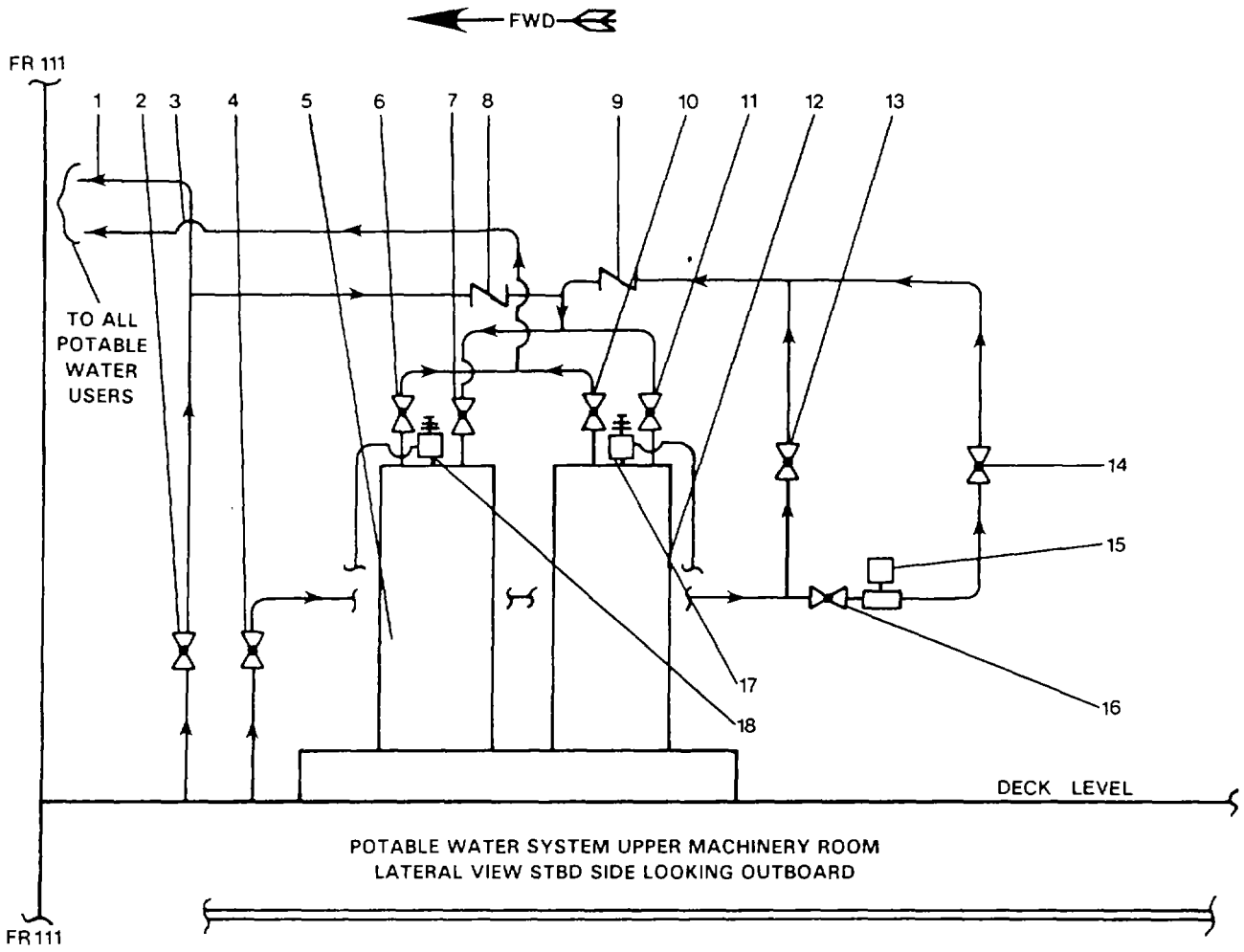


FIGURE 2-113. Potable Water System (Sheet 1 of 2).

LEGEND

1. POTABLE WATER DISCHARGE VALVE TO LUBE OIL AND FUEL OIL PURIFIERS (TYP)
2. FLEXIBLE COUPLING FROM POTABLE WATER DISCHARGE VALVE TO LUBE OIL AND FUEL OIL PURIFIER'S (TYP)
3. #1 FUEL OIL PURIFIER
4. #2 FUEL OIL PURIFIER
5. LUBE OIL PURIFIER
6. POTABLE WATER DISCHARGE VALVE TO BILGE PUMP PRIMING LINE
7. POTABLE WATER DISCHARGE VALVE TO PORT REDUCTION GEAR EXPANSION TANK
8. POTABLE WATER DISCHARGE VALVE TO PORT MAIN ENGINE EXPANSION TANK
9. POTABLE WATER DISCHARGE VALVE TO PORT S.S.D. GENERATOR EXPANSION TANK
10. ENGINE COOLING WATER FILL MANIFOLD
11. POTABLE WATER DISCHARGE VALVE TO STBD S.S.D. GENERATOR EXPANSION TANK
12. POTABLE WATER DISCHARGE VALVE TO STBD MAIN ENGINE EXPANSION TANK
13. POTABLE WATER DISCHARGE VALVE TO STBD REDUCTION GEAR EXPANSION TANK
14. POTABLE WATER DISCHARGE VALVE TO BALLAST PUMP PRIMING PUMP
15. SUCTION VALVE FROM PORT POTABLE WATER TANK
16. SUCTION VALVE FROM STBD POTABLE WATER TANK
17. POTABLE WATER SUCTION PIPE
18. OILY WATER SEPARATOR
19. POTABLE WATER DISCHARGE VALVE TO OILY WATER SEPARATOR BACK FLUSH SYSTEM
20. INLINE STOP VALVE
21. SWING CHECK VALVE
22. #2 POTABLE WATER PUMP
23. #2 POTABLE WATER PRESSURE TANK
24. #2 POTABLE WATER PUMP DISCHARGE VALVE
25. #2 POTABLE WATER PUMP SUCTION STRAINER
26. #2 POTABLE WATER PUMP SUCTION VALVE
27. #1 POTABLE WATER PUMP SUCTION VALVE
28. #1 POTABLE WATER PUMP SUCTION STRAINER
29. #1 POTABLE WATER PUMP DISCHARGE VALVE
30. #1 POTABLE WATER PRESSURE TANK
31. POTABLE WATER DISCHARGE PIPE TO UPPER MACHINERY ROOM
32. #1 POTABLE WATER PUMP
33. MARINE SANITATION DEVICE HOLDING TANK
34. POTABLE WATER FLUSHING VALVE TO MARINE SANITATION DEVICE HOLDING TANK
35. POTABLE WATER FAUCET DISCHARGE VALVE
36. POTABLE WATER FAUCET
37. #1 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE (0 TO)
38. #2 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE (0 TO)
39. #2 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE LINE
40. #2 POTABLE WATER PUMP PRESSURE STAT
41. #1 POTABLE WATER PUMP PRESSURE STAT
42. #1 POTABLE WATER PUMP DISCHARGE PRESSURE GAUGE LINE

FIGURE 2-113. Potable Water System (Sheet 2 of 2).



LEGEND

1. POTABLE WATER DISCHARGE PIPE
2. POTABLE WATER DISCHARGE VALVE FROM ENGINE ROOM
3. HOT WATER DISCHARGE PIPE
4. HOT WATER RETURN VALVE FROM ENGINE ROOM
5. # 1 WATER HEATER
6. # 1 WATER HEATER DISCHARGE VALVE
7. # 1 WATER HEATER INLET VALVE
8. SWING CHECK VALVE
9. SWING CHECK VALVE
10. # 2 WATER HEATER DISCHARGE VALVE
11. # 2 WATER HEATER INLET VALVE
12. # 2 WATER HEATER
13. HOT WATER CIRCULATING PUMP BYPASS VALVE
14. HOT WATER CIRCULATING PUMP DISCHARGE VALVE
15. HOT WATER CIRCULATING PUMP
16. HOT WATER CIRCULATING PUMP SUCTION VALVE
17. # 2 WATER HEATER PRESSURE RELIEF VALVE SET AT 125 PSI
18. # 1 WATER HEATER PRESSURE RELIEF VALVE SET AT 125 PSI

FIGURE 2-114. Potable Water Piping System - Upper Machinery Room.

b. Open port potable water tank suction valves (15, FIGURE 2-113, Sheet 1 of 2).

c. Open STBD potable water tank suction valves (16).

d. Open #1 potable water pressure pump suction valve (27).

e. Open #1 potable water pressure pump discharge valve (29).

f. Open potable water discharge valve from engine room (2, FIGURE 2114).

g. Set FRESH WATER PRESS SET #1 STBD circuit breaker (80, FIGURE 2-103, Sheet 5 of 7) to ON position.

h. Set HAND/OFF/AUTO (92, Sheet 5 of 7) to the AUTO position.

i. Observe discharge pressure gauge (37, FIGURE 2-113, Sheet 1 of 2).

NOTE

If no pressure is indicated within 30 seconds, set HAND/OFF/AUTO (92, FIGURE 2-103, Sheet 5 of 7) to OFF and refer to unit maintenance.

j. Open hot water return valve from engine room (4, FIGURE 2-114).

k. Open hot water circulating pump suction valve (16).

l. Open hot water circulating pump discharge valve (14).

m. Open water heater inlet valves (7) and (11).

n. Open water heater discharge valves (6) and (10).

o. Set circuit breaker (5) and (6) to ON position on P2 panel (FIGURE 2-101, Sheet 16 of 21).

p. Turn hot water circulating pump switch (FIGURE 2-96) to ON position.

2-5.4.3. Marine Sanitation Device.

2-5.4.3.1. Marine Sanitation Device Startup. (FIGURE 2-115)

NOTE

Steps must be taken to prevent untreated sewage from being discharged overboard or from entering the marine sanitation device when startup operation or maintenance is in progress.

a. Close drain valves (21), (23) and (42).

b. Close sewage inlet valve (10).

c. Close overboard sump pump discharge valve (19).

d. Close discharge valve (2), bypass valves (6) and (26), and inlet valve (25).

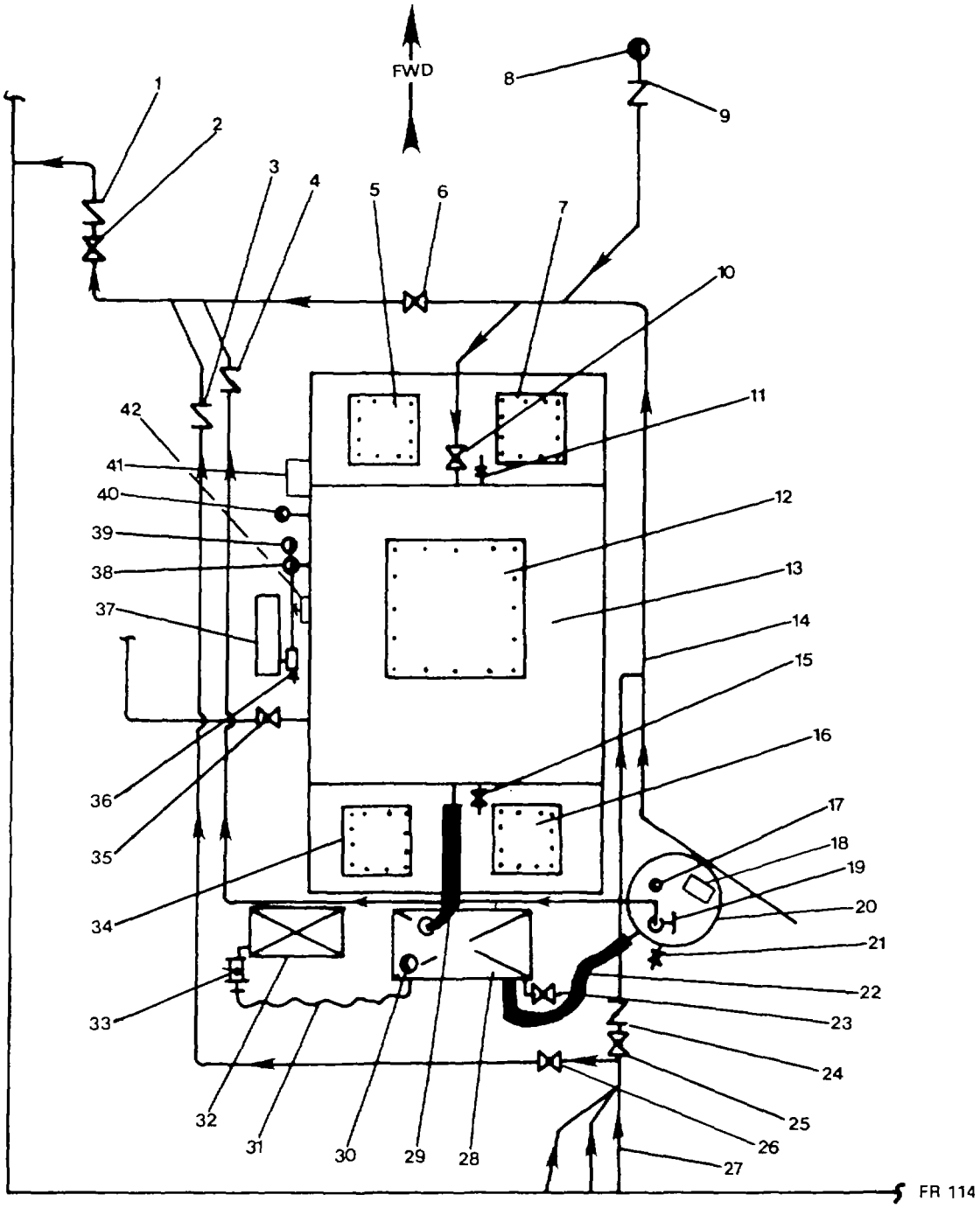
e. Open fresh water inlet valve (35).

f. Open vent valves (11) and (15) until water seeps out and trapped air is released.

g. Close vent valves (11) and (15).

h. Close fresh water inlet valve (35) when water begins to overflow into chlorine contact tank (28).

i. Fill chlorine holding tank (32) with a bleach solution mixture .05 mg per liter.



MARINE SANITATION DEVICE
ENGINE ROOM PORT SIDE AFT
PLAN VIEW LOOKING DOWN

FIGURE 2-115. Marine Sanitation Piping (Sheet 1 of 2).

LEGEND

1. SWING CHECK VALVE
2. MARINE SANITATION DEVICE OVERBOARD DISCHARGE VALVE
3. SWING CHECK VALVE
4. SWING CHECK VALVE
5. REMOVABLE INSPECTION COVER
6. MARINE SANITATION DEVICE SEWAGE BYPASS VALVE
7. REMOVABLE INSPECTION COVER
8. SEWAGE INLET PIPE
9. SWING CHECK VALVE
10. MARINE SANITATION DEVICE SEWAGE INLET VALVE
11. VENT VALVE
12. REMOVABLE INSPECTION COVER
13. MARINE SANITATION DEVICE
14. SEWAGE INLET PIPE
15. VENT VALVE
16. REMOVABLE INSPECTION COVER
17. MARINE SANITATION DEVICE OVERBOARD SUMP PUMP VENT
18. MARINE SANITATION DEVICE SUMP PUMP POWER CONTROL PANEL
19. MARINE SANITATION DEVICE OVERBOARD SUMP PUMP DISCHARGE VALVE
20. MARINE SANITATION DEVICE SUMP PUMP/HOLDING TANK
21. OVERBOARD SUMP PUMP HOLDING TANK DRAIN VALVE
22. CHLORINE CONTACT TANK DISCHARGE HOSE TO SUMP PUMP HOLDING TANK
23. CHLORINE CONTACT TANK DRAIN VALVE
24. SWING CHECK VALVE
25. LAUNDRY AND GALLEY DRAIN INLET VALVE
26. LAUNDRY AND GALLEY DRAIN BYPASS VALVE
27. LAUNDRY AND GALLEY DRAIN PIPES
28. CHLORINE CONTACT TANK
29. MARINE SANITATION DEVICE DISCHARGE HOSE TO CHLORINE CONTACT TANK
30. CHLORINE CONTACT TANK VENT PIPE
31. CHLORINE FEED HOSE TO CHLORINE CONTACT TANK
32. CHLORINE HOLDING TANK
33. CHLORINE DISCHARGE CONTROL VALVE
34. REMOVABLE INSPECTION COVER
35. FRESHWATER FILL AND FLUSHING INLET VALVE
36. AGITATION AIR INLET RELIEF VALVE
37. AGITATION AIR BLOWER
38. AGITATION AIR INLET VALVE
39. AGITATION AIR PRESSURE GAUGE 0-30 PSI
40. MARINE SANITATION DEVICE VENT PIPE
41. BLOWER MOTOR CONTROL PANEL
42. DRAIN VALVE

FIGURE 2-115. Marine Sanitation Piping (Sheet 2 of 2).

j. Open gravity feed chlorine discharge control valve (33).

k. Open agitation air inlet valve (38).

l. Press START button on blower motor control panel (41) to start agitation air blower motor (37).

m. Observe agitation air pressure gauge (39). Adjust air inlet relief valve (36) until gauge reads 5 psi.

n. Close sewage bypass valve (6) and laundry and galley drain inlet valve (25).

o. Open sewage inlet valve (10) and laundry and galley drain bypass valve (26).

p. Open overboard discharge valve (2).

q. Open overboard sump pump discharge valve (19).

r. On marine sanitation device sump pump control panel (18), set selector switch to AUTO.

s. Set power switch to ON at the sump pump power control panel (18).

t. Check chlorine feed hose (31) to chlorine contact tank (28), and chlorine discharge control valve (33) for flow of chlorine.

2-5.4.3.2. Marine Sanitation Device Shutdown. (FIGURE 2-115)

NOTE

Steps must be taken to prevent untreated sewage from being discharged overboard within 3 miles from shore or from entering the marine sanitation device when shutdown operation or maintenance is in progress.

a. Close sewage inlet valve (10).

b. Open sewage bypass valve (6).

c. Press STOP button on blower motor control panel (41) to turn off power to agitation air blower (37).

d. Close agitation air inlet valve (38).

e. Set overboard sump pump (18), selector switch to OFF.

f. Set power switch to OFF at the sump pump power control panel (18).

g. Close overboard sump pump discharge valve (19).

h. Close chlorine discharge control valve (33).

2-5.4.4. Ship Stores Refrigeration.

2-5.4.4.1. Pre-Operation. (FIGURE 2-116).

a. Check unit cooler fans (11, Sheet 3 of 4) in chill and freeze rooms, for free rotation.

b. Check oil level in crankcase sight glasses (4).

NOTE

Level should be at center of glass or slightly above center. If level is low, refer to unit maintenance.

c. Open all in line valves (6, Sheet 2 of 4) behind condensers.

d. Check freeze room and chill room thermostats (12, Sheet 3 of 4) located below unit coolers (11) for binding operation or damage. If binding or damaged, refer to unit maintenance.

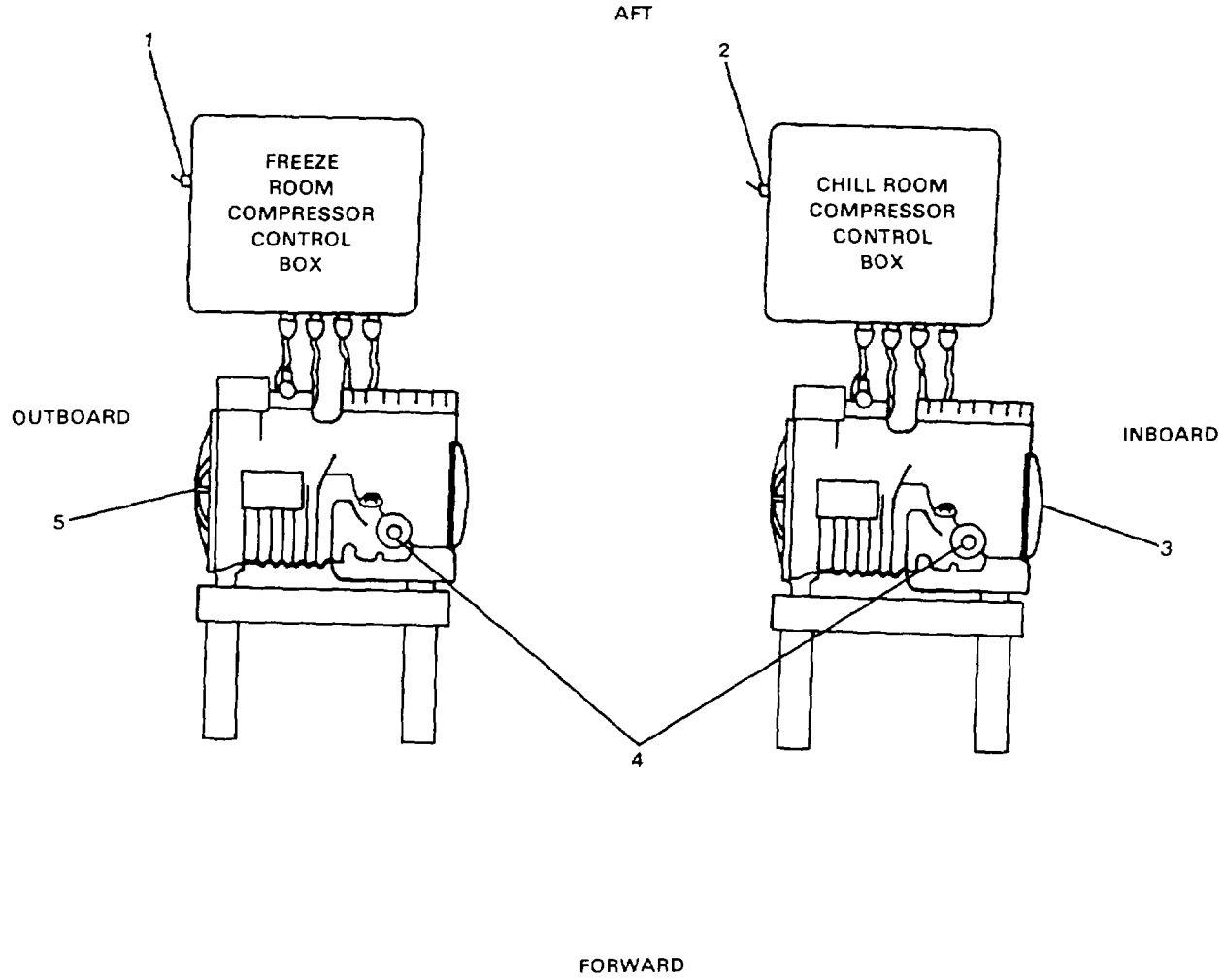


FIGURE 2-116. Ship's Store Refrigeration (Sheet 1 of 4).

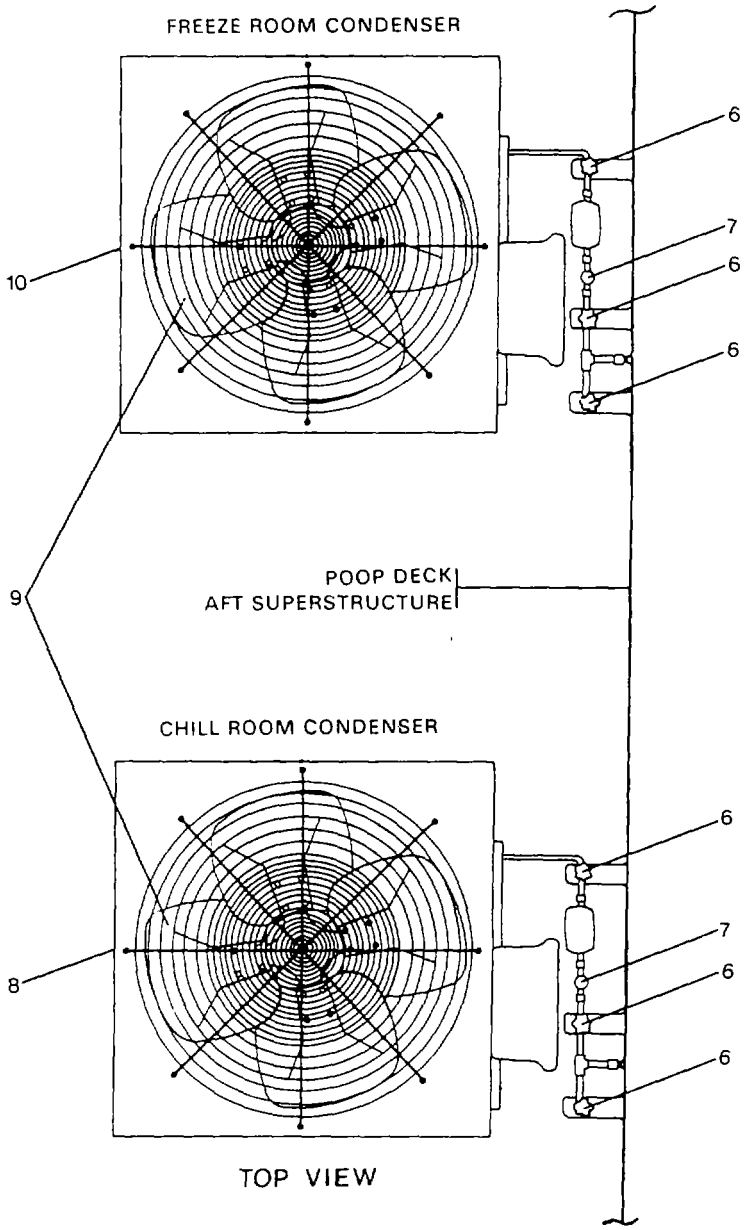


FIGURE 2-116. Ship's Store Refrigeration (Sheet 2 of 4).

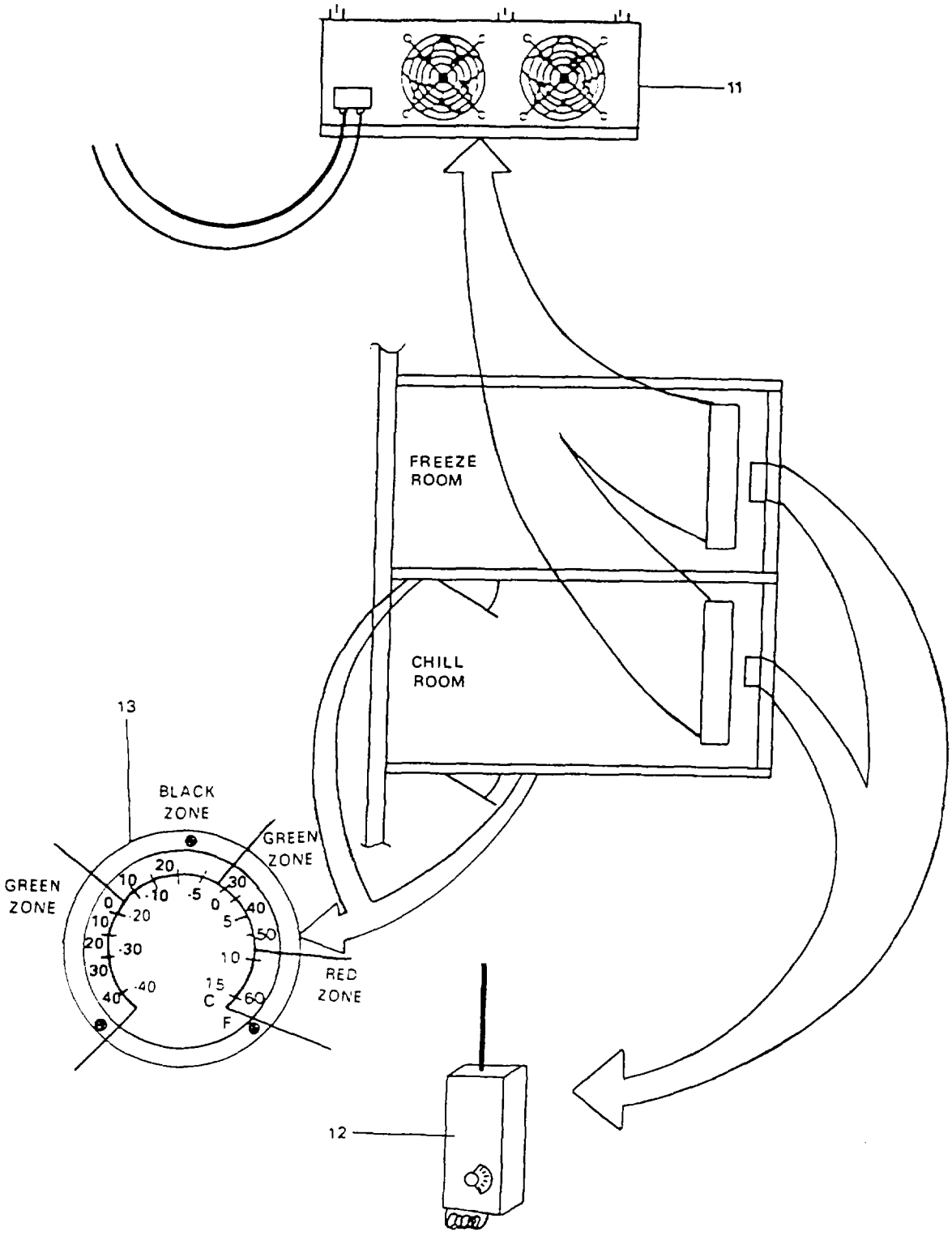
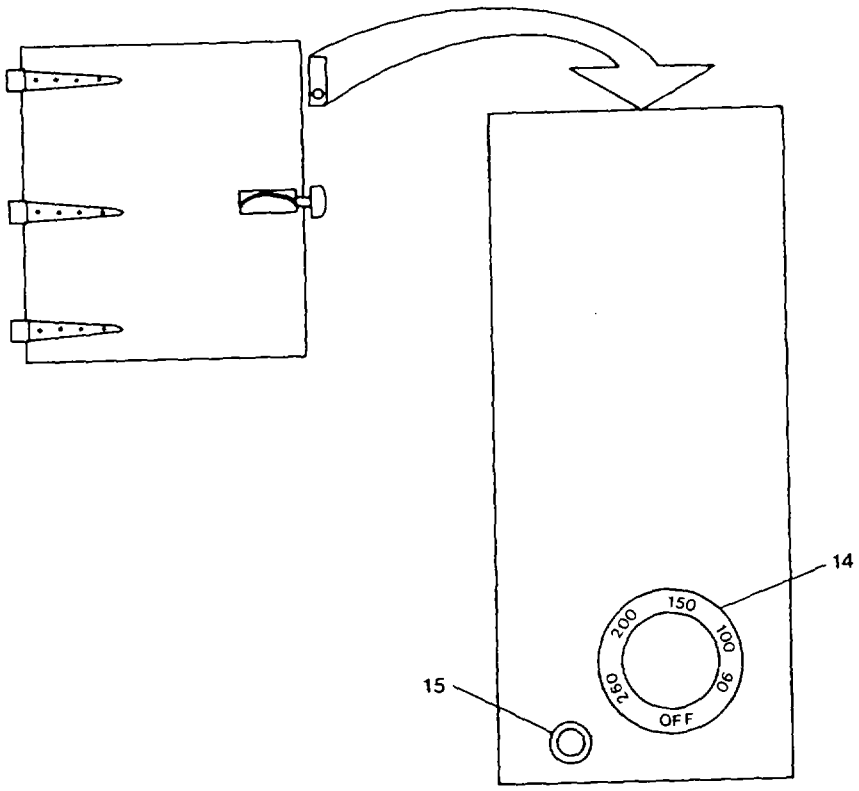


FIGURE 2-116. Ship's Store Refrigeration (Sheet 3 of 4).



LEGEND

1. POWER SWITCH
2. POWER SWITCH
3. COMPRESSOR
4. CRANKCASE OIL SIGHT GLASSES
5. COMPRESSOR
6. IN-LINE VALVE CONTROLS
7. LIQUID REFRIGERANT SIGHT GLASSES
8. CONDENSER UNIT – CHILL ROOM
9. CONDENSER FAN BLADES
10. CONDENSER UNIT – FREEZE ROOM
11. UNIT COOLERS
12. THERMOSTATS
13. THERMOMETERS
14. THERMOSTAT
15. INDICATOR LIGHT

FIGURE 2-116. Ship's Store Refrigeration (Sheet 4 of 4).

2-5.4.4.2. Operation. (FIGURE 2-116)

a. Turn freeze room thermostat (12, Sheet 4 of 4) to -100F setting.

b. Turn chill room thermostat (12) to 36-380F setting.

NOTE

Outboard compressor and control box above it is for freeze room, and inboard compressor and control box is for chill room.

c. Set circuit breaker (3, FIGURE 2-101, Sheet 16 of 21) on power panel P2 in upper machinery room to ON (up) (freeze room) and circuit breaker 4 to ON (chill room).

d. Set power switches located on upper left side of compressor control boxes (1 and 2, FIGURE 2-116, Sheet 1 of 4) to ON (up).

CAUTION

After refrigeration unit startup, if grinding noises are heard from compressors or motors or leaks observed in piping, shut power off on control boxes (1 and 2) by setting power switches to off (down) immediately. Refer to unit maintenance.

e. Turn door seal heater control (14, FIGURE 2-116, Sheet 4 of 4) to 1400F.

f. Check liquid refrigerant sight glasses (4, FIGURE 2-116, Sheet 1 of 4) located behind condensers (3 and 5). If bubbles appear, refrigerant is low. Refer to unit maintenance.

g. Monitor system temperatures on the monitor thermometers (13, Sheet 3 of 4) located outside the chill room on the right side of door and the inside chill room on the left side of freeze room door.

h. Check that system cycles at proper temperature settings by monitoring unit cooler fans when cycling on and checking thermometer settings at unit cooler fan when turning off.

2-5.4.4.3. Operation After First 24 Hours. (FIGURE 2-116)

a. Check compressors (3 and 5, Sheet 1 of 4) for knocking, cavitation, and unusual noises.

b. Check thermometers outside chill room door and inside chill room on left side of freeze room door for proper temperature settings. Chill room, 36-38°F; freeze room, -10°F.

c. Check thermostats (12, FIGURE 2-116, Sheet 3 of 4) under each room unit cooler for proper setting.

d. Check each unit cooler coil behind cooler fan (11) for excessive ice buildup.

e. Observe unit cooler fans (11) to determine if each is operating freely.

f. Check drain pans in each unit cooler for excessive amount of water.

g. On poop deck aft, observe each condenser fan (9) for free rotation.

NOTE

If any problems or defects resulting from these checks are observed, refer to unit maintenance.

2-5.4.4.4. Shutdown. (FIGURE 2-116)

a. Check that thermostats (12, Sheet 3 of 4) in chill room and freeze room are set to proper temperature settings. Chill room, 36-38°F; freeze room, -10°F.

b. Set ON/OFF switches on upper left side of control boxes (1 and 2, FIGURE 2-116, Sheet 1 of 4) above each compressor to OFF (down).

c. Set circuit breakers No. 3 (freeze room) and No. 4 (chill room) to OFF on power panel P2 in upper machinery room (FIGURE 2-110).

d. Turn OFF door seal heater, (14, FIGURE 2-116, Sheet 4 of 4).

2-5.4.5. Gyrocompass.

NOTE

Compass starting procedure should begin at least 2 hours before the compass is to be used to allow proper settling. The compass should also have been stopped for a minimum of 1/2 hour before restarting.

a. Set the gyrocompass power converter switch No. 25 (Figure 2-117) on the Pilothouse Emergency Distribution Panel EP2 to the ON position.

b. Set the gyrocompass MK 37 transmitter switch No. 23 to the ON position.

c. Position RPTR switch (12, FIGURE 2-117) to OFF.

d. Position MODE selector switch (7) to slew.

NOTE

The compass will slew rapidly if the gyro is uncaged.

e. Note that CAGED lamp (15) is lit. If it is not, depress caging control (1) on top of binnacle to cage the gyro and wait 5 minutes for the ballistic fluid to stabilize.

NOTE

Wait 5 to 10 seconds between reversals of direction to permit the servoamplifier to stabilize.

f. Use the TILT/AZIMUTH switch (9) to rotate the compass card to the approximate ship's course.

NOTE

In the (+) position, the card rotates counterclockwise; in the (-) position, the card rotates clockwise.

g. Position MODE SELECTOR switch (7) to start. Wait 10 minutes before proceeding.

h. Depress caging control (1) on top of binnacle. Notice that caged lamp (15) extinguishes.

i. Position MODE SELECTOR switch (7) to MANUAL LEVEL.

j. Operate TILT/AZIMUTH switch (9) to level the gyro as indicated by the LEVEL METER (3) indicating zero.

k. Position the MODE SELECTOR switch (7) to RUN.

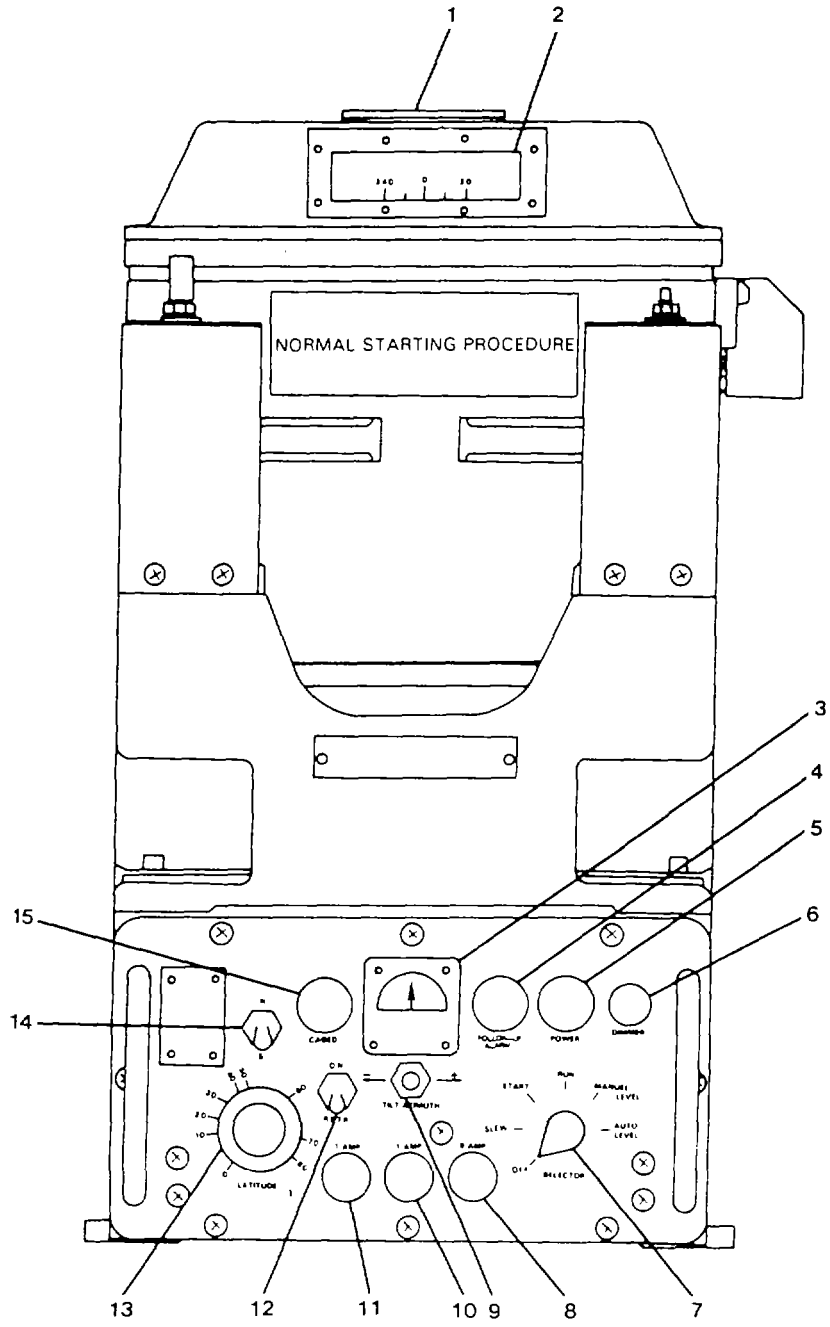
1. Position N-S switch (14) as required.

m. Position LATITUDE control (13) to ship's latitude.

n. On compass repeater (FIGURE 2-118), press synchronizer knob (4) to engage gear train.

o. Rotate the repeater card (5) to agree with master compass.

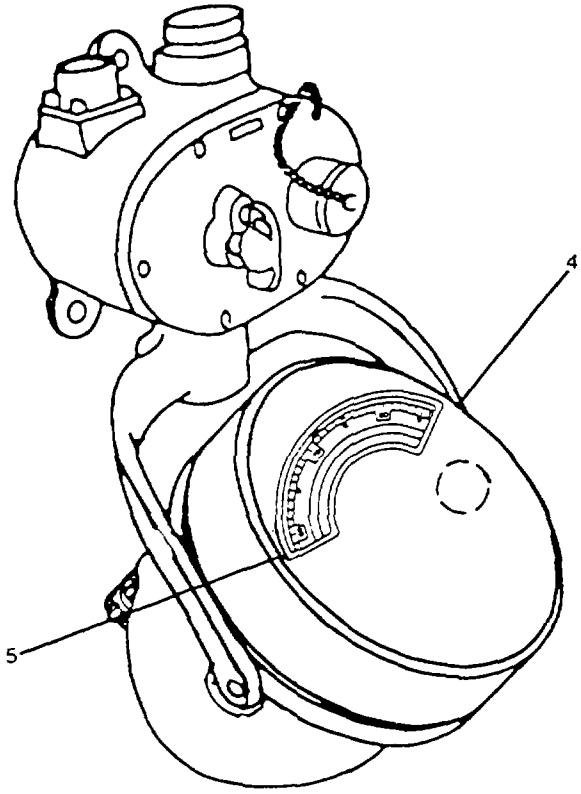
p. Release synchronizer knob (4).



LEGEND

1. CAGED BUTTON
2. VIEWING WINDOW
3. LEVEL METER
4. FOLLOW-UP ALARM LAMP
5. POWER LAMP
6. DIMMER CONTROL
7. MODE SELECTOR
8. 8 AMP DC FUSE
9. TILT/AZIMUTH
10. 1 AMP AC FUSE
11. 1 AMP RPTR FUSE
12. RPTR SWITCH
13. LATITUDE CONTROL
14. N-S SWITCH
15. CAGED LAMP

FIGURE 2-117. Gyrocompass MARK 27 MOD 1 Electronic Control Panel.



LEGEND
4. SYNCHRONIZER KNOB
5. REPEATER CARD

FIGURE 2-118. Open-Scale Compass Repeater.

NOTE

The synchronizing knob is not to be operated when the repeater motor is energized.

q. Position RPTR switch (12, FIGURE 2-117) to ON.

r. Adjust DIMMER control (6) as required.

2-5.4.6. MK 37 MOD E Transmission Unit and Power Transfer Units Operation.

WARNING

Ship's AC power is present at fuse F1 and POWER switch S1 terminals on the inside of the cabinet cover even when the unit is turned off. THESE VOLTAGES ARE DANGEROUS. Use extreme care when servicing or operating the unit with the front cover open. Personal injury could result.

a. On the MARK 37 MOD E Transmission Unit (FIGURE 2-119), with the ON-OFF POWER switch (3) in the OFF position (down), open the front cover of unit and set the repeater switches (4) A2S1 through A2S12 to the OFF (down) position. Close the front cover of unit.

b. Turn on and settle the gyrocompass.

c. Set ON-OFF POWER switch (3) to ON (up) position.

d. Synchronize each compass repeater individually to the present compass heading. Locations of compass repeaters are as follows:

(1) Top pilot house.

(2) Port and starboard bridge wings.

(3) Emergency steering room.

e. Set each associated repeater switch (4) on the Transmission Unit to ON when synchronized.

2-5.4.7. Turn Off Procedures.

a. Set ON/OFF POWER switch (3) on Transmission Unit to OFF (down) position.

NOTE

All repeater loads will require resynchronization when the unit is turned back on.

2-5.4.8. Gyropilot Settings. (FIGURE 2-120)

a. Set RATE MULT control (64, Sheet 2 of 2) to 1.0.

NOTE

Use 1.0 for light draft loading and up to 2.0 for full draft loading.

b. Set RUD LIMIT control (60) to 15 degree position.

NOTE

Fifteen degree position is usually sufficient for keeping heading and normal heading changes.

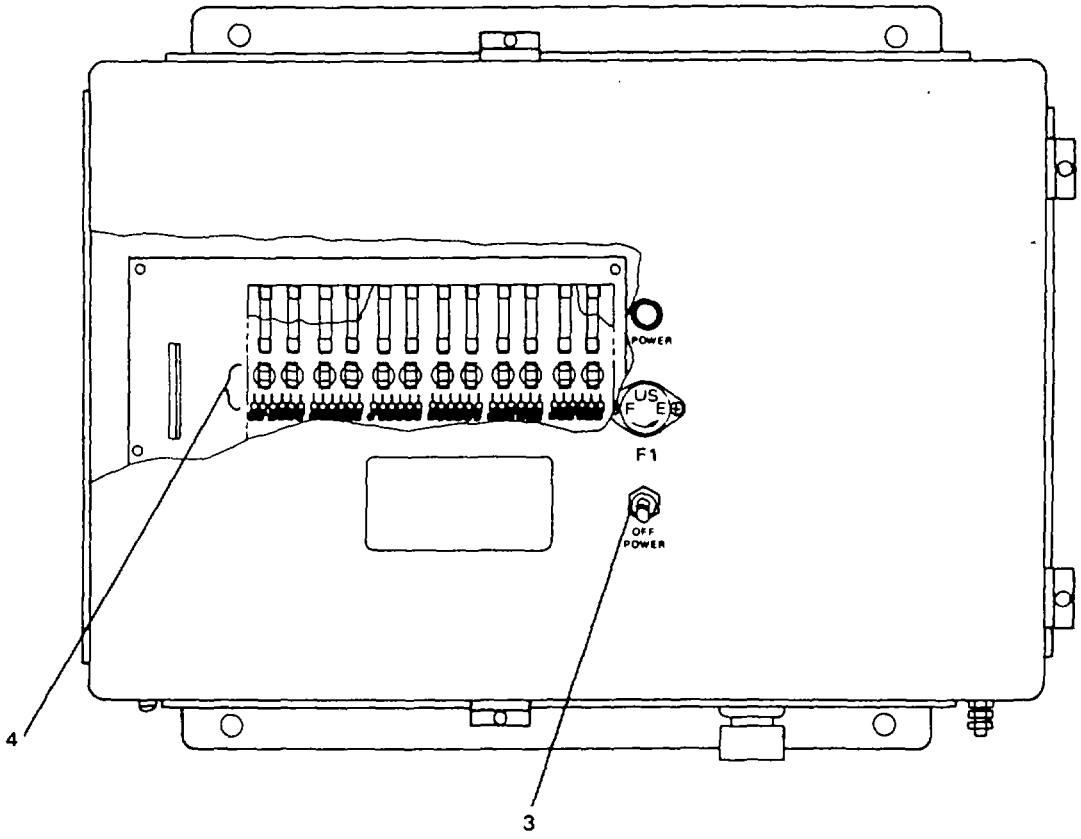
c. Set WEATHER control (61).

NOTE

A low setting in normal seas is desirable for accurate heading keeping. A high setting in heavy seas will reduce ineffective rudder activity.

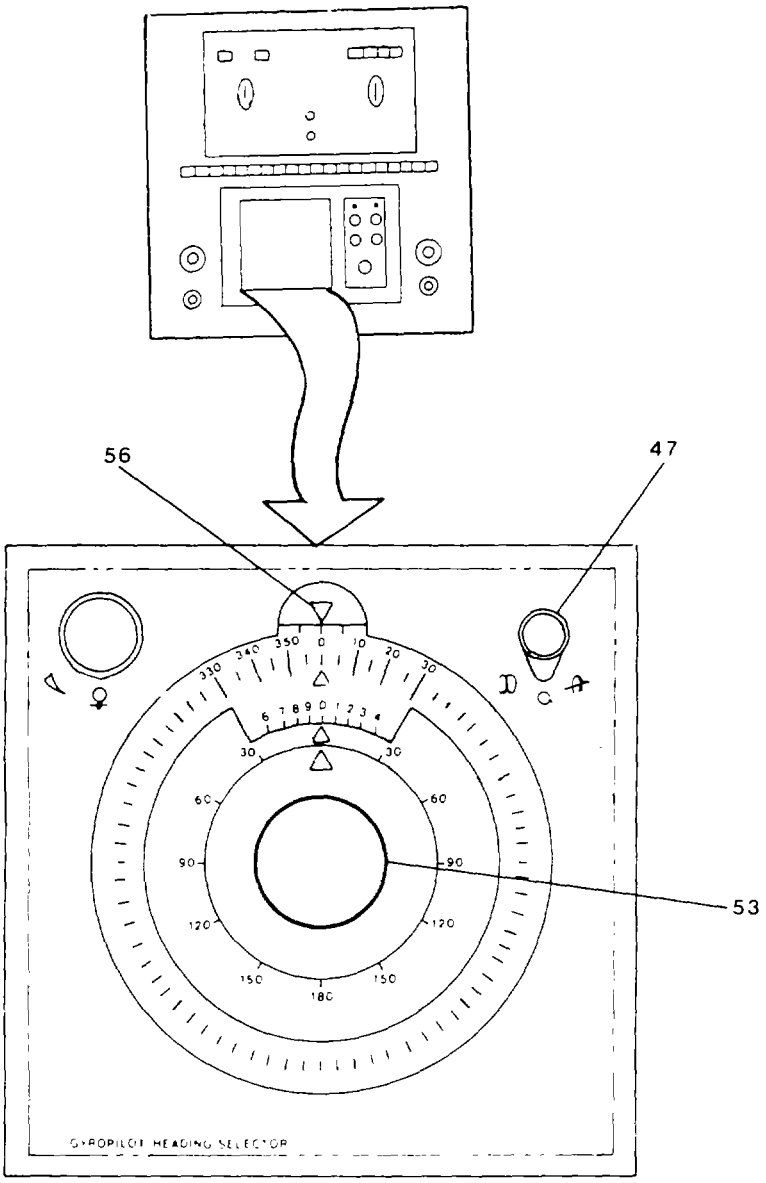
d. Set RUD MULT control (63) to initial setting of 1.0.

e. Set HAND/AUTO/REMOTE mode switch (62) to HAND.



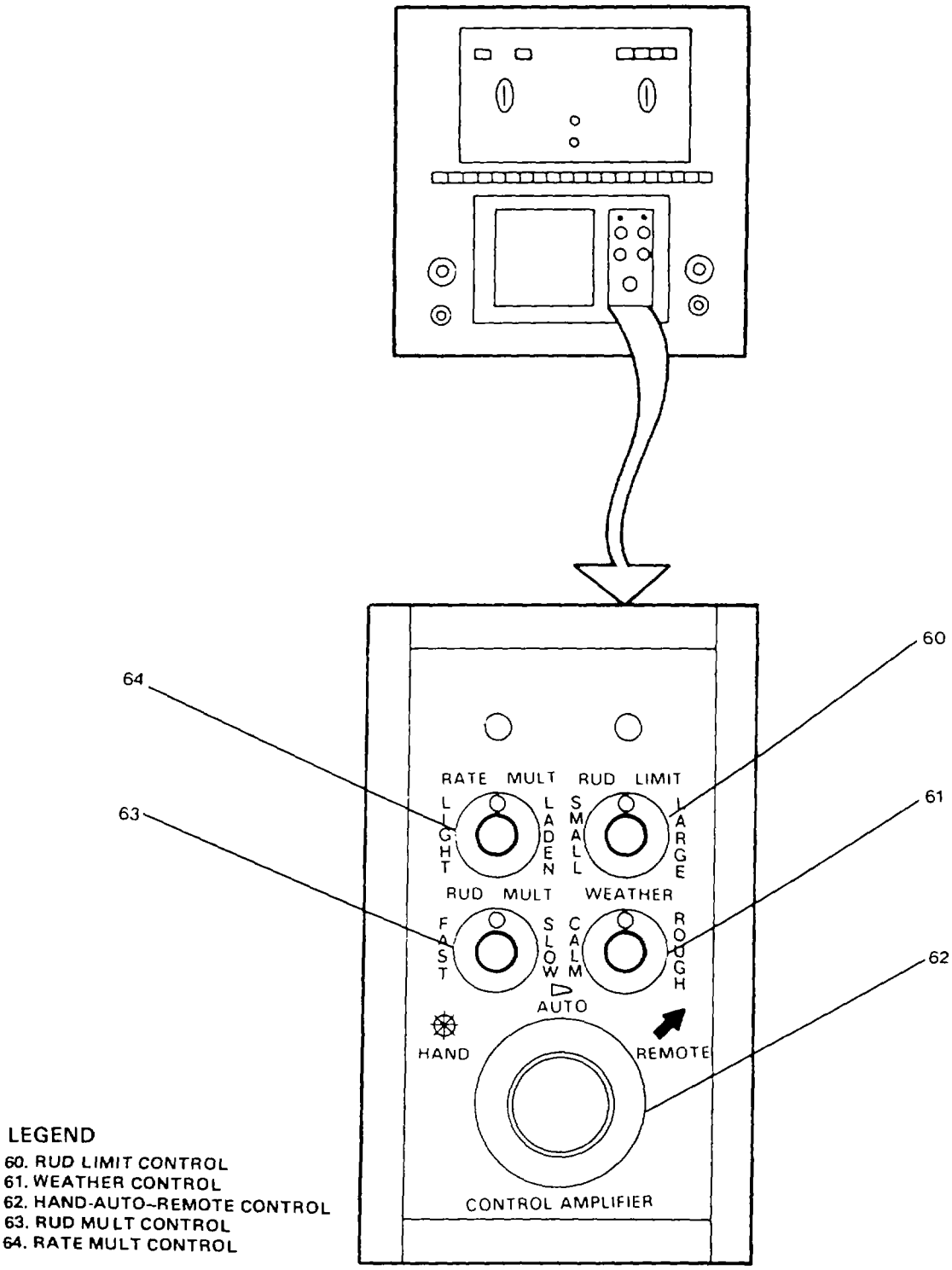
LEGEND
3. ON-OFF POWER SWITCH
4. REPEATER SWITCHES

FIGURE 2-119. MARK 37 MOD E Transmission Unit.



LEGEND
47. MODE SELECTOR
53. HEADING SELECTOR
56. LUBBER LINE

FIGURE 2-120. Pilothouse Steering Cabinet (Sheet 1 of 2).



LEGEND

60. RUD LIMIT CONTROL
61. WEATHER CONTROL
62. HAND-AUTO-REMOTE CONTROL
63. RUD MULT CONTROL
64. RATE MULT CONTROL

FIGURE 2-120. Pilothouse Steering Cabinet (Sheet 2 of 2).

NOTE

To ensure correct heading indication, it is imperative that the Heading Repeater be synchronized with the gyrocompass. The repeater remains synchronized even when the system is off, provided gyrocompass data is available.

f. Set the Mode Selector switch (47, Sheet 1 of 2) to synchronize.

g. Rotate the Heading Selector knob (53) until the dials show the same heading indication at the course heading index lubber line (56) as the gyrocompass heading.

NOTE

Position the Mode Selector (47) to gyrocompass and note that the repeater and the gyrocompass headings are the same. If the headings are not the same, repeat step above.

h. Position the Heading Selector knob (53) as necessary to align the pointer under the course heading index lubber line (56).

i. Energize the Gyropilot by positioning the Steering Control switch, (62, Sheet 2 of 2) to the HAND position.

NOTE

Always go into AUTO operation from the HAND mode with the rudder at amidships and with no ordered heading change to prevent undesirable rudder movement.

j. Set Mode switch (62) to AUTO and note that the vessel steadies on the indicated heading.

k. Adjust the Control Amplifier controls as follows for optimum heading control:

(1) Set RUD LIMIT Control (60, Sheet 2 of 2) as desired.

NOTE

Adjust to set the rudder inside limits as desired. Higher settings allow larger rudder angles, lower settings reduce maximum rudder angles used in heading changing but may interface with heading keeping.

(2) Set WEATHER Control (61, Sheet 2 of 2) to 0 in calm weather.

NOTE

The optimum setting for a particular sea condition is equal to the number of degrees of natural yaw from the selected heading. For example, if the ship is yawing plus or minus 3 degrees from the ordered heading when the WEATHER control is set to 0, set the WEATHER control to 3.

(3) Set RUD MULT (64, Sheet 2 of 2) to minimum setting.

NOTE

This will prevent the vessel from wandering from the ordered heading in a calm sea. Operation at reduced speed usually requires a higher setting. This control increases rudder angle ordered for a given heading.

l. To change heading, rotate the heading (outer) scale of the Heading Selector (53, Sheet 1 of 2) to the desired heading or rotate the relative heading change (inner) scale to the desired heading change.

m. As the vessel comes to the new heading, verify that the course heading, (outer) scale, and the vernier heading, (middle) scale, indicate the new heading at the

lubber line, and the relative heading change, (inner) scale, indicates zero.

2-5.5. Air Start Main Generator (STBD).

a. On main switchboard (FIGURE 2102, Sheet 1 of 7), set MAN/OFF/AUTO switch (19) to the AUTO position.

b. Align fuel oil service piping system to STBD ship's service diesel generator (FIGURE 2-121) as follows:

(1) Open STBD generator's fuel oil supply valve (6).

(2) Open STBD generator's fuel oil filter inlet valve (7).

NOTE

Place one fuel oil filter in operation and keep second as backup.

(3) Open fuel oil filter outlet valve (9).

(4) Open return fuel oil discharge valve (1).

(5) Flood the starboard generator fuel system by pumping with the hand operated priming pump (13) until a slight pressure is indicated on the engine fuel pressure gauge (4, FIGURE 2-122).

c. Align STBD ship service diesel generator cooling water piping system (FIGURE 2-123) to air start generator as follows:

(1) Open STBD generator cooling water suction valve (6) from keel cooler.

(2) Open STBD expansion tank discharge valve (12).

(3) Open STBD generator cooling water discharge valve (15) to keel cooler.

NOTE

If the ship service diesel generator requires extra cooling, the suction and discharge valves (5 and 16) to the cooling coils located in ballasts tanks may be opened.

d. On port side of air start generator, twist the kill pushbutton (6, FIGURE 2-122) clockwise to ensure it is in the run position.

e. Open generator air cutout valve (34, FIGURE 2-124).

f. Open valves (14, 17 and 34, FIGURE 2-108, Sheet 1 of 4).

g. On Engine Room Console (FIGURE 2-106, Sheet 5 of 12), press SGE start pushbutton (43).

NOTE

If engine fails to start within 30 seconds, release the starter pushbutton. Wait 2 minutes to allow the starter motor to cool before using it again.

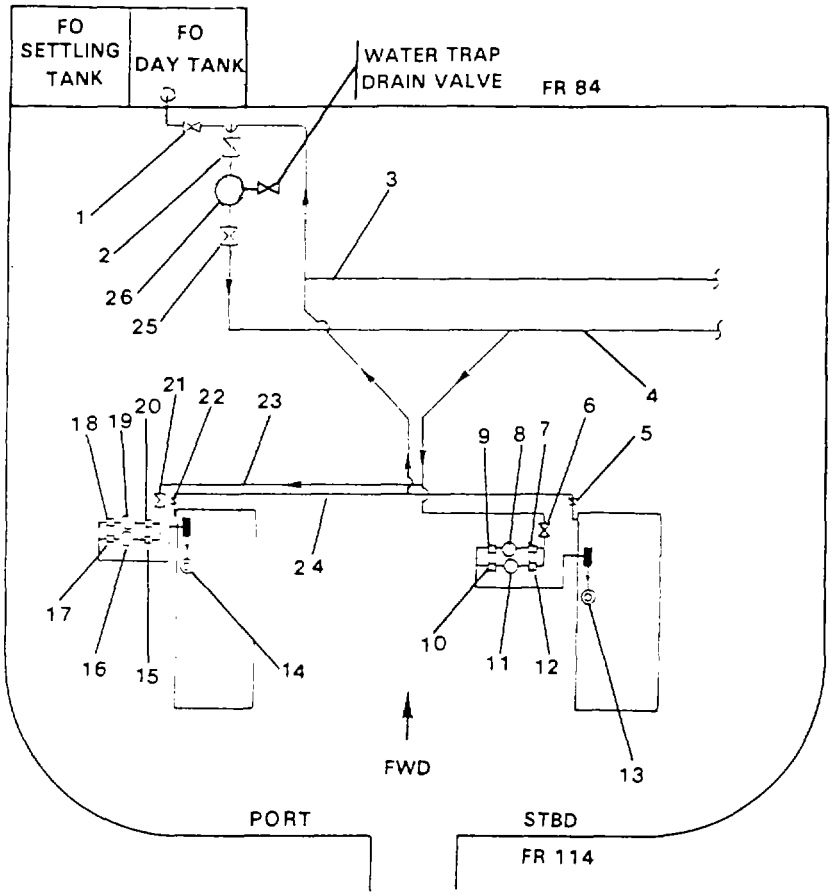
h. Allow engine to run 3 to 5 minutes or until water temperature (9, Sheet 2 of 12) begins to rise.

CAUTION

If the oil pressure does not rise to 45 psi within 15 seconds, STOP the engine and refer the generator to unit maintenance.

i. On main switchboard FIGURE 2-102, Sheet 1 of 7, set selector switch (8) to Gen. No. 2.

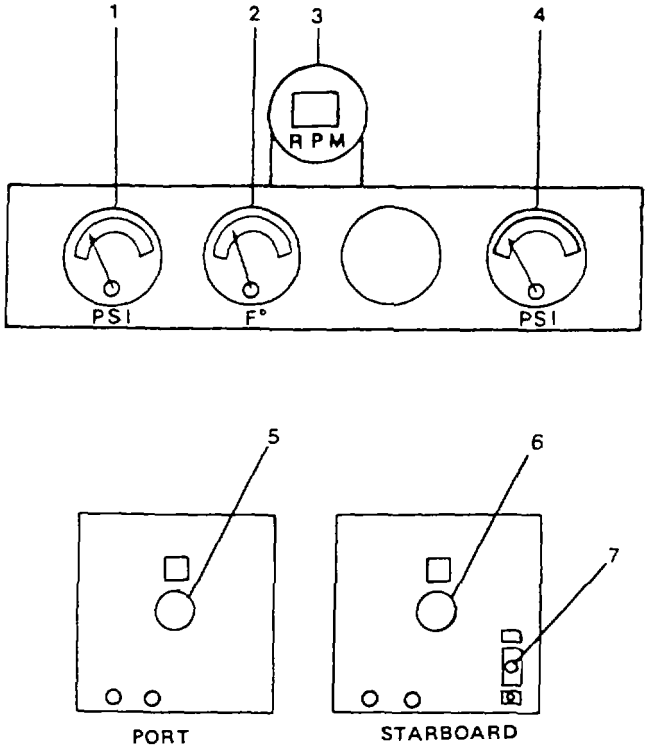
j. Increase GEN 2 SPEED CONTROL (20) on main switchboard until Hertz meter (7) reads 60.2.



LEGEND

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL HEADER INLET VALVE
3. RETURN FUEL OIL HEADER PIPE
4. FUEL OIL SUPPLY HEADER PIPE
5. SWING CHECK VALVE
6. GENERATOR FUEL OIL SUPPLY VALVE
7. FUEL OIL FILTER INLET VALVE
8. FUEL OIL FILTER
9. FUEL OIL FILTER OUTLET VALVE
10. FUEL OIL FILTER OUTLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER INLET VALVE
13. FUEL OIL PRIMING PUMP
14. FUEL OIL PRIMING PUMP
15. FUEL OIL FILTER INLET VALVE
16. FUEL OIL FILTER
17. FUEL OIL FILTER OUTLET VALVE
18. FUEL OIL FILTER OUTLET VALVE
19. FUEL OIL FILTER
20. FUEL OIL FILTER INLET VALVE
21. GENERATOR FUEL OIL SUPPLY VALVE
22. SWING CHECK VALVE
23. FUEL OIL SUPPLY PIPE
24. FUEL OIL RETURN PIPE
25. INLINE STOP VALVE
26. WATER TRAP

FIGURE 2-121. Ship's Service Diesel Generator Fuel Oil Service Piping System.



LEGEND
1. P.S.I.
2. F°
3. R.P.M.
4. P.S.I.
5. EMERGENCY STOP SWITCH
6. EMERGENCY STOP SWITCH
7. ON-OFF SWITCH

FIGURE 2-122. Generator Set Engine 250 KW.

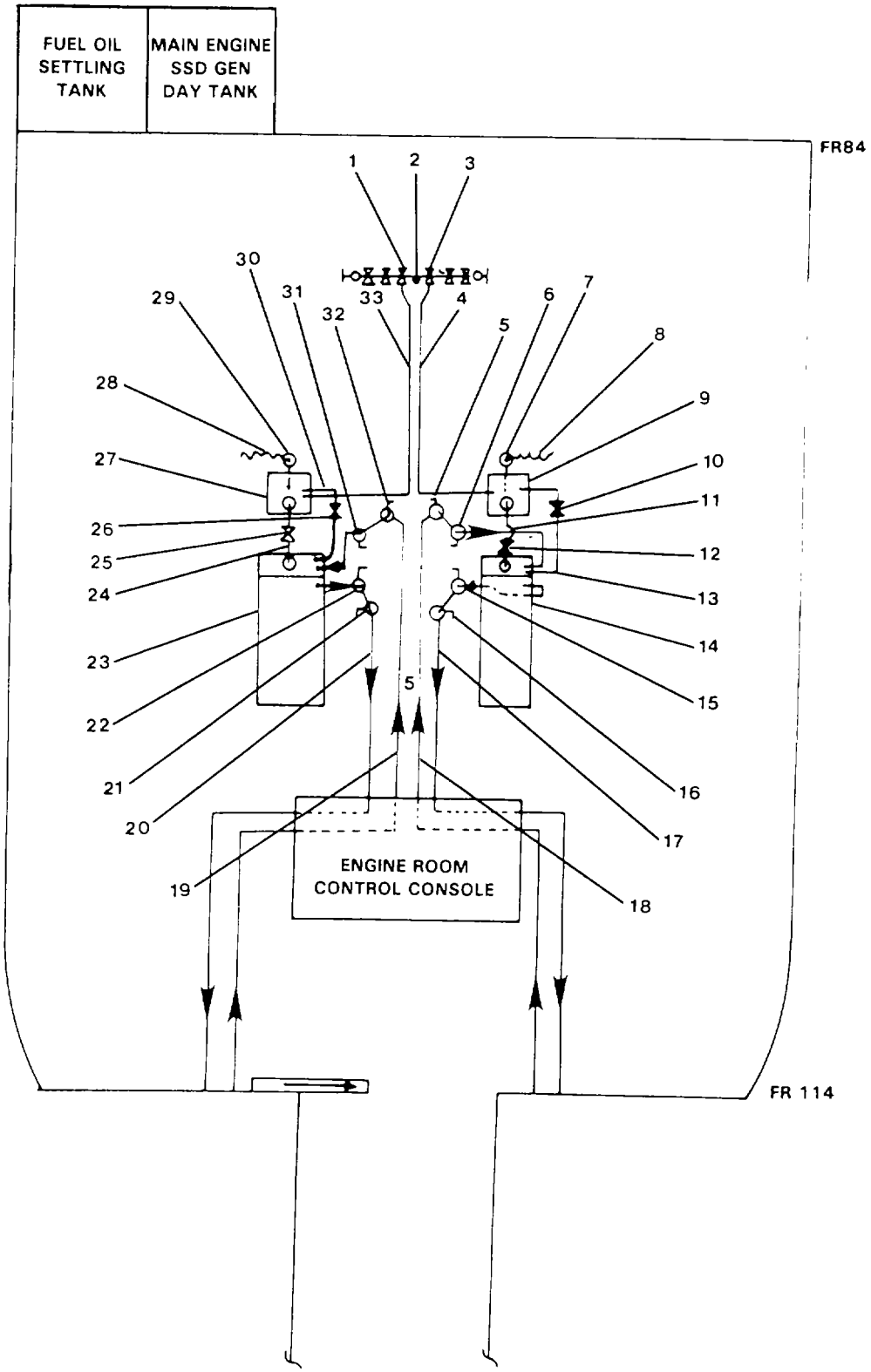


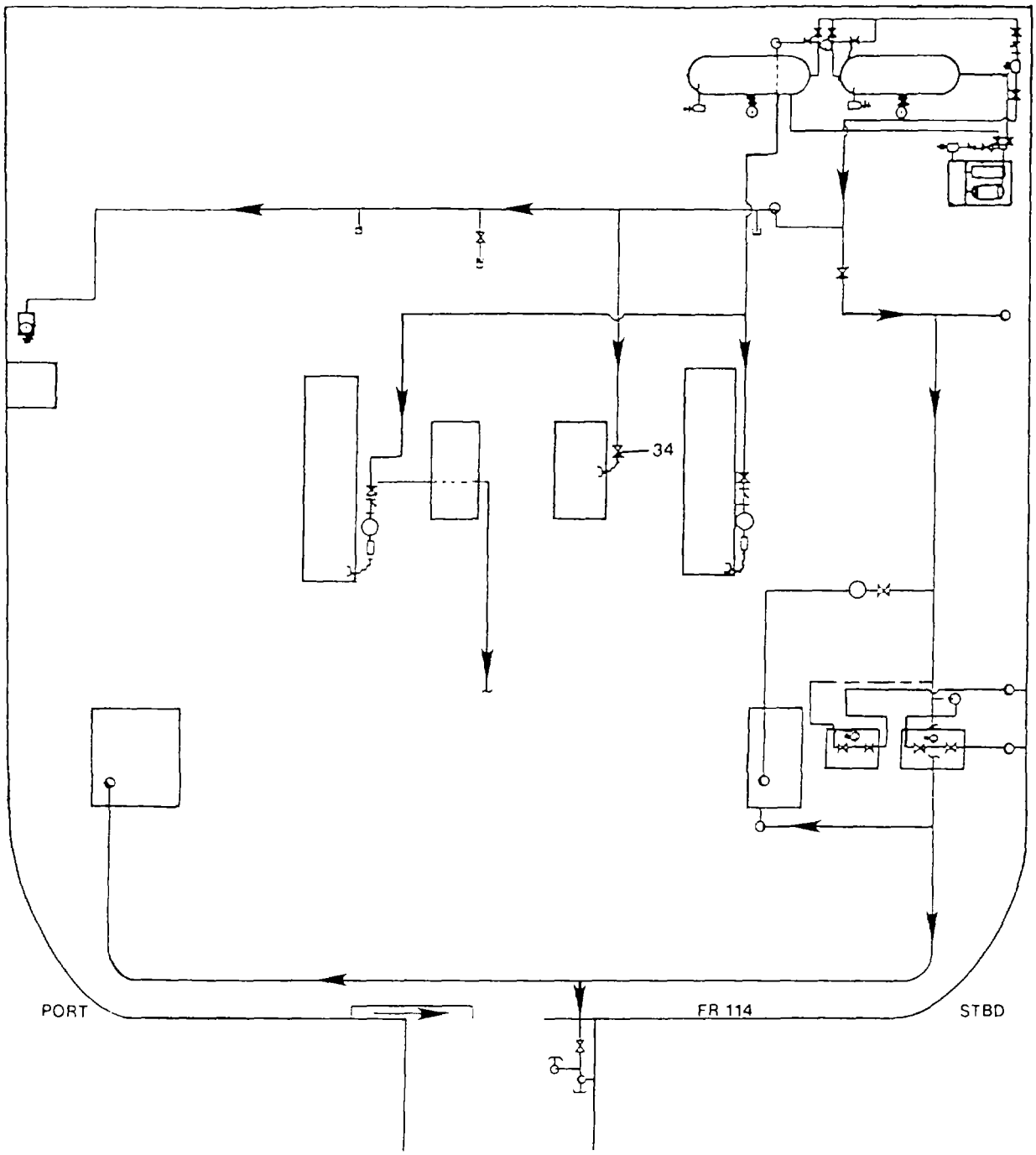
FIGURE 2-123.

Ship's Service Diesel Generator Cooling Water Piping System (Sheet 1 of 2).

LEGEND

1. FRESH WATER FILL VALVE TO PORT GENERATOR EXPANSION TANK
2. FRESH WATER DISTRIBUTION MANIFOLD
3. FRESH WATER FILL VALVE TO STBD GENERATOR EXPANSION TANK
4. FRESH WATER FILL PIPE TO STBD GENERATOR EXPANSION TANK
5. STBD GENERATOR COOLING WATER SUCTION VALVE FROM COOLING COILS IN BALLAST TANK
6. STBD GENERATOR COOLING WATER SUCTION VALVE FROM KEEL COOLERS
7. STBD GENERATOR COOLING WATER LOW LEVEL ALARM
8. ELECTRICAL LEAD TO GENERATOR ALARM PANEL
9. STBD GENERATOR COOLING WATER EXPANSION TANK
10. STBD GENERATOR COOLING WATER VENT VALVE
11. COOLING WATER DISCHARGE PIPE FROM EXPANSION TANK TO GENERATOR
12. COOLING WATER DISCHARGE VALVE FROM EXPANSION TANK TO GENERATOR
13. STBD GENERATOR COOLING WATER VENT PIPE
14. STBD GENERATOR
15. STBD GENERATOR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
16. STBD GENERATOR COOLING WATER DISCHARGE VALVE TO COOLING COILS IN BALLAST TANK
17. STBD GENERATOR COOLING WATER PIPE TO COOLING COILS IN BALLAST TANK
18. STBD GENERATOR COOLING WATER PIPE FROM COOLING COILS IN BALLAST TANK
19. PORT GENERATOR COOLING WATER PIPE FROM COOLING COILS IN BALLAST TANK
20. PORT GENERATOR COOLING WATER PIPE TO COOLING COILS IN BALLAST TANK
21. PORT GENERATOR COOLING WATER DISCHARGE VALVE TO COOLING COILS IN BALLAST TANK
22. PORT GENERATOR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
23. PORT GENERATOR
24. COOLING WATER DISCHARGE PIPE FROM EXPANSION TANK TO GENERATOR
25. COOLING WATER DISCHARGE VALVE FROM EXPANSION TANK TO GENERATOR
26. PORT GENERATOR COOLING WATER VENT VALVE
27. PORT GENERATOR COOLING WATER EXPANSION TANK
28. ELECTRICAL LEAD TO GENERATOR ALARM PANEL
29. PORT GENERATOR COOLING WATER LOW LEVEL ALARM
30. PORT GENERATOR COOLING WATER VENT PIPE
31. PORT GENERATOR COOLING WATER SUCTION VALVE FROM KEEL COOLER
32. PORT GENERATOR COOLING WATER SUCTION VALVE FROM COOLING COILS IN BALLAST TANK
33. FRESH WATER FILL PIPE TO PORT GENERATOR EXPANSION TANK

FIGURE 2-123. Ship's Service Diesel Generator Cooling Water Piping System (Sheet 2 of 2).



LEGEND
34. STBD S.S.D. GENERATOR STARTING AIR CUTOUT VALVE

FIGURE 2-124. Compressed Air Piping System - Engine Room.

k. Turn BUS GEN 2 SWITCH (13) to read phase 1-2.

l. Adjust GENERATOR NO. 2 VOLTAGE ADJ RHEO (21) to read 460 on A.C. VOLTS meter (12).

NOTE

If generator is started with MAN/OFF/AUTO switch (19) in MANual position, voltage adjustment is made by VOLTAGE switch (17).

m. Set GEN fl/GEN #2 selector switch (25, FIGURE 2-102, Sheet 1 of 7) to GEN #2.

n. Increase GEN 2 speed control (20) until Hertz meter (7) reads 60.2.

o. Synchronizing meter (30) will rotate in a clockwise direction. When pointer is 5 degrees before or after top dead center, close GENERATOR #2 CKT BKR (61).

NOTE

When generator No. 2 is placed on the line, the load will cause its speed to be dragged down and the speed of the other generator to increase due to its decrease of load. The white synchronizing indicator lights will begin to blink.

p. Adjust the GEN 2 SPEED CONTROL switch (20) to increase Hertz meter (7) back to 60.

q. Set engine control switch (15, FIGURE 2-20) on Emergency Generator Control Panel to AUTO position.

NOTE

Placing the emergency generator into automatic standby will allow the emergency generator to pick up the emergency load within 45 seconds if main power is lost.

2-5.6. Main Propulsion System.

2-5.6.1. Starboard Main Engine.

a. Align Starboard Main Engine/Reduction Gear cooling water piping system (FIGURE 2-125) as follows:

(1) Open STBD MAIN ENGINE expansion tank discharge valve (9).

(2) Open STBD main engine cooling water discharge valve (24) to keel cooler (2 each).

(3) Open STBD main engine cooling water suction valve (23) from keel cooler (2 each).

NOTE

Observe expansion tank level indicator; refill expansion tank as needed.

(4) Open STBD reduction gear expansion tank discharge valve (14).

(5) Open STBD reduction gear cooling water suction valve (28) from keel cooler.

(6) Open reduction gear cooling water discharge valve (29) to keel cooler.

(7) Open reduction gear cooling water system vent valve (16).

(8) Open pressure gauge cutout valve (15).

b. Turn GEAR OIL COOLING PUMP STBD circuit breaker on Engine Room Motor Control Center (52, FIGURE 2-103, Sheet 3 of 7) to AUTO position.

c. Align Stern Tube Lubricating Piping System (FIGURE 2-126) as follows:

(1) Open sea chest suction valve (5).

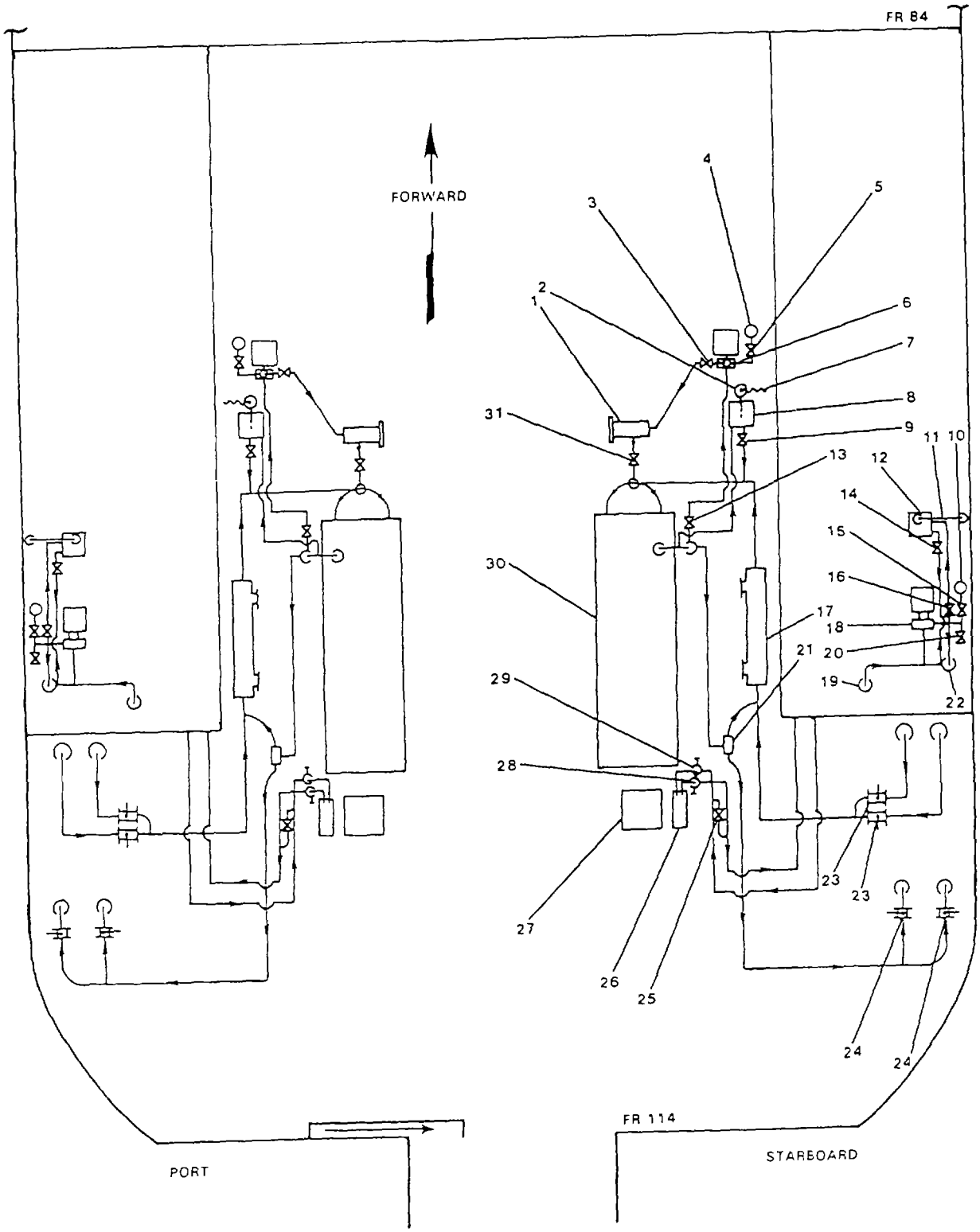
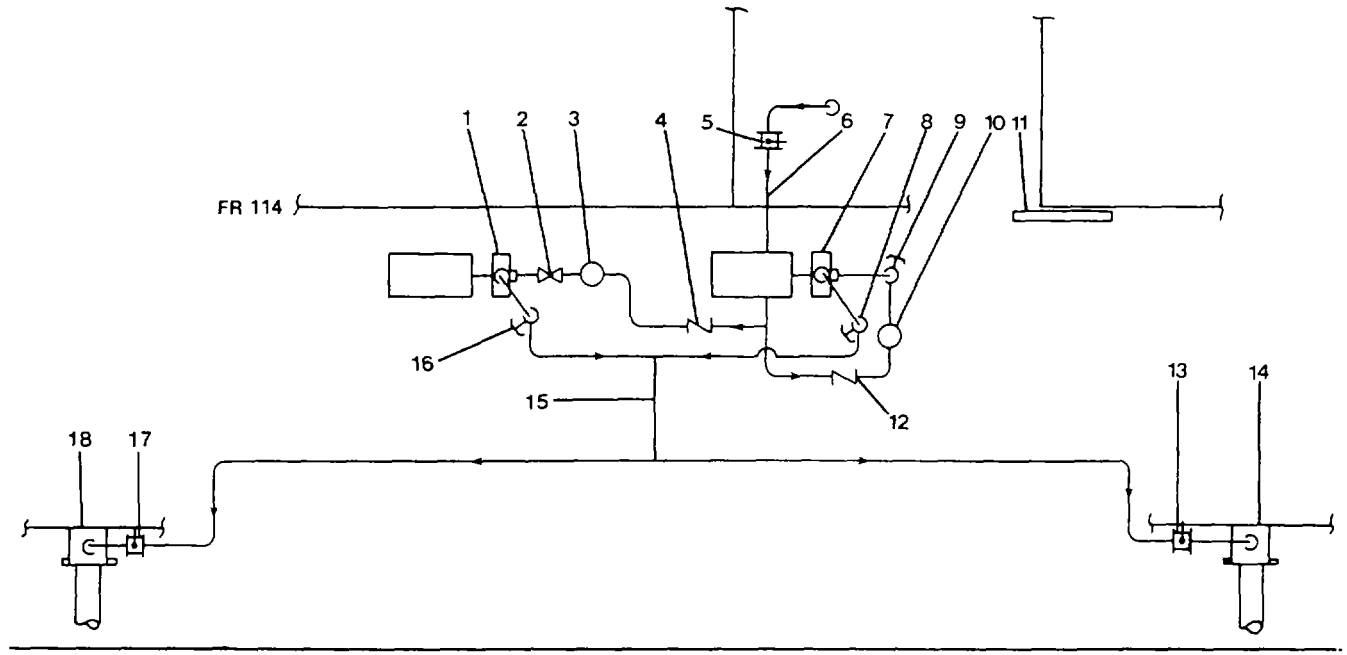


FIGURE 2-125. Main Engine and Reduction Gear Cooling Water (Sheet 1 of 2).

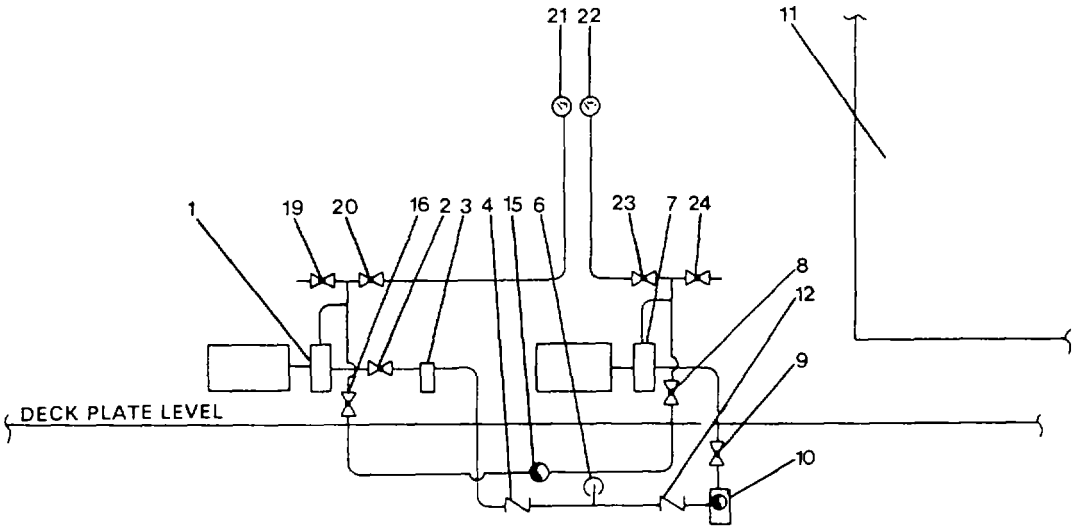
LEGEND

1. MAIN ENGINE PREHEATER
2. COOLING WATER EXPANSION TANK LOW LEVEL ALARM
3. PREHEATER CIRCULATING PUMP DISCHARGE VALVE
4. PREHEATER CIRCULATING PUMP DISCHARGE PRESSURE GAUGE (0 TO 200 PSI)
5. GAUGE CUTOUT VALVE
6. PREHEATER CIRCULATING PUMP AND MOTOR
7. LOW LEVEL ALARM ELECTRICAL LEAD
8. COOLING WATER EXPANSION TANK
9. EXPANSION TANK DISCHARGE VALVE
10. REDUCTION GEAR COOLING WATER PUMP DISCHARGE PRESSURE GAUGE (0 TO 100 PSI)
11. EXPANSION TANK OVERFLOW PIP TO BILGES
12. REDUCTION GEAR COOLING WATER EXPANSION TANK
13. PREHEATER CIRCULATING PUMP SUCTION VALVE
14. REDUCTION GEAR COOLING WATER EXPANSION TANK DISCHARGE VALVE
15. PRESSURE GAUGE CUTOUT VALVE
16. REDUCTION GEAR COOLING WATER SYSTEM VENT VALVE
17. MAIN ENGINE LUBE OIL COOLER
18. REDUCTION GEAR COOLING WATER PUMP AND MOTOR
19. REDUCTION GEAR COOLING WATER SUCTION PIP FROM KEEL COOLERS
20. DRAIN COCK
21. THERMOSTATICALLY OPERATED KEEL COOLER BYPASS VALVE (AMOT)
22. REDUCTION GEAR COOLING WATER PUMP DISCHARGE PIPE
23. MAIN ENGINE COOLING WATER SUCTION VALVES FROM KEEL COOLER
24. MAIN ENGINE COOLING WATER DISCHARGE VALVES TO KEEL COOLER
25. REDUCTION GEAR COOLING WATER BYPASS VALVE
26. REDUCTION GEAR LUBE OIL COOLER
27. MAIN ENGINE REDUCTION GEAR
28. REDUCTION GEAR COOLING WATER SUCTION VALVE FROM KEEL COOLER
29. REDUCTION GEAR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
30. MAIN ENGINE
31. MAIN ENGINE PREHEATER SUCTION VALVE

FIGURE 2-125. Main Engine and Reduction Gear Cooling Water (Sheet 2 of 2).



STERN TUBE LUBRICATION PIPING SYSTEM
ENGINE ROOM AFT BULKHEAD FRAME 114 LOOKING DOWN



STERN TUBE LUBRICATION PIPING SYSTEM
ELEVATION VIEW AFT BULKHEAD ENGINE ROOM
CENTER LINE LOOKING AFT

FIGURE 2-126. Stern Tube Lubricating Piping System (Sheet 1 of 2).

LEGEND

1. STBD STERN TUBE LUBRICATION PUMP AND MOTOR
2. STBD STERN TUBE LUBRICATION PUMP SUCTION VALVE
3. SUCTION STRAINER
4. SWING CHECK VALVE
5. SEA CHEST SUCTION VALVE
6. STERN TUBE LUBRICATING PUMP SUCTION PIPE
7. PORT STERN TUBE LUBRICATING PUMP AND MOTOR
8. PORT STERN TUBE LUBRICATING PUMP DISCHARGE VALVE
9. PORT STERN TUBE LUBRICATING PUMP SUCTION VALVE
10. SUCTION STRAINER
11. HYDRAULIC OPERATED DOOR
12. SWING CHECK VALVE
13. INLINE STOP VALVE
14. PORT STERN TUBE
15. STERN TUBE LUBRICATING PUMP DISCHARGE PIPE
16. STBD STERN TUBE LUBRICATING PUMP DISCHARGE VALVE
17. INLINE STOP VALVE
18. STBD STERN TUBE
19. STBD STERN TUBE LUBRICATING PUMP VENT VALVE
20. PRESSURE GAUGE CUTOUT VALVE
21. PRESSURE GAUGE (0 TO 100)
22. PRESSURE GAUGE (0 TO 100)
23. PRESSURE GAUGE CUTOUT VALVE
24. PORT STERN TUBE LUBRICATING PUMP VENT VALVE

FIGURE 2-126. Stern Tube Lubricating Piping System (Sheet 2 of 2).

(2) Open pump suction valves (2 and 9).

(3) Open pump discharge valves (8 and 16).

(4) Open inline stop valves (13 and 17).

(5) Set STBD HAND-OFF-AUTO switch (1, Figure 2-91) to HAND position.

NOTE

Located on the port stanchion is the motor controller for the port stern tube lubricating pump. This pump will be used as backup.

(6) Set port stern tube lubricating pump in AUTO position (1).

d. Align STBD Main Engine lube oil circulating system (FIGURE 2-127) as follows:

(1) Open STBD Main Engine lube oil filter inlet valve (14).

(2) Open STBD Main Engine lube oil filter outlet valve (16).

e. Align starboard main engine lube oil transfer and purification piping system (FIGURE 2-128) as follows:

(1) Close all valves in lube oil transfer and purification piping system.

(2) Open STBD prelube pump suction valve (11).

(3) Open STBD prelube pump discharge valve (22) to main engine.

(4) Open discharge valve (19) to STBD main engine lubricating system.

(5) Close valves 6, 43, and 51.

(6) Set MAIN ENGINE PRE-LUBE OIL PUMP-STBD circuit breaker (78, FIGURE 2-103, Sheet 5 of 7) on Engine Room Motor Control Center to the ON position.

(7) Press MAIN ENGINE PRELUBE OIL PUMP STBD start button (101).

(8) Press start button (1, Figure 2-129) starboard station.

NOTE

Prelubricate engine at a minimum of 10 psi (69 kPa) for a period of not less than 3 and not more than 5 minutes.

f. Align fuel oil service piping (FIGURE 2-130) to the starboard main engine as follows: (1) Open fuel oil day tank outlet valve (2).

(2) Open inline stop valve (23).

(3) Open STBD engine inline stop valve (9).

(4) Open one STBD engine fuel oil strainer inlet valve (12).

NOTE

Place one fuel oil strainer in use and keep the other strainer as backup.

(5) Open the same fuel oil strainer outlet valve (8).

(6) Open two Racor fuel oil filter inlet valves (20).

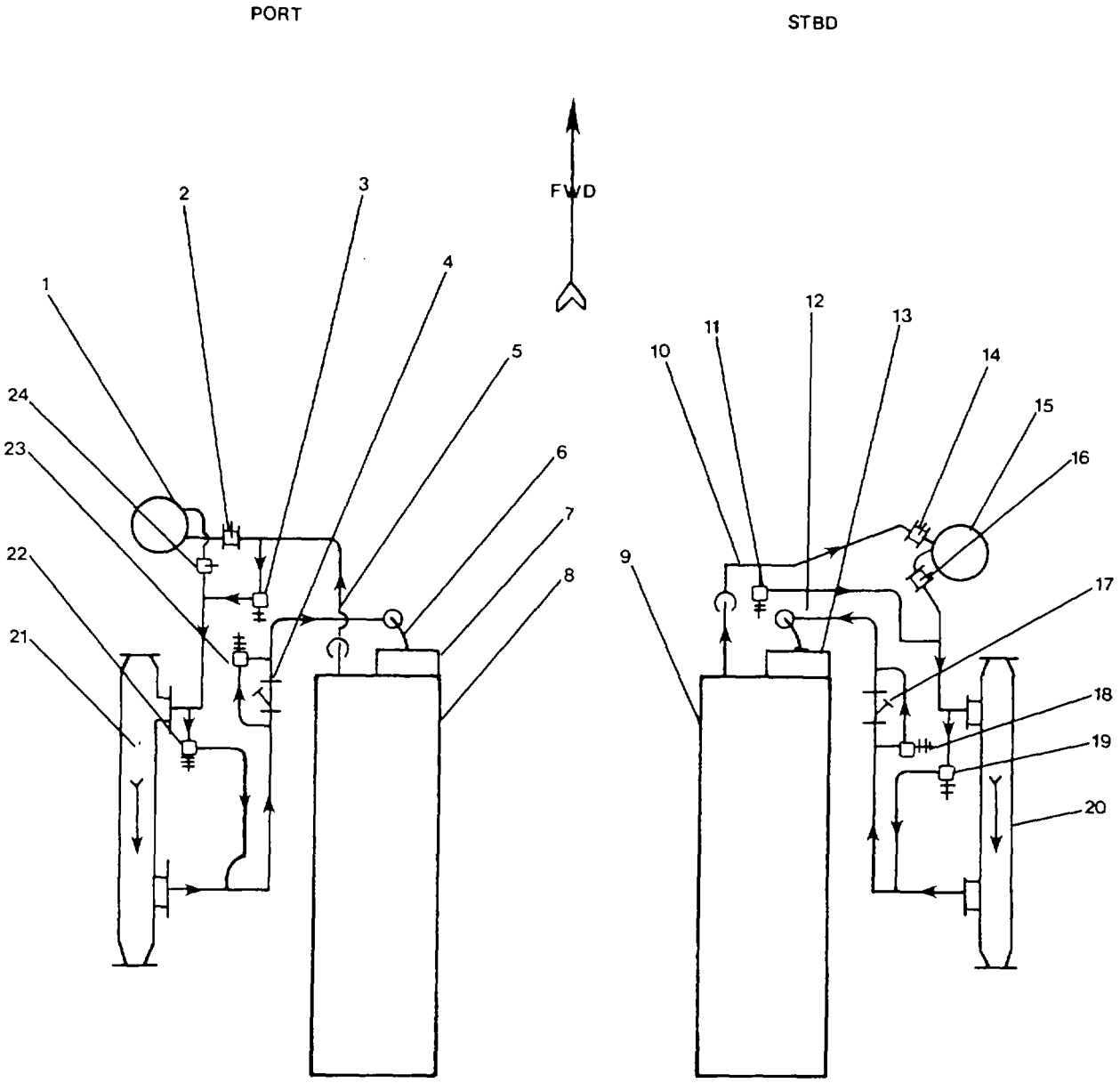


FIGURE 2-127. Main Engine Lube Oil Circulating System (Sheet 1 of 2).

LEGEND

1. PORT MAIN ENGINE LUBE OIL FILTER
2. PORT MAIN ENGINE LUBE OIL FILTER INLET VALVE
3. LUBE OIL FILTER BY PASS RELIEF VALVE
4. PORT MAIN ENGINE LUBE OIL ''Y'' TYPE STRAINER
5. PORT MAIN ENGINE LUBE OIL DISCHARGE PIPE
6. PORT MAIN ENGINE LUBE OIL SUCTION PIPE
7. PORT MAIN ENGINE LUBE OIL STRAINER
8. PORT MAIN ENGINE
9. STBD MAIN ENGINE
10. STBD MAIN ENGINE LUBE OIL DISCHARGE PIPE
11. STBD MAIN ENGINE LUBE OIL FILTER BYPASS RELIEF VALVE
12. STBD MAIN ENGINE LUBE OIL SUCTION PIPE
13. STBD MAIN ENGINE LUBE OIL STRAINER
14. STBD MAIN ENGINE LUBE OIL FILTER INLET VALVE
15. STBD MAIN ENGINE LUBE OIL FILTER
16. STBD MAIN ENGINE LUBE OIL FILTER OUTLET VALVE
17. STBD MAIN ENGINE LUBE OIL ''Y'' TYPE STRAINER
18. STBD MAIN ENGINE LUBE OIL ''Y'' TYPE STRAINER BYPASS RELIEF VALVE
19. STBD MAIN ENGINE LUBE OIL COOLER BYPASS RELIEF VALVE
20. STBD MAIN ENGINE LUBE OIL COOLER
21. PORT MAIN ENGINE LUBE OIL COOLER
22. PORT MAIN ENGINE LUBE OIL COOLER BYPASS RELIEF VALVE
23. PORT MAIN ENGINE LUBE OIL ''Y'' TYPE STRAINER BYPASS RELIEF VALVE
24. PORT MAIN ENGINE LUBE OIL FILTER OUTLET VALVE

FIGURE 2-127. Main Engine Lube Oil Circulating System (Sheet 2 of 2).

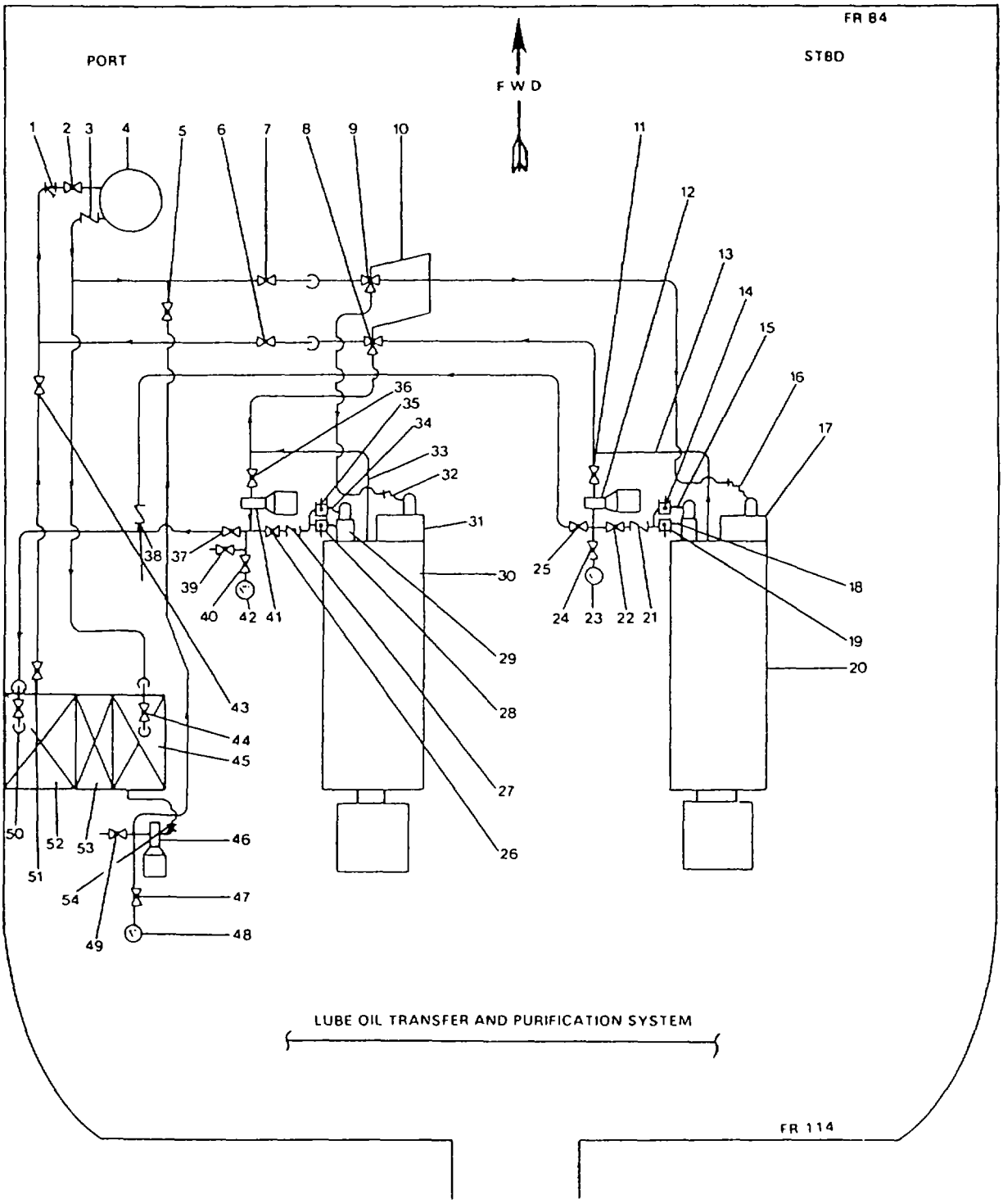
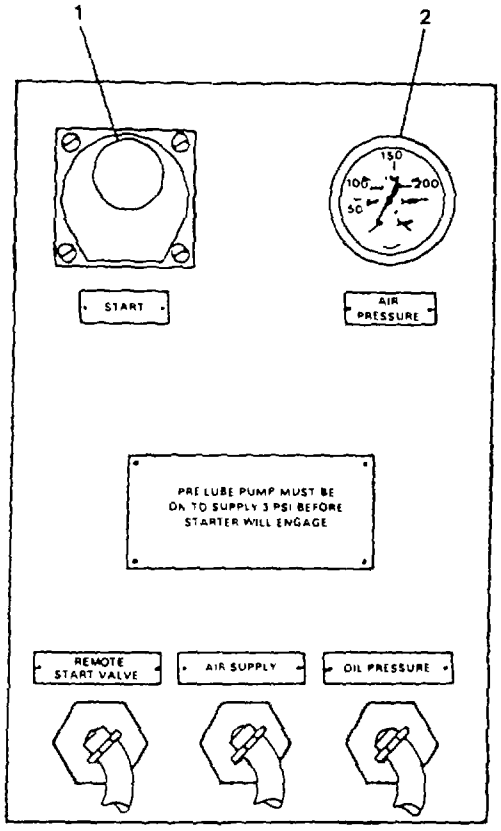


FIGURE 2-128. Lube Oil Transfer and Purification Piping System (Sheet 1 of 2).

LEGEND

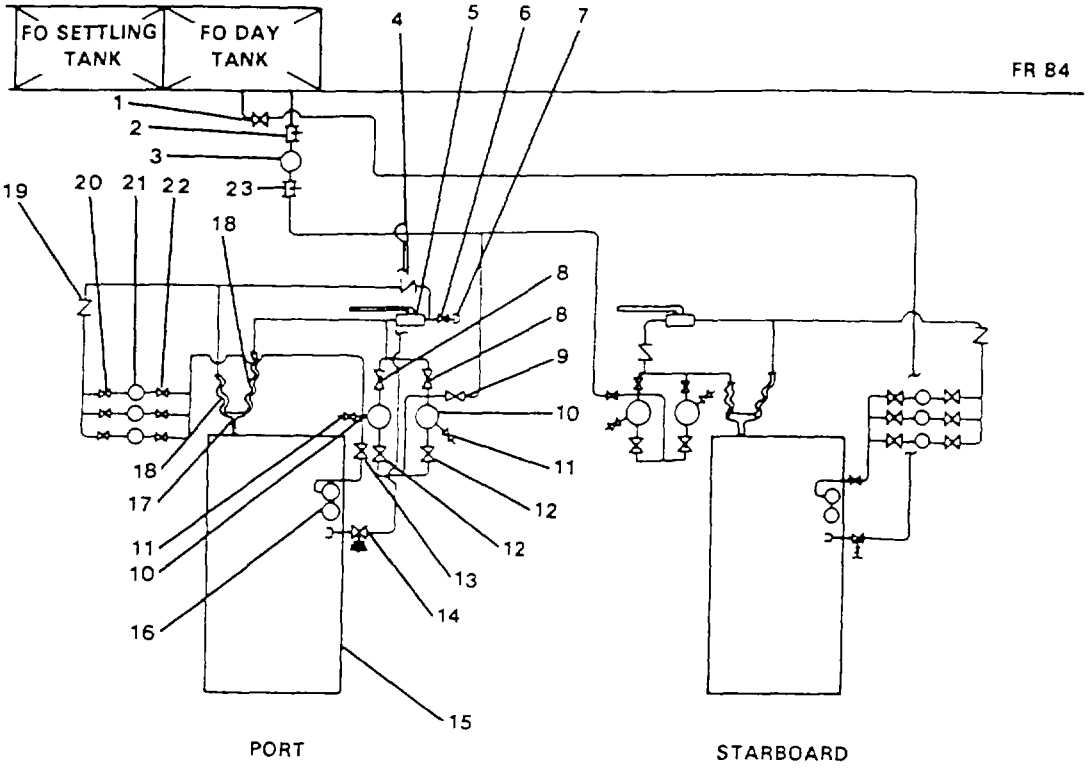
1. Y TYPE STRAINER
2. LUBE OIL PURIFIER SUCTION VALVE
3. SWING CHECK VALVE
4. LUBE OIL PURIFIER
5. LUBE OIL TRANSFER PUMP DISCHARGE VALVE
6. INLINE STOP VALVE
7. INLINE STOP VALVE
8. THREE WAY SELECTOR VALVE
9. THREE WAY SELECTOR VALVE
10. THREE WAY SELECTOR VALVE OPERATING LEVER
11. STBD PRELUBE PUMP SUCTION VALVE
12. STBD PRELUBE PUMP AND MOTOR
13. STBD MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
14. DISCHARGE VALVE TO STBD MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
15. FLEXIBLE COUPLING
16. FLEXIBLE COUPLING
17. STBD MAIN ENGINE LUBE OIL STRAINER
18. FLEXIBLE COUPLING
19. DISCHARGE VALVE TO STBD MAIN ENGINE LUBRICATING SYSTEM
20. STBD MAIN ENGINE
21. SWING CHECK VALVE
22. STBD PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
23. DISCHARGE PRESSURE GAUGE (0-200 PSI)
24. PRESSURE GAUGE CUTOUT VALVE
25. STBD PRELUBE DISCHARGE VALVE TO LUBE OIL SETTLING TANK
26. PORT PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
27. SWING CHECK VALVE
28. DISCHARGE VALVE TO PORT MAIN ENGINE LUBRICATING SYSTEM
29. FLEXIBLE COUPLING
30. PORT MAIN ENGINE
31. PORT MAIN ENGINE LUBE OIL STRAINER
32. FLEXIBLE COUPLING
33. PORT MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
34. FLEXIBLE COUPLING
35. DISCHARGE VALVE TO PORT MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
36. PORT PRELUBE PUMP SUCTION VALVE
37. PORT PRELUBE PUMP DISCHARGE VALVE TO LUBE OIL SETTLING VALVE
38. SWING CHECK VALVE
39. DRAIN COCK
40. PRESSURE GAUGE CUTOUT VALVE
41. PORT PRELUBE PUMP AND MOTOR
42. PORT PRELUBE DISCHARGE PRESSURE GAUGE (0 TO-200 PSI)
43. INLINE STOP VALVE
44. LUBE OIL STORAGE TANK INLET VALVE
45. LUBE OIL STORAGE TANK
46. LUBE OIL TRANSFER PUMP AND MOTOR
47. PRESSURE GAUGE CUTOUT VALVE
48. LUBE OIL TRANSFER PUMP DISCHARGE PRESSURE GAUGE
49. LUBE FAUCET DISCHARGE VALVE
50. LUBE OIL SETTLING TANK INLET VALVE
51. LUBE OIL SETTLING TANK OUTLET VALVE
52. LUBE OIL SETTLING TANK
53. GEAR OIL STORAGE TANK
54. LUBE OIL TRANSFER SUCTION VALVE

FIGURE 2-128. Lube Oil Transfer and Purification Piping System (Sheet 2 of 2).



LEGEND
1. START
2. AIR PRESSURE

FIGURE 2-129. Main Engine Air Start Panel.



LEGEND:

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL DAY TANK OUTLET VALVE
3. WATER TRAP
4. SWING CHECK VALVE
5. HAND OPERATED PRIMING VALVE
6. FAUCET CUTOUT VALVE
7. FAUCET
8. FUEL OIL STRAINER OUTLET VALVES
9. INLINE STOP VALVE
10. FUEL OIL STRAINER
11. FUEL OIL STRAINER HOUSING DRAIN VALVE
12. FUEL OIL STRAINER INLET VALVES
13. INLINE STOP VALVE
14. RETURN FUEL PRESSURE REGULATING VALVE
15. MAIN ENGINE
16. ENGINE MOUNTED DUPLEX FUEL OIL FILTER
17. MAIN ENGINE FUEL OIL PUMP
18. FLEXIBLE HOSE CONNECTION
19. SWING CHECK VALVE
20. RACOR FUEL OIL FILTER INLET VALVES
21. RACOR FUEL OIL FILTERS
22. RACOR FUEL OIL FILTER OUTLET VALVES
23. INLINE STOP VALVE

FIGURE 2-130. Main Engine Fuel Oil Service Piping System.

NOTE

Three Racor fuel oil filters are installed. A drop in fuel oil pressure indicates a restriction within the fuel oil filter system. This is corrected by placing the standby filter in operation. Then refer the restricted fuel oil system to unit maintenance.

(7) Open the same two Racor fuel oil filter outlet valves (22).

(8) Open inline stop valve (13).

(9) Flood the STBD main engine fuel oil system by manually pumping the hand operated priming pump until a positive pressure is shown on the main engine monitoring panel (FIGURE 2-131) fuel oil pressure gauge (5).

g. Check control air pressure at ERC (20, FIGURE 2-106, Sheet 4 of 10). Pressure should read between 125 and 150 psi.

h. Check that START AIR PRESSURE gauge at STBD Main Engine Air Start panel (2, FIGURE 2-129) reads between 200 and 250 psi.

i. At Main Engine Starting Station (FIGURE 2-132) position the injector control lever (1) not to exceed one-third rack (idle position).

j. On Main Engine Air Start Panel (FIGURE 2-129) press and hold engine START button (1) until engine starts.

NOTE

Engine should start within 10 seconds.

k. Release engine START button.

1. At Main Engine Starting Station (FIGURE 2-132), control speed of engine with injector control lever (1) until governor assumes control, then release the lever.

m. Check lubricating oil pressure (15, FIGURE 2-131).

n. Secure STBD Main Engine lube oil transfer and purification system piping system (FIGURE 2-128) as follows:

(1) Close STBD prelube pump suction valve (11).

(2) Close STBD prelube pump discharge valve (22).

(3) Close discharge valve (19) to STBD MAIN ENGINE lubricating system.

o. Run the engine as follows:

CAUTION

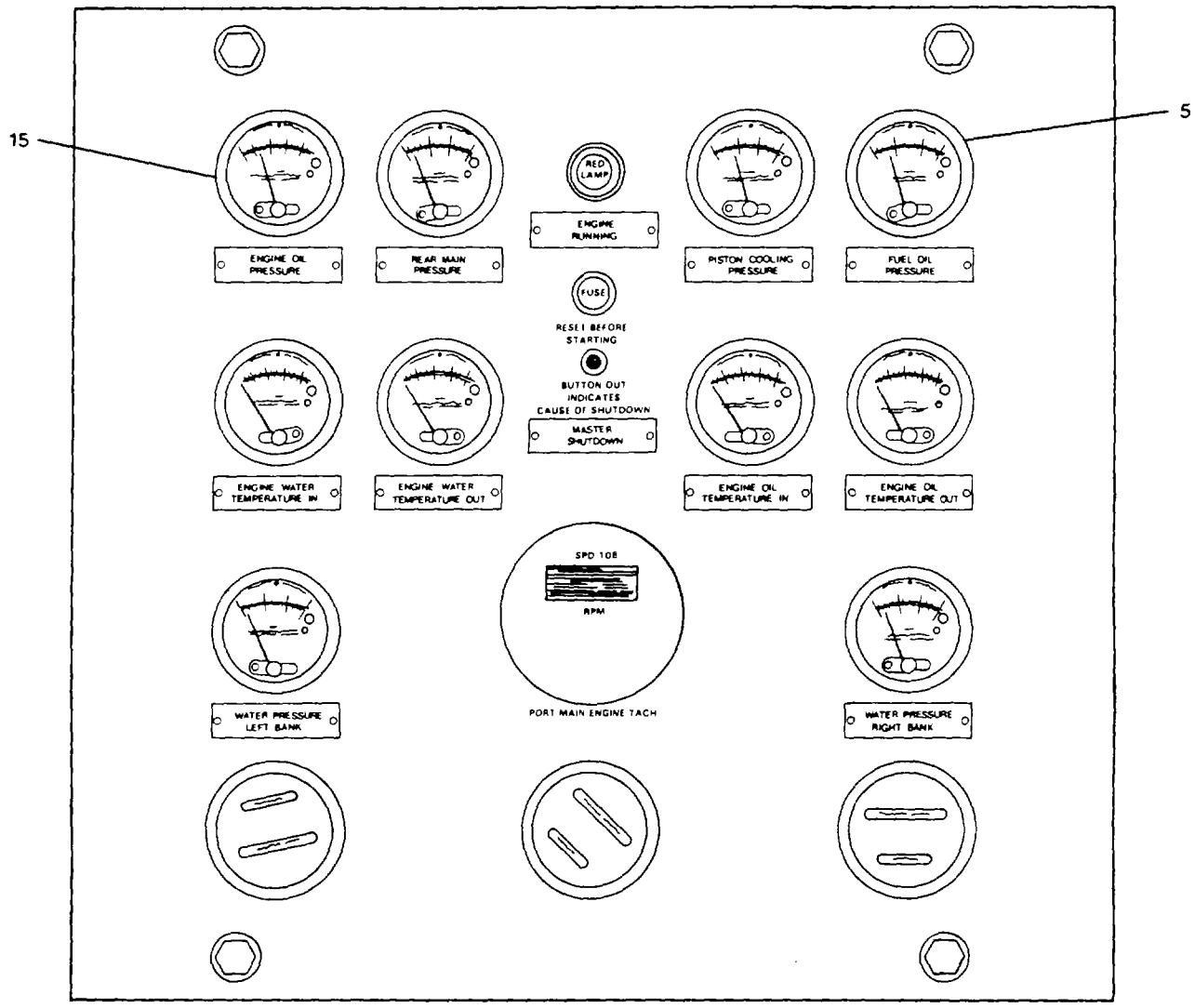
Do not increase engine speed beyond idle until JKT WTR TEMP (18, FIGURE 2-106, Sheet 4 of 12) is 1200F.

(1) After ship is underway, increase the engine speed slowly to full speed by means of the STBD Throttle Control lever (69, FIGURE 2-106, Sheet 6 of 12) at the ERC.

NOTE

If engine has been repaired or overhauled, it is good practice to run the engine slowly with frequent inspections to ensure that the renewed parts are satisfactory. Check pressures and temperatures carefully during this run.

(2) Check oil flow sight gauge at top-rear of the reduction gear to ensure oil is flowing when the gear clutch is engaged.



LEGEND
5. FUEL OIL PRESSURE
15. ENGINE OIL PRESSURE

FIGURE 2-131. Main Engine Monitoring Panel.

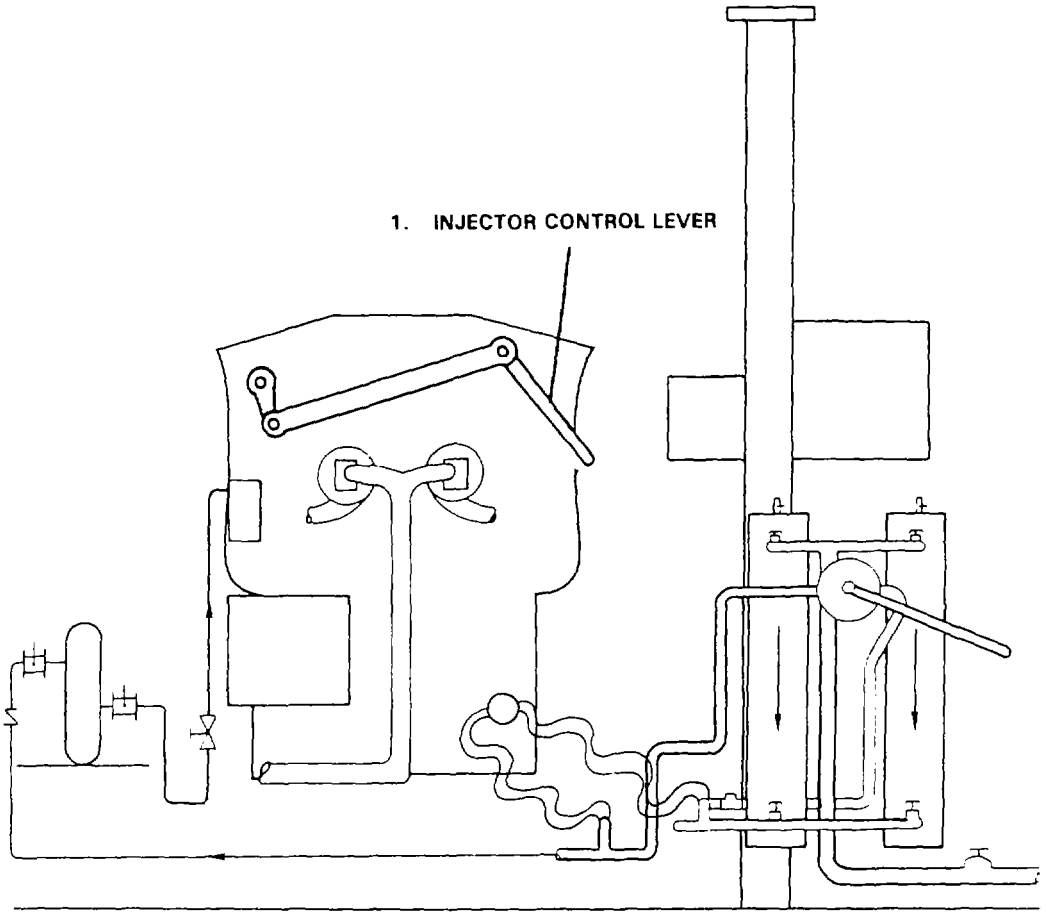


FIGURE 2-132. Main Engine Starting Station.

NOTE

At rated load and speed, ensure the temperature is between 140160 F and pressure is within 260-280 psi.

2-5.6.2. Port Main Engine.

2-5.6.2.1. Port Main Engine Reduction Gear Cooling Water Piping System. (FIGURE 2-125)

a. Open Port Main Engine expansion tank discharge valve (9).

b. Open both Port Main Engine cooling water discharge valves (24) to keel cooler.

c. Open both Port Main Engine cooling water suction valves (23) from keel cooler.

NOTE

Observe expansion tank level indicator; refill expansion tank as needed.

d. Open Port Reduction Gear expansion tank discharge valve (14).

e. Open Port Reduction Gear cooling water suction valve (28) from keel cooler.

f. Open Port Reduction Gear cooling water discharge valve (29) to keel cooler.

g. Open Port Reduction Gear cooling water system vent (16).

h. Open pressure gauge cutout valve (15).

i. Set GEAR OIL COOLING PUMP PORT circuit breaker on Engine Room Motor Control Center (43, FIGURE 2-103, Sheet 3 of 7) to the AUTO position.

2-5.6.2.2. Port Main Engine Lube Oil Circulating System Alignment. (FIGURE 2-127)

a. Open Port Main Engine lube oil filter inlet valve (2).

b. Open Port Main Engine lube oil filter outlet valve (24).

2-5.6.2.3. Port Main Engine Lube Oil Transfer and Purification Piping System Alignment. (FIGURE 2-128)

a. Open Port prelube pump suction valve (36).

b. Open Port prelube pump discharge valve (26).

c. Open discharge valve (28) to Port Main Engine lubricating system.

d. Close valves (37) and (50).

e. Set MAIN ENGINE PRE-LUBE OIL PUMP PORT circuit breaker on Engine Room Motor Control Center (77, FIGURE 2-103, Sheet 5 of 7) to the START position.

f. Press MAIN ENGINE PRE-LUBE OIL PUMP PORT start button (105).

NOTE

Prelubricate engine at a minimum of 10 psi (69 kPa) for a period of not less than 3 and not more than 5 minutes.

2-5.6.2.4. Port Main Engine Fuel Oil Service Piping Alignment. (FIGURE 2-130)

a. Open Port Main Engine inline stop valve (9).

b. Open Port Main Engine fuel oil strainer inlet valve (12).

NOTE

Place one fuel oil strainer in use and keep the other strainer as backup.

c. Open the same fuel oil strainer outlet valve (8).

d. Open two Racor fuel oil filter inlet valves (20).

e. Open the same two Racor fuel oil filter valves (22).

f. Open inline stop valve (13).

g. Manually pump the hand operated priming pump (5) until a positive pressure is shown on the engine fuel oil pressure gauge (15, FIGURE 2-131) located on the main engine monitoring panel.

h. Verify control air pressure reading at ERC (58, FIGURE 2-106, Sheet 6 of 12) is between 125 and 150 psi.

i. Verify AIR PRESSURE gauge reading at port main engine monitor panel (2, FIGURE 2-129) is between 200 and 250 psi.

j. Position the injector control level (1, FIGURE 2-131) not to exceed one-third rack (idle position).

k. Press and hold engine START button on Engine Air Start Panel (1, FIGURE 2-129) until engine starts.

NOTE

Engine should start within 10 seconds.

l. Release engine START button.

m. Control speed of engine with injector control level (1, FIGURE 2-132) until governor assumes control, then release the lever.

n. Secure pre-lube pump.

CAUTION

If minimum pressure (35 psi) is not indicated on the gauge within 10 seconds, stop the engine and refer it to unit maintenance.

o. Check engine oil pressure (15, FIGURE 2-131).

p. Check JKT WTR TEMP (4, FIGURE 2-106, Sheet 2 of 12) to make sure water is being circulated.

2-5.6.2.5. Port Main Engine Lube Oil Transfer and Purification Piping System Shutdown. (FIGURE 2-128)

a. Press MAIN ENGINE PRE-LUBE OIL PUMP-PORT local stop button on Engine Room Motor Control Center (104, FIGURE 2-103, Sheet 5 of 7).

b. Close port prelube pump suction valve (36, FIGURE 2-128).

c. Close port prelube discharge valve (26).

d. Close discharge valve (35) to port main engine lube oil circulating system.

e. Close discharge valve (28) to port main engine lubricating system.

2-5.6.2.6. Running the Engine.

CAUTION

• Do not increase engine speed beyond idle until cooling water temperature is 1200F. Failure to do so could cause damage to the engine.

• If engine has been repaired or overhauled, run the engine slowly with frequent inspections to ensure that the renewed parts are

satisfactory. Check pressures and temperatures carefully during this run.

a. After ship is under way, move Port Throttle Control lever slowly to increase the engine speed to full speed.

b. Verify oil is flowing when the reduction gear clutch is engaged by checking oil flow sight gauge at top-rear of reduction gear.

NOTE

At rated load and speed, ensure the temperature is between 1400-1600F and pressure is between 260-280 psi.

2-5.7. Steering System.

2-5.7.1. Steering System Preoperation Procedures.

WARNING

- **Before applying power to Steering Hydraulic Pump Motors, ensure that rudders are clear aft of vessel**. authority to move rudders.

- **Station a crew member at the Steering Hydraulic Pump Motor Controller Panel (Figure 2-133) in case of faulty or improper performance of the steering system.**

CAUTION

Ensure the brass bar locking the selector switches together between the Emergency Transfer Panels (6, FIGURE 2-29) is in place. If the brass locking bar is missing, ensure both selector switches are turned to the same position to ensure control of both sets of rudder is not split between the engine room and the pilothouse, putting maneuvering of the vessel in jeopardy.

NOTE

If the steering system has not been previously operated, perform the startup procedure in paragraph 2-5.7.1 before performing the preoperation procedures.

a. Turn #1 and #2 Steering Hydraulic Pump Motor Controller selector switches (FIGURE 2-133) to the AUTO position.

b. Turn Emergency Transfer Panels #1 and #2 selector switches (FIGURE 2-134) to the NORMAL position.

c. Observe Engine Room Console indicators (158-177, Sheet 10 of 12, FIGURE 2-106, and 29, 30 and 31, Sheet 5 of 12) for steering system malfunctions during steering system operation. Lit indicators indicate electric and hydraulic malfunctions. Immediately shutdown system if any indicators are lit and notify Officer of the Deck and Engineer Watch Officer.

d. Observe that the #1 and #2 power available indicators (27 and 29, FIGURE 2-135, Sheet 2 of 4) at the Pilothouse Steering stand are lit and the #1 and #2 control power failure indicators (33 and 23) are not lit.

NOTE

On FIGURE 2-135, key numbers 19 through 38 are indicators of system status. Key numbers 27 and 29 light green to indicate power is available for the steering system. The other indicators light red to indicate steering system electrical or mechanical malfunctions or service requirements. Monitor these key numbers during steering system operation. Report malfunctions and service requirements to unit maintenance.

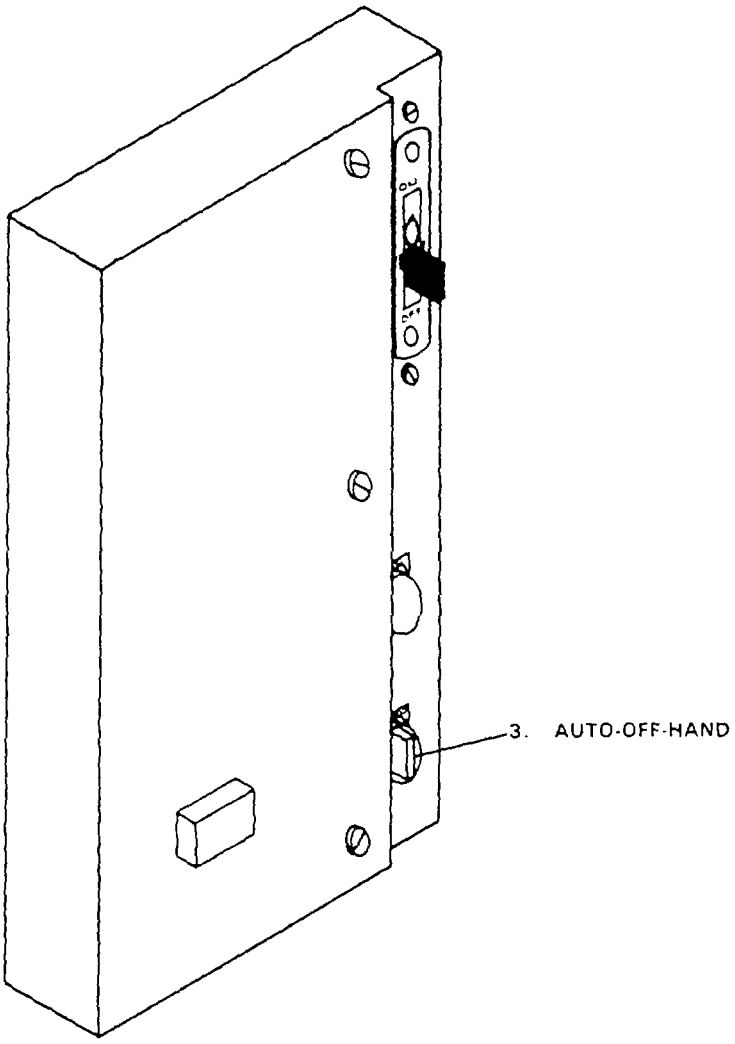


FIGURE 2-133. Steering Hydraulic Pump Motor Controller.

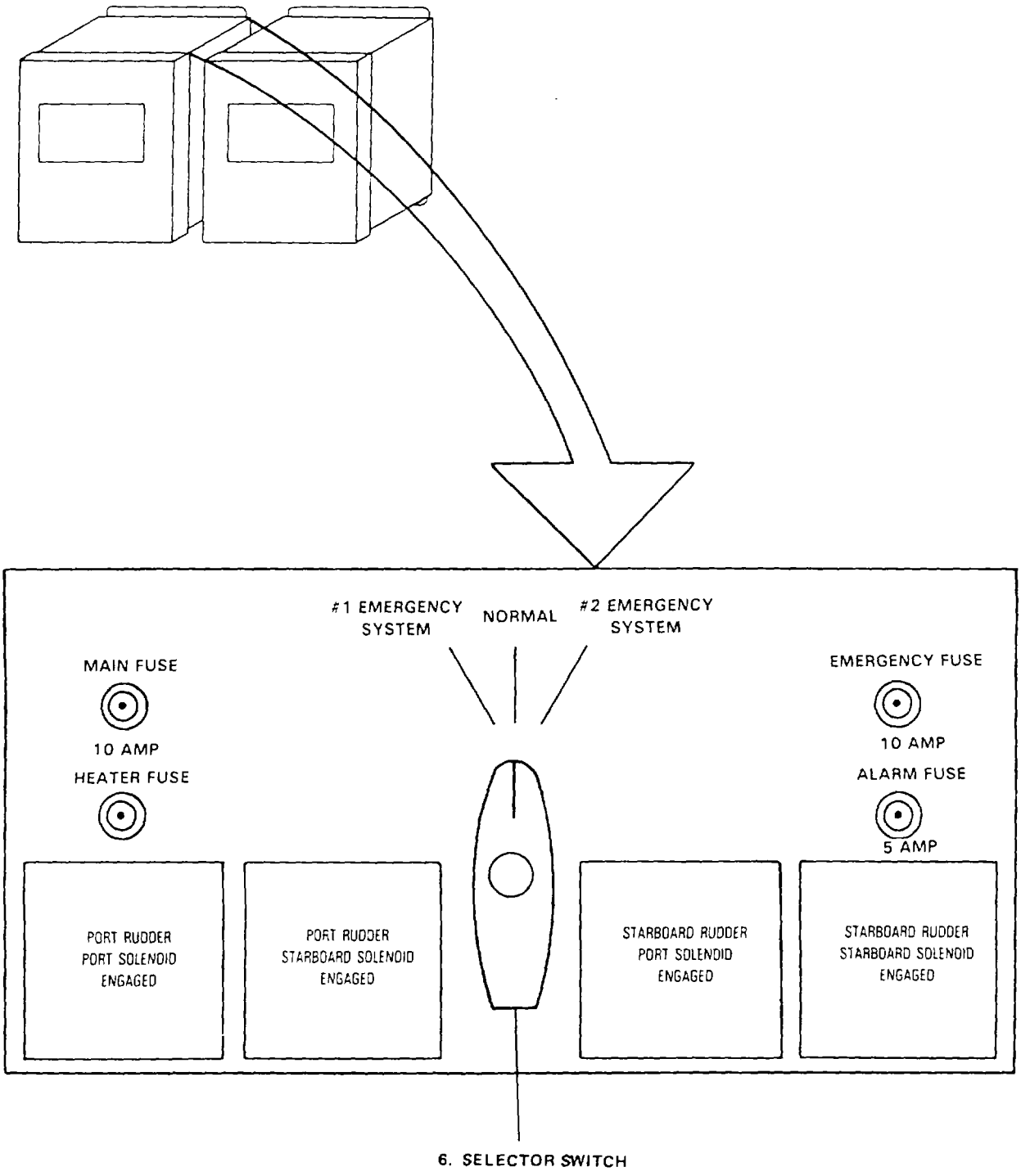


FIGURE 2-134. Emergency Transfer Panel (Sheet 1 of 2).

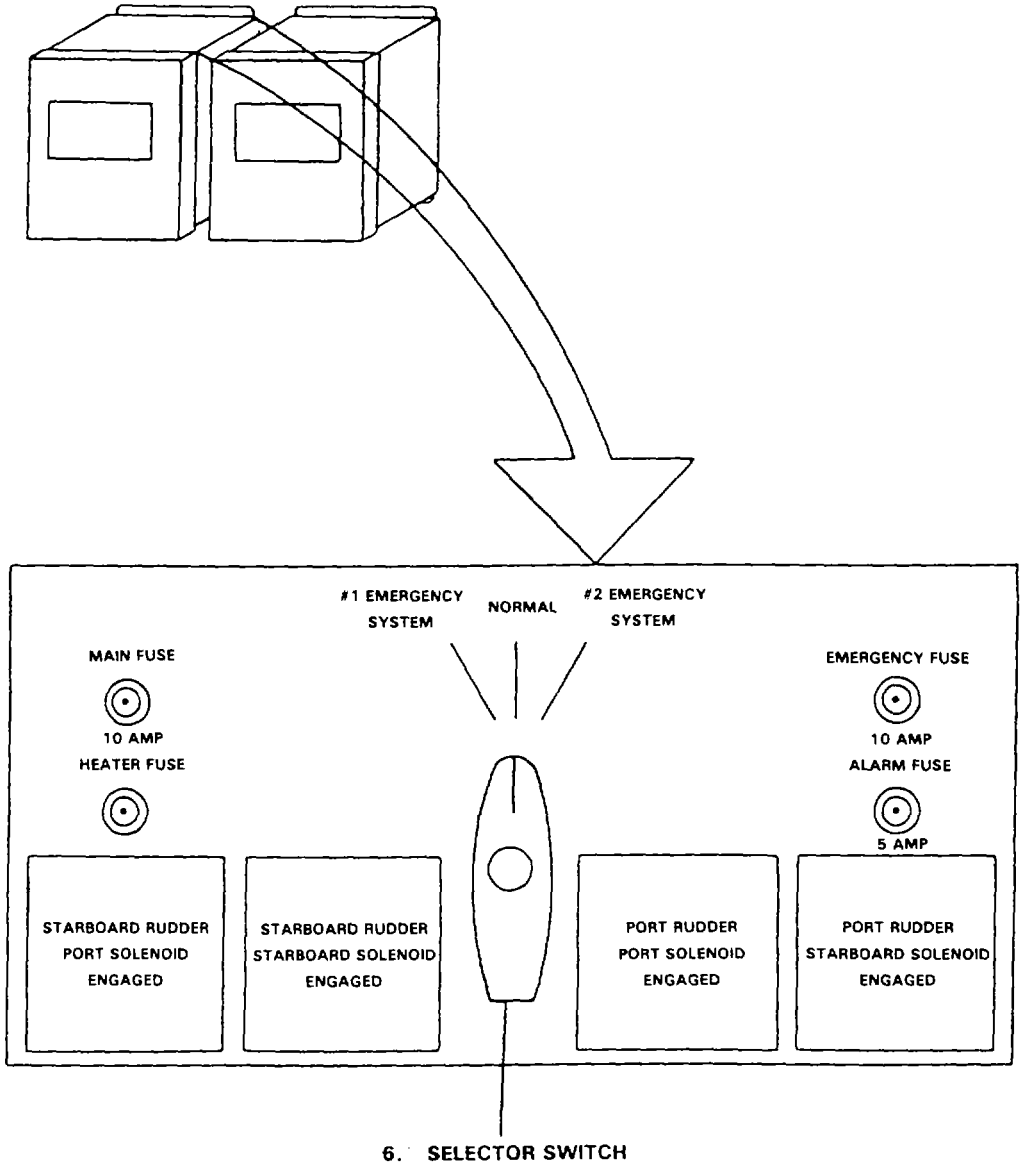


FIGURE 2-134. Emergency Transfer Panel (Sheet 2 of 2).

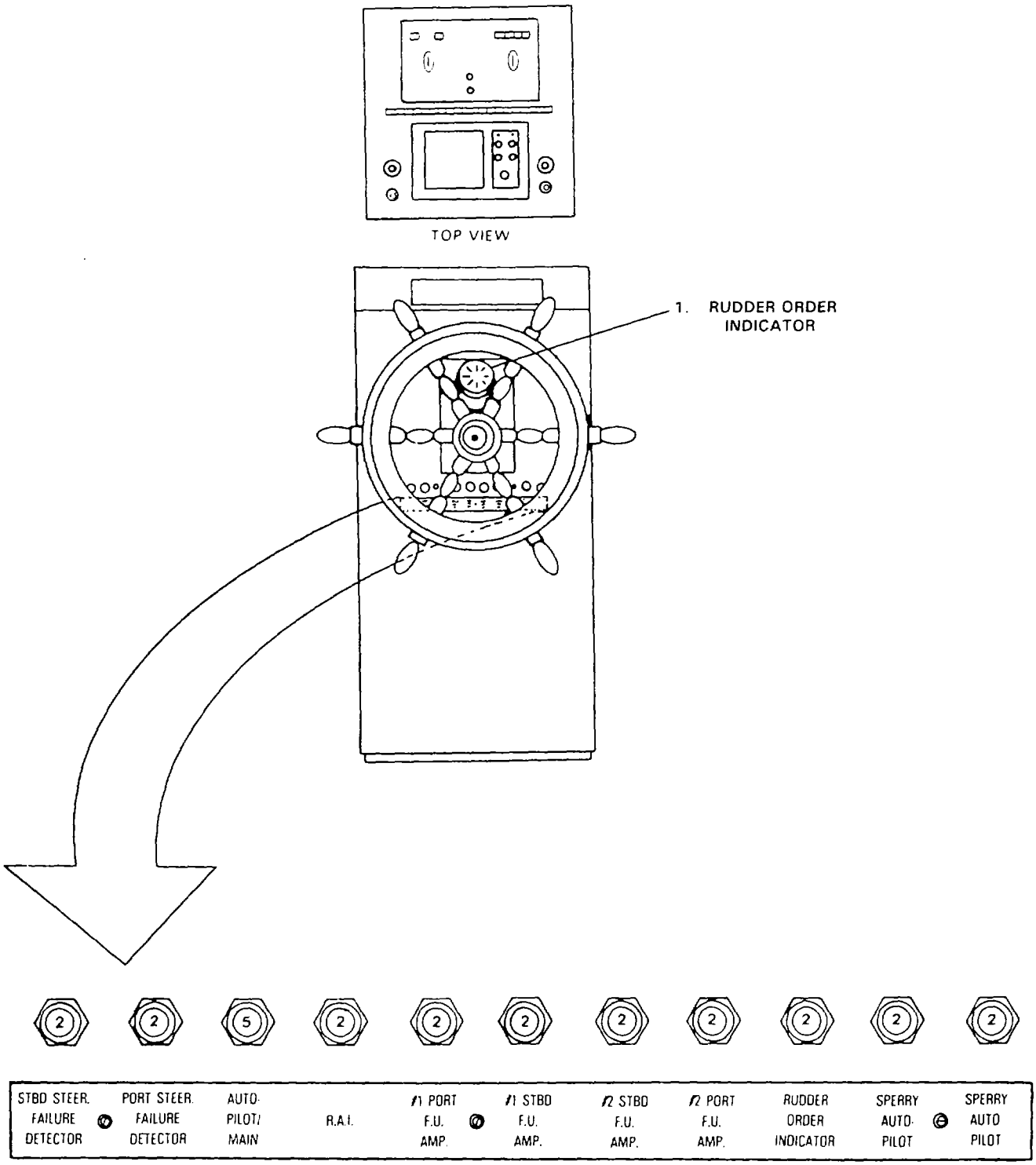
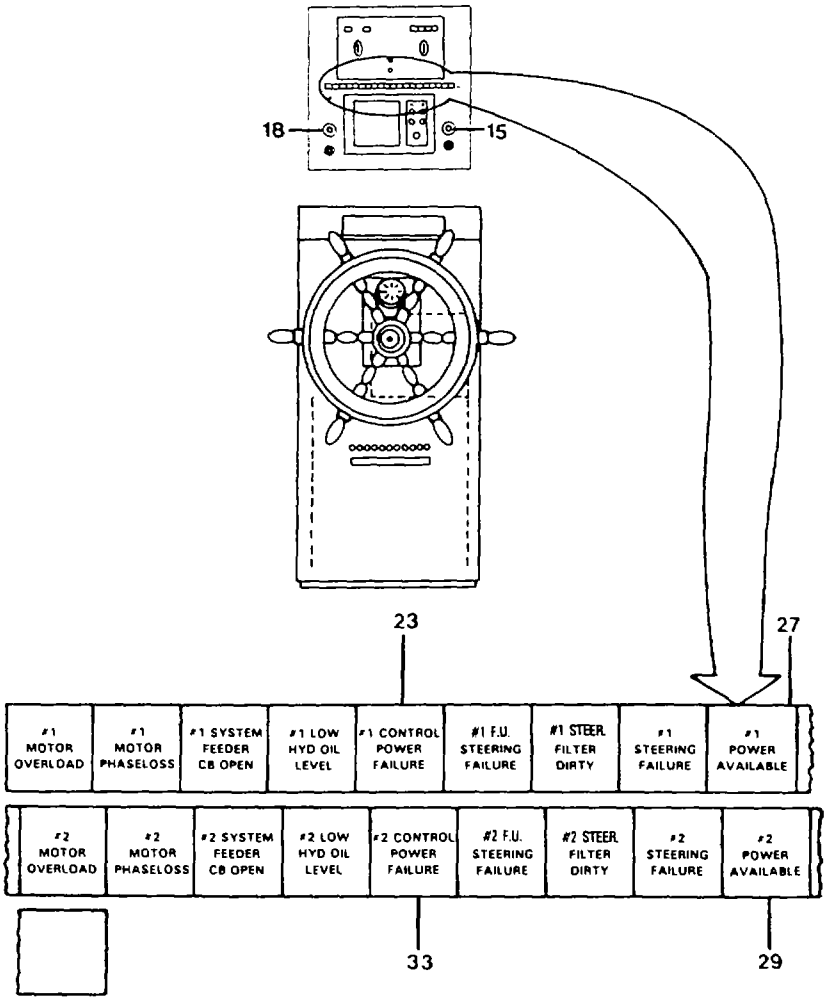


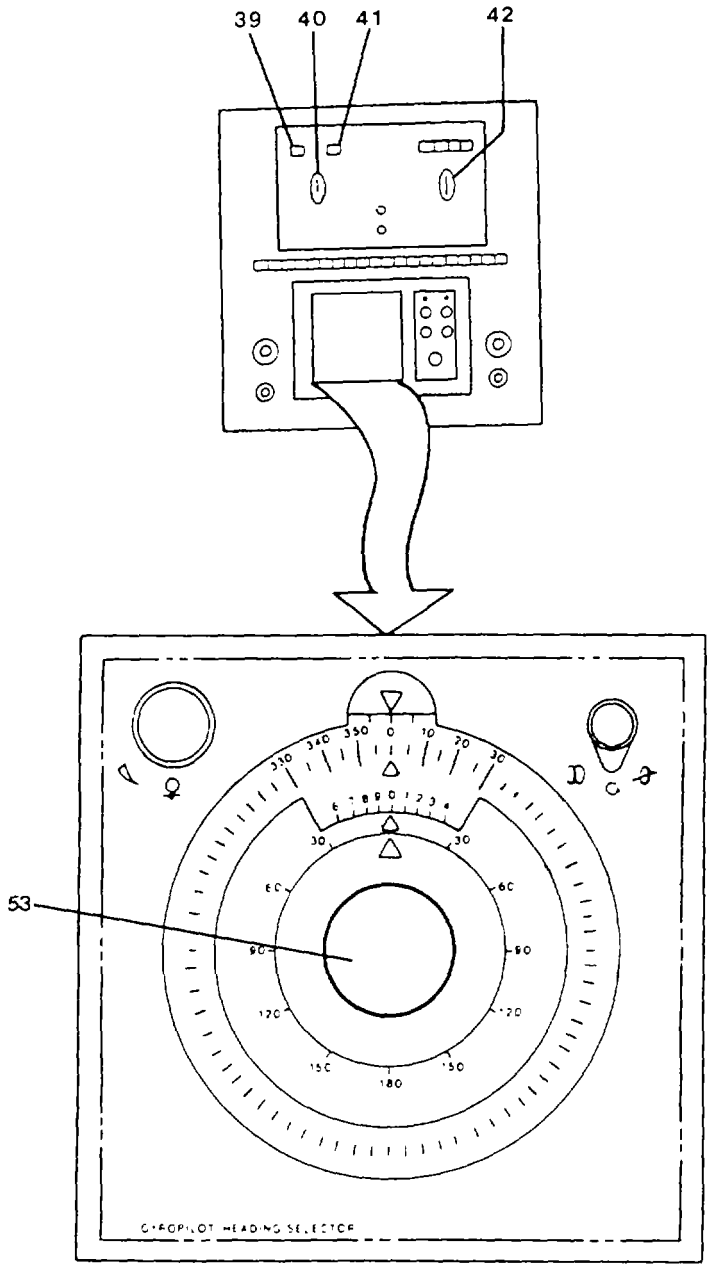
FIGURE 2-135. Pilothouse Steering Cabinet (Sheet 1 of 4).



LEGEND

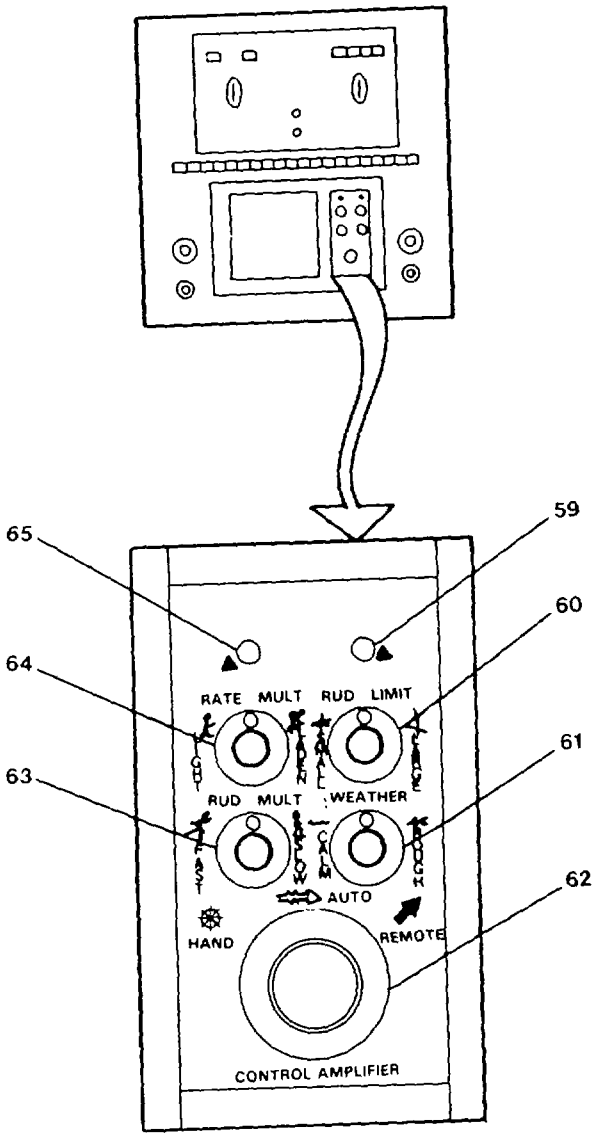
15. NON-FOLLOWUP CONTROLLER
18. NON-FOLLOWUP CONTROLLER
23. #1 CONTROL POWER FAILURE
27. #1 POWER AVAILABLE
29. #2 POWER AVAILABLE
33. #2 CONTROL POWER AVAILABLE

FIGURE 2-135. Pilothouse Steering Cabinet (Sheet 2 of 4).



LEGEND
39. #1 PUMP RUNNING
40. #2 PUMP RUNNING
41. MODE SELECTOR
42. STEERING SELECTOR SWITCH
53. HEADING SELECTOR KNOB

FIGURE 2-135. Pilothouse Steering Cabinet (Sheet 3 of 4).



LEGEND
59. STARBOARD RUDDER INDICATOR
60. RUD LIMIT
61. WEATHER
62. HAND AUTO REMOTE
63. RUD MULT
64. RATE MULT
65. PORT RUDDER INDICATOR

FIGURE 2-135. Pilothouse Steering Cabinet (Sheet 4 of 4).

e. Place the steering selector switch (42, FIGURE 2-135, Sheet 3 of 4) to the Non-Follow-Up position.

f. Place pump select switches (41, Sheet 3 of 4) to #1 PUMP position.

g. Verify that the port PUMP ON indicator (39) is lit green.

h. Operate the port rudder NonFollow-Up Control Lever (18, Sheet 2 of 4) in the port or starboard direction. The port rudders should move to port or starboard as observed on the port pilothouse rudder angle indicator.

i. Operate the starboard rudder Non-Follow-Up Control Lever (15, Sheet 2 of 4) in the port or starboard direction. The starboard rudders should move in the port or starboard direction as indicated by the pilothouse starboard rudder angle indicator.

j. Place Pump Selector switch (41, Sheet 3 of 4) to #2 PUMP position.

k. Verify that the starboard PUMP ON (40, Sheet 3 of 4) indicator is lit green.

l. Operate the port Non-Follow-Up Control Lever (18) in the port or starboard direction. The port rudders should move to port or starboard as observed on the pilothouse port rudder angle indicator.

m. Operate the starboard NonFollow-Up Control Lever (15, Sheet 2 of 4) in the port or starboard direction. The starboard rudders should move to port or starboard as indicated on the pilothouse starboard rudder angle indicator.

n. Place the Steering Selector switch (42, Sheet 3 of 4) to the Follow-Up position.

o. Set the helm to 0° as indicated on the RUDDER ORDER INDICATOR (Sheet 1 of 4). The rudders should be at 0° ± 2° as indicated on both pilothouse port and starboard rudder angle indicators (Sheet 4 of 4).

p. Set the helm to 10° starboard. The rudders should move to 10° starboard ± 2° within 5 seconds.

q. Set the helm to 30° starboard. The rudders should move to 30° + 2° starboard within 10 seconds.

r. Set the helm to 0°. The rudders should move to 0° ± 2° within 15 seconds.

s. Set the helm to 10° port. The rudders should move to 10° ± 2° port within 5 seconds.

t. Set the wheel to 30° port. The rudders should move to 30° ± 2° within 10 seconds.

u. Set the wheel to 0°. The rudders should move to 0° ± 2° within 15 seconds.

NOTE

The steering system is now ready for operation.

2-5.7.2. Steering System Operation.

NOTE

If steering system has not been previously operated, perform startup procedures in paragraph 2-5.7.1. Perform the preoperation procedures in paragraph 26.7.2 before operating steering system for usual operation.

a. Follow-Up Mode of Steering.

NOTE

When the selector switch is turned to the Follow-Up (FU) Mode, the rudders will move to the position of the helm. Prior to switching to FU mode, place helm in the position to align with desired rudder position.

(1) Place the Steering Selector switch (42, FIGURE 2-135, Sheet 3 of 4) in the Follow-Up position.

(2) Place the Pump Selector switch (41) to either #1 or #2 position.

NOTE

The port and starboard rudders are now controlled by the helm. Movement of the helm causes the port and starboard rudders to move in the same direction. If the helm is held in a stationary position, the port and starboard rudders remain in stationary positions.

CAUTION

When moving rudders to hardover position, ease rudders slowly the last 3 degrees of travel to avoid damage to the steering system.

(3) Steer the vessel by rotating helm port or starboard to obtain headings as indicated on the RUDDER ORDER INDICATOR (1, Sheet 1 of 4).

(4) Observe rudder positions on the port and starboard rudder angle indicators.

(5) Maintain selected course position by monitoring gyrocompass repeater (FIGURE 2-118) and rotating helm, as required, to stay on course.

b. Non-Follow-Up Mode of Steering.

(1) Place the Steering Selector switch (42, FIGURE 2-135, Sheet 3 of 4) in the Non-Follow-Up position.

(2) Place the Pump Selector switch (41) to either #1 or #2 position.

NOTE

The port rudders are now independently controlled by the port NonFollow-Up Control Lever. The starboard rudders are now independently controlled by the starboard Non-Follow-Up Control Lever. Movement of the NonFollow-Up Control Levers causes the rudders to move in the same direction unless the Rudder Limit Switch is activated. When the Non-Follow-Up Control Levers are held stationary, the rudders remain stationary. If the NonFollow-Up Control Levers are right position. Rudders remain where positioned.

(3) Obtain new course headings by operating the Non-FollowUp Control Levers as required.

(4) Observe rudder positions on the port and starboard rudder angle indicators.

(5) Maintain course headings by observing the gyrocompass repeater (FIGURE 2-118) and operating the NonFollow-Up Levers as required.

c. Autopilot Mode.

(1) Steer vessel to desired heading in present steering mode.

(2) Set desired heading with Header Selector knob (53, FIGURE 2135, Sheet 3 of 4).

(3) Set helm amidships.

(4) Turn selector switch (42) to Autopilot position.

(5) Turn control amplifier (62) to AUTO position.

(6) Monitor vessel heading to ensure autopilot is keeping vessel on course.

2-5.7.3. Steering System Shutdown.

a. Place Selector switch (42, FIGURE 2-135) to the OFF position.

b. Place Pump Selector switch (41, Sheet 3 of 4) to the OFF position.

c. Place #1 and #2 Steering Hydraulic Pump Motor Controller Selector switches (3, FIGURE 2-133) to the OFF position.

2-5.8. Bow Thruster Operation.

NOTE

The bow thruster engine may be started at the bow thruster compartment or at the engine room console (ERC) after Before Starting Procedures are accomplished. The bow thruster is operated at the pilothouse console (PHC) primarily and can be operated at the ERC, utilizing voice communications for pilothouse commands.

2-5.8.1. Before-Starting Procedure.

a. Check bow thruster lubricating oil day tank level. Level in sight glass (3, FIGURE 2-136) should be full.

b. Align bow thruster lubricating system piping.

(1) Open gear expansion tank inlet valve (1) from bow thruster.

(2) Open gear expansion tank outlet valve (7) to bow thruster.

c. Turn on compartment supply air by pressing START button (5, FIGURE 2-137, Sheet 1 of 2) on BOW THRUSTER COMPARTMENT VENTILATION SYSTEM Controller.

d. Align cooling water system piping (FIGURE 2-138).

(1) Open cooling water expansion tank discharge valve (4) to bow thruster engine.

(2) Open cooling water outlet valve (8) from keel cooler.

(3) Open cooling water inlet valve (7) to keel cooler.

e. Align bow thruster fuel oil system piping (FIGURE 2-139).

(1) Open fuel oil day tank outlet valve

(2) Open inline stop valve (7).

NOTE

Two fuel oil filters are installed. Operate with one and use second filter as a backup.

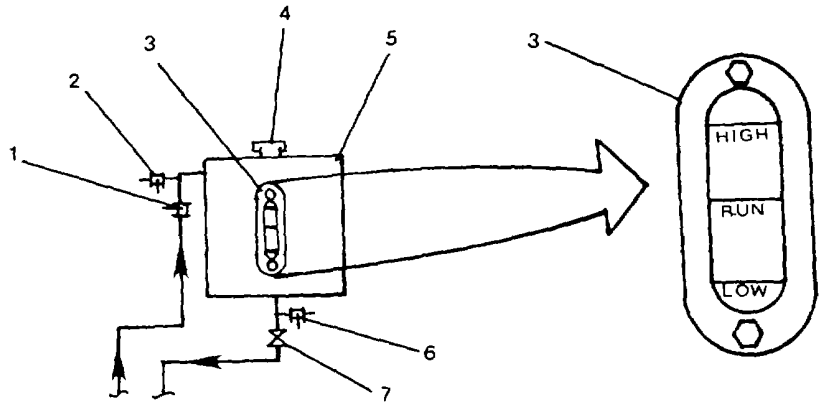
(3) Open fuel oil filter inlet valve (9) or (14).

(4) Open fuel oil filter outlet valve (11) or (12).

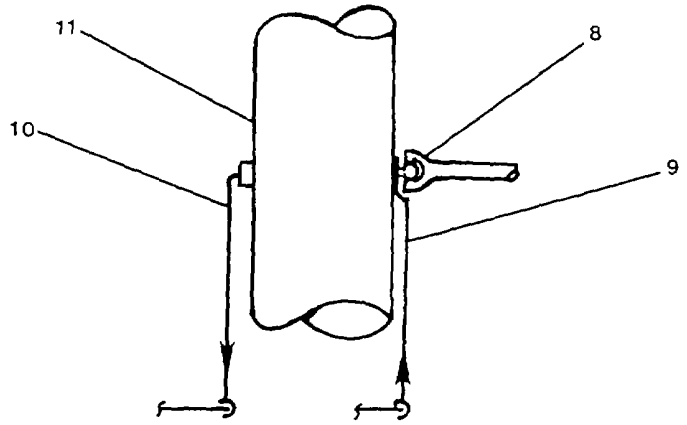
(5) Flood bow thruster fuel system by manually pumping hand operated priming pump (16).

2-5.8.2. Bow Thruster Starting at ERC.

a. Ensure BOW THRUSTER control lever (28, FIGURE 2-106, Sheet 5 of 12) is in NEUTRAL position.



BOW THRUSTER GEAR OIL EXPANSION TANK
LOCATED PORT SIDE MAIN DECK FRAME II
DECK STORES COMPARTMENT

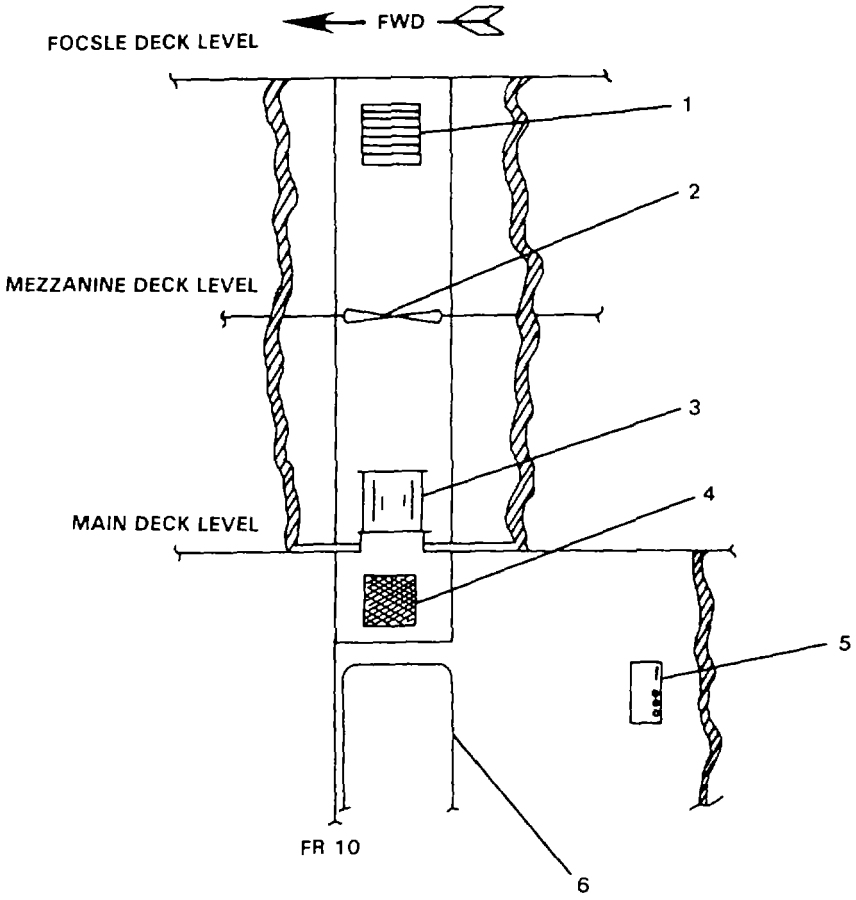


BOW THRUSTER

LEGEND

1. GEAR OIL EXPANSION TANK INLET VALVE FROM BOW THRUSTER
2. GEAR OIL EXPANSION TANK VENT VALVE
3. GEAR OIL EXPANSION TANK LEVEL INDICATOR
4. GEAR OIL EXPANSION TANK FILL PORT
5. GEAR OIL EXPANSION TANK
6. GEAR OIL EXPANSION TANK DRAIN VALVE
7. GEAR OIL EXPANSION TANK OUTLET VALVE TO BOW THRUSTER
8. BOW THRUSTER DRIVE SHAFT
9. GEAR OIL EXPANSION TANK DISCHARGE PIPE TO BOW THRUSTER
10. GEAR OIL RETURN PIPE TO GEAR OIL EXPANSION TANK
11. BOW THRUSTER TUNNEL

FIGURE 2-136. Bow Thruster Lube Oil System.

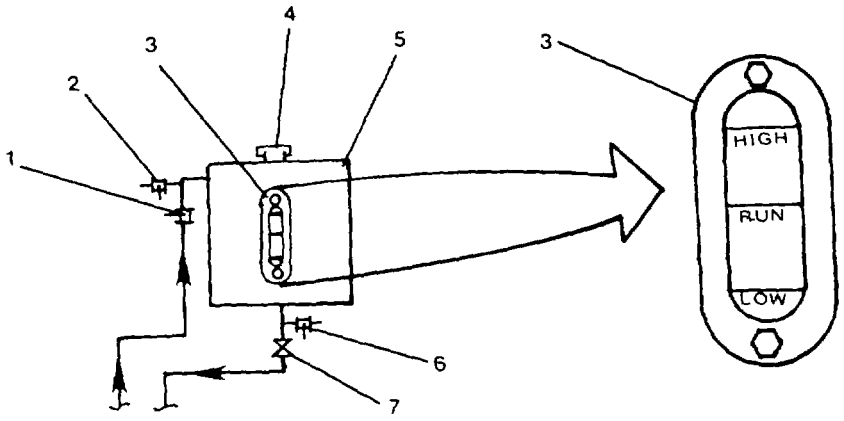


BOW THRUSTER ROOM VENTILATION SUPPLY
ELEVATION VIEW, CENTER LINE LOOKING TO STBD

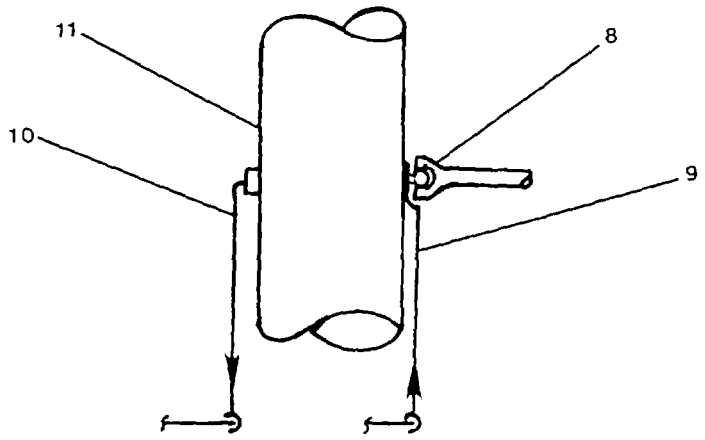
LEGEND

1. BOW THRUSTER COMPARTMENT SUPPLY AIR INTAKE EQUIPPED WITH FIXED LOUVERS AND BUG SCREEN
2. MEZZANINE DECK CUTOUT
3. BOW THRUSTER COMPARTMENT SUPPLY FAN
4. BOW THRUSTER COMPARTMENT SUPPLY AIR INLET
5. BOW THRUSTER SUPPLY FAN CONTROLLER
6. BOW THRUSTER COMPARTMENT DOORWAY STBD SIDE
7. BOW THRUSTER COMPARTMENT NATURAL VENTILATION EXHAUST AIR OUTLET EQUIPPED WITH LOUVERS AND BIRD SCREEN
8. MAIN DECK CUTOUT FOR HATCH
9. BOW THRUSTER ENGINE EXHAUST PIPE
10. BOW THRUSTER COMPARTMENT DOORWAY PORT SIDE

FIGURE 2-137. Bow Thruster Room Ventilation Supply (Sheet 1 of 2).



BOW THRUSTER GEAR OIL EXPANSION TANK
LOCATED PORT SIDE MAIN DECK FRAME II
DECK STORES COMPARTMENT

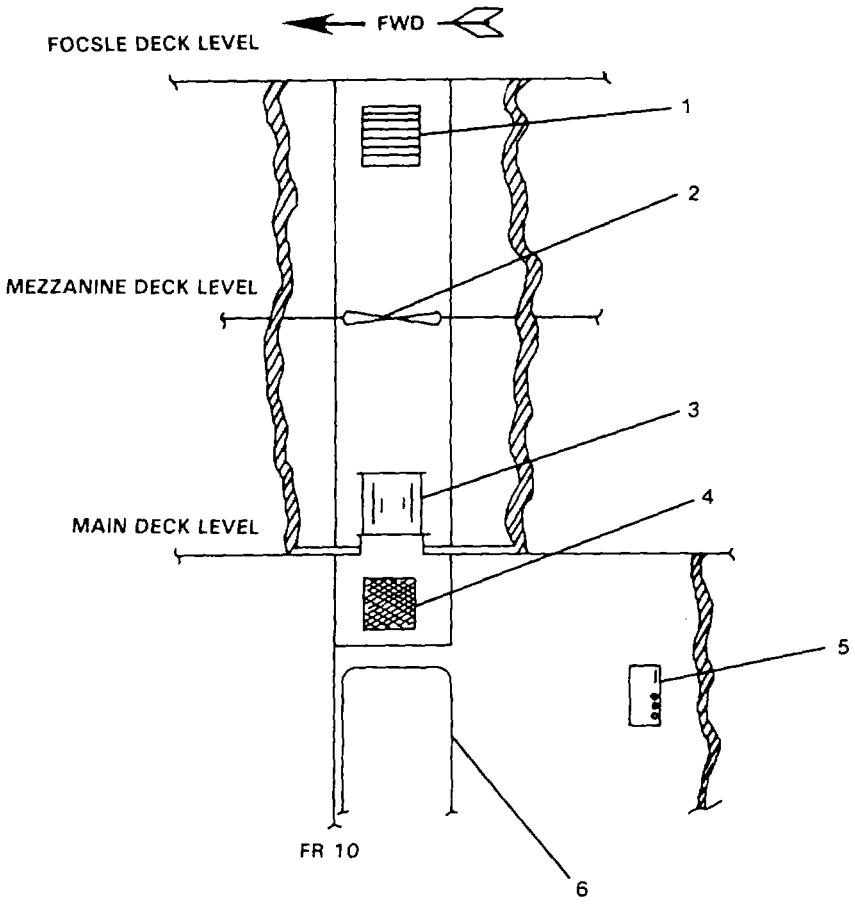


BOW THRUSTER

LEGEND

1. GEAR OIL EXPANSION TANK INLET VALVE FROM BOW THRUSTER
2. GEAR OIL EXPANSION TANK VENT VALVE
3. GEAR OIL EXPANSION TANK LEVEL INDICATOR
4. GEAR OIL EXPANSION TANK FILL PORT
5. GEAR OIL EXPANSION TANK
6. GEAR OIL EXPANSION TANK DRAIN VALVE
7. GEAR OIL EXPANSION TANK OUTLET VALVE TO BOW THRUSTER
8. BOW THRUSTER DRIVE SHAFT
9. GEAR OIL EXPANSION TANK DISCHARGE PIPE TO BOW THRUSTER
10. GEAR OIL RETURN PIPE TO GEAR OIL EXPANSION TANK
11. BOW THRUSTER TUNNEL

FIGURE 2-136. Bow Thruster Lube Oil System.



BOW THRUSTER ROOM VENTILATION SUPPLY
ELEVATION VIEW, CENTER LINE LOOKING TO STBD

LEGEND

1. BOW THRUSTER COMPARTMENT SUPPLY AIR INTAKE EQUIPPED WITH FIXED LOUVERS AND BUG SCREEN
2. MEZZANINE DECK CUTOUT
3. BOW THRUSTER COMPARTMENT SUPPLY FAN
4. BOW THRUSTER COMPARTMENT SUPPLY AIR INLET
5. BOW THRUSTER SUPPLY FAN CONTROLLER
6. BOW THRUSTER COMPARTMENT DOORWAY STBD SIDE
7. BOW THRUSTER COMPARTMENT NATURAL VENTILATION EXHAUST AIR OUTLET EQUIPPED WITH LOUVERS AND BIRD SCREEN
8. MAIN DECK CUTOUT FOR HATCH
9. BOW THRUSTER ENGINE EXHAUST PIPE
10. BOW THRUSTER COMPARTMENT DOORWAY PORT SIDE

FIGURE 2-137. Bow Thruster Room Ventilation Supply (Sheet 1 of 2).

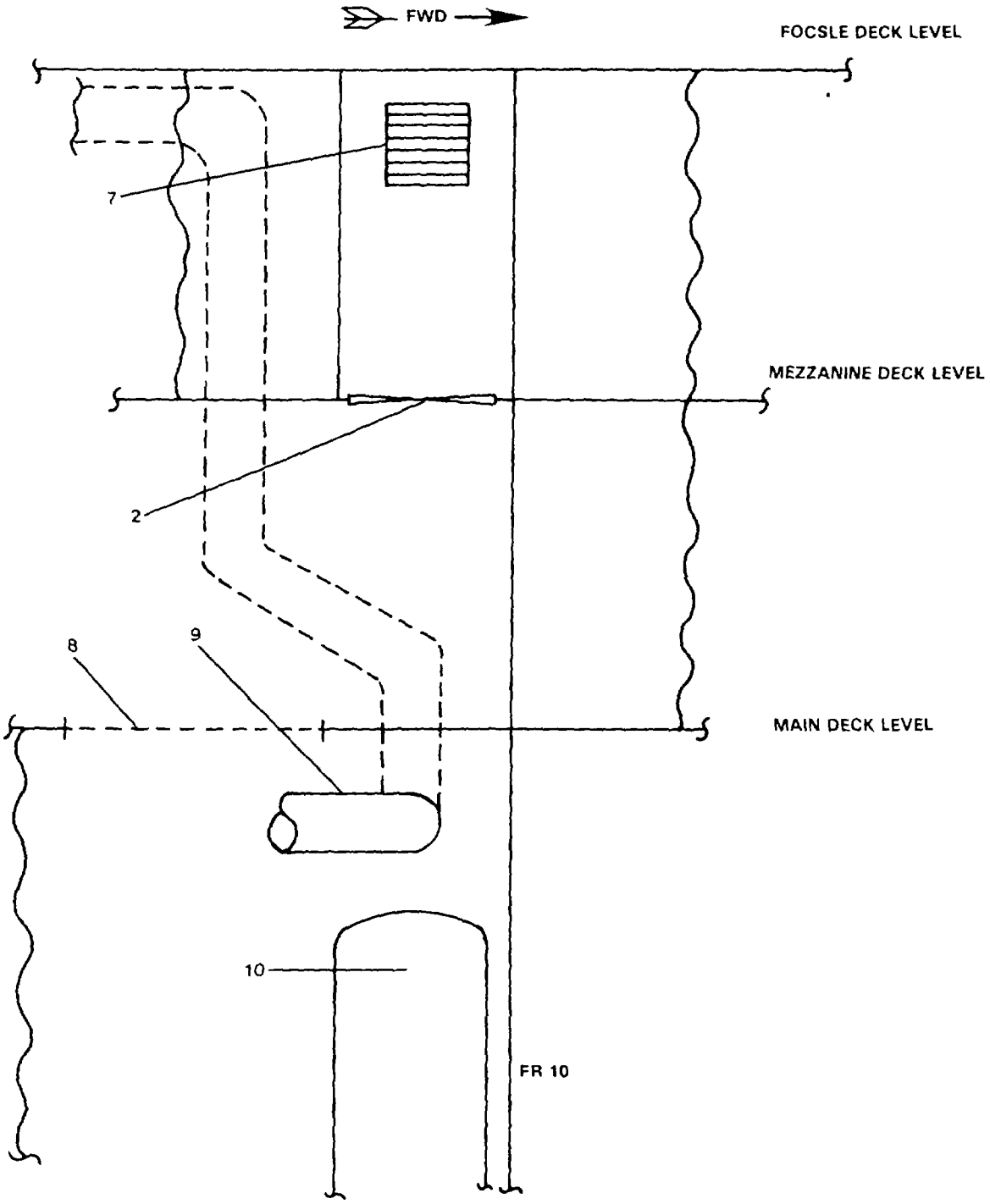
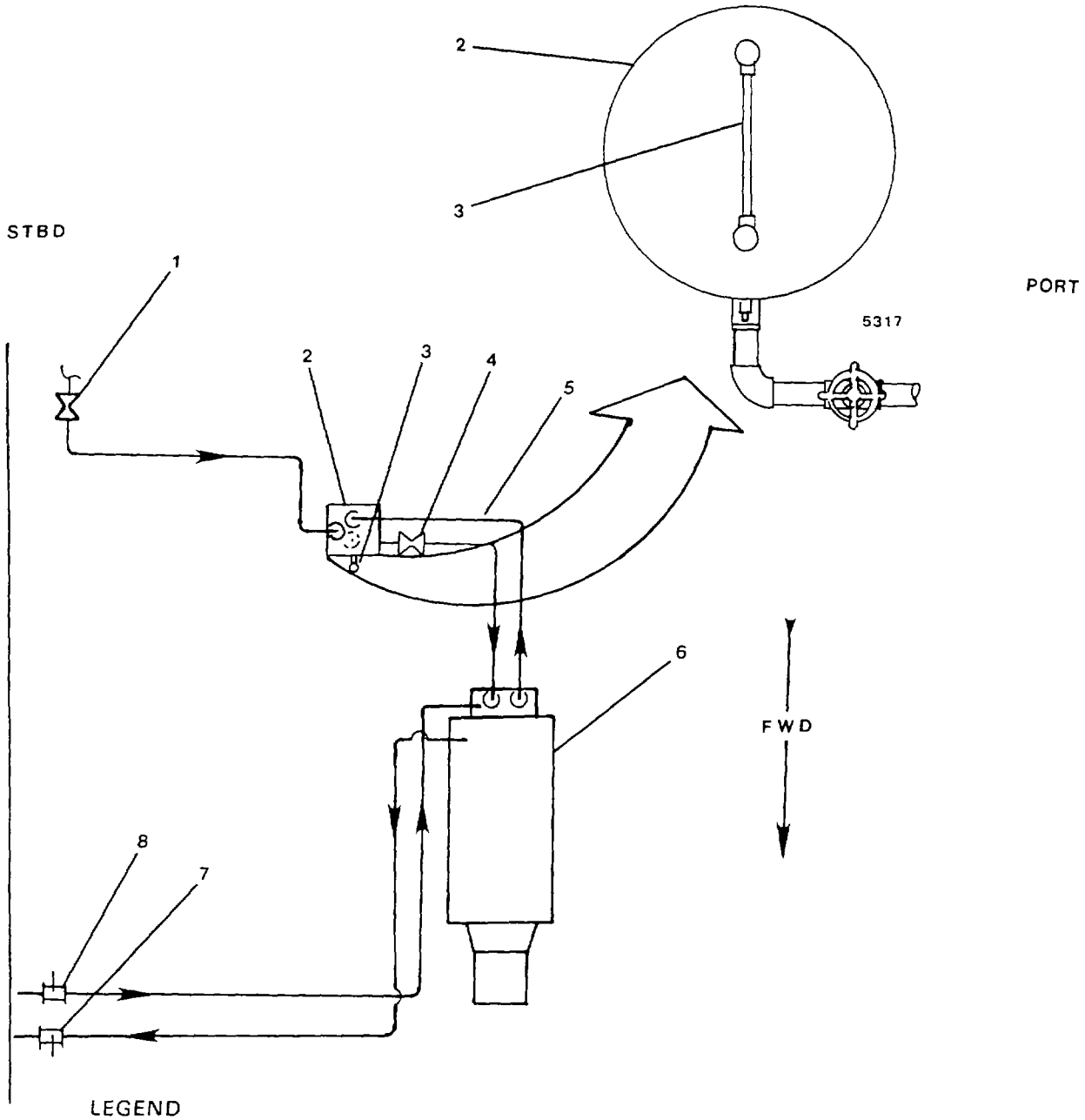


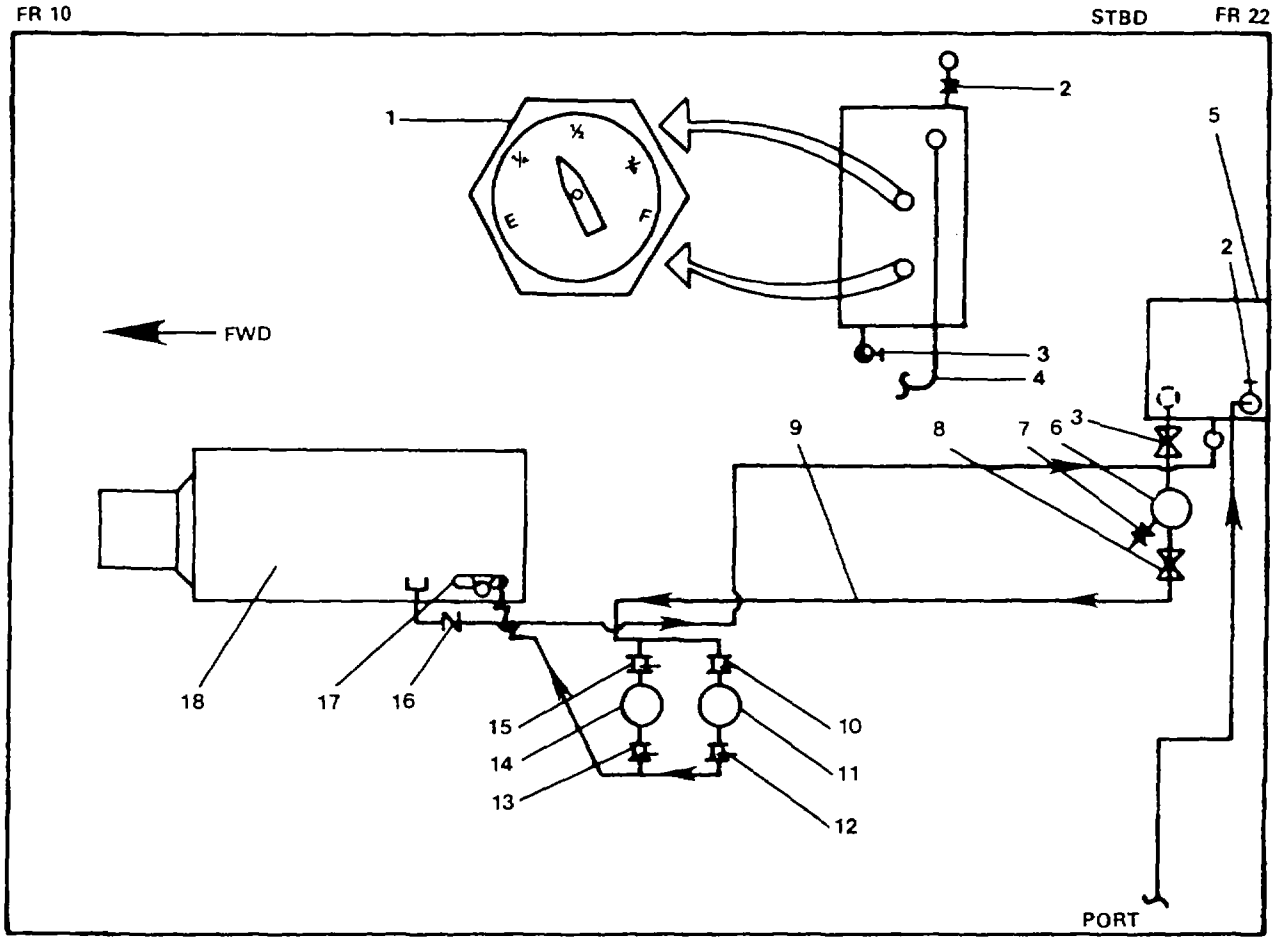
FIGURE 2-137. Bow Thruster Room Ventilation Supply (Sheet 2 of 2).



LEGEND

1. COOLING WATER EXPANSION TANK FRESH WATER FILL VALVE
2. COOLING WATER EXPANSION TANK
3. EXPANSION TANK SIGHT GLASS LEVEL INDICATOR
4. EXPANSION TANK DISCHARGE VALVE TO BOW THRUSTER ENGINE
5. COOLING WATER VENT PIPE
6. BOW THRUSTER ENGINE
7. COOLING WATER INLET TO KEEL COOLER
8. COOLING WATER OUTLET VALVE FROM KEEL COOLER

FIGURE 2-138. Bow Thruster Cooling Water System.



LEGEND

1. TANK LEVEL INDICATORS
2. DAY TANK FILL VALVE
3. FUEL OIL DAY TANK OUTLET VALVE
4. FUEL OIL RETURN DISCHARGE PIPE
5. DAY TANK
6. WATER TRAP
7. WATER TRAP DRAIN VALVE
8. INLINE STOP VALVE
9. FUEL OIL SERVICE SYSTEM SUCTION PIPE
10. FUEL FILTER INLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER OUTLET VALVE
13. FUEL OIL FILTER OUTLET VALVE
14. FUEL OIL FILTER
15. FUEL OIL FILTER INLET VALVE
16. SWING CHECK VALVE
17. FUEL OIL PRIMING PUMP
18. BOW THRUSTER ENGINE

FIGURE 2-139. Bow Thruster Fuel Oil Piping.

b. Check that CONTAIR TRANSF actuator (75, Sheet 6 of 12) is in the AFT position.

CAUTION

Do not crank engine for more than 30 seconds. Allow 2 minutes for starter to cool.

c. Press BOW THRUSTER START pushbutton (56, Sheet 5 of 12) and hold until engine starts.

d. Observe B.T. TACH indicator (55, Sheet 5 of 12) for engine RPM indication that engine has started.

e. Release BOW THRUSTER START pushbutton (56).

CAUTION

For best performance and maximum service life of the engine and marine gear, shifting of the marine gear must be done in a specific manner.

SHIFTING	RPM
Neutral to PORT or STARBOARD	Maximum 1500 RPM
Shifting across NEUTRAL	Maximum 1000 RPM

2-5.8.3. Neutral to Port or Starboard Operation at ERC.

CAUTION

Do not activate and use the bow thruster until the thruster tunnel is completely submerged.

NOTE

Moving the BOW THRUSTER control lever (28, FIGURE 2-106, Sheet 5 of 12) either PORT or STARBOARD in the first 15 degrees of either quadrant will engage the marine gear. Increasing control lever movement beyond the 15 degree point will cause throttle increase corresponding to maximum control lever travel.

a. Check B.T. TACH indicator (55, Sheet 5 of 12) for idle RPM indication (maximum 1000 rpm).

b. Move BOW THRUSTER control lever (28, Sheet 5 of 12) to PORT or STARBOARD direction to engage marine gear.

CAUTION

Allow 2 seconds before increasing engine speed.

c. Increase BOW THRUSTER control lever movement to desired engine rpm (maximum 2800) as indicated on B.T. TACH indicator (55, Sheet 5 of 12).

2-5.8.4. Port or Starboard to Neutral Operation at ERC.

a. Move BOW THRUSTER control lever (28, Sheet 5 of 12) to low idle position.

b. Hesitate 2 seconds, then move BOW THRUSTER control lever (28) to NEUTRAL.

2-5.8.5. Reversing Direction Operation at ERC.

CAUTION

Never reverse direction of the bow thruster at full engine rpm. Damage to marine gear will result.

a. Move BOW THRUSTER control lever (28, Sheet 5 of 12) to low idle position (1000 rpm) as indicated on B.T. TACH indicator (55).

b. Hesitate 2 seconds, then move BOW THRUSTER control lever (28) to new position, PORT or STARBOARD.

c. Increase BOW THRUSTER control lever (28) movement to new direction and desired engine rpm.

2-5.8.6. Shifting Control Air to PHC.

NOTE

To allow bow thruster operation at the PHC, control air must be directed to the console.

a. Position CONTAIR TRANSF actuator (75, Sheet 6 of 12) at ERC to forward position.

b. At PHC, push down on TRANSFER VALVE (19, FIGURE 2-140, Sheet 1 of 2).

2-5.8.7. Neutral to Port or Starboard Operation at PHC.

CAUTION

• Do not use the bow thruster until the thruster tunnel is completely submerged.

• Moving the BOW THRUSTER control lever either PORT or STARBOARD in the first 15 degrees of either quadrant will engage the marine gear. Increasing control lever movement beyond 15 degrees will cause throttle increase correspondingly to maximum control lever travel.

a. Check BOWTHRUST TACH indicator (FIGURE 2-140, Sheet 2 of 2) for idle rpm (not to exceed 1000 rpm).

b. Move BOW THRUSTER control (6, Sheet 1 of 2) to PORT or STARBOARD direction and pause 2 seconds to allow marine gear to fully engage.

c. Increase BOW THRUSTER control movement to desired engine rpm (maximum 2800).

2-5.8.8. Port or Starboard to Neutral Operation at PHC.

a. Move BOW THRUSTER control (6, Sheet 1 of 2) to low idle position.

b. Hesitate 2 seconds and then move BOW THRUSTER control to NEUTRAL position.

2-5.8.9. Reversing Direction Operation at PHC.

CAUTION

Never reverse direction of bow thruster at full engine rpm. Damage to marine gear will result.

a. Move BOW THRUSTER control (6, Sheet 1 of 2) to low idle position (1000 rpm).

b. Hesitate 2 seconds, then move BOW THRUSTER control (6 to new position through NEUTRAL.

c. Increase BOW THRUSTER control movement to desired engine rpm.

2-5.8.10. Shutdown at PHC.

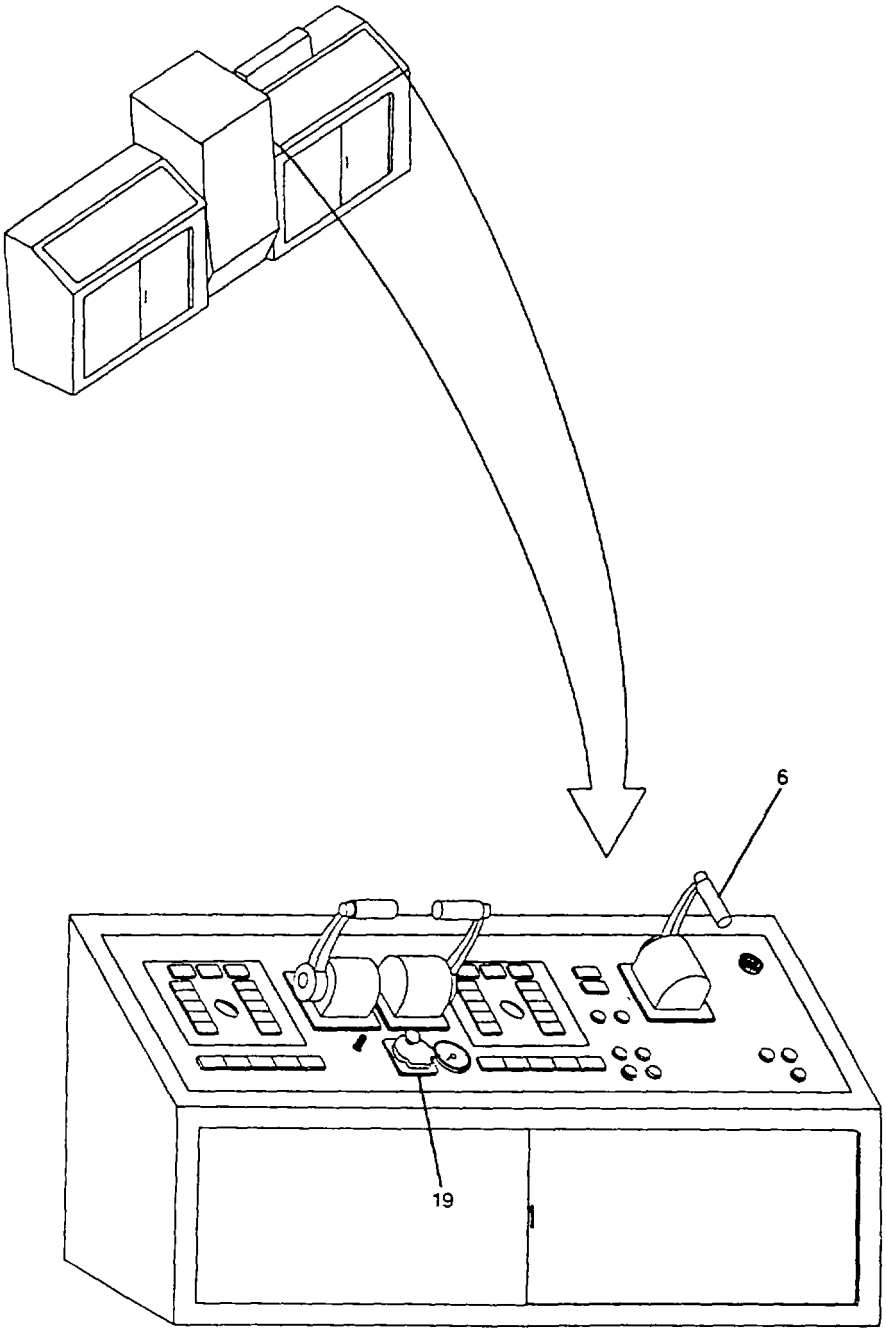
a. Check that BOW THRUSTER control (6, Sheet I of 2) is in NEUTRAL position.

b. Pull up on TRANSFER VALVE (19, Sheet I of 2).

2-5.8.11. Shutdown at ERC.

a. Check that CONTAIR TRANSF actuator (75, FIGURE 2-106, Sheet 6 of 12) is in AFT position.

b. Check that BOW THRUSTER control lever (28, Sheet 5 of 12) is in NEUTRAL position.



LEGEND
6. BOW THRUSTER CONTROL
19. TRANSFER VALVE

FIGURE 2-140. Pilothouse Console (Sheet 1 of 2).

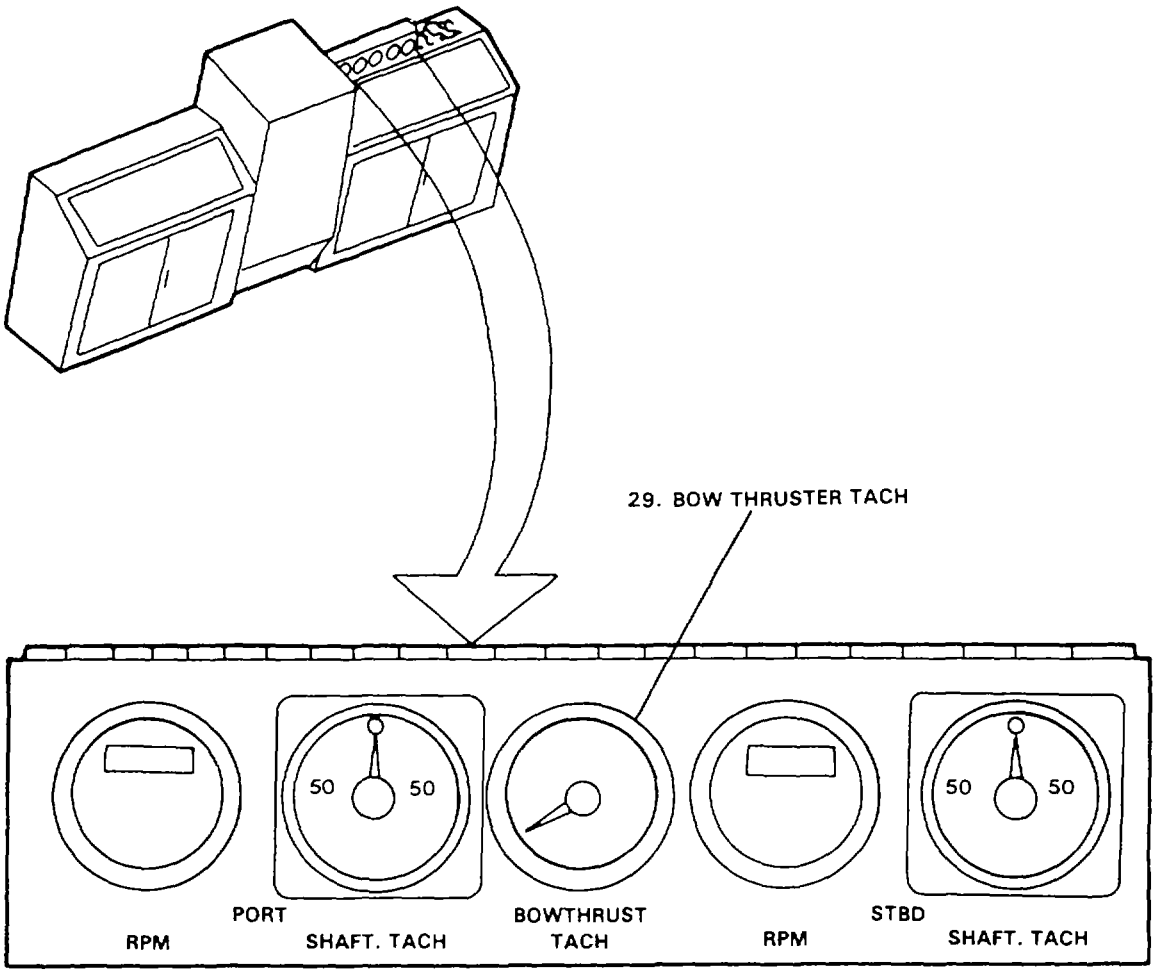


FIGURE 2-140. Pilothouse Console (Sheet 2 of 2).

2-5.8.12. After Shutdown Bow Thruster Compartment

a. Secure bow thruster fuel oil system piping (FIGURE 2-139).

(1) Close fuel oil day tank outlet valve (3).

(2) Close inline stop valve (7).

NOTE

Two fuel oil filters are installed. Secure fuel filter inlet and outlet valves in use.

(3) Close fuel oil filter inlet valve (9) or (14).

(4) Close fuel oil filter outlet valve (11) or (12).

b. Secure engine cooling water system piping (FIGURE 2-138).

(1) Close cooling water inlet valve (7) to keel cooler.

(2) Close cooling water outlet valve (8) from keel cooler.

(3) Close cooling water expansion tank discharge valve (4) to bow thruster engine.

(4) Close cooling water expansion tank fresh water fill valve (1).

c. Turn off compartment air supply by pressing STOP button (5, FIGURE 2-137) on BOW THRUSTER COMPARTMENT VENTILATION SYSTEM controller.

2-5.8.13. After Shutdown Port Deck Stores Compartment

a. Secure bow thruster lubricating oil system (FIGURE 2-136).

(1) Close gear oil expansion tank inlet valve (1) from bow thruster.

(2) Close gear oil expansion tank outlet valve (7) to bow thruster.

b. Check lubricating oil day tank level (3, FIGURE 2-136).

c. If necessary, add oil at expansion tank fill port (4).

2-5.9. Halon 1301 Fire Suppression Operation The Halon 1301 Fire Suppression System consists of engine room, bow thruster room, emergency generator room and the paint locker.

2-5.9.1. Engine Room Halon Operation.

WARNING

- **A waiting period of at least 30 minutes is required to ensure that the area has cooled and the fire will not re-ignite upon entry of personnel. When a hatch or door is opened or the ventilation system is restarted, oxygen enters the area and dilutes the Halon.**
- **Do not re-enter the space where Halon has been used to extinguish a fire unless wearing an oxygen breathing apparatus (OBA).**
- **Wear the OBA until the atmosphere is certified safe. Anyone suffering from the toxic effects of Halon 1301 vapor should immediately move, or be moved, to fresh air.**
- **All personnel must leave the engine room immediately upon activation of the Halon 1301 Fire Suppression System alarm. System discharges within 25 seconds after activation. Evacuating personnel must secure the doors as they evacuate the area.**

a. Surface Pull Box.

NOTE

- **Both pull boxes are mounted on the bulkhead forward of the starboard engine room door.**
- **The Halon 1301 Fire Suppression System for the engine room cannot be automatically activated unless both pull box handles are pulled.**

(1) Break glass on VALVE RELEASE surface pull box (FIGURE 2-141) with hammer (3).

(2) Pull handle (2) away from pull box (1) 4 to 6 inches. Release handle.

(3) Break glass on CYLINDER RELEASE surface pull box with hammer (3).

(4) Pull handle (2) away from pull box (1) 4 to 6 inches. Release handle.

NOTE

- **Alarm siren will sound in engine room. Discharge of Halon will be delayed for 25 seconds to allow evacuation of engine room. Discharge of Halon is completed in 10 seconds.**
- **Pressure Operated Switches Reset. During the 25 second warning time, four PRESSURE OPERATED SWITCHES automatically shut down the engine room console, two main engines, two ship's service generators, fuel oil supplies, and the ventilation system in the engine room. Before this equipment can be restarted, the four PRESSURE OPERATED SWITCHES must be reset.**

b. Reset the four pressure switches located above Halon bottles on the forward bulkhead of the Upper Machinery Room by pushing the stem (1, FIGURE 2-142) down to the SET position.

NOTE

Further resetting is not required. The Halon and C02 cylinders must be recharged or replaced and the pull boxes must be reset by depot maintenance when the vessel is docked.

2-5.9.2. Bow Thruster Room Halon Operation

WARNING

All personnel shall leave the bow thruster room immediately upon activation of the Halon 1301 Fire Suppression System alarm. System discharges within 25 seconds after activation. Evacuating personnel must secure all hatchways and doors as they evacuate the area.

a. Watertight Pull Box Operation.

NOTE

Both watertight pull boxes are mounted on the exterior bulkhead to the right of the DECK STORES watertight door.

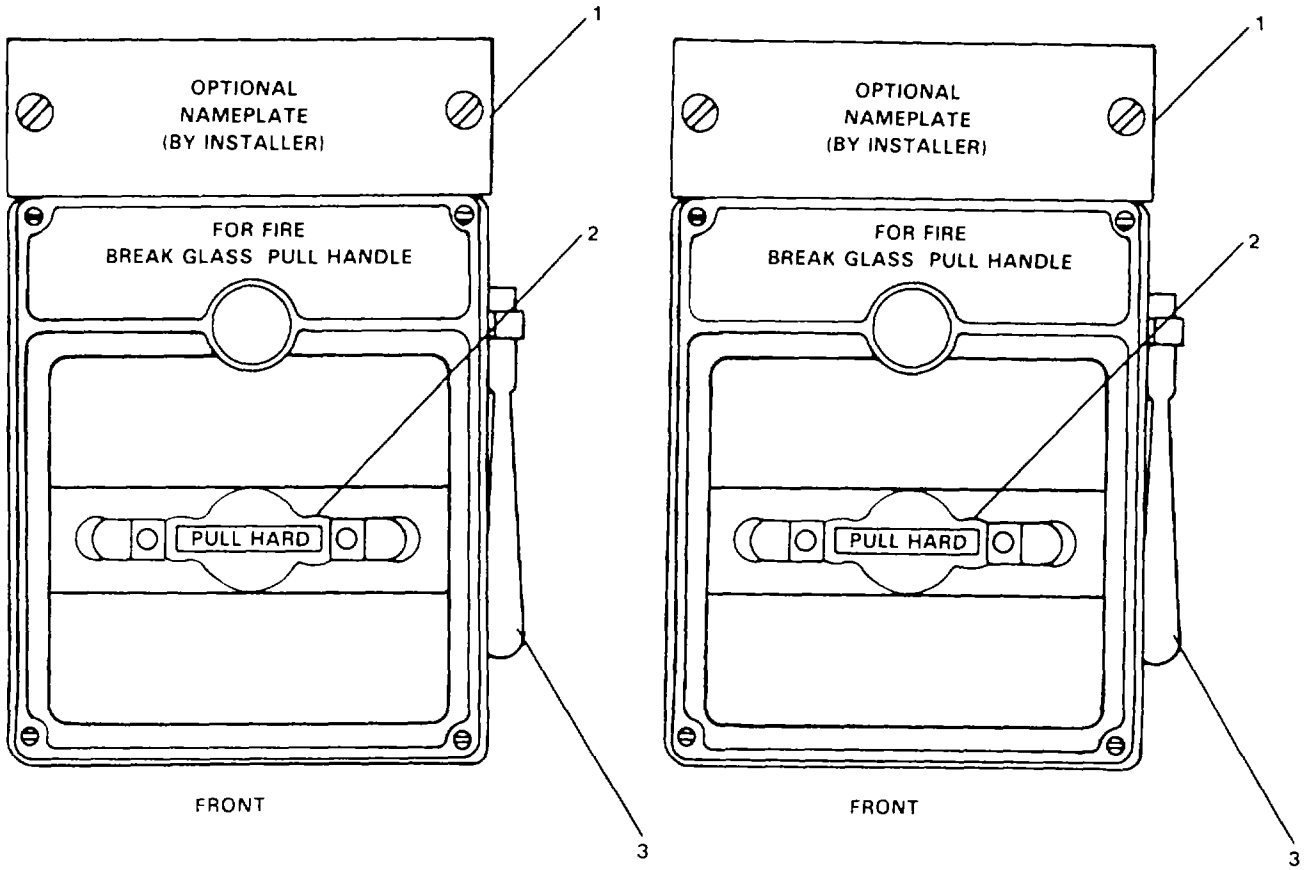
WARNING

The Halon 1301 Fire Suppression System for the bow thruster room cannot be automatically activated unless both watertight pull box handles are pulled.

(1) Turn handle (2, FIGURE 2-143) on VALVE RELEASE pull box 180 degrees counterclockwise.

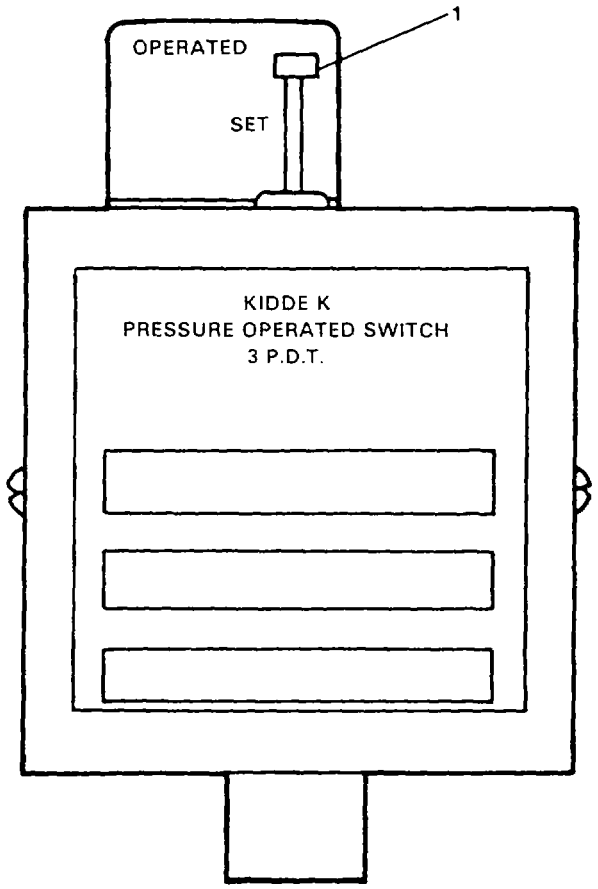
(2) Pull down on handle and open cover.

(3) Break glass on VALVE RELEASE pull box with hammer (3).



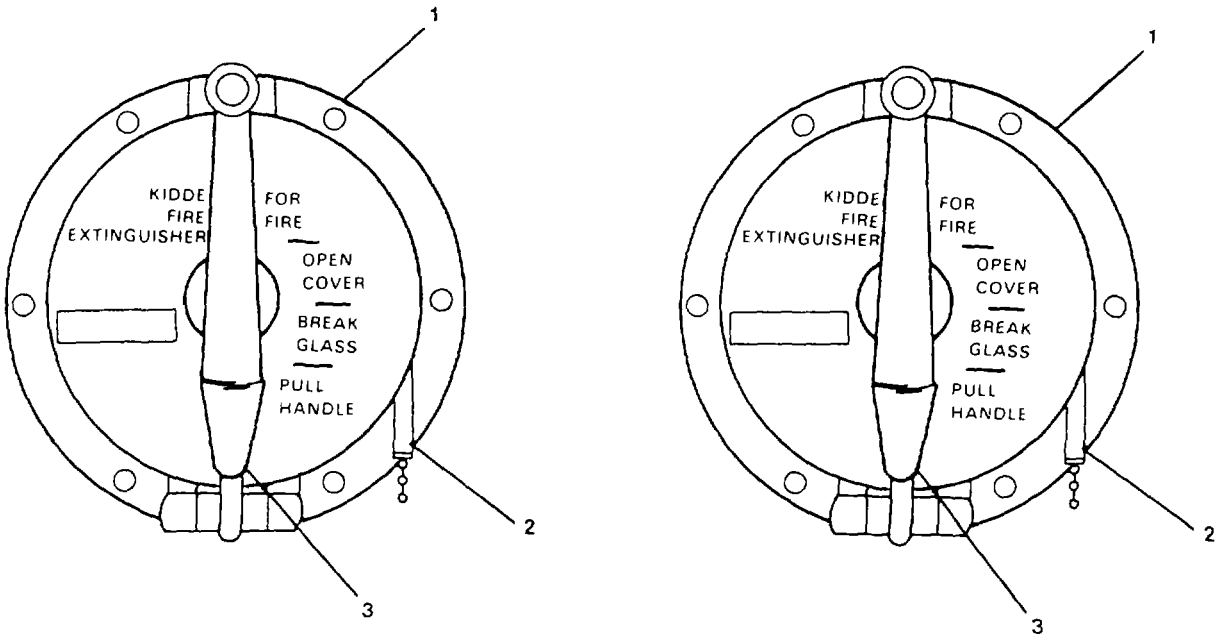
LEGEND
1. PULL BOX
2. PULL HANDLE
3. HAMMER

FIGURE 2-141. Surface Pull Box Halon 1301 Fire Suppression System.



LEGEND
1. STEM

FIGURE 2-142. Pressure Operated Switch.



LEGEND
1. PULL BOX
2. HANDLE
3. HAMMER

FIGURE 2-143. Watertight Pull Box Halon 1301 Fire Suppression System.

(4) Pull interior handle away from pull box approximately 4 to 6 inches. Release handle.

(5) Pull handle (2).

(6) Pull down on handle and open cover on CYLINDER RELEASE pull box using hammer (3).

(7) Pull interior handle away from pull box approximately 4 to 6 inches. Release handle.

NOTE

- **Alarm siren will sound in bow thruster room. Discharge of Halon will be delayed for 25 seconds to allow evacuation of bow thruster room. Discharge of Halon is completed in 10 seconds.**

- **Pressure Operated Switches Reset. During the 25 second warning time, two PRESSURE OPERATED SWITCHES automatically shut down the bow thruster engine and the ventilation system in the bow thruster room. Before this equipment can be restarted, the two PRESSURE OPERATED SWITCHES must be reset.**

(8) Push the stem (1, FIGURE 2-143) down to the SET position.

NOTE

Further resetting is not required. The Halon and C02 cylinders must be recharged or replaced and the pull boxes must be reset by depot maintenance when the vessel is docked.

2-5.9.3. Emergency Generator Room Halon Operation.

WARNING

All personnel shall leave the emergency generator room immediately upon activation of the Halon 1301 Fire Suppression System alarm. System discharges within 25 seconds after avtivation. Evacuating personnel must secure the door as they evacuate the area.

a. Operation of the emergency generator room surface pull box (FIGURE 2-143) will release Halon into the actuation piping. Halon is held back by the discharge delay for 25 seconds while the siren sounds and pressure switches are activated for ventilation shutdown.

b. After the Halon system has been discharged, the pressure operated switch mounted in upper machinery room must be reset by pushing the stem down to the SET position (FIGURE 2-142).

NOTE

Further resetting is not rerequired. The Halon cylinder must be recharged or replaced and the pull box must be reset by depot maintenance when the vessel is docked.

2-5.9.4. Paint Locker Halon Operation.

a. A Halon fire suppression cylinder is mounted in the rear of the paint locker above the top shelf.

WARNING

All personnel shall leave the paint locker area immediately upon activation of the Halon 1301 Fire Suppression System. System discharges within 10 seconds after activation. Evacuating personnel shall secure the watertight door as they evacuate the area.

b. Cylinder is equipped with an automatic temperature actuated valve.

When the ambient temperature reaches 2120F, the valve opens and discharges Halon.

2-5.10. Ballast System Operation.

2-5.10.1. Ballast Ship Operation.

a. Depress stop switch (74, FIGURE 2-103, Sheet 4 of 7).

b. Close all valves in the ballast piping system. Pump is shut down (not running) (FIGURE 2-144).

c. Open suction/discharge valves (15, 16, 17, 22, or 25) to ballast tanks to be filled.

d. Open sea chest cutout valve (20 or 21) as needed.

e. Open pump suction valve (8).

f. Open gauge cutout valve (5).

g. Open discharge valve (32) to ballast main.

h. Depress start switch (75, FIGURE 2-103, Sheet 4 of 7) and start ballast pump (4, FIGURE 2-144).

NOTE

Observe pressure gauge (6, FIGURE 2-144). If no discharge pressure is indicated within 10 seconds, depress stop switch. Refer to unit maintenance.

i. Depress stop switch (74, FIGURE 2-103, Sheet 4 of 7) when desired tank(s) level is acquired or when tank(s) is full.

j. Close all valves in the ballast piping system (FIGURE 2-144).

2-5.10.2. Deballast Ship Operation.

a. Depress stop switch (71, FIGURE 2-103, Sheet 4 of 7).

b. Close all valves in ballast piping system. Pump is shut down (not running) (FIGURE 2-144).

c. Open ballast tank(s) suction/discharge valve(s) (15, 16, 17, 20, or 21) as desired.

d. Open ballast main suction valve (2).

e. Open gauge cutout valve (5).

f. Open pump discharge valve (7).

g. Open overboard discharge valve (12).

h. Depress start switch (75, FIGURE 2-103, Sheet 4 of 7) and start pump (4, FIGURE 2-144).

NOTE

Observe discharge pressure gauge (6, FIGURE 2-144). If no discharge pressure is indicated within 10 seconds, depress stop switch. Refer to unit maintenance.

i. Observe pressure gauge (6). When no pressure is observed, depress stop switch (74, FIGURE 2-103) when desired liquid level is acquired or tank(s) is empty.

j. Close all valves in ballast piping system (FIGURE 2-144).

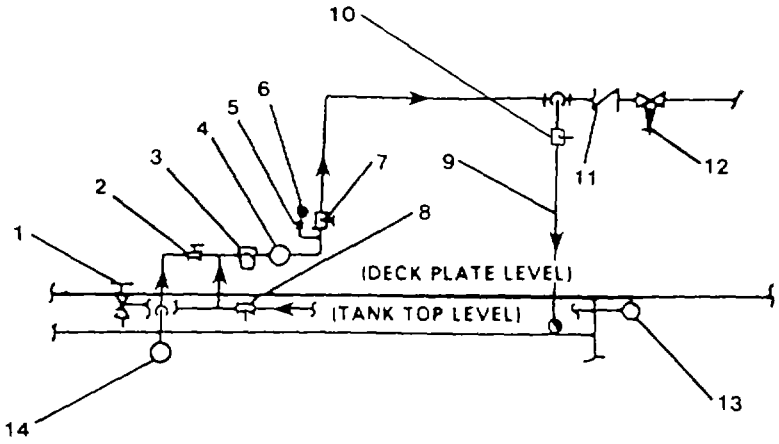
2-5.10.3. Pump Bilges Operation.

a. Depress stop switch (74, FIGURE 2-103, Sheet 4 of 7).

b. Close all valves in the ballast piping section. Pump is shut down (not running) (FIGURE 2-144).

c. Open bilge suction valve (1).

d. Open gauge cutout valve (5).



BALLAST PIPING SYSTEM ENGINE ROOM
FORWARD BULKHEAD
LATERAL VIEW LOOKING FROM AFT TO FORWARD

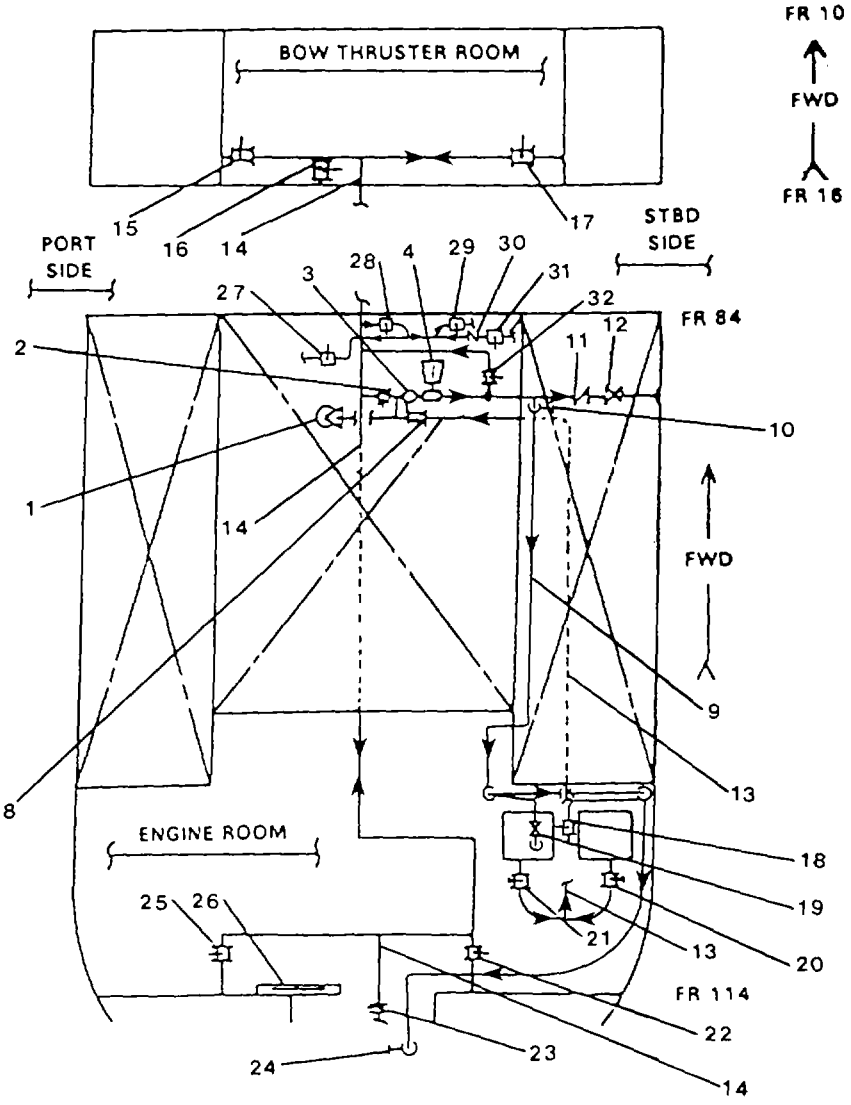


FIGURE 2-144. Ballast Piping System (Sheet 1 of 2).

LEGEND

1. EMERGENCY BILGE SUCTION VALVE
2. BALLAST PUMP SUCTION VALVE
3. BALLAST PUMP SUCTION STRAINER
4. BALLAST PUMP AND MOTOR
5. PRESSURE GAUGE CUTOUT VALVE
6. PRESSURE GAGE (0 TO 300 PSI)
7. BALLAST PUMP DISCHARGE VALVE
8. BALLAST PUMP SEA WATER SUCTION VALVE
9. SEA CHEST BLOWDOWN DISCHARGE PIPE
10. SEA CHEST BLOWDOWN SUPPLY VALVE
11. SWING CHECK VALVE
12. BALLAST OVERBOARD VALVE
13. BALLAST PUMP SEAWATER SUCTION PIPE
14. BALLAST MAIN PIPE
15. #1 BALLAST TANK PORT SUCTION AND DISCHARGE VALVE
16. #1 BALLAST TANK CENTER LINE SUCTION AND DISCHARGE VALVE
17. #1 BALLAST TANK STBD SUCTION AND DISCHARGE VALVE
18. HIGH SEA CHEST BLOWDOWN VALVE
19. LOW SEA CHEST BLOWDOWN VALVE
20. HIGH SEA CHEST CUTOUT VALVE
21. LOW SEA CHEST CUTOUT VALVE
22. #2 BALLAST TANK STBD SUCTION AND DISCHARGE VALVE
23. EMERGENCY FIRE PUMP SUCTION VALVE TO BALLAST MAIN
24. BLOWDOWN VALVE TO SEA CHEST LOCATED IN SKEG
25. BALLAST TANK PORT SUCTION AND DISCHARGE VALVE
26. HYDRAULIC OPERATED DOOR
27. BILGE/BALLAST PUMP SUCTION VALVE TO BALLAST MAIN
28. CROSS CONNECT VALVE BETWEEN BILGE PIPING AND BALLAST MAIN
29. FIRE/BILGE PUMP SUCTION VALVE
30. SWING CHECK VALVE
31. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
32. BALLAST PUMP DISCHARGE VALVE TO BALLAST MAIN

FIGURE 2-144. Ballast Piping System (Sheet 2 of 2).

e. Open pump discharge valve (7).

f. Open overboard discharge valve (12).

g. Depress start switch (75, FIGURE 2-103, Sheet 4 of 7) and start pump (4, FIGURE 2-144).

NOTE

Observe discharge pressure gauge (6, FIGURE 2-144). If no discharge pressure is indicated within 10 seconds, depress stop switch. Refer to unit maintenance.

h. Depress stop switch (74, FIGURE 2-103, Sheet 4 of 6) when bilges are empty.

i. Close all valves in ballast piping system (FIGURE 2-144).

2-5.11. Fire/Bilge Piping System Engine Room. (FIGURE 2-107)

a. Firemain Operation.

(1) Close all valves in fire/bilge piping system (FIGURE 2107).

(2) Open sea chest cutout valves (24 and/or 25) as needed.

(3) Open sea chest suction valve (13).

(4) Open fire/bilge pump suction valve (19).

(5) Open fire/bilge pump discharge valve (11).

(6) Open gauge cutout (9).

(7) Open discharge valve (7) to fire main.

(8) Turn OFF/ON switch to ON (110, FIGURE 2-103, Sheet 6 of 7).

(9) Observe pump discharge gauge (8, FIGURE 2-107).

NOTE

If no pressure is indicated within 30 seconds, turn switch (110, FIGURE 2-103) to stop.

(10) Turn OFF/ON switch to OFF (110, FIGURE 2-103, Sheet 6 of 7) when operation is completed.

(11) Close all valves in fire/bilge piping system (FIGURE 2107).

b. Bilge Pumping Operation.

(1) Turn OFF/ON switch to OFF (110, FIGURE 2-103, Sheet 6 of 7).

(2) Close valves (1-7, 9-11, 13, 18-19, and 21) in fire/bilge piping system (FIGURE 2-107).

(3) Close all valves in bilge/ballast piping system (FIGURE 2-145).

(4) Open bilge/ballast piping system suction valve (9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, and 21 as desired, FIGURE 2-145) to bilge area or void tank to be pumped.

(5) Open bilge suction valve (15, FIGURE 2-107).

(6) Open pump suction valve (19).

(7) Open pump discharge valve (11).

(8) Open gauge cutout (9).

(9) Open inline stop valve (6).

(10) Open overboard discharge valve (5).

(11) Open overboard discharge valve (3) on bilge/ballast piping system (FIGURE 2-145).

(12) Turn OFF/ON switch to ON (110, FIGURE 2-103, Sheet 6 of 7).

(13) Observe pump discharge gauge (8, FIGURE 2-107).

NOTE

If no pressure is indicated within 30 seconds, turn OFF/ON switch to OFF (110, FIGURE 2-103, Sheet 6 of 7).

(14) Turn OFF/ON switch to OFF (110, FIGURE 2-103, Sheet 6 of 7) when operation is completed.

(15) Close all valves in fire/bilge and bilge/ballast piping systems (FIGURES 2-107 and 2-145).

c. Pump Ballast Operation.

(1) Turn OFF/ON switch to OFF (110, FIGURE 2-103, Sheet 6 of 7).

(2) Close all valves in fire/bilge piping system (FIGURE 2107).

(3) Close all valves in bilge/ballast piping system (FIGURE 2145).

(4) Open ballast tank suction valves (14, 15, 16, 19, and 21) as needed.

(5) Open ballast main suction valve (17, FIGURE 2-107).

(6) Open fire/bilge pump suction valve (19).

(7) Open fire/bilge pump discharge valve (11).

(8) Open inline stop valve (6).

(9) Open overboard discharge valve (5).

(10) Open overboard discharge valve (12) on bilge/ballast piping system (FIGURE 2-145).

(11) Turn OFF/ON switch to ON (110, FIGURE 2-103, Sheet 6 of 7).

(12) Observe pump discharge gauge (8, FIGURE 107).

NOTE

If no pressure is indicated within 30 seconds, press pump stop switch (110, FIGURE 2103, Sheet 6 of 7).

(13) Turn OFF/ON switch to OFF (110, FIGURE 2-103, Sheet 6 of 7) when operation is completed.

(14) Close all valves in fire/bilge piping system (FIGURE 2107).

(15) Close all valves in bilge/ballast piping system (FIGURE 2145).

2-5.12. Bilge/Ballast Pump and Piping Operation.

NOTE

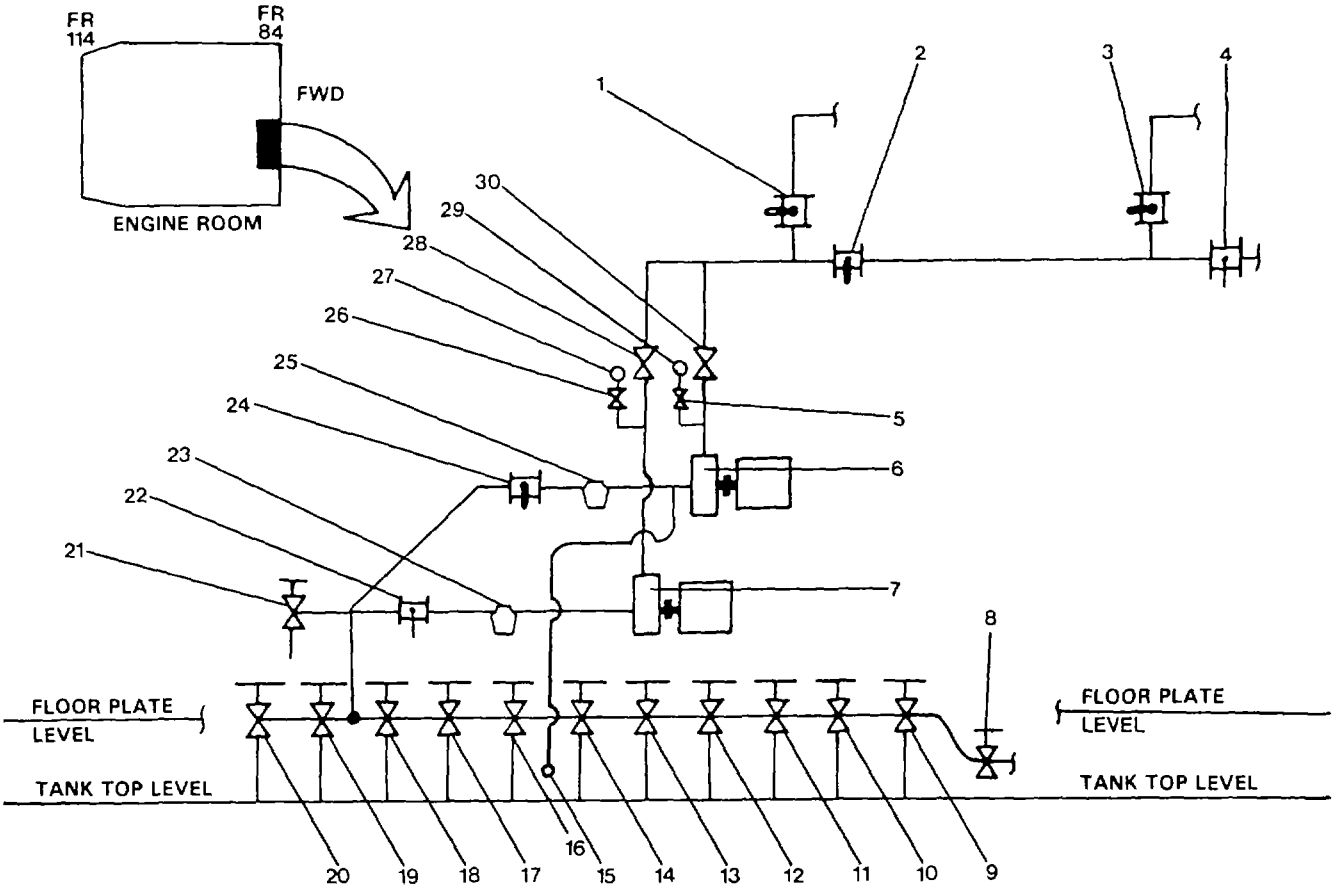
This system can be used to pump bilges or ballast tanks.

2-5.12.1. Bilge Pump Operation.

a. Depress stop switch (66 or 70, FIGURE 2-103, Sheet 4 of 7).

b. Close all valves in bilge/ ballast piping system. Pumps are shut down (not running) (FIGURE 2-145).

c. Open suction valves (9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, and 21) to bilge area or void tank to be pumped.



BILGE/BALLAST PIPING SYSTEM
ENGINE ROOM FORWARD BULKHEAD
LATERAL VIEW LOOKING FROM AFT TO FORWARD

LEGEND

1. PUMP DISCHARGE VALVE TO SLUDGE TANK
2. IN LINE STOP VALVE
3. PUMP DISCHARGE OVERBOARD VALVE
4. DISCHARGE VALVE FROM FIRE/BILGE PUMP
5. PRESSURE GAGE CUTOUT VALVE
6. BILGE/BALLAST PUMP
7. BILGE/BALLAST PUMP
8. BALLAST MAIN SUCTION VALVE
9. 2 VOID TANK STBD SUCTION VALVE
10. 1 VOID TANK STBD SUCTION VALVE
11. FORWARD PEAK TANK SUCTION VALVE
12. 1 VOID TANK CENTER LINE SUCTION VALVE
13. 2 VOID TANK CENTERLINE SUCTION VALVE
14. BOW THRUSTER ROOM SUCTION VALVE
15. FRESH WATER PRIMING LINE TO BILGE PUMP
16. 1 VOID TANK PORT SUCTION VALVE
17. 2 VOID TANK PORT SUCTION VALVE
18. ENGINE ROOM BILGE SUCTION STBD AFT
19. AFT PASSAGE WAY BILGE SUCTION
20. ENGINE ROOM BILGE SUCTION PORT AFT
21. INDEPENDENT BILGE SUCTION VALVE
22. BILGE PUMP SUCTION VALVE
23. BILGE PUMP SUCTION STRAINER
24. BILGE PUMP SUCTION VALVE
25. BILGE PUMP SUCTION STRAINER
26. PRESSURE GAUGE CUTOUT VALVE
27. DISCHARGE PRESSURE GAUGE (0-200 PSI)
28. BILGE PUMP DISCHARGE VALVE
29. DISCHARGE PRESSURE GAUGE (0-200 PSI)
30. BILGE PUMP DISCHARGE VALVE

FIGURE 2-145. Bilge/Ballast Piping System.

d. Open pump suction valve (22 and/or 24).

e. Open pressure gauge cutout valve (26).

f. Open pump discharge (28 and/or 30).

g. Open discharge valve (1) to sludge tank for discharge of contaminated bilge water.

h. Open inline stop valve (2) and overboard discharge valve (3) to discharge bilge overboard.

i. Open ballast overhead valve (12, FIGURE 2-144).

j. Depress start switch (67 or 71, FIGURE 2-103, Sheet 4 of 6) and start pump (12 or 41, FIGURE 2-146).

NOTE

• Observe discharge pressure gauge (20).

• If no discharge pressure is indicated within 20 seconds, depress stop switch (66 or 70, FIGURE 2-103, Sheet 4 of 6) and stop pump. Refer to unit maintenance.

k. Depress stop switch (66 or 70) and stop pump when bilge area or void tank being pumped is empty.

l. Close all valves in bilge piping system (FIGURE 2-145).

2-5.12.2 Pump Ballast Operation.

a. Start emergency fire pump.

(1) Close valve (1, FIGURE 2-145) emergency fire pump suction valve to ballast main.

(2) Open valve (2) emergency fire pump sea water suction valve from sea chest in skeg.

(3) Open emergency fire pump discharge valve (7).

(4) Turn START switch (3, FIGURE 2-93) to ON, emergency fire pump motor controller in aft passageway.

(5) Observe discharge pressure gauge (9, FIGURE 2-107).

NOTE

If no pressure is indicated within 30 seconds, turn switch (3, FIGURE 2-93) to OFF. Refer to unit maintenance.

(6) Turn fire/bilge pump motor switch (110, FIGURE 2-103, Sheet 6 of 7) to OFF on engine room motor control center.

(7) Close fire/bilge sea water suction valve (13, FIGURE 2107).

(8) Close fire/bilge pump suction valve (19).

(9) Close fire/bilge pump discharge valve (11).

(10) Close fire/bilge pump discharge valve to firemain (7).

(11) Open ballast tank suction/discharge valves (15, 16, 17, 22, and 25, FIGURE 2-144) as required.

(12) Open cross connect valve between bilge piping and ballast main (28).

(13) Open bilge/ballast pump suction valve to ballast main (27).

(14) Open bilge pump suction valve (22 and/or 24, FIGURE 2-145).

(15) Open bilge pump discharge valves (28 and/or 30).

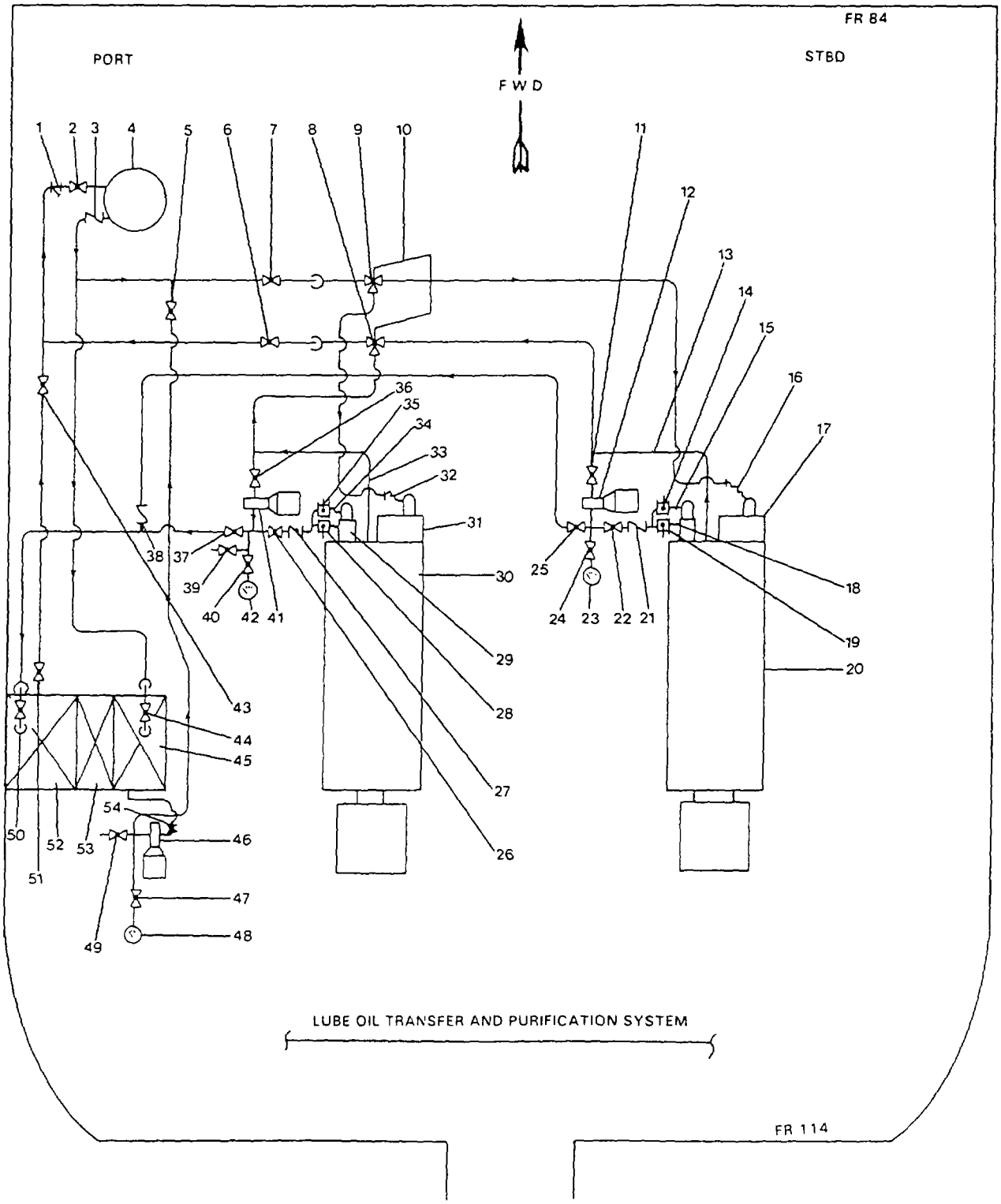


FIGURE 2-146. Lube Oil Transfer Piping System (Sheet 1 of 2).

LEGEND

1. Y TYPE STRAINER
2. LUBE OIL PURIFIER SUCTION VALVE
3. SWING CHECK VALVE
4. LUBE OIL PURIFIER
5. LUBE OIL TRANSFER PUMP DISCHARGE VALVE
6. INLINE STOP VALVE
7. INLINE STOP VALVE
8. THREE WAY SELECTOR VALVE
9. THREE WAY SELECTOR VALVE
10. THREE WAY SELECTOR VALVE OPERATING LEVER
11. STBD PRELUBE PUMP SUCTION VALVE
12. STBD PRELUBE PUMP AND MOTOR
13. STBD MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
14. DISCHARGE VALVE TO STBD MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
15. FLEXIBLE COUPLING
16. FLEXIBLE COUPLING
17. STBD MAIN ENGINE LUBE OIL STRAINER
18. FLEXIBLE COUPLING
19. DISCHARGE VALVE TO STBD MAIN ENGINE LUBRICATING SYSTEM
20. STBD MAIN ENGINE
21. SWING CHECK VALVE
22. STBD PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
23. DISCHARGE PRESSURE GAUGE (0-200 PSI)
24. PRESSURE GAUGE CUTOUT VALVE
25. STBD PRELUBE DISCHARGE VALVE TO LUBE OIL SETTLING TANK
26. PORT PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
27. SWING CHECK VALVE
28. DISCHARGE VALVE TO PORT MAIN ENGINE LUBRICATING SYSTEM
29. FLEXIBLE COUPLING
30. PORT MAIN ENGINE
31. PORT MAIN ENGINE LUBE OIL STRAINER
32. FLEXIBLE COUPLING
33. PORT MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
34. FLEXIBLE COUPLING
35. DISCHARGE VALVE TO PORT MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
36. PORT PRELUBE PUMP SUCTION VALVE
37. PORT PRELUBE PUMP DISCHARGE VALVE TO LUBE OIL SETTLING VALVE
38. SWING CHECK VALVE
39. DRAIN COCK
40. PRESSURE GAUGE CUTOUT VALVE
41. PORT PRELUBE PUMP AND MOTOR
42. PORT PRELUBE DISCHARGE PRESSURE GAUGE (0 TO-200 PSI)
43. INLINE STOP VALVE
44. LUBE OIL STORAGE TANK INLET VALVE
45. LUBE OIL STORAGE TANK
46. LUBE OIL TRANSFER PUMP AND MOTOR
47. PRESSURE GAUGE CUTOUT VALVE
48. LUBE OIL TRANSFER PUMP DISCHARGE PRESSURE GAUGE
49. LUBE FAUCET DISCHARGE VALVE
50. LUBE OIL SETTLING TANK INLET VALVE
51. LUBE OIL SETTLING TANK OUTLET VALVE
52. LUBE OIL SETTLING TANK
53. GEAR OIL STORAGE TANK
54. LUBE OIL TRANSFER SUCTION VALVE

FIGURE 2-146. Lubricating Oil Transfer Piping System (Sheet 2 of 2).

16) Open pressure gauge cutout valves (5 and/or 26).

(17) Open inline stop valve (2).

(18) Open pump discharge overboard valve (3).

(19) Open ballast overboard valve (12, FIGURE 2-144).

(20) Depress START pushbutton (67 and/or 71, FIGURE 2-103, Sheet 4 of 7) to start port #1 and/or #2 bilge pumps.

(21) Observe discharge pressure gauges (27 and/or 29, FIGURE 2145).(

NOTE

If no pressure is indicated within 30 seconds, depress pump STOP switches (66 and/ or 70, FIGURE 2-103, Sheet 4 of 7). Refer to unit maintenance.

b. Secure Ballast Pumping Operation.

(1) Depress port #1 and/or #2 bilge pump STOP pushbuttons (66 and/or 70).

(2) Close all valves in bilge/ballast piping systems.

(3) Close all valves in ballast piping system.

(4) Open fire/bilge sea water suction valve (13, FIGURE 2-107).

(5) Open fire/bilge pump suction valve (19).

(6) Open fire/bilge pump discharge valve (11).

(7) Open fire/bilge pump discharge valve to fire main (7).

(8) Turn fire/bilge pump motor switch to ON (110, FIGURE 2-103, Sheet 6 of 7).

(9) Observe discharge pressure gauge (8, FIGURE 2-107).

NOTE

If no pressure is indicated within 30 seconds, turn switch (110, FIGURE 2-103, Sheet 6 of 7) to OFF. Refer to unit maintenance.

(10) Turn emergency fire pump switch OFF (3, FIGURE 2-92).

(11) Emergency fire pump is now in standby status.

2-5.13. Lube Oil Transfer Piping System. (FIGURE 2-115)

a. Depress stop switch (40, FIGURE 2-103, Sheet 2 of 7).

b. System Startup.

(1) Close all valves in the lube oil transfer piping system and lube oil purification piping system.

(2) Open transfer pump suction valve (54).

(3) Open gauge cutout valve (47).

(4) Open transfer pump discharge valve (5).

(5) Open inline stop valve (6 and 7).

(6) Position three way valve (9) to port or starboard main engine lube oil sump as desired.

(7) Depress pump start switch (41, FIGURE 2-103, Sheet 2 of 7).

(8) Observe discharge pressure gauge (48, FIGURE 2-146).

NOTE

If no discharge pressure is indicated within 10 seconds, depress pump stop switch (40, FIGURE 2-103, Sheet 2 of 7). Refer to unit maintenance.

(9) Monitor main engine oil level. Do not overfill.

c. Stop Operation.

(1) Depress pump stop switch (40, FIGURE 2-103, Sheet 2 of 7).

(2) Close all valves in lube oil transfer piping system (FIGURE 2-146).

2-5.14. Fuel Oil Transfer.

2-5.14.1. Fuel Oil Transfer from Main Engine Day Tank to Bow Thruster or Emergency Generator Day Tank.

a. Turn on fuel oil transfer pump circuit breakers (1 and 2) at the Engine Motor Control Center (FIGURE 2103, Sheet 1 of 7).

b. Align fuel oil transfer piping system by closing all valves (FIGURE 2147).

c. Open main engine day tank suction valve (11).

d. Open fuel oil transfer pump suction valve (22).

e. Open pressure gauge cutout valve (18).

f. Open fuel oil transfer pump discharge valve (2).

g. Open inline stop valve (24).

h. Open discharge valve (3) to bow thruster day tank and/or discharge valve (4) to emergency generator day tank.

i. Open bow thruster day tank fill valve (2, FIGURE 2-148) located at the day tank and/or open emergency generator day tank fill valve (2, FIGURE 2-149) located at the day tank.

j. Press START switch (22 or 26, FIGURE 2-103, Sheet 1 of 7) located at the fuel oil transfer pump motor controller to start transfer pump (20, FIGURE 2-147).

k. Observe discharge pressure gauge (19).

NOTE

If no pressure is indicated within 10 seconds, press STOP switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) to stop pump (20, FIGURE 2-115). Refer to unit maintenance.

1. Observe the bow thruster day tank gauge (1, FIGURE 2-148) and/or emergency generator day tank gauge (19, FIGURE 2-116). Press the STOP switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) when the tanks contain the required level.

m. Close all valves in the fuel oil transfer piping system (FIGURE 2147).

n. Close bow thruster day tank fill valve (2, FIGURE 2-148) and/or emergency generator day tank fill valve (2, FIGURE 2-149).

2-5.14.2. Transfer Fuel Oil Between Storage Tanks.

a. Close all valves in fuel oil transfer piping system (FIGURE 2-147).

b. Open suction valve (13).

c. Open forward fuel oil storage tank isolation valve (15).

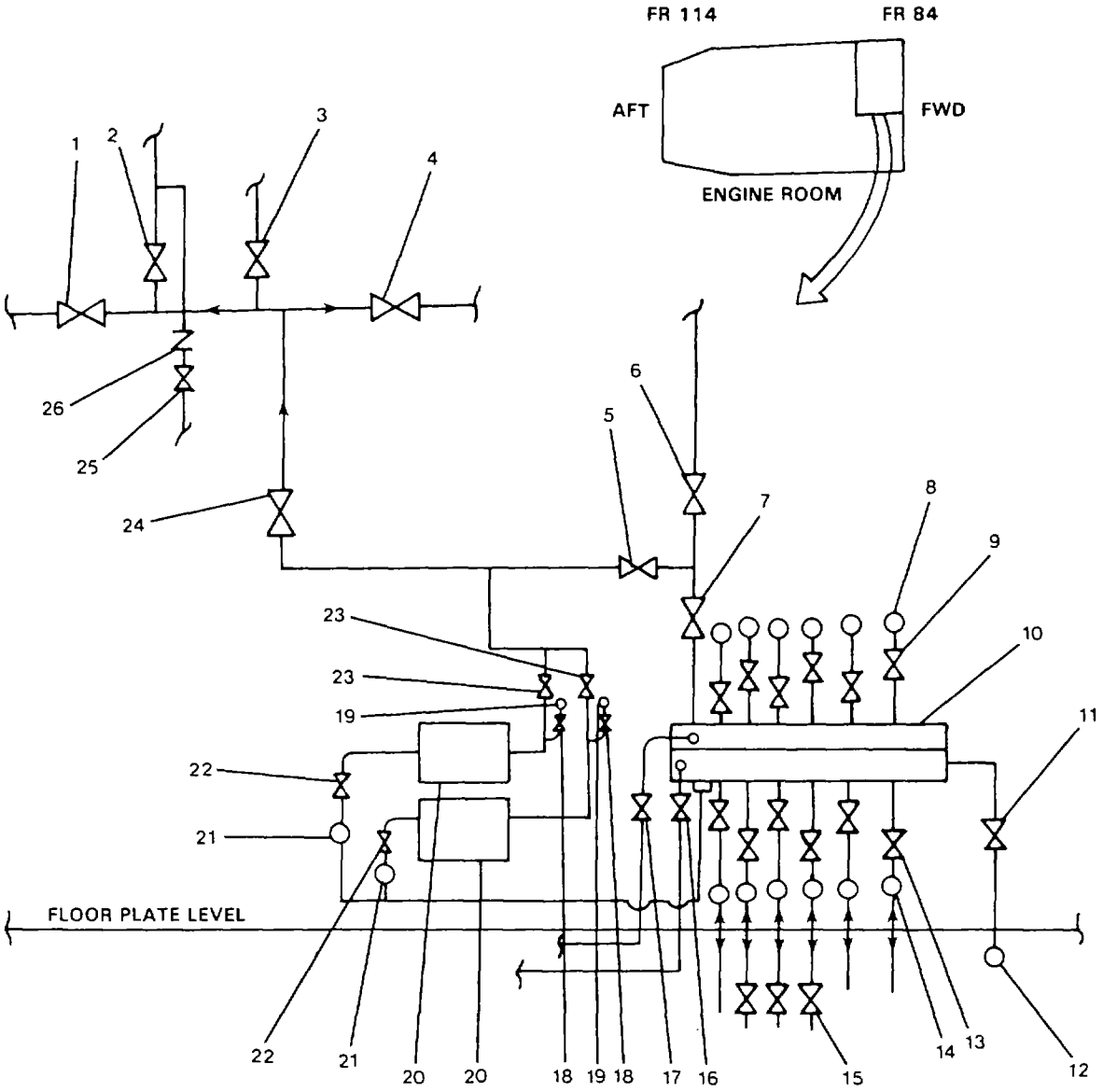
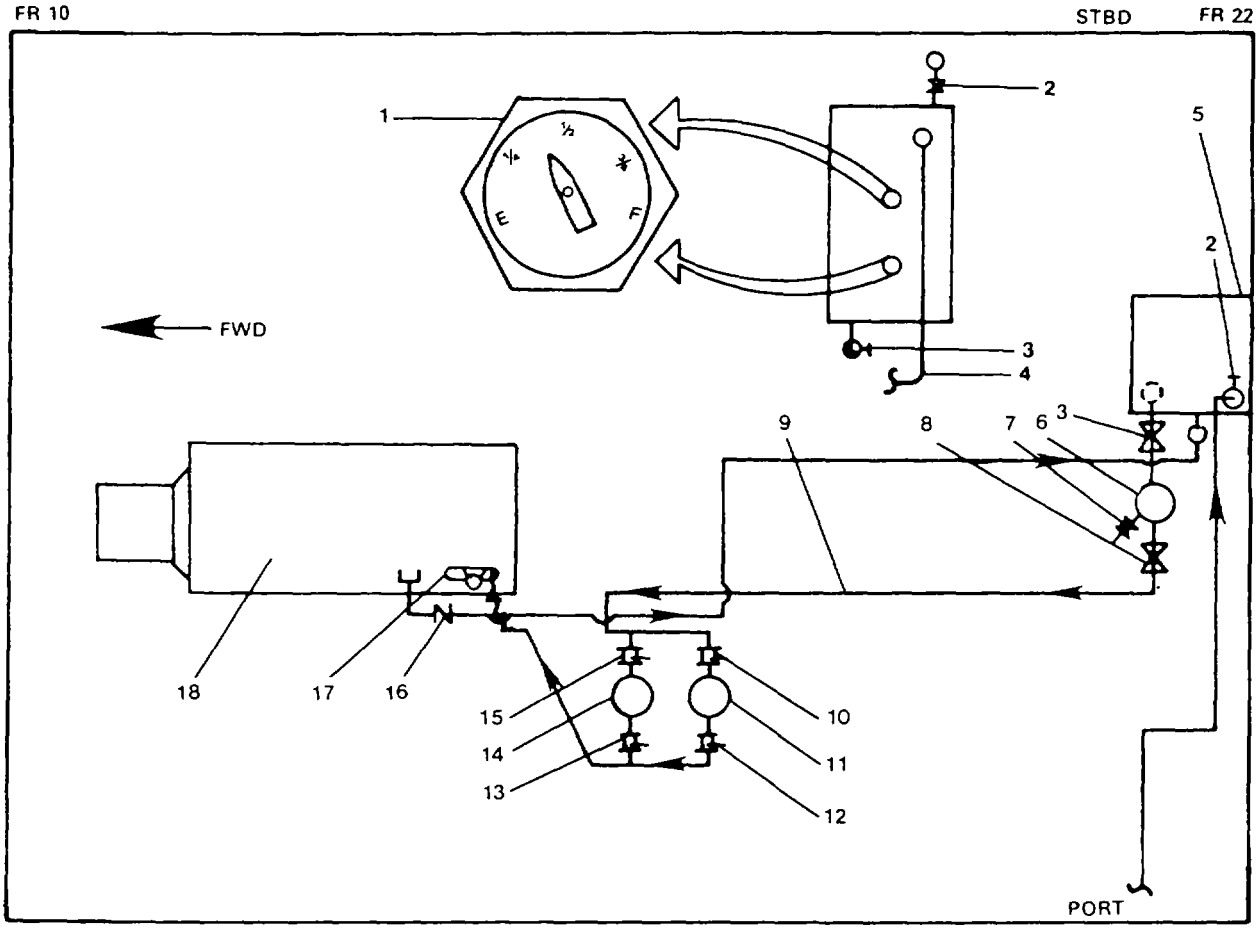


FIGURE 2-147. Fuel Oil Transfer Piping System (Sheet 1 of 2).

LEGEND

1. DISCHARGE VALVE TO FUEL OIL SETTLING TANK
2. DISCHARGE VALVE TO MAIN ENGINE FUEL OIL DAY TANK
3. DISCHARGE VALVE TO BOW THRUSTER DAY TANK
4. DISCHARGE VALVE TO EMERGENCY GENERATOR DAY TANK
5. INLINE STOP VALVE
6. DISCHARGE AND SUCTION VALVE TO AND FROM FUELING STATION LOCATED ON MAIN DECK
7. DISCHARGE VALVE TO FUEL OIL MANIFOLD
8. MANIFOLD DISCHARGE PIPE (TYP)
9. MANIFOLD DISCHARGE VALVE (TYP)
10. FUEL OIL TRANSFER MANIFOLD
11. MAIN ENGINE DAY TANK SUCTION VALVE
12. FUEL OIL SERVICE MAIN PIPE
13. MANIFOLD SUCTION VALVE (TYP)
14. MANIFOLD SUCTION PIPE (TYP)
15. FORWARD FUEL OIL STORAGE TANK ISOLATION VALVE
16. FUEL OIL PURIFIER SUCTION VALVE
17. FUEL OIL PURIFIER DISCHARGE VALVE
18. PRESSURE GAUGE CUTOUT VALVE
19. DISCHARGE PRESSURE GAUGE
20. FUEL OIL TRANSFER PUMP
21. FUEL OIL TRANSFER PUMP SUCTION STRAINER
22. FUEL OIL TRANSFER PUMP SUCTION VALVE
23. FUEL OIL TRANSFER PUMP DISCHARGE VALVE
24. INLINE STOP VALVE
25. FUEL OIL DISCHARGE VALVE TO MAIN ENGINE/S.S.D. GENERATOR DAY TANK
26. SWING CHECK VALVE

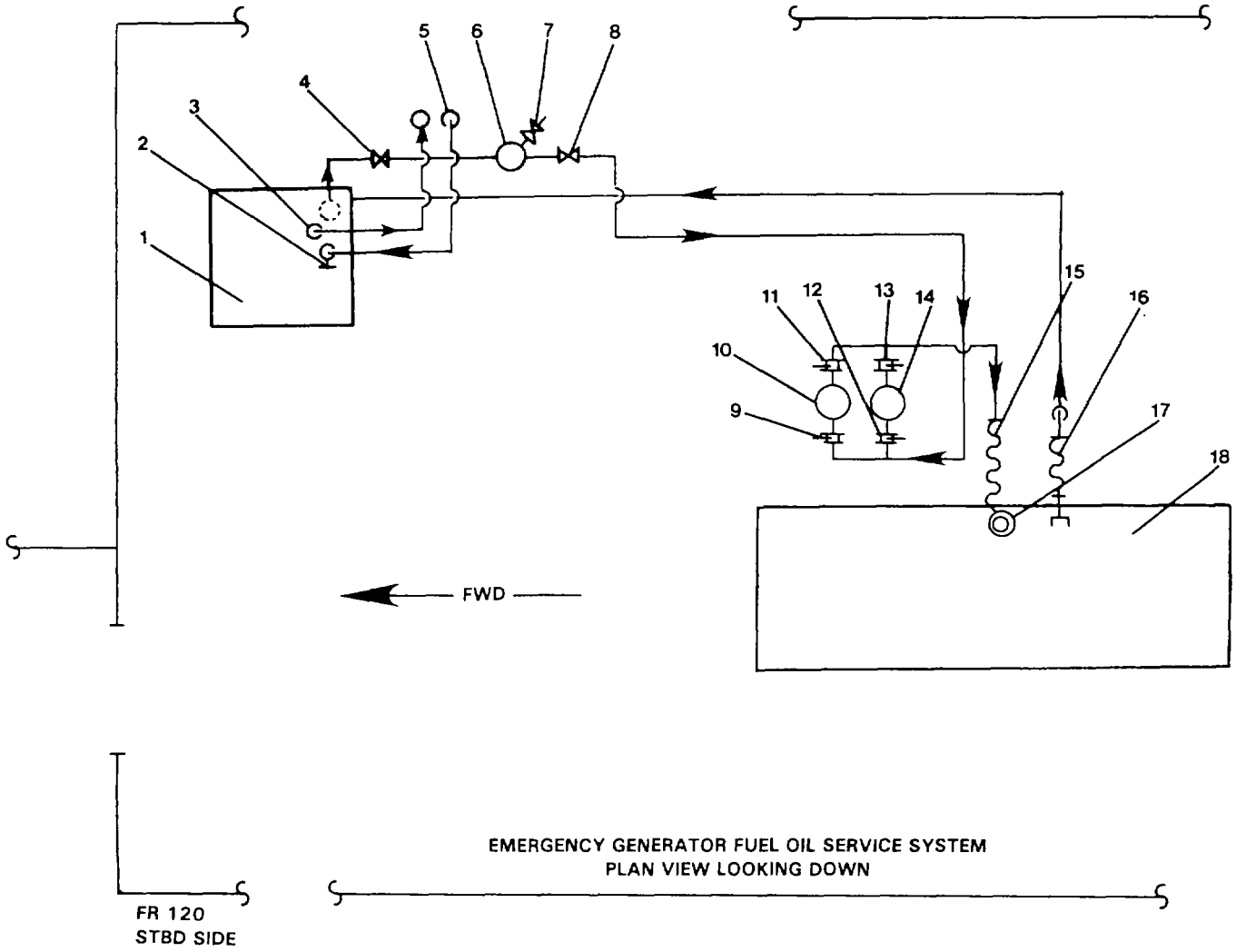
FIGURE 2-147. Fuel Oil Transfer Piping System (Sheet 2 of 2).



LEGEND

1. TANK LEVEL INDICATORS
2. DAY TANK FILL VALVE
3. FUEL OIL DAY TANK OUTLET VALVE
4. FUEL OIL RETURN DISCHARGE PIPE
5. WATER TRAP
6. WATER TRAP DRAIN VALVE
7. INLINE STOP VALVE
8. FUEL OIL SERVIC E SYSTEM SUCTION PIPE
9. FUEL OIL FILTER INLET VALVE
10. FUEL OIL FILTER
11. FUEL OIL FILTER OUTLET VALVE
12. FUEL OIL FILTER OUTLET VALVE
13. FUEL OIL FILTER
14. FUEL OIL FILTER INLET VALVE
15. SWING CHECK VALVE
16. FUEL OIL PRIMING PUMP
17. BOX THRUSTER ENGINE

FIGURE 2-148. Bow Thruster Fuel Oil Piping System.



LEGEND

1. EMERGENCY GENERATOR FUEL OIL DAY TANK
2. FUEL OIL DISCHARGE VALVE TO DAY TANK FROM ENGINE ROOM
3. DAY TANK VENT PIPE TO MAIN DECK
4. FUEL OIL DAY TANK OUTLET VALVE TO EMERGENCY GENERATOR
5. FUEL OIL SUPPLY PIPE FROM ENGINE ROOM
6. WATER TRAP
7. WATER TRAP OFF VALVE
8. INLINE STOP VALVE
9. FUEL OIL FILTER INLET VALVE
10. RACOR FUEL OIL FILTER
11. FUEL OIL FILTER OUTLET VALVE
12. FUEL OIL FILTER INLET VALVE
13. FUEL OIL FILTER OUTLET VALVE
14. RACOR FUEL OIL FILTER
15. FLEXIBLE COUPLING
16. FLEXIBLE COUPLING
17. FUEL OIL PRIMING PUMP
18. EMERGENCY GENERATOR

FIGURE 2-149. Emergency Generator Fuel Oil Piping System.

d. Open fuel oil transfer pump suction valve (22).

e. Open fuel oil transfer pump discharge valve (23).

f. Open pressure gauge cutout valve (18).

g. Open inline stop valve (5).

h. Open discharge valve (7) to fuel oil manifold.

i. Open manifold discharge valve (9).

j. Depress fuel oil transfer pump start switch (22 or 26, FIGURE 2-103, Sheet 1 of 7).

k. Observe pump discharge pressure gauge (19, FIGURE 2-147).

NOTE

*** If no pressure is indicated within (10) seconds, depress pump stop switch (21 or 25, FIGURE 2-103, Sheet 1 of 7). Refer to unit maintenance.**

*** The fuel oil transfer system is now in operation. Fuel oil level in storage tanks can only be taken by sounding. Do not overfill tanks.**

2-5.14.2.1. Stop Operation.

a. Depress pump stop switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) when desired tank level is required.

b. Close all valves in fuel oil transfer piping system (FIGURE 2-147).

2-5.14.3. Fuel Oil Transfer from Storage Tank to Settling Tank.

a. Turn on fuel oil transfer pump circuit breakers (1 and 2) at the Engine Motor Control Center (FIGURE 2103, Sheet 1 of 7).

b. Align fuel oil transfer piping system by closing all valves (FIGURE 2-147).

c. Open discharge valve (1) to fuel oil settling tank.

d. Open inline stop valve (24).

e. Open fuel oil transfer pump discharge valve (23).

f. Open gauge cutout valve (18).

g. Open fuel oil transfer pump suction valve (22).

h. Open storage tank discharge valve (13).

i. Open forward fuel tank isolation valve (15).

j. Press START switch (22 or 26, FIGURE 2-103, Sheet 1 of 7) located at the fuel oil transfer pump motor controller to start transfer pump (20, FIGURE 2-147).

k. Observe discharge pressure gauge (19).

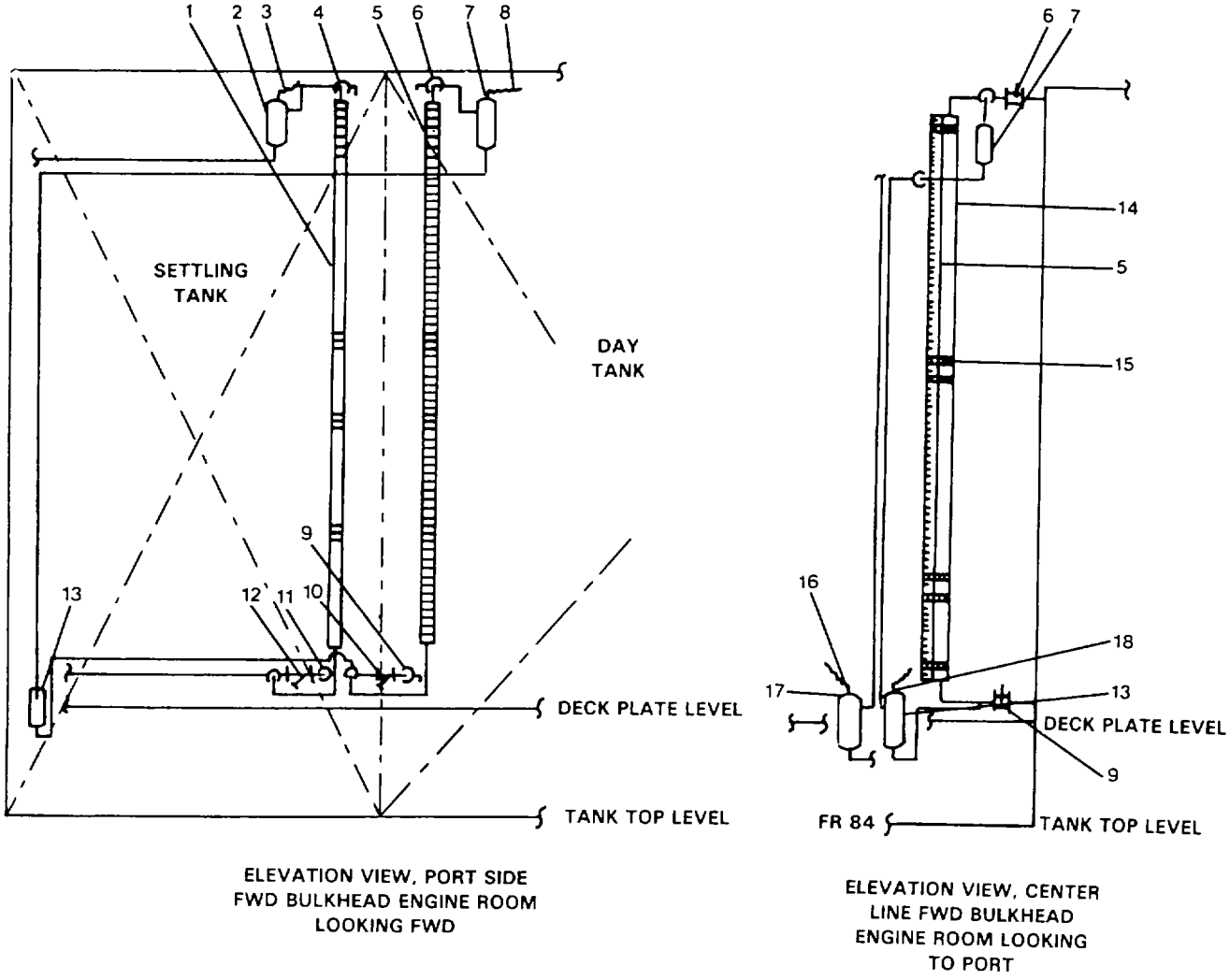
NOTE

If no pressure is indicated within 10 seconds, press STOP switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) to stop pump (20, FIGURE 2-147). Refer to unit maintenance.

l. Observe settling tank level indicator (1, FIGURE 2-150).

m. Press the STOP switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) when the tanks contain the required level.

n. Close all valves in the fuel oil transfer piping system (FIGURE 2147).



ELEVATION VIEW, PORT SIDE FWD BULKHEAD ENGINE ROOM LOOKING FWD

ELEVATION VIEW, CENTER LINE FWD BULKHEAD ENGINE ROOM LOOKING TO PORT

LEGEND

1. SETTLING TANK LEVEL INDICATOR
2. SETTLING TANK HIGH LEVEL ALARM
3. ELECTRICAL LEAD
4. SETTLING TANK LEVEL INDICATOR UPPER CUTOUT VALVE
5. DAY TANK LEVEL INDICATOR
6. DAY TANK LEVEL INDICATOR UPPER CUTOUT VALVE
7. DAY TANK HIGH LEVEL ALARM
8. ELECTRICAL LEAD
9. DAY TANK LEVEL INDICATOR LOWER CUTOUT VALVE
10. "Y" TYPE STRAINER
11. SETTLING TANK LEVEL INDICATOR CUTOUT VALVE
12. "Y" TYPE STRAINER
13. DAY TANK LEVEL INDICATOR LOW LEVEL ALARM
14. STAINLESS STEEL PIPE
15. SCREW TYPE HOSE CLAMP "TYP"
16. ELECTRICAL LEAD
17. SETTLING TANK LEVEL INDICATOR LOW LEVEL ALARM
18. ELECTRICAL LEAD

FIGURE 2-150. Fuel Oil Settling Tank/Day Tank Level Indicator.

2-5.14.4. Refueling Operation.

WARNING

Fueling operations present a serious fire hazard. Ensure NO SMOKING signs are placed at appropriate locations throughout vessel and/or decks. Make announcements through public address system that fueling operations are in progress. Take other precautions as required by U.S. Army Regulations.

a. Align fuel oil transfer piping system by closing all valves (FIGURE 2147).

NOTE

Isolation valves (15) are reach rods operated with a T-handle from the main deck just forward of frame 84 port side. These valves will be normally open.

b. Open fuel oil tank isolation valves (15).

c. Open fuel oil manifold discharge valves (9) as required.

d. Open discharge valve (7) to fuel oil manifold.

e. Open discharge/suction valve (6) to main deck fueling station.

f. Connect fueling hose to fueling station hose connection (71, FIGURE 2-151, Sheet 2 of 3), open fueling station valve (6, FIGURE 2-147), start pumping operations.

g. Sound tanks (33, 42, and 76, FIGURE 2-151, Sheet 2 of 3), located on main decks. Do not overfill tanks.

h. Close manifold discharge valves (9, FIGURE 2-147) as tanks fill to required level.

i. Stop pumping operation when all tanks have filled to required level.

j. Close all valves in fuel oil transfer piping system.

2-5.14.5. Defueling Operation.

WARNING

Defueling operations present a serious fire hazard. Ensure NO SMOKING signs are placed at appropriate locations through-out vessel and/or decks. Make announcements through public address system that defueling operations are in progress. Take other precautions as required by U.S. Army Regulations.

a. Turn on fuel oil transfer pump circuit breaker (1, FIGURE 2-103, Sheet 1 of 7) at the engine room motor control center.

b. Align Fuel Oil Transfer piping system by closing all valves (FIGURE 2-147).

c. Connect discharge hose to fuelng station (71, FIGURE 2-151, Sheet 2 of 3) located on main deck. Open fueling station stop valve (6, FIGURE 2-147).

d. Open discharge/suction valve (6) to main deck fueling station.

e. Open inline stop valve (5).

f. Open fuel oil pump discharge valve (23).

g. Open gauge cutout valve (18).

h. Open fuel oil transfer pump suction valve (22).

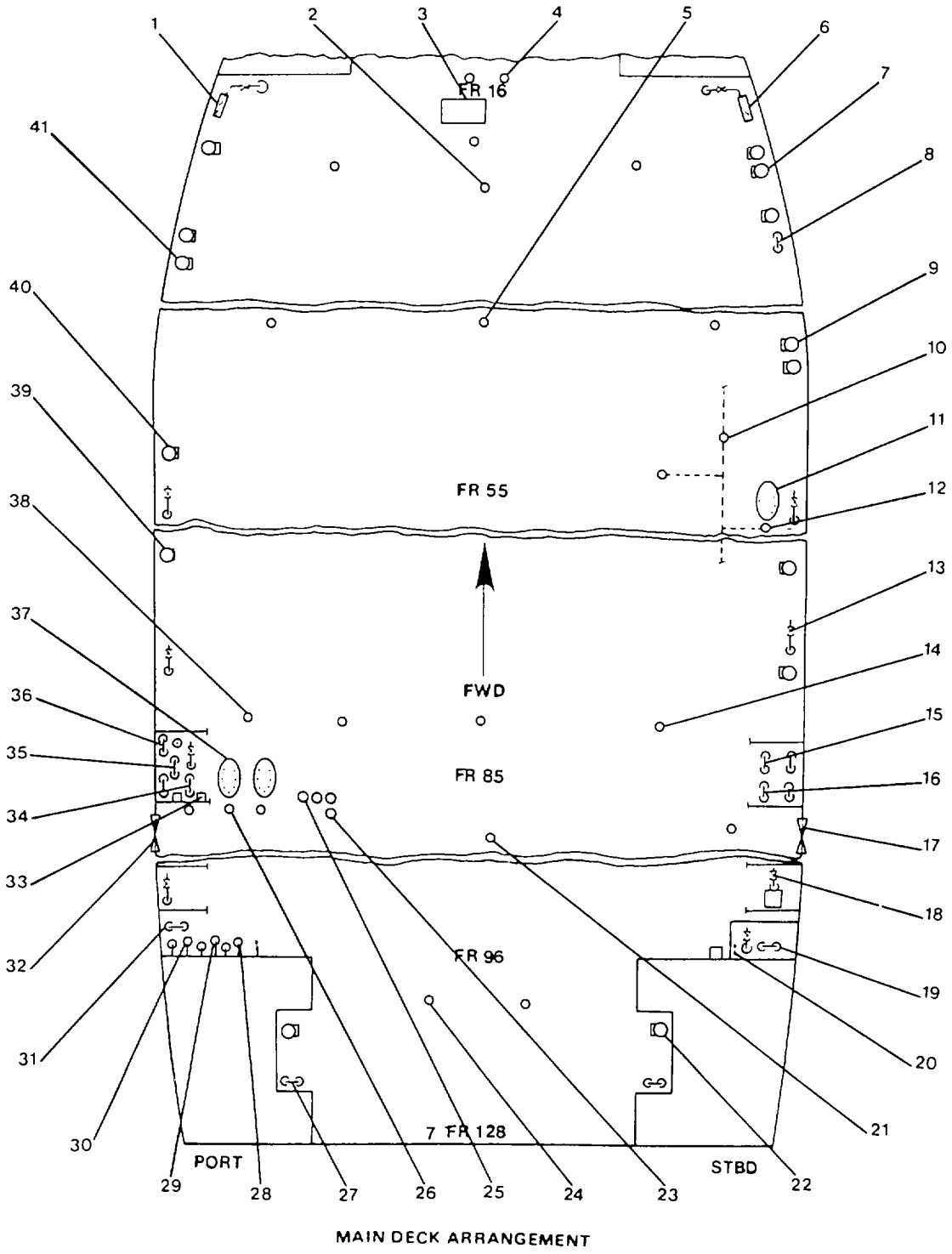


FIGURE 2-151. Main Deck (Sheet 1 of 3).

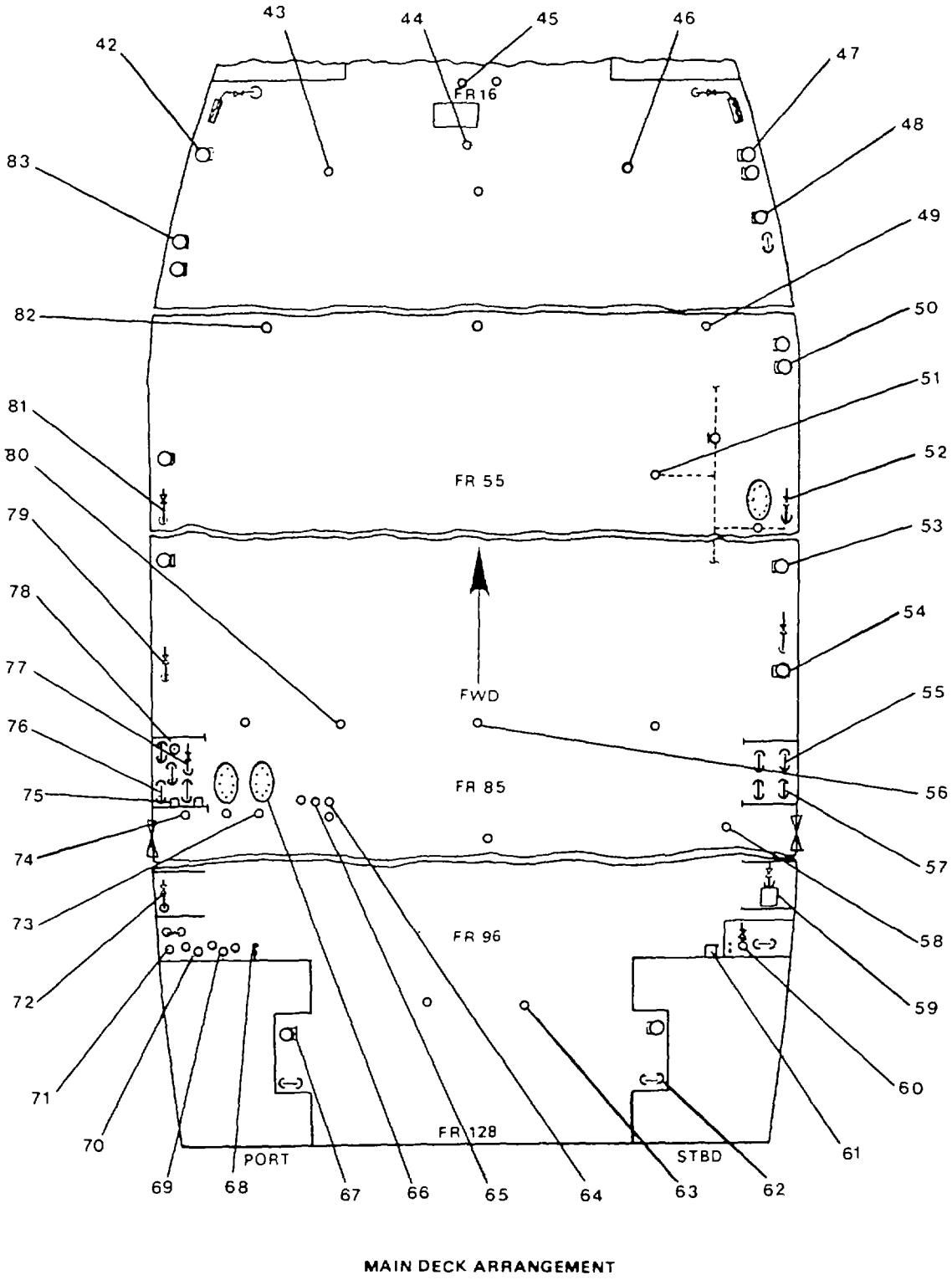


FIGURE 2-151. Main Deck (Sheet 2 of 3).

LEGEND

1. MAIN DECK FIRE STATION PORT SIDE
2. #1 CENTERLINE BALLAST TANK SOUNDING TUBE
3. REMOVABLE HATCH
4. REACH ROD CONNECTION TO FORE PEAK TANK BILGE SUCTION ISOLATION VALVE
5. #1 CENTERLINE VOID TANK SOUNDING TUBE
6. MAIN DECK FIRE STATION STBD SIDE
7. #1 CENTERLINE BALLAST TANK VENT
8. BOW THRUSTER DAY TANK VENT
9. #2 STBD VOID TANK VENT
10. REACH ROD CONNECTION TO FWD MAIN DECK FIRE STATION ISOLATION VALVES
11. REMOVABLE MANHOLE COVER
12. REACH ROD CONNECTION TO MAIN DECK FIRE STATION STBD SIDE MID SHIPS ISOLATION VALVE
13. POTABLE WATER FILL STATION STBD SIDE
14. #2 STBD VOID TANK SOUNDING TUBE
15. #1 CENTERLINE FUEL OIL STORAGE TANK VENT
16. #2 CENTERLINE FUEL OIL STORAGE TANK VENT
17. MAIN DECK GANGWAY STBD SIDE
18. FIRE MAIN HOSE CONNECTION STBD SIDE
19. SLUDGE TANK VENT
20. FRESH WATER BIBB COCK
21. #1 CENTERLINE FUEL OIL STORAGE TANK SOUNDING TUBE
22. #2 STBD BALLAST TANK VENT
23. REACH ROD CONNECTION TO MAIN ENGINE FUEL OIL DAY TANK ISOLATION VALVE
24. #2 PORT BALLAST TANK SOUNDING TUBE
25. REACH ROD CONNECTION TO #1 PORT FUEL OIL STORAGE TANK ISOLATION VALVE
26. FUEL OIL SETTLING TANK SOUNDING TUBE
27. STEERING COMPARTMENT VENT
28. LUBE OIL STORAGE TANK VENT
29. GEAR OIL STORAGE TANK VENT
30. LUBE OIL SETTLING TANK VENT
31. HYDRAULIC OIL STORAGE TANK VENT
32. MAIN DECK GANGWAY PORT SIDE
33. #1 FUEL OIL TRANSFER PUMP REMOTE START/STOP SWITCH
34. #2 PORT FUEL OIL STORAGE TANK VENT
35. MAIN ENGINE FUEL OIL DAY TANK VENT
36. #1 PORT FUEL OIL STORAGE TANK VENT
37. REMOVABLE MANHOLE COVER
38. #1 PORT FUEL OIL STORAGE TANK SOUNDING TUBE
39. PORT POTABLE WATER TANK VENT
40. #2 PORT VOID TANK VENT
41. #1 CENTERLINE VOID TANK VENT
42. #1 PORT BALLAST TANK VENT
43. #1 PORT BALLAST TANK SOUNDING TUBE
44. REACH ROD CONNECTION TO BOW THRUSTER DAY TANK FUEL OIL OUTLET VALVE
45. FORE PEAK VOID TANK SOUNDING TUBE
46. #1 STBD BALLAST TANK SOUNDING TUBE
47. #1 STBD BALLAST TANK VENT
48. #1 STBD VOID TANK VENT
49. #1 STBD VOID TANK SOUNDING TUBE
50. #2 CENTERLINE VOID TANK VENT
51. REACH ROD CONNECTION TO MAIN DECK FIRE MAIN STATION PORT SIDE MID SHIPS ISOLATION VALVE
52. MAIN DECK FIRE STATION STBD SIDE MID SHIPS
53. STBD POTABLE WATER TANK VENT
54. COFFERDAM VENT
55. #1 STBD FUEL OIL STORAGE TANK VENT
56. #2 CENTERLINE VOID TANK SOUNDING TUBE
57. #2 STBD FUEL OIL STORAGE TANK VENT
58. #1 STBD FUEL OIL STORAGE TANK SOUNDING TUBE
59. ENGINE ROOM ESCAPE HATCH
60. SLUDGE PUMP DISCHARGE HOSE CONNECTION
61. SLUDGE PUMP REMOTE START/STOP SWITCH
62. STEERING COMPARTMENT VENT
63. #2 STBD BALLAST TANK SOUNDING TUBE
64. REACH ROD CONNECTION TO #1 FUEL OIL STORAGE TANK ISOLATION VALVE
65. REACH ROD CONNECTION TO #1 CENTERLINE FUEL OIL STORAGE TANK ISOLATION VALVE
66. REMOVABLE MANHOLE COVER
67. #2 PORT BALLAST TANK VENT
68. FRESH WATER BIBB COCK
69. LUBE OIL STORAGE TANK FILL PIPE
70. GEAR OIL STORAGE TANK FILL PIPE
71. HYDRAULIC OIL STORAGE TANK FILL PIPE
72. FIRE MAIN HOSE CONNECTION PORT SIDE
73. MAIN ENGINE FUEL OIL DAY TANK SOUNDING TUBE
74. REACH ROD CONNECTION TO FUEL OIL SETTLING TANK ISOLATION VALVE
75. #2 FUEL OIL TRANSFER PUMP REMOTE START/STOP SWITCH
76. FUEL OIL SETTLING TANK VENT
77. FUELING STATION HOSE CONNECTION
78. MAIN ENGINE FUEL OIL DAY TANK FILL PIPE
79. POTABLE WATER FILL STATION PORT SIDE
80. #2 PORT VOID TANK SOUNDING TUBE
81. MAIN DECK FIRE STATION PORT SIDE MID SHIPS
82. #1 PORT VOID TANK SOUNDING TUBE
83. #1 PORT VOID TANK VENT

FIGURE 2-151. Main Deck (Sheet 3 of 3).

i. Open fuel oil manifold suction valve (13).

NOTE

Isolation valves (15) are reach rods operated with a T-handle from the main deck, just forward of frame 84 port side. These valves will normally be open.

j. Open fuel oil tank isolation valves (15).

k. Press START switch (22 or 26, FIGURE 2-103, Sheet 1 of 7) located at the fuel oil transfer pump motor controller to start pump (20, FIGURE 2-147).

1. Observe discharge pressure gauge (18, FIGURE 2-147).

CAUTION

If no pressure is indicated within 10 seconds, press STOP switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) to stop pump (20, FIGURE 2-147). Refer to unit maintenance.

m. Sound tanks (33, 42 and 76, FIGURE 2-151, Sheet 2 of 3), located on the main deck, at regular intervals.

n. Close fuel oil manifold suction valves (13, FIGURE 2-147) as tanks are emptied.

o. Press STOP switch (21 or 25, FIGURE 2-103, Sheet 1 of 7) when tanks have reached the required level or are empty as indicated by a loss of pressure at gauge (19, FIGURE 2-147).

p. Close stop valve (6).

q. Close all valves in fuel oil transfer piping system.

2-5.14.6. Fuel Oil Purification.

2-5.14.6.1. Transferring Fuel Oil From Settling Tank to Main Engine Day Tank.

a. Turn on Fuel Oil Purifier circuit breakers (29 and 38, FIGURE 2-103, Sheet 2 of 7) at the Engine Motor Control Center.

b. Align the Fuel Oil Purification Piping system by closing all valves (FIGURE 2-152).

c. Open fuel oil suction valve (4) from settling tank.

d. Open fuel oil discharge valve (6) to main engine/ship's service diesel generator.

e. Press START switch (FIGURE 2-153) on Fuel Oil Purifier Controller (1 or 2 as required).

f. Allow 3-5 minutes for the purifier to run up to speed.

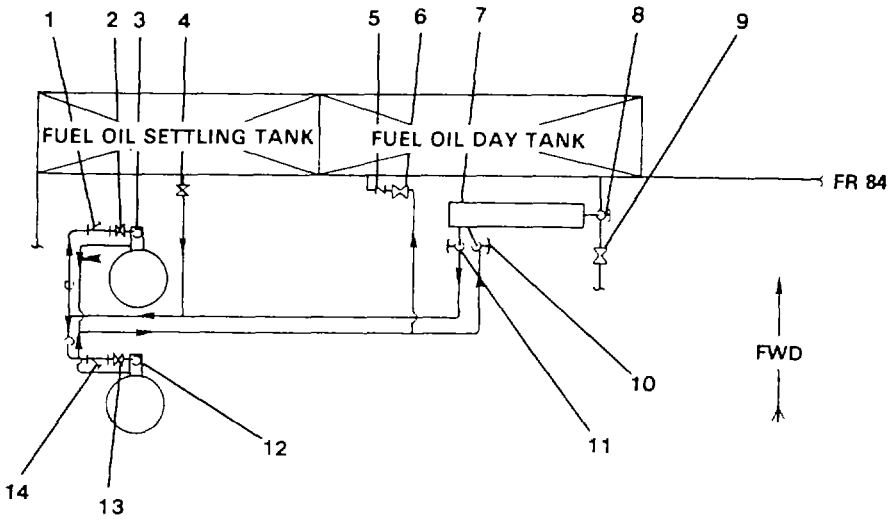
g. Open purifier freshwater inlet valve (1, FIGURE 2-153).

h. Close purifier freshwater inlet valve (1) when water appears at sludge discharge port sight glass (5, FIGURE 2-154).

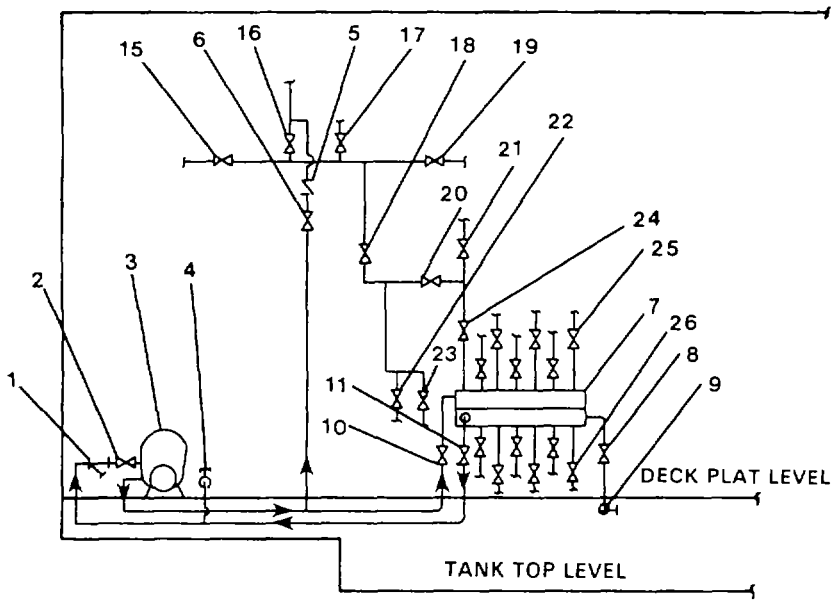
i. Open purifier suction valve (2 or 13, FIGURE 2-152).

j. Observe clean oil discharge port sight glass (3, FIGURE 2-154) for discharge.

k. Observe sludge discharge port sight glass (5, FIGURE 2-154). Press fuel oil purifier STOP switch (2, FIGURE 2-153) if clean oil appears.



FUEL OIL PURIFICATION PIPING SYSTEM
ENGINE ROOM FWD BULKHEAD PORT SIDE FR 84
PLAN VIEW LOOKING DOWN



ENGINE ROOM FWD BULKHEAD
PORT SIDE LOOKING FWD

FIGURE 2-152. Fuel Oil Purification System (Sheet 1 of 2).

LEGEND

1. "Y" TYPE SUCTION STRAINER
2. 1 F.O. PURIFIER SUCTION VALVE
3. 1 F.O. PURIFIER
4. F.O. PURIFIER SUCTION VALVE FROM F.O. SETTLING TANK
5. SWING CHECK VALVE
6. F.O. PURIFIER DIST VALVE TO F.O. DAY TANK
7. F.O. TRANSFER MANIFOLD
8. F.O. MANIFOLD SUCTION VALVE FROM F.O. DAY TANK
9. F.O. SERVICE SYSTEM HEADER PIPE CUTOUT VALVE
10. F.O. PURIFIER DISCHARGE VALVE TO F.O. MANIFOLD
11. F.O. PURIFIER SUCTION VALVE FROM F.O. MANIFOLD
12. 2 F.O. PURIFIER
13. 2 F.O. PURIFIER SUCTION VALVE
14. "Y" TYPE SUCTION STRAINER
15. F.O. TRANSFER PUMP DISCHARGE VALVE TO F.O. SETTLING TANK
16. F.O. TRANSFER PUMP DISCHARGE VALVE TO F.O. DAY TANK
17. F.O. TRANSFER PUMP DISCHARGE VALVE TO BOW THRUSTER DAY TANK
18. INLINE STOP VALVE
19. F.O. TRANSFER PUMP DISCHARGE VALVE TO EMERGENCY GENERATOR DAY TANK
20. INLINE STOP VALVE
21. F.O. DISCHARGE AND SUCTION VALVE TO AND FROM FUELING STATION LOCATED ON MAIN DECK
22. 1 F.O. TRANSFER PUMP DISCHARGE VALVE
23. 2 F.O. TRANSFER PUMP DISCHARGE VALVE
24. DISCHARGE VALVE TO AND FROM F.O. TRANSFER MANIFOLD
25. F.O. TRANSFER MANIFOLD DISCHARGE VALVES (TYP)
26. F.O. TRANSFER MANIFOLD SUCTION VALVES (TYP)

FIGURE 2-152. Fuel Oil Purification System (Sheet 2 of 2).

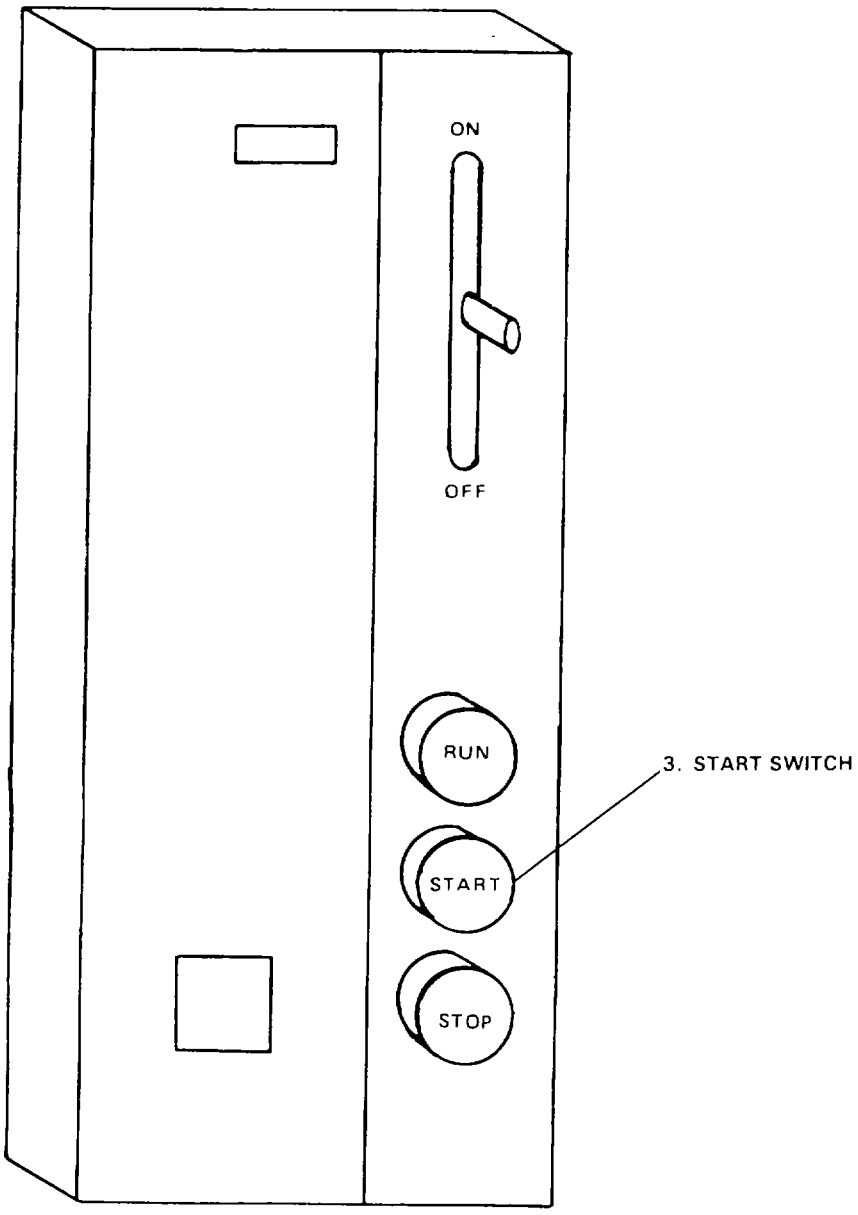
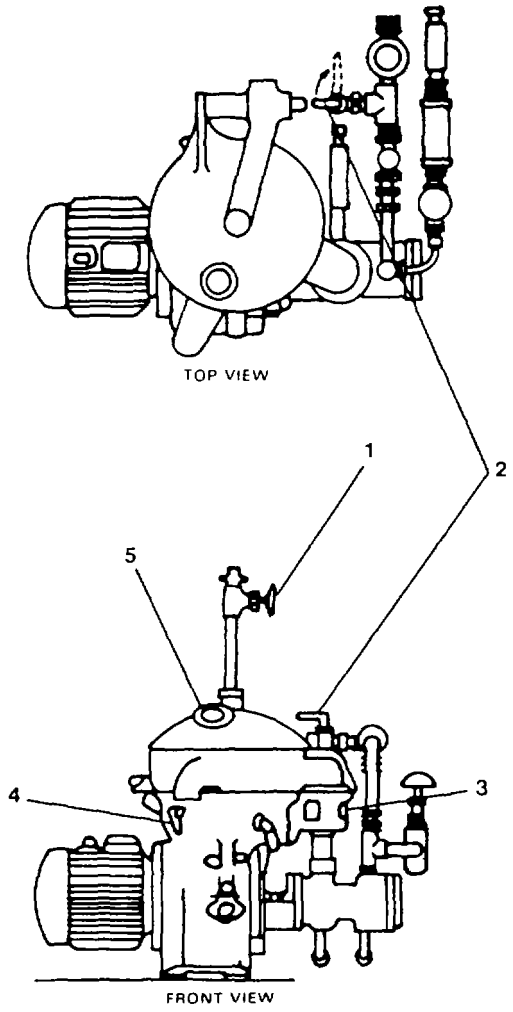


FIGURE 2-153. Fuel Oil Purifier Controller.



LEGEND
1. FRESHWATER INLET VALVE
2. STOP SWITCH
3. OIL DISCHARGE PORT SIGHT GLASS
4. OPERATING LEVER
5. SLUDGE DISCHARGE PORT SIGHT GLASS

FIGURE 2-154. Fuel Oil Purifier.

1. Observe day tank level indicator (1, FIGURE 2-155).

m. Press fuel oil purifier STOP switch (2, FIGURE 2-153) when required level is reached.

n. Engage purifier brake by lifting operating lever (4, FIGURE 2-154).

o. Close all valves in the fuel oil purification piping system (FIGURE 2-152).

2-5.14.6.2. Transferring Fuel Oil From Settling Tank to Bow Thruster and Emergency Generator Day Tanks.

a. Turn on Fuel Oil Purifier circuit breakers (29 and 38, FIGURE 2-103, Sheet 2 of 6) at the Engine Motor Control Center.

b. Align the fuel oil purification piping system by closing all valves (FIGURE 2-152).

c. Open fuel oil suction valve (4) from settling tank.

d. Open fuel oil purifier discharge valve (10).

e. Open fuel oil manifold discharge valve (24).

f. Open inline stop valve (20).

g. Open inline stop valve (18).

h. Open fuel oil pump discharge valve (17) to bow thruster and/or fuel oil pump discharge valve (19) to emergency generator.

i. Open bow thruster day tank fill valve (2, FIGURE 2-148) and/or emergency generator day tank fill valve (2, FIGURE 2-149).

j. Press START switch (3, FIGURE 2-153) on fuel oil purifier controller (1 or 2 as required).

k. Allow 3-5 minutes for the purifier to run up to speed.

1. Open purifier freshwater inlet valve (1, FIGURE 2-154).

m. Close purifier freshwater inlet valve (1, FIGURE 2-154) when water appears at sludge discharge port sight glass (4, FIGURE 2-154).

n. Open purifier suction valve (2).

o. Open purifier suction valve (2 or 13, FIGURE 2-152, Sheet 1 of 2).

p. Observe clean oil discharge port sight glass (3, FIGURE 2-154) for discharge.

q. Observe sludge discharge port sight glass (5). Press fuel oil purifier stop switch (2, FIGURE 2-153) if clean oil appears.

r. Observe day tank level indicator (19, FIGURE 2-155).

s. Press fuel oil purifier STOP switch (2, FIGURE 2-154) when required level is reached.

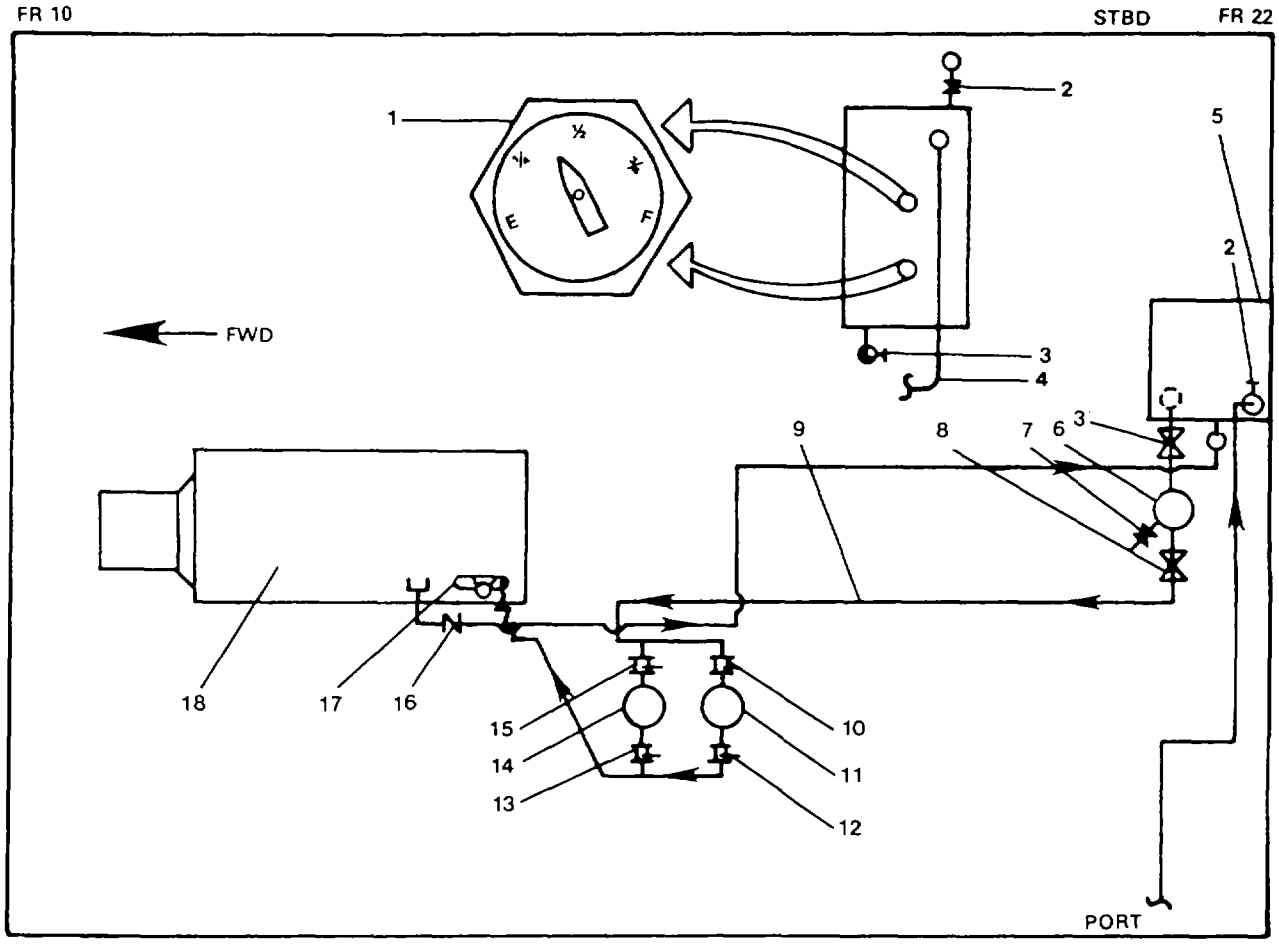
t. Engage purifier brake by lifting operating lever (4, FIGURE 2-154).

u. Close all valves in the fuel oil purification piping system (FIGURE 2-152).

v. Close bow thruster day tank fill valve (2, FIGURE 2-148) and/or emergency generator day tank fill valve (2, FIGURE 2-149).

2-5.15. Oily Water Separator Piping System. (FIGURE 2-156) 2-5.15.1. Operating Procedures.

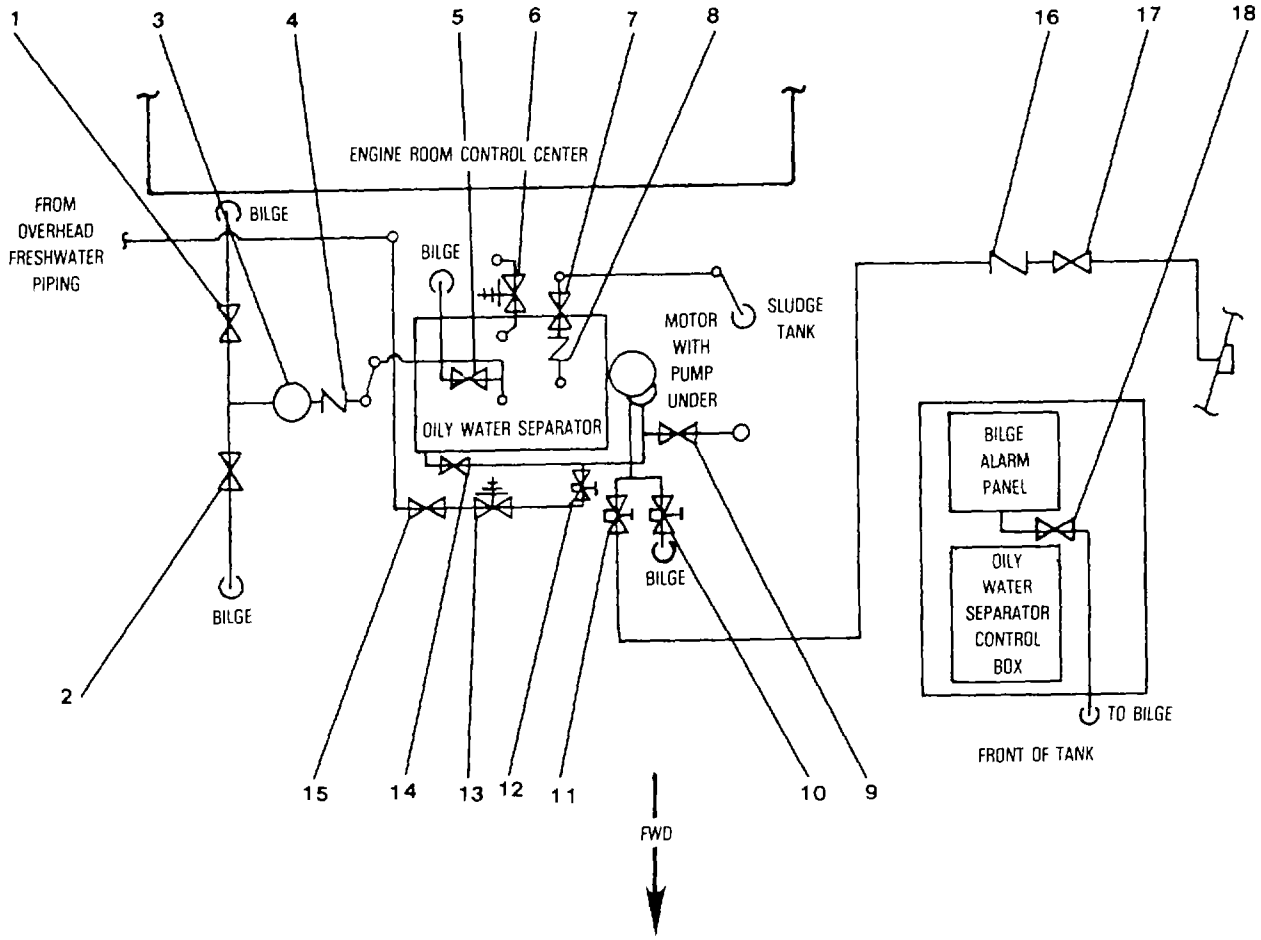
a. Close all valves in the oily water separator piping system.



LEGEND

1. TANK LEVEL INDICATORS
2. DAY TANK FILL VALVE
3. FUEL OIL DAY TANK OUTLET VALVE
4. FUEL OIL RETURN DISCHARGE PIPE
5. DAY TANK
6. WATER TRAP
7. WATER TRAP DRAIN VALVE
8. INLINE STOP VALVE
9. FUEL OIL SERVICE SYSTEM SUCTION PIPE
10. FUEL FILTER INLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER OUTLET VALVE
13. FUEL OIL FILTER OUTLET VALVE
14. FUEL OIL FILTER
15. FUEL OIL FILTER INLET VALVE
16. SWING CHECK VALVE
17. FUEL OIL PRIMING PUMP
18. BOW THRUSTER ENGINE

FIGURE 2-155. Day Tank Level Indicator (Typical).



LEGEND

1. OILY WATER SEPARATOR BILGE SUCTION VALVE, AFT
2. OILY WATER SEPARATOR BILGE SUCTION VALVE, FORWARD
3. SUCTION STRAINER
4. SWING CHECK VALVE
5. MANUAL BACKFLUSH DISCHARGE VALVE TO BILGE
6. PRESSURE RELIEF VALVE
7. DISCHARGE VALVE TO SLUDGE TANK
8. SWING CHECK VALVE
9. SAMPLE VALVE
10. SOLENOID OPERATED RECIRCULATION VALVE TO BILGES
11. SOLENOID OPERATED OVERBOARD DISCHARGE VALVE
12. SOLENOID OPERATED ON MANUAL BACKFLUSH VALVE
13. BACKFLUSH PRESSURE REDUCING VALVE
14. OIL CONTENT METER FLUSH VALVE
15. FRESHWATER INLET VALVE TO BACK FLUSH SYSTEM
16. SWING CHECK VALVE
17. OVERBOARD DISCHARGE VALVE
18. DISCHARGE VALVE TO OIL CONTENT METER

FIGURE 2-156. Oily Water Separator Piping System.

b. Open bilge suction valves (1 and/or 2).

c. Open discharge valve (7) to sludge tank.

d. Open overboard discharge valve (17).

e. Open discharge valve (18) to oil content meter in bilge alarm panel (19).

f. Open freshwater back flush valve (15).

g. Set OFF/ON switch to ON position (8, FIGURE 2-157).

NOTE

Oily water separator is now operating in an automatic mode.

2-5.15.2. Manual Backflush Procedure.

a. Set OFF/ON switch to OFF position (8, FIGURE 2-157).

b. Close discharge valve (7, FIGURE 2-156) to sludge tank.

c. Open manual backflush discharge valve (5) to bilges.

d. Turn solenoid of manually operated backflush valve hand wheel (12) in a clockwise direction. Handwheel is located on the bottom of the solenoid valve.

NOTE

Manual backflush is now in progress.

2-5.16. Dirty Oil/Oily Bilge Piping System. (FIGURE 2-158) 2-5.16.1. Start Operation.

a. Close all valves in dirty oil/oily bilge piping system. Refer to FIGURE 2-158.

b. Open discharge valves (6, 9, 12, 14, 26, and 35) as needed to drain sumps of main engines, reduction gears, ship service diesel generators or lubricating oil setting tank.. Close discharge valves when sumps are empty.

c. Connect discharge hose to discharge connection on the main deck.

d. Open sludge tank discharge valve (19).

e. Open sludge pump discharge valve (28).

f. Open sludge pump suction valve (31).

g. Depress pump start switch (30).

h. Observe discharge hose outlet, if no oil is discharged within 30 seconds, press the pump stop switch (30). Refer to unit maintenance.

i. Determine tank level by sounding tank at sounding tube (38).

j. Press pump stop switch (30) when sludge tank is empty or pump loses discharge output.

2-5.16.2. Stop Operation.

a. Press pump stop switch (30).

b. Close all valves in dirty oil/oily bilge piping system (FIGURE 2-158).

c. Disconnect and stow discharge hose.

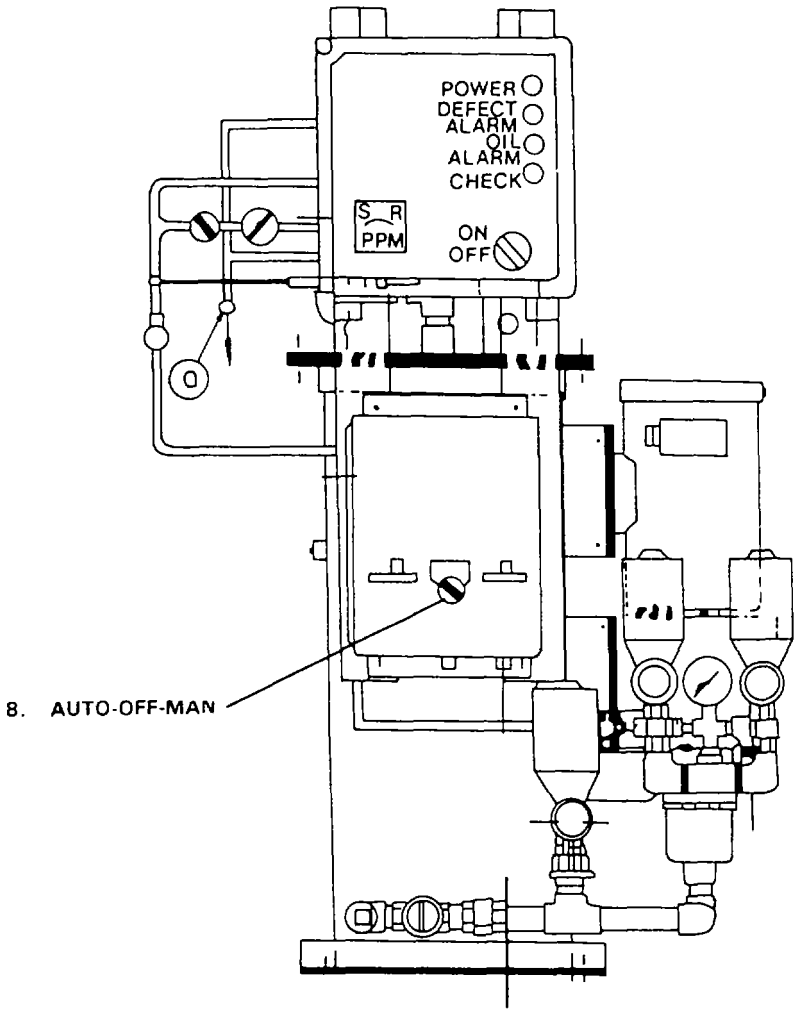
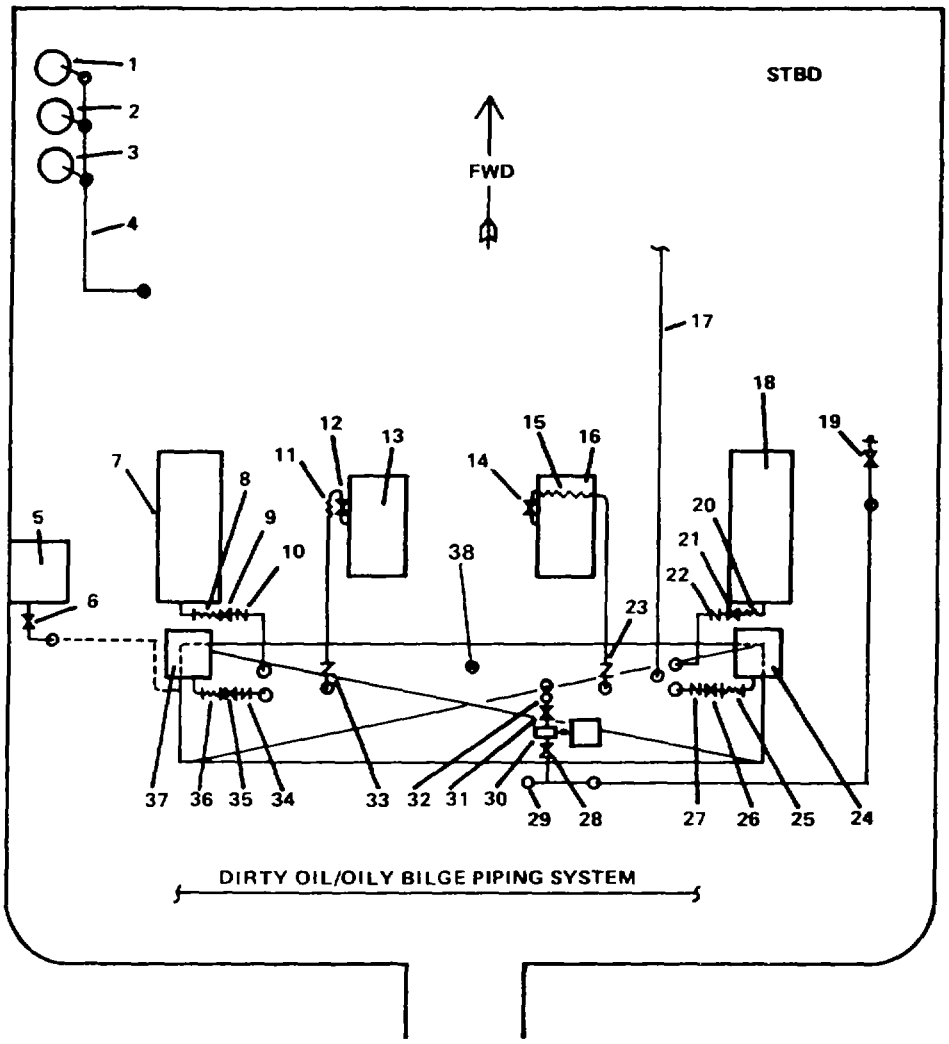


FIGURE 2-157. Oily Water Separator.



LEGEND

1. FUEL OIL PURIFIER
2. FUEL OIL PURIFIER
3. LUBE OIL PURIFIER
4. PURIFIER DISCHARGE PIPE TO SLUDGE TANK
5. LUBE OIL SETTLING TANK
6. LUBE OIL SETTLING TANK DISCHARGE VALVE TO SLUDGE TANK
7. PORT MAIN ENGINE
8. FLEXIBLE COUPLING
9. PORT MAIN ENGINE LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
10. SWING CHECK VALVE
11. FLEXIBLE COUPLING
12. PORT S.S.D. GENERATOR LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
13. PORT S.S.D. GENERATOR
14. STBD S.S.D. GENERATOR LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
15. FLEXIBLE COUPLING
16. STBD S.S.D. GENERATOR
17. OILY BILGE DISCHARGE PIPE TO SLUDGE TANK
18. STBD MAIN ENGINE
19. SLUDGE TANK DISCHARGE VALVE AND INTERNATIONAL HOSE CONNECTION LOCATED ON MAIN DECK
20. FLEXIBLE COUPLING
21. STBD MAIN ENGINE LUBE OIL SUMP DISCHARGE VALVE TO SLUDGE TANK
22. SWING CHECK VALVE
23. SWING CHECK VALVE
24. STBD REDUCTION GEAR
25. FLEXIBLE COUPLING
26. STBD REDUCTION GEAR SUMP DISCHARGE VALVE TO SLUDGE TANK
27. SWING CHECK VALVE
28. SLUDGE PUMP DISCHARGE VALVE
29. DISCHARGE PRESSURE GAUGE (0 TO)
30. SLUDGE PUMP AND MOTOR
31. SLUDGE PUMP SUCTION VALVE
32. SLUDGE PUMP SUCTION STRAINER
33. SWING CHECK VALVE
34. SWING CHECK VALVE
35. PORT REDUCTION GEAR SUMP DISCHARGE VALVE TO SLUDGE TANK
36. FLEXIBLE COUPLING
37. PORT REDUCTION GEAR
38. SOUNDING TUBE

FIGURE 2-158. Dirty Oil/Oily Bilge Piping System.

2-5.17. Bow Anchor Windlass, Bow Ramp Winch and Bow Ramp Operations. (FIGURE 2-159)

CAUTION

The bow anchor windlass and gypsies are not designed to moor the vessel either on the anchor chain or on the gypsies. The anchor chain should be supported by the chain stoppers. Mooring on the gypsies and lying at anchor on the wildcat will damage or destroy the windlass.

2-5.17.1. Bow Anchor Windlass Operation

2-5.17.1.1. Pre-Operation Check of Controls.

a. Set port and starboard windlass control valves (28, FIGURE 2-159, Sheet 3 of 4) to neutral.

b. Disconnect port and starboard clutches (12, Sheet 2 of 4) from bow ramp winch drums.

c. Engage port and starboard gypsy clutches (27, Sheet 2 of 4).

d. Engage port and starboard chain stoppers (32, Sheet 3 of 4).

e. Engage port and starboard windlass brakes (10, Sheet 2 of 4).

f. Check hydraulic fluid level sight glass (7, Sheet 1 of 4) for full indication.

g. Engage hydraulic pump circuit breaker No. 1 (FIGURE 2-101, Sheet 15 of 21) on power panel P1.

WARNING

*** Before operating windlass, be sure personnel and foreign objects are clear of wildcat, anchor chain, and related components. Moving windlass parts can cause serious personal injuries or death.**

*** High pressure hydraulic systems can cause serious personal injury in the event of equipment failure. Shut down hydraulic unit operation by pressing STOP button (5, Sheet 1 of 4) if system pressure exceeds 2000 psi.**

h. Depress start button (4, FIGURE 2-159, Sheet 1 of 4).

NOTE

*** If motor fails to start, reset motor controller by depressing PUSH TO TRIP button (2, Sheet 1 of 4).**

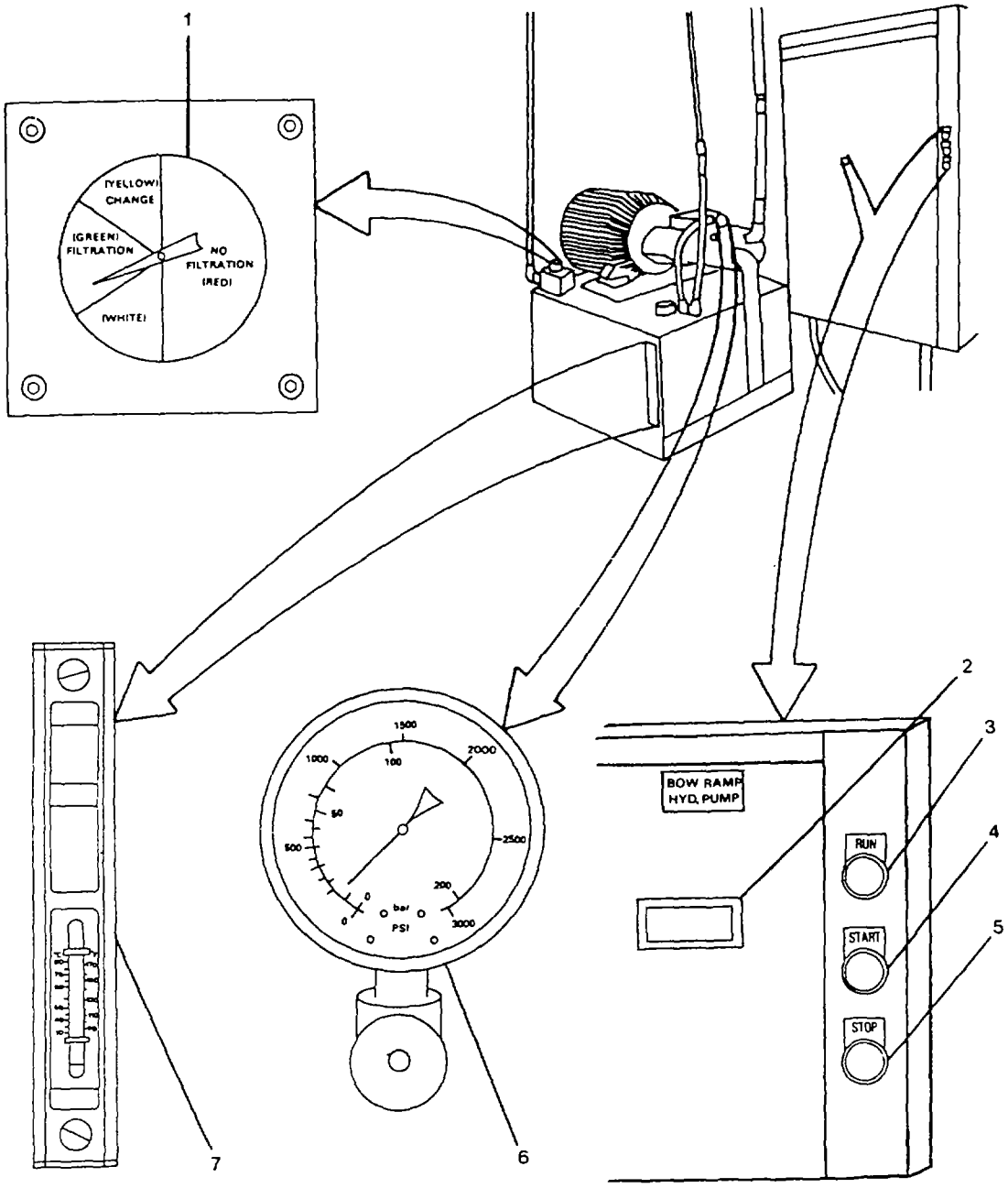
*** Operator may also start and stop hydraulic unit from remote controls (24 and 25. Sheet 2 of 4) located at port bow anchor windlass assembly.**

i. Check system hydraulic pressure gauge (6, Sheet 1 of 4) for reading above designed operating pressure of 2000 psi.

CAUTION

Shut down hydraulic unit operation by pressing STOP button(5, Sheet 1 of 4) if filter condition indicator (1, Sheet 1 of 4) needle appears in the CHANGE (Yellow) or NO FILTRATION (Red) quadrant. Damage to hydraulic unit could occur if fluid is not filtered properly.

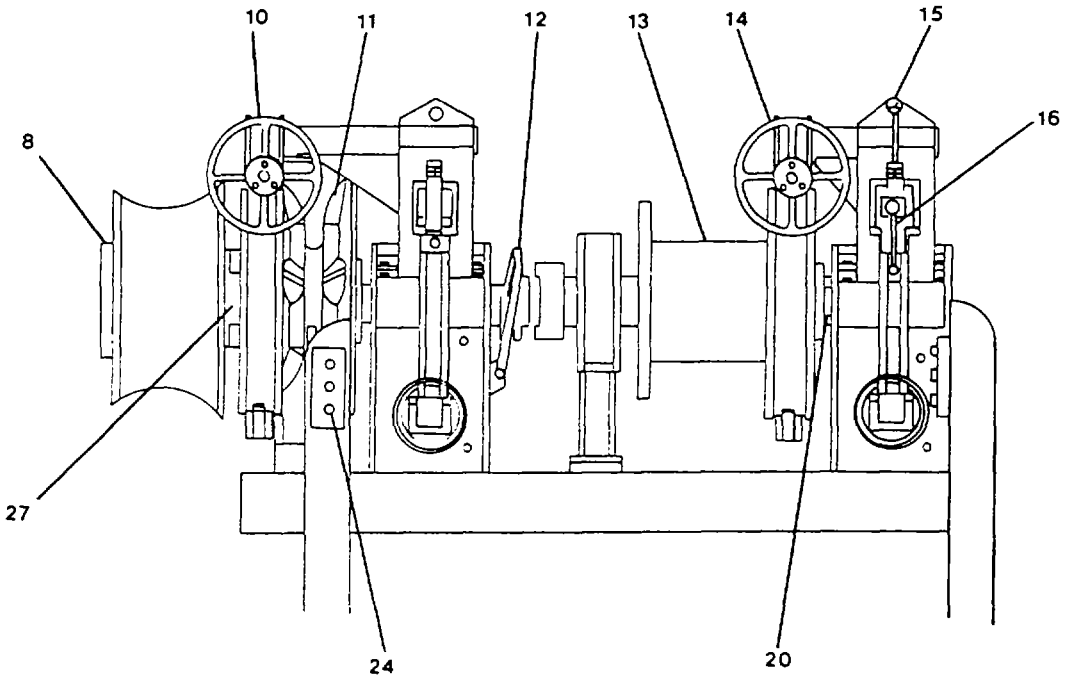
j. Check filter condition indicator (1) for reading in the FILTRATION (Green) quadrant.



LEGEND

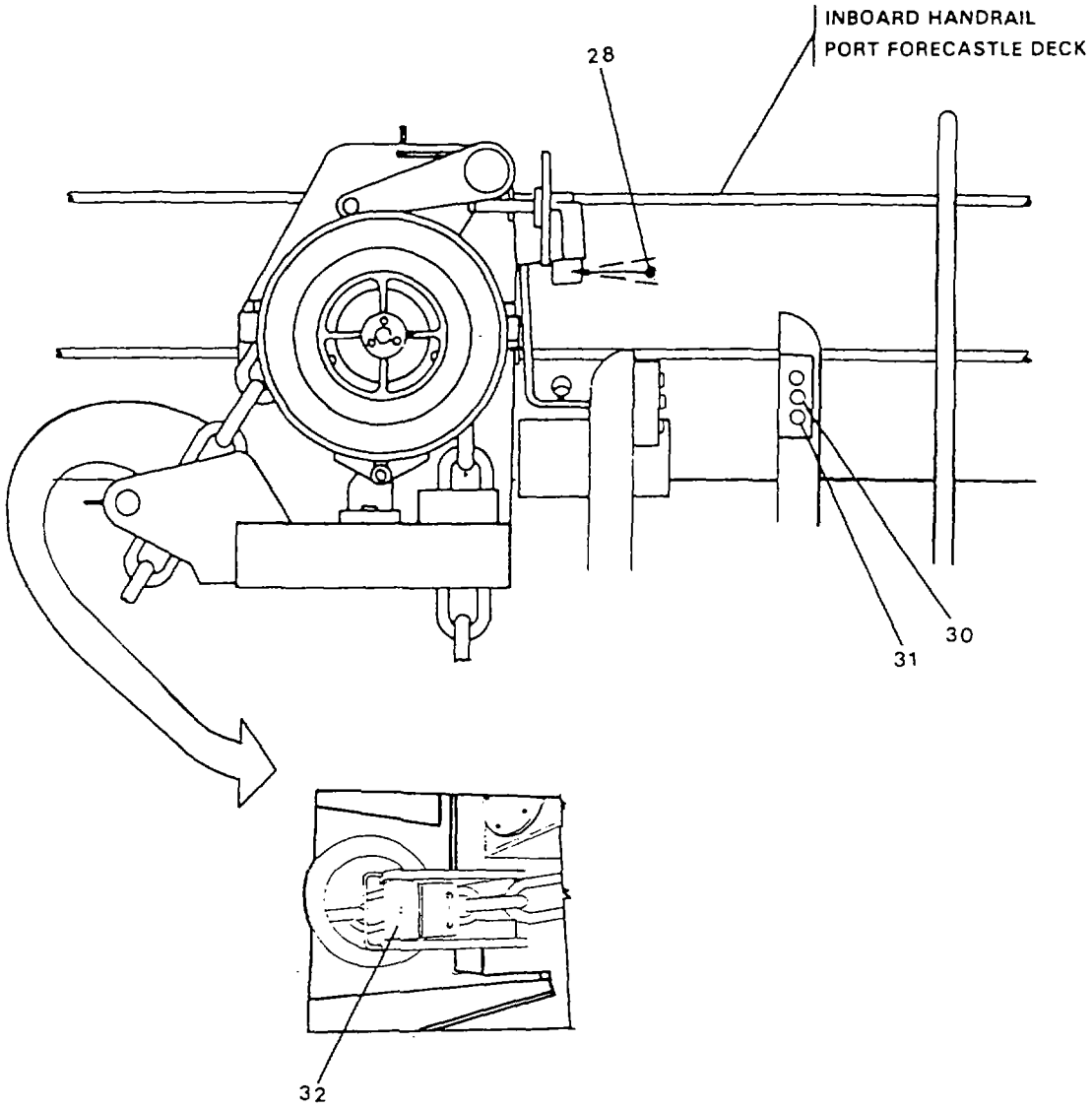
1. FILTER CONDITION INDICATOR
2. PUSH TO TRIP BUTTON
4. START BUTTON
5. STOP BUTTON
6. HYDRAULIC PRESSURE GAUGES
7. FLUID LEVEL SIGHT GLASS

FIGURE 2-159. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 1 of 4).



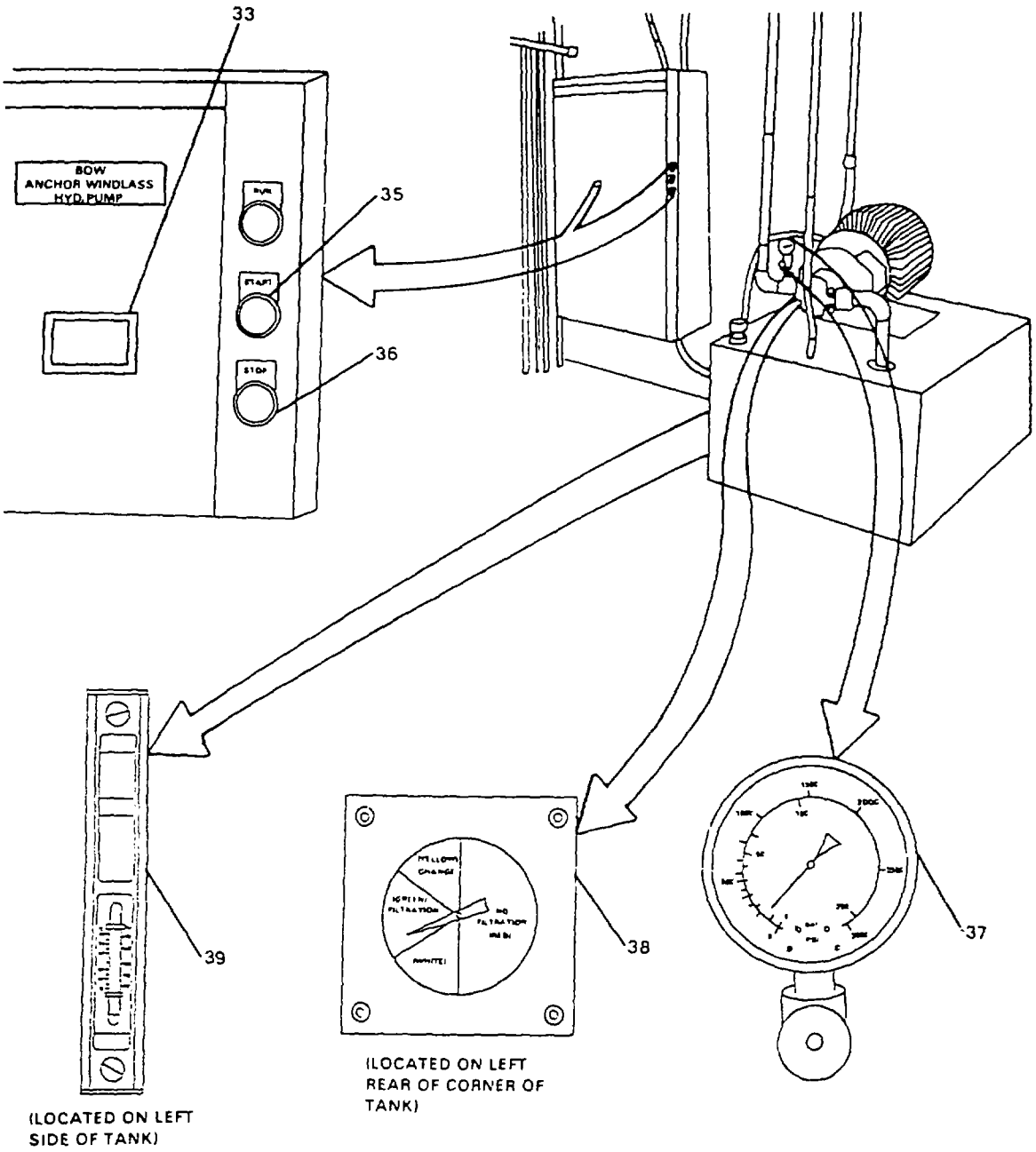
LEGEND
8. GYPSY CLUTCH HAND WHEEL
10. WILDCAT/GYPSY HAND BRAKE WHEEL
11. WILDCAT
12. CLUTCH
13. BOW RAMP WINCH DRUM
14. BOW RAMP WINCH DRUM HANDBRAKE WHEEL
15. HYDRAULIC PRESSURE GAUGE
16. BOW RAMP WINCH CONTROL VALVE
20. CLUTCH
24. STOP BUTTON
27. GYPSY CLUTCH

FIGURE 2-159. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 2 of 4).



LEGEND
28. BOW ANCHOR WINDLESS CONTROL VALVE
30. START BUTTON
31. STOP BUTTON
32. CHAIN STOPPER

FIGURE 2-159. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 3 of 4).



LEGEND

33. PUSH TO TRIP BUTTON
35. START BUTTON
36. STOP BUTTON
37. HYDRAULIC PRESSURE GAUGE
38. FILTER CONDITION INDICATOR
39. FLUID LEVEL SIGHT GLASS

FIGURE 2-159. Bow Anchor Windlass Controls and Bow Ramp Winch Controls (Sheet 4 of 4).

NOTE

Both port and starboard anchor windlass assemblies may be operated at the same time or individually.

2-5.17.1.2. Lowering Anchor by Paying Out Chain

NOTE

When situations require anchor to be lowered slowly, anchor chain may be payed out using the hydraulic system and the wildcat.

a. Conduct pre-operation check of controls as prescribed in paragraph 2-5.17.1.1.

WARNING

Before operating windlass, be sure personnel and foreign objects are clear of wildcat, anchor chain and related components. Moving windlass parts can cause serious injuries or death.

b. Release windlass handbrake by turning windlass handbrake wheel (10, Sheet 2 of 4) counterclockwise.

c. Gently jog wildcat (11, Sheet 2 of 4) in the haul-in direction by moving control valve (28, Sheet 3 of 4) DOWN, then quickly moving it back to NEUTRAL. This allows wildcat (11, Sheet 2 of 4) to fully engage anchor chain, taking the strain off chain stopper (32, Sheet 3 of 4).

d. Disengage chain stopper (32, Sheet 3 of 4).

NOTE

Moving control valve allows hydraulic pressure to release failsafe brake. If power failure occurs, failsafe brake engages, preventing payout of anchor chain.

e. Move windlass control valve (28, Sheet 3 of 4) UP to lower or pay out anchor chain to the desired length. Move windlass control valve (28, Sheet 3 of 4) to its NEUTRAL position to stop payout of chain.

f. Engage chain stopper (32, Sheet 3 of 4).

g Jog (gently) wildcat (11, Sheet 2 of 4) in the payout direction by moving windlass control valve (28, Sheet 3 of 4) UP, then quickly returning it to NEUTRAL. This allows the chain stopper to fully engage chain, taking strain off the wildcat.

h. Turn handbrake wheel (10, Sheet 2 of 4) clockwise to set windlass handbrake.

2-5.17.1.3. Lowering Anchor by Releasing Handbrake.

NOTE

In situations when anchors must be ready for instant use, such as in narrow channels or around docks, the anchors may be lowered quickly if windlass is in STANDBY condition by simply releasing handbrake.

a. Conduct pre-operation check of controls as prescribed in paragraph 2-5.17.1.1.

WARNING

Before operating windlass be sure personnel and foreign objects or clear of wildcat, anchor chain and related components. Moving windlass parts can cause serious injuries or death.

b. Place windlass in STANDBY condition by completing following tasks.

(1) Turn windlass handbrake wheel (10, Sheet 2 of 4) counterclockwise.

(2) Jog (gently) wildcat (11, Sheet 2 of 4) in the haul-in direction by moving windlass control valve (28, Sheet 3 of 4) DOWN, then quickly moving it back to NEUTRAL.

(3) Turn handbrake wheel (10, Sheet 2 of 4) clockwise to set windlass handbrake.

(4) Disengage chain stopper (32, Sheet 3 of 4).

(5) Turn gypsy clutch handwheel (8, Sheet 2 of 4) counterclockwise to disengage gypsy clutch (27, Sheet 2 of 4).

NOTE

With bow anchor windlass in the STANDBY condition, the anchor is secured only by the handbrake and can be quickly released by turning handbrake. Turn handbrake wheel counterclockwise to lower anchor. Control anchor descent by varying the pressure on the handwheel.

c. Turn the handbrake (10, Sheet 2 of 4) clockwise to stop anchor's descent.

d. Engage chain stopper (32, Sheet 3 of 4).

e. Turn handbrake wheel (10, Sheet 2 of 4) counterclockwise to release handbrake. This allows chain stopper to engage chain and take strain off wildcat.

f. Turn handbrake wheel (10, Sheet 2 of 4) clockwise to set handbrake.

g. Turn gypsy clutch handwheel (8, Sheet 2 of 4) clockwise to engage gypsy clutch.

2-5.17.1.4. Hauling In Anchor.

2-5.17.1.5. Gypsy Operation.

WARNING

*** Be sure personnel and foreign objects are clear of wildcat, anchor chain and related components. Moving windlass parts can cause serious injuries or death.**

*** DO NOT operate hydraulic motor with brake engaged.**

*** Before operating windlass be sure personnel and foreign objects are clear of wildcat, anchor chain and related components. Moving windlass parts can cause serious injuries or death.**

CAUTION

Chain stopper should be engaged during the haul-in procedure. As each link in the chain passes through, the chain stopper will slip into the next link as a link moves toward the windlass. This protects the windlass in the event of a failure from paying out all the chain without control.

a. Conduct pre-operation check of control settings as prescribed in paragraph 2-5.17.1.1.

b. Turn gypsy clutch handwheel (8, Sheet 2 of 4) counterclockwise to disengage gypsy clutch (27, Sheet 2 of 4).

c. Hold control valve (28, Sheet 3 of 4) up to rotate gypsy counterclockwise or down to rotate gypsy clockwise.

d. Engage clutch (27, Sheet 2 of 4), by turning gypsy clutch handwheel (8, Sheet 2 of 4) clockwise, when gypsy operations are complete.

NOTE

When additional pulling power is needed for hauling in lines, such as during mooring or docking operations, gypsies may be disconnected and operated independently of wildcats.

2-5.17.1.6. Post-Operation Check of Controls.

a. Conduct a thorough visual inspection of both port and starboard bow anchor windlass assemblies including clutches, brakes, wildcats, gypsies, visible anchor chain and hydraulic unit in machinery room. Check all hydraulic lines, fittings and gauges for leaks. Report noted deficiencies to unit maintenance.

b. Disconnect port and starboard clutches (12) from bow ramp winch drum (13, Sheet 2 of 4).

c. Engage port and starboard clutches (27, Sheet 2 of 4).

d. Engage port and starboard chain stoppers (32, Sheet 3 of 4).

e. Engage port and starboard windlass brakes (10, Sheet 2 of 4).

f. Depress hydraulic pump STOP button (5, Sheet 1 of 4).

g. Open circuit breaker No. 1 (FIGURE 2-101, Sheet 15 of 21) in power panel P1 on port bulkhead of bow ramp hydraulic machinery room.

2-5.17.2. Bow Ramp Winch and Bow Ramp Operation.

2-5.17.2.1. Pre-Operational Check of Controls. (FIGURE 2-159)

a. Place bow ramp winch control valve (16, Sheet 2 of 4), located on port winch assembly, in the center (neutral) position.

b. Disconnect port and starboard clutches (12, Sheet 2 of 4) from bow anchor windlass assemblies.

c. Engage port and starboard clutches (20, Sheet 2 of 4).

d. Engage port and starboard bow ramp winch handbrakes (14, Sheet 2 of 4).

e. Engage hydraulic pump circuit breaker No. 2 (FIGURE 2-101, Sheet 15 of 21) (port bulkhead of upper machinery room).

WARNING

*** Before operating bow ramp winch, be sure personnel and foreign objects are clear of wire rope drum, wire rope, bow ramp and related components. Moving winch and ramp parts can cause serious injury or death.**

*** High pressure hydraulic systems can cause serious personal injury in the event of equipment failure. Shut down hydraulic unit operation by pressing STOP button (36, Sheet 4 of 4) if system pressure exceeds 3000 psi.**

f. Depress hydraulic pump START button (35, FIGURE 2-159, Sheet 4 of 4). If motor fails to start, reset motor controller by depressing PUSH TO TRIP button (33, Sheet 4 of 4).

NOTE

Operator may also start or stop hydraulic unit from remote controls (30 and 31, Sheet 3 of 4) located at port bow ramp winch assembly.

g. Check system hydraulic pressure gauge (37, Sheet 4 of 4) for reading above designed operating pressure of 2000 psi. Immediately shut down system by pressing STOP button (36, Sheet 4 of 4) and notify unit maintenance.

CAUTION

Shut down hydraulic unit operation by pressing STOP button (36, Sheet 4 of 4) if filter condition indicator needle appears in the CHANGE (Yellow) or NO FILTRATION (Red) quadrant. Damage to hydraulic unit could occur if fluid is not filtered properly.

h. Check filter condition indicator (38, Sheet 4 of 4) for reading in the FILTRATION (Green) quadrant.

NOTE

Both port and starboard bow ramp assemblies will be operated at the same time when controlled by the single bow ramp winch control valve (16, Sheet 2 of 4), located on the port forecastle deck.

2-5.17.2.2. Lowering Bow Ramp.

a. Complete pre-operation check of controls as prescribed in paragraph 2-5.17.2.1.

WARNING

Before operating bow ramp winch, be sure personnel and foreign objects are clear of wire rope drum, wire rope, bow ramp and related components. Moving winch and ramp parts can cause serious injury or death.

NOTE

This procedure requires four crew members: two on main deck, one on port forecastle deck, and one on starboard forecastle deck.

b. Turn locking bar wheel (1, FIGURE 2-160, Sheet 1 of 2) counterclockwise to release port and starboard drum brakes.

c. Move winch control handle (16, FIGURE 2-159, Sheet 2 of 4) to the right to haul in and tension wire ropes to ramp.

d. Jog winch until strain is relieved from ratchet dogs (4, FIGURE 2-160, Sheet 1 of 2) and locking bars (2).

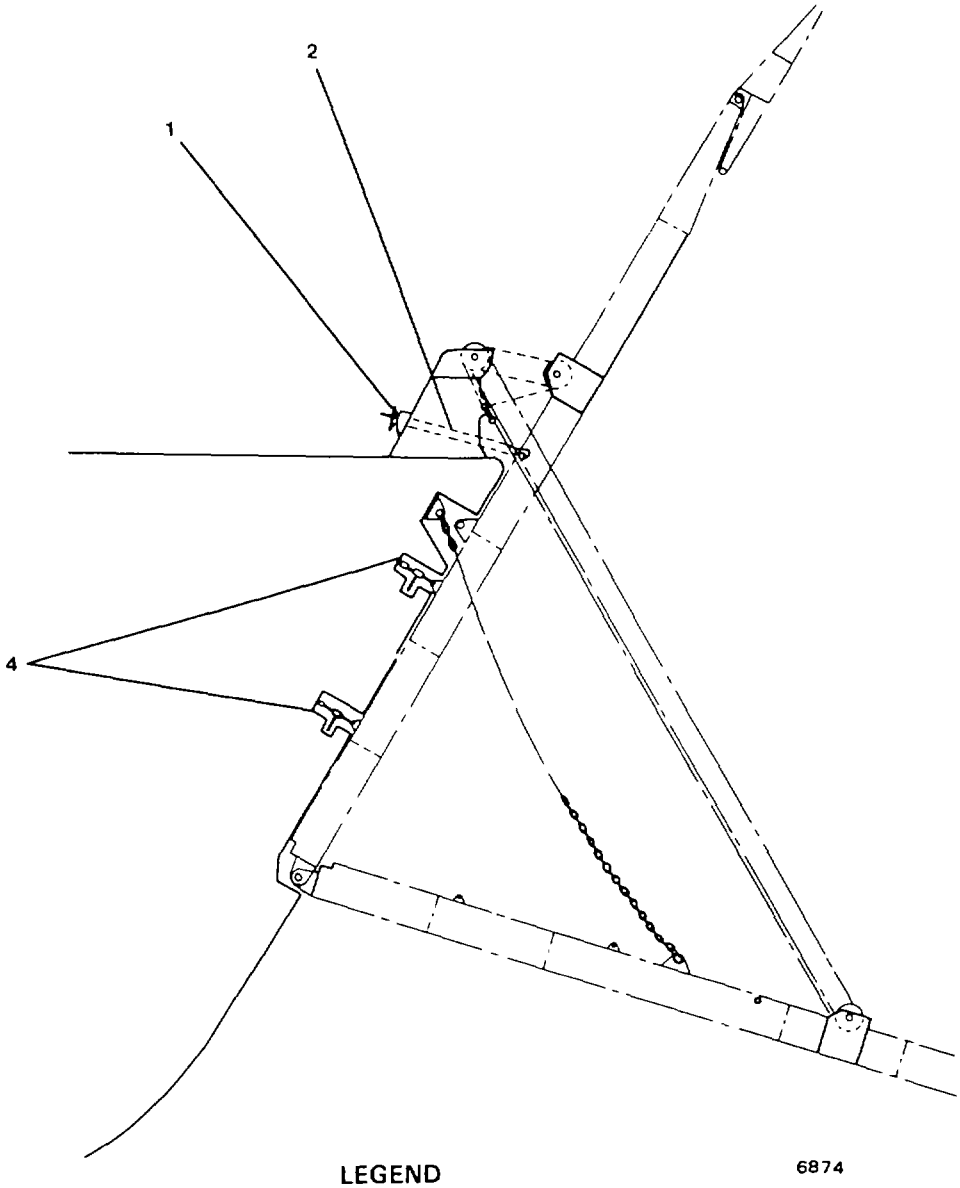


FIGURE 2-160. Bow Ramp Locking Devices (Sheet 1 of 2).

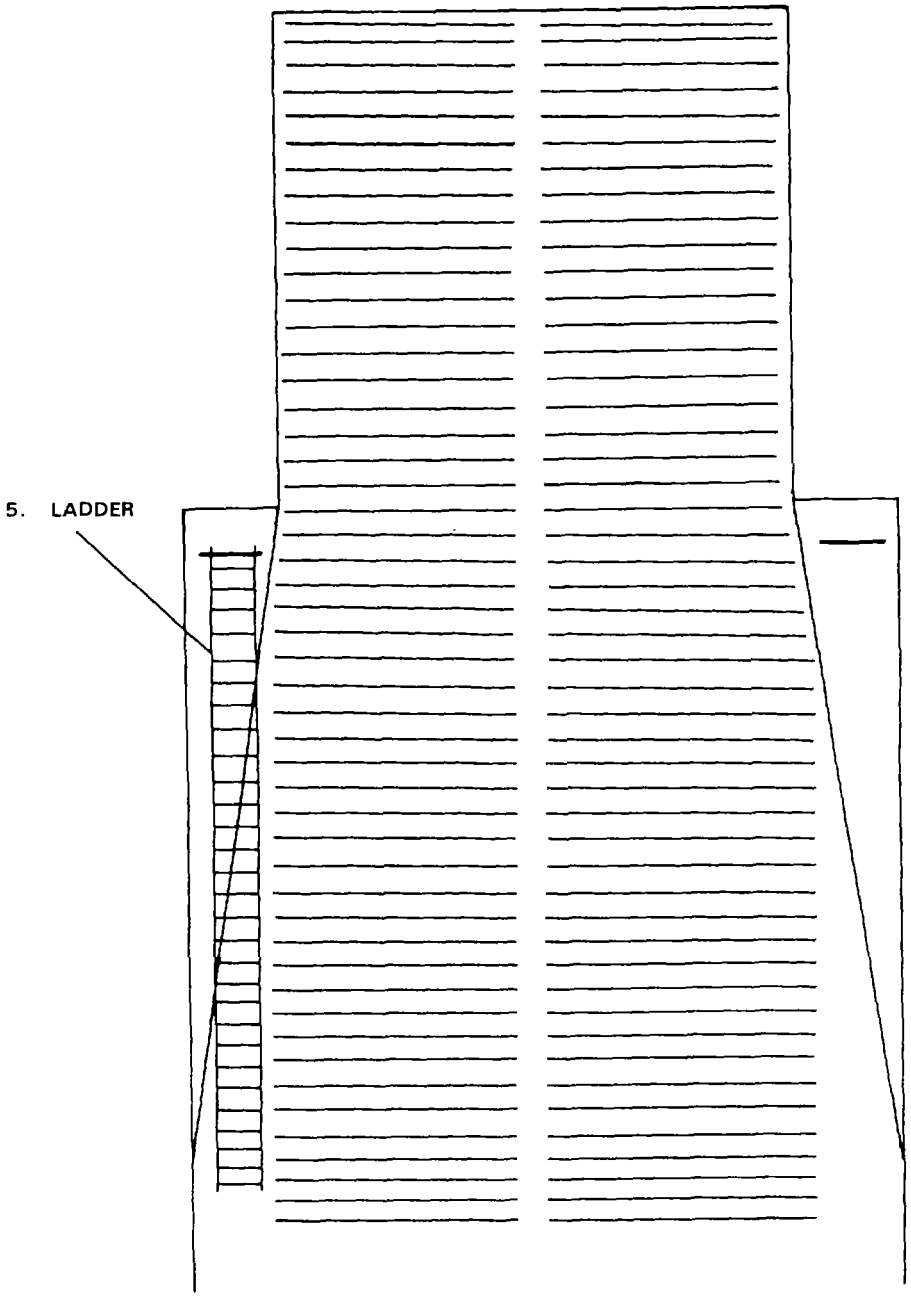


FIGURE 2-160. Bow Ramp Locking Devices (Sheet 2 of 2).

e. Return control valve (16, FIGURE 2-159, Sheet 2 of 4) to neutral.

NOTE

Crew members on main deck perform following procedures.

f. Install ladder (FIGURE 2-160, Sheet 2 of 2) on ladder brackets. (6).

g. Climb ladder to ratchet dogs and release two port and two starboard ratchet dogs (4, Sheet 1 of 2).

NOTE

Crew members on forecastle deck perform following procedures.

h. Turn the port and starboard locking bar wheels (1) counterclockwise to relieve port and starboard locking bars (2, Sheet 1 of 2).

i. Remove and stow ladder (Sheet 2 of 2).

NOTE

Station crew members at port and starboard locking bar wheels (1, Sheet 1 of 2) and two crew members on main deck just aft of bow ramp to observe and report any damage to ramp seal and chains.

j. Turn handwheels (14, FIGURE 2160, Sheet 2 of 4) counterclockwise to release port and starboard handbrakes.

WARNING

Clear all personnel and equipment from bow ramp and from bow ramp path of travel. Moving ramp can cause serious injury or death.

*** High pressure hydraulic systems can cause serious personal injury in the event of equipment failure. If system pressure exceeds 2000 psi, immediately shut down system and notify unit maintenance.**

k. Check system hydraulic gauge (15, Sheet 2 of 4), for reading above designed operating pressure of 2000 psi. If pressure exceeds 2000 psi, shut down system by depressing STOP button (31, Sheet 3 of 4).

NOTE

Ramp can be lowered only from port winch assembly control valve which operates both ramp winch assemblies. No control valve or hydraulic pressure gauge exists on starboard assembly.

1. Lower ramp by moving control valve (16, Sheet 2 of 4) to the left and monitor reading on hydraulic gauge (15).

m. Continue holding control valve (16, Sheet 2 of 4) to the left until bow ramp is lowered to the desired position.

n. Return valve (16, Sheet 2 of 4) to center (neutral) position to stop bow ramp travel.

o. After ramp has landed, overrun winch slightly to eliminate tension in cable.

p. Reset port and starboard bow ramp winch brakes by turning handwheels (14, Sheet 2 of 4) clockwise.

q. Conduct post-operation check of controls as prescribed in paragraph 2-5.17.2.4.

r. Depress hydraulic pump STOP button (36, Sheet 4 of 4).

2-5.17.2.3. Raising Bow Ramp.

a. Conduct pre-operation check of controls as prescribed in paragraph 25.17.2.1.

WARNING

Before operating bow ramp winch, be sure personnel and foreign objects are clear of wire rope, bow ramp, and related components. Moving ram and winch parts can cause serious injury or death.

NOTE

This procedure requires four crew members: two on main deck, one on port forecastle, and one on starboard forecastle decks.

b. Clear bow ramp of all personnel and foreign objects.

main deck to observe ramp seal and to signal bow ramp winch operator to stop closing ramp if necessary.

d. Station two crew members at port And starboard handbrake wheels (14, FIGURE 2-159, Sheet 2 of 4).

e. Turn the handbrake wheels (14) counterclockwise to release port and starboard drum brakes.

WARNING

*** Clear all personnel and equipment from bow ramp and from bow ramp path of travel. Moving ramp can cause serious injury or death.**

*** High pressure hydraulic systems can cause serious injury in the event of equipment failure. Do not operate bow ramp winch if system pressure exceeds 2000 psi. Immediately shut down system and notify unit maintenance.**

f. Check system hydraulic gauge (15, Sheet 2 of 4) for reading above designed operating pressure of 2000 psi. If pressure exceeds 2000 psi, shut down system by depressing STOP button (31, Sheet 3 of 4).

g. Move bow ramp winch control lever (16, Sheet 2 of 4) to the right to raise ramp.

NOTE

Ramp can be raised only from port winch assembly control valve which operates both ramp winch assemblies. No control valve or hydraulic gauge exist on starboard assembly.

h. Hold control valve (16, Sheet 2 of 4) to the right until the bow ramp is closed.

i. Return valve (16) to the center neutral position to stop bow ramp winch.

j. Turn port and starboard handwheels (14, Sheet 2 of 4) clockwise to reset port and starboard bow ramp winch brakes.

k. Turn locking bar wheels (1, FIGURE 2-160, Sheet 1 of 2) clockwise to engage and lock port and starboard locking bars (2).

I. Install ladder (5, Sheet 2 of 2) on ladder brackets (6).

m. Climb ladder to engage and lock two port and two starboard ratchet dogs (4, Sheet 1 of 2).

n. Conduct post-operation check of controls as prescribed in paragraph 2-16.17.2.4.

2-5.17.2.4. Post-Operation Check of Controls.

a. Conduct a thorough visual inspection of both port and starboard bow ramp winch assemblies including clutches, brakes, wire rope drums, visible wire rope, and hydraulic unit in machinery room. Check all hydraulic lines, fittings and gauges for leaks. Report deficiencies to unit maintenance.

b. Disconnect port and starboard clutches (12, FIGURE 2-159, Sheet 2 of 4) from bow anchor windlass assemblies.

c. Engage port and starboard clutches (20, Sheet 2 of 4).

d. Engage port and starboard bow ramp winch drum brakes (14, Sheet 2 of 4).

e. Check hydraulic fluid level in sight glass (39, Sheet 4 of 4), hydraulic pressure on gauge (37, Sheet 4 of 4), and filter condition on indicator (38, Sheet 4 of 4), noting and reporting any abnormalities to supervisor and maintenance.

f. Depress STOP button (36, Sheet 4 of 4) to turn off bow ram winch.

g. Open circuit breaker No. 2, in power panel P1 (FIGURE 2-101, Sheet 15 of 21), on port bulkhead of hydraulic machinery room.

2-5.18. Stern Anchor Winch, Stern Ramp Winch And Stern Ramp Operation.

2-5.18.1. Stern Anchor Winch Operation.

WARNING

*** Do not operate winch with guards removed.**

*** Stay alert.**

*** Never operate winch alone.**

*** Keep clear of moving winch and wire rope.**

*** Never wear loose clothing or jewelry while operating winch.**

*** Never attempt to guide wire rope onto spools.**

*** Never leave controls while winch is operating.**

*** Never perform maintenance while winch is running.**

2-5.18.1.1. Pre-Operation Check.

a. Move winch control valve (13, FIGURE 2-161, Sheet 2 of 4) to NEUTRAL.

b. Set brakes (11, Sheet 2 of 4) to 1500 psi. Refer to gauge (12, Sheet 2 of 4).

c. Engage main spool dog (14, Sheet 2 of 4).

d. Disengage main spool clutch (Sheet 3 of 4).

e. Engage auxiliary spool dog (17, Sheet 3 of 4).

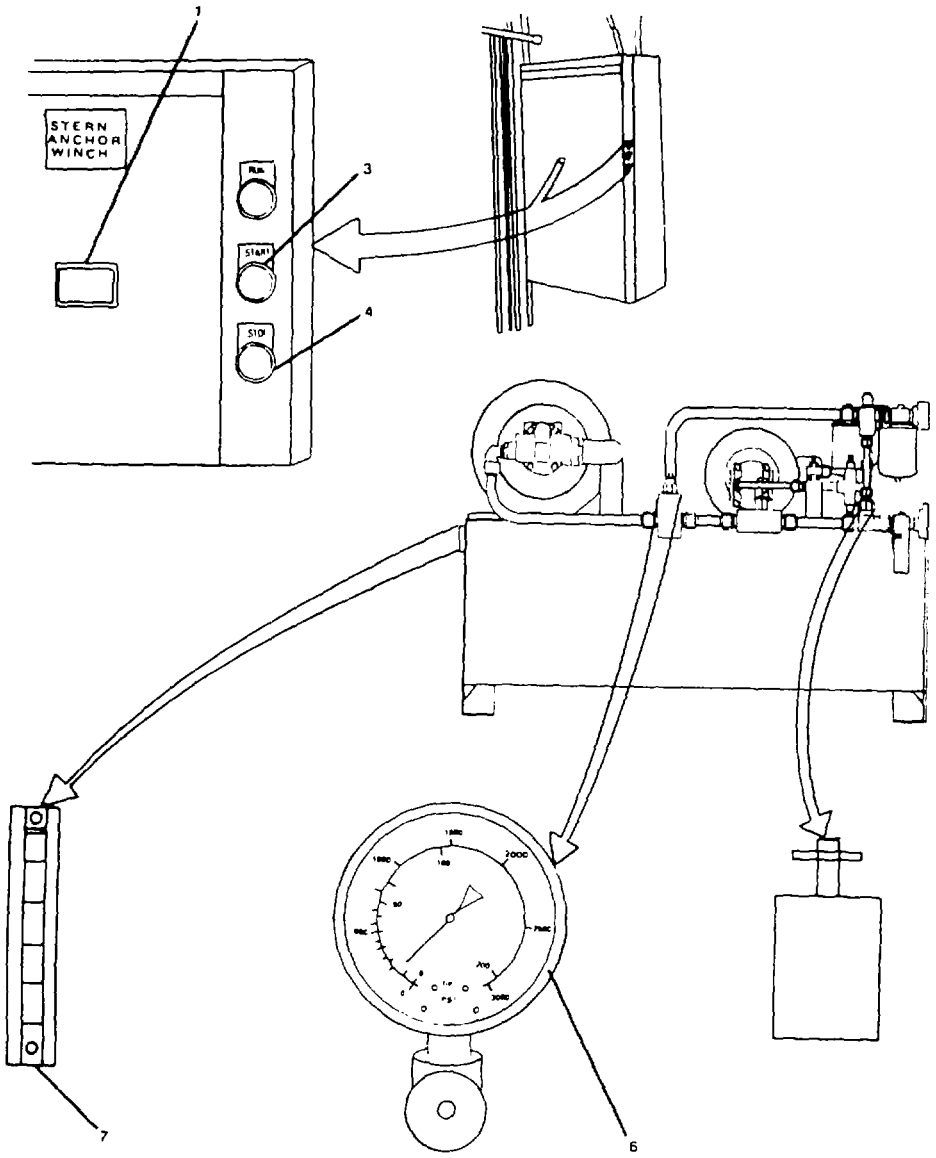
f. Disengage auxiliary spool clutch (16, Sheet 3 of 4).

WARNING

Before starting hydraulic pump, clear personnel and foreign objects from spools, wire rope, clutches, and related components. Moving winch parts can cause serious injury or death.

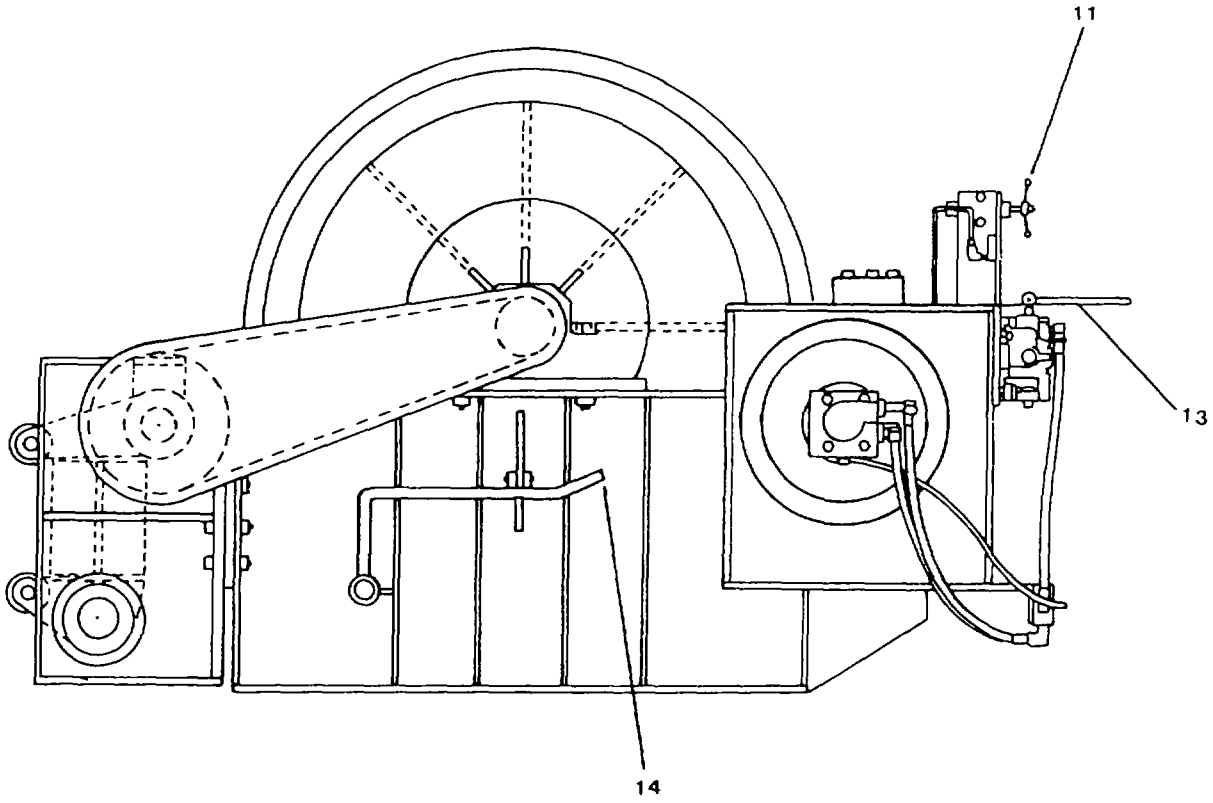
g. Start hydraulic pump as follows:

(1) Turn on circuit breaker No. 2 (FIGURE 2-101, Sheet 16 of 21) in power panel P3 in Emergency Generator Room, main deck aft.



LEGEND
1. PUSH TO RESET
3. START BUTTON
4. STOP BUTTON
6. PRESSURE INDICATOR
7. SIGHT GAUGE

FIGURE 2-161. Stern Anchor Winch (Sheet 1 of 4).



LEGEND
11. HYDRAULIC BRAKE HANDLE
13. CENTRAL VALVE
14. MAIN SPOOL DOG HANDLE

FIGURE 2-161. Stern Anchor Winch (Sheet 2 of 4).

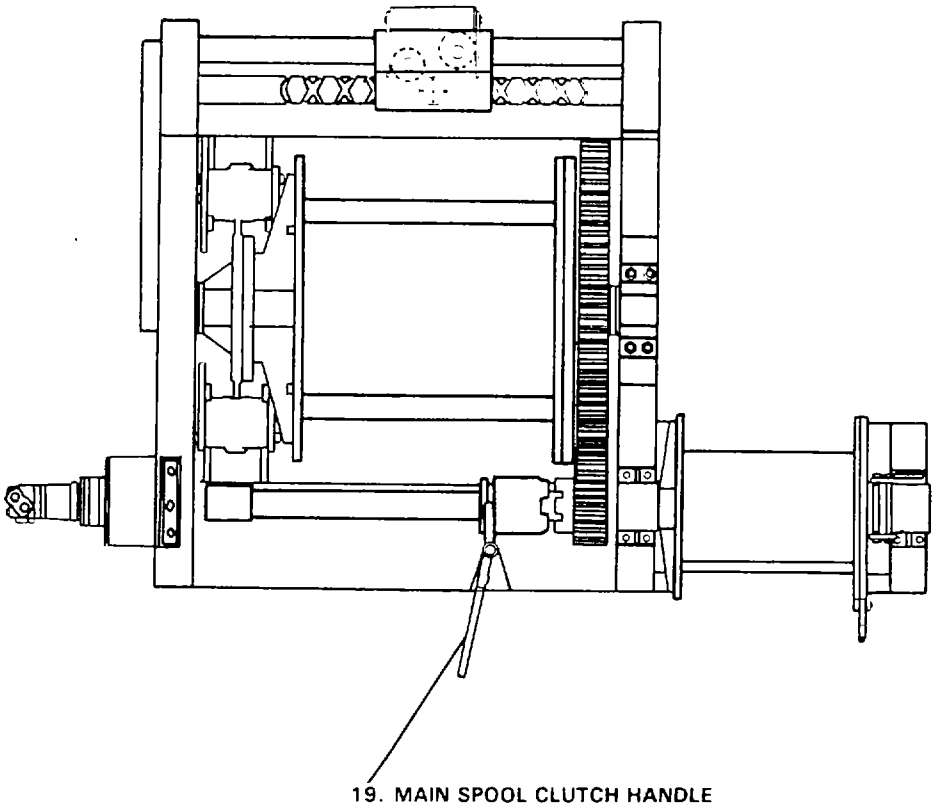
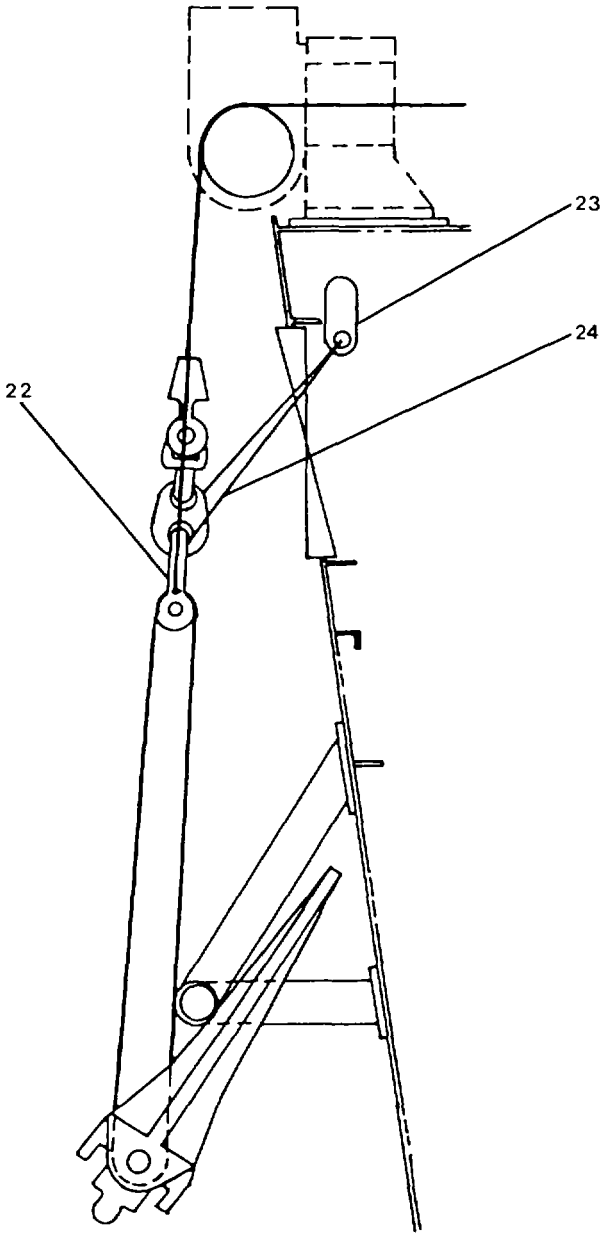


FIGURE 2-161. Stern Anchor Winch (Sheet 3 of 4).



LEGEND
22. ANCHOR SHACKLE
23. PAD EYES
24. ANCHOR HOLDBACK WIRE ROPE

FIGURE 2-161. Stern Anchor Winch (Sheet 4 of 4).

(2) Depress reset button (1, FIGURE 2-161, Sheet 1 of 4) on motor controller.

(3) Depress START button (3, Sheet 1 of 4) on motor controller.

WARNING

High pressure hydraulic systems can cause serious injury if equipment fails. Do not operate if hydraulic pressure exceeds 3000 psi.

NOTE

Hydraulic pump can also be started or stopped at remote controls (8 and 9, Sheet 2 of 4) on winch.

h. Check hydraulic pressure gauge (6, Sheet 1 of 4). If pressure exceeds 3000 psi:

(1) Depress STOP button (4, Sheet 1 of 4) on motor controller.

(2) Report high pressure reading to supervisor and maintenance.

2-5.18.1.2. Lowering Anchor by Paying Out Wire Rope

a. Conduct pre-operation check of controls prescribed in paragraph 2-5.18.1.1.

WARNING

Before operating winch, clear personnel and foreign objects from spools, wire rope, clutches and related components. Moving winch parts can cause serious injury or death.

b. Engage hydraulic brakes (11, FIGURE 2-161, Sheet 2 of 4).

c. Engage and lock main spool clutch (Sheet 3 of 4).

d. Disengage main spool dog (14, Sheet 2 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

e. Release brakes (11, Sheet 2 of 4).

f. Haul in wire rope by jogging control valve (13, Sheet 2 of 4) UP.

g. Reset brakes (11, Sheet 2 of 4).

h. Detach anchor holdback wire rope (24, Sheet 4 of 4).

i. Release brakes (11, Sheet 2 of 4).

j. Pay out anchor and wire rope to desired length by holding control valve handle (13, Sheet 2 of 4) DOWN.

k. Stop payout by bringing control valve handle (13, Sheet 2 of 4) to NEUTRAL.

CAUTION

Never engage dog while spool is moving. Engaging dog with spool moving will destroy winch.

l. Engage main spool dog (14, Sheet 2 of 4).

m. Engage brakes (11, Sheet 2 of 4).

n. Conduct post-operation check of controls as prescribed in paragraph 2-5.18.1.5.

2-5.18.1.3. Lowering Anchor by Releasing Brakes

a. Conduct pre-operation check of controls prescribed in paragraph 2-5.18.1.1.

WARNING

Before operating winch, clear personnel and foreign objects from spools, wire rope, clutches and related components. Moving winch parts can cause serious injury or death.

b. Engage hydraulic brakes (11, FIGURE 2-161, Sheet 2 of 4).

c. Engage and lock main spool clutch (Sheet 3 of 4).

d. Disengage main spool dog (14, Sheet 2 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

e. Slowly release brakes (11, Sheet 2 of 4).

f. Haul in wire rope by jogging control valve (13, Sheet 2 of 4) UP.

g. Reset brakes (11, Sheet 2 of 4).

h. Detach anchor holdback wire rope (24, Sheet 4 of 4).

i. Disengage and lock clutch (Sheet 3 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

j. Release brakes (11, Sheet 2 of 4) and allow main spool (20, Sheet 3 of 4) to free-wheel.

k. Control speed of anchor descent by varying pressure with brake (11, Sheet 2 of 4).

l. Stop anchor descent by fully engaging brake (11, Sheet 2 of 4).

CAUTION

Never engage dog while spool is moving. Engaging dog with spool moving will destroy winch.

m. Engage main spool dog (14, Sheet 2 of 4).

n. Conduct post-operation check of controls as prescribed in paragraph 2-5.18.1.5.

2-5.18.1.4. Raising Anchor.

a. Conduct pre-operation of controls prescribed in paragraph 2-5.18.1.1.

WARNING

Before operating winch, clear personnel and foreign objects from spools, wire rope, clutches and related components. Moving winch parts can cause serious injury or death.

b. Engage hydraulic brakes (11, FIGURE 2-161, Sheet 2 of 4).

c. Engage and lock main spool clutch (Sheet 3 of 4).

d. Disengage main spool dog (14, Sheet 2 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

e. Haul in wire rope by moving control valve (13, Sheet 2 of 4) UP.

f. Hold control valve (13, Sheet 2 of 4) UP until anchor is up and against anchor rack.

g. Engage brake (11, Sheet 2 of 4).

CAUTION

Never engage dog while spool is moving. Engaging dog while spool is moving will destroy winch.

h. Engage main spool dog (14, Sheet 2 of 4).

i. Secure anchor to vessel by inserting anchor holdback wire (24, Sheet 4 of 4) through anchor shackle (22, Sheet 4 of 4) and attaching holdback wire to pad eyes (23, Sheet 4 of 4).

j. Conduct post-operation check of controls as prescribed in paragraph 2-5.18.1.5.

2-5.18.1.5. Post-Operation Check of Controls. Perform the following checks after operating the stern anchor winch.

a. Conduct a complete inspection of winch and components.

b. Engage brakes (11, FIGURE 2-164, Sheet 2 of 4).

c. Engage main spool dog (14, Sheet 2 of 4).

d. Disengage clutch (Sheet 3 of 4).

e. Engage auxiliary spool dog (17, Sheet 3 of4).

f. Disengage auxiliary spool clutch (16, Sheet 3 of 4).

g. Check hydraulic fluid level (7, Sheet 1 of 4).

h. Stop hydraulic pump as follows:

(1) Depress STOP button (4, Sheet 1 of 4).

(2) Turn off circuit breaker No. 2 (FIGURE 2-101, Sheet 17 of 21) on power panel P3 in Emergency Generator Room, main deck aft.

2-5.18.2. Stern Ramp Winch and Stern Ramp Operation.

WARNING

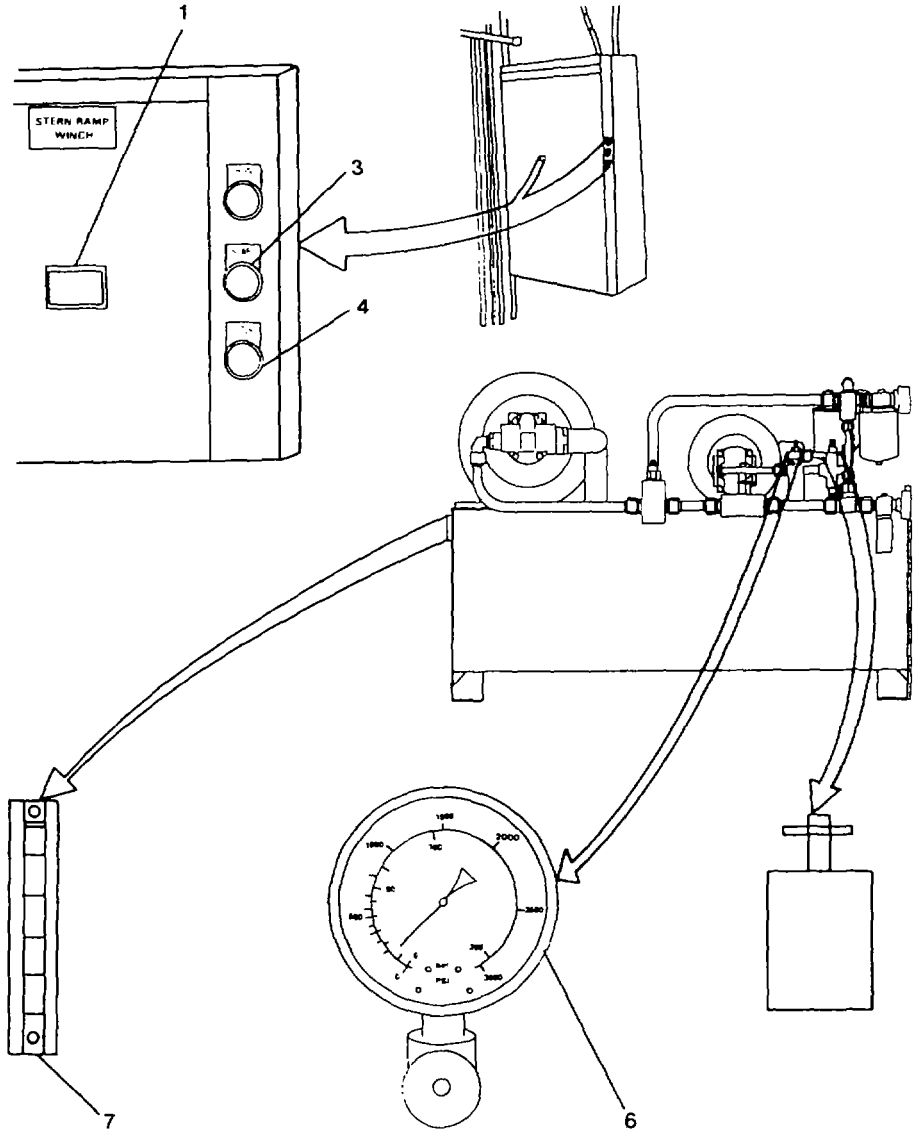
- **Before operating winch, be sure personnel and foreign objects are clear of stern ramp, winch, fairleads, wire ropes and related components. Moving ramp and winch parts can cause serious injury or death.**
- **Never leave controls while ramp is moving or ramp winch is running.**
- **Never perform maintenance while ramp winch is running.**

a. Perform Pre-Operation Check of controls.

(1) Inspect winch and bow ramp components.

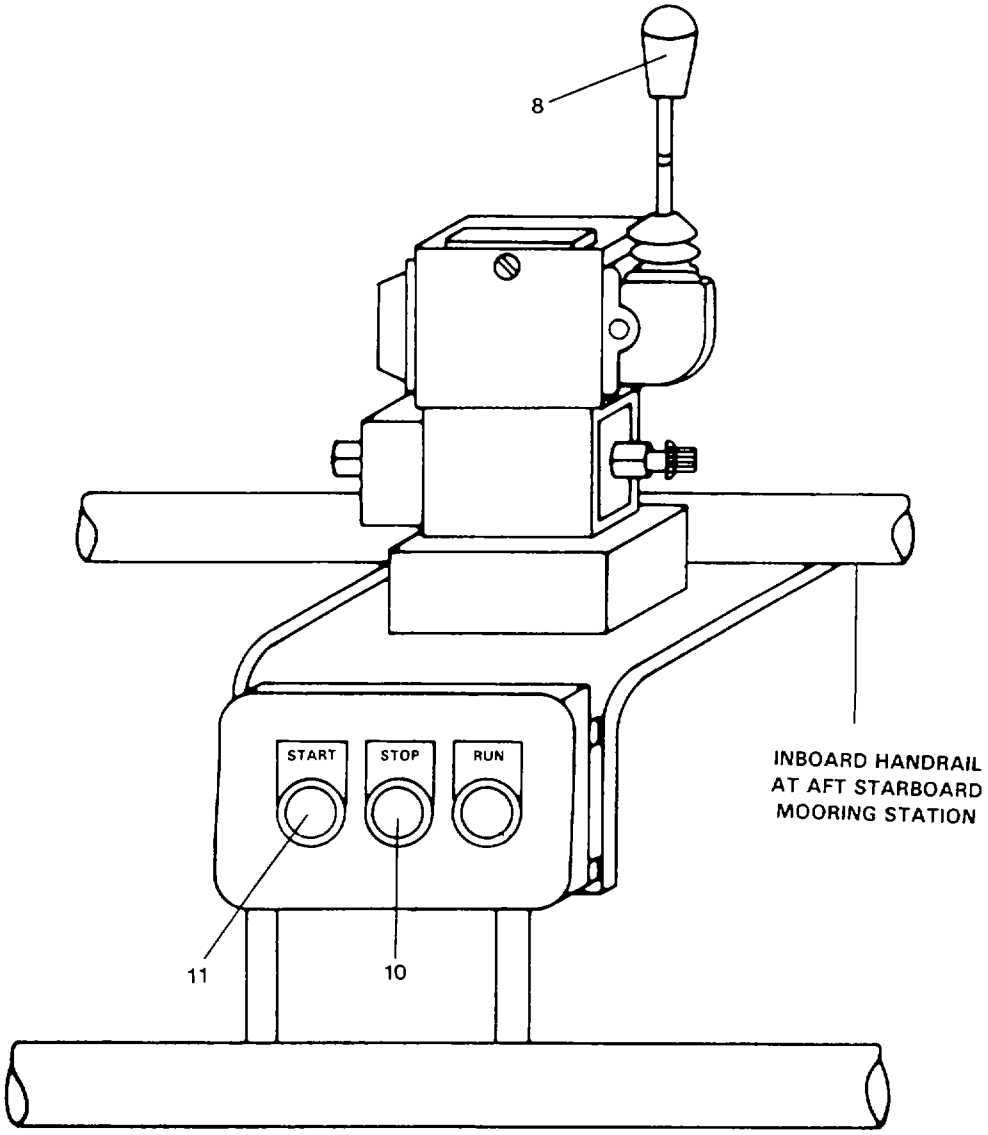
(2) Move manual control valve (8, FIGURE 2-162, Sheet 2 of 2) to NEUTRAL.

(3) Check hydraulic fluid level (7, Sheet 1 of 2).



LEGEND
1. PUSH TO RESET BUTTON
3. START BUTTON
4. STOP BUTTON
6. PRESSURE INDICATOR
7. SIGHT GAUGE

FIGURE 2-162. Stern Ramp Winch Controls (Sheet 1 of 2).



LEGEND
8. CONTROL VALVE
10. STOP BUTTON
11. START BUTTON

FIGURE 2-162. Stern Ramp Winch Controls (Sheet 2 of 2).

WARNING

Before starting hydraulic pump, clear personnel and foreign objects from stern ramp, fairleads, wire rope and sheaves.

b. Start stern ramp hydraulic pump as follows:

(1) Turn on circuit breaker No. 1 (FIGURE 2-101, Sheet 17 of 21) at power panel P3 in Emergency Generator room, main deck aft.

(2) Depress PUSH TO RESET button (1, FIGURE 2-162, Sheet 1 of 2).

(3) Depress START button (3, Sheet 1 of 2) on motor controller.

WARNING

High pressure hydraulic systems can cause serious injury if equipment fails. Do not operate if hydraulic pressure exceeds 2000 psi.

NOTE

Hydraulic pump can also be started or stopped at remote controls (10 and 11, Sheet 2 of 2).

c. Check hydraulic pressure gauge (6, Sheet 1 of 2). If pressure exceeds 2000 psi, depress STOP button (4, Sheet 1 of 2) on motor controller. Report high pressure reading to unit maintenance.

d. Lower stern ramp as follows:

WARNING

Before lowering ramp, clear personnel and foreign objects from stern ramp, fairleads, wire ropes and related components.

Moving ramp and winch parts can cause serious injury or death.

(1) Move control valve (8, Sheet 2 of 2) RIGHT to tension wire rope and release strain from ratchet dogs (1, FIGURE 2-163).

(2) Attach ladder (3, FIGURE 2-163) to port edge of mezzanine deck.

(3) Release two port ratchet dogs (1).

(4) Attach ladder (3) to starboard edge of mezzanine deck.

(5) Release two starboard ratchet dogs (1).

(6) Remove and stow ladder (3).

(7) Move control valve (8, FIGURE 2-162, Sheet 2 of 2) LEFT. Hold control valve to LEFT until ramp reaches desired position.

(8) Stop ramp movement by moving control valve (8, Sheet 2 of 2) to center NEUTRAL.

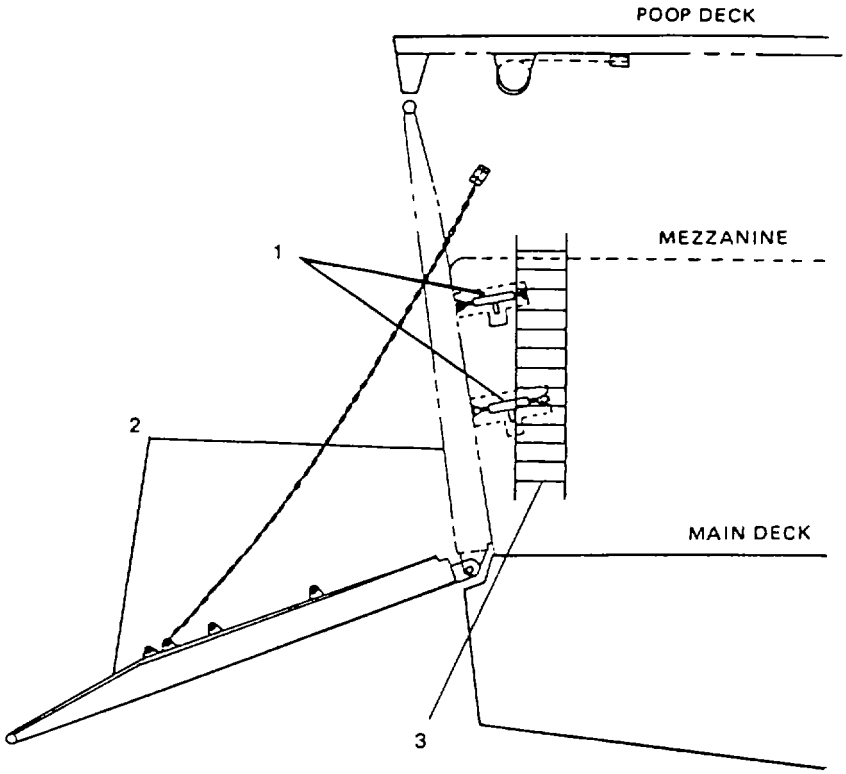
e. Raise stern ramp as follows:

(1) Conduct pre-operation check of controls as prescribed in step a.

WARNING

Before raising stern ramp, clear personnel and foreign objects from stern ramp, fairleads, wire ropes and related components. Moving ramp and winch parts can cause serious injury or death.

(2) Move control valve (8, Sheet 2 of 4) RIGHT. Hold control valve to RIGHT until ramp is closed.



LEGEND
1. RATCHET DOGS
2. STERN RAMP
3. LADDER

FIGURE 2-163. Stern Ramp Locking Devices.

(3) Stop ramp movement by moving control valve (8, Sheet 2 of 4) to center, NEUTRAL.

(4) Attach ladder (3, FIGURE 2-163) to port edge of mezzanine deck.

(5) Engage and tighten two port ratchet dogs (1).

(6) Engage and tighten two starboard ratchet dogs (1).

(7) Remove and stow ladder (3).

f. Perform post-operation check of controls.

(1) Inspect winch and ramp assemblies for damage.

(2) Check hydraulic fluid level (7, FIGURE 2-161, Sheet 1 of 4).

(3) Stop stern ramp hydraulic pump as follows:

(a) Depress STOP button (4, FIGURE 2-162, Sheet 1 of 2).

(b) Turn off circuit breaker No. 1 (FIGURE 2-101, Sheet 17 of 21) in power panel P3 in Emergency Generator room, main deck aft.

NOTE

In the event stern ramp winch becomes inoperable, the auxiliary spool of the stern anchor winch may be used to raise and lower stern ramp. Refer to Stern Ramp Emergency Procedures in Section IV.

2-5.19. Engine Order Telegraph (EOT). When an order is issued to change either engine speed or direction (forward or reverse), the following procedures occur at the Pilothouse Console (PHC) and at the Engine Room Console (ERC).

2-5.19.1. Pilothouse Console (PHC). (FIGURE 2-140)

a. Rotate the EOT switch (9, FIGURE 2-164) so that the EOT switch points at the ordered position.

NOTE

A bell will ring at the ERC and PHC when PHC EOT and ERC EOT switch positions do not match.

b. Observe the indicator lamps on the EOT panel.

NOTE

When the ERC operator places the ERC EOT switch in the same position as the PHC EOT switch, the associated lamp will light on the PHC EOT panel.

2-5.19.2. Engine Room Console (ERC). (FIGURE 2-106)

NOTE

A bell will ring to alert the ERC operator to a new EOT command.

a. Observe the EOT panel for a new command indicator light.

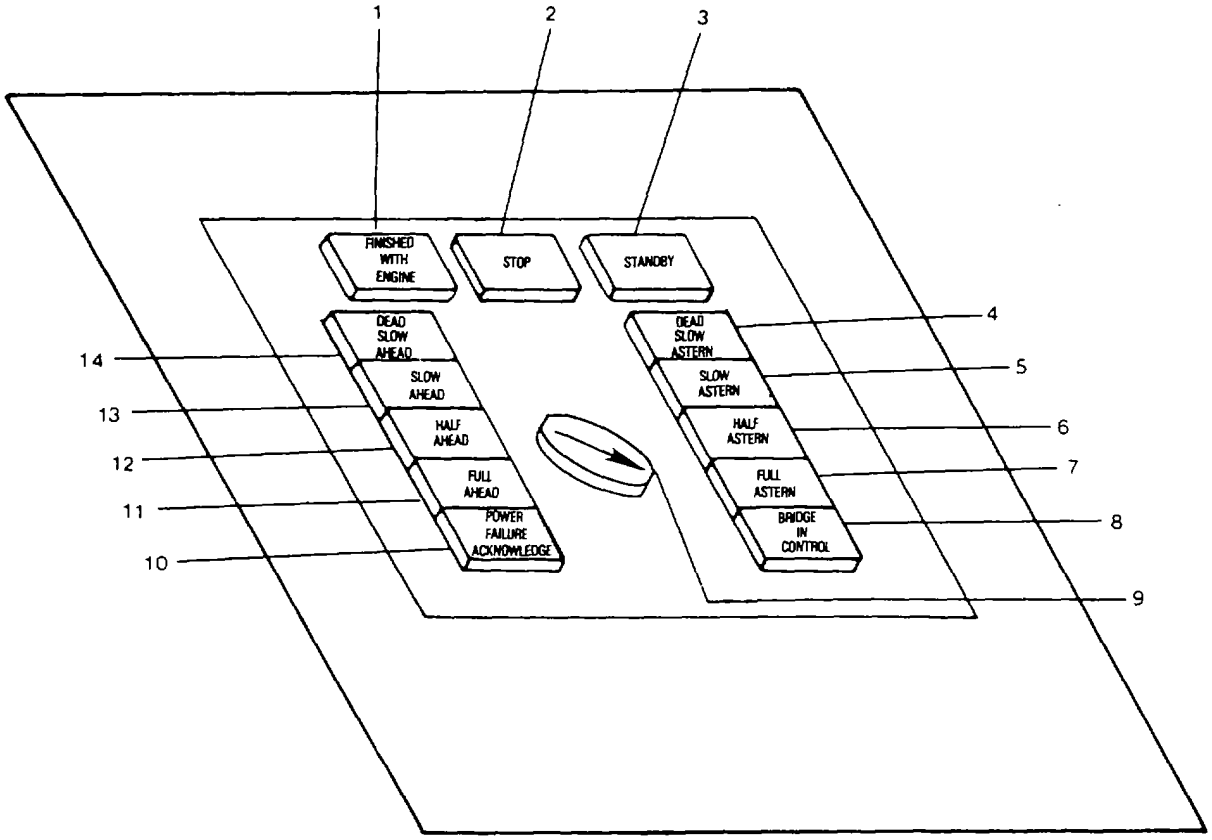
b. Place the ERC EOT switch (9, FIGURE 2-164) in the new command position. Bell will cease ringing.

2-5.20. Sound Powered Telephone System. The sound powered telephone system includes the following:

a. 19 Station Sound Powered Telephone (FIGURE 2-165).

b. Sound Powered Telephone (FIGURE 2-166).

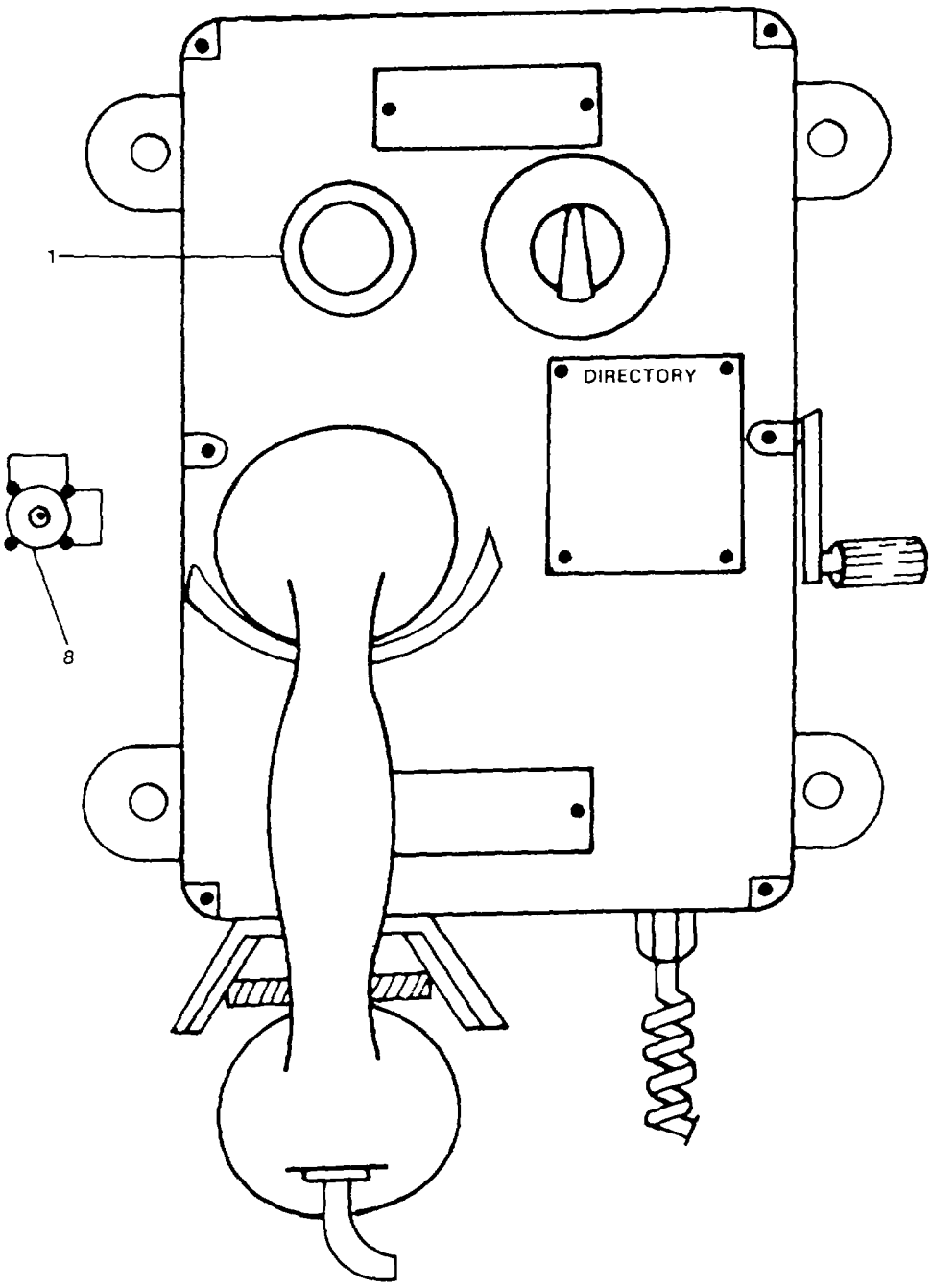
c. Watertight Telephone (FIGURE 2-167).



LEGEND

1. FINISHED WITH ENGINE
2. STOP
3. STANDBY
4. DEAD SLOW ASTERN
5. SLOW ASTERN
6. HALF ASTERN
7. FULL ASTERN
8. BRIDGE IN CONTROL
9. EOT SELECTOR SWITCH
10. POWER FAILURE ACKNOWLEDGE
11. FULL AHEAD
12. HALF AHEAD
13. SLOW AHEAD
14. DEAD SLOW AHEAD

FIGURE 2-164. Engine Order Telegraph (EOT).



LEGEND
1. INDICATOR LIGHT
8. BELL, 6"

FIGURE 2-165. Telephone, 19 Station.

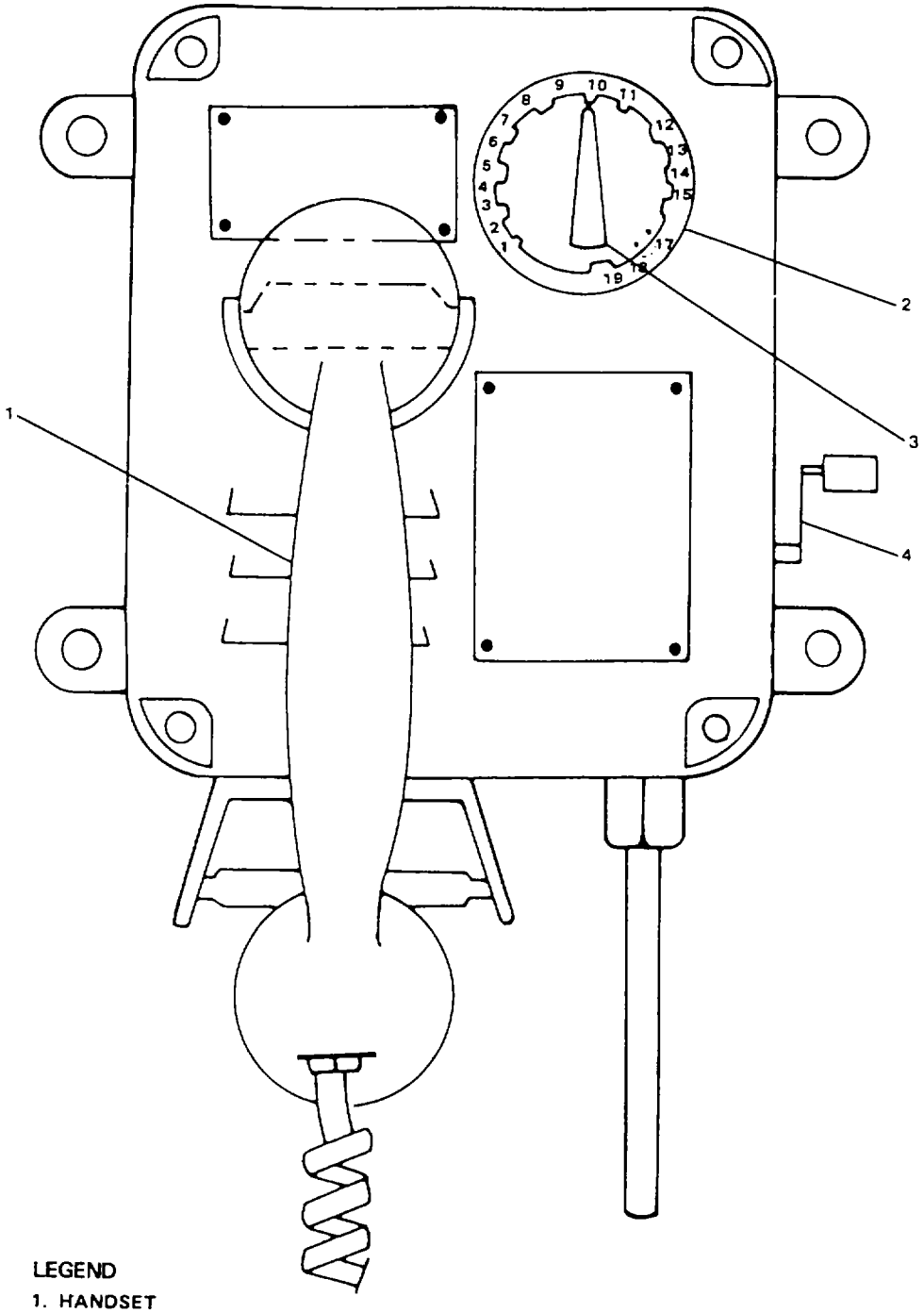
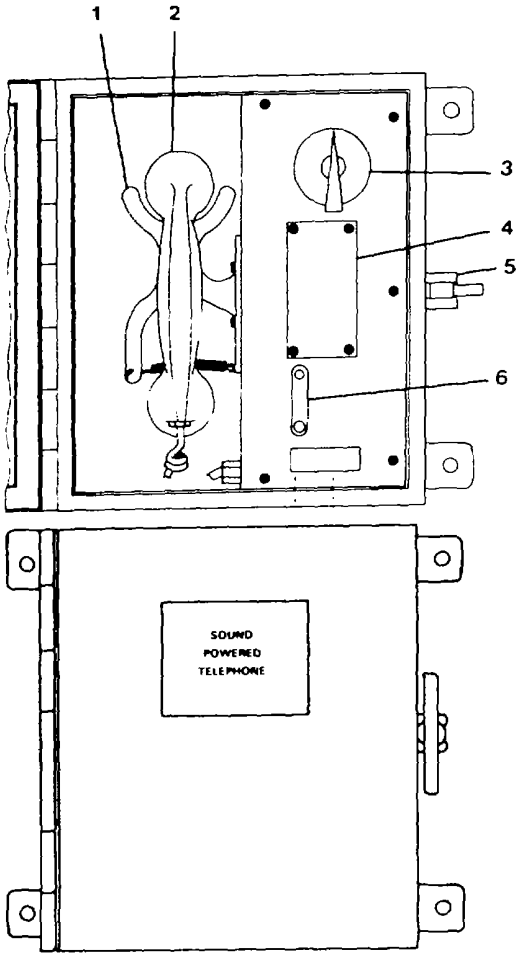


FIGURE 2-166. Telephone, Sound Powered.



LEGEND
1. HANDSET BRACKET
2. HANDSET
3. SELECTOR SWITCH
4. DIRECTORY PLATE
5. RETAINER PIVOT
6. MAGNETO HANDLE

FIGURE 2-167. Watertight Sound Powered Telephone (MWTH-196).

d. Head Set - Chest Set Sound Powered Telephone (FIGURE 2-168).

e. Sound Powered Telephone Jack-box (FIGURE 2-169).

2-5.20.1. Normal Operation.

NOTE

The normal operation for the 19 station sound powered telephones, sound powered telephone, and watertight telephone are the same. They will be discussed first. Then the head set-chest set sound powered telephone will follow.

2-5.20.1.1. Sound Powered Telephone (Typical). (FIGURE 2-166)

a. Answering a call

(1) Lift the handset (1) from its cradle.

(2) Depress and hold button to talk and receive voice.

b. To call.

(1) Turn selector switch (3) to desired station (2).

(2) Turn hand crank (4) to generate bell on the station being called.

(3) Depress pushbutton on handset and hold down button while speaking.

c. Replace handset in holding cradle when call is finished.

2-5.20.1.2. Head Set-Chest Set Sound Powered Telephone. (FIGURE 2-168)

a. Remove cover (2, FIGURE 2-169) on jackbox, place plug (10, FIGURE 2-168) in sound powered telephone jackbox (FIGURE 2-169).

b. Disconnect hook (12, FIGURE 2-168) on neck strap, place neck strap around neck, and reconnect hook.

c. Place headset (3) on head.

d. Adjust mouthpiece (6).

e. Depress button (7) on mouthpiece (8) to talk.

f. Listen through headset when button is depressed or when button is not depressed.

g. Remove headset (3) and place on mouthpiece support bracket (6).

h. Remove neck strap (12), disconnect plug (10) from jackbox, and stow in storage box.

i. Replace jackbox cover (2, FIGURE 2-169).

2-5.20.2. Operation of External Bells and Lights In noisy spaces (the engine room, emergency generator room and bow thruster compartment), the sound powered telephone system has bells indicator lights (1 and 8, FIGURE 2-165) and rotating beacon (1, FIGURE 2-170). These indicators alert operators for incoming calls.

a. Lift the handset from its cradle to stop bells and lights.

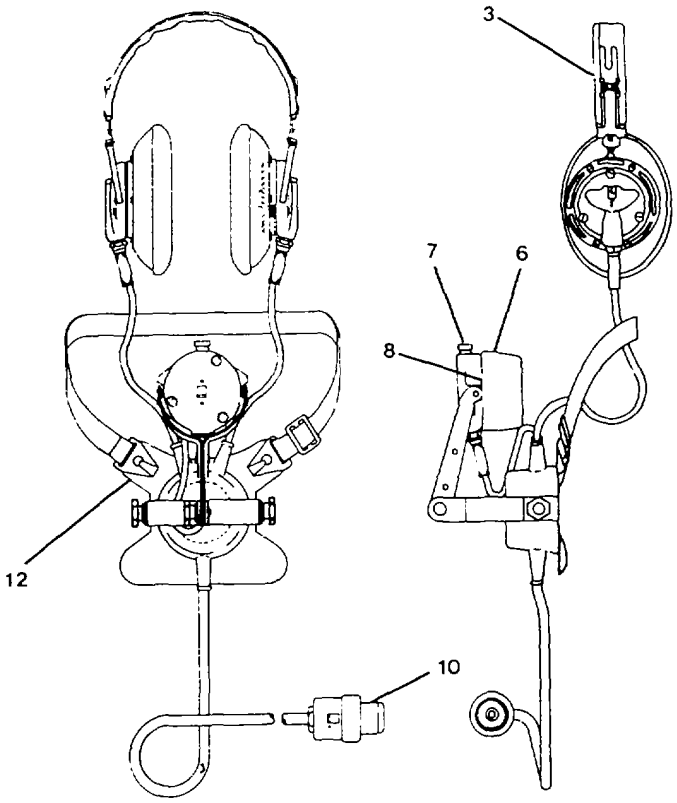
b. Replace handset to reset the bells and lights.

2-5.21. Bench Grinder. (FIGURE 2-171)

a. Preparation for use.

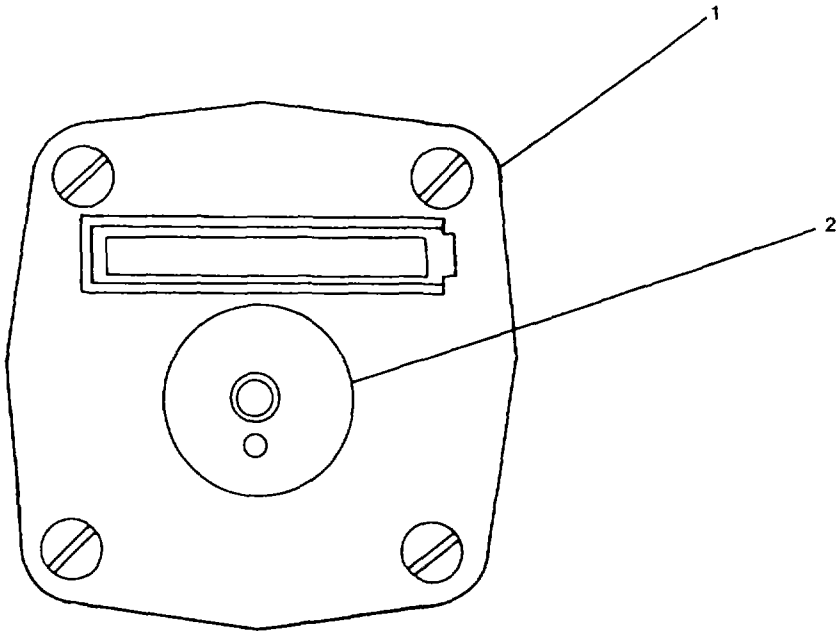
(1) Turn grinder wheels (2) by hand to ensure free movement and no obstructions.

(2) Check that tool rest (3) and spark protectors (1) do not touch the wheels.



LEGEND
3. HEADBAND
6. TRANSMITTER
7. PUSHBUTTON
8. MOUTHPIECE
10. JACK PLUG
12. HOOK

FIGURE 2-168. Head Set-Chest Set Sound Powered Telephone.



LEGEND
1. JACK BOX
2. JACK BOX COVER

FIGURE 2-169. Sound Powered Telephone Jackbox (G15A).

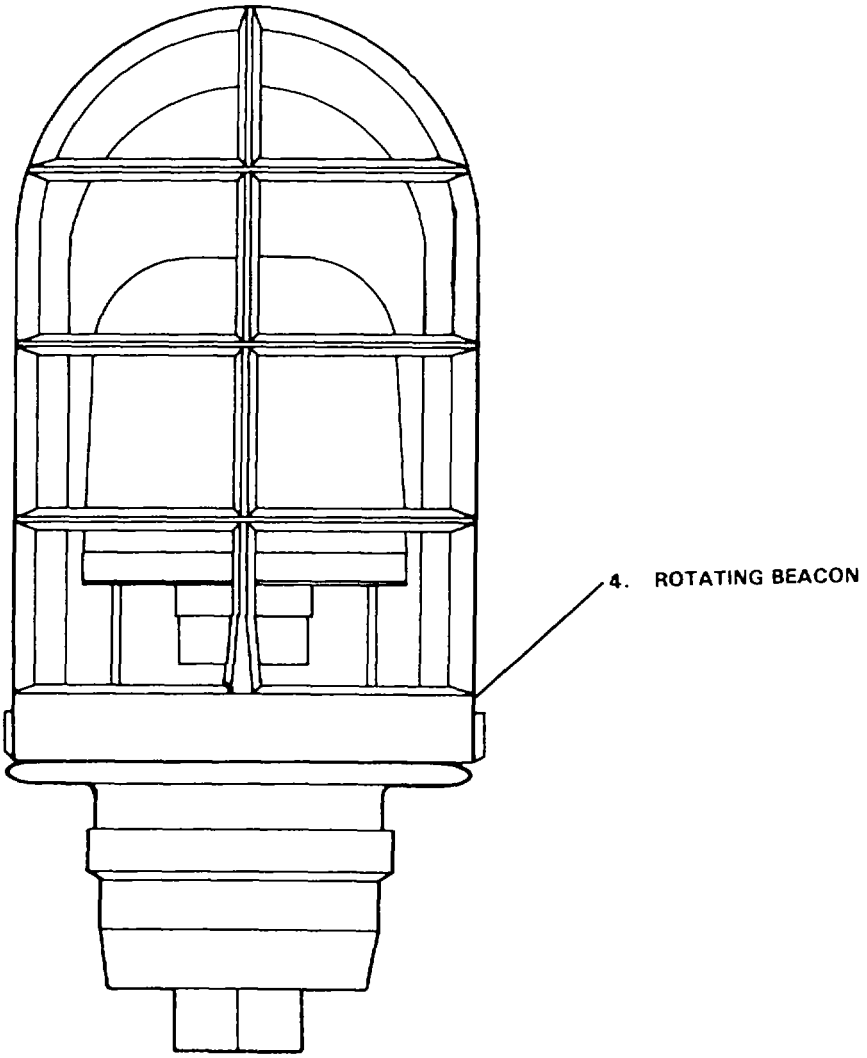
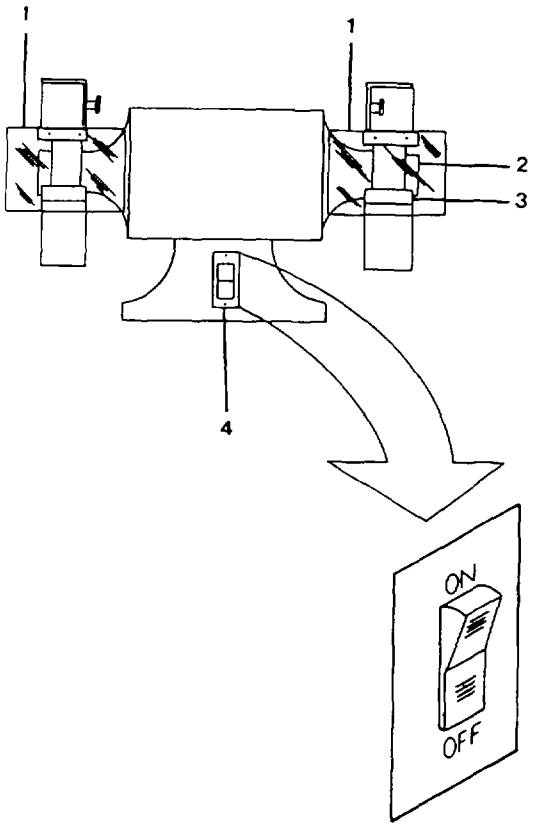


FIGURE 2-170. Watertight Rotating Beacon.



LEGEND

1. SPARK PROTECTORS	3. TOOL REST
2. GRINDING WHEEL	4. ON/OFF SWITCH

FIGURE 2-171. Bench Grinder, JBG-6A.

b. Operating Procedures.

WARNING

- **Wear eye protection when using this equipment.**
- **Use grinding wheel prescribed for grinding speed.**
- **Do not connect the bench grinder to a power source, receptacle, or power outlet with voltage greater than specified. Serious personal injury or damage to the equipment can occur. If in doubt, do not plug in the bench grinder. Using a power source with voltage less than the nameplate rating may cause damage to equipment.**
- **Do not modify the plug. Shock hazard and personal injury or damage to equipment may occur.**
- **Repair or replace damaged or worn cord immediately.**
- **Wear proper clothing. Loose clothing, jewelry, gloves, or neckties may become caught in grinder.**
- **Do not overreach. Keep proper footing at all times while using grinder.**
- **DO NOT leave grinder running when not in use.**

CAUTION

Excessive or sudden pressure slows the grinding action, overloads the motor, puts dangerous stresses on the wheel, gouges the wheel, and causes rough grinding with reduced accuracy.

(1) Place grinder ON/OFF switch (4) to ON position.

(2) Allow grinder to reach full speed before starting to grind.

(3) Use tool rests (3) for best grinding results.

(4) Hold the piece being ground firmly against the wheel (2) with a light but steady pressure.

(5) Keep tool rests (3) adjusted to within 1/16 inch of grinding wheel (2).

(6) When grinding is complete, place ON/OFF switch (4) in the OFF position.

2-5.22. Belt Drive Lathe.

2-5.22.1. Preparation for Use.

WARNING

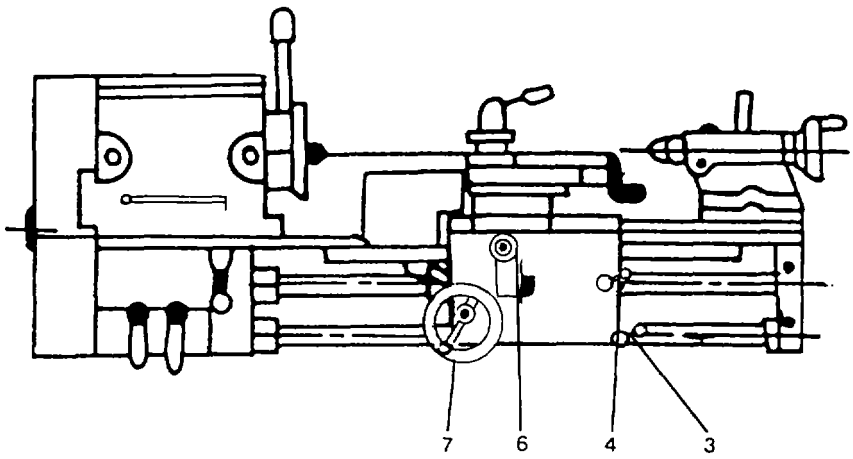
- **Shock hazard exists with this equipment. Ensure that plugs, connections, and wire are in proper working condition. Never leave equipment running when unattended. Disconnect from power source when servicing or changing bits, blades, cutters or other accessories. Do not operate equipment in wet or damp environment.**
- **Use eye protection. Keep guards in place. Do not wear loose clothing or articles of jewelry. Do not overreach; keep proper footing.**

CAUTION

Do not force tools, keep work secured in clamps or vises. Do not overload machinery. Do not change any piece of equipment accessory or component while lathe is running.

a. Position the HIGH-LOW speed change lever (4, FIGURE 2-172) in the neutral position.

b. Manually rotate the spindle to ensure free movement.



LEGEND

3. LEVER SWITCH
4. SPEED CHANGE LEVER
6. CROSS SLIDE HAND WHEEL
7. TRAVERSE HAND WHEEL

FIGURE 2-172. Belt Driven Lathe, 1336 PBD.

c. Set the HIGH-LOW speed change lever (4) to the LOW setting.

d. Set the Cross Slide Power Selector and Threads Cutting/Longitudinal Travel Engagement Lever (6) in the neutral positions.

NOTE

When performing step e, ensure that the Carriage Slide and Cross Slide move freely.

e. Check for freedom of movement of the Carriage Longitudinal Travel Wheel (7) and the Cross Slide Handwheel (6).

2-5.22.2. Start Procedures.

a. Select the LOW spindle speed (4).

b. Engage apron mounted lever switch (3).

c. Verify that spindle is turning counterclockwise. If spindle is turning clockwise, stop the lathe and notify unit maintenance.

d. Run lathe for 15 minutes. Operate all controls of headstock and carriage to determine that all controls function properly.

e. After 15 minutes of operating lathe, disengage the lever switch (3) and turn OFF motor.

f. Check oil in sight gauges of headstock and carriage. Fill with oil if necessary. Oil all headstock and carriage oil points.

g. Run lathe at low speed setting for 2 to 3 hours, periodically check oil sight gauges.

h. Cautiously, feel the two spindle bearings on the outside of headstock housing. If the housing is hot or excessive heat is being generated, immediately shut down lathe and notify unit maintenance.

2-5.22.3. During Operations.

a. Keep lathe clean and properly lubricated at all times.

b. Check the bed frequently to determine if it has remained level. Level it again if necessary.

c. Keep leadscrew threads clean and lightly lubricated at all times.

d. Do not move the tailstock along the ways if the ways are dirty or filled with excessive chips and debris.

2-5.23. Windshield Wipers. (FIGURE 2-173)

a. Turn the windshield wiper control knob clockwise to activate the windshield wipers. (Knob is located in the pilothouse overhead above the steering console.)

b. Adjust speed by movement of the knob.

c. Turn windshield control knob fully counterclockwise to turn off.

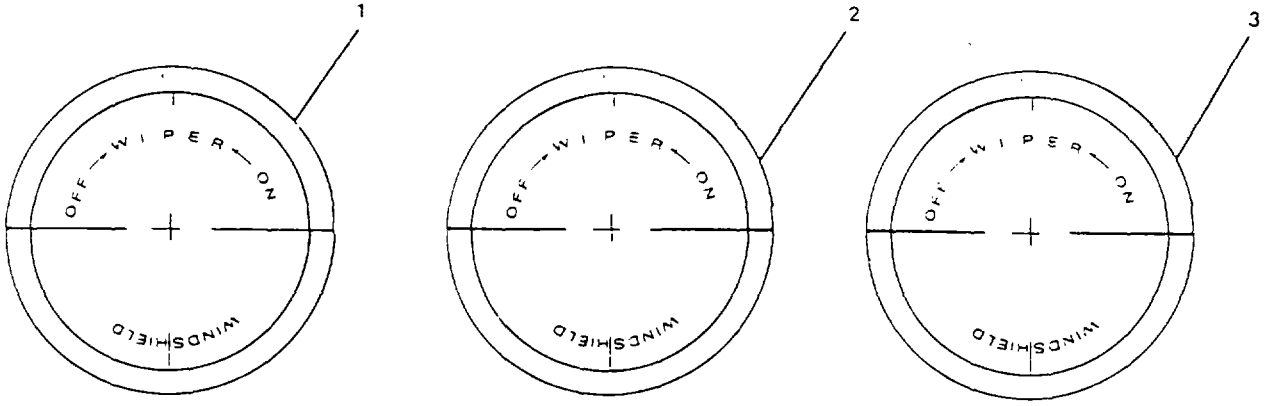
2-5.24. Watertight Door System Operation. (FIGURE 2-174)

a. Rotate local hand pump handle (3) counterclockwise to close door or clockwise to open door.

NOTE

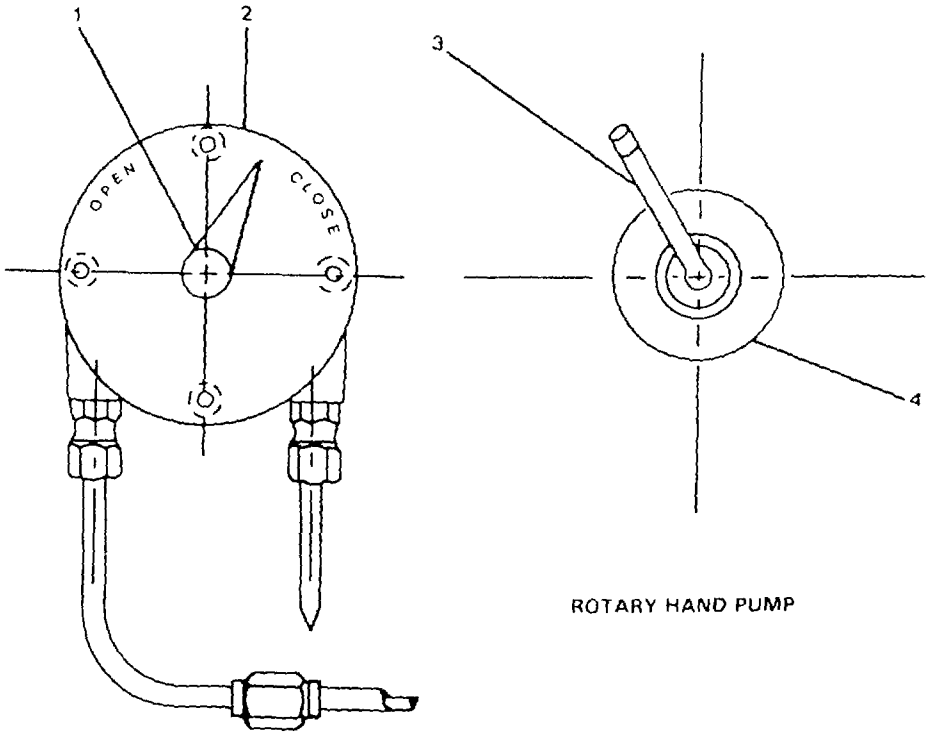
It may be necessary to rotate hand pump handle very fast to increase hydraulic pressure to break door loose when initially opening a sealed door.

b. Rotate remote control pump handle (1) (in the upper machinery



LEGEND
1. PORT WINDSHIELD WIPER
2. CENTERLINE WINDSHIELD WIPER
3. STARBOARD WINDSHIELD WIPER

FIGURE 2-173. Windshield Wipers.



LEGEND
1. POINTER INDICATOR
2. PANEL INDICATOR
3. ROTARY HAND PUMPS

FIGURE 2-174. Watertight Door System.

room) from open to close position. Position will be shown on indicator (2).

NOTE

Door can be closed from the remote control station, but must be opened by local hand pump handle.

2-5.25. 1 kW Xenon Searchlight. (FIGURE 2-175)

a. Lighting Lamp.

(1) Power box (12, Sheet 2 of 2) is located in the passageway, starboard side, near the crew's mess.

(2) Place power supply switch in the ON position (11, Sheet 2 of 2).

CAUTION

Do not hold in START position any longer than necessary to start lamp.

(3) Open control box door located adjacent to searchlight. Turn the OFF/START switch (1, Sheet 1 of 2) to START. Hold long enough to start lamp, then turn to straight up position.

b. Directing Beam.

(1) Point lever handle (5) in desired direction.

(2) Twist lever handle (5) to tilt beam up or down.

(3) Secure up or down position with twist-type knob (6) forward of lever handle (5).

(4) Secure direction with clamp screw knob (4) on the underside of lamp stand.

c. Focusing Beam.

WARNING

Searchlight drum gets hot after lamp has been burning for some time. Avoid bodily contact with drum and wear gloves when handling focus knob.

(1) Push up manual focus knob (3), located under the drum, and twist to change beam diameter.

(2) Push toggle switch (2) on powerbox down to decrease beam diameter or up to increase beam diameter.

d. Push TEST Switch button (7). Observe that Over-Temp light is on.

2-5.26. Aerovane Wind Transmitter. (FIGURE 2-176)

a. Turn on circuit breaker Number 21 (FIGURE 2-101, Sheet 7 of 21), on EP2 Power Panel in the pilot house.

b. Adjust dimmer knob to read dials at night, or as necessary.

2-5.27. Portable Fire Pump.

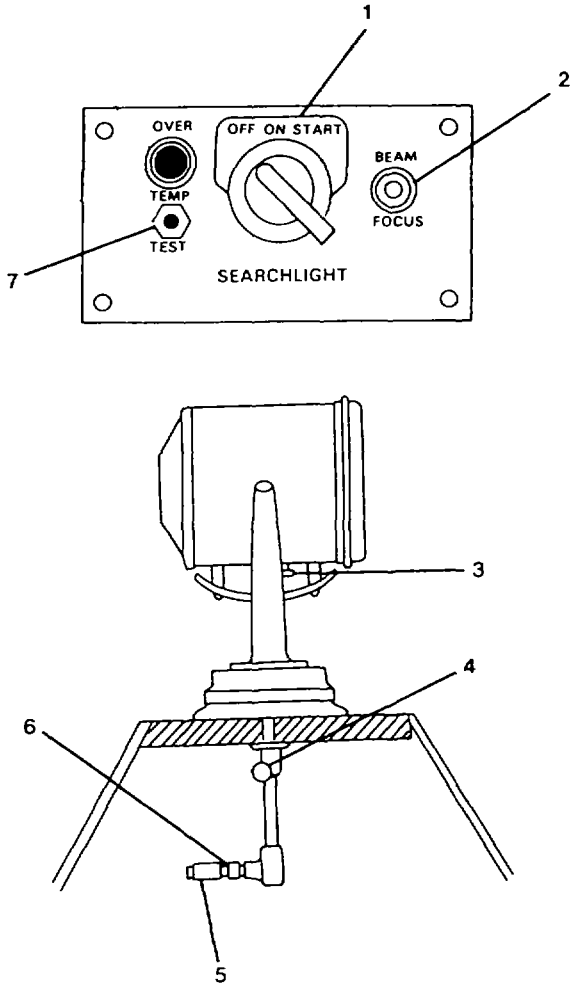
2-5.27.1. Automatic Priming Startup.

a. Clear discharge port of priming pump.

b. Connect red battery cable to (+) positive pole next to carburetor and black cable to (-) negative pole next to main pump suction inlet.

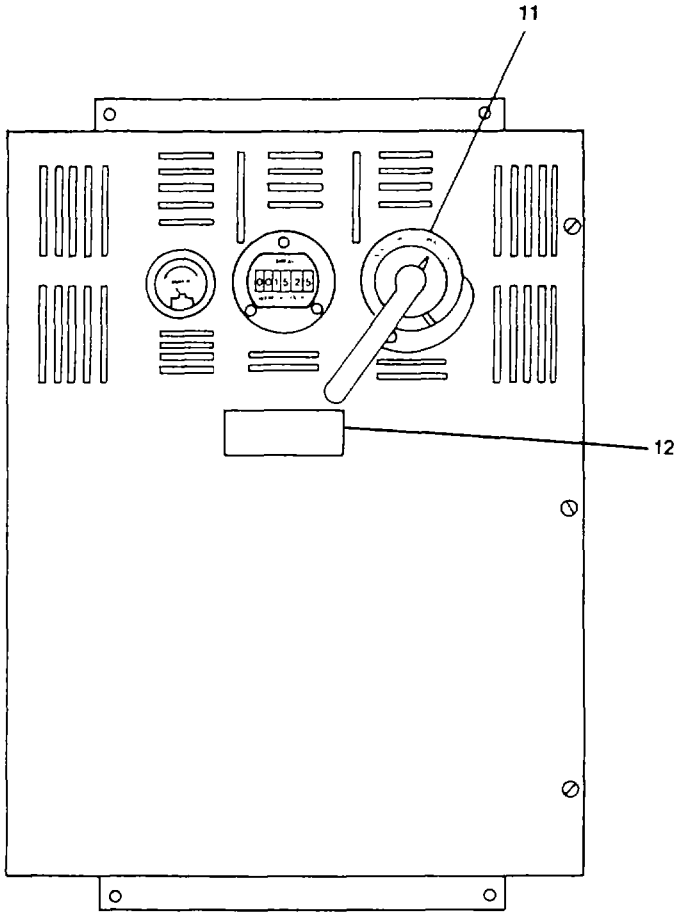
c. Place OFF-START-RUN switch (3, FIGURE 2-177, Sheet 1 of 3) in start position.

d. Advance SPEED control (7) clockwise direction, to one quarter of full throttle.



LEGEND
1. OFF-START SWITCH
2. BEAM FOCUS SWITCH
3. MANUAL FOCUS KNOB
4. LOCK CLAMP SCREW
5. LEVER HANDLE
6. LOCK
7. TEST SWITCH

FIGURE 2-175. 1 kW Xenon Searchlight (Sheet 1 of 2).



LEGEND
11. ON-OFF RESET
12. POWER BOX

FIGURE 2-175. 1 kW Xenon Searchlight (Sheet 2 of 2).

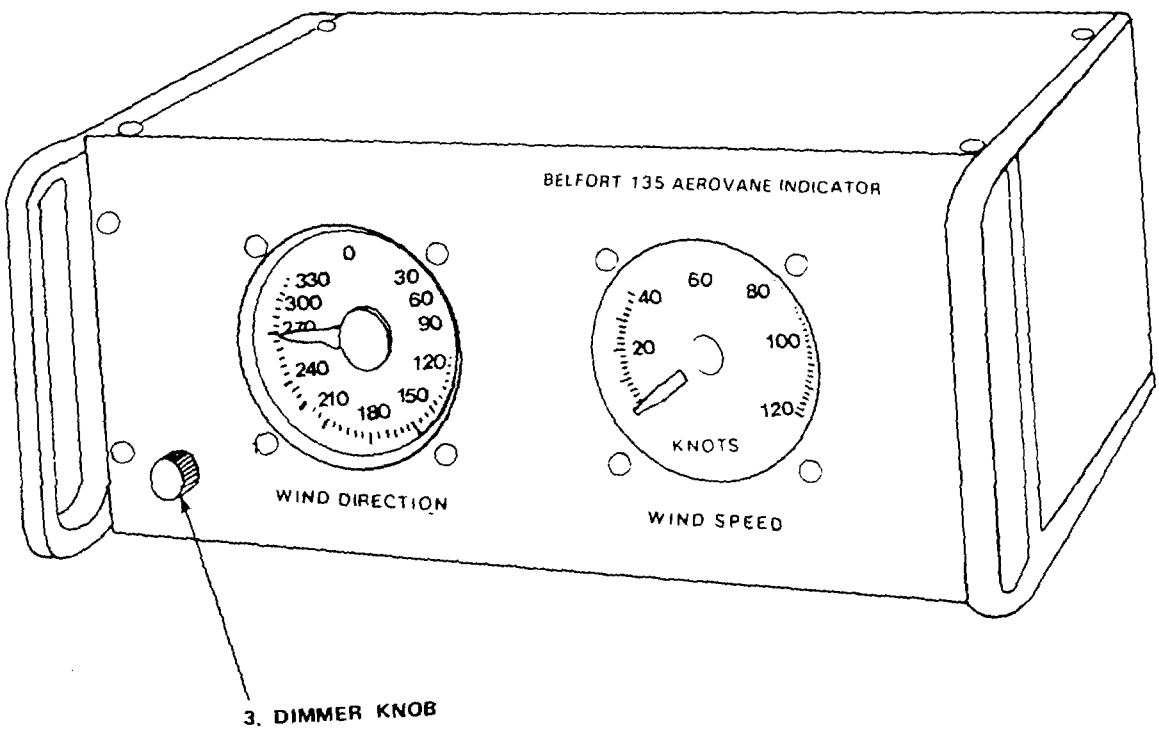


FIGURE 2-176. Aerovane Wind Transmitter.

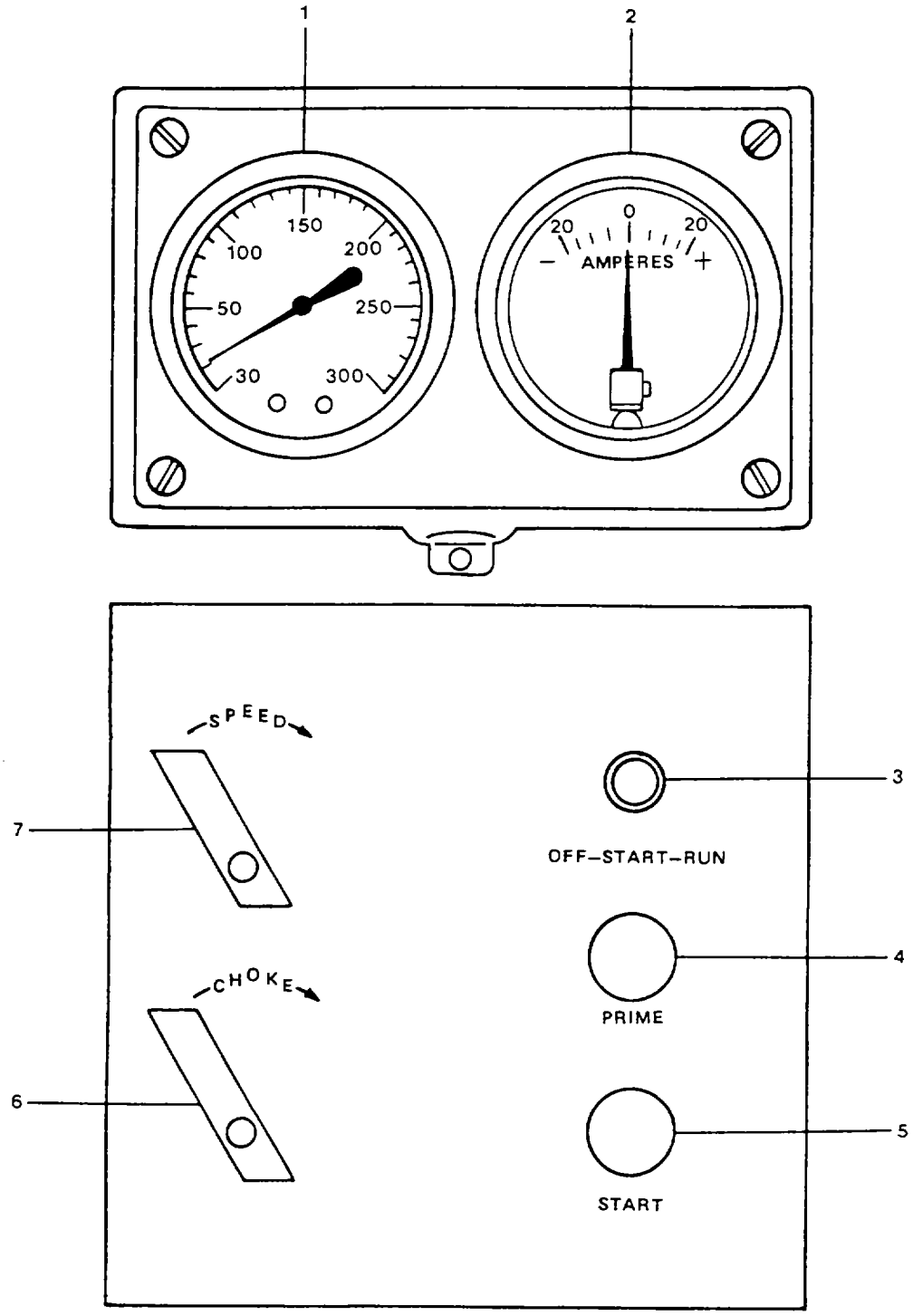


FIGURE 2-177. Portable Firefighting Service, Gasoline Engine Driven Centrifugal Pump (Sheet 1 of 3).

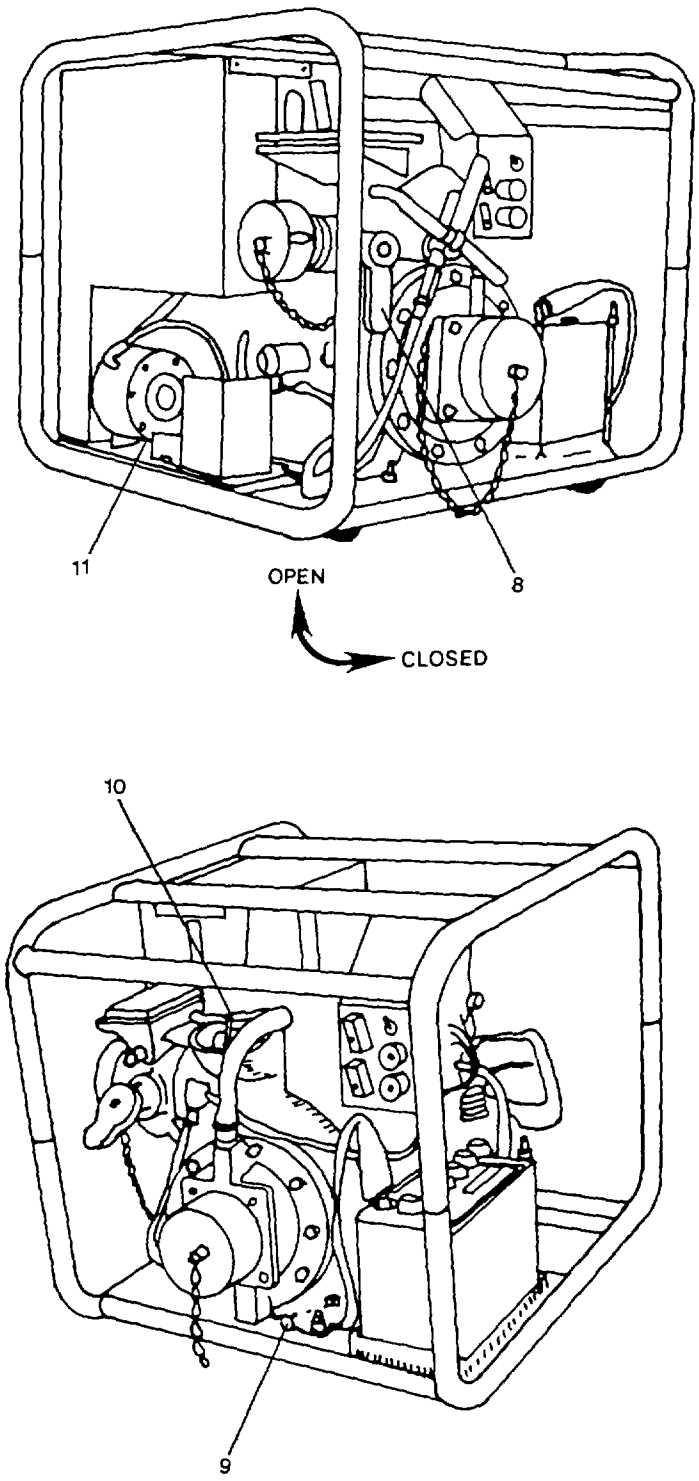
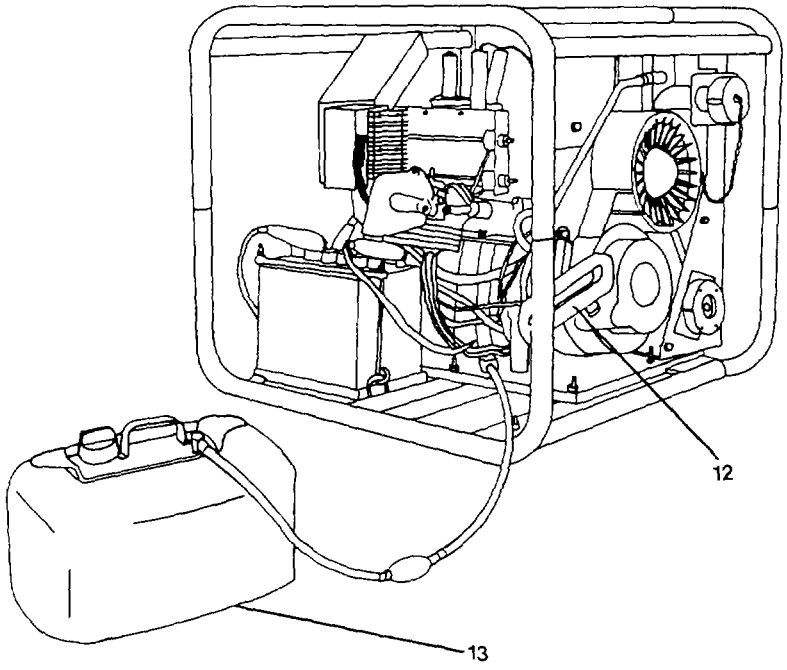


FIGURE 2-177. Portable Firefighting Service, Gasoline Engine Driven Centrifugal Pump (Sheet 2 of 3).



LEGEND

1. PRESSURE GAUGE
2. AMPERE GAUGE
3. OFF-START-RUN
4. PRIME
5. START
6. CHOKE
7. SPEED
8. WATER DISCHARGE VALVE
9. PUMP DRAIN VALVE
10. MANUAL PRIMING INLET PLUG
11. PRIMING PUMP DISCHARGE PORT
12. MANUAL START PULL CORD
13. EXTERNAL FUEL TANK

FIGURE 2-177. Portable Firefighting Service, Gasoline Engine Driven Centrifugal Pump (Sheet 3 of 3).

NOTE

If engine is cold, advance CHOKE control (6) fully clockwise (closed), then half open as engine starts, and fully open for running.

e. Depress and hold START pushbutton (5) until engine starts. Adjust choke and speed controls as required.

CAUTION

Do not allow pump to run more than 2 minutes without water flowing. Lack of cooling water could cause severe impeller and exhaust system damage.

f. Rotate water discharge valve (8, FIGURE 2-177, Sheet 2 of 3) counterclockwise to fully CLOSED position.

NOTE

If suction lift is 20 feet or less, push in and keep firm continuous pressure on PRIME pushbutton (4, Sheet 1 of 3) until pump is primed.

g. Open slowly by rotating water discharge valve (8, Sheet 2 of 3) clockwise until indicating pressure on gauge and advance speed control (7, Sheet 1 of 3) as required.

h. Release PRIME pushbutton (4) after priming pump.

i. Place OFF-START-RUN switch (3) in RUN position.

j. Rotate CHOKE control (6) to full counterclockwise, OFF position.

2-5.27.2. Manual Priming Startup.

a. Unscrew and remove manual prime inlet plug (10, FIGURE 2-177, Sheet 2 of 3) from priming inlet.

b. Fill pump with water until filler cap is full, replace plug in priming inlet.

c. Place OFF-START-RUN switch (3, Sheet 1 of 3) in START position.

d. Advance SPEED control (7) in clockwise direction, 1/4 full throttle.

NOTE

If engine is cold, advance CHOKE control (6) fully clockwise (closed), then half open as engine starts, and fully open for running.

e. Depress and hold START pushbutton (5) until engine starts. Adjust choke and speed controls as required.

CAUTION

Do not allow pump to run more than 2 minutes without water flowing. Lack of cooling water could cause severe impeller and exhaust system damage.

f. Open water discharge valve (8, Sheet 2 of 3) slowly and advance engine speed control (7, Sheet 1 of 3) as required to attain desired pumping pressure.

g. Place OFF-START-RUN switch (3) in RUN position.

h. Rotate CHOKE control (6) to full counterclockwise position.

2-5.27.3. Turn-Off Instructions.

a. Rotate SPEED control (7, FIGURE 2-177, Sheet 1 of 3) to full counterclockwise OFF position.

b. Place OFF-START-RUN switch (3) in OFF position.

c. Open pump drain valve (9, Sheet 2 of 3) fully counterclockwise. Keep open until drained.

d. Flush pump with fresh water.

(1) Place suction hose with foot valve and strainer into fresh water supply.

(2) Prime pump until full, inspect for leaks.

(3) Shut discharge valve.

WARNING

Ensure exhaust gases discharge to outside atmosphere.

(4) Start engine. Switch to start; advance speed slightly; press start button; choke as needed.

(5) Prime pump; push priming button and hold, when water discharges from priming pump; ensure discharge hose is manned; open water discharge valve slowly. Release priming button.

NOTE

Primer pump should evacuate air from impeller housing and suction hose in approximately 60 seconds.

CAUTION

Do not operate pump more than 2 minutes unless pressure shows on gauge or priming pump discharges water.

(6) Operate pump; switch to run; adjust engine speed to obtain desired discharge pressure.

(7) Operate pump for 1 minute; inspect for leaks, unusual noises and vibrations.

(8) Slow engine speed to idle and push primer button; observe discharge at primer pump; allow primer pump to run for 30 to 45 seconds to flush out; release primer button.

(9) Shut discharge valve.

(10) Stop engine by disconnecting fuel hose and allowing engine to run until excess fuel is burned off.

(11) Depressurize and remove fuel tank.

(12) Check oil level in priming pump oiler; fill if necessary. Switch engine control to OFF position, then push both starter and priming buttons to oil priming for storage. Hold both buttons for approximately 5 seconds. Release buttons.

(13) Disconnect hoses and fitting.

(14) Drain pump by opening pump drain valve fully counterclockwise.

(15) Dry unit, replace caps on all opening; close pump drain valve.

(16) Stow pump hoses and connectors.

2-5.27.4. Manual Startup With Automatic Priming.

a. Perform steps a through d in paragraph 2-5.27.1.

b. Pull manual start pull cord (12, FIGURE 2-177, Sheet 3 of 3) in a quick steady motion until engine starts.

CAUTION

Do not allow pump to run more than 2 minutes without water flowing. Lack of cooling water could cause severe impeller and exhaust system damage.

c. Perform steps f through j in paragraph 2-5.27.1.

2-5.27.5. Manual Startup With Manual Priming.

a. Perform steps a through d in paragraph 2-5.27.1.

b. Pull manual start pull cord (12, FIGURE 2-177, Sheet 3 of 3) in a quick steady motion until engine starts.

CAUTION

Do not allow pump to run more than 2 minutes without water flowing. Lack of cooling water could cause severe impeller and exhaust system damage.

c. Perform steps f through h in paragraph 2-5.27.1.

2-5.27.6. Centrifugal Electric Submersible Pump. (FIGURE 2-178)

a. Attach strainer (5) to pump (4) inlet.

b. Attach hose (2) to pump (4) discharge.

c. Lower pump into the water using attached handling line (1).

CAUTION

Keep the pump inlet in water while pump is operating.

d. Lead the discharge hose (2) to nearest discharge point.

e. Plug power lead (3) into nearest receptacle or extension lead.

2-5.27.7. Countermeasure Washdown System The countermeasure washdown system is turned on or off by the key operated switch in the pilothouse. The countermeasure switch is located on the port, half bulkhead below the trim clinometer.

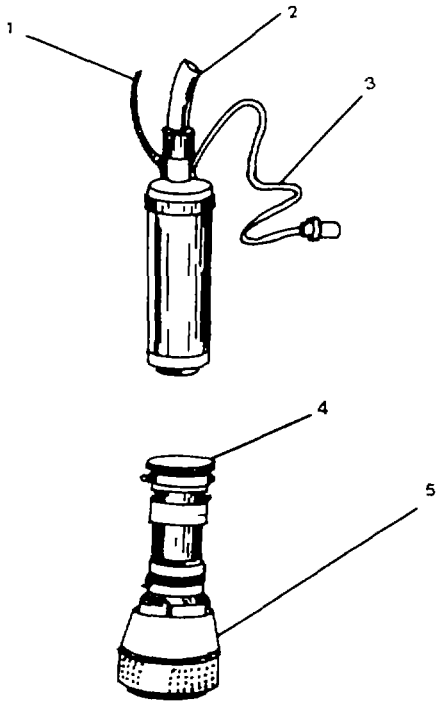
2-5.28. Arc Welder. (FIGURE 2-179)

WARNING

- **Electric shock can kill. Electrodes and work area (or ground) is "hot" when welder is on. Never touch electrodes to body or clothing. Wear dry gloves. Never work in wet or damp areas. Ensure all connections are tight and clean.**
- **Fumes and gases can be dangerous. Keep away from fumes. Work in well ventilated area. Welding on galvanized steel, lead or cadmium produces toxic fumes. Ensure adequate protection. DO NOT weld in areas where chlorinated hydrocarbon vapors from degreasing, cleaning or spraying chemicals are present. These are highly toxic gases. Death could result.**
- **Arc rays can injure eyes and burn skin. Wear proper protection for eyes and skin. Wearing of contact lenses during welding acts to fuse the eye and lens. Do not wear contact lenses when welding.**
- **Welding produces heat and sparks; keep a fire extinguisher at hand in the event of a fire during welding.**
- **Welder and electrodes are live when the power switch is ON. Observe safety precautions or injury could result.**

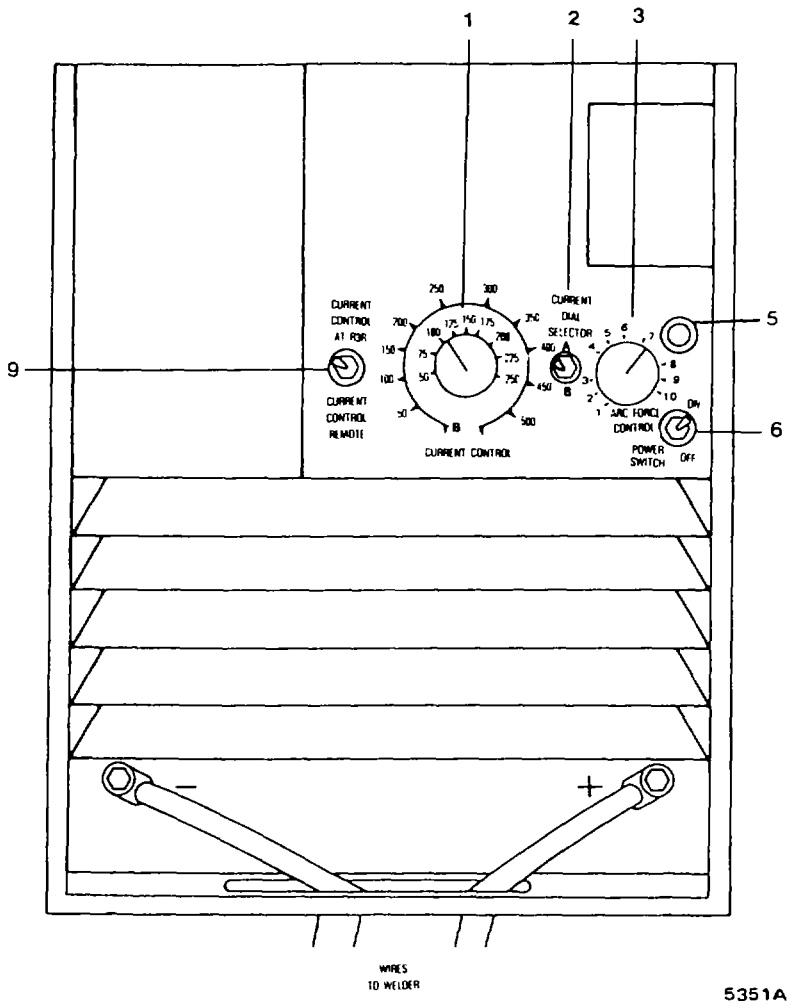
a. Move power switch (6) to ON position and observe that red power light (5) is on.

b. Place Current Dial Selector (2) in the A or B range depending on desired arc current.



LEGEND
1. HANDLING LINE
2. DISHCHARGE HOSE
3. POWER CONNECTOR
4. DISCHARGE HOSE OUTLET
5. STRAINER

FIGURE 2-178. Portable Salvage (Fire) Pump.



LEGEND
1. CURRENT CONTROL
2. CURRENT DIAL SELECTOR
3. ARC FORCE CENTRAL
5. POWER LIGHT
6. ON-OFF SWITCH
9. CURRENT CONTROL SWITCH

FIGURE 2-179. Arc Welder.

c. Place current control switch (9) in the "at R3R" or "Remote" mode.

NOTE

The "at R3R" is for control at the electrodes (connected to the unit by wires) or control of the "Remote" mode (used for the pocket amptrol "wireless" welder).

d. Adjust current control knob (1) to desired setting.

e. Adjust arc force control (3) setting from one to ten.

NOTE

The mid-range of five to six is sufficient for most work.

2-5.28.1. Pocket Amptrol.

a. Switch control current switch (9) to remote position. This places control at the remote pocket amptrol.

b. Switch current dial selector (2) to B setting.

c. Switch power (6) to ON.

d. Insert one end of the probe into the electrode holder and hold the other end at the work for approximately 5 seconds.

e. To change current, change the probe dial setting and repeat the 5 second procedure of placing the probe between electrode and work.

2-5.29. Commissary Equipment.

2-5.29.1. Marine Range #325-1M and #325-4M. (FIGURE 2-180)

a. Set circuit breakers 1 and 2 (FIGURE 2-101, Sheet 13 of 21) on power distribution panel 7A to ON.

2-5.29.1.1. Initial Preheat.

a. Set top and bottom oven switches (6) to LOW.

b. Set thermostat (4, 5) to 350 degrees.

NOTE

Allow range oven to heat (8 to 12 hours) until all vapor and condensation is gone.

c. Apply salad oil to each top plate.

d. Turn each plate switch or thermostat (4, 5) to LOW. Allow plate to heat for 3 hours.

2-5.29.1.2. Operation.

a. Turn on four heat switches (4) for round speed units.

b. Turn ON four grill plate unit controls (5).

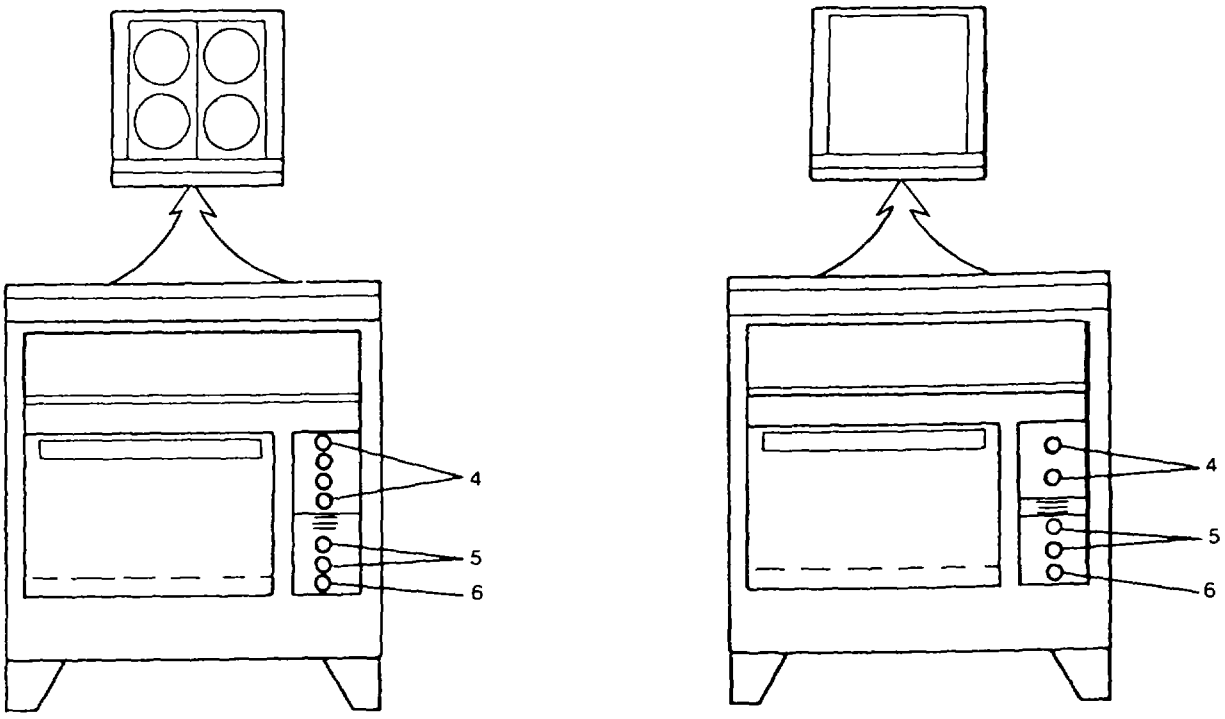
c. Turn ON top/bottom heat switches (6) and adjust automatic temperature control to desired setting. See Table 2-3 for settings.

d. Turn top/bottom heat switches (6) to OFF.

e. Turn automatic temperature control (7) to OFF.

f. Turn four grill plate unit controls (5) to OFF.

g. Set circuit breaker 1 and 2 (1 and 2, FIGURE 2-101) on power distribution panel 7A to OFF.



LEGEND
4. GRILL PLATE UNIT CONTROLS
5. RANGE CONTROLS
6. AUTOMATIC TEMPERATURE CONTROLS

FIGURE 2-180. Marine Range #325-lM and #325-4M.

Table 2-3. Marine Range Temperature Setting Guide

General Class of Product	Average Range Temperature	Time (Min)	With Metal Deck Switch Settings		Rack Position
			Top	Bottom	
Pies	375-425	35-60	Low	Medium	Rack on Deck
Rolls	375-400	15-30	Low	High	Rack Support
Cake	350-400	20-45	Low	High	Rack Support
Pastries	325-375	8-20	Low	High	Rack Support
Bread	425-450	25-45	Low	Medium	Rack on Deck
Roast Beef	300-325	Low	High or Medium	Rack on Deck	

2-5.29.2. Groen TDB/6 Kettle. (FIGURE 2-181)

2-5.29.2.1. Initial Startup.

a. Turn on circuit breaker (4) on power distribution panel 7A.

b. Pour a quart of water into the kettle.

c. Heat water at highest thermostat setting (4).

d. Observe that indicator light (5) is ON.

e. Turn OFF thermostat (4).

f. Tilt kettle to ensure free movement.

2-5.29.2.2. Kettle Startup.

a. Check jacket water level (3). If below mark, call unit maintenance.

b. Check pressure gauge (1). If not 20 to 30 inches of vacuum, call unit maintenance.

c. Turn ON circuit breaker (4, FIGURE 2-101) on power distribution panel 7A.

d. Turn thermostat to desired setting and observe indicator light (5, FIGURE 2-181).

2-5.29.2.3. Kettle Shutdown.

a. Turn OFF thermostat (4).

b. Turn OFF circuit breaker (4, FIGURE 2-101) on power distribution panel 7A.

2-5.29.3. Marine Counter Fryer MOD C-28M.

a. Fill the fryer with cooking oil to upper mark (FIGURE 2-182).

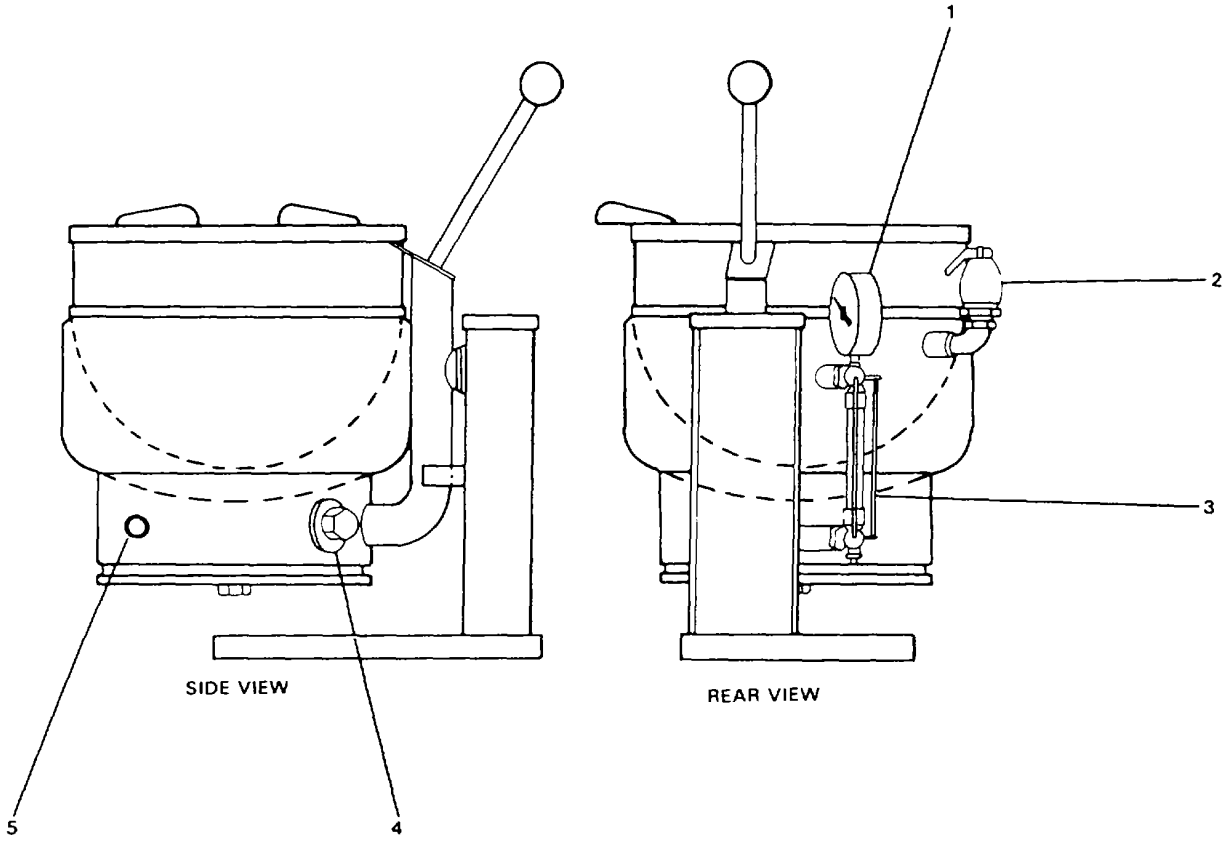
b. Set circuit breaker (3, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7A to ON.

c. Turn ON power switch (5, FIGURE 2-182).

d. Turn thermostat (4) to desired temperature. Observe heat lamp (2) is ON.

NOTE

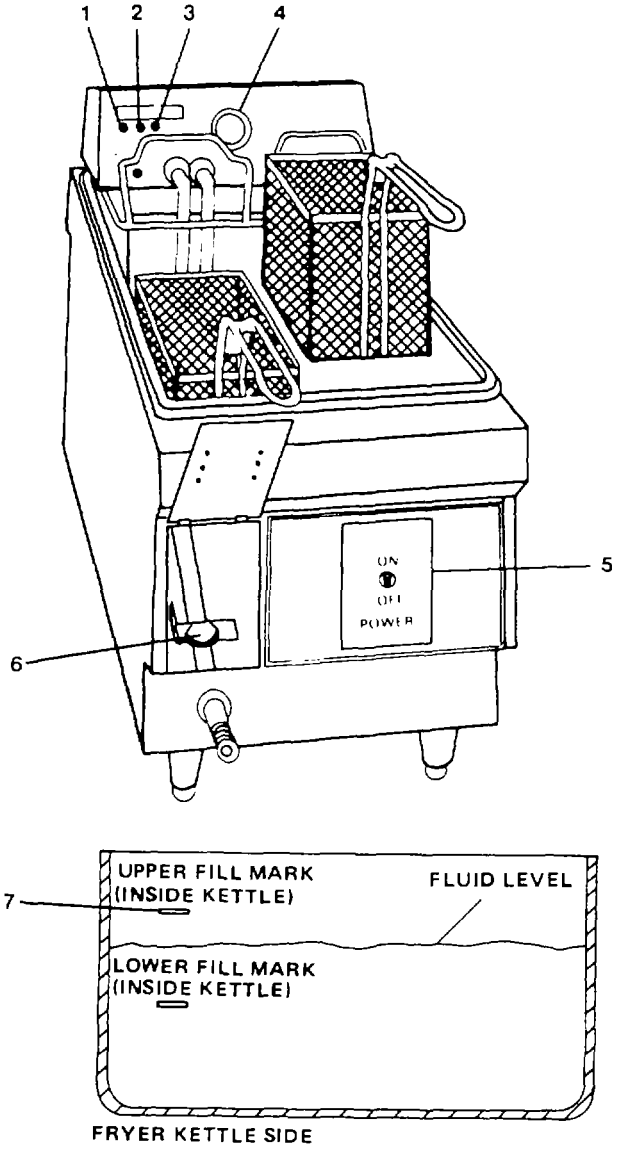
Lamp (3) will light in over-temperature condition. Thermostat will automatically go OFF when this condition occurs.



LEGEND

1. PRESSURE GAUGE
2. SAFETY VALVE
3. WATER LEVEL GAUGE GLASS
4. THERMOSTAT
5. PILOT LIGHT

FIGURE 2-181. Groen TDB/6 Kettle.



LEGEND

1. POWER PILOT LAMP
2. HEAT PILOT LAMP
3. OVER TEMP LAMP
4. THERMOSTAT
5. POWER SWITCH
6. FRONT OIL DRAIN VALVE
7. UPPER FILL MARK

FIGURE 2-182. Marine Counter Fryer MOD C-28.

e. Turn OFF thermostat (4).

f. Turn OFF power switch (5).

g. Turn OFF circuit breaker 3 (FIGURE 2-101, Sheet 13 of 21) on power distribution panel 7A.

h. Allow to cool and drain cooking oil through drain pipe (6, FIGURE 2-182).

2-5.29.4. Food Mixer #A120.

2-5.29.4.1. Operating Instructions.

a. Turn ON circuit breaker (12, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

b. Lower bowl support (5, FIGURE 2-183) with the bowl lift handle (3).

c. Place bowl on bowl support (5) and lock in place using the bowl clamp (8).

d. Install the agitator (9), turning it clockwise to seat the shaft pin in the slot of the agitator shaft.

e. Raise bowl to desired mixing level.

f. Select mixing speed with the gear shift level (11).

g. Place ON-OFF switch (1) to the ON position. Mixer is now running.

h. Place ON-OFF switch (1) to the OFF position to stop mixer.

i. Turn OFF circuit breaker (12, FIGURE 2-101) on power distribution panel 7B.

2-5.29.5. Meat Slicer Model 512. (FIGURE 2-184)

2-5.29.5.1. Operating Instructions.

a. Set slice adjusting dial (3) to the desired thickness.

b. Turn ON circuit breaker (6, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

c. Place ON-OFF switch (4, FIGURE 2-184) to ON to start slicer.

d. Place ON-OFF switch (4) to OFF to stop slicer.

e. Turn OFF circuit breaker (6, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

2-5.29.6. Baker's Scale #M10.

2-5.29.6.1. Operating Procedures.

a. Set zero balance before use.

b. Place load on center of platform.

c. Read weight information from dial.

2-5.29.7. Marine Reach-In Refrigerator/Freezer.

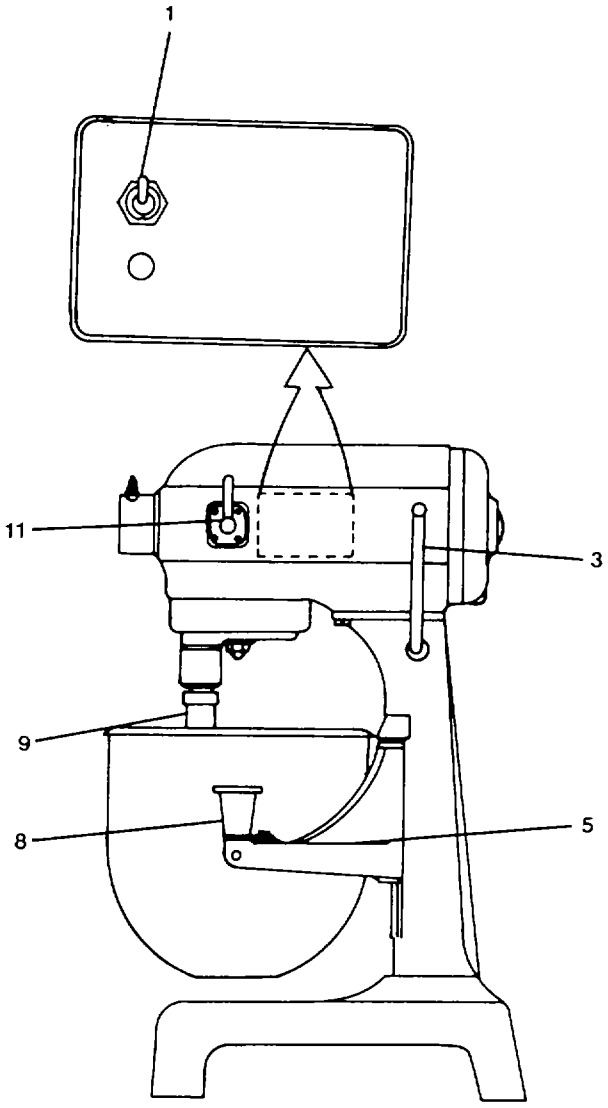
2-5.29.7.1. Startup Procedure.

a. Turn ON circuit breaker (3, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7A.

b. Check liquid refrigerant indicator glass (FIGURE 2-185). After 2 minutes, the glass should appear clear and full of liquid refrigerant.

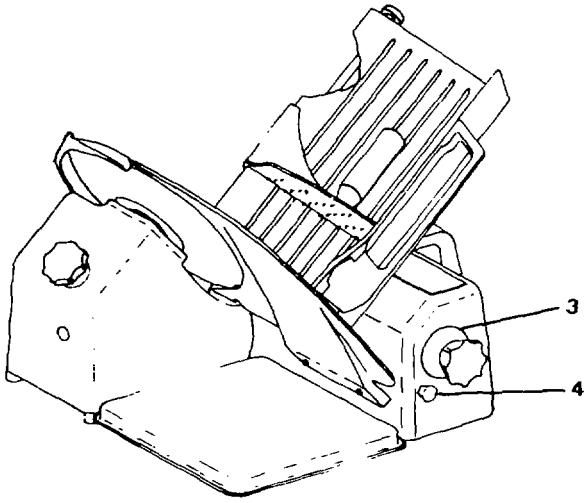
c. Check temperature in reach-in refrigerator. After 15 minutes the temperature should begin to approach the green zone, indicating adequate operation.

d. Check storage area after 3 hours. Once the operating temperature has been reached, stocking of the containment area can begin.



LEGEND
1. ON/OFF SWITCH
3. BOWL LIFT HANDLE
5. BOWL SUPPORT
8. BOWL CLAMP
9. AGITATOR
11. GEAR SHIFT LEVER

FIGURE 2-183. Food Mixer #A120.



LEGEND
3. SLICE ADJUSTING DIAL
4. ON-OFF SWITCH

FIGURE 2-184. Meat Slicer Model 512.

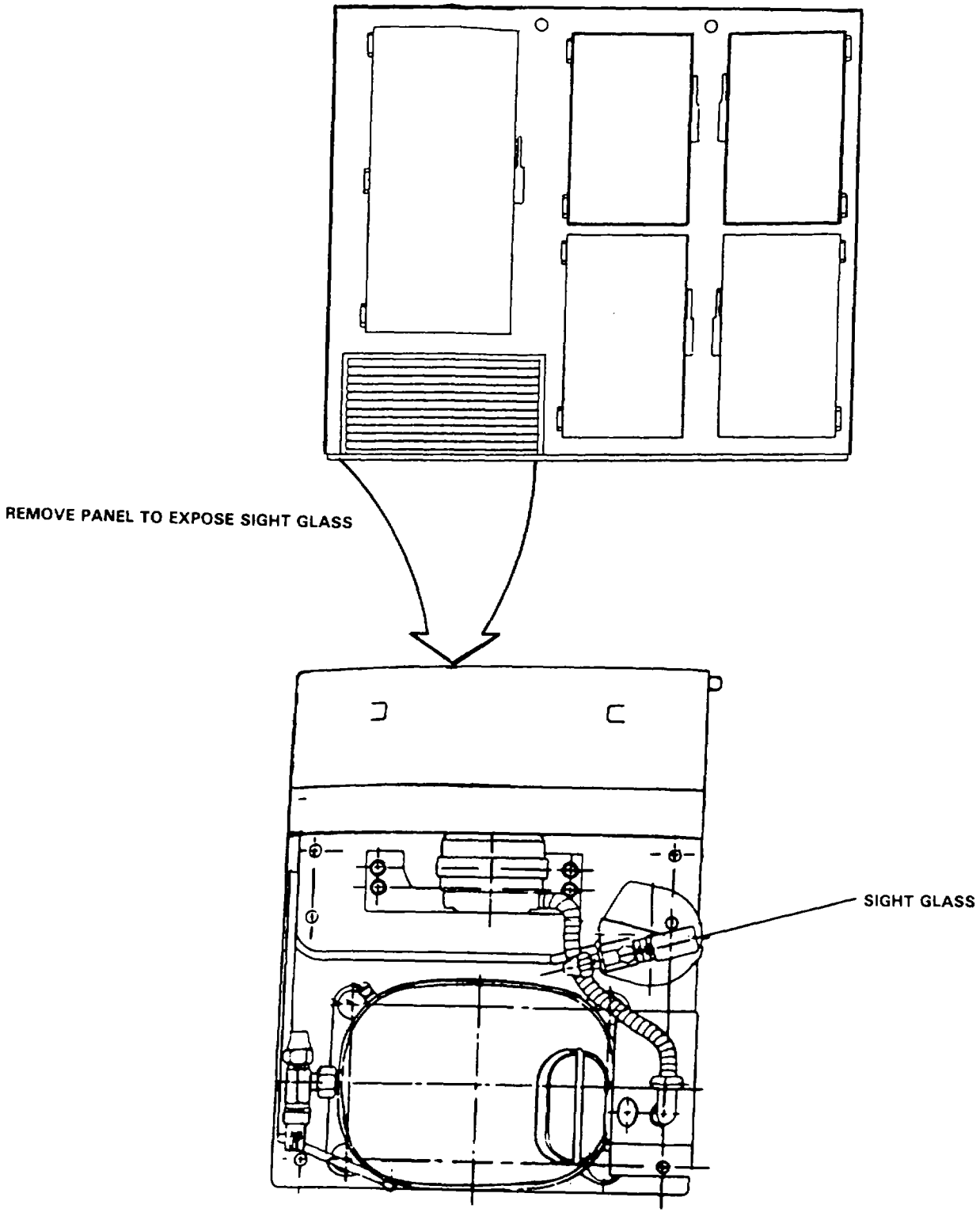


FIGURE 2-185. Sight Glass Location.

2-5.29.7.2. Shutdown Procedure. Turn OFF circuit breaker (3, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7A.

2-5.29.8. Microwave Oven #SNAC-7TP.

2-5.29.8.1. Operational Procedures.

a. Turn ON circuit breaker 8 (crew's mess) and 10 (officer's mess) (8 and 10, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

b. Open oven door (5, FIGURE 2-186) and place food on shelf. Close door.

c. Push one of the buttons 1-7 (4). The display will indicate the number of the button in use, the percentage of power and the total programmed time (1) (3).

NOTE

If two stage cooking has been preprogrammed, it is normal for the power indicator light to shift from defrost to cook during the heating cycle.

d. When an audible tone is sounded, open oven door and remove food.

NOTE

If no buttons are pushed after the last heating cycle, the oven will shut down in 60 seconds.

e. Turn OFF circuit breakers 8 and 10 (8 and 10, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

2-5.29.9. Drop-In Food Well Unit. (FIGURE 2-187)

a. Turn ON circuit breaker (1, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

b. Put approximately 1" of water in well pans (1, FIGURE 2-187).

c. Set control (2) to 10 for approximately 15 minutes.

d. Adjust control to desired setting. See settings below. Setting 10 equals 195°F Setting 8 equals 175°F Setting 6 equals 155°F

e. Do not hold food below 150°F.

f. Maintain water in the well pan.

g. Keep food covered to maintain temperature control.

h. Set control (2) to OFF.

i. Turn OFF circuit breaker (1, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

2-5.29.10. Coffee Urn #BMAC-3S.

2-5.29.10.1. Startup Procedures.

a. Turn on circuit breaker (2, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

b. Check water level in gauge glass (9, FIGURE 2-188). Water should be within 5" of top of gauge glass.

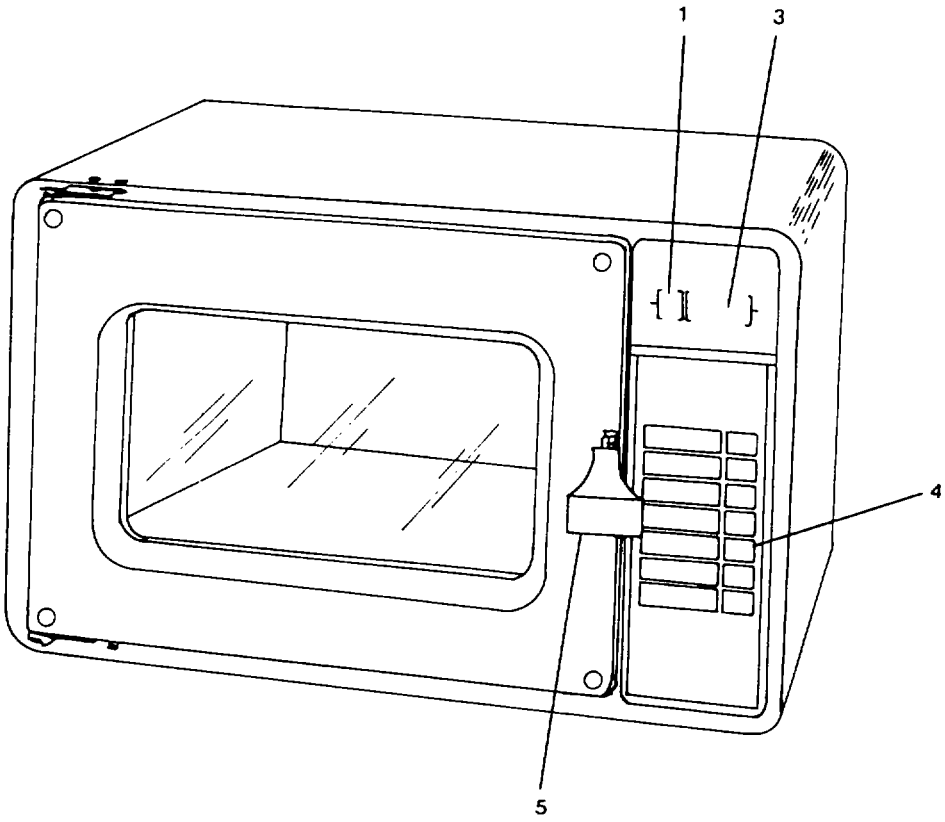
c. Turn thermostat (6) to boil.

d. Check thermometer (8). Ensure temperature is in the brewing region.

NOTE

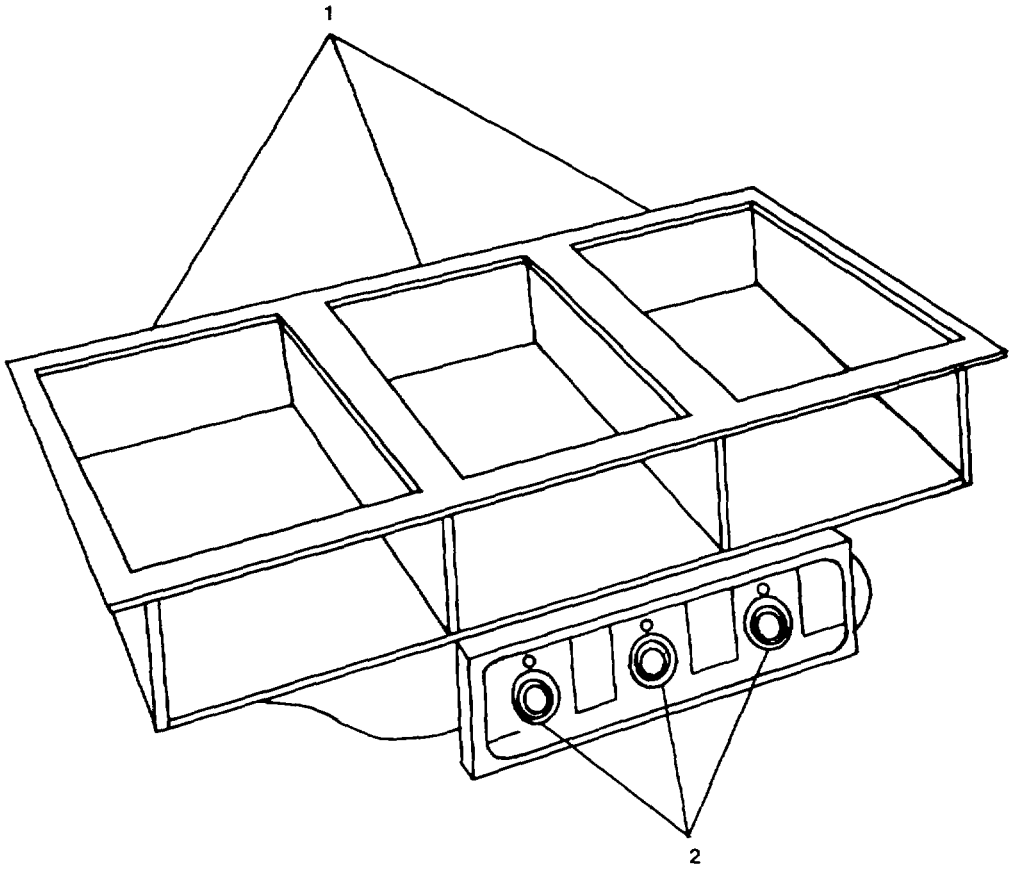
Do not brew coffee until the dial thermometer (5) indicates in the red brewing region.

e. Place a single paper filter into wire basket. Put fresh ground coffee into paper filter and level bed.



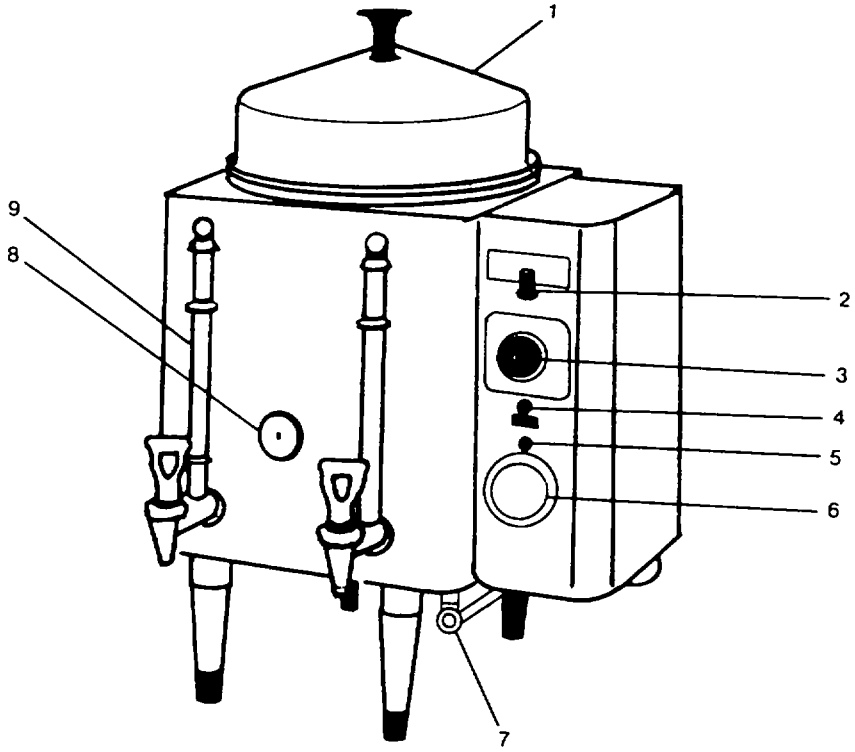
LEGEND
1. BUTTON SET
3. DISPLAY INDICATOR
4. PUSH BUTTONS
5. OVEN DOOR LATCH

FIGURE 2-186. Microwave Oven #SNAC-7TP.



LEGEND
1. WELL PANS
2. THERMOSTATS

FIGURE 2-187. Drop-In Food Well Unit.



LEGEND
1. COVER
2. BREW INDICATOR LIGHT
3. PUSHBUTTON TIMER
4. AGITATOR BUTTON
5. TEMPERATURE INDICATOR
6. THERMOSTAT
7. DIAL THERMOSTAT
8. GAUGE GLASS
9. WATER INLET VALVE

FIGURE 2-188. Coffee Urn BMAC.

f. Open water inlet valve (9).

g. Brew coffee with cover (1) on.

h. Turn timer knob (3) to dial stop or push start button (2).

NOTE

Coffee will begin brewing and will be indicated by the level in gauge. When brew indicator lamp (2) goes out, brewing is complete.

i. Turn water inlet valve (9) off.

j. Blend coffee by pressing the agitation button (4) for about 20 seconds.

k. After brewing, turn thermostat (6) to hold. Coffee can be held for 2 hours at 1800F and for 30 minutes at 2000F.

l. Turn thermostat (6) to OFF.

m. Turn OFF circuit breaker (2, FIGURE 101, Sheet 14 of 21) on power distribution panel 7B.

2-5.29.11. Dishwasher #FFW-1. (FIGURE 2-189)

2-5.29.11.1. Initial Startup Procedures.

a. Turn ON circuit breaker (6, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7A.

b. Check that NORMAL/DELMINE switch (7) is in the NORMAL position.

c. Close and latch the door, and turn the ON/FILL-DRAIN/OFF switch (6) to the ON/FILL position.

d. Open the door when the orange cycle light (4) goes off. Allow timer to reset and close and latch the door to start a wash cycle. When the cycle

light (4) goes off again, repeat this step.

e. Open the door to see if there is water in the sump at the end of the second cycle. If the sump is not filled, close and latch the door to run another cycle. If there is water in the sump, the machine is ready for normal operation.

NOTE

If, after the third cycle, the sump is not filled, check the plumbing to make sure all manual water valves are open.

2-5.29.11.2. Startup Procedure.

a. Remove heavy food soil by scraping or pre-rinsing pans and utensils. Utensils with dried-on food products should be soaked.

b. Load the rack with trays, utensils, bowls, and other items to be washed. Do not overload rack.

c. Open the door and slide rack into the machine. Wash only one rack at a time.

d. Close and latch the door.

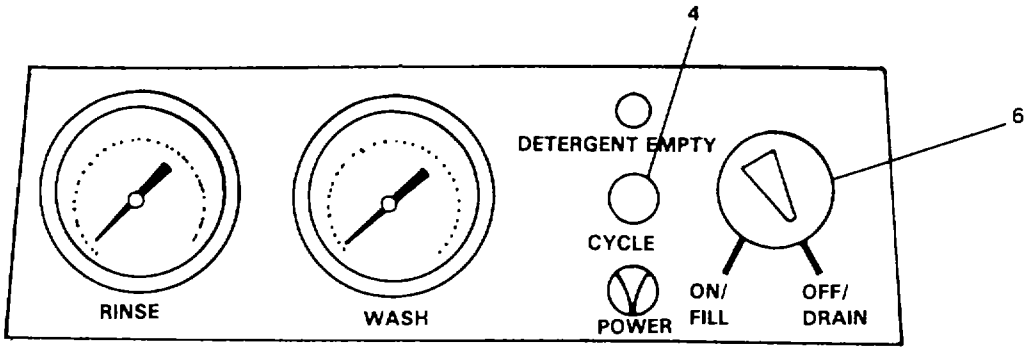
NOTE

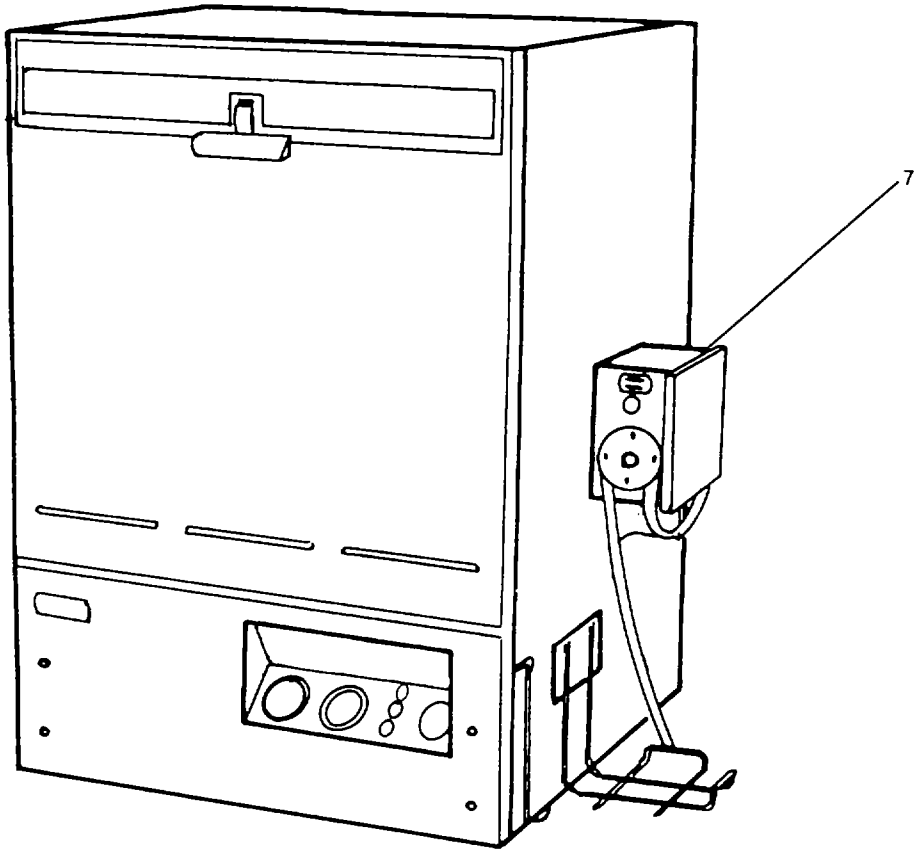
The orange cycle light (4) will come on, indicating a wash cycle is in progress. The wash cycle lasts 2 1/2 minutes. Do not open door while machine is running, otherwise cycle will be interrupted.

e. Open door and remove the rack of clean ware when the cycle light (4) goes off.

NOTE

The dishwasher is ready for repeat operation after a short period for the timer to reset.





LEGEND
4. CYCLE LIGHT
6. ON/FILL-DRAIN/OFF
7. NORMAL/DELIME CONTROL

FIGURE 2-189. Dishwasher #FFW-1.

2-5.29.11.3. Prime Replacement Soap.

a. Place tube in bottle of soap.

b. Turn ON/FILL, OFF/DRAIN switch (6) to ON/FILL position.

c. Close and latch door.

d. Turn the priming switch (7) to prime position and hold for 20-30 seconds. This fills the detergent tubing.

2-5.29.12. Foodwaste Disposer #FD2/502-E-4. (FIGURE 2-190)

2-5.29.12.1. Pre-operational Check.

WARNING

- **Never use your hand to check rotation of the flywheel or to remove foreign matter from the disposer.**
- **Never check rotation of flywheel or remove foreign matter from disposer with power applied.**

a. Turn the flywheel to check for free rotation.

b. Using tongs or pliers, remove any foreign matter in the disposer.

2-5.29.12.2. Disposer Operation.

a. Turn ON circuit breaker (8, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7A.

b. Start disposer with the controller (FIGURE 2-190) before feeding food waste and check to be sure water is flowing into the disposer.

c. Feed food waste into the disposer.

CAUTION

- **Do not feed china, metal, rags, clam shells, or similar material into the disposer.**
- **Do not put grease or oil in the disposer. Grease or oil can clog the drain.**

NOTE

Always allow the disposer and motor to run for a short period after grinding is completed to assure proper flushing of the disposer and waste line.

d. Turn lever off.

e. Turn OFF circuit breaker (8, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7A.

2-5.29.13. Waste Compactor #GTC-1. (FIGURE 2-191)

2-5.29.13.1. Loading Compactor.

a. Turn ON circuit breaker (13, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

CAUTION

Do not compact aerosol cans or any other containers holding, or which held, toxic chemicals, insecticides, or combustible contents. Fumes may be released that are hazardous to health or a fire or explosion may result.

2-5.29.13.2. Starting Compactor.

a. Turn the OFF/ON START switch (2, FIGURE 2-191) to the START position.

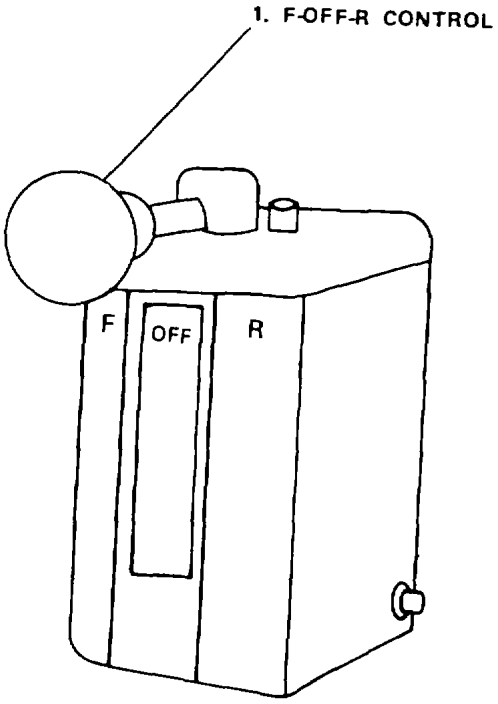
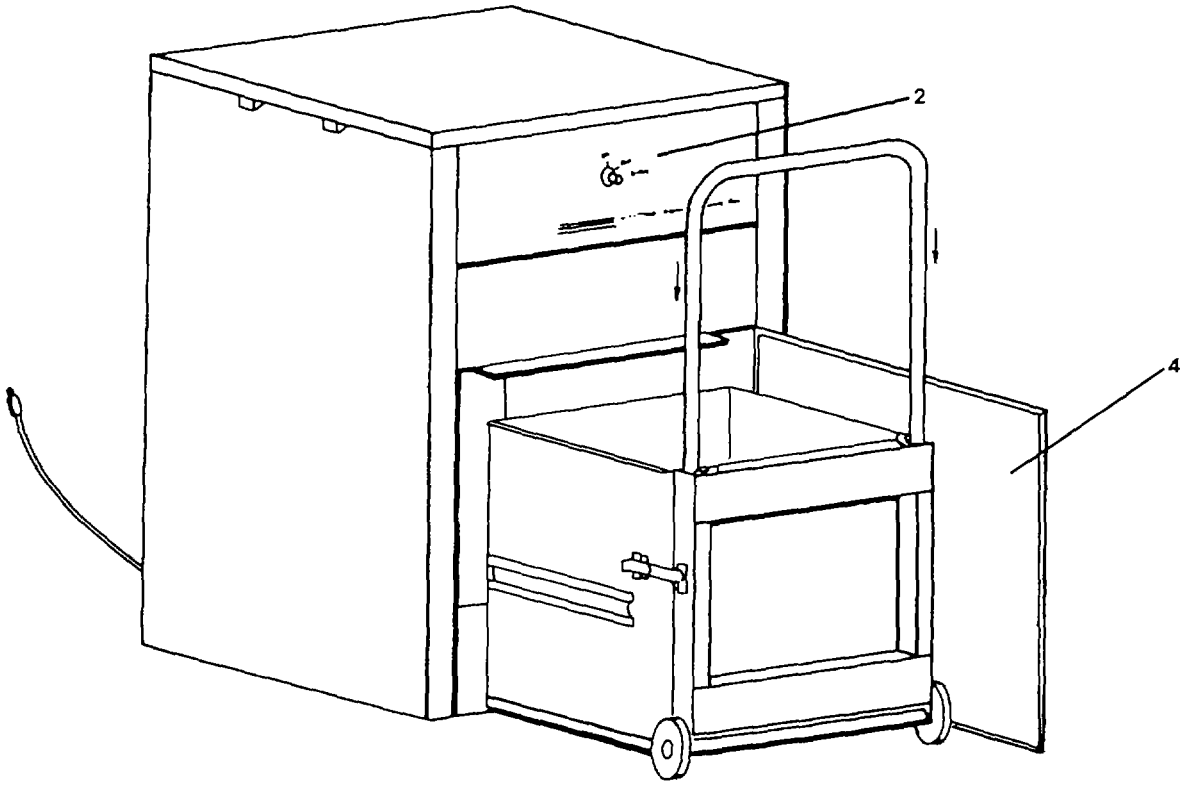


FIGURE 2-190. Foodwaste Disposer FD 2/50-2-E-4.



LEGEND
2. OFF/ON START KEY SWITCH
4. DOOR

FIGURE 2-191. Waste Compactor GTC-1.

WARNING

Compacted trash may contain broken glass and other sharp objects. Use extreme care when handling the trash bag to avoid injury.

NOTE

- **The spring loaded switch returns to the ON position for the rest of the cycle. During the compacting cycle, if the door (4) is opened the unit will shut off. When closing the door, with the key switch (2) still in the ON position, the unit will start and the ram will automatically return to the home position.**
- **If the container slips out of position during a compacting cycle, the ram will retract to its home position. The door (4) can then be opened and the trash rearranged.**
- **For maximum compaction, allow the ram to remain in the compressed position after each insertion of trash.**

b. Turn the keyswitch (2) to OFF or open the door.

2-5.29.14. Sanitizing Sink Heater #3CS-6. (FIGURE 2-192)

2-5.29.14.1. Operating Procedures

CAUTION

Do not turn on electrical current to the heater until the tank has been filled with water.

a. Check that small pipe cap (6) to the heating chamber is in place.

b. Close sump valve by operating the drain handle (3).

c. Fill the holding vessel with hot tap water to normal operating level.

d. Turn on circuit breaker (5, FIGURE 2-183) on power distribution panel 7A.

CAUTION

The Energy Cut-Off (ECO) does not protect the heater when both reservoirs are drained.

e. Place power switch (4, FIGURE 2-192) to ON position.

NOTE

- **The indicating dial thermometer (5) will indicate when sanitizing temperature is reached.**
- **All heaters have an ECO switch that will shut OFF the power if the unit should overheat.**
- **If the ECO switch has activated, a low water level may be the cause.**
- **To reset 3CS heaters, fill to the proper water level. Place the OFF-ON switch (4) to OFF, then ON.**

2-5.29.14.2. Draining.

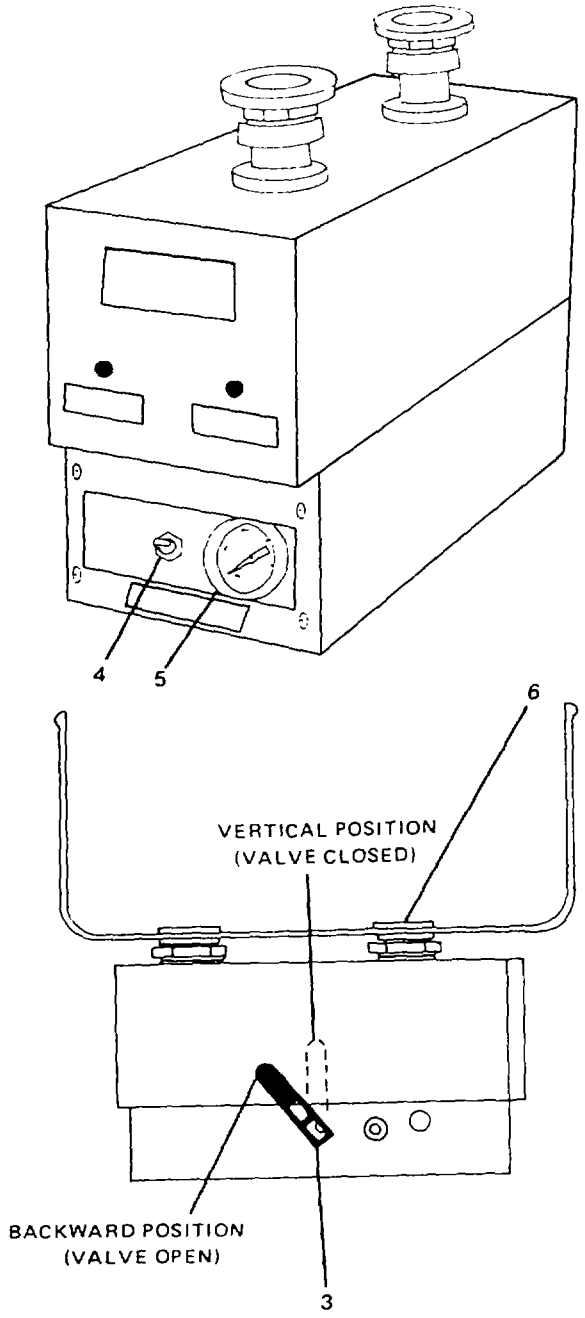
CAUTION

Do not drain holding vessel with power ON.

a. Place OFF-ON switch (4) to OFF position.

b. Turn off circuit breaker (5, FIGURE 2-183) on power distribution panel 7A.

c. Open the sump valve (3).



LEGEND

3. SUMP DRAIN HANDLE
4. ON/OFF/RESET SWITCH
5. DIAL THERMOMETER
6. SMALL PIPE CAP

FIGURE 2-192. Sanitizing Sink Heater.

2-5.29.15. Marine Coffee Maker #OT-20. (FIGURE 2-193)

2-5.29.15.1. Coffee Brewing Directions. (FIGURE 2-193)

a. Place filter in funnel (3) and add desired amount of coffee.

b. Level the bed of coffee and insert funnel in hood guides.

c. Place empty decanter (4) on bottom warmer under funnel.

d. Place ON-OFF switch (7) to the ON position, deflect the start switch and brew a pot of coffee.

CAUTION

Do not warm coffee pots empty or with small amounts of coffee in them. This could damage or break coffee pots.

e. Turn off coffee pot by placing ON-OFF switch (7) to the OFF position.

2-5.29.16. Milk Dispenser #MSF-SK-2. (FIGURE 2-194)

2-5.29.16.1. Preparation for Use.

a. Place milk container (1) over valve (3) so that the tube lines up with the opening in the valve.

b. Open valve (3) and feed tube through tube passage.

CAUTION

Do not stretch tube; this may cause the tube to pull loose from the container, causing the contents to drain.

c. Remove polyethylene film covering tube.

d. Allow valve to close, pinching off the dispensing tube.

NOTE

If tube is of a determined length, remove plug. If the tube is not of a determined length, cut off 1/4 inch below valve spout.

2-5.29.16.2. Operating Instructions.

a. Turn ON circuit breaker (14, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

NOTE

During normal operation, the temperature indicator (2) shall remain in the safe or green zone (320-44o).

2-5.29.17. Toaster #102-2. (FIGURE 2-195)

2-5.29.17.1. Operation.

a. Turn ON circuit breaker (4, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.

b. Press operating lever (1, FIGURE 2-195) to activate heating elements.

c. Adjust the color selection knob (3) from light to dark as desired.

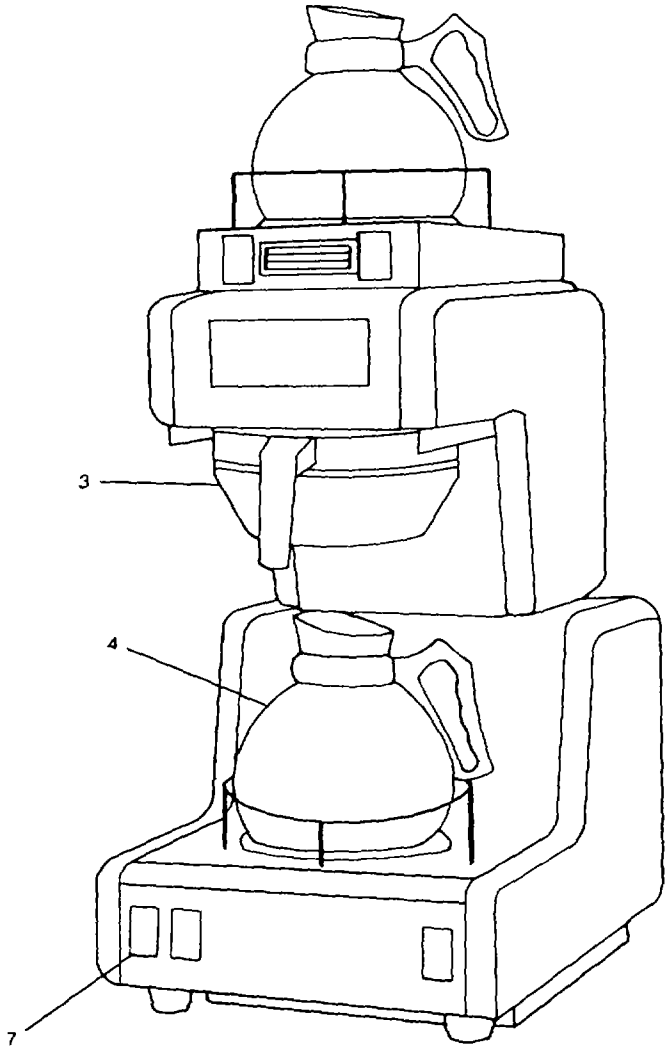
NOTE

Operating levers can be manually released by a separate release lever (2).

2-5.29.18. Exhaust Ventilator Control Cabinet. (FIGURE 2-196)

2-5.29.18.1. Starting Ventilator.

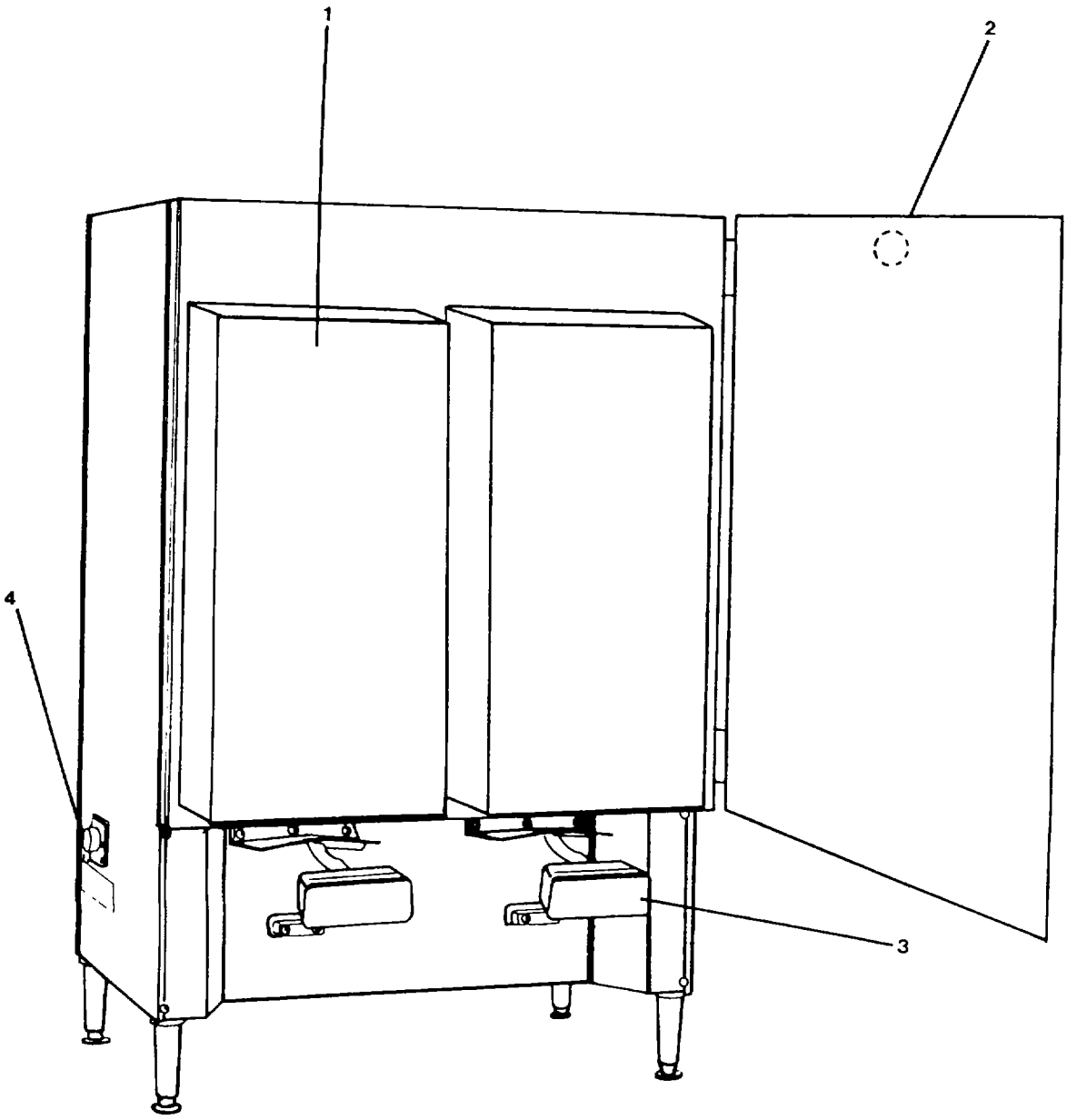
a. Turn ON circuit breaker (24, FIGURE 2-101, Sheet 14 of 21) on power distribution panel 7B.



LEGEND

3. FUNNEL
4. COFFEE POT
7. ON-OFF TOGGLE SWITCH

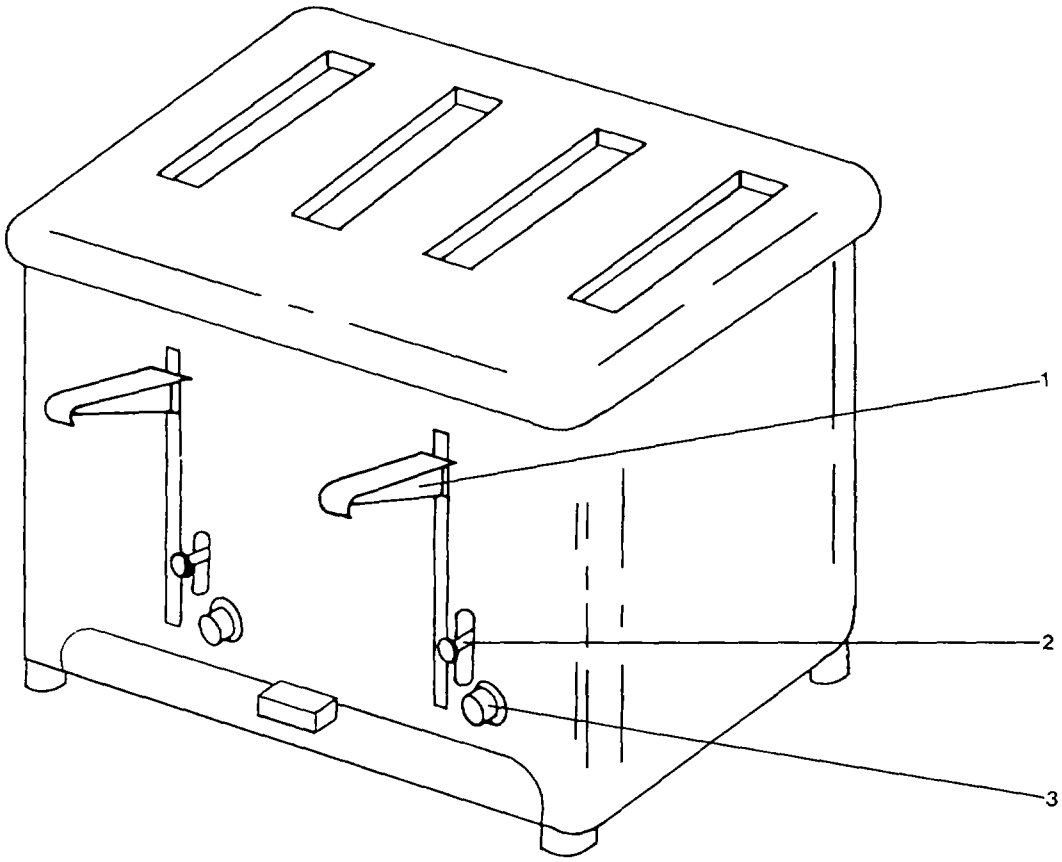
FIGURE 2-193. Marine Coffee Maker #Qt-20.



LEGEND

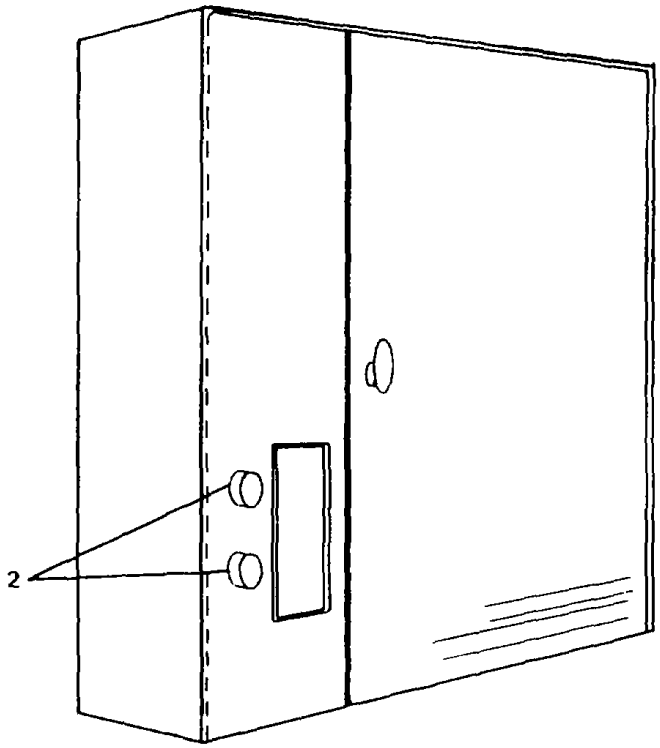
1. MILK CONTAINER
2. THERMOMETER
3. DISPENSING VALVE
4. THERMOMETER

FIGURE 2-194. Milk Dispenser NSF-SK-2.



LEGEND
1. OPERATING LEVER
2. RELEASE LEVER
3. COLOR SELECTION KNOB

FIGURE 2-195. Toaster 1D2-2.



LEGEND:

2. START/STOP PUSHBUTTON

FIGURE 2-196. Exhaust Ventilator Control Cabinet.

b. Push the START/STOP button (2, FIGURE 2-196).

c. Push the START/STOP button (2, FIGURE 2-196) to stop the ventilator.

2-5.30. Liferafts and Davit.

2-5.30.1. Shifting Davit and Raft Container to Deployment Position.

a. Disconnect safety chain from hand rail at raft boarding area.

b. Insert hairpin (3, FIGURE 2-197) in pin retainer (2) on side of raft container and remove two containment pins (6) from each side of raft container.

c. Insert winch handle (1, FIGURE 2-198) on LOW SPEED RETURN shaft of liferaft davit (4).

d. Raise davit hook (5, FIGURE 2-199) by cranking the winch handle until tension on davit boom tieback (9, FIGURE 2-198) is released.

e. Remove davit boom tieback (9).

f. Remove winch handle (1) from low speed return shaft (4) of liferaft davit.

g. Release brake on liferaft davit by lifting manual brake release lever (7, FIGURE 2-198). Davit should travel to full outboard position.

h. Insert winch handle (1) on LOW SPEED RETURN shaft (4) of liferaft davit.

i. Crank winch handle (1) until an adequate length is payed out, allowing davit hook (5, FIGURE 2-199) to reach the container deployment chain (1, FIGURE 2-202) located on the inboard sloping side of the raft container.

j. Retrieve davit hook (5, FIGURE 2-199) using the retrieval line (1).

k. Pull attached release lanyard (3) to open davit hook (5).

l. Place jaws of davit hook (5) over container deployment chain ring (1) and squeeze hook (5) shut.

m. Crank winch handle (1, FIGURE 2-198) (raise davit hook) until raft container is rolled out to the deployed position.

n. Install two containment pins (6, FIGURE 2-197) on each side of raft container.

o. Crank winch handle (1, FIGURE 2-198) (lower davit hook) until an adequate length cable is payed out to reach raft lifting ring located under the velcro boot (8, FIGURE 2-197) on the raft container.

p. Retrieve davit hook (5, FIGURE 2-199) using the retrieval line (1).

q. Pull release lanyard (3) to open davit hook (5) and remove container deployment chain ring (1, FIGURE 2-197) from davit hook (5, FIGURE 2-199).

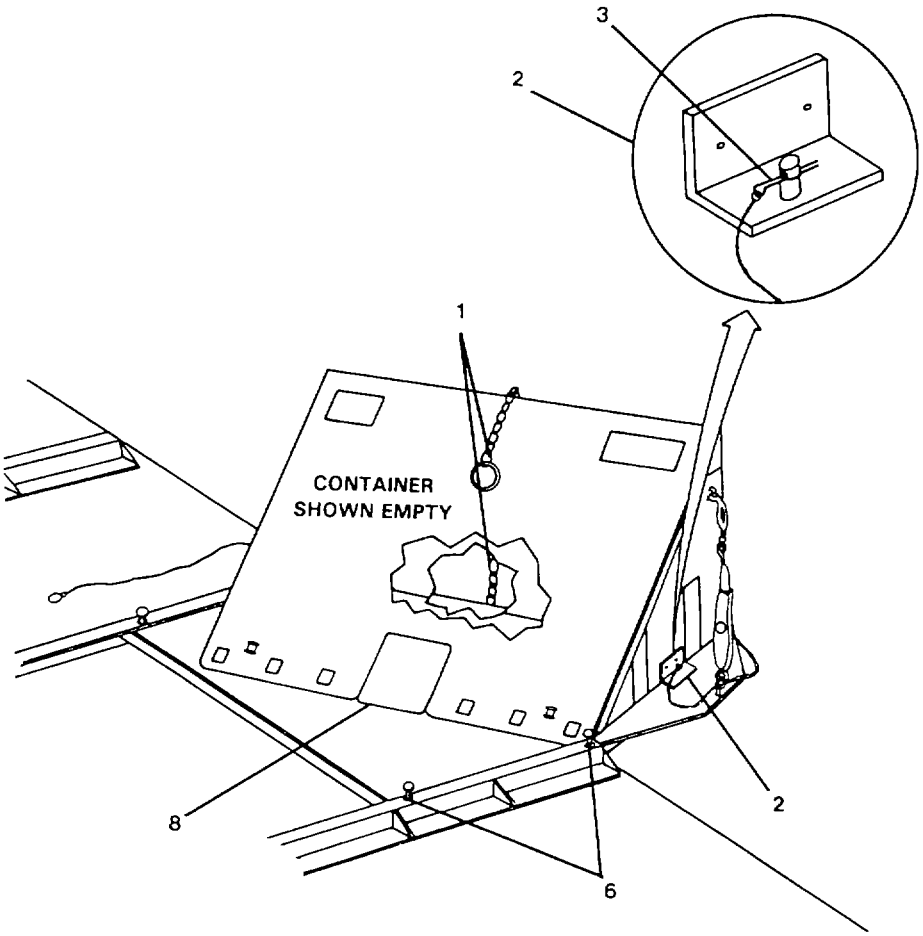
2-5.30.2. Deployment and Inflation of Liferaft.

a. Pull raft lifting ring out of velcro boot (8, FIGURE 2-197) approximately 6 inches.

b. Place jaws of davit hook (5, FIGURE 2-199) over raft lifting ring and squeeze hook shut.

c. Remove winch handle (1, FIGURE 2-198) from LOW SPEED RETURN shaft (4).

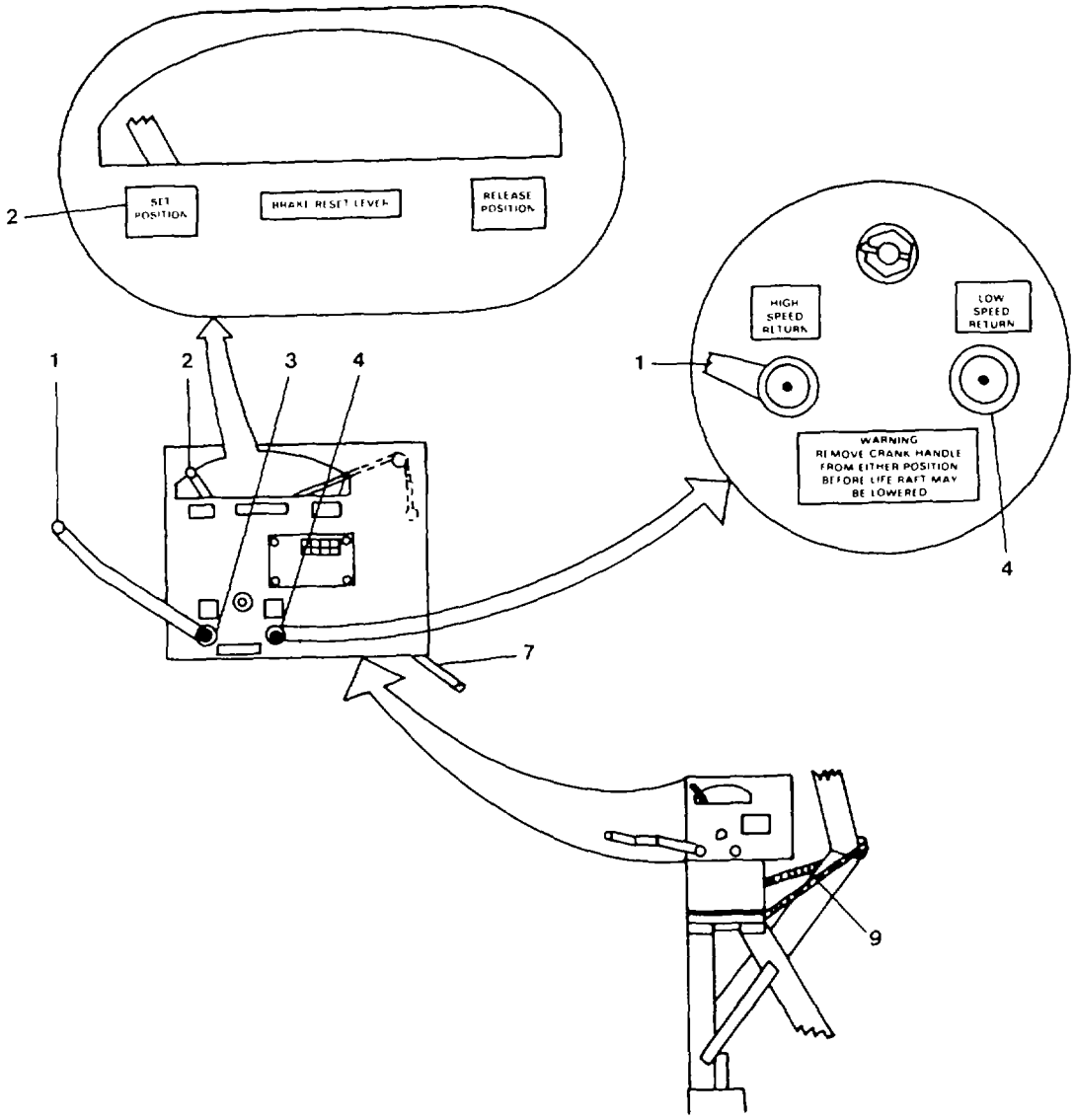
d. Lower manual brake release lever (7, FIGURE 2-198) to set manual brake.



PORT AND STARBOARD POOP DECK
ABOUT FRAME 88

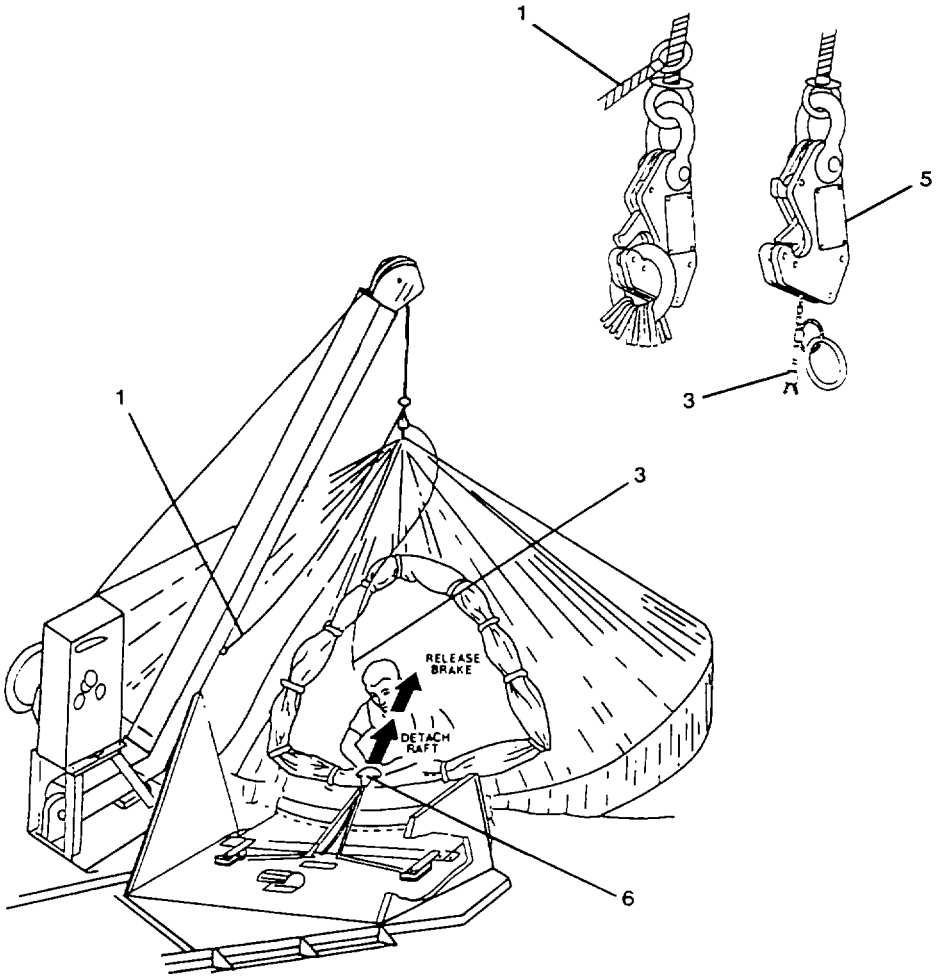
LEGEND
1. CONTAINER DEPLOYMENT CHAIN
2. PIN RETAINER ASSEMBLY
3. HAIRPIN
6. CONTAINMENT PINS
8. VELCRO COVER

FIGURE 2-197. Liferaft Deployment System.



LEGEND
1. WINCH HANDLE
2. BRAKE RESET LEVER
3. HIGH SPEED RETURN
4. LOW SPEED RETURN
7. MANUAL BRAKE RELEASE LEVER
9. DAVIT BOOM TIEBACK

FIGURE 2-198. Liferaft Davit.



LEGEND
1. RETRIEVAL LINE
3. HOOK RELEASE LANYARD
5. AUTOMATIC RAFT HOOK
6. RELEASE HANDLE

FIGURE 2-199. Liferaft Release System.

CAUTION

Set the manual brake before lifting raft and activating inflation cylinder. The brake is needed to hold the load while hoisting the empty raft into boarding position. Failure to set the brake could result in damage to the raft.

e. Insert winch handle (1) on LOW SPEED RETURN shaft (4).

f. Crank winch handle (1) (raise davit hook) (5, FIGURE 2-199) until davit hook is about 5 feet above the deck.

NOTE

Raft will automatically release container pins, open container cover, and inflate.

g. Crank winch handle (1, FIGURE 2-198); raise davit hook (5) until davit hook hits the cable stop.

NOTE

Raft inflation is complete in approximately 20 seconds.

h. Crank winch handle (1), adjusting raft position until the raft top tube is level with the deck edge.

WARNING

Ensure that winch handle is removed and stowed, and the brake is in the SET position (2). A safety interlock will prevent remote brake release and raft descent when winch handle remains on either the HIGH SPEED RETURN or LOW SPEED RETURN shaft. Failure to remove winch handle could delay raft descent and endanger lives in an emergency.

i. Remove winch handle (1) from LOW SPEED RETURN shaft (4).

2-5.30.3. Boarding Raft.

NOTE

The crew member in charge of the liferaft should board first and stand by entrance to assist evacuees.

a. Load raft starting outboard.

WARNING

Do not exceed rated load capacity of 25 persons. Evacuees can be dumped overboard if the load capacity is exceeded.

b. Hold onto suspension ropes inside raft.

c. Sit equally spaced to balance raft.

2-5.30.4. Lowering and Detaching Raft

WARNING

Lowering raft is a two-step operation. Make sure girt bar holding raft to vessel is released prior to releasing remote brake. Evacuees could be dumped overboard if brake is released while raft is connected to vessel.

NOTE

After the raft has been loaded, the person in charge of the raft must do the following:

a. Pull release handle (6, FIGURE 2-199) located under velcro cover about 6 inches to release girt bar holding raft to vessel.

b. Pull release handle (6) another 6 inches to release the remote break on the liferaft davit. Release the release handle as raft begins descent.

c. Pull release lanyard (3) (to arm davit hook for automatic release) when raft is close to or on the water.

NOTE

If davit hook fails to release when the raft is floating, firmly pull release lanyard to override the davit hook release mechanism.

2-5.30.5. Retrieving Davit Hook.

NOTE

Prior to launching additional rafts, the davit operator must reset the brake and retrieve the davit hook. The operator must then shift raft container to the deployment position, attach lift ring, inflate, and load second or additional rafts.

a. Raise davit manual brake release lever (7, FIGURE 2-198) to uppermost position.

b. Place BRAKE RESET LEVER (2) to SET position.

c. Insert winch handle (1) on HIGH SPEED RETURN shaft of liferaft davit (3).

d. Crank winch handle (1) (raise davit hook) until an adequate length of cable remains to reach the container deployment chain (1, FIGURE 2-197).

e. Retrieve davit hook using the retrieval line (1, FIGURE 2-199).

f. Remove winch handle from HIGH SPEED RETURN shaft (3, FIGURE 2-198).

NOTE

Refer to paragraph 2-5.30.1 to deploy container and lower and detach raft.

2-5.31. Handling Davit Operation**.**

WARNING

- **Clear working area of unnecessary personnel and equipment prior to davit operations.**
- **Safe Pre-Operation Set-Up requires three persons to elevate boom and a fourth person to install boom support pin. Failure to follow set-up procedures could result in serious injury and damage to equipment.**

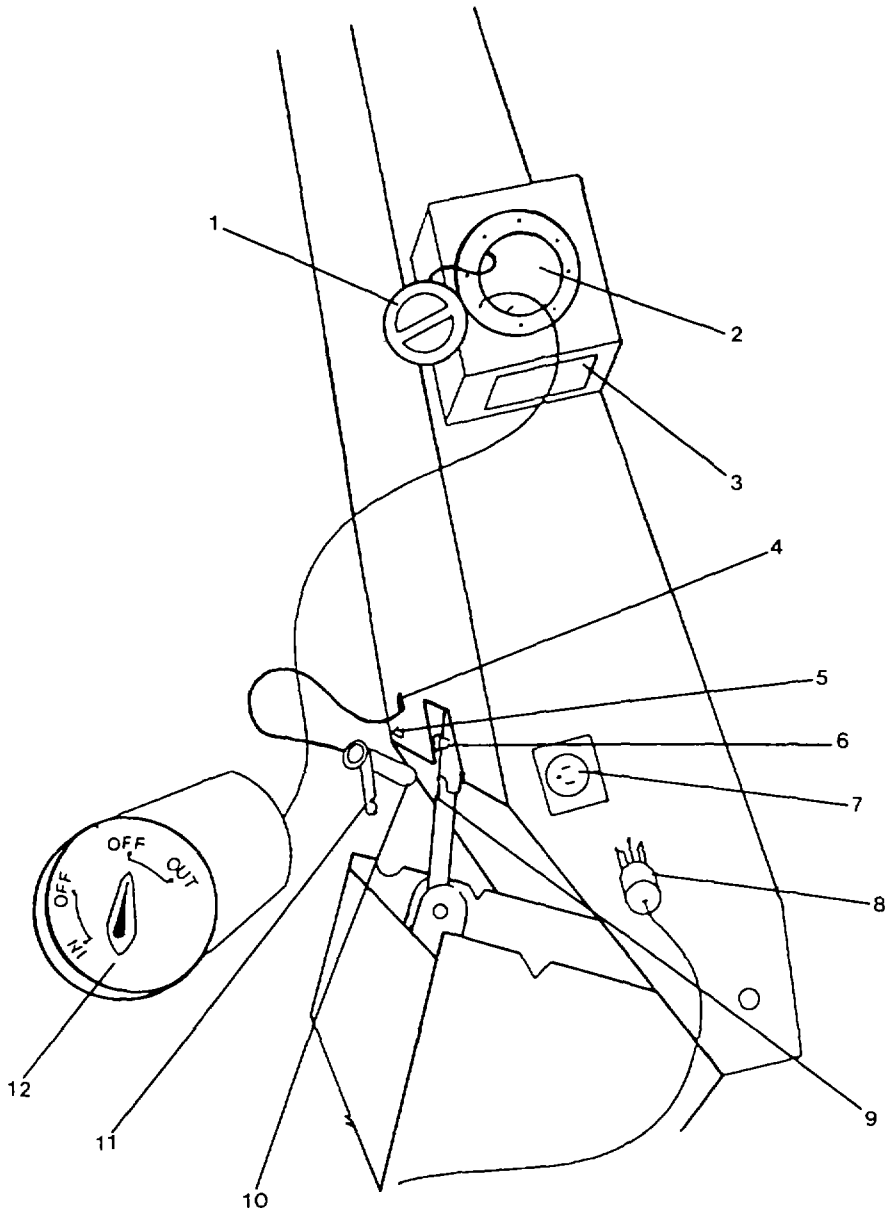
2-5.31.1. Pre-Operation Set-Up and Control Check Inspect work area around davit to ensure safe operating area. One winch operator and three assistants complete pre-operation set-up and control check as follows:

a. Remove access cover (1, FIGURE 2-200) on storage compartment (2) and remove remote winch control (12) and power cord (8).

WARNING

- **Never plug power cord in to an ungrounded outlet.**
- **Prior to connecting electrical power, ensure that electric remote control is in OFF position. Otherwise the winch could unexpectedly start, causing serious personal injury or damaging equipment.**

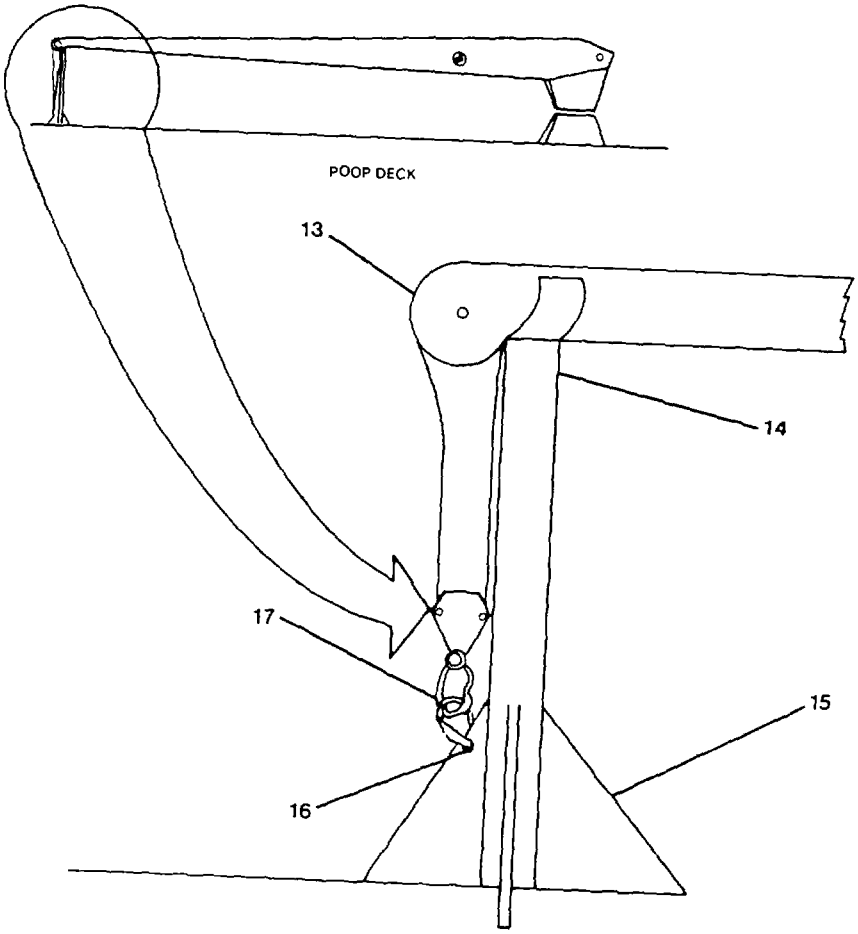
b. Turn on electrical power at starboard lighting distribution panel L-3 (19, FIGURE 2-101, Sheet 5 of 21) located in the starboard passageway on Main Deck.



LEGEND

1. ACCESS COVER
2. STORAGE COMPARTMENT
3. INSTRUCTION PLACARD
4. BOOM SUPPORT PIN RECESS
5. LOCKING THUMB-SCREW
6. LOCKING THUMB-SCREW
7. 115V AC ELECTRICAL POWER SOCKET
8. ELECTRICAL POWER CORD
9. HOLE IN BOOM SUPPORT
10. BOOM SUPPORT PIN
11. RETAINER TAB ON BOOM SUPPORT PIN
12. REMOTE ELECTRIC WINCH CONTROL

FIGURE 2-200. Handling Davit Controls (Sheet 1 of 2).



LEGEND
13. DAVIT BOOM
14. DAVIT BOOM REST
15. DAVIT BOOM REST BASE
16. LIFTING HOOK KEEPER
17. DAVIT BOOM LIFTING HOOK

FIGURE 2-200. Handling Davit Controls (Sheet 2 of 2).

c. Plug power cord (8) into davit boom socket (7) and into shipboard 115 volt AC electrical outlet located in starboard stairwell leading to starboard aft mooring station.

d. Turn switch on electric remote control to the OUT position to release tension on cable and lifting hook (17, FIGURE 2-200, Sheet 2 of 2).

e. Remove lifting hook (17) from lifting hook keeper (16).

f. Remove boom support pin (10, Sheet 1 of 2) from boom support pin recess (4) by loosening thumbscrew (5) and turning boom support pin (10) clockwise to disengage retainer tab (11).

WARNING

Exercise care to prevent davit from swinging to one side during lifting procedure.

g. Using three soldiers, manually raise davit boom to 45 degree angle, exposing hole (4) in boom support.

h. Secure davit in upright position by inserting and locking boom support pin (10) into hole (9) in boom support. Lock boom support pin by turning counterclockwise to engage slot in retainer tab (11). Turn thumbscrew (6) clockwise.

2-5.31.2. Lifting Operations. Perform the following tasks

a. Attach hook to load.

b. Raise load enough to clear handrails.

c. Pivot boom to desired lift position.

2-5.31.3. Sequence of Lifting Operation

WARNING

- **Never use davit and winch for any type of human support or transportation.**
- **Operator should never lift a load over assistants or other personnel. No one should walk under a hoisted load. Severe injury or death could result should winch or davit equipment fail. Operator is responsible for ensuring load is safely attached. Operator MUST NOT attempt to hoist loads until absolutely certain conditions of load and winch will allow safe operation.**

CAUTION

- **Always stop winch before load reaches davit boom. Never unwind all cable from drum when paying out. Always leave at least five wraps of cable on drum.**
- **Always ensure that load has come to a complete stop and is stable prior to changing direction of winch.**

a. Lift load by turning control switch (12) to the IN position. Winch will continue to hoist load as long as operator holds switch to the IN position. Winch will stop hoisting load when operator releases switch.

b. Push boom around the swivel base until load is over the unloading point.

c. Lower load by turning switch (12) to the OUT position. Load will continue to lower until operator

releases switch. When load reaches release point, overrun the winch to obtain slack in lifting cable.

d. Detach lifting hook.

2-5.31.4 Stowing Winch and Davit.

CAUTION

Always stop winch before hook reaches the davit boom.

a. Haul hoisting hook to within about 4 feet of boom by turning switch (12) to the IN position.

b. Swing boom over boom support rest (14, Sheet 2 of 2).

c. Using three soldiers, lift boom to relieve strain on boom support pin (10, Sheet 1 of 2). Loosen locking thumbscrew (6), turn boom support pin (10) counterclockwise to disengage retainer tab (11). Pull boom support pin (10) from hole (9) in boom support.

d. Secure lifting hook (17, Sheet 2 of 2) to lifting hook keeper (16). Pull tension on cable, hook (17), and keeper (16) by turning switch (12) to the IN position until boom (13) is tightly secured to boom rest (14).

e. Replace boom support pin (10, Sheet 1 of 2) in boom support pin recess (4). Secure retainer tab (11) with locking thumbscrew (5).

f. Stow remote electric winch controls (12) and electric power cord (8) in the stowage compartment (2). Replace access cover (1) by turning clockwise.

g. Turn circuit breaker in Panel L3 to OFF position.

2-5.32. Shore Connections.

2-5.32.1. Power Cable Connection.

WARNING

Ensure that power cable does not enter water. Electrocution, serious injury, or equipment damage can occur during connection if cable connector gets wet.

a. Pay out power cable (2) from reel assembly (1) by hand (FIGURE 2-201).

b. Position cable end (1) at cable roller guide (2, FIGURE 2-202).

c. Tie one end of heaving line (3) to cable end (1).

d. Direct other end of heaving line through cable roller guide (FIGURE 2-202) (located at edge of poop deck starboard side), then throw heaving line to dockside facilities.

NOTE

There are 150 feet of cable; direct attention to cable reel payout. There should be a sufficient amount of cable remaining on reel. Otherwise, a preventer line is used to prevent complete cable runoff.

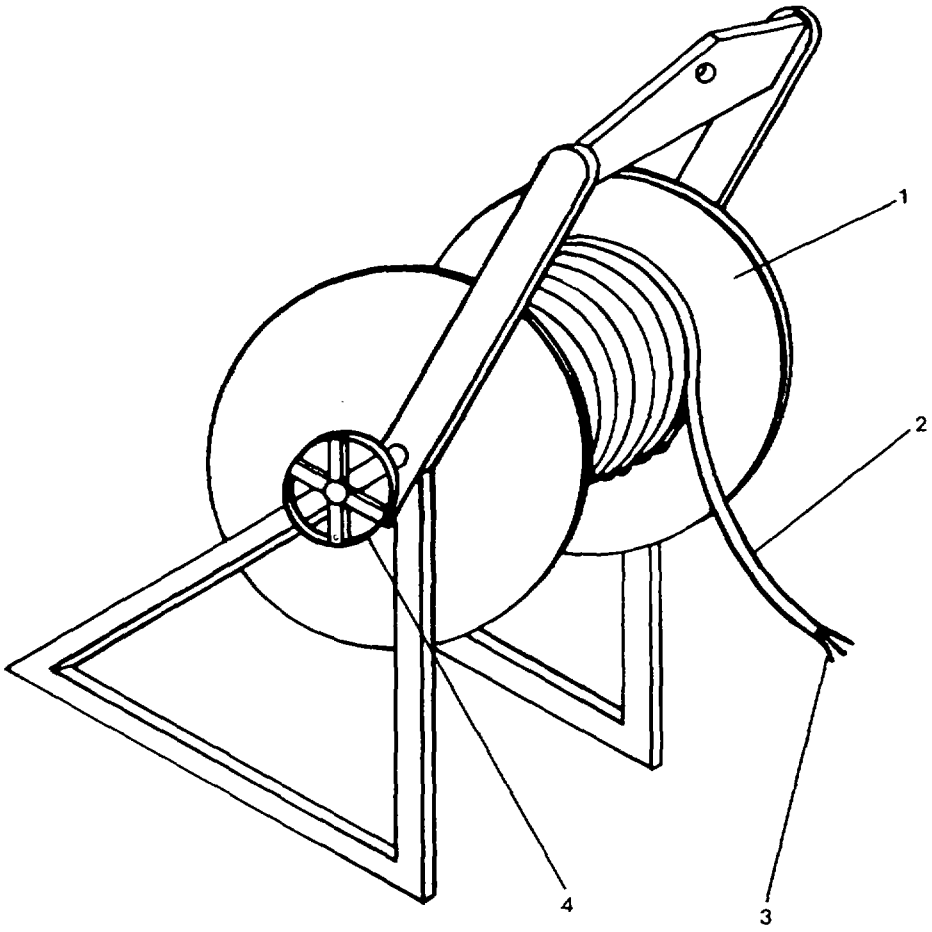
e. Coordinate cable payout between onboard and dockside crew.

f. Connecting Cables (FIGURE 2-203).

(1) Loosen bolts (11), holding terminal cover (1) closed.

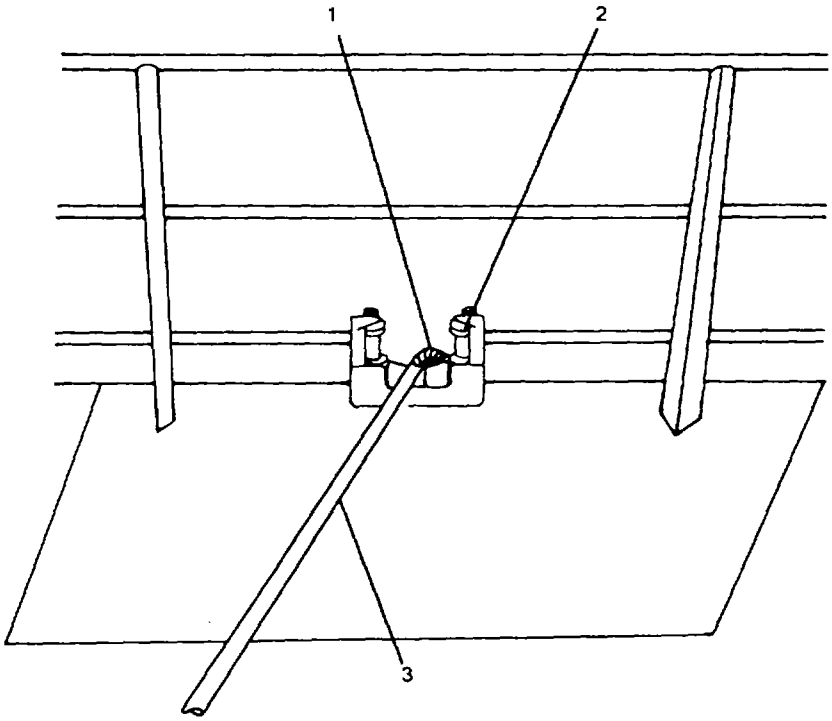
(2) Open terminal cover (1).

(3) Remove pipe plug (9).



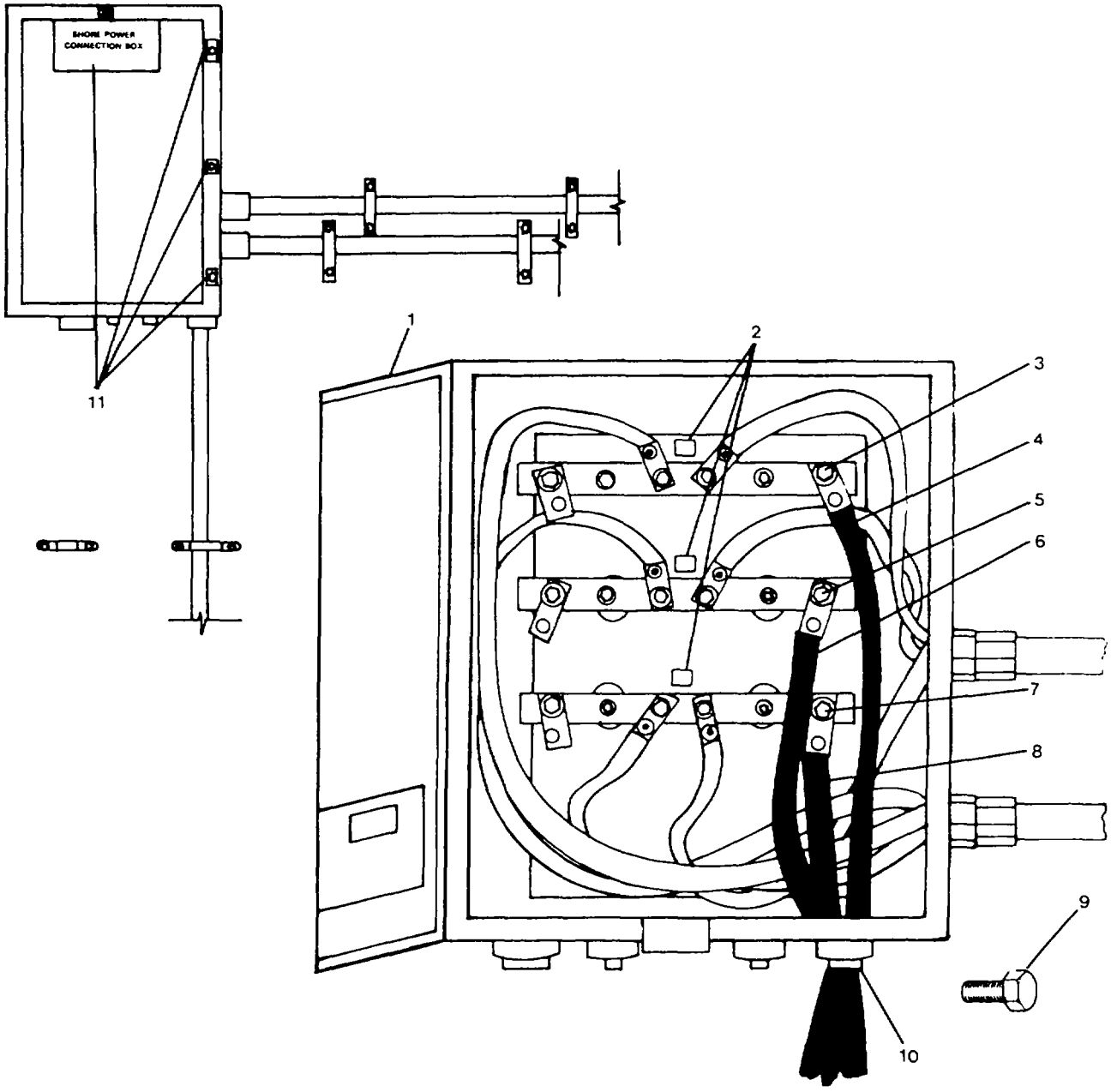
LEGEND
1. REEL ASSEMBLY
2. POWER CABLE
3. CABLE END
4. REEL ASSEMBLY WHEEL

FIGURE 2-201. Shore Power Cable and Reel.



LEGEND
1. CABLE END
2. CABLE ROLLERS
3. CABLE

FIGURE 2-202. Cable Roller Guide.



LEGEND

1. TERMINAL COVER
2. PHASE TAGS
3. "A" PHASE CONNECTION
4. "A" PHASE WIRE
5. "B" PHASE CONNECTION
6. "B" PHASE WIRE
7. "C" PHASE CONNECTION
8. "C" PHASE WIRE
9. PIPE PLUG
10. WIRES
11. TERMINAL COVER BOLTS

FIGURE 2-203. Shore Terminal Box.

(4) Install cables (10) into terminal box.

NOTE

Consult phase tags (2) to ensure proper wire to terminal connection.

(5) Connect wire (4) to top "A" phase terminal (3).

(6) Connect wire (6) to middle "B" phase terminal (5).

(7) Connect wire (8) to bottom "C" phase terminal (8).

WARNING

Ensure that no electrical power is applied to dock connections prior to connecting shore power cables.

(8) Ensure shore ends of cable are connected to the proper phased connection. Shore power facilities may vary in arrangement and method of hook-up.

g. Shifting to Shore Power.

NOTE

Metal locking bar is intended to stop simultaneous activation of shore and ship's power. Therefore, there will be a momentary interrupt of power during the shifting process. An announcement must be made over the general announcing system to place all electronic and unnecessary electrical equipment in standby while shifting to shore power.

(1) Ensure power is available from shore facility.

(2) On the main switchboard, place main circuit breaker for generators No. 1 and No. 2 (61, 62, FIGURE 2-102, Sheet 4 of 6) in the OFF position.

(3) Slide the metal locking bar to the left.

(4) Energize the shore power circuit breaker on switchboard.

2-5.32.2. Power Cable Disconnect

WARNING

Ensure that power cable does not enter water. Electrocution, serious injury, or equipment damage can occur during disconnection if cable connector gets wet.

NOTE

- **Make an announcement over the general announcing system to place all electronic and unnecessary electrical equipment in standby while shifting from shore power to ship's power.**
- **Ensure generators are online and ready to accept electrical load.**

a. Shift from shore to ship's power.

(1) Turn shore power circuit breaker OFF on main switchboard.

(2) Slide metal locking bar to right.

(3) Turn generator No. 1 and No. 2 circuit breaker to ON position.

b. Disconnect cables.

WARNING

Ensure there is no electrical power at shore facility to ship.

(1) Loosen bolts (11) and open terminal cover (1).

(2) Disconnect cables from shore power facility.

(3) Remove wires (4, 6, 8) from terminals (3, 5, 8).

(4) Pull cables (10) from terminal box.

(5) Install pipe plug (9).

(6) Close terminal cover (1) and tighten bolts (11).

NOTE

Direct attention to power cable haul in. If a sufficient amount of cable remains on the reel, the preventer line can be removed to facilitate reeling operation.

CAUTION

Ensure that cable does not enter water.

c. Coordinate cable reel-in between onboard and dockside crew. Stop-off one end of heaving line to cable end at dockside.

d. Operate reel assembly wheel (4, FIGURE 2-201) to haul-in power cable. Position cable (3, FIGURE 2-202) on roller guide (2) while cable haul-in is in progress. Ensure that power cable is not twisted, kinked, or misaligned as cable is being repositioned onto reel.

e. Secure ends of cable (3, FIGURE 2-201) connections with waterproof wrappings.

2-5.32.3. Firemain From Shore Connection. (FIGURE 2-204)

a. Attach shore firemain hose at Main Deck International firemain hose connection (FIGURE 2-205).

b. Turn shore firemain water on.

c. Open firemain hose connection cutout valve (5, starboard; or 8, port).

d. Open inline stop valve to main deck hose connection (6, starboard; or 7, port).

e. Turn fire/bilge OFF/ON switch on Engine Room Motor Control Center (1, FIGURE 2-206) to the OFF position.

f. Close discharge valve to firemain (1, FIGURE 2-204).

g. Close fire/bilge pump discharge valve (2).

h. Close fire/bilge pump seawater suction valve (3).

i. Close fire/bilge pump suction valve (4).

2-5.32.4. Firemain From Shore Disconnect.

a. Open fire/bilge pump suction valve (4, FIGURE 2-204).

b. Open fire/bilge pump sea water suction valve (3).

c. Open fire/bilge pump discharge valve (2).

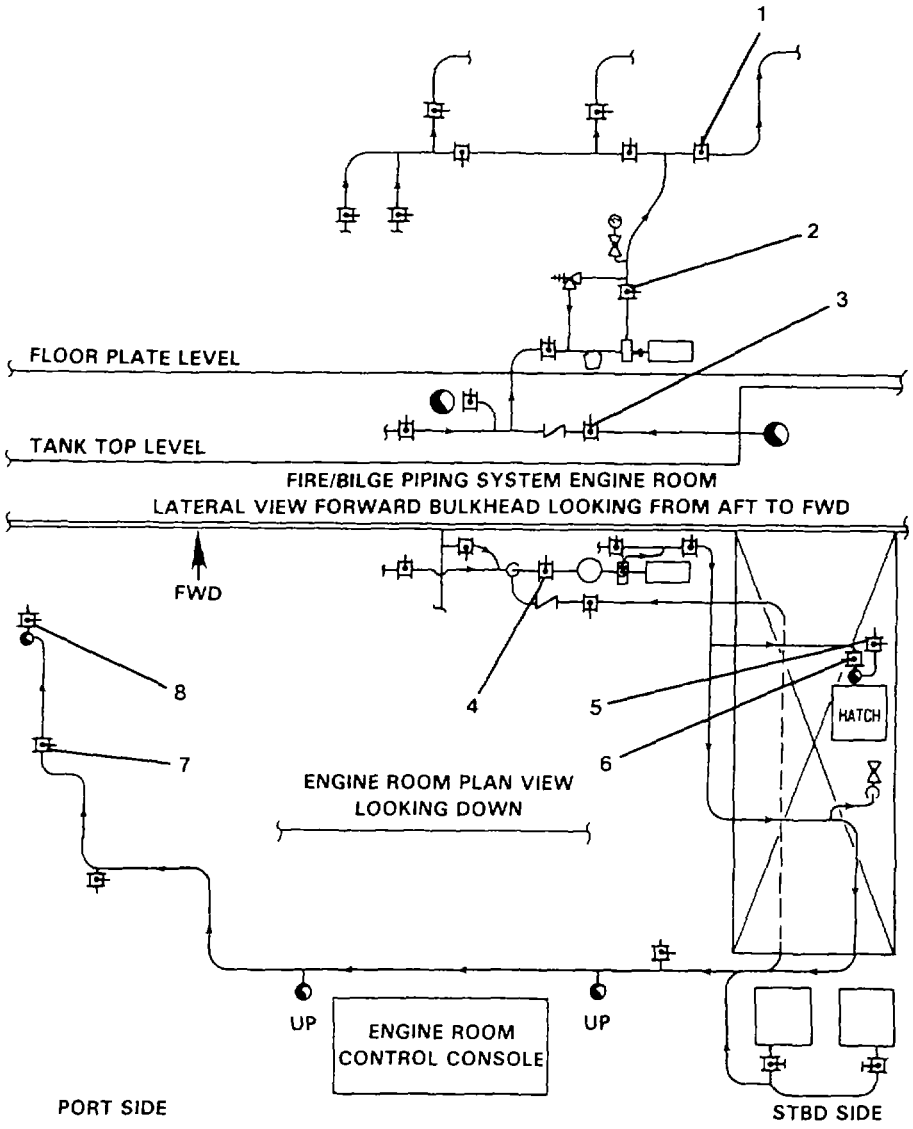
d. Open discharge valve to firemain (1).

e. Turn fire/bilge OFF/ON switch on Engine Room Motor Control Center (FIGURE 2-206) to ON position.

f. Close inline stop valve to main deck hose connection (6, starboard; 7, port, FIGURE 2-204).

g. Turn shore firemain water OFF.

h. Disconnect shore firemain hose at Main Deck International firemain hose connection (1, FIGURE 2-205).



LEGEND

1. DISCHARGE VALVE TO FIRE MAIN
2. FIRE/BILGE PUMP DISCHARGE VALVE
3. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
4. FIRE/BILGE PUMP SUCTION VALVE
5. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK STBD SIDE
6. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION STBD SIDE
7. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION PORT SIDE
8. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK PORT SIDE

FIGURE 2-204. Fire Bilge Piping System - Engine Room.

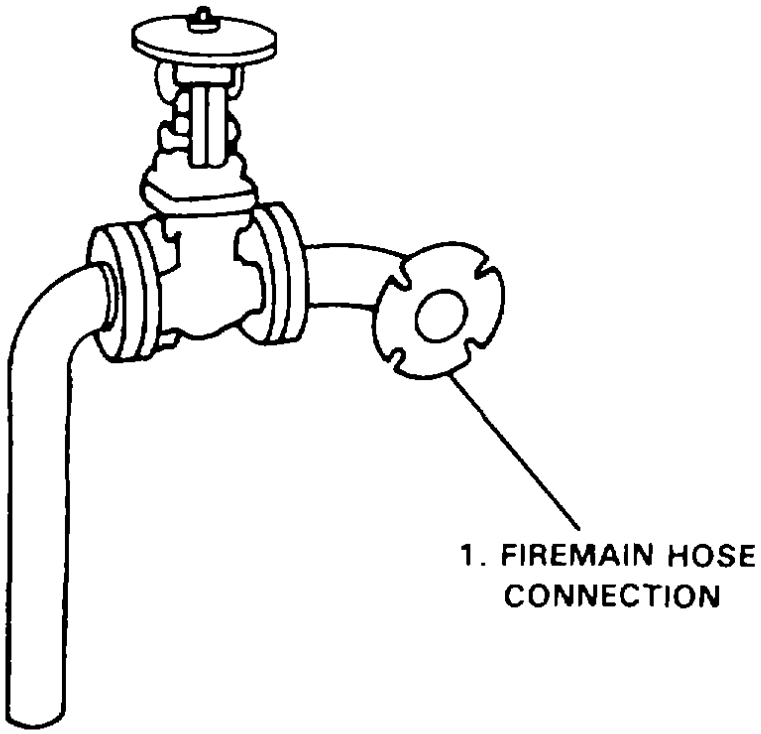


FIGURE 2-205. Main Deck International Fire Main Hose Connection.

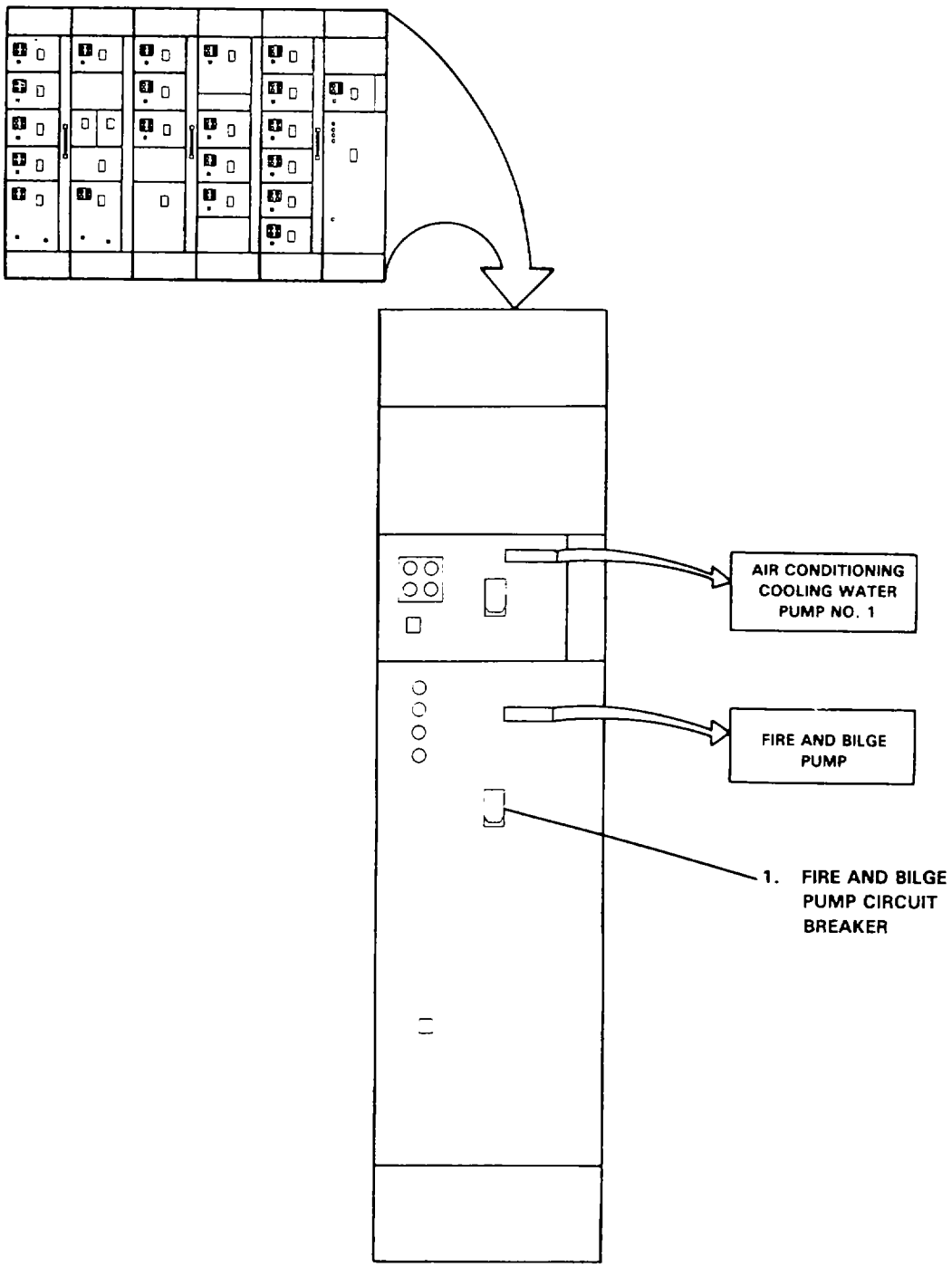


FIGURE 2-206. Engine Room Motor Control Center.

2-5.33. Equipment Conditions Prior To Getting Underway.

WARNING

The normal operating configuration of critical ship systems and equipment may be revised due to system or equipment malfunction.

Prior to verifying the operating configuration, check Table 2-4 against the master list of equipment failures to ensure appropriate systems or equipment are operating.

NOTE

After shore power and shore firemain connections are disconnected for getting underway, ship's critical systems and major equipment must be verified in its proper operating configuration.

a. Check critical ship's systems and major equipment (Table 2-4) to ensure normal operating configuration.

b. Check other deck, bridge and engine room equipment for proper stowage and operation. (List follows Table 2-4.)

Table 2-4. Equipment Condition Checklist

Equipment	Operating	Standby	Auto
Equipment	Operating	Standby	Auto
Main propulsion unit (stbd)	X		
Main propulsion unit (port)	X		
Distilling plant		X	
Ship's service diesel generator (stbd)	X		
Ship's service diesel generator (port)	X		
Diesel oil transfer pump (1)		X	
Diesel oil transfer pump (2)		X	
Diesel oil manifold		X	
Diesel oil purifier (1)		X	
Diesel oil purifier (2)		X	
Main engine prelube pump (stbd)		X	
Main engine prelube pump (port)		X	
Fire and bilge pump		X	
Emergency fire pump		X	
Bilge manifold		X	

Table 2-4. Equipment Condition Checklist

Equipment	Operating	Standby	Auto
Bilge pump (1)		X	
Bilge pump (2)		X	
Ballast pump		X	
Hot water heater (1)	X		
Hot water heater (2)	X		
Potable water set (1)	X		
Potable water set (2)		X	
Ship's service refrigeration	X		
Ship's service refrigeration	X		
Oily water separator		X	
Marine sanitation device	X		
Ship's service air compressor (1)	X		
Ship's service air compressor (2)		X	
Air receiver (1)	X		
Air receiver (2)		X	
Sludge pump		X	
Main switchboard	X		
Engine room control console	X		
Lube oil purifier		X	
Emergency generator			X
Main engine lube oil cooler (stbd)	X		
Main engine lube oil cooler (port)	X		
Gear oil cooling water pump (stbd)	X		

Table 2-4. Equipment Condition Checklist - CONT

Equipment	Operating	Standby	Auto
Gear oil cooling water pump (port)	X		
Halon fire system			X
Lube oil transfer pump		X	
Stern tube lubricating pump (stbd)	X		
Stern tube lubricating pump (port)			X
Hydraulic steering pump (1)	X		
Hydraulic steering pump (2)		X	
Windlass and bow ramp winch (stbd)		X	
Windlass and bow ramp winch (port)		X	
Stern anchor winch		X	

UNDERWAY

ON DECK

1. Secure rescue boat and liferafts for sea.
2. Phone check.
3. Test anchor windlass.
4. Ship secured for sea/includes cargo, well deck area and bow ramp.
5. Ensure gun mounts secured and covered.
6. Remove rat guards and frapping lines.
7. Set sea detail; ensure line handling stations, emergency steering, and anchor are manned.
8. Make proper anchor ready for letting go in case of emergency.
9. Stand by to take in gangway and fenders.

*Check captain's night orders.

BRIDGE

1. Check fuel and water reports/draft report.
2. Check muster/crew and bridge stations.
3. Check weather reports: wind, barometer.
4. Recheck navigation track laid to destination.
5. Check reports that show which equipment is out of operation.
6. Determine if assistance is needed getting underway.
7. Test steering, including rudder angle indicator and heading indicator with compass.
8. Test ship's whistle.
9. Test radar.
10. Test phone circuits and IMC (general announcing system).
11. Test EOT and throttles in conjunction with engine room.
12. Test running lights and navigation lights.

13. Test gyrocompass with repeaters.
14. Test depth recorder (fathometer).
15. Test general, chemical and collision alarms.
16. Ensure all equipment is on bridge: binoculars, pencils, logs, etc.
17. Switch from shore power to ship's service generator.
18. Set clocks.
19. Set sea detail.
20. Order gangplank taken in.

ENGINE ROOM

1. Prepare fuel and water reports/draft report.
2. Test emergency steering panel.
3. Test all lamp tests on panels to ensure alarm lights are working.
4. Ensure engine motor control center is properly aligned.
5. Test phone circuits and communications with bridge.
6. Test EOT and throttles in conjunction with bridge.
7. Ensure main switchboard is properly aligned.
8. Ensure all piping systems are properly aligned.
9. Store all loose gear and secure cabinets.
10. Set sea detail on command from the master.

2-5.34. Shutdown Procedures

2-5.34.1. Main Engines.

NOTE

Observe FINISHED WITH ENGINE indication on either EOT (1, FIGURE 2-207) for indication that bridge has finished with engine.

a. Rotate the EOT switch (9) to point to FINISHED WITH ENGINE.

b. Press STOP on ERC (62 or 65, FIGURE 2-208).

c. Press the lube oil purifier STOP button on the controller (4, FIGURE 2-209).

d. Press STOP button on lube oil transfer pump (46, FIGURE 2-209).

e. Close all valves in main engine lubricating oil piping system (FIGURE 2-209).

f. Close all valves in main engine fuel oil circulation piping system (FIGURE 2-210).

g. Close all valves in the stern tube lubrication piping system (FIGURE 2-211).

h. Press STOP on the reduction gear cooling water pump motor controller (18, FIGURE 2-212).

i. Close all valves in the main engine/reduction gear cooling water piping system.

2-5.34.2. Gyrocompass.

a. Set RPTR Switch (FIGURE 2213) to OFF position.

b. Set gyrocompass, power converter and battery charger (Breaker 25, FIGURE 2-101, Sheet 8 of 21) on Pilothouse Emergency Distribution Panel EP2 to OFF position.

2-5.34.3. Potable Water System.

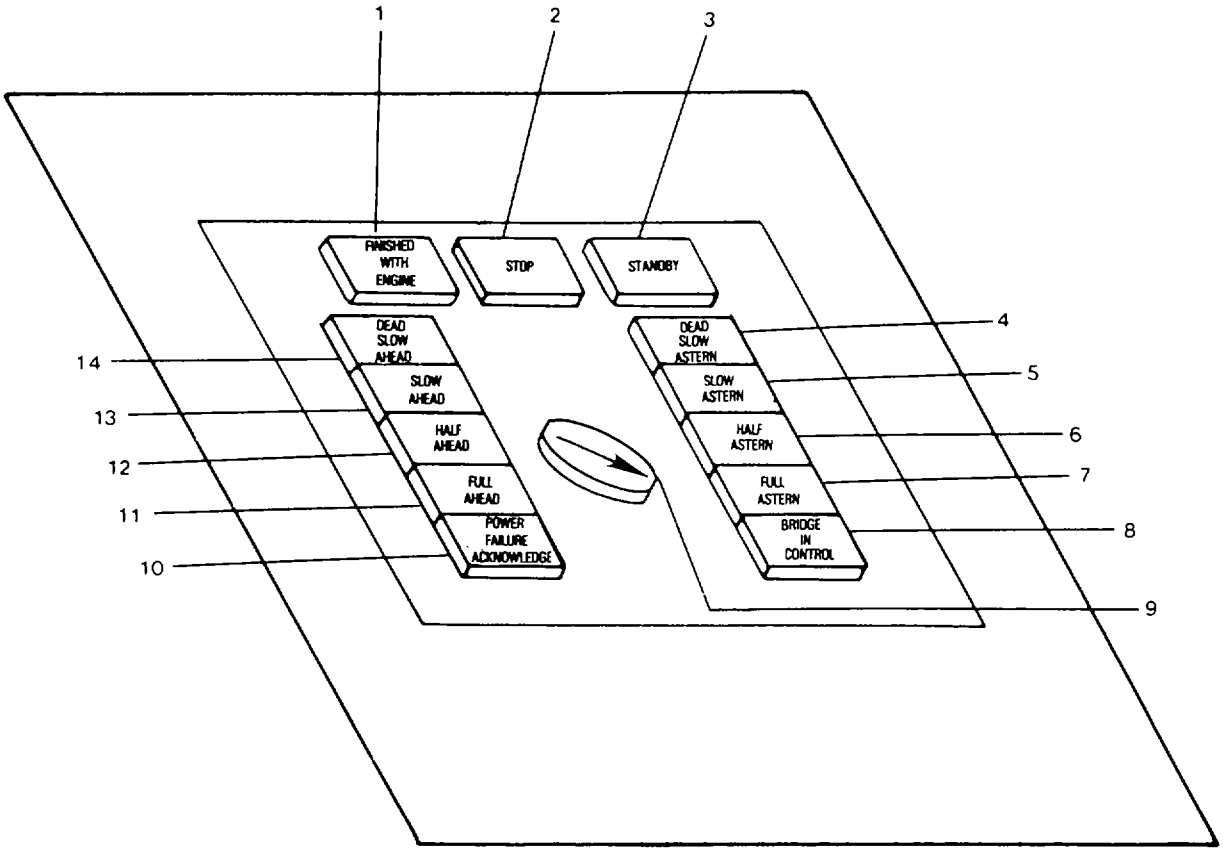
a. Turn hot water circulating pump switch (FIGURE 2-114) in the upper machinery room to OFF.

b. Turn FRESHWATER PRESS SET #1 STBD HAND/OFF/AUTO switch (93, SWITCH 2-215) on Motor Control Center to OFF.

c. Set FRESHWATER PRESS SET #1 STBD circuit breaker (80) to OFF position.

d. Turn motor control center FRESHWATER PRESS SET #2 STBD switch (89, FIGURE 2-215) to OFF.

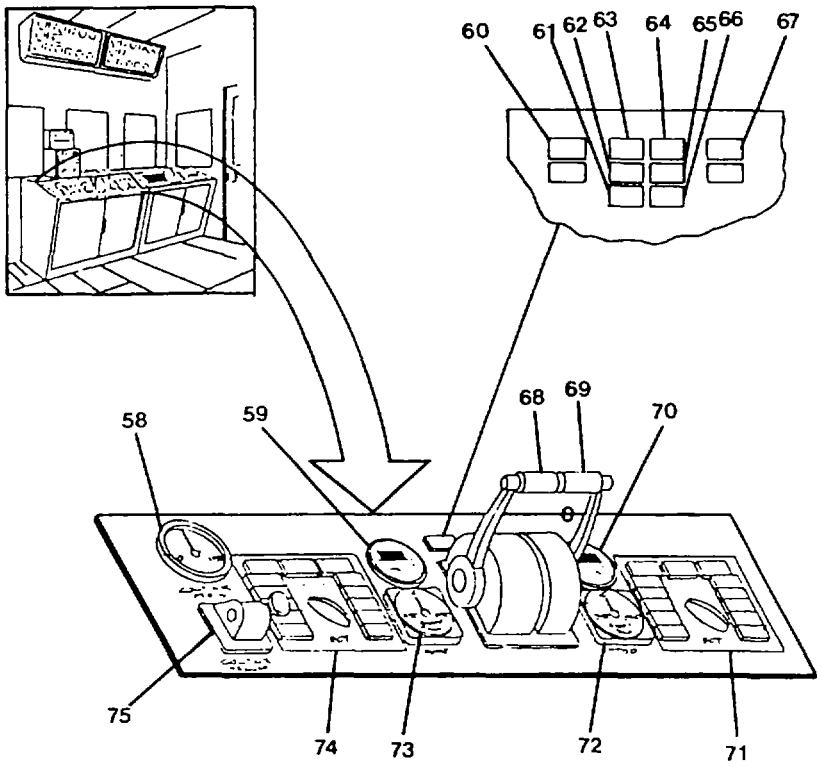
e. Turn FRESHWATER PRESS SET #2 STBD circuit breaker (81) to OFF.



LEGEND

1. FINISHED WITH ENGINE
2. STOP
3. STANDBY
4. DEAD SLOW ASTERN
5. SLOW ASTERN
6. HALF ASTERN
7. FULL ASTERN
8. BRIDGE IN CONTROL
9. EOT SELECTOR SWITCH
10. POWER FAILURE ACKNOWLEDGE
11. FULL AHEAD
12. HALF AHEAD
13. SLOW AHEAD
14. DEAD SLOW AHEAD

FIGURE 2-207. Engine Order Telegraph (EOT).



LEGEND

58. CONT AIR PRESS INDICATOR (NOT LABELED ON SHIP)
59. PORT MAIN ENGINE TACH
60. PORT AUTO SHUTDOWN OVERRIDE
61. P.M.E. EMERGENCY STOP
62. P.M.E. STOP
63. PORT MAIN ENGINE RUNNING
64. STBD MAIN ENGINE RUNNING
65. S.M.E. STOP
66. S.M.E. EMERGENCY STOP
67. STBD AUTO SHUTDOWN OVERRIDE
68. PORT THROTTLE CONTROL LEVER
69. STARBOARD THROTTLE CONTROL LEVER
70. STBD MAIN ENGINE TACH
71. EOT PANEL STBD (SEE SEPARATE PANEL
72. SHAFT RPM STBD
73. SHAFT RPM PORT
74. E.O.T. PORT
75. CONTAIR TRANSF ACTUATOR

FIGURE 2-208. Engine Room Console.

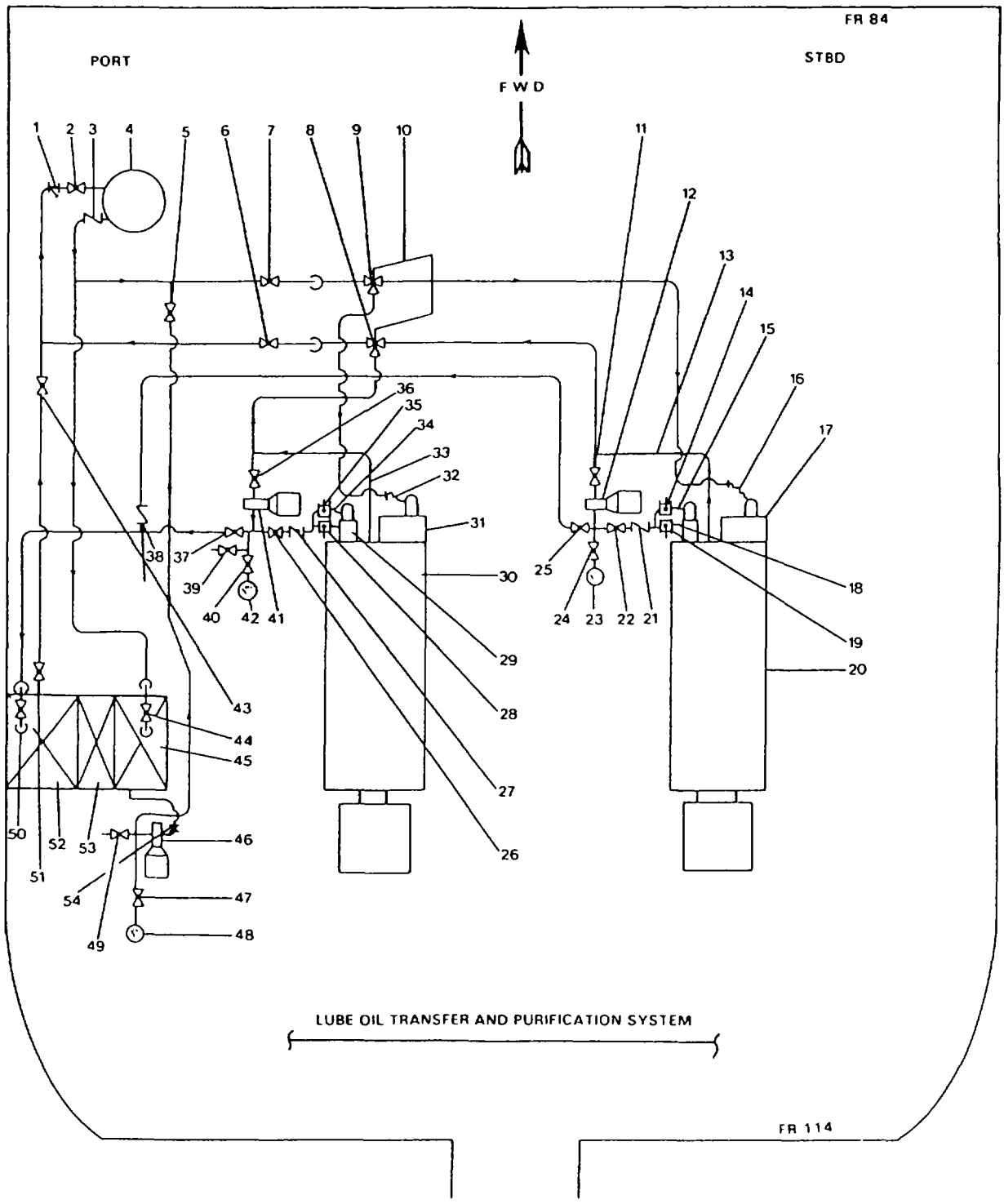
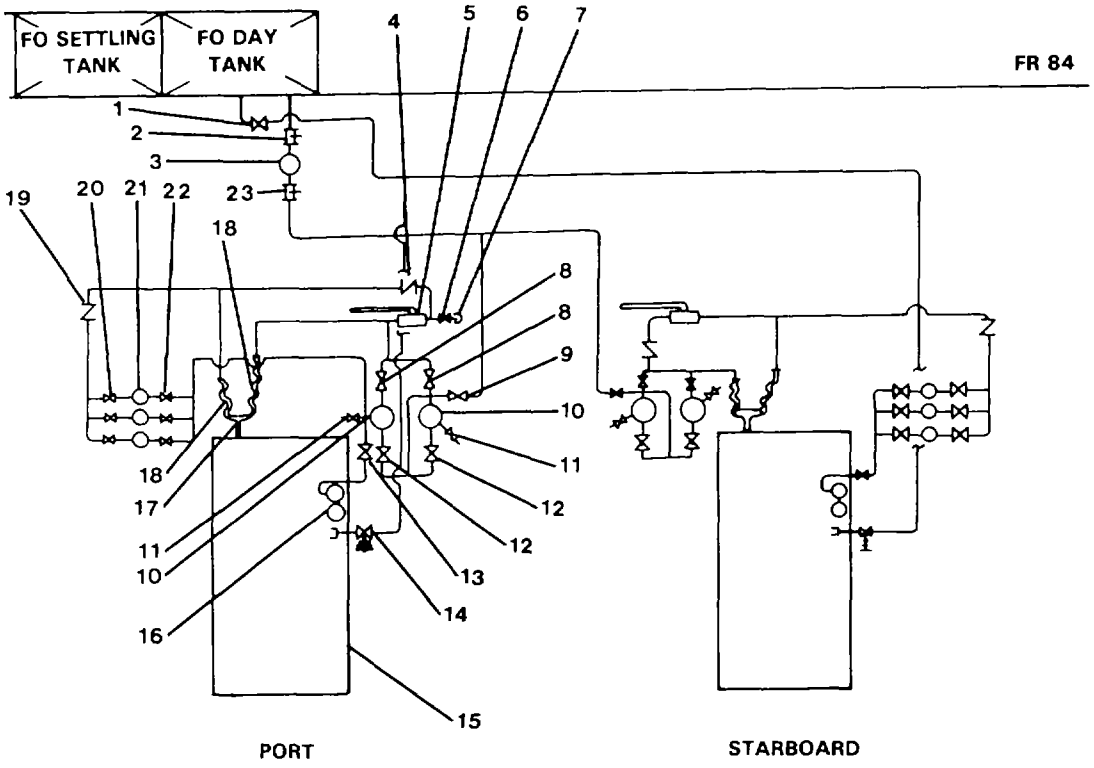


FIGURE 2-209. Lubricating Oil Transfer and Purification Piping System (Sheet 1 of 2).

LEGEND

1. Y TYPE STRAINER
2. LUBE OIL PURIFIER SUCTION VALVE
3. SWING CHECK VALVE
4. LUBE OIL PURIFIER
5. LUBE OIL TRANSFER PUMP DISCHARGE VALVE
6. INLINE STOP VALVE
7. INLINE STOP VALVE
8. THREE WAY SELECTOR VALVE
9. THREE WAY SELECTOR VALVE
10. THREE WAY SELECTOR VALVE OPERATING LEVER
11. STBD PRELUBE PUMP SUCTION VALVE
12. STBD PRELUBE PUMP AND MOTOR
13. STBD MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
14. DISCHARGE VALVE TO STBD MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
15. FLEXIBLE COUPLING
16. FLEXIBLE COUPLING
17. STBD MAIN ENGINE LUBE OIL STRAINER
18. FLEXIBLE COUPLING
19. DISCHARGE VALVE TO STBD MAIN ENGINE LUBRICATING SYSTEM
20. STBD MAIN ENGINE
21. SWING CHECK VALVE
22. STBD PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
23. DISCHARGE PRESSURE GAUGE (0-200 PSI)
24. PRESSURE GAUGE CUTOUT VALVE
25. STBD PRELUBE DISCHARGE VALVE TO LUBE OIL SETTLING TANK
26. PORT PRELUBE PUMP DISCHARGE VALVE TO MAIN ENGINE
27. SWING CHECK VALVE
28. DISCHARGE VALVE TO PORT MAIN ENGINE LUBRICATING SYSTEM
29. FLEXIBLE COUPLING
30. PORT MAIN ENGINE
31. PORT MAIN ENGINE LUBE OIL STRAINER
32. FLEXIBLE COUPLING
33. PORT MAIN ENGINE LUBE OIL SUMP SUCTION PIPE
34. FLEXIBLE COUPLING
35. DISCHARGE VALVE TO PORT MAIN ENGINE LUBE OIL CIRCULATING SYSTEM
36. PORT PRELUBE PUMP SUCTION VALVE
37. PORT PRELUBE PUMP DISCHARGE VALVE TO LUBE OIL SETTLING VALVE
38. SWING CHECK VALVE
39. DRAIN COCK
40. PRESSURE GAUGE CUTOUT VALVE
41. PORT PRELUBE PUMP AND MOTOR
42. PORT PRELUBE DISCHARGE PRESSURE GAUGE (O TO 200 PSI)
43. INLINE STOP VALVE
44. LUBE OIL STORAGE TANK INLET VALVE
45. LUBE OIL STORAGE TANK
46. LUBE OIL TRANSFER PUMP AND MOTOR
47. PRESSURE GAUGE CUTOUT VALVE
48. LUBE OIL TRANSFER PUMP DISCHARGE PRESSURE GAUGE
49. LUBE FAUCET DISCHARGE VALVE
50. LUBE OIL SETTLING TANK INLET VALVE
51. LUBE OIL SETTLING TANK OUTLET VALVE
52. LUBE OIL SETTLING TANK
53. GEAR OIL STORAGE TANK
54. LUBE OIL TRANSFER SUCTION VALVE

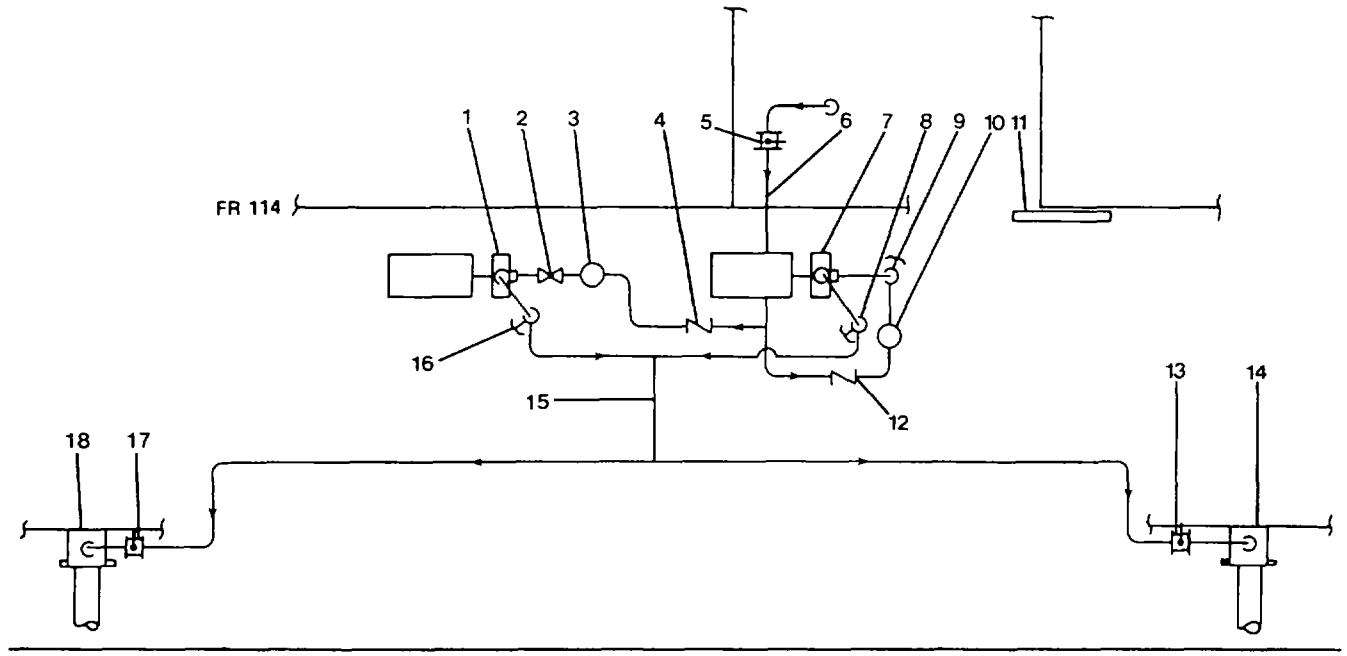
FIGURE 2-209. Lubricating Oil Transfer and Purification Piping System (Sheet 2 of 2).



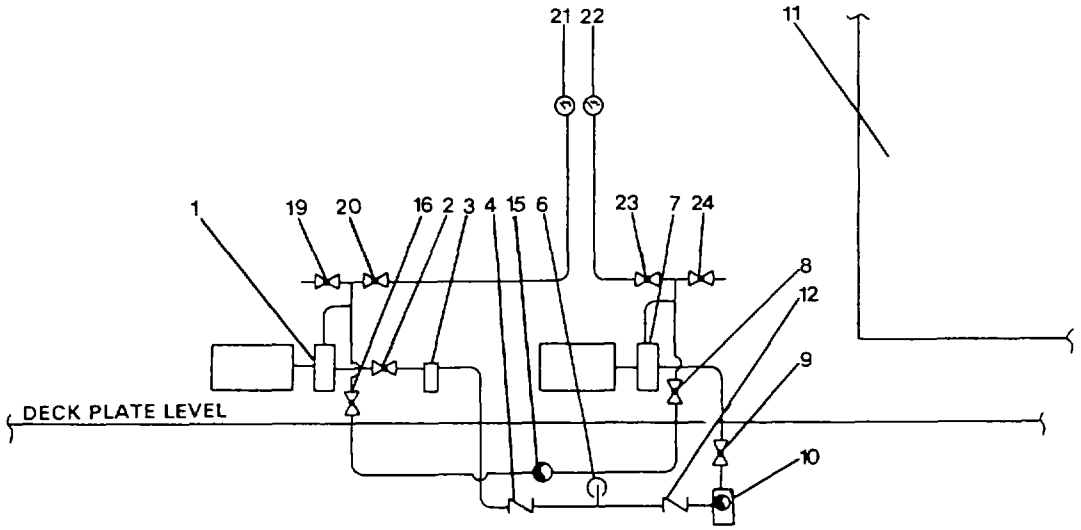
LEGEND:

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL DAY TANK OUTLET VALVE
3. WATER TRAP
4. SWING CHECK VALVE
5. HAND OPERATED PRIMING VALVE
6. FAUCET CUTOUT VALVE
7. FAUCET
8. FUEL OIL STRAINER OUTLET VALVES
9. INLINE STOP VALVE
10. FUEL OIL STRAINER
11. FUEL OIL STRAINER HOUSING DRAIN VALVE
12. FUEL OIL STRAINER INLET VALVES
13. INLINE STOP VALVE
14. RETURN FUEL PRESSURE REGULATING VALVE
15. MAIN ENGINE
16. ENGINE MOUNTED DUPLEX FUEL OIL FILTER
17. MAIN ENGINE FUEL OIL PUMP
18. FLEXIBLE HOSE CONNECTION
19. SWING CHECK VALVE
20. RACOR FUEL OIL FILTER INLET VALVES
21. RACOR FUEL OIL FILTERS
22. RACOR FUEL OIL FILTER OUTLET VALVES
23. INLINE STOP VALVE

FIGURE 2-210. Main Engine Fuel Oil Service Piping System.



STERN TUBE LUBRICATION PIPING SYSTEM
ENGINE ROOM AFT BULKHEAD FRAME 114 LOOKING DOWN



STERN TUBE LUBRICATION PIPING SYSTEM
ELEVATION VIEW AFT BULKHEAD ENGINE ROOM
CENTER LINE LOOKING AFT

FIGURE 2-211. Stern Tube Lubricating Piping System (Sheet 1 of 2).

LEGEND

1. STBD STERN TUBE LUBRICATION PUMP AND MOTOR
2. STBD STERN TUBE LUBRICATION PUMP SUCTION VALVE
3. SUCTION STRAINER
4. SWING CHECK VALVE
5. SEA CHEST SUCTION VALVE
6. STERN TUBE LUBRICATING PUMP SUCTION PIPE
7. PORT STERN TUBE LUBRICATING PUMP AND MOTOR
8. PORT STERN TUBE LUBRICATING PUMP DISCHARGE VALVE
9. PORT STERN TUBE LUBRICATING PUMP SUCTION VALVE
10. SUCTION STRAINER
11. HYDRAULIC OPERATED DOOR
12. SWING CHECK VALVE
13. INLINE STOP VALVE
14. PORT STERN TUBE
15. STERN TUBE LUBRICATING PUMP DISCHARGE PIPE
16. STBD STERN TUBE LUBRICATING PUMP DISCHARGE VALVE
17. INLINE STOP VALVE
18. STBD STERN TUBE
19. STBD STERN TUBE LUBRICATING PUMP VENT VALVE
20. PRESSURE GAUGE CUTOUT VALVE
21. PRESSURE GAUGE (0 TO 100)
22. PRESSURE GAUGE (0 TO 100)
23. PRESSURE GAUGE CUTOUT VALVE
24. PORT STERN TUBE LUBRICATING PUMP VENT VALVE

FIGURE 2-211. Stern Tube Lubricating Piping System (Sheet 2 of 2).

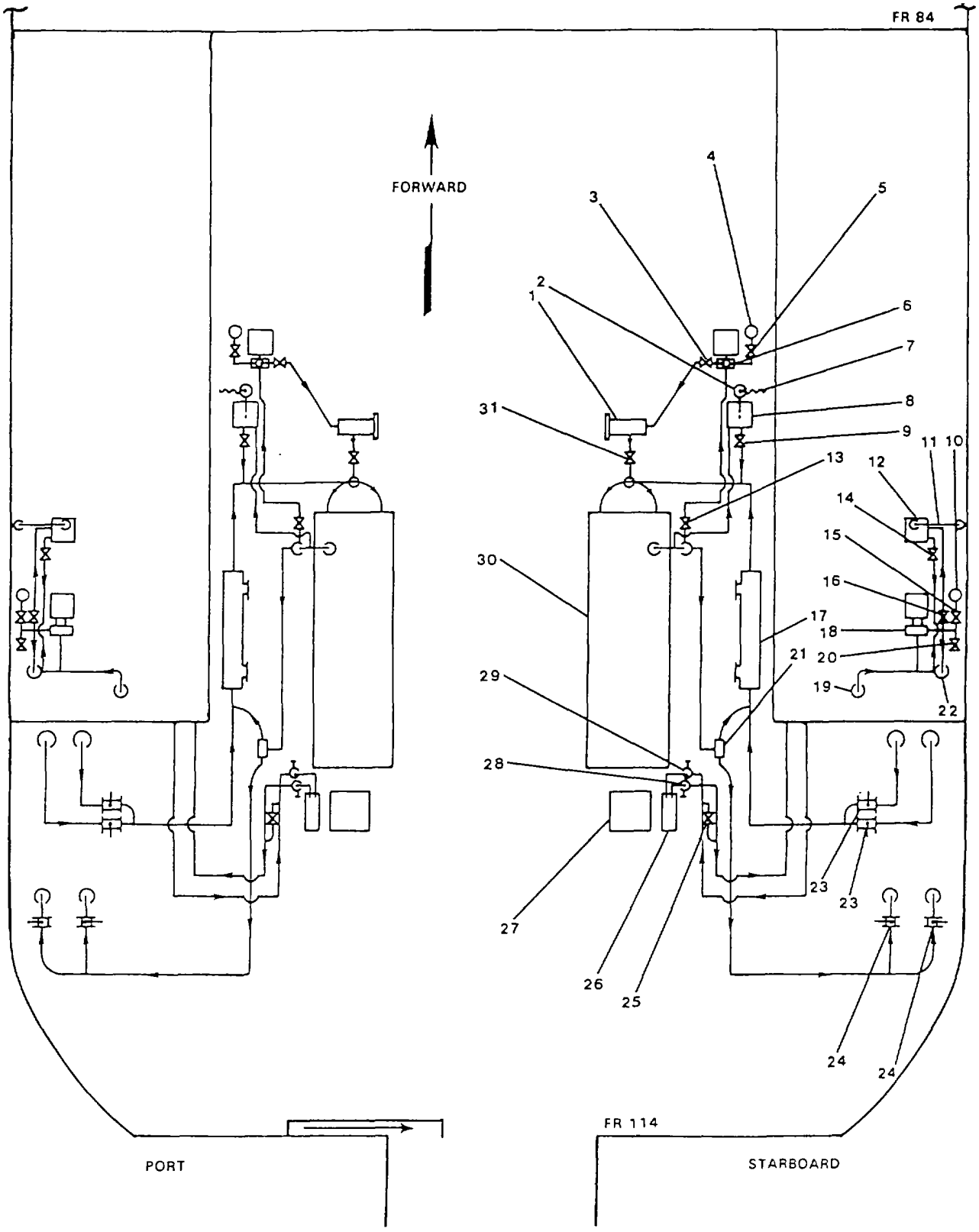


FIGURE 2-212. Reduction Gear Cooling Water Piping System (Sheet 1 of 2).

LEGEND-

1. MAIN ENGINE PREHEATER
2. COOLING WATER EXPANSION TANK LOW LEVEL ALARM
3. PREHEATER CIRCULATING PUMP DISCHARGE VALVE
4. PREHEATER CIRCULATING PUMP DISCHARGE PRESSURE GAUGE 10 TO 200 PSII
5. GAUGE CUTOUT VALVE
6. PREHEATER CIRCULATING PUMP AND MOTOR
7. LOW LEVEL ALARM ELECTRICAL LEAD
8. COOLING WATER EXPANSION TANK
9. EXPANSION TANK DISCHARGE VALVE
10. REDUCTION GEAR COOLING WATER PUMP DISCHARGE PRESSURE GAUGE (O TO 100 PSI)
11. EXPANSION TANK OVERFLOW PIP TO BILGES
12. REDUCTION GEAR COOLING WATER EXPANSION TANK
13. PREHEATER CIRCULATING PUMP SUCTION VALVE
14. REDUCTION GEAR COOLING WATER EXPANSION TANK DISCHARGE VALVE
15. PRESSURE GAUGE CUTOUT VALVE
16. REDUCTION GEAR COOLING WATER SYSTEM VENT VALVE
17. MAIN ENGINE LUBE OIL COOLER
18. REDUCTION GEAR COOLING WATER PUMP AND MOTOR
19. REDUCTION GEAR COOLING WATER SUCTION PIP FROM KEEL COOLERS
20. DRAIN COCK
21. THERMOSTATICALLY OPERATED KEEL COOLER BYPASS VALVE (AMOT)
22. REDUCTION GEAR COOLING WATER PUMP DISCHARGE PIPE
23. MAIN ENGINE COOLING WATER SUCTION VALVES FROM KEEL COOLER
24. MAIN ENGINE COOLING WATER DISCHARGE VALVES TO KEEL COOLER
25. REDUCTION GEAR COOLING WATER BYPASS VALVE
26. REDUCTION GEAR LUBE OIL COOLER
27. MAIN ENGINE REDUCTION GEAR
28. REDUCTION GEAR COOLING WATER SUCTION VALVE FROM KEEL COOLER
29. REDUCTION GEAR COOLING WATER DISCHARGE VALVE TO KEEL COOLER
30. MAIN ENGINE
31. MAIN ENGINE PREHEATER SUCTION VALVE

FIGURE 2-212. Reduction Gear Cooling Water Piping System (Sheet 2 of 2).

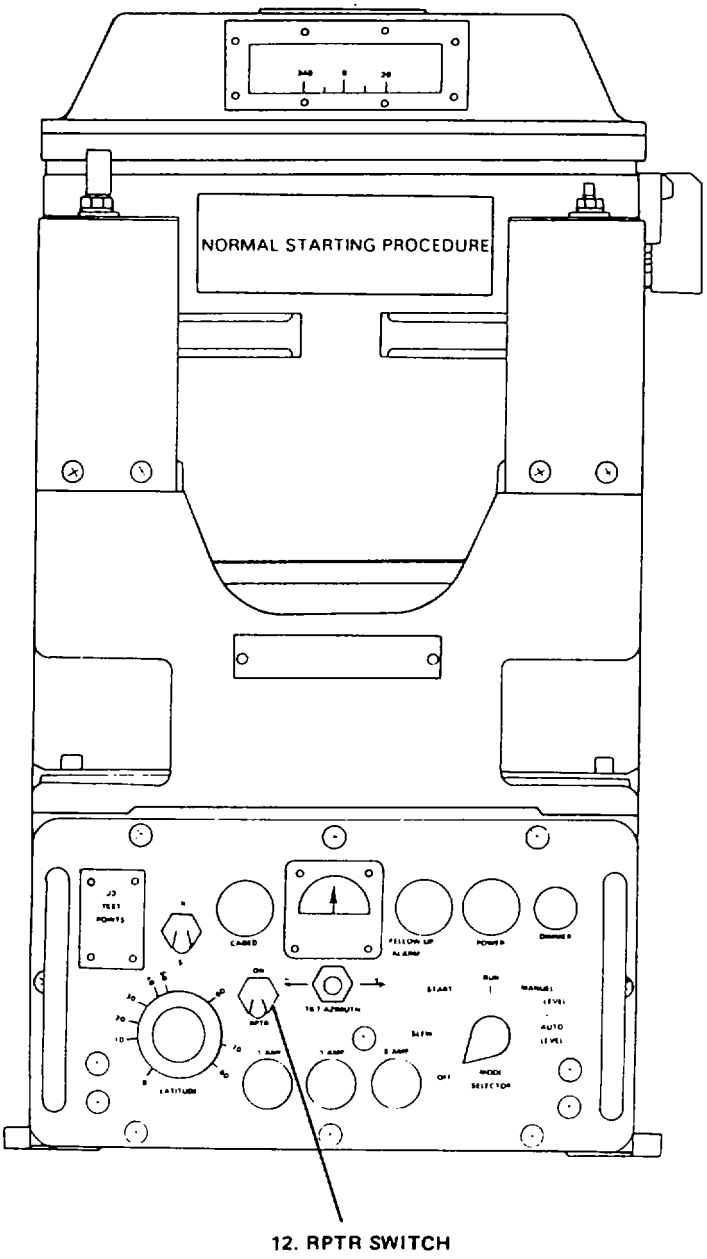


FIGURE 2-213. Gyrocompass MARK 27 MOD 1 Electronic Control Panel.

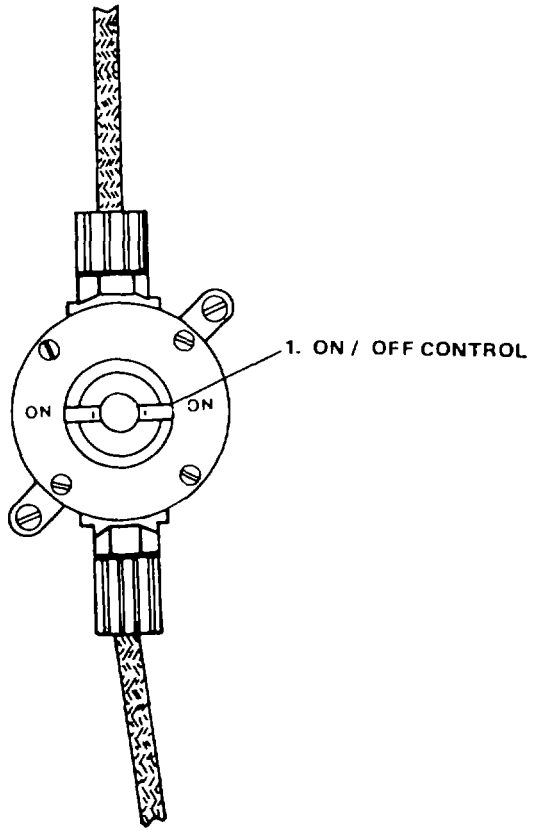


FIGURE 2-214. Hot Water Circulating Pump Switch - Upper Machinery Room.

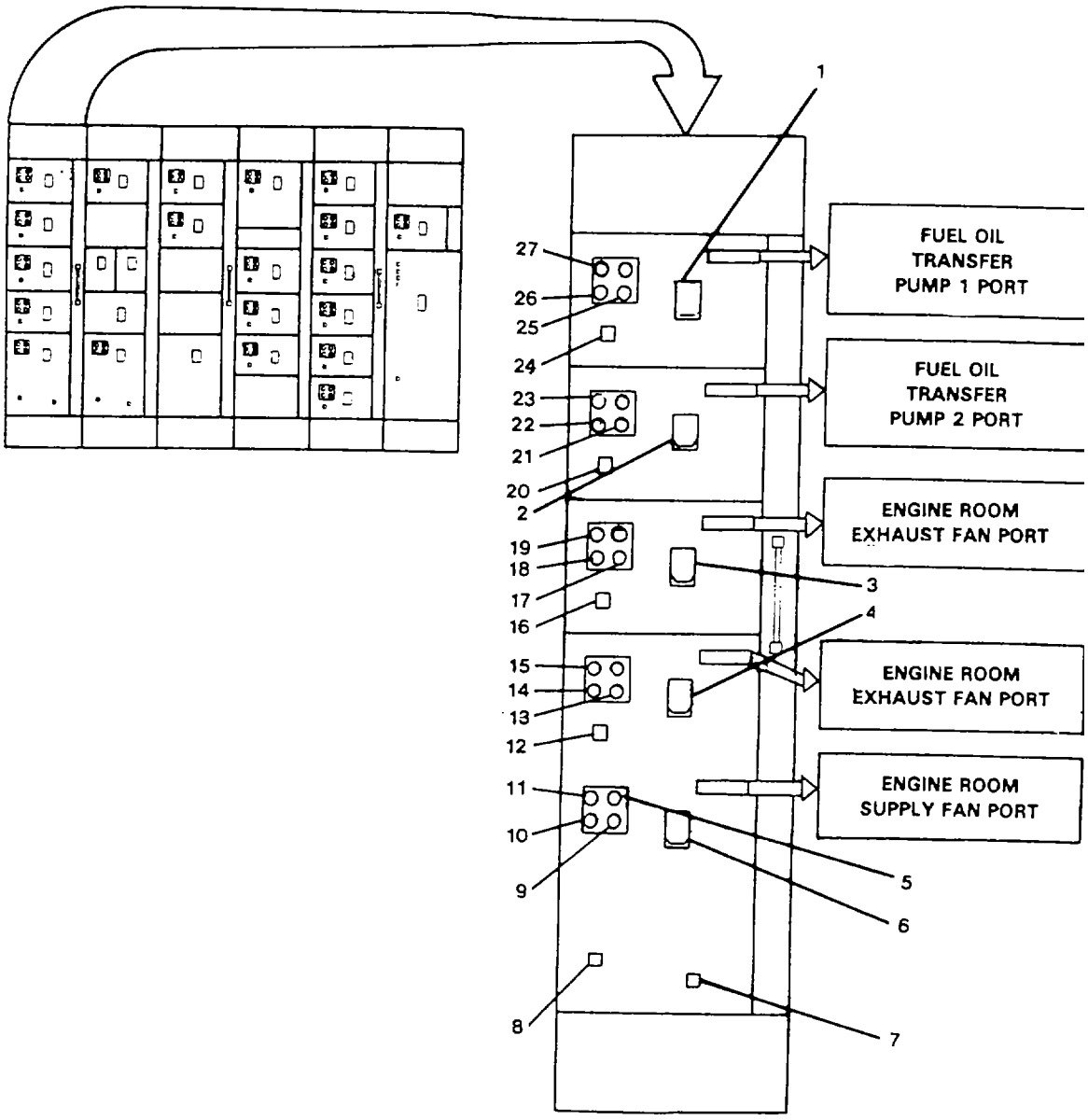


FIGURE 2-215. Engine Room Motor Control Center (Sheet 1 of 7).

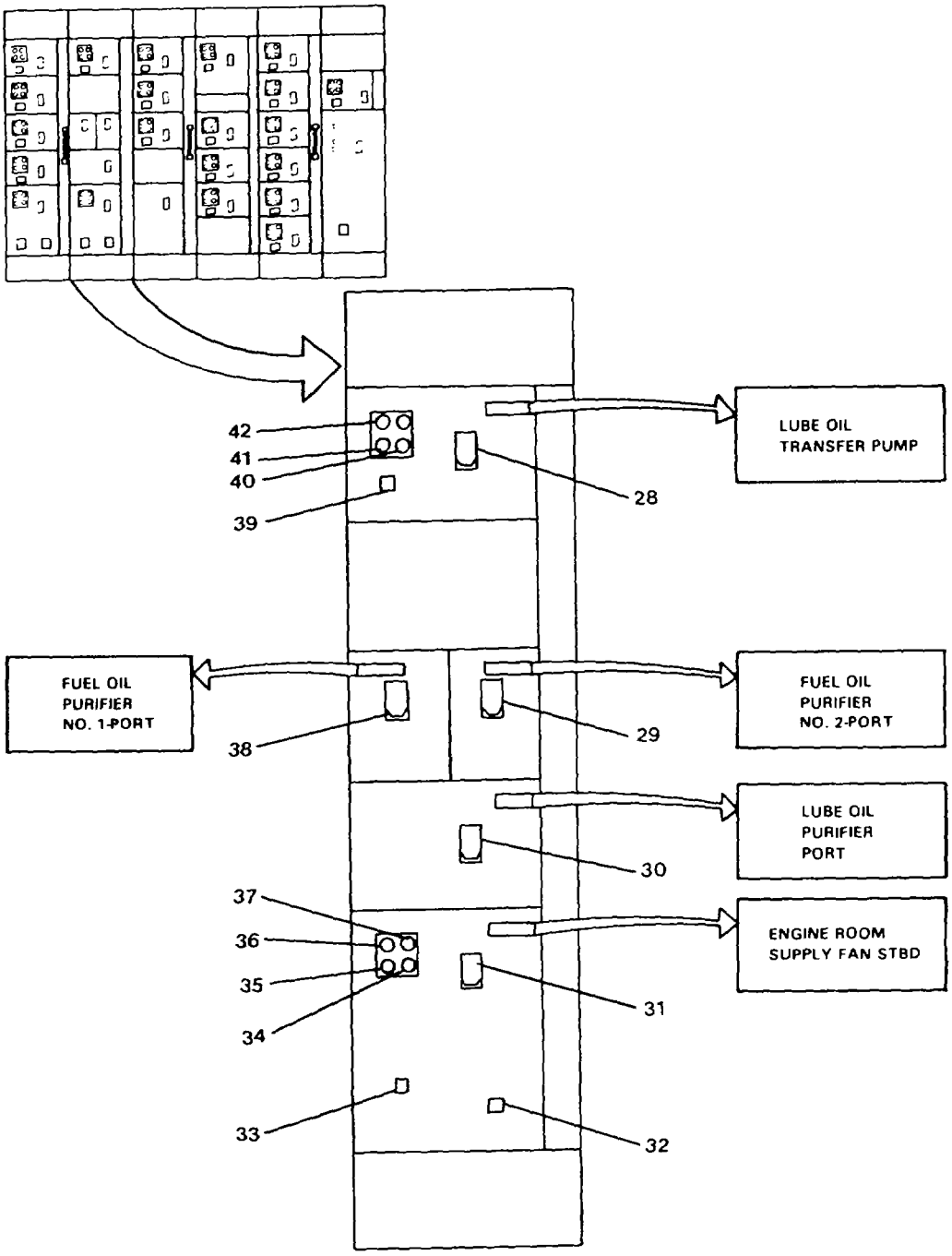


FIGURE 2-215. Engine Room Motor Control Center (Sheet 2 of 7).

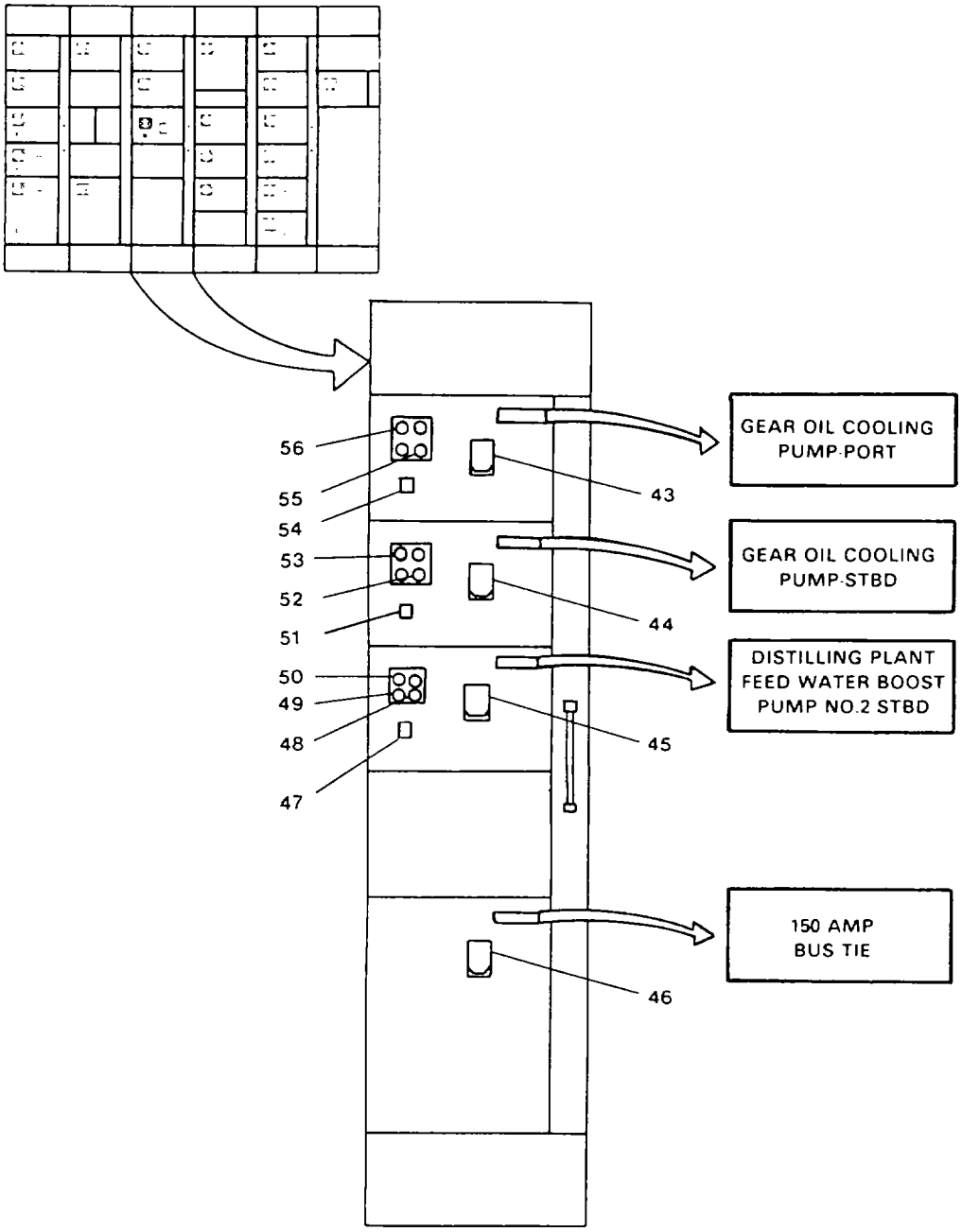


FIGURE 2-215. Engine Room Motor Control Center (Sheet 3 of 7).

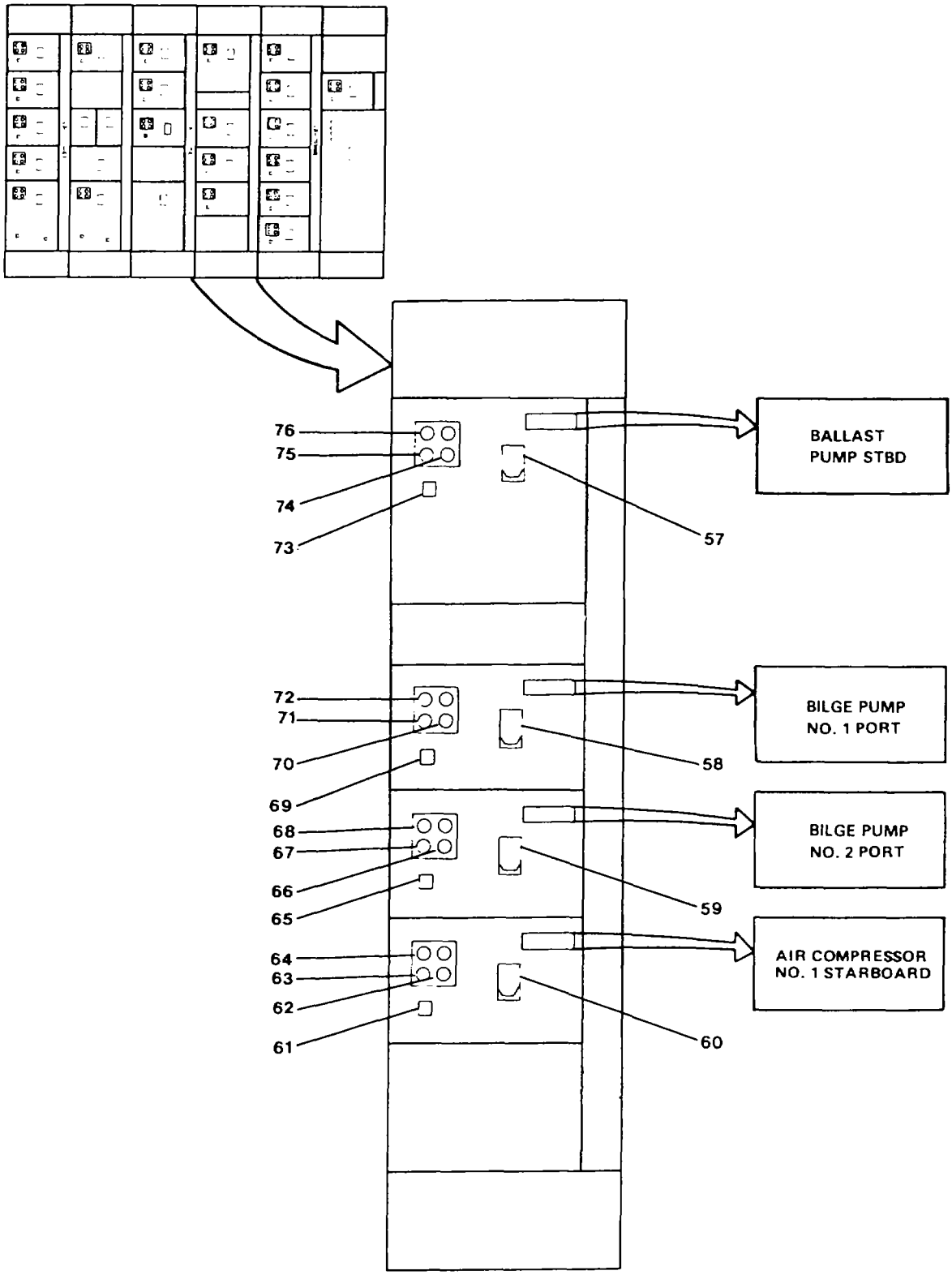


FIGURE 2-215. Engine Room Motor Control Center (Sheet 4 of 7).

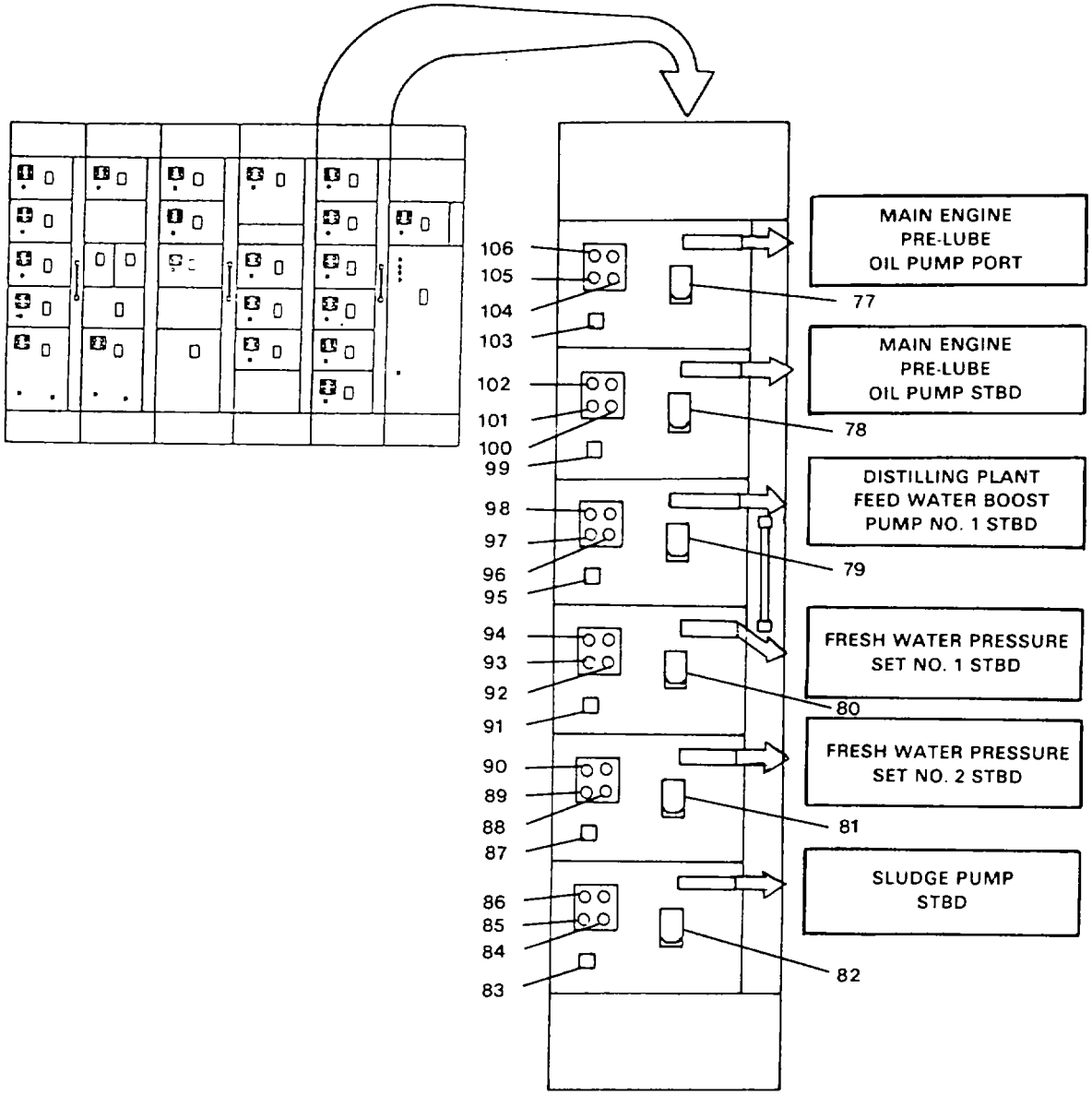


FIGURE 2-215. Engine Room Motor Control Center (Sheet 5 of 7).

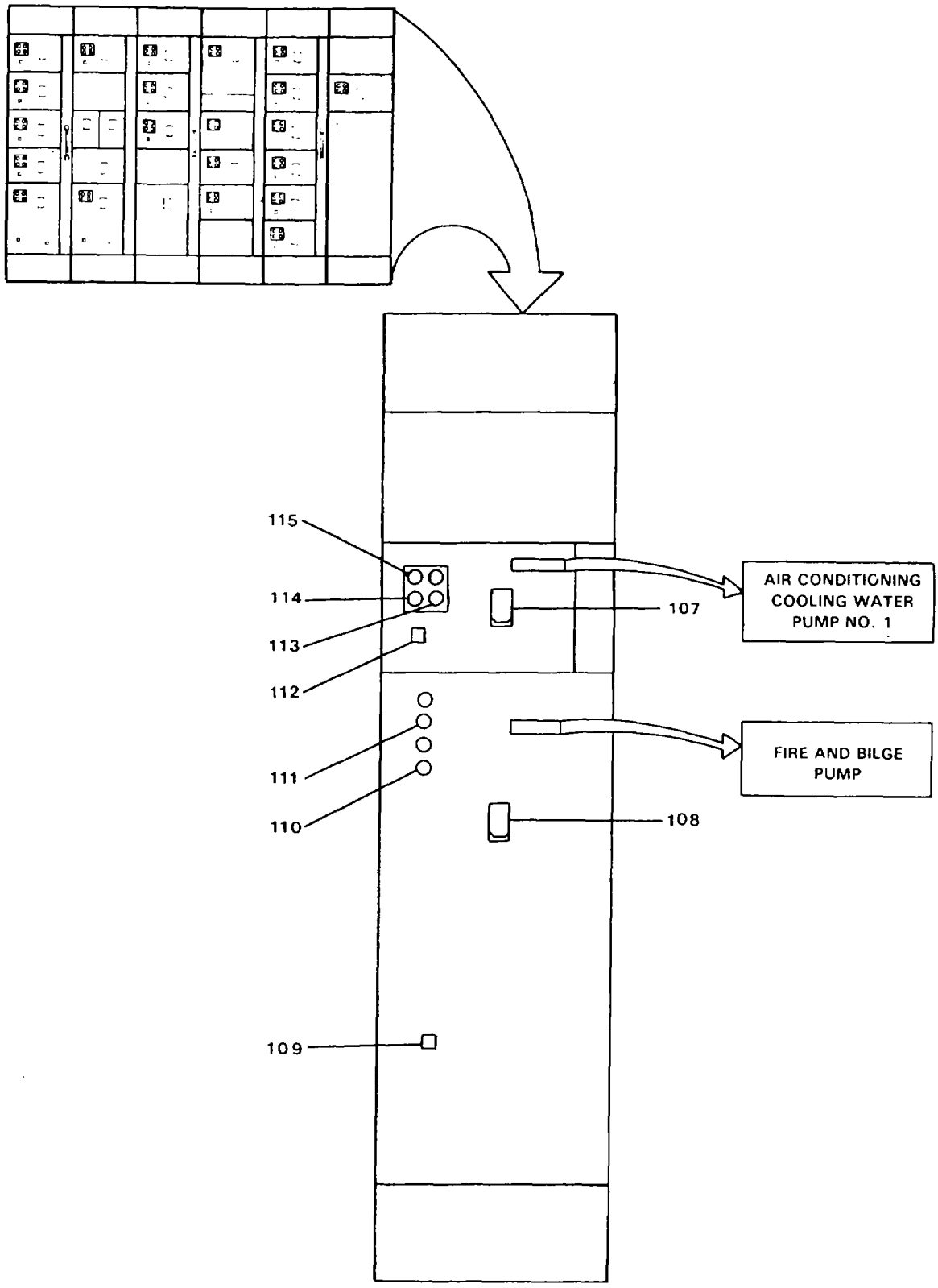


FIGURE 2-215. Engine Room Motor Control Center (Sheet 6 of 7).

LEGEND

1. CIRCUIT BREAKER (15 AMP)
2. CIRCUIT BREAKER (15 AMP)
3. CIRCUIT BREAKER (15 AMP)
4. CIRCUIT BREAKER (15 AMP)
5. SLOW RUN
6. CIRCUIT BREAKER (40 AMP)
7. RESET PUSHBUTTON
8. RESET PUSHBUTTON
9. STOP SLOW FAST
10. UV RESET
11. FAST RUN
12. RESET PUSHBUTTON
13. STOP
14. START
15. ON
16. RESET PUSHBUTTON
17. STOP
18. START
19. ON
20. RESET PUSHBUTTON
21. STOP
22. START
23. ON
24. RESET PUSHBUTTON
25. STOP
26. START
27. ON
28. CIRCUIT BREAKER 1(15 AMP)
29. CIRCUIT BREAKER 1(15 AMPI
30. CIRCUIT BREAKER 1(15 AMP)
31. CIRCUIT BREAKER (40 AMP)
32. RESET PUSHBUTTON
33. RESET PUSHBUTTON
34. STOP SLOW FAST
35. UV RESET
36. FAST RUN
37. SLOW RUN
38. CIRCUIT BREAKER (15 AMP)
39. RESET PUSHBUTTON
40. STOP
41. START
42. ON
43. CIRCUIT BREAKER (15 AMP)
44. CIRCUIT BREAKER (15 AMP)
45. CIRCUIT BREAKER (15 AMP)
46. CIRCUIT BREAKER (150 AMPI
47. RESET PUSHBUTTON
48. STOP PUSHBUTTON
49. START PUSHBUTTON
50. ON
51. RESET PUSHBUTTON
52. HAND-OFF-AUTO
53. ON
54. RESET PUSHBUTTON
55. HAND-OFF-AUTO
56. ON
57. CIRCUIT BREAKER (70 AMP)
58. CIRCUIT BREAKER (110 AMP)
59. CIRCUIT BREAKER (110 AMPI
60. CIRCUIT BREAKER (25 AMP)
61. RESET PUSHBUTTON
62. HAND-OFF-AUTO
63. UV RESET
64. ON
65. RESET PUSHBUTTON
66. STOP
67. START
68. ON
69. RESET PUSHBUTTON
70. STOP
71. START
72. ON
73. RESET PUSHBUTTON
74. STOP
75. START
76. ON
77. CIRCUIT BREAKER (15 AMP)
78. CIRCUIT BREAKER (15 AMP)
79. CIRCUIT BREAKER (15 AMP)
80. CIRCUIT BREAKER (15 AMP)
81. CIRCUIT BREAKER (15 AMP)
82. CIRCUIT BREAKER (15 AMP)
83. RESET PUSHBUTTON
84. STOP
85. START
86. ON
87. RESET PUSHBUTTON
88. HAND-OFF-AUTO
89. UV RESET
90. ON
91. RESET PUSHBUTTON
92. HAND-OFF-AUTO
93. UV RESET
94. ON
95. RESET PUSHBUTTON
96. STOP
97. START
98. ON
99. RESET PUSHBUTTON
100. STOP
101. START
102. ON
103. RESET PUSHBUTTON
104. STOP
105. START
106. ON
107. CIRCUIT BREAKER (20 AMP)
108. CIRCUIT BREAKER (110 AMP)
109. RESET PUSHBUTTON
110. OFF-ON
111. RUN
112. RESET PUSHBUTTON
113. STOP
114. START
115. ON

FIGURE 2-215. Engine Room Motor Control Center (Sheet 7 of 7).

f. Set DISTILLING PLANT FEED WATER BOOST PUMP STBD switch (97) to OFF and circuit breaker (79) to OFF.

g. Set DISTILLING PLANT FEEDWATER BOOST PUMP STBD switch (49) to OFF and circuit breaker (45) to OFF.

2-5.34.4. Engine Room Motor Control Center. (FIGURE 2-215)

a. Set FUEL OIL TRANSFER PUMP #1 PORT switch (26) and circuit breaker (1) to OFF.

b. Set LUBE OIL TRANSFER PUMP switch (41) and circuit breaker (28) to OFF.

c. Set fuel oil purifier #1 port circuit breaker (38) to OFF.

d. Set fuel oil purifier #2 port circuit breaker (29) to OFF.

e. Set fuel oil purifier port circuit breaker (30) to OFF.

f. Set gear oil cooling pump port switch (56) to OFF and circuit breaker (43) to OFF.

g. Set gear oil cooling pump STBD switch (53) and circuit breaker (44) to OFF.

h. Set main engine pre-lube pump oil pump port switch (104) and circuit breaker (77) to OFF.

i. Set main engine pre-lube oil pump STBD switch (100) and circuit breaker (78) to OFF.

j. Set SLUDGE PUMP STBD switch (85) and circuit breaker (22) to OFF.

k. Set air conditioning cooling water pump Number 1 switch (114) and circuit breaker (107) to OFF.

l. Set ballast pump STBD switch (75) and circuit breaker (57) to OFF.

m. Set bilge pump Number 1 port switch (71) and circuit breaker (58) to OFF.

n. Set bilge pump Number 2 port switch (67) and circuit breaker (59) to OFF.

o. Set AIR COMP Number 1 STBD switch (63) and circuit breaker (60) to OFF.

2-5.34.5. Compressed Air System. Close all valves in compressed air system. Refer to FIGURES 2-216 and 2-217.

2-5.34.6. Emergency Switchboard. Set GENCKT BKR control switch MAN-OFF-AUTO (11, FIGURE 2-218) to OFF.

2-5.34.7. Generator Number 2.

a. Set GEN #2 power switch (41, FIGURE 2-219) to OFF. Hold until generator stops operating.

b. Set GENERATOR #2 circuit breaker (61) to OFF.

2-5.34.8. Generator Number 1.

a. Set GEN #1 power switch (45, FIGURE 2-219) to OFF. Hold until generator stops operating.

b. Set GENERATOR #1 circuit breaker (62) to OFF.

c. Shift metal locking bar (50) to left.

d. Set shore power circuit breaker (51) to ON. Observe shore power light (6) is lit.

e. Close all valves in fuel oil system piping. Refer to FIGURE 2-209.

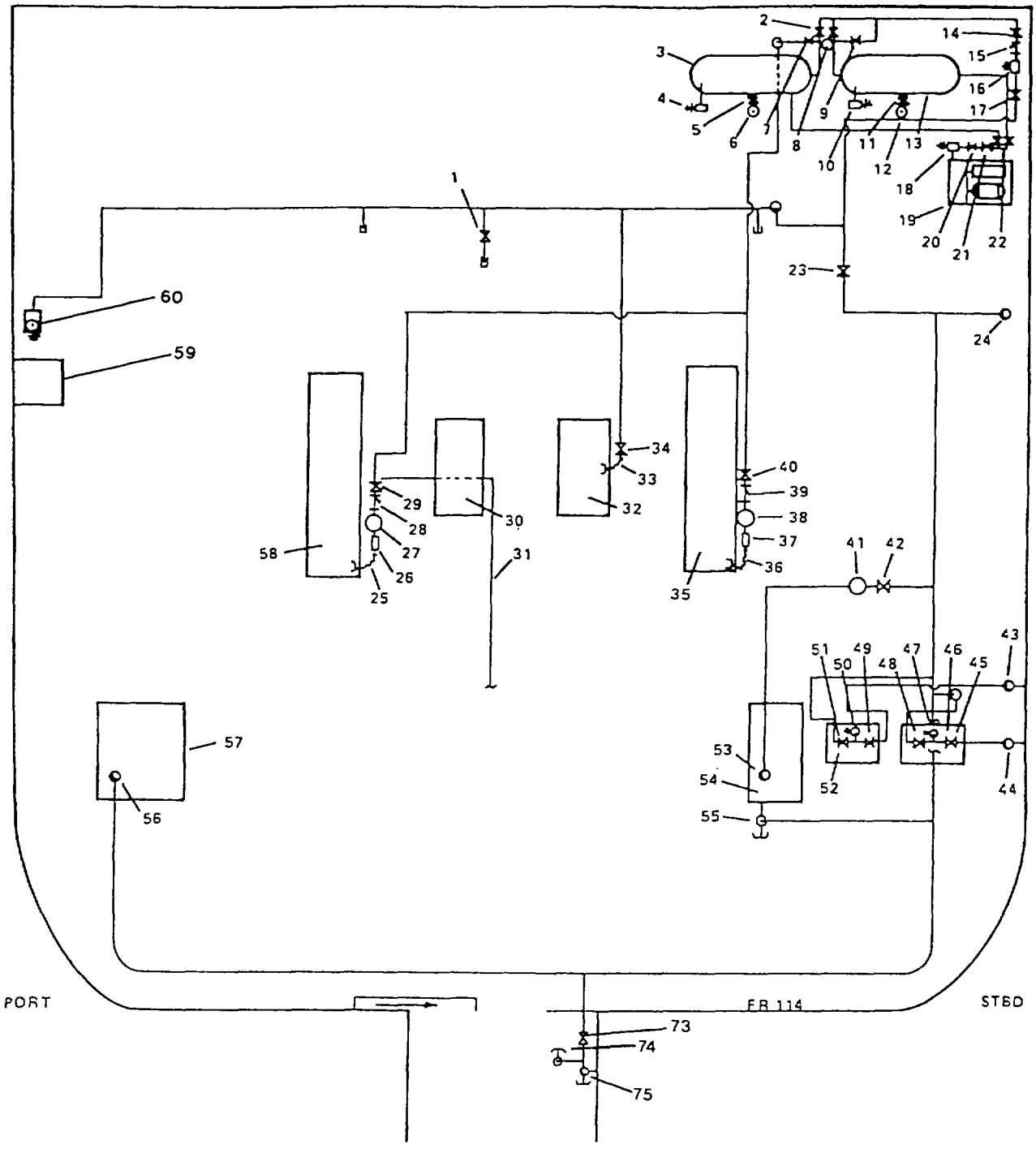
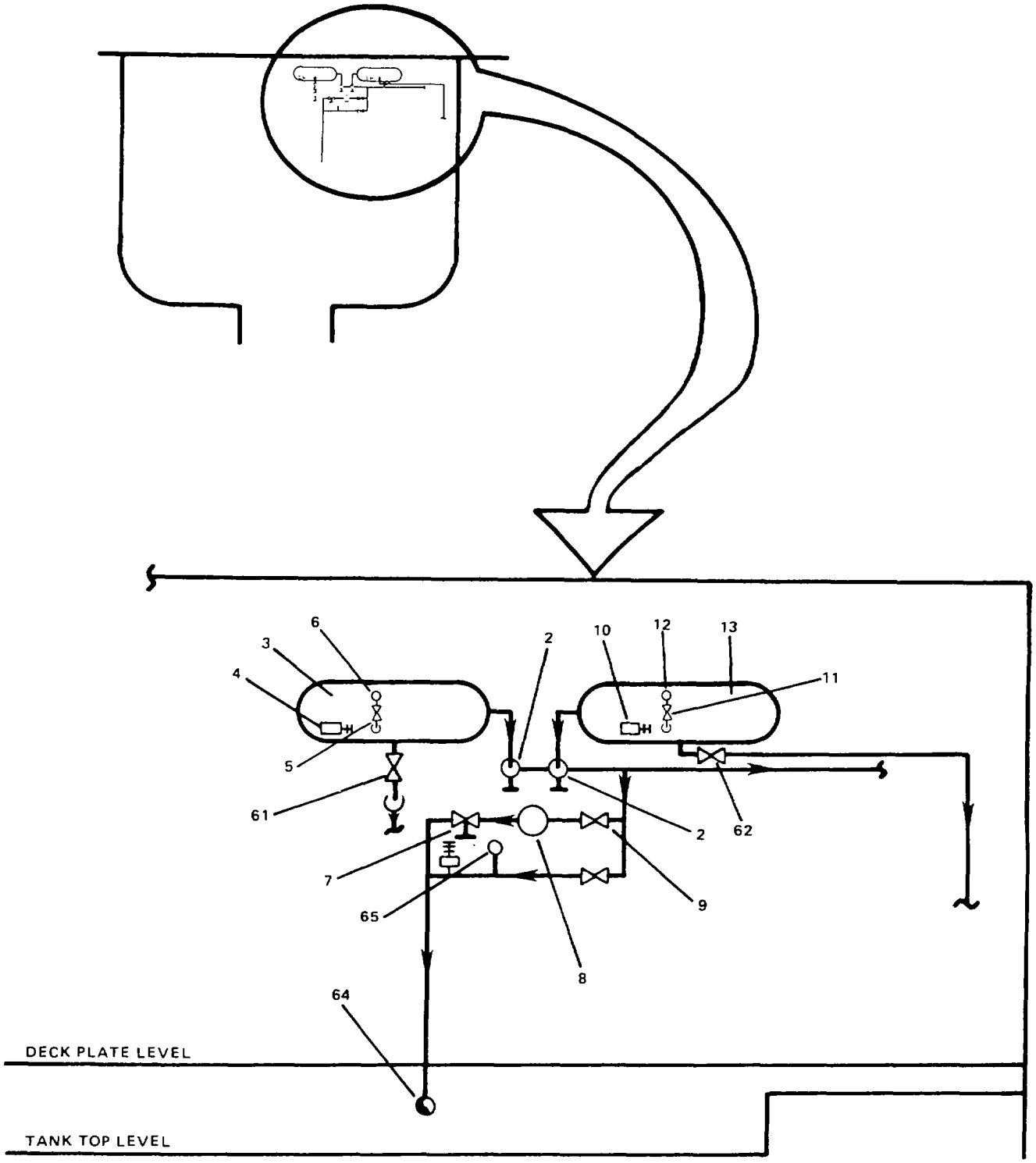


FIGURE 2-216. Compressed Air Piping System (Sheet 1 of 4).



MAIN ENGINE STARTING AIR REDUCING STATION
ENGINE ROOM FWD BULKHEAD FRAME 84 STBD SIDE

FIGURE 2-216. Compressed Air Piping System (Sheet 2 of 4).

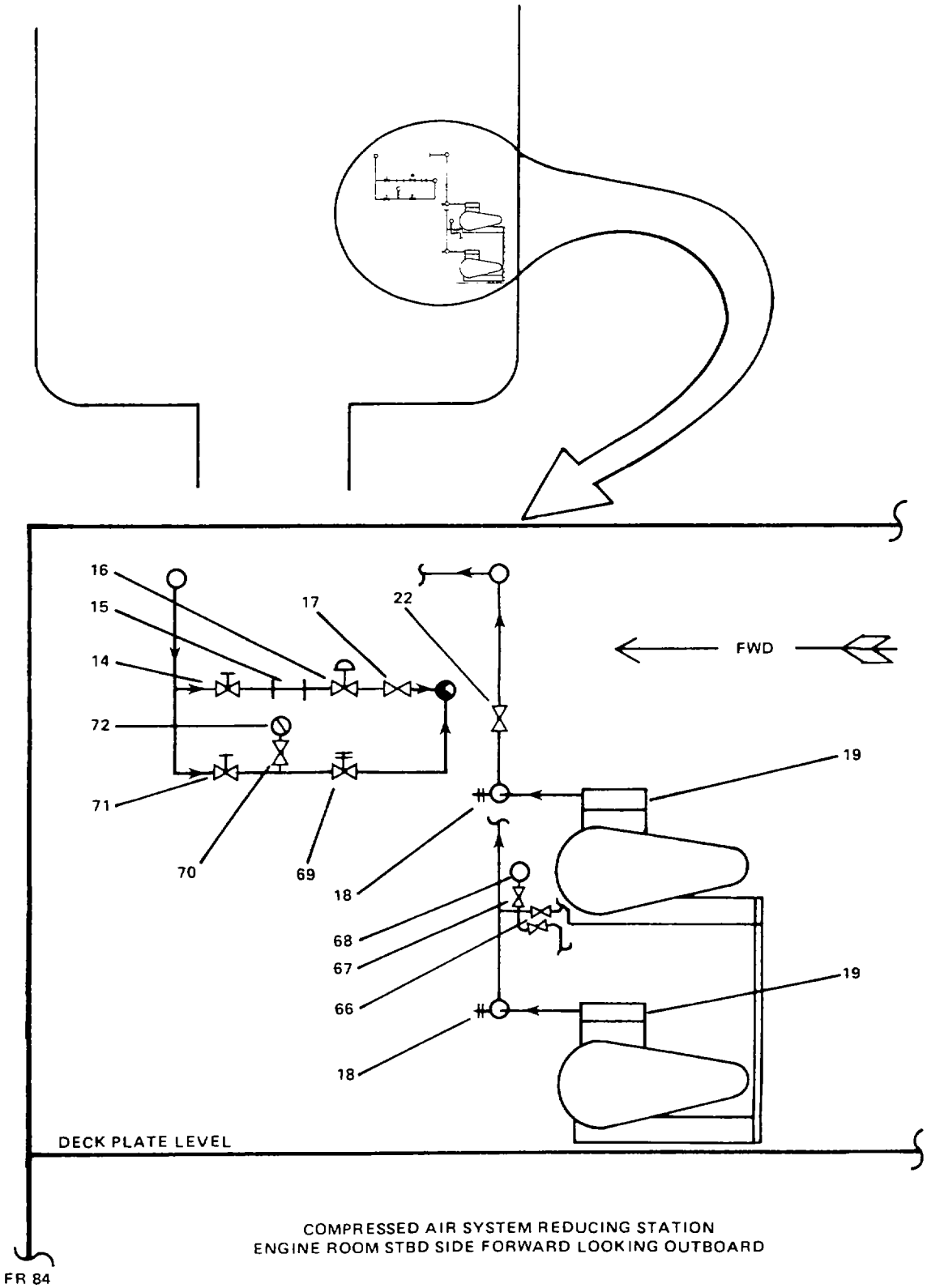
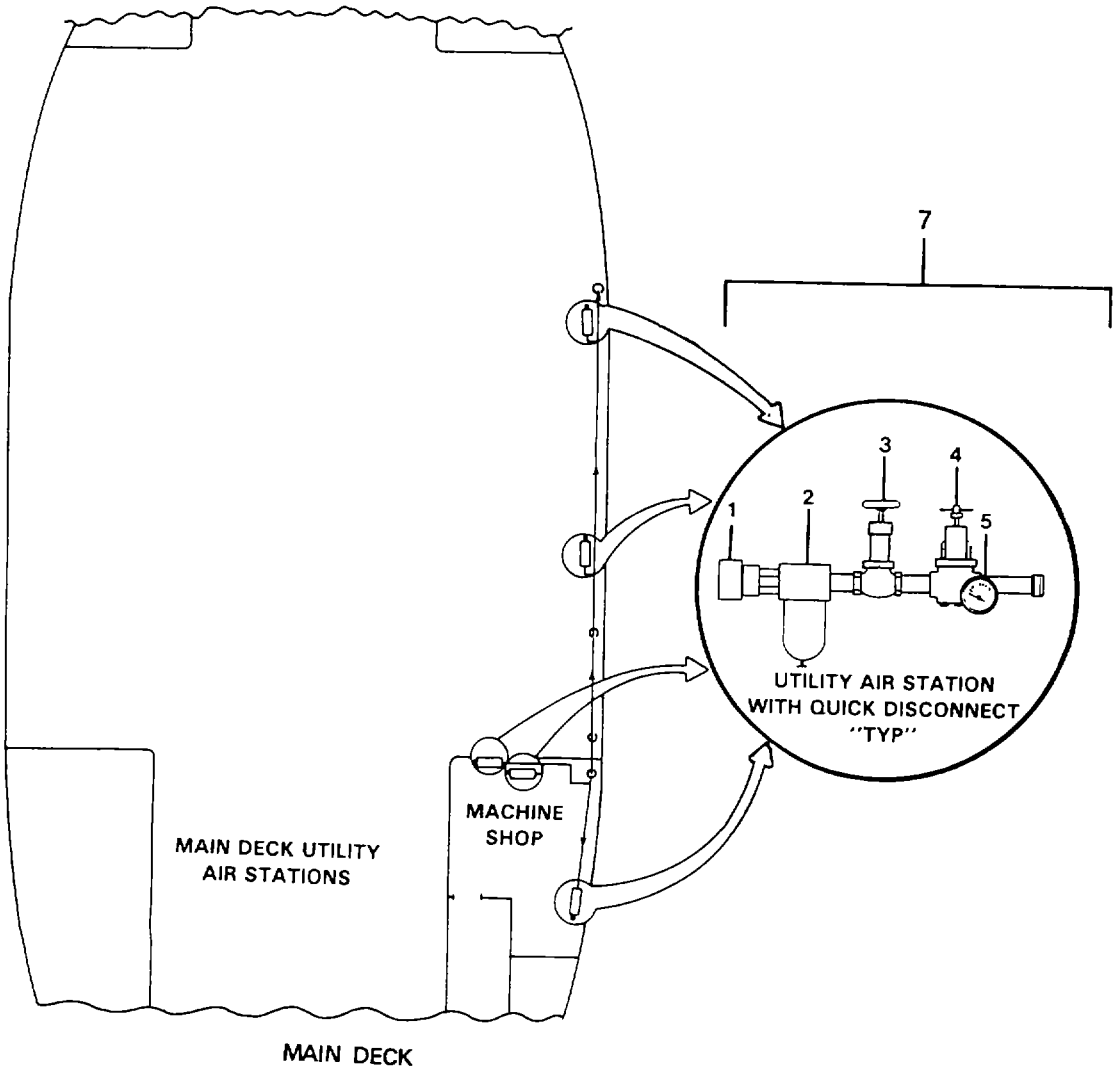


FIGURE 2-216. Compressed Air Piping System (Sheet 3 of 4).

LEGEND

1. RESERVE AIR OUTLET
2. #1 AND ,2 AIR RECEIVER OUTLET VALVES
3. #2 AIR RECEIVER
4. #2 AIR RECEIVER PRESSURE RELIEF VALVE SET AT 275 PSI
5. PRESSURE GAUGE CUTOUT VALVE
6. #1 AIR RECEIVER PRESSURE GAUGE 0 TO 300 PSI
7. MAIN ENG STARTING AIR STATION OUTLET VALVE
8. MAIN ENGINE STARTING AIR STATICN REDUCING AIR VALVE
9. MAIN ENGINE STARTING AIR STATION INLET VALVE
10. #1 AIR RECEIVER PRESSURE RELIEF VALVE SET AT 275 PSI
11. PRESSURE GAUGE CUTOUT VALVE
12. #1 AIR RECEIVER PRESSURE GAUGE (O TO 3001
13. #1 AIR RECEIVER
14. COMPRESSED AIR REDUCING STATION INLET VALVE
15. COMPRESSED AIR REDUCING STATION "Y" TYPE STRAINER
16. COMPRESSED AIR REDUCING STATION REDUCING VALVE
17. COMPRESSED AIR REDUCING STATION OUTLET VALVE
18. AIR COMPRESSOR RELIEF VALVE SET AT 275 PSI
19. SHIP SERVICE AIR COMPRESSOR
20. SWING CHECK VALVE
21. SHIP SERVICE AIR COMPRESSOR DISCHARGE VALVE
22. #1 AND #2 AIR RECEIVER INLET VALVES
23. INLINE STOP VALVE
24. COMPRESSED AIR DISCHARGE PIPE TO MAIN DECK
25. FLEXIBLE COUPLING
26. MAIN ENGINE STARTING AIR RELAY VALVE
27. MAIN ENG STARTER LUBRICATOR
28. "Y" TYPE STRAINER
29. PORT MAIN ENGINE STARTING AIR CUTOUT VALVE
30. PORT S.S.D.
31. COMPRESSED AIR DISCHARGE PIPE TO CONTROL AIR STATION
32. STBD S.S.D. GENERATOR
33. FLEXIBLE COUPLING
34. STBD S.S.D. GENERATOR STARTING AIR CUTOUT VALVE
35. STBD MAIN ENGINE
36. FLEXIBLE COUPLING
37. STBD MAIN ENG STARTING AIR RELAY VALV-E
38. STBD MAIN ENG STARTER LUBRICATOR
39. "Y" TYPE STRAINER
40. STBD MAIN ENG STARTING AIR CUTOUT VALVE
41. INLINE AIR STRAINER
42. INLINE STOP VALVE
43. LOW SEA CHEST VENT PIPE
44. HIGH SEA CHEST VENT PIPE
45. HIGH SEA CHEST VENT VALVE
46. HIGH SEA CHEST
47. HIGH SEA CHEST BLOW DOWN VALVE
48. INLINE STOP VALVE
49. LOW SEA CHEST VENT VALVE
50. LOW SEA CHEST BLOW DOWN VALVE
51. INLINE STOP VALVE
52. LOW SEA CHEST
53. COMPRESSED AIR DISCHARGE PIPE TO PILOT HOUSE
54. STBD MAIN ENG AND S.S.D. GENERATOR EXHAUST PIPE UPTAKE SPACE
55. UTILITY AIR OUTLET WITH QUICK DISCONNECT
56. COMPRESSED AIR DISCHARGE PIPE TO BRIDGE DECK
57. PORT MAIN ENG AND S.S.D. GENERATOR EXHAUST PIPE UPTAKE SPACE
58. PORT MAIN ENGINE
59. WORK BENCH
60. UTILITY AIR STATION WITH REDUCING VALVE AND GAUGE
61. #2 AIR RECEIVER DRAIN VALVE TO BILGES
62. #1 AIR RECEIVER DRAIN VALVE TO BILGES
63. MAIN ENG STARTING AIR STATION BYPASS VALVE
64. MAIN ENG STARTING AIR DISCHARGE PIPE
65. MAIN ENG STARTING AIR PRESSURE GAUGE 0 TO 300 PSI
66. COMPRESSED AIR DISCHARGE VALVES TO COMPRESSOR CONTROL RELAYS
67. PRESSURE GAUGE CUTOUT VALVES
68 COMPRESSOR DISCHARGE PRESSURE GAUGE GENERATOR 0 TO 300 PSI
69. COMPRESSED AIR REDUCING STATION RELIEF VALVE SET AT 165 PSI
70. PRESSURE GAUGE
71. COMPRESSED AIR REDUCING STATION HAND OPERATED BYPASS VALVE
72. COMPRESSED AIR REDUCING STATION PRESSURE GAUGE (0 TO 300 PSI)
73. INLINE STOP VALVE
74 SKEG SEA CHEST BLOWDOWN VALVE
75. SKEG SEA CHEST VENT VALVE

FIGURE 2-216. Compressed Air Piping System (Sheet 4 of 4).



LEGEND

1. QUICK DISCONNECT
2. AIR/WATER FILTER SEPARATOR
3. AIR STOP VALVE
4. COMPRESSED AIR REDUCING VALVE
5. PRESSURE GAUGE 0-200 PSI
6. COMPRESSED AIR TO BOW THRUSTER ROOM
7. UTILITY AIR STATION (TYP)

FIGURE 2-217. Compressed Air Piping System - Main Deck and Above (Sheet 1 of 6).

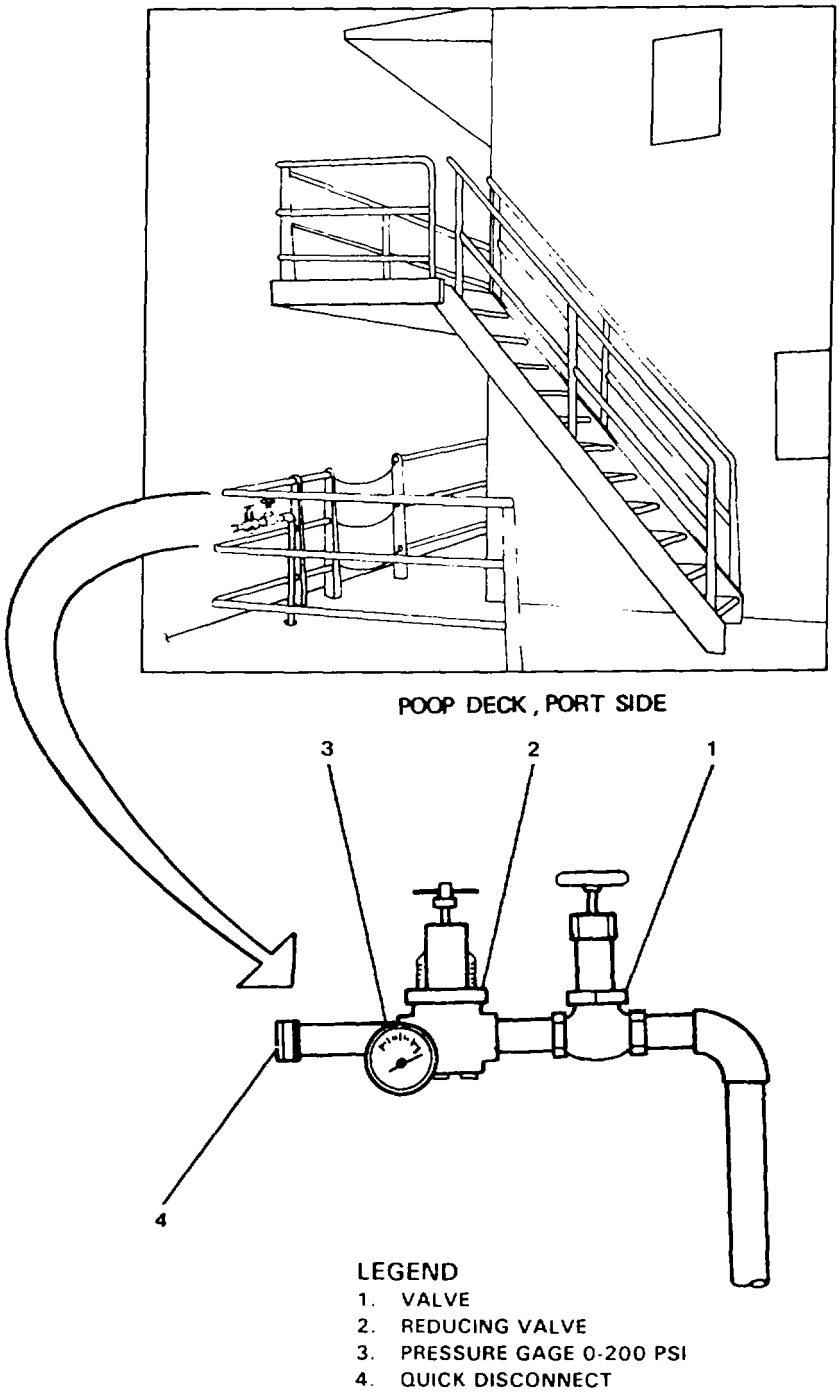


FIGURE 2-217. Compressed Air Piping System - Main Deck and Above (Sheet 2 of 6).

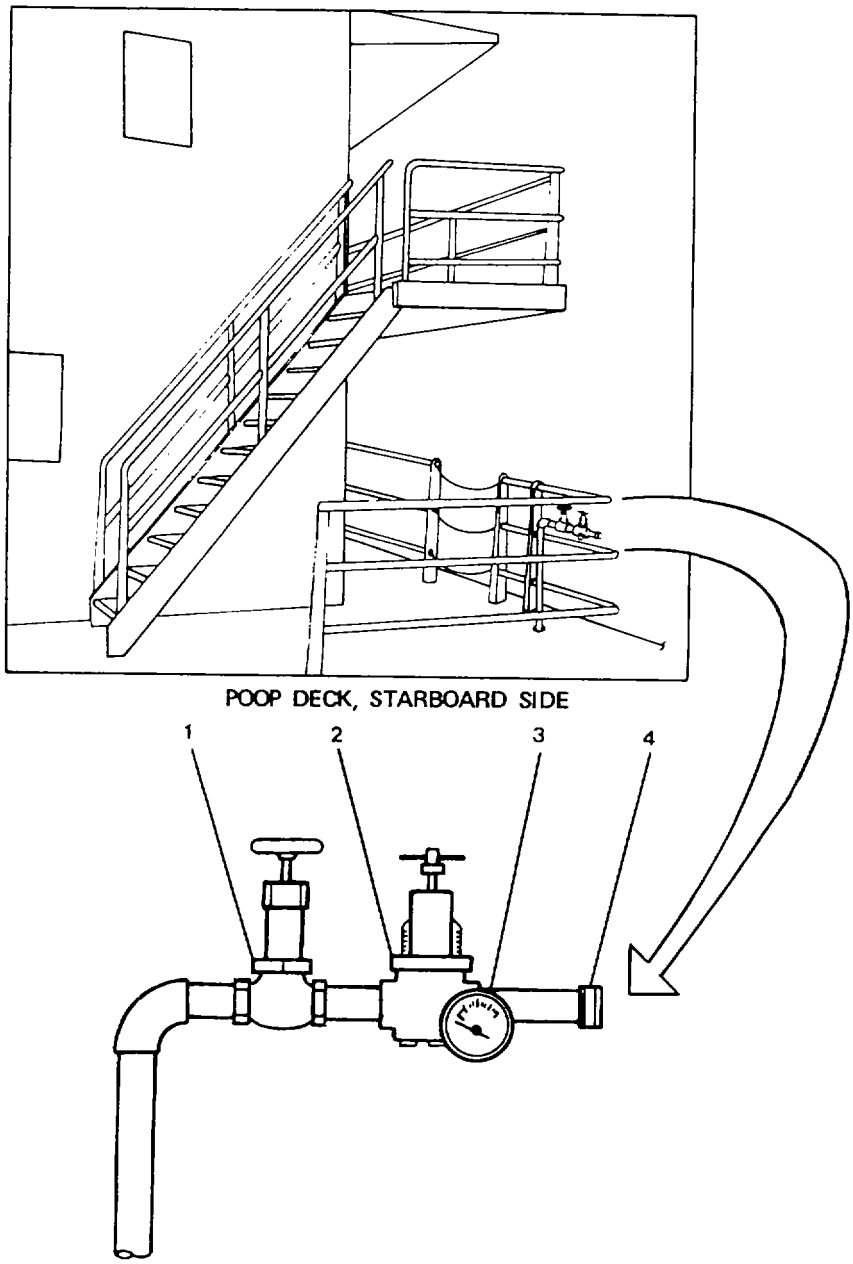


FIGURE 2-217. Compressed Air Piping System - Main Deck and Above (Sheet 3 of 6).

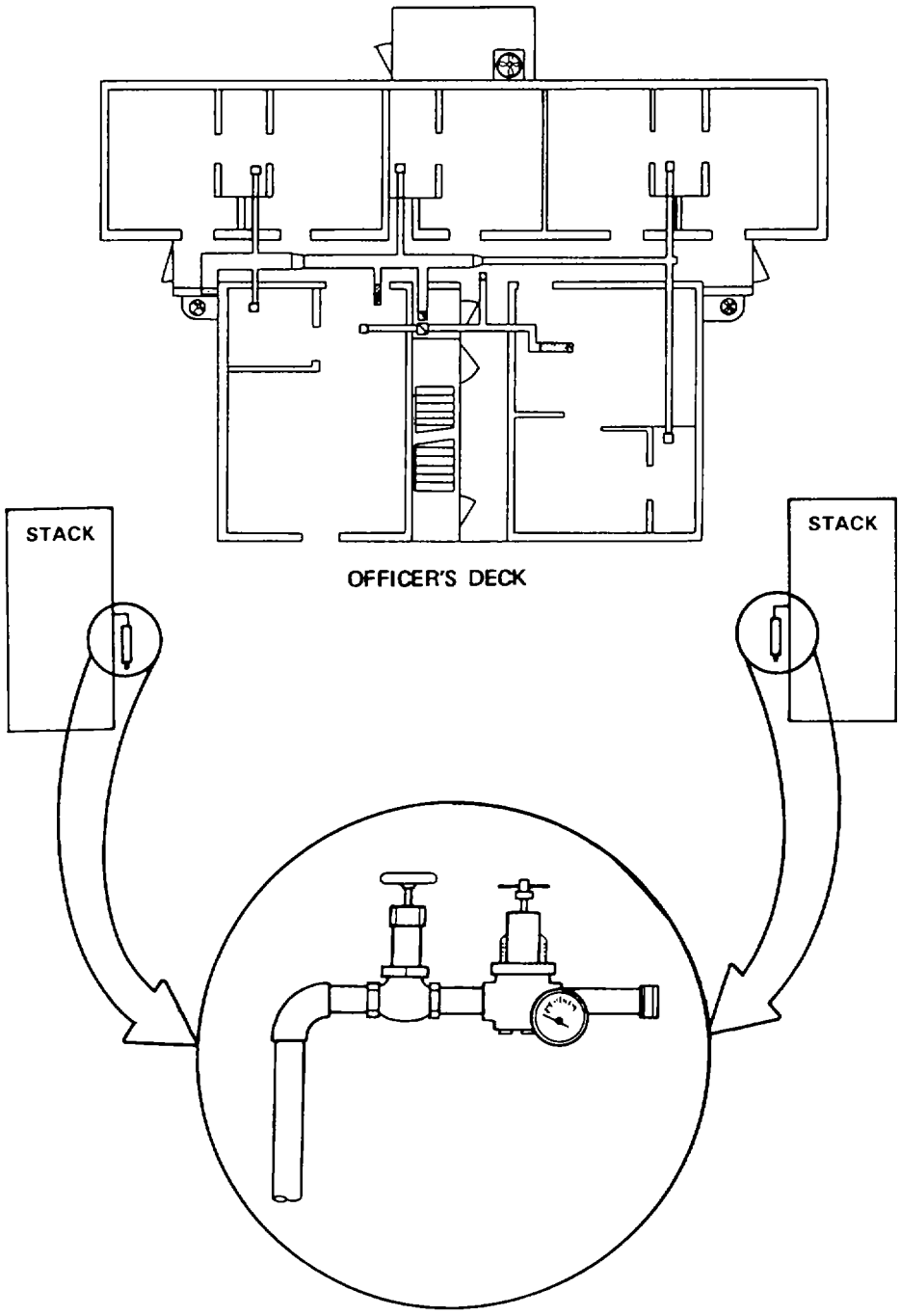


FIGURE 2-217. Compressed Air Piping System - Main Deck and Above (Sheet 4 of 6).

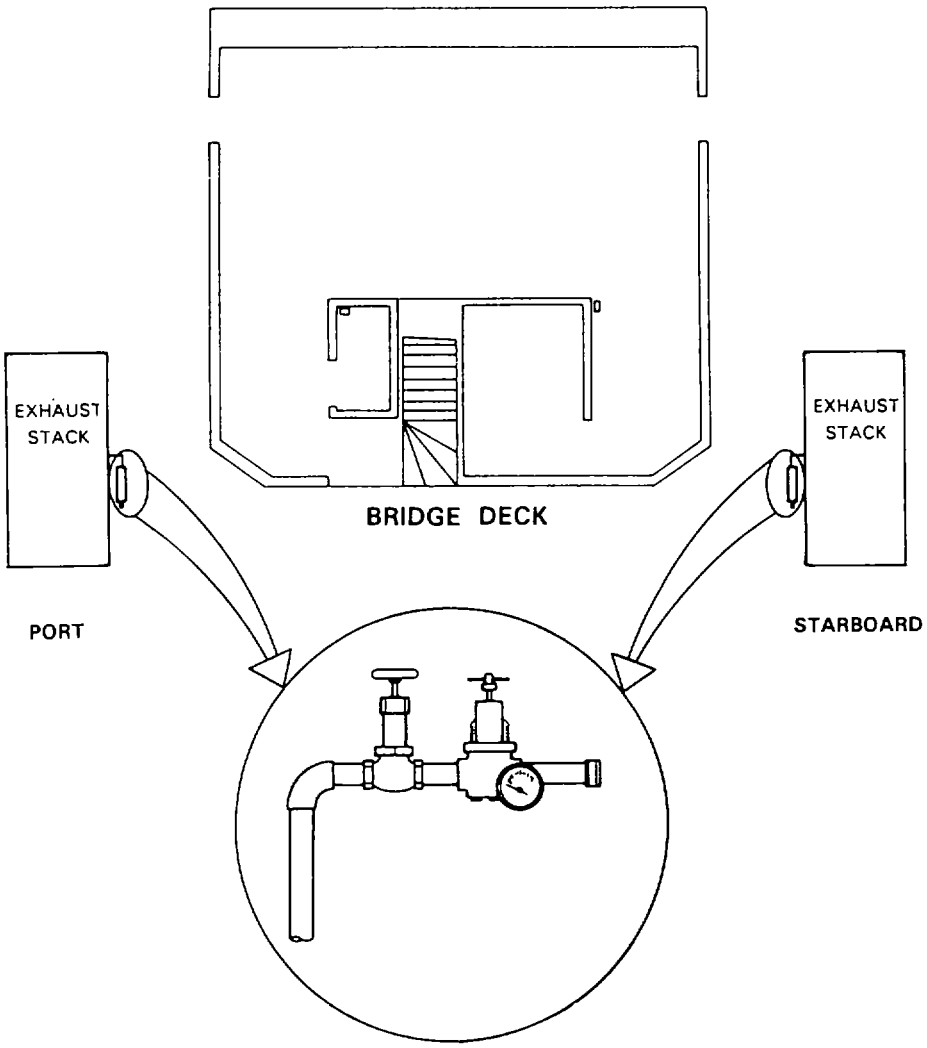
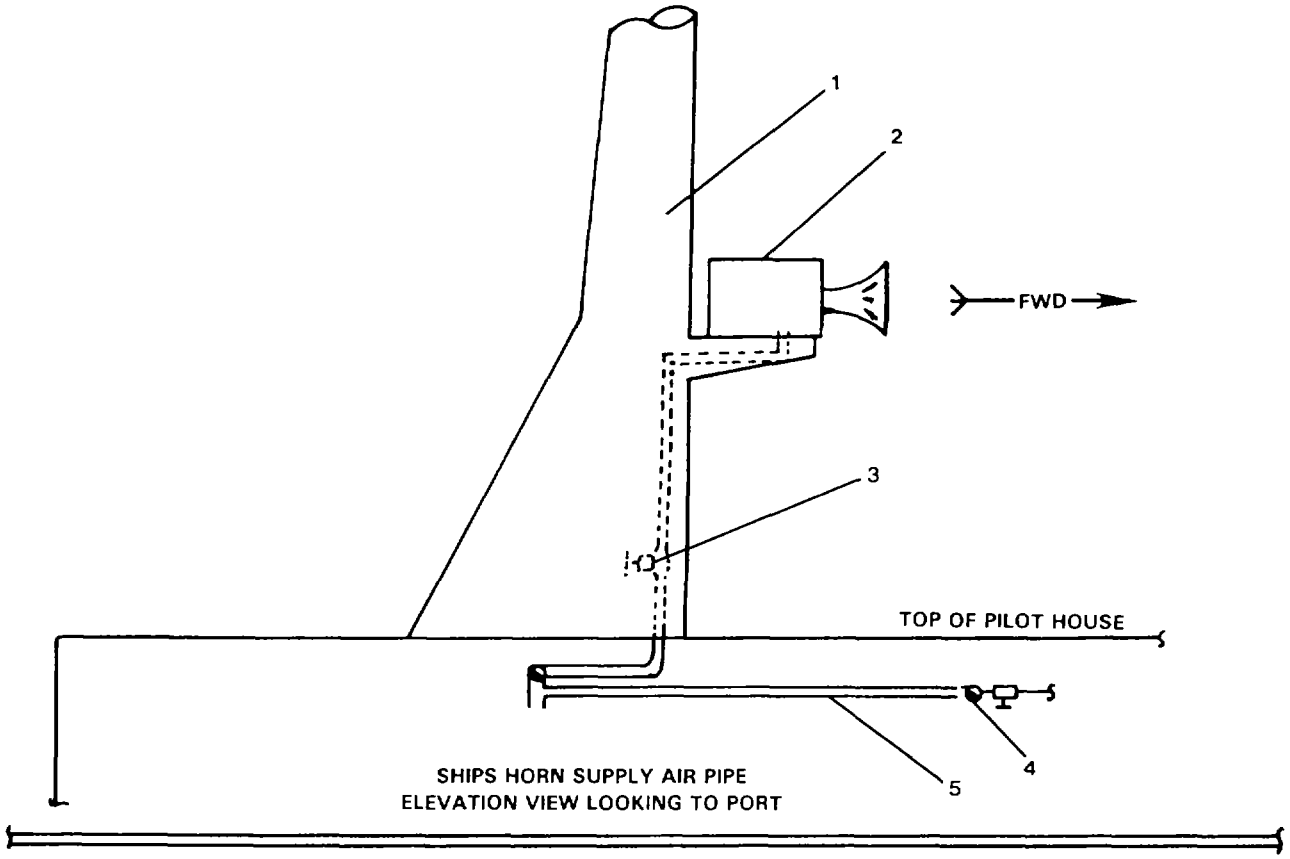
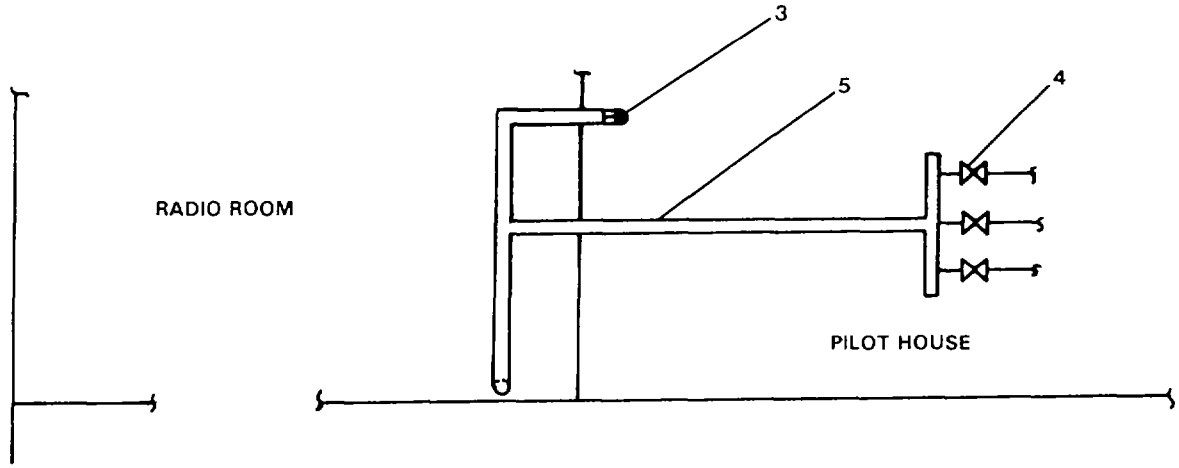


FIGURE 2-217. Compressed Air Piping System - Main Deck and Above (Sheet 5 of 6).





PLAN VIEW PILOT HOUSE
WINDSHIELD WIPER AIR SUPPLY

LEGEND

1. SHIPS MAIN MAST
2. SHIPS HORN
3. SHIPS HORN AIR SUPPLY CUTOUT VALVE
4. WINDSHIELD WIPER AIR CONTROL VALVE
5. WINDSHIELD WIPER AIR SUPPLY PIPE

FIGURE 2-217. Compressed Air Piping System - Main Deck and Above (Sheet 6 of 6).

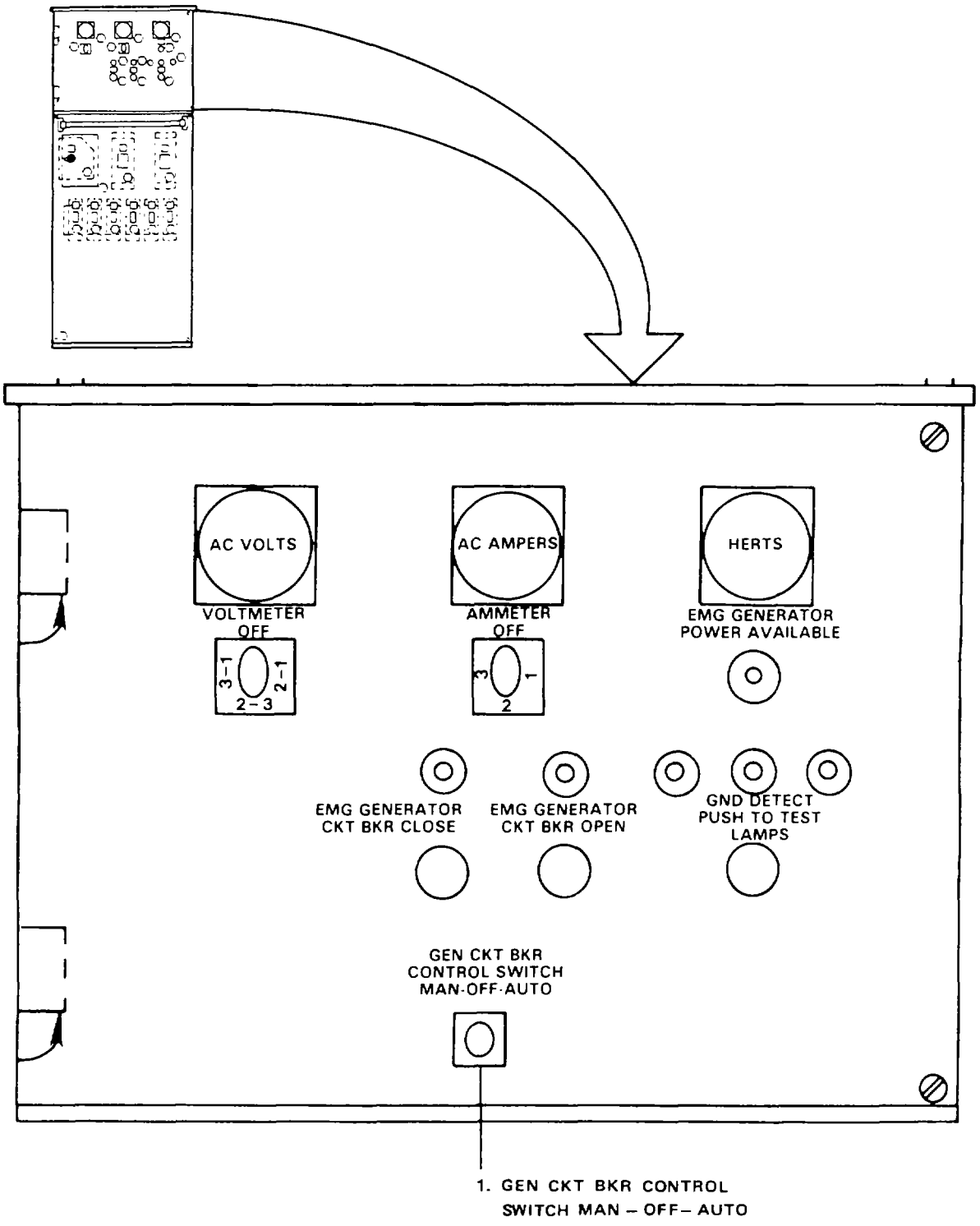
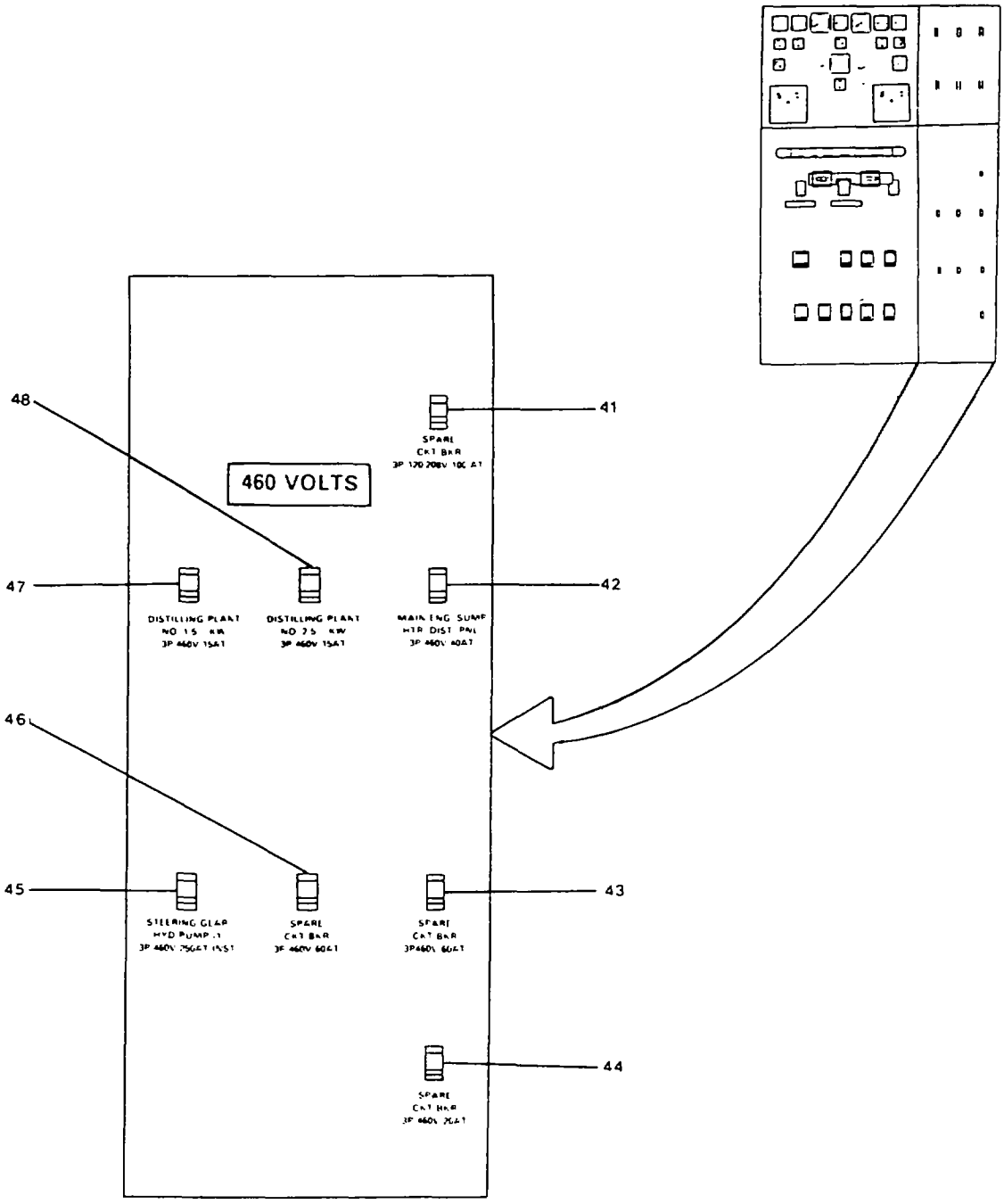


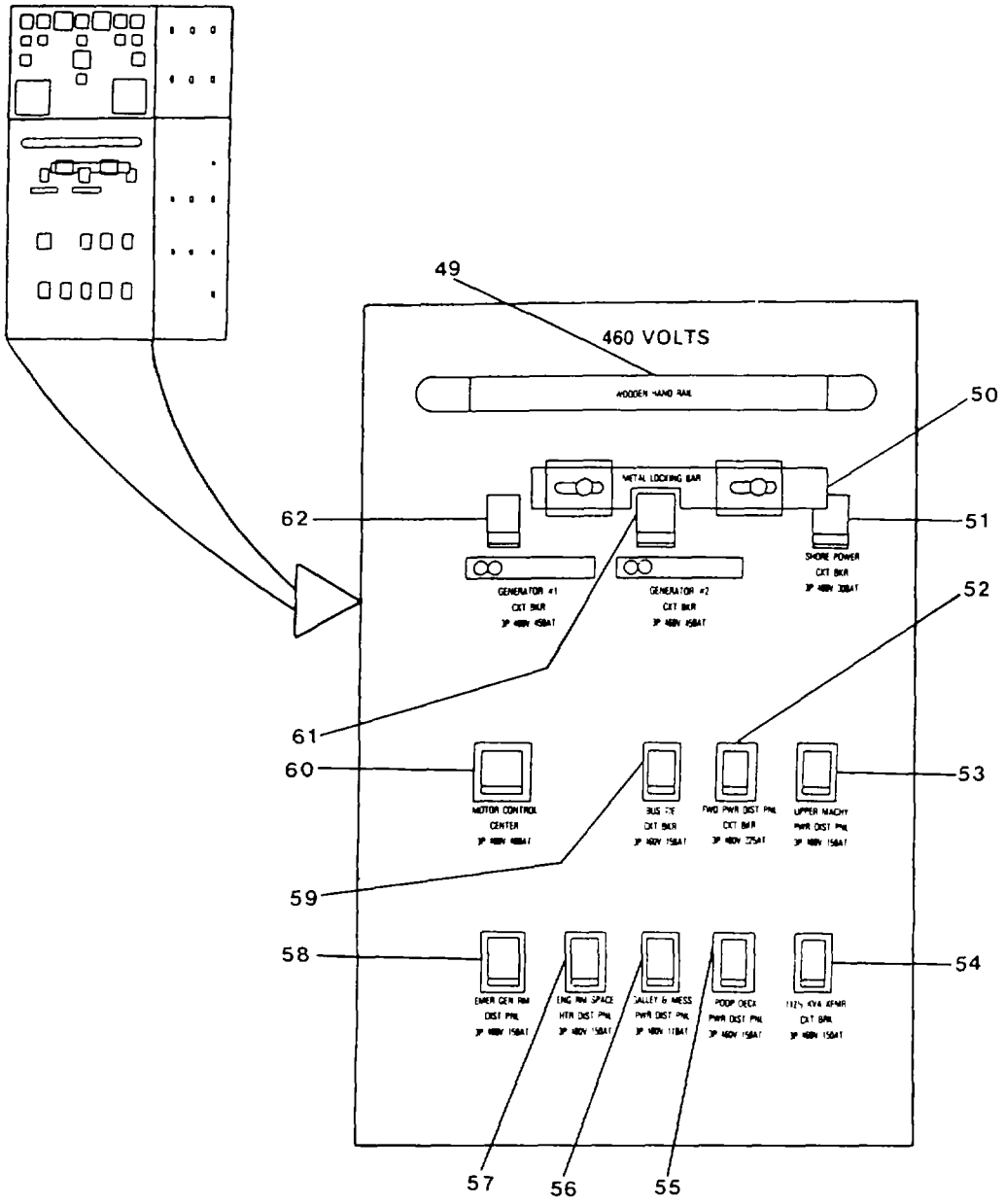
FIGURE 2-218. Emergency Switchboard.



LEGEND

41. SPARE CKT BKR 3P 120/208V 100AT
42. MAIN ENG. SUMP HTR. DIST. PNL. 3P 460V 40AT
43. SPARE CKT BKR 3P 460V 60AT
44. SPARE CKT BKR 3P 460V 20AT
45. STEERING GEAR HYD PUMP #1 3P 460V 250AT INST
46. SPARE CKT BKR 3P 460V 60AT
47. DISTILLING PLANT NO. 1 5 1/2 KW 3P 460V 15AT
48. DISTILLING PLANT NO. 2 5 1/2 KW 3P 460V 15AT

FIGURE 2-219. Main Switchboard (Sheet 1 of 2).



LEGEND

49. WOODEN HAND RAIL
50. METAL LOCKING BAR
51. SHORE POWER CKT BKR 3P 460V 300AT
52. FWD. PWR. DIST. PNL. CKT BKR 3P 460V 225AT
53. UPPER MACHY. PWR. DIST. PNL. 3P 460V 150AT
54. 112 ½ KVA XFMR. CKT BKR 3P 460V 150AT
55. POOP DECK PWR. DIST. PNL. 3P 460V 150AT
56. GALLEY & MESS PWR. DIST. PNL. 3P 460V 110AT
57. ENG. RM. SPACE HTR. DIST. PNL. 3P 460V 150AT
58. EMER. GEN. RM. DIST. PNL. 3P 460V 150AT
59. BUS TIE CKT BKR 3P 460V 150AT
60. MOTOR CONTROL CENTER 3P 460V 400AT
61. GENERATOR #2 CKT BKR 3P 460V 450AT
62. GENERATOR #1 CKT BKR 3P 460V 450AT

FIGURE 2-219. Main Switchboard (Sheet 2 of 2).

f. Close all valves in the cooling water piping system for the ship service diesel generators. Refer to FIGURE 2-220.

2-5.34.9. Firemain Shutdown.

NOTE

As long as any personnel are on board the vessel, the fire pump should remain online.

a. Place OFF/ON switch (110) in OFF position on Engine Room Motor Control Center (FIGURE 2-215).

b. Set circuit breaker (108) to OFF position.

CAUTION

Firefighting service onboard the vessel is restricted to portable firefighting systems and automatic Halon system. Leave firemain aligned to be operable as soon as the fire/bilge pump can be energized and pressure builds in the firemain.

2-5.34.10. Final Shutdown.

a. Set engine room exhaust fan port switch (18, FIGURE 2-215) and circuit breaker (3) to OFF.

b. Set engine room exhaust fan port switch (14) and circuit breaker (4) to OFF.

c. Set engine room supply fan port switch (10) and circuit breaker (6) to OFF.

d. Set engine room supply fan STBD switch (35) and circuit breaker (31) to OFF.

e. Set 150 AMP bus tie circuit breaker (46) to OFF.

f. Set the following circuit breakers on the main switchboard (FIGURE 2-219) to OFF.

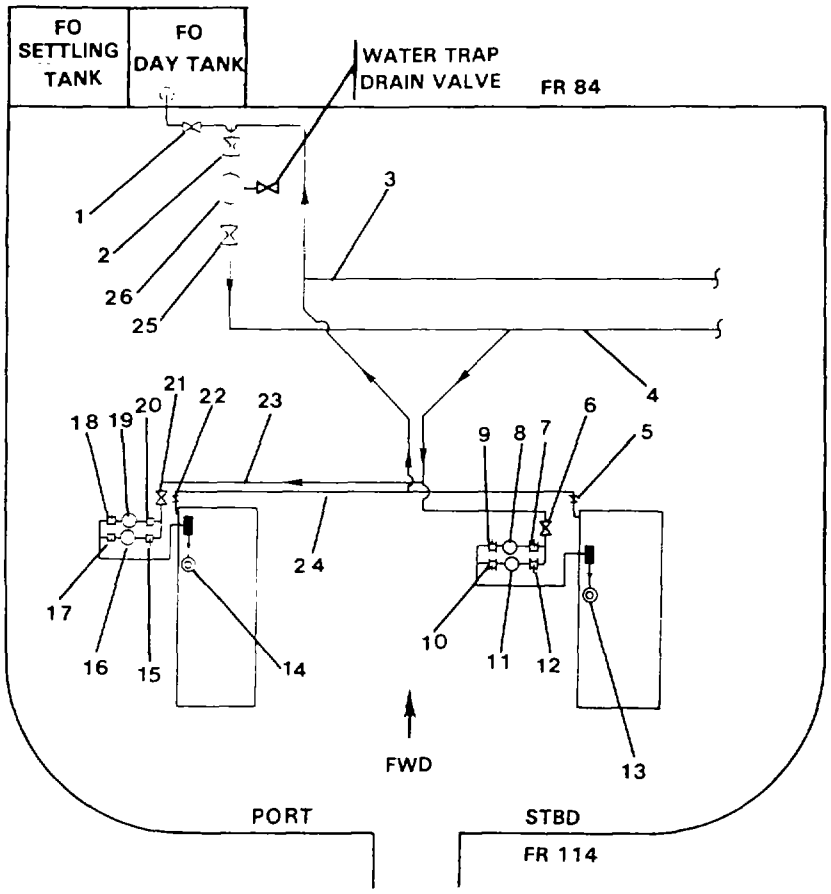
(1) Steering Gear Hydraulic Pump (45).

(2) Distilling Plant No. 1 (47).

(3) Distilling Plant No. 2 (48).

(4) Main Engine Sump Heater Distribution Panel (42).

(5) Motor Control Center (60).



LEGEND

1. RETURN FUEL OIL DISCHARGE VALVE TO DAY TANK
2. FUEL OIL HEADER INLET VALVE
3. RETURN FUEL OIL HEADER PIPE
4. FUEL OIL SUPPLY HEADER PIPE
5. SWING CHECK VALVE
6. GENERATOR FUEL OIL SUPPLY VALVE
7. FUEL OIL FILTER INLET VALVE
8. FUEL OIL FILTER
9. FUEL OIL FILTER OUTLET VALVE
10. FUEL OIL FILTER OUTLET VALVE
11. FUEL OIL FILTER
12. FUEL OIL FILTER INLET VALVE
13. FUEL OIL PRIMING PUMP
14. FUEL OIL PRIMING PUMP
15. FUEL OIL FILTER INLET VALVE
16. FUEL OIL FILTER
17. FUEL OIL FILTER OUTLET VALVE
18. FUEL OIL FILTER OUTLET VALVE
19. FUEL OIL FILTER
20. FUEL OIL FILTER INLET VALVE
21. GENERATOR FUEL OIL SUPPLY VALVE
22. SWING CHECK VALVE
23. FUEL OIL SUPPLY PIPE
24. FUEL OIL RETURN PIPE
25. INLINE STOP VALVE
26. WATER TRAP

FIGURE 2-220. Ship's Service Diesel Generator Fuel Oil Service Piping System.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS
Section Index (Table of Contents)

Section Index (Table of Contents) - Continued

2-6. GENERAL . This section contains operating procedures for individual equipment during periods of equipment failure, abnormal conditions, or periods of unusual weather conditions. Emergency conditions that occur as a result of storm damage, accident at sea or battle damage are covered in TM 55-1915-200-SDC, the Shipboard Damage Control Manual. Only those unusual conditions associated with equipment failures or normal breakdowns are described here.

2-7. OPERATING PROCEDURES.

2-7.1. Power Generation. Normal power from ship service generators through the main switchboard, maintain bus tie breakers in the normal (on-line) configuration. This power (voltage) steps down through a transformer and applies 110 volts to the main and emergency bus tie breakers. This voltage keeps the main bus tie breaker closed and the emergency bus tie breaker open. In the event of a power failure, the main bus tie breaker will open and kill all AC voltage. After AC power is lost, the voltage holding the main bus tie breaker is lost and the main bus tie breaker will open. Simultaneously, several actions take place. First, a mechanical dead bus timer will start; this energizes the auto crank of the emergency generator. Second, 24 VDC battery will take over the operation of emergency communication circuits and emergency lighting. Finally, the dead bus timer starts a 45 second time delay. This time delay allows the emergency generator to come up to speed and settle out before the emergency bus tie breaker closes and applies a load to the emergency generator. At this point, AC voltage is applied to the emergency switchboard. All of this operation and switching requires no action from the operator.

2-7.1.1. Emergency Equipment Available. When the emergency generator is operating and the emergency power is applied, the following equipment is available:

a. Fire Pump.

b. Steering Gear Hydraulic Pump Number 2.

c. Emergency Generator Room Steering Gear Compartment Fan.

d. Air Compressor Number 2.

e. Emergency Generator Air Supply Fan.

f. Emergency Load Center Panel Transformer.

2-7.1.2. Reset Emergency Generator. As soon as an electrical failure has occurred, the process of correcting the failure and restoring power from the ship service generators will begin. Troubleshooting and maintenance procedures are in TM 55-1915-200-24&P. When power is available, and ship service generators are operating, perform the following procedures:

a. Turn the Emergency Generator Engine Control Switch (15, FIGURE 2-20) to the RESET position.

b. This will stop the Emergency Generator Engine. Allow the engine to idle down and stop with the Engine Control Switch (15) in RESET.

c. Return Engine Control Switch (15) to the AUTOMATIC position. This places the emergency generator ready in the event of another power failure.

NOTE

The Emergency Generator Engine control switch (15) has four settings: RESET, STOP, MANUAL, and AUTOMATIC. The STOP position will immediately stop the Emergency Generator Engine. However, it is preferable to use the RESET since this prepares the Emergency Generator Engine for restart.

NOTE

Should a power failure occur immediately after an electrical load is applied to the ship service generators, the emergency generator can be started from the MANUAL position, if the Engine Control Switch (15) has not been placed in the AUTOMATIC position.

2-7.2. Gyrocompass.

2-7.2.1. Heavy Sea Starting.

a. Position RPTR switch (12, FIGURE 2-221) to OFF (down) and MODE SELECTOR switch (7) to SLEW.

NOTE

The compass will slew rapidly if the gyro is caged.

b. Note that the CAGED lamp (15) is lighted. If it is not, depress the caging control (1) on top of the binnacle to cage the gyro and wait 5 minutes for the ballistic fluid to stabilize.

c. Use the TILT/AZIMUTH switch (9) to rotate the compass card to the approximate ship's course. In the (+) position the card rotates counterclockwise, in the (-) position the card rotates clockwise.

NOTE

The compass card will move away from heading rapidly if a longer period than that indicated in the following stop is allowed between starting and uncaging. If possible, uncage when the ship is at the center of pitch or roll so the gyro will be released near a level position.

d. Position the MODE SELECTOR switch (7) to START Wait 30 to 35 seconds, then depress cager control on top of the binnacle and note that the CAGED lamp (15) extinguishes.

e. Note if pointer on the Level Meter (3) swings equally about zero. If it does, proceed to the next step. If it does not, operate the TILT/ AZIMUTH switch (9) in the direction of the required tilt correction until equal travel about the zero point is obtained.

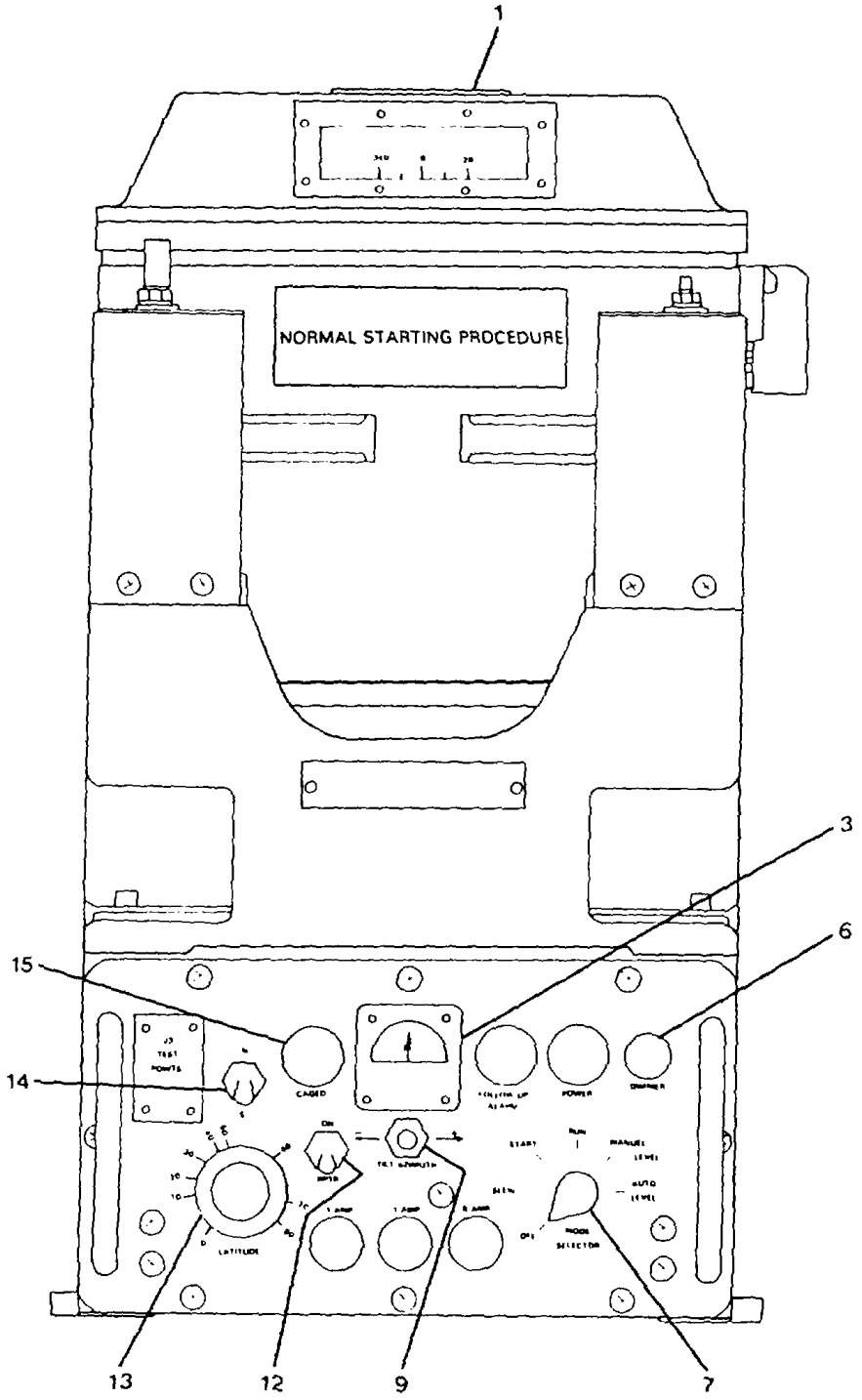
f. Observe the compass card for about one minute to determine the direction of card movement with respect to the required course.

(1) If the card is moving toward heading, allow it to continue until it is within 2 degrees of the desired heading, then operate the TILT/AZIMUTH switch (9) to level the gyro and make the average position of the Level Meter (3) pointer zero.

(2) If the card is moving away from heading, reverse polarity of the average pointer position by operating the TILT/AZIMUTH switch (9). Wait until the direction of the card movement changes and, when it is within 2 degrees of the desired heading, operate the TILT/AZIMUTH switch to level the gyro and make the average position of the Level Meter (3) pointer zero.

g. Position MODE SELECTOR switch (7) to RUN.

h. Position N-S switch (14) to N (north) or S (south) as required.



LEGEND

1. CAGED BUTTON
3. LEVEL METER
6. DIMMER CONTROL
7. MODE SELECTOR
9. TILT/AZIMUTH
12. RPTR SWITCH
13. LATITUDE CONTROL
14. N-S SWITCH
15. CAGED LAMP

FIGURE 2-221. Gyrocompass Mark 27 Mod 1 Electronic Control Panel.

i. Position LATITUDE control (13) to ship's latitude.

NOTE

If step repeaters are used they must be synchronized to the compass card before positioning RPTR switch (12) to ON.

j. Wait 10 minutes after uncaging and position RPTR switch (12) to ON if repeaters are used.

k. Adjust DIMMER control (6) as required.

NOTE

The Level Meter indication will vary from zero at the equator to full scale near the poles. For example, the indication at 40 degrees north latitude will be between + two and five scale gradations.

2-7.2.2. Emergency Restarting.

NOTE

The following procedure is to be used if the gyro has dumped or the compass must be started with the gyro running. This condition is indicated by full scale deflection of the Level Meter and a rapid slewing of the compass card.

a. Position MODE SELECTOR (7, FIGURE 2-221) switch to AUTO LEVEL. Note that compass stops slewing and settles at a random heading.

b. Position MODE SELECTOR switch (7) to MANUAL LEVEL.

c. Depress caging control (1) on top of the binnacle and note that CAGED lamp (15) lights.

d. Position TILT/AZIMUTH switch (9) in same direction as that required to return the compass card to the proper heading and release the switch after the compass card begins to rotate slowly toward the desired heading.

e. Allow compass card to rotate 2 or 3 degrees past the required heading, then depress caging control on top of the binnacle. Note that CAGED lamp (15) extinguishes.

f. Position MODE SELECTOR switch (7) to AUTO LEVEL and note that the gyro comes to an approximate level as indicated by the Level Meter (3).

g. Position MODE SELECTOR switch (7) to MANUAL LEVEL, then operate TILT/AZIMUTH switch (9) to obtain a zero indication on the Level Meter.

h. Position MODE SELECTOR switch (7) to RUN.

2-7.3. Steering System Failure.

a. Select #2 pump position at the steering console PUMP SELECTOR switch (41, FIGURE 2-222). If operating on #2 pump, select #1.

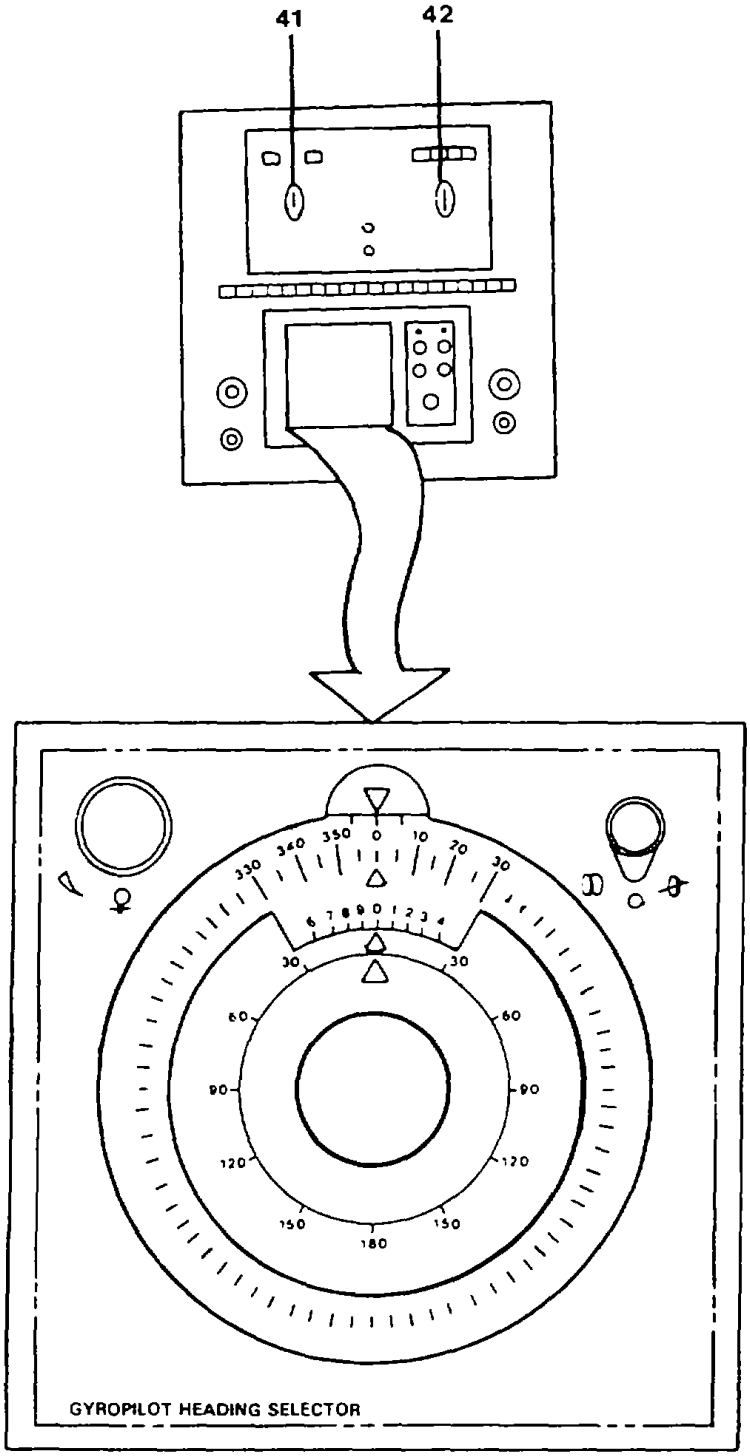
b. Attempt to steer the vessel. If unable to steer, select the nonfollow-up mode with the MODE SELECT switch (42).

CAUTION

If a low hydraulic fluid level alarm is present, steer the vessel with as little rudder movement as possible. The low level may have been caused by a leak which could deplete the hydraulic fluid of the power unit in use.

c. If steerage is available, dispatch an engineer to determine the cause of the loss of steering.

d. Isolate any leaks by closing appropriate valves.



LEGEND
41. PUMP SELECTOR
42. MODE SELECTOR

FIGURE 2-222. Pilothouse Steering Cabinet.

e. If steering is not possible from the pilothouse, dispatch a crew member to the Emergency Steering System Station and establish communication on the sound powered telephone system.

f. Switch the Emergency Transfer selector (6, FIGURE 2-223) located in the Emergency Steering System Station, to #1 Emergency System position.

g. Attempt to steer the vessel using the Emergency Steering Station joysticks (3 and 4, FIGURE 2-224), at the direction of the helmsman.

2-7.4. Halon 1301 Fire System.

2-7.4.1. Manual Release for Halon for Fire in Engine Room.

a. Close all doors to protected area.

b. Open 1/2" stop valve (1, FIGURE 2-225), located in the machinery room, by operating release lever on top of valve. (Remove pin and pull lever.) c. Open C02 pilot cylinder by operating cylinder release lever (2) on side of cylinder valve. (Remove pin and pull lever.)

NOTE

Alarm siren will sound in Engine Room and discharge of Halon will be delayed for 25 seconds to allow evacuation of area to be protected.

WARNING

Halon 1301 may produce toxic byproducts while extinguishing fire. Where possible, the area in which the Halon discharge took place should be left secured for a minimum of 30 minutes. Personnel should wear protective clothing and breathing apparatus upon reentry.

2-7.4.2. Bypass of 25-Second Discharge Delay.

a. Pull out locking pin (3, FIGURE 2-225).

b. Pull lever to open.

2-7.4.3. Manual Release of Halon for Fire in Bow Thruster Room.

a. Close all doors to protected area.

b. Open 1/2" stop valve (1, FIGURE 2-226) located in the STBD deck store, by operating release lever on top of valve. (Remove pin and pull lever.) c. Open CO2 pilot cylinder (2) by operating release lever on side of cylinder valve. (Remove pin and pull lever.) NOTE Alarm siren will sound in Bow Thruster room and discharge of Halon will be delayed 25 seconds to allow evacuation of area to be protected.

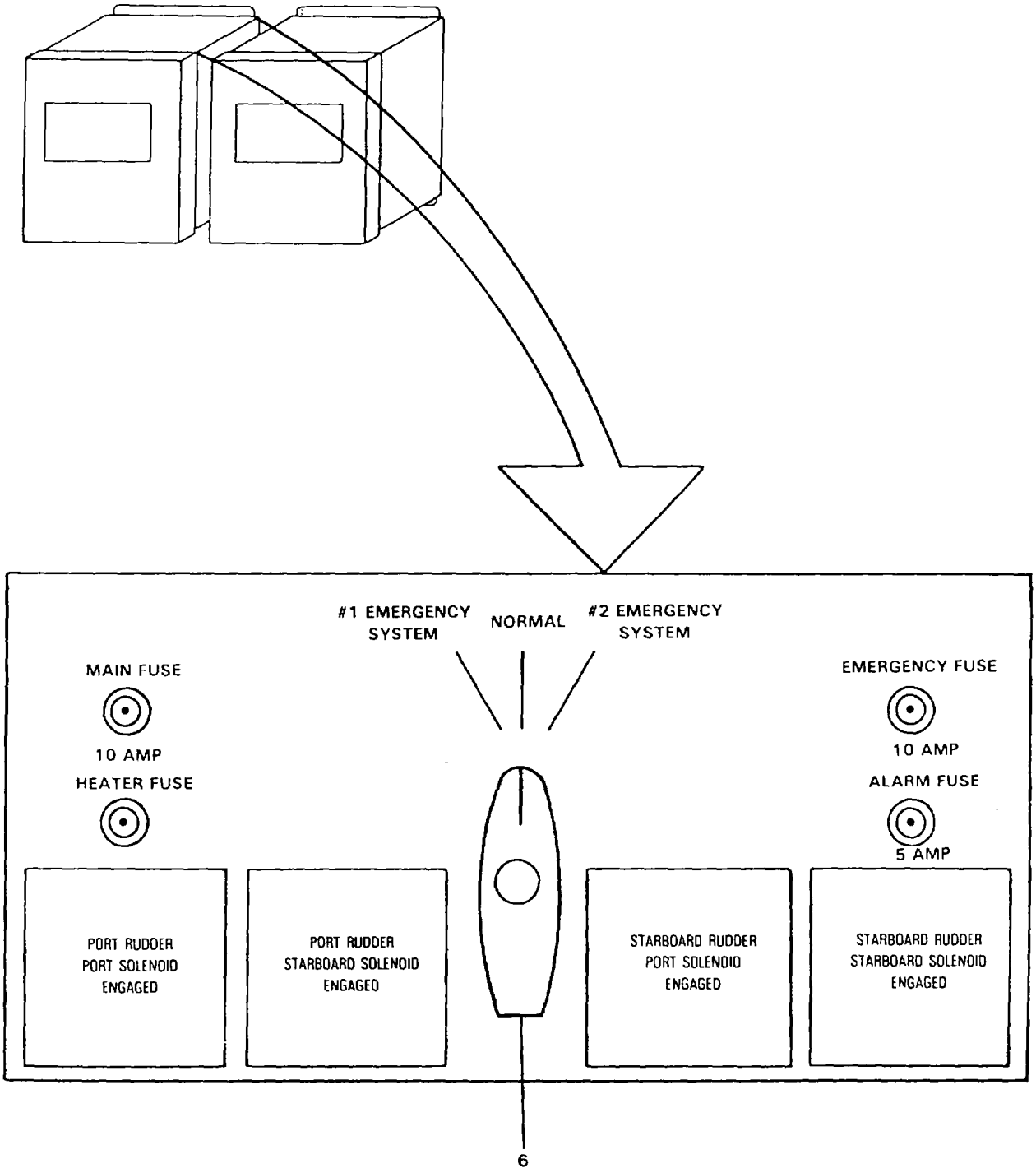
WARNING

Halon 1301 may produce toxic byproducts while extinguishing fire. Where possible, the area in which the discharge took place should be left secured for 30 minutes. Personnel should wear protective clothing and breathing apparatus upon re-entry.

2-7.4.4. Bypass of 25-Second Discharge Delay.

a. Pull out locking pin (3).

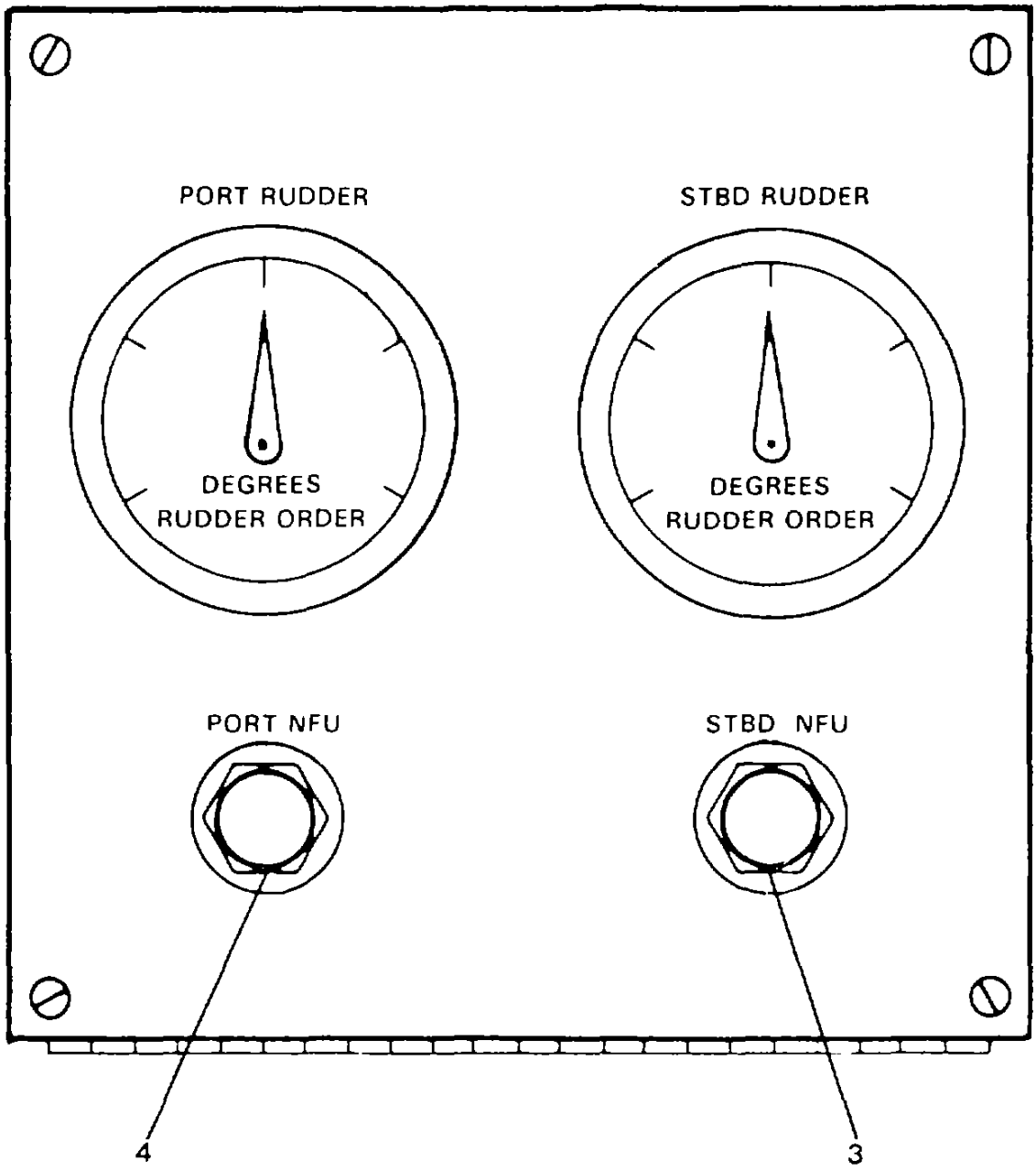
b. Pull lever to open.



LEGEND

6. ROTARY SWITCH

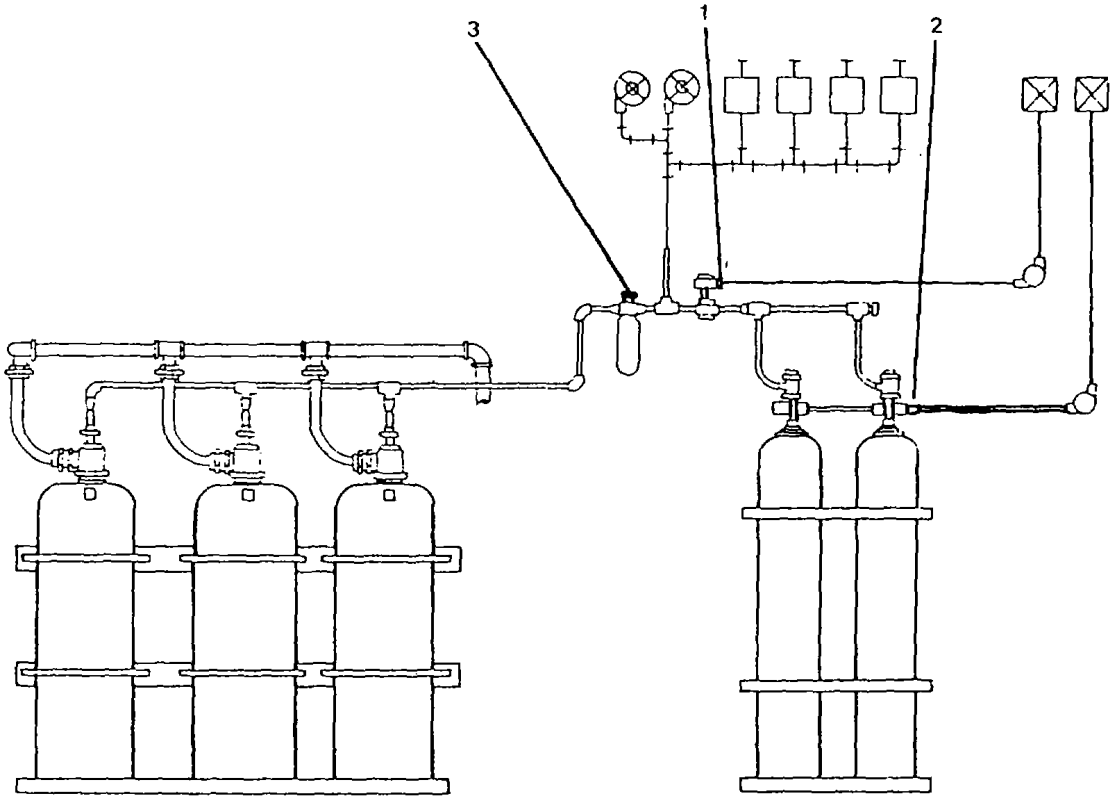
FIGURE 2-223. Emergency Transfer Panel (Port Shown).



LEGEND

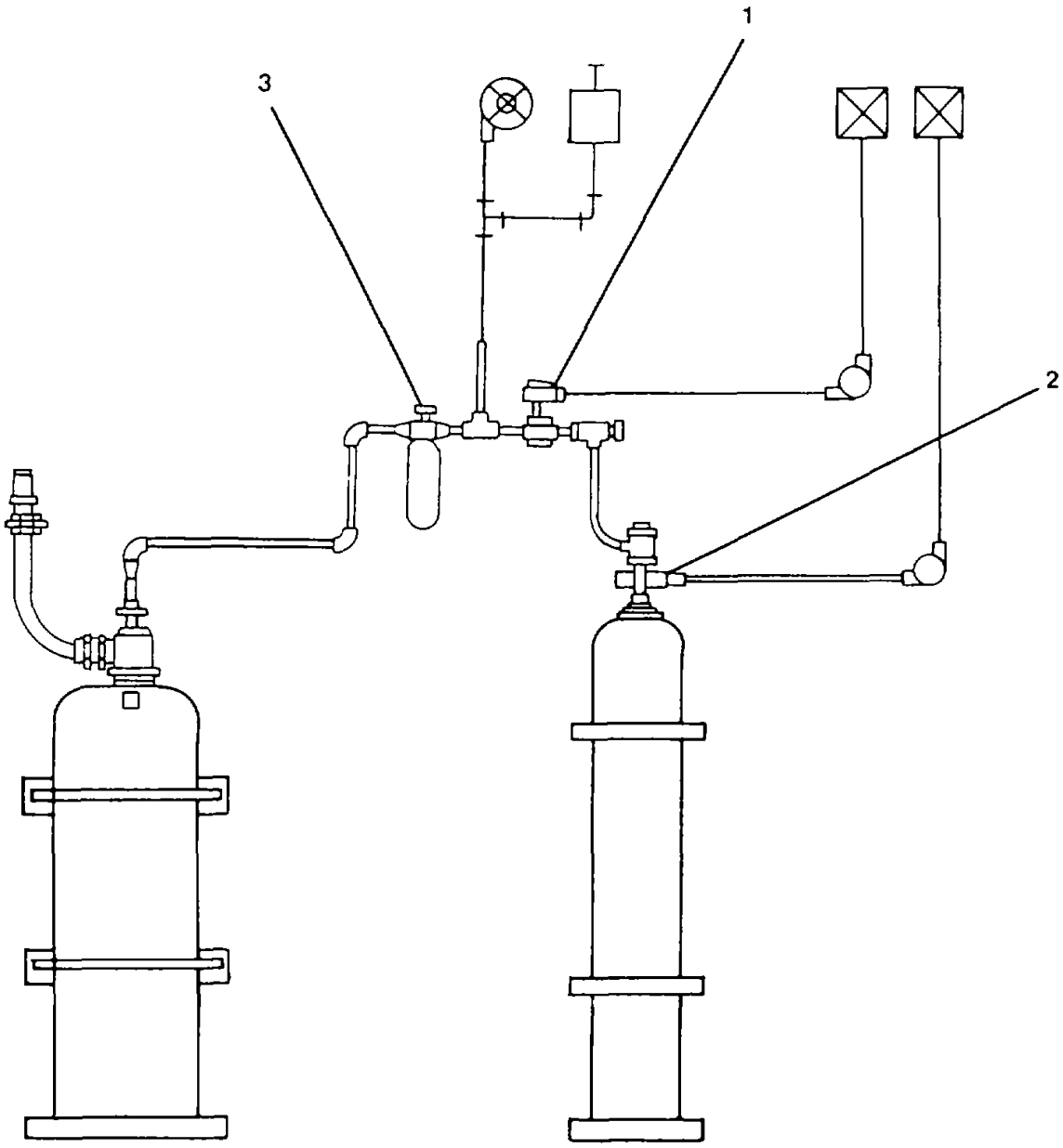
3. STBD NFU
4. PORT NFU

FIGURE 2-224. Emergency Steering Station.



LEGEND
1. ½'' STOP VALVE
2. CYLINDER RELEASE LEVER
3. LOCKING PIN

FIGURE 2-225. Engine Room Halon System.



LEGEND
1. ½" STOP VALVE
2. CO_2 PILOT CYLINDER
3. LOCKING PIN

FIGURE 2-226. Bow Thruster Room Halon System.

2-7.4.5. Manual Release of Halon for Emergency Generator Room.

a. Close emergency generator's room door.

b. Remove locking pin (4, FIGURE 2-227) from CO2 cylinder, raise lever (2) on top of cylinder.

NOTE

Alarm siren will sound in emergency generator room and discharge of Halon will be delayed for 25 seconds to allow evacuation.

WARNING

Halon 1301 may produce toxic byproducts while extinguishing fire. Where possible, the area in which the discharge took place should be left secured for a minimum of 30 minutes. Personnel should wear protective clothing and breathing apparatus upon reentry.

2-7.5. Deballasting With Bilge Pump. (FIGURES 2-228 and 2-229)

a. Close all valves in ballast piping system and bilge ballast piping system.

b. Open bilge pump discharge valve (30, FIGURE 2-229) and pressure gauge cutoff valve (5).

c. Open in line stop valve (2).

d. Open discharge overboard valve (3).

e. Open bilge pump suction valve (24).

f. Open crossconnect valve (28, FIGURE 2-228).

g. Open ballast overboard valve (12).

h. Open ballast tank discharge valves as required (15, 16, 17, 22, and 25).

i. Open ballast main suction valve (8, FIGURE 2-229).

j. Start bilge pump (6) by pressing START button (71, FIGURE 2-18) on motor control center.

CAUTION

Observe discharge pressure gauge (29, FIGURE 2-229). If no discharge pressure is observed within 30 seconds, press the STOP button (70, FIGURE 2-230, Sheet 1 of 2). Refer to unit maintenance.

k. Press the STOP button (70, FIGURE 2-230, Sheet 1 of 2) when the tank(s) is empty, as indicated by a loss of discharge pressure.

l. Close all valves in the ballast piping system and bilge ballast piping system.

2-7.6. Bilge Pumping With Ballast Pump. (FIGURE 2-228)

NOTE

This procedure causes polluted water to be pumped directly overboard. Use only in an emergency.

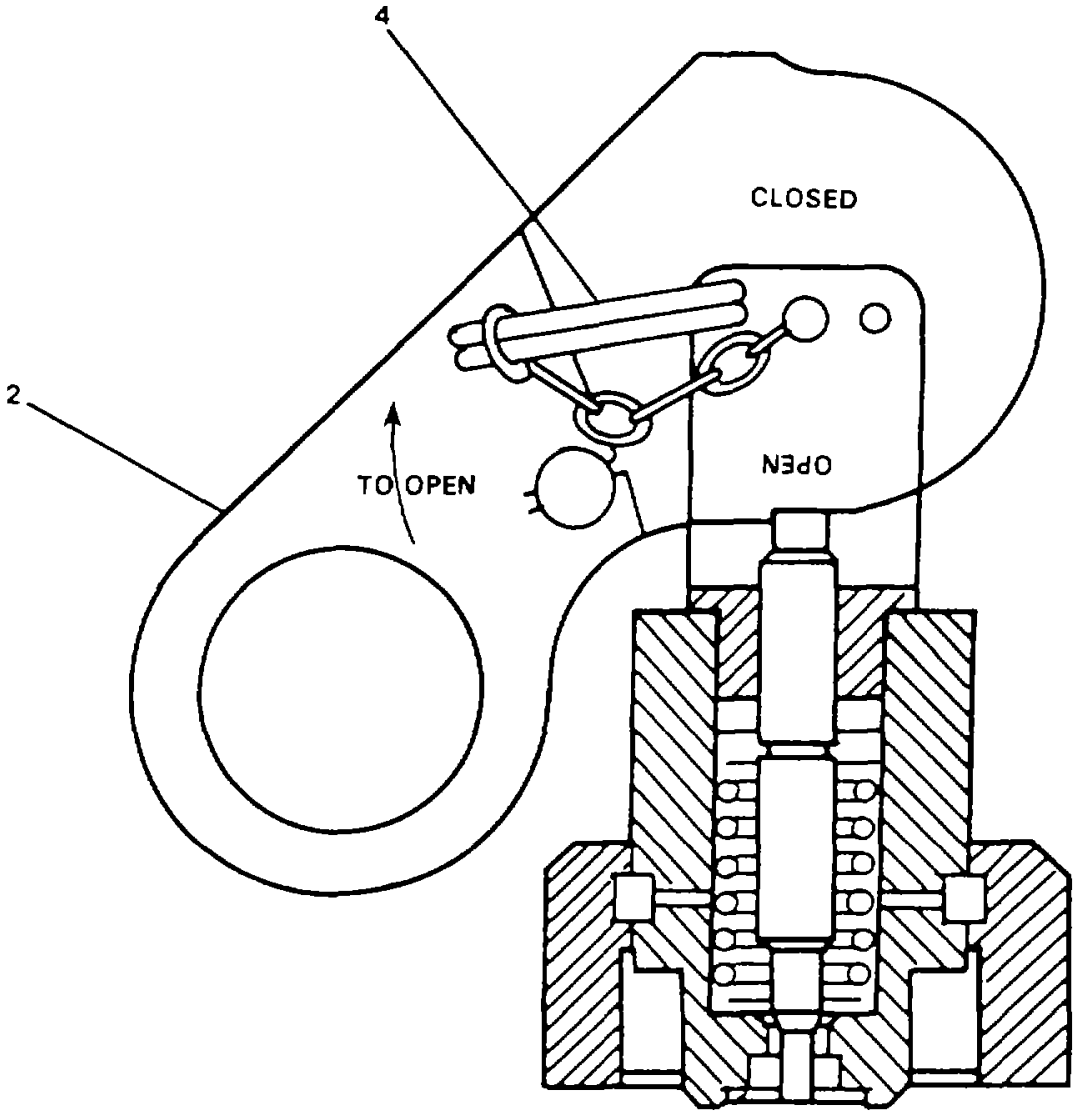
a. Close all valves in piping system.

b. Open Emergency bilge suction valve (1).

c. 3. Open pressure gauge cutoff valve (5).

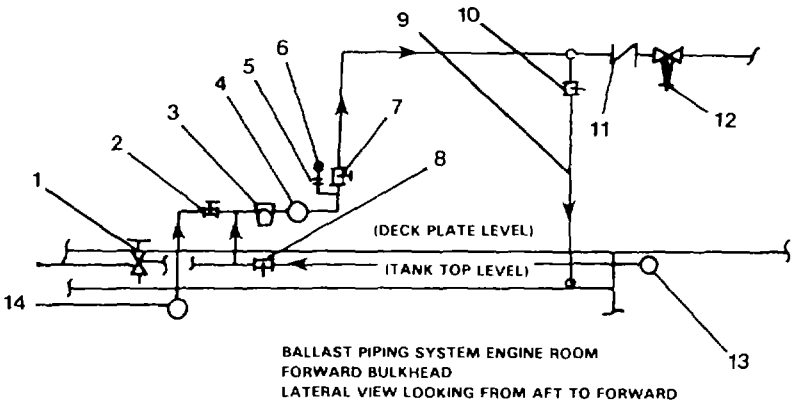
d. Open ballast pump discharge valve (7).

e. Open ballast overboard valve (12).



LEGEND
2. LEVER
4. LOCKING PIN

FIGURE 2-227. Lever Operated Control Emergency Generator Room.



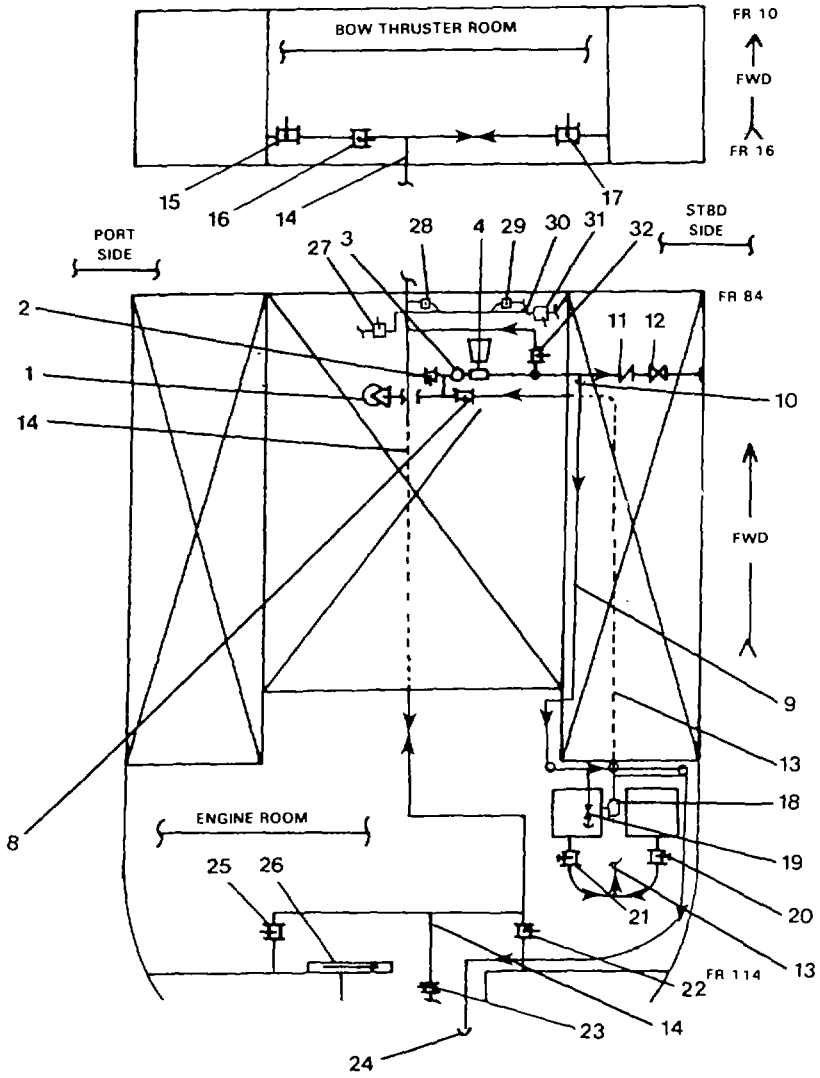
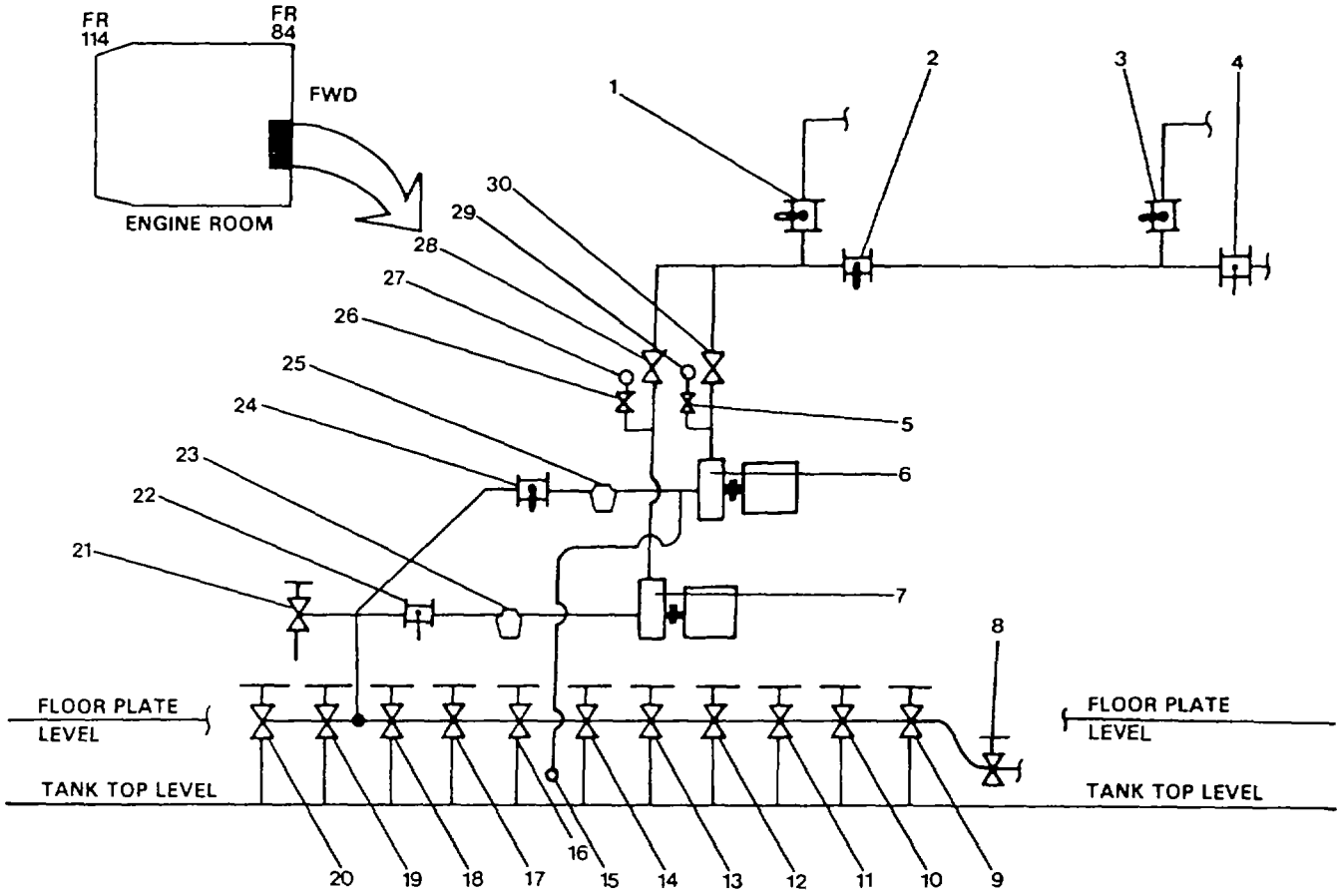


FIGURE 2-228. Ballast Piping System (Sheet 1 of 2).

LEGEND

1. EMERGENCY BILGE SUCTION VALVE
2. BALLAST PUMP SUCTION VALVE
3. BALLAST PUMP SUCTION STRAINER
4. BALLAST PUMP AND MOTOR
5. PRESSURE GAUGE CUTOUT VALVE
6. PRESSURE GAGE (0 TO 300)
7. BALLAST PUMP DISCHARGE VALVE
8. BALLAST PUMP SEA WATER SUCTION VALVE
9. SEA CHEST BLOWDOWN DISCHARGE PIPE
10. SEA CHEST BLOWDOWN SUPPLY VALVE
11. SWING CHECK VALVE
12. BALLAST OVERBOARD VALVE
13. BALLAST PUMP SEAWATER SUCTION PIPE
14. BALLAST MAIN PIPE
15. 1 BALLAST TANK PORT SUCTION AND DISCHARGE VALVE
16. 1 BALLAST TANK CENTER LINE SUCTION AND DISCHARGE VALVE
17. 1 BALLAST TANK STBD SUCTION AND DISCHARGE VALVE
18. HIGH SEA CHEST BLOWDOWN VALVE
19. LOW SEA CHEST BLOWDOWN VALVE
20. HIGH SEA CHEST CUTOUT VALVE
21. LOW SEA CHEST CUTOUT VALVE
22. 2 BALLAST TANK STBD SUCTION AND DISCHARGE VALVE
23. EMERGENCY FIRE PUMP SUCTION VALVE TO BALLAST MAIN
24. BLOWDOWN VALVE TO SEA CHEST LOCATED IN SKEG
25. BALLAST TANK PORT SUCTION AND DISCHARGE VALVE
26. HYDRAULIC OPERATED DOOR
27. BILGE/BALLAST PUMP SUCTION VALVE TO BALLAST MAIN
28. CROSS CONNECT VALVE BETWEEN BILGE PIPING AND BALLAST MAIN
29. FIRE/BILGE PUMP SUCTION VALVE
30. SWING CHECK VALVE
31. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
32. BALLAST PUMP DISCHARGE VALVE TO BALLAST MAIN

FIGURE 2-228. Ballast Piping System (Sheet 2 of 2).

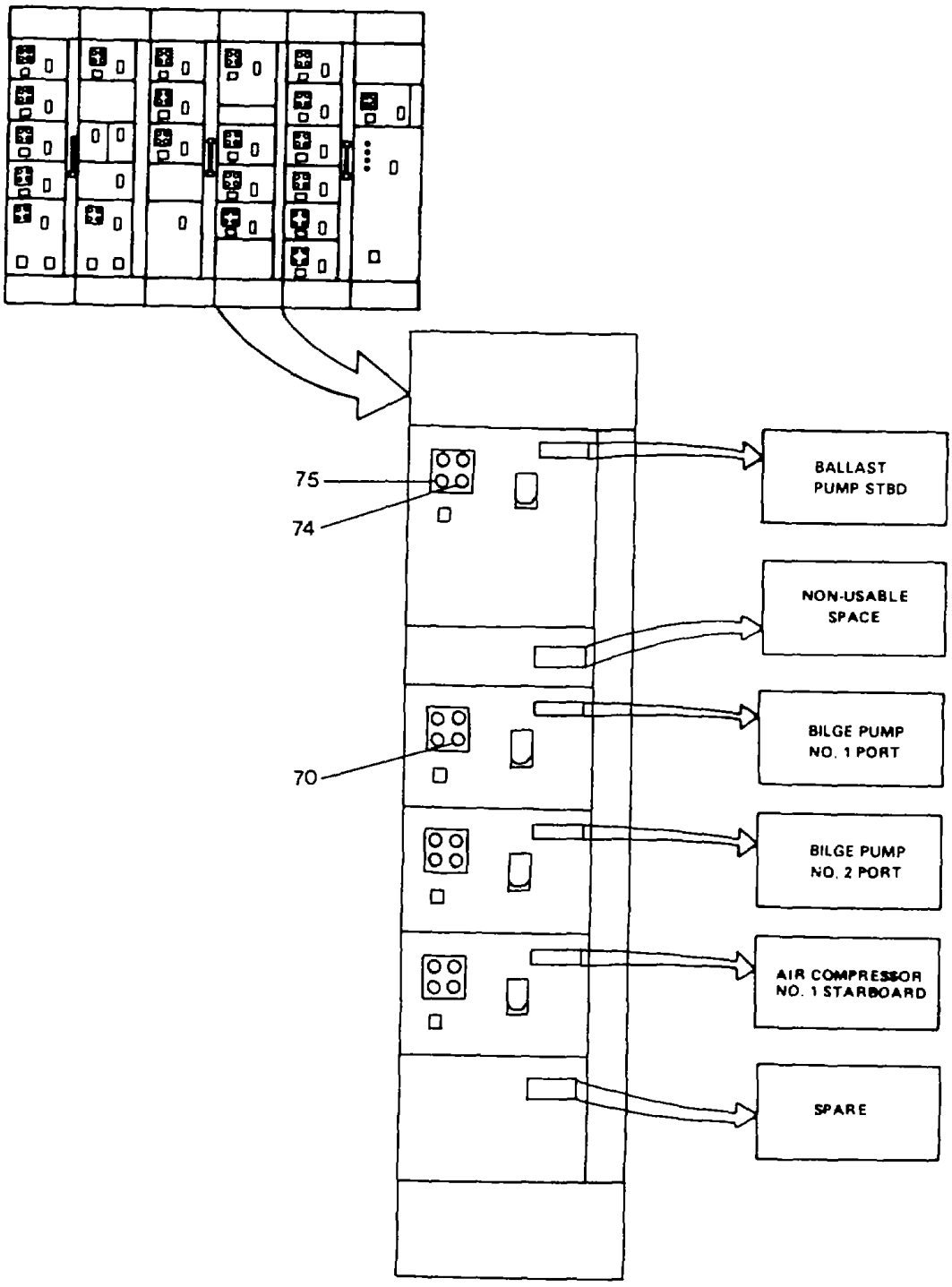


BILGE/BALLAST PIPING SYSTEM
ENGINE ROOM FORWARD BULKHEAD
LATERAL VIEW LOOKING FROM AFT TO FORWARD

LEGEND

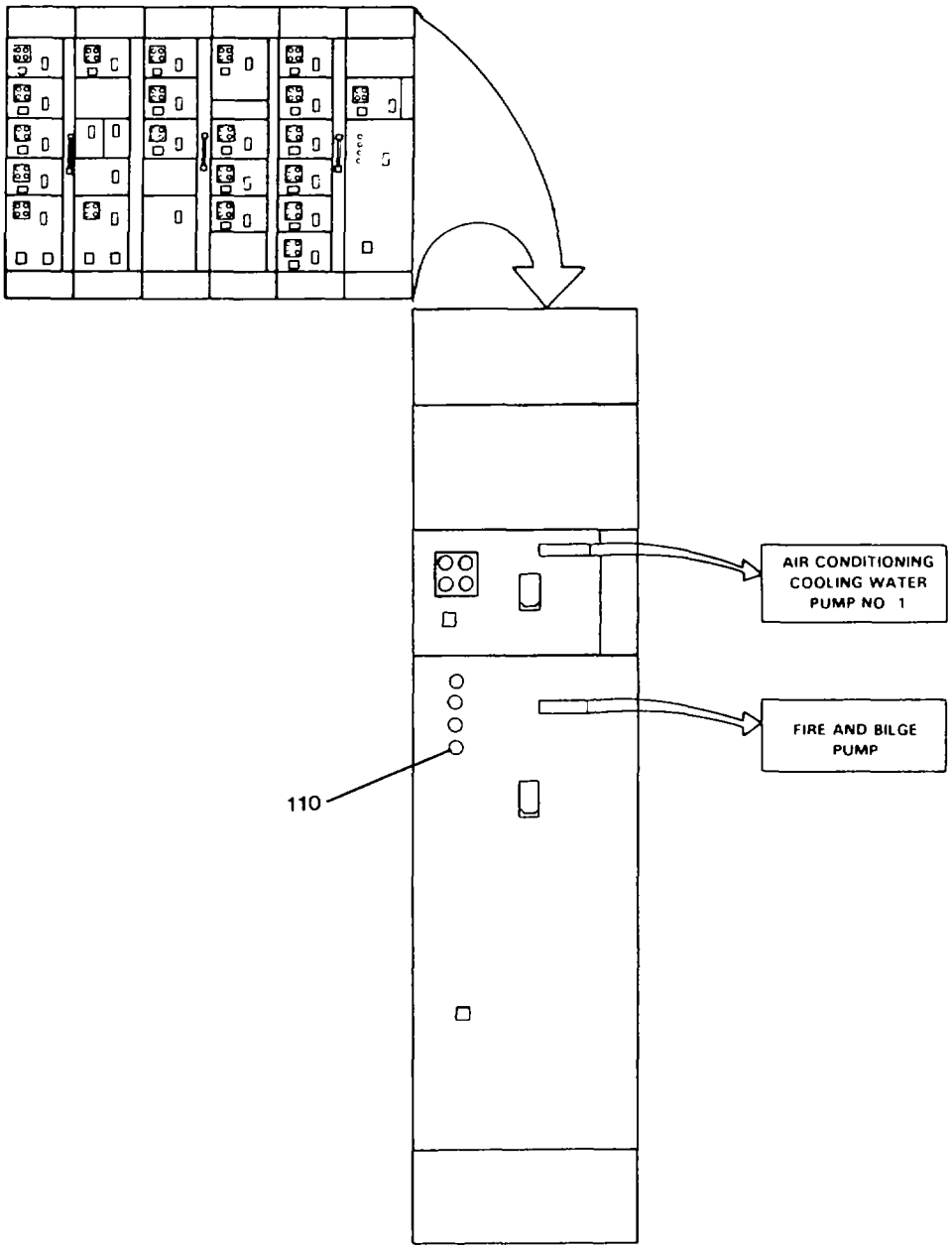
1. PUMP DISCHARGE VALVE TO SLUDGE TANK
2. IN LINE STOP VALVE
3. PUMP DISCHARGE OVERBOARD VALVE
4. DISCHARGE VALVE FROM FIRE/BILGE PUMP
5. PRESSURE GAGE CUTOUT VALVE
6. BILGE/BALLAST PUMP
7. BILGE/BALLAST PUMP
8. BALLAST MAIN SUCTION VALVE
9. 2 VOID TANK STBD SUCTION VALVE
10. 1 VOID TANK STBD SUCTION VALVE
11. FORWARD PEAK TANK SUCTION VALVE
12. 1 VOID TANK CENTER LINE SUCTION VALVE
13. 2 VOID TANK CENTERLINE SUCTION VALVE
14. BOW THRUSTER ROOM SUCTION VALVE
15. FRESH WATER PRIMING LINE TO BILGE PUMP
16. 1 VOID TANK PORT SUCTION VALVE
17. 2 VOID TANK PORT SUCTION VALVE
18. ENGINE ROOM BILGE SUCTION STBD AFT
19. AFT PASSAGE WAY BILGE SUCTION
20. ENGINE ROOM BILGE SUCTION PORT AFT
21. INDEPENDENT BILGE SUCTION VALVE
22. BILGE PUMP SUCTION VALVE
23. BILGE PUMP SUCTION STRAINER
24. BILGE PUMP SUCTION VALVE
25. BILGE PUMP SUCTION STRAINER
26. PRESSURE GAUGE CUTOUT VALVE
27. DISCHARGE PRESSURE GAUGE (0-200 PSI)
28. BILGE PUMP DISCHARGE VALVE
29. DISCHARGE PRESSURE GAUGE (0-200 PSI)
30. BILGE PUMP DISCHARGE VALVE

FIGURE 2-229. Bilge Ballast Piping System.



LEGEND
70. STOP PUSHBUTTON
74. STOP PUSHBUTTON
75. START PUSHBUTTON

FIGURE 2-230. Engine Room Motor Control Center (Sheet 1 of 2).



LEGEND
110. OFF-ON SWITCH

FIGURE 2-230. Engine Room Motor Control Center (Sheet 2 of 2).

f. Start ballast pump (4) by pressing START button (75, FIGURE 2-230, Sheet 1 of 2) on motor control center.

CAUTION

Observe gauge (6, FIGURE 2-228). If discharge pressure is not observed within 30 seconds, press the STOP button (74, FIGURE 2-230, Sheet 1 of 2). Refer to unit maintenance.

g. Press the STOP button (74, FIGURE 2-230, Sheet 1 of 2) when the bilges are empty, as indicated by a loss of discharge pressure.

h. Close all valves in the piping system.

2-7.7. Bilge Pumping With Fire Bilge Pump.

a. Align the Fire Bilge piping system (FIGURE 2-231) as follows:

(1) Close all valves in Fire Bilge piping system and bilge ballast piping system (FIGURES 2-231 and 2-229).

(2) Open valves 9 through 20 on bilge manifold or valve 21 as required (FIGURE 2-229).

(3) Open suction valve from bilge manifold (15, FIGURE 2-231).

(4) Open Fire Bilge pump suction valve (19).

(5) Open Fire Bilge pump discharge valve (11).

(6) Open discharge pressure gauge cutout valve (9).

(7) Open in-line stop valve (6).

(8) Open overboard discharge suction valve (15) valve (5).

(9) Open ballast overboard valve (12, FIGURE 2-229).

b. Start the Fire Bilge pump (12, FIGURE 2-231) by turning the ON/OFF switch (110, FIGURE 2-230, Sheet 2 of 2) at the motor control center.

CAUTION

Observe discharge gauge (8, FIGURE 2-231). If discharge pressure is not present within 30 seconds, press the STOP button. Refer to unit maintenance.

c. Turn the ON/OFF switch (110, FIGURE 2-230, Sheet 2 of 2) to OFF when the bilges are empty, as indicated by a loss of discharge pressure.

d. Close all valves in the Fire Bilge piping system.

e. Close all valves in the Bilge Ballast piping system (FIGURE 2-229).

2-7.8. Deballasting With Emergency Fire Pump.

a. Close all valves in ballast piping system (FIGURE 2-228).

b. Close emergency fire pump sea water suction valve (2, FIGURE 2-232).

c. Open emergency fire pump suction valve (1) to ballast piping system.

d. Open emergency fire pump discharge valve (7).

e. Open discharge pressure gauge (9).

f. Open ballast tank suction valves (15, 16, 17, 22, or 25, FIGURE 2-228) as required.

g. Open ballast overboard valve (12).

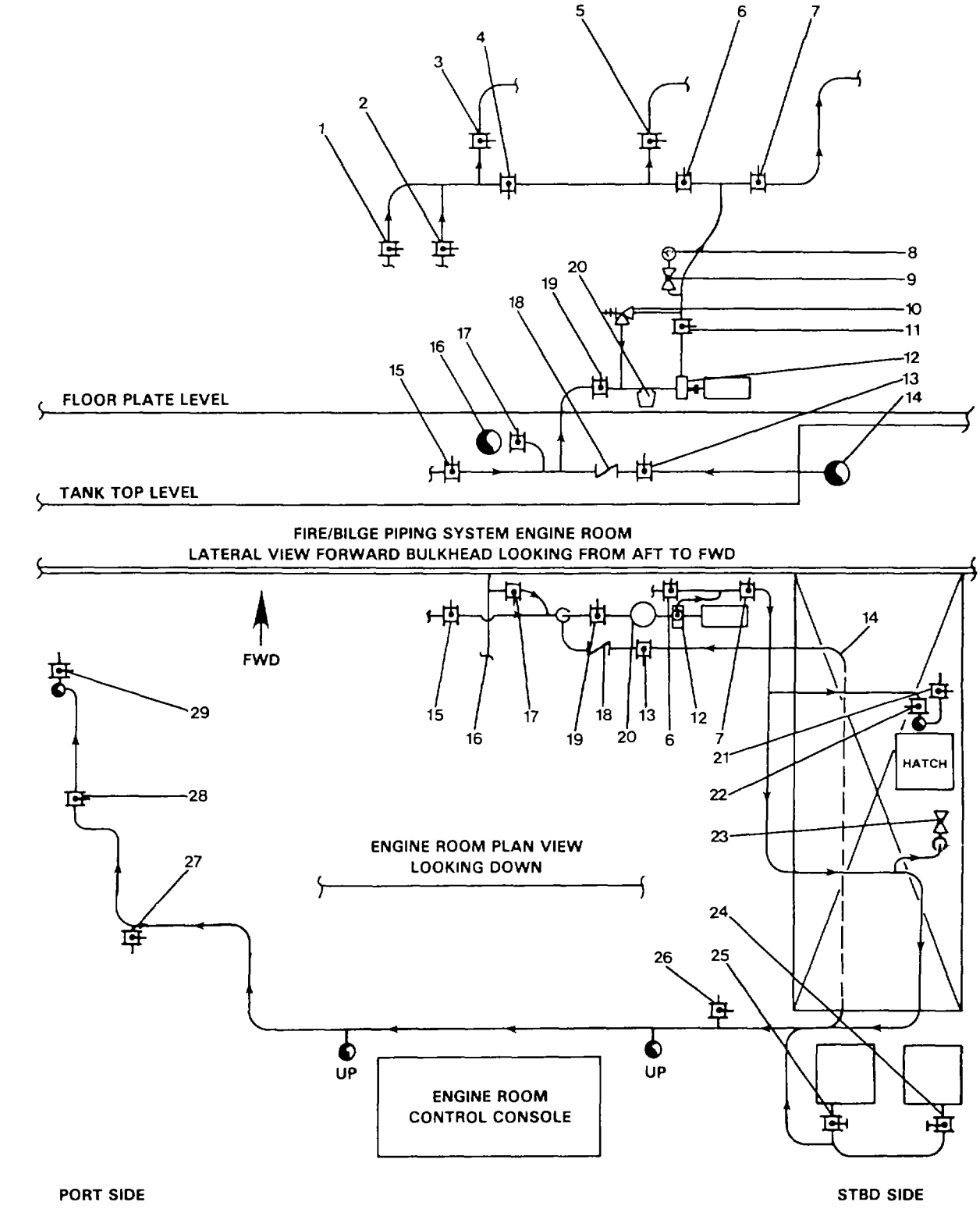
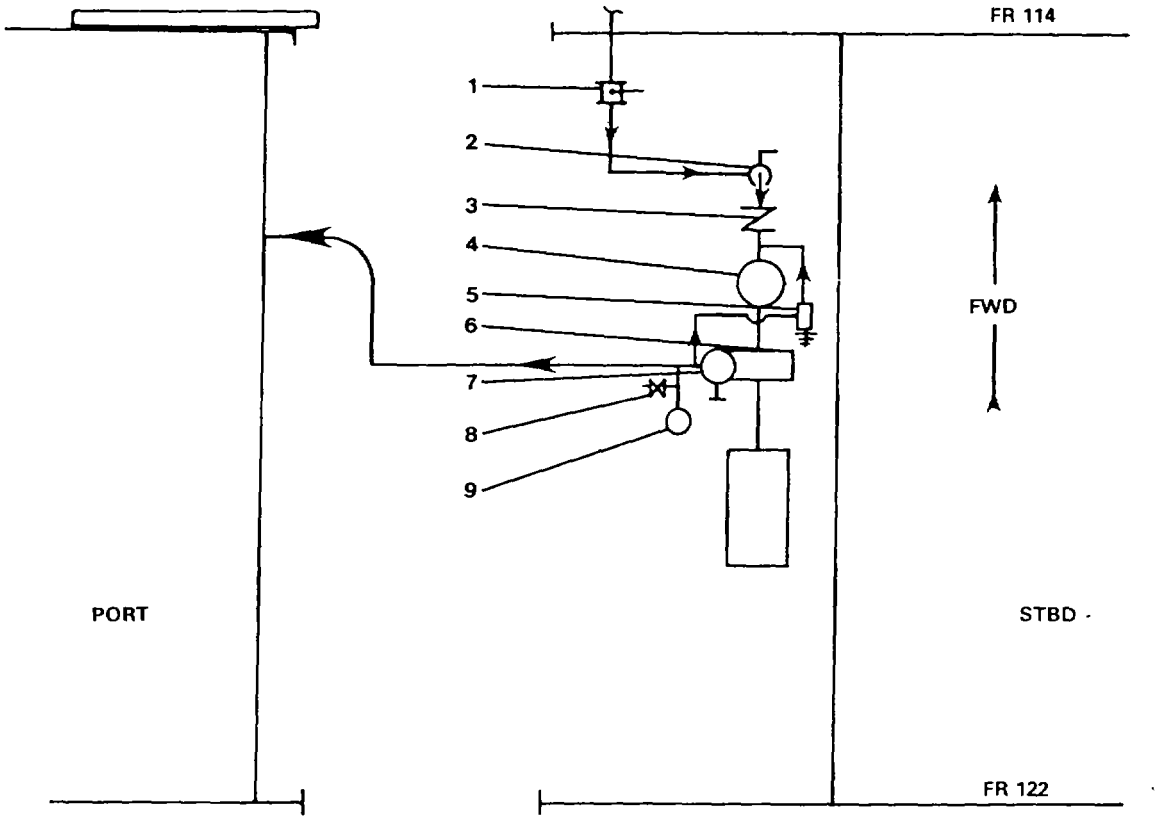


FIGURE 2-231. Fire/Bilge Piping System - Engine Room (Sheet 1 of 2).

LEGEND

1. BILGE/BALLAST PUMP DISCHARGE VALVE
2. BILGE/BALLAST PUMP DISCHARGE VALVE
3. DISCHARGE VALVE TO SLUDGE TANK
4. INLINE STOP VALVE
5. OVERBOARD DISCHARGE VALVE
6. INLINE STOP VALVE
7. DISCHARGE VALVE TO FIRE MAIN
8. DISCHARGE PRESSURE GAUGE (0 To 200 PSI)
9. DISCHARGE PRESSURE GAUGE CUTOUT VALVE
10. PRESSURE RELIEF VALVE
11. FIRE/BILGE PUMP DISCHARGE VALVE
12. FIRE/BILGE PUMP AND MOTOR
13. FIRE/BILGE PUMP SEA WATER SUCTION VALVE
14. FIRE/BILGE PUMP SEA WATER SUCTION PIPE
15. SUCTION VALVE FROM BILGE MANIFOLD
16. BALLAST MAIN PIPE
17. SUCTION VALVE FROM BALLAST MAIN PIPE
18. SWING CHECK VALVE
19. FIRE/BILGE PUMP SUCTION VALVE
20. FIRE/BILGE PUMP SUCTION STRAINER
21. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK STBD SIDE
22. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION STBD SIDE
23. ENGINE ROOM FIRE STATION CUTOUT VALVE
24. HIGH SEA CHEST CUTOUT VALVE
25. LOW SEA CHEST CUTOUT VALVE
26. FIRE MAIN PIPING SYSTEM DRAIN VALVE
27. FIRE MAIN PIPING SYSTEM DRAIN VALVE
28. INLINE STOP VALVE TO MAIN DECK HOSE CONNECTION PORT SIDE
29. FIRE MAIN HOSE CONNECTION CUTOUT VALVE LOCATED ON MAIN DECK PORT SIDE

FIGURE 2-231. Fire/Bilge Piping System - Engine Room (Sheet 2 of 2).



EMERGENCY FIRE PUMP AFT PASSAGE WAY
PLAN VIEW LOOKING DOWN

LEGEND

1. EMERGENCY FIRE PUMP SUCTION VALVE TO BALLAST MAIN
2. EMERGENCY FIRE PUMP SEA WATER SUCTION VALVE FROM SEA CHEST IN SKEG
3. SWING CHECK VALVE
4. SUCTION STRAINER
5. RELIEF VALVE
6. EMERGENCY FIRE PUMP AND MOTOR
7. EMERGENCY FIRE PUMP DISCHARGE VALVE
8. PUMP VENT VALVE
9. DISCHARGE PRESSURE GAUGE 0-300 PSI

FIGURE 2-232. Emergency Fire Pump Piping System.

h. Close all valves in the Fire Bilge pump piping system (FIGURE 2-231).

i. Open overboard discharge valve (5).

j. Open inline stop valve (6).

k. Open discharge valve to fire main (7).

l. Turn emergency fire pump motor controller OFF/ON switch (3, FIGURE 2-92) to ON.

m. Turn the OFF/ON switch (3, FIGURE 2-92) to OFF when deballasting is complete, as indicated by a loss of discharge pressure.

2-7.9. Bow Ramp Emergency Operation.

WARNING

Before operating windlass and winch, ensure personnel and foreign objects are clear of wildcat, anchor clam, bow ramp and related components. Moving winch and ramp parts can cause serious injury.

2-7.9.1. Bow Ramp Operation Using Port and Starboard Anchor Windlasses.

CAUTION

This procedure requires four personnel to perform: two to operate the windlasses and two to operate the locking bars, ratchet dogs, and to act as observers. Equal haul-in and payout of port and starboard cables is essential. Failure to follow this procedure may cause serious damage to the bow ramp.

2-7.9.1.1. Lowering of Bow Ramp. (FIGURE 2-233)

a. Apply port and starboard handbrakes (10 and 14, Sheet 1 of 2) on the windlass and bow ramp winch assemblies.

b. Station two observers aft of the ramp on the main deck to observe ramp operation.

c. Turn on power to the windlass hydraulic systems by pressing the black start button (25) located at the port windlasses.

d. Engage port and starboard clutches (12), which couple the bow ramp winch drums (13) to the windlass assemblies.

e. Disengage port and starboard bow ramp winch clutches (20).

f. Disengage port and starboard gypsy clutches (27) to disconnect drive to the wildcats (11).

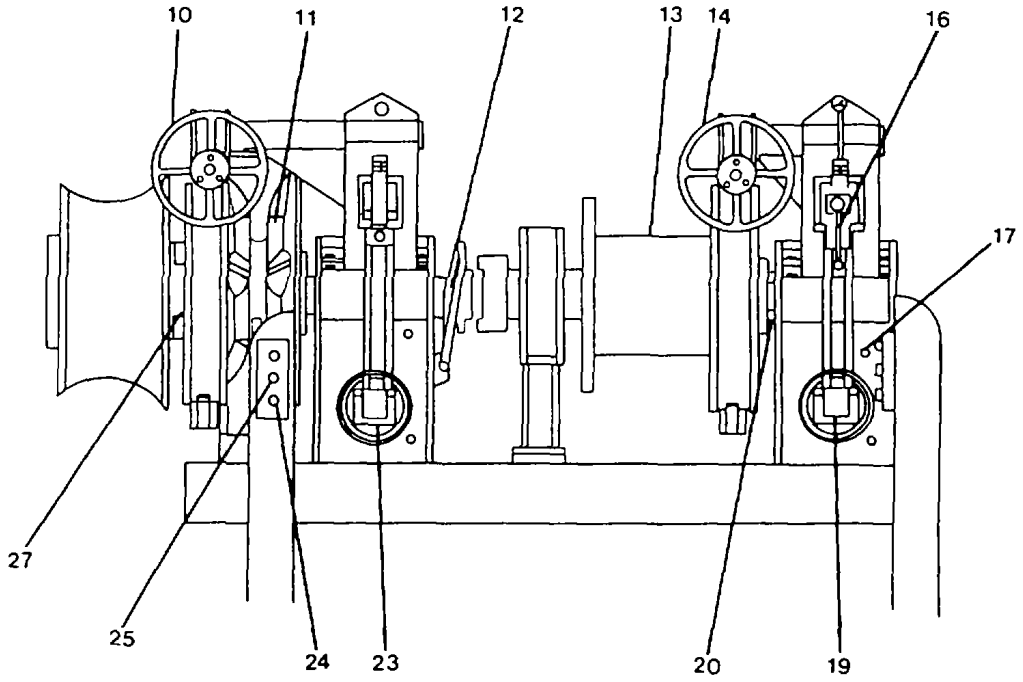
g. Release port and starboard bow ramp winch brakes by turning handbrake wheel (14) counterclockwise.

h. Apply tension to the ramp cables by moving control lever (27) down.

NOTE

The failsafe brakes (23) will be released by hydraulic pressure when the control lever (28, Sheet 2 of 2) is moved from the neutral position. It will be re-applied when the control lever (28) is returned to the neutral position.

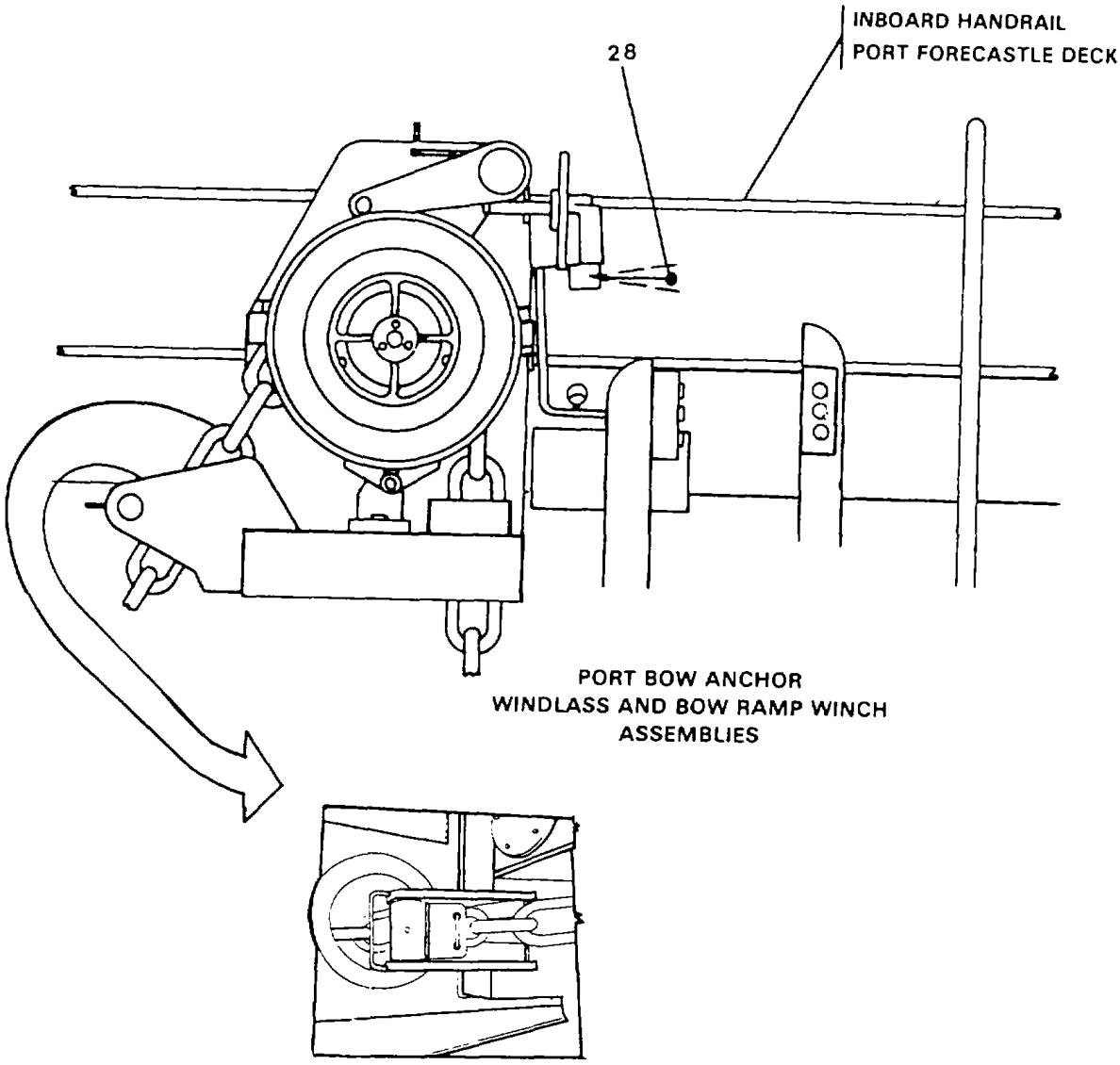
i. Apply the port and starboard bow ramp winch brakes (14, Sheet 1 of 2).



LEGEND

10. WILDCAT/GYPSY HANDBRAKE WHEEL
11. WILDCAT
12. CLUTCH
13. BOW RAMP WINCH DRUM
14. BOW RAMP WINCH DRUM HANDBRAKE WHEEL
16. BOW RAMP WINCH CONTROL VALVE
17. BOW RAMP WINCH OIL LEVEL INSPECTION PLUG
19. BOW RAMP WINCH HYDRAULIC MOTOR WITH FAIL-SAFE BRAKE
20. CLUTCH
23. WINDLASS HYDRAULIC MOTOR WITH FAIL-SAFE BRAKE
24. RED STOP BUTTON
25. BLACK START BUTTON
27. GYPSY CLUTCH

FIGURE 2-233. Bow Ramp Anchor Windlass and Bow Anchor Winch Controls (Sheet 1 of 2).



LEGEND:

28. BOW ANCHOR WINDLESS CONTROL VALVE

FIGURE 2-233. Bow Ramp Anchor Windlass and Bow Anchor Winch Controls (Sheet 2 of 2).

j. Attach the bow ramp ladder (5, FIGURE 2-234) to the ladder mounting bracket (6) on the port side of the ramp.

k. Loosen the upper and lower ratchet dogs (4, FIGURE 2-235) and remove shackle.

l. Move the bow ramp ladder (5, FIGURE 2-234) to the starboard ladder bracket (6).

m. Loosen the upper and lower ratchet dogs (4, FIGURE 2-235), and remove shackle.

n. Release the port and starboard locking bars (2) by turning the locking bar wheel (1) counterclockwise.

o. Release port and starboard bow ramp winch handbrakes (14, FIGURE 2-233, Sheet 1 of 2), by turning handwheel counterclockwise.

WARNING

Before operating windlass and winch, ensure personnel and foreign objects are clear of wildcat, anchor clam, bow ramp and related components. Moving winch and ramp parts can cause serious injury.

p. Lower bow ramp by moving up control lever (28, Sheet 2 of 2). Follow directions of observers to ensure equal payout of port and starboard ramp cables.

q. Continue lowering ramp until it bottoms and the cables have a small amount of slack.

r. Set port and starboard ramp winch brakes by turning handwheel (14, Sheet 1 of 2) clockwise.

s. Turn off power to windlass by pressing red stop button (24).

t. Disengage port and starboard clutches (12) which disconnect windlass drive from the winches.

2-7.9.1.2. Raising the Bow Ramp. (FIGURE 2-233)

CAUTION

Station two observers aft of bow ramp on the main deck to direct windlass operator in haul in operation. The observers must also ensure that the safety chains do not jam between the ramp and the bow. Failure to haul in equally on both cables may cause serious damage to the ramp.

a. Turn on power to bow windlasses by pressing black start button (25).

b. Engage port and starboard clutches (12) which connects the windlass drive to the winches.

c. Disengage port and starboard bow ramp winch clutches (20).

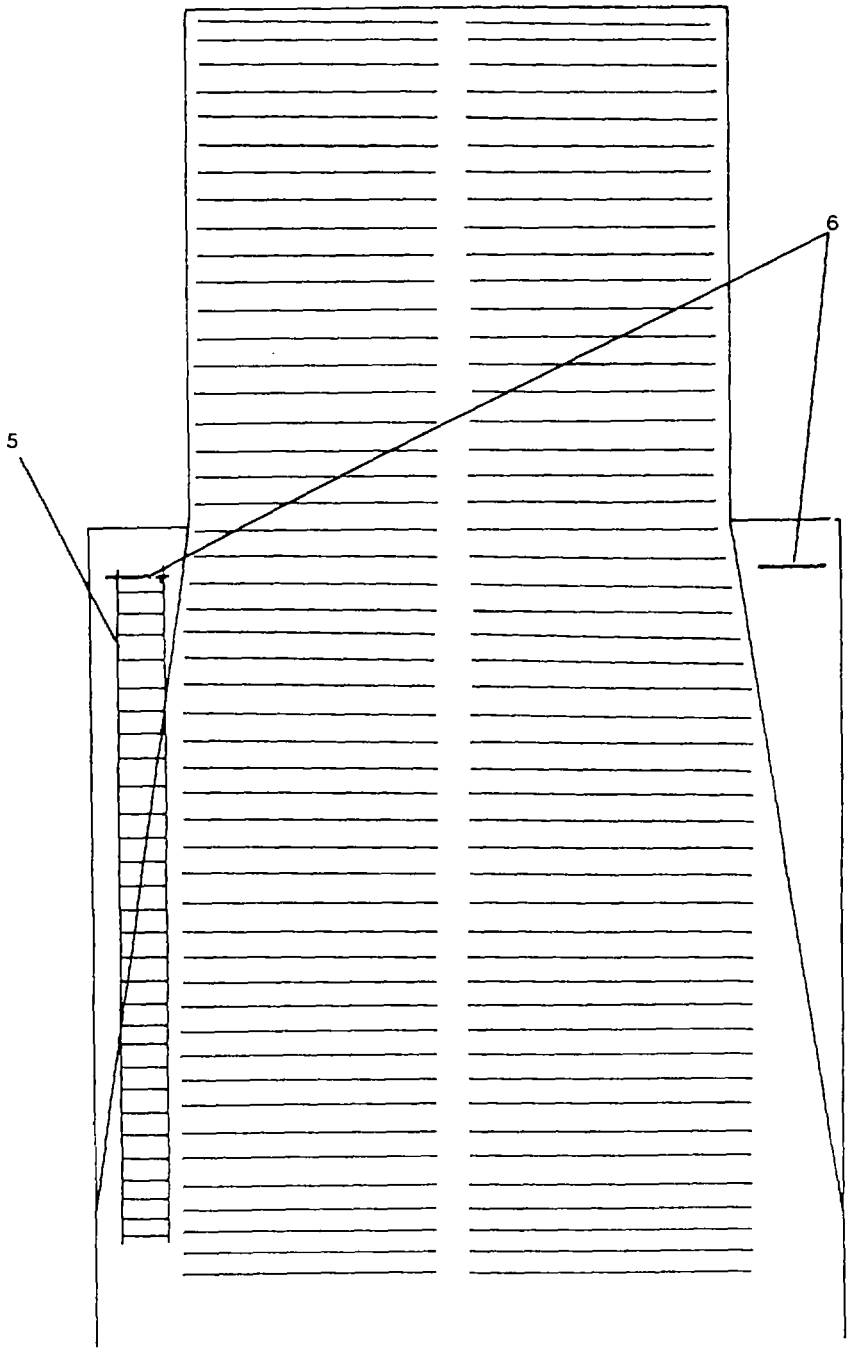
d. Disengage port and starboard gypsy clutches (27) to disconnect drive to the wildcats (11).

e. Release port and starboard bow ramp winch brakes by turning handwheel (14) counterclockwise.

WARNING

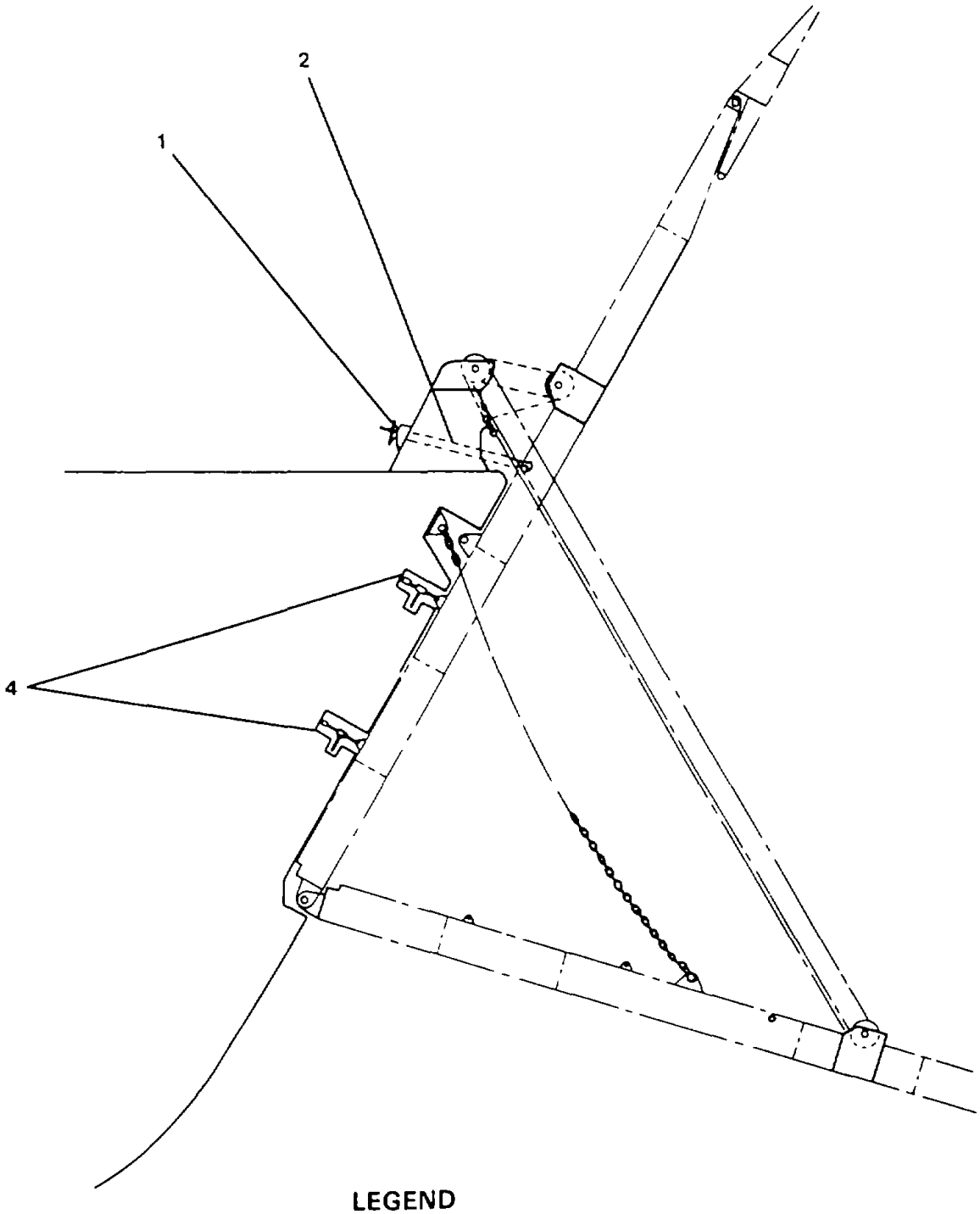
Before operating windlass and winch, ensure personnel and foreign objects are clear of wildcat, anchor clam, bow ramp and related components. Moving winch and ramp parts can cause serious injury.

f. Raise ramp by moving control levers (28, Sheet 2 of 2) downwards to haul in cables. Follow directions of observers to ensure even haul in.



LEGEND
5. LADDER (SHOWN ON PORT LADDER BRACKET)
6. LADDER BRACKETS

FIGURE 2-234. Bow Ramp Ladder Installation.



LEGEND
1. LOCKING BAR WHEEL
2. LOCKING BAR
4. RATCHET DOGS

FIGURE 2-235. Bow Ramp Locking Devices.

NOTE

The failsafe brakes (23, Sheet 1 of 2) will be released by hydraulic pressure when the control lever (28, Sheet 2 of 2) is moved from the neutral position. The brake will be reapplied when the control lever (28) is returned to the neutral position.

g. Continue raising ramp until it comes into contact with the bow seal.

h. Apply port and starboard bow ramp winch brakes by turning handwheels (14, Sheet 1 of 2) clockwise.

i. Turn off power to windlasses by pressing red stop button (24).

j. Install bow ramp ladder (5, FIGURE 2-234) to port ladder bracket (6).

k. Connect the port upper and lower ratchet dogs (4, FIGURE 2-235) to the ramp with shackles.

1. Tighten ratchet dogs (4).

m. Move the ladder (5, FIGURE 2-234) to the starboard ladder bracket (6).

n. Connect the starboard upper and lower ratchet dogs (4, FIGURE 2-235) to the ramp with shackles.

o. Tighten ratchet dogs (4).

p. Engage the port and starboard locking bars (2) by turning the locking bar wheel (1) clockwise.

q. Disengage port and starboard winch clutches (11, FIGURE 2-233, Sheet 1 of 2) which disconnect windlass drive from the winches.

2-7.10. Stern Ramp Emergency Operation.

NOTE

If the stern ramp winch fails, the stern ramp may be lowered and raised using the stern anchor winch. The following procedures describe the emergency operations.

WARNING

- **Inspect the winch (FIGURE 2-236) and components for damage prior to operation.**
- **Do not operate winch with guards removed.**
- **Keep all personnel clear of moving winch and wire rope. Never attempt to guide rope onto spools.**
- **Never wear loose clothing or jewelry while operating winch.**
- **Never operate the winch alone.**
- **Never leave controls while winch is operating.**

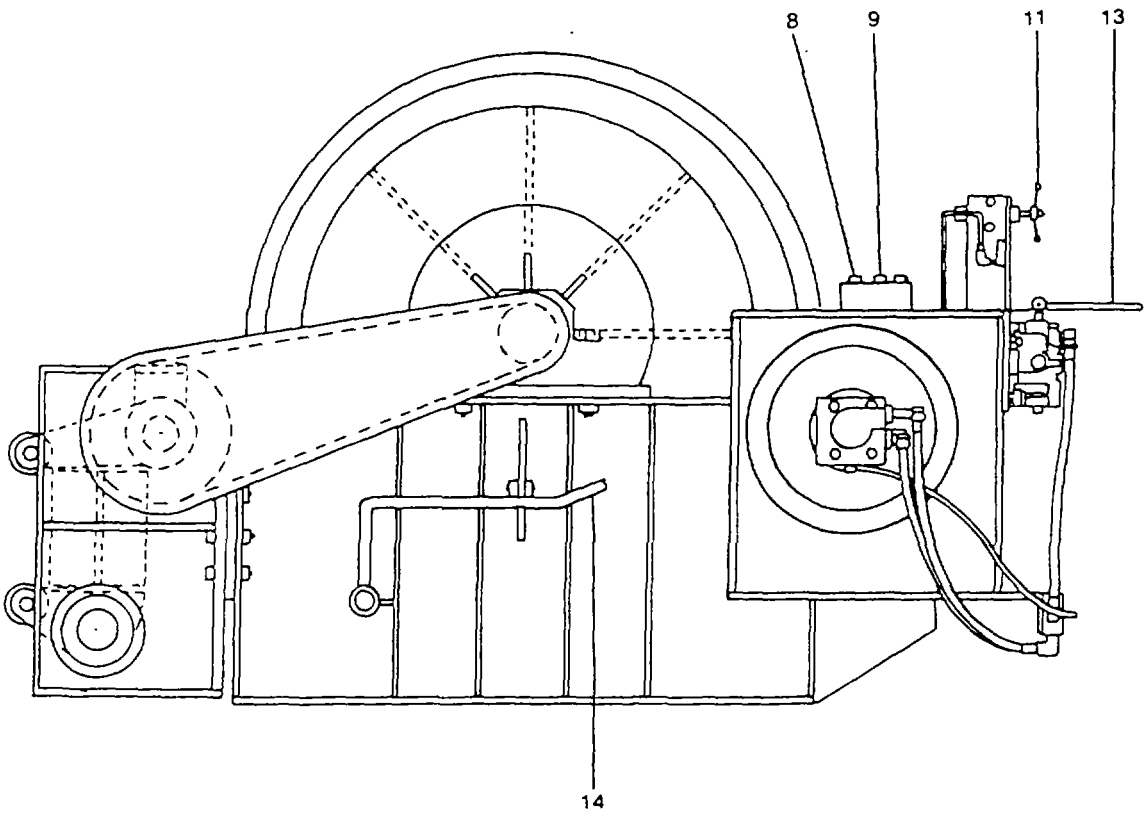
CAUTION

These procedures require four persons: a winch operator, two persons on main deck, and an observer.

2-7.10.1. Lowering Ramp. (FIGURE 2-236)

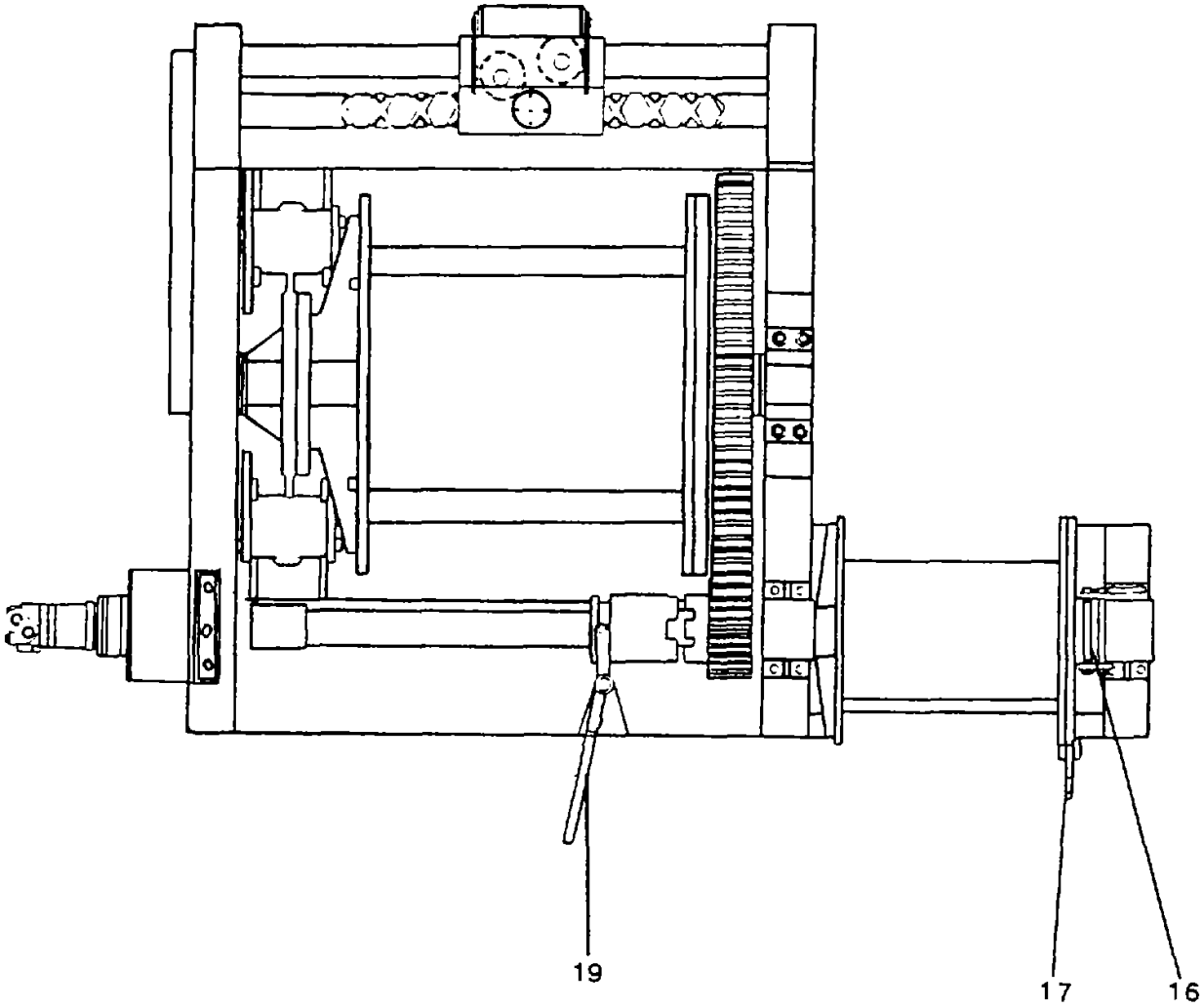
a. Turn handle (11, Sheet 1 of 4) clockwise (1500 psi) to set brake on main spool.

b. Depress START button (8) to turn power on.



LEGEND
8. START
9. STOP
11. HYDRAULIC BRAKE HANDLE
13. CONTROL VALVE
14. MAIN SPOOL DOG HANDLE (SHOWN IN ENGAGED POSITION)

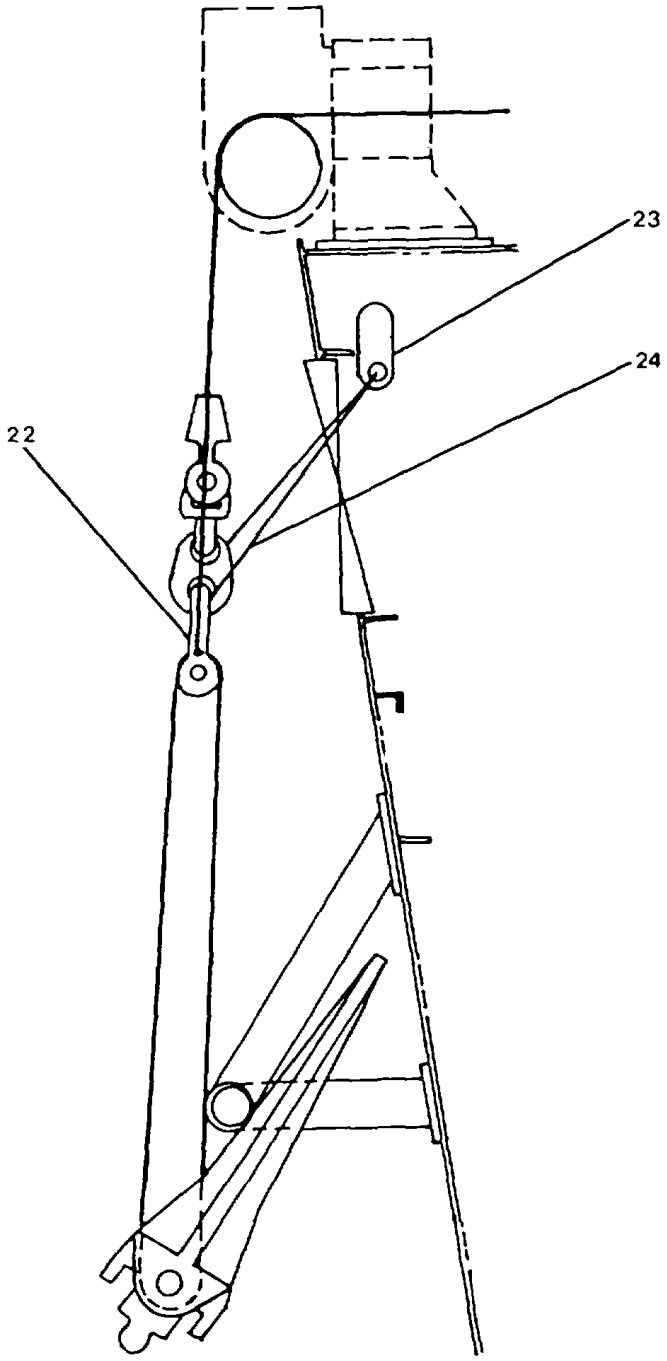
FIGURE 2-236. Stern Anchor and Winch Controls (Sheet 1 of 4).



LEGEND

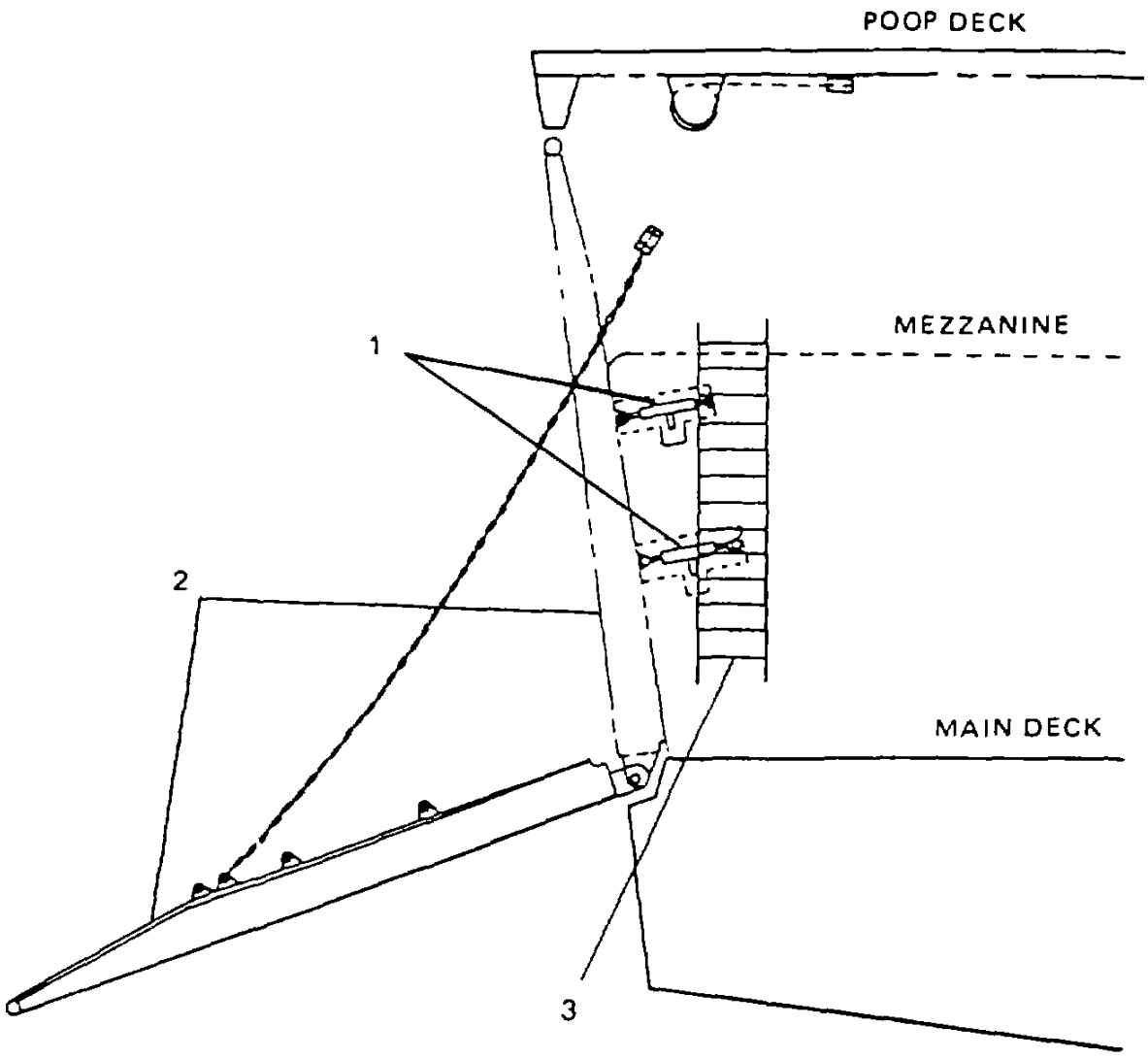
16. AUXILIARY SPOOL CLUTCH HANDLE
17. AUXILIARY SPOOL DOG HANDLE
19. MAIN SPOOL CLUTCH HANDLE

FIGURE 2-236. Stern Anchor and Winch Controls (Sheet 2 of 4).



LEGEND
22. ANCHOR SHACKLE
23. PADEYE
24. ANCHOR HOLDBACK WIRE ROPE

FIGURE 2-236. Stern Anchor and Winch Controls (Sheet 3 of 4).



LEGEND

1. RATCHET DOGS
2. STERN RAMP
3. LADDER

FIGURE 2-236. Stern Anchor and Winch Controls (Sheet 4 of 4).

c. Engage main spool dog (14) and lock.

NOTE
It may be necessary to jog spool to engage dog.

d. Disengage main spool clutch (19) and lock.

e. Engage auxiliary spool clutch (16) and lock.

f. Disengage auxiliary spool dog (17).

NOTE
It may be necessary to jog the spool to engage dog.

g. Move control lever (13) down to pay out sufficient auxiliary cable for connecting to ramp.

h. Rig the auxiliary cable pulley (4, FIGURE 2-237) to the padeye (5) at the center of ramp.

i. Move control lever (13, FIGURE 2-236, Sheet 1 of 4) up to take up slack in cable.

j. Hook the stern ramp ladder (3, Sheet 4 of 4) to the mezzanine deck port side.

k. Disconnect main ramp cable (3, FIGURE 2-237) from ramp:

(1) Hold and secure cable (3) to handrail with wire.

(2) Remove cotter pin (1).

(3) Loosen ratchet dogs (1, FIGURE 2-236, Sheet 4 of 4) and disconnect from ramp by removing shackles.

l. Move ladder (3) to starboard side.

m. Disconnect main ramp cable (3, FIGURE 2-237) from ramp.

(1) Hold and secure cable to handrail with wire.

(2) Remove cotter pin (1).

(3) Loosen ratchet dogs (1, FIGURE 2-236, Sheet 4 of 4) and disconnect from ramp (2) by removing shackles.

n. Lower ramp to desired level by moving control lever (13, Sheet 1 of 4) down.

NOTE
Failsafe brake is disengaged by hydraulic pressure when control lever is moved from neutral position. Brake is re-applied when control lever is returned to neutral.

2-7.10.2. Raising Ramp. (FIGURE 2-242)

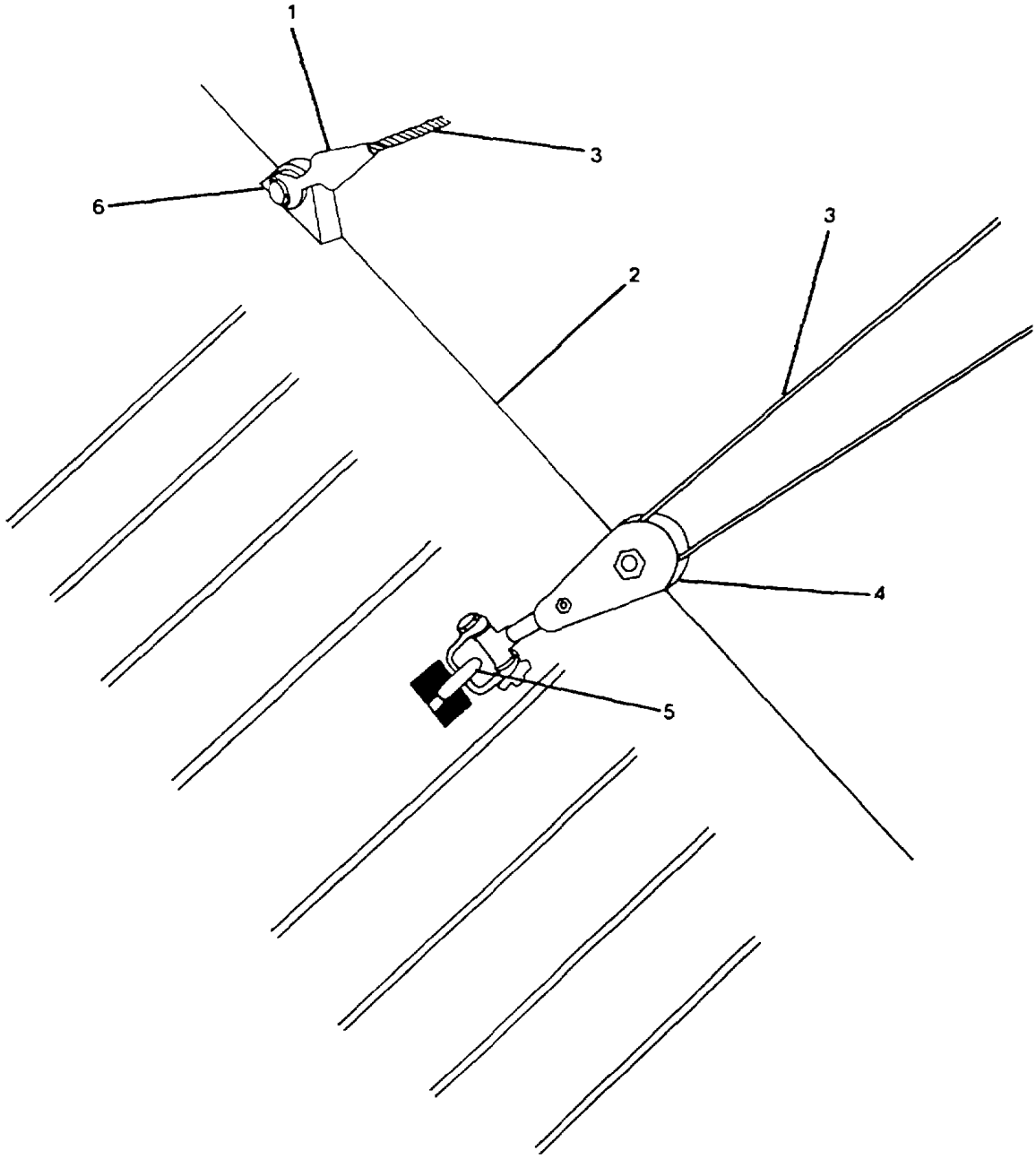
CAUTION
Station two observers forward of the stern ramp on the main deck to observe proper operation of ramp, and to prevent safety chains from fouling the ramp.

a. Press START button (8, Sheet 1 of 4) to turn power on.

b. Disengage auxiliary spool locking dog (17, Sheet 2 of 4).

NOTE
It may be necessary to jog the spool to engage dog.

c. Raise ramp by moving control lever (13, Sheet 1 of 4) towards the bow.



LEGEND
1. COTTER PIN
2. STERN RAMP
3. MAIN RAMP CABLE
4. AUXILIARY CABLE PULLEY
5. SHACKLE
6. PADEYE

FIGURE 2-237. Stern Ramp Support.

d. Install stern ramp ladder (3, Sheet 4 of 4) to mezzanine deck portside.

e. Secure ratchet dogs (1) to ramp (2) with shackle (6, FIGURE 2-237).

f. Tighten ratchet dogs (1, FIGURE 2-236, Sheet 4 of 4).

g. Move ladder (3) to starboard side.

h. Secure ratchet dogs (1) to ramp with shackle (6, FIGURE 2-237).

i. Tighten ratchet dogs (1, FIGURE 2-236, Sheet 4 of 4).

j. Slacken cable by moving control lever (13, Sheet 1 of 4) down.

k. Engage auxiliary spool locking dog (17, Sheet 2 of 4).

(1) Remove bolt (2, FIGURE 2-238) from open end socket (3) on end of main ramp cable (4).

(2) Place open end socket (3) over padeye (6).

(3) Align opening of socket (3) with opening of padeye (6).

(4) Place bolt (2) through the socket (3) and padeye (6) opening.

(5) Secure bolt with cotter pin (1).

NOTE

It may be necessary to jog the spool to engage dog.

l. Press STOP button (9, FIGURE 2-236, Sheet 1 of 4) to remove power.

m. Disengage auxiliary spool clutch (17).

2-7.10.3. Stern Anchor Winch Emergency Operation (Hydraulic).

NOTE

If the stern anchor winch hydraulic pump fails, use the stern ramp winch hydraulic pump.

WARNING

- **Inspect winch and components for damage prior to operating.**
- Do not operate winch with guards removed.
- Stay alert.
- Never operate winch alone.
- Keep all personnel clear of moving winch and wire rope.
- Never wear loose clothing or jewelry while operating winch.
- Never attempt to guide wire rope onto spools.
- Never leave controls while winch is operating.
- Never perform maintenance while winch is running.

2-7.10.3.1. Pre-Operation Check.

a. Move winch control valve (13, FIGURE 2-236, Sheet 1 of 4) to NEUTRAL.

b. Set brakes (11) to 1500 psi. Refer to gauge (12).

c. Engage main spool dog (14).

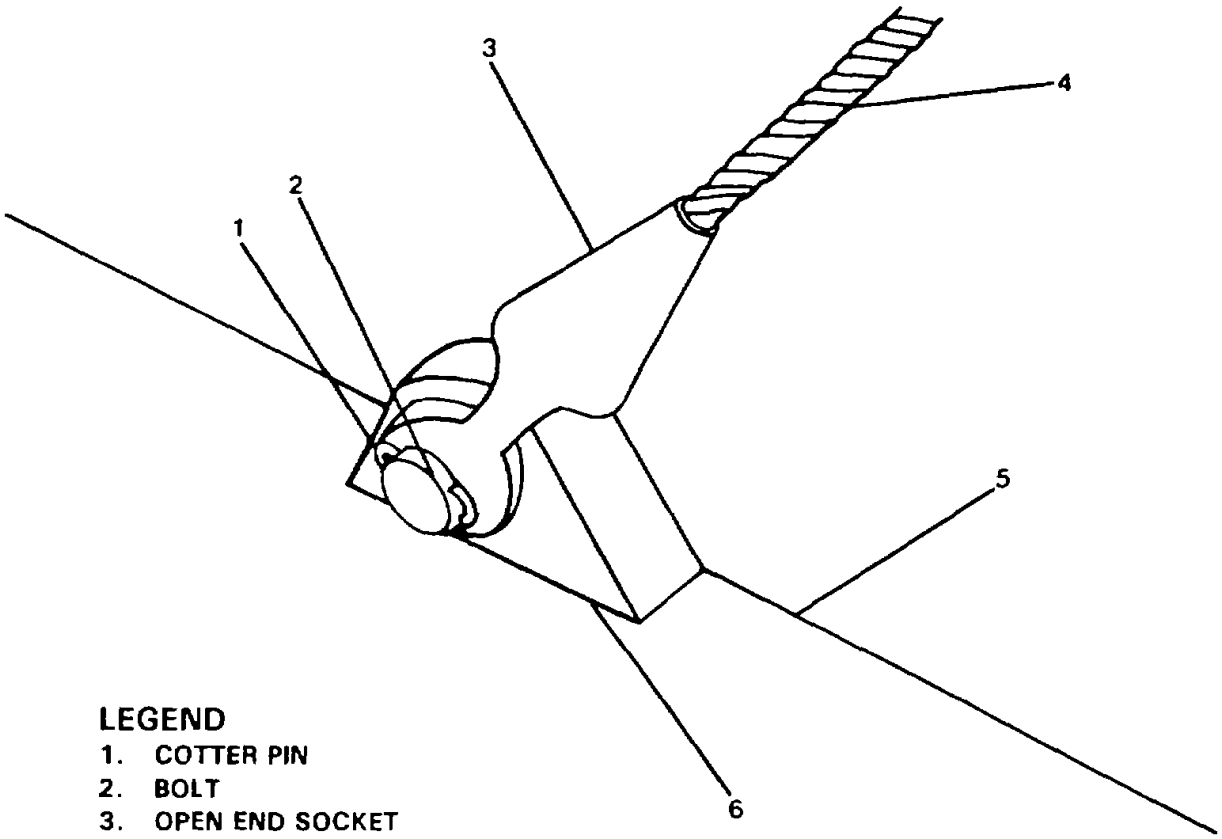


FIGURE 2-238. Main Cable to Ramp Connection.

d. Disengage main spool clutch (19).

e. Engage auxiliary spool dog (17).

f. Disengage auxiliary spool clutch (16).

g. Check hydraulic fluid in stern ramp hydraulic system (7, FIGURE 2-239).

h. Turn manual control valve (5) to Stern Anchor Winch.

WARNING

Before starting hydraulic pump, clear personnel and foreign objects from spools, wire rope, clutches, and related components. Moving winch parts can cause serious injury or death.

i. Start stern ramp winch hydraulic pump as follows:

(1) Turn on circuit breaker No. 1 in power panel P3 in Emergency Generator Room, main deck aft.

(2) Depress reset button (1) on stern ramp winch motor controller.

(3) Depress START button (3) on stern ramp winch motor controller.

WARNING

High pressure hydraulic systems can cause serious injury if equipment fails. Do not operate if hydraulic pressure exceeds 3000 psi.

j. Check hydraulic pressure gauge (6). If pressure exceeds 3000 psi:

(1) Depress STOP button (4) on stern ramp winch motor controller.

(2) Report high pressure reading to supervisor and maintenance.

2-7.10.3.2. Lowering Anchor by Paying Out Wire Rope. (FIGURE 2-236)

a. Conduct pre-operation check of controls prescribed in paragraph 2-7.10.3.1.

WARNING

Before operating winch, clear personnel and foreign objects from spools, wire rope, clutches and related components. Moving winch parts can cause serious injury or death.

b. Engage hydraulic brakes (11, Sheet 1 of 4).

c. Engage and lock main spool clutch (19, Sheet 2 of 4).

d. Disengage main spool dog (14, Sheet 1 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

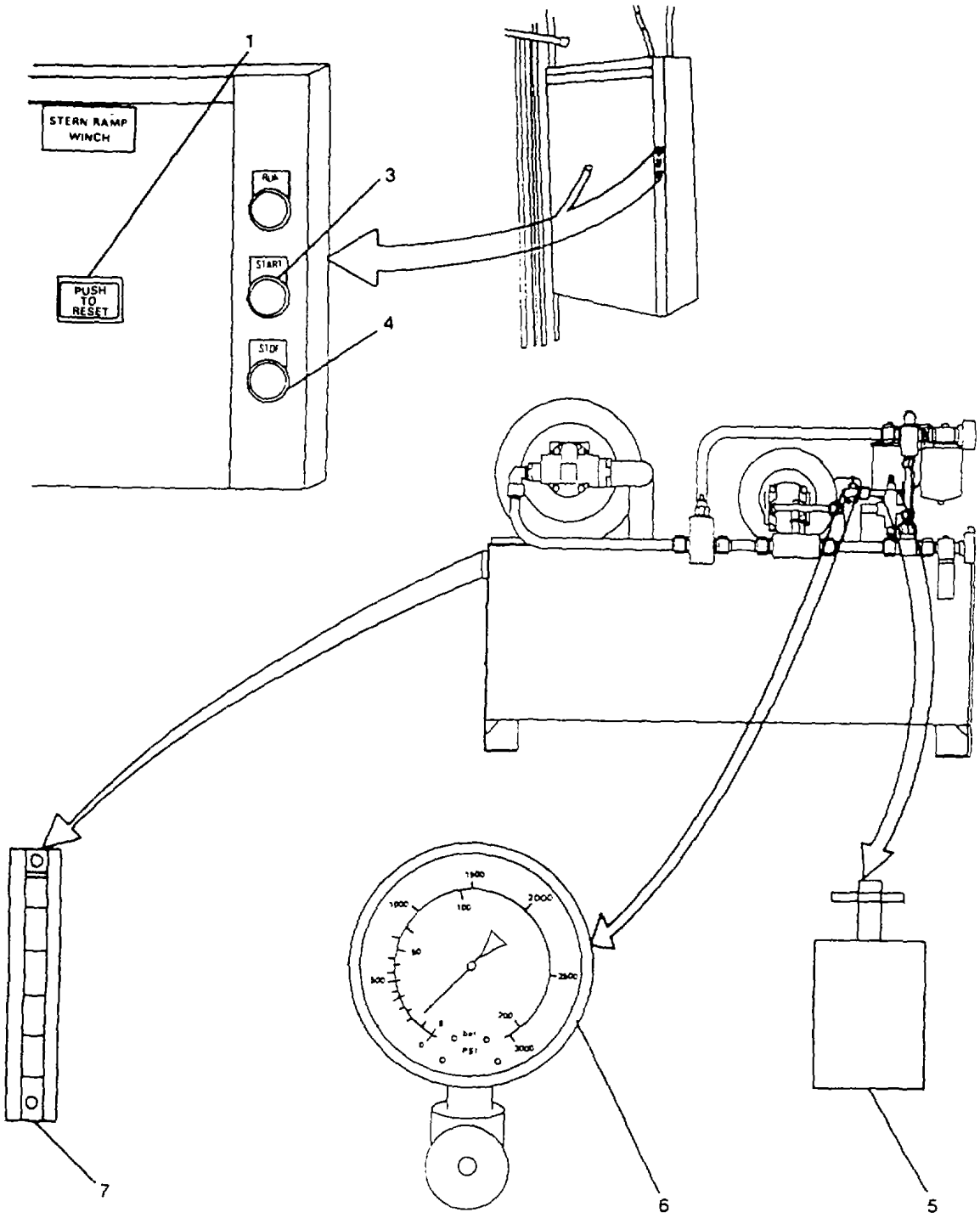
e. Release brakes (11).

f. Haul in wire rope by jogging control valve (13) UP.

g. Reset brakes (11).

h. Detach anchor holdback wire rope (24, Sheet 3 of 4).

i. Release brakes (11, Sheet 1 of 4).



LEGEND

1. RESET PUSHBUTTON
3. START PUSHBUTTON
4. STOP PUSHBUTTON
5. MANUEL CONTROL VALVE
6. PRESSURE GAUGE
7. SIGHT GAUGE

FIGURE 2-239. Stern Ramp Winch Controls.

j. Pay out anchor and wire rope to desired length by holding control valve handle (13) in DOWN.

k. Stop payout by bringing control valve handle (13) to NEUTRAL.

CAUTION

Never engage dog while spool is moving. Engaging dog with spool moving will destroy winch.

l. Engage main spool dog (14).

m. Engage brakes (11).

n. Conduct post-operation check of controls as prescribed in paragraph 2-7.10.3.5.

2-7.10.3.3. Lowering Anchor by Releasing Brakes. (FIGURE 2-236)

a. Conduct pre-operation check prescribed in paragraph 2-7.10.3.1.

WARNING

Before operating winch, clear personnel and foreign objects from spools, wire rope, clutches and related components. Moving winch parts can cause serious injury or death.

b. Engage hydraulic brakes (11, Sheet 1 of 4).

c. Engage and lock main spool clutch (19, Sheet 2 of 4).

d. Disengage main spool dog (14, Sheet 1 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

e. Release brakes (11).

f. Haul in wire rope by jogging control valve (13) UP.

g. Reset brakes (11).

h. Detach anchor holdback wire rope (24, Sheet 3 of 4).

i. Disengage and lock clutch (19, Sheet 2 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

j. Release brakes (11, Sheet 1 of 4) and allow main spool to freewheel.

k. Control speed of anchor descent by varying pressure with brake (11).

l. Stop anchor descent by fuly engaging brake (11).

CAUTION

Never engage dog while spool is moving. Engaging dog while spool is moving will destroy winch.

m. Engage main spool dog (14).

n. Engage brakes (11).

o. Conduct post-operation check of controls as prescribed in paragraph 2-7.10.3.5.

2-7.10.3.4. Raising Anchor. (FIGURE 2-236)

a. Conduct pre-operation check of controls prescribed in paragraph 2-7.10.3.1.

WARNING

Before operating winch, clear personnel and foreign objects from spools, wire rope, clutches and related components. Moving winch parts can cause serious injury or death.

b. Engage hydraulic brakes (11, Sheet 1 of 4).

c. Engage and lock main spool clutch (19, Sheet 2 of 4).

d. Disengage main spool dog (14, Sheet 1 of 4).

CAUTION

Never release brakes completely. Maintain "drag" on brakes to prevent runaway of spool which could damage winch.

e. Release brakes (11).

f. Haul in wire rope by moving control valve (13) UP.

g. Hold control valve UP until anchor is up and against anchor rack.

h. Engage brake (11).

CAUTION

Never engage dog while spool is moving. Engaging dog while spool is moving will destroy winch.

i. Engage main spool dog (14).

j. Secure anchor to vessel by inserting anchor holdback wire (24, Sheet 3 of 4) through anchor shackle (22) and attaching holdback wire to padeyes (23).

2-7.10.3.5. Post-Operation Check of Controls. (FIGURE 2-236)

NOTE

Perform the following checks after operating the stern anchor winch.

a. Conduct a complete inspection of winch and components.

b. Engage brakes (11, Sheet 1 of 4).

c. Engage main spool dog (14).

d. Disengage clutch (19, Sheet 2 of 4).

e. Engage auxiliary spool dog (17).

f. Disengage auxiliary spool clutch (16).

g. Check hydraulic fluid level (7, FIGURE 2-239).

h. Stop hydraulic pump as follows.

(1) Depress STOP button (4) on stern ramp winch motor controller.

(2) Turn off circuit breaker No. 1 on power panel P3 in Emergency Generator Room, main deck aft.

i. Turn manual control valve (5) back to stern ramp winch.

2-7.11. Main Engine Cold Weather Start. (FIGURE 2-240)

NOTE

To maintain a constant state of readiness, main engine coolant temperature must be kept above 125 F. In cases of extreme temperatures, pre-heat the coolant as follows:

a. Open preheater circulating pump discharge valve (3).

b. Open preheater circulating pump suction valve (13).

c. Open main engine preheater suction valve (31).

d. Open discharge gauge cutout valve (5).

e. Turn HAND-OFF-AUTO switch (3, FIGURE 2-241) to AUTO position on circulating pump motor controller.

CAUTION

Observe discharge pressure gauge (4, FIGURE 2-240). If discharge pressure is not observed within 30 seconds, turn the HAND-OFF-AUTO switch (3, FIGURE 2-241) to the OFF position.

f. Turn HAND-OFF-AUTO switch (2, FIGURE 2-242) on main engine sump heater to the AUTO position.

2-7.12. Firefighting Equipment.

NOTE

All portable damage control equipment including submersible pumps, portable fire pumps, eductors, and desmoke blowers are located in the Damage Control Locker on the main deck, portside.

2-7.12.1. Operation of Submersible Pumps Against High Discharge Head.

NOTE

When it is necessary to dewater against a high discharge head, connect pumps in series.

a. Connect pumps in accordance with FIGURE 2-243.

CAUTION

Submerse Pump #1 before applying power to prevent overheating.

b. Apply power by plugging general purpose extension box into the nearest receptacle.

NOTE

There is no power switch on the pump.

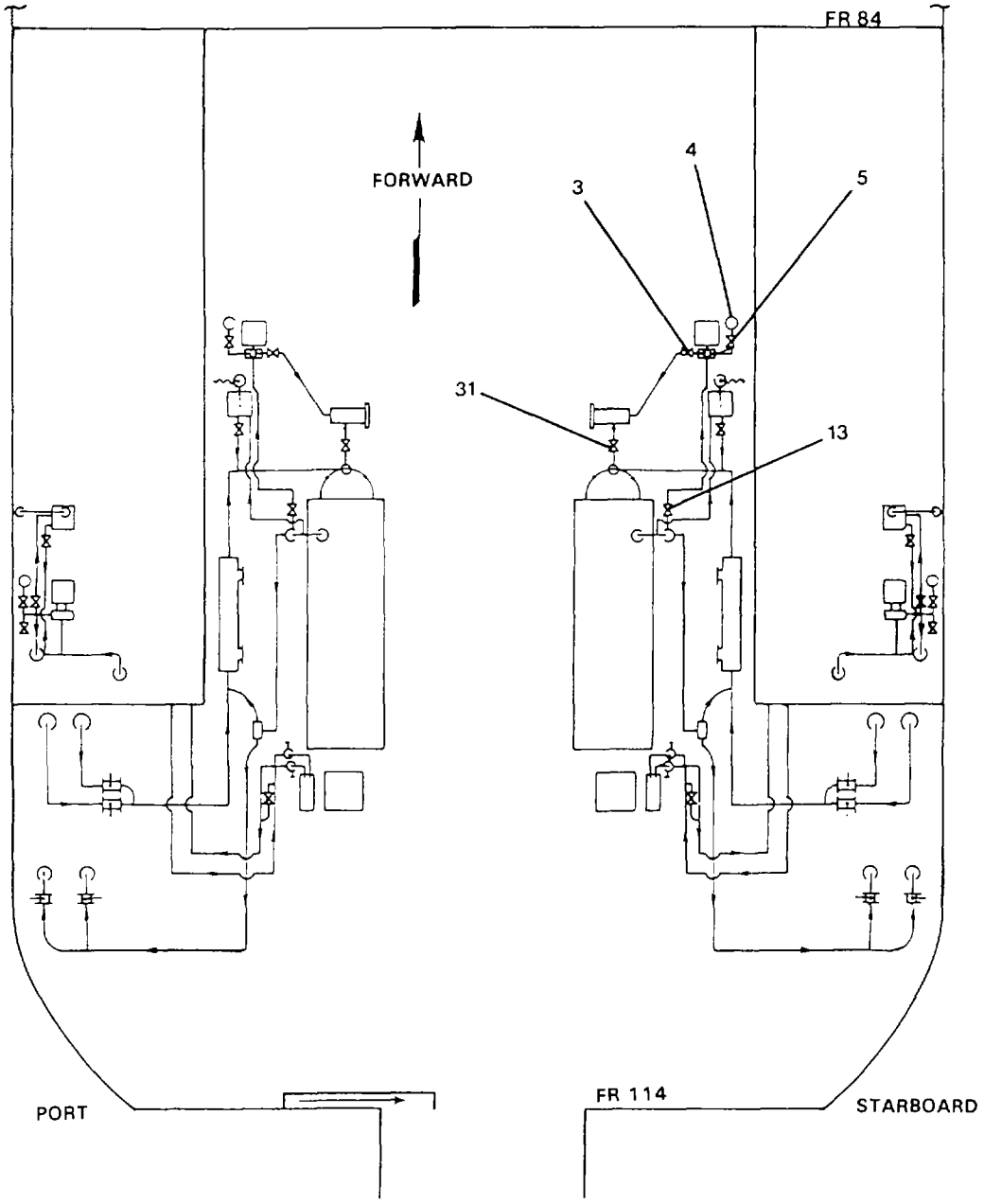
2-7.13. Workboat Launching.

2-7.13.1. Heavy Weather Conditions.

WARNING

- Vessel must be positioned to place workboat davit and launch area on leeward side of weather to reduce risk of personal injury and damage to equipment.
- Clear working area of unnecessary personnel and equipment prior to davit operations.
- Safe pre-operation set-up requires three persons to elevate the boom and a fourth soldier to install boom support pin. Failure to follow set-up procedures could result in serious injury and damage to equipment.

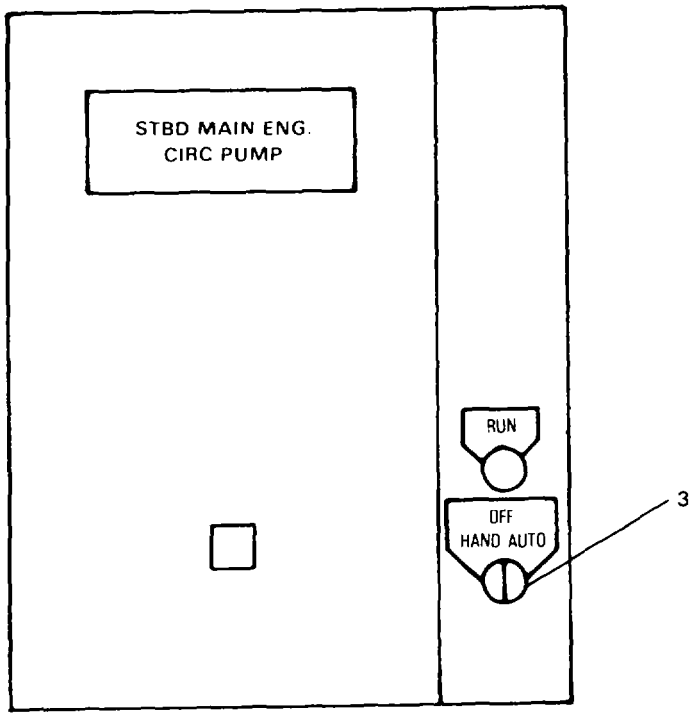
a. Inspect work area around davit to ensure safe operating area.



LEGEND

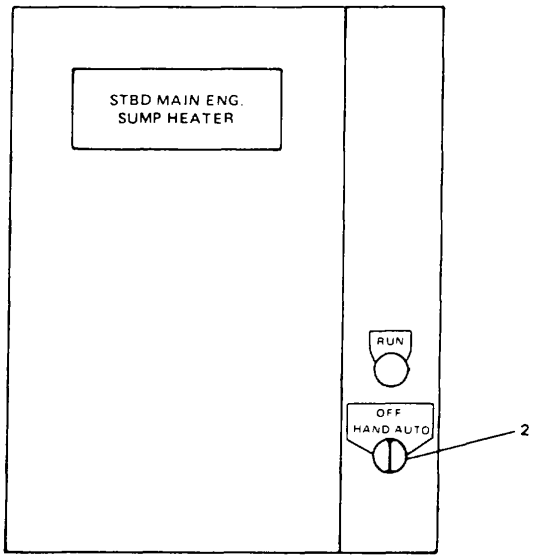
3. PREHEATER CIRCULATING PUMP DISCHARGE VALVE
4. PREHEATER CIRCULATING PUMP DISCHARGE PRESSURE GAUGE (0 TO 200 PSI)
5. GAUGE CUTOUT VALVE
13. PREHEATER CIRCULATING PUMP SUCTION VALVE
31. MAIN ENGINE PREHEATER SUCTION VALVE

FIGURE 2-240. Main Engine Cold Weather Start.



LEGEND
3. HAND-OFF-AUTO SWITCH

FIGURE 2-241. STBD Main Engine Circulating Pumps.



LEGEND
2. HAND-OFF-AUTO SWITCH

FIGURE 2-242. STBD Main Engine Sump Heater.

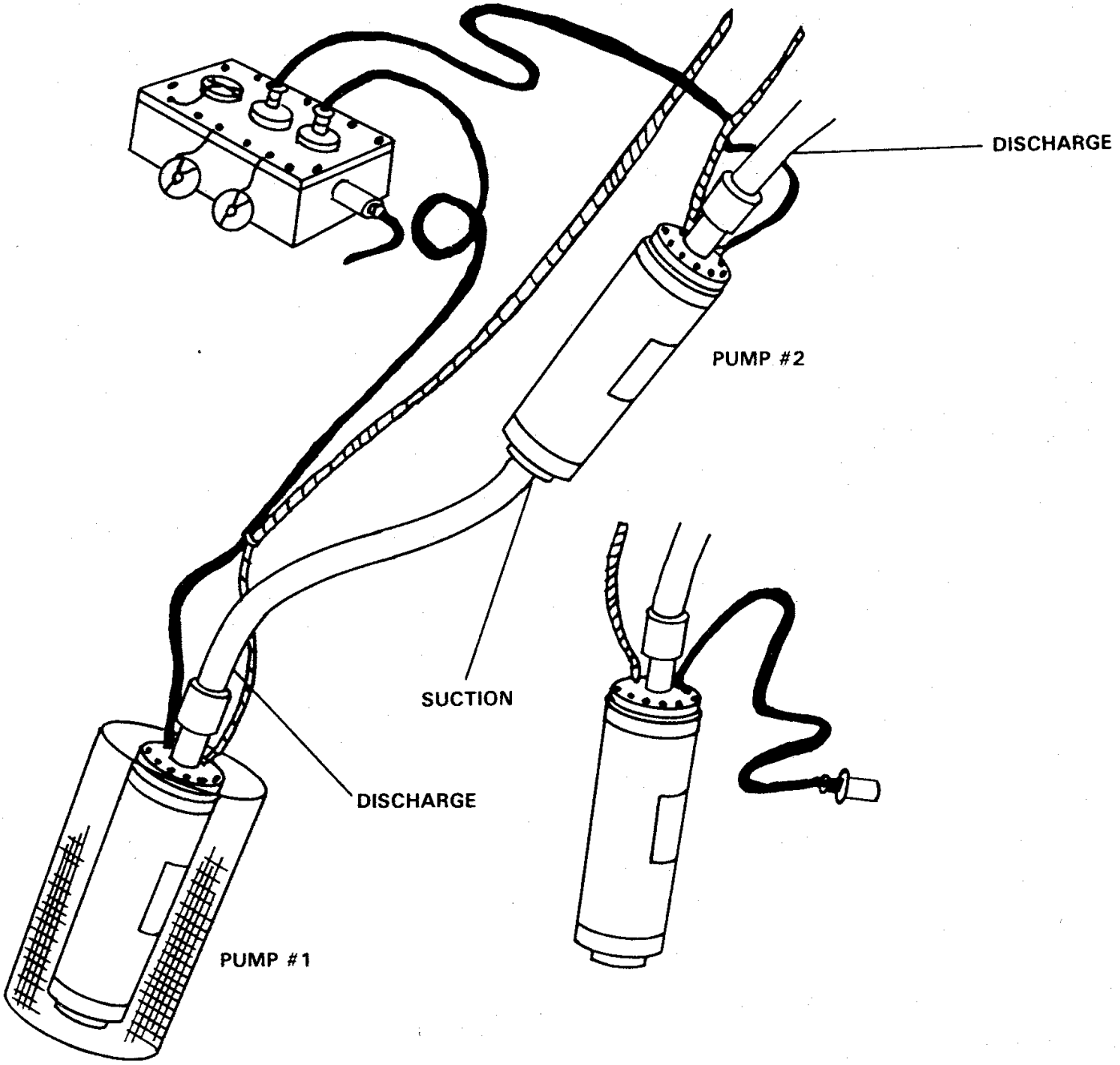


Figure 2-243. Tandem Operation of Submersible Pumps.

NOTE

One winch operator and three assistants are required for the pre-operation set-up and control check.

b. Remove access cover (1, FIGURE 2-244) on storage compartment (2) and remove remote winch control (12) and power cord (8).

WARNING

- Never plug power cord in to an ungrounded outlet.
- Prior to connecting electrical power ensure that electric remote control is in OFF position. Otherwise the winch could unexpectedly start and cause serious personal injury or damage equipment.

c. Turn on electrical power at starboard lighting distribution panel L-3.

d. Plug power cord (8) into davit boom socket (7) and into shipboard 115 volt AC electrical outlet located in starboard stairwell leading to starboard aft mooring station.

e. Turn switch on electric remote control to the OUT position to release tension in cable and lifting hook (17).

f. Remove lifting hook (17) from lifting hook keeper (16).

g. Remove boom support pin (10) from boom support pin recess (4) by loosening thumbscrew (5) and turning boom support pin (10) clockwise to disengage retainer tab (11).

WARNING

Exercise care to prevent davit from swinging to one side during lifting procedure. Swinging davit could cause personal injury.

h. Manually raise davit boom to 45 degree angle, exposing hole (9) in boom support.

i. Secure davit in upright position by inserting and locking boom support pin (10) into hole (9) in boom support. Lock boom support pin by turning counterclockwise to engage slot in retainer tab (11). Turn thumbscrew (6) clockwise.

WARNING

- Never use davit and winch for any type of human support or transportation.
- Never lift a load over personnel. Never walk under a hoisted load. Do not attempt to hoist loads until conditions of load and winch will allow safe operation. Severe injury or death could result should winch or davit equipment fail.

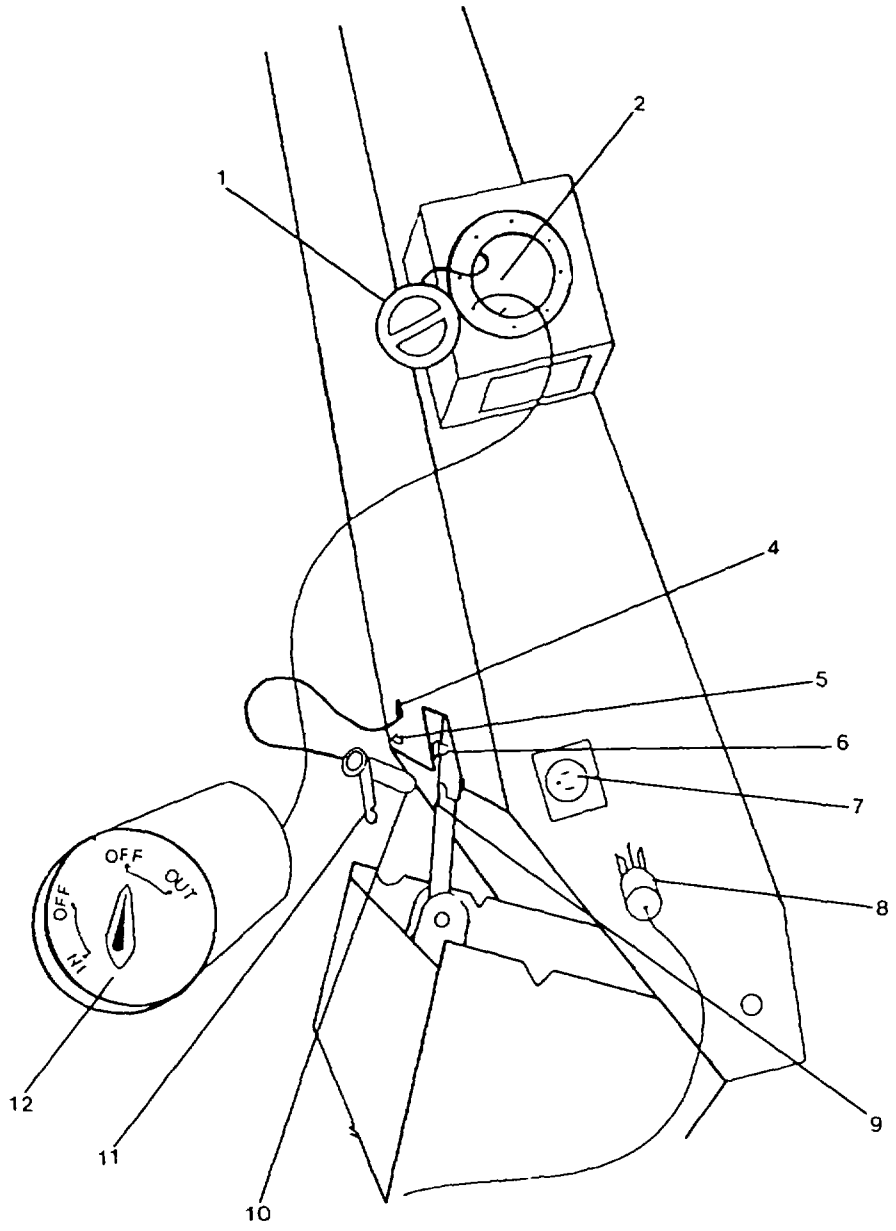
CAUTION

Always stop winch before load reaches davit boom. Never unwind all cable from drum when paying out. Always leave at least five wraps of cable on drum. The davit cable could be damaged.

j. Remove the workboat cover.
k. Pivot boom over the workboat.
1. Attach hook to workboat sling.
m. Attach a painter to the workboat towing bridle.
n. Attach release line to the davit hook.

CAUTION

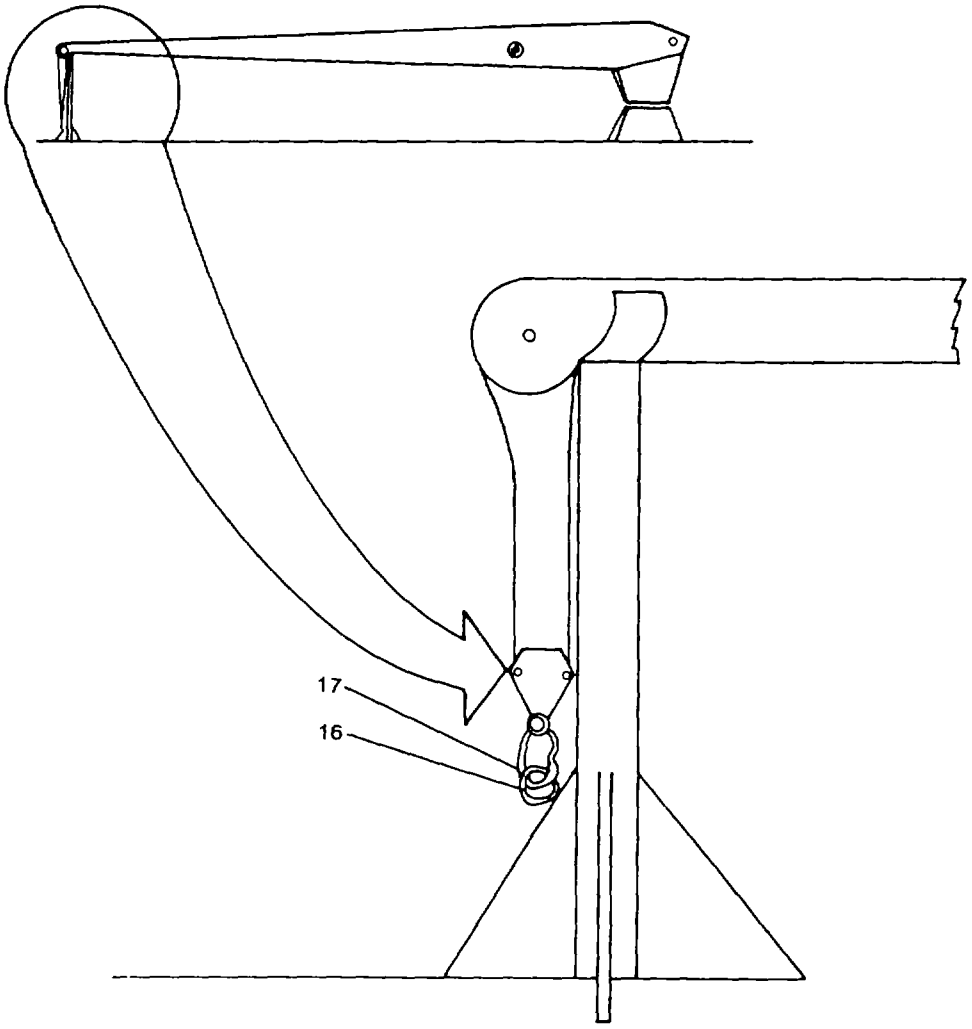
Always ensure that load has come to a complete stop and is stable prior to changing direction of winch.



LEGEND

1. ACCESS COVER
2. STORAGE COMPARTMENT
4. BOOM SUPPORT PIN RECESS
5. LOCKING THUMB-SCREW
6. LOCKING THUMB-SCREW
7. 115V AC ELECTRICAL POWER SOCKET
8. ELECTRICAL POWER CORD
9. HOLE IN BOOM SUPPORT
10. BOOM SUPPORT PIN
11. RETAINE TAB ON BOOM SUPPORT PIN
12. REMOTE ELECTRIC WINCH CONTROL

FIGURE 2-244. Handling Davit Controls (Sheet 1 of 2).



LEGEND
16. LIFTING HOOK KEEPER
17. DAVIT BOOM LIFTING HOOK

FIGURE 2-244. Handling Davit Controls (Sheet 2 of 2).

o. Lift boat by turning control switch (12) to the IN position.

NOTE

Winch will continue to hoist load as long as operator holds switch to the IN position. Winch will stop hoisting boat when operator releases switch.

p. Push boom around the swivel base until boat is over the unloading point.

q. Secure painter to handrail.

r. Secure release line to handrail.

s. Lower boat by turning switch (12) to the OUT position.

NOTE

Load will continue to lower until operator releases switch.

t. Overrun the winch to obtain slack in lifting cable when boat reaches the water.

u. Release the hook by pulling on the release line.

v. Retrieve davit cable by turning switch to IN position.

w. Lower jacobs ladder over the side and board the boat.

2-7.13.2. Workboat Retrieval. (FIGURE 2-244)

WARNING

The vessel must be positioned to place the workboat davit and launch area on the leeward side of the weather to reduce the risk of personnel injury and equipment damage.

a. Bring the boat alongside adjacent to the davit.

b. Secure a painter to the workboat towing bridle.

c. Lower the davit cable by turning control switch (12) to the OUT position.

d. Lower jacobs ladder.

e. Attach hook (17) to workboat sling.

NOTE

Workboat personnel board the vessel via the jacobs ladder.

f. Lift boat by turning control switch (12) to the IN position.

NOTE

Winch will continue to hoist boat as long as operator holds switch to the IN position.

g. Stop hoisting boat by releasing switch when boat is clear of side.

h. Push boom around the swivel base until boat is over the unloading point.

i. Lower boat by turning switch (12) to the OUT position.

NOTE

Boat will continue to lower until operator releases switch.

j. Overrun the winch to obtain slack in lifting cable when boat reaches release point.

k. Detach lifting hook.

1. Secure boat.

m. Replace cover and secure.

2-7.13.3 Abandon Ship Conditions.

NOTE

If power is available, launch the boat with davit.

a. Secure a painter from boat to liferafts.

b. Maneuver the boat to move liferafts clear of danger.

2-7.14. Liferafts.

2-7.14.1. Manual Deployment. (FIGURE 2-245)

NOTE

In extreme emergencies such as rapid flooding or failure of the liferaft davit, the liferafts may be deployed manually.

a. Disconnect cylinder lanyard (5, FIGURE 2-245) from deck-mounted eyebolt.

b. Remove container lid retainer pins (7) from liferaft container.

c. Lift container lid and allow it to fall outboard and open fully.

d. Pull the release handle located in the velcro pouch at the bottom center of the liferaft container.

e. Remove liferaft from liferaft container.

f. Remove painter line (cylinder lanyard) from pouch located in middle of door opening of liferaft.

g. Tie painter line off to a dead end connection.

h. Throw the liferaft overboard into the water.

NOTE

The liferaft will automatically inflate because the cylinder lanyard is tied off to a dead end connection.

2-7.14.2. Free Float Deployment. No operator action is required for free float deployment of the liferafts. The hydraulic static release (4, FIGURE 2-245) will automatically deploy and inflate the liferaft when the ship is under 5 to 15 feet of water.

2-7.15. Nuclear, Biological and Chemical (NBC) Decontamination Procedures.

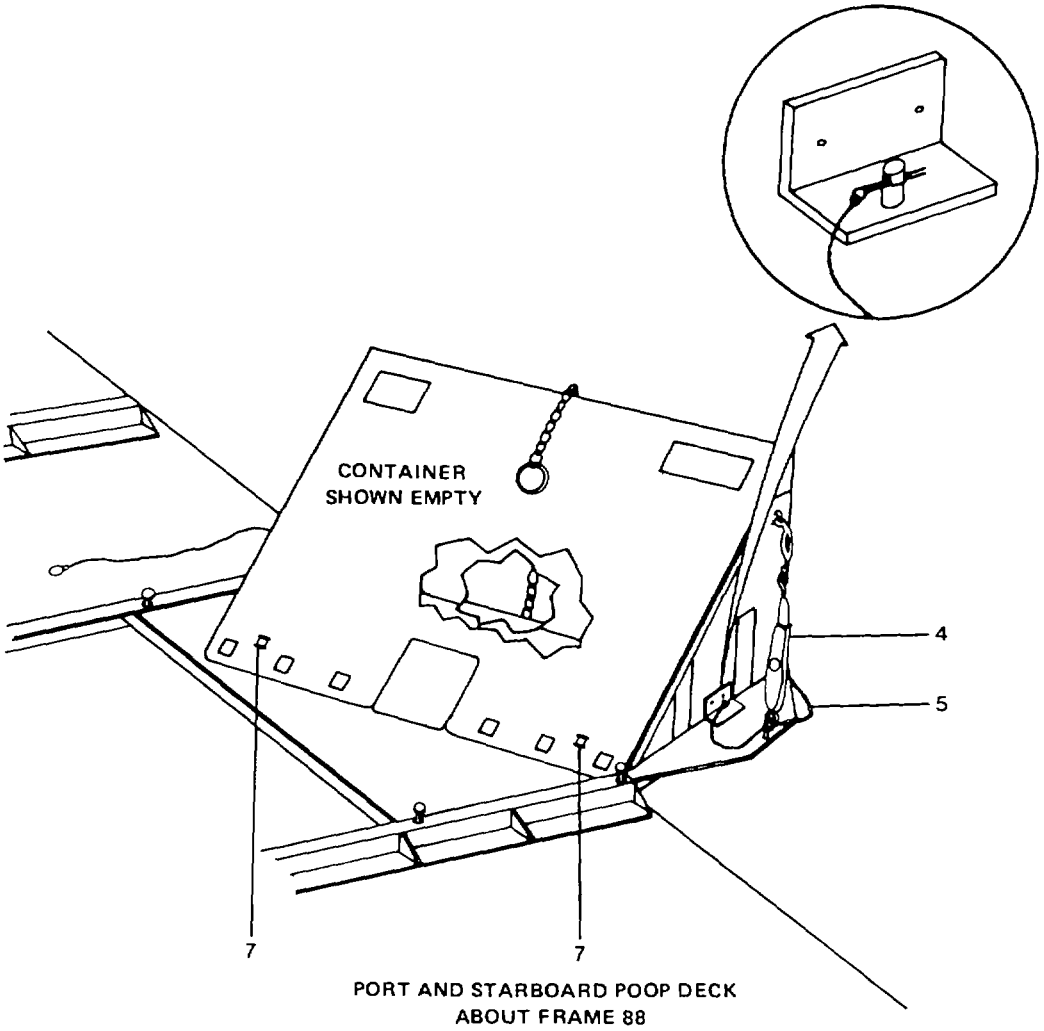
NOTE

Detailed DECON procedures can be found in FM 3-87, FM 21-40 and FM 21-41.

2-7.15.1. General. The following procedures can be performed until appropriate NBC DECON facilities are available. The vessel master will supervise, assign crew duties, and assist the supporting NBC unit. DECON equipment is located on the bridge with the countermeasures washdown system, and other equipment is listed in Section II of Appendix B.

2-7.15.2. Emergency Procedures. If NBC attack is known or suspected, mask at once and continue mission. If inside, do not leave the vessel. If outside, follow DECON procedures below to avoid taking contamination into the vessel. Do not unmask until told to do so.

a. Nuclear Decontamination. Brush fallout from skin, clothing, and equipment with available brushes and rags. Wash skin and have radiation check made as soon as tactical situation permits.



LEGEND
4. HYDROSTATIC RELEASE
5. CYLINDER LANYARD
7. CONTAINER LID RETAINER PINS

FIGURE 2-245. Liferaft Deployment System.

b. Biological Decontamination. The vessel crew has no method to detect or DECON biological agents. Remain masked and continue mission until told to unmask.

c. Chemical Detection and Decontamination.

WARNING

Do not use decontamination spray on personnel. It could cause personal injury.

(1) Use M8 paper from the Chemical Agent Detection Kit or M9 paper to determine if liquid agent is present on vessel weather deck surfaces.

(2) If exposure to liquid agent is known or suspected, clean exposed skin, clothing, and personal gear, in that order, using M258A1 kit.

Use the buddy system. Wash exposed skin and thoroughly decontaminate as soon as the tactical situation permits.

(3) If the M8 or M9 paper indicates that liquid chemical agent is present on the vessel weather deck surfaces, use the countermeasures washdown system to partially DECON the vessel.

2-7.16. Preparation for Heavy Weather.

When heavy weather conditions occur, loose gear or equipment can cause personal injury or damage to equipment.

WARNING

An unexpected ship roll or pitch may cause a soldier to fall against live electrical circuits, rotating machinery, or hot surfaces.

a. Weather Decks. Stow all lines, hoses and loose equipment. Secure and cover all hose reels, cable reels, and the work/rescue boat. Secure and dog all hatches to weather decks. Rig storm lines if any work on the weather decks are required during heavy weather conditions.

b. Pilothouse. Ensure all microphones or headsets are properly in their holders. Secure pencils, rulers and compasses on chart table. Secure coffee pot and all other loose items.

c. Living Spaces and Dining Areas. Secure all pots, cups, dishes, silverware. Tie chairs to table legs or stack and secure. Secure loose personal gear in berthing spaces.

d. Galley. If weather conditions are severe, stop all food preparation that presents a hazard, such as hot oil in fryer, steam, boiling water or hot liquids in oven or on stove burners.

e. Engine and Machinery Spaces. Secure all loose items and tools. Stop all non-essential maintenance. If maintenance is necessary, work in pairs.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. GENERAL. This Chapter contains all those lubrication instructions needed by the operator to help keep the LSV in good running order. For additional lubrication instructions, refer to LO 55-1915-200-12.

3-2. MANDATORY LUBRICATION INSTRUCTIONS. The following lubrication instructions are mandatory and will be performed as scheduled. A separate lubrication order is not published for this equipment.

3-2.1. Main Engine 16-645E6.

3-2.1.1. Prelubrication. (FIGURE 3-1)

a. Prelubrlication of a new engine, or an engine which has been inoperative for more than 48 hours is necessary. Prelubrication protects unlubricated engine parts during the interval when the lube oil pump is filling the passages with oil.

b. Open lube oil system priming valve (3) and operate priming pump (5) to fill lubricating oil system until strainer housing (7) is filled by oil draining from the lubricating oil cooler (4). Strainer housing should be filled until oil overflows into oil pan (6).

c. Close lubricating oil system priming valve (3). Check that main lubricating oil prelube valve (1) is open and piston cooling prelube valve (2) is closed.

d. Operate priming pump (5).

Prelubricate engine at a minimum of 69 kPA (10 psi) for a period of not less than three and not more than five minutes (approximately 57 1pm (15 gpm)).

e. While pressure is being applied, open cylinder test valves (FIGURE 3-2) and turn engine manually one complete revolution. Check all bearings at the crankshaft, camshafts, rocker arms, and at the rear gear train for oil flow. Check for fluid discharge at the cylinder test valves. If there is any sign of water or oil being ejected at the test valves, or any indication of obstruction while rotating the engine, determine the cause before attempting to start the engine. Contact unit maintenance if necessary.

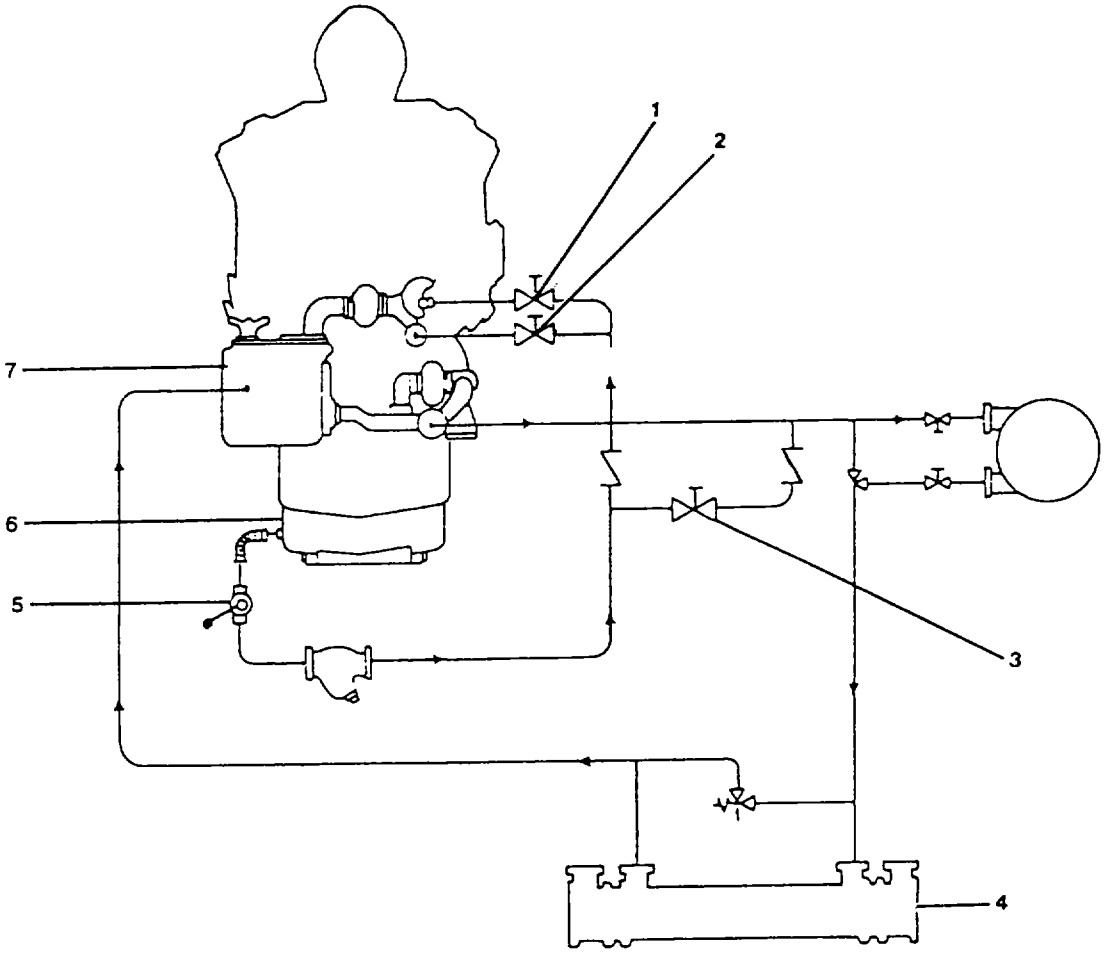
f. On new or overhauled engines, close main lubricating oil prelubricating valve (1, FIGURE 3-1) and open piston cooling prelubricating valve (2).

g. Operate priming pump (5). Check for unrestricted oil flow at each piston cooling oil pipe (2, FIGURE 3-3).

h. Close cylinder test valves (FIGURE 3-2).

i. Pour a liberal quantity of oil over the cylinder mechanism of each bank.

j. Check oil level in strainer housing (7, FIGURE 3-1) and, if required, add oil to strainer housing until it overflows into the oil pan (6, FIGURE 3-1). (Check through square opening on top of strainer.)



LEGEND

1. MAIN LUBE OIL PRELUBE VALVE
2. PISTON COOLING PRELUBE VALVE
3. LUBE OIL SYSTEM PRIMING VALVE
4. LUBE OIL COOLER
5. PRIMING PUMP
6. OIL PAN
7. STRAINER HOUSING

FIGURE 3-1. Prelubrication Schematic.

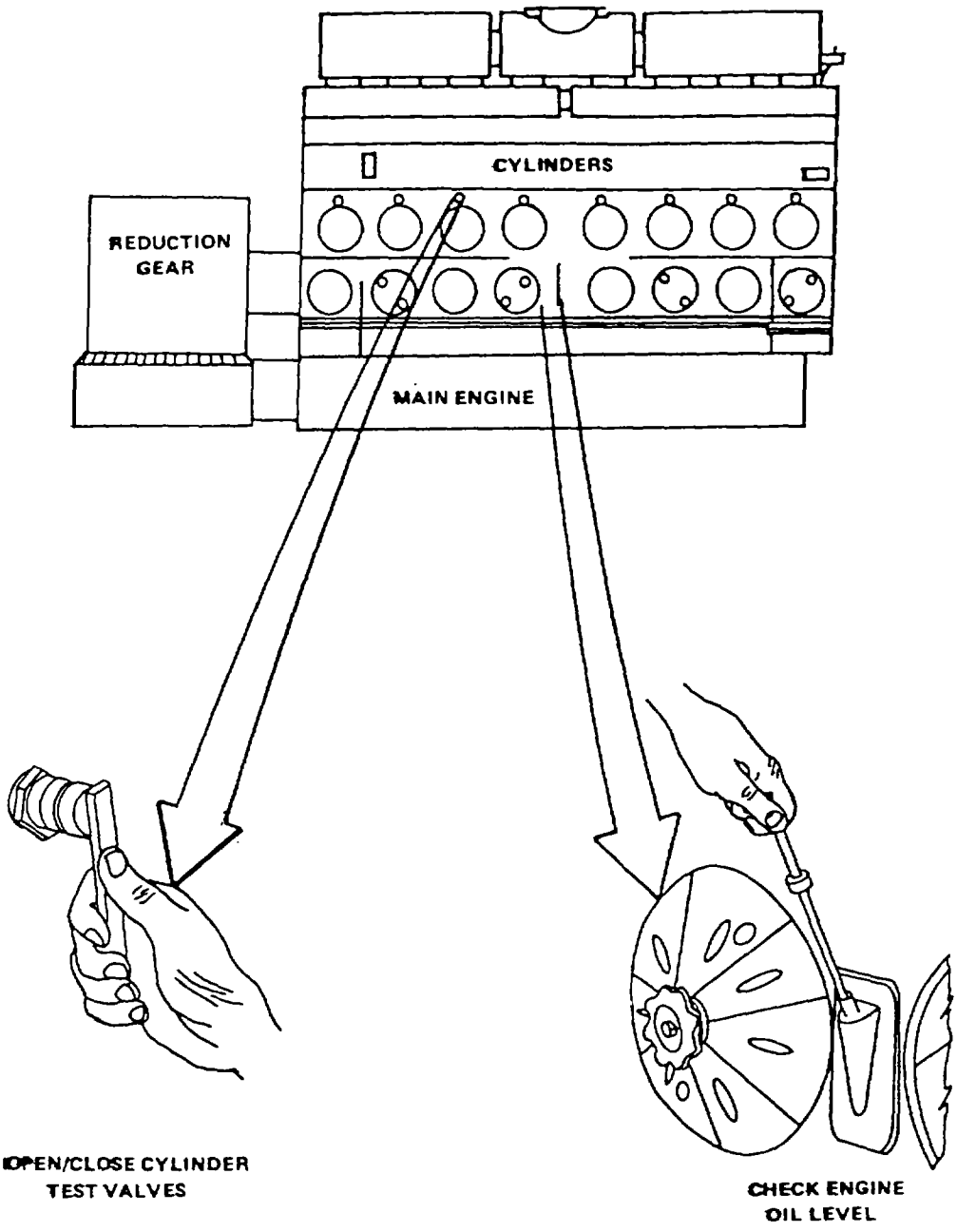
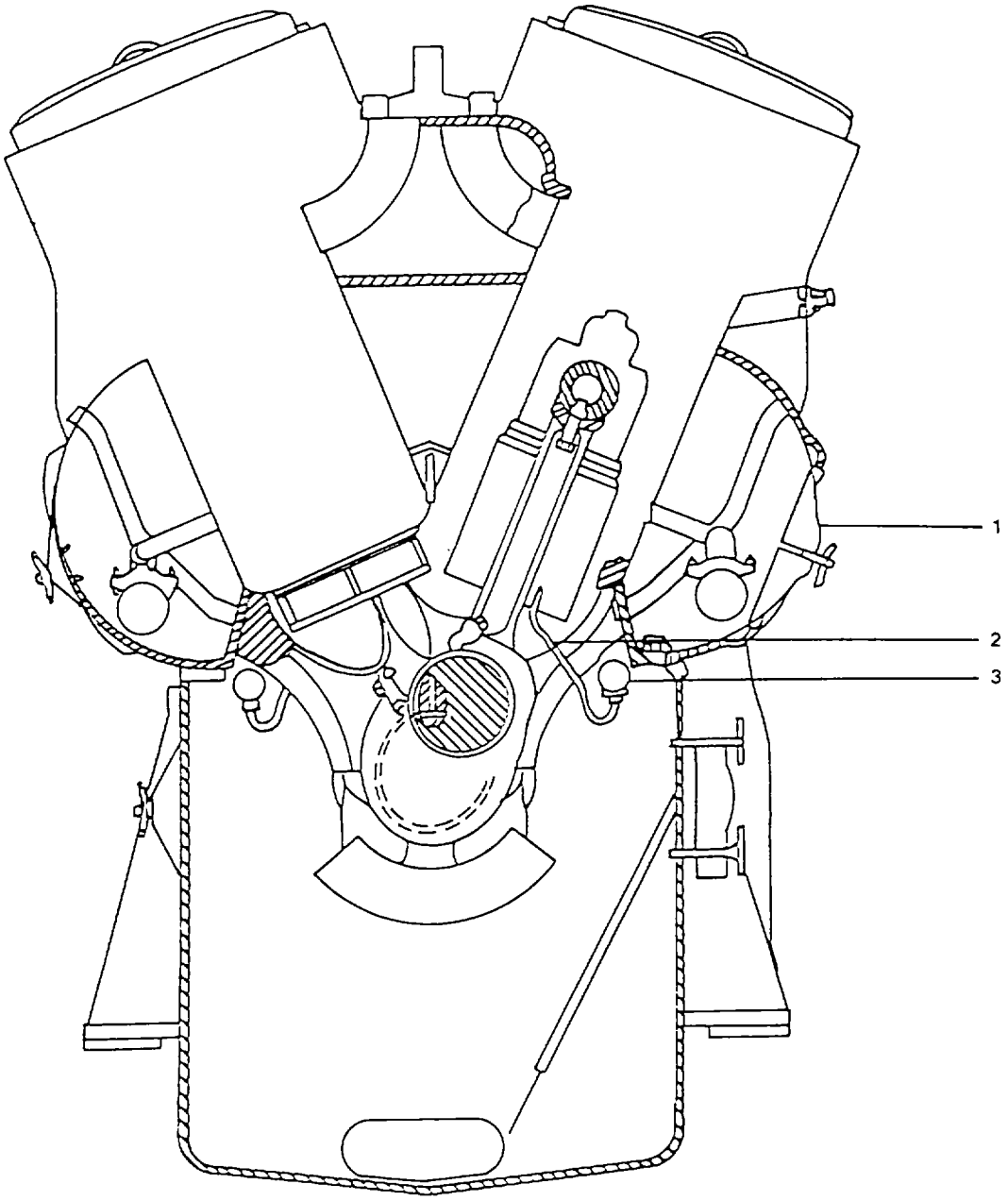
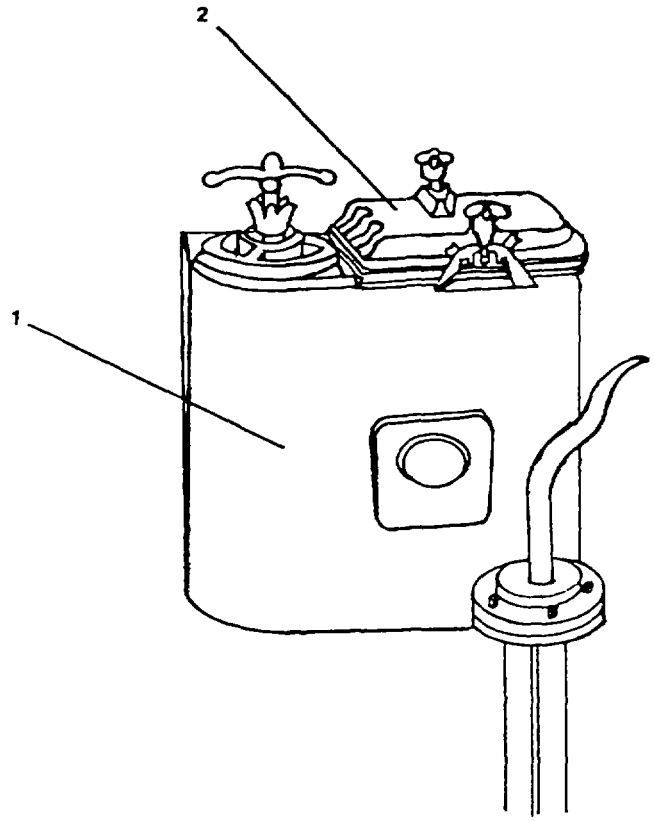


FIGURE 3-2. Main Engine Details.



LEGEND
1. AIR BOX HANDHOLE COVER
2. PISTON COOLING OIL PIPE
3. PISTON COOLING OIL MANIFOLD

FIGURE 3-3. Piston Cooling Oil Pipe .



LEGEND
1. OIL STRAINER
2. SQUARE OPENING

FIGURE 3-4. Oil Strainer.

k. Replace and securely close all handhole covers and engine top deck covers.

NOTE

When an engine is replaced it is important that the entire oil system, such as oil coolers, filters, and strainers, be thoroughly cleaned before a replacement engine or the reconditioned engine is put in service. A recurrence of trouble may be experienced in the clean engine if other system components have been neglected.

In some cases engines have been removed from service and stored in the "as is" condition by draining the oil and applying anti-rust compound. When these engines are returned to service, care must be taken to see that any loose deposits are flushed out before adding a new oil charge. The entire engine should be sprayed with fuel to break up any sludge deposits and then drained, being careful that the drains are not plugged. Fuel should not be sprayed directly on the valve mechanism or bearings, as lubrication will be removed or dirt forced into these areas. The surfaces should then be wiped dry before new oil is added to the engine.

3-2.1.2. <u>During Engine Operation</u>.

a. Check oil pressure gauge (FIGURE 3-5) at top rear of the reduction gear to ensure oil pressure when the gear clutch is engaged.

b. Recheck lube oil level (FIGURE 3-2) after engine is at operating temperature. Lube oil level should be on full mark on dipstick with engine at idle speed and oil hot.

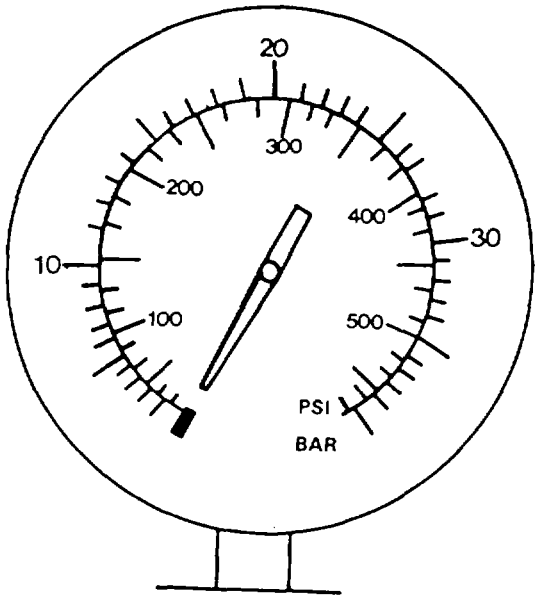


FIGURE 3-5. <u>Oil Pressure Gauge</u>.

Section II. MAINTENANCE INSTRUCTIONS

3-3. MAINTENANCE PROCEDURES. Maintenance procedures for functions listed in the "C" level maintenance column on the MAC are found in TM 55-1915-200-24&P.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS

Deck Department Log ..... DA Form 55-40

Engine Department Log ..... DA Form 55-44

Equipment Inspection and Maintenance Work Sheet..... DA Form 2404

Quality Deficiency Report ..... SF 368

Recommended Changes to Publications and Blank Forms..... DA Form 2028-2

A-3. FIELD MANUALS

First Aid for Soldiers ..... FM 21-11

A-4. TECHNICAL MANUALS

Organizational Operation and Maintenance Instructions-for the Satellite Signals Navigation Set ..... NAVY SPAWAR EE170-AA-OMI-010/WRN-6
ARMY TM 11-5826-311-12-2-1

Organizational Operation and Maintenance Instructions for the Satellite Signals Navigation Set ..... NAVY SPAWAR EE170-AA-OMI-020/WRN-6
..... ARMY TM 11-5826-311-12-2-2

Shipboard Damage Control Manual for Logistics Support Vessel (LSV) ..... TM 55-1915-200-SDC

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Logistics Support Vessel..... TM 55-1915-200-24&P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions for Main Engine, Model Number 16-645E6 ..... TM 55-1915-201-24

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Repair Parts and Special Tools List for the Main Engine, Model Number 16-645E6 ..... TM 55-1915-201-24P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Reverse Reduction Gearbox, Model Number WAV 630-2240..... TM 55-1915-202-24&P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions for the Generator Set Engine, 250 kW, Model Number 3406-B..... TM 55-1915-203-24

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Repair Parts and Special Tools List for the Generator Set Engine, 250 kW, Model Number 3406-B ..... TM 55-1915-203-24P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions for the Generator Set Engine, 90 kW, Model Number 3304-B..... TM 55-1915-204-24

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Repair Parts and Special Tools List for the Generator Set Engine, 90 kW, Model Number 3304-B ..... TM 55-1915-204-24P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions for the Bow Thruster Engine Set, Model Number 3306-B..... TM 55-1915-205-24

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Repair Parts and Special Tools List for the Bow Thruster Engine Set, Model Number 3306-B..... TM 55-1915-205-24P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Bow Thruster, Model Number S-152-L ..... TM 55-1915-206-24&P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Water Purification System, Model Number SW-1000 Series IV ..... TM 55-1915-207-24&P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Environment Control System ..... TM 55-1915-208-24&1P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Compressed Air System, Model Number QR-25-350 ..... TM 55-1915-209-24&P

Unit, Intermediate Direct Support, and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for the Electro-Hydraulic Steering System ..... TM 55-1915-210-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Bow Anchor Windlass and Bow Ramp Winch System, Model Number FCWH-6 ..... TM 55-1915-211-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Stern Anchor Winch and Stern Ramp Winch System (Jigger), Model Number HAW-19.0 ..... TM 55-1915-212-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Magnetic Compass . ..... TM 55-1915-213-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Marine Sanitation System, Model Number RF-1500-FP-CBPN-D ..... TM 55-1915-214-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for FirePump System, Model Number 344A-BF . ..... TM 55-1915-215-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Bilge/Ballast Pump System, Model Number 344A-lBF/411 . ..... TM 55-1915-216-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Gyrocompass, Model Number MARK 27 MOD 1 . ..... TM 55-1915-217-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Ship Stores Refrigeration ..... TM 55-1915-218-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for MK 37 MOD E Transmission Unit and Power Transfer Units, Model Number MK 37 MOD E . ..... TM 55-1915-219-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Gyro-pilot, Model Number SRP 680 ..... TM 55-1915-220-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Compass Repeaters, Model Number 1976158 ..... TM 55-1915-221-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Centralized Control and Monitoring System . ..... TM 55-1915-222-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Commissary Equipment . ..... TM 55-1915-223-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Lube Oil/Fuel Oil Purifier, Model Number MAB103B-24 . ..... TM 55-1915-224-24&P

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Instructions Including Repair Parts and Special Tools List for Fire Fighting System, Model Number HALON 1301 . ..... TM 55-1915-225-24&P

A-5. TECHNICAL BULLETINS

Warranty Procedures for Logistics Support Vessel (LSV)..... TB 55-1915-200-24

A-6. MISCELLANEOUS PUBLICATIONS

Army Medical Department Expendable Items..... CTA 8-100

Expendable/Durable Items..... CTA 50-970

Index of Army Publications and Blank Forms..... DA Pam 310-1

Lubrication Order for Logistic Support Vessel (LSV) . ..... LO 55-1915-200-12

The Army Maintenance Management System (TAMMS)..... DA Pam 738-750

Navigation Rules, International-Inland..... COMDINST 16672.2A

APPENDIX B
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I. INTRODUCTION

B-1. SCOPE

This appendix lists components of end item and basic issue items for the Logistics Support Vessel (LSV) to help you inventory items required for safe and efficient operation.

B-2. GENERAL

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the LSV in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the LSV during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column (1) Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

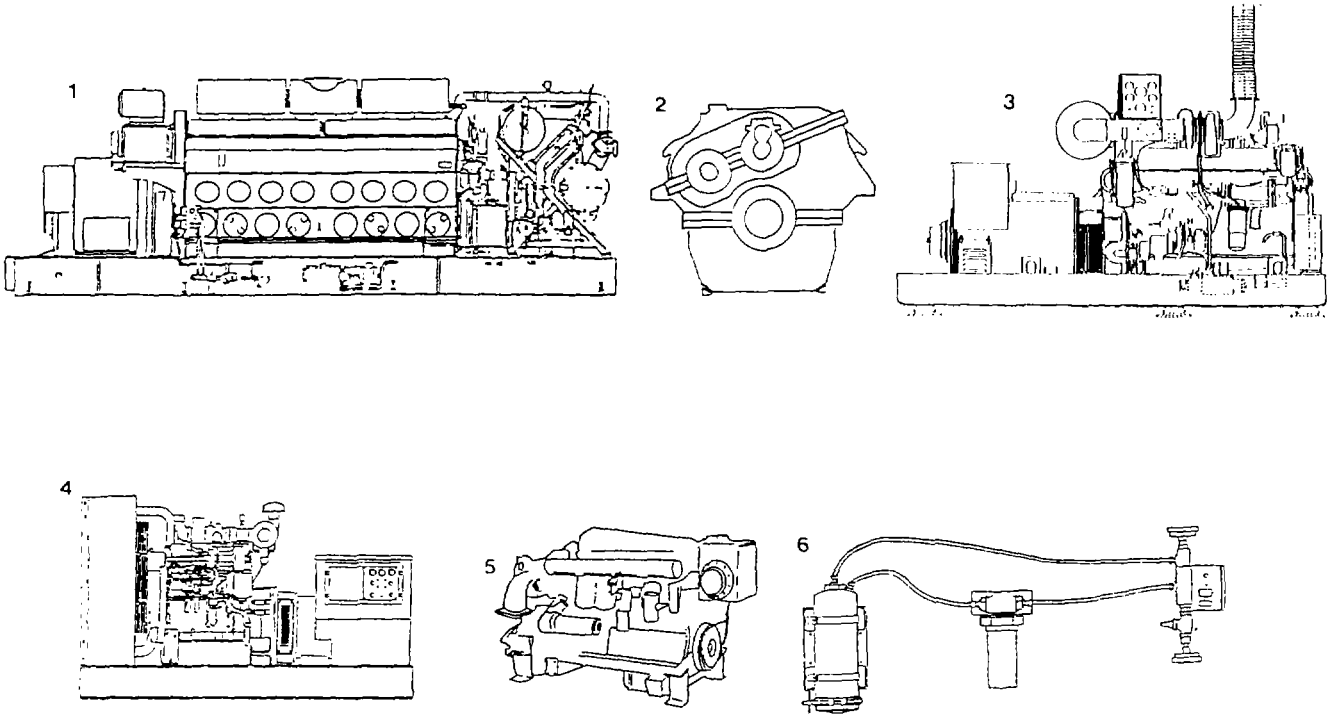
b. Column (2) National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) Description. Indicates the Federal item name and if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

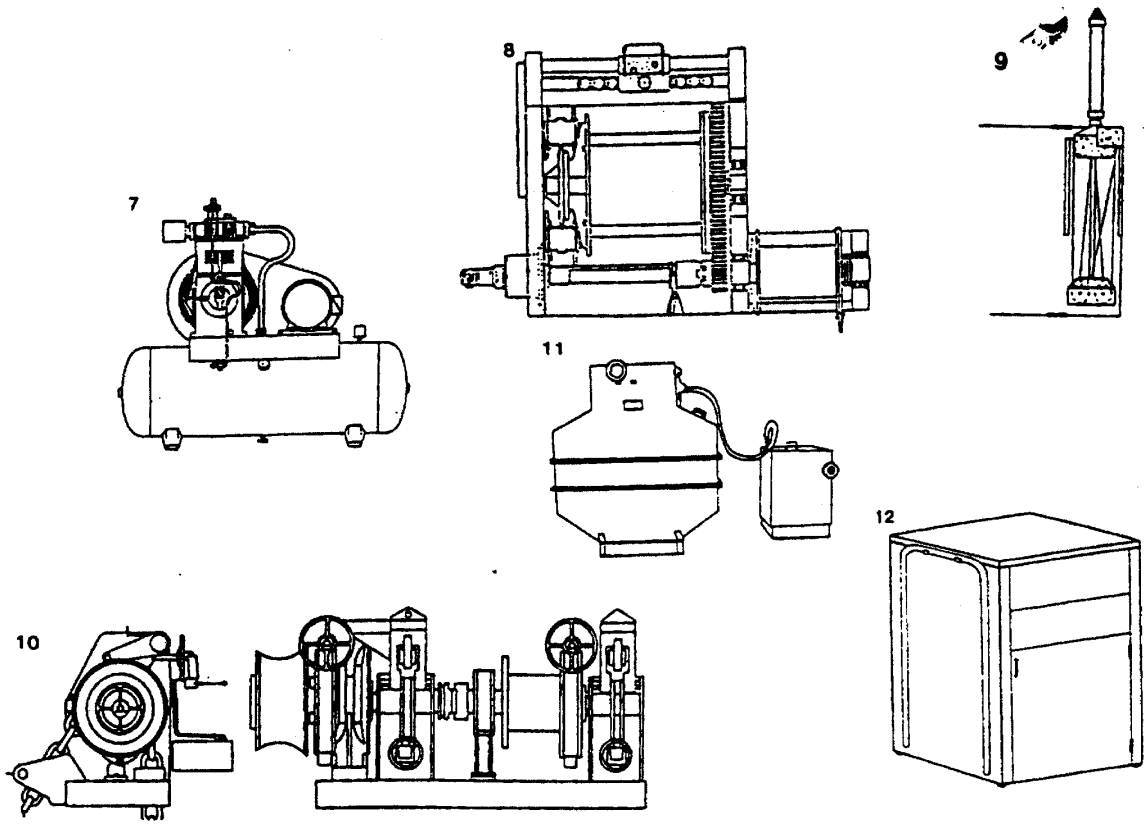
e. Column (5) Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

SECTION II. COMPONENTS OF END ITEM

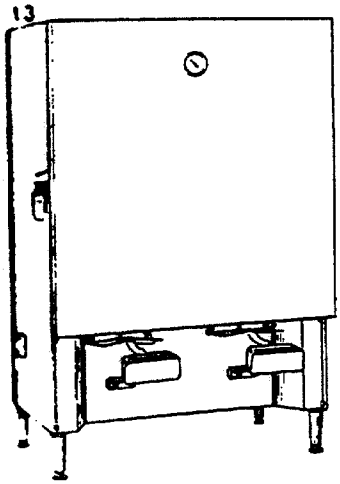


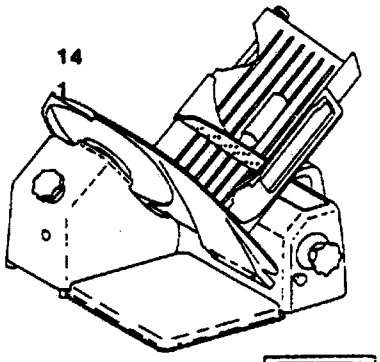
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
1		MAIN ENGINES (72915) 16-645E6		EA	2
2		MAIN REDUCTION GEAR (08835) WAV2240		EA	2
3		SHIP SERVICE GENERATOR (11083) 3406-B-DITA		EA	2
4		EMERGENCY GENERATOR (11083) 3304-B DITA		EA	1
5		ENGINE, BOW THRUSTER (11083) 3306-B DITA		EA	1
6		BROMINE FEEDER (08576) SSFM-50A		EA	2

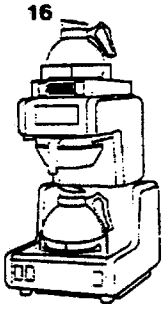
Section II. COMPONENTS OF END ITEM -Cont.

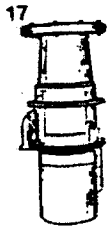


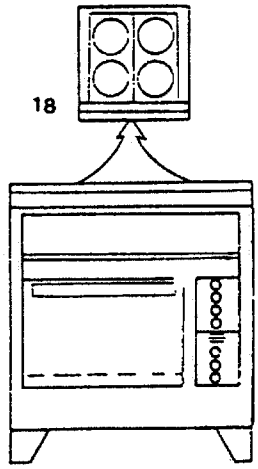
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
7		AIR COMPRESSOR (49576) D-350	EA	2
8		STERN ANCHOR WINCH (67121) 550-HAW-19.0	EA	1
9		STERN RAMP WINCH (1CC45) 21-69096	EA	1
10		BOW ANCHOR/RAMP WINDLASS (96151) FCWH-6	EA	2
11		MARINE SANITATION PLANT (65038) RF-1500-FP	EA	1
12		WASTE COMPACTOR (62607) GTC-1	EA	1

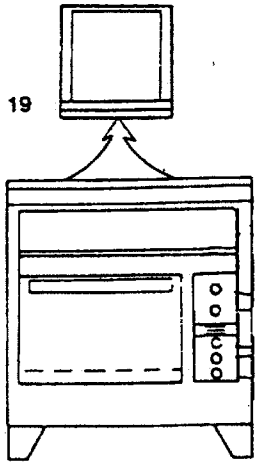




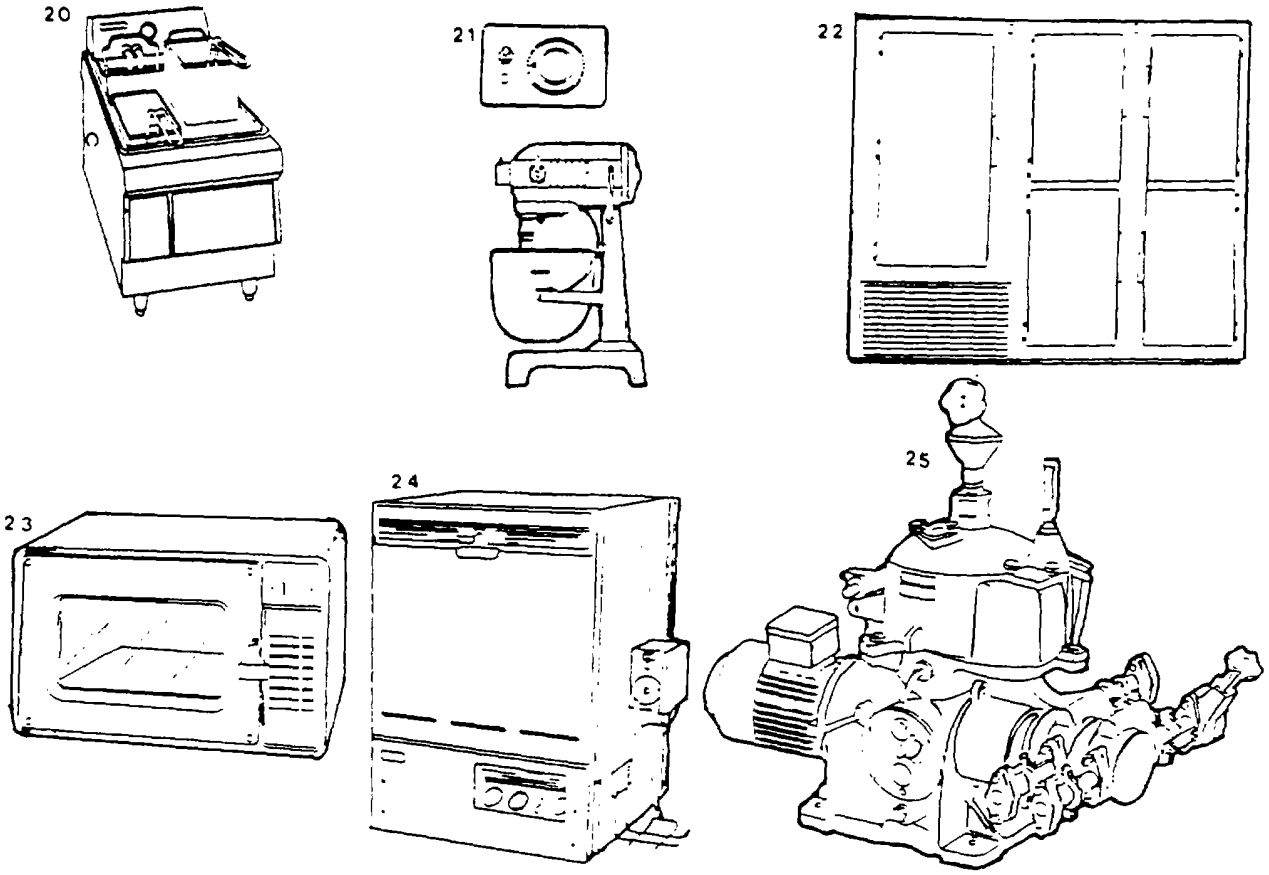






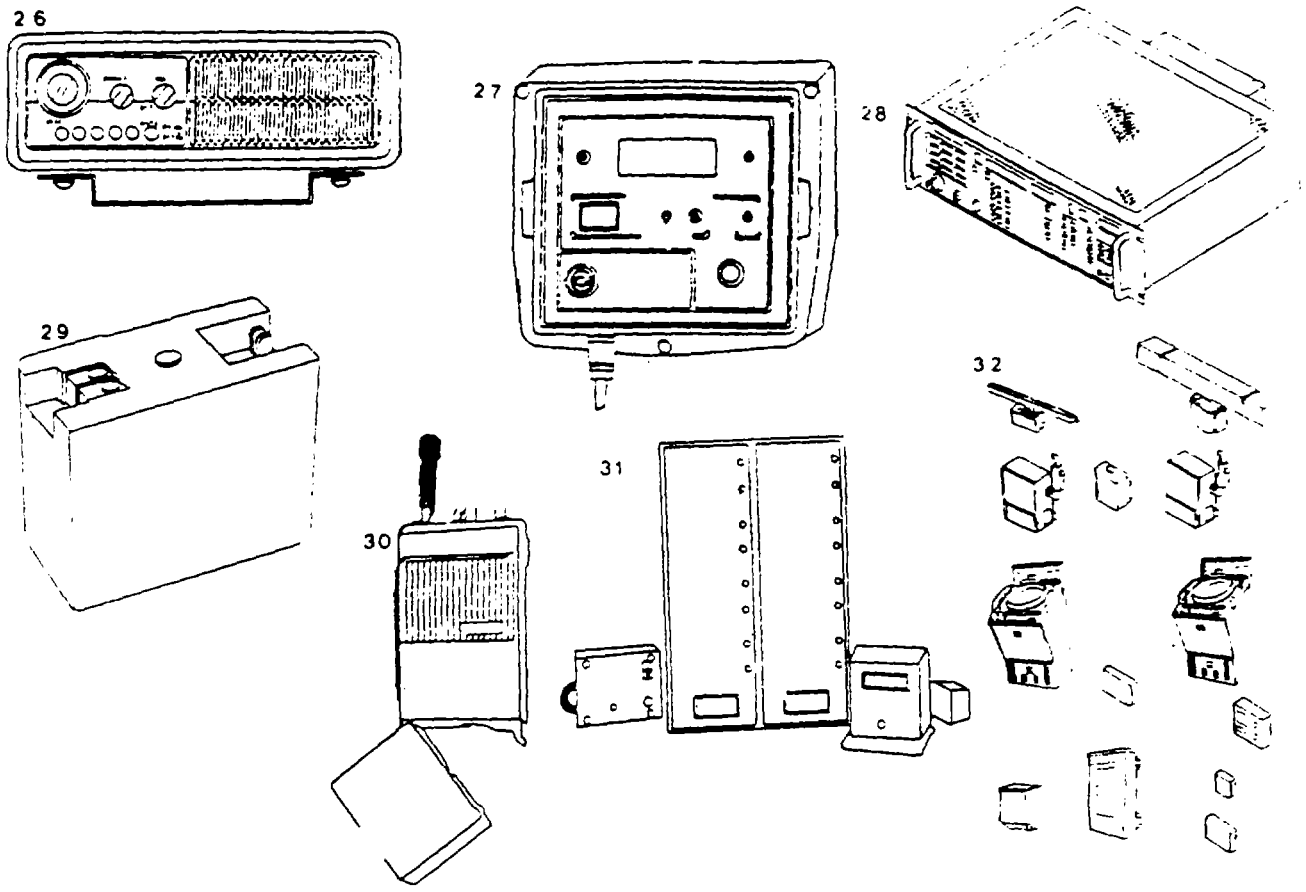


(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
13	7310-00-345-9903	MILK DISPENSER (12884) NSF-SK-3		EA	1
14		FOOD SLICER (60438):MOD 512		EA	1
15		(Deleted)			
15	7310-01-189-4435	COFFEE MAKER (25628) OT-20		EA	4
17		FOOD DISPOSAL (60438) ED 2/50-2-E-4		EA	1
18		MARINE GALLEY RANGE (34931) MOD 32S-1 M		EA	1
19		MARINE GALLEY RANGE (34931) MOD 32S-4M		EA	1



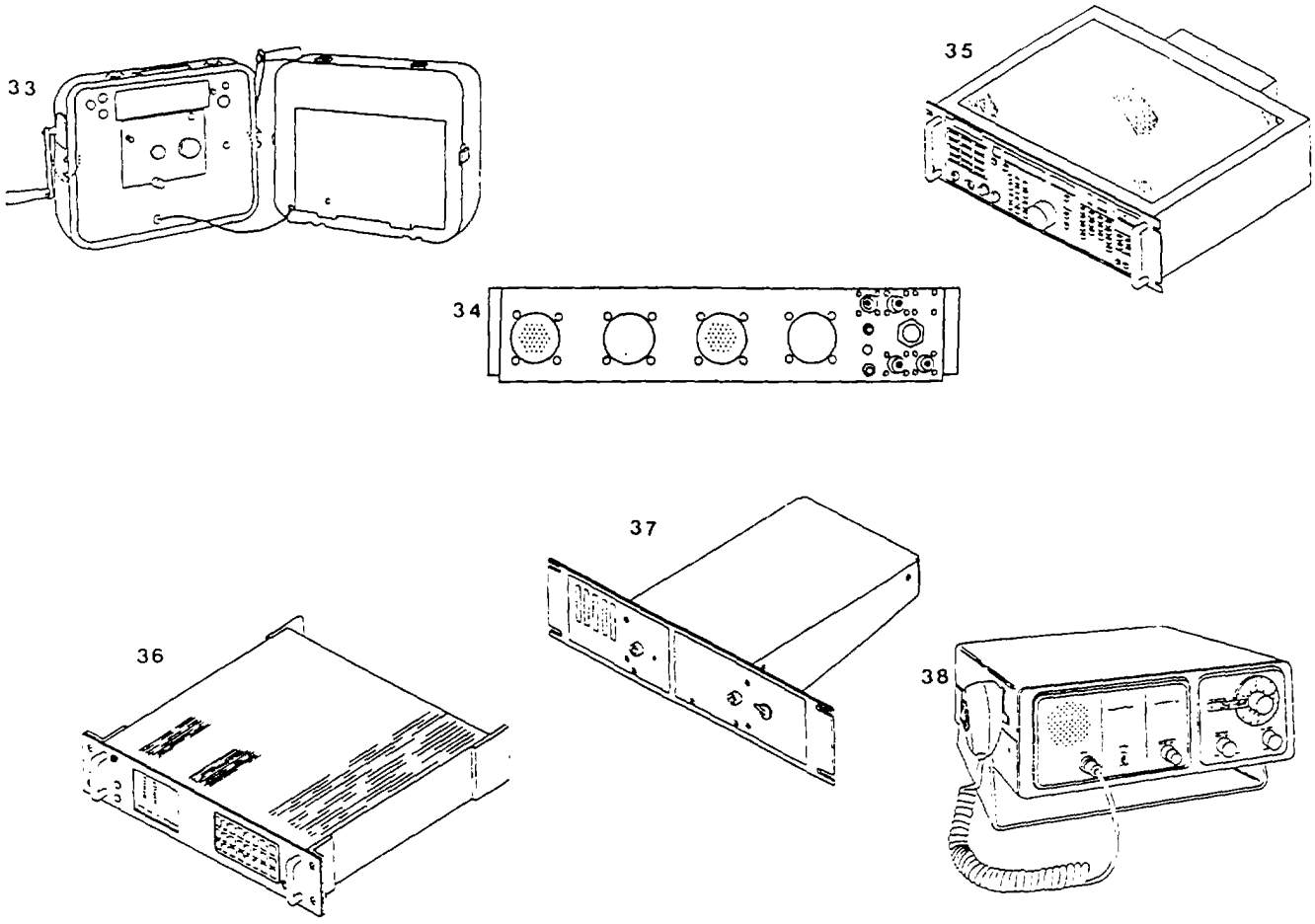
(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
20		DEEP FRYER (34931) C-28	EA	1
21		FOOD MIXER (60438) NMOD A1l 20	EA	1
22		REFRIGERATOR/FREEZER (60438) R-50F3-2MI-ADS	EA	1
	3431-00-620-5999	WELDING MACHINE, ELEC, 300 AMP (81348) MIL-W-80027	EA	1
23		MICROWAVE OVEN SNAC-7TP	EA	2
24		DISHWASHER FFW-1	EA	1
25		LUBE OIL PLURIFIER MAB 103	EA	3

Section II. COMPONENTS OF END ITEM -Cont.



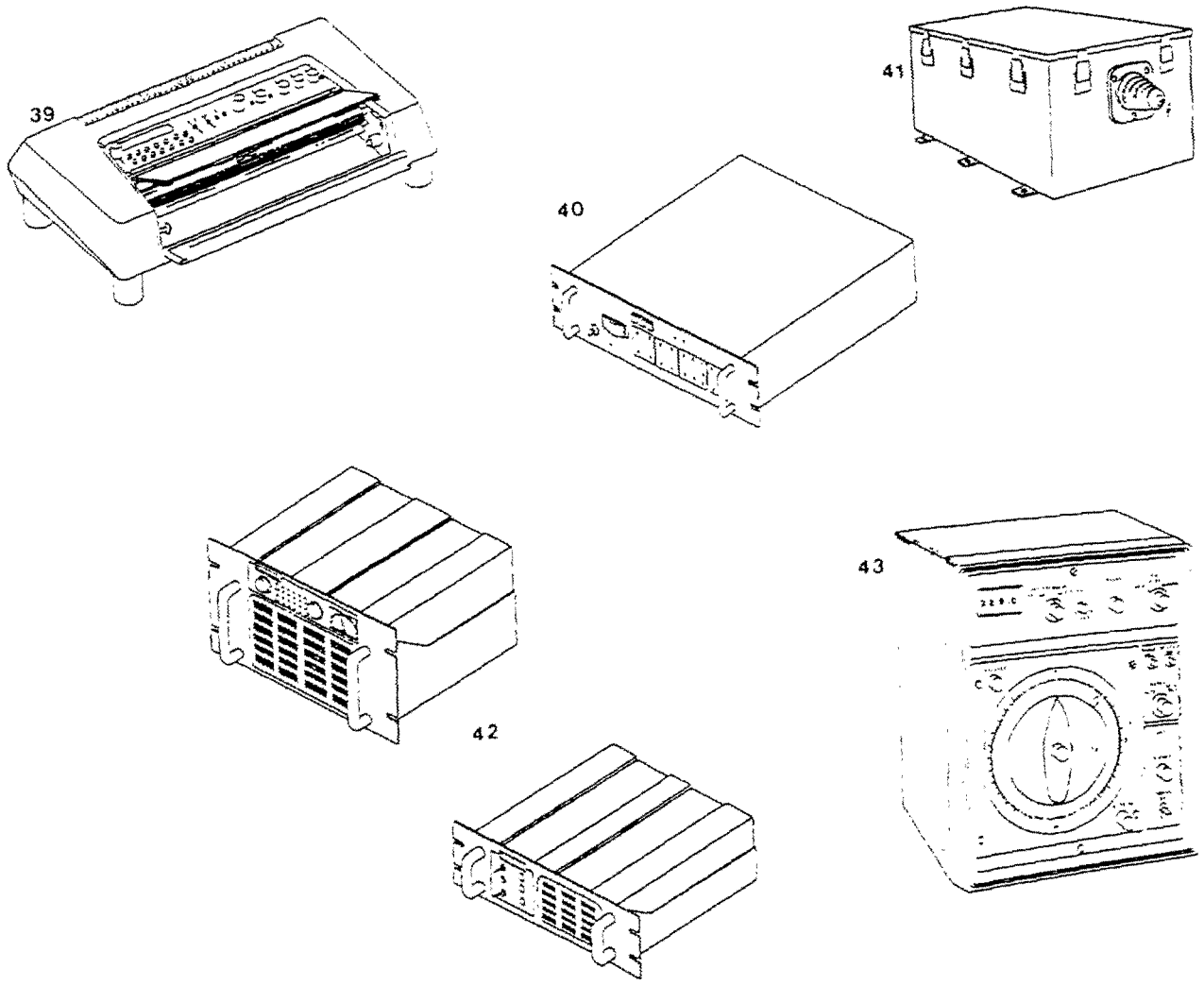
(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
26		MARINE RECEIVER, Model 1511		EA	1
27		DIGITAL DEPTH INDICATOR, Model D600		EA	1
28		MSR 1600 EXCITER		EA	1
29		STANDARD RPX BATTERY, Nicad, Model CNB230, 10.8 V		EA	5
30		RADIO, Model HSX (AA) VH FM Marine		EA	10
31		BATTERY CHARGER, MULTI		EA	1
32		DUAL RADAR SYSTEM		EA	1
	5820-01-151-9916	RADIO SET, ANNRC-87, SINGARS		EA	1
	3510-01-151-3468	WASHING MACHINE, Household Laundry		EA	2
	3510-01-309-7295	DRYER, Household Laundry		EA	2

SECTION II. COMPONENTS OF END ITEM - Cont.



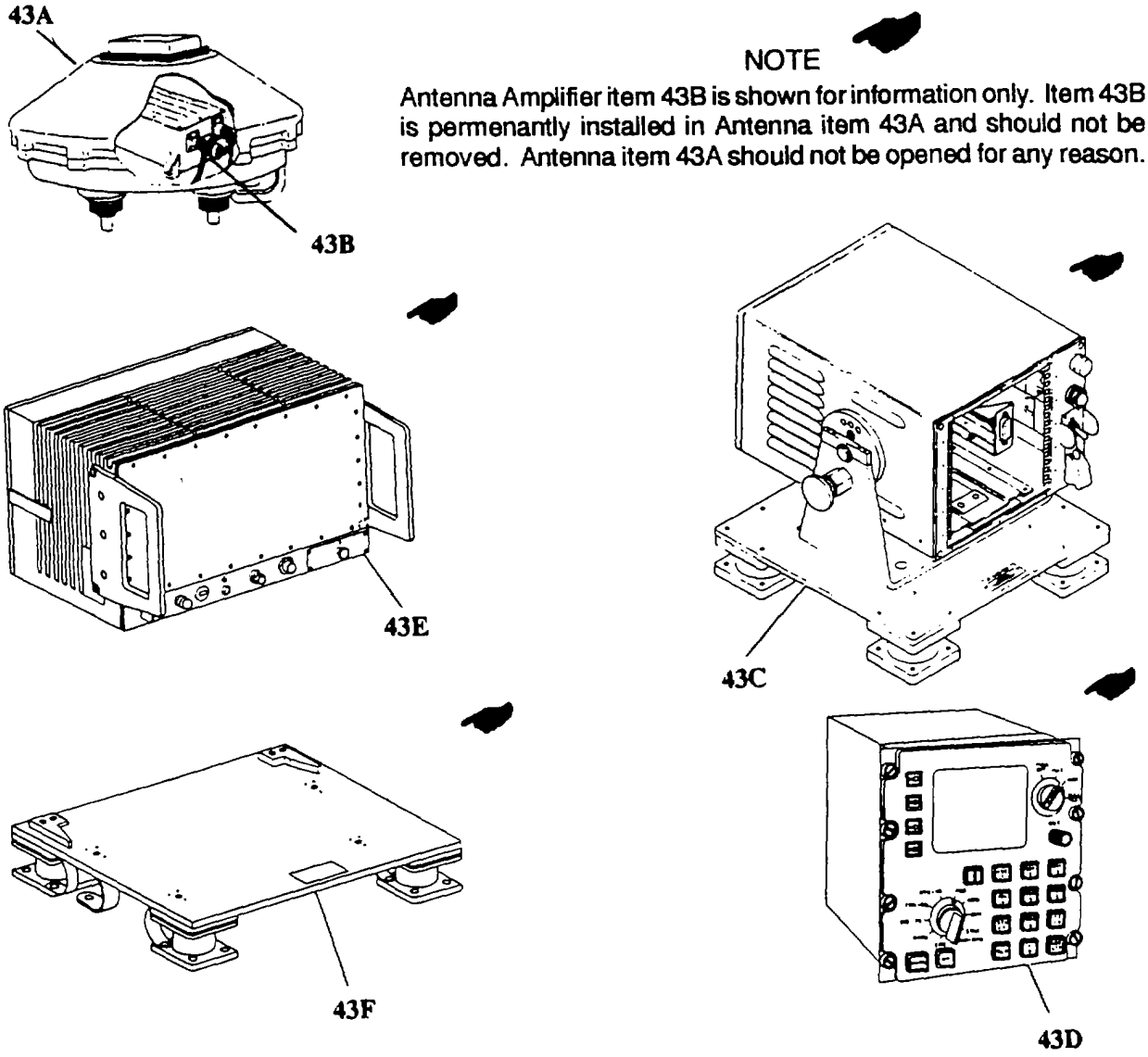
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
33		403A EMERGENCY LIFEBOAT TRANSCEIVER	EA	1
34		MSR6606 AMPLIFIER INTERFACE UNIT	EA	1
35		MSR5050 RECEIVER	EA	1
36		Model 1280A FSK MODEM	EA	1
37		MR 370-13A RADIOTELEPHONE ALARM GENERATORS	EA	1
38		Model 6100 SYNTHESIZED SSB RADIOTELEPHONE	EA	1

Section II. COMPONENTS OF END ITEM — Cont.



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
39		MARINE FAX TR-4		EA	1
40		RF-3500 B/C ADOPTIVE ARQ TERMINAL		EA	1
41		MSR 4030 1 KW AUTOMATIC ANTENNA COUPLER		EA	1
42		MSR 1020 AMPLIFIER/MSR 6212 POWER SUPPLY		EA	1
43		4005A AUTOMATIC DIRECTION FINDER RECEIVER/INDICATOR		EA	1

Section II. COMPONENTS OF END ITEM - Cont.

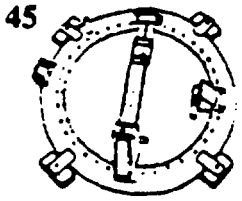


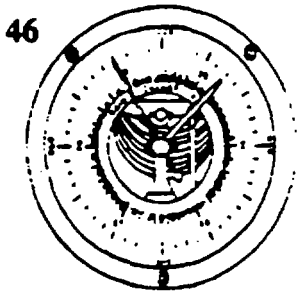
NOTE

Antenna Amplifier item 43B is shown for information only. Item 43B is permenantly installed in Antenna item 43A and should not be removed. Antenna item 43A should not be opened for any reason.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		Global Positioning System (Satellite Navigator):			
43A		Antenna AS-3819/SRN		EA	1
43B		Antenna Amplifier AM-7314/URN		EA	1
43C		Electrical Equip. Mounting Base MT-6486/SRN		EA	1
43D		Indicator Control C-11702/UR		EA	1
43E		Radio Receiver R-2331/URN		EA	1
43F		Electrical Equip. Mounting Base MT-6586/S		EA	1

Section III. BASIC ISSUE ITEMS -Cont.



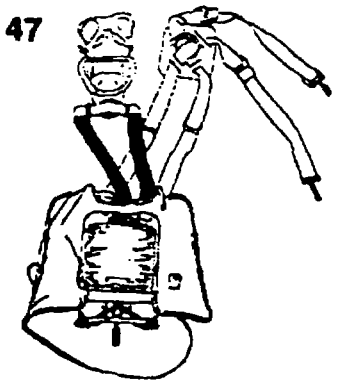


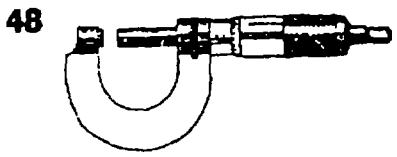
(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
44		(Deleted)			
	2040-00-222-3729	Anchor, Sea, 36" x 70 " (81348) MM-1-562		EA	2
	4210-00-372-0864	Applicator, Nozzle, 1-1/2" x 4"		EA	8
	4210-00-372-0865	Applicator, Nozzle, 1-1/2" x 10"		EA	3
	5130-00-293-2852	Auger, Kit Water Closet		EA	1
	4210-00-142-4949	Ax, Fire, Pickhead, 6 lbs. (81348) GGG-A-926		EA	14
45	6605-00-240-5599	Azimuth Circle, MK-4, Mod 1 (81349) MIL-C-228		EA	2
	5120-00-293-0665	Bar, Wrecking, 30", Size 4, Type 5, Class 1 (81348) GG-B-101		EA	2
46	6660-00-075-6666	Barometer, Aneroid (59310) 2237MB		EA	2
	6140-00-635-3824	Battery Filler, Gravity (81348) W-B-1 77		EA	2
	6350-00-256-9062	Bell, Ship's, 30 lbs., "A" Flat (81349) MIL-B-674		EA	1

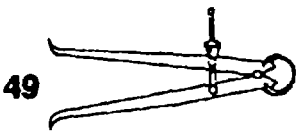
SECTION III. BASIC ISSUE ITEMS -Cont.

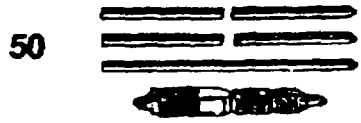
(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I	(5) QTY RQR
	1240-01-207-5787	Binocular, 7 X 50, Type Ml7A1 (19200) 9394727	EA	4
	6545-00-911-1300	Blanket Set, Medical (33333) (No Ref)	EA	2
	7210-00-715-7985	Blanket, Bed, Wool (81349) MIL-B-844	EA	65
	3940-00-892-4560	Block, Tackle, 3-1R2" Double Sheave, 3300 lbs., Iron & Steel Shell, 3/4" Fibrous Rope, Type 2 (81348) GGG-B-490	EA	2
	3940-O0-068-9173	Block, Tackle, 4-112" Double Sheave, 5100 lbs., Iron & Steel Shell, 1" Fibrous Rope, Type 2 (81348) GGG-490	EA	2
	4140-01-039-9845	Blower, Ventilating, Portable (27020) GE-V8	EA	2
	7195-0W-224-5190	Board, Bulletin, Type A (81349) MIL-F-902	EA	2
	7195-00--224-5191	Board, Bulletin, Type B (81349) MIL-F-902	EA	2
	7330-00-685-5013	Bowl Set, Food Mixing, 3 Pc., Stainless Steel (81348) RR-B1242	EA	2
	7330-00-262-2323	Bowl, Food Mixing, Stainless Steel, 5 Qt., 11' Dia, 4-7/8" Deep (81348) RR-B-1242	EA	2
	5140-00-587-5558	Box, Tool (81348) GGG-T-588/7	EA	1

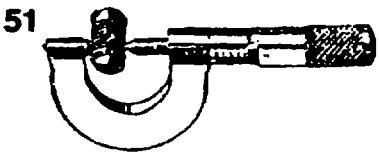
Section III. BASIC ISSUE ITEMS - Cont.











(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
47	4240-00-616-2857	Breathing Apparatus, Oxygen Generating, with Canister and Carrying Case, Navy Type A4 (81349) MIL-B-51254		EA	7
	5120-01-237-3232	BRG&W. Ring Inst Tool		EA	1
	5340-01-233-2861	Bumper, Rubber		EA	8
	7330-00-550-7592	Butcher's Steel, 10" Blade (81348) GGG-C-746		EA	2
	2090-00-782-3088	Cabinet, Filing, Four Drawer with Combination Lock (80064) 805-163842		EA	3
	7125-00-132-8973	Cabinet, Key, 75 Key, Steel Grey, Type 2, Class A (81348) AA-C-30		EA	3
	5210-00-293-0042	Caliper, Micrometer		EA	1
48	5210-00-554-7134	Caliper Set, Micrometer, Outside, 0" to 6", Type 1, Class 1, Style A (81348) GGG-C-1 05		EA	1
49	5210-00-229-3051	Caliper, Inside, Spring, Rect. Leg, 6", Type 1, Class 1, Style A (81348) GGG-C-95		EA	1
50	5210-00-221-1921	Caliper, Micrometer, Inside, Rod & Sleeve, 2" to 12", Type 2, Class 2, (81348) GGG-C-1 05		EA	1
51	5210-00-287-3336	Caliper, Micrometer, Outside, 6" to 9", Interchangeable Anvil, Type 1, Class 1, Style B (81348) GGG-C-105		EA	1
	7240-00-256-7700	Can, Flammable Waste, Foot Operated, 10 Gal (81348) RR-C-114		EA	4
	7240-00-222-3088	Can, Gasoline, 5 Gallon (81349) MIL-C-1283		EA	2

Section III. BASIC ISSUE ITEMS - Cont.

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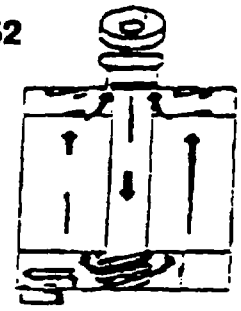
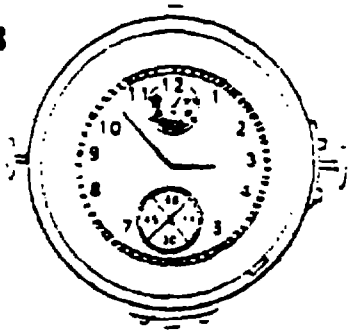


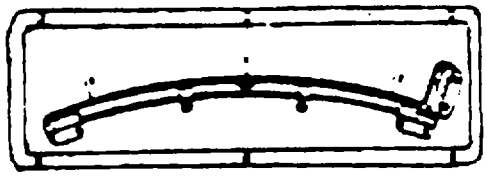
53



(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
52	4240-00-174-1365	Canister, Oxygen Generating, Breathing Apparatus (81349) MIL-C-17671		EA	63
	5120-00-529-4124	Canister, Storage Battery, Type 2, Class A, size 20 (81348) GGG-C-1968		EA	1
	5340-01-141-7850	Cap and Chain, Pump		EA	2
	6645-00-290-2233	Case, Chronometer, Gimbal (33333) No Ref.		EA	2
	5100-00-222-2128	Chisel, Cape, Hand (81348) GGG-C-313		EA	1
	5100-00-554-7345	Chisel, Cape, Hand, Heavy Duty, 6-3/4" x 1/4", Type 1, Style B (81348) GGG-C-313		EA	2
	5100-00-236-3273	Chisel, Cold, Hand, Heavy Duty, 7-1/2" x 7/8", Type 4, Class 1 (81348) GGG-C-313		EA	2
	5100-00-203-6424	Chisel, Power Hammer, Scaling, 1-1/4" x 9", RD Shank Type 15, Class A (81348) GGG-C-330		EA	2
53	6645-00-238-9054	Chronometer, Size 35, (81349) MIL-C-2536		EA	2
	5120-00-180-0909	Clamp, "C', Medium, 9" x 2-1/4" (81348) GGG-C-406		EA	4

Section III. BASIC ISSUE ITEMS - Cont.

54



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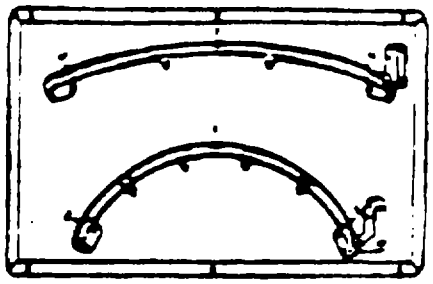
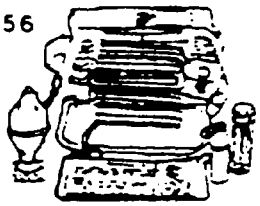


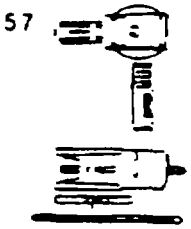
(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5120-00-529-3744	Clamp, "C", Heavy, 4-1/2" to 2-1/4" (81348) GGG-C-406		EA	4
	5120-00-180-0909	Clamp, "C", Light, 6" Opening, 2-3/4" (81348) GGG-C-406		EA	4
	7910-00-530-6260	Cleaner, Vacuum, AC/DC, 120V, 60 Hz, Single Phase Industrial Type (81348) W-C-421		EA	2
54		6605-00-818-3897 Clinometer, Ship Trim, Type 2 (81349) MIL-C-20061		EA	4
55	6605-00-825-5618	Clinometer, Ship Heel, Type 1 (81349) MIL-C-20061		EA	4
	5999-00-195-9689	Clip, Electrical, Crocodile, 3-1/2" Long (81348) W-C-440		EA	4
	6645-00-224-8631	Clock, Marine, Mechanical, 8 Day, Sweep Second Hand, Type B, Size 6" (81349) MIL-C-1194		EA	6
		(Deleted)		EA	2
	2920-01-226-8057	Coil, Ignition		EA	2
	7330-00-680-2762	Colander, 11 Qt. (81348) RR-K-260		EA	1
	6630-01-067-3827	Comparator Set, Color Chlorine/Bromine (34807) 6896		EA	1
	4310-00-133-3512	Compressor Unit, Reciprocating, Air, 40CFM, Type 1 (81349) MIL-C-17596		EA	1
		Computer System, Consisting of:			
		Computer, Model ASL 486		EA	1
		Monitor, Model CVP		EA	1
		Printer, Model ALQ 300 SX		EA	1
	7025-01-272-5039	Drive Unit, A-A-55001		EA	2

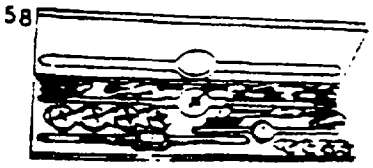
Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		Coverall, Fire Retardant, Armid Body, 100% Cotton (81349) MIL-C-24945:		EA	40
	8405-01-286-6336	SIZE 36 Short			
	8405-01-286-6337	SIZE 36 Regular			
	8405-01-286-6338	SIZE 38 Short			
	8405-01-286-6339	SIZE 38 Regular			
	8405-01-286-6340	SIZE 38 Long			
	8405-01-286-6341	SIZE 40 Short			
	8405-01-286-6342	SIZE 40 Regular			
	8405-01-286-6343	SIZE 40 Long			
	8405-01-286-6344	SIZE 42 Short			
	8405-01-286-6345	SIZE 42 Regular			
	8405-01-286-6346	SIZE 42 Long			
	8405-01-286-6347	SIZE 44 Short			
	8405-01-286-6348	SIZE 44 Regular			
	8405-01-286-6349	SIZE 44 Long			
	8405-01-286-6350	SIZE 46 Short			
	8405-01-286-6351	SIZE 46 Regular			
	8405-01-286-6352	SIZE 46 Long			
	8405-01-286-6353	SIZE 48 Regular			
	8405-01-286-6354	SIZE 48 Long			
	5120-00-224-1390	Crowbar, 1-1/4" Dia., 61" Long, (81348) GGG-B-101		EA	4
	7350-00-935-6635	Cruet, Condiment, 6 Oz. (81348) DD-T-101		EA	4
	5180-00-596-1038	Cutter and Flaring Tool Kit, 1/8" to 1-1/8" Cut Range, 3/16" to 3/4" Swaging, Type 2, Class 1, (81348) GGG-C-771		EA	2
	5110-00-224-7058	Cutter, Hydraulic, Wire Cutting (85767) Model P		EA	1
	5110-00-188-2524	Cutter, Bolt, Rigid, Clipper, 36" Long, Type 2, Class 4 (81348) GGG-C-740		EA	2
	7330-00-633-8904	Cutter, Doughnut, Steel, 3" (81349) MIL-C-40115		EA	2

Section III. BASIC ISSUE ITEMS - Cont.





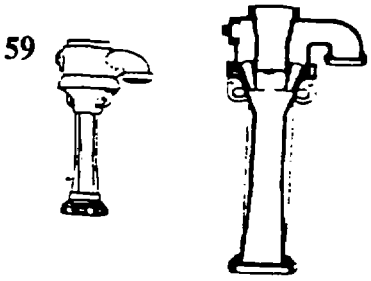


(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5110-00-293-0460	Cutter, Pipe, Wheel Type, Cuts 1/8" to 2" Dia., Type 1, Class 1, Style B (81348) GGG-C-771		EA	1
	5110-00-221-1049	Cutter, Pipe, Wheel Type, Cuts 2" to 4" Dia., Type 1, Class 1, Style B (81348) GGG-C-771		EA	1
	5110-00-224-7058	Cutter, Wire, Rope, Hand Operated, Hydraulic, Cuts 0" to 1-1/8" Dia, Type 1, Class 1, Size 2 (81348) GGG-C-800		EA	1
	5180-00-541-1644	Cutting and Flaring Set, Tubing (81348) GGG-C-771		EA	2
56	6665-00-903-4767	DETECTOR KIT, Chemical Agent (81361) E5-77-2092		EA	2
57	6665-00-618-1482	DETECTOR KIT, Carbon Monoxide Colormetric (81349) MIL-D-3945		EA	2
58	5136-00-856-3471	DIE AND TAP SET, Thread Cutting, Carbon Steel, Adj. Die Stock (84729) ACE 614		EA	2
	5110-00-289-0007	DIE SET, Metal Stamping, Letter, A through Z, Period and Ampersand, 1/4" Size, Type 2, Grade A (81348) GGG-D-280		EA	1
	5110-00-289-0003	DIE SET, Metal Stamping, Numeral, 0 through 9, 1/4" Size, Type 1, Grade A (81348) GGG-D-280		EA	2
	7330-00-272-2488	DIPPER, Kitchen, Stainless Steel, 1 Pt., 8" Handle, Size 1 (81348) RR-D-400 (Deleted)		EA	4
	7350-00-205-0928	DISPENSER, Paper Napkins, Stainless Steel, 125 Capacity (81348) RR-D-500		EA	6
	4510-00-585-6305	DISPENSER, Paper Towel (81348) WW-D-1909		EA	4

Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	7350-00-641-6050	DISPENSER, Sugar, 12 Oz., Glass Body, Stainless Steel Cap With Flip Opening (81348) DD-T-101		EA	6
	4930-00-263-9886	DISPENSING PUMP, Hand Driven, 20 Gal per 100 Strokes (81349) MIL-D-40078		EA	1
	6675-00-286-0602	DIVIDER SET, Navigator		EA	2
	5210-00-266-7038	DIVIDER, Mechanic's, Solid Nut Adj., 4", Type A, Class 2 (81348) GGG-D-351		EA	1
	7330-00-205-3155	DOUBLE BOILER, Aluminum, Heavy Duty, 11 Qt. (81348) RR-B-500		EA	2
	7330-00-205-3154	DOUBLE BOILER, Domestic, Aluminum, 3 Qt. (81348) RR-B-500		EA	2
	5130-00-889-9002	DRILL PRESS, Electric, 1/2" Cap. (81348) W-D-00661		EA	1
	5133-00-293-1161	DRILL SET, Twist, Morse Taper Shank, Set of 16, Frac. Sizes 49/64" to 1" by 64ths (81,348) GGG-D-751		EA	2
	5133-00-293-0983	DRILL SET, Twist, Set #2, Str. Short Shank, Set of 29, Frac. Sizes 1/16" to 1/2" by 64ths (81348) GGG-D-751		EA	3
		Drill, Air, 3/8", Part No. 7AM3		EA	1
		Drill, Air, 1/2", Part No. 7AN4		EA	1
	5130-00-204-2728	DRILL, Electric, Portable, 1/4" Cap., 115 VAC, Type 3, Class B, Style 2 (81348) W-D-661		EA	1
	5130-00-473-6224	DRILL, Electric, Portable, Double Insulated, 3/8" Cap., 115 V AC/DC (81348) W-D-661		EA	3
	5130-00-393-1849	DRILL, Electric, Portable, Double Insulated, 1/2" Cap., 115 V AC/DC, 650 RPM (81348) W-D-661		EA	1
	5120-01-268-5458	Driver, Wrist Pin		EA	1

Section III. BASIC ISSUE ITEMS - Cont.



(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
59	4320-00-256-8206	Eductor, Bilge, 4", (Ejector, Jet) (71905) 485011		EA	1
	7330-00-243-2408	Egg Beater, Handcrank, Double Beaters, Heavy Duty, Type 1 (81348) RR-E-300		EA	2
	7330-00-815-1458	Egg Whip, Stainless Steel, 16" Long, 3" Dia., Item 7, size 3 (81348) RR-W-456		EA	2
	4220-01-251-6466	Exposure/Survival Suit, USCG Approved, Adult Universal (60352) 1409-A, ISS-590-1		EA	44
	4240-01-116-9888	Emergency Escape Breathing Device (53711) 802300-01		EA	44
	4240-01-116-9889	Emergency Escape Breathing Device Trainer		EA	1
	4240-00-240-5140	Faceshield, Industrial, Amber, K18 Plastic Visor (81348) MIL-S-3126		EA	4
	4240-00-240-5141	Faceshield, Industrial, Clear, K18 Plastic Visor (81348) MIL-S-3126		EA	4
	2040-00-128-7982	Fender, Marine, 32" X 50", Foam Filled		EA	6
	2040-00-807-4197	Fender, Marine (81349) MIL-F-58065		EA	16
60	5120-00-223-8860	Fid, 18" Long, Type 1, Style A (81349) MIL-F-3113		EA	6

SECTION BASIC ISSUE ITE.MS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	NO NSN	FLAG BAG, PORTABLE, Aluminum 20 Gauge, 27-I/2" x 13 x 26, Hinged. 72 Compartments 3" x 3-1/2" x 13, w/Lock & Handles (33333) No Ref		EA	1
	8345-00-262-2419	FLAG ORG TC		EA	2
	8345-00-656-1434	FLAG, NATIONAL, UNITED STATES 2'4" x 4'6" (81348) DDD-F-416		EA	2
	8345-00-656-1446	FLAG, NATIONAL, UNION JACK I' 10" x 28" (81348) DD-F-416		EA	2
	8345-00-935-0445	FLAG, SIGNAL, "A" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6803	FLAG, SIGNAL, "B" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0446	FLAG, SIGNAL, "C" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6805	FLAG, SIGNAL, "D" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0447	FLAG, SIGNAL, "E" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-9218	FLAG, SIGNAL, "F' Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-9987	FLAG, SIGNAL, "G" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0448	FLAG, SIGNAL, "H" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-49	FLAG, SIGNAL, "I" Intn'l Code. Size 6 (81349) MIL-F-2692		EA	2
	8345-926-681	FLAG. SIGNAL, "J" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2

Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	8345-00-926-9988	FLAG, SIGNAL, "K" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0450	FLAG, SIGNAL, 'L" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0444	FLAG, SIGNAL, 'M" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6001	FLAG, SIGNAL, "N" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0451	FLAG, SIGNAL, 'O" Intn'l Code, Size 6 81349) MIL-F-2692		EA	2
	8345-00-935-0452	FLAG, SIGNAL, 'P" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0453	FLAG, SIGNAL, 'Q" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6812	FLAG, SIGNAL, 'R" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0454	FLAG, SIGNAL, "S" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6002	FLAG, SIGNAL, '" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6814	FLAG, SIGNAL, U'" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0455	FLAG, SIGNAL, 'V' Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0456	FLAG, SIGNAL, "W" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6004	FLAG, SIGNAL, X'" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0457	FLAG, SIGNAL, Y" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2

Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M U/M	(5) QTY RQR
	8345-00-935-0458	FLAG, SIGNAL, “Z" Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	6230-00-264-8261	FLASHLIGHT, Watertight, 2 Cell (81349) MIL-F-3747		EA	8
	4210-01-056-8343	Foam, AFFF		EA	12
	7330-00-634-1995	Food Turner, Cake, 7-1/2", Solid Blade (81348) RR-F-575		EA	4
	7340-00-223-7791	Fork, Food Preparation, 15" Long, 2 Tines, Stainless Steel (81349) MIL-V-10815		EA	2
	5110-00-289-9657	Frame, Hand, Hacksaw, for 10" to 12" Blade, Type 1, class 1, Style 1 (81348) GGG-F-671		EA	2
	7240-00-527-9868	Funnel, Metal, with Strainer, Galvanized, Steel, 1 Qt., Type 1 (81348) RR-F-800		EA	2
	7240-00-144-5995	Funnel, Steel, with Strainer, 1 Gal. (81348) RR-F-800		EA	2
	7240-00-230-2393	Funnel, with Spout and Strainer, Galvanized, Steel, 1 Pt., Type 1 (81348) RR-F-800		EA	2
	5210-00-223-9194	GAGE, Thickness, 0,0015 - 0.125		EA	1
	5210-01-218-4342	GAGE, Float Level		EA	1
	5330-00-641-1193	Gasket Material, Sheet, Compressed, 1/16", Type 1, Class 1, (81348) HH-P-466		FT	10
	5330-00-171-6551	Gasket Material, Sheet, Compressed, 1/8", Type 1, Class 1, (81348) HH-P-466		FT	10

Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	8415-00-268-7859	Gloves, Leather, (Welders) (81348) JJ-C-451		PR	2
	4240-00-052-3776	Goggles, Industrial, Plastic, Safety (81348) GGG-G-513		EA	32
	2040-00-238-9060	Grapnel, Marine, 5 Prong (81349) MIL-G-613		EA	1
		Grinder, Air, Part No. AG230FP64		EA	1
		Grinder, Air, Part No. 77A60P109		EA	6
	3415-00-243-1465	Grinder, Bench Mounted, Elcl, 115 VAC (81348) W-G-00656		EA	2
	4930-00-287-5419	Gun, Fluid, Direct Delivery, 25.8 Oz. (81348) GGG-0-591		EA	1
	4930-00-253-2478	Gun, Grease, hand, 16 Oz. Capacity (81349) MIL-G-3859		EA	2
	5120-00-203-4546	Hammer, Hand, Cross-Peen, 3 Lbs. (81348) GGG-H-86		EA	2
	5120-00-061-8545	Hammer, Hand, Machinist's, Ball Peen, 24 Oz, Fiberglass Handle (81348) GGG-H-86		EA	2
	5120-00-061-8546	Hammer, Hand, Machinist's, Ball Peen, 32 Oz, Fiberglass Handle (81348) GGG-H-86		EA	2
	5120-00-255-1476	Hammer, Hand, Ship's Maul, 5 Lbs., Type 12 (81348) GGG-H-86		EA	2
	5120-00-224-4111	Hammer, Hand, Scaling, Boiler Pick, 1 Lb., (81348) GGG-H-86		EA	6
	5120-00-224-4141	Hammer, Hand		EA	1
	5120-00-243-2957	Hammer, Hand, Sledge, Blacksmith, 10 Lbs., Type 10, Class 1 (81348) GGG-H-86		EA	4
	5130-00-190-6442	Hammer, Pneumatic, Portable, Scaling, Type 1, Style A (81348) 00-H-116		EA	4
	5130-00-228-3161	Hatchet, Half (81348) GGG-H-131		EA	2
	5965-00-940-8699	Headset Chest Set, High Noise		EA	2
	3950-00-965-0096	Hoist, Chain, Hand-Operated, Hook, 2-Ton Capacity, Class 2, type C (81348) MIL-H-904		EA	2
	3950-00-889-8728	Hoist, Chain, Hand-Operated, Hook, 1-Ton Capacity, Class 1, type C (81348) MIL-H-904		EA	2
	3950-00-937-7978	Hoist, Wire Rope, 1000-lb Capacity (06550) P-15H		EA	2

Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	2040-00-268-9250	Hook, Boat, 10' (81349) MIL-H-3496		EA	2
	4720-00-202-6482	Hose Assembly, Nonmetallic, Water, Rubber Wrapped, 3/4" (81348) ZZ-H-601		EA	4
	4210-01-131-0249	Hose, Fire, 1-1/2", 50 Ft., Orange		EA	28
	4210-01-131-0247	Hose, Fire, 2-1/2", 50 Ft., Orange		EA	6
	4720-00-293-7874	Hose Assembly, Air, 1/2" X 50 Ft. (81348) 22-H-500		EA	4
	4210-00-230-6572	Hose Assembly, Nonmetallic, Eductor (81348) ZZ-H-451		EA	2
	6665-01-115-7666	Indicator, Oxygen/Explosive, MSA Model 260, MSA Part No. 449900 (55799)		EA	2
		NOTE The following items go with Indicator, Oxygen/Explosive, above:			
	6665-01-257-1902	Sensor, Oxygen, Replacement, MSA Part No. 457621 (55799)		EA	2
	6665-01-167-0685	Sensor, Combustible Gas, Replacement, MSA Part No. 449917 (55799)		EA	2
		Calibration Check Kit, Model R, With 1.5 Um Regulator, MSA Part No. 476609 (55799)		EA	1
	6830-01-304-9650	Calibration Check Gas, (0.75% Pentane, 15% Oxygen, in Nitrogen), MSA Part No. 476304 (55799)		EA	2
		Sampling Line, Synthetic Rubber, 10', MSA Part No. 11955 (55799)		EA	2
		Water Trap, MSA Part No. 497199 (55799)		EA	1
		Filter Package, (5 in each package), MSA Part No. 497200 (55799)		PK	1
	6545-00-922-1200	Kit, First Aid, 12 Unit (33333) (No Ref.)		EA	2
	4730-00-470-6625	Kit, Fitting, Coper Tubing (30320) 51025		EA	1

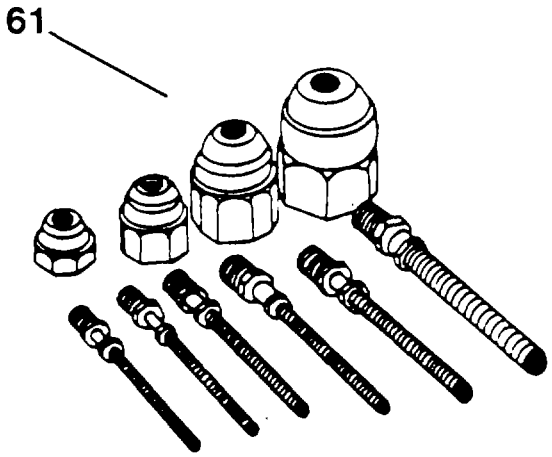
SECTION III. BASIC ISSUE ITEMS - Cont.

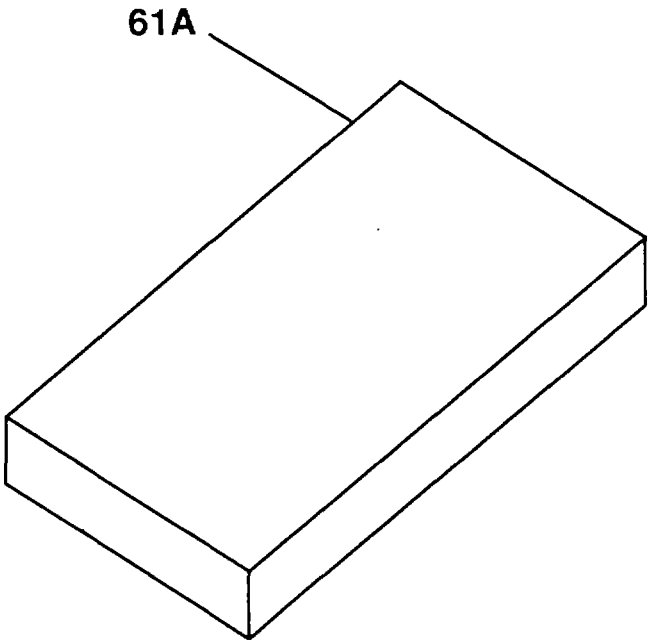
(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	NO NSN	KIT, RUNING GEAR (To Make Welder Portable) C/O 2 ea, Axles, 4 ea casters (40608) 040-874		EA	2
	8470-01-127-7337	HELMET PHONE TALKER (81349) MILH-22199		EA	3
	1095-00-392-2980	KIT, SERVICE, Line, Throwing Device (75324) GR-52CK		EA	1
	5180-00-754-0661	KIT, WELDING Access CJO Electrode Cable Min. 35 Ft. Long: 1 Ea. Ground Cable w/Clamps, Min. 30 FL. Long: 1 Ea Welding Helmet (19204)87540661 (or equal)		EA	1
	7340-00-223-7771	KNIFE, COOKS, 12" Carbon Steel Blade Rosewood Handle (81348) GGG-C-746		EA	4
	7340-00-223-7769	KNIFE, PARING, 3-1/2" Hi-Carbon Steel Blade, Rosewood Handle (81348)GGG-C-746		EA	4
	7340-00-223-7766	KNIFE, SLICING, 12' Carbon Steel Blade, Rosewood Handle (81348) GGG-C-746		EA	4
	7340-00-291-0625	KNIFE, STEAK, Food Prep, 10" Long (81348) GGG-C-746		EA	1
	2090-00-242-2511	LADDER, JACOBS, 15'		EA	1
	7330-00-248-1153	LADLE, KITCHEN, 8 Oz. Stainless Steel, w/o Pouring Lip (81348)RR-L-30		EA	4
	6230-00-783-6252	LANTERN, Subassembly		EA	9
	6230-00-783-6519	LATERN, Body		EA	9
	6230-00-828-6398	LANTERN, ELECTRIC 6 V w/Relay PON, Explosion Proof (81349) MIL-L-4020		EA	9
	2020-00-789-1075	LASHING GEAR VEHICLE, 35,000 Lbs. Breaking Strength (80064)805-1313819		EA	100

Section III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	2020-00-789-1065	Lashing Gear, Vehicle, 17,000 lbs. Breaking Strength 80064 805-1313817		EA	150
	5440-00-223-6025	Ladder, Extension (58536) A-A-1997		EA	1
	4940-01-378-3354	Leak Detector, Refrigerant Gas (16734) TIF5650		EA	1
	4220-00-200-0538	Life Preserver Vest (81349) MIL-L-18045		EA	44
	4220-00-275-3157	Life Ring, 30"		EA	8
	6230-00-152-2870	Light, Desk, Chart Table (With Filter Assy. MIL-STD-1 6721)		EA	2
	6230-00-268-9246	Light, Extension, Explosion Proof (81349) MIL-L-4020		EA	4
	6230-00-782-0643	Light, Marker, Distress, Rail (Ring Buoy)		EA	6
	6260-01-086-8077	Light, Marker, Distress, Personnel Marker		EA	100
	1095-00-270-6019	Line, Throwing Device (81349) MIL-L-45505		EA	1
	6530-00-042-8131	Litter,, Rigid, Stokes (81349) MIL-L-1117		EA	2
	2090-00-956-3017	Locker, Fuse, Aluminum, 15" X 11-3/8" (80064) 805-1363771		EA	1
	2090-00-956-3016	Locker, Hand Grenade, Aluminum, 26-1/8" X 15/16" (80064) *85-1363770		EA	1
	2040-00-823-4298	Locker, Pyrotechnic (80064) 805-1360-275		EA	1
	4930-00-640-4081	Lubricating Gun, Hand, 9 Oz. (33333) No Ref		EA	2
	4930-00-253-2478	Lubricating Gun, Hand, 14 Oz. (81349) MIL-G-3859		EA	2

Section III. BASIC ISSUE ITEMS - Cont.



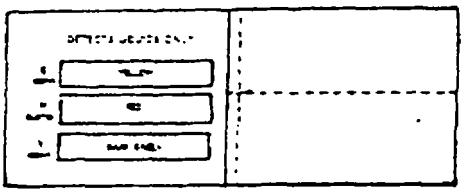


(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
61	5120-00-691-1165	MANDREL SET, Hand (Used to Assemble Swivel Nut fittings to Hoses)		EA	2
	1370-01-074-0591	MARKER, Location, Marine, MK 58, Mod 1 (1000) Part No. 3139741		EA	2
	6850-00-270-9986	MARKER, Sea, Fluorescent (81349) HIL-S-17980		EA	4
	5120-00-224-9443	MARLINE SPIKE, 14", Plain, Wire Rope Type, With Eye, Type 1 (81349) MIL-M-15926		EA	2
	7330-00-205-3093	MASHER, Potato, Hand (81348) RR-W-456		EA	2
61A	7210-01-177-3628	MATTRESS, Bed (81348) V-M-96K, Type II, Class 1, Style 1, Size 4A		EA	31
	7240-00-233-6013	MEASURE, Liquid, Flexible Spout, 1 Qt., Type 1, Class B (81348) RR-M-1850		EA	3

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	7240-00-233-6025	Measure, Liquid, Rigid Spout, 4 Qt, Type 1, Class A (81348) RR-M-1850		EA	3
	7330-00-272-7876	Measuring Set, Spoon, Cres (4 Spoons) (81349) MIL-M-40122		EA	2
	5830-00-688-6633	Megaphone, Power, Hand Held (80058) AN/PIQ-5		EA	1
	6625-01-139-2512	Multimeter, Digital, AN/PSM-45		EA	3
	6625-01-146-2430	Multimeter, Digital, ANIUSM-486		EA	3
	4210-00-288-6857	Nozzle, 1-1/2", 3 Position		EA	11
	4210-00-392-2944	Nozzle, 2-1/2', 3 Position		EA	5
	4210-40-225-6225	Nozzle, Ffire Foam, 1-1/2'		EA	6
	4930-00-262-8868	Oiler, Hand, Rex Spout, 1 Pt. (81348) GGGO-591		EA	2
	4930-00-266-9182	Oiler, Hand, 8 Oz. (81348) GGG-O-591		EA	3
	7330-00-272-2590	Opener, Can, Elec., Portable 115 V, Type 1 (81349) MIL-0-40155		EA	1
	7330-00-205-3151	Opener, Can, Manual, Table Mounted (81348) FF-0-601		EA	1
	7240-00-160-0455	Pail, Utility, Metal, Heavy Weight, 3-1/2 Gal (81348) RR-P-35		EA	4
	7330-00-634-4494	Pan, Baking & Roasting (81348) RR-P-54		EA	4
	7330-00-205-3164	Pan, Baking & Roasting, 13-1/4" x 9-1/4" x 2-1/4" (81348) RR-P-54		EA	4
	7330-00-234-7401	Pan, Baking & Roasting, 24' x 12" x 8" (81348) MIL-P-3852		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.



(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	7330-00-205-3150	PAN, Cake, Round, 9" Dia. x 1-1/2" Deep (81348) RR-P-62		EA	4
	7330-00-238-3805	PAN, Frying,1 2" Dia. (81348) RR-P-89		EA	2
	7330-00-954-6015	PAN, Frying, 8", Co.: Durawear Corp. (78440) Model DW 908		EA	2
	7330-00-244-4549	PAN, Muffin, 12 Cups, Aluminum, Heavy Duty, Style A (81348) RR-P-54		EA	4
	7330-00-823-6883	PAN, Pie, Aluminum, 9", Style A (81348) RR-P-54		EA	4
62	6665-00-050-8529	PAPER, Chemical Agent Detector (81361) D5-67-266		BX	6
	4320-01-228-5625	PARTS KIT, Reciprocating Pump		EA	1
	4320-01-228-5626	PARTS KIT, Reciprocating Pump		EA	1
	7330-00-238-8316	PEELER, Potato, Hand (81349) MIL-P-20583		EA	2
	8345-00-935-0410	PENNANT, Signal, Answer, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-5990	PENNANT, Signal, Answer, 1st Repeater, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0421	PENNANT, Signal, Answer, 2nd Repeater, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-9207	PENNANT, Signal, Answer, 3rd Repeater, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2

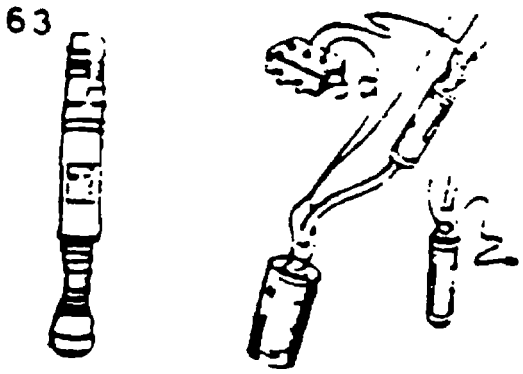
SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	8345-00-935-0495	PENNANT, Signal, '0" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0401	PENNANT, Signal, '1" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-6023	PENNANT, Signal, "2. Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0490	PENNANT, Signal, '3" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0491	PENNANT, Signal, '4" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0492	PENNANT, Signal, "5" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0493	PENNANT, Signal, "6" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-926-9214	PENNANT, Signal, '7' Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0494	PENNANT, Signal, "8" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	8345-00-935-0405	PENNANT, Signal, '9" Numeric, Intn'l Code, Size 6 (81349) MIL-F-2692		EA	2
	7210-00-205-3205	PILLOW, Bed, Type 1, Size 3 (81348) V-P-356		EA	35
	5315-01-284-9272	PIN HOUSING, Socket		EA	1
	7350-00-249-5165	Pitcher, Water, 2 Qt., Stainless Steel, Style A, Size 2 (81348) RR-P-386		EA	8

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5110-00-239-8253	PLIERS, Diagonal Cutting, Plain Regular Nose, 6" Long, Type , Class 1 (81348) GGG-P-468		EA	2
	5120-00-248-9420	PLIERS, Lineman's, w/Side Cutters and Wire Skinners, 8" Long, Type 9, Class 2 (81348) GGG-P-471		EA	2
	5120-00-239-8251	PLIERS, Lineman's, w/Side Cutters, 8" Long, Plain Handle, Type 9, Class 1, Style A (81348) GGG-P-471		EA	2
	5120-00-223-7396	PLIERS, Slip Joint, Straight Nose, 6" Long, Type 2, Class 2, Style A (81348) GGG-P-471		EA	2
	7330-00-263-8505	POT, Cooking, w/o Cover, 24 Qt. (81348) A-A-441		EA	2
	7330-00-205-4146	POT, Cooking, w/Cover, 14 Qt. (81348) RR-B-500		EA	2
	5360-00-241-1224	POT, Cooking, w/Cover, 6 Qt.		EA	4
	6830-00-584-3041	PROPANE, 14 Oz. Disposable Cylinder, Type 2 (81348) BB-G-110		EA	4
	4240-00-022-2946	PROTECTOR, Aural, Sound (81349) MIL-P-38268		EA	32
	6675-00-191-1514	PROTRACTOR, Plastic, 3 Arm, Type 2 (81349) MIL-B-288 Type II		EA	2
	5120-00-224-9456	PULLER, Fuse, 1/2" and 1-1/4" Dia., Type 1, Size 2 (81348) W-P-796		EA	2
	5120-00-243-2776	PULLER, Fuse, 1" and 2-1/2" Dia., Type 1, Size 3 (81348) W-P-796		EA	1
	5120-00-595-9304	PULLER, Mechanical, Double-End Grip, Two Jaw, External, 6" Spread, 3" Reach, Type 1, Class 1, Style B (81348) GGG-P-781		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.



(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5120-00-595-9305	PULLER, Mechanical, Double-End Grip, Two Jaw, External, 8' Spread, Type 1, Class 1, Style B, Size 2 (81348) GGG-P-781		EA	1
	5120-00-110-4564	PULLER, Wheel		EA	1
63	4320-00-368-3186	PUMP UNIT, Centrifugal, Elec., Submersible (39428) 4327K4		EA	2
	4310-00-289-5967	PUMP UNIT, Vacuum, Rotary, 115 VAC, 13 CFM (to Pull Vacuum on Air Conditioning and Refrigeration Systems) (33333) No ref.		EA	1
	4320-01-186-3377	PUMP, Centrifugal, Gas Engine, Port Fire Fighting Service (26840) 545-2150-00-0		EA	2
	4320-01-306-6342	ACCESSORY PUMP, MOD 1, P250 (26480) 340-0530-00-0		EA	2
	5110-00-449-7313	PUNCH SET, Cutting, Double Bow, 7 Hollow Punches, Sizes 1/4" to 5/8" Dia. 45225 HP 7		EA	1
	5120-00-223-1014	PUNCH, Drive Pin, Extra Long Point, 1/8" Point size, 8" Long, Type 8, Class B (81348) GGG-P-831		EA	2
	5120-00-223-1016	PUNCH, Drive Pin, Extra Long Point, 1/4" Point size, 8" Long, Type 8, Class B (81348) GGG-P-831		EA	2
	5120-00-223-1018	PUNCH, Drive Pin, Extra Long Point, 3/8" Point size, 8" Long, Type 8, Class B (81348) GGG-P-831		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	2040-00-288-2866	RAT GUARD, Galvanized, 3" X 36", Type Conical (81349) MIL-G-2767		EA	6
	5120-00-186-4215	REAMER, Hand		EA	1
	5120-00-223-9556	EXTRACTOR, Pack		EA	1
	5120-00-223-9557	EXTRACTOR, Pack		EA	1
	5120-00-223-9558	EXTRACTOR, Pack		EA	1
	5120-00-223-9559	EXTRACTOR, Pack		EA	1
	4240-00-629-8199	RESPIRATOR, Air Filtering (81349) MIL-R-3308		EA	4
	5120-00-017-2849	RIVETER, Blind, Hand (81348) GGG-R-00395		EA	1
	6675-00-191-1509	RULE, Parallel, 18", Navigator's, Folding (81348) GG-P-118		EA	2
	7520-00-141-5365	RULLER, Slide, Nautical (81348) GG-S-446		EA	1
	7510-00-161-6215	RULLER, Wood, 12" (81348) A-A-355		EA	4
	5130-00-857-8526	SANDER, Disc, Elec, Portable, AC/DC (81348) OO-S-90		EA	3
	7330-00-240-2134	SAUCEPAN, w/Cover, 2 Qt., Size 1 (81349) MIL-S-40044		EA	4
	7330-00-240-2137	SAUCEPAN, w/Cover, 7-1/2 Qt., Size 3 (81349) MIL-S-40044		EA	2
		(Deleted)			
	5110-00-293-3435	SAW, Hand, Crosscut, Straight Back 26" Long 8 Teeth Per Inch, Type 5 (81348) GGG-S-65		EA	2
	5130-01-397-9020	SAW, Reciprocating		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

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(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
64	5130-00-965-9876	SCALER, PNEUMATIC, Portable, Needle Type (81348) MIL-S-23492		EA	4
65	5130-00-288-6577	SCALING & CHIPPINC TOOL, Electric 115 V AC/DC (81349) MIL-S-19875		EA	4
	7330-00-153-9760	SCOOP, KITCHEN, Stainless Steel, 7-7/8" x 5-1/4" (81348) RR-S-131		EA	4
	5120-00-278-1267	SCREWDRIVER, Flat Tip, Cabinet, 8" Lg, 9/64" Nom Tip Width, Type 1, Class 1 Design A (81348) GGG-S-121		EA	2
	5120-00-278-1282	SCREWDRIVER, Flat Tip, 4" Long, 1/4" Nom Tip Width, Type 1, Class 5, Style 1, Design B, Shape B (81348) GGG-S-121		EA	2
	5120-00-237-6985	SCREWDRIVER, Flat Tip, 8" Long, 3/8" Nom Tip Width, Type 1, Class 5, Design A (81348) GCC-S-121		EA	2
66	6605-00-224-7735	SEXTANT, MARINE, Range of ARC 5 to 145 Deg, w/Case & Polaroid Filters, Type A (81349) MIL-S-2387		EA	2
	7350-00-240-7068	SHAKER, PEPPER, 9 Cu In Cap, Type 8 (81348) RR-K-260		EA	4
	7350-00-680-2630	SHAKER, SALT and PEPPER, Glass Body Stainless Steel Top 2 Oz. (81348) DD-T-101		EA	10
	7350-00-240-7069	SHAKER, SALT, 9 Cu In Cap, Type 8 (81348) RR-K-260		EA	4
	7520-00-162-6178	SHARPENER, PENCIL, Manual (81348) GG-S-236		EA	7

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5110-00-293-0089	Shears, Metal Cutting, Straight Cut, 2-1/2" to 3-1/2" Cut, 12-1/2" Overall Length, type 2, Class 1, Style B (81348) GGG-S-291		EA	2
	4240-00-764-5152	Shield, Face,, Ind., Clear (02622) 4843		EA	2
	4240-00-240-5140	Shield, Face,, Ind., Amber (81348) MIL-S-3126		EA	2
	7330-00-184-0089	Sifter, Flour, 1-1/2 Qt. (81348) RR-S-345		EA	2
	1370-00-629-2336	Signal, Illumination, Ground, Red Star, Parachute, M126A1 (19203) 8797968		EA	12
	5850-00-407-6671	Signal, Lamp, Equipment (80063) SE 11		EA	1
	3439-00-930-1638	Soldering Gun, Electrical, Trigger Operated (11103) 450		EA	2
	7330-00-684-8740	Spatula, Steel, 14" Blade (81348) GGG-C-746		EA	2
	7330-00-254-4791	Spatula, Steel, 8" Spring Tempered Blade (81348) GGG-C-746		EA	2
	7340-00-223-7800	Spoon, Basting, 21" Long (81348) RR-S-617		EA	4
	7340-00-240-7080	Spoon, Food Service, 15" Long, Type 1 (81348) RR-S-617		EA	4
	7340-00-205-1421	Spoon, Slotted Serving, 15" Long (81348) RR-S-617		EA	6
	7240-00-177-6154	Spout, Flexible (81349) MIL-S-1285		EA	1
	3740-00-641-4719	Sprayer, Insecticide, Hand Pump, 2 Gal. (81349) MIL-S-14102		EA	2
	4240-01-258-1245	Station, Eye Wash, Portable		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	7520-00-298-7044	Stencil Set, Marking, 2' Brass Interlocking Letters (81348) RR-S-714		EA	2
	7520-00-272-9683	Stencil Set, Marking, 3" Brass Interlocking Letters (81348) RR-S-714		EA	2
	7520-00-298-7043	Stencil Set, Marking, 1' Brass Interlocking Letters (81348) RR-S-714		EA	2
	7520-00-269-9012	Stencil Set, Marking, 4" Brass Metal Letters (81348) RR-S-714		EA	2
	7110-00-634-8596	Stool, Revolving, Metal, Gray (81348) AA-S-700		EA	2
	6645-00-250-4680	Stopwatch, 60 Second Dial, Type 1, Class 2 (81348) GG-S-764		EA	2
	4730-01-228-0965	Strainer, Sediment		EA	4
	5210-00-174-3231	Straightedge		EA	1
	6680-00-242-9229	Tachometer, Mechanical, Hand (57163) 107		EA	2
	5136-00-357-7504	Tap and Die Set, (UNF)		EA	1
	5136-00-357-7494	Tap and Die Set, (NC)		EA	1
	5136-00-189-7805	Taps, Pipe, 1/8" X 27 Thread Size		EA	2
	5136-00-189-7806	Taps, Pipe, 1/4" X 18 Thread Size		EA	2
	5136-00-189-7807	Taps, Pipe, 3/8" X 18 Thread Size		EA	2
	5136-00-189-7808	Taps, Pipe, 1/2' X 14 Thread Size		EA	2
	5136-00-237-8147	Taps, Pipe, 3/4" X 14 Thread Size		EA	2
	5136-00-237-8148	Taps, Pipe, 1" X 11-1/2 Thread Size		EA	2
	5136-00-237-8149	Taps, Pipe, 1-1/4" X 11-1/2 Thread Size		EA	2
	5136-00-889-6976	Taps, Pipe, 1-1/2" X 11-1/2 Thread Size		EA	2
	5136-00-889-6977	Taps, Pipe, 2" X 11-1/2 Thread Size		EA	2
	5210-00-526-0752	Tape, Measuring, Tank Level Gauge, 50' Long, Brass Plumb Bob, Glare Free (37163)14075		EA	4
	5210-00-221-1882	Tape, Measuring, 100' Steel, Type 2, Class B (81348) GGG-T-106		EA	2
	5210-00-234-6745	Tape, Measuring, 50' Steel, Type 2, Class B (81348) GGG-T-106		EA	3
	6685-00-880-1293	TEMPLSTIK, 175 Degree		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	6630-00-531-1968	Test Kit, Oil Condition (81349) MIL-T-19467		EA	2
	6630-00-171-5126	Tester, Battery, Electrolyte Solution, Specific Gravity Range 1.1 to 1.35, Class 1, Style 8 (81348) GG-T-258		EA	2
	6685-00-938-0431	Thermomelt Stick		EA	2
	6685-00-266-3711	Thermomelt Stick		EA	2
	6685-00-255-9981	Thermometer, Self-Indicating, Liquid in Glass (81348) GG-T-351		EA	2
	6685-00-641-0189	Thermometer, Self-Indicating, Meat (81348) GG-T-353		EA	2
	5180-00-357-7514	Threading Set, Pipe, 1/8" to 1", Type 1, Class 1 (81348) GGG-T-581		EA	1
	5180-00-313-3042	Threading Set, Pipe, 1/8" to 1" Holding Cap, 32" to 44" Pipe Die (81348) GGG-T-581		EA	1
	7310-01-272-7891	Toaster, Electric, Automatic, 4 Slices, 115 V, 60 Hz, Single Phase (81348) W-T-550		EA	3
	7330-00-616-0997	Tongs, Food Serving, 12" Long (81349) MIL-T-40097		EA	6
	5310-01-272-8270	Tool, Mech. Seal Ramp		EA	1
	5180-00-391-1087	Tool Kit, Electrical Repair (81348) GGG-B-60		EA	2
	5180-00-392-2895	Tool Kit, Electricians (80064) 9000565Q4-73721		EA	1
	5180-00-699-5273	Tool Kit, Master Mechanic's (50980) SC5180-90-CL-NO5		EA	1
	5180-00-293-2875	Tool Kit, Carpenter (81348) 60-Piece		EA	1
	5180-00-629-9783	Tool Kit, General Mechanic's, Rail and Marine (81996) SC5780-00-97-CL-E28		EA	1
	5180-00-511-1950	Tool Kit, Machinist (19204) SC5280-95-CL-A02		EA	1
	5180-00-596-1474	Tool Kit, Refrigeration and Air Conditioning (50980) SC5180-90-CL-N18		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

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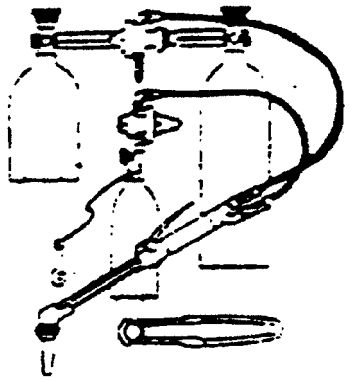

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5180-00-754-0661	Tool Kit, Welder (50980) SC5180-00-90-CL-N39		EA	1
	3439-00-542-0531	Torch Kit, Soldering, L.P. Gas (81348) GGG-T-570		EA	2
69	3433-00-357-8116	Torch Outfit, Cuffing and Welding, Medium Duty, Oxygen and Acetylene (50980) SC3433-90-GL-N03		EA	1
	7350-00-195-7334	Tray, Mess, Stainless Steel, 6 Compartment (81349) MIL-T-46		EA	21
	7350-00-823-73Q1	Tray, Service, Plastic (81349) MIL-T-43259		EA	4
	5136-00-357-7504	Threading Set, Tap and Die, NF (81348) GGG-T-330		EA	1
	5136-00-357-7494	Threading Set, Tap and Die, NC (81348) GGG-T-330		EA	1
	6675-00-190-5867	Triangle, Drafting, Plastic, 30 to 60 Degree, 10n, Type 1 (81348) GG-T-671		EA	2
	6675-00-190-5862	Triangle, Drafting, Plastic, 45 x 45 Degree, en, Type 1 (81348) GG-T-671		EA	2
	6675-00-866-0110	Triangle, Plastic, 15 Degree, (81348) GG-T-671		EA	2
	4210-01-087-0815	Trigate Valve, (P-250)		EA	2
	5120-00-222-1542	Tubing Bender		EA	1
	5120-00-222-1543	Tubing Bender		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5120-00-240-0152	Tubing Bender		EA	1
	5120-00-240-0153	Tubing Bender		EA	1
	5120-00-240-0154	Tubing Bender		EA	1
	5120-00-240-0155	Tubing Bender		EA	1
	5120-00-240-0156	Tubing Bender		EA	1
	5120-00-240-0157	Tubing Bender		EA	1
		Typewriter, Electronic, Radio Room (39101) Royal 415		EA	1
	6730-00-116-1620	Viewer, Printer, Microfiche (81349) MIL-V-80241		EA	1
	5120-00-188-1182	Vise, Bench and Pipe, Swivel Base, 3-1/2" Jaw, 3" Opening, Type 4 (81348) GGG-V-41 0		EA	2
	5120-00-293-0110	Vise, Bench and Pipe, 6" Jaw Width, 8" Opening, 1/4" to 6" Pipe Range, Type 4 (81348) GGG-V-410		EA	2
	5120-00-221-1117	Vise, Machinist, Swivel Base, 5" Jaw, 8" Opening, class 2 (81348) GGG-V-410		EA	1
	2910-01-228-5713	VRO Pump		EA	1
	6605-00-273-6985	Weight, Sounding, 9 Lbs. (81349) MIL-S-3717		EA	1
	8465-00-254-8803	Whistle, Plastic Ball, With Lanyard (81348) W-1 053		EA	100
	5120-00-081-2309	Wrench Set, Socket, 1" Drive, 12 Point, Type 2, Class 2, Style A (81348) GGG-W-641		EA	1
	5120-00-740-3379	Wrench, Box, Adj., 8" Long, 1/4" to 1" Cap. (08292) 26AB8		EA	1
	5120-00-449-8083	Wrench, Open End, Adjustable, 9-1/2" to 10-1/2" Long, 1-1/8" Jaw Opening, Size 10 (81348) GGG-W-631		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5120-00-240-3796	Wrench, Open End, Adjustable, 11-1/2" to 12-1/2' Long, 1-5/16' Jaw Opening, Size 12 (81 348) GGG-W-631		EA	1
	5120-00-240-1414	Wrench, Open End, Adjustable, 17-1/2" to 19" Long, 2-1/16" Jaw Opening (81348) GGG-W-631		EA	2
	5120-00-449-8084	Wrench, Open End, Adjustable, 23-1/2" to 25' Long, 2-7/16" Jaw Opening, Size 24 (81348) GGG-W-631		EA	2
	5120-00-264-3795	Wrench, Open End, Adjustable, 5-1/2' to 6-1/2" Long, 3/4" Jaw Opening, Size 6 (81348) GGG-W-631		EA	2
	5120-00-277-1480	Wrench, Pipe, Adjustable, Heavy Duty, Aluminum Handle, 24' Long, 1-1/2" to 2-1/2 Capacity, Type 2, Class C (81348) GGG-W-651		EA	2
	5120-00-277-1477	Wrench, Pipe, Adjustable, Heavy Duty, Aluminum Handle, 10" Long, 1/4' to 1" Capacity, Type 2, Class C (81348) GGG-W-651		EA	2
	5120-00-277-1479	Wrench, Pipe, Adjustable, Heavy Duty, Aluminum Handle, 18' Long, 1" to 2" Capacity, Type 2, Class C (81348) GGG-W-651		EA	2
	5120-00-270-4310	Wrench, Pipe, Adjustable, Heavy Duty, 48" Long, 5' Capacity, Type 2, Class A (81348) GGG-W-651		EA	2
	5120-00-270-4309	Wrench, Pipe, Adjustable, Heavy Duty, 36" Long, 3-1/2" Capacity, Type A, Class A (81348) GGG-W-651		EA	1
	5120-00-277-1478	Wrench, Pipe, Adjustable, Heavy Duty, Aluminum Handle, 14' Long, 1/2' to 1-1/2" Capacity, Type 2, Class C (81348) GGG-W-651		EA	1
	5120-00-277-1486	Wrench, Pipe, Adjustable, Heavy Duty, 14' Long, 1-1/2" Capacity, Type 2, Class A (81348) GGG-W-651		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5120-00-277-1481	Wrench, Pipe, Adjustable, Heavy Duty, 36" Long, Aluminum Handle, 2-1/2" to 3-1/2" Capacity, Type 2, Class C (81348) GGG-W-651		EA	2
	5120-00-277-1483	Wrench, Pipe, Adjustable, Heavy Duty, 6" Long, 1/2" Capacity, Type 2, Class A (81348) GGG-W-651		EA	2
	5120-01-245-7546	Wrench, Socket		EA	1
	5120-00-293-1602	Wrench, Spanner, for 1-3" Dia. Hose, Type 5 (81348) GGG-W-665		EA	22
	5120-00-293-0406	Wrench, Spanner, 1-1/4" to 3" (81348) GGG-W-665		EA	14
	5120-00-221-7983	Wrench, Torque, 3/4" Drive, 0 to 600 Ft. Lbs., Type 2, Class 1 (81348) GGG-W-00686		EA	2
	5120-00-640-6365	Wrench, Torque, 1/2" Square Male Drive, 0 to 250 Ft. Lbs., Type 2, Class 1, Style A (81348) GGG-W-00686		EA	2
	7920-00-579-8484	Wringer and Bucket, Mop, Light Duty, 16 Qt. (81348) RR-M-1075		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	2910-01-319-0117	Actuator, P/N 7W1454 Woodward (11 083) EG3 P		EA	2
	4320-01-272-2979	Adapter, Pump/Motor (63544) 2825-00019		EA	1
	2930-01-053-4559	Adapter, Water Pump (11083) P/N 7C9222		EA	2
	6625-01-268-4047	Ammeter (10741) 9591		EA	1
	6625-01-274-2092	Ammeter, Grd., Det. (04314) 354-320-MTMT		EA	1
	6625-01-268-4048	Ammeter, 0-500 (04314) 250-340-LSSF		EA	1
	6625-01-144-5520	Ammeter (11083) 4L6839		EA	1
	6625-01-268-4049	Ammeter, 0-200A (04314) 250-340-LSRL		EA	1
	2030-01-271-6218	Amplifier, Steering (63544) 1111-10900		EA	2
		(Deleted)			
		Bags, Beast, (10 Count), Compactor (01349) GBB-10		EA	20
	5330-00-549-7691	Band (11083) 9L5854		EA	2
	2090-01-274-1988	Barrier, Mounting (63544) 5100-00036		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	6140-00-195-1315	BATTERY (19728) 9939X		EA	1
	6140-01-273-7411	BATTERY, Gel-Cell (63544) 3900-00002		EA	1
		BATTERY, Lithium (82692) 600027-392-001		EA	1
		(Deleted)			
	5995-01-311-6900	BATTERY w/Cable Assy (14304) 6919-1450		EA	1
		BEADS, Polypropylene (5W198) 14 lbs		EA	14
	3110-01-267-5673	BEARING (38151) A-7812R-55		EA	1
	3110-01-266-7566	BEARING (38151) A-7812R-60		EA	1
	3110-01-161-5472	BEARING (04579) 068-0160-647		EA	1
	3110-01-170-3708	BEARING (04579) 068-0458-647		EA	1
	3120-01-136-3569	BEARING (11083) 8N5421		EA	7
	3120-01-130-6158	BEARING (11083) 8N8224, alt 4W5738		EA	7
	3110-00-341-6621	BEARINGS, HP 1/2, 3/4, 1,1-1/2 (80352) 416821-2D		EA	8
	3110-01-265-5025	BEARINGS, HP 1, 1-1/2 (80352) 416821-52F		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	3110-01-265-1766	BEARINGS, HP 3 (80352) 416821-3F		EA	1
	3110-01-300-6410	BEARINGS, HP 3 (50380) 416821-3G		EA	1
	3110-01-266-0701	BEARINGS, HP 5 (80352) 6206		EA	1
	3110-01-266-4448	BEARINGS, HP 5 (80352) 6207		EA	1
	3110-01-266-4449	BEARINGS, HP 15 (80352) 6312		EA	2
	3130-01-025-6325	BEARINGS, Blower Shaft (10855) KT66CZ- 103		EA	2
	3110-01-268-4017	BEARING CUP (49576) 3720		EA	2
	3110-01-268-4022	BEARING, Carrier Group (49576) 110812-003		EA	1
	3110-00-227-3123	BEARING, Cone (49576) 6652		EA	2
	3110-01-268-4018	BEARING, Cone (49576) 2788		EA	2
	3110-00-554-3248	BEARING, I.B. (49579) 068-0161-647		EA	1
	3110-00-544-3197	BEARING, I.B. (49579) 068-1907-647		EA	1
	3110-01-266-7567	BEARING, Motor (38151) A-7848R-30		EA	1
	3110-01-266-7565	BEARING, Motor (38151) A-7812R-35		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	3110-01-285-4169	BEARING, Motor (38151) A-9700R-55		EA	1
	3110-01-178-1603	BEARING, Motor (38151) A-9700R-60		EA	1
	3110-01-265-5020	BEARING, O.B. (04579) 068-2206-647		EA	1
	3110-00-293-9305	BEARING, O.B. (04579) 068-2310-647		EA	1
	3110-00-211-6272	BEARING ASSEMBLY, Outer (82484) GC-3		EA	1
	2815-00-103-8101	BEARING, Insert (72915) 8341192		EA	1
	3120-00-366-1136	BEARING, Lower (72915) 8136114		EA	1
	3120-00-824-5330	BEARING, Upper (72915) 8354118		EA	1
	6350-01-274-2053	BELL, 4" (63544) 1300-00010		EA	1
	3030-01-269-7241	BELT (60985)11-0133-2		EA	1
	3030-00-741-6835	BELT, Drive (71176) A-48", alt A-52"		EA	1
	3030-01-269-7240	BELT (60985)11-0135B-1		EA	1
		BELT, Drive (17550) 25-025		EA	1
	3030-00-536-1847	BELT, Drive (24161) 3VX265		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	3030-00-840-9344	BELT, Drive (24161) 3V280		EA	2
		BELT, Stylus, 25" x 75" (17550) 2247B		EA	2
	3030-01-033-0597	BELTS, V- (20796) 3V335		EA	2
	3030-01-269-7239	BELTS, V- (11568) B-83 (Deleted)		EA	2
	4310-01-368-6413	COMPRESSOR, Rotary (51729) 22U-RAI		EA	1
	5306-00-795-4925	BOLT, ASM (72915) 8159340		EA	2
		BRACKET, Line Fuse (82692) 601633-602-001		EA	1
	2815-01-053-4853	BREATHER ASSEMBLY (11083) 4N4668		EA	2
	6240-01-266-4453	BULB (08576) 0775-05		EA	2
	6240-00-152-2982	BULB, 15 Watt, 18" (08108) F15T8CW		EA	6
	6240-00-902-4660	LAMP, Incandescent, PL120 PSB (88204) 120PSB		EA	1
	6240-00-155-8707	BULB (11083) 3N5719		EA	1
	6240-01-268-0396	BULB, 1000 Watt (34395) C1000S52		EA	3

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I	(5) QTY RQR
		(Deleted)		
		(Deleted)		
	6240-01-304-4631	LAMP, Incandescent, 150A,120 Volt (34395) 717AM7D2	EA	2
	6240-00-152-2983	BULB, 20 Watt (08108) F20T12/W	EA	5
	6240-01-288-7061	BULB, 300 Watt (34395) MRS40-500	EA	2
	6240-01-268-0397	BULB, 400 Watt (08108) C400S51	EA	2
	6240-00-299-5546	LAMP, Flourescent, 8 Watt (08108) F8T5CW	EA	24
	6240-01-268-0395	LAMP (37833) DLI-CE130	EA	5
		BULBS, Clear Sync (08108) 1OW120V	EA	4
	6240-01-268-2192	BULB, Light, 25T8C Microwave (22230) M9D98	EA	1
	6240-01-266-1652	BULB, Light (82692) 600005-390-005	EA	2
		(Deleted)		
	6240-01-268-2193	BULB, Shatter-Resistant Base Cabinet Heater (20087) 02-30-046	EA	1
	6240-01-254-5795	BULBS (46576) 342-4	EA	12

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I	(5) QTY RQR
	5365-01-155-7270	BUSHING (04579)136-1414-208	EA	2
	3120-01-127-5376	BUSHING (11083) 4M5317	EA	1
	4730-01-183-4575	BUSHING (11083) 5B4855	EA	3
	5365-01-266-8798	BUSHING (11083) 5M5317	EA	1
	5360-01-214-4954	BUSHING, Sheave Bore (71176) H-1-3/16"	EA	1
	5910-01-272-2965	CAPACITOR (63544)1500-00001	EA	1
	5910-01-268-4015	CAPACITOR (10741) 2896	EA	1
	5910-01-163-0595	CAPACITOR (10741) 9610	EA	1
	5910-01-096-7959	CAPACITOR (10741)8178	EA	1
	5910-01-268-4016	CAPACITOR (10741) 8647	EA	1
	5330-01-110-9277	GASKET, Valve Cap (10855) EN99ZA-102	EA	2
	4130-00-812-9490	CAP, Valve (10855) EN99ZA-002	EA	2
	6220-01-275-5054	CARD, Dual Plug Lamp (OBML2) KCC1 086L	EA	1
	5930-01-269-7246	CARD, Power Switch (OBML2) KCCS1 086S	EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	2815-00-994-7643	CARRIER, PISTON (72915) 8367800		EA	1
	4610-01-022-9970	CARTRIDGE, Bromine (08576) 9540-01		EA	5
	4820-01-268-4020	CARTRIDGE, Filter (D8835) WAV2240-A37		EA	1
	4820-01-268-4019	CARTRIDGE, Sun CBGA-LAN Counter Balance Valve (54035) CBGA-LAN		EA	1
	5920-00-062-1235	CARTRIDGE, Fuse (81348) F03250V1-2A		EA	1
		(Deleted)			
	4820-01-268-4043	CARTRIDGE, Sun RPGC-JAN Relief Valve		EA	4
		(54035)RPGC-JAN		EA	1
	2815-01-275-2151	CASE VENTS-Alwitco F-28 (99016) F-28		EA	4
		(Deleted)			
	5999-01-269-7302	CIRCUIT BOARD, Printed w/Auto Pilot (63544) 1111-18400		EA	1
	6110-01-272-2986	CIRCUIT BOARD, Printed (63544) 1111-20000		EA	1
	5999-01-269-7306	CIRCUIT BOARD, RAI Printed (63544) 1700-14001		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5999-01-269-7305	CIRCUIT BOARD, Printed (63544) 1700-17102		EA	1
	5999-01-272-3005	CIRCUIT BOARD, Printed, 24VDC Alarm Module (63544) 1111-17600		EA	10
	5999-01-269-7300	CIRCUIT BOARD, Printed, 24VDC Clock Module (63544) 1111-17800		EA	2
	5999-01-269-7303	CIRCUIT BOARD, Printed, 4-20 Receiver (63544) 1111-18500		EA	5
	5999-01-269-7304	CIRCUIT BOARD, Printed, RTD Transmitter (63544) 1111-18600		EA	5
	5999-01-269-7309	CIRCUIT BOARD, Printed, (Pos) (63544) 9999-23400		EA	1
	5999-01-280-0079	CIRCUIT BOARD, Printed, Dimmer (Neg) (63544) 1111-19800		EA	1
	5999-01-269-7301	CIRCUIT BOARD, Printed, Audible (63544) 1111-18000		EA	1
	5925-01-144-5459	CIRCUIT BREAKER (11083) 3N5582		EA	4
		CIRCUIT BREAKER, 450 Amp 3 Pole (66927) SLL63N500, SHL69500NT		EA	1
	5925-01-268-0425	CIRCUIT BREAKER, 400 Amp 3 Pole (66927) JJ63B400, JXD63B400		EA	1
	5925-01-268-0424	CIRCUIT BREAKER, 300 Amp 3 Pole (66927) JJ63B300, SJD69B300		EA	1
	5925-01-271-0700	CIRCUIT BREAKER, 250 Amp 3 Pole (66927) FJ63B250, FXD63B250		EA	1
	5925-01-228-0602	CIRCUIT BREAKER, 225 Amp 3 Pole (66842) FJ63B225, FXD63B225		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5925-01-271-6225	CIRCUIT BREAKER, 5 Amp (63544) 4300-00021		EA	2
	5925-01-271-6224	CIRCUIT BREAKER, 5 Amp (63544)4300-00020		EA	2
	5925-01-271-6222	CIRCUIT BREAKER, 5 Amp (63544) 4300-00014		EA	2
	5925-01-272-2984	CIRCUIT BREAKER, 10 Amp (63544) 4300-00015		EA	2
	5925-01-273-7416	CIRCUIT BREAKER, 25 Amp (63544) 4300-00018		EA	2
	5950-01-266-0715	COILS, Solenoid Valve (78462) MKC-2-110		EA	1
	4140-01-268-2210	CONDENSOR, Fan 5KSP51GL470HS (17479)15076		EA	1
	6105-01-270-6831	CONDENSOR, Fan Motor (17479)15027		EA	1
	5930-00-340-9708	CONDENSOR, Ranco Pressure Control (50992) 01 0-2054		EA	1
	5930-01-201-6499	CONDENSOR, Ranco Pressure Control (50992) 012-4834		EA	1
	4130-00-844-7050	CONDENSOR, Sporlan Drier (58553) C-163		EA	1
	4820-00-571-5892	CONDENSOR, Sporlan Expansion Valve (78462) GFE-1 C		EA	1
	6680-00-910-2418	CONDENSOR, Sporlan See All (58553) SA-13U		EA	1
	4820-01-268-2213	CONDENSOR, Superior Relief Valve (58553) 3014-350#		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
		(Deleted)			
	5999-01-274-1991	CONTACT BLOCK, N/O (63544) 5100-00022		EA	1
		CONTACT BLOCK (63544) 5100-00008		EA	2
	5930-01-202-3766	CONTACT, Oil Pressure (11083) 7N5946		EA	1
		CONTACT, Pre-Alarm Group (11083) 3N8790		EA	1
	6320-01-266-8804	CONTACT, Pre-Alarm Group (11083) 7W5342		EA	1
	6110-01-316-4863	CONTACTOR (74924) C133-011		EA	3
	6110-01-274-4242	CONTACTOR (36232) M-12161-19		EA	1
	6110-01-178-9231	CONTACTOR (10855) HN52KC-053		EA	2
	6110-01-127-6290	CONTACTOR (11083) 5N8596		EA	1
	5945-00-103-5132	CONTACTOR (10855) HN53CD-208		EA	1
	6110-01-200-6811	CONTACTOR, Water Temp. (11083) 5N8597		EA	1
	1915-01-275-5060	CONTROL PCB (36232) G-1574-1		EA	1
		(Deleted)			

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	3040-01-268-5102	COOLER, Oil (11083) 4N729		EA	1
	4730-01-287-6786	COUPLING (63544) 2825-00020		EA	1
	3010-00-438-2756	COUPLING INSERT (14204) 370		EA	1
	3010-00-102-0358	COUPLING INSERT (14204) 670		EA	1
	3010-01-019-4863	COUPLING INSERT, Magnaloy #570 (14204) 570		EA	1
	5340-01-142-9335	COUPLING SLEEVE, Woods (79425) 9E		EA	2
	3010-00-517-1848	COUPLING SPIDER, Lovejoy (75665) L100		EA	1
		CYLINDER, CO2, 50 Lbs (33525) 982548		EA	3
	4210-01-078-3669	CYLINDER, CO2, 100 Lbs (33525) 870269		EA	1
	2815-01-268-0454	CYLINDER HEAD Group (11083) 1W1439, Alt. 7W0009		EA	1
	7310-01-268-4012	CYLINDER, Range Guard, 2-1/2 Qt. (04826) 9196880		EA	1
	2030-01-271-6212	CYLINDER, Steering (63544) 2825-00033		EA	1
	2805-01-261-2772	CYLINDER, Liner Assy. (72915) 9090233		EA	1
	2815-00-102-2787	CYLINDER, Head Assy. (72915) 9319736		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	4310-01-157-3625	CRANKSHAFT ASSY (49576) 110221-001		EA	1
	6810-01-051-2815	DPD Tablets (08576) 3003-12		BX	1
	6850-01-266-1673	DESICCANT (82692) 600003-205-001		EA	1
	2030-01-271-6217	DETECTOR PANEL, Steering Failure (63544)11-12800		EA	1
	6350-01-230-4054	DETECTOR, Fire (63544) DT-200-R (5520-00013)		EA	2
	6350-01-348-4790	DETECTOR, Fire (05351) DT-135R (5520-00012)		EA	2
	6350-01-271-6253	DETECTOR, Smoke, Intrinsically Safe (63544) DT-315 (5520-00010)		EA	2
	2990-01-261-2759	DETECTOR, Low Water and Crankcase Pressure Assy. (72915) 8464678, Alt. 9570696		EA	1
	6350-01-271-6252	DETECTOR, Smoke (63544) DI-3/DB-35 5520-00011		EA	2
	4820-00-148-5511	DIAPHRAGM (49576) 1855		EA	2
	4210-01-288-3574	DIAPHRAGM, Silicone (56436) 911604		EA	1
	5930-01-272-2972	DIMMER, P.B.C. (63544) 1700-21700		EA	1
I		(Deleted)			
	5961-01-276-6204	DIODES (36232) M-9661-31		EA	3

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5961-01-272-2997	DIODE, 1 Amp (63544) 4800-00002		EA	5
	5961-01-272-2998	DIODE, 3 Amp (63544) 4800-00013		EA	2
	5999-01-266-8814	DIODE ASSEMBLY (11083) 5N4988		EA	10
	5999-01-266-8813	DIODE ASSEMBLY (11083) 5N8565		EA	10
	5961-01-266-8832	DIODE ASSEMBLY (11083) 3N5980		EA	6
	7320-01-279-4900	DOOR LATCH, Dishwasher (60438)185590		EA	1
	5315-01-261-2767	DOWEL, Basket/Rod (72915) 8031947		EA	1
	5315-00-366-2815	DOWEL, Bearing Lock (72915) 8029147		EA	1
	5315-00-241-7499	DOWEL, Upper Bearing (72915) 8025990		EA	1
		ELECTRODE HOLDER (71416) 04 126400		EA	4
		ELECTRODE, 12" (71416) 6013-SS-P-1		FT	1
		ELECTRODE, 24" (71416) 6013-SS-P-2		EA	1
		ELECTRODE, 36" (71416) 6013-SS-P-3		EA	2
	2910-00-325-0949	ELEMENT ASSEMBLY (72915) 3386761		EA	12
	4540-01-218-4390	ELEMENT ASSEMBLY (11083) 5N8566		EA	1
	6115-01-266-8829	ELEMENT ASSEMBLY (11083) 5N8567		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I	(5) QTY RQR
	6620-00-018-2196	ELEMENT ASSEMBLY (72915) 8322495	EA	4
	2940-00-074-3584	ELEMENT, Air Cleaner Assembly (11083) 4L9852	EA	1
	4330-01-267-8057	ELEMENT, Air Filter (49576) 110377E200 (Deleted)	EA	8
	4330-01-265-1760	ELEMENT, Filter (65038) 75CF14	EA	2
	4330-01-268-2317	ELEMENT, Filter (72915) 9522063	EA	12
	2940-01-103-3265	ELEMENT, Filter (07988) S-58	EA	18
	2940-00-083-8741	ELEMENT, Filter, L.O. Cooler (72915) 8345482	EA	7
	4130-01-273-7483	ELEMENT, Hycon Return Filter, (59793) 0240R010P	EA	4
	4330-01-272-2963	ELEMENT, Filter, Replacement (63544) 2825-00032	EA	24
	4330-00-008-7371	ELEMENT, Fuel Filter (72915) 8423132	EA	12
	4330-01-046-3399	ELEMENT, Fuel Filter, 1/2" (55752) 2020	EA	8
	6680-00-482-5888	THERMOSTAT, FLOW CNTRL (94607) 1096X150	EA	4
	6680-00-035-9373	THERMOSTAT, FLOW CNTRL (94607) 1096X160	EA	4
	5330-00-929-9478	PACKING, Preformed (72915) 8309544	EA	' 8
	6620-00-110-8321	SLEEVE (72915) 8309543	EA	8

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Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4130-00-791-1420	Filter Drier (78462) C-305		EA	2
		Filter, Foam (82692) 600032-641-001		EA	1
	2910-00-157-0650	Filter, Fuel (11083) 1 P2299		EA	3
	2910-01-051-2341	Filter, Fuel Assembly (11083) 4N5823		EA	12
	7310-00-512-1076	Filters, Marine Coffee Maker, OT-20 (25628) A-12		EA	1
	4330-00-366-2986	Filter, Oil (72915) 8173850		EA	1
	2940-00-029-0388	Filter, Oil (11083) 2P4004		EA	2
	4330-01-281-5269	Filter, Oil (6-pack) (49576) 110814-001		EA	2
		Filter, Panel (82692) 600032-641-003		EA	2
		Filter, Panel (82692) 600032-641-002		EA	1
	4730-01-192-7218	Filter, Flowezy Suction (55524) P-50-1-1-1/2"-200RV3		EA	4
	4330-01-278-7544	Filter		EA	2

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5945-01-268-4021	Flasher (46576) 133		EA	1
		Frame, Sight Glass (71871) 32641		EA	1
		Friction Shoe Assembly (68225) 407741		EA	10
	2910-01-227-7933	Fuel Pickup Assembly		AY	2
	5920-01-262-7310	Fuse (03956) 1802839-9		EA	5
	5920-01-266-8867	Fuse (11083) 3N5612		EA	6
	5920-01-122-4180	Fuse (11083) 3N2050		EA	6

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5920-01-266-1641	Fuse, Slo-Blo, 5A (82692) 600006-396-030		EA	4
	5920-00-284-9220	Fuse, Time Delay (75915) 313001		EA	4
	5920-01-268-0398	Fusetron, 3A (10741) 4110A3		EA	2
	5330-01-084-1290	Gasket (04579) 364-1312-614		EA	2
	5330-01-086-3992	Gasket (04579) 364-2034-603		EA	2
	5330-01-043-5830	Gasket (04579) 364-1015-603		EA	2
	5330-01-246-9426	Gasket (04579) 364-1208-507		EA	2
	5330-00-247-3631	Gasket (71905) 5330-00-247-3631		EA	4
	5330-01-161-9859	Gasket (10741) 4460		EA	1
	5330-01-193-1618	Gasket (10741) 9700		EA	1
	5330-01-128-5196	Gasket (11083) 7N799		EA	1
	5330-00-923-6986	Gasket (11083) 2M4108		EA	2
	5330-00-074-3789	Gasket (11083) 4L7636		EA	1
	5330-01-233-2961	Gasket, Exhaust Drain		EA	2
	5330-00-237-7145	Gasket (11083) 6L6580		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-00-520-1552	Gasket (46576) 133	EA	2
	5330-00-074-3603	Gasket (11083) 4M2969	EA	1
	5330-01-127-8574	Gasket (11083) 7N200 alt 7N0200	EA	1
	5330-01-067-5728	Gasket (11083) 2P6132	EA	1
	5330-01-067-5727	Gasket (11083) 2P2720	EA	1
	5330-00-074-3527	Gasket (11083) 8M904	EA	1
	5330-00-297-7228	Gasket (11083) 7F7590	EA	1
	5330-00-920-6922	Gasket (11083) 2M5407	EA	1
	5330-01-067-5724	Gasket (11083) 1 P1255	EA	1
	5330-00-931-8048	Gasket (11083) 1S6595	EA	1
	5330-00-618-0241	Gasket (11083) 8S8258	EA	4
	5330-00-599-5887	Gasket (11083) 2A3398	EA	4
	5330-00-613-7468	Gasket (11083) 8S1965	EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	6210-00-177-8001	BULB, 120 Volt (95405) 717A		EA	25
	6240-01-268-4010	BULB, 15 Watt (08108) FI5T8CW		EA	2
	6240-01-268-0408	BULB, 150A, 120 Volt (08108) 717AM7D2		EA	2
	6240-00-152-2983	BULB, 20 Watt (08108) F20T12/W		EA	5
		BULB, 300 Walt (08108) MRS40-500		EA	2
	6240-01-268-0397	BULB, 400 Watt (08108) C400S51		EA	2
	6240-01-268-0394	BLLB, 8 Watt (08108) FS8T5CW		EA	24
	6240-01-268-0395	BULB (08108) DL1 -C3130		EA	5
		BULBS, Clear Sync (08108) 10W'120V		EA	4
	6240-01-268-2192	BULB, LIGHT, 25T8C Microwave (22230) M9D98		EA	1
	6240-01-266-1652	BULB, LIGHT (82692) 600005-390005		EA	2
		(Deleted)		EA	1
	6240-01-268-2193	BULB, Shatter-Resistant Base Cabinet Heater (20087) 02-30-046		EA	1
	6240-01-254-5795	BULBS (46576) 342-4		EA	12

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5365-01-155-7270	BUSHING (04579) 136-1414-208		EA	2
	3120-01-127-5376	BUSHING (11083) 4M5317		EA	1
	4730-01-183-4575	BUSHING (11083) 5B4855		EA	3
	5365-01-266-8798	BUSHING (11083) 5M5317		EA	1
	5360-01-214-4954	BUSHING, Sheave Bore (71176) H-1-3/16"		EA	1
	5910-01-272-2965	CAPACITOR (63544) 1500-00001		EA	1
	5910-01-268-4015	CAPACITOR (10741) 2896		EA	1
	5910-01-163-0595	CAPACITOR (10741) 9610		EA	1
	5910-01-096-7959	CAPACITOR (10741) 8178		EA	1
	4310-012-51-6199	CAPACITOR (10741) 8647		EA	1
	5330-01-110-9277	CAPS, Seal (10855) EN99ZA-102		EA	2
	4130-00-812-9490	CAPS, Seal (10855) EN99ZA-002		EA	2
	6220-01-275-5054	CARD, Dual Plug Lamp KCCS 1086L		EA	1
	5930-01-265-7246	CARD, POWER SWITCH KCCS1086S		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	2815-00-994-7643	CARRIER, PISTON (72915) 8367800		EA	1
	4610-01-022-9970	CARTRIDGE, BROMINE (08576) 9540--01		EA	5
		CARTRIDGE, FILTER (D8835) WAV2240-A37		EA	1
	4820-01-268-4020	CARTRIDGE, Sun CBGG-Lan Counter Balance Valve (54035) CBGG-LAN		EA	1
	4820-01-268-4019	CARTRIDGE, Sun CBGA-LAN Counter Balance Valve (54035) CBGA-LAN		EA	1
	5920-00-204-8102	CARTRIDGE, FUSE (81349) F03A250-1/2A		EA	4
	2815-01-275-2151	CARTRIDGE, Sun RPGC-JAN Relief Valve (54035) RPGC-JAN		EA	1
	4820-01-268-4043	CARTRIDGE, SUN RPGC-JAN Relief Valve (54035) RPGC-JAN'		EA	1
	2815-01-275-2151	CASE Vents-Alwitco F-28 (99016) F-28 (Deleted)		EA	4
	5999-01-269-7302	CIRCUIT BOARD, Printed (AS-IOW-SYN) w/Auto Pilot (63544) 1111-18400		EA	1
	6110-01-272-2986	CIRCUIT BOARD, Printed (63544) 1111-20000		EA	1
	5999-01-269-7306	CIRCUIT BOARD, RAI Printed (63544) 1700-14001		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5999-01-269-7305	CIRCUIT BOARD, Printed (63544) 1700-17102		EA	1
	5999-01-272-3005	CIRCUIT BOARD, Printed, 24VDC Alarm Module (63544) 1111-17600		EA	10
	5999-01-269-7300	CIRCUIT BOARD, Printed, 24VDC Clock Module (63544) 1111-17800		EA	2
	5999-01-269-7303	CIRCUIT BOARD, Printed, 4-20 Receiver (63544)1111-18500		EA	5
	5999-01-269-7304	CIRCUIT BOARD, Printed, RTD Transmitter (63544) 1111-18600		EA	5
	5999-01-269-7309	CIRCUIT BOARD, Printed (Pos) (63544) 9999-23400		EA	1
	5999-01-269-0079	CIRCUIT BOARD, Printed, Dimmer (Neg) (63544) 1111-19800		EA	1
	5999-01-269-7301	CIRCUIT BOARD. Printed, Audible (63544) 1111-18000		EA	1
	5925-01-144-5459	CIRCUIT BREAKER (11083)3N5582		EA	4
		CIRCUIT BREAKER, 450A 3 Pole (66927) SLL63N500 SLD6311500		EA	1
	5925-01-268-0425	CIRCUIT BREAKER, 400A 3 Pole (66927) JJ63B400 JXD63B400		EA	1
	5925-01-268-0424	CIRCUIT BREAKER, 300A 3 Pole (66927) JJ63B300 SJD69300		EA	1
	5925-01-271-0700	CIRCUIT BREAKER, 250A 3 Pole (66927) FJ63B250 FXD63B250		EA	1
	5925-01-271-0699	CIRCUIT BREAKER. 225A 3 Pole (66927) FJ63B225 FXD63B225		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5925-01-271-0698	CIRCUIT BREAKER, 150A 3 Pole (66927) FJ63B150 FXD63B150		EA	1
	5925-01-271-0697	CIRCUIT BREAKER, 125A 3 Pole (66927) FJ63B125 FXD63B125		EA	1
	5925-01-271-0701	CIRCUIT BREAKER, 110A 3 Pole (66927) FJ63B110 FXD63BI 10		EA	1
	5925-01-271-0703	CIRCUIT BREAKER, 1OOA 3 Pole (66927) E23B100		EA	1
	5925-01-268-0423	CIRCUIT BREAKER, 100A 3 Pole (66927) E43B100		EA	1
	5925-01-268-0422	CIRCUIT BREAKER, 90A 3 Pole (66927) E43B090		EA	1
	5925-01-271-0696	CIRCUIT BREAKER, 70A 3 Pole (66927) Q370		EA	1
	5925-01-268-0421	CIRCIT BREAKER, 70A 3 Pole (66927) E23B070		EA	1
	5925-01-268-4032	CIRCUIT BREAKER, 60A 3 Pole (66927) E43B060		EA	1
	5925-01-271-0695	CIRCUIT BREAKER, 50A 3 Pole (66927) Q350		EA	1
	5925-01-271-0702	CIRCUIT BREAKER, 50A 3 Pole (66927) E23B050		EA	1
	5925-01-271-0694	CIRCUIT BREAKER, 40A 3 Pole (66927) Q340		EA	1
	5925-01-268-0420	CIRCUIT BREAKER, 40A 3 Pole (66927) E43B040		EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5925-01-268-0419	CIRCUIT BREAKER, 30A 3 Pole (66927) E43B030		EA	1
	5925-01-271-0705	CIRCUIT BREAKER, 25A 3 Pole (66927) E43B25		EA	1
	5925-01-271-0704	CIRCUIT BREAKER, 20A 3 Pole (66927) E43B020		EA	2
	5925-01-274-2051	CIRCUIT BREAKER, 15A 3 Pole (66927) E43B015		EA	6
	5925-01-271-0693	CIRCUIT BREAKER, 30A 2 pole (66927) Q230		EA	1
	5925-01-271-0691	CIRCUIT BREAKER, 20A 2 Pole (66927) Q220		EA	1
	5925-01-271-0692	CIRCUIT BREAKER, 1SA 2 Pole (66927) Q225		EA	3
	5925-01-271-0690	CIRCUIT BREAKER, 40A 1 Pole (66927) Q140		EA	1
	5925-01-27140689	CIRCUIT BREAKER, 30A 1 Pole (66927) Q130		EA	1
	5925-01-275-2170	CIRCUIT BREAKER, 25A 1 Pole (66927) Q125		EA	1
	5925-01-271-0688	CIRCUIT BREAKER, 20A 1 Pole (66927) Q120		EA	4
	5925-01-271-0687	CIRCUIT BREAKER, 15A 1 Pole (66927) Q115		EA	7
	5925-01-271-6223	CIRCUIT BREAKER, 2Amp (63544) 4300-00016		EA	2
	5925-01-274-2052	CIRCUIT BREAKER, 2 Amp (63544) 4300-00019		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5925-01-271-6225	CIRCUIT BREAKER, 5 Amp (63544) 4300-00021		EA	2
	5925-01-271--6224	CIRCUIT BREAKER, 5 Amp (63544) 43(0O ()20		EA	2
	5925-01-271-6222	CIRCUIT BREAKER, 5 Amp (63544) 430-(00014		EA	2
	5925-01-272-2984	CIRCUIT BREAKER, 10 Amp (63544) 43(X-000015		EA	2
	5925-01-273-7416	CIRCUIT BREAKER, 25 Amp (63544) 4300-00018		EA	2
	5950-01-266-0715	COLS, Solenoid Valve (78462) MKC-2-110		EA	1
	4140-01-268-2210	CONDENSOR, Fan 5KSP51GL470HS (17479) 15076		EA	1
	6105-01-270-6831	CONDENSOR, Fan, Motor (17479) 15027		EA	1
	5930-00-340-9708	CON'DENSOR, Ranco Pressure Control (50992) 010-2054		EA	1
	5930-01-201-6499	CONDENSOR, Ranco Pressure Control (50992) 012-4834		EA	1
	4130-00-844-7050	CONDENSOR, Sporlan Drier (58553) C-163		EA	1
	4820-00-571-5892	CONDENSOR, Sporlan Expansion Valve (78462) GFE-IC		EA	1
	6680-00-910-2418	CONDENSOR, Sporlan See All (58553) SA-13U		EA	1
	4820-01-268-2213	CONDENSOR, Superior Relief Valve (58553) 3014-350#		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont
(ON-BOARD REPAIR PARTS'

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
		(Deleted)			
	5999-01-274-1991	CONTACT BLOCK, N/O (63544) 5100 00022		EA	1
		CONTACT BLOCK (63544) 5100-08		EA	2
	5930-01-202-3766	CONTTACT, Oil pressure 7N5946		EA	1
	6320-01-266-8804	CONTACT, Pre-Alarm Group (11083) 3N8790		EA	1
	6320-01-266-8804	CONTACT, Pre-Alarm Group (11083) 7W5342		EA	1
		CONTACT (53958) C133-011		EA	3
	6110-01-274-42-2	CONTTACTOR (36232) NM-12161-19		EA	1
	6110-01-178-9231	CONTACTOR (10855) HN52KC053		EA	2
	6110-01-127-6290	CONTACTOR (11083) 5N8596		EA	1
	5945-00-103-5132	CONTACTOR (10855) HN53CD-208		EA	1
	6110-01-200-6811	CONTACTOR, Water Temp (11083) 5N8597		EA	1
	1915-01-275-5060	CONTROL PCB (36232) G-1574-1		EA	1
	6110-01-272-2986	CONTOLLER, Programmable (63544)1111-20000		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	3040-01-268-5102	COOLER, OIL (11083) 4N729, alt 763039		EA	1
	4730-01-287-6786	COUPLING (63544) 2825-00020		EA	1
	3010-00-438-2756	COUPLING INSERT (14204) 370		EA	1
	3010-00-102-0358	COUPLING INSERT (14204) 670		EA	1
	3010-01-019-4863	COUPLING INSERT, Magnaloy #570 (14204) 570		EA	1
	5340-01-142-9335	COUPLING SLEEVE, Woods (79425) 9E		EA	2
	3010-00-517-1848	COUPLING SPIDER, Lovejoy (75665) L100		EA	1
		CYLINDER, 50 Lbs, CO2 (33525) 982548		EA	3
	4210-01-078-3669	CYLINDER, C02, 100 Lbs (33525) 870269		EA	1
	2815-41-268-4454	CYLINDER Headgroup (1083) 1W1439 alt. 7W0009		EA	1
	7310-01-268-4012	CYLINDER, RANGE GUARD, 2-1/2 Qt (04826)9196880		EA	1
	2030-01-271-6212	CYLINDER, STEERING (63544) 2825-00033		EA	1
	2805-01-261-2772	CYLINDER, LINER ASSY (72915) 9090233		EA	1
	2815-00-102-2787	CYLINDER, HEAD ASSY (72915) 9319736		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4310-011-57-3625	CRANKSHAFT Assy (49576) 110221X401		EA	1
	6810-01-051-2815	DPD Tablets (08576) 3003-12		EA	1
	6850-01-266-1673	DESSICANT (82692) 600003-205-001		EA	1
	2030-01-271-6217	DETECTOR PANEL, Steering Failure (63544)1111-12800		EA	1
		DETECTOR, FIRE (63544) DT-200R (5520-0013)		EA	2
		DETECTOR, FIRE (63544) DT-135R (5520-00012)		EA	2
	635-01-271-6253	DETECTOR, Intrinsically Safe SMOKE (63544) DT-315 (5520-00010)		EA	2
	2990-01-261-2759	DETECTOR, Low Water & Crankcase Pressure Assy (72915) 8464678 alt> 9570696		EA	1
	6350-01-271-6252	DETECTOR, SMOKE (63544) DI-3/DB-35 5520-00011		EA	2
	4820-001-48-5511	DIAPHRAM (49576) 1855		EA	2
	4210-01-288-3574	DIAPHRAGM (Silicone) (56436) 911604		EA	1
	5930-01-272-2972	DIMMER, P.B.C. (63544) 1700-21700		EA	1
	5999-01-280-0079	DIMMER, PCB Steering Lamp (63544)1111-19800		EA	1
	5961-01-276-6204	DIODES (36232) M-9661-31		EA	3

APPENDIX B
Section III. BASIC ISSUE ITEMS LIST - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5961-01-272-2997	DIODE, 1 Amp (63544)4800-00002		EA	5
	5961-01-272-2998	DIODE, 3 Amp (63544)4800-00013		EA	2
	5999-01-266-8814	DIODE ASSEMBLY (11083) 5N4988		EA	10
	5999-01-266-8813	DIODE ASSEMBLY (11083) 5N8565		EA	10
	5961-01-266-8832	DIODE ASSEMBLY (11083) 3N5980		EA	6
	7320-01-279-4900	DOOR LATCH, Dishwaster (60438)185590		EA	1
	5315-01-261-2767	DOWEL, Basket/Rod (72915) 8039147		EA	1
	5315-00-366-2815	DOWEL, Bearing Loc (972915) 8029147		EA	1
	5315-00-241-7499	DOWEL, Upper Brg (72915) 8025990		EA	1
		ELECTRODE HOLDER (71416) 04 126400		EA	4
		ELECTRODE, 12" (71416) 6013-SS-P-1		EA	1
		ELECTRODE, 24" (71416) 6013-SS-P-2		EA	1
		ELECTRODE, 36" (71416) 6013-SS-P-3		EA	2
	2910-00-325-0949	ELEMENT, ASSEMBLY (72915) 3386761		EA	12
	4540-01-218-2044	ELEMENT ASSEMBLY (11083) 5N8566		EA	1
	6115-01-266-8829	ELEMENT ASSEMBLY (11083) 5N8567		EA EA	1 1

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	6620-00-018-2196	ELEMENT ASSEMBLY (72915) 8322495		EA	4
	2940-00-074-3584	ELEMENT, Air Cleaner Assembly (11083) 4L9852		EA	1
	4330-01-265-1770	ELEMENT, AIR FILTER (949576) 110377E2QQ (Deleted)		EA	8
	4330-01-265-1760	ELEMENT, FILTER (65038) 75CF14		EA	2
	4330-01-268-2317	ELEMENT, FILTER (72915) 9522063)		EA	12
	2520-00-545-1350	ELEMENTS, FILTER (99066) 5-58		EA	18
	2940-00-083-8741	ELEMENT, FILTER, L. O. Cooler (729115) 8345482		EA	7
	4130-01-273-7483	ELEMENT, Hycon Return Filter (59793) 0240R010P		EA	4
	4330-01-272-2963	ELEMENT, FILTER Replacement (63544)2825-00032		EA	24
	4330-00-008-7371	ELEMENT, FUEL (72915) 8423132		EA	12
	4330-01-046-3399	ELEMENT, FILTER FUEL 1/2" (55752) 2020		EA	8
	6680-00-482-5888	THERMOSTAT, FLOW CNTRL. (94607) 1096X150		EA	4
	6680-00-035-9373	THERMOSTAT, FLOW CNTRL. (94607) 1096X160		EA	4
	5330-00-929-9478	PACKING PREFORMED (72915) 8309544		EA	8
	6620-00-110-8321	SLEEVE (72915) 8309543		EA	8

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4330-01-106-3759	ELEMENT, FILTER FUEL 3/4" (55752) 2021, alt 2040		EA	8
	4540-01-286-8563	ELEMENT, GRIDDLE, INNER (11010-10)		EA	1
	4540-01-286-8562	ELEMENT, GRIDDLE, OUTER (11010-09)		EA	1
		ELEMENT, HEATER SPACE (71400)212-9-420.01		EA	2
	4520-01-267-8058	ELEMENT, HEATER (10741) H5369A		EA	2
		ELEMENT, HEATER SPACE (71400)20947.5-3		EA	2
	4540-00-109-2542	ELEMENT, Heater Gasket (72915)8348921		EA	1
	4540-01-229-2841	ELEMENT, Heater Space (71400) 209-9-45.0-1		EA	2
	4540-01-268-2198	ELEMENT, HEATING DISHWASHER (60438)292794		EA	1
	4520-01-198-6512	ELEMENT, HEATER SPACE (71400) 207-8-43.0-1,207-43.0-3		EA	2
	4540-01-211-0931	ELEMENT, HEATING Sink Heater (20087) 02-06-300		EA	1
	4540-01-207-1042	ELEMENT, HEATING Upper, Louver (17702) AP-7487-ML		EA	1
	4240-01-049-0975	FACEPIECE (03950)4607535		EA	1
	4140-01-266-1682	FAN, ASSEMBLY (82692)600072-700-001		EA	1
	4140-01-162-2630	FAN ASSEMBLY (10741)9615X		EA	1
		FEEDBACK LINKAGE (Model FL300) (63544)1111-17300		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
		FEEDBACK Unit (63544) 1111-16800		EA	1
		FILTER (10855) 7-1/2 x 41-3/4 x 1"		EA	12
		FILTER (10855) 7-1/2 x 57-3/4 x 1"		EA	12
		FILTER (10855) 7-1/2 x 25-3/4 x 1"		EA	18
		FILTER (10855) 10 x 32 x 1		EA	36
		FILTER (10855) 12-3/4 x 35-3/4 x 1"		EA	1
		FILTER (10855) 7-1/2 x 21 - 3/4 x 1'		EA	60
		FILTER (10855) 10 x 37 x 1"		EA	12
	4330-01-269-7244	FILTER, CARTRIDGE (53800) 9HT17816		EA	2
	4130-01-265-5026	FILTERS (10855) 16 x 20 x 2" 1W103		EA	2
	2940-01-107-9531	FILTER, AIR CLEANER (11083) 4N15, 4N0015		EA	1
	4330-01-266-8822	FILTER, AIR CLEANER, Soot (11083) 4N7808		EA	1
	2940-00-125-9544	FILTER ASSEMBLY (11083) 2P4005		EA	12
		FILTER, BREATHER (49503) ABB-40N		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4130-00-791-1420	FILTER DRIER (78462) C-305		EA	2
		FILTER, FOAM (82692) 600032-641 -01		EA	1
	2910-00-157-0650	FILTER, FUEL (11083) 1P2299		EA	3
	2910-01-051-2341	FILTER, FUEL ASSEMBLY (11083) 4N5823		EA	12
		(Deleted)			
	7310-00-512-1076	FILTERS, MARINE COFFEE MAKER OT-20 (25628) A-12		EA	1
	4330-00-366-2986	FILTER, OIL (72915)8173850		EA	1
	2940-00-029-0388	FILTER, OIL (11083) 2P4004		EA	2
	4330-01-2676-8113	FILTER, OIL (6-pack) (49576)110814-)01		EA	2
		FILTER, PANEL (82692) 60003241-003		EA	2
		FILTER, PANEL (82692) 600032441-002		EA	1

SECTION III. BASIC ISSUE ITENS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5945-01-268-4021	FLASHER (46576) 133		EA	1
	4730-01-192-7218	FILTER, Flowezy Suction (55524) P-50-1-1-1/2"-200 RV3		EA	4
		FRAME, Sight Glass (71871) 32641		EA	1
		FRICTION Shoe Assembly (68225) 407741		EA	10
	5920-01-262-7310	FUSE (03956) 1802839-9		EA	5
	5920-01-266-8867	FUSE (11083) 3N5612		EA	6
	5920-01-122-4180	FUSE (11083) 3N2050		EA	6

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5920-01-113-0559	FUSE (81349) FM09B250V2A		EA	5
	5920-01-099-0539	FUSE (81349) FM09B250V1A		EA	5
	5920-00-838-0302	FUSE (81349) F09A250V8A		EA	5
	5920-00-285-0901	FUSE (81349) F60C500V3A		EA	5
	5920-00-549-0032	FUSE (81349) F09A250Z		EA	5
	5920-00-280-3537	FUSE (81349) F03A250VIAS		EA	5
	5920-00-519-7733	FUSE (96906) MS90079-1-1 (Deleted)		EA	5
	5920-00-665-2881	FUSE (96906) MS90079-1-1		EA	5
	5920-01-131-8371	FUSE (11083) 3N7807		EA	5
	5920-01-265-1758	FUSE (08576) 3003-85 (Deleted)		EA	1
	6930-01-057-7494	FUSE (75915) 275005		EA	4
	5920-01-274-3075	FUSE, ABC-15 Counter, Fryer (34931) 30900-01		EA	2

SECTION III. BASIC ISSUE ITEMS -Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5920-00-243-7996	Fuse, AGC 1-1/2 (71400) AGC-1.5		EA	5
	5920-00-848-8881	Fuse, AGC 3 (71400) AGC-3		EA	5
	5920-00-221-4507	Fuse, AGX 1/10 (71400) AGX-1/10		EA	5
	5920-00-280-4998	Fuse, GLH-8 (71400) GLH-8		EA	5
	5920-00-199-9498	Fuse, MDL 0.5 (71400) MDL 0.5		EA	6
	5920-00-270-5219	Fuse, MDX 2 (71400) MDX-2		EA	5
	5920-00-284-7466	Fuse, MDX 4 (71400) MDX-4		EA	5
	5920-01-091-8362	Fuse, MTH 5 (71400) MTH-5		EA	5
	5920-00-611-6654	Fuse, MTH 6 (71400) MTH-6		EA	5
	5920-01-266-1643	Fuse, 0.1A, 125V, 3AG (82692) 600006-396-004		EA	5
	5920-01-266-1642	Fuse, 1A, 125V, 3AG (82692) 600006-396-019		EA	6
	5920-01-274-2055	Fuse, 1 Amp (63544) 4300-00002		EA	10
	5920-01-268-0401	Fuse, 1.125 A (71400) 24-166-045-010		EA	15
	5920-00-284-9493	Fuse, 2A, 250 V (81349) FA2A250V1/8AS		EA	5
	5920-01-271-3111	Fuse, 3A, GMA5X20-3		EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
		FUSE, 3A (5 per pack)		PK	1
		(82205)518846-16			
	5920-00-813-2714	FUSES, 3A		EA	20
		(71400) BBS-3			
		FUSE, 3 Amp		EA	4
		(82692) 600004-396-014			
	5920-00-131-9823	FUSE, 35A 13.6VDC (output)		EA	5
		(71400) AGU-35			
	5920-01-268-0400	FUSE, 3.5A		EA	10
		(39572) 24-166-045-020			
	5920-01-393-2730	FUSE, 4 ASB		EA	4
		(82692) 600006-396-029			
	5920-01-268-0404	FUSE, 5A		EA	10
		(71400) BAF-5			
	5920-01-281-5101	FUSE, 5 Amp		EA	10
		(63544) 4300-00004			
	5920-01-033-4891	FUSES, 8A, 110VAC (input)		EA	5
		(71400) ABC-8			
	5920-01-266-1640	FUSE, 8A		EA	6
		(75915) 8A250V312			
	5920-01-270-9818	FUSE, 10A		EA	2
		(71400) 3AG313010, alt ABC-10			
	5920-01-268-0403	FUSE, 10 Amp		EA	10
		(64393) FMN-10			
	5920-01-268-0399	FUSE 10A 600V		EA	2
		(10741) 4114A10			

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5920-01-27-0710	FUSE, 10 Amp (63544)4300 00003		EA	10
	5920-01-268-0402	FUSE, 60A (39572) 24-166-045-007		EA	20
	5920-00-280-9549	FUSE, CARTRIDGE (71400) FNM15		EA	5
	5920-01-193-2731	FUSE, Fast Blow 6A (82692) 600004-396-017		EA	4
	5920-01-268-2188	FUSE, AG-1 1 Amp Sink Heater (20087) 02-03-001		EA	2
	5920-01-280-2334	FUSE, A(3AG 2A 250V) Exhaust Vent. Control Cabinet (09051) 11313002		EA	2
		FUSE, 32V, 20A, Slo-Blo (82692) 600193-618-001		EA	5
	5920-01-266-1642	FUSE, 1 Amp, Slo-Blo (82692) 600006396-019		EA	5
	5920-01-131-9816	FUSE, SLO-BLO, 1AMDL1 (17550) MDL 1		EA	4
		FUSE, CLIP 17550-51-011		EA	4
	5920-01-271-6246	FUSE HOLDER (63544) 430000007		EA	1
	5920-01-287-5340	FUSE HOLDER, Indicating (63544) 4300-00001		EA	2
		FUSES, POST W/5A (72915) 342001		EA	1
	5920-01-145-3077	FUSE RANGE 2081240V (34931) 309009		EA	4

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5920-01-266-1641	FUSE, SLO-BLO, 5A (82692) 600006-396-030		EA	4
	5920-00-284-9220	FUSE, TIME DELAY (75915) 313001		EA	4
	5920-01-268-0398	FUSETRON 3A (10741) 4110A3		EA	2
	5330-01-084-1290	GASKET (04579) 364-1312-614		EA	2
	5330-01-086-3992	GASKET (04579) 364-2034-03		EA	2
	5330-01-043-5830	GASKET (04579) 364-1015-603		EA	2
	5330-01-246-9426	GASKET (04579) 364-1208-507		EA	2
	5330-00-247-3631	GASKET (71905) 5330-00-247-3631		EA	4
	5330-01-161-9859	GASKET (10741) 4460		EA	1
	5330-01-193-1618	GASKET (10141) 9700		EA	1
	5330-01-128-5196	GASKET (11083) 7N7999		EA	1
	5330-00-923-6986	GASKET (11083) 2M4108		EA	2
	5330-00-074-3789	GASKET (11083) 4L7636		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-00-237-7145	GASKET (11083) 6L6580	EA	1
	5330-00-520-1552	GASKET (11083) 851605	EA	2
	5330-40074-3603	GASKET (11083) 4M2969	EA	1
	5330-01-127-8574	GASKET (11083) 7N200 alt 7N0200	EA	1
	5330-01-467-5728	GASKET (11083) 2P6132	EA	1
	5330-01-467-5727	GASKET (11083) 2P2720	EA	1
	5330-00-074-3527	GASKET (11083) 8M904	EA	1
	5330-00-297-7228	GASKET (11083) 7F7590	EA	1
	5330-00-920-6922	GASKET (11083) 2M5407	EA	1
	5330-01-067-5724	GASKET (11083) 1P1255	EA	1
	5330-00-931-8048	GASKET (11083) 1S6595	EA	1
	5330-00-618-0241	GASKET (11083) 8S8258	EA	4
	5330-00-599-5887	GASKET (11083) 2A3398	EA	4
	5303-00-613-7468	GASKET (11083) 8S1965	EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-00-671-6892	GASKETS (10855) 6D68-1131		EA	2
	5334-00-851-6905 5330-01-111-9287	GASKETS (10855) 6D40-1131		EA	2
	5330-01-043-5831	GASKET (04579) 364-2035603		EA	2
	5330-00-557-8494	GASKET (11083) 5S6051		EA	2
	5330-01-063-9839	GASKET (11083) 4N3841		EA	1
	5330-01-067-5726	GASKET (11083) 2P2516 alt 1W1172		EA	1
	5330-01-156-3780	GASKET (11083) 1P451 alt 1P0451		EA	1
	5330-00-074-3787	GASKET (11083) 4L9891		EA	1
	5330-01-053-4832	GASKET (11083) 4N3661		EA	2
	5330-01-266-8898	GASKET (11083) 1W1898		EA	1
	5330-01-239-8647	GASKET (11083) 7N625 alt 7N0625, 7C3037		EA	1
	5330-01-178-2105	GASKET (11083) 1W3132 alt 7W6081		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-01-103-3958	GASKET (11083) 2N931	EA	8
	5330-01-268-5101	GASKET (11083) 4N3858	EA	1
	5330-01-053-4833	GASKET (11083) 4N1156	EA	1
	5330-00-074-3789	GASKET (11083) 4L7636	EA	1
	5330-01-053-4839	GASKET (11083) 4N641	EA	1
	5330-01-053-4831	GASKET (11083) 4N1135	EA	1
	5330-01-268-5100	GASKET (11083) 1W2636	EA	1
	5330-00-989-3295	GASKET (11083) 1S4810	EA	1
	5330-00-931-8048	GASKET (11083) 1S6595	EA	1
	5330-00-920-6922	GASKET (11083) 2M5407	EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-00-074-3527	GASKET (11083) 8M0904 alt 8M904,		EA	2
	5330-00-297-7228	GASKET (11083) 7F7590		EA	2
	5330-00-989-3295	GASKET (11083) 1S54810		EA	1
	5330-00-931-8048	GASKET (11083) 1S6595		EA	1
	5330-01-124-1161	GASKET (11083) 7N944 alt 7N0944		EA	2
	5330-00-440-9791	GASKET (11083) 8S6410		EA	3
	5330-00-710-9586	GASKET (11083) 5H8331		EA	1
	5330-00-760-7367	GASKET (11083) 5S6735		EA	1
	5330-01-240-0697	GASKET (11083) 9L5908		EA	1
	5330-01-185-4681	GASKET (11083) 2W5447		EA	1
	5330-01-069-0992	GASKET (11083) 8S1963		EA	1
	5330-00-008-9181	GASKET (11083) 5S6045		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-00-437-8752	GASKET (11083) 8S1606	EA	2
	5330-00-760-7367	GASKET (11083) 5S6735	EA	1
	5330-01-129-2545	GASKET (11083) 7N8022	EA	1
	5330-01-129-5916	GASKET (11083) 7N8020 alt 7M544	EA	1
	5330-00-987-7330	GASKET (11083) 3L1585	EA	1
	5330-00-246-3312	GASKET (11083) 7M7273	EA	1
	5330-01-050-8135	GASKET (11083) 4N790 alt 4N0790	EA	1
	5330-01-104-6564	GASKET (11083) 4F3602	EA	1
	5330-01-102-1810	GASKET (11083) 7N8175	EA	6
	5330-01-242-6870	GASKET (11083) 4N3955	EA	1
	5330-01-053-4827	GASKET (11083) 2N8204	EA	18
	5330-01-055-1995	GASKET (11083) 4N9008	EA	2
	5330-01-053-4838	GASKET (11083) 4N4188	EA	4
	5330-01-050-8134	GASKET (11083) 4N699	EA	1

SECTION II. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-01-053-4842	GASKET (11083) 4N933, alt 4N0933		EA	2
	5330-01-053-4838	GASKET (11083) 4N4188		EA	1
	5330-00-824-5322	GASKET (72915) 8291349		EA	16
	5330-00-447-9641	GASKET (72915) 8028760		EA	4
	5330-00-824-5332	GASKET (72915) 8326233		EA	2
	5330-00-366-0858	GASKET (72915) 8366785		EA	2
	5330-00-291-6054	GASKET (72915) 3306447		EA	1
	5330-00-052-8221	GASKET (72915) 3242958		EA	1
	5330-00-824-4382	GASKET (72915) 8347756, alt 9570676		EA	1
	5330-00-826-9740	GASKET (72915) 8347416		EA	4
	5330-00-366-1206	GASKET (72915) 8029149		EA	4
	5330-00-297-6197	GASKET (72915) 8069445		EA	2
	5330-00-795-4945	GASKET (72915) 8167060		EA	4
	5330-00-363-5758	GASKET (72915) 8028264		EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-00-366-3472	GASKET (72915) 8084685		EA	1
	5330-01-271-0712	GASKET (1Y537) 700-6		EA	2
	5330-01-092-0258	GASKET, 1-1/2 (03950) 5330-014)92-0258		EA	10
	5330-01-092-0259	GASKET, 2-1/2 (03950) 5330-01-092-0259		EA	10
	5330-01-266-0775	GASKET, 8 x 10 x 15 (04579) 364-1275-598		EA	2
	5330-01-224-3701	GASKET, AFTERCOOLER (11083) 9L5904		EA	1
	2815-01-268-2315	GASKET, CASE (72915) 3319451		EA	12
	5330-01-274-2067	GASKET, DISCHARGE COMPRESSOR (59431) 020-012-10		EA	1
	5330-00-366-3022	GASKET, COVER (72915) 8085253		EA	4
		GASKET, COVER (49503) EC-S12		EA	1
	5530-00-010-4910	GASKET, HOUSING (72915) 8312916		EA	2
	5330-00-171-4032	GASKET, HOUSING COVER (72915) 8173851		EA	2
	5330-01-265-1932	GASKET, INLET (24999) 006994A 1		EA	2
	5330-01-269-7282	GASKET, L. O. Cooler (72915) 8268756		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-01-143-7410	GASKET, LENS (46576) 1143		EA	4
	5330-01-207-7233	GASKET, O-RING (73124) ST260-Z6B		EA	1
	5330-01-183-6647	GASKET, O-RING (73124) ST269Z5B		EA	1
	5330-01-276-0547	GASKET, O-RING (73124) ST6500042, alt STL6500042		EA	1
	5330-00-447-9643	GASKET, OVERSPEED Cover Assy (72915) 8028765		EA	1
	5330-01-265-1931	GASKETS, RETURN (24999) 006450A1		EA	2
	5330-00-809-9087	GASKET SET (10855) 6D43-172		EA	2
	5330-01-124-1205	GASKET SET (49576) 7503		EA	2
	5330-01-268-2212	GASKET, VALVE Suction, Compressor (59431) 0200012-11		EA	1
	6685-01-042-6723	GAGE, G 1/4 Pressure (61049) 213		EA	1
	3950-01-268-2189	GAGE (9U092) AGL-25-500--S		EA	1
	3950-01-268-2190	GAGE (9U092) AGL-25-3000-S		EA	1
	6685-01-048-4682	GAUGE 0-200 (38508)J1454		EA	1
	6685-01-259-6098	GAUGE 30--30 (38508)J1412		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	6685-01-266-4212	GAUGE, AIR PRESSURE (65038) 136013		EA	1
	662-01-266-8805	GAUGE, (Fuel Press) (11083) 2W3687		EA	1
	6620-01-158-2910	GAUGE, (Fuel Press) (11083) 1W706, alt 1W0706		EA	1
	6680-01-271-6191	GAUGE, OIL (49576) 110822		EA	2
	6620-00-882-6972	GAUGE, OIL PRESSURE (11083) 5L7456, alt 7W2937		EA	1
	6620-01-272-2996	GAUGE, PRESSURE 0-3-PSI (63544) 2950-00010		EA	1
	6685-00-566-2524	GAUGE, PRESSURE 0-200-1/4 Bottom (72100) 23K		EA	2
	6620-01-273-7495	GAUGE, PRESSURE 0-600 PSI (63544) 2950-00019		EA	1
	6620-01-273-7494	GAUGE, PRESSURE 0-160 PSI (63544) 2950-00009		EA	2
		GAUGE, PRESSURE LHA (49503) PGL-25-3000-S		EA	1
	6620-01-272-2995	GAUGE, PRESSURE 0-100 PSI (63544) 2950-00007		EA	1
	6620-01-273-7493	GAUGE, PRESSURE 0-60 PSI (63544) 2950-00008		EA	1
	6685-01-111-0147	GAUGE, PRESSURE (11568) M-1227 (Deleted)		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
		Gauge, Sight (49503) SLT-1214		EA	1
	6685-00-079-0312	Gauge, Water Temp (11083) 5L7444		EA	1
		Glass, Pull Box (33525) 31302		EA	3
	6680-00-791-1419	Glass, Sight (78462) SA-15S, SA15S		EA	1
	6680-01-274-2066	Glass, Sight, Coffee Urn (18412) M0854		EA	1
		Handle (82692) 600262-618-001		EA	2
	4310-01-268-4054	Head Assy., Alt 107382 (49576) 7382X16L		EA	1
	5965-01-268-4034	Head-Chest Set (78957) 702019-375		EA	1
		Holder (39572) 51-0901-01-3		EA	4
	5977-01-281-5119	Holder, Electrode (36232) L-4628-2		EA	1
	5920-01-266-1677	Holder, Fuse (82692) 600014-613-002		EA	4
	4720-01-126-4605	Hose (11083) 3N6036		EA	1
	4720-01-129-5794	Hose (11083) 3N6033		EA	1
	4720-00-883-0467	Hose (11083) 5P1262		CN	10
	4720-01-103-3697	Hose (11083) 5P1260		CM	10

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4720-01-266-8827	Hose Assembly (11083) 5N6502		EA	1
	4720-01-266-8828	Hose Assembly (11083) 5N6056		EA	1
	4720-00-421-3854	Hose Assembly (11083) 5P1263		CM	90
	4720-01-067-5672	Hose Assembly (11083) 1P1195		EA	1
	4720-01-225-5016	Hose Assembly (11083) 3N8097		EA	1
	4720-01-103-3697	Hose Assembly (11083) 5P1 260		EA	1
	4720-01-266-8835	Hose Assembly (11083) 3N7155		EA	1
	4720-01-225-5017	Hose Assembly (11083) 3N8098		EA	1
	4240-01-049-0978	Hose Assembly, Facepiece and Low Pressure (56436) 941877		EA	1
	4210-01-273-4727	Hose Assembly, Non-Metallic		AY	2
	4720-01-185-2372	Hose, Non-Metallic		FT	6
	4730-01-177-4726	Hose Clamps (08576) 4689-00		EA	4
	4240-01-049-0978	Hose, Low Pressure (03950) 4240-01-049-0978		EA	1
	4320-01-265-5024	Impeller (04579) 443-2445-225		EA	1
	4320-01-265-5023	Impeller (04579) 443-0445-225		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4320-01-266-0717	IMPELLER (04579) 443-1768-225		EA	1
	4320-00-592-9427	IMPELLER (88032) 1129		EA	1
		(Deleted)			
		INDICATOR, Unit Digital (17550) TD-2305/SQN-18		EA	1
	6645-01-268-4045	INDICATOR (Elapsed Time) (10741) 6094		EA	1
	6620-01-266-8894	INDICATOR (Eng Oil Press) (11083) 1W4304		EA	1
	6620-01-210-9002	INDICATOR (Eng Oil Press) (11083) 2W3681		EA	1
	6620-01-158-2910	INDICATOR FUEL PRESS (11083) 1W'706		EA	1
	6210-01-271-6226	INDICATOR, GREEN (63544) 2450-00001		EA	2
		INDICATOR, LANIP HOLDER (63544) 5102(00)28		EA	5
	2090-01-272-2971	INDICATOR, OPERATOR (63544) 5100-00035		EA	2
	6620-01-222-5465	INDICATOR, WATER TEMP (11083) 243671		EA	1
	6685-01-266-8806	INRDICATOR, WATER TEMP (11083) 2W3670		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	6685-01-266-8807	INDICATOR, WATER TEMP (11083) 1W4302		EA	1
	4320-01-266-8809	INJECTOR, PUMP FUEL (11083) 2W1078, All 2W0256		EA	1
	4320-01-266-8810	INJECTOR, PUMP FUEL, Housing & Governor (11083) 7W0043, Alt 4W2547		EA	1
		INJECTOR, FUEL (11083) 8N7007, Alt 4W7017		EA	6
	2910-00-824-0468	INJECTOR, FUEL (72915) 5229200		EA	16
	4710-00-795-4939	INJECTION LINE ASSY (72915) 8160209		EA	16
	2910-01-266-8820	INJECTOR LINES, Fuel (11083) 41W9352		EA	6
	2910-01-169-9758	INJECTOR NOZZLE (11083) 8N7005		EA	6
	4910-00-366-1465	INJECTION RACK (72915) 8431626		EA	1
	4310-01-267-8119	INTER COOLER (49576) 5857-401		EA	2
	5935-00-552-6790	JACKBOX (80064) G-15B SYM-2842		EA	1
		(Deleted)			
	5315-01-050-0247	KEY (04579) 4724247-087		EA	1
	5315-01-087-9698	KEY (04579) 4724-201-087		EA	1
	5315-01-266-0762	KEY (04579) 4724 413-107		EA	1

SECTION III. BASIC ISSUE ITENIS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	5330-01-266-8812	KIT (11083) 24727		EA	1
	4820-01-287-6784	KIT, Valve Plate Compressor (59431)998-0661-20		EA	1
	5920-01-189-5240	KIT, FUSE (10741) 6294		EA	2
	5330-01-268-2197	KIT, GASKET COMIPRESSOR (59431) 99800669-25		EA	1
	5330-01-289-9390	KIT, COMPRESSOR ON'ERHAUL "O" Ring (49576) 110774		EA	2
	5330-01-275-2150	KIT, GASKET (72915) 3278364		EA	1
		KIT, GASKET COOLER (D8835 ZUV1		EA	1
		KIT, GASKET HEAT EXCHANGER (72915) 269453		EA	2
	5330-00-889-6196	KIT, GASKET, Pump Priming (26495) 3263355		EA	1
		KIT, GASKET REPAIR (D8835) A63-60-2240		EA	1
	2990-01-261-7897	KIT, HARDWARE (72915) 8409745		EA	1
		(Deleted)			
	43204-01-265-1781	KIT, LIQUID END MAINT. (04579) 476-0254-4		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I U/M	(5) QTY RQR
	4320-01-265-1778	KIT, LIQUID END HAINT, (04579) 476-0250-64	EA	1
	3120-01-275-2357	KIT, MAIN BEARING (72915) 8452210	EA	1
	3120-01-268-2355	KIT, MAIN BEARING (72915) 8452186	EA	1
	2815-01-267-8060	KIT, OIL PULNIP REPAIR (49576) 160079	EA	2
	7320-01-268-4011	KIT, Parts, Door Handle, Compactor Screws, Keys (62607) 22387-R	EA	1
	6680-01-274-1961	KIT, Sight Glass Compressor (59431) 998-0002-04 (Deleted)	EA	1
	6630-01-287-5344	KIT, TEST (63544)1111-17500	EA	1
	4820-01-199-8899	KIT, VALVE SET w/Gaskets (11568) Z-104	EA	1
	5355-00-958-9982	KNOB (96906) MS91528-2E2B	EA	1
	5355-00-917-1011	KNOB (96906) MS91528-1E1B	EA	1
		KNOB (82205) 2412755-0001	EA	1
	5355-01-266-8889	KNOB (11083) 3N5982 (Deleted)	EA	1

SECTION III. BASIC MISSILE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
		KNOB (33967) 5515-854	EA	1
		KNOB (33967) 5515- 855	EA	1
		KNOB (33967) 15-6856	EA	1
		(Deleted)		
		KNOB, 7/8 Dia (82692) 600101-618- 01	EA	1
		KNOB (82692) 600101-618-001	EA	1
		KNOB, CONCENTRIC (82692) 600196-618-001	EA	1
		KNOB, ON/OFF SQUELCH (82692) 600)196-618-001(1	EA	1
		KNOB, TUNING (82692) 600101-618{-03	EA	1
	6240-01-272-2985	LANES, RL-4 (63544) 2450-00075	EA	10
	6220-01-287-6785	LAMP (63544) 2450-00008	EA	10
	6240-41-287-6782	LAMP (39572) 6S6-120V, alt 656-120W	EA	3
		(Deleted)		
	6240-01-162-4086	LAMP (10741) 9800	EA	4
		LAMP (15997) 31504P, alt 5WAAB00132	EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6240-01-262-7311	LAMP (03956) T-957150-2		EA	2
	6240-00-155-8707	LAMP (96906) MS25231-1819		EA	2
	6240-01-274-4237	LAMP (54121) 6W-S6		EA	6
	6240-00-223-9100	LAMP (81349) M5098/10-001		EA	2
	6240-00-143-3049	LAMP (96906) (6S6)MS15579-4		EA	6
	6240-00-057-2887	LAMP (96906) MS15571-1		EA	2
	6240-00-926-4462	LAMP (03956) 1801295-7		EA	2
	6240-00-223-9100	LAMP (81349) NE51, alt M15098/10)0!		EA	2
	6240-00-155-7878	LAMP (11083) 3N5588		EA	2
	6240-01-266-8877	LAMP (11083) 3N5718		EA	1
	6240-00-939-7859	LAMP, 115 VAC (63544) 24500002		EA	10
	6240-01-271-6190	LAMP, H-Mc (73274) 6190, alt 6192		EA	5

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
	6240-01-269-7276	LAMPS, 24 VDC (63544) 2450-00034	EA	20
	6240-00-155-8706	LAMP, #47 (82205) 502047-2	EA	4
		LAMP, BEARING SCALE (71744) CM 328	EA	6
		LAMP, DISPLAY (71744) CM 377	EA	6
	6210-00-299-3082	LAMP HOLDER ASSY (1 1083) 3N5583	EA	2
	6240-00-763-7744	LAMP, INCANDESCENT (96906) MS 18209-387	EA	3
		LAMP, KEYING (17550) 1813	EA	2
		LAMP, Min, Incand (80368) 7377, alt 1033745-1	EA	6
		LAMP, PILOT (91802) 2110QA1	EA	1
		(Deleted)		
	6650-01-268-4051	LENS (72619) ZA2-BV03	EA	1
		LENS, AMBER (72619) 51-0113-300	EA	1
		LENS, CLEAR (72619) 51-0137-300	EA	1
		LENS, CLEAR (82692) 600005-630-001	EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6620-01-268-4052	LENS. GREEN (72619) P30PLSLG, alt 30NPS02		EA	10
	6220-01-269-7231	LENS, GREEN (46576) 261-1 (GR)		EA	1
	6210-01-069-9014	LENS. GREEN (72619) 51-0112-300		EA	1
	6650-01-268-4053	LENS. LIGHT, GREEN (72619)25-135-479-002		EA	10
	6210-00-299-3882	LENS, RED (72619)51-0111-300		EA	1
		LENS. RED (82692)600005-630-002		EA	1
	6220-01-269-7233	LENS, RED (46576)261-1(R)		EA	1
		LENS, WHITE (39572)51-0135-300		EA	1
	6220-01-269-7232	LENS, WHITE (46576) 261-1 (WH)		EA	2
	6220-01-115-5040	LENS, YELLOW (46576)256-1		EA	1
	6210-00-176-4928	LIGHT, INDICATOR (81349) LH89/1		EA	3
	6210-01-157-0631	LIGHT, INDICATOR (31601-01)		EA	1
	6210-01-122-5837	LIGHT, INDICATOR, RED (08576)3011-25		EA	1
	6210-01-122-5836	LIGHT, INDICATOR, CLEAR (08576)3011-26		EA	1
	6210-01-267-8118	LIGHT, PILOT (39572) P30KLGR 1, alt P30PLSR1		EA	5

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6240-01-268-4035	LIGHT, STD, 120V (39572) 25-135-477-004		EA	5
	4710-01-266-8912	LINE ASSEMBLY (11083) 2W4186, alt 7W9696		EA	1
	4710-01-266-8836	LINE ASSEMBLY (11083) 2W4185, alt 7W9695		EA	1
	4710-01-266-8913	LINE ASSEMBLY (11083) 2W4184, alt 7W9694		EA	1
	4710-01-266-5063	LINE ASSEMBLY (11083) 2W4183, alt 7W9693		EA	1
	4710-01-266--8914	LINE ASSEMBLY (11083) 2W4182, alt 7W9692		EA	1
	4710-01-266-8915	LINE ASSEMBLY (11083) 2W4181, alt 7W9691		EA	1
	2815-01-024-4596	LINER (11083) 2P8889		EA	2
	2815-01-179-3109	LINER (11083) 1W6280, al 7'W3550		EA	6
	2090-01-272-2978	LINKAGE ARM (63544) 1200-16505		EA	1
	2090-01-272-2977	LINKAGE BAR (63544) 1200-16504		EA	1
	2990-00-288-3650	LOCK (11083) 2A4429		EA	24
	2990-00-288-3650	LOCK (11083) 2A4429		EA	8
	5940-01-269-7238	LUGS, Copper (36232) T-120		EA	4

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		(Deleted)			
		(Deleted)			
	6625-01-287-5314	METER, 9" (63544) 2950-17101		EA	1
	6620-01-273-7496	METER, 0-25- PSI Fire Pump (63544) 295-00020		EA	1
	6685-01-272-2990	METER, 0-1200°F (63544) 2950-00005		EA	2
	6685-01-272-2993	METER, 0-2500°F (63544) 2950-00002		EA	2
	6625-01-268-4037	METER, Freq., 55-65-HZ (04314) 254-350-ANAN		EA	1
	6625-01-145-8184	METER, FREQUENCY (11083) 5N3047		EA	1
	6685-01-273-7489	METER, PYROMETER (63544) 2950-0012		EA	1
	6625-01-272-2970	METER, RAI (63544) 2950-0001		EA	1
	6620-01-268-4046	METER, VOLT, 0600 (39572) 250-344-SJSJ		EA	1
		METER, VOLT (11083) 4L6696		EA	1
	5965-01-T93-2739	MICROPHONE ASSY (82692) 600279-713 401		EA	1
	6105-01-273-7636	MODULE, MOTOR SAVER (63544) 4300-00005		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6320-01-275-2147	Module, Pre-Alarm (11083) 241791		EA	1
	5930-01-271-6209	Module, Switch (63544) 5100-00037		EA	2
		Motor (10741) 8036		EA	1
	3010-01-122-2616	Motor (10741) 8177		EA	1
		Motor (05472)345925-1631, alt. 34-5425-5593		EA	1
	6105-01-272-2975	Motor (63544) 2800-00017		EA	1
		Motor (68225) C120743		EA	1
	6105-01-287-5331	Motor, 2 HP (38151) 184TrDR 7076 Del		EA	1
	6105-01-274-2059	Motor, 3 HP, 1730 RPM, 182T Frame (11349) R-206		EA	1
	6105-01-265-1768	Motor, 115V, 3 Speed (10855) 42AA-680011		EA	1
	6105-01-275-2146	Motor, Air Start (72915) 8377435		EA	1
	2990-00-891-8441	Motor, Air Start (72915) 8367694		EA	1
	2990-01-275-2148	Motor, Air Starter (11083) 4N5712		EA	1
		Motor, Blower (00705) 145TTFR5327		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6105-01-269-7274	Motor, 1 HP (60985) OR-2501 F-74		EA	1
	6105-01-268-4033	Motor, 10 HP, Electric (49576) 2155TTDR7026		EA	1
		Motor, Electric (71871) MAB 103B-24		EA	1
	6105-01-271-7599	Motor, Electric, 1-1/2 HP (42223)11708A		EA	1
	6105-01-213-1446	Motor, Fan (36232) M-7468-2		EA	1
	6105-01-265-1769	Motor, 208 Volt, 3 Speed Fan (10855) 42AA-680022		EA	1
	6105-01-269-7273	Motor, Pump, 1/6 HP (84182) 48S17D1051E		EA	1
		Motor, Starting (11083) 9L5065		EA	1
	2920-01-266-8812	Motor, Starting Air (11083) 7N6571, Alt. 7W6560		EA	1
	2910-01-066-4743	Motor, Starting and Solenoid (11083) 3T2649, Alt. 6N1889		EA	1
	2540-01-276-0551	Motor, Wiper (82484) 571, M704-45		EA	1
	4310-00-450-9213	Muffler Assy., Intake (11568) Z-828		EA	4
	2940-01-222-0295	Oil Filter w/Line		EA	2
	3040-01-272-3007	Operator, Joystick (63544) 5100-00007		EA	1
	5310-01-269-3849	Nut, Bell (1Y537) 700-7-A		EA	2

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4730-01-228-0976	Orifice Assembly, Exhaust		AY	2
	5925-01-269-2210	Overloads, Heater (65038) E-38		EA	1
	6810-01-051-2814	PH Reagent (08576) 3360-00		EA	1
	5330-00-948-6482	Packing (11083) 3K360		EA	2
	5330-00-913-8872	Packing (11083) 8M5248		EA	2
	5330-00-828-8639	Packing (11083) 4L9564		EA	2
	5330-01-230-1596	Packing, Preformed (72915)84443777		EA	2
	5330-01-225-0810	Packing, Preformed (72915) 8481741		EA	2
	5330-01-268-0438	Packing, Preformed, Plastic Top Lap (46576)1105		EA	4
		Packing, Preformed, Main Drive (17550) 25-169		EA	1
		Packing, Preformed, Stem, 10" (15645) 5530-214		EA	1
		Packing, Preformed, Top, 8" (15645) 5530-212		EA	1
	5330-01-086-3993	Packing, Preformed (04579) 364-0409-457		EA	2
	5330-01-227-3327	Packing, Preformed (04579) 364-0423-457		EA	1
	5330-01-084-1281	Packing, Preformed (04579) 364-0570-457		EA	1
	5330-01-077-3005	Packing, Preformed (08576) 5778-00		EA	2

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5330-01-268-4038	Packing, Preformed (01226) 30-02-22		EA	1
	5330-01-266-0768	Packing, Preformed (08576) 4809-00		EA	4
	5330-01-268-2211	Packing, Preformed, Terminal Cluster, Compressor (59431) 020-0003-02		EA	1
	5330-01-115-7249	Packing, Preformed (71724)187-1		EA	1
	5330-01-276-0545	Packing, Preformed, Soft Iron (71724) 287-1		EA	1
	5330-01-172-4127	Packing, Preformed (04579) 364-0414-457		EA	2
	5330-01-276-0546	Packing, Preformed (67266) 00918-0001, Alt. 00518-0001		EA	30
	4820-01-193-7276	Petcock (54035) NSAB-KXV-BA		EA	2
	5315-01-271-3112	Pin, Groove (1Y537) 700-11-A		EA	2

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	2815-00-817-9871	Pin, Piston (72915) 8269842		EA	1
	5315-01-269-3838	Pin, Groove (1Y537) 700-9-A		EA	2
	2815-01-266-8908	Piston (11083) 2W1177, 8N3102		EA	2
	2805-01-261-2771	Piston Assembly (72915) 9336997		EA	1
	4310-00-292-5342	Piston Assembly, High Press (49576) 5846X001		EA	1
	4310-00-248-0105	Piston Assembly, Low Press (49576) 8640X		EA	1
	9330-01-297-6200	Plastic Strip		EA	8
	5905-01-274-2123	Pot, 5K-6 Layer (63544) 4760-0502		EA	1
	5905-01-123-1960	Potentiometer (36232) T-1 0812-40		EA	2
	5905-01-272-3004	Potentiometer (63544) 4750-00005		EA	1
	5905-01-274-2124	Potentiometer (63544) 4750-00006		EA	1
	6115-01-276-0526	Power Pack Assembly (72915) 9328181		EA	1
	2815-01-268-2364	Power Pack Assembly (72915) 9328179		EA	1
		Power Supply Assembly (82692) 600460-705-001		EA	1
		Power Supply, External (82692) 600036-391-001		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6130-01-281-5103	Power Supply, 24 VDC - 16 Amp (63544) 4000-0002		EA	1
	6105-01-273-7427	Power Supply, 2 Amp (63544) 9999-22300		EA	1
		Plug, Screw (71871) 524717-01		EA	1
	2920-01-268-7370	Plugs, Spark (11583) RN-3		EA	4
	4330-01-275-5053	Pump, H-32, 1/3 HP (84182) H-32-1/2HP		EA	1
	4320-01-265-5022	Pump (65038) SE-51		EA	1
	2815-01-279-1551	Pump (04579) 344ABF1 1/2x2x9B		EA	1
		Pump (58148) 2320102		EA	1
	4320-01-272-2980	Pump (63544) 2825-00021		EA	1
	4320-01-304-7280	Pump, Cooling Water Gear (68225) SMP-2000-56C, Alt. SMP 2000		EA	1
	4320-01-266-8811	Pump, Water (11083) 9N3288		EA	1
	4320-01-255-2943	Pump, Fresh Water (11083) 2W8001		EA	1
	4320-01-268-7229	Pump, Fresh Water (42223) HCM-150-23		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4320-01-202-5611	PUMP, FRESH WATER (11083) 7N6208, Alt lW6602		EA	1
	4320-01-266-824	PUMP, FRESH WATER (11083) 9N3288, Alt 7W7019		EA	2
	2910-01-268-2316	PUMP, FUEL (72915) 8410219		EA	1
	4320-01-274-8230	PUMP, FUEL TRANSFER (11083) 1W1700		EA	1
		PUMP, GASKET HEAD (06987) 2584		EA	1
	4320-01-266-8797	PUMP, LEFT BANK (72915) 8240497		EA	1
	4320-01-275-5055	PUMP, MOTOR SET (31425) 93004-2610		EA	1
	2815-01-152-5521	PUMP, OIL (11083) 2P]784, Alt 4W2448		EA	1
	4130-01-128-9189	PUMP, OIL ASSY (10855) 6D68-952		EA	1
	2815-00-366-2974	PUMP, PISTON COOLING (72915)8084556		EA	1
	4320-00-366-1173	PUMP, RIGHT BANK (72915) 8058625		EA	1
	4320-01-275-5065	PUMP, ROTARY, Viking (63097) HLA195		EA	1
	4320-01-163-3545	PUMP, TRANSFER (11083) 1W1695		EA	1
		(Deleted)			

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5961-01-166-6444	RECTIFIER (10741) R2309		EA	1
	5961-01-129-5811	RECTIFIER ASSY (11083) 3N1481		EA	3
	5961-01-129-5812	RECTIFIER ASSY (11083) 3N1482		EA	3
	6130-01-266-8802	RECTIFIER ASSEMBLY (11083) 3N7803		EA	2
	6130-01-266-8801	RECTIFIER ASSEMBLY (1 1083) 4W0182		EA	2
	5940411-271-0707	RECTIFIER, BRIDGE (63544) 3130-0001		EA	1
	5940-01-271-0706	RECTIFIER, BRIDGE, 35 Amp (63544) 4800-00020		EA	1
	6620-01-008-1893	REGULATOR (11083) 7N208		EA	1
	5935-01-287-6781	RELAY, 1.5 - 15 Sec (39572) 7012AC		EA	1
	5945-01-266-8940	RELAY (11083) 3N5714		EA	1
	5945-01-270-7461	RELAY, 115 VAC (63544) 450-0001		EA	1
	5945-01-272-2967	RELAY, 24 VDC (11 Pin) (63544) 4500-00011		EA	1
	5945-01-272-2969	RELAY, 12 VDC (8 Pin) (63544) 4500-00031		EA	1
	5945-01-265-1762	RELAY (65038) BW1SOOC		EA	1
	5945-01-272-2974	RELAY (63544) 4500-0008		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5945-01-274-2042	RELAY (63544) 4500-00002		EA	1
	5945-01-267-8059	RELAYS, HTR 10A 120V1 (39572) KRPA-11AG		EA	1
	5945-41-266-8830	RELAY, AUXILIARY (11083) 3N7818		EA	1
	2815-01-266-8837	RELAY, FUEL SHUT-OFF (11083) 6T4007		EA	1
	5945-01-265-1763	RELAYS, OVERLOAD (10855) HN69 GZ-106		EA	2
	5945-01-268-4050	RELAY, REVERSE POWER (39572) 256-PATU		EA	2
	5935-01-271-6247	RELAY SOCKET (63544)2100-00051		EA	1
	5945-01-047-6605	RELAY, SOLID STATE (08576) 3003-84		EA	1
	5945-01-272-3001	RELAY, SOLID STATE (Str Amp) (63544) 4500-0012		EA	3
	5945-01-225-8789	RELAY, TIMER (10855) HN61KK-041		EA	1
	5945-01-206-8593	RELAY, TIME DELAY (11083) 448471		EA	1
	5945-01-272-2968	RELAY, TIMER (63544) 4500-00028		EA	1
	5360-00-416-6675	RELEASE SPRING (68225) 301832		EA	10
		RESET, AUTOMATIC, Limit Cut Out (53958) C231-05, alt C231-057		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		RESET, AUTOMATIC, Thermo Disc (53958) C241-005		EA	1
	4240-01-265-1759	RESET, MANUAL, Limit Cut Out (53958) C232-042		EA	1
	5905-01-213-6384	RESISTOR (36232) T-12300-49		EA	1
	5905-01-188-2358	RESISTOR ASSY (10741) 9723X		EA	I
	5340-01-268-4036	RETAINING CUP, Lens (46576) 1133		EA	4
	5905-01-144-5490	RHEOSTAT (11083) 3N5981		EA	1
	5905-01-274-4297	RHEOSTAT (54121) 9		EA	1
		RING (04579) 6760003-010		EA	1
	3950-0 -268-2190	RING, BACK-UP (01226) 30-12-22		EA	1
	5330-01-265-1780	RING, CASE (04579) 676-0018-208		EA	2
	4320-00-171-0564	RING, CASE (04579) 676-1152-208		EA	1
		RING, CASE (04579) 676-1154-208		EA	1
	5330-01-266-0766	RING, PACKING (04579) 564-0177-802		EA	24
	5365-01-268-4044	RING, RETAINING (01226) 40-18-38		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5365-01-102-1818	RING, RETAINING (04579) 67640945-488		EA	1
	5365-00-433-9825	RING, RETAINING (04579) 67640943-088		EA	1
	5365-01-266-0779	RING, RETAINING (04579) 676-0929-088		EA	1
	4310-00-029-0124	RING, SET H Press (49576) 8168		EA	1
	4310-00-484-2735	RING, SET Low Press (49576) 7527		EA	1
	5365-00-598-4375	RING, SNAP (72915) 8059699		EA	1
	2815-00-487-3123	ROD (11083) 555918		EA	2
	2815-01-051-2337	ROD (11083) 4N5609		EA	6
	2815-00-795-4923	ROD, CONNECTING Form (72915) 9544257		EA	1
	2815-00-795-4922	ROD, CONNECTING Fork (72915) 8159354		EA	1
	4310-01-267-8062	ROD, CONNECTING H Press Assy (49576) 110804X		EA	1
	4310-00-871-6918	ROD, CONNECTING Lou Press Assy (49576) 6655X		EA	1
		ROD, TEST (10741) 9779		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		ROLL, CHART (17550) 30-032		EA	24
	4020-01-266-1680	ROPE, Polyurethane (82692) 600007-116-003		EA	1
	2815-01-146-4526	ROTOR COIL (11083) 145300		EA	4
	2815-01-066-6473	ROTOR COIL (11083) 6N7154		EA	12
	6685-01-272-2992	RTD 0-] 2000F (63544) 5520-00002		EA	2
	6685-01-272-2991	RTD 0-2500F (63544) 5520-00001		EA	2
		(Deleted)			
	5980-01-272-3002	SCREEN, DISPLAY (63544) 5100-00038		EA	2
	5965-01-T93-2734	SCREEN, SPEAKER (82692) 600006-611		EA	1
	5305-01-269-7236	SCREW (1Y537) 700-8-A		EA	2
	5330-01-211-0809	SEAL (11083)448087		EA	18
	5330-01-128-4130	SEAL (11083) 7N8018		EA	6
	5330-00-865-5253	SEAL (11083) 3J1907		EA	3
	2520-00-847-4351	SEAL (11083) 9M4849		EA	4

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
	5330-00-104-4371	SEAL (11083)3S5496	EA	1
	5330-00-663-5709	SEAL (11083)5F3106	EA	1
	5330-01-266-8897	SEAL (11083) 3K360	EA	1
	5330-00-999-5504	SEAL (11083) 8M4446	EA	1
	5330-00-492-1790	SEAL (11083) 8M4438	EA	1
	5330-00-913-8872	SEAL (11083) 8M5248	EA	3
	5330-00-710-2146	SEAL (11083) 3H976	EA	1
	5330-01-239-8350	SEAL (11083)5P3218	EA	12
	5330-01-266-8088	SEAL (11083)6N5121	EA	18
	5330-00-104-4371	SEAL (11083)3S5496	EA	2
	5330-00-939-0687	SEAL (11083)2M9780	EA	2
	5330-00-105-0368	SEAL (11083) 9M7002	EA	1
	5330-00-006-8397	SEAL (11083) 9M4218	EA	6
	5330-01-053-4684	SEAL (11083) 5K5959	EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5330-00-246-6380	SEAL (11083)359643		EA	1
	5330-00-599-0936	SEAL (11083)4F7387		EA	6
	5330-01-266-8823	SEAL (11083) 4N7390		EA	4
		SEAL P/N 9M3786		EA	4
	5330-00-869-6566	SEAL (11083) 9M9647		EA	1
	5330-01-053-4685	SEAL (11083)5L2727		EA	1
	2520-00-847-4351	SEAL (11083) 9M4849		EA	1
	5330-00-939-0687	SEAL (11083)2M9780		EA	1
	2520-00-890-2235	SEAL (11083) 8M5253		EA	2
	2950-00-930-9407	SEAL (11083) 7M8485		EA	1
	5330-00-433-3778	SEAL (11083) 6L1648		EA	1
	5330-00-663-4535	SEAL (11083)2H3932		EA	6
	5330-00-339-6224	SEAL (11083)5F7054		EA	6

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5330-00-291-7192	SEAL (1 1083) 2H3934		EA	6
	5330-01-183-1504	SEAL (11083) 6V6921		EA	6
	5330 00-031-2558	SEAL (11083) 1S8974, 1S8947		EA	6
	5330-01-160-2077	SEAL (11083) 6M5062		EA	6
	3120-01-076-9278	SEAL (11083) 9L9098		EA	1
	5330-00-865-5253	SEAL (11083) 3J1907		EA	1
	5330-01-152-0601	SEAL (11083) 6V3507		EA	2
	5330-01-266-8826	SEAL (11083) 7N8025		EA	12
	5330-01-104-4371	SEAL (11083) 3S5496		EA	1
	5330-00-494-2764	SEAL (11083) 5S6670		EA	6
	5330-00-663-5709	SEAL (11083) 5F3106		EA	1
	5330-00(886-2777	SEAL (11083) 2H3927		EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5330-00-968-5388	SEAL (11083) 4F8824		EA	1
	5330-00-105-0368	SEAL (11083) 9M7002		EA	1
	2930-00-105-2662	SEAL (11083)159544		EA	4
	5330-00-074-3773	SEAL (11083) 4L8337		EA	2
	2940-00-936-8244	SEAL (11083) 551188		EA	2
	5330-00-920-6924	SEAL (11083) 1H1023		EA	6
	3120-01-076-9278	SEAL (11083) 9L9098		EA	6
	5330-01-942-5114	SEAL (11083) 8M4437		EA	6
	5330-01-266-0720	SEAL, CAPSCREW (04579) 908-1292-999		EA	2
	5330-01-266-7642	SEAL, CAPSCREW (04579) 908-1290-999		EA	2
	5330-01-268-4013	SEAL, DOOR, Dishwasher (60438) 185360		EA	1
	4320-00-446-8410	SEAL, GREASE (04579) 712-0231-653		EA	1
	5330-01-084-3363	SEAL, GREASE (04579) 712-0234-653		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5330-01-084-3362	SEAL, GREASE (04579) 712-0233-653		EA	1
	5330-01-246-3888	SEAL, GREASE (04579) 712-329-653		EA	2
	5330-01-246-3887	SEAL, GREASE (04579) 712-6328-653		EA	1
	5330-01-128-6854	SEAL Group (11083) 1N3216		EA	1
		(Deleted)		EA	1
	4320-00-080-4906	SEAL. MECHANICAL (04579) 712-4910-749		EA	2
	5330-01-027-8777	SEAL, MECHANICAL (04579) 712-0907-749		EA	2
	5330-01-037-5914	SEAL, MECHANICAL 030760) 1802		EA	1
	5330-00-889-8812	SEAL, 0-RING (72915) 8342588		EA	5
	5330-01-266-8897	SEAL 0-RING (11083) 3K0360		EA	1
		SEAL, 0-RING (67266) 00636002		EA	10
		SEAL, 12" BU7TERFLY (67266) G00444-0001		EA	10
	6620-00-882-6971	SENDING UNIT OIL (11083) 5L7450		EA	1
	6620-00-079-0311	SENDING UNIT, UATER TEMP (11083) 5L7442		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6105-01-287-6780	SERVOMETER, BOOSTER PUMP (72915) 9086388		EA	1
	304--01-275-5064	SHAFTS (82484) F854-2.5		EA	1
		SHAFT, STUB (68225) C121829		EA	1
	6680-01-272-2989	SHAFT, METER TACH (63544) 295006		EA	1
	662'5-01-272-3006	SHAFT, TACH, Proximity) Pick-Ups (63544) 5100009		EA	2
	4330-01-108-4292	SHELL (08576) 44-480		EA	1
	3415-01-275-5062	SHIELD, EYE (6(0985) JBG-6A-59		EA	2
	6605-01-266-8803	SHUTOFF, ELEC Group (11083) 248197		EA	1
		(Deleted)			
	4320-01-1 3-1552	SLEEVE (n04579) 756-078-208		EA	1
	432001-160-6704	SLEEVE (04579) 756-0039-208		EA	2
	3110-01-266-0718	SLEEVE (04579) 756-0077-208		EA	1
	2815-01-266-0719	SLINGER (04579) 764-1026-478		EA	1
	4320-01-244-4729	SLINGER (04579) 764-1028-478		EA	2

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	2815-01-266-0708	Deflector (04579) 764-1021-478		EA	1
	4320-01-244-6060	Deflector, Dirt and Liquid (04579) 764-1022-478		EA	2
	2815-01-266-0707	Deflector (04579) 764-1015-478		EA	12
	6220-01-269-7249	Socket (46576) 347		EA	1
	6220-01-269-7250	Socket, Med., Prefocus (46576) 347A		EA	1
	5935-01-267-8061	Socket, Dual Med., Prefocus (46576) 303		EA	2
	2040-01-274-4236	Socket (54121) Deck 17		EA	1
	5945-01-268-3359	Solenoid (11083) 8C4771		EA	1
	5999-01-269-7301	Sonalert (63544) 1111-18000		EA	1
	5999-01-271-6214	Sonalert (63544) 1300-00013		EA	1
	5999-01-272-2966	Sonalert (63544)1300-00014		EA	1
	5999-01-271-6215	Sonalert (63544)1300-00015		EA	1
	5999-01-271-6216	Sonalert (63544)1300-00016		EA	1
	5999-01-271-0640	Sonalert (63544)1300-00017		EA	1
	5999-01-271-0641	Sonalert (63544) 1300-00018		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5999-01-271-6213	Sonalert (63544) 1300-00012		EA	1
	1915-01-273-9887	Sound Alert SC628		EA	1
		Spanner (71871) 67028		EA	1
		Spanner (71871) 30292		EA	1
		Splash Guard, Food Waste Disposal (60438) 202105		EA	1
		Speaker (82692) 600007-370-001		EA	1
	5365-01-147-9591	Spring (11083) 4N5906		EA	12
	5360-00-519-6605	Spring (11083) 757144		EA	4
	2090-01-274-1989	Station, Manual Fire (63544) 5100-00064		EA	2
	2090-01-268-7365	Starter (10741) 5367		EA	1
	4330-01-348-6421	Filter Element (55524) P75-2-1/2-100-RV3		EA	1
	3950-01-273-9888	Strainer, Sink Assembly, Sink Heater (20087) 05-30-009		EA	1
	2910-01-264-9527	Strainer, Element, Sediment		EA	2
	4730-01-264-4791	Strainer, Sediment		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4730-01-268-2216	STRAINER, SUCTION COMPRESSOR (59431) 0130010-00		EA	1
	4730-01-271-6251	STRAINER, SUCTION (63544) 2825-00026		EA	2
		STRAP for 50 Lbs C02 (33525) 270014		EA	4
		STRAP for 100B LBS Cylinders (33525) 270157		EA	1
		STYLUS (17550) 1114		EA	12
		(Deleted)			
	5340-01-265-1772	SAILING BOLT ASSEMBLY (04579) 099{)01 5644		EA	4
	5930-01-269-7247	SWITCH (60985) JBG-6A-44		EA	1
	5930-01-268-0413	SWITCH (10741)9731		EA	1
	5930-01-266-8834	SWITCH (11083) 3N5979		EA	1
	5930-01-266-8833	SWITCH (11083) 3N5976		EA	1
	5930-01-265-5019	SWITCH, 2 POSITION (65038) 10250T1311		EA	I
	5930-01-265-5018	SWITCH, 3 POSITION (65038) 10250T1323		EA	1
	5930-01-271-6219	SWITCH ADAPTER (63544) 5100-0005		EA	2

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	2920-01-266-8819	SWITCH ASSY (11083) 5N0364		EA	1
		SWITCH, AIR FLOW (53958) C31109, alt C321 09		EA	I
	5930-01-271-0722	SWITCH ASSY, AIR FLOW (10741) 5292X		EA	I
		SWITCH, AM (39572) 7018973		EA	1
	5930-01-261-2766	SWITCH ASSY LUBE OIL (72915) 8464151		EA	1
	5930-01-112-5220	SWITCH, AUTO RESET Freeze (92578) A19ZBA-1		EA	1
	6105-01-265-5035	SWITCH, BLOWER MOTOR (65038) E-075		EA	1
	5930-01-268-0415	SWITCH, VM (39572) V10-D/45 OR VID-DV15		EA	1
	5930-01-267-5940	SWITCH, VM (39572) 7018974		EA	1
	5930-01-269-2218	SWITCH, VMXFER (39572) 7018970		EA	1
	5930-01-266-0706	SWITCH, FAN SPEED (10855) 42CA-680186		EA	1
	5930-01-268-0406	SWITCH, FREQ (39572)7018969		EA	1
	2920-01-266-8817	SWITCH GROUP (11083) 8N6670		EA	1
	5945-00-104-1434	SWITCH, HIGH PRESSURE (10855) HK01UA-267		EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5930-01-271-6207	SWITCH, I.P.B.M. Power On/Off (63544)		EA	1
	5930-01-271-6208	SWITCH, I.P.B. (2-N10) (63544)		EA	1
		SWITCH, UNIT INTERFACE (82692) MSR6606		EA	1
	5930-01-271-0725	SWITCH, LEVEL (Bilge) (63544) 553 0-0)01		EA	1
	5930-01-271-0723	SWITCH, LEVEL (63544) 5530-00003		EA	2
	5930-01-271-0724	SWITCH, LEVEL ADJUSTING (63544) 5530-0(004		EA	1
	5930-01-281-5102	SWITCH, LIMIT (63544) 5100)00004		EA	2
	5930-01-266-7573	SWITCH, LIMIT (10855) 42CA-680208		EA	2
	593000-103-9313	SWITCH, LOW PRESSURE (10855) HK02UB-042		EA	2
		SWITCH, MANUAL CHANGE OVER (10855) 42CA-680199		EA	1
	6685-01-271-0715	SWITCH, METER PYROMETER 16 Position (63544) 2950 00003		EA	1
	2920-01-266-8818	SWITCH (Oil Pressure) (11083) 6T6652		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5930-01-268-2186	SWITCH, ON/OFF (17479) 2 x 464		EA	1
	5930-01-265-5027	SWITCH, ON/OFF (10855) HR54AF-042		EA	2
	5930-01-272-2964	SWITCH, P.B. MOMENTARY (63544) 5100-0052		EA	1
	5930-01-213-1436	SWITCH, POWER (36232) T-10800-4		EA	1
	5930-01-201-6499	SWITCH, PRESSURE (50992) 012-4834		EA	1
	5930-01-191-1198	SWITCH, PRESSURE (11568) M-1227		EA	1
	5930-01-271-6227	SWITCH, PRESSURE (59077) CFSP-15/35AR 4M-C-EL		EA	1
	5930-01-271-0708	SWITCH, PRESSURE HIGH (63544) 5510(0002		EA	2
	5930-01-271-0709	SWITCH, PRESSURE LOW (63544) 5510-00006		EA	2
	5930401-269-7248	SWITCH, RANGE (36232) T-10800-20		EA	1
	5945-00-931-6314	SWITCH, RELAY (10855) HN61KK-912		EA	1
	5930-01-213-4076	SWITCH, REMOTE (36232) TI 1160		EA	1
	5930-01-271-6231	SWITCH, ROTARY, 6-Layer (63544) 5100-00001		EA	1
	5930-01-271-6206	SWITCH, SELECTOR (E.O.T.) (63544) 510000061		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5930-01-272-2973	SWITCH, SELECTOR (63544) 5100-00032		EA	1
	5930-01-274-2056	SWITCH, SPEED (63544) 5100-00051		EA	1
	2920-00-160-9732	SWITCH, STARTER (11083) 2P4749, alt 9W1077		EA	1
	5930-01-268-0414	SWITCH, SYNC (39572) 7018971		EA	1
		SWITCH, TERMINAL BLOCK 120V (53958) E123-046		EA	1
	5930-01-268-2187	SWITCH, TEMPERATURE (9U092) TL009-159		EA	1
	5930-01-092-6122	SWITCH, 2 Stg Temperature (92578) A28-29		EA	1
	2920-01-266-8815	SWITCH (Temp Wtr) (11083) 3N7442		EA	1
	5930-01-274-4292	SWITCH. TOGGLE (54121) 16		EA	1
		SWITCH, TOGGLE 7560K5		EA	1
	5930-01-266-1650	SWITCH, TOGGLE (82692) 600289-616006		EA	1
	5930-01-267-5674	SWITCH, TOGGLE (11083) 6L5079		EA	1
	5950-01-269-7227	SWITCH, TRANSFORMER (10741)6350		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5930-01-266-0714	SWITCH, WATER FLOW (92578) F61MB-1		EA	1
	2920-01-266-8816	SWITCH (Wtr Press) (11083) 6T6653		EA	1
		SWITCHGAGE (72915) A25TK250		EA	1
	6620-01-261-2768	SWITCHGAGE (03479) A25PK75		EA	1
	6620-01-262-9489	SWITCHGAGE (72915) A25PK100		EA	1
		SYNCSCOPE, SLOW FAST (39572) 106-452-AAA		EA	1
	2090-01-274-1990	TARGETS, SHAFT TACH (63544) 1200-17401		EA	2
	6320-01-261-2760	TATTLETALE, SHUTDOWN (72915) 221PH		EA	1
	5940-01-266-0713	TERMINAL BLOCK (10855) HYIIUC-125		EA	1
	5940-01-269-0713	TERMINAL, OUTPUT (36232) M-13900		EA	2
		TERMINAL, POWER BLOCK, 120V (53958) E123-054		EA	1
	5940-01-265-5021	TERMINAL PLATES (10855) 06DA660045		EA	1
	5940-01-266-8906	TERMINAL STRIP (11083) 3N5983, alt 4L6470		EA	4
	4610-01-178-6571	TEST TAP, Stem (08577) 4942-00		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	6640-01-049-4436	TEST TUBE (08576)3005-32		EA	2
	6640-01-049-4437	TEST TUBE (08576) 3005-3		EA	2
	5930-01-218-2044	THERMOSTAT (11083) 5N8568		EA	1
	6620-01-266-0716	THERMOSTAT (10855) 42CA-680193		EA	1
	5930-01-218-2044	THERMOSTAT (11083) 5N8568		EA	1
	6620-01-268-7375	THERMOSTAT ASSY (10741) 9566X		EA	1
	5930-01-144-7594	THERMOSTAT, GRIDDLE 450°F (304-02-08)		EA	1
	6620-01-271-6192	THERMOSTAT, OVERHEAT, DEFROST (12148)15285		EA	1
	5930-01-210-2255	THERMOSTAT, LOWER, Model 8-IV-800AP- (11702)8295		EA	1
	5930-01-010-5401	THERMOSTAT, UPPER, Model 8-[V-800AP- (17702)8293		EA	1
		THERMOSTAT, WALL MOUNT (10855)42CA-680195		EA	1
	5930-00-458-8709	THERMOSTAT. 2 Stage Heat Wall (92578) T25-A1		EA	1
	5930-01-079-7407	THERMOSTAT, 1 Stage Heat Wall (92578) A 19EAF-2		EA	1
	6620-01-265-1757	THERMOSTAT, 1Stage Heat Wall (25795)T651		EA	1
		THERMPAK, PAPER PACK (01009)TPI0650-2P		EA	3

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5945-01-103-5132 6645-01-187-1790	TIME GUARD (10855) HK25RC-011		EA	1
	6645-01-26-88631	TIMER (11083) 3N5978		EA	1
		TOOL (71871) 73579		EA	1
	4330-01-108-0984	TOP (08576) 4456-0		EA	1
	2530-00-028-9806	TORQUE BAR (68225) 301831		EA	1
		(Deleted)			
	5950-01-269-7245	TRANSFORMER, CONTROL (36232) M-12390-31		E A	1
	5950-01-187-7441	TRANSFORMER RF (10741) 9361K		EA	1
	5950-01-187-5984	TRANSFORMER, 1000W 440V (10741) 9816X		EA	1
	5950-01-271-6249	TRANSFORMER (63544) 5600-0)00]		EA	1
	6120-01-261-2774	TRANSFORMER (72915) AM4972		EA	1
	5961-41-269-7292	TRANSISTOR, Power (Dimmer) (63544) 4800-001		EA	2
	6685-01-287-5341	TRANSMITTER, 0-250-PSI Fire Pump (63544) 5500-001		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		TUBE, Air Flow Pick UP (53958) F341-011		EA	1
	4720-01-022-4455	TUBING, Bulk 5 FT (08576) 4680400		EA	5
	4710-01-266-4452	TUBING, SUCTION (65038) 1744		EA	10
	2950-01-266-8799	TURBOCHARGER (11083) 2W1576, Alt 2W3556		EA	1
	2950-01-266-8800	TURBOCHARGE GROUP (11083) 2W6738, Alt 7C6701		EA	1
	4310-007-52-3672	UNLOADER ASSY (Head) (49576) 7483X		EA	2
	4310-00-734-5097 4310-00-459-5968	UNLOADER, HYDRAULIC (49576)111060-002		EA	1
	5340-01-188-4901	V-BAND ASSEMBLY (08576) 3005-81		EA	1
	3030-01-011-1280	V-BELT SET (11083) 3N2756, alt 8L4526		EA	2
	3030-01-267-8093	V-BELTS (49576) 9003-2081		EA	6
	2815-01-143-1409	VALVE (11083) 6N9916		EA	1
	4820-01-265-5034	VALVE, 208V, 3 Way (10855) 42CA-680219		EA	2
	4820-01-265-1764	VALVE, ANGLE ACCESS (58553) 600A-4B		EA	1
	4820-00-447-9787	VALVE ASSEMBLY (72915) 8077201		EA	1

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4820-01-265-1761	VALVE, Calibrated Needle (12168) 2104000		EA	1
	4820-01-268-4040	VALVE, CHECK (59793) RV-25-1.0/12		EA	1
	4820-01-271-713	VALVE, CHECK (11568) P-5822A		EA	1
	4820-01-268-4039	VALVE, CHECK (59793) RV-16-1.0/5		EA	1
	4820-01-269-2245	VALVE, CHECK (58148) S 1-1T031-4		EA	1
	4820-01-272-2988	VALVE, CHECK (63544) 2825-0036, alt 2850-0001		EA	2
	4820-01-266-4450	VALVE, Comb Balance & Stop (10855) 42CA-680212		EA	2
	4820-01-275-5056	VALVES, CONTROL (82484) GC-161, GC-61		EA	1
		VALVE CONTROL Comp (D8835) WAV2240-VI, WAV2240V1		EA	1
	4520-01-261-2770	VALVE, CUTOFF ASSY (72915) 8412324		EA	1
	4820-01-271-6211	VALVE, DIRECTIONAL CONTROL (63544) 2825-00022		EA	1
	4820-01-274-1962	VALVE, DISCHARGE COMPRESSOR (59431)510-0218-01		EA	1
	4820-01-98-1329	VALVE, DISCHARGE ASSY (49576) 6670X		EA	3
	2815-01-179-2485	VALVE, EXHAUST (11083) 1W3860		EA	6

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4820-01--056-2991	VALVES, EXPANSION (70255) TCLE 1/2 HW		EA	1
	4820-01-271-6210	VALVE, FLOW CONTROL (63544) 2825-00023		EA	1
	2815-01-152-0635	VALVE, INTAKE (11083) 7N572		EA	2
	2815-01-179-2484	VALVE, INTAKE (11083) 1W'3859, alt 2W'2622		EA	6
	2815-01-186-2371	VALVE, INTAKE (I 1083,) 2'2620		EA	2
	9905-01-243-0621	VALVES, LIQUID LINE (17812) 15237P		EA	1
	4820-01-271-6193	VALVE, MANUAL CONTROL (19184) NM.S-75		EA	1
	4130-00-986-0779	_ PLATE ASSY, Center Bank (1OS85 6D75-163		EA	1
	4820-01-265-1771	VALVE PLATE ASSY, Right & Left (10855) 06DA401843		EA	2
	4810-01-269-7228	VALVE PRESSURE, Regulating 1-12" (49576) 1584-275-BJ		EA	1
	4820-00-768-3550	VALVE, PRESSURE REGULATING (11083) IL5011		EA	1
	4820-01-275-9479	VALVE, PRESSURE RELIEF (58148) 30-292-4, 30-202-4		EA	1
		VALVE, 3/8" QUICK RELEASE (68225) P52935-3		EA	2
	4820-01-265-1936	VALVE, 450 PSI RELIEF (58553) 3214-450		EA	1

SECTION III. BASIC ISSUE ITEMS - Cont.
(ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4820-01-268-4041	VALVE, RELIEF (54035) RPGC-LAN-CED		EA	1
	4820-01-268-4042	VALVE, RELIEF (54035) RPIC-LCN-IEN		EA	1
	2815-01-274-2093	VALVE, RELIEF (63544) 2825--X38		EA	2
	4820-01-265-1935	VALVE, PRESSURE RELIEF (65038) 13-101-4		EA	1
	4820-01-268-0411	RELIEF SAFETY (49576) 2961175		EA	4
		(Deleted)			
	4820-00-421-6984	VALVE, SAFETY (11568) Z67-75		EA	1
	4810-01-268-5103	VALVE, SOLENOID (08576) 5883-00		EA	1
	4820-00-844-8636	VALVE, SAFETY (11568) Z-206-200		EA	1
		VALVE, SOLENOID (13939) MO]8A92		EA	1
	4810-00-445-4512	VALVES, SOLENOID (78462) MB 1052		EA	1
	4810-01-279-1559	VALVE, SOLENOID (13939) 18A42		EA	2
	4820-01-217-5713	VALVE, MODULAR Controls Shuttle (54846) DSVI-8-B-2		EA	1
	4820-01-266-4451	VALVE, STOP (10855) 42CA-80209		EA	2

SECTION III. BASIC ISSUE ITEMS (ON-BOARD REPAIR PARTS)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	4310-00-258-7678	VALVE, SUCTION ASSY (49576) 6671XU		EA	3
	4820-01-274-2041	VALVE, SUCTION COMPRESSOR (59431) 510 068-01		EA	1
	4820-01-274-1963	VALVE, Superior 1/4" Condensor (58553) 214-4S		EA	1
	4820-00-490-9103	VALVE, Superior 3/8" Condensor (58553) 214-6S		EA	1
	4820-01-280-0067	VALVE, WATER REGULATING (92578) V46BR-2-1-1/2		EA	1
	3120-00-517-0448	WASHER, THRUST (72915) 8135330		EA	1
	3415-01-269-7242	WHEEL, GRINDING (60985) JBG-6A-21		EA	2
	5120-01-162-2912	WRENCH, LAMP (10741) 9781		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: MAIN ENGINE MODEL NO. 645E6

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		REPLACE: INJECTOR			
	5210-00-447-9669	INJECTOR TIMING GAUGE (72915) 8034638		EA	1
	4910-00-366-1465	INJECTOR HOLDING RACK (72915) 8431626		EA	1
		REPLACE: WATER PUMP			
		WATER PUMP MOUNTING BOLT WRENCH (72915) 9519601		EA	1
		TEST: VALVES			
		TEST VALVE WRENCH (72915) 8032587		EA	1
		REPLACE: CYLINDER HEAD AND PISTON			
	5120-01-276-5951	SWEENY TORQUE WRENCH with Multiplier (72915) 220-1		EA	1
	5306-00-366-1385	PISTON PULLING EYEBOLT (72915) 8040413		EA	1
	5120-00-366-1496	FORK ROD SUPPORT (72915) 8052958		EA	1
	4910-00-366-1382	CYLINDER HEAD CARRYING BASKET (72915) 8060247		EA	1
	2530-00-248-3871	BLADE ROD PROTECTOR BOOT (72915) 8062033		EA	1
	4910-00-366-1387	FORK ROD PROTECTOR BOOT (72915) 8062034		EA	1
	521000-366-1422	PISTON COOLING PIPE ALIGNMENT GAUGE (72915) 8071720		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: MAIN ENGINE MODEL NO. 645E6

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5120-00-366-1472	CYLINDER HEAD REMOVING FIXTURE (72915) 8075894		EA	1
	5120-01-276-5941	PISTON COOLING PIPE CLEANING TOOL (72915) 8087086		EA	1
	5210-00-366-1419	LASH ADJUSTMENT MINIMUM CLEARANCE GAUGE (72915) 8107788		EA	1
	5120-00-366-1446	CYLINDER LINER LIFTER (72915) 8116358		EA	1
	5120-00-323-9429	SNAP RING REMOVER (72915) 8171633		EA	1
		FORK CONNECTING ROD BASKET THREAD GAUGE (72915) 8265955		EA	1
	5120-00-177-7053	PISTON RING EXPANDER (72915)8349892		EA	1
	5120-00-176-8614	LIFTING CLAMP ASSEMBLY (79215) 8417858		EA	1
	5120-00-176-8616	PISTON HOLDING TOOL (72915) 8417859		EA	1
	5120-00-176-8617	CONNECTING ROD POSITIONING CLAMP ASSEMBLY (72915) 8417881		EA	1
	5120-01-276-5953	PISTON RING COMPRESSOR and Guide (72915) 9333846		EA	1
	5120-01-274-4238	PISTON CARRIER HOLDING FIXTURE (72915)9534635		EA	1
		ADJUST: ENGINE CONTROLS			
	5120-01-275-9482	THIN WRENCH SET (72915) LTA-810K		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: MAIN ENGINE MODEL NO. 645E6

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		CRANKOVER TOOLS SET			
		ELECTRIC DRIVE UNIT (72915) 9543867		EA	1
		AIR DRIVE KIT (72915) 9560333		EA	1
		REMOTE CONTROL (72915) 9560388		EA	1
		CRANKOVER TOOL (72915) 9561844		EA	1
		REMOVE: BLOWER			
	4940-00-366-1452	BLOWER LIFTING PLATE (72915) 8072929		EA	1
		BLOWER NUT RATCHET WRENCH (72915)8177166		EA	1
		REPAIR AND TEST: INJECTOR			
	5120-00-880-7549	INJECTOR RACK GAUGE (72915) 8339610		EA	1
		INJECTOR TESTER (Complete) (72915) 9549015		EA	1
		REPAIR: WATER PUMP			
	5120-00-465-4052	IMPELLER INSTALLER (72915) 8052959		EA	1
	5120-00-998-7663	PUMP IMPELLER/GEAR PULLER (72915) 8354367		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: MAIN ENGINE MODEL NO. 645E6

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		REPLACE AND REPAIR: DRIVE GEAR TRAIN			
		FEELER GAUGE SET (72915) 8067337		EA	1
		DIAL INDICATOR 72915) 8255423		EA	1
		REPAIR: CYLINDER HEAD AND LINER			
	4910-00-366-1500	CRAB STUD PROTECTOR TUBES (72915) 8034600		EA	1
	4910-00-366-1477	VALVE SEAT RECONDITIONING TOOL Set (72915) 8035775		EA	1
	4910-00-366-1498	VALVE CHECKING TRAM (72915) 8042773		EA	1
		CRAB NUT TAP 1-3/4"-12 (72915) 8050688		EA	1
	5110-00-366-1467	CYLINDER TEST VALVE SEAT REAMER (72915) 8064804		EA	1
	5120-00-366-1483	VALVE BRIDGE SPRING COMPRESSOR (72915) 8070883		EA	1
	5120-00-399-5558	VALVE BRIDGE LOCK RING (72915) 8070903		EA	1
	5120-00-366-1463	LASH ADJUSTER INSTALLER (72915) 8072927		EA	1
	4920-00-876-5386	TAPERED PILOT CHECKING FIXTURE (72915) 8173996		EA	1
		WIRE BRUSH (Stones) (72915) 8078883		EA	1
	5120-00-366-1475	LOCK RING REMOVER - Lash Adjuster (72915) 8080632		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: MAIN ENGINE MODEL NO. 645E6

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		STONE AND GUIDE BLOCK SET (W47-J43) (72915) 8084163		EA	1
		VALVE GUIDE CLEANER (72915) 8141439		EA	1
		VALVE SEAT SEAL TESTER (72915) 8213518		EA	1
		CYLINDER HEAD STUD HOLE CLEANER (72915)8211907		EA	1
		VALVE GUIDE INSTALLER-REMOVER (72915) 8224241		EA	1
		REAMER SPEED REDUCER (Used with 837969) (72915) 8228304		EA	I
		LINER BORE GAUGE (72915) 8275258		EA	1
		GAUGE LOCATOR (72915) 8278541		EA	1
		CYLINDER LINER RIDGE REAMER (72915) 8374969		EA	1
		MASTER GAUGE (Used with 8275258) (72915) 8374970		EA	I
	5120-00-366-1459	LASH ADJUSTER PULLER (72915) 8394719		EA	I
		LASH ADJUSTER PULLING ARM (72915) 8395481		EA	1
		VALVE SPRING COMPRESSOR (72915) 9546582		EA	1
		STUD THREAD FILE (72915) 9549346		EA	1
	5180-00-935-4642	CRAB NUT WRENCH Set (72915) 9551713		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: CATERPILLER ENGINE

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/M	(5) QTY RQR
		REPAIR: CRANKSHAFT		
	5120-00-366-1474	UPPER MAIN BEARING SHELL REMOVER (72915) 8055837	EA	1
		MAIN BEARING NUT TAP 1-1/4" -12 (72915) 8060387	EA	1
	5120-01-184-1282	MAIN BEARING NUT OFFSET RATCHET WRENCH (72915)8191591	EA	1
	5130-01-021-3635	MAIN BEARING POWER WRENCH Set (72915) 8474807	EA	1
		MAIN BEARING CAP APPLICATION and REMOVAL TOOL (72915) 8487487	EA	1
		UPPER MAIN BEARING REMOVER TOOL (72915) 8488833	EA	1
		REMOVE AND INSTATATION OF FUEL. INJECTION PUMP AND GOVERNOR		
	4710-01-053-4874	LINE ASSEMBLY (11083) 4N5336	EA	1
	5120-01-124-1773	SOCKET (11083) 5P144I	EA	1
		SEAL GUIDE (11083) 5P4755	EA	1
	5120-01-276-0530	FUEL LINE WRENCH (11083) 5P5193	EA	1
	5120-01-276-0531	FUEL LINE WRENCH (11083) 5P5195	EA	1
	4930-01-268-7417	EXTRACTOR (11083) 5P6229	EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: CATERPILLER ENGINE

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5130-01-2776-0532	WRENCH (11083) 5P961		EA	1
	2815-01-268-2194	TIMING PIN (11083) 6V4186		EA	1
		GOVERNOR ADJUSTING TOOL Group (11083) 6V6070		EA	1
	4940-01-268-2199	COMPRESSOR GROUP (11083) 6V7050		EA	1
	5120-00-178-1267	EXTRACTOR (11083) 852244		EA	1
	5120-00-861-4014	WRENCH (11083) 854613		EA	1
		CIRCUIT TESTER (11083) 8T500		EA	1
	5120-01-288-6755	BEARING PULLER ATTACHMENT (11083) 8H663		EA	1
		TIMING THE ENGINE.			
	5120-00-589-1446	PULLER ASSEMBLY (11083) 1P2321		EA	1
	5120-01-123-5982	DRIVE PLATE (11083) 1P474		EA	1
	5315-01-139-8266	TIMING PIN (11083) 6V2112		EA	1
	4910-01-136-1057	ENGINE TIMING INDICATOR Group (11083) 6V3100		EA	1
	6680-01-135-7427	MULTITACH Group (11083) 6V3121		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: CATERPILLER ENGINE

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		ENGINE SET POINT INDICATOR Group (11083) 6V4060		EA	1
	5120-01-276-0544	INJECTION LINE SPEED PICKUP Group (11083) 6V495Q		EA	1
	3020-01-250-1610	TURNING TOOL (11083) 9S9082		EA	1
		<u>TEST TOOLS FOR ELECTRICAL SYSTEM</u>			
	6675-01-257-2285	AMMETER (11083) 6V4910		EA	1
		BATTERY LOAD TESTER (11083) 6V4930		EA	1
	6625-01-268-2208	HEAVY-DUTY DIGITAL MULTIMETER (11083) 6V7070		EA	1
		AC/DC CLAMP-ON AMMETER (11083) 8T90O		EA	1
		<u>REPLACE PISTON</u>			
	4730-01-876-6521	COUPLER ASSEMBLY (11083) 1P2375		EA	1
		COUPLER ASSEMBLY (11083) 1P2376		EA	1
	4320-01-268-2196	HYDRAULIC PUMP (11083) 2D2825, alt 1U5230		EA	1
	5120-01-184-0331	PISTON RING COMPRESSOR (11083) 5P3526		EA	1
	4940-01-268-2202	PRESS GROUP (11083) 5P8639		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: CATERPILLER ENGINE

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5120-01-276-0542	ADAPTER (11083) 5P8645		EA	1
	5120-01-276-0543	ADAPTER (11083) 5P8646		EA	1
	5365-01-268-2195	SPACER (11083) 6V3197		EA	1
	512001-184-7174	PISTON RING EXPANDER (11083) 7M3978		EA	1
	3442-00-876-6522	HOSE ASSEMBLY (11083) 8F0024		EA	1
		REPLACE CYLINDER HEAD AND LINERS			
		ADAPTER PLATE (11083) 1P2396		EA	1
	5210-01-124-1737	LINER PROJECTION TOOL Group (11083) 1P5510		EA	1
	5130-01-183-8583	PULLER Group (11083) 1P0820		EA	1
	4910-01-097-6946	CYLINDER LINER INSTALLATION Tool (11083) 2P8260		EA	1
	5120-01-124-1738	PLATE (11083) 3H0465		EA	1
	5120-01-276-0528	VALVE LIFTER TOOL Group (11083) 5P7433		EA	1
	5120-01-189-9632	CYLINDER LINER PULLER (11083) 5P8665		EA	1
	4940-01-268-2201	LINK BRACKET (Quantity-12) (11083) 6V2156		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: CATERPILLER ENGINE

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
	5120-00-633-5085	PULLER CROSSBAR (11083) 8B7548		EA	1
	5120-00424-0465	LEG (11083) 8B7549		EA	1
	5120-00-288-6756	BEARING PULLER ATTACHMENT (11083) 8B7551		EA	1
	5120-00-378-4254	STEP PLATE (11083) 8B7561		EA	1
		RATCHET PULLER (11083) 859906		EA	1
		REPLACE OIL PUMP			
	7220-01-268-2215	STEP PLATE (11083) 1P458		EA	1
		CHANGE FILTER			
	5120-01-081-1922	STRAP URENCH (11083) 2P8250		EA	1
		REPLACE BEARING AND SEAL			
	5120-01-124-1906	MAIN BEARING REMOVAL & INSTALLATION TOOL (11083) 2P5518		EA	1
	5840-01-136-1056	LOCATOR (11083) 5P1733		EA	1
	5365-01-136-6764	SPACER (11083) 5P7303		EA	1
	5120-01-2760527	INSTALLER (11083) 6V6142		EA	1

SECTION III. BASIC ISSUE ITEMS
SPECIAL TOOLS FOR: CATERPILLER ENGINE

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		INSTALLER (11083) 6V6143		EA	1
		MEASURING ENGINE OIL.			
	5840-01-136-1058	ENGINE PRESSURE Group (11083) 6V3150		EA	1
		TEST COOLING SYSTEM			
		THERMISTOR THERMOMETER Group (11083) 8T470		EA	1
	2930-01-124-1739	COOLING SYSTEM PRESSURIZING PUMP Group (I1083) 9S8140		EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(HYDRAULIC WATERTIGHT DOOR)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I	(5) QTY RQR
		Pliers, Tru Arc (73680) 5000-287	EA	1

Section III. BASIC ISSUE ITEMS - Cont.
(MACHINE SHOP EQUIPMENT)

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	5120-01-269-7243	Dresser Grinding Wheel (55719) WD-1 2		EA	1
	5310-01-229-7902	Washer, Flat		EA	2
	5120-01-269-7234	Wrench (60985)10-0362-00		EA	1
	5120-01-269-7235	Wrench (60985)10-0363-00		EA	1

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SECTION III. BASIC ISSUE ITEMS
WATER PURIFICATION SYSTEM

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		WATER PURIFICATION SYSTEM			
		SERVICE TOOL KIT (65379) 35096		EA	1
		TEST KIT, BROMINE (65379) 5719-00		EA	1

APPENDIX B
Section IV. BASIC ISUE ITEMS LIST
Firefighting, Safety, and Damage Control Items

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
		NOTE **Some firefighting, safety, and damage control items are contained in Section III of this Basic Issue Items List (BII).**			
	4210-00-209-5023	Adapter, 1-1/2" National Pipe Thread to 1-1/2" National Standard Thread		EA	4
	6840-01-315-9841	Bacteriastatic Additive, (Eye and Face Wash Fountain)		BX	2
	4220-00-276-8926	Buoyant Vest, Work Type		EA	15
	N/A (Local Purchase Item)	Burn Dressing Kit, Contains two 8" X 18", one 4" X 16", four 4" X 4", one 12" X 16" (Face Mask) Dressings, and one Package of Burn-jel Topical Dressing. Ordering Information: "Water-jel AWK Kit", H&H Associates Inc., P.O. Box 4469, Alexandria, VA 22303, Phone: 1-800-326-5708		KT	3
	4240-00-238-9959	Canister, Training		EA	2
	4240-00-159-1986	Canister, Training, Locker		EA	1
	N/A (Local Purchase Item)	Coverall, Antiexposure, Sterns Model 1FS-580, Orange, Ordering Information: Lifesaving Systems Corp., 720 4th St. SW, Ruskin, FL 33570-1829, (813) 645-2768		EA	10
	4720-00-227-7225	Duct, 8" Dia. X 15' Long, with Carrier		EA	2
	N/A (Local Purchase Item)	Emergency Position Indicating Radio Beacon (EPIRB), Category 1, 406 MHz Satellite, F.C.C. Approved		EA	1
	4240-00-542-2048	Face Shield, Industrial, Tilting		EA	3
	N/A (Local Purchase Item)	Fire Blanket, 72" X 60". Ordering Information: "Water-jel AWK Kit", H&H Associates Inc., P.O. Box 4469, Alexandria, VA 22303, Phone: 1-800-326-5708		KT	3
	4210-00-889-2491	Fire Extinguisher, Portable, 10 lb, USCG Approved, (A-B-C)		EA	23

APPENDIX B
Section IV. BASIC ISUE ITEMS LIST - Cont.
Firefighting, Safety, and Damage Control Items

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	6230-00-269-3034	Flashlight, 2 Cell, Explosion Proof		EA	7
	4820-00-540-2381	Foot Valve with Strainer, 3" ID		EA	2
	4240-00-190-6432	Goggle, Industrial, No Vents, (Chemical Splash)		EA	4
	4240-00-052-3776	Goggle, Safety, Vented, Clear		EA	15
	8415-00-935-3136	Hard-hat, Orange		EA	12
	8415-00-935-3139	Hard-hat, White		EA	6
	4240-00-022-2522	Harness, Safety, Torso		EA	4
	4210-00-776-0657	Hose, Exhaust, Engine, 2" ID X 20' Long		EA	2
	4210-01-248-8822	Hose, Potable Water, 1-1/2" X 50', Blue		EA	6
	4210-00-725-9234	Hose, Suction, 3" ID X 10' Long		EA	4
	N/A (Local Purchase Item)	Hydrostatic Release Unit, Hammer H20, Liferaft, Hammer H20, MPN 6D887, Part No. HA2000H		EA	4
	8415-00-268-8264	Jacket, Welder's		EA	1
	6545-01-155-1598	Kit, Flotation Assembly, Includes two Flotation Tubes with Covers, five Restraint Straps, and one five pound Ballast Bar		KT	2
	6545-00-116-1410	Kit, First Aid, Large		KT	2
	4730-00-542-3359	Kit, Pipe Repair, Emergency, Part No. MIL-R-17882B (81349)		KT	1
	5180-00-391-1087	Kit, Tool, Electrician's Repair, Magnetic, 9000S, 6202-73125 (80064), Rev. F, Type 234, AMACN		KT	1
	4240-00-022-2518	Lanyard, Safety Harness		EA	6
	4240-00-022-2521	Lanyard, Safety Harness, Dyna Brake		EA	4
	4010-00-285-9901	Life Line, OBA Tending		EA	7
	1940-01-015-7346	Liferaft, Navy, Mk-6, 25 Man		EA	4
	4020-01-344-0552	Line, Heaving, Safety, 100'		EA	8
	4020-00-530-0698	Line, Retrieving, Ring Buoy		RL	1

APPENDIX B
Section IV. BASIC ISUE ITEMS LIST - Cont.
Firefighting, Safety, and Damage Control Items

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
	N/A (Local Purchase Item)	Plug, Deck Socket, Model No. 70-39, Ordering Information: Radio Enterprise, P.O. Box 14052, Savannah, GA 31416		EA	97
	5510-00-260-8953	Plug, Soft Wood, 1" X 0" X 3" Long		EA	10
	5510-00-260-8958	Plug, Soft Wood, 2" X 0" X 4" Long		EA	10
	5510-00-260-8962	Plug, Soft Wood, 3" X 0" X 8" Long		EA	10
	5510-00-260-8966	Plug, Soft Wood, 5" X 1" X 10" Long		EA	10
	5510-00-260-8969	Plug, Soft Wood, 7" X 3" X 10" Long		EA	10
	5510-00-260-8973	Plug, Soft Wood, 8" X 4" X 10" Long		EA	5
	5510-00-260-8949	Plug, Soft Wood, 10" X 7" X 12" Long		EA	5
	4220-00-275-3157	Ring Buoy, Life Saving, 30"		EA	8
	2090-00-052-1581	Shoring, Steel, Adjustable, Long, 6' to 11'		EA	10
	2090-00-058-3737	Shoring, Steel, Adjustable, Short, 3' to 5'		EA	10
	1670-01-226-5300	Sling, Rescue, Helicopter Hoisting, Part No. 190		EA	2
	9390-01-078-8660	Tape, Retro Reflective, 3" X 50 yds		RL	1
	9390-01-082-8927	Tape, Retro Reflective, 1" X 50 yds		RL	1
	4240-01-116-9889	Training Unit, EEBD		EA	1
	5510-00-268-3479	Wedge, Plug, Tapered, Hardwood, 2" X 2" X 8" Long		EA	5
	5510-00-268-3485	Wedge, Plug, Tapered, Hardwood, 4" X 2" X 8" Long		EA	5
	5510-00-268-3481	Wedge, Plug, Tapered, Hardwood, 3" X 3" X 12" Long		EA	5
	5510-00-268-3475	Wedge, Shoring, Tapered, Hardwood, 1-1/2" X 2" X 12" Long		EA	5
	5510-00-268-3476	Wedge, Shoring, Tapered, Hardwood, 1-1/2" X 3" X 12" Long		EA	5
	5120-00-277-9075	Wrench, Spanner, Adj 1-1/2" to 3"		EA	13
	5120-00-277-9076	Wrench, Spanner, (P-250 Pump)		EA	2

APPENDIX B
Section IV. BASIC ISUE ITEMS LIST - Cont.
Firefighting, Safety, and Damage Control Items

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
		FIRE FIGHTERS ENSEMBLE			
	8460-00-606-8366	Bag, Fire Fighter Ensemble		EA	7
	8430-00-753-5935	Boots, Size 5		PR	7
	8430-00-753-5936	Boots, Size 6		PR	7
	8430-00-753-5937	Boots, Size 7		PR	7
	8430-00-753-5938	Boots, Size 8		PR	7
	8430-00-753-5939	Boots, Size 9		PR	7
	8430-00-753-5940	Boots, Size 10		PR	7
	8430-00-753-5941	Boots, Size 11		PR	7
	8430-00-753-5942	Boots, Size 12		PR	7
	8430-00-753-5943	Boots, Size 13		PR	7
	8430-00-753-5944	Boots, Size 14		PR	7
	8430-00-753-5945	Boots, Size 15		PR	7
	8415-01-300-6557	Coverall, Medium		EA	3
	8415-01-300-6558	Coverall, Large		EA	3
	8415-01-300-6559	Coverall, X-Large		EA	1
	8415-01-267-9661	Gloves, Anti-Flash		EA	7
	8415-01-335-7902	Gloves, Medium		EA	3
	8415-01-335-7903	Gloves, Large		EA	3
	8415-01-335-7904	Gloves, X-Large		EA	1
	8415-01-271-8069	Helmet		EA	7
	8415-01-268-3473	Hood, Anti-Flash		EA	7

APPENDIX B
Section V. BASIC ISUE ITEMS LIST
Material Change (MC) Added Items

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(4) U/I	(5) QTY RQR
		NOTE **Due to a Material Change (MC), the LSV Water Maker Units have been replaced with the Maxim HJ30C Heat Recovery Evaporator. Due to this change, the following 39 items are added to this BII to support the new equipment.**		
		Cell, Salinity. (11839) 99088-37	EA	1
		Coil, Dump Valve, (11839) 93077-69	EA	2
		Cylinder, Clear, (11839) 93000-67	EA	1
		Feed Orifice, (11839) 95747-38	EA	1
		Fuse, Cartridge, (11839) 93001-40	EA	5
		Gage, Compound, (11839) 95696-40	EA	2
		Gage, Sea Water Pressure, (11839) 95714-33	EA	2
		Gasket, Rib, (11839) 95216-32	EA	2
		Gasket, Ring, (11839) 95216-31	EA	2
	5330-00-136-5650	Gasket, Sight Glass, (11839) 95739-31	EA	2
	4320-01-331-6211	Impeller, Pump, (11839) 93466-34	EA	1
	5315-01-258-8970	Key, Impeller, (11839) 93460-48	EA	1
	5330-01-320-6977	Kit, Mechanical Seal, (11839) 93466-63	EA	2
	4320-01-256-5607	Kit, Replacement, (11839) 93455-02	EA	2
		Kit, Spare Parts, (11839) 93077-88	EA	1
		Kit, Strainer Repair, (11839) 93000-70	EA	2
	6240-01-129-0771	Lamp, Alarm, (11839) 93001-33	EA	4
	6240-01-146-9197	Lamp, Power On, (11839) 93001-34	EA	4
		Lens, Meter, (11839) 93001-32	EA	1
		Meter, (11839) 93001-31	EA	1

APPENDIX B
Section V. BASIC ISUE ITEMS LIST - Cont.
Material Change (MC) Added Items

(1) ILLUS/ NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/I	(5) QTY RQR
		Motor, A/C, (11839) 78634-41		EA	1
		Nozzle, Brine Jet, (11839) 93218-41		EA	1
		Nozzle, Vacuum Jet, (11839) 93218-39		EA	1
	4320-01-232-6931	Pump Set, Distillate, (11839) 78634-08		EA	1
	4320-01-340-2276	Pump Set, Feed Water, (11839) 78601-01		EA	1
		Relay, Power, (11839) 93001-36		EA	1
		Resistor, Test Cell, (11839) 93001-41		EA	1
	5365-01-256-5708	Ring, Casing, (11839) 93460-37		EA	1
		Screen, Basket, (11839) 93000-63		EA	1
		Screw, Fillister Head, (11839) 93466-31		EA	4
	4320-01-256-5417	Screw, Impeller, (11839) 93460-39		EA	1
		Sea Water Bypass Orifice, (11839) 95747-50		EA	1
	4730-01-256-5704	Sleeve, Shaft, (11839) 93460-38		EA	1
		Strainer, Sea Water, (11839) 95525-40		EA	1
		Switch, Power, (11839) 93001-35		EA	1
	4820-01-260-0790	Valve, Check, (11839) 96021-32		EA	1
	4820-01-117-0527	Valve, Dump, (11839) 99098-36		EA	1
	4820-01-374-6392	Valve, Relief, (11839) 95751-34		EA	1
		Window, Inspection, (11839) 95051-31		EA	1

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SECTION III. BASIC ISSUE ITEMS

(1) ILLUS/ ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		OPERATOR'S MANUAL for Logistics Support Vessel (LSV) TM 55-1915-200-10		EA	1
		LUBRICATION ORDER for Logistics Support Vessel (LSV) LO 55-1915-200-12		EA	2

Appendix C.
ADDITIONAL AUTHORIZATION LIST (AAL)

Section I. INTRODUCTION

C-1. SCOPE
This appendix lists additional items you are authorized for the support of the Logistics Support Vessel (LSV).

C-2. GENERAL
This list identifies items that do not have to accompany the LSV and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING
National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e. CTA, MTOE, TDA, or JTA) which authorizes the item to you.

Section II. ADDITIONAL AUTHORIZATION ITEMS LIST

(1) National Stock Number	(2) Description CAGEC and Part Number	Usable On Code	(3) U/I	(4) Qty rqr
8405-01-057-3483	Coveralls, Blue		EA	AR
8405-01-057-3485	Coveralls, Blue		EA	AR
8405-01-057-3488	Coveralls, Blue		EA	AR
8405-01-057-3489	Coveralls, Blue		EA	AR
8405-01-057-3494	Coveralls, Blue		EA	AR
8405-01-057-3496	Coveralls, Blue		EA	AR
	CTA AUTHORIZED ITEMS			
	Recorder, Video Cassette, VC-A102, 96846		EA	2
	Television, Color, RXH169WA02, 26744		EA	2

APPENDIX D
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the Logistic Support Vessel (LSV). This list is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items. Adjust when higher category maintenance requirements are involved.

D-2. EXPLANATION OF COLUMNS

a. Column (1) - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea., in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements

SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) CATEGORY	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	7520-00(281-5911	BASKET, WASTE PAPER 81348)RR-B-181	EA
2	C	6135-00-050-3280	BATTERY, DRY CELL, Emergency Light 6V (For Battle Lantern) (81350)BA-200V	EA
3	C	6135-00-073-8939	BATTERY, LIGHT DISTRESS RAIL (81349) BA-1574/U	EA
4	C	6135-00-120-1020	BATTERY, FLASHLIGHT (81349)BA-30	BX
5	C	7510-00-889-3439	BINDER, LOOSELEAF, Equip Log Book (81349)MIL-B-43064	EA
6	C	5110-00-277-4590	BLADES, HAND, HACKSAW, High-Speed Steel 24 Teeth per Inch (81 349)GGG-B-451	BD
7	C	5110-00-277-4590	BLADES, HAND, HACKSAW, High-Speed Steel 18 Teeth per Inc, Type 1, Class 2, Grade A (81348)CGG-B-451	BD
8	C	7350-00-251-8746	BOWL, EATING, PLASTIC (81348)L-T-48	EA
9	C	7920-00-267-2967	BROOM, PUSH, RATTAN (No Handle) (81348)H-B-71	EA
10	C	7920-00-291-8305	BROOM, UPRIGHT, CORN (81348)H-B-71	EA
11	C	7920-00-165-7277	BRUSH, DUSTINE BENCH (81348)H-B-190	EA
12	C	7920-00-243-3407	BRUSH, FLOOR SWEEPING, 18", (No Handle) (81348)H-B-651	EA
13	C	7920-00-772-5800	BRUSH, SANITARY (81348)H-B481	EA

SECTION II. EXPENDABLE/DURABLE SUPPLIES LIST - Continued

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
14	C	7920-00-240-7171	Brush, Scrub, Deck (No Handle) (81348) H-B-531	EA
15	C	7920-00-240-7174	Brush, Scrub, Floor, Hand (81348) H-B-1 490	EA
16	C	7920-00-291-5815	Brush, Wire, Curved Handle (81348) H-B-178	EA
17	C	5130-00-528-2167	Brush, Wire, Rotary Wheel, 1/2" Arbor, 4" OD, Type 3, Class 1, Style A (81348) H-B-771	EA
17a	C	5130-00-293-2858	Brush, Wire, Rotary Cup, 1/2" Arbor, 5" OD (81348) H-B-771	EA
18	C	7920-00-246-8501	Brush, Wire, Scratch, 7-1/2" x 2-1/4" (81348) H-B-178	EA
19	C	7510-00-240-5503	Clipboard, File, 9" x 17" (81348) LLL-A650	EA
20	C	8030-00-616-7694	Compound, Anti Seize (Pipe Joint, Thread) (81348) MIL-T-83843	LB
21	C	7930-00-880-4454	Compound, Dish-washing, Hand, Liquid, 1 Gal (81348) P-D-410	GL
22	C	4020-00-240-2164	Cord, Cotton, 1/4 In., 200 Ft. Coil (81349) MIL-L-1145	CL
23	C	4020-00-240-2160	Cord, Cotton, 5/16 In., 1200 Ft. Coil (81349) T-C-571	CL
24	C	7350-01-084-1234	Tumbler, Drinking (81348) DD-T-90	EA
25	C	7350-00-823-7398	Dish, Eating, 5-9/16" Dia. (81348) DD-T-90	EA
26	C	5345-881-8378	Disk, Abrasive, No. 24 Grit Size, Closed Coat, 1/2" Arbor (81348) P-D-455	EA

SECTION II. EXPENDABLE/DURABLE SUPPLIES LIST - Continued

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
27	C	5345-00-881-8377	Disk, Abrasive, No. 36 Grit Size, Closed Coat, 1/2" Arbor (81348) P-D-455	EA
28	C	5345-00-881-8375	Disk, Abrasive, No. 60 Grit Size, Closed Coat, 1/2" Arbor (81348) RR-D-800	EA
29	C	7290-00-224-8308	Dustpan (81348) RR-D-800	EA
30	C	7340-00-241-8169	Fork, Table, Plain, Cres, 4 Tine, 24/Box (81348) RR-F-450	BX
31	C	5330-00-641-1193	Gasket Material, Sheet, Compressed, 1/16 In., Type 1, Class 1 (81348) HH-P-466	FT
32	C	5330-00-171-6551	Gasket Material, Sheet, Compressed, 1/8 In., Type 1, Class 1 (81348) HH-P-466	FT
33	C	9150-00-663-9795	Grease, Ball and Roller Bearing, 5 Lb. Can, (81349) MIL-G-18709	CN
34	C	9150-00-530-6814	Grease, Wire Rope, Exposed, 35 Lb. Can (81349) MIL-G-18458/Ship	CN
35	C	4020-00-174-3031	Halyard, Cotton, Braided (81349) MIL-H-226	CL
36	C	7920-00-267-1218	Handle, Mop, Wood, Screw Type (81348) NN-H-101	EA
37	C	7920-00-263-0328	Handle, Wood, AMCE Thread for use with Floor Sweeping Brush, Type 1, Class 1 (81348) NN-H-104	EA
38	C	7920-00-141-5452	Handle, Wood, fpr ise wotj Rattan Push Broom, Squeeze and Deck Brush, Type 2 (81348) NN-H-104	EA
39	C	7340-00-060-6057	Knife, Steak, Table (81348) RR-F-450	BX

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SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
40	C	7340-00-241-8170	KNIFE, TABLE, Cres 24/Box (81348)RR-F-450	BX
41	C	6240-00-143-3124	LAMP, INCANDESCENT, 100 Watt (81348)W-L-101/1A	EA
42	C	6240-00-155-8655	LAMP, INCANDESCENT, 40 Watt (81348)W-L- 101-22AT	EA
43	C	6240-00-143-3119	LAMP, INCANDESCENT, 60 Watt (08805)60A/D 115-125V	EA
43a.	C	6240-00-152-2987	LAMP, FLUORESCENT, 48"	EA
43b.	C	6240-01-268-0393	LAMP, FLUORESCENT, 24"	EA
43c.	C	6240-01-268-0344	LAMP, FLUORESCENT, 12"	EA
44	C	8010-00-239-5737	LEAD WHITE (Paste in Oil) Type B (81348)TT-W-251	CN
45	C		LINER, BAKING Cup	CO
46	C	4020-00-240-2185	MARLIN, HEMP Type 4, Class 1, 20 lbs. Coil (81348)T-R-605	CL
47	C	7920-00-171-1148	MOPHEAD, WET, Cotton Type 1, Style 1 (81348)T-M-561	EA
48	C	8540-00-285-7001	NAPKIN, TABLE, Paper (81 348)UU-N-001650	BX
49	C	5330-00-085-1701	PACKING MATERIAL, PLASTIC, 15" Self Dispensing Can, 5/32" OD (81348)A-A-1184	FIT
50	C	6665-00-550-8529	PAPER, CHEMICAL AGENT DETECTOR (81361)D5-67-266	BX
51	C	8540-00-530-3770	PAPER, TOILET, 96 Rolls/Box (81348)(CID) A-A-97	BX
52	C	7930-00-266-7137	POLISH, METAL Type 2, Class 1 (81348)P-P-556	EA

SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) CATEGORY	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
53	C	7210-00-292-2326	PILLOWCASE, BED, type 1, Class 4 (81348)DDD-P-351	EA
54	C	4020-00-752-8879	ROPE, NYLON, Mooring, 4" Dia 50' Long, 41 41,300 Lbs Breaking Strength	CL
55	C	4020 00-641-8900	ROPE, NYLON, 1-1/2" DIA (81348)MIL-R- 17343	CL
56	C	4020-00-641-8900	ROPE, NYLON, 3/4" DIA (81348)MIL-R-17343 DIA	CL
57	C	4020-00-542-3308	ROPE, NYLON, 6" DIA (18349)MIL-R-17343	CL
58	C	7920-00-205-1711	RAG, WIPING, 50 Lbs Bale (81348)A-A-531	BL
59	C	7930-00-205-0442	SCOURING POWDER (81348)P-S-311	CN
60	C	4020-00-162-6178	SEIZING STUFF, Hemp (81348)GG-S-236	CL
61	C	7210-00-148-1017	SHEET, BED, 63" x 106", Type 6, Size 5 (81348)DDD-S-281	EA
62	C	8135-00-043-5331	SHEET, PLASTIC (Food Wrap) (81348)LP-370	EA
63	C	7930-00-579-8532	SOAP, LAUNDRY, 100 Lb Drum (81348)P-S-1792	DR
64	C	3439-00-188-6986	SOLDER, LEAD ALLOY,, Acid Cord, 5 Lb (81349)QQ-5-771	SL
65	C	3439-00-188-6988	SOLDER, LEAD ALLOY, Rosin Core, 1 lb (81348)QQ-5-571	SL
66	C	7340-00-241-8171	SPOON, DESSERT, 24/Box, 7" Long (81348)RR-F-450	BX

SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) CATEGORY	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
67	C	7340-00-205-3340	SPOON, ICED TEA, 6" Long (81348)RR-F-450	BX
68	C	7340-00-205-3341	SPOON, TABLE, Cres 24/Box (81348)RR-F-450	BX
69	C	7920-00-267-4639	SQUEEGE, WINDOW, 8" Long (81348)ZZS466	EA
70	C	5640-00-409-4265	TAPE, DUCT (45255)Duct Tape Alum	RO
71	C	5970-00-185-8531	TAPE, ELECTRICAL INSULATION 85 Ft Various Widths (81348)HH-1-510	RO
72	C		TAPE, REFLECTING, Green, 6 x 3"	RL
73	C	8540-00-291-0392	TOWELS, PAPER (81348)UU-T-595	BX
73a.	C	7920-00-823-9773	TOWELS, PAPER WIPING (81348) UU-T-595	BX
75	C	4720-00-277-4029	TUBING, COPPER 1/4" (81349)MIL-T-24107	CL
76	C	4720-00-277-4026	TUBING, COPPER 1/4" (81349)MIL-T-241 07	CL
77	C	4720-00-277-4027	TUBING, COPPER, 3/8" (81349)MIL-T-24107	CL
78	C	4720-00-277-4030	TUBING, COPPER, 5/16" (81349)MIL-T-24 107	CL
79	C	4030-00-241-8886	TWINE, LINE, 5Ply (81348)T-T-891	EA
80	C	7240-00-965-4427	WASTE RECEPTACLE, TRASH CAN, w/Cover Polyethylene Plastic, 10 Gal (81348)L-W-25	EA
81	C	6850-00 001-4194	WATER INDICATOR, PASTE 81349)MIL-W-83779	EA

APPENDIX E
STOWAGE AND SIGN GUIDE
FOR COMPONENTS OF END ITEN, BASIC ISSUE
ITEMS, AND APPLICABLE ADDITIONAL AUTHORIZATION
LIST ITEMS

E-1. SCOPE

This appendix shows the locations for stowage of equipment and materiel required to be carried on the Logistics Support Vessel (LSV).

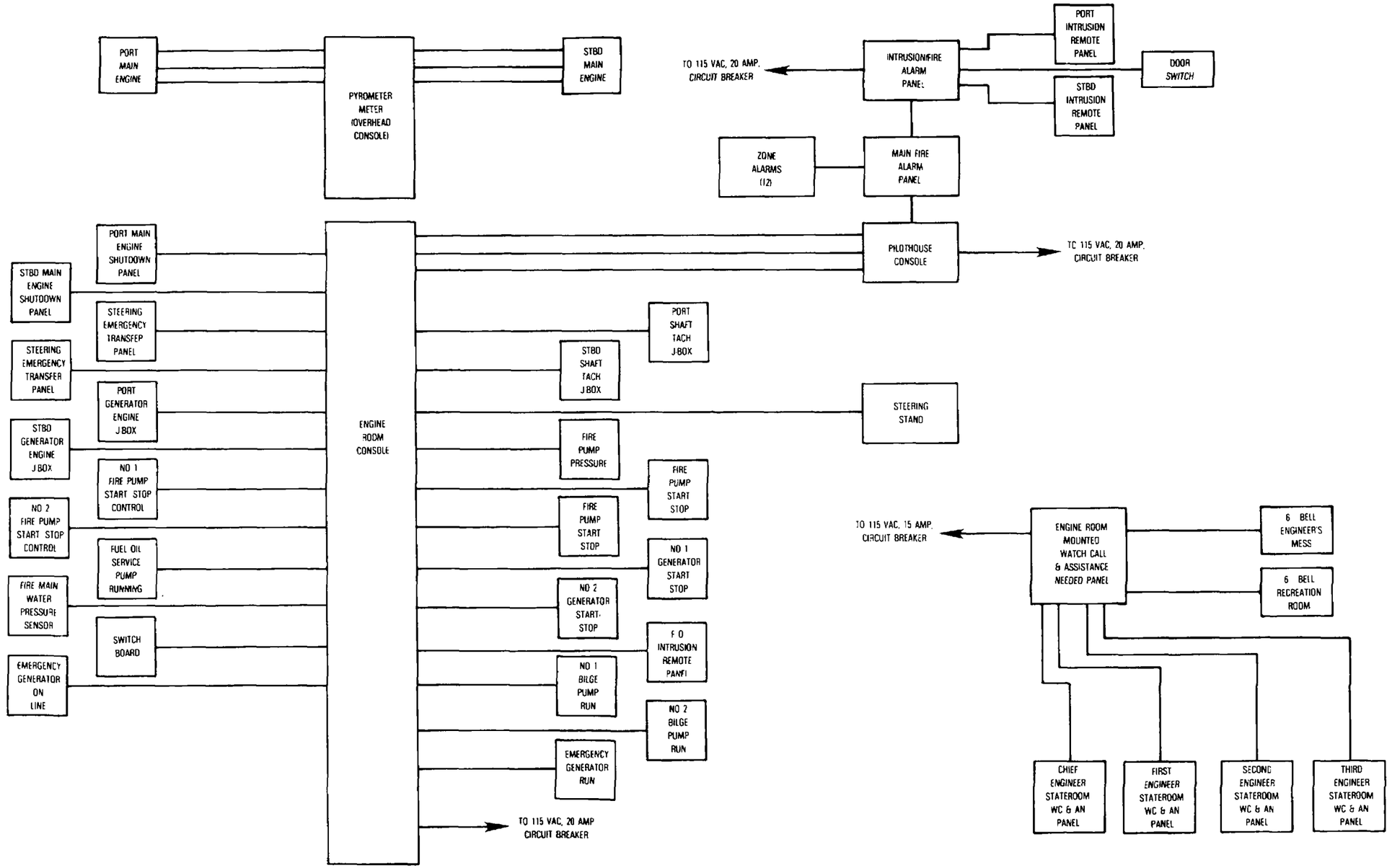
E-2. GENERAL

The illustrations below and on the following pages show the location of decals, stencils, and metal signs used on the vessel. Most of these signs mark the places where equipment should be stowed. Some are cautions or information you need to operate the vessel safely.

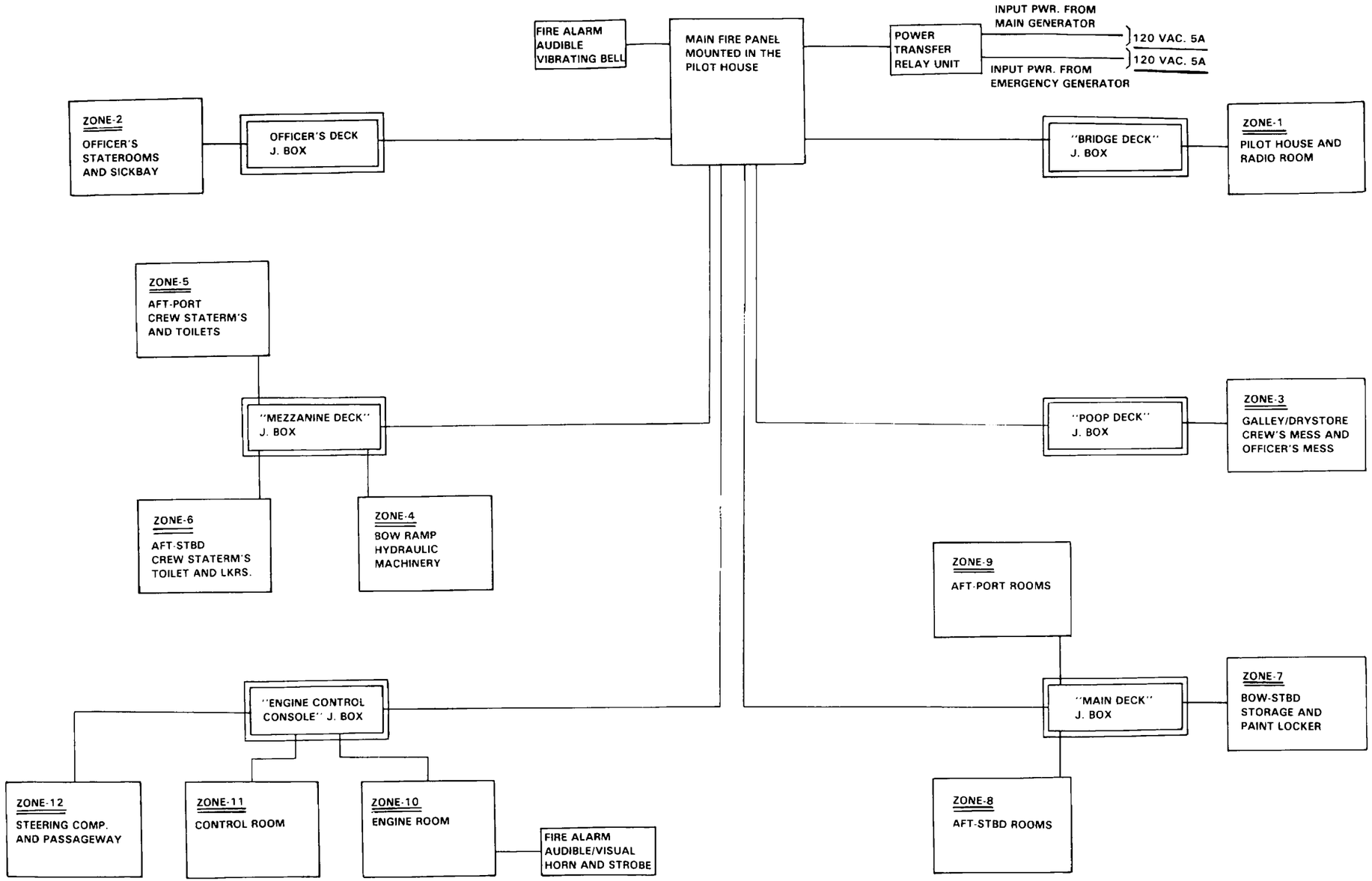
APPENDIX F
ON-VEHICLE EQUIPMENT LOADING PLAN
LOGISTICS SUPPORT VESSEL
(LSV)

This is a standard load plan for the Logistics Support Vessel (LSV). It is designed to supplement the stowage and sign guide contained in Appendix E. It includes selected items of personal and unit equipment issued to most units within the Army equipped with this vessel. It does not include items shown in Appendix E. Equipment not shown in either this Appendix or Appendix E may be loaded in accordance with local command policy.

Proponent:



FO-1. Centralized Control and Monitoring System (CCMS).



FO-2. Marine Fire and Smoke Detection System.

ALPHABETICAL INDEX

ALPHABETICAL INDEX - CONT

ALPHABETICAL INDEX - CONT

ALPHABETICAL INDEX - CONT

ALPHABETICAL INDEX - CONT

ALPHABETICAL INDEX - CONT

ALPHABETICAL INDEX - CONT

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

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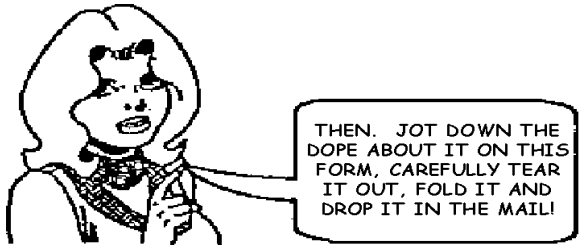
RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?



FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
Co A, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 55- 1915-200-10	11-Apr-88	Operator's Manual LSV

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	*2-1a*		
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 [illegible] to show 4 cyli[illegible]

Cal[illegible] identified as a bol[illegible] called a s[illegible]er.

I or[illegible] b-16 by NSN 291[illegible] 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 (268) 317-7111

SIGN HERE
John Doe

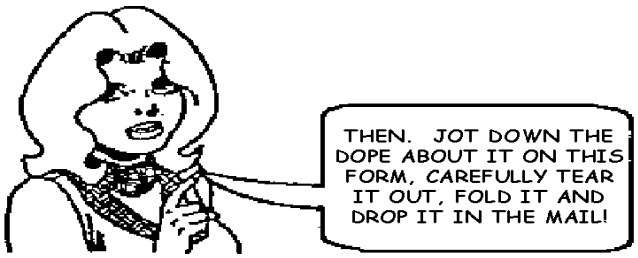
DA FORM 1 JUL 97 **2028-2**

PREVIOUS EDITIONS ARE OBSOLETE.
DRSTS-M verprint3, 1 Nov 80

P.S.- - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?



FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 55-1915-200-10	11-Apr-88	Operator's Manual LSV

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

DA FORM 1 JUL 97 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.
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REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

TEAR ALONG PERFORATED LINE

FILL IN YOUR UNITS ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

_____

_____

OFFICIAL BUSINESS

COMMANDER
U.S. TANK-AUTOMOTIVE AND ARMAMENTS COMMAND
ATTN: AMSTA-LC-CIP-WT
ROCK ISLAND, IL 61299-7630

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17 and 27.

From: **"Whomever" whomever@avma27.army.mil**
To: **amsta-ac-nml@ria.army.mil**

Subject: **DA Form 2028**

1. ***From:*** Joe Smith
2. ***Unit:*** home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-1915-200-10
9. ***Pub Title:*** TM
10. ***Publication Date:*** 11-APR-88
11. ***Change Number:*** 12
12. ***Submitter Rank:*** MSG
13. ***Submitter Fname:*** Joe
14. ***Submitter Mname:*** T
15. ***Submitter Lname:*** Smith
16. ***Submitter Phone:*** 123-123-1234
17. ***Problem:*** 1
18. ***Page:*** 1
19. ***Paragraph:*** 3
20. ***Line:*** 4
21. ***NSN:*** 5
22. ***Reference:*** 6
23. ***Figure:*** 7
24. ***Table:*** 8
25. ***Item:*** 9
26. ***Total:*** 123
27. ***Text:***
    This is the text for the problem below line 27.

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 = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 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 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 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
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 063933-000