CHAPTER 2
GENERAL ARRANGEMENT

Section I
EXTERIOR ARRANGEMENT

2-1. GENERAL.

The following section contains coverage on all exterior equipment and fittings located on the bridge deck and the main deck. Refer to Figure 2-27 for the outboard profile of the craft.

2-2. BRIDGE DECK. (Figure 2-1.)

2-2.1. ACCESS. The bridge deck is located between frames 4-1/2 and 15. Access to the bridge deck can be gained from the weather deck using the vertical ladder at frame 15 starboard of centerline, the vertical ladders at frame 10 port and starboard or the inclined ladder located at frame 4-1/2 port side of centerline. An additional vertical ladder located aft of frame 10 allows access to the pilothouse top.

2-2.2. AUXILIARY CONNING STATION. The auxiliary conning station is located on the bridge deck at frame 15, starboard side (Figure 2-2). The following equipment is installed at the station:

1. Sound Powered Telephone
2. Receptable w/S.P. Switch
3. Steering Power Indicator Light
4. Engine Tachometers
5. Main Engine Normal Stop Button (P/S)
6. Bow Thruster Control Panel
7. Main Engine Control Head (P/S)
8. NFU Steering Controller
9. Rudder Angle Indicator

2-2.3. CRANE CONTROLS AND POWER UNIT. The crane controls are located at frame 15, starboard side and the crane power unit is at frame 14 port side of the craft (Figure 2-27).

2-2.4. LIFE BOATS. Two 15-man MK-5 MOD 2 compressed air inflatable lifeboats are stowed and secured to the bridge deck at frame 11, port and starboard (Figure 2-27). Stowage racks allow the lifeboat to fall clear of the main deck when released. A covered 12-foot, 3-inch inflated lifeboat is stowed between frames 11 and 14 on the bridge deck. Two oars and a 4.5 outboard motor are provided and are stowed in the bosun's locker.

2-2.5. FUEL CANS. Five 6-gallon portable fuel cans are provided for the lifeboat and are stowed in a rack on the bridge deck at frame 13 (Figure 2-27). Hold down straps are provided for the fuel cans. The stowage rack is installed at the starboard deck edge to allow cans to be readily jettisoned in case of fire.

2-2.6. SEARCHLIGHTS AND FLOODLIGHT. Two signal/searchlights are mounted on the bridge deck at frame 10-1/2 (Figure 2-27). One searchlight and one floodlight are mounted at frame 15. Another searchlight is mounted on the pilothouse top at frame 7-1/2.

2-2.7. MAIN MAST. The main mast, with yard arm and fittings for navigation and electrical equipment, is mounted on the top of the pilothouse (Figure 2-3). Antennas are mounted as follows (Figure 2-27):

1. Top of mast — Satellite Navigation System.
2. Port side of mast — UHF/FM System
3. Starboard side of mast — Loran "C" System
4. Top of Pilothouse — Radar System
5. Top of Pilothouse — Direction Finder
6. Top of Pilothouse — VHF System
7. Top of Deckhouse — HF System

2-2.8. FIRE STATION. A fire station is located on the bridge deck at frame 10, starboard side of the pilothouse (Figure 2-1).

2-2.9. RAILS AND LIFE LINES. (Figure 2-27.) Pipe hand rails are installed at the inclined ladder at frame 4-1/2. Grab rails are provided at the three vertical ladders. Life rails are installed around the aft and forward area of the bridge deck for personnel safety. The life rails are 38-3/4-inches high and are made of 1-1/4-inch and 1-inch diameter pipe with stanchions for support at the corners. Areas between frames 11 and 12, port and starboard are not protected with rails due to life raft mounting. A three tier removable chain life line with hooks is provided at the vertical ladder from the main deck starboard side of centerline. Two single chain life lines are located port and starboard at frame 9, at the vertical ladders. Grab rails are located on the deckhouse bulwarks to allow personnel easy movement on the weather deck during inclement weather or heavy seas.

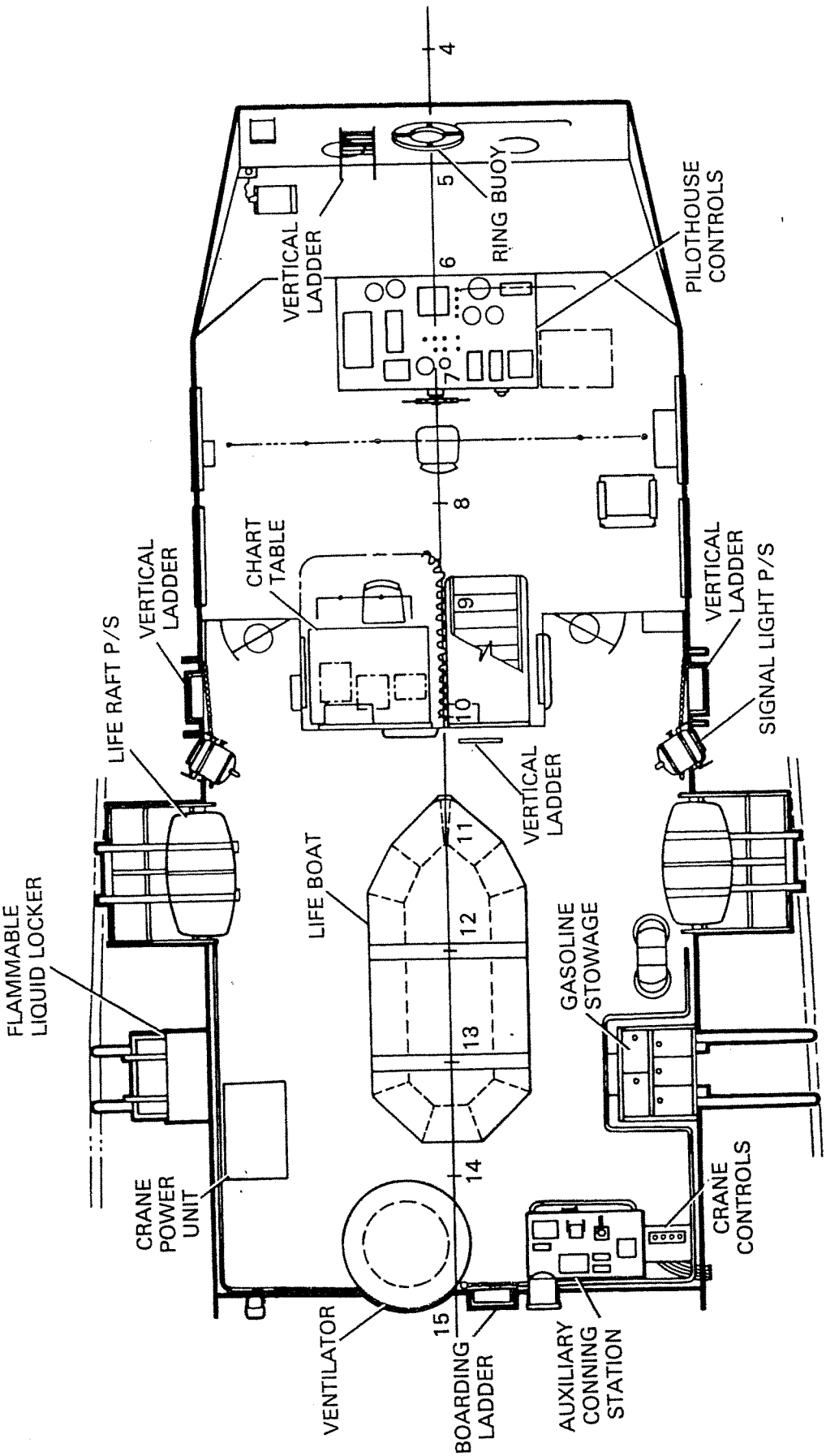


Figure 2-1. Bridge Deck

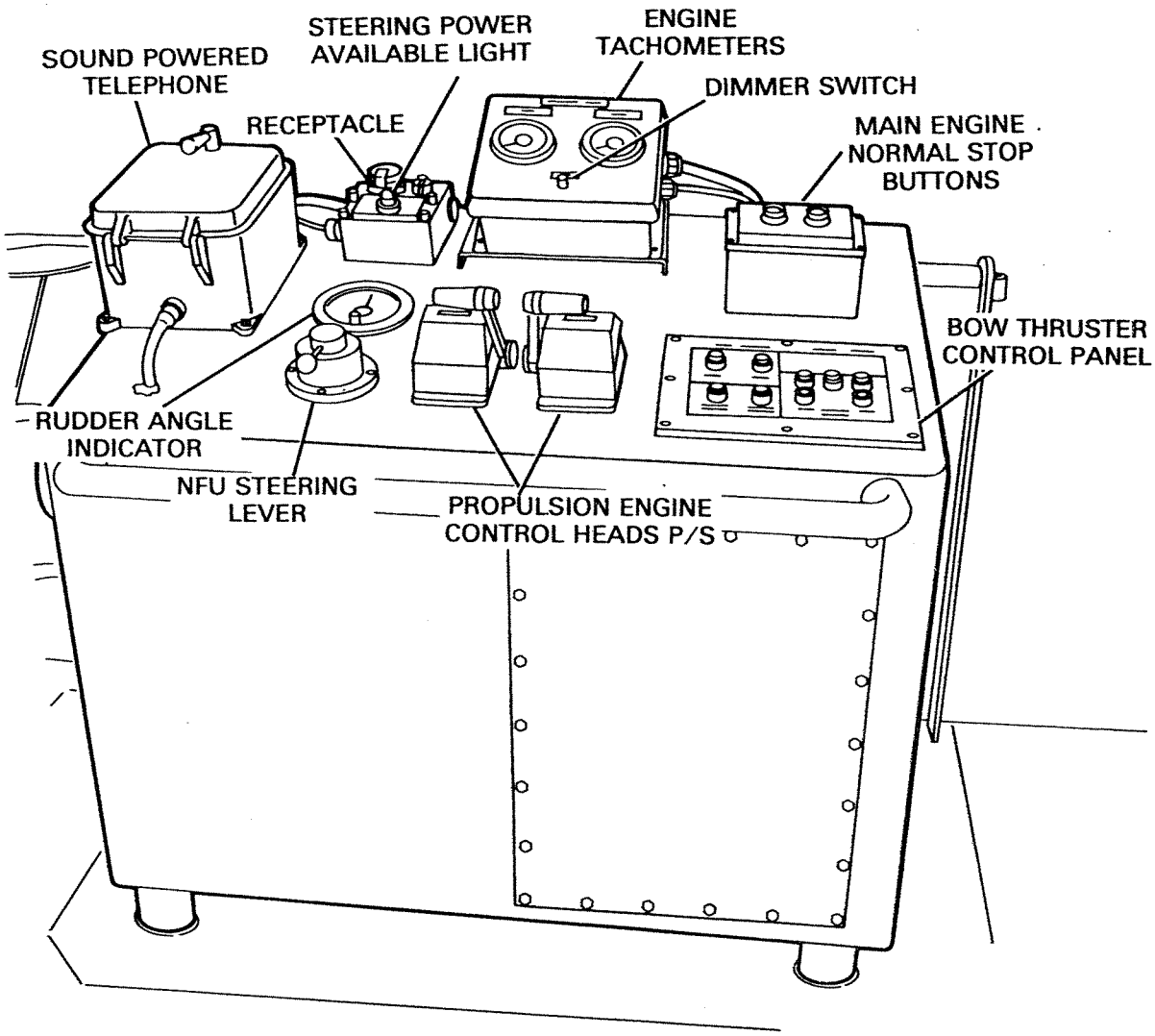


Figure 2-2. Auxiliary Coning Station
(Bridge Deck, Forward Frame 15, Starboard)

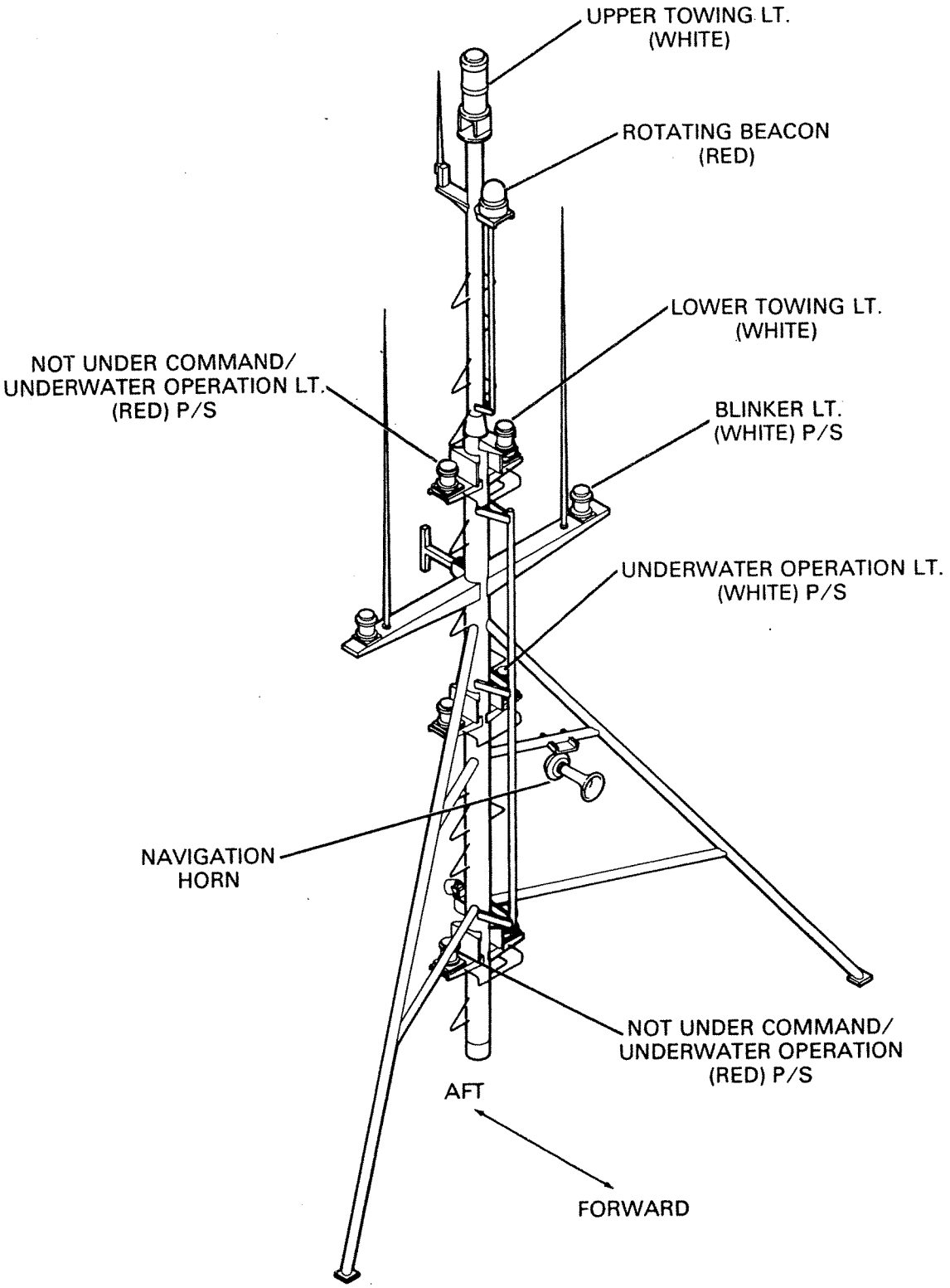


Figure 2-3. Main Mast
(Bridge Deck, Frame 10

2-3. NAVIGATION AIDS.

Navigation and task lights are installed on the craft in accordance with the International Regulations for Preventing Collision at Sea dated 1972. Location and quantity of these navigation aids is as follows (Figure 2-3):

1. One masthead/upper white towing light, facing forward, main mast (AUQA SIGNAL 700).
2. Two sets of underwater operation lights 360 degree visibility, main mast (red, white, red — AUQA SIGNAL 55).
3. One lower white towing light, facing forward, main mast (AUQA SIGNAL 55).
4. Not under command/under water operation light (red, port and starboard).
5. Underwater operation light (white, port and starboard).
6. One port side light, red (AUQA SIGNAL 700).
7. One starboard side light, green (AUQA SIGNAL 700).
8. Blinker lights, end of yard arm, main mast (AUQA SIGNAL 55). Key control located in pilothouse.
9. One towing light, yellow, facing aft, stern mast (AUQA SIGNAL 55).
10. One stern light, white, facing aft, stern mast (AUQA SIGNAL 700).
11. Red rotating beacon light on the mast.
12. Two searchlights are provided on the craft, one located on top of the pilothouse and one at the auxiliary conning station. The pilothouse searchlight illuminates the area forward of the craft and is controlled from inside the pilothouse. The auxiliary conning station searchlight illuminates the area aft of the craft and is controlled at the station.
13. Two 12-inch, 100 watt, 120 volt signal searchlights are mounted port and starboard on the bridge wings at frame 10-1/2.
14. A navigation horn is installed on the main mast with controls located in the pilothouse.

2-4. MAIN DECK. (Figure 2-29.)

The main deck runs from frame 2 through frame 28. The deckhouse located between frames 4-1/2 through 15 contains the following compartments. Refer to Section II, Interior Arrangement, for details.

1. C.O. Stateroom — Port side between frames 4-1/2 and 7
2. CPO Stateroom — Starboard side between frames 4-1/2 and 7
3. Wash Room, Water Closet and Showers — Port side between frames 7 and 8-1/2
4. Electrical Equipment Room — Starboard side between frames 7 and 8
5. Air Handling Room — Starboard side between frames 8 and 10
6. Galley — Starboard side between frames 10 and 13-1/2
7. Bosun's Locker — Starboard side between frames 13-1/2 and 15
8. Shelter Deck Area — Port side between frames 13-1/2 and 15
9. Mess/Lounge — Port side between frames 8-1/2 and 13-1/2.

2-4.1. SCUTTLES AND HATCHES. Watertight scuttles are located at frame 18-1/2 starboard side and frame 11-3/4 port side. A raised watertight hatch is located at frame 4, starboard side of centerline. A raised watertight hatch is located at frame 26-1/2 port side of centerline. Devices for holding hatches and scuttles in the open position are provided. Grab rods are provided in all cases to assist personnel in exiting and entering. Flush hatches and scuttles are provided with drains at the recessed coaming and are connected to the main drainage system.

2-4.2. DECK FITTINGS. Two towing padeyes are located on the centerline at frame 0 and between frames 27 and 28. Five-inch double bits are located at frame 25 port side, frame 13 port side, frame 5-1/2 port side and frame 2 port side. Closed chocks are provided on the aft portion of the main deck, one at centerline frame 28 and two at frame 26, port and starboard. Six closed railing chocks are provided, at frame 2-1/2 port and starboard, at frame 5 port and starboard and at frame 14 port and starboard. A bow chock is located at centerline frame minus 1-1/2. Six 4-inch circumference mooring lines are provided. One 600-foot, 6-inch circumference towing hawser fitting with a 17-ton loop shackle and a 35-ton shackle is provided and stowed on a reel in the lazarette at frame 26. The opposite end of the towing hawser is fitted with a 4-foot eye.

2-4.3. ANCHOR HANDLING. The anchor handling windlass is located at frame 2 on the main deck (Figure 2-29). Two 350-pound anchors (Figure 2-27) with 135 fathoms of 5/8-inch chain are installed in hawse pipes with deck securing fittings. Anchor chains are stowed in a chain locker below the main deck forward of frame 2.

2-4.4. DECK CRANE. The deck crane is located on the main deck aft of frame 16, starboard side of the craft (Figure 2-29). Stowage fittings for the boom are located port side aft of frame 16 (primary stowage) and aft of frame 21 starboard side (alternate stowage). The crane controls are located on the bridge deck. Refer to paragraph 2-2.3.

2-4.5. TORPEDO HANDLING. (Figure 2-29.) The torpedo hoist winch is located at frame 15-1/2, just aft of the deckhouse in line with the torpedo ramp. The winch drum contains 200 feet of 5/16-inch diameter cable. The control station for the winch is located on frame 16. The torpedo handling power unit is located in the hold at frame 5. Refer to Section II, Interior Arrangement, for detailed information on the torpedo handling system.

2-4.5.1. The torpedo transfer carriage is located between frame 19 and 20 on the main deck. The carriage track is recessed in the deck and raised or lowered hydraulically with hydraulic cylinders located port side, at the head of the carriage. The traversing of the carriage is also hydraulically controlled. Controls for the transfer carriage are located at the control station located at frame 16. Retainer straps are provided on the carriage to retain the torpedo during movement.

2-4.5.2. Torpedo rollers are provided on the main deck between frames 17 and 27 to support and restrain torpedos ranging from 10 inches to 21 inches in diameter. Roller foundations are provided with padeyes for attaching securing straps and preventor bridles. Preventor bridles and securing straps are stowed in the bosun's storeroom.

2-4.5.3. Rubber fenders are provided on both sides of the torpedo recovery end of the ramp deck track to prevent damage to the craft and the torpedos (Figure 2-4). Lateral retainers are provided at the top of the ramp to prevent the torpedos from falling off in heavy seas.

2-4.5.4. Four inch movable snatch blocks are provided to attach transfer winch cables to aft and forward ends of torpedos to control movement onto torpedo rollers on the deck. Snatch blocks are stowed in the bosun's locker.

2-4.5.5. Covers are provided on the main deck to protect hydraulic lines at the inhaul winch transfer winches and the hydraulic cylinders on the transfer carriage.

2-4.6. FIRE STATIONS AND PUMP. A fire station is located on the deckhouse bulwark at frame 4-1/2 (Figure 2-5), and at frame 14-1/2, in the deck shelter area (Figure 2-29). The PE-250 portable fire fighting pump is located at frame 15 aft of the deckhouse. The pump can be used to pressurize the firemain during total electrical failure or during other emergencies can be used as a portable device for fire fighting or de-watering.

2-4.7. RING BUOYS. (Figure 2-29.) Ring buoys are located at frame 28, 18 inches aft of frame 23 port and starboard and on the deckhouse bulwark at frame 8 port side, frame 6 starboard and forward of frame 5. The buoys on the deckhouse are equipped with water lights. The life preserver locker is located at frame 15 on the main deck. There are 19 life preservers in the locker.

2-4.8. PILOTHOUSE EQUIPMENT BATTERIES. Batteries for emergency use of the compass, navigation lights, alarm system and communication gear are housed in an enclosed battery box which is located at frame 4-1/2 just forward of the deckhouse (Figure 2-5).

2-4.9. SWIMMER'S PLATFORM A boarding ladder and swimmer's platform are located on the transom port side of centerline. The swimmer's platform is hinged to allow raising it when not in use. Pins are provided to secure platform in lowered position during torpedo retrieval (Figure 2-29).

2-4.10. TANKS AND VENTS. Containment tanks are provided at both fuel fill connections, the lube oil fill connection and the fresh water fill connections. The containment tanks have a holding capacity of 42 gallons. Vents for fuel oil and ballast tanks terminate in goose necks on the main deck. Fuel oil vents are fitted with flame screens and containment tanks.

2-4.11. RAILS AND LIFE LINES. Life rails and life lines are provided from frame 15 starboard to frame 15 port side. The life rails are 38-3/4 inches high and consist of 1-1/4-inch and 1-inch pipes with 3-inch stanchions. Life lines are located at frames 17 port and starboard and at the transom on centerline. The life lines consist of 3 tiers of 5/16-inch chain with snap hooks for removal. Removal of these chains may be necessary to allow swimmers access to the deck or for access at port or starboard for boarding personnel or loading stores.

2-4.12. STERN MAST. The stern mast is located on frame 28 at centerline and is fitted with a yellow towing light, a white stern light and the jackshaft. The bow mast is located forward of frame -1. Bow mast rigging is identical to the stern jackshaft (Figure 2-28).

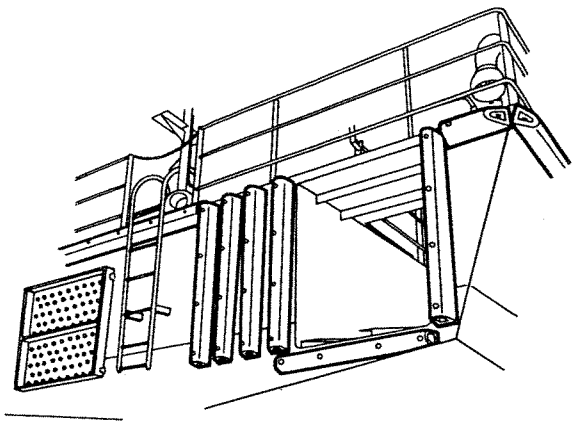


Figure 2-4. Ramp Fenders
(Main Deck, Frame 28, Starboard)

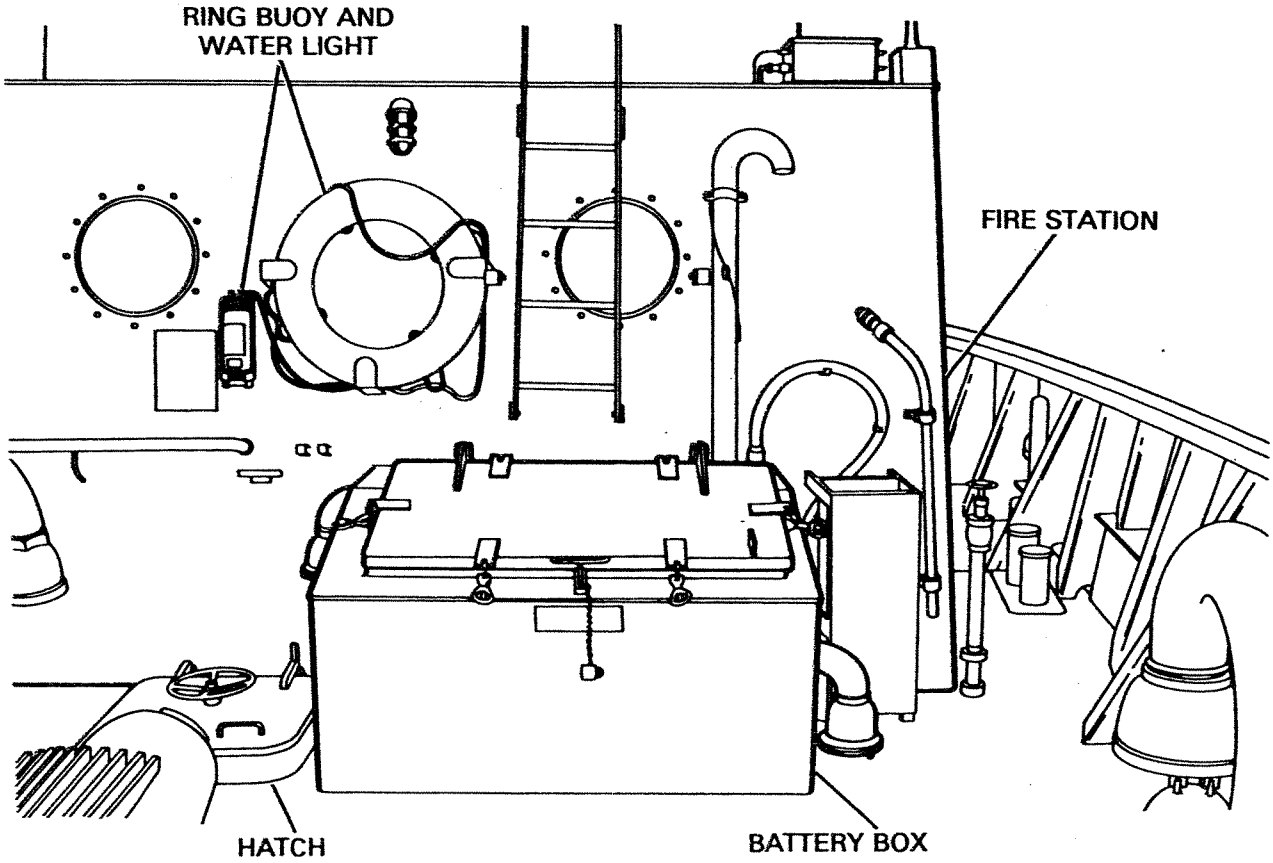


Figure 2-5. Main Deck Battery Box
(Main Deck, Frame 4-1/2, Port)

Section II
INTERIOR ARRANGEMENT

2-5. GENERAL.

This section describes the interior systems arrangements as well as physical descriptions of living and storage compartments. System arrangements reference interrelation between other major systems on the craft. In addition to the outboard profiles (Figures 2-27 and 2-28) and plan views of the decks (Figure 2-2, 2-29 and 2-30), system illustrations are included to show relationship of system components. These system illustrations are accompanied by legends to identify parts and indicate their location on the craft. Most of the system illustrations, profiles and plan views are foldouts which are located at the end of this chapter and are referenced through this manual. Refer to Chapter 3 for function and detail description.

2-6. PILOTHOUSE.

The pilothouse is located between frames 6 and 10 on the bridge deck (Figure 2-2). Access to the pilothouse is gained through doors located at frame 9, port and starboard or the inclined ladder from the deckhouse at frame 9. Full 360 degree visibility is provided from the pilothouse. Electric window wipers are installed on each forward window in the pilothouse. Both pilothouse doors are fitted with a window and a fixed portlight. All opening windows are fitted with screens.

2-6.1. FURNITURE. The pilothouse contains a chart table, a book rack, two binocular holders, a key locker and three chairs in addition to the necessary racks, shelves and cabinets required to house the equipment.

2-6.2. INCLINOMETERS. A heel inclinometer is located at centerline above the console. The trim inclinometer is on the port side of the pilothouse.

2-6.3. CONSOLE. The pilothouse console located on centerline between frames 6 and 7 houses the helm controls and navigation equipment (Figure 2-6 for illustration).

2-7. DECKHOUSE.

2-7.1. C.O. STATEROOM. The C.O. stateroom is located in the deckhouse between frames 4-1/2 and 7 port side (Figure 2-29). Access to the stateroom is gained from the passageway at frame 7. The stateroom is fitted with a single berth, a secretary bureau, a book rack, a chair and a built-in wardrobe. A small arms locker for stowing one M-14 rifle, one .45 caliber pistol, a Very pistol plus ammunition and cleaning gear is installed at frame 5 in the C.O. stateroom. A fire extinguisher is located at frame 6-1/2.

2-7.2. C.P.O. STATEROOM. The C.P.O. stateroom is located in the deckhouse between frames 4-1/2 and 7 on the starboard side of the craft (Figure 2-29). Access to the stateroom is gained from the passageway at frame 7. The stateroom is fitted with a double berth with lockers underneath, a hinged writing table, a book rack, a chair and a wardrobe. A fire extinguisher is located at frame 6-1/2.

2-7.3. WASHROOM. The washroom, water closet space is located in the deckhouse between frames 7 and 8-1/2 (Figure 2-29). Access is gained from the passageway at frame 8. The compartment is fitted with a lavatory, a water closet and a shower. Curtains, towel hooks, cabinets, soap dispenser, mirror, paper towel holder and grab bars are fitted as necessary in the space. A fire extinguisher is located at fame 7-3/4 in the passageway forward of the washroom door.

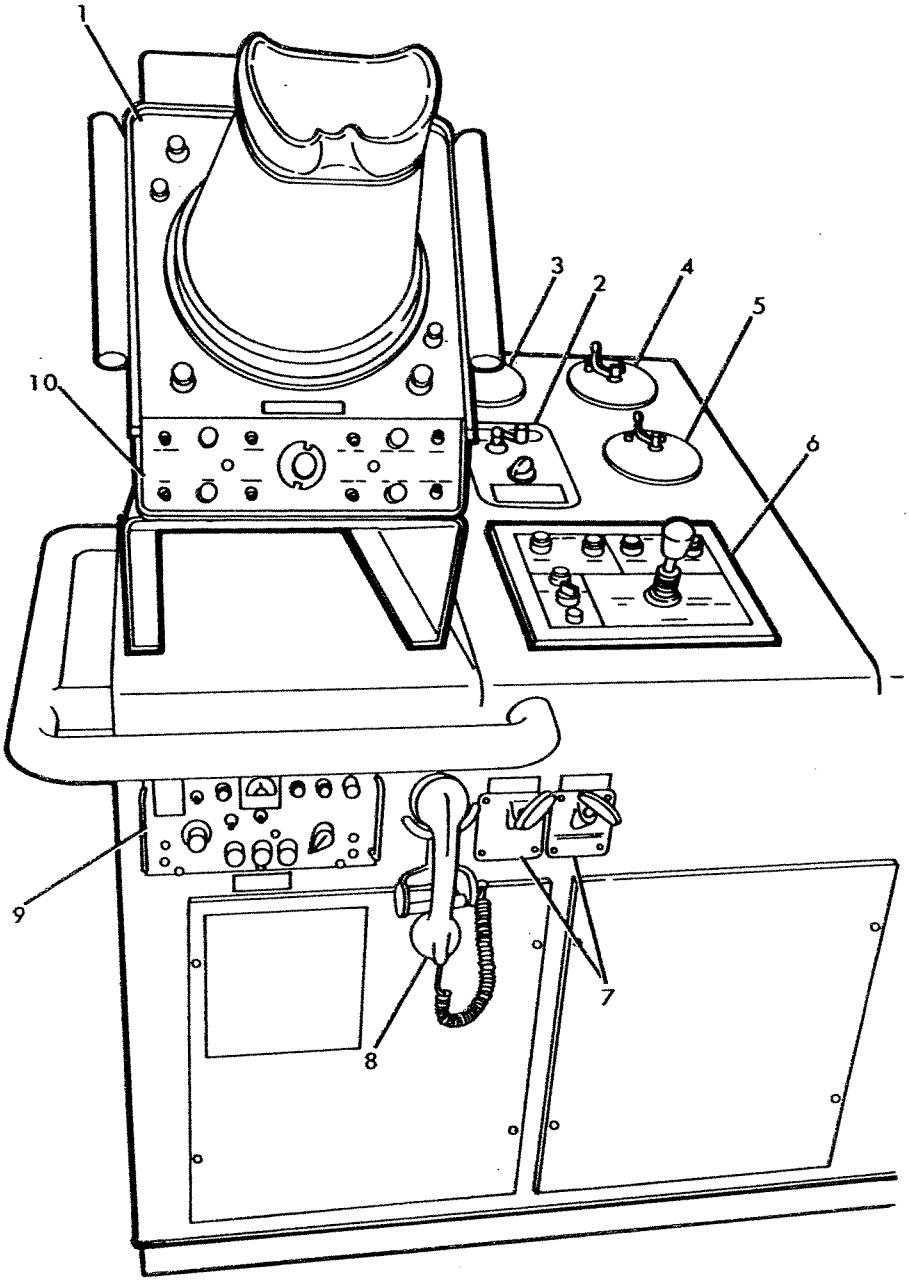
2-7.4. GALLEY. The galley is located between frames 10 and 13-1/2 on the starboard side of the deckhouse (Figure 2-29). Access to the galley is gained from the companionway at frame 13-1/2 or from the mess/lounge space. The galley is fitted with a double door refrigerator/freezer, a range, a microwave oven, a coffee urn, a flake ice/water dispenser, a toaster and a water cooler.

2-7.4.1. The galley is equipped with a fire suppression system that is activated by a fusible link located in the exhaust hood. The system will flood the duct, the plenum and the appliance surface with dry chemical when the fusible link separates. The system can also be operated manually. Refer to Chapter 3, Section XIII for detailed information.

2-7.4.2. Overhead cabinets and a dresser with drawers and shelves are installed for stowage of utensils, dishes and bowls. A double sink is installed with one sink fitted with a spray rinse assembly attached to the booster water heater, located in the provisions storeroom, to provide adequate rinse temperatures for dishwashing. Towel racks, a soap dispenser and a paper towel dispenser are also supplied.

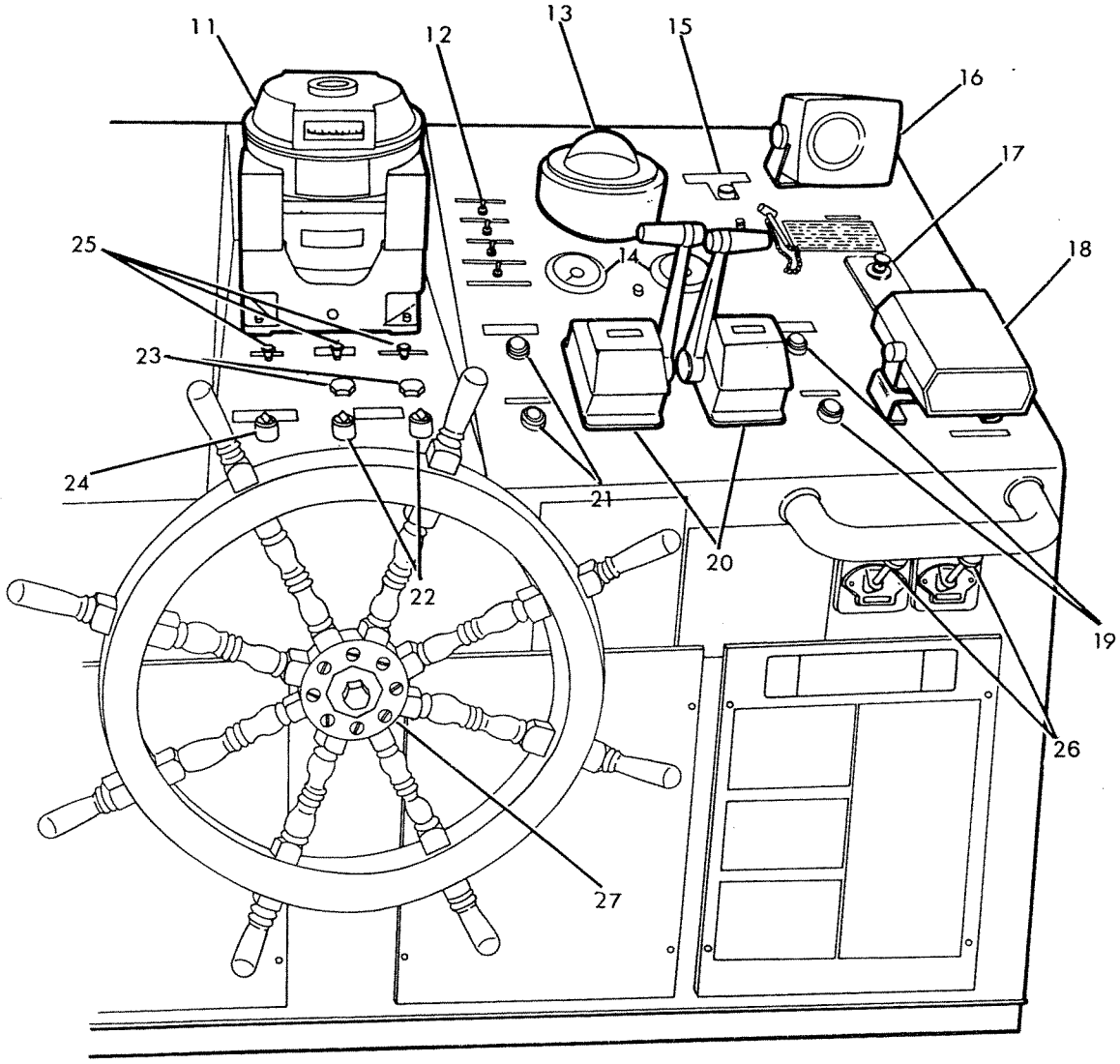
2-7.4.3. A vent hood is provided over the range fitted with a 1/3 hp exhaust fan. Ventilation ducts are provided above the peninsula between the galley and mess and lounge. A fire extinguisher is located at frame 10. A porthole is located above the sink at frame 11.

2-7.5. MESS/LOUNGE. The mess/lounge is located between frames 8-1/2 and 13-1/2 on the port side of the deckhouse (Figure 2-29). Access can be gained from the passageway at frame 8-1/2, from the shelter deck area at



1. RADAR UNIT
2. SP TELEPHONE
3. CHEMICAL ATTACK ALARM
4. GENERAL ALARM
5. COLLISION ALARM
6. BOW THRUSTER CONTROLLER
7. MAIN ENGINE EMERGENCY SHUTDOWN PORT AND STARBOARD
8. S.S. TELEPHONE HANDSET
9. GYRO ELECTRONICS CONTROL ASSEMBLY
10. TRUE BEARING UNIT

Figure 2-6. Pilothouse Console (Sheet 1 of 2)
(Pilothouse, Frame 7)



11. GYROCOMPASS
12. LIGHTS ON-OFF SWITCH
13. MAGNETIC COMPASS
14. ENGINE TACHOMETERS PORT AND STARBOARD
15. BREAK GLASS PUSH BUTTON (FANS AND FUEL OIL PUMP)
16. DEPTH SOUNDER
17. BLINKER TELEGRAPH
18. SPEED LOG
19. STARBOARD ENGINE START-STOP SWITCHES
20. MAIN ENGINE CONTROL HEAD
21. PORT ENGINE START-STOP SWITCHES
22. STEERING GEAR SELECTOR SWITCH
23. GENERATOR EMERGENCY STOP SWITCHES (2)
24. NFU STEERING DISCONNECT
25. WINDOW WIPER SWITCHES (3)
26. MAIN ENGINE CLUTCH DISCONNECT
27. HELM PUMP

Figure 2-6. Pilothouse Console (Sheet 2 of 2)
(Pilothouse, Frame 7)

frame 13-1/2, from the companionway at frame 10-1/4 or from the galley. The mess/lounge is fitted with 2 mess tables, 2 booths, 2 benches, hat and coat hooks and a first aid box. A cleaning locker is located at frame 13-1/2 port side of the deckhouse. Portholes are located at frames 10-1/2 and 12-1/2 port side, above the booths.

2-7-6. BOSUN'S LOCKER. The bosun's locker is located between frames 13-1/2 and 14-1/2 on the starboard side of the deckhouse (Figure 2-29). Access is gained from the weather deck at frame 14-1/2. Shelves, pipe jack rods, portable metal battens and hooks are provided for storage. The space from frame 14-1/2 to 15 aft of the bosun's locker is the exhaust trunk from the engine room which runs through this space.

2-7.7. SHELTER DECK. The shelter deck area is located between frames 13-1/2 and 15 on the port side of the deckhouse (Figure 2-29). This area is closed on three sides and the top to protect recovery personnel during inclement weather. Access can be gained from the weather deck at frame 15 and from the mess/lounge at frame 13-1/2. The space contains a deluge shower with eye wash and a wash basin for decontamination of personnel contacting torpedo fuel. A fire station and the swab rack are located in this area and are mounted on the engine air intake truck located between frames 14 and 15.

2-7.8. ELECTRICAL EQUIPMENT ROOM. The electrical equipment room is located between frames 7 and 8, starboard side (Figure 2-29). Access is gained from the passageway at frame 7-1/2. This space contains the rectifier power supply, the galley power panel P403 and the sonar receiver/transmitter (Figure 2-7).

2-8. PROPULSION SYSTEM. (Figure 2-8.)

The propulsion system includes the following components: propulsion engines and marine gears, propeller shafts, propellers and propulsion controls. These components make up the basic propulsion system but cannot operate unless the inter-related systems for fuel, cooling, lube, ventilation, exhaust and the electrical system are also operational. Each of the related systems will be covered in this section.

2-8.1. SHAFT ARRANGEMENT. (Figure 2-8.) The propulsion engines and attached marine gears are located in the engine room between frames 17 and 20, port and starboard. The propeller shafts are coupled to the marine gear at frame 20. The propeller shafts are 27 feet, 10 inches in overall length. The propellers are secured to the ends of the shafts at frame 26-3/4. The shafts are supported in bearings in the stern tube and skeg. A stuffing box is provided where each shaft enters the stern tube.

2-8.2. PROPULSION CONTROLS. The propulsion controls and tachometers are located in the pilothouse on the control console (Figure 2-6) and on the auxiliary conning station (Figure 2-2). The control levers and clutch disconnects are mechanically connected transfer units through cables. The propulsion engines transfer units (Figure 2-9) are located in the engine room above the engine they control. This unit allows for manual operation of the system from the engine room if necessary. Governor control is accomplished from the transfer unit in the engine room by cable to the governor control (Figure 2-10) on the engine. Clutch control is transmitted from the transfer unit by cable to the engine clutch control (Figure 2-11). The arrangement of the control cables is shown in Figure 2-31.

2-8.3. ENGINE INSTRUMENTS. In addition to the tachometers for the diesel propulsion engines (Figures 1-5 and 1-6), each engine is equipped with a gage board in the passageway between the engines to allow personnel to monitor engine performance (Figure 2-12.)

2-9. DIESEL ENGINE EXHAUST SYSTEM. (Figure 2-13.)

A separate exhaust system is employed for each diesel engine. All components of the system are removable. Each propulsion engine exhaust systems consists of one elbow, one bellows, an exhaust tube, a muffler and an outlet. Three hose connections are used in each system and are secured to the piping with corrosion-resistant steel hose clamps. Two clamps are installed at each end of the hose connections. Each generator engine exhaust system consists of one elbow, one bellows, one riser, an exhaust tube, a muffler and an outlet. Hose connections are the same as connections used on the propulsion exhaust system except smaller hoses and clamps are used. Each exhaust system is provided with direct sea water injection connected downstream from the highest point in the exhaust piping to prevent water from access to the engine. The slope of the exhaust piping provides complete drainage from each engine to the hull terminus. The engine exhaust systems depend on the sea water cooling system operation to allow sea water injection to the system through a lockable valve. No sea water flow for cooling can be obtained unless the propulsion engines are functioning. The mufflers are designed for wet operation and are fitted with bibb cocks for draining. The exhaust piping is insulated with 3-inch thick thermal glass fiber insulation.

2-10. FUEL SYSTEM.

Operation of the fuel system depends on the supply of electrical power to the fuel transfer pump motor.

The fuel oil system consists of the three storage tanks, the fuel day tanks, the fuel transfer pumps, fuel/water separators, stripping pump and the necessary lines, valves and fittings to supply fuel oil to the engines (Figure 2-32).

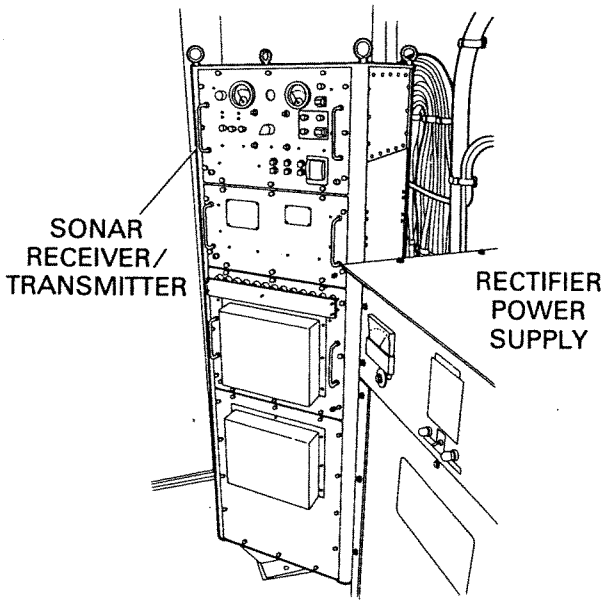


Figure 2-7. Electrical Equipment Room
(Main Deck, Frames 7-8, Starboard)

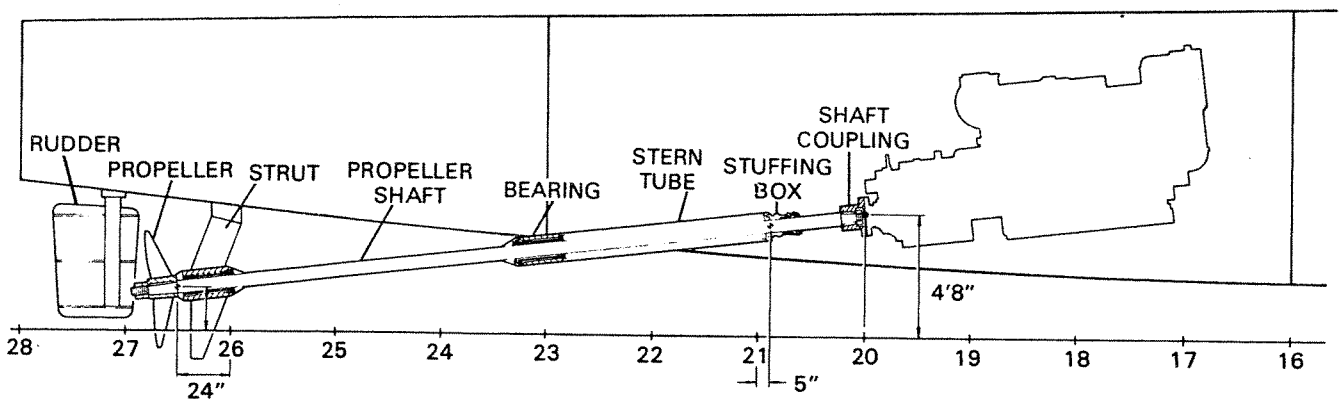


Figure 2-8. Propulsion System

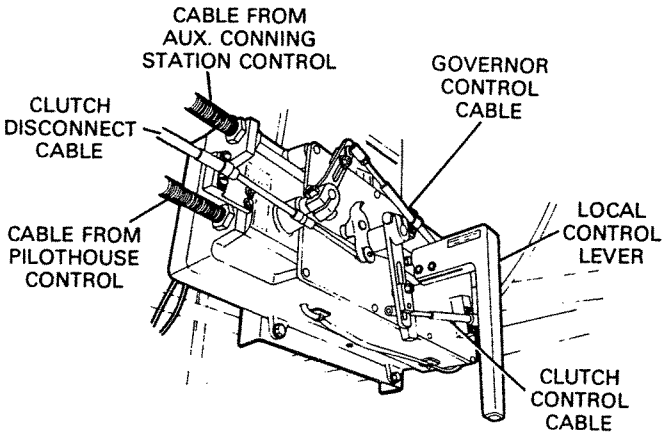


Figure 2-9. Engine Transfer Unit
(Engine Room, Frame 18-1/2)

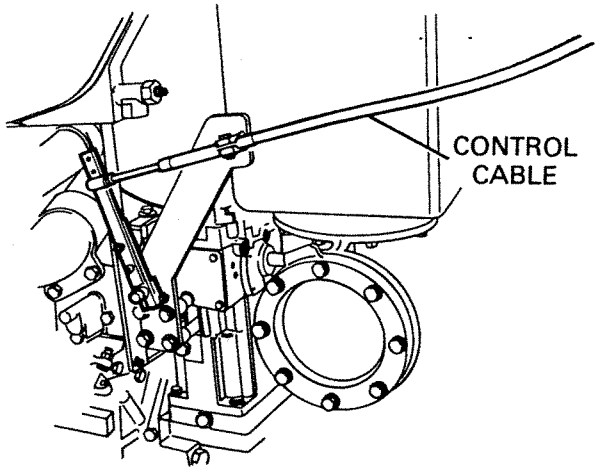


Figure 2-10. Governor Control (Transfer Unit to Engine)
(Engine Room, Forward, Frame 20)

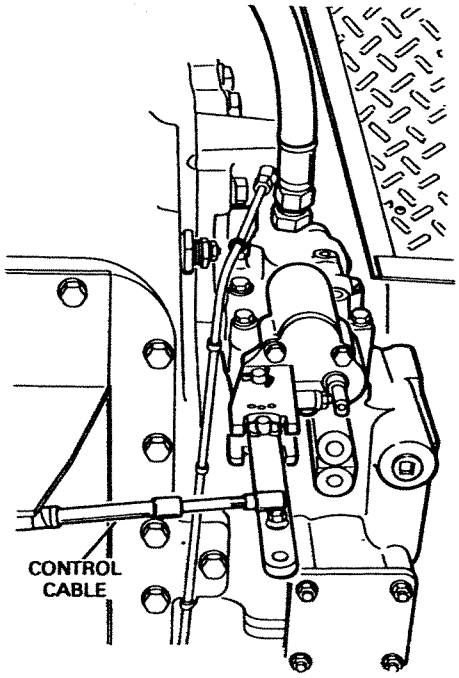


Figure 2-11. Clutch Control (Transfer Unit to Engine) (Engine Room, Aft, Frame 17)

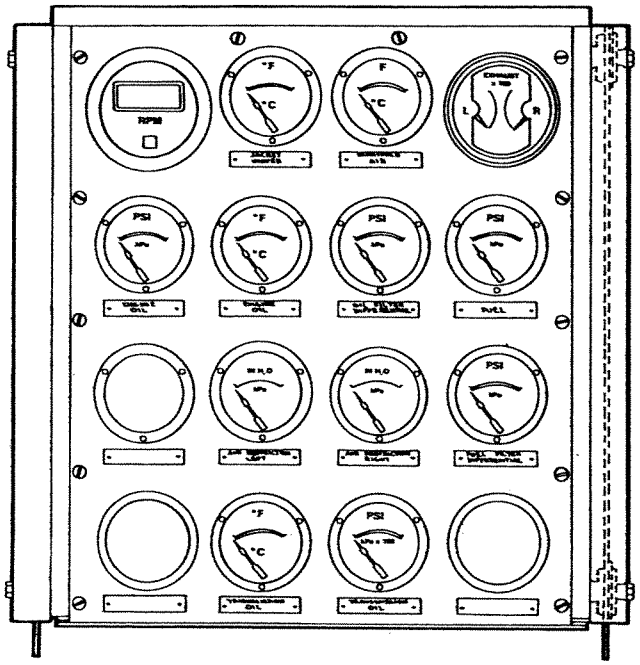


Figure 2-12. Diesel Propulsion Engine Gage Board

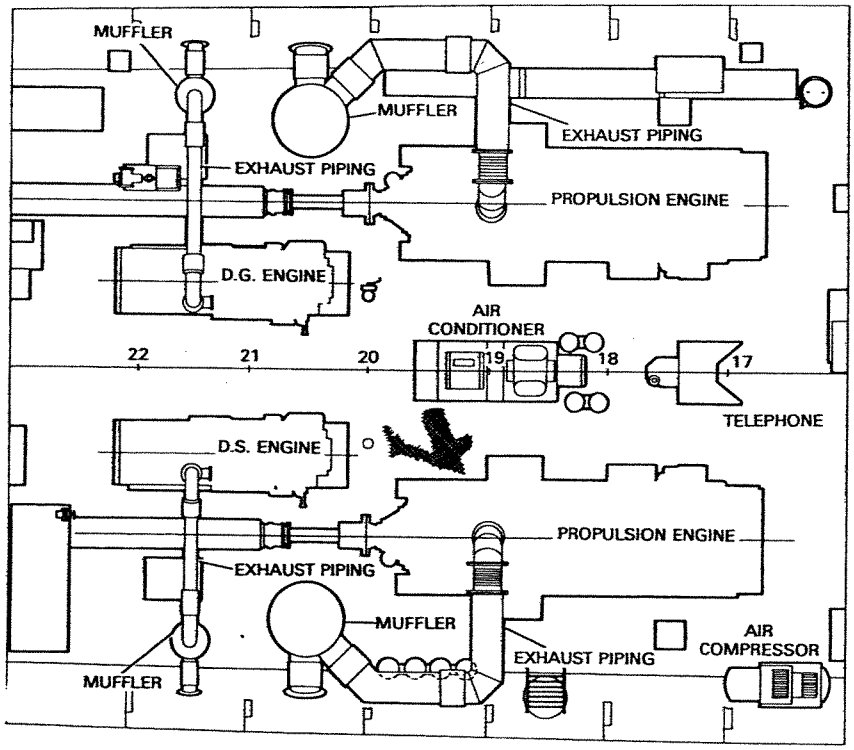


Figure 2-13. Diesel Engine Exhaust System

Two fuel oil storage tanks are located between frames 9 and 12 port and starboard. The third storage tank is located under the engine room between frames 16 and 22. The fuel oil day tanks are located at frame 23, port and starboard side of lazarette passageway. The fuel transfer pump (Figure 1-7), stripping pump (Figure 1-8) and water/fuel separator are located in the engine room at frame 22. Emergency fuel shut-off handles (Figure 1-9) are located on the main deck at frame 23. Operation of these handles will shut off all fuel supply to the engines.

2-11. LUBE SYSTEM. (Figure 2-14.)

Electrical power must be supplied through the engine room lighting panel L103 to operate the fast lube oil change system pump. The lube system consists of the lube oil storage tank, the waste oil tank, the waste oil discharge pump, the portable fast lube oil change system and the necessary hoses, lines and fittings to operate the system. The lube oil storage tank is located at frame 23 aft of the engine room. The tank is fitted with a fill pipe, a vent, an overflow to bilge, a liquid level indicator, a bibb cock, a drain valve and a quick disconnect fitting. The engines and marine gears are fitted with piping, valves and quick disconnect fittings to allow use of the Fast Lube Oil Change System (FLOCS) for oil change. The waste oil tank is located at frame 15 under the grating in the pump room. It is vented to space and is fitted with piping for accepting waste oil from the FLOCs during oil change and discharge piping and valves to the main deck for waste oil disposal. The Fast Lube Oil Change System (Figure 1-11) is a portable unit with hoses and quick disconnect coupling that is stowed in the engine room between frames 21 and 22, starboard side. The manual starter and plug for the FLOCS is mounted on a stanchion aft of frame 20 in the engine room.

2-12. FRESH WATER SYSTEM. (Figure 2-33.)

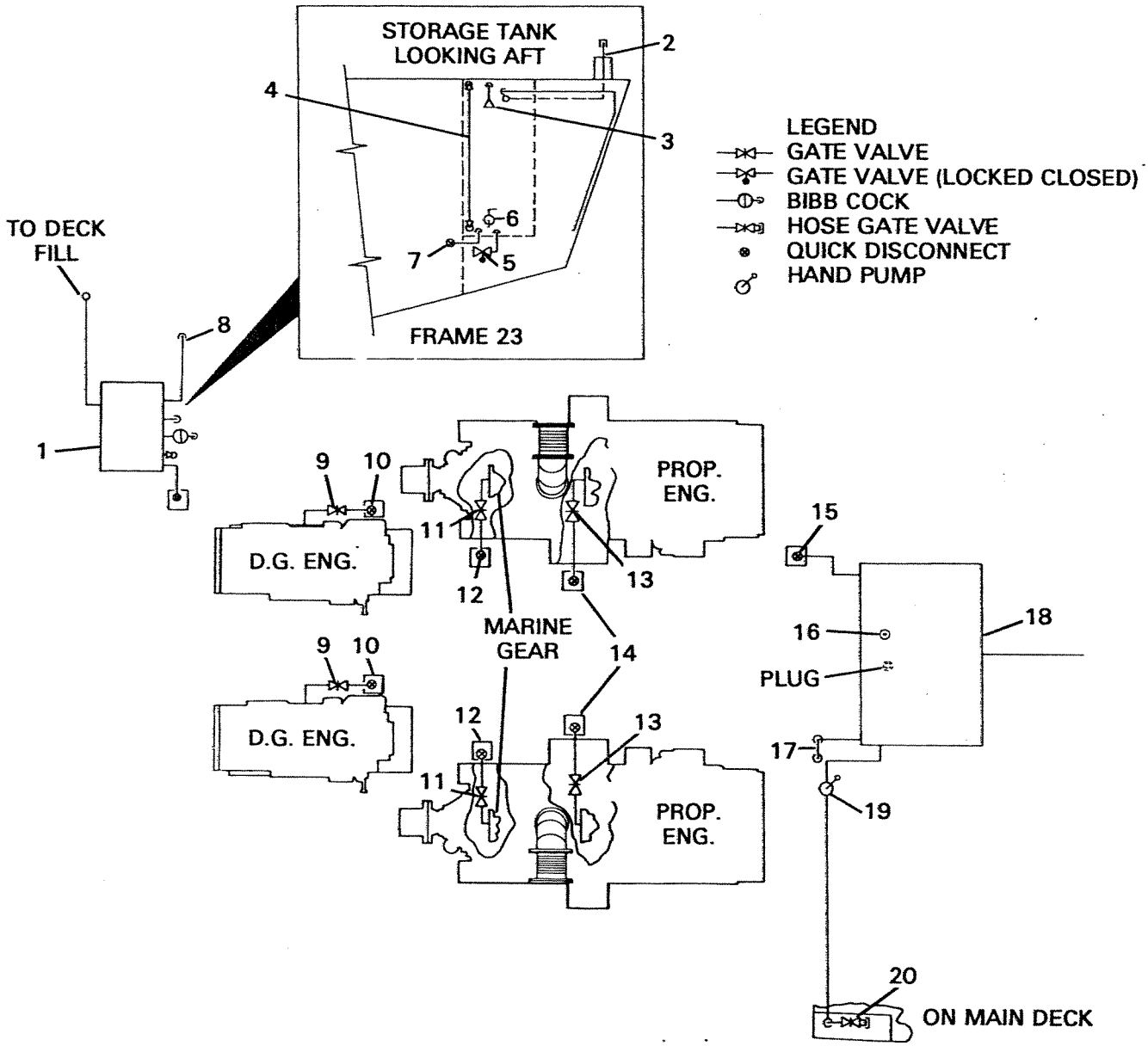
Electrical power must be supplied through power panels P401, P402 and P403 to operate the hot water heater, the potable water pump and the booster water heater. The fresh water system consists of two potable water tanks, the hot water heater, booster water heater, pressure set, filter and the necessary valves, lines and fittings to supply the hot and cold water outlets. The potable water tanks are located in the pump rooms between frames 12-1/2 and 15-1/2 port and starboard. The hot water heater is located at frame 15 in the pump room. The booster water heater is located in the provisions storeroom at frame 12. The pressure set and filters (Figure 1-17) are located in the pump room under the inclined ladder at frame 13. Fill connections are located at frame 12 on the main deck. A chlorine tank (Figure 1-16) that can be moved to port or starboard, is provided to treat water at the fill connections (Figure 1-15).

2-12.1. COLD WATER OUTLETS. Outlets requiring cold water supply are as follows:

1. Washroom — Deckhouse
   a. Shower — Frame 7 (Port)
   b. Water Closet — Frame 7 (Port)
   c. Lavatory — Frame 8 (Port)
2. Galley
   a. Drinking Fountain — Frame 12-1/2 (Centerline)
   b. Ice Flake Dispenser — Frame 11 (Centerline)
   c. Sink — Frame 11 (Starboard)
3. Shelter Deck
   a. Shower and Eye Wash — Frame 14-1/2 (Port)
   b. Wash Basin — Frame 14-1/2 (Port)
4. Washroom — 1st Platform
   a. Shower — Frame 10 (Port)
   b. Water Closet — Frame 12 (Port)
   c. Lavatory — Frame 10-1/2 (Port)
5. Pressure Set — Pump Room — Frame 13 (Starboard)
6. Hot Water Heater — Pump Room — Frame 15 (Port)
7. Booster Water Heater — Provisions Storeroom — Frame 12 (Starboard)
8. Service Connection — Engine Room — Frame 23 (Starboard)
9. Washdown Connections — Main Deck — Frames 22-3/4 and 25 (Starboard)

2-12.2. HOT WATER OUTLETS. Outlets requiring hot water supply are as follows:

1. Washroom — Deckhouse
   a. Shower
   b. Lavatory
2. Galley — Deckhouse
   a. Sink
   b. Rinse Unit
3. Shelter Deck — Aft of Deckhouse
   a. Shower
   b. Wash Basin
4. Washroom — 1st Platform
   a. Shower
   b. Lavatory
5. Booster Water Heater — Provisions Storeroom



1. STORAGE TANK, FRAME 23, PORT, LAZARETTE
2. FILL CONNECTION, FRAME 23-1/2, PORT, MAIN DECK
3. TANK VENT, FRAME 23, PORT, ENGINE ROOM
4. LIQUID LEVEL INDICATOR, FRAME 23, PORT, ENGINE ROOM
5. L.O. DRAIN VALVE, N.C., FRAME 23, PORT, ENGINE ROOM
6. BIBB COCK VALVE, FRAME 23, PORT, ENGINE ROOM
7. STORAGE TANK QUICK DISCONNECT, FRAME 23, PORT, ENGINE ROOM
8. OVERFLOW, FORWARD OF FRAME 23, PORT, ENGINE ROOM
9. D.G. ENGINE L.O. DISCH. VALVE, FORWARD OF FRAME 21, PORT AND STARBOARD, ENGINE ROOM
10. D.G. QUICK DISCONNECT, FORWARD OF FRAME 21, PORT AND STARBOARD, ENGINE ROOM
11. MARINE GEAR L.O. DISCH. VALVE, FRAME 19-1/2, PORT AND STARBOARD, ENGINE ROOM
12. MARINE GEAR QUICK DISC., FRAME 19-1/2, PORT AND STARBOARD, ENGINE ROOM
13. PROP. ENG. L.O. DISCH. VALVE, FRAME 19, PORT AND STARBOARD, ENGINE ROOM
14. PROP. ENG. QUICK DISC., FRAME 19, PORT AND STARBOARD, ENGINE ROOM
15. WASTE OIL TANK QUICK DISC., AFT OF FRAME 16, PORT, ENGINE ROOM
16. SOUNDING TUBE, FRAME 15-1/2, PORT, PUMP ROOM
17. WASTE OIL TANK VENT, FRAME 16, STARBOARD, PUMP ROOM
18. WASTE OIL TANK, FRAME 15, CENTERLINE, PUMP ROOM
19. WASTE OIL DISCHARGE PUMP, FRAME 16, STARBOARD, PUMP ROOM
20. WASTE OIL DISCHARGE VALVE, FRAME 16, STARBOARD, MAIN DECK
21. FLOCS UNIT (NOT SHOWN), FRAMES 21-22, STARBOARD, ENGINE ROOM

Figure 2-14. Lube Oil System

2-13. FIREMAIN SYSTEM.

The firemain system depends on electrical power supply through power panels P401 and P402 to the fire pumps and their controllers. The firemain system provides pressurized water to the fire stations from the sea chests in the engine room through two 100-GPM fire pumps. One pump is located in the engine room at frame 16-1/2, port side (Figure 1-18). The aft pump is located in the lazarette two feet aft of frame 25, starboard (Figure 1-19). The firemain system piping (Figure 2-34) extends fore and aft under the main deck with branches to the five fire stations located as follows:

1. Main deck, at frame 15, port side (Figure 1-20).
2. Main deck, aft of frame 4, port side.
3. Bridge deck at frame 10, port side.
4. Engine room, forward of frame 20, port side of centerline.
5. Crew berthing space, at frame 9, port side.

NOTE

Sea water will be drawn from the ballast tanks and pumped into the firemains if the ballast manifold valves are open. Similarly, bilge will be drawn and pumped into the firemain if the bilge manifold valves are open.

2-14. BILGE SYSTEM.

Electrical power supply to the fire pumps and their controllers must be supplied by the generator engines or shore power to operate the fire pumps and controllers for the bilge system. The primary function of the bilge system (Figure 2-35) is to prevent accumulation of water in low areas of the craft and to discharge all such water overboard. The lines from bilge spaces terminate at a valved bilge manifold which is tied into the firemain system to allow the fire pumps to be used for bilge pumping. The two fire pumps take suction from the sea and discharge overboard through an eductor. The eductor suction is connected to the bilge manifold, with independent suction from the engine room and pump room. The bilge manifold (Figure 1-24) is located in the engine room aft of frame 16 on centerline. The manifold has branch lines leading to the voids and bilges. A remote operated gate valve (Figure 1-23) is located in the branch line to the anchor chain locker pump. This valve is controlled from the main deck aft of frame 2. A tee-wrench for valve operation is located on the deckhouse exterior bulkhead 12 inches off centerline. Bilge level sensors (Figure 1-22) in the hold spaces are wired to the master alarm panel in the pilothouse to give immediate indication of bilge flooding.

2-15. BALLAST SYSTEM.

The fire pump in the lazarette and its controller must be supplied electrical power to operate the ballast system. The ballast system (Figure 2-36) is connected to the firemain system to utilize the fire pump in the lazarette (Figure 1-19) for ballasting and deballasting. The ballast manifold (Figure 1-25) is located in the engine room forward of frame 23, on centerline. Gate valves on the manifold can be opened or closed to connect the line to the tanks. Sea water is drawn from the sea chests in the engine room to add ballast to the ballast tanks as needed. The tanks may also be deballasted overboard through the eductor suction. The ballast tanks are located in the forepeak, between frames 6 and 9, port and starboard and aft of frame 23, port and starboard. A remote operated valve (Figure 1-23) for the forepeak ballast tank is located in the bosun's stores. This valve is operated from the main deck using the T-wrench provided.

2-16. SEA WATER SYSTEM. (Figure 2-37.)

Operation of the sea water system requires that the propulsion engines are operational to run the engine driven pumps and that electrical power is supplied through power panel P401 to the air conditioning sea water cooling pump motor. The sea water system consists of the sea water pumps on the propulsion engines, sea water strainers, the air conditioning sea water pump and the necessary valves and fittings to make the system operational.

The A/C sea water cooling pump (Figure 1-27) is located in the engine room at frame 17 on centerline. The 15 GPM pump supplies cooling for the A/C compressor/condenser also located in the engine room forward of frame 20.

The engine mounted sea water pumps (Figure 1-26) circulate the sea water to perform the following services:

1. Cooling the propulsion engines and the diesel generator through a heat exchanger.
2. Cooling the engine return fuel.
3. Cooling the forward stern tube shaft bearings.
4. Cooling the reduction gear heat exchanger.
5. Cooling the bow thruster hydraulic fluid.
6. The surplus sea water from each system cools the engine exhaust and is discharged overboard.

NOTE

An emergency sea water supply connection is provided in the engine room to supply the cooling system if pumps are inoperative or if the craft is in dry dock for repair. The connection is fitted with a 4-inch gate valve.

2-17. STEERING SYSTEM. (Figure 2-38.)

Operation of the steering system is dependent on the proper functioning of the generator engines to supply electrical power to the steering pumps, the Non-Follow Up (NFU) Steering Control and the rudder angle indicator. The steering system consists of the helm pump and steering wheel (Figure 2-6) located in the pilothouse, the steerer lever (Figure 2-2) on the auxiliary conning station, the header tank (Figure 1-29) located on the pilothouse roof, the steering pumps, ram actuator, mini-accumotor and rudder stocks located in the lazarette at frame 27. Rudder angle indicators are located at the helm and the auxiliary conning station. The rudder is secured to the rudder stock flange at frame 27. Supply and return lines with valves and fittings are required to supply pressurized oil from the steering pumps and accumotor to the helm and auxiliary conning station.

2-18. BOW THRUSTER SYSTEM. (Figure 2-39.)

Bow thruster operation is dependent upon propulsion engine operation to run the hydraulic pump (Figure 1-30). Electrical power must also be supplied to the control panels in the pilothouse and at the auxiliary conning station. The bow thruster space is located between frames 4-1/2 and 6 in the hold. Access to the space is gained at frame 4-1/2 through the arch doorway from the bosun's stores space. Entry to the bosun's stores is gained through the water tight hatch on the main deck at frame 4. The bow thruster (Figure 1-31) and bow thruster reservoir (Figure 1-32) are mounted in this space along with the return filter, directional control valve, the cross over relief valve and the necessary lines and fittings to make the system operational. The bow thruster hydraulic pump (Figure 1-30) is located in the engine room at frame 17 port side and is driven directly off the starboard propulsion engine. An oil cooler for the system, cooled by sea water is located in the engine room under the floor plates at frame 17-1/2. Control panels are located in the pilothouse and at the auxiliary conning station (Figures 2-2 and 2-6). A header tank (Figure 1-33) for the system is located on the bridge deck at frame 10.

2-19. DECK CRANE SYSTEM.

The hydraulic crane (Figure 1-34) requires power from electrical system to run the hydraulic pump electric motor and the controls on the control stand (Figure 1-37). The crane is supplied power through a circuit breaker on the electric plant control panel P400 located in the engine room and the crane controller (Figure 1-36). Panel P400 is supplied by either the generator engines or shore power.

The crane is hydraulically powered from its own self-contained power pack (Figure 1-36). Interconnecting hoses, tubes and piping are installed to make the system operational (Figure 2-40). A 30-gallon hydraulic reservoir supplies hydraulic oil to the system through a suction strainer in the pump supply line.

2-20. TORPEDO HANDLING SYSTEM. (Figure 2-41.)

Operation of the torpedo handling system depends not only on the major components of the system but requires electrical power from the electric plant control panel P400 to the power unit (Figure 1-38). This unit works in conjunction with the inhaul winch and transfer winches (Figure 1-39), transfer carriage (Figure 1-40) and control console (Figure 1-41) located on the main deck. The torpedo handling hydraulic power unit is located in the bow thruster space forward of frame 6. The power unit consists of the following major components.

1. Hydraulic Pump
2. Electric Motor
3. Hydraulic Reservoir
4. Filters
5. Control and Relief Valves

2-21. ANCHOR HANDLING SYSTEM. (Figure 2-15.)

Electrical power must be supplied through power panel P403 to make the anchor handling operable. The anchor handling system consists of the windlass located on the main deck at frame 2, the anchors, the anchor chains, hawse pipes, the anchor chain locker, a motor controller and a pushbutton station mounted on the deckhouse bulkwork at frame 4-1/2 (Figure 1-43). The anchor chain locker is fitted with a sump tank to allow water run off from the chain after weighing anchor. The sump tank is fitted with a manual operated drain valve located in the bosun's stores. The valve is operated from the main deck using a T-wrench.

2-22. SEWAGE SYSTEM.

Electrical power must be supplied through power panel P401 to allow operation of the sewage pump and controller, the sewage control panel, the alarm system, and sump pump.

2-22.1. COLLECTION AND DISPOSAL. The sewage system permits the collection, holding and transfer of sewage on the craft (Figure 2-16). The holding tank, equipped with an eductor, a discharge pump, an automatic level indicator and the necessary valves and piping is located in the pump room at frame 15 (Figure 1-44). The sewage control panel (Figure 1-45) is located in the pump room mounted on the port side of the potable water tank. Tank full indicators are located at each water closet and in the pilothouse.

2-22.2. GRAY WATER. A sump tank is provided to collect gray water from showers, wash basins and sinks and is located under the grating in the pump room. The sump pump (Figure 1-47) is located in the pump room

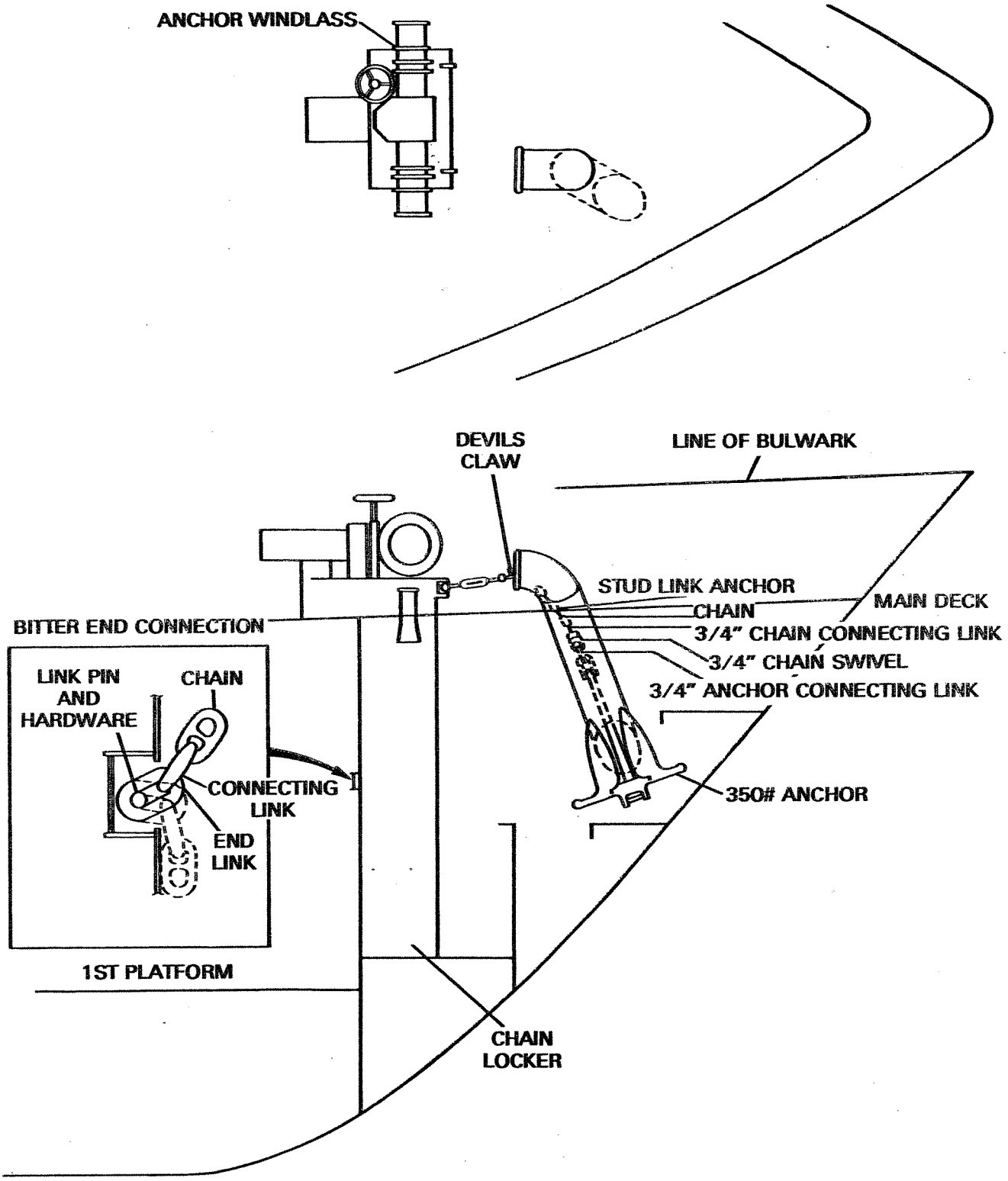
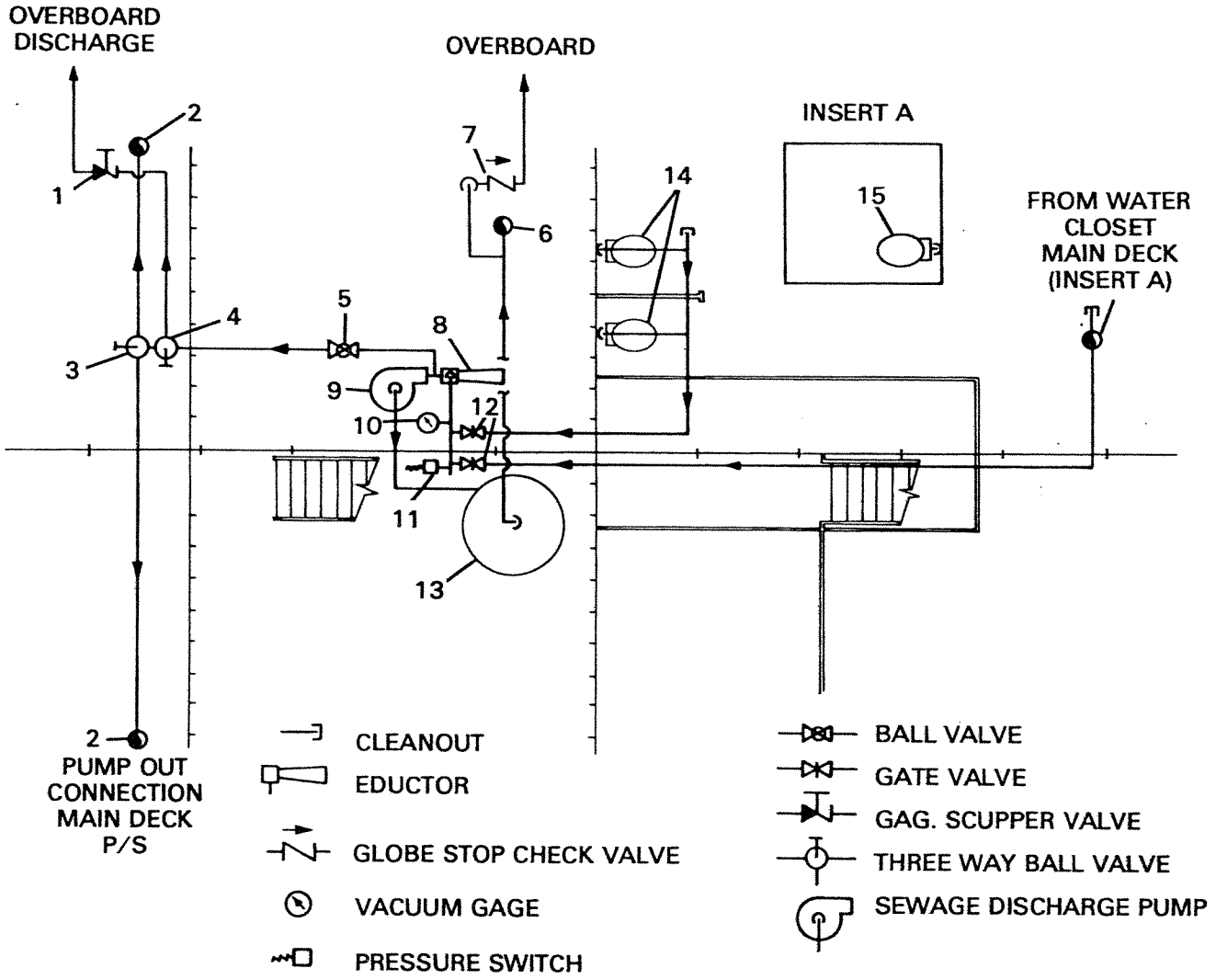


Figure 2-15. Anchor Handling System



1. SEWAGE OVBD. DISCH. VALVE, FRAME 17-1/2, PORT, ENGINE ROOM
2. PUMP OUT CONNECTION, FRAME 16-1/2, PORT AND STARBOARD, MAIN DECK
3. OVBD. DISCH. AND D.K. PUMP VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
4. SEWAGE SUCT. PUMP DISCH. VALVE, FRAME 16, PORT, ENGINE ROOM
5. OVBD. DISCH. VALVE, FRAME 14, PORT, PUMP ROOM
6. SEWAGE TANK VENT, FRAME 13, PORT, MAIN DECK
7. SEWAGE TANK VENT CHECK VALVE, FRAME 12-1/2, PUMP ROOM
8. EDUCTOR, FRAME 13-1/4, CENTERLINE, PUMP ROOM
9. SEWAGE PUMP, FRAME 13-1/4, CENTERLINE, PUMP ROOM
10. VACUUM GAGE, FRAME 13-1/2, PORT, PUMP ROOM
11. PRESSURE SWITCH, FRAME 13-1/2, PORT, PUMP ROOM
12. SEWAGE ISOLATION VALVE, FRAME 13, PORT AND STARBOARD, PUMP ROOM
13. SEWAGE HOLDING TANK, FRAME 13, CENTERLINE, PUMP ROOM
14. WATER CLOSET, FRAME 12, PORT, 1ST PLATFORM
15. WATER CLOSET, FRAME 7, PORT, MAIN DECK

Figure 2-16. Sewage System Diagram

mounted on the port side potable water tank. The overboard discharge for the sump tank is located aft of frame 12 (Figure 2-42).

2-23. HEATING, VENTILATION AND AIR CONDITIONING SYSTEM. (Figures 2-43 and 2-44.)

Operation of the heating, ventilation and air conditioning system is dependent upon electrical power supply to all heaters, fans, controllers, the air handler and the air conditioning unit as well as sea water circulation to the A/C condenser. To accomplish electrical supply as required the generator engines must be operating or shore power must be connected to the craft. The ventilation and air conditioning major components are located in the air handling room and the engine room. Freon gages are installed in the air handling room for pressure and temperature checks. Heaters are fitted into the ducting to temperature controlled areas. Space heaters are also used in the washrooms, the engine room and the lazarette.

2-23.1. AIR HANDLING ROOM. (Figure 2-30.) The air handling room is located on the main deck in the deckhouse between frames 8 and 10. The air handler unit is located in this space as well as the necessary ducting to supply ventilation, heated air or air conditioning to the temperature controlled areas of the craft. Access to the air handling room is gained from the main deck at frame 8-3/4.

2-23.2. AIR CONDITIONING UNIT. The air conditioning unit (Figure 1-50) is located in the engine room. The condenser is cooled by sea water circulated by the sea water pump. The unit is fitted with a gage board to check oil and water pressure and water failure. Other gages are installed in the piping to monitor water temperature in other areas of the unit piping.

2-24. COMPRESSED AIR SYSTEM. (Figure 2-17.)

Electrical power must be supplied through power panel P402 to the air compressor. The compressed air system supplies air for the horn and also low pressure purging air to the torpedo ramp area. Two compressed air outlets are also provided in the engine room, one near the workbench and the other at frame 21, starboard side for blow down of sea chests. The compressor (Figure 1-51) is located in the engine room aft of frame 16, starboard side. A manual horn valve is located in the pilothouse above the helm console. The horn (Figure 2-3) is on the main mast on the pilothouse top. Compressed air is piped through a pressure regulator that reduces 120 PSI to 25 PSI for purging. The torpedo ramp fitting is located at frame 22, main deck, starboard side.

2-25. FIRE EXTINGUISHING SYSTEMS.

2-25.1. HALON SYSTEM. The fixed halon fire extinguishing system requires electrical power supply to the control panel in the pilothouse and the break glass stations in the mess/lounge as well as to the system itself.

NOTE

In the event of main power failure, the emergency 24 VDC batteries can be connected at the disconnect switch which is located in the bow thruster area at frame 4-1/2 just starboard of centerline. These batteries also serve navigation and communication equipment and alarm panels.

2-25.1.1. The fixed halon system protects the engine room. Components which are located in the engine room consist of flame detectors and control amplifiers, cylinder and valve assemblies, 180-degree fan nozzles, and pressure switches. These components are identified and located on Figure 2-18.

2-25.1.2. The Halon system fire control panel (Figure 1-52) is located in the pilothouse between frames 7 and 8, port side. T-handles for full manual release of Halon are located at the top of the inclined ladder in the pump room ladderway (Figure 1-54).

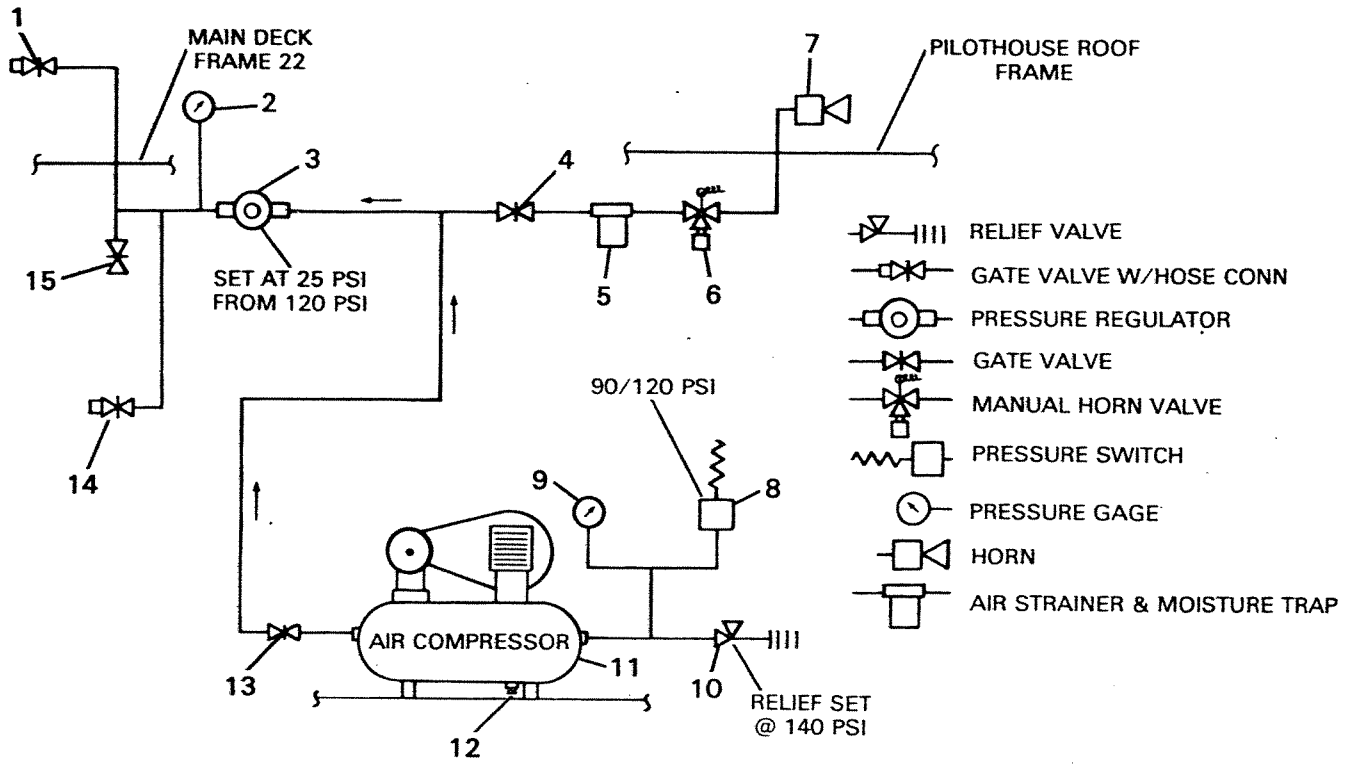
2-25.1.3. Two break glass emergency controls (Figure 1-53) are located in the mess/lounge area. Use of these controls will activate both a primary and a secondary release of halon in the engine room.

2-25.2 GALLEY FIRE SUPPRESSION SYSTEM. Refer to paragraph 1-6.20. for description and location of components. Refer to chapters 3 and 7 for operation.

2-26. ELECTRICAL POWER DISTRIBUTION SYSTEM.

The electrical power distribution system consists of the following major components:

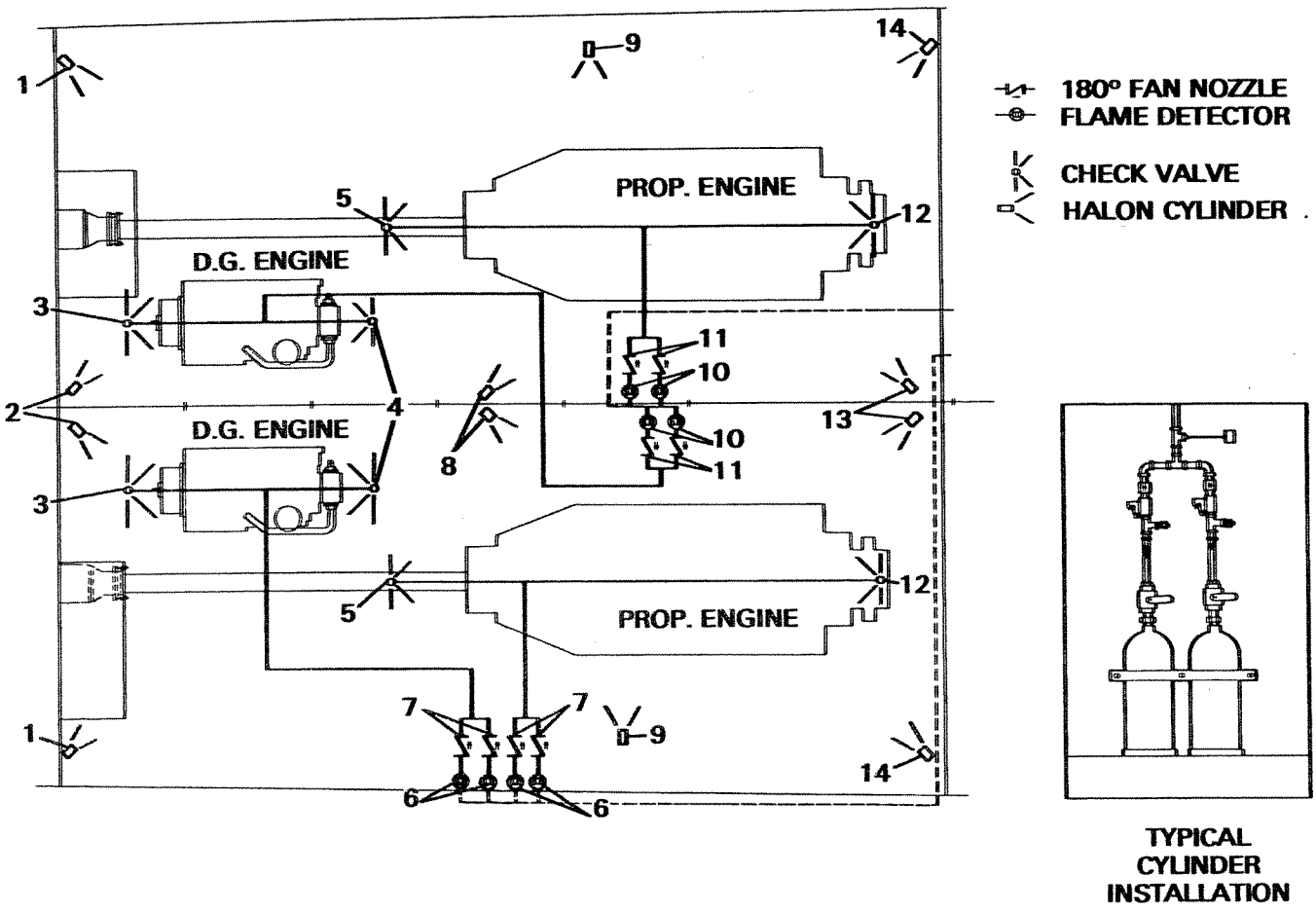
1. Two diesel generators located in the engine room between frames 20 and 22, port and starboard (Figure 2-19).
2. The electric plant control panel P400 located in the engine room forward of frame 23, port side (Figure 2-19).
3. The 440 volt AC distribution panel P402 located in the engine room at frame 16, starboard (Figure 2-19).
4. The 440 volt AC distribution panel P401 located in the engine room at frame 16, port side (Figure 2-19).



MAXIMUM WORKING PRESSURE 125 PSIG

1. AIR SUPPLY VALVE, FRAME 22, STARBOARD, MAIN DECK
2. AIR RDCR., STA. PRESS. GAGE, FRAME 22, STARBOARD, ENGINE ROOM
3. PRESSURE REDUCER VALVE, FRAME 21-1/2, STARBOARD, ENGINE ROOM
4. AIR SUPPLY VALVE, FRAME 11, STARBOARD, PILOTHOUSE
5. AIR STRAINER, FRAME 10-1/2, STARBOARD, PILOTHOUSE
6. MANUAL HORN VALVE, FRAME 11, STARBOARD, PILOTHOUSE
7. MANUAL HORN, FRAME 10, PORT SIDE OF MAST, PILOTHOUSE TOP
8. COMPRESSOR PRESS. SW., FRAME 16-1/2, STARBOARD, ENGINE ROOM
9. PRESSURE GAGE, FRAME 16-1/2, STARBOARD, ENGINE ROOM
10. COMP. RELIEF VALVE, FRAME 16-1/2, STARBOARD, ENGINE ROOM
11. AIR COMPRESSOR, FRAMES 16-17, STARBOARD, ENGINE ROOM
12. COMP. DRAIN VALVE, FRAME 16-1/2, STARBOARD, ENGINE ROOM
13. COMP. DISCH. VALVE, FRAME 17, ENGINE ROOM
14. AIR SUPPLY VALVE, FRAME 23, STARBOARD, ENGINE ROOM
15. DRAIN VALVE, FRAME 22-1/2, STARBOARD, ENGINE ROOM

Figure 2-17. Compressed Air System Diagram



1. FLAME DETECTOR, FRAME 23, PORT AND STARBOARD, ENGINE ROOM
2. FLAME DETECTOR, FRAME 23, CENTERLINE, ENGINE ROOM
3. D.G. FAN NOZZLE, FRAME 22-1/2, PORT AND STARBOARD, ENGINE ROOM
4. D.G. FAN NOZZLE, FRAME 20-3/4, PORT AND STARBOARD, ENGINE ROOM
5. PROP. ENG. FAN NOZZLE, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
6. HALON CYLINDERS, FRAMES 19-20, STARBOARD, ENGINE ROOM
7. CYLINDER CHECK VALVES, FRAMES 19-20, STARBOARD, ENGINE ROOM
8. FLAME DETECTORS, FRAME 19-1/2, CENTERLINE, ENGINE ROOM
9. FLAME DETECTORS, FRAME 19, PORT AND STARBOARD, ENGINE ROOM
10. HALON CYLINDERS, FRAME 18, PORT AND STARBOARD CENTERLINE, ENGINE ROOM
11. CYLINDER CHECK VALVES, FRAME 18, PORT AND STARBOARD CENTERLINE, ENGINE ROOM
12. PROP. ENG. FLAME NOZZLE, FRAME 16-1/2, PORT AND STARBOARD, ENGINE ROOM
13. FLAME DETECTORS, FRAME 16-1/4, PORT AND STARBOARD CENTERLINE, ENGINE ROOM
14. FLAME DETECTORS, FRAME 16, PORT AND STARBOARD, ENGINE ROOM
15. PRIMARY MANUAL RELEASE HANDLE, FRAME 14, STARBOARD, ENGINE ROOM ACCESS STAIRWELL (NOT SHOWN)
16. SECONDARY MANUAL RELEASE HANDLE, FRAME 14, STARBOARD, ENGINE ROOM ACCESS STAIRWELL (NOT SHOWN)
17. FIRE CONTROL PANEL, FRAME 7-8, PORT, PILOTHOUSE (NOT SHOWN)
18. BR. GLASS EMERGENCY CONTROLS, FRAME 13-1/2, PORT, MESS/LOUNGE (NOT SHOWN)

Figure 2-18. Halon System Diagram

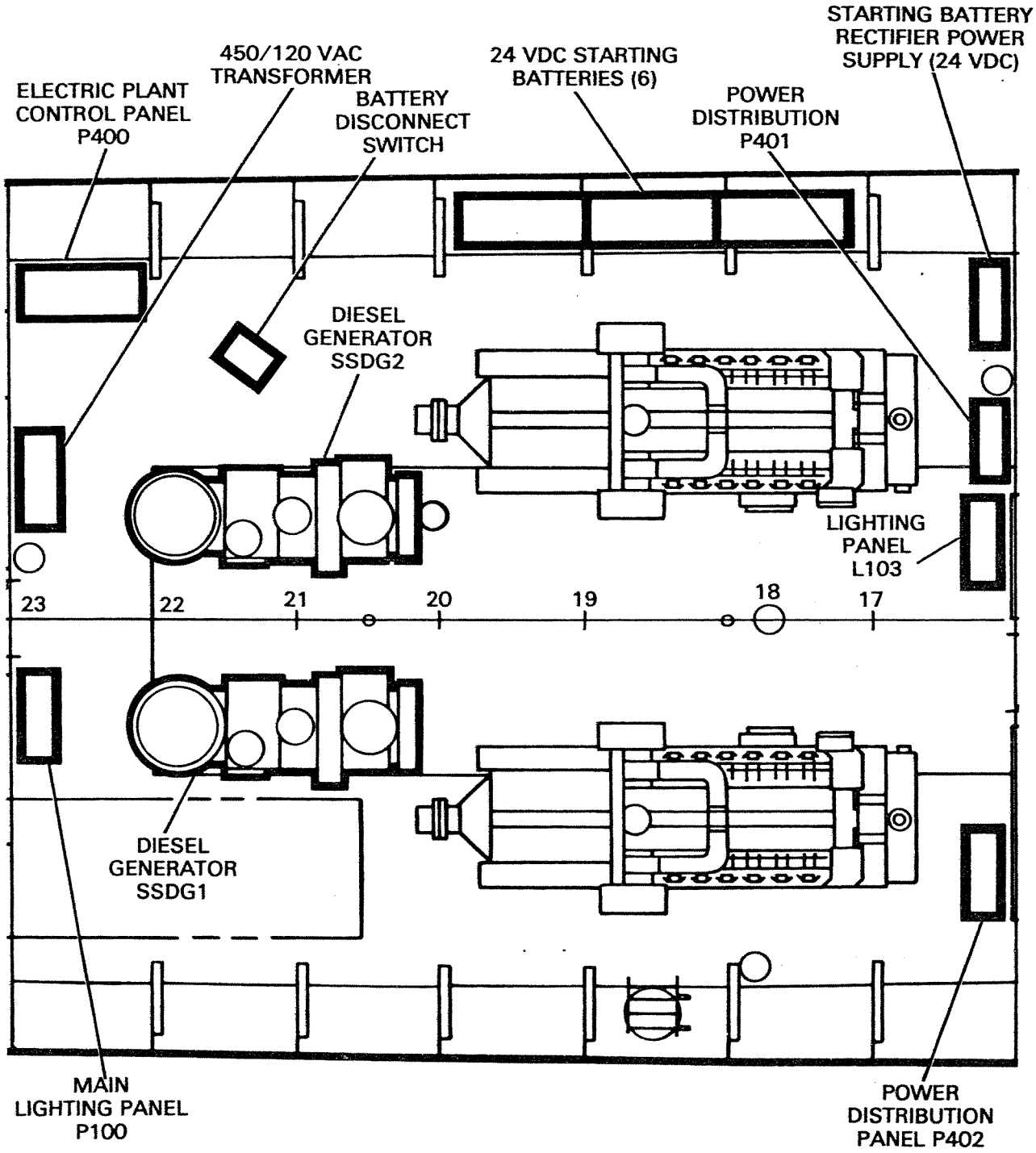


Figure 2-19. Location of Electrical Power Components in Engine Room

5. The 440 volt AC distribution panel P403 located in the electrical equipment room at frame 7, starboard (Figure 2-20).
6. The 440/120 transformer (45 KVA) located in the engine room at frame 23 (Figure 2-19).
7. Starting battery rectifier power supply located in the engine room at frame 16, port side (Figure 2-19).
8. Six 24 VDC engine starting batteries located in the engine room port side between frames 19 and 20 (Figure 2-19).
9. The pilothouse equipment rectifier power supply located in the electrical equipment room at frame 8 (Figure 2-20).

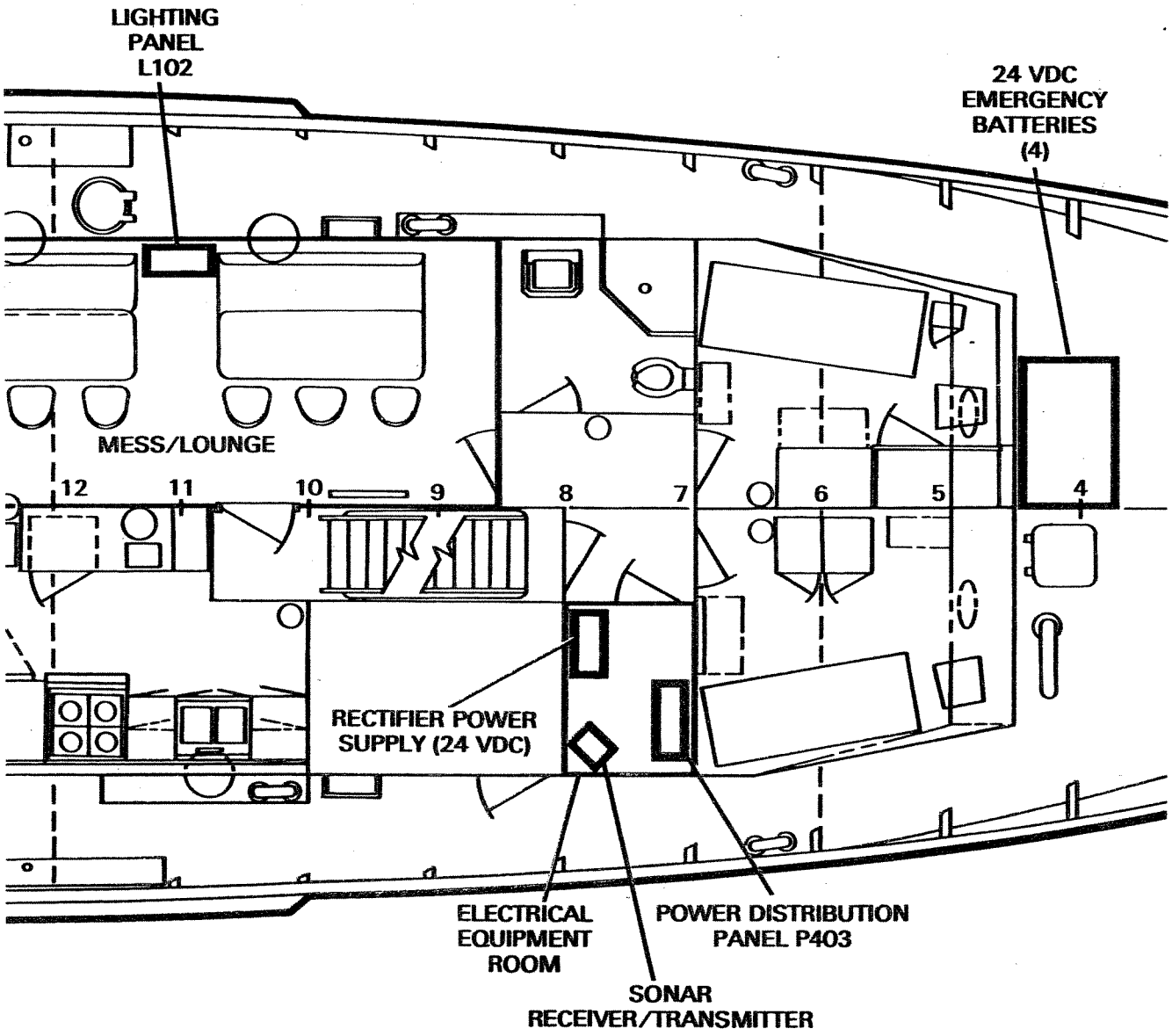


Figure 2-20. Location of Electrical Power Distribution Components in Electrical Equipment Room and Main Deck

10. Four 24 VDC emergency batteries located on the main deck at frame 4-1/2 (Figure 2-20).
11. The 120 volt main distribution panel L100 located in the engine room at frame 23 (Figure 2-19).
12. The galley 120 volt distribution panel L102 located in the mess/lounge area at frame 9, port side (Figure 2-20).
13. The engine room 120 volt distribution panel L103 located at frame 16, port side of centerline (Figure 2-20).
14. The pilothouse 120 volt distribution panel L101 located in the pilothouse at frame 7, port side (Figure 2-21).
15. The 24 VDC distribution panel P024 located in the pilothouse at frame 8-1/2, port side (Figure 2-21).
16. Navigation light panel located in the pilothouse at frame 9, starboard (Figure 2-21).

Motor controllers disconnect switches for deck power and lighting are located throughout the craft. Refer to onboard NAVSEA drawings 320-6003388 and 330-6003390 for locations of all major electrical components.

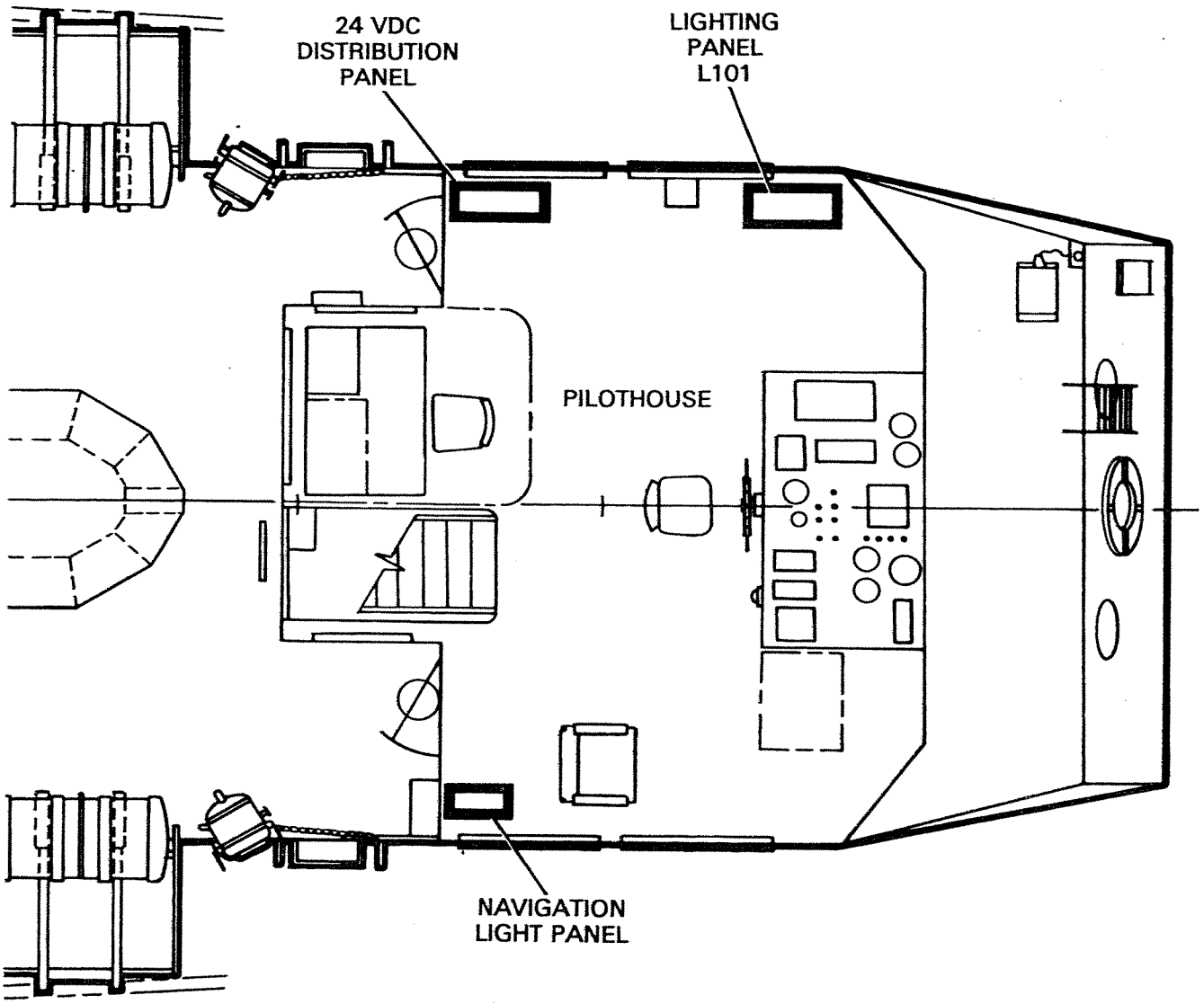


Figure 2-21. Location of Electrical Power Components in Pilothouse

2-27. ELECTRONIC NAVIGATION SYSTEMS.

2-27.1. LORAN "C" SYSTEM. (Figure 2-22.) One Loran "C" NAV-XL Set, EPSCO Marine Inc., Westwood, MA 02090, model number 5070, is installed in the pilothouse above the chart table. The Loran "C" operates on 115 VAC and is connected to the pilothouse lighting panel L101 which receives power from the main distribution panel L100.

2-27.2. SATELLITE NAVIGATION SYSTEM. (Figure 2-22.) The satellite navigation set, Magnavox MX5102 is installed with an interface box to receive speed inputs from the speed log model 3200, manufactured by Datamarine International Inc. and the MK27 gyrocompass. The system is located in the pilothouse above the chart table. The system operates on 115 VAC and receives power from the main distribution panel L100 through the pilothouse lighting panel L101.

2-27.3. ELECTRONIC NAVIGATION POSITION PLOTTING SYSTEM. The position plotting unit, manufactured by EPSCO Marine, Inc., C-Plot 2-track plotter, model number 4080 is installed in the pilothouse on the chart table. The unit operates on 115 VAC and receives data inputs from the Loran "C" set. The unit receives its power from the main distribution panel L100 through the pilothouse lighting panel L101.

2-27.4. AUTOMATIC DIRECTION FINDER. (Figure 2-22.) The automatic direction finder, Furuno model FD-171-ADF, is located in the pilothouse above the chart table. The system operates on 24 VDC and receives power from the galley power panel P403 through the 24 VDC rectifier power supply panel located on the main deck at frame 7-1/2, starboard side of the craft.

2-27.5. DEPTH INDICATOR SYSTEM. (Figure 2-23.) The depth indicator set, Raytheon Marine Company model F-360-D, is installed in the pilothouse on the control console. The unit operates on 24 VDC and receives power from the main distribution panel L100 through the pilothouse lighting panel L101. The thru-hull transducer for the depth indicator is located at frame 12, centerline.

2-27.6. SURFACE SEARCH RADAR. A Canadian Marconi model KAAR LN-66 surface search radar unit is located in the pilothouse. The display unit (Figure 2-24) is equipped with a non-glare face panel. Power is supplied to the radar unit from the main distribution panel L100 through the pilothouse lighting panel L101. The true bearing unit is mounted on top of the radar display.

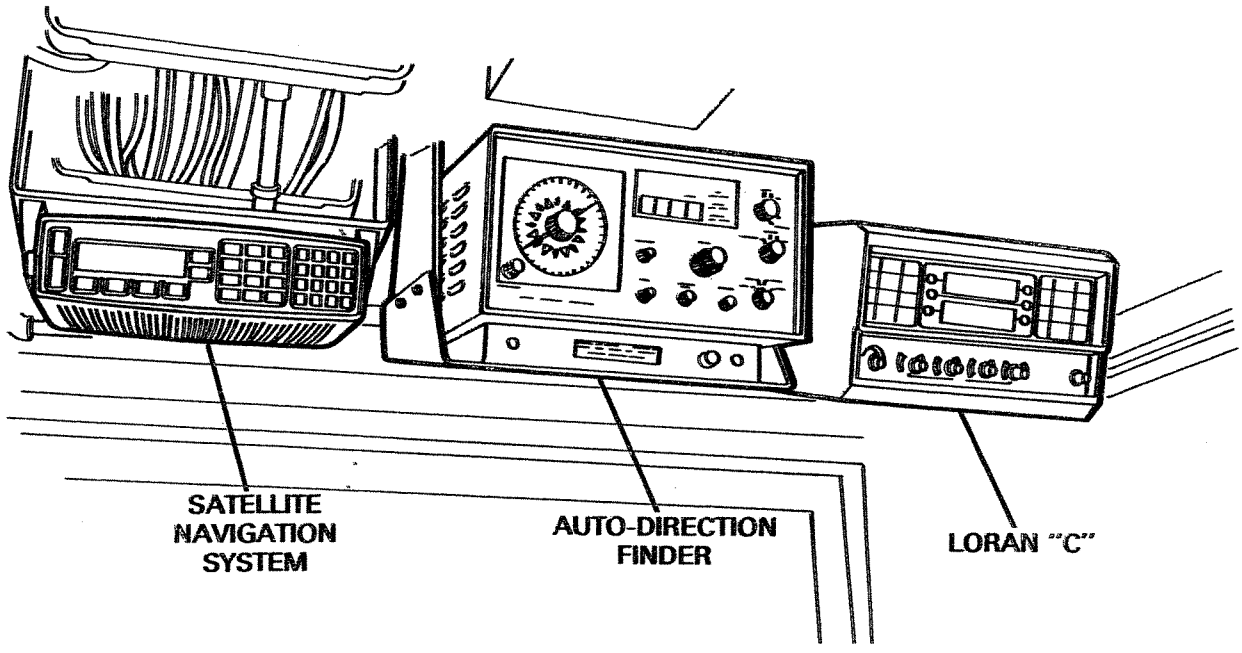


Figure 2-22. Loran "C", Satellite Navigation System and Auto Direction Finder (Pilothouse, Frame 10)

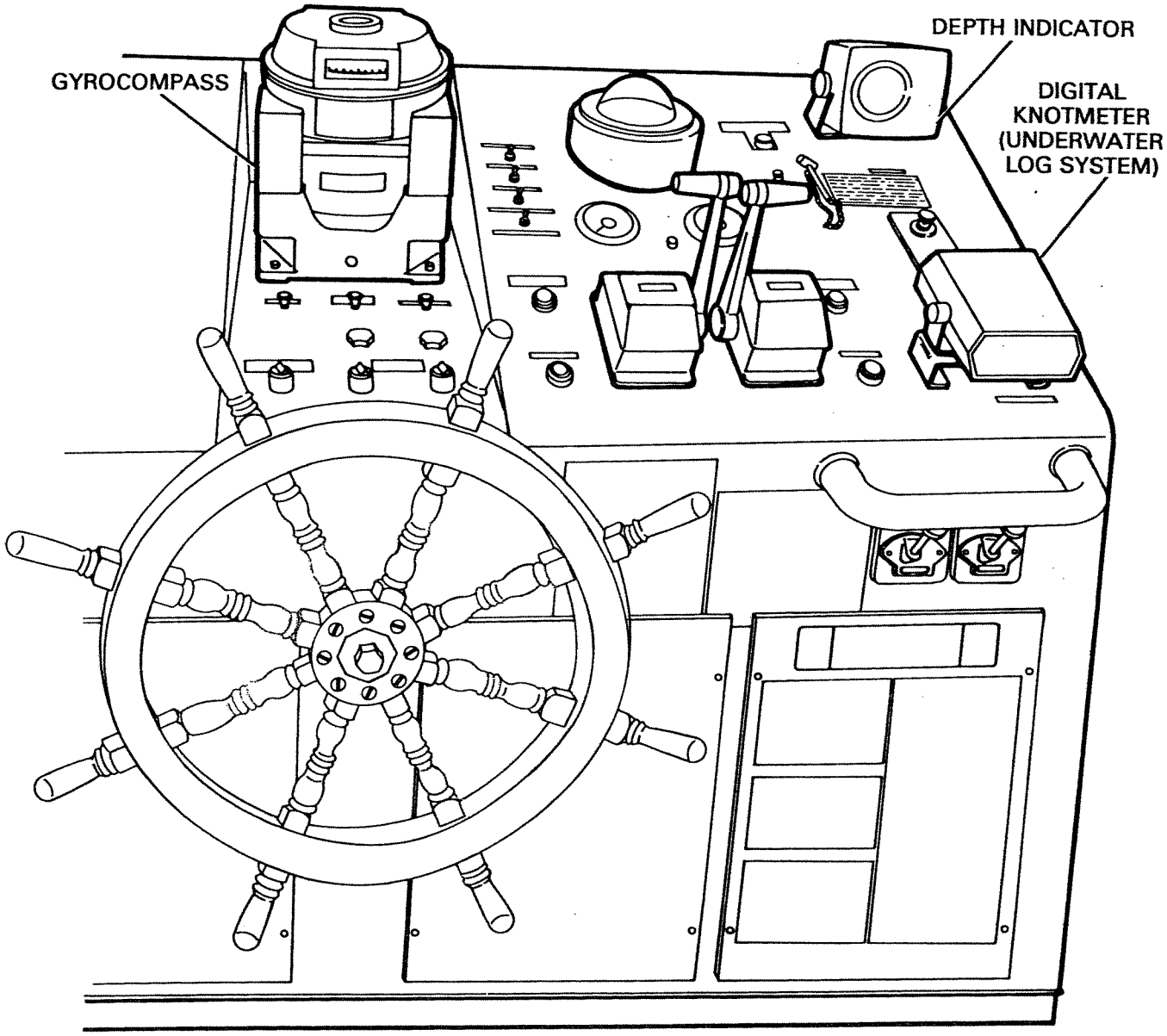


Figure 2-23. Depth Indicator, Gyrocompass and Digital Knotmeter (Pilothouse, Frame 6)

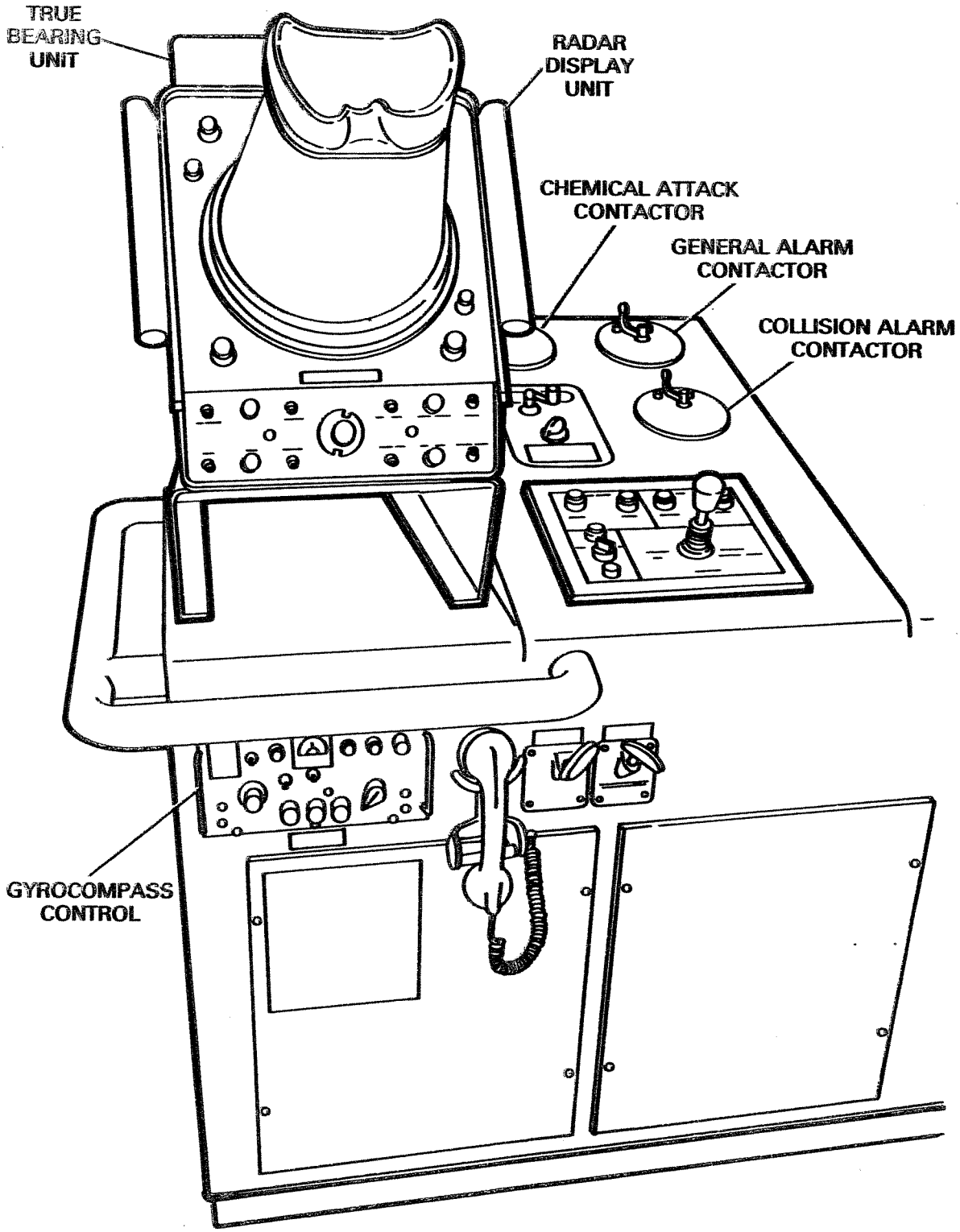


Figure 2-24. Surface Search Radar and Alarm Contactors (Pilothouse, Frame 6-1/2, Port)

2-28. ELECTRICAL NAVIGATION SYSTEMS.

2-28.1. GYROCOMPASS. The model MK27, Mod 1 gyrocompass consists of a master unit (Figure 2-23), an electronic control assembly (Figure 2-22) and the necessary interconnecting cable assemblies. The system supplies 1X and 36X speed, 400 Hertz true course information to the radar system and 70V step to the satellite navigation system. The unit is powered by the 24 VDC rectifier located on the main deck at frame 7-1/2 starboard side.

2-28.2. DIGITAL KNOTMETER. A model 3200 underwater log system (Figure 2-23) manufactured by Datamarine International Inc. is installed in the pilothouse on the starboard side of the control console. The unit operates from the main distribution panel L100 through the pilothouse lighting panel L101 and a 12 VDC power supply. The thru-hull transducer for the underwater log system is located at frame 12, 1 foot, 8 inches starboard of centerline.

2-29. TELEPHONE SYSTEMS.

The craft is equipped with six sound powered telephone sets located as follows:

1. Pilothouse — mounted on the console.
2. Auxiliary Conning Station — inside console.
3. Aft Weather Deck — frame 15.
4. Forward Look Out — Bow
5. Engine Room — aft of frame 17. The engine room telephone is mounted in an acoustical hood and is fitted with a Klaxon type horn to alert engine room personnel.
6. Lazarette — at frame 25.

Two shore dial telephones are provided for communications between ship and shore systems. The dial telephones are located as follows:

1. Pilothouse — frame 7, starboard.
2. Mess/Lounge — frame 8-1/2, port.

2-30. ANNOUNCING SYSTEMS.

2-30.1. GENERAL ANNOUNCING SYSTEM. The general announcing/intership announcing system provides for transmission of orders and information to various locations simultaneously by means of microphones and remote loudspeakers connected through a central amplifier. The system consists of a 50 watt amplifier/control unit, model number E-3750, manufactured by Marine Electric RPD Inc. and the associated speakers, loudhailer, handset and microphones. The amplifier/control unit and microphone is located in the pilothouse at frame 7, starboard side (Figure 2-25). Five labeled toggle switches on the amplifier/control unit allow selection of spaces announcement will reach. All speakers or only certain speakers can be switched on, as necessary. The announcing system serves the following spaces:

1. Crew passageway — frame 9.
2. Messroom — frame 13-1/2.
3. Engine room — frame 23.
4. Aft weather deck — frame 15.
5. Main deck passageway — frame 7.
6. Forward weather deck — Frame 4-1/2.

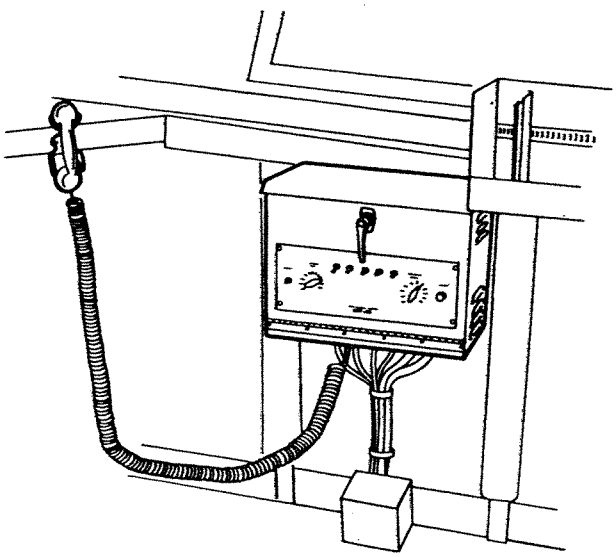


Figure 2-25. Announcing System Amplifier and Handset (Pilothouse, Frame 7, Starboard)

2-30.2. LOUDHAILER AND MEGAPHONE. The loudhailer is located atop the pilothouse; it is used with the general announcing systems. The portable megaphone is stowed in the pilothouse on the radio rack.

2-30.3. GENERAL ALARM. Refer to paragraph 2-34.4.

2-31. SHIPS ENTERTAINMENT SYSTEM.

The Radio Shack model 12-1543 radio receivers provide transmission of radio broadcast reception and cassette playing to areas within the craft. The units are installed in the mess room, CO stateroom, CPO berthing space and the crew's berthing space. The receivers are connected to a common antenna system and obtain power from the general purpose receptacle in each space.

2-32. RADIO SYSTEMS.

Radio systems provided on the craft are shown on Figure 2-26. All systems receive power from the 24 VDC rectifier panel located at frame 7-1/2 starboard side, main deck. The radio equipment is installed in the pilothouse on the radio rack, starboard side of the console at frame 7. Antennas for the radio system are located on the pilothouse top.

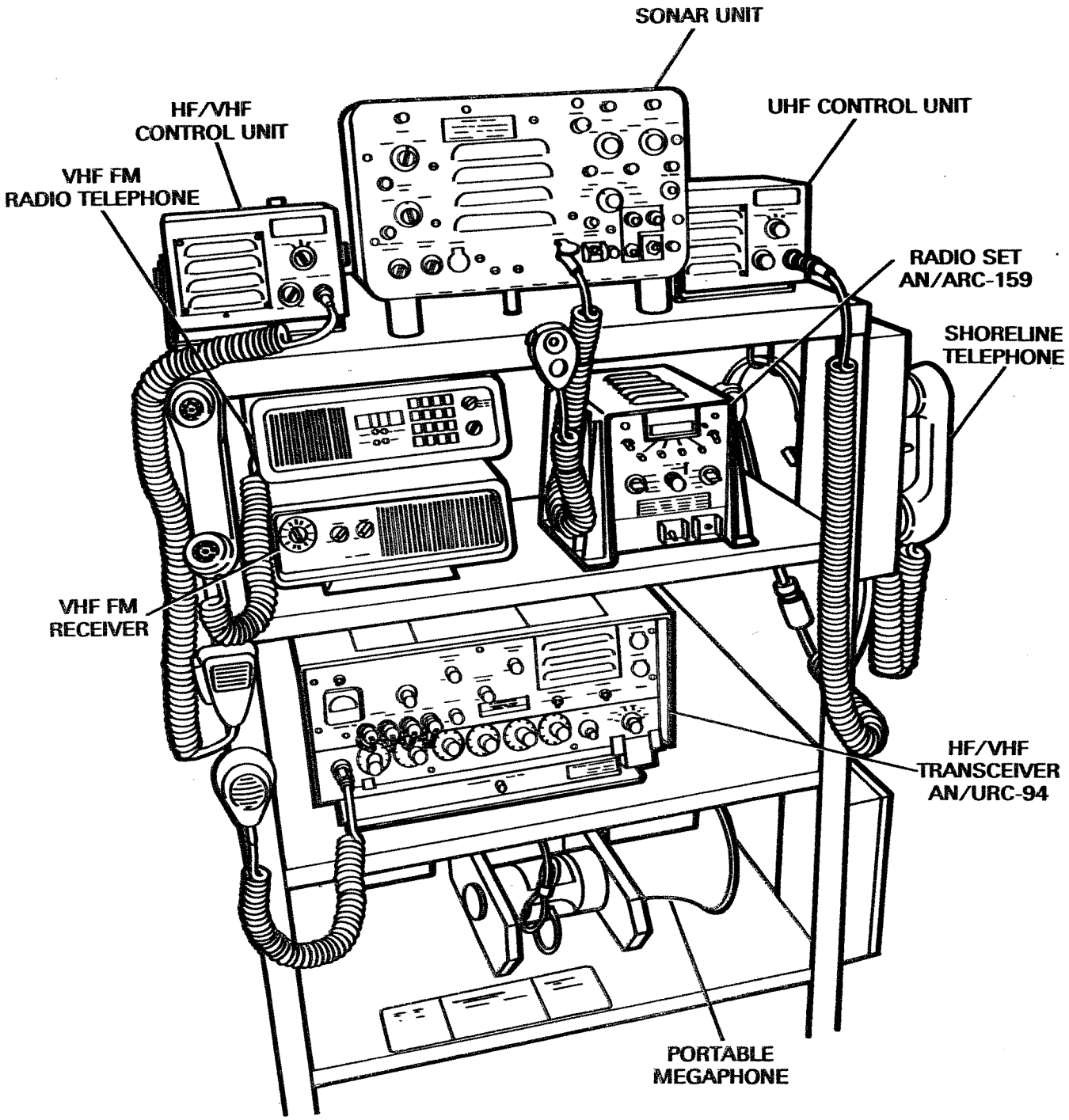


Figure 2-26. Radio Rack Components
(Pilothouse, Frame 7, Starboard)

2-32.1. UHF RADIO SET. UHF Radio Set AN/ARC-159 (225-400 MHz) with control unit C-10206 and headset RF-3014. This unit uses antenna AT-150A.

2-32.2. HF/VHF RADIO SET. HF/VHF Radio Set AN/URC-94 consists of transceiver RT-1230, control unit C-10206, handset H189-GR and junction box J-3641. This unit is used with VHF antenna coupler AS-1729 and 9-foot antenna and antenna coupler CU-2184 and 35-foot antenna.

2-32.3. VHF RADIO TELEPHONE. VHF FM Radio Telephone, Intech model 90 (155.5 - 163.575 MHz receiver and 155.5 - 158.975 MHz transmit).

2-32.4. VHF RECEIVER. VHF FM Receiver, Intech model 11 (156-163 MHz).

2-33. UNDERWATER COMMUNICATIONS SYSTEM (SONAR).

The AN/WQC-2A sonar communications set (Figure 2-26) installed on the craft consists of a receiver/transmitter, local and remote control stations and two transducers. The transducer assembly is mounted to the hull at frame 14 providing a clear acoustic field of view in the horizontal plane 350 degrees in azimuth. A guard structure is attached to the hull for transducer protection. The sonar communication set operates on 115 VAC supplied from the main distribution panel L100. The receiver/transmitter unit is located in the electrical equipment room (Figure 2-7).

2-34. ALARM AND MONITORING SYSTEMS.

2-34.1. PILOTHOUSE ALARM PANEL. (Figure 1-60.) This panel indicates the following conditions:

1. Low oil pressure on port and starboard propulsion engines and diesel generator engines.
2. High jacket water temperature on port and starboard propulsion engines and diesel generator engines.
3. Control power failure, main power failure and motor overload for steering system.
4. Bilge flooding.
5. Engine room halon release.
6. Low oil level in steering system header tank.

2-34.2. ENGINE ROOM REMOTE ALARM PANEL. (Figure 1-61.) This panel indicates the following conditions for the steering system:

1. Control power failure, main power failure and motor overload for port and starboard steering hydraulic pumps.
2. Low oil level in steering system header tank.
3. Machinery trouble.
4. Test of lamp and horn circuits.

2-34.3. HALON CONTROL PANEL. (Figure 1-52.) This panel has two lights to indicate fire in the engine room.

2-34.4. GENERAL ALARM SYSTEM. The general alarm system is an integral part of the general announcing/intership announcing system. Contactors for general alarm, collision alarm and chemical attack alarm are mounted on the console in the pilothouse (Figure 2-24).

2-34.5. SEWAGE HOLDING TANK ALARM. The sewage holding tank is equipped with an automatic alarm system to indicate when the tank is filled to 90 per cent capacity. Summary alarm lights are provided in the pilothouse (Figure 1-60) and at each water closet. The system operates on 115 VAC.

2-34.6. SEWAGE CONTROL PANEL. In addition to controlling the sewage pump this panel also contains warning lights and audible alarms for high level and low limit vacuum, a system fault light and a reset button (Figure 1-45).

2-34.7. BOW THRUSTER CONTROL PANELS. Both the pilothouse control panel (Figure 2-6) and auxiliary conning station remote control panel (Figure 2-2) have warning lights to indicate low hydraulic oil level and high oil temperature.

2-34.8. INDICATING SYSTEMS. The following indicating systems are incorporated on the craft:

1. Tachometer Indicators. Tachometer indicators for each propulsion engine are installed in the pilothouse console (Figure 2-6) and at the auxiliary conning station console (Figure 2-2). The indicators are back lighted with red lights and power is supplied through the 24 VDC rectifier, located on the main deck at frame 7-1/2, starboard.
2. Rudder Angle Indicator. The electric rudder angle indicators are installed at the pilothouse steering console (Figure 2-6) and the auxiliary conning station (Figure 2-2). The unit operates on 24 VDC supplied through the 24 VDC rectifier located on the main deck at frame 7-1/2, starboard.
3. Diesel Engines. Each propulsion engine has a gage board to monitor engine operations. The boards are located in the engine room between the engines. Each diesel generator engine is also provided with a gage board to monitor engine operation.
4. Air Conditioning Unit. A gage board is provided on the air conditioning unit (Figure 1-50) to indicate the status of operation.
5. Bilge Flooding Indicating System. Seven sensors (Figure 1-22) are installed in the bilge areas to indicate high water level.

2-35. FIRST PLATFORM AND HOLD. (Figure 2-30.)

2-35.1. LAZARETTE. The lazarette is located between frames 28 and 25 in the hold. Access is gained from the engine room at frame 25 or through the water tight hatch located port side of centerline between frames 26 and 27. The lazarette contains the steering system, the starboard and port rudder stock, the rope stowage reel, one fire pump and controller, two steering gear motor controllers and the motor controller for the hydraulic power pack. The equipment and spares storage area is located on the port side of the centerline in the lazarette. Bin and rack type stowage for mechanical, electrical and electronic repair parts is provided. The passageway between frames 23 and 25 allows access to the engine room from the lazarette. Located port and starboard of the passageway are the aft ballast tanks and fuel oil day tanks. The lube oil storage tank is located port side of the fuel oil day tank at frame 23.

2-35.2. ENGINE ROOM FIRE EXTINGUISHERS. Five portable fire extinguishers are provided in the engine room and are located as follows:

1. At frame 23 port side of centerline.
2. At frame 20 forward of port diesel generator.
3. At frame 18, on centerline.
4. At frame 18, starboard side of propulsion engine.
5. At frame 16, forward of port propulsion engine.

2-35.3. PROVISIONS STOREROOM. The provisions storeroom is located on the first platform between frames 10-3/4 and 12. Access to the storeroom is gained from passageway at frame 10-3/4. The storeroom is fitted with portable battens and gratings to prevent bulk stores from coming in contact with bulkhead or deck plating.

2-35.4. OBSERVERS BERTHING. The observers berthing space is located between frames 10 and 12 on the first platform, port side. Access to the space is gained from the passageway at frame 10. The observers berthing space is fitted with two upper berths and one lower berth with three locking drawers. Three clothes lockers and hat and coat hooks are also provided. A mirror is mounted on the bulkhead at frame 12. Three berth lights, one mirror light, one light fixture and a step light are provided for illumination. A portable fire extinguisher is located at frame 9-1/2.

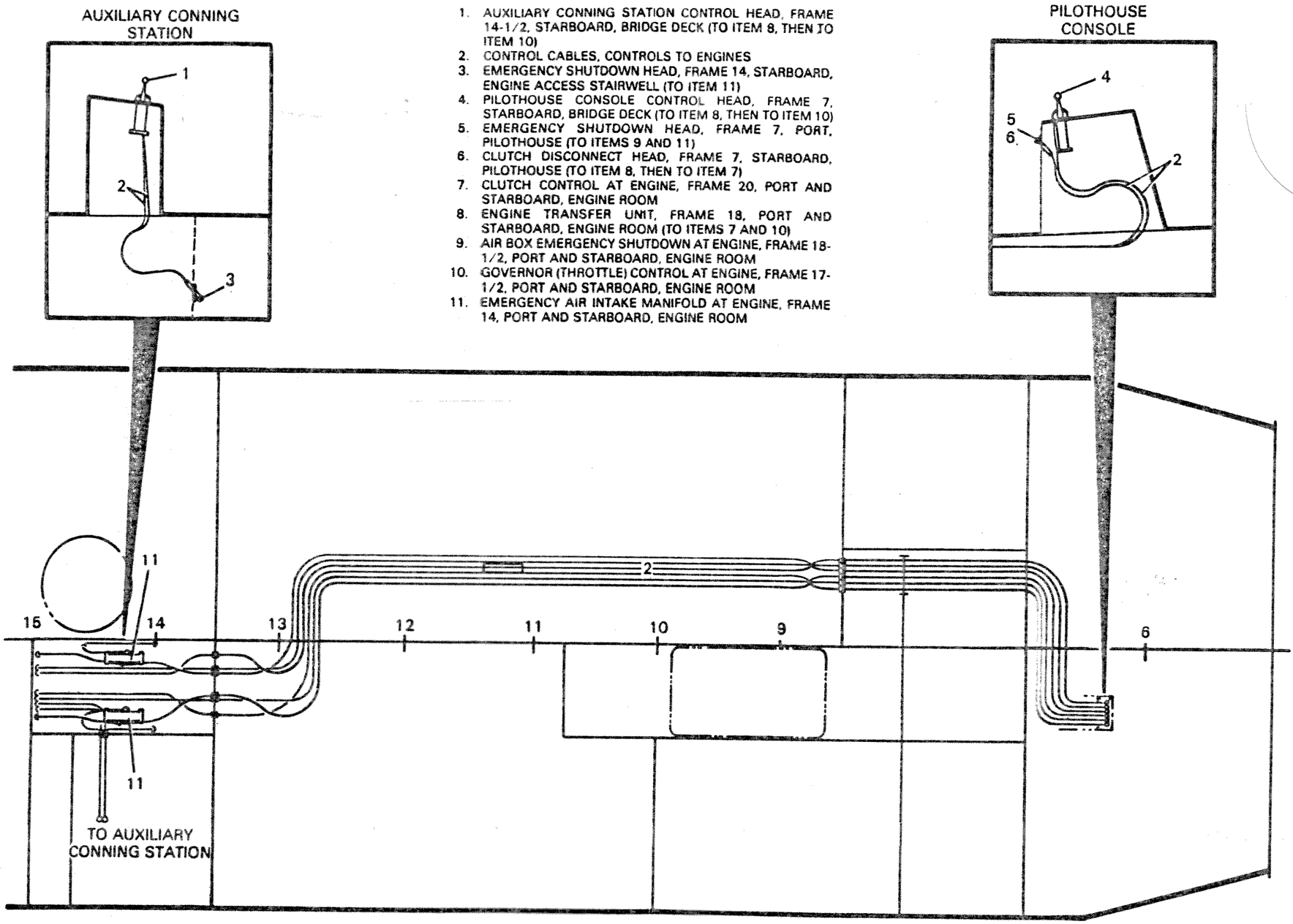
2-35.5. WASHROOM, WATER CLOSET AND SHOWERS. The washroom is located between frames 9-1/2 and 12 on the port side of the first platform. Access is gained from the passageway at frame 10-1/2. The washroom is fitted with two water closets, one lavatory and one shower. Curtains are installed at each water closet and around the shower. Towel hooks, a soap dish, a toliet cabinet, toliet paper and paper towel holders, soap dispenser unit and a mirror are also provided. A convection heater, a mirror light and a light fixture are also provided in the washroom.

2-35.6. CREW BERTHING SPACE. The crew berthing space is located between frames 6 and 9-1/2 on the first platform. Access to the space is gained from the passageway at frame 8-1/2. The crew berthing space is fitted with four upper berths, four hinged middle berths with lockers and four lower berths with lockers. Six lockers stacked two high and two large lockers are located in the space. Twelve hat and coat hooks, two mirrors and a fire extinguisher are also provided. Two light fixtures, two mirror lights, two step lights and twelve berth lights are provided in the crew berthing area. A light switch and a duplex receptacle are also provided.

2-35.7. PASSAGEWAY. The passageway is located between frames 8-1/2 and 10-3/4. The passageway gives access to the provisions storeroom, the washroom, the observers berthing space, the crew berthing space and the linen locker located under the inclined ladder on the starboard side. Access to the deckhouse can be gained by use of the inclined ladder.

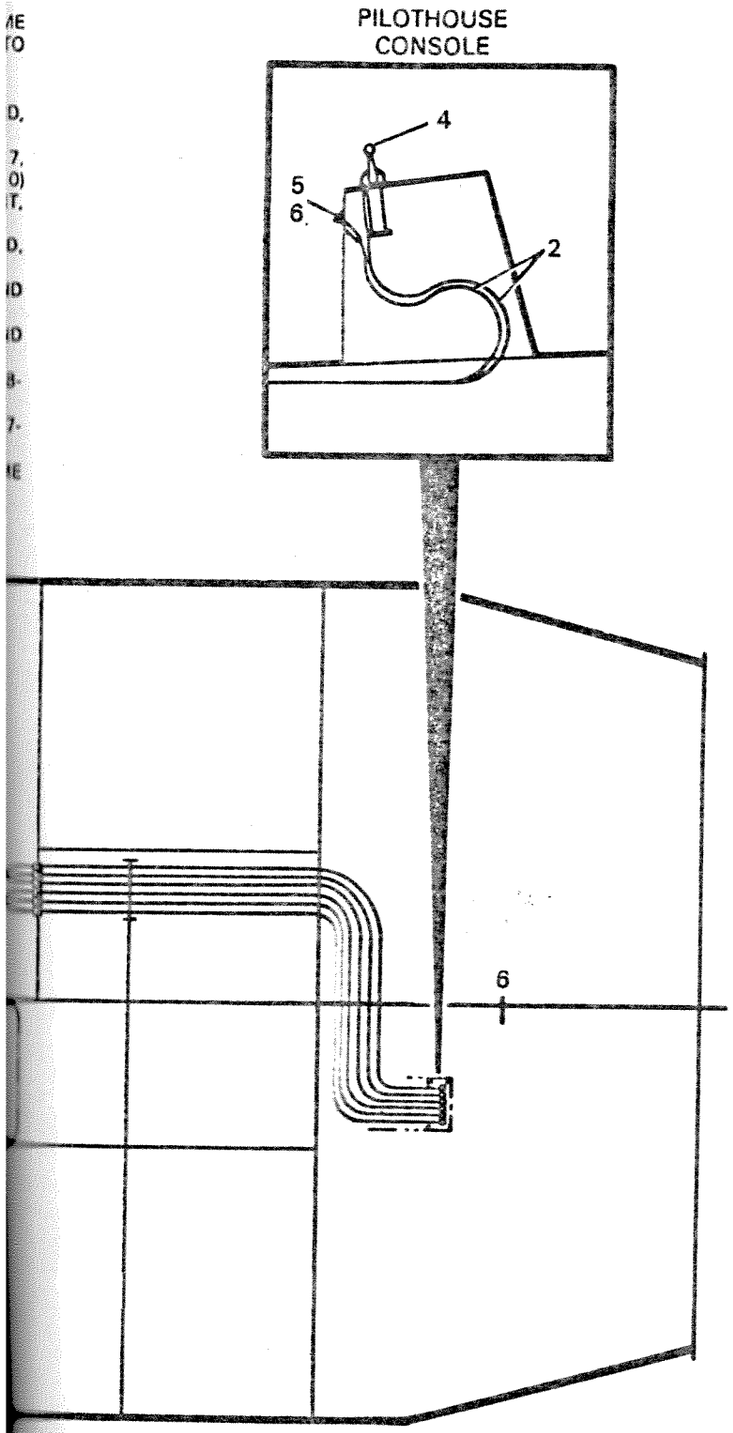
2-35.8. PUMP ROOM. The pump room is located between frames 12 and 16. Access to the pump room is obtained from the engine room or from the deckhouse via the inclined ladder. The pump room area contains the major components of the sewage system and the pressure set and water heater for the potable water system. A small sink with hot and cold water and a Betadine soap dispenser is installed under the inclined ladder for personnel use after performing maintenance on the sewage system.

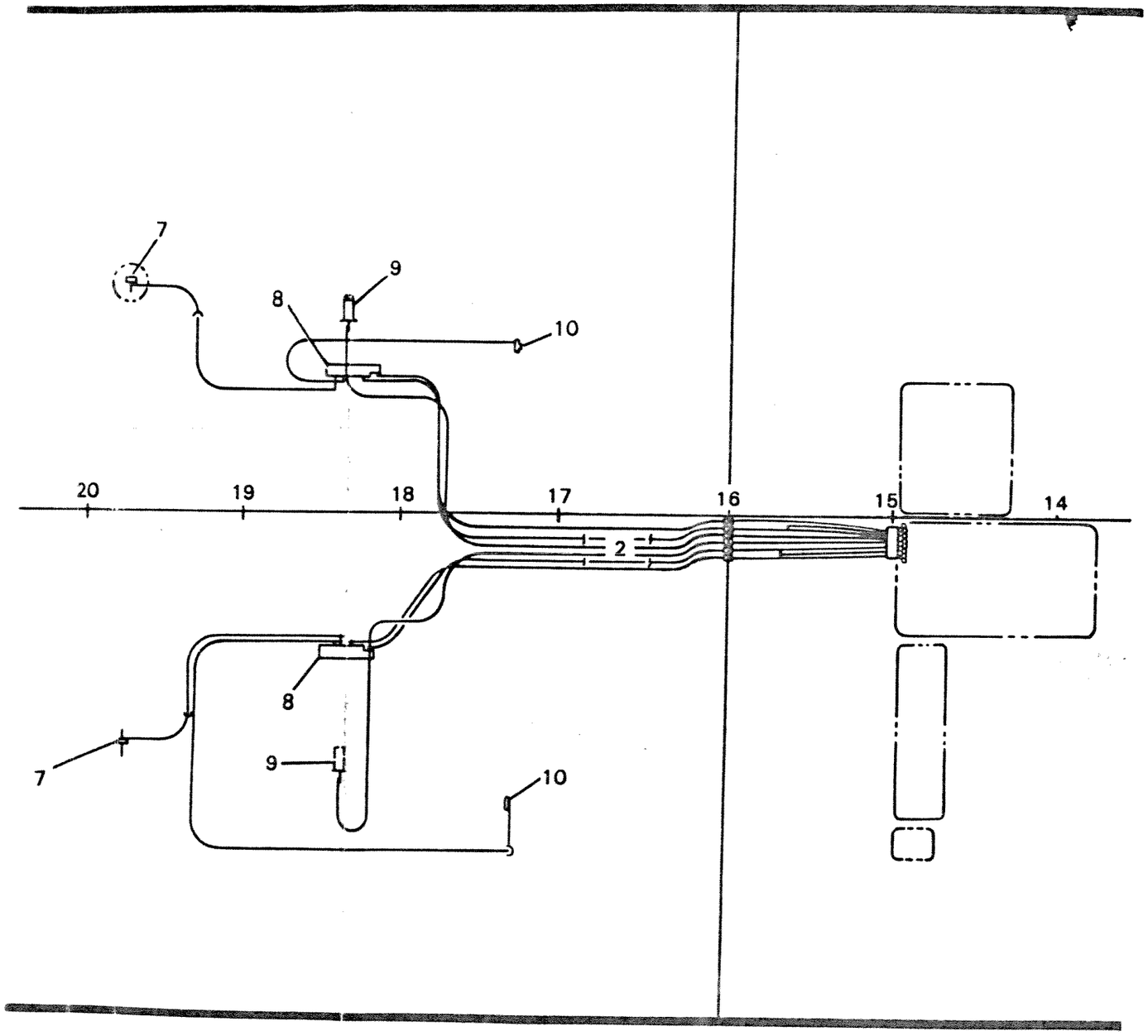
2-35.9. HOLD SPACE. The hold space from frame 6 to frame 12 contains two ballast tanks and two fuel tanks. The ballast tanks located between frames 6 and 9 have a capacity of 1457 gallons each. The fuel tank located between frames 9 and 12 have a capacity of 1801 gallons each.



1. AUXILIARY CONNING STATION CONTROL HEAD, FRAME 14-1/2, STARBOARD, BRIDGE DECK (TO ITEM 8, THEN TO ITEM 10)
2. CONTROL CABLES, CONTROLS TO ENGINES
3. EMERGENCY SHUTDOWN HEAD, FRAME 14, STARBOARD, ENGINE ACCESS STAIRWELL (TO ITEM 11)
4. PILOTHOUSE CONSOLE CONTROL HEAD, FRAME 7, STARBOARD, BRIDGE DECK (TO ITEM 8, THEN TO ITEM 10)
5. EMERGENCY SHUTDOWN HEAD, FRAME 7, PORT, PILOTHOUSE (TO ITEMS 9 AND 11)
6. CLUTCH DISCONNECT HEAD, FRAME 7, STARBOARD, PILOTHOUSE (TO ITEM 8, THEN TO ITEM 7)
7. CLUTCH CONTROL AT ENGINE, FRAME 20, PORT AND STARBOARD, ENGINE ROOM
8. ENGINE TRANSFER UNIT, FRAME 18, PORT AND STARBOARD, ENGINE ROOM (TO ITEMS 7 AND 10)
9. AIR BOX EMERGENCY SHUTDOWN AT ENGINE, FRAME 18-1/2, PORT AND STARBOARD, ENGINE ROOM
10. GOVERNOR (THROTTLE) CONTROL AT ENGINE, FRAME 17-1/2, PORT AND STARBOARD, ENGINE ROOM
11. EMERGENCY AIR INTAKE MANIFOLD AT ENGINE, FRAME 14, PORT AND STARBOARD, ENGINE ROOM

MANIFOLD CONNECTIONS

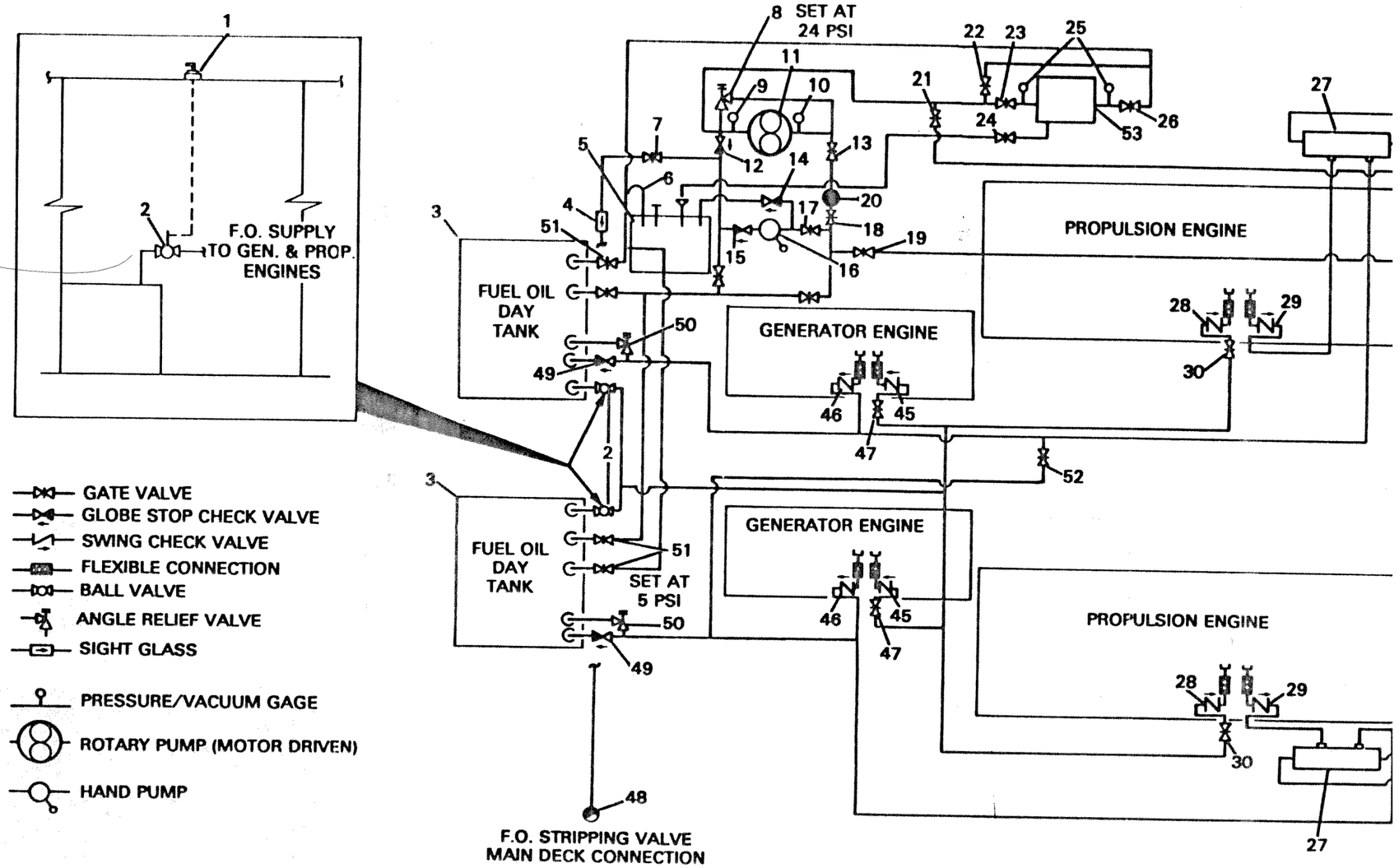




ENGINE CONTROLS CONNECTION

Figure 2-31. Propulsion Engine Controls

1. REMOTE SHUT-OFF VALVE, FRAME 23, PORT AND STARBOARD, MAIN DECK
2. F.O. SUPPLY VALVE TO ENGINES, FRAME 24, PORT AND STARBOARD, LAZARETTE
3. F.O. DAY TANKS, FRAME 23, PORT AND STARBOARD, LAZARETTE
4. SIGHT GLASS, FRAME 22, ENGINE ROOM
5. OILY WATER TANK, FRAME 22, PORT, ENGINE ROOM
6. OILY WATER TANK VENT, FRAME 22, PORT, ENGINE ROOM
7. OILY WATER DISCH. VALVE TO MN. DK., FRAME 20, PORT, ENGINE ROOM
8. XFR PUMP RELIEF VALVE, FRAME 22, PORT, ENGINE ROOM
9. PRESSURE GAGE, XFR PUMP, FRAME 22, PORT, ENGINE ROOM
10. SUCTION GAGE, XFR PUMP, FRAME 22, PORT, ENGINE ROOM
11. TRANSFER PUMP VALVE, F.O., FRAME 22, PORT, ENGINE ROOM
12. XFR PMP DISCH. VALVE, FRAME 22, PORT, ENGINE ROOM
13. XFR PMP SUCTION VALVE, FRAME, FRAME 22, ENGINE ROOM
14. OILY WATER SUCTION VALVE, FRAME 22, PORT, ENGINE ROOM
15. STRIPPING PUMP DISCH. VALVE, FRAME 22, PORT, ENGINE ROOM
16. STRIPPING PUMP, FUEL OIL, FRAME 22, PORT, ENGINE ROOM
17. F.O. STR. PUMP SUCTION VALVE, FRAME 22, PORT, ENGINE ROOM
18. F.O. XFR PUMP SUCTION VALVE, FRAME 22, PORT, ENGINE ROOM
19. F.O. XFR/STR VALVE, FRAME 20, PORT, ENGINE ROOM
20. FUEL OIL STRAINER, FRAME 22, PORT, ENGINE ROOM
21. F.O. PUR SPLY VALVE, FRAME 22, PORT, ENGINE ROOM
22. F.O. PUR BYPASS VALVE, FRAME 22, PORT, ENGINE ROOM
23. F.O. PUMP DISCH. VALVE, FRAME 20, PORT, ENGINE ROOM
24. WATER SEP. DRAIN VALVE, FRAME 22, PORT, ENGINE ROOM
25. PRESSURE GAGES, FRAME 22, PORT, ENGINE ROOM
26. F.O. RETURN VALVE, FRAME 20, STARBOARD, ENGINE ROOM
27. FUEL OIL HEAT EXCHANGER, FRAME 18, PORT AND STARBOARD, ENGINE ROOM
28. SWING CHECK VALVE PROP. ENG. SPLY, FRAME 18, ENGINE ROOM
29. SWING CHECK VALVE PROPULSION ENG. F.O. RETURN, FRAME 19, PORT AND STARBOARD, ENGINE ROOM
30. PROPULSION ENG. SPLY VALVE, FRAME 19, PORT AND STARBOARD, ENGINE ROOM
31. F.O. SPLY TANK H.S. VALVE, FRAME 16, STARBOARD, ENGINE ROOM
32. F.O. SPLY TANK L.S. VALVE, FRAME 16, STARBOARD, ENGINE ROOM
33. F.O. SUPPLY TANK MIDSHIPS, FRAMES 16 TO 22, ENGINE ROOM
34. F.O. FILL VALVE, MIDSHIP TANK, FRAME 15-1/2 STARBOARD, PUMP ROOM
35. F.O. SPLY TK. H.S. VALVE, FRAME 12, PORT, PUMP ROOM
36. F.O. SPLY TK. L.S. VALVE, FRAME 12, PORT, PUMP ROOM
37. F.O. FILL PORT TK. VALVE, FRAME 12, PORT, PUMP ROOM
38. FUEL TANK, FRAME, FRAMES 9-12, PORT
39. FUEL TANK, FRAME, FRAMES 9-12, STARBOARD
40. F.O. FILL STBD. TK. VALVE, FRAME 12, CENTERLINE, PUMP ROOM
41. F.O. SPLY TK. L.S. VALVE, FRAME 12, STARBOARD, PUMP ROOM
42. F.O. SPLY TK. H.S. VALVE, FRAME 12, STARBOARD, PUMP ROOM
43. F.O. FILL VALVE, FRAME 12, PORT, MAIN DECK
44. F.O. FILL VALVE, FRAME 12, STARBOARD, MAIN DECK
45. SWING CHECK VALVE GEN. ENG., FRAME 20, PORT AND STARBOARD, ENGINE ROOM
46. SWING CHECK VALVE, GEN. ENG., FRAME 20, PORT AND STARBOARD, ENGINE ROOM
47. GEN. F.O. SUPPLY VALVE, FRAME 20, PORT AND STARBOARD, ENGINE ROOM
48. DIRTY O. DOCKSIDE DISCH. VALVE, FRAME 22, PORT, MAIN DECK
49. F.O. DAY TK. RET. VALVE, FRAME 23, STARBOARD, ENGINE ROOM
50. RELIEF VALVE, F.O. DAY TANK, FRAME 23, PORT AND STARBOARD, ENGINE ROOM
51. F.O. RETURN TO DAY TANKS VALVE, FRAME 23, PORT AND STARBOARD, ENGINE ROOM
52. ENG. F.O. SPLY VALVE, FRAME 19, PORT AND STARBOARD, ENGINE ROOM
53. WATER SEPARATOR, FRAME 22, PORT, ENGINE ROOM



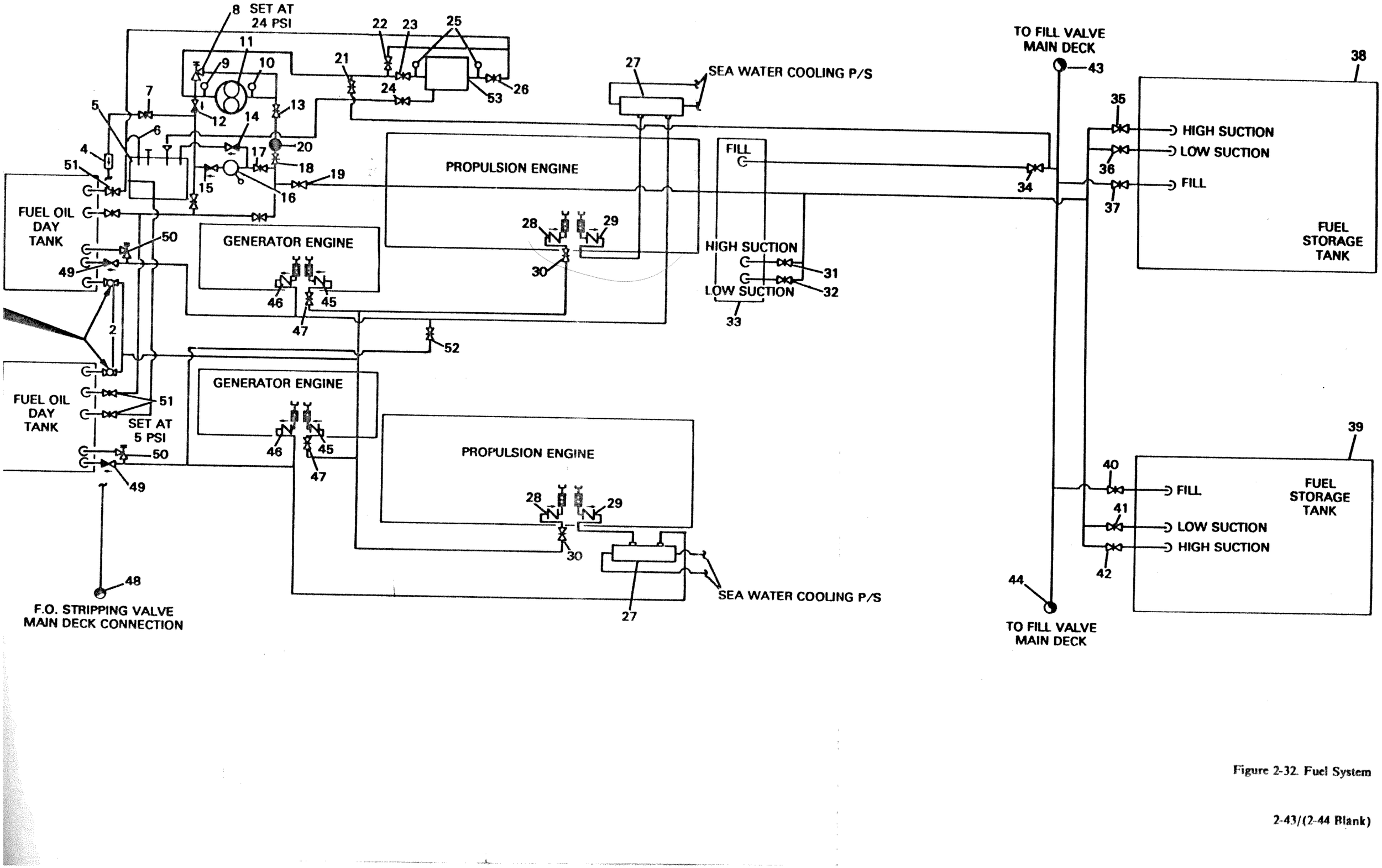
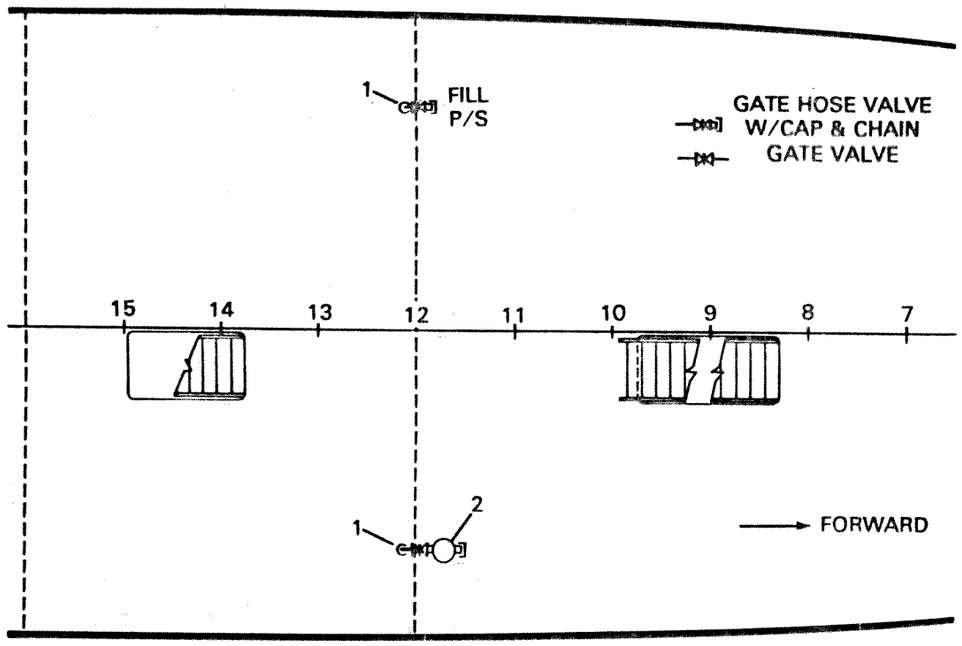
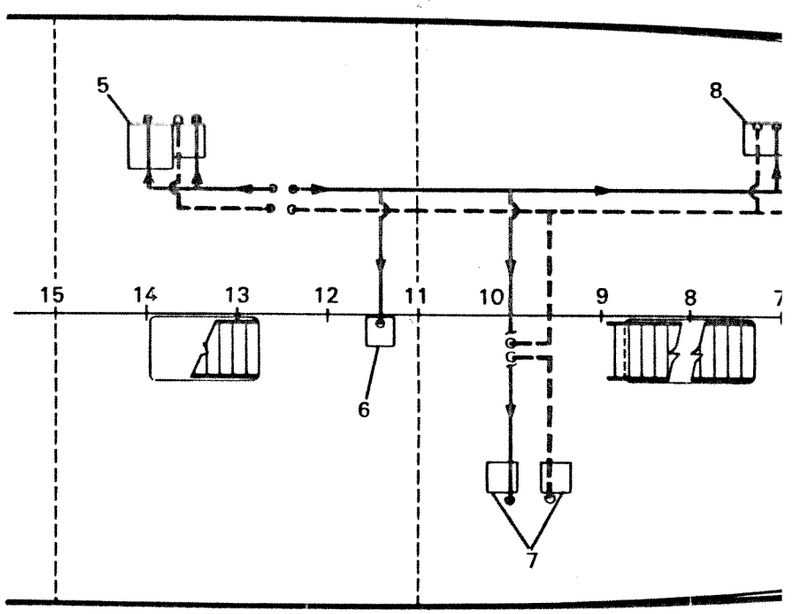


Figure 2-32. Fuel System

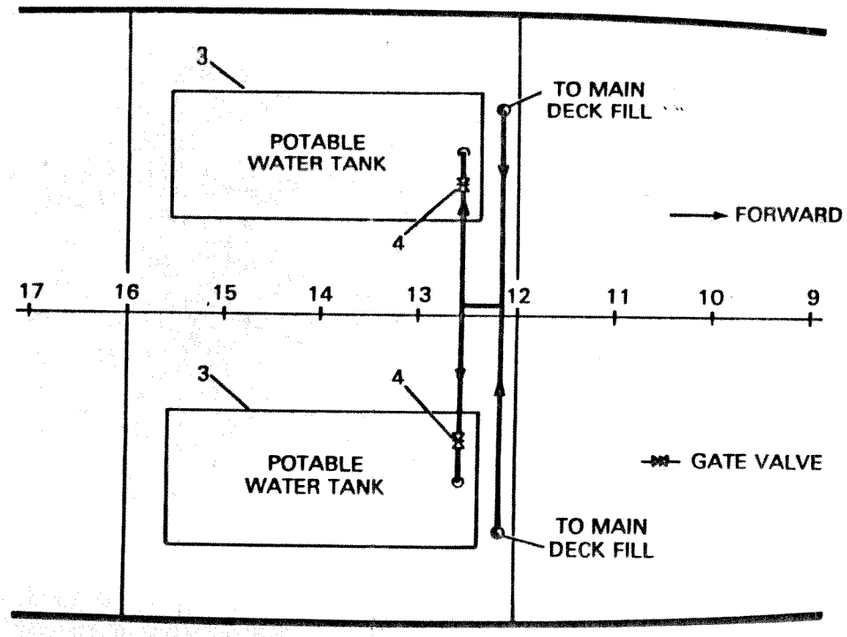
1. POT. WATER FILL VALVE, FRAME 12, PORT AND STARBOARD, MAIN DECK
2. CHLORINE TANK, FRAME 12, PORT AND STARBOARD, MAIN DECK
3. POTABLE WTR TANKS, FRAMES 12-1/2 - 15-1/2, PORT AND STARBOARD, PUMP ROOM
4. POT. WTR TK. RET. VALVE, FRAME 12, PORT AND STARBOARD, PUMP ROOM
5. DELUGE SHOWER, FRAME 15, PORT, SHELTER DECK
6. DRINKING FOUNTAIN, FRAME 12-1/2, STARBOARD, GALLEY
7. GALLEY SINKS, FRAME 11, STARBOARD, GALLEY
8. LAVATORY, FRAME 8, PORT, DECKHOUSE WASHROOM
9. SHOWER, FRAME 7, PORT, DECKHOUSE WASHROOM
10. WATER CLOSET, FRAME 7, PORT, DECKHOUSE WASHROOM
11. TORPEDO WASHDOWN VALVE, FRAME 23 AND 25-1/2, MAIN DECK
12. POT. WTR LEVEL INDICATORS, FRAME 15-1/2, PORT AND STARBOARD, PUMP ROOM
13. POT. WTR TK. VENT, FRAME 15, PORT AND STARBOARD, PUMP ROOM
14. HOT WTR HEATER, FRAME 15, PORT, PUMP ROOM
15. H.P.W. SPLY TO HAND SINK VALVE, FRAME 15-1/2, PUMP ROOM
16. C.P.W. SPLY TO HAND SINK VALVE, FRAME 15-1/2, PUMP ROOM
17. F.W. TK. DISCH. VALVE, FRAME 14-1/2, PORT AND STARBOARD, PUMP ROOM
18. HAND SINK, FRAME 14-1/2, STARBOARD, PUMP ROOM
19. C.P.W. SPLY CHECK VALVE, FRAME 14-1/2, PORT, PUMP ROOM
20. F.W. SUCT. PRESS. SET VALVE, FRAME 14-1/2, PORT, PUMP ROOM
21. C.P.W. SPLY TO MAIN DECK VALVE, FRAME 14, PORT, PUMP ROOM
22. H.P.W. SPLY TO MAIN DECK VALVE, FRAME 14, PORT, PUMP ROOM
23. C.P.W. SPLY VALVE, FRAME 12, PORT, WASHROOM, CREWS QUARTERS
24. H.P.W. SPLY VALVE, FRAME 12, PORT, WASHROOM, CREWS QUARTERS
25. RELIEF VALVE POT. WATER SPLY, FRAME 13, PORT, PUMP ROOM
26. POT. WTR SUPPLY VALVE, FRAME 12-1/2, CENTERLINE, PUMP ROOM
27. POT. WTR SUPPLY VALVE, FRAME 13-1/2, PORT, PUMP ROOM
28. PRESS SET DISCHARGE VALVE, FRAME 14, STARBOARD, PUMP ROOM
29. C.P.W. SPLY HEATER VALVE, FRAME 14, CENTERLINE, PUMP ROOM
30. FRESH WTR PUMP, FRAME 14-1/2, STARBOARD, PUMP ROOM
31. PRESSURE TANK, FRAME 13, STARBOARD, PUMP ROOM
32. POT. WTR FILTERS, FRAME 13, STARBOARD, PUMP ROOM
33. WATER CLOSETS, FRAME 12, PORT, WASHROOM
34. LAVATORY, FRAME 10, PORT, WASHROOM
35. SHOWER, FRAME 9-1/2, PORT, WASHROOM
36. BOOSTER HEATER, FRAME 11-1/2, PROVISIONS STORE ROOM
37. C.P.W. SPLY VALVE, MN. DECK WR, FRAME 7, PORT, CREWS QUARTERS
38. H.P.W. SPLY VALVE, MN. DECK WR, FRAME 7, PORT, CREWS QUARTERS
39. C.P.W. SERV VALVE, FRAME 20, STARBOARD, ENGINE ROOM



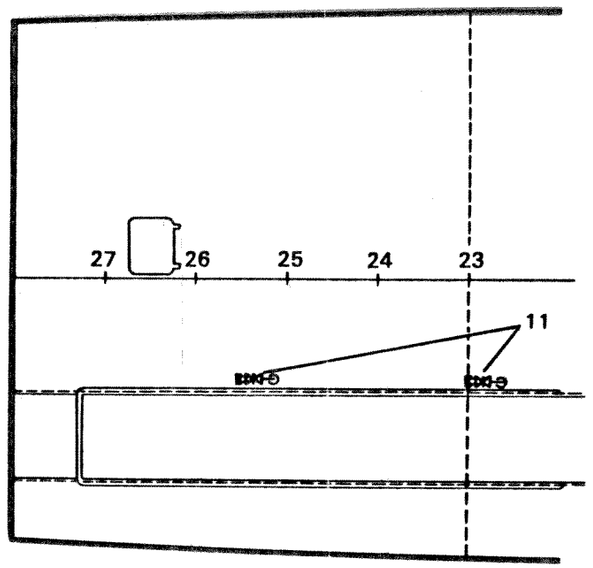
MAIN DECK



MAIN DECK



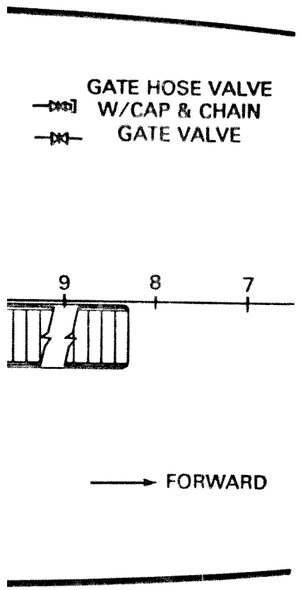
HOLD

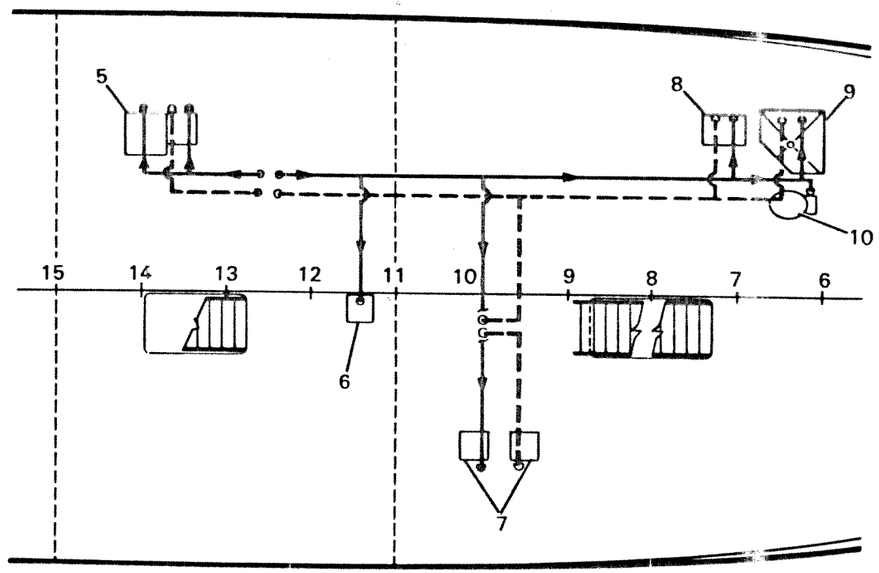


MAIN DECK

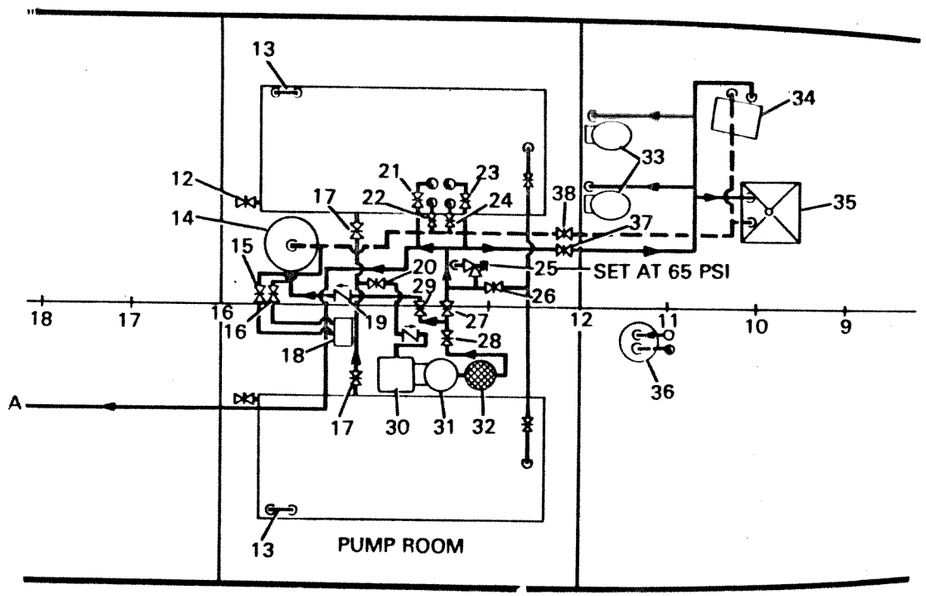
HOLD

GATE
W/C
COLD
HOT V

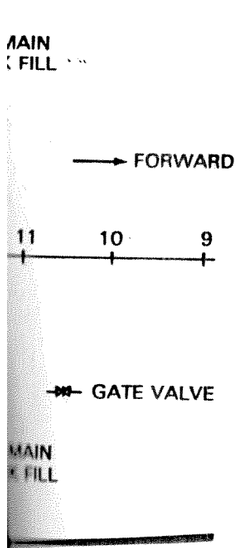


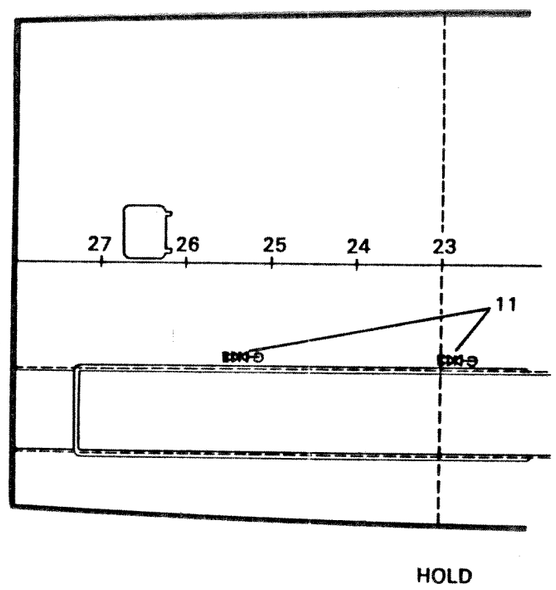


MAIN DECK



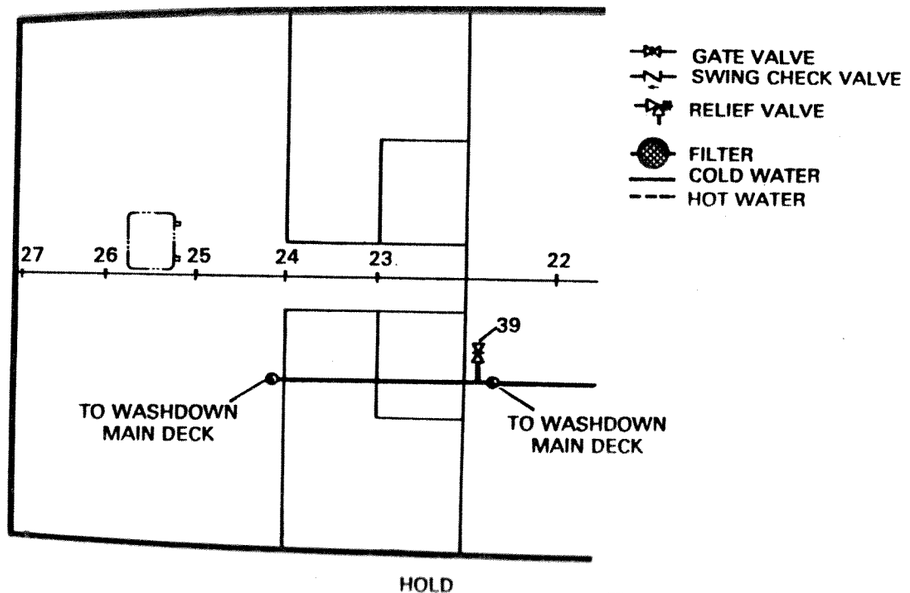
FIRST PLATFORM





HOLD

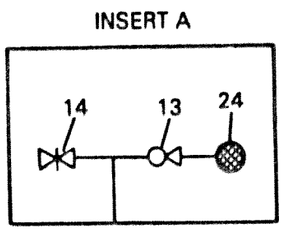
GATE HOSE VALVE W/CAP & CHAIN
COLD WATER
HOT WATER

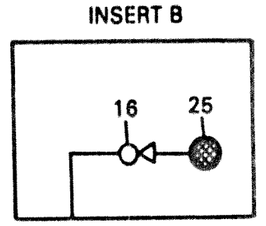


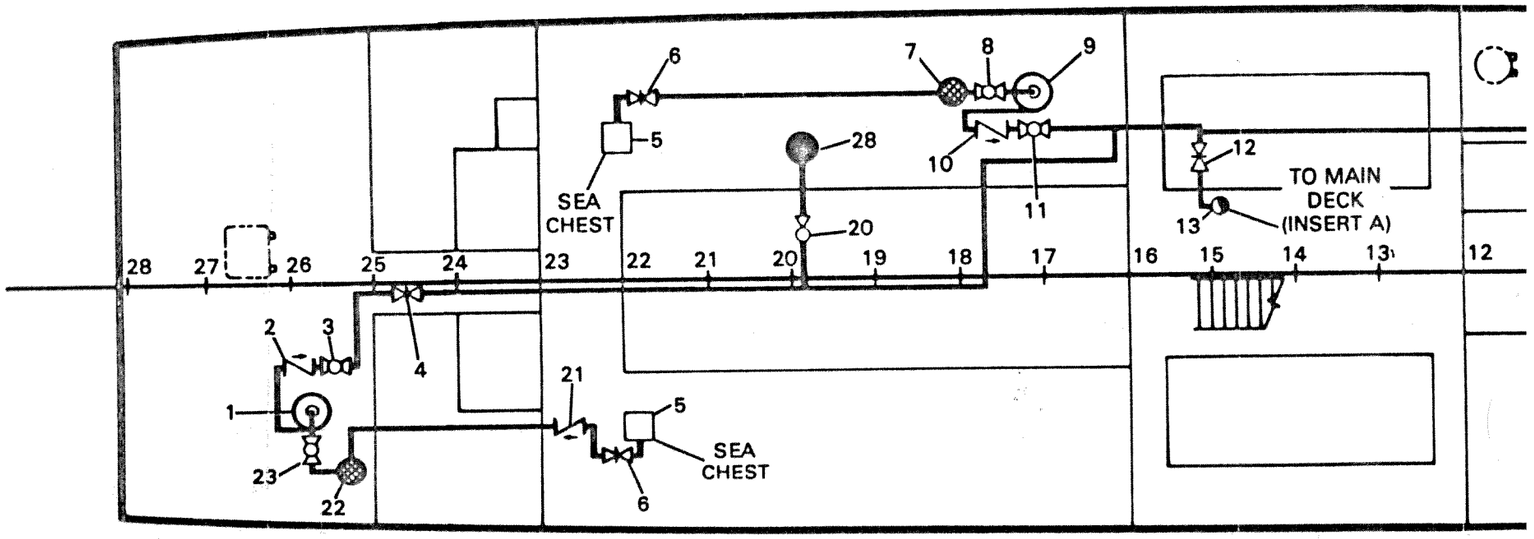
HOLD

Figure 2-33. Fresh Water System

1. FIRE, BILGE & BALLAST PUMP #1, FRAME 25, STARBOARD, LAZARETTE
2. PUMP #1 DISCH. CHECK VALVE, FRAME 25-1/2, STARBOARD, LAZARETTE
3. FIRE BILGE & BL'ST DISCH. VALVE, FRAME 25, STARBOARD, LAZARETTE
4. FIRE MAIN S.W. SUPPLY VALVE, FRAME 25, STARBOARD, LAZARETTE
5. SEA CHEST, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
6. S.W. SEA CHEST SUCTION VALVE, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
7. S.W. STRAINER, FRAME 16-1/2, PORT, ENGINE ROOM
8. FIRE PUMP #2 SUCTION VALVE, FRAME 16, PORT, ENGINE ROOM
9. FIRE PUMP #2, FRAME 16-1/2, PORT, ENGINE ROOM
10. #2 FIRE PUMP DISCH. CHECK VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
11. FIRE PUMP #2 DISCHARGE VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
12. F.S. #3 SUPPLY TO MN. DK. VALVE, FRAME 16, PORT, PUMP ROOM
13. FIRE STA. #3 VALVE, FRAME, FRAME 15, PORT, MAIN DECK
14. PE-250 SPLY VALVE TO FM, FRAME 15, PORT, MAIN DECK
15. F.S. #1 SUPPLY VALVE TO BRIDGE, FRAME 10-1/2, STARBOARD, CPO STATEROOM
16. FIRE STA. #1 VALVE, FRAME 10, PORT, BRIDGE DECK
17. F.S. #2 SUPPLY VALVE TO MN. DK., FRAME 7, STARBOARD, CREW BERTHING
18. FIRE STA. #2 VALVE, FRAME 4-1/2, PORT, MAIN DECK
19. FIRE STA. #4 VALVE, FRAME 9, CENTERLINE, PASSAGE 1ST PLATFORM
20. FIRE STA. #5 VALVE, FRAME 20, CENTERLINE, ENGINE ROOM
21. FIRE PUMP SUCT. CHECK VALVE, FRAME 22-1/2, STARBOARD, ENGINE ROOM
22. S.W. STRAINER, FRAME 25, STARBOARD, LAZARETTE
23. FIRE PUMP SUCT. VALVE, FRAME 25, STARBOARD, LAZARETTE
24. FIRE STATION STRAINER, FRAME 14-1/2, PORT, MAIN DECK
25. FIRE STATION STRAINER, FRAME 9-1/2, PORT, BRIDGE DECK
26. FIRE STATION STRAINER, FRAME 8-1/2, CENTERLINE, PASSAGE 1ST PLATFORM
27. FIRE STATION STRAINER, FRAME 4, PORT, MAIN DECK
28. FIRE STATION STRAINER, FRAME 20, CENTERLINE, ENGINE ROOM







GATE VALVE
GLOBE STOP CH
CHECK VALVE
BALL VALVE
FIRE STATION VA

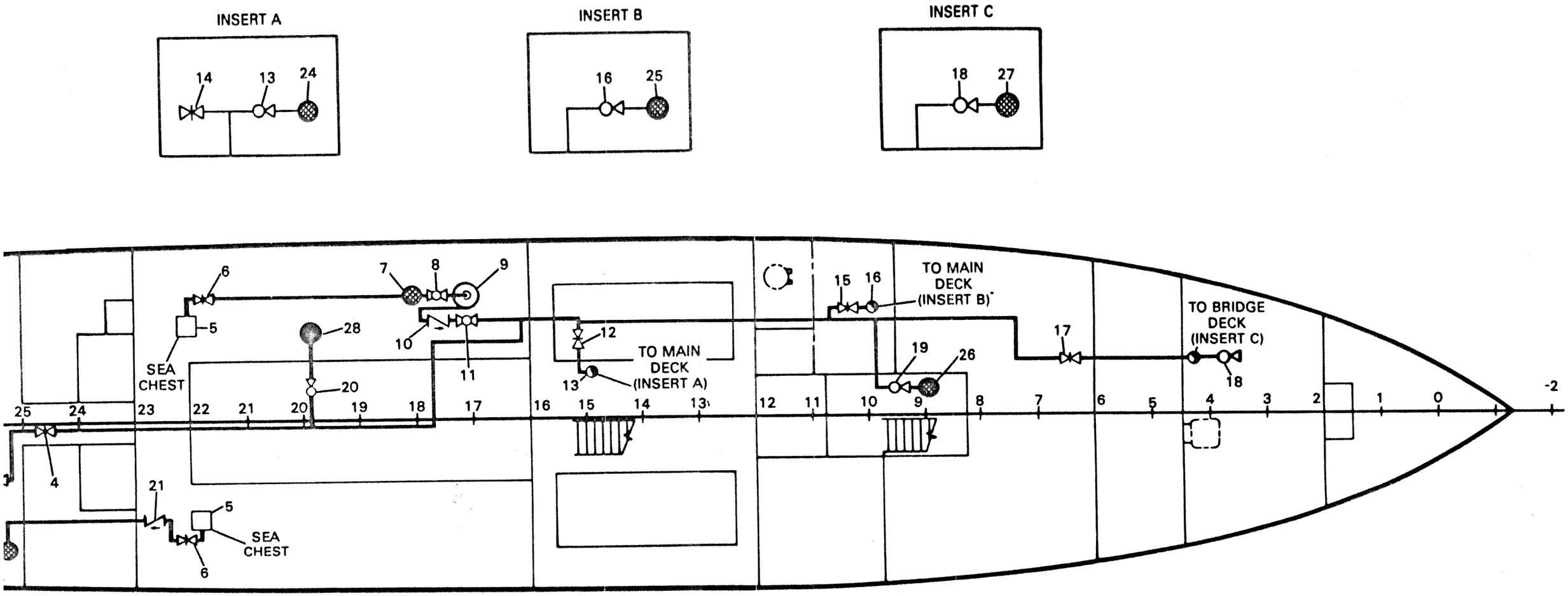
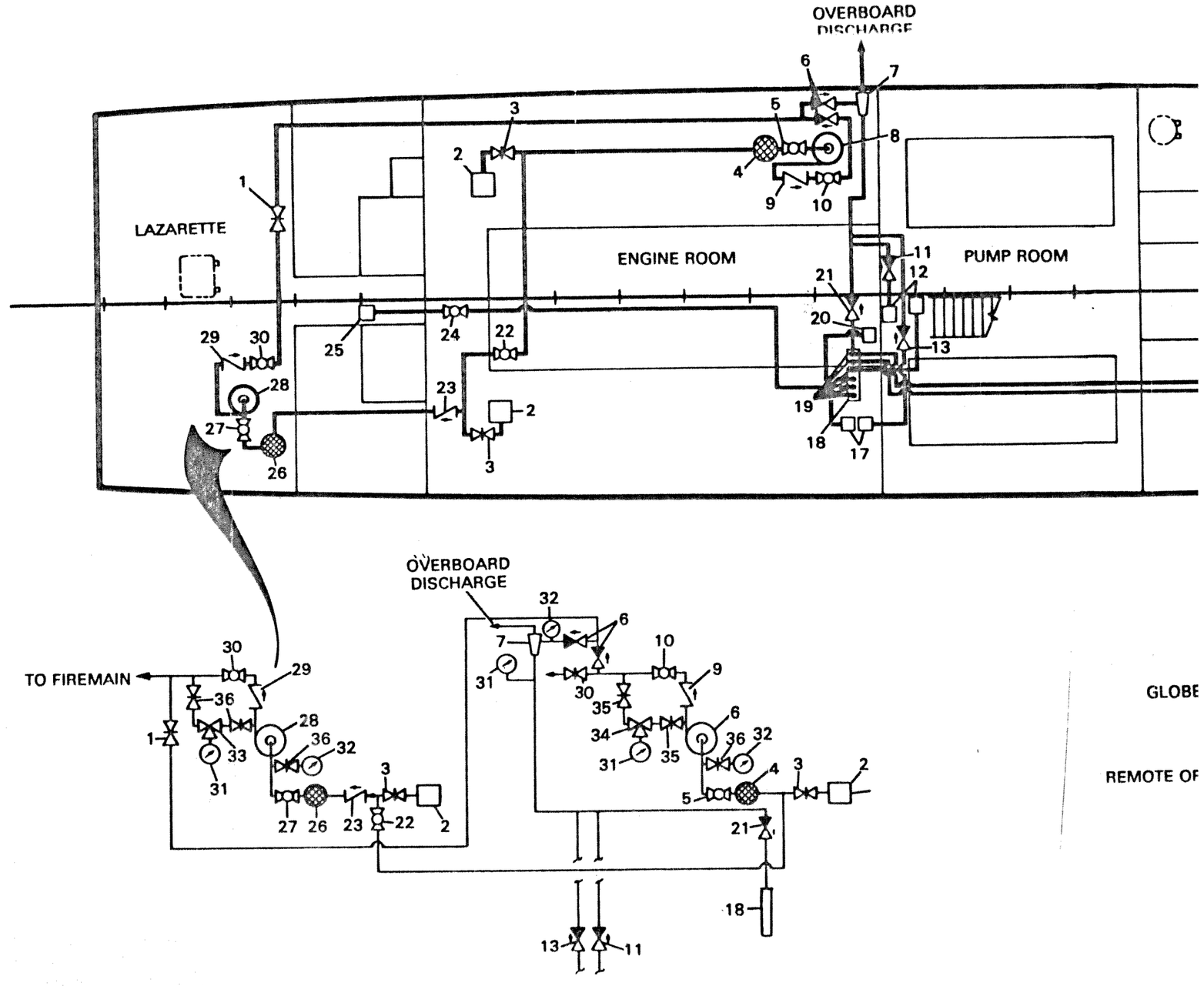


Figure 2-34. Firemain Diagram

1. BILGE & BLST OVBD DISCH. VALVE, FRAME 25, PORT, LAZARETTE
2. SEA CHEST, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
3. S.W. SUCT. VALVE, SEA CHEST, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
4. S.W. STRAINER, FRAME 16-1/2, PORT, ENGINE ROOM
5. FIRE PUMP SUCT. VALVE, FRAME 16, PORT, ENGINE ROOM
6. BILGE & BLST OVBD. DISCH. VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
7. EDUCTOR, FRAME 16-1/2, PORT, ENGINE ROOM
8. FIRE PUMP #2, FRAME 16-1/2, PORT, ENGINE ROOM
9. FIRE PUMP #2 DISCH. CHECK VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
10. FIRE PUMP DISCH. VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
11. INDEP. BILGE SUCT. VALVE, FRAME 16, STARBOARD, PUMP ROOM
12. BILGE STRAINER, FRAME 15-3/4, PORT AND STARBOARD, PUMP ROOM
13. INDEP. BILGE SUCT. VALVE, FRAME 16, STARBOARD, PUMP ROOM
14. BILGE STRAINER, FRAME 6, STARBOARD, BOW THRUSTER AREA
15. CHAIN LOCKER, SUCT. VALVE, FRAME 2, CENTERLINE, CREW BERTHING
16. SUMP TANK, CHAIN LOCKER, FRAME 2, STARBOARD
17. BILGE STRAINER, FRAME 16-1/2, STARBOARD, ENGINE ROOM
18. BILGE MANIFOLD, FRAME 16-1/2, PORT, ENGINE ROOM
19. BILGE SUCT. VALVE, LAZARETTE, FRAME 16-1/2, CENTERLINE, ENGINE ROOM
19. BILGE SUCT. VALVE, BOW THR., FRAME 16-1/2, CENTERLINE, ENGINE ROOM
19. BILGE SUCT. VALVE, PUMP RM., FRAME 16-1/2, CENTERLINE, ENGINE ROOM
19. BILGE SUCT. VALVE, ENG. RM., PORT, FRAME 16-1/2, CENTERLINE, ENGINE ROOM
19. BILGE SUCT. VALVE, ENG. RM. STARBOARD, FRAME 16-1/2, CENTERLINE, ENGINE ROOM
20. BILGE STRAINER, FRAME 16-1/2, STARBOARD, ENGINE ROOM
21. BILGE MANIFOLD SUCTION VALVE, FRAME 16, PORT, ENGINE ROOM
22. BILGE & BLST OVBD DISCH. VALVE, FRAME 22, CENTERLINE, ENGINE ROOM
23. FIRE PUMP SUCT. CHECK VALVE, FRAME 22-1/2, STARBOARD, ENGINE ROOM
24. BILGE DRAIN VALVE, FRAME 22, CENTERLINE, ENGINE ROOM
25. BILGE STRAINER, FRAME 24, CENTERLINE, LAZARETTE
26. S.W. STRAINER, FRAME 25, STARBOARD, LAZARETTE
27. FIRE, BILGE PUMP SUCT. VALVE, FRAME 25, STARBOARD, LAZARETTE
28. FIRE PUMP #1, FRAME 25-1/2, STARBOARD, LAZARETTE
29. FIRE PUMP DISCH. CHECK VALVE, FRAME 25-1/2, STARBOARD, LAZARETTE
30. FIRE, BILGE PUMP DISCH. VALVE, FRAME 25, STARBOARD, LAZARETTE
31. PRESSURE GAGE, FRAME 16-1/2, PORT, ENGINE ROOM
31. PRESSURE GAGE, FRAME 25-1/2, STARBOARD, LAZARETTE
32. PRESS/VAC GAGE, FRAME 16-1/2, PORT, ENGINE ROOM
32. PRESS/VAC GAGE, FRAME 25-1/2, STARBOARD, LAZARETTE
33. THREE WAY FIRE PUMP VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
34. THREE WAY FIRE PUMP VALVE, FRAME 25-1/2, PORT, LAZARETTE
35. ISLN. VALVES, FRAME 16-1/2, PORT, ENGINE ROOM
36. ISLN. VALVES, FRAME 25-1/2, STARBOARD, LAZARETTE



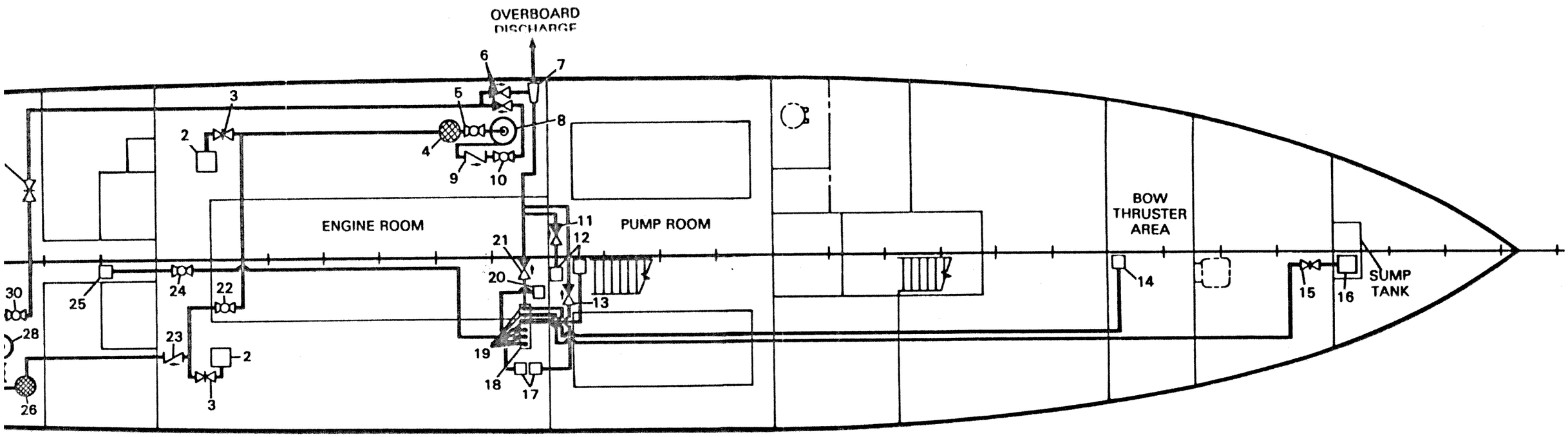
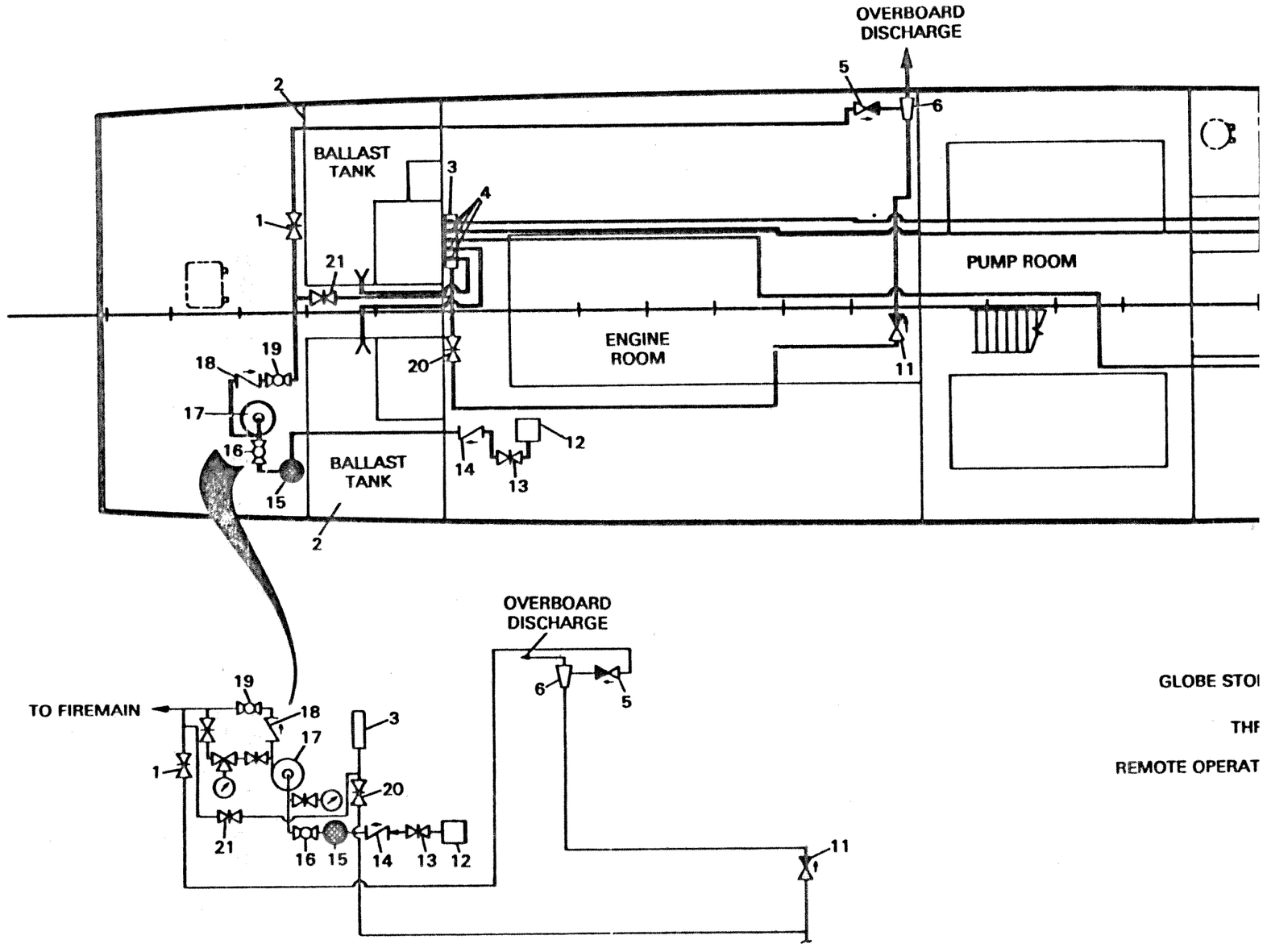


Figure 2-35. Bilge System Diagram

1. BALLAST OVBD. DISCH. VALVE, FRAME 25, PORT, LAZARETTE
2. BALLAST TANKS, FRAME 23 - 25, PORT AND STARBOARD, LAZARETTE
3. BALLAST MANIFOLD, FRAME 23, PORT, ENGINE ROOM
4. AFT PORT BLST. TK. SUCT. & DISCH. VALVE, FRAME 23, PORT, ENGINE ROOM
4. AFT STBD BLST. TK. SUCT. & DISCH. VALVE, FRAME 23, PORT, ENGINE ROOM
4. FWD PORT BLST. TK. SUCT. & DISCH. VALVE, FRAME 23, PORT, ENGINE ROOM
4. FWD STBD BLST. TK. SUCT. & DISCH. VALVE, FRAME 23, PORT, ENGINE ROOM
4. FWD PEAK BLST. TK. SUCT. & DISCH. VALVE, FRAME 23, PORT, ENGINE ROOM
5. BLST. OVBD. DISCH. VALVE, FRAME 16, PORT, ENGINE ROOM
6. EDUCTOR, FRAME 16-1/2, PORT, ENGINE ROOM
7. FWD BALLAST TANK, FRAMES 6 - 9-1/2, PORT, HOLD
8. FOREPEAK BALLAST VALVE, FRAME 2, STARBOARD, CREW BERTHING
9. FOREPEAK BALLAST TANK, FRAMES -1 to 2, HOLD
10. FWD BALLAST TANK, FRAMES 6 - 9-1/2, STARBOARD, HOLD
11. BALLAST OVBD. DISCH. VALVE, FRAME 16, STARBOARD, ENGINE ROOM
12. S.W. SEA CHEST, FRAME 20-1/2, STARBOARD, ENGINE ROOM
13. S.W. SUCT. VALVE, SEA CHEST, FRAME 20-1/2, STARBOARD, ENGINE ROOM
14. FIRE PUMP SUCT. CHECK VALVE, FRAME 22-1/2, STARBOARD, ENGINE ROOM
15. S.W. STRAINER, FRAME 25, STARBOARD, LAZARETTE
16. FIRE, BILGE, BLST. PUMP SUCT. VALVE, FRAME 25, STARBOARD, LAZARETTE
17. FIRE, BILGE, BLST. PUMP, FRAME 25-1/2, STARBAORD, LAZARETTE
18. FIRE PUMP DISCH. CHECK VALVE, FRAME 25-1/2, STARBOARD, LAZARETTE
19. BALLAST PUMP DISCH. VALVE, FRAME 25, STARBOARD, LAZARETTE
20. BALLAST MANIFOLD DISCH. VALVE, FRAME 23, CENTERLINE, ENGINE ROOM
21. BALLAST MANIFOLD SUCT. VALVE, FRAME 25, CENTERLINE, LAZARETTE



GLOBE STOI

THI

REMOTE OPERAT

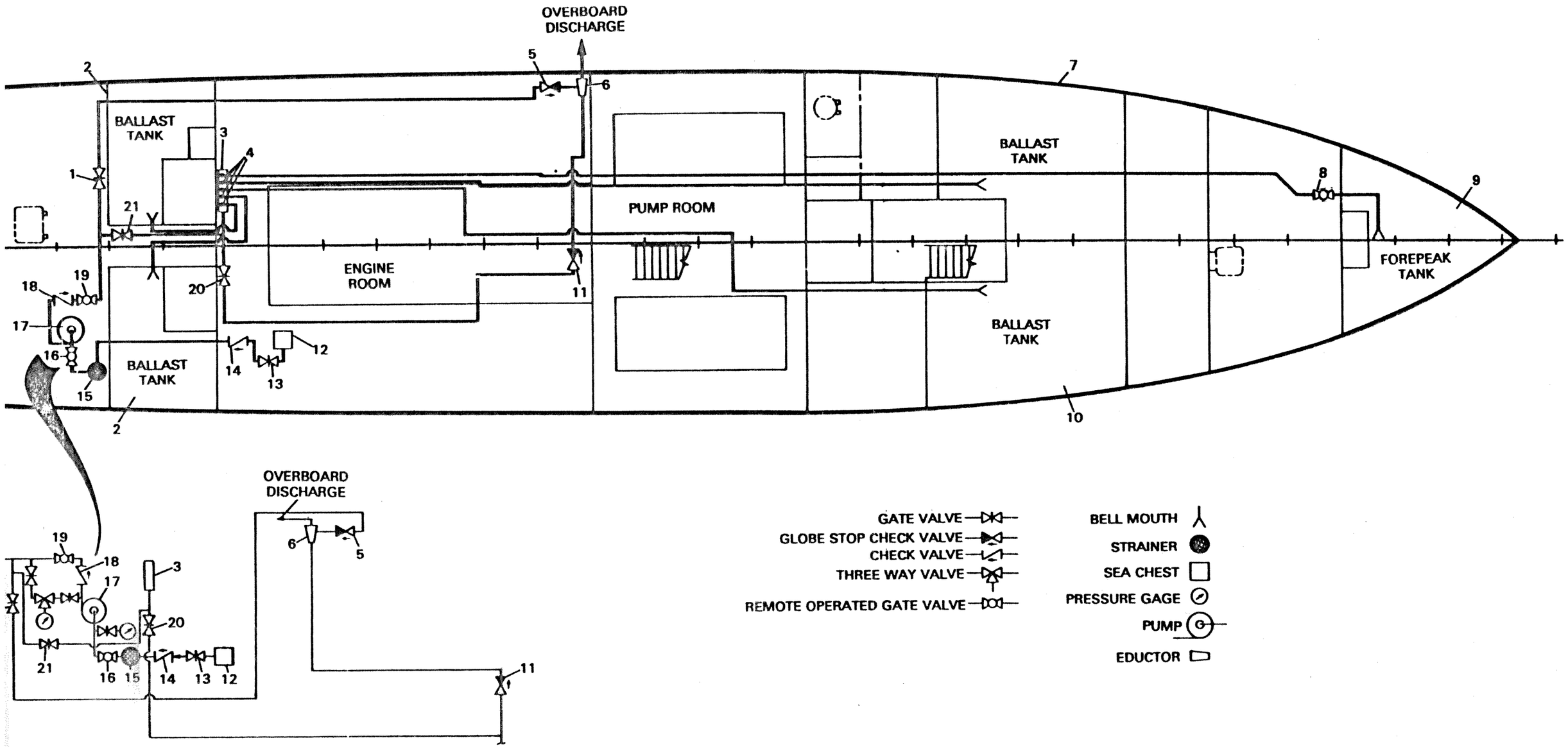
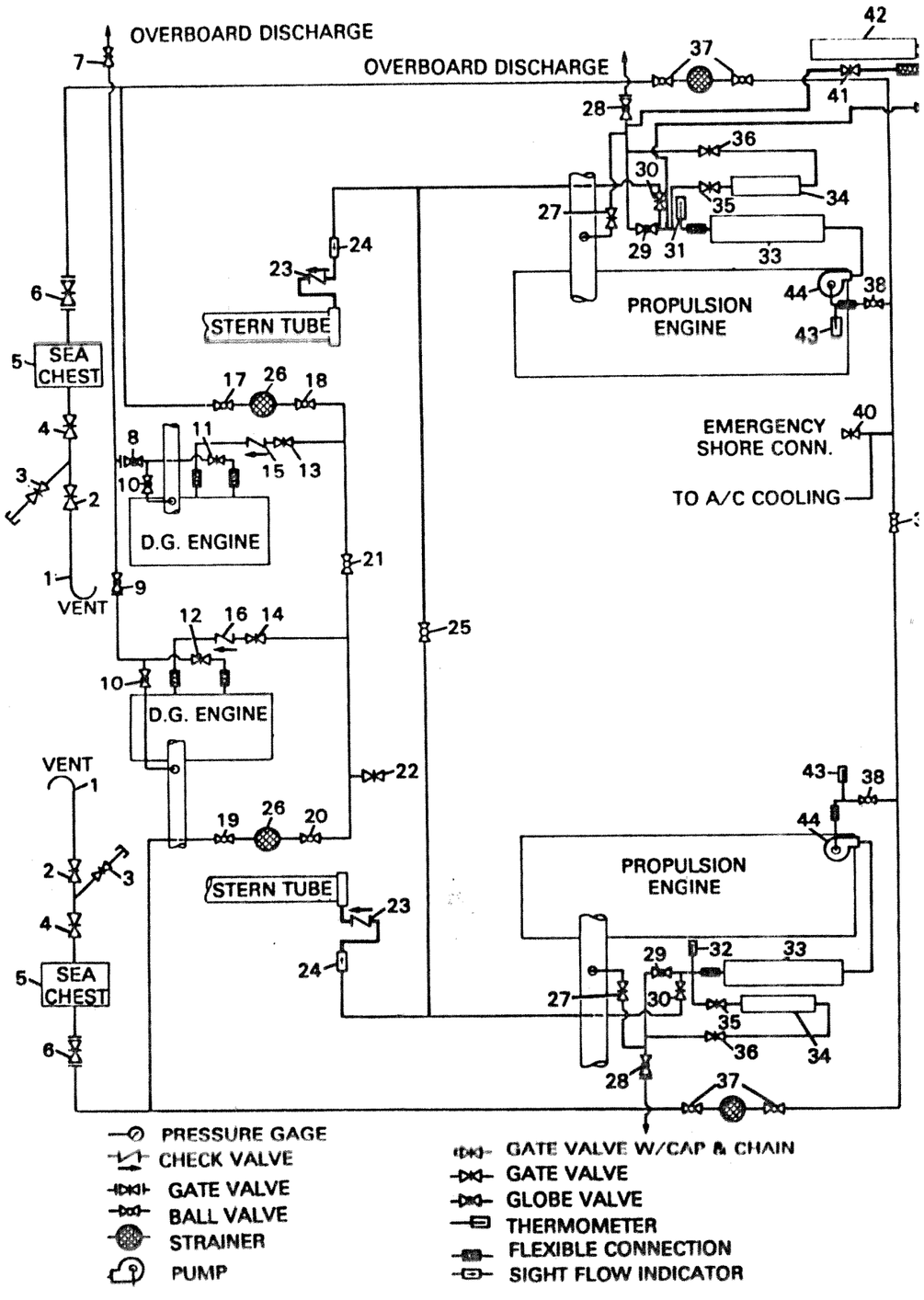
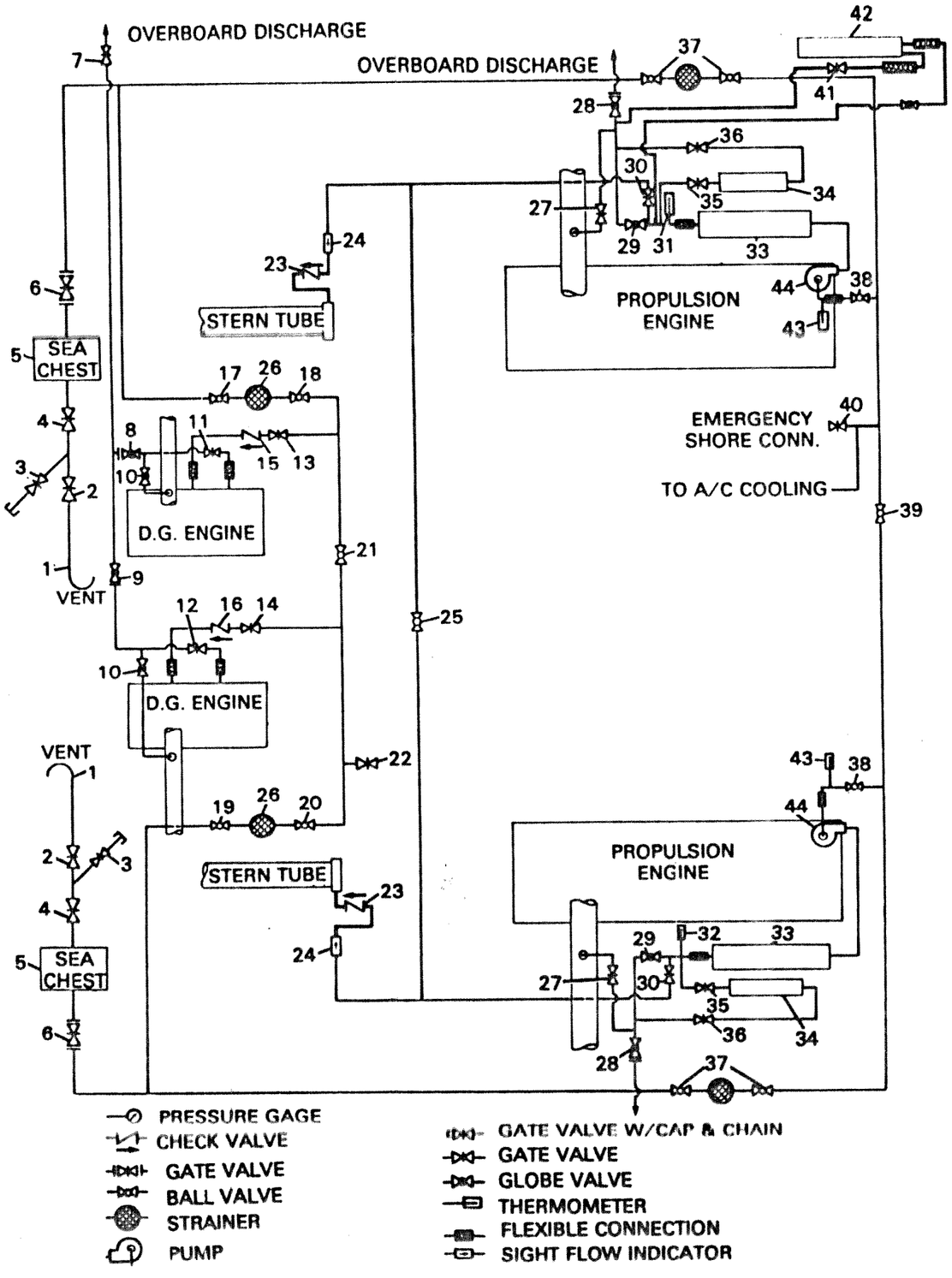


Figure 2-36. Ballast System Diagram

1. VENT, SEA CHEST, FRAME 22, PORT AND STARBOARD, MAIN DECK
2. SEA CHEST VENT VALVE, FRAME 22, PORT AND STARBOARD, ENGINE ROOM
3. SEA CHEST BLWDN. VALVE, FRAME 21-1/2, PORT AND STARBOARD, ENGINE ROOM
4. SEA CHEST VENT VALVE, FRAME 21-1/2, PORT AND STARBOARD, ENGINE ROOM
5. SEA CHEST, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
6. S.W. SPLY VALVE, FRAME 21, PORT AND STARBOARD, ENGINE ROOM
7. GEN. S.W. DISCH. VALVE, OVBD. VALVE, FRAME 21, PORT, ENGINE ROOM
8. GEN. S.W. DISCH. VALVE, FRAME 21, PORT, ENGINE ROOM
9. GEN. S.W. DISCH. VALVE, FRAME 20-1/2, CENTERLINE, ENGINE ROOM
10. S.W. GEN. EXH. VALVE, FRAME 21, PORT AND STARBOARD, ENGINE ROOM
11. GEN. S.W. DISCH. VALVE, FRAME 21, PORT, ENGINE ROOM
12. GEN. S.W. DISCH. VALVE, FRAME 20-1/2, STARBOARD, ENGINE ROOM
13. GEN. S.W. SPLY VALVE, FRAME 21-1/2, PORT, ENGINE ROOM
14. GEN. S.W. SPLY VALVE, FRAME 20-1/2, STARBOARD, ENGINE ROOM
15. CHECK VALVE GEN. S.W. SPLY, FRAME 21-1/2, PORT, ENGINE ROOM
16. CHECK VALVE GEN. S.W. SPLY, FRAME 20-1/2, STARBOARD, ENGINE ROOM
17. GEN. S.W. SPLY VALVE, FRAME 22, PORT, ENGINE ROOM
18. GEN. S.W. SPLY VALVE, FRAME 21-1/2, PORT, ENGINE ROOM
19. GEN. S.W. SPLY VALVE, FRAME 21, STARBOARD, ENGINE ROOM
20. GEN. S.W. SPLY VALVE, FRAME 20-1/2, STARBOARD, ENGINE ROOM
21. GEN. S.W. SPLY BYPASS VALVE, FRAME 20-1/2, CENTERLINE, ENGINE ROOM
22. GEN. EMER. S.W. SPLY VALVE, FRAME 22, STARBOARD, ENGINE ROOM
23. STERN TUBE SPLY CHECK VALVE, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
24. SIGHT WINDOW, FRAME 20-1/2, PORT AND STARBOARD, ENGINE ROOM
25. STERN TUBE INTERCONN. VALVE, FRAME 20, PORT, ENGINE ROOM
26. S.W. FILTER, FRAME 22, PORT, FRAME 21, STARBOARD, ENGINE ROOM
27. S.W. MN. ENG. EXH. VALVE, FRAME 18-1/2, PORT AND STARBOARD, ENGINE ROOM
28. HEAT EXCH. S.W. OVBD. VALVE, FRAME 18, PORT AND STARBOARD, ENGINE ROOM
29. HEAT EXCH. S.W. DISCH. VALVE, FRAME 18, PORT AND STARBOARD, ENGINE ROOM
30. STERN TUBE S.W. SPLY VALVE, FRAME 17-1/2, PORT AND STARBOARD, ENGINE ROOM
31. HEAT EXCH. THERMOMETER, FRAME 17, ENGINE ROOM
32. F.O. HEAT EXCH. THREMOMETER, FRAME 17, ENGINE ROOM
33. HEAT EXCHANGER, FRAME 18, PORT AND STARBOARD, ENGINE ROOM
34. F.O. HEAT EXCHANGER, FRAME 18, PORT AND STARBOARD, ENGINE ROOM
35. F.O. HEAT EXCH. S.W. SPLY VALVE, FRAME 17-1/2, PORT AND STARBORD, ENGINE ROOM
36. F.O. HEAT EXCH. S.W. DISCH. VALVE, FRAME 18, PORT AND STARBOARD, ENGINE ROOM
37. MN. ENG. S.W. SPLY VALVE, FRAME 17-1/2, PORT AND STARBORD, ENGINE ROOM
38. MN. ENG. S.W. SPLY VALVE, FRAME 16-1/2, PORT AND STARBOARD, ENGINE ROOM
39. MAIN ENG. S.W. SPLY CROSSOVER VALVE, FRAME 16, CENTERLINE, ENGINE ROOM
40. S.W. SPLY EMER. SHORE CONN. VALVE, FRAME 16-1/2, STARBORD, ENGINE ROOM
41. S.W. SPLY HYD. OIL COOLER VALVE, FRAME 17, PORT, ENGINE ROOM
42. HYD. OIL COOLER, FRAME 16, PORT, ENGINE ROOM
43. S.W. THERMOMETER, FRAME 17, PORT AND STARBORD, ENGINE ROOM
44. ENG. MTD. S.W. PUMP, FRAME 17, PORT AND STARBOARD, ENGINE ROOM
45. A/C UNIT S.W. SPLY VALVE, FRAME 17-1/2, CENTERLINE, ENGINE ROOM
46. A/C SEA WATER PUMP, FRAME 17-1/2, CENTERLINE, ENGINE ROOM
47. A/C S.W. SPLY VALVE, FRAME 18, CENTERLINE, ENGINE ROOM
48. S.W. PRESSURE VALVE, FRAME 18, CENTERLINE, ENGINE ROOM
49. S.W. DRAIN VALVE, FRAME 18, CENTERLINE, ENGINE ROOM
50. PRESSURE GAGE, FRAME 18, CENTERLINE, ENGINE ROOM
51. S.W. THERMOMETER, FRAME 19, CENTERLINE, ENGINE ROOM
52. AIR CONDITIONING UNIT, FRAME 19, CENTERLINE, ENGINE ROOM
53. S.W. THERMOMETER, FRAME 20, CENTERLINE, ENGINE ROOM
54. INSTRUMENT PANEL VALVE, FRAME 20, CENTERLINE, ENGINE ROOM
55. A/C UNIT S.W. DISCH. VALVE, FRAME 19-1/2, CENTERLINE, ENGINE ROOM
56. A/C UNIT S.W. DISCH. BYPASS VALVE, FRAME 19-1/2, CENTERLINE, ENGINE ROOM
57. OVBD. DISCH. CHECK VALVE, FRAME 18-1/2, STARBOARD, ENGINE ROOM
58. A/C UNIT S.W. OVBD. DISCH. VALVE, FRAME 18-1/2, PORT ENGINE ROOM



'2, PORT AND
GINE ROOM
17, ENGINE
STARBOARD,
PORT AND
17-1/2, PORT
18, PORT AND
2, PORT AND
2, PORT AND
E, FRAME 16,
AME 16-1/2,
ME 17, PORT,
E ROOM
D STARBORD,
STARBOARD,
, CENTERLINE,
CENTERLINE,
LINE, ENGINE
LINE, ENGINE
LINE, ENGINE
ENGINE ROOM
LINE, ENGINE
RLINE, ENGINE
LINE, ENGINE
CENTERLINE,
ME 19-1/2,
RAME 19-1/2,
ME 18-1/2,
18-1/2, PORT



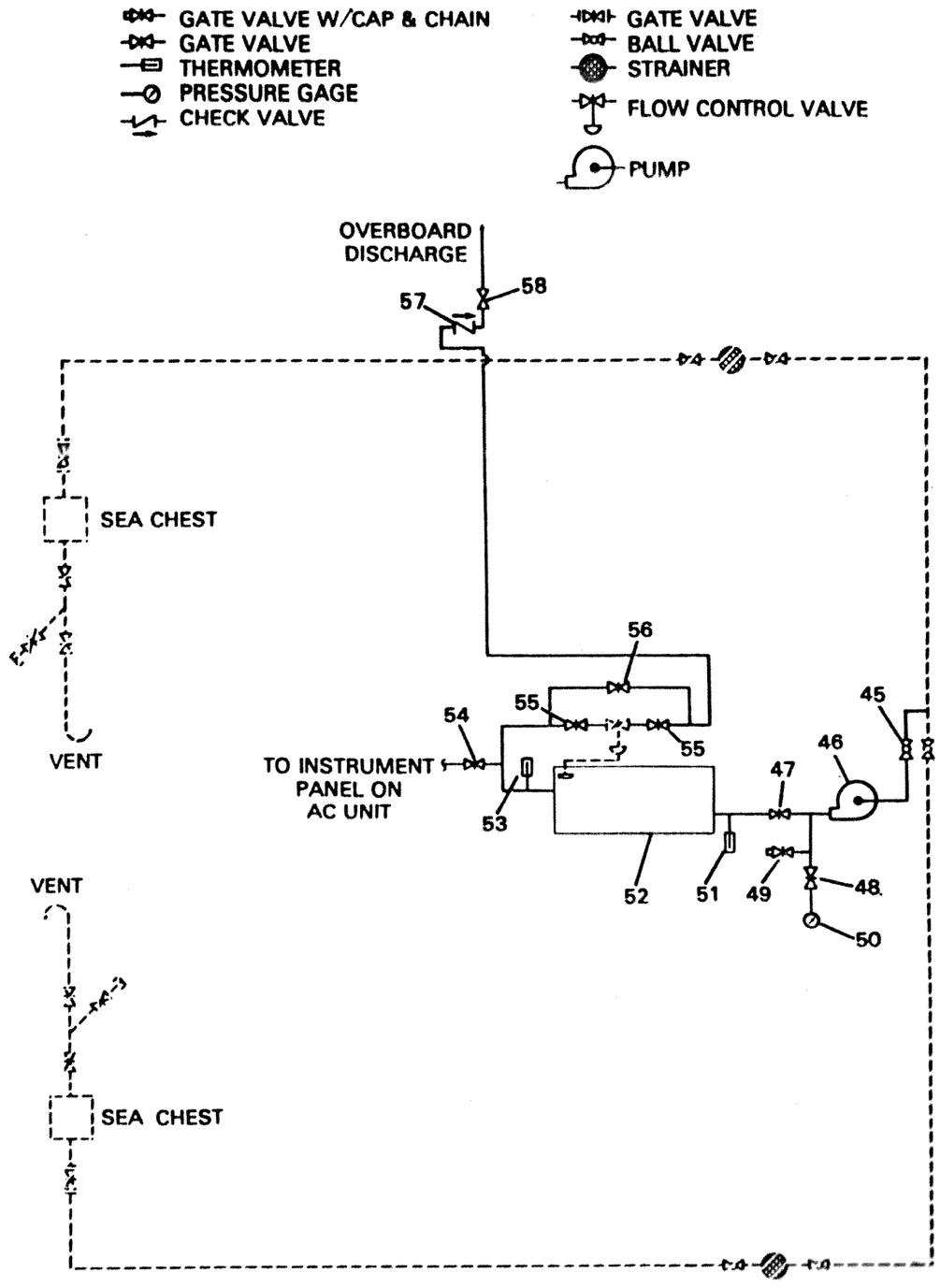
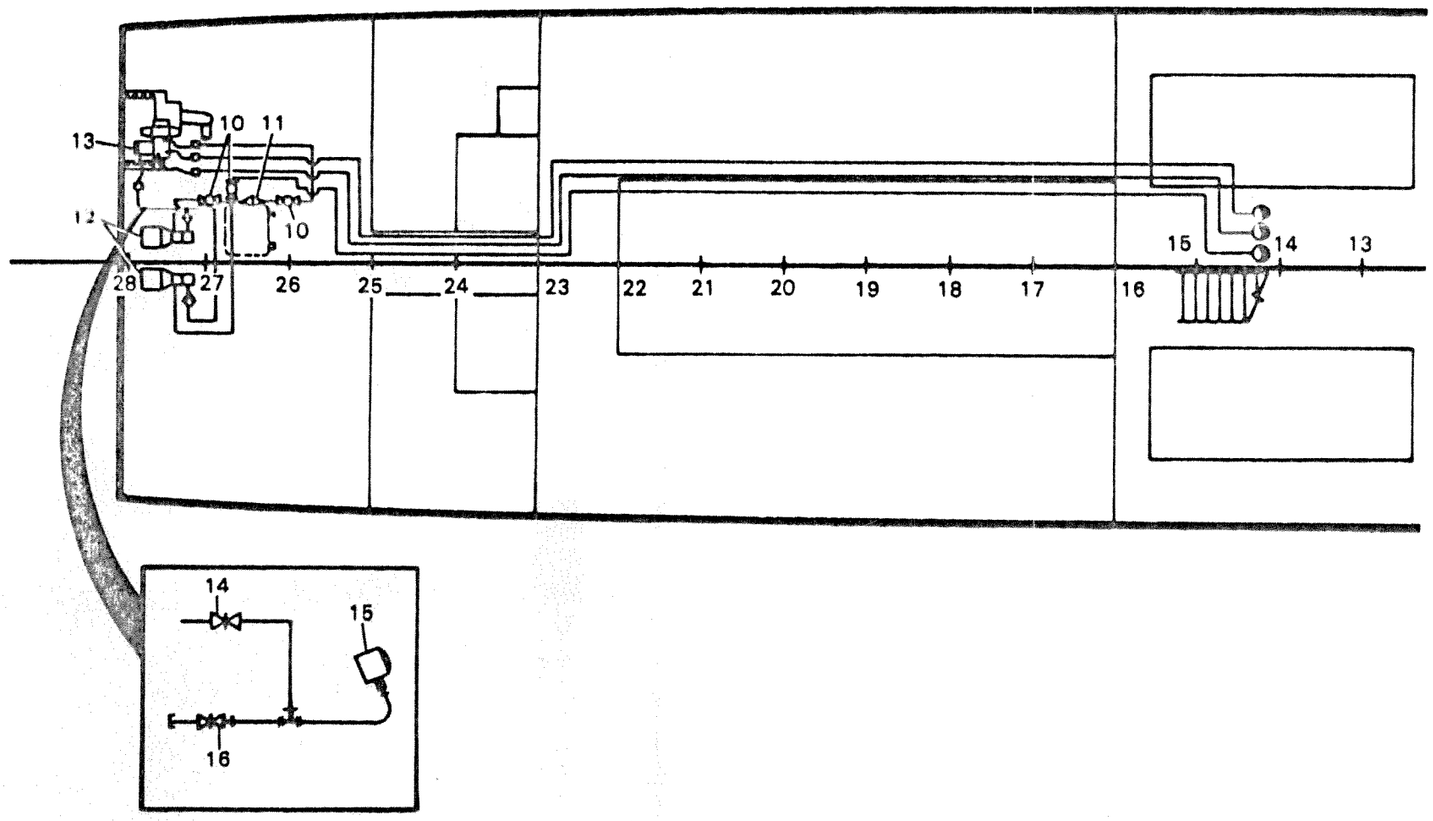
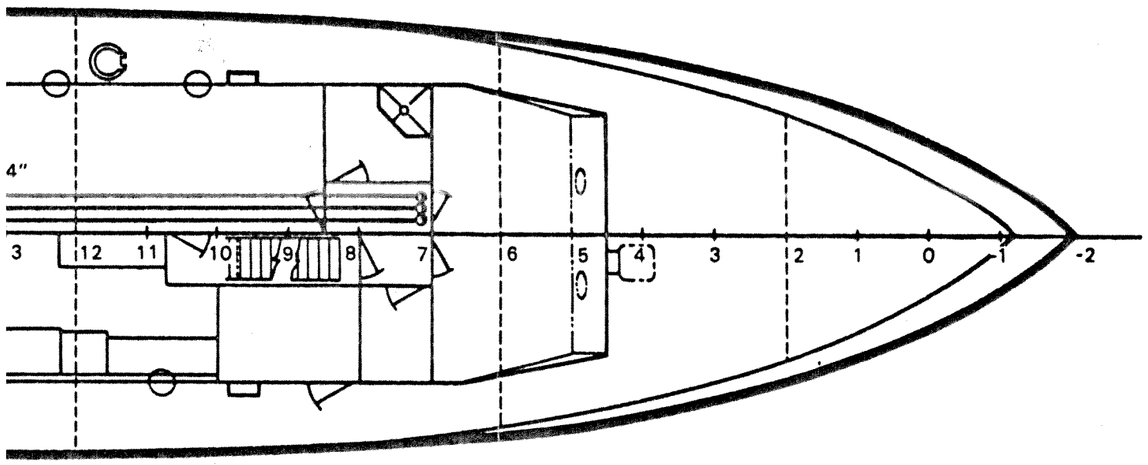


Figure 2-37. Sea Water System

HOLD



MAIN DECK



)ARD, PILOTHOUSE TOP
ARBOARD, PILOTHOUSE

IAME 9, STARBOARD,

8-1/2, STARBOARD,

NE, PILOTHOUSE
TERLINE, PILOTHOUSE
RAME 6-1/2, PORT,

2, PORT, PILOTHOUSE

9. PRESSURE CHECK VALVE, FRAME 6-1/2, PORT, PILOTHOUSE (UNDER CONSOLE)
10. ISOLATION VALVES, FRAME 27-1/2, PORT, LAZARETTE
11. FILTER, FRAME 27-1/2, PORT, LAZARETTE
12. PUMP SET W/CHECK VALVES, FRAME 27-1/2, CENTERLINE, LAZARETTE
13. ACCUMOTOR, FRAME 27-1/2, PORT, LAZARETTE
14. PRESSURE CHECK VALVE, FRAME 27, STARBOARD, LAZARETTE
15. PRESSURE GAGE, FRAME 27, STARBOARD, LAZARETTE
16. PRESSURE CHECK VALVE, FRAME 27, STARBOARD, LAZARETTE

BRIDGE DECK

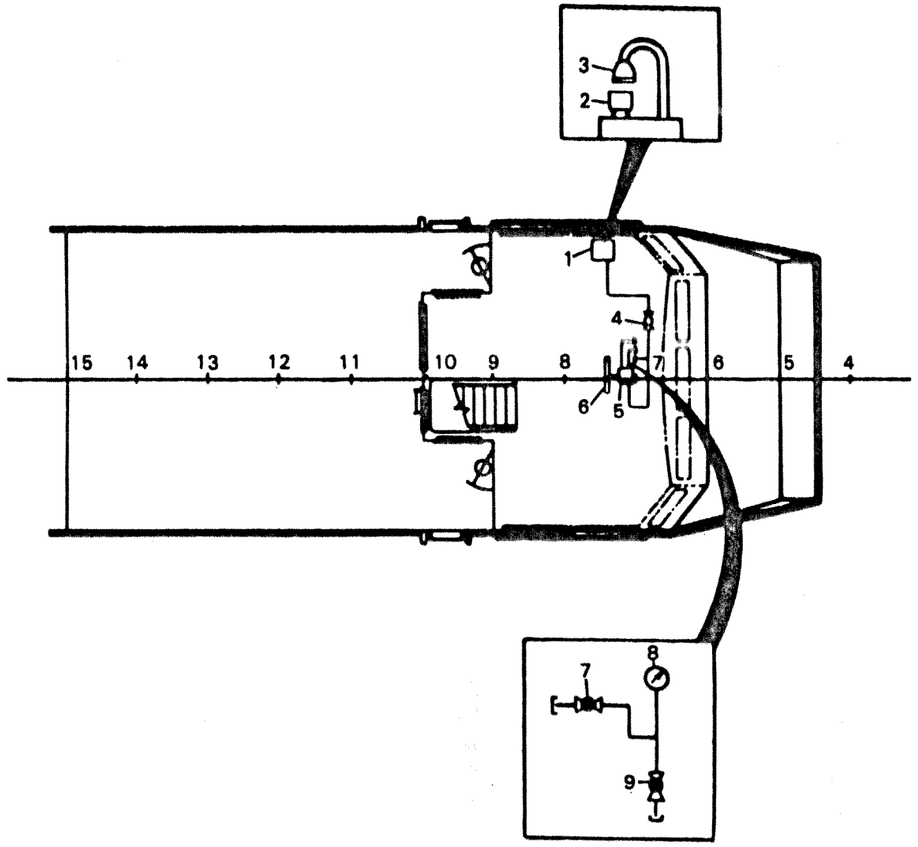
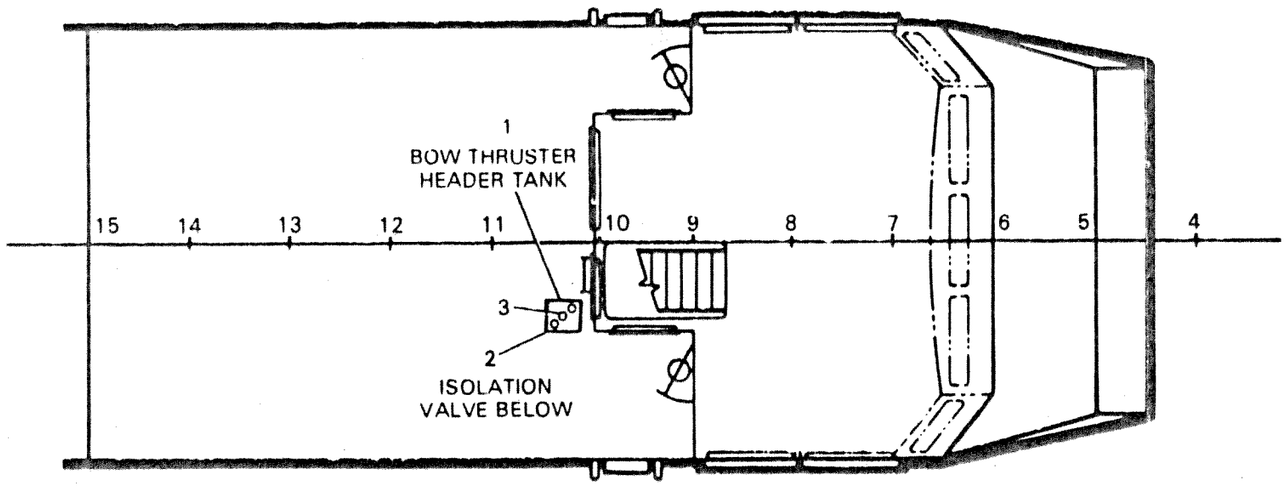
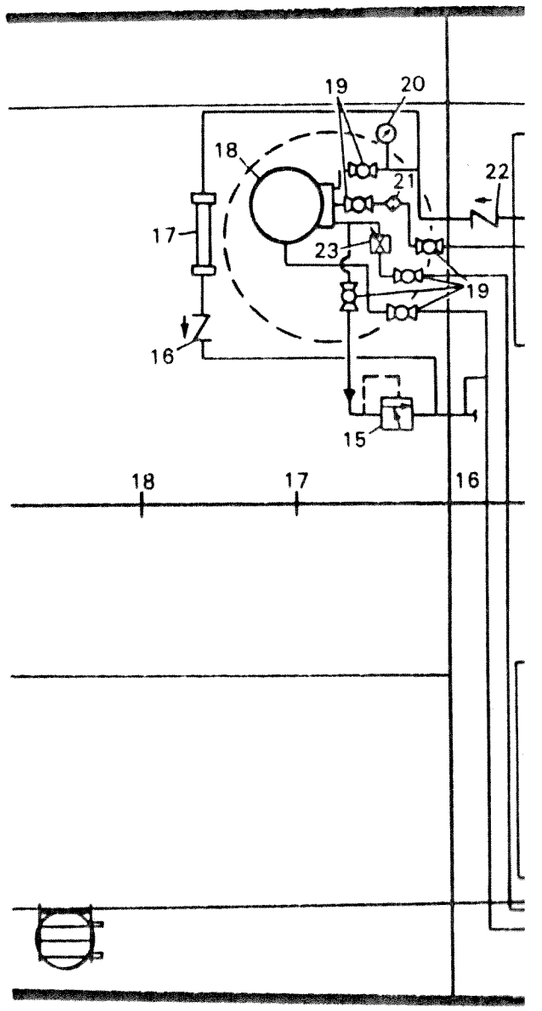
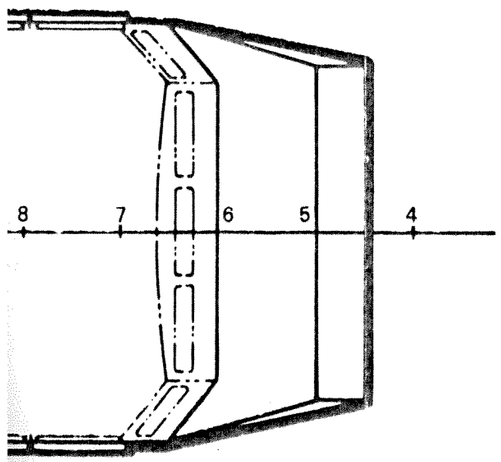


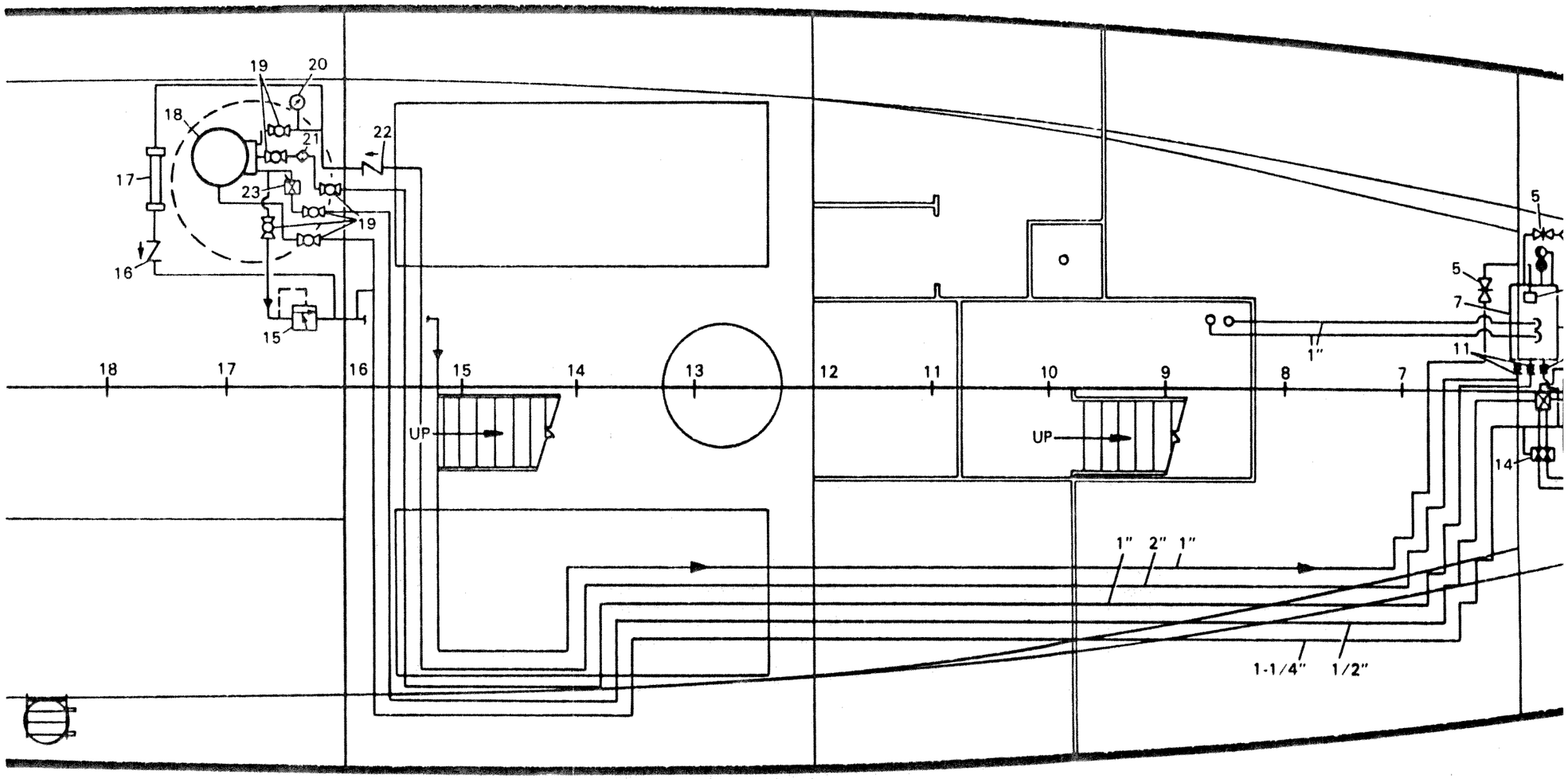
Figure 2-38. Steering System Diagram





1. HEADER TANK, FRAME 10, STARBOARD, BRIDGE DECK
2. ISOLATION VALVE, FRAME 10, STARBOARD, BRIDGE DECK
3. TANK VENT, FRAME 10, STARBOARD, BRIDGE DECK
4. BACK PRESSURE VALVE, FRAME 6, STARBOARD, BOW THRUSTER SPACE
5. ISOLATION VALVE, FRAME 6-1/2, STARBOARD, BOW THRUSTER SPACE (2)
6. IN-LINE FILTER, FRAME 6-1/2, STARBOARD, BOW THRUSTER SPACE
7. BOW THRUSTER RESRVOIR, FRAME 6, PORT, BOW THRUSTER SPACE
8. RESERVOIR DRAIN VALVE, FRAME 5-3/4, PORT, BOW THRUSTER SPACE
9. RETURN FILTER, FRAME 5-3/4, PORT, BOW THRUSTER SPACE
10. DRAIN ISOLATION VALVE, FRAME 5-3/4, PORT, BOW THRUSTER SPACE
11. ISOLATION SUCTION VALVES, FRAME 5-3/4, PORT, BOW THRUSTER SPACE
12. DIRECTIONAL CONTROL VALVE, FRAME 6, STARBOARD, BOW THRUSTER SPACE
13. BOW THRUSTER, FRAME 5-1/2, CENTERLINE, BOW THRUSTER SPACE
14. CROSSOVER RELIEF VALVE, FRAME 6, STARBOARD, BOW THRUSTER SPACE
15. RELIEF VALVE, FRAME 17-1/2, PORT, ENGINE ROOM
16. CHECK VALVE, FRAME 17, PORT, ENGINE ROOM
17. OIL COOLER, FRAME 17, PORT, ENGINE ROOM
18. HYDRAULIC PUMP, FRAME 17-1/2, PORT, ENGINE ROOM
19. ISOLATION VALVES, FRAME 17-1/2 - 18, PORT, ENGINE ROOM
20. PRESSURE GAGE, FRAME 17, PORT, ENGINE ROOM
21. FILTER, FRAME 17, PORT, ENGINE ROOM
22. CHECK VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
23. FLOW CONTROL VALVE, FRAME 17-1/2, PORT, ENGINE ROOM
24. CHECK VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
25. FLOWMETER, FRAME 16-1/2, PORT, ENGINE ROOM
26. CHECK VALVE, FRAME 16-1/2, PORT, ENGINE ROOM





THRUSTER, FRAME 5-1/2, CENTERLINE, BOW
STER SPACE
SOVER RELIEF VALVE, FRAME 6, STARBOARD, BOW
STER SPACE
F VALVE, FRAME 17-1/2, PORT, ENGINE ROOM
K VALVE, FRAME 17, PORT, ENGINE ROOM
OOLER, FRAME 17, PORT, ENGINE ROOM
AULIC PUMP, FRAME 17-1/2, PORT, ENGINE ROOM
ATION VALVES, FRAME 17-1/2 - 18, PORT, ENGINE
M
SURE GAGE, FRAME 17, PORT, ENGINE ROOM
R, FRAME 17, PORT, ENGINE ROOM
K VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
CONTROL VALVE, FRAME 17-1/2, PORT, ENGINE
M
K VALVE, FRAME 16-1/2, PORT, ENGINE ROOM
METER, FRAME 16-1/2, PORT, ENGINE ROOM
K VALVE, FRAME 16-1/2, PORT, ENGINE ROOM

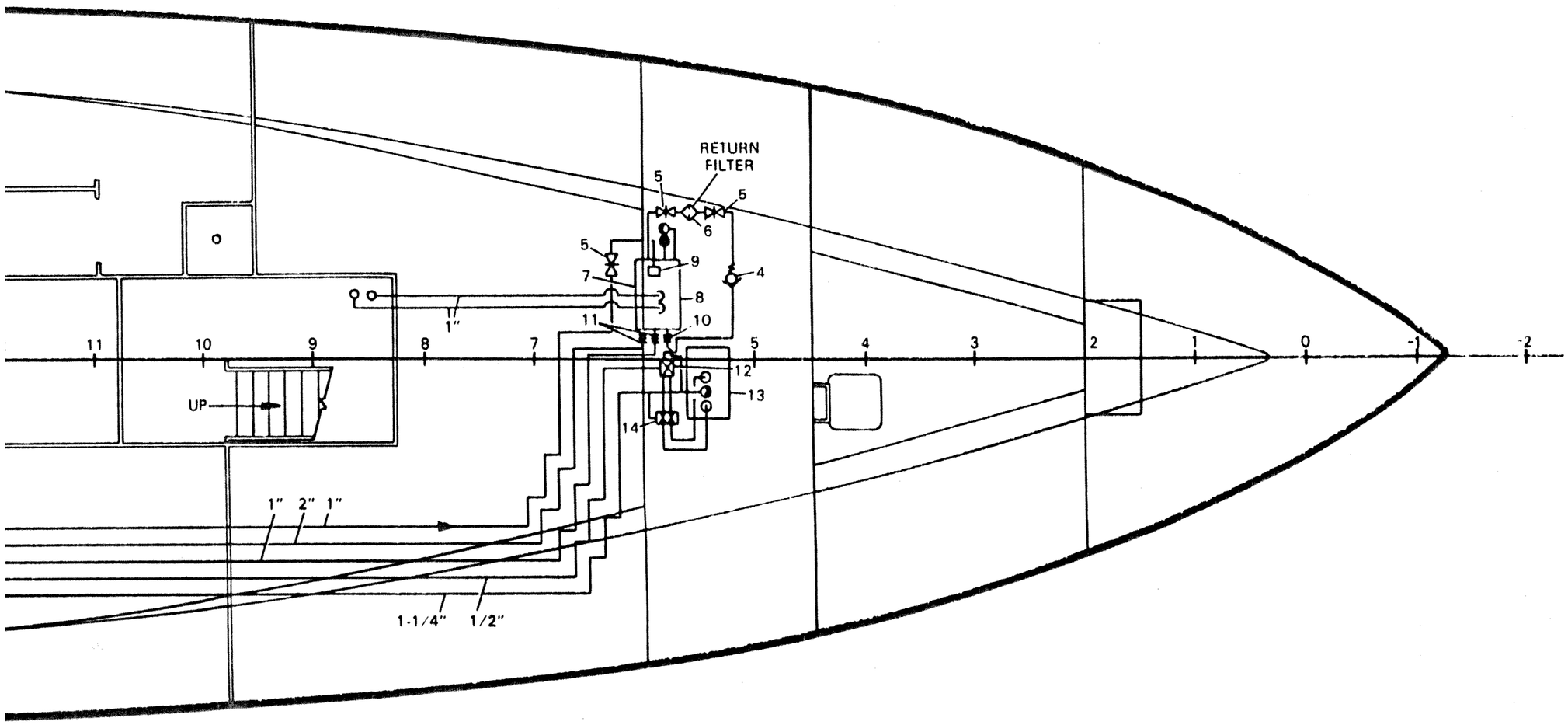
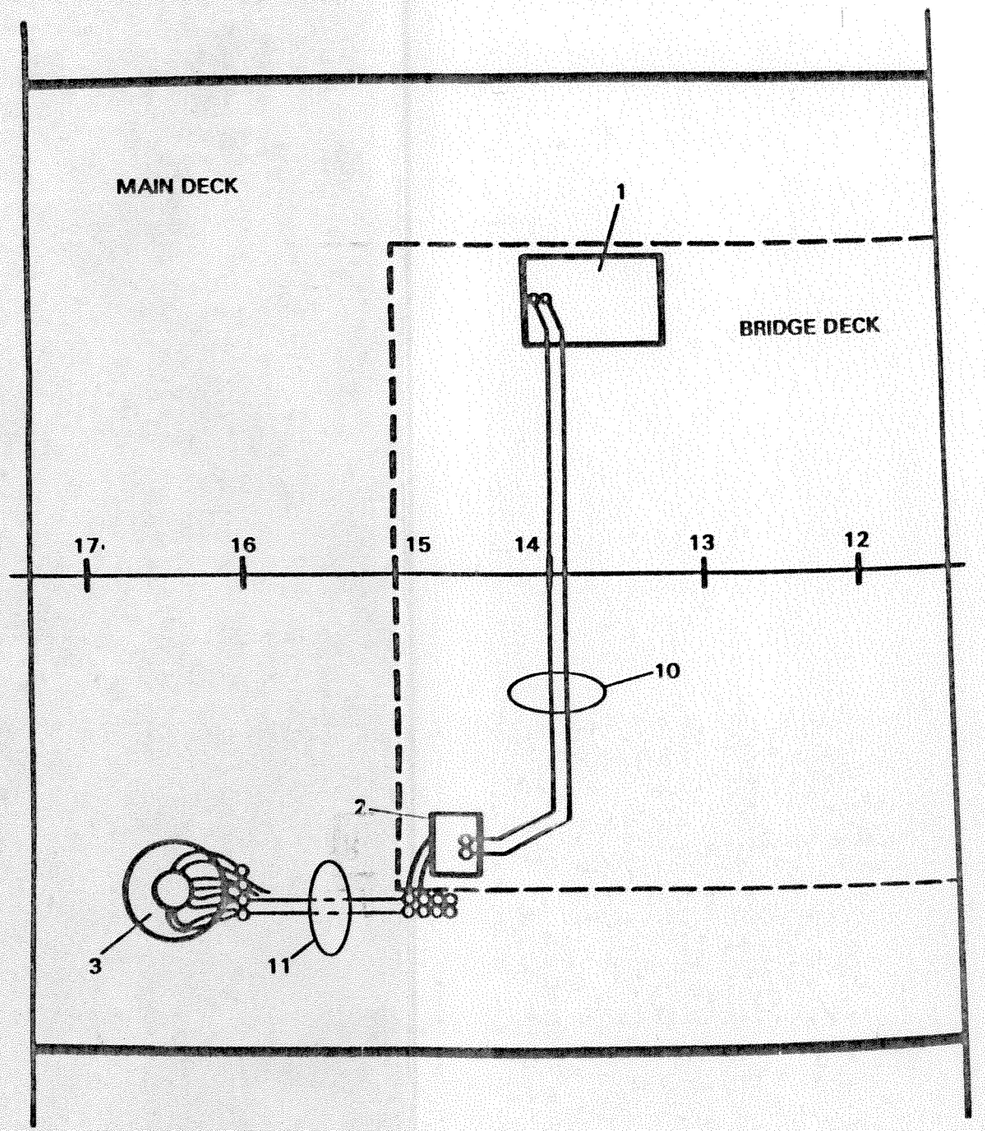
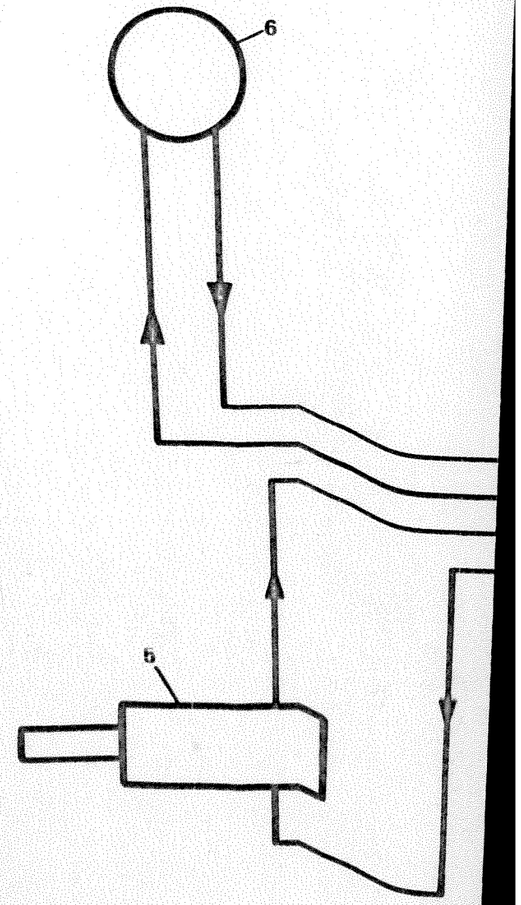
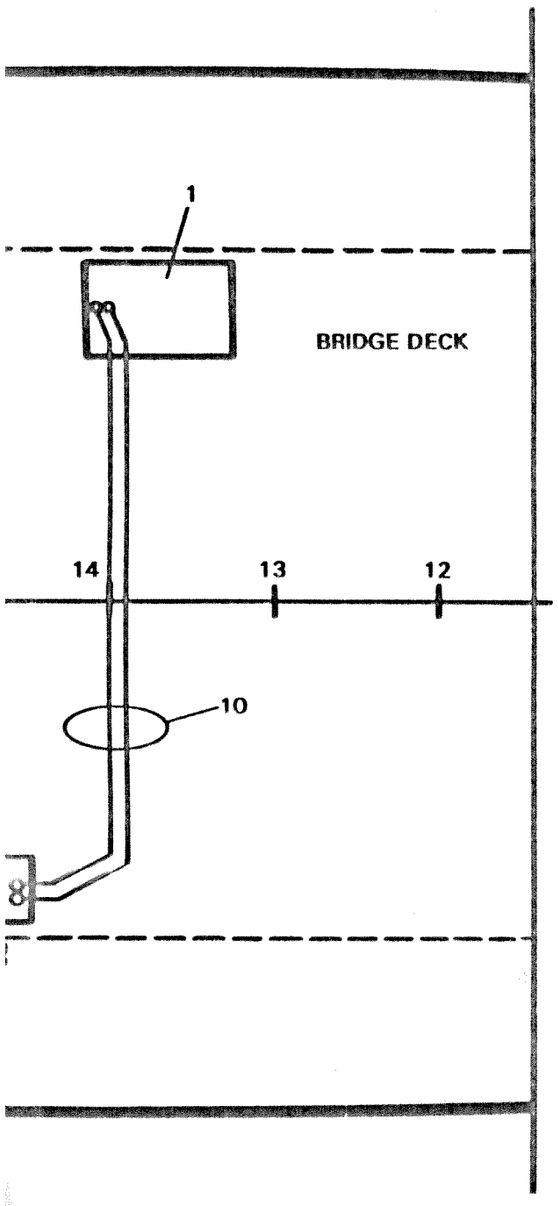


Figure 2-39. Bow Thruster Diagram

1. CRANE POWER PACK
2. CRANE CONTROL STAND AND VALVE
3. CRANE BASE AND ROTARY SWIVEL
4. BOOM CYLINDER
5. JIB CYLINDER
6. CRANE WINCH
7. COUNTERBALANCE VALVE
8. SWING DRIVE AND BRAKE
9. SWING MOTOR
10. MAIN PRESSURE AND RETURN LINE (2)
11. CRANE PRESSURE AND RETURN LINES (8)







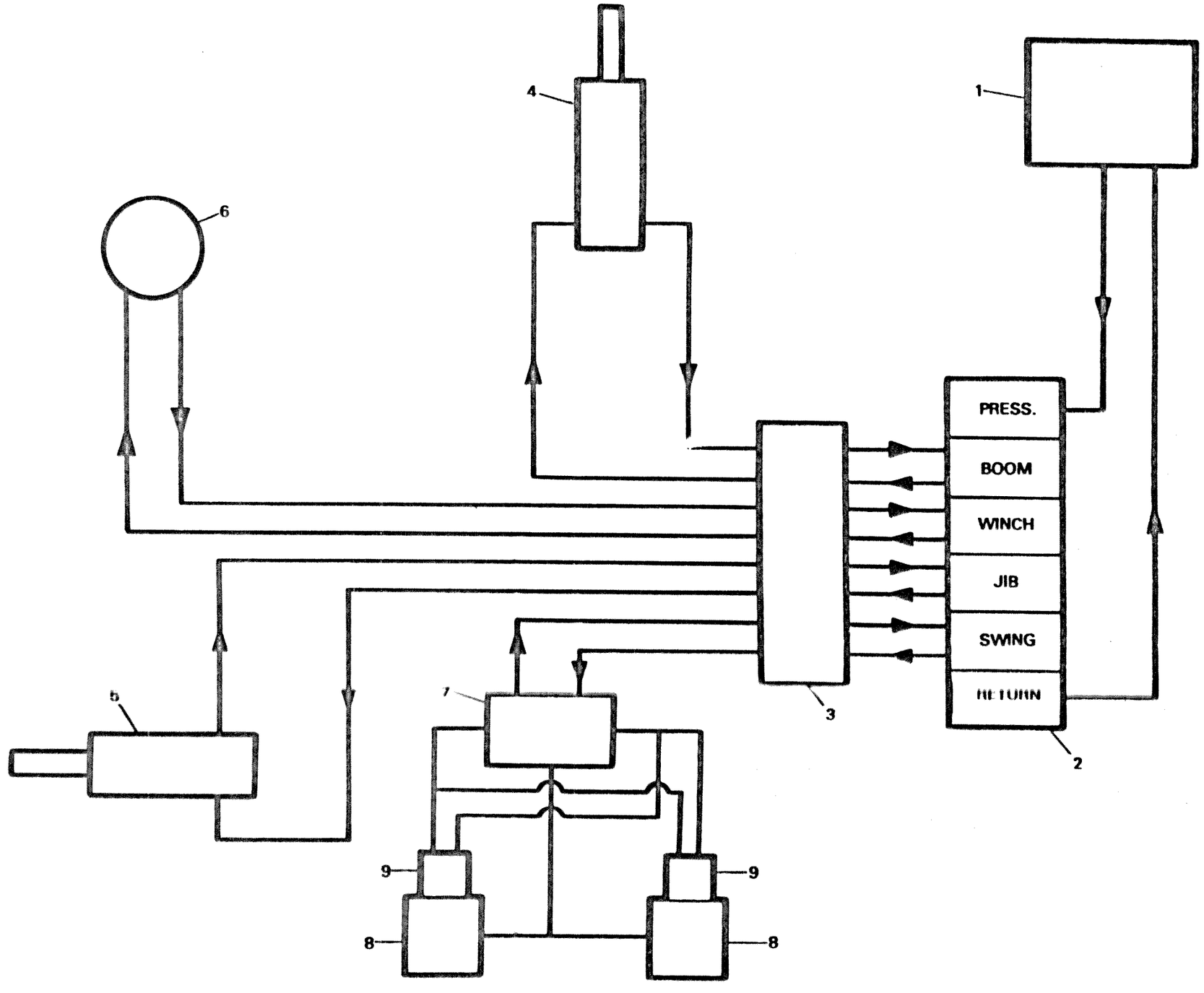


Figure 2-40. Deck Crane System Diagram

1. PL2 TRANSFER WINCH, FRAME 27-1/2, STARBOARD, MAIN DECK
2. PRESSURE REDUCING VALVE, FRAME 27-1/2, STARBOARD, MAIN DECK
3. HYDRAULIC CYLINDER, FRAME 20, PORT, MAIN DECK
4. HYDRAULIC MOTOR, FRAME 19-1/2, PORT, MAIN DECK
5. FLOW CONTROL VALVES, FRAME 19-1/2, PORT, MAIN DECK
6. BI-DIRECTIONAL FLOW CONT. VALVE, FRAME 19, PORT, MAIN DECK
7. HYDRAULIC CYLINDER, FRAME 19, PORT, MAIN DECK
8. BI-DIRECTIONAL FLOW CONT. VALVE, FRAME 19, PORT, MAIN DECK
9. DIRECTIONAL CONTROL VALVE, FRAME 16, STARBOARD, MAIN DECK
10. FLOW CONTROL VALVES, FRAME 16, STARBOARD, MAIN DECK
11. PL2 TRANSFER WINCH, FRAME 16-1/2, STARBOARD, MAIN DECK
12. PRESSURE REDUCING VALVE, FRAME 16-1/2, STARBOARD, MAIN DECK
13. H7A IN-HAUL WINCH, FRAME 16, STARBOARD, MAIN DECK
14. PRESSURE GAGE, FRAME 6, STARBOARD, BOW THRUSTER AREA
15. ISOLATION BALL VALVES, FRAME 5-1/2, STARBOARD, BOW THRUSTER AREA
16. FILTER, FRAME 5-1/2, STARBOARD, BOW THRUSTER AREA
17. POWER UNIT AND RESERVOIR, FRAME 5-1/2, STARBOARD, BOW THRUSTER AREA

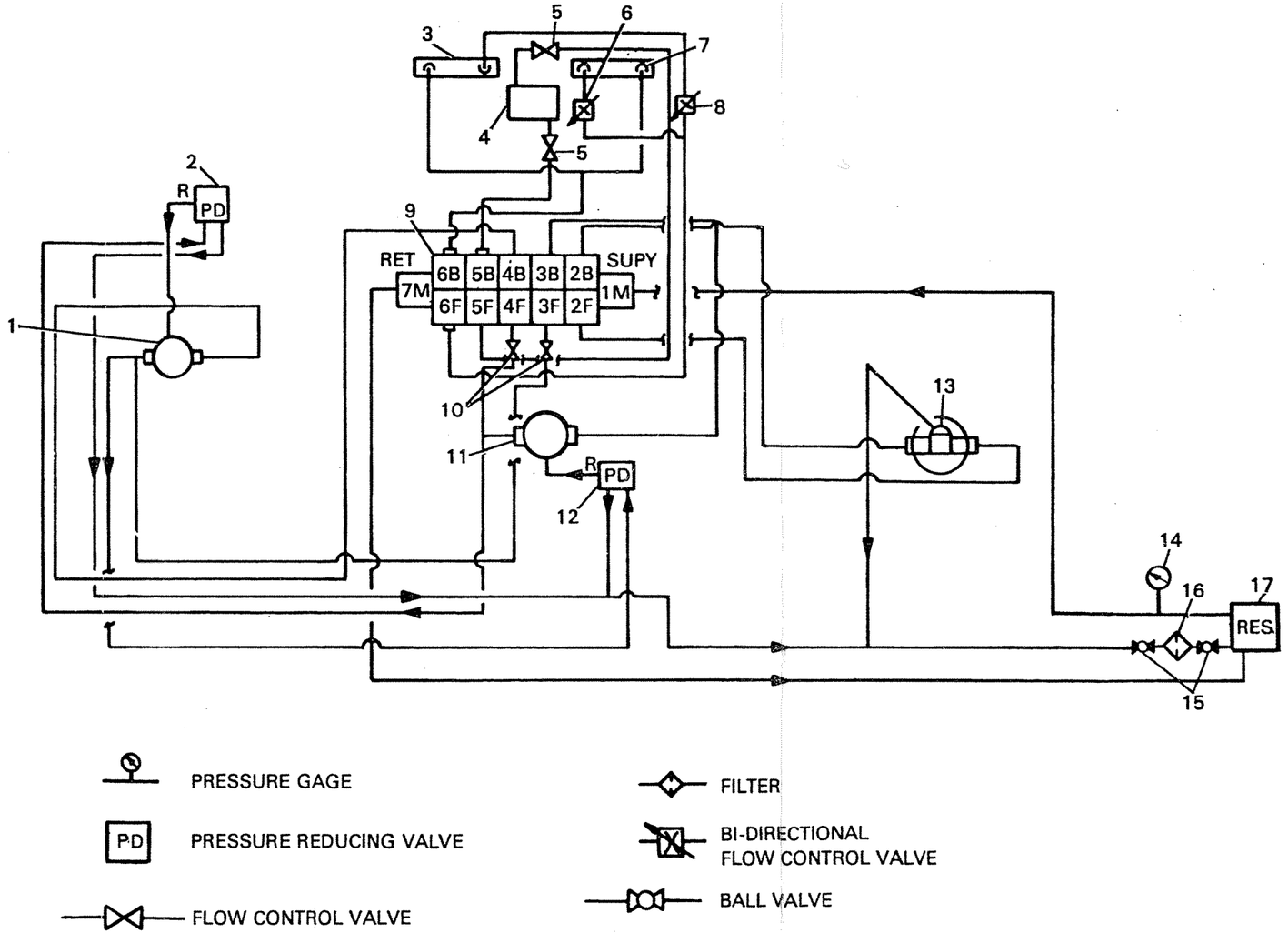
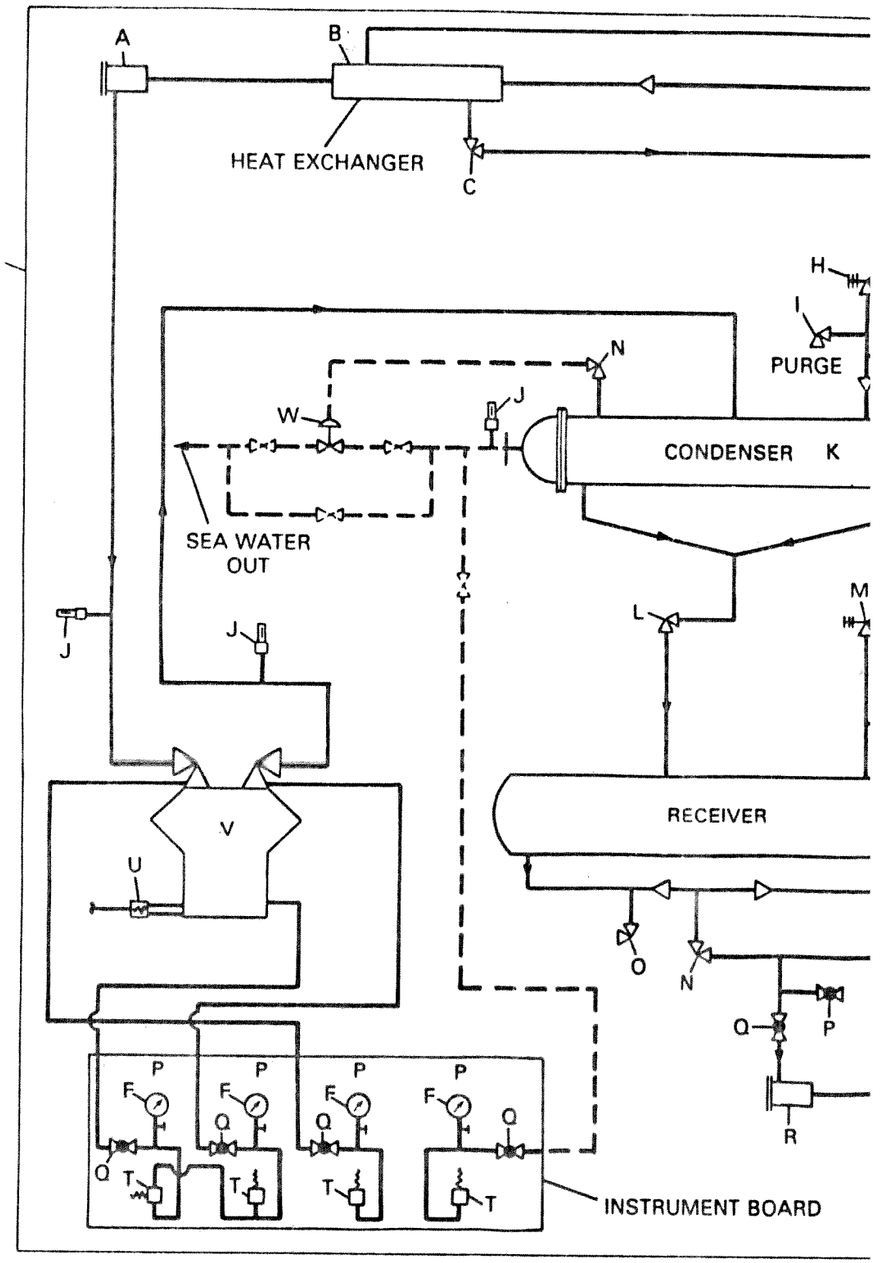


Figure 2-41. Torpedo Handling Hydraulic Diagram

1. AIR CONDITIONING UNIT, FRAMES 18 - 20, ENGINE ROOM
   A. SUCTION STRAINER
   B. HEAT EXCHANGER
   C. ANGLE VALVE
   D. MOISTURE INDICATOR
   E. RUPTURE DISC (SET AT 300 PSIG)
   F. PRESSURE GAGE
   G. PRESSURE GATE VALVE
   H. RELIEF VALVE (SET AT 300 PSIG)
   I. PURGE ANGLE VALVE
   J. THERMOMETER
   K. CONDENSER
   L. ANGLE VALVE
   M. RELIEF VALVE (SET AT 300 PSIG)
   N. ANGLE VALVE
   O. ANGLE VALVE (DRAIN OR CHARGE)
   P. GLOBE VALVE (DRAIN OR CHARGE)
   Q. GLOBE VALVE
   R. FILTER/DRIER
   S. SOLENOID VALVE
   T. PRESSURE SWITCH
   U. HEATER
   V. COMPRESSOR
   W. FLOW CONTROL VALVE
2. MOISTURE INDICATOR, FRAME 8 1/4, STARBOARD, AIR HANDLING ROOM
3. ACCESS VALVE, FRAME 8-1/4, STARBOARD, AIR HANDLING ROOM
4. HAND EXPANSION VALVE, FRAME 9, STARBOARD, AIR HANDLING ROOM
5. STOP GLOBE VALVE, FRAME, FRAME 9, STARBOARD, AIR HANDLING ROOM
6. LIQUID STRAINER, FRAME 9-1/2, STARBOARD, AIR HANDLING ROOM
7. SOLENOID VALVE, FRAME 9-1/2, STARBOARD, AIR HANDLING ROOM
8. ACCESS VALVE, FRAME 9, STARBOARD, AIR HANDLING ROOM
9. THERMAL EXPANSION VALVE, FRAME 9-1/2, STARBOARD, AIR HANDLING ROOM
10. ACCESS VALVE, FRAME 9, STARBOARD, AIR HANDLING ROOM
11. STOP GLOBE VALVE, FRAME 9, STARBOARD, AIR HANDLING ROOM
12. PRESSURE GAGE, FRAME 8, STARBOARD, AIR HANDLING ROOM
13. ACCESS VALVE, FRAME 8, STARBOARD, AIR HANDLING ROOM
14. ANGLE STOP VALVE, FRAME 8, STARBOARD, AIR HANDLING ROOM
15. THERMOMETER, FRAME 8-1/2, STARBOARD, AIR HANDLING ROOM
16. CONTROL VALVE, FRAME 8, STARBOARD, AIR HANDLING ROOM
17. AIR HANDLER W/PRESS SW., FRAMES 8-1/2 - 9-1/2, STARBORD, AIR HANDLING ROOM



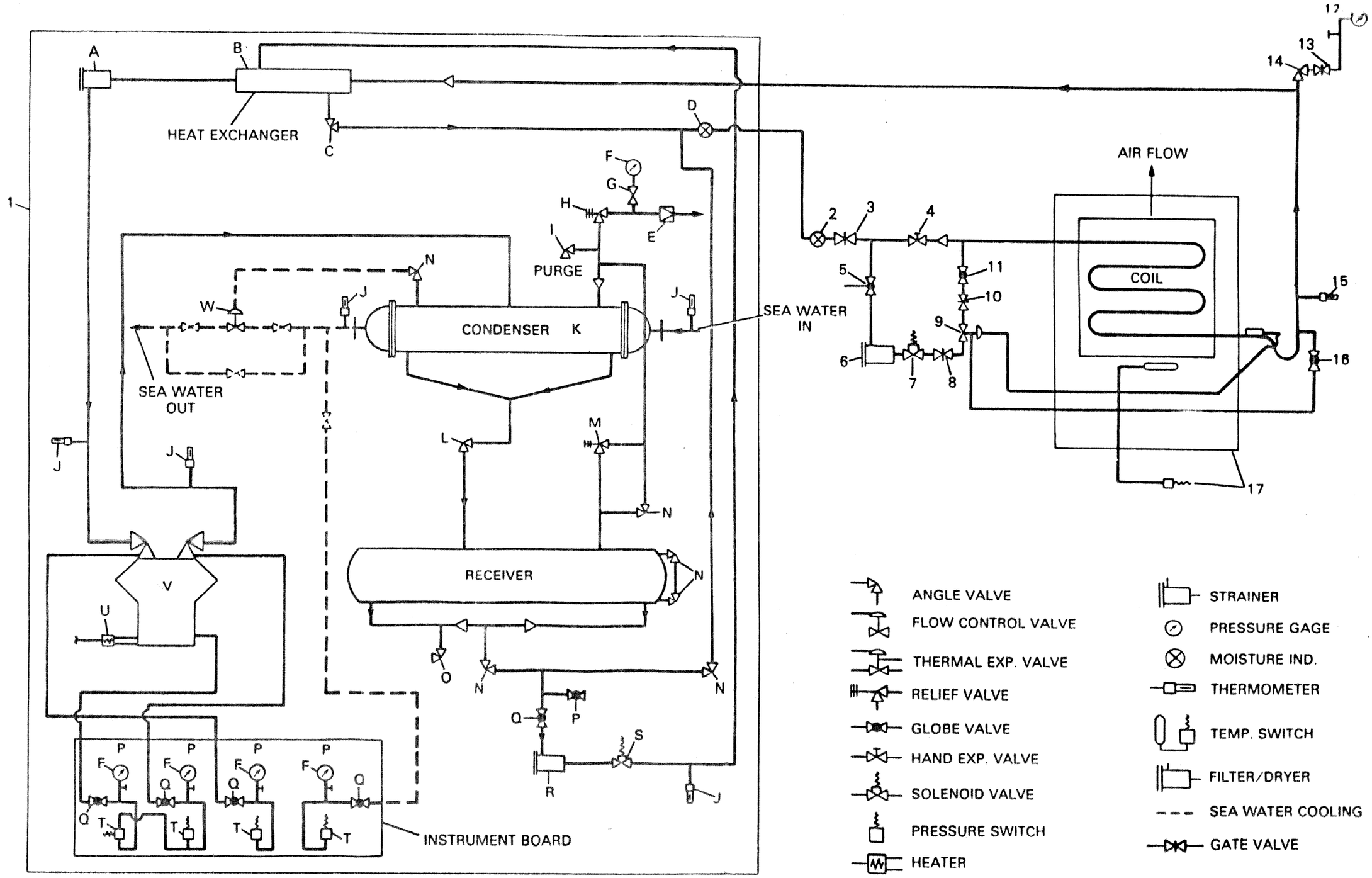
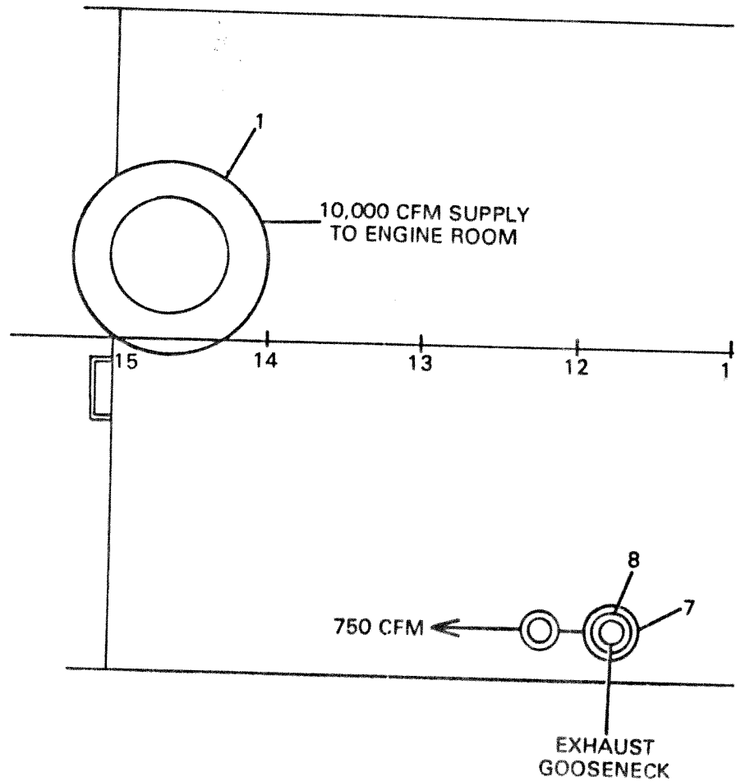


Figure 2-43. A/C Refrigeration Piping Diagram

1. MUSHROOM VENTILATOR, FRAME 15, PORT, BRIDGE DECK
2. HEATER, (H-4), FRAME 8, PORT, BRIDGE DECK
3. DIFFUSER, FRAME 8, PORT AND STARBOARD, BRIDGE DECK (PILOTHOUSE)
4. DEFROSTER, FRAME 6-1/2, PORT AND STARBOARD, BRIDGE DECK
5. HOT AIR BLOWER, (E-5), FRAME 7, CENTERLINE, BRIDGE DECK
6. HEATER, (H-3), FRAME 8, STARBOARD, BRIDGE DECK
7. SILENCER, (E-6), FRAME 12, STARBOARD, BRIDGE DECK
8. EXHAUST FAN, (F-4), FRAME 12, STARBOARD, BRIDGE DECK



1. MUSHROOM VENTILATOR, FRAME 15, PORT, BRIDGE DECK
2. HEATER, (H-4), FRAME 8, PORT, BRIDGE DECK
3. DIFFUSER, FRAME 8, PORT AND STARBOARD, BRIDGE DECK (PILOTHOUSE)
4. DEFROSTER, FRAME 6-1/2, PORT AND STARBOARD, BRIDGE DECK
5. HOT AIR BLOWER, (E-5), FRAME 7, CENTERLINE, BRIDGE DECK
6. HEATER, (H-3), FRAME 8, STARBOARD, BRIDGE DECK
7. SILENCER, (E-6), FRAME 12, STARBOARD, BRIDGE DECK
8. EXHAUST FAN, (F-4), FRAME 12, STARBOARD, BRIDGE DECK

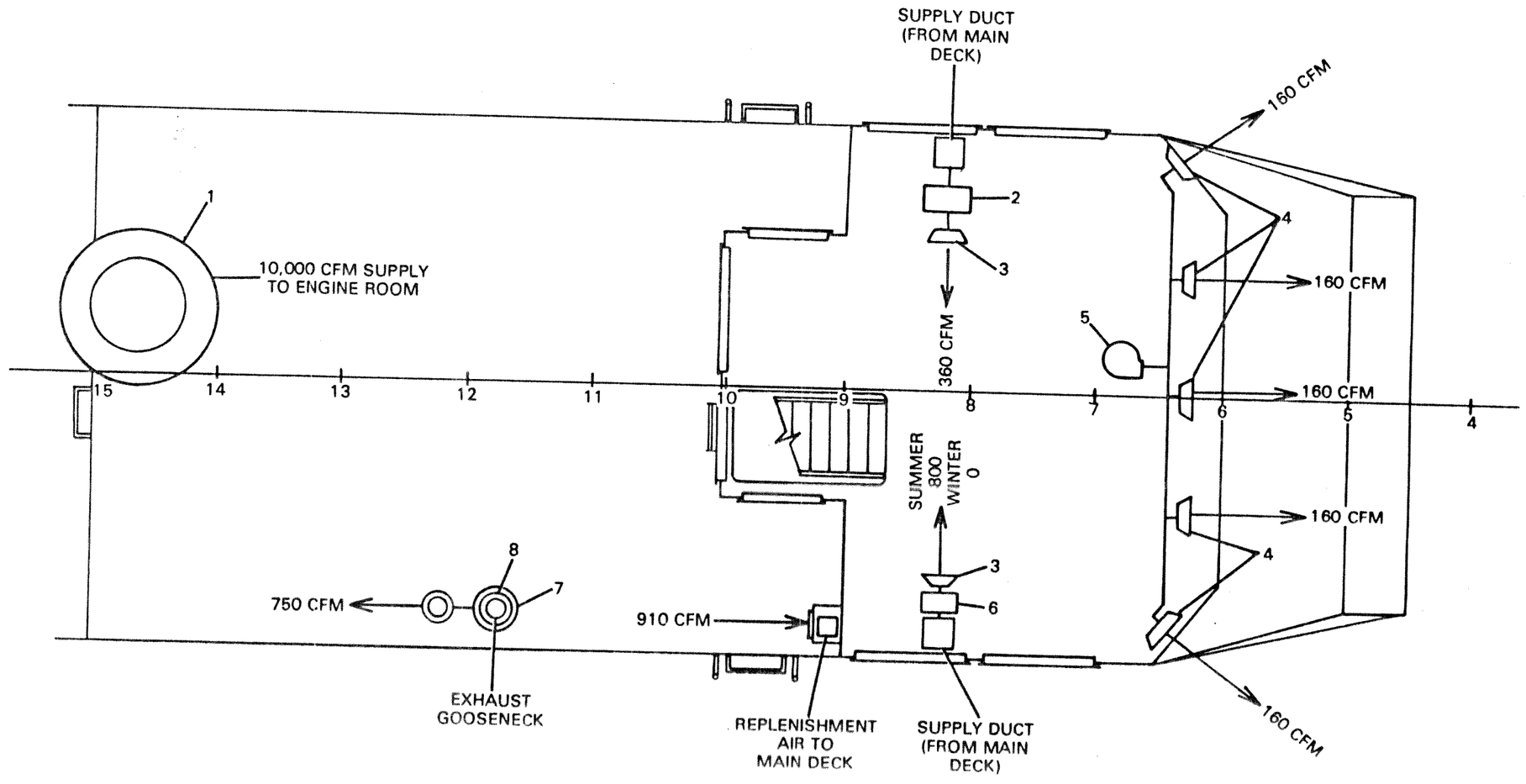
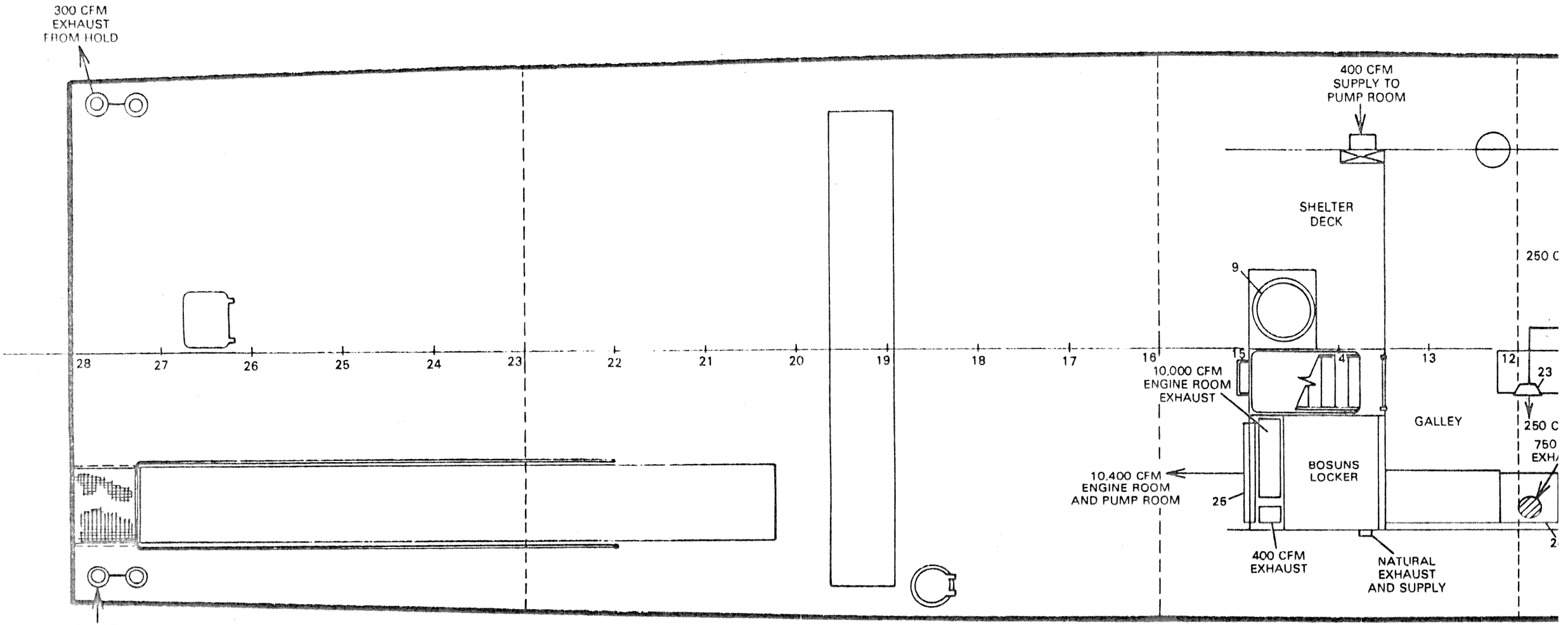
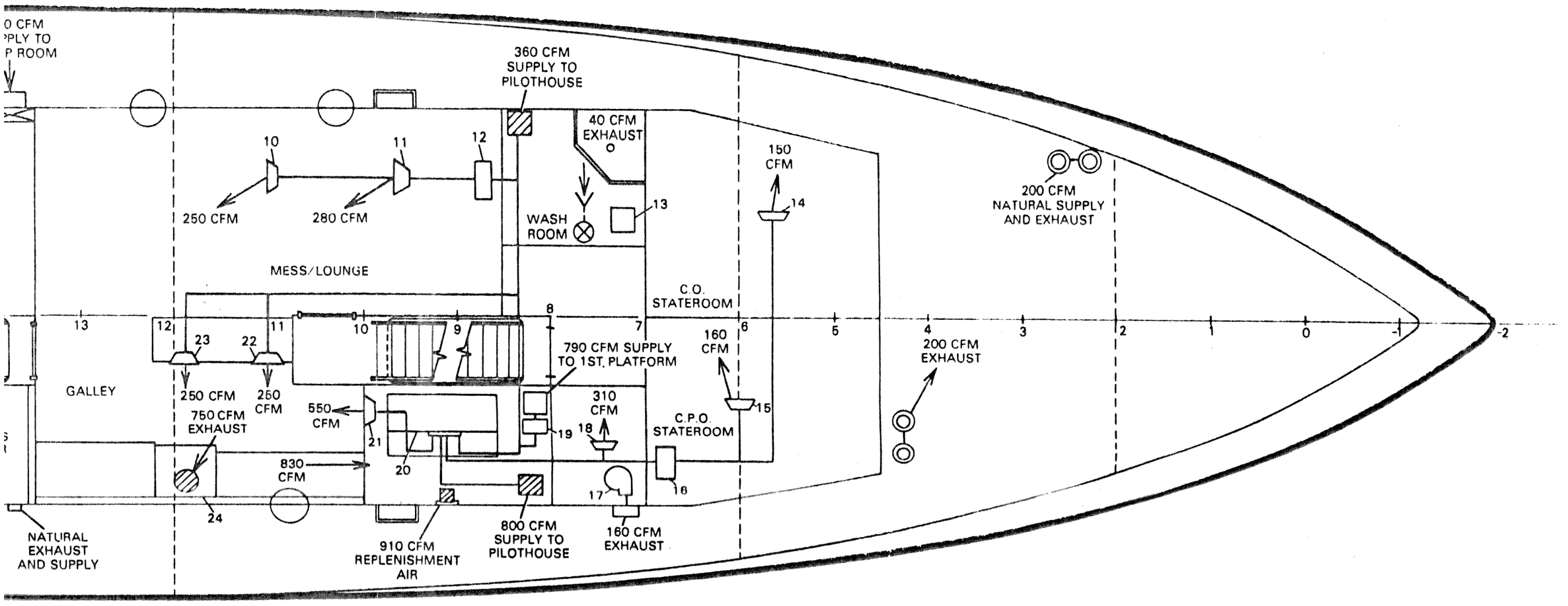


Figure 2-44. Heating, Ventilation and Air Conditioning System Diagram (Sheet 1 of 3)

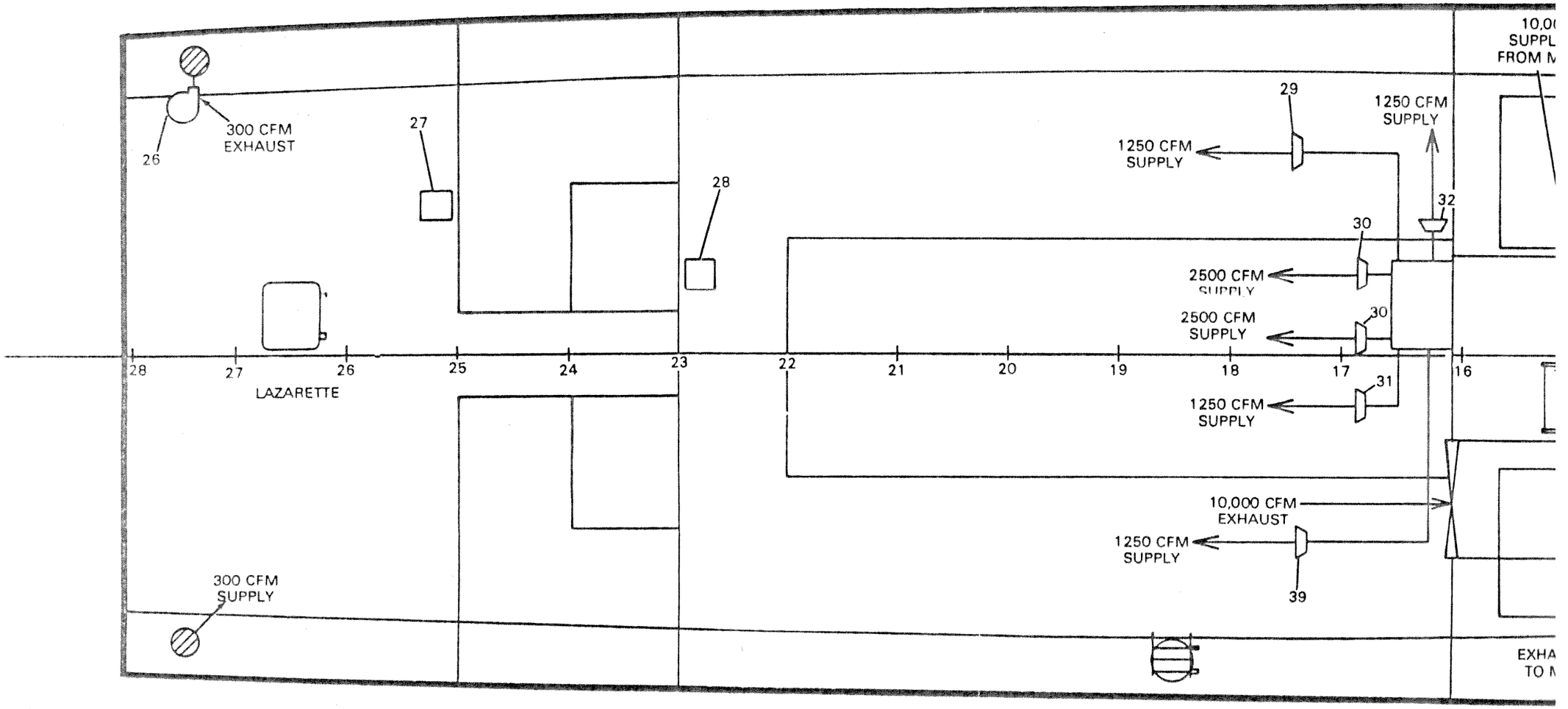


9. ENG ROOM SUPPLY FAN, (F-1), FRAME 15, PORT, MAIN DECK
10. DIFFUSER, FRAME 11, PORT, MAIN DECK (MESS/LOUNGE)
11. DIFFUSER, FRAME 10, PORT, MAIN DECK (MESS/LOUNGE)
12. DUCT HEATER, (H-1), FRAME 8-1/2, PORT, MAIN DECK
13. CONVECTION HEATER, (H-6), FRAME 7-1/2, PORT, MAIN DECK
14. DIFFUSER, FRAME 5-1/2, PORT, MAIN DECK (C.O. STATEROOM)
15. DIFFUSER, FRAME 6, STARBOARD, MAIN DECK (C.P.O. STATEROOM)
16. DUCT HEATER, (H-2), FRAME 7, STARBOARD, MAIN DECK (C.P.O. STATEROOM)
17. EXHAUST FAN, (F-5), FRAME 7-1/2, STARBOARD, MAIN DECK (ELECTRICAL EQUIPMENT ROOM)
18. DIFFUSER, FRAME 7-1/2, STARBOARD, MAIN DECK (ELECTRICAL EQUIPMENT ROOM)
19. DUCT HEATER, (H-5), FRAME 8, STARBOARD, MAIN DECK (AIR HANDLING ROOM)
20. AIR HANDLER, FRAMES 8-1/2 - 9-1/2, STARBOA DECK (AIR HANDLING ROOM)
21. DIFFUSER, FRAME 10, STARBOARD, MAIN D HANDLING ROOM)
22. DIFFUSER, FRAME 11, STARBOARD, MAIN DECK
23. DIFFUSER, FRAME 12, STARBOARD, MAIN DECK
24. GALLEY HOOD, FRAME 12, STARBOARD, MA (GALLEY)
25. EXHAUST LOUVER, FRAME 15, STARBOARD, M. (ENGINE ROOM)

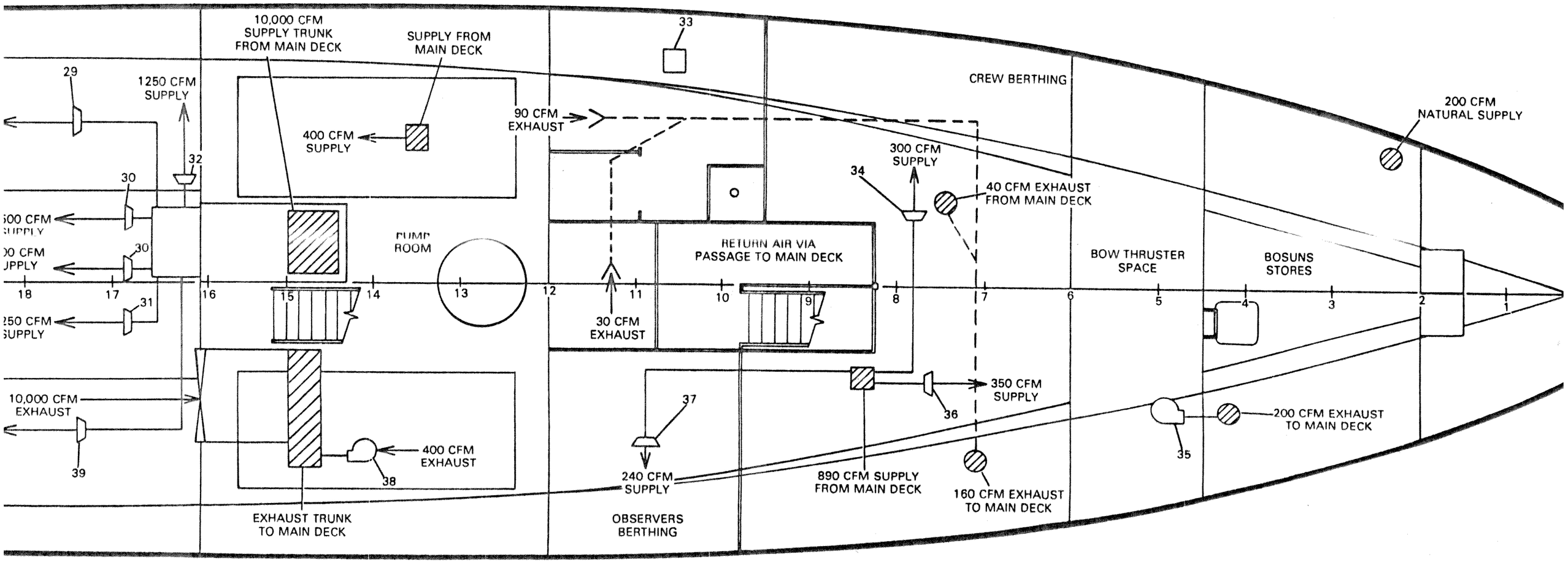


ANDLER, FRAMES 8-1/2 - 9-1/2, STARBOARD, MAIN
(AIR HANDLING ROOM)
SER, FRAME 10, STARBOARD, MAIN DECK (AIR
LING ROOM)
SER, FRAME 11, STARBOARD, MAIN DECK (GALLEY)
SER, FRAME 12, STARBOARD, MAIN DECK (GALLEY)
Y HOOD, FRAME 12, STARBOARD, MAIN DECK
TY)
LOUVER, FRAME 15, STARBOARD, MAIN DECK
ROOM)

Figure 2-44. Heating, Ventilation and Air Conditioning System Diagram (Sheet 2 of 3)



26. EXHAUST FAN, (F-2), FRAME 27-1/2, PORT, LAZARETTE
27. FORCED AIR HEATER, (H-8), FRAME 25, PORT, LAZARETTE
28. FORCED AIR HEATER, (H-7), FRAME 23, PORT, ENGINE ROOM
29. DIFFUSER, FRAME 17-1/2, PORT, ENGINE ROOM
30. DIFFUSER, FRAME 17, PORT, ENGINE ROOM
31. DIFFUSER, FRAME 17, STARBOARD, ENGINE ROOM
32. DIFFUSER, FRAME 16, PORT, ENGINE ROOM
33. CONVECTION HEATER, (H-9), FRAME 10-1/2, PORT, WASHROOM
34. DIFFUSER, FRA
35. EXHAUST FAN THRUSTER SPA
36. DIFFUSER, FRA
37. DIFFUSER, FI BERTHING
38. EXHAUST FAN ROOM
39. DIFFUSER, FRA



1/2, PORT, LAZARETTE
ME 25, PORT, LAZARETTE
AME 23, PORT, ENGINE

, ENGINE ROOM
GINE ROOM
RD, ENGINE ROOM
GINE ROOM
FRAME 10-1/2, PORT,

34. DIFFUSER, FRAME 8, PORT, CREW BERTHING
35. EXHAUST FAN, (F-6), FRAME 5, STARBOARD, BOW THRUSTER SPACE
36. DIFFUSER, FRAME 7-1/2, STARBOARD, CREW BERTHING
37. DIFFUSER, FRAME 11, STARBOARD, OBSERVERS BERTHING
38. EXHAUST FAN, (F-3), FRAME 14, STARBOARD, PUMP ROOM
39. DIFFUSER, FRAME 17-1/2, STARBOARD, ENGINE ROOM

Figure 2-44 Heating, Ventilation and Air

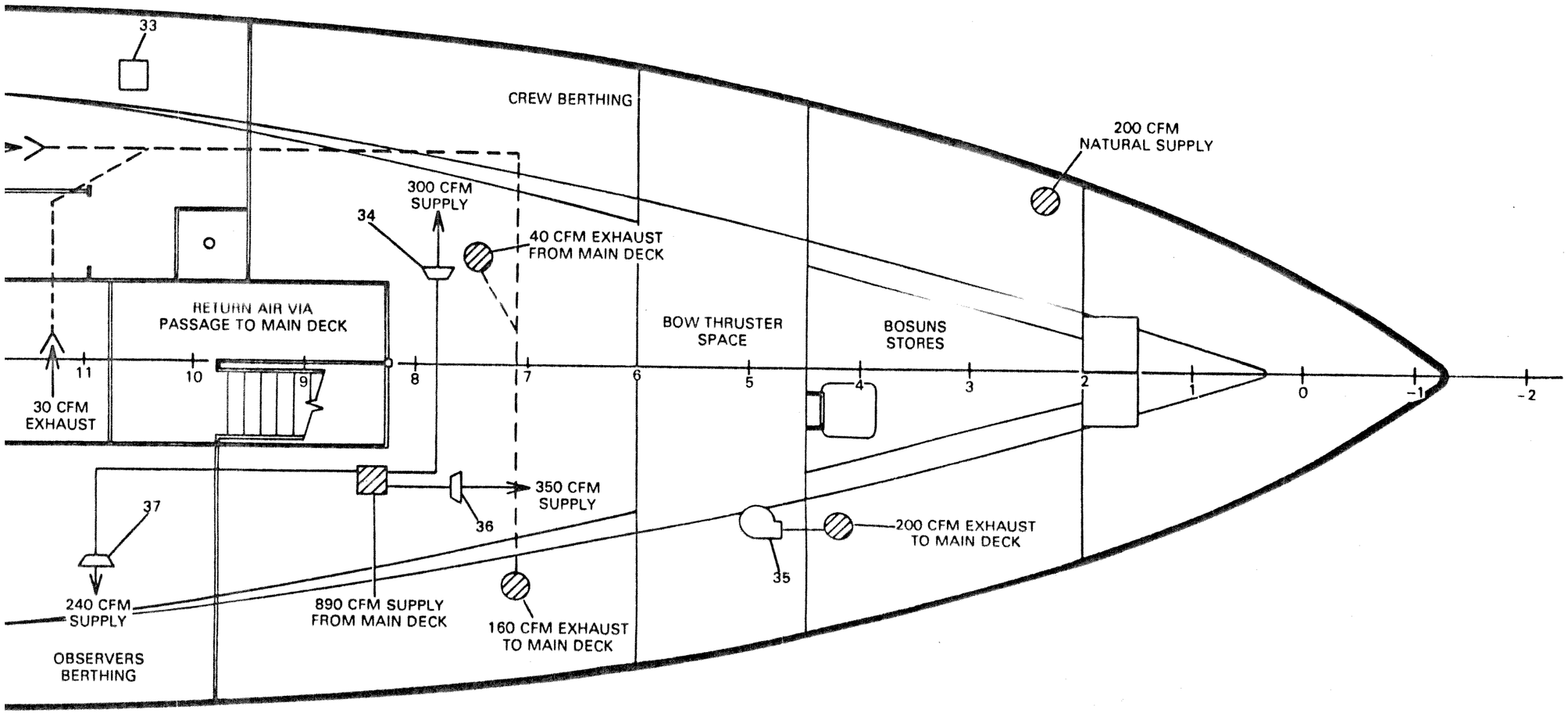


Figure 2-44 Heating, Ventilation and Air Conditioning System Diagram (Sheet 3 of 3)