

CHAPTER 1 GENERAL INFORMATION.

Section I INTRODUCTION

I-1. SCOPE.

This manual contains descriptive information, operating instructions and maintenance data for the Torpedo Weapons Retriever, 120TWR built by Marinette Marine Corporation, Marinette, Wisconsin 54143 (Figures I-1 and I-2). This Boat Information Book is the basic source of information for the crew, planning yards, training commands, operating command and other naval activities. This publication will be used in conjunction with the 85 onboard Technical Service Manuals which contain detailed information on the major components of the Torpedo Weapons Retriever. Refer to Table I-3 for a listing of onboard manuals. Information in this manual is presented in eight chapters further sub-divided into appropriate sections. The general content and arrangement of the manual is given in the Table of Contents. The text is supplemented with line drawings, sketches, diagrams and plan drawings which are assigned

consecutive figure numbers throughout each chapter and are listed in the List of Illustrations. Tabular data is listed in the List of Tables. References to the illustrations and tables are given in the text as applicable. Paragraphs are numbered in sequence within each chapter. For example, paragraph 3-2 is the second paragraph in Chapter 3. If additional paragraph breakdown is necessary the subparagraph following 3-2 would be 3-2.1, etc.

I-2. PURPOSE.

The Torpedo Weapons Retriever is utilized in support of underwater acoustic submarine operations and torpedo exercises. The craft is designed to launch and retrieve acoustic devices as well as retrieve torpedos and missiles in the ocean. Leading characteristics of the Torpedo Weapons Retriever are listed in Table I-1. Specific particulars related to equipment and systems are listed in other chapters of the manual.

Table I-1. Leading Characteristics

Length (overall)	120 Feet
Length (waterline)	110 Feet
Breadth	25 Feet
Depth (amidships)	12 Feet - 10 Inches
Draft (full load)	7 Feet - 5 Inches
Displacement (full load)	248 Long Tons
Horsepower	2350 B.H.P.
Speed	14.7 Knots
Endurance	1700 NM
Crew Accommodations	18 Men
Tank Capacities	
Fuel Oil	8713 Gallons
Ballast (sea water)	43.7 Long Tons
Potable Water	5200 Gallons
Sewage	400 Gallons
Load Capacities	
Torpedo Stowage	34,300 Lbs.
Crew and Effects	3,140 Lbs.
Stores	4,480 Lbs.
Hull Registry Numbers	TWR 120TR821 thru 120TR825 TWR 120TR831 thru 120TR833

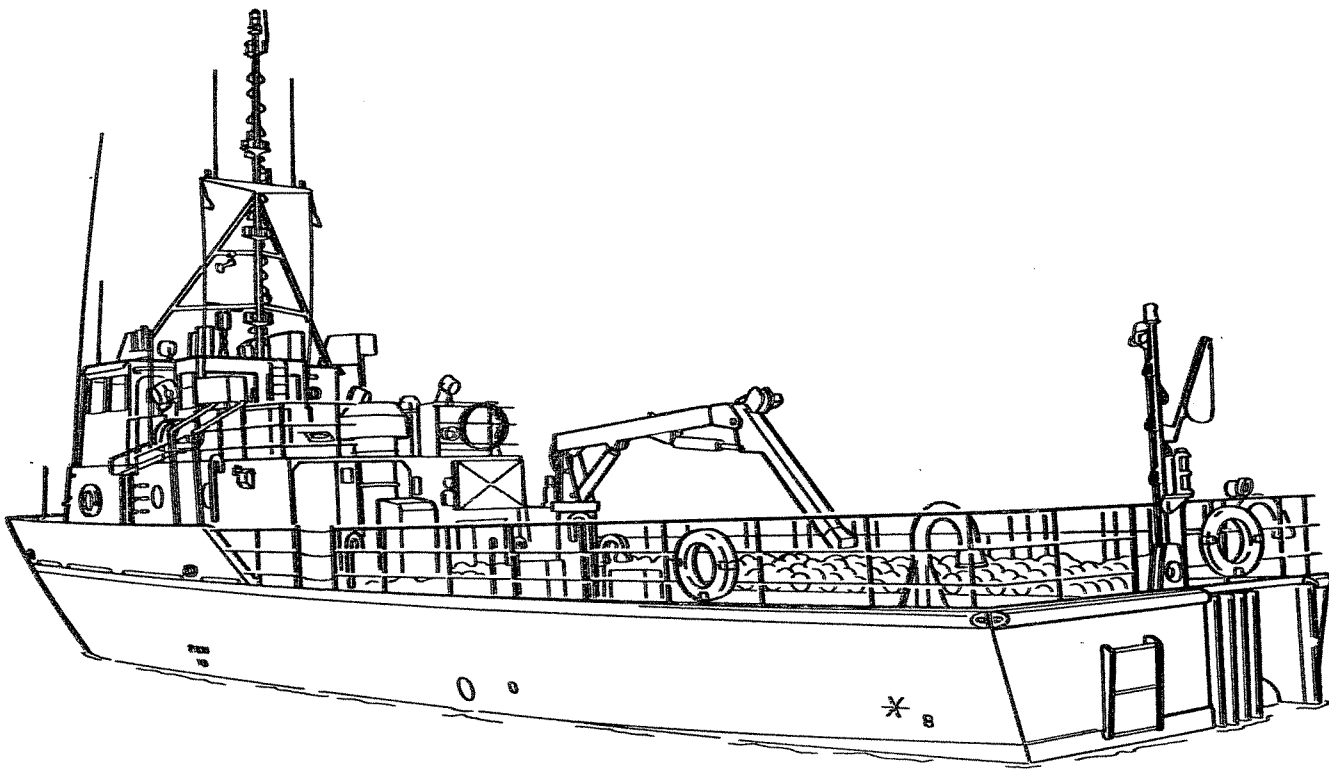


Figure 1-1. 3/4, Aft View

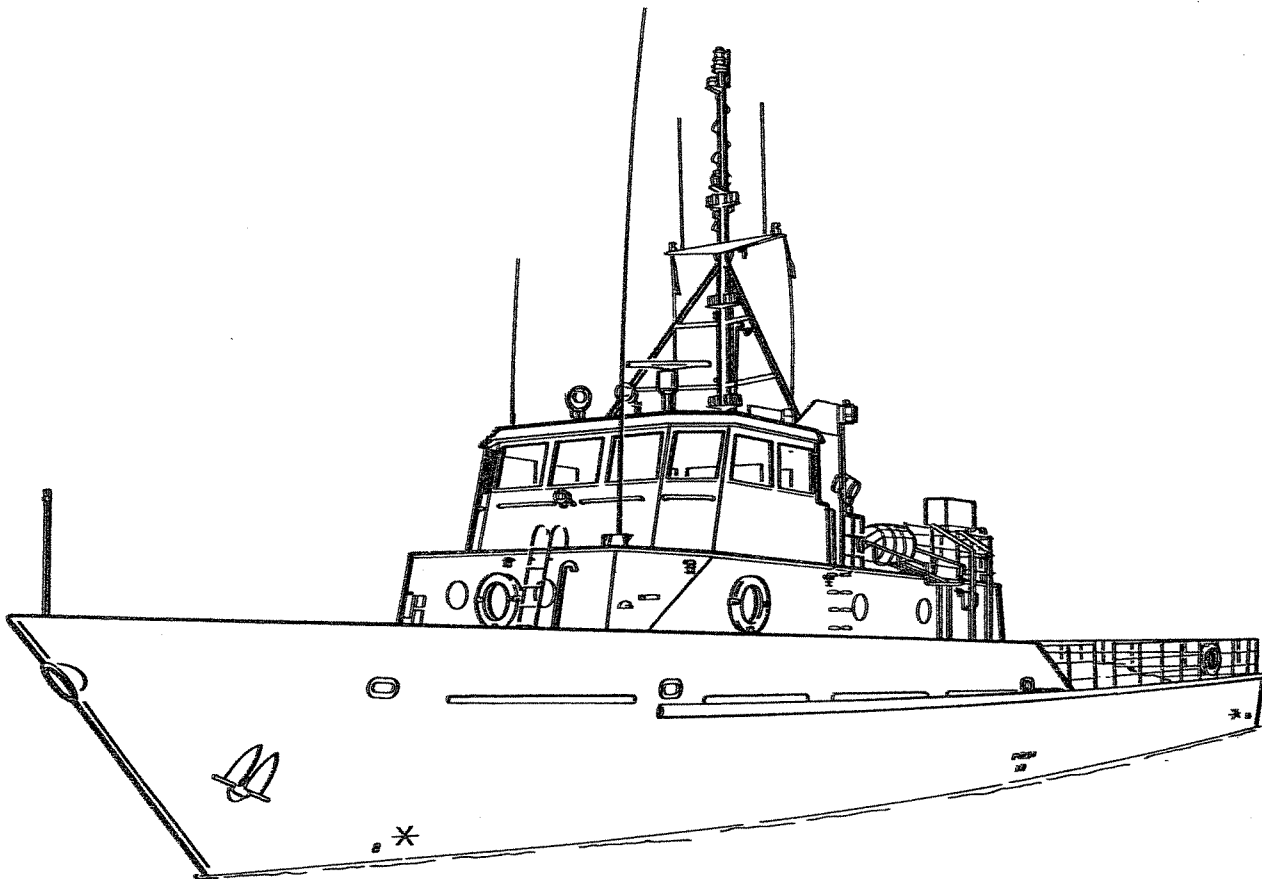


Figure 1-2. 3/4, Forward View

Section II GENERAL DESCRIPTION

1-3. GENERAL.

1-3.1. **PROPULSION AND STEERING.** The Torpedo Weapons Retriever is powered by twin diesel engine driven propellers. Steering at the rudders is controlled by an electro-hydraulic steering system. A bow thruster is employed for additional steering and maneuvering capability. Control of the propulsion engines and steering can be accomplished from the helm station in the pilothouse or the auxiliary conning station on the bridge weather deck.

1-3.2. **DECK CRANE.** The craft is equipped with an electro-hydraulic crane rated at 4000 pounds and capable of operating at full capacity at a permanent list of 15 degrees. The crane is capable of 360 degree rotation and it's primary function is to off-load retrieved torpedos to another craft or a shore facility. The crane is also used for loading stores and provisions. The crane is hydraulically powered from a self-contained power pack and has an outreach of 24 feet.

1-3.3. **TORPEDO HANDLING.** Torpedo handling and transfer is accomplished with the use of an in-haul winch, two transfer winches and a transfer carriage. The main deck is fitted with a ramp deck track and torpedo rollers to support and restrain torpedos. The equipment provided allows for ease of movement and secure and safe stowage of torpedos without damage to the torpedos or the craft.

1-3.4. **ELECTRICAL POWER.** Normal electrical power for the craft is supplied by two diesel generators and related wired distribution system. A pierside connection is provided to connect electrical shore power to the craft when docked.

1-3.5. **NAVIGATION AND COMMUNICATONS.** The craft is equipped with a full complement of electronic and electrical navigation equipment, radio communication equipment, radar, sonar and an announcing system. This equipment is located in the pilothouse. Ship-to-shore and sound powered telephones, alarm and indicating systems are also provided.

1-3.6. **OTHER SYSTEMS.** Other onboard systems are as follows:

1. Fuel, lube oil and exhaust systems for the diesel engines.
2. Bilge, ballast and firemain system for bilge water removal, craft trim and fire fighting.
3. Fresh water system for crew and torpedo washdown.
4. Sea water system for machinery cooling.
5. Anchor windlass for anchor handling.

6. Heating, ventilation and air conditioning system to support crew space.
7. Sewage system for waste retention and disposal.
8. Compressed air system for the air horn, torpedo ramp purging air, and engine room service.
9. Fire extinguishing system for the engine room (halon), galley hood, and portable fire extinguishers.

Deck fittings are provided on the weather deck for water, fuel and lube oil filling. Fittings are also provided for sewage discharge and dirty oil discharge to a shore facility.

1-3.7 **CREW QUARTERS AND SPACE.** Crew berthing is provided for a complement of eighteen along with water rooms, mess/lounge and galley. Stowage areas are provided on the craft for provisions, bosun's stores and spare parts. The storerooms are fitted with bins, racks and shelving to use all available space to the best advantage.

1-3.8. **HULL.** The craft hull is an all steel welded construction with watertight bulkheads at frames 2, 6, 12, 16 and 23. Transverse bulkheads below the main deck are at frames 2, 6, 12, 16, 23 and 25. Sea chests are located 6 inches forward of frame 22 in the engine room. Hull penetration for the bow thruster propeller is located 16 inches aft of frame 5, 18 inches above the base line. Two inboard skegs support the propeller shaft bearings. Cathodic protection is provided for the hull as described in paragraph 1-4. Refer to Chapter 5, Section I, for detailed description of hull construction.

1-4. CATHODIC PROTECTION. (Figure 1-3.)

The underwater areas of the craft are protected from corrosion by zinc anodes, type ZHC-23 in accordance with MIL-A-18001. The anodes are fastened with self-locking nuts and flat washers to fully threaded studs welded to the hull. Zinc anodes are located as follows:

1. On the hull three feet aft of frame 4 (P/S).
2. On the hull three feet forward of frame 14 (P/S).
3. On the hull three feet aft of frame 14 (P/S).
4. On the hull one foot aft of frame 21 (P/S).
5. On the skeg at frame 23 (P/S).
6. On the skeg at frame 24 (P/S).
7. On the hull 18 inches aft of frame 24 (P/S).
8. On the hull 12 inches forward of frame 26 (P/S).
9. Two anodes on each rudder (P/S).

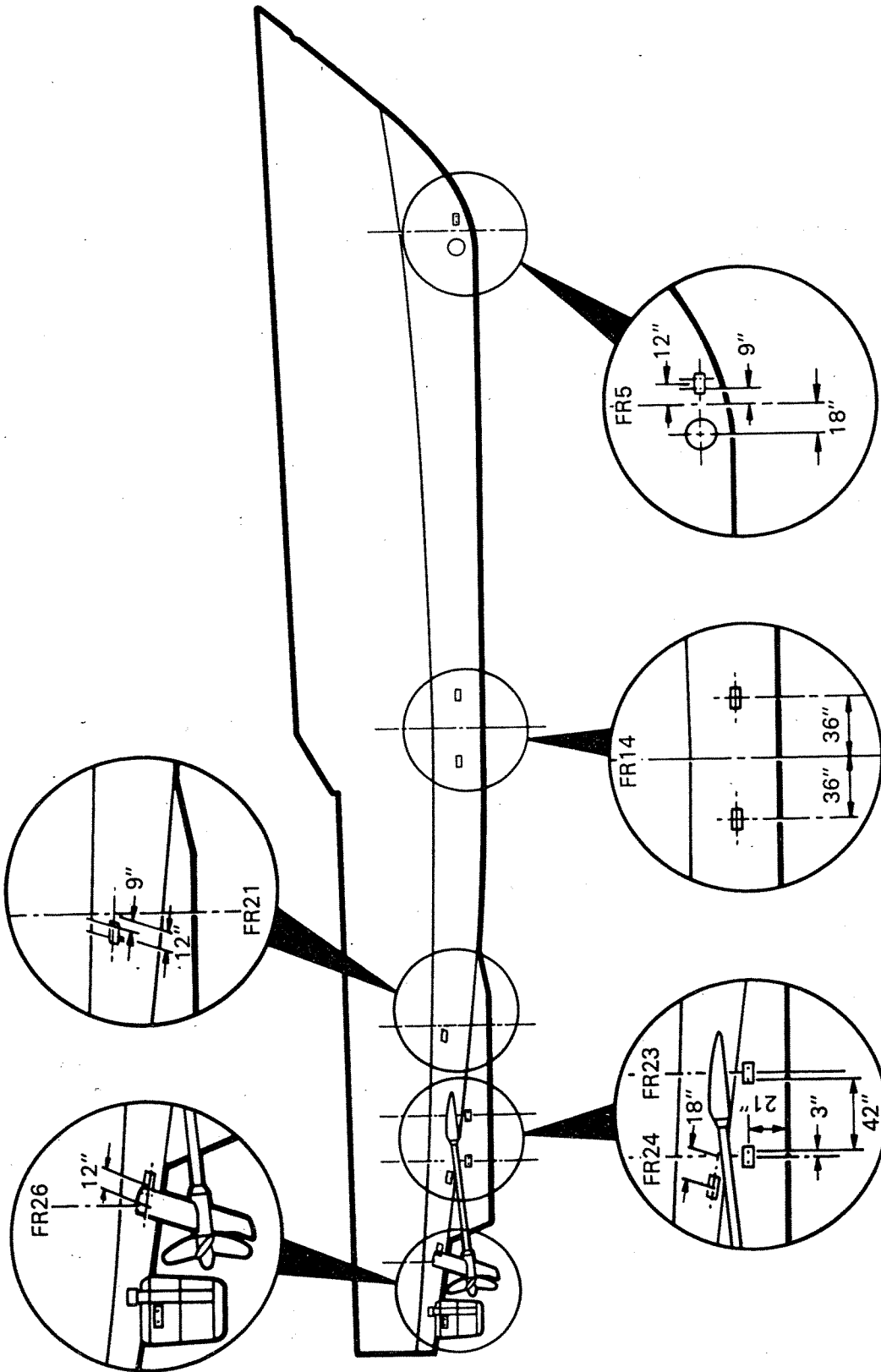


Figure 1-3. Cathodic Protection

1-5. LABEL PLATES AND MARKING.

1-5.1. PLATES. The information label plate and the boatalt label plate are located in the pilothouse at the helm station. Label plates are also installed to provide information regarding stowage locations, lubrication information, safety precautions, emergency procedures, etc. Label plates are located to insure maximum visibility and are mounted adjacent to or on the applicable component.

1-5.2. MARKINGS. Limiting draft marks are located port and starboard 18 inches aft of frame 2 and 18 inches forward of frame 27. The limiting draft marks are 7 feet, 8-7/8 inches above the underside of the keel. An appendage mark is located at frame 14, 6 inches above the upper most draft mark to indicate operating draft including sonar transducer and guard below the keel of the craft.

1-6. OPERATING SYSTEMS.

The following paragraphs are brief descriptions of the purpose and components of the operating systems together with illustrations of major and safety-related components. Location of components is indicated in the illustration captions. Detailed information on the location of all system components is given in Chapter 2. System diagrams are shown in Chapter 2 and 3.

1-6.1. PROPULSION SYSTEM. The propulsion system consists of two Caterpillar diesel engines, Model

3512, with reverse reduction gears, two propulsion shafts, shaft couplings, port and starboard propellers and the propulsion controls (Figure 1-4). The propulsion shafts are machined stainless steel, 5.5 inches in diameter, with keyways and threads to secure the couplings and propellers to the shafts. Heavy nuts and cotter pins are employed to secure the aft end at the propeller. Shaft locking devices are provided consisting of semi-yokes bolted to the stringers of the engines. Stowage for the devices is provided in the engine room. Mechanical single-lever remote controls are provided in the pilothouse (Figure 1-5) and at the auxiliary conning station (Figure 1-6) for propulsion control. Start-stop buttons are on the pilothouse console. Normal stop buttons for the propulsion engines are located at the auxiliary conning stations and at the pilothouse console. Emergency main engine shutdown controls are located at the pilothouse console and in the companion way access to the engine room at frame 13-1/2.

The diesel engines are equipped as follows:

1. Fuel and oil coolers
2. Heat exchangers
3. Oil and fuel filters
4. Starting motors
5. Governors
6. Reverse reduction gears
7. Auxiliary drives
8. Quick start aids
9. Priming pumps
10. Gage boards

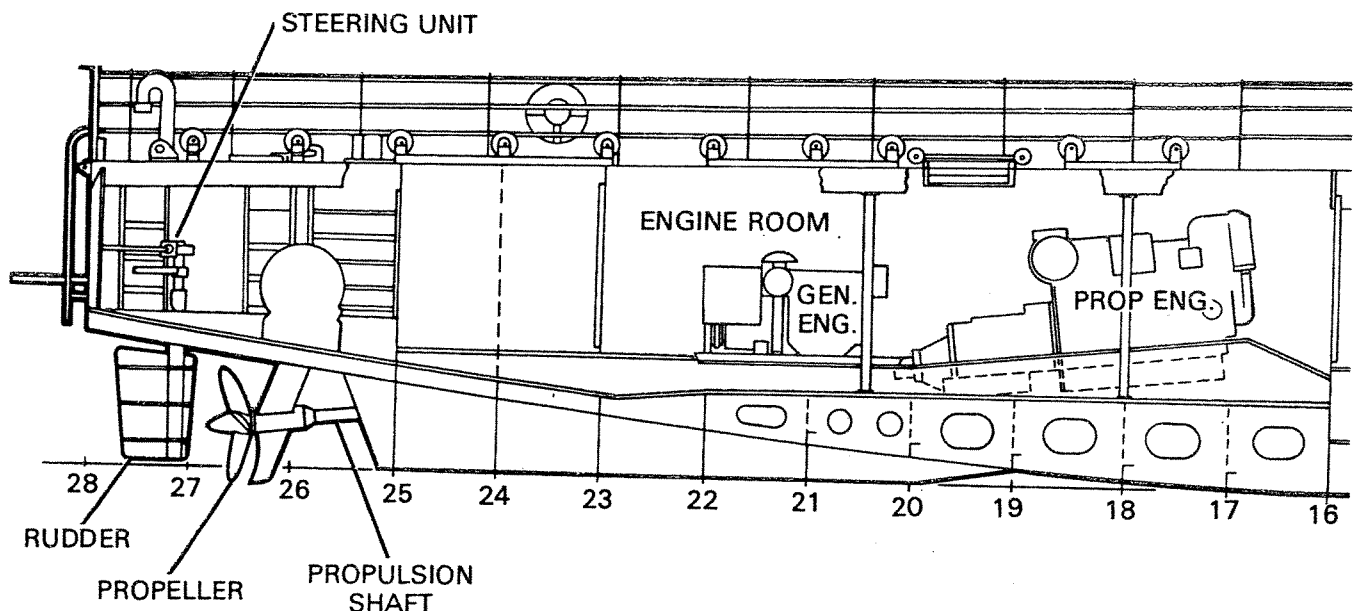
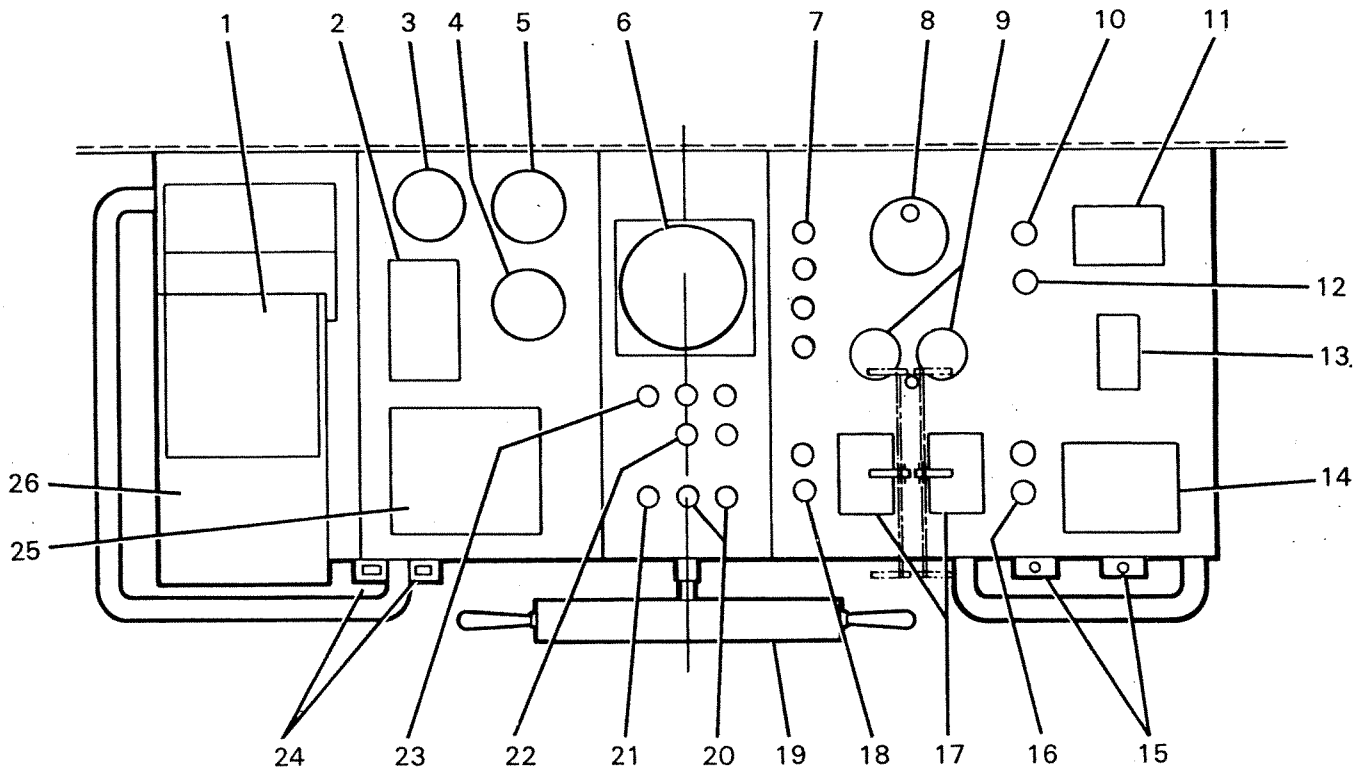
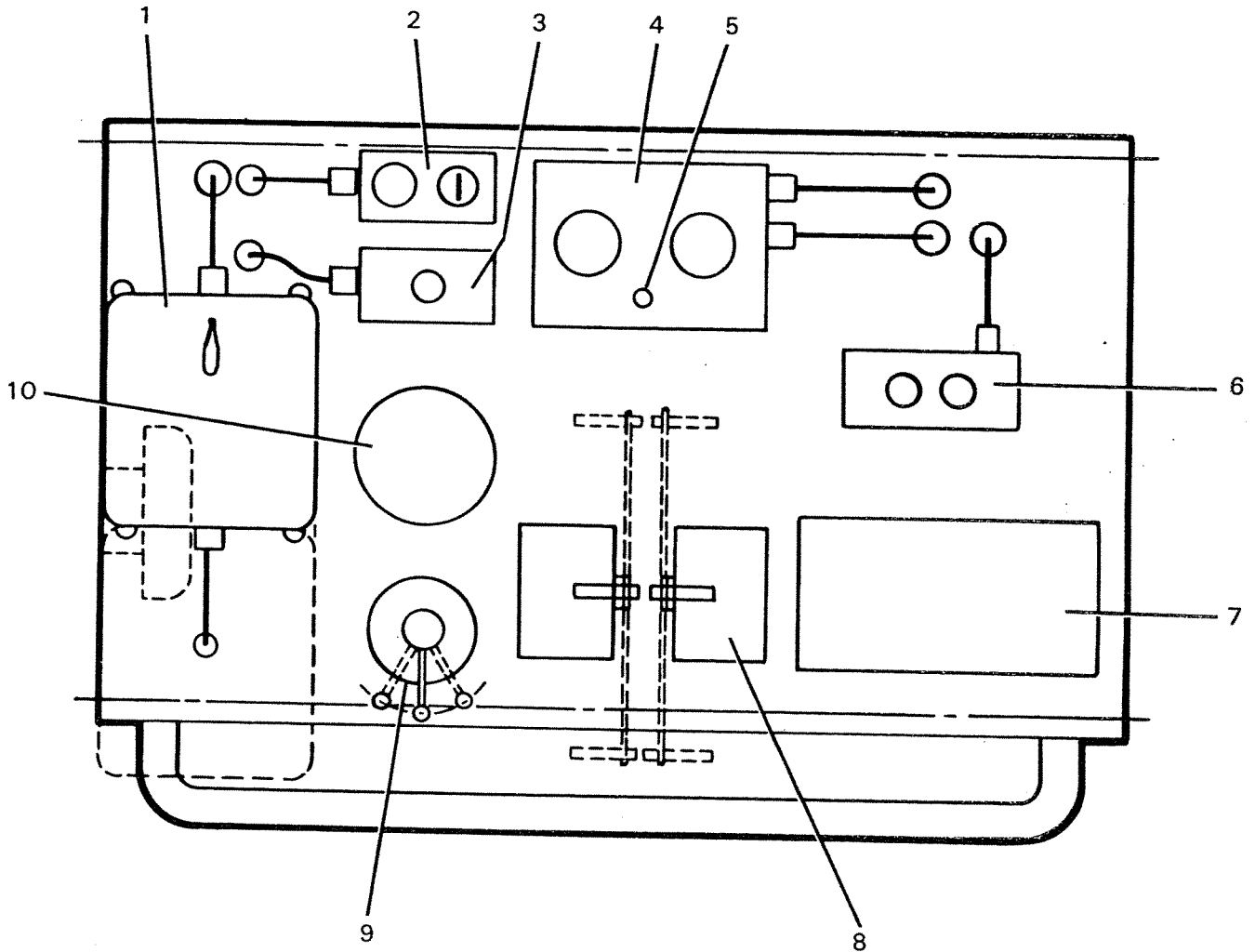


Figure 1-4. Propulsion Engine, Shaft and Propeller



- | | |
|--|---|
| 1. TRUE BEARING UNIT | 14. SPEED LOG |
| 2. SP TELEPHONE STATION SELECTOR | 15. MAIN ENGINE CLUTCH DISCONNECT |
| 3. CHEMICAL ATTACK ALARM CONTACTOR | 16. STARBOARD ENGINE START-STOP SWITCHES |
| 4. COLLISION ALARM CONTACTOR | 17. MAIN ENGINE CONTROL HEAD |
| 5. GENERAL ALARM CONTACTOR | 18. PORT ENGINE START-STOP SWITCHES |
| 6. GYROCOMPASS | 19. HELM WHEEL (TURNS PUMP) |
| 7. LIGHTS ON-OFF SWITCH | 20. STEERING GEAR SELECTOR SWITCH |
| 8. MAGNETIC COMPASS | 21. NFU STEERING DISCONNECT |
| 9. ENGINE TACHOMETERS PORT AND STARBOARD WITH DIMMER | 22. GENERATOR EMERGENCY STOP SWITCHES (2) |
| 10. BREAK GLASS PUSH BUTTON (FANS AND FUEL OIL PUMP) | 23. WINDOW WIPER SWITCHES (3) |
| 11. DEPTH SOUNDER | 24. MAIN ENGINE EMERGENCY SHUTDOWN (PORT AND STARBOARD) |
| 12. COMPASS LIGHT SWITCH | 25. BOW THRUSTER CONTROLLER |
| 13. BLINKER TELEGRAPH | 26. RADAR DISPLAY UNIT |

Figure 1-5. Pilothouse Console Panel



1. SOUND POWERED TELEPHONE
2. SWITCH RECEPTACLE
3. STEERING POWER AVAILABLE LIGHT
4. PROPULSION ENGINE TACHOMETERS
5. DIMMER SWITCH
6. MAIN ENGINE NORMAL STOP BUTTON
7. BOW THRUSTER CONTROL PANEL
8. PROPULSION ENGINE CONTROL HEADS (PORT AND STARBOARD)
9. NFU STEERING LEVER
10. RUDDER ANGLE INDICATOR

Figure 1-6. Auxiliary Conning Station Panel

1-6.2. DIESEL ENGINE EXHAUST SYSTEM. The exhaust system is located in the engine room and consists of mufflers, hoses, exhaust tubes and the necessary fittings and clamps to connect the four diesel engines to the system. Each system is cooled by direct sea water injection controlled by a lockable valve. Drain cocks are installed to insure complete drainage of the system when the engine is secured. The propulsion engines exhaust through the hull at frame 20-1/2 port and starboard and the generator engines exhaust at frame 21-1/2 port and starboard. 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.

1-6.3. FUEL SYSTEM. The fuel system supplies diesel fuel to the propulsion engines and the generator engines from the day tanks located at frame 23 in the hold. Additional fuel tanks are located under the floor plates in the engine room and between frames 9 and 12 port and starboard. The combined fuel capacity is 8713 gallons. The fuel transfer pump (Figure 1-7) located in the engine room allows transfer of fuel from the forward tanks to the day tanks. A hand-operated rotary pump (Figure 1-8) is provided for stripping the fuel tanks and is located in the engine room at frame 22, port side. The fuel shut-off T-handles (Figure 1-9) located on the main deck at frame 23-1/2 starboard, will automatically discontinue fuel supply to all engines. Fuel fill connections (Figure 1-10) are located on the main deck at frame 12-1/2, port and starboard. Containment tanks are located at the fill connection to prevent fuel spill on the deck. The fuel system also contains a fuel/water separator, an oily water tank, vents for all tanks and the necessary lines, valves and fittings for efficient stowage and fuel use.

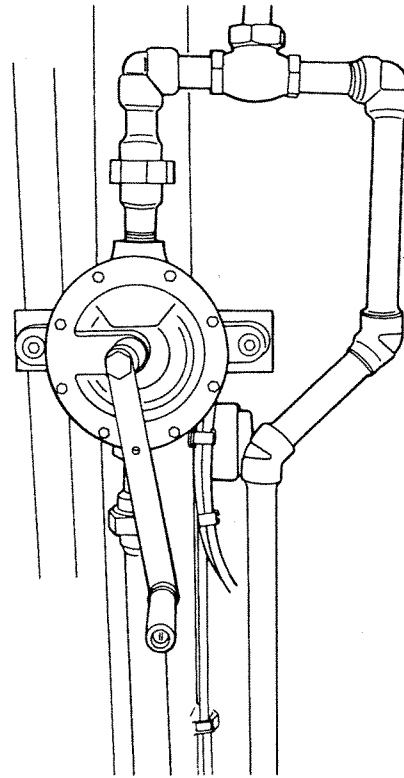


Figure 1-8. Fuel Stripping Pump
(Engine Room, Frame 22, Port)

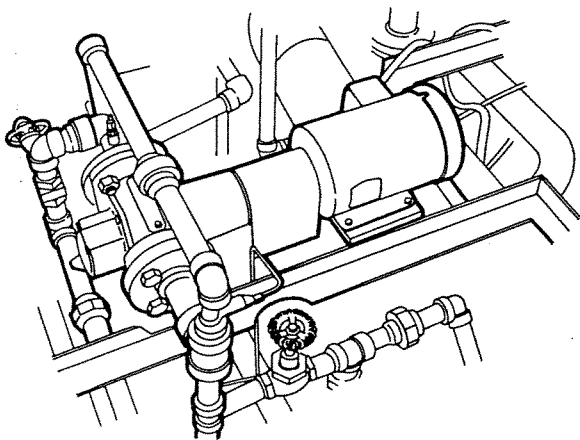


Figure 1-7. Fuel Transfer Pump
(Engine Room, Frame 22, Port)

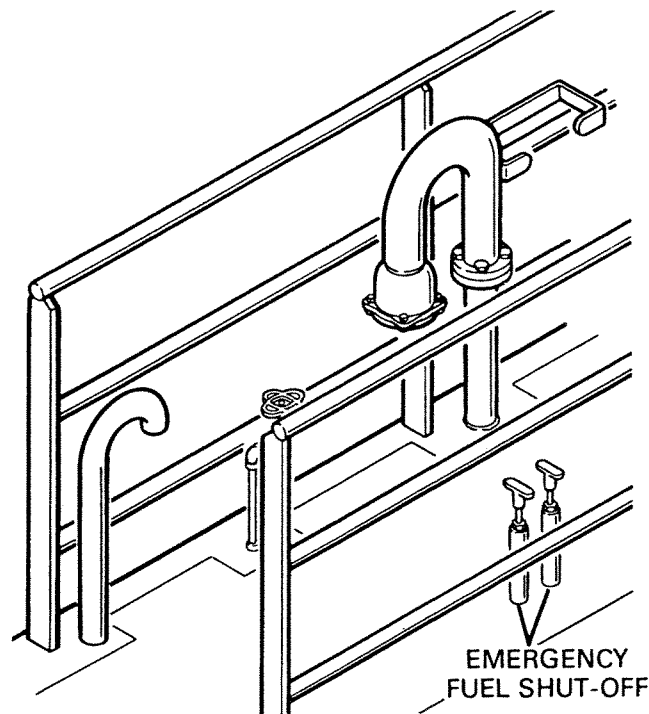


Figure 1-9. Emergency Fuel Shut-Off Handles
(Main Deck, Frame 23-1/2, Starboard)

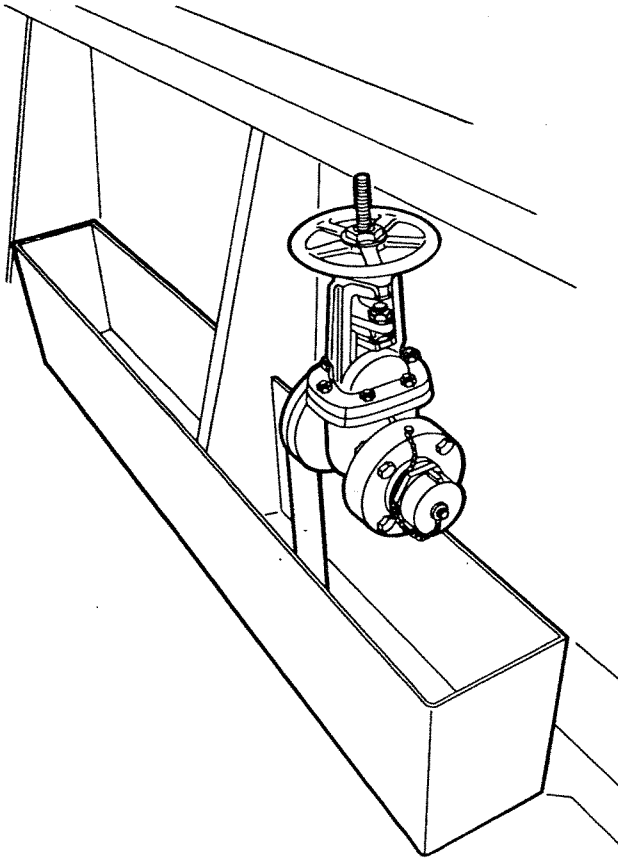


Figure 1-10. Fuel Fill Connection
(Main Deck, Frame 12-1/2, Port and Starboard)

1-6.4. LUBE OIL SYSTEM. The purpose of the lube oil system is to allow fast evacuation of oil from engines and marine gears to the waste oil tank and refill of lube oil sumps from the storage tank. A 250 gallon lube oil storage tank is installed in the lazarette aft of frame 23. The tank is fitted with a fill connection, a liquid level gage, a locked closed drain valve and a bibb cock for servicing lube oil sumps using a portable container. The tank is vented to space and has a 2-inch overflow to the bilge. A quick disconnect fitting is provided for use with the Fast Lube Oil Change System (FLOCS). The propulsion engines, marine gears and generator engines are also fitted with quick disconnect couplings to use with the FLOCS. Drip trays are provided under all quick disconnects. The Fast Lube Oil Change System (FLOCS) consists of two 15-foot portable coupling and drain hose assemblies, one suction strainer and a 115VAC electric evacuation pump with a 5-foot hose (Figure 1-11). The unit is stowed forward of frame 22 in the engine room, starboard side. A quick disconnect coupling is fitted on the waste oil tank to transfer the waste oil removed from

the engines to the stowage tank until shore discharge can be arranged. A hand operated lube oil discharge pump (Figure 1-12) is installed at frame 16 in the pump room, starboard side of engine room access door to discharge to waste oil. The deck fill (Figure 1-13) for the lube oil storage tank is located forward of frame 24 on the main deck. A containment tank with a capacity of 42 gallons is installed around the fill connection. The waste oil deck discharge connection is located at frame 15-1/2, starboard, on the main deck. A containment tank of 42 gallons is provided at the discharge (Figure 1-14).

1-6.5. FRESH WATER SYSTEM. The fresh water system includes provisions for filling, stowage and transfer of potable water. Fresh water tanks are located between frames 12 and 16 port and starboard in the pump room. Each tank is vented to space and is fitted with level indicators. Potable water tanks are filled aft of frame 12, port and starboard on the main deck. The shore connection (Figure 1-15) is fitted with a blue cap and fitting and is marked POTABLE WATER ONLY. The potable water hose is stowed in the shelter deck area forward of frame 15 above the emergency fire pump. A chlorine tank (Figure 1-16) with a 2-gallon capacity is located forward of frame 12 on the starboard side of the main deck. If water supply must be delivered from the port side the chlorine tank can be moved and installed at the port side connection. The fresh water system consists of the storage tanks, a hot water heater, a booster heater, water filters (Figure 1-17), a pressurized water tank and water pump and the necessary lines and fittings for system delivery. Water is supplied through the system to the washrooms, pump room sink, drinking fountain, galley, torpedo washdown, hot water heater, booster heater, deluge shower and wash basin and a service connection in the engine room.

1-6.6. FIREMAIN SYSTEM. The purpose of the firemain system is to supply pressurized water to the fire stations for fire fighting. The firemain system uses two 100 GPM electric motor driven fire pumps (Figures 1-18 and 1-19). Both pumps take suction from the sea chests located 6 inches aft of frame 22 port and starboard in the engine room.

1-6.6.1. The firemain system provides pressurized water to the fire stations (Figure 1-20) located as follows:

1. Bridge deck, frame 10, port side.
2. Main deck, frame 4-1/2, port side.
3. Main deck, at frame 15.
4. First platform, at frame 9.
5. Hold, engine room, forward of frame 20.

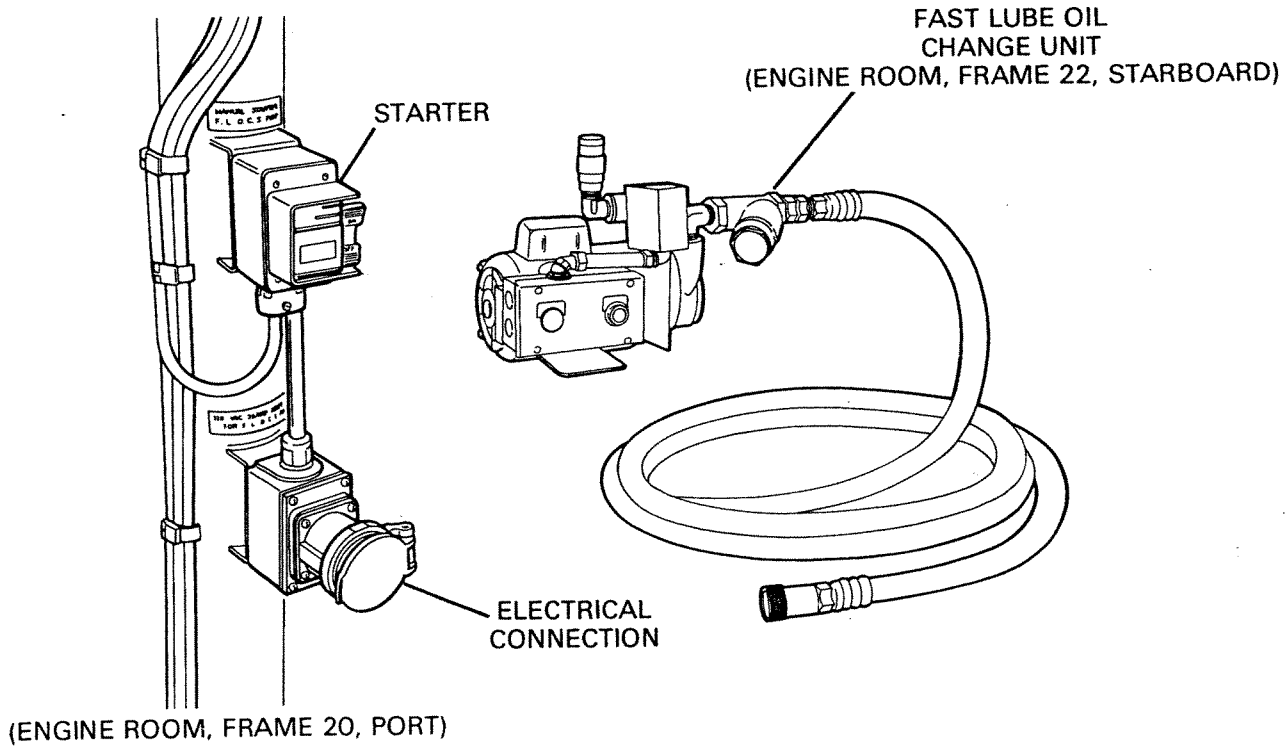


Figure 1-11. Fast Lube Oil Change Unit, Starter and Electrical Connection

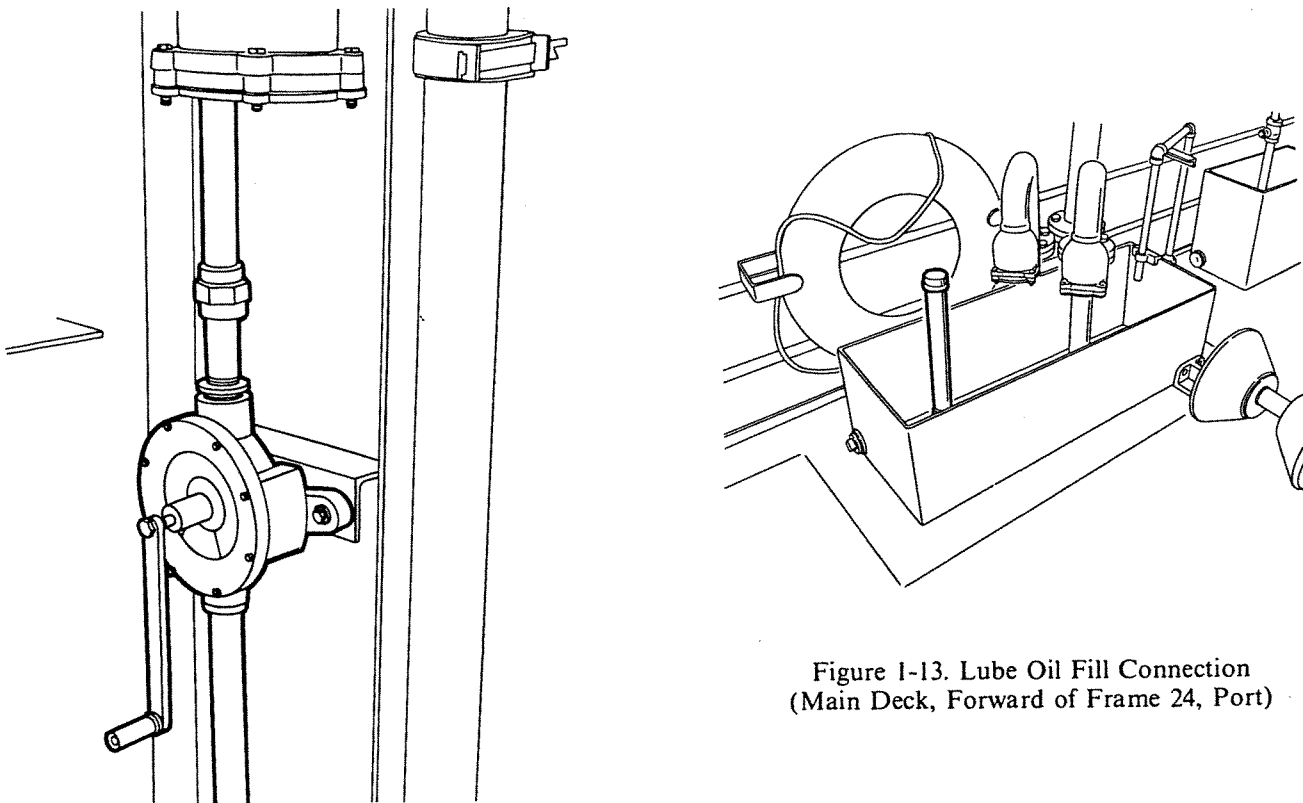


Figure 1-13. Lube Oil Fill Connection
(Main Deck, Forward of Frame 24, Port)

Figure 1-12. Waste Oil Discharge Pump
(Pump Room, Forward of Frame 16, Starboard)

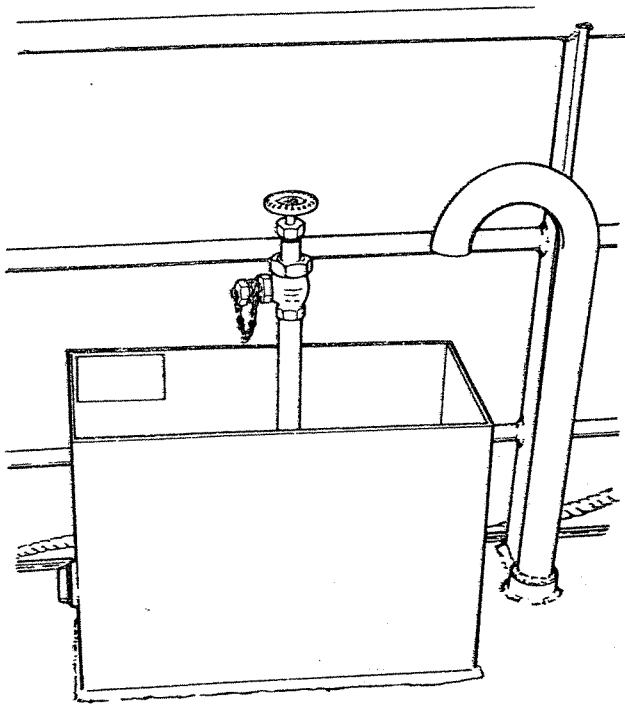


Figure 1-14. Waste Lube Oil Discharge
(Main Deck, Frame 15-1/2, Starboard)

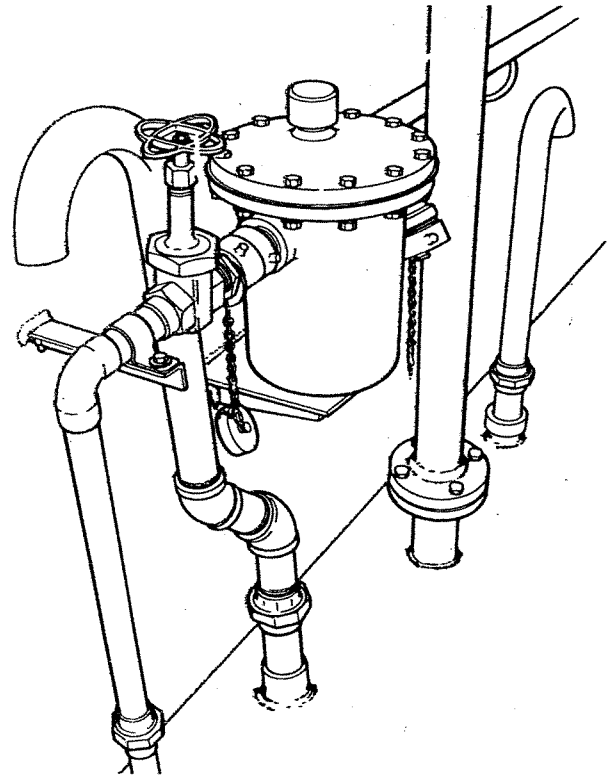


Figure 1-16. Chlorine Tank
(Main Deck, Frame 12, Port)

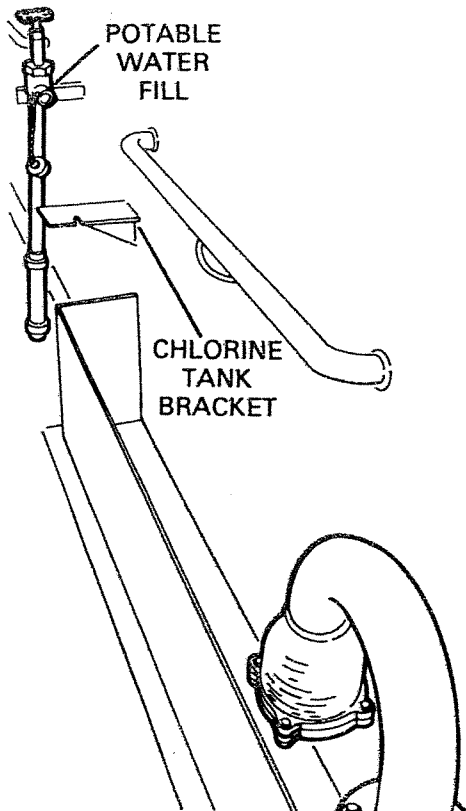


Figure 1-15. Potable Water Connection
(Main Deck, Frame 12, Port and Starboard)

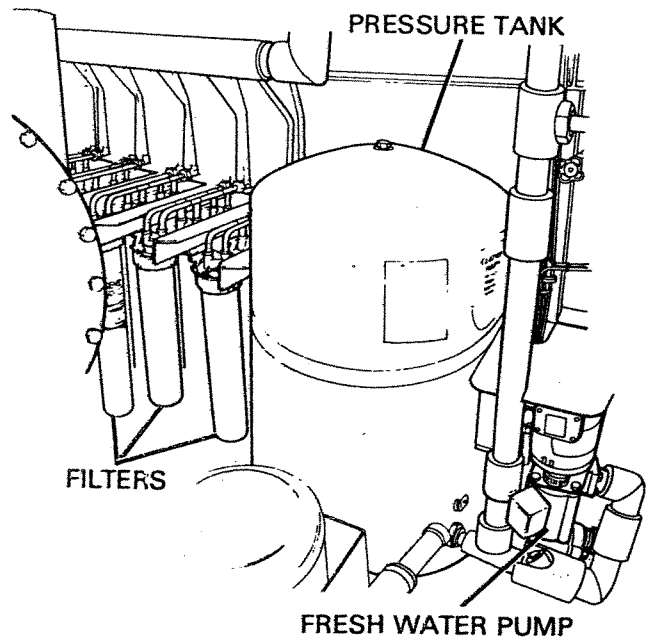


Figure 1-17. Pressure Set and Filters
(Pump Room, Frame 13)

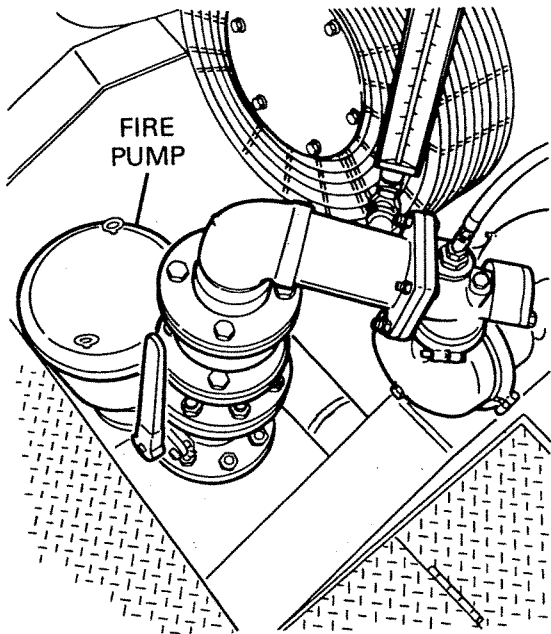


Figure 1-18. Engine Room Fire Pump
(Frame 16-1/2, Port)

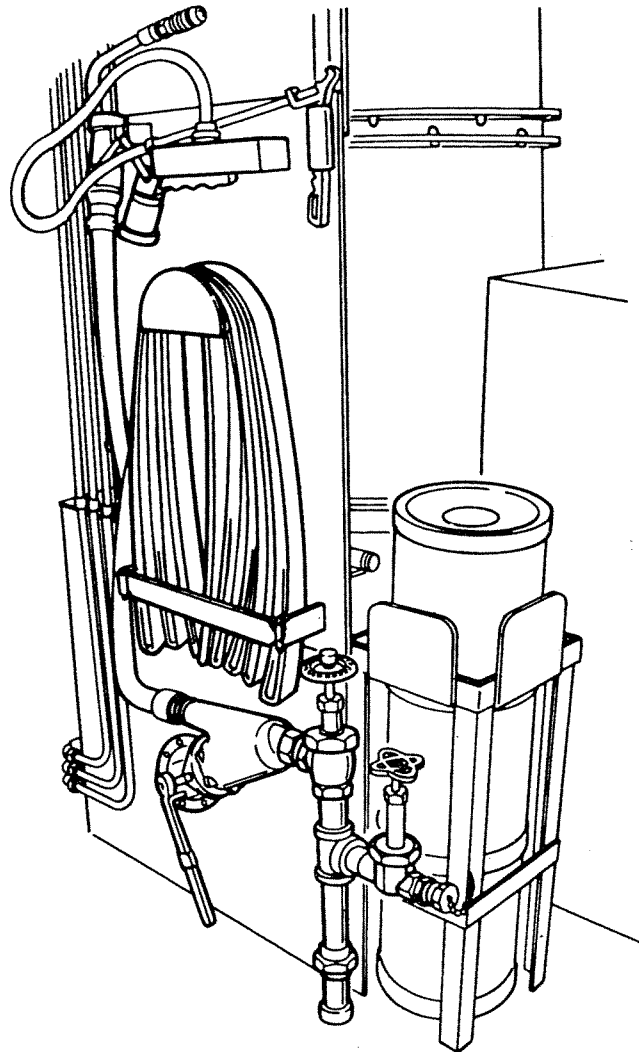


Figure 1-20. Fire Station
(Main Deck, Frame 15, Port)

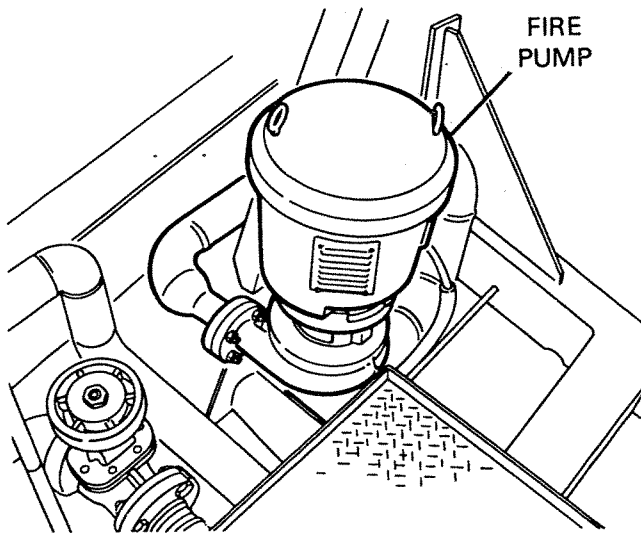


Figure 1-19. Lazarette Fire Pumps
(Aft of Frame 25, Starboard)

1-6.6.2. Each fire station is equipped with brackets to mount the following equipment:

1. Fire plug.
2. "Y" type strainer with lever handle ball valve.
3. 1-1/2-inch, 3-position, all-purpose nozzle.
4. 4-foot low velocity fog applicator.
5. Spanner wrench.
6. Inline foam inductor.
7. Variable pattern spray nozzle.
8. Hose rack with two, 50-foot lengths of 1-1/2-inch double jacketed fire hose. (Engine room is fitted with only one length of hose.)

1-6.6.3. A PE-250 emergency fire fighting pump (Figure 1-21) is located on the main deck at frame 15. This pump can be used to pressurize the firemain during total electrical failure. The pump can also be used as a portable device for fire fighting or de-watering. Refer to onboard Technical Service Manual NAVSEA 0947-LP-238-5010 for detailed information on the fire fighting pump. An eight gallon fuel tank and a fuel line assembly for the pump are stowed in the bosun's locker. Accessories for the PE-250 emergency fire fighting pump are stowed in the shelter deck area above the pump. Hoses are stowed on clamps welded to the port side bridge deck hand rails forward of frame 15. Accessories are as follows:

1. One three way gate valve.
2. Foot valve and strainer.
3. One reducer.
4. Three suction hose assemblies.
5. One exhaust hose.

1-6.7. **BILGE SYSTEM.** The purpose of the bilge system is to remove excess water from low areas on the craft and

discharge water overboard through the eductor. The bilge system also operates through the two 100 GPM electric motor driven fire pumps (Figures 1-18 and 1-19). Both pumps take suction from the bilge manifold and discharge overboard aft of frame 20, first platform. The forward fire pump handles the independent suction from the engine room and pump room. A bilge level alarm system is installed on the craft to indicate high bilge levels in the lazarette, engine room, pump room provisions storeroom, bow thruster space and the bosun's stores space. An indicator light on the alarm panel in the pilothouse will provide visual indication of bilge flooding as sensed by bilge level sensors (Figure 1-22). The sump under the chain locker forward of frame 2, starboard side of centerline is fitted with a remote operated gate valve (Figure 1-23) controlled from a deck box on the main deck. Bilge is drawn through box strainers located in the lazarette, engine room, pump room and the bow thruster space as selected at the bilge manifold and is discharged overboard through the eductor. The bilge manifold (Figure 1-24) is fitted with globe stop check valves and is located at frame 16 in the engine room.

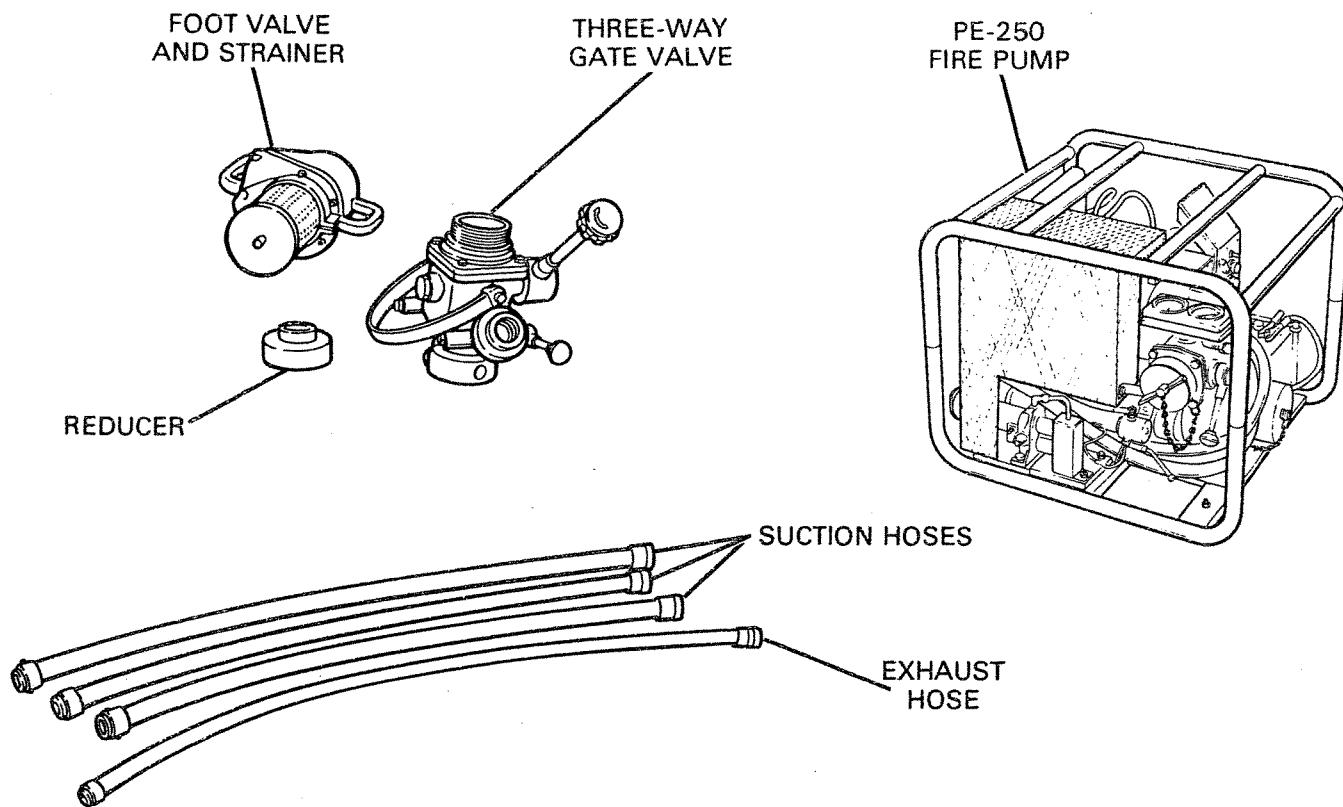


Figure 1-21. PE-250 Fire Pump and Accessories
(Main Deck, Frame 15, Port)

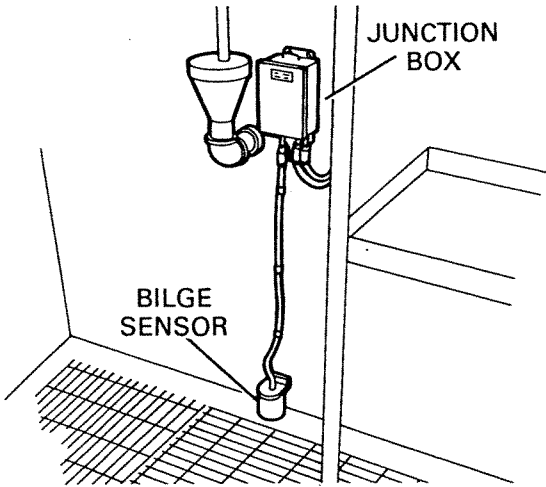


Figure 1-22. Bilge Level Sensors (Various Locations)

1-6.8. BALLAST SYSTEM. The purpose of the ballast system is to add or remove water from the ballast tanks to improve stability or control draft of the craft. The ballast system uses the aft 100 GPM fire pump (Figure 1-19) which takes suction from the ballast manifold and the sea chest. The pump will ballast from the sea chest to the ballast tanks or deballast the tanks through the overboard discharge. Ballast tanks are located at frame 23 port and starboard, between frames 6 and 9 port and starboard and in the craft forepeak. A remote operated gate valve (Figure 1-22) is incorporated in the line to the forepeak ballast tank which is controlled from the deck box on the main deck. The ballast manifold (Figure 1-25) fitted with gate valves is located just forward of frame 23 in the engine room.

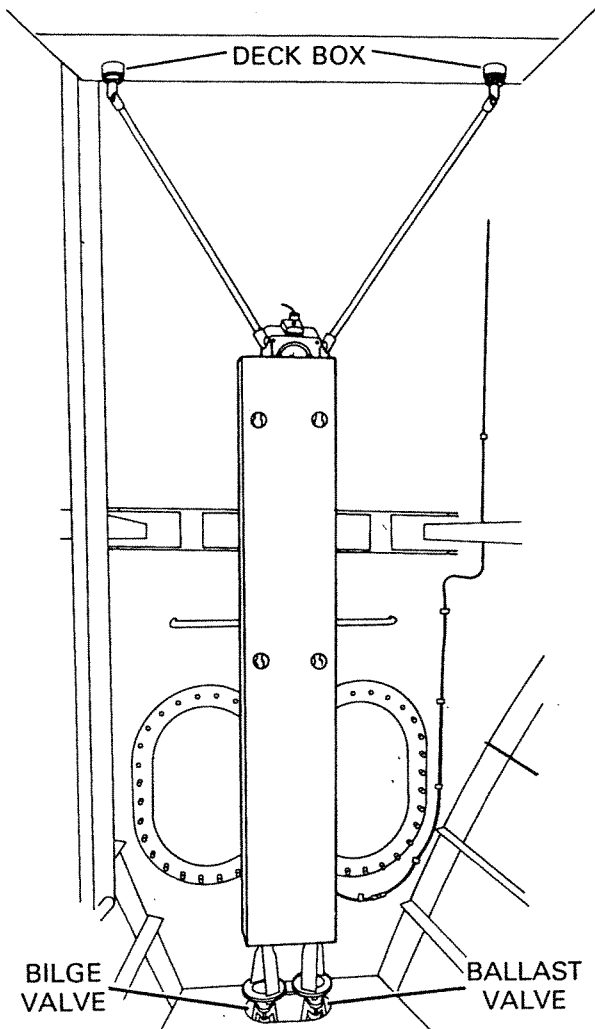


Figure 1-23. Remote Control Valves (Bosun's Stores, Frame 2, Centerline)

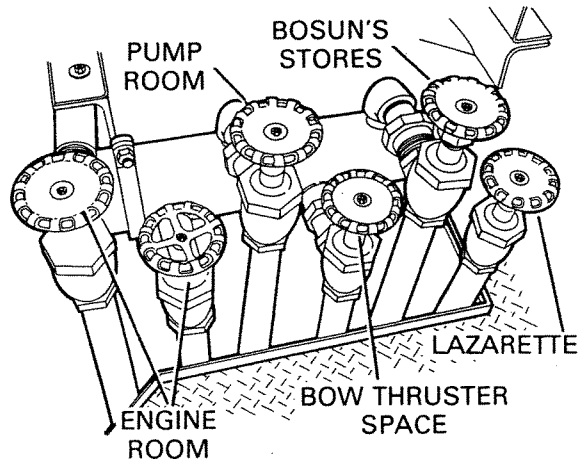


Figure 1-24. Bilge Manifold and Valves (Engine Room, Frame 16, Port)

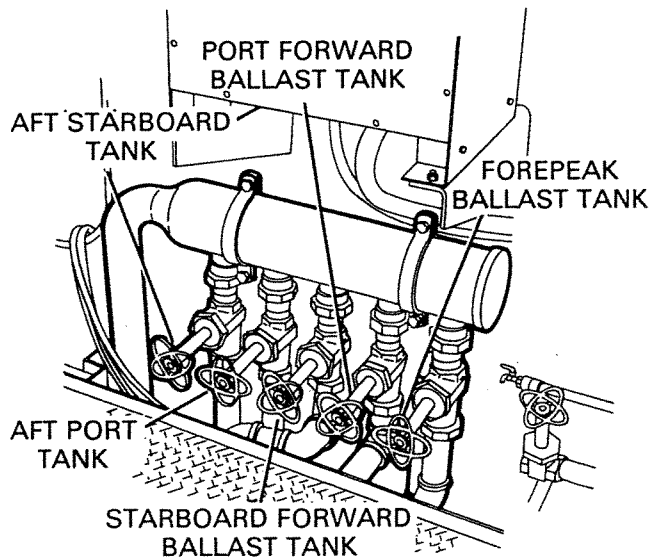


Figure 1-25. Ballast Manifold and Valves (Engine Room, Frame 23, Centerline)

1-6.9. SEA WATER AND COOLING WATER SYSTEM. The sea water cooling system provides cooling for the propulsion engines, the ships service generators, the reduction gears, the air conditioning condenser, the stern tube shaft bearings and the bow thruster hydraulic cooler. Engine mounted raw water pumps (Figure 1-26) circulate the sea water to cool the heat exchangers. A separate pump (Figure 1-27) taking suction from the sea water crossover circulates water to the A/C condenser. 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. Make-up for the engines cooling system is from the fresh water system. The fresh water circulates through the engine jackets, heat exchangers and lubricating oil coolers. Service connections for the fresh water system are available in the engine room to add water to the system when necessary. Sea water strainers are located at the sea chests in the engine room.

1-6.10. STEERING SYSTEM. Steering is accomplished hydraulically. Hydraulic power for the system is provided by two motor driven pumps (Figure 1-28) in a dual power pack arrangement located in the lazarette between frames 27 and 28. The header (supply) tank for the steering system is located on the pilothouse roof at frame 9 (Figure 1-29). The rudders are mechanically linked and moved by the steering unit (Figure 1-4). Steering is controlled at the helm wheel (Figure 1-5) with the helm pump which is located on the pilothouse console or a lever steerer at the auxiliary conning station (Figure 1-6). In event of electric power failure, which will disable the pumps and electric lever steerer, emergency steering can be accomplished with the helm pump. Clockwise rotation of the steering wheel turns the craft to starboard and vice versa.

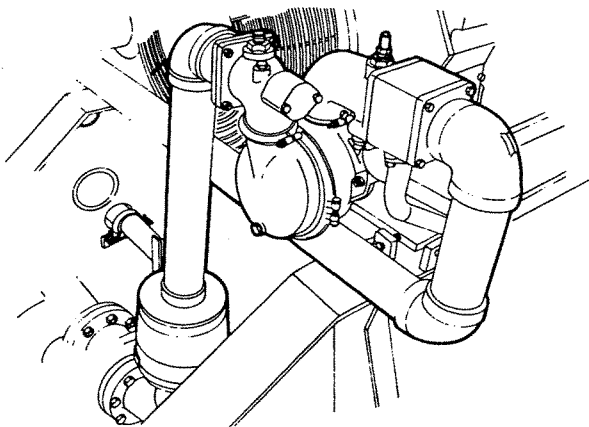


Figure 1-26. Engine Driven Sea Water Pump
(Engine Room, Frame 17, Port and Starboard)

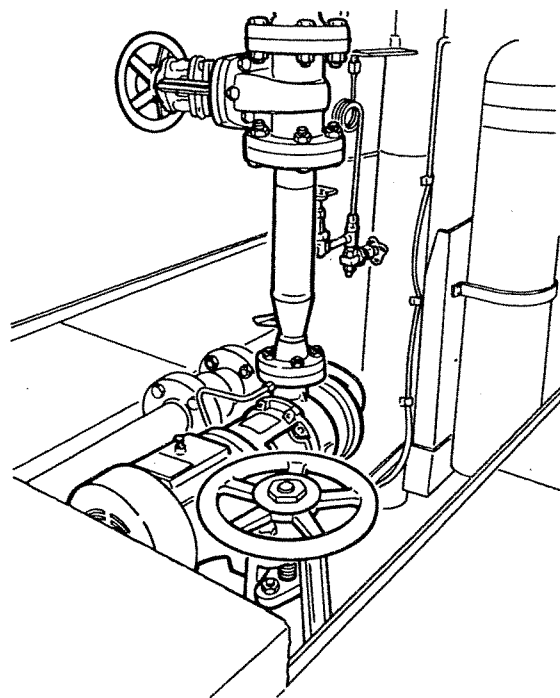


Figure 1-27. A/C Condenser Sea Water Pump
(Engine Room, Frame 17, Centerline)

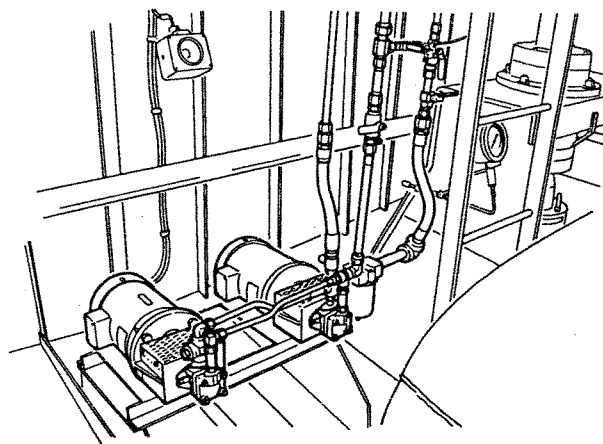


Figure 1-28. Steering Pumps
(Lazarette, Between Frames 27 and 28)

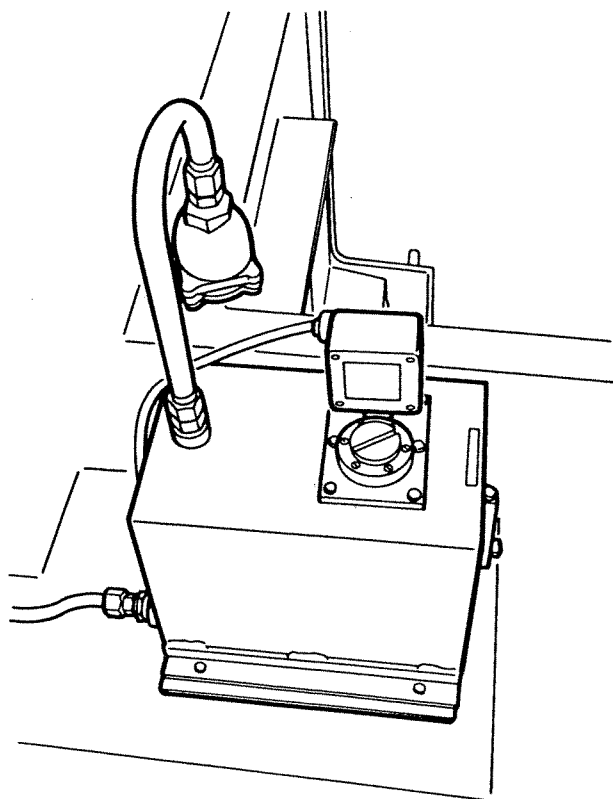


Figure 1-29. Steering Header Tank
(Pilothouse Roof, Frame 9)

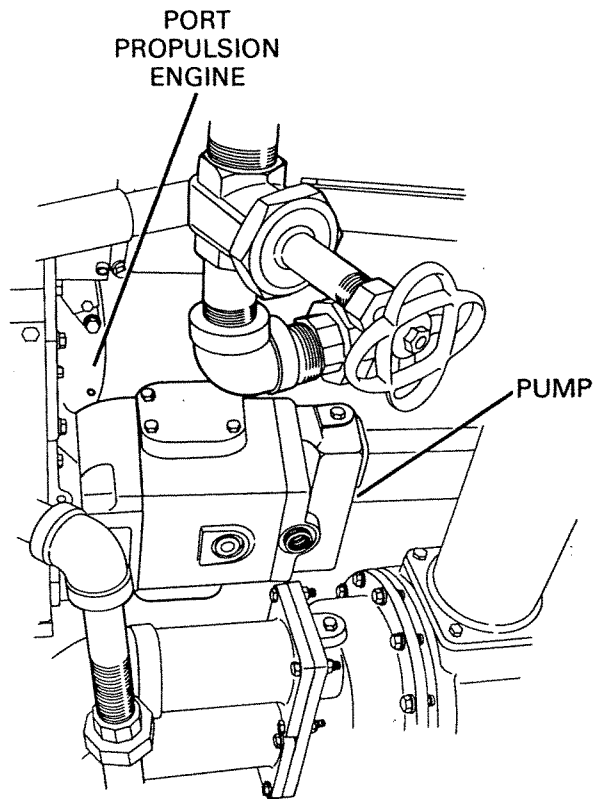


Figure 1-30. Bow Thruster Hydraulic Pump
(Engine Room, Between Frames 5 and 6, Port)

1-6.11. **BOW THRUSTER SYSTEM.** The bow thruster is a hydraulically powered propulsion system designed to provide lateral thrust to the bow of the craft. The system provides a means of controlling the ship against wind and side currents as well as allowing added maneuverability when docking in close area. The bow thruster system consists of a main hydraulic pump (Figure 1-30), bow thruster (Figure 1-31), reservoir (Figure 1-32), header tank (Figure 1-33), hydraulic oil cooler, valves, pressure gage and control panels. The main hydraulic pump is driven directly off the craft's main port propulsion engine and provides the flow and pressure to operate the system. The bow thruster has a primary and a secondary control panel to allow control of the thruster from the pilothouse or from the auxiliary conning station on the bridge deck (Figures 1-5 and 1-6). Low oil and high temperature warning devices are located on both control panels to prevent damage to the hydraulic pump. A pressure relief valve is also incorporated in the system in the event the system becomes over pressurized.

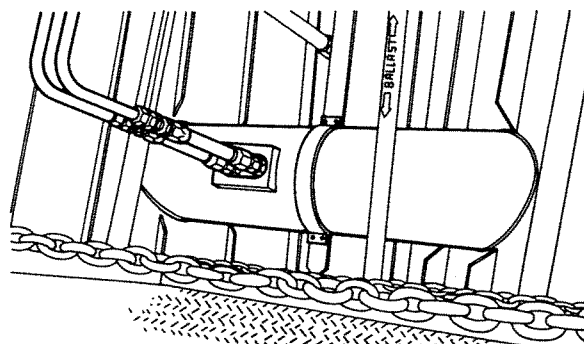


Figure 1-31. Bow Thruster
(Holds Frames 4-1/2 and 6)

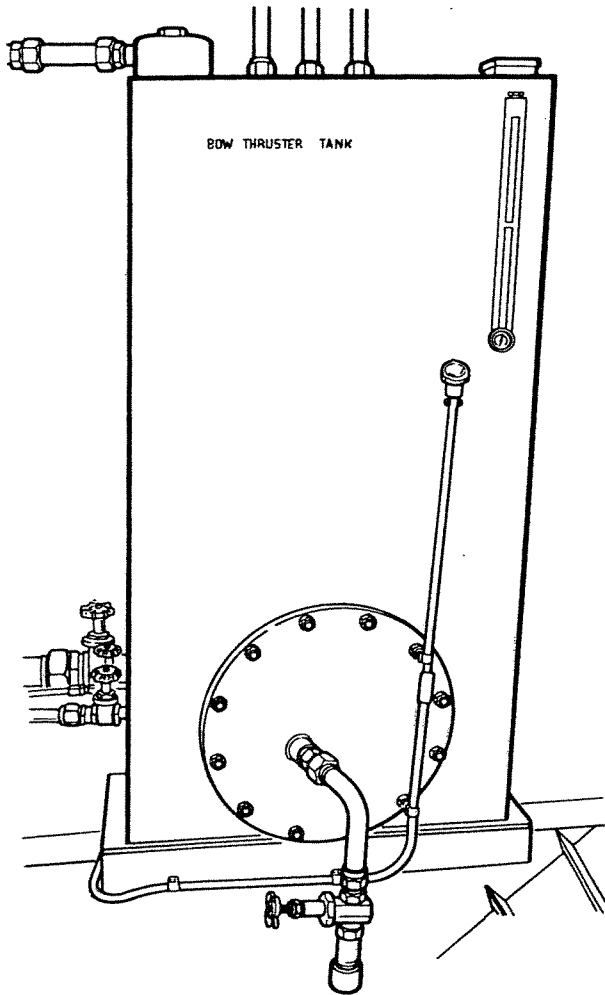


Figure 1-32. Bow Thruster Reservoir
(Frame 6, Port)

1-6.12. DECK CRANE SYSTEM. The purpose of the crane is to off-load retrieved torpedos to another craft or a shore facility. The crane is also used for loading stores and provisions. The crane (Figure 1-33) is located on the starboard side of the main deck aft of frame 16. The crane is hydraulically powered from a self-contained power pack. The power pack (Figure 1-34) and motor controller (Figure 1-35) for the crane are located at frame 14 port side. Refer to onboard Technical Service Manual SG811-AA-MMC-010 for complete details on the crane. The crane has an outreach of 24 feet with a minimum safe

working capacity of 4000 pounds at full extension. The crane control stand (Figure 1-37) is located on the bridge deck, at frame 15 starboard. The crane is capable of operating at full capacity at a permanent list of 15 degrees. The crane is capable of 360 degree rotation. The crane consists of the base, spindle, booms, hydraulic control valve, hydraulic cylinders, gear boxes, brake, hydraulic pump, motor controller, 25 HP electric motor, a reservoir with suction and return filters, and the necessary piping and tubing to make the system operable. The crane can be stowed in two positions. Longitudinally, stowage is required when torpedos are onboard and athwartships to correct anticipated list when torpedos have not been retrieved.

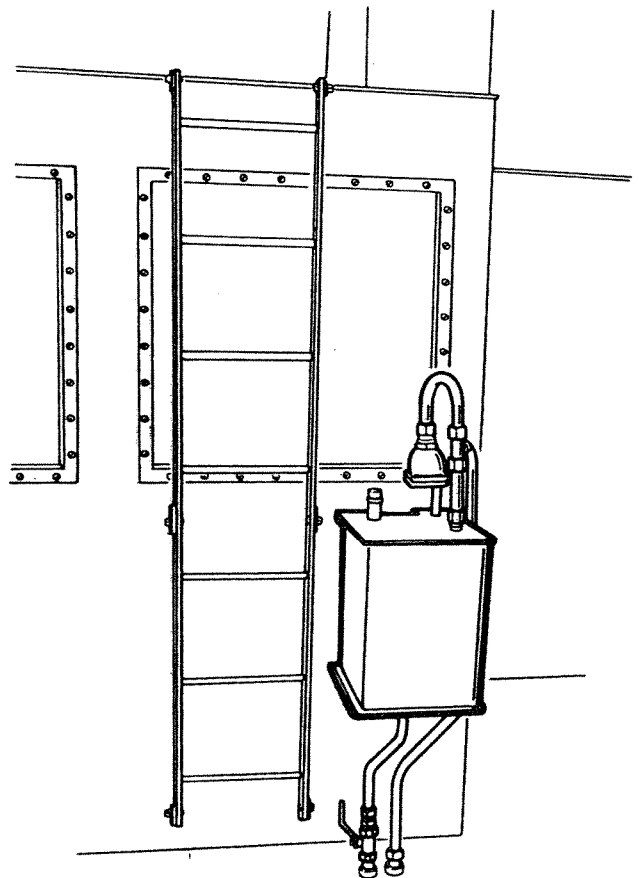


Figure 1-33. Bow Thruster Header Tank
(Bridge Deck, Frame 10)

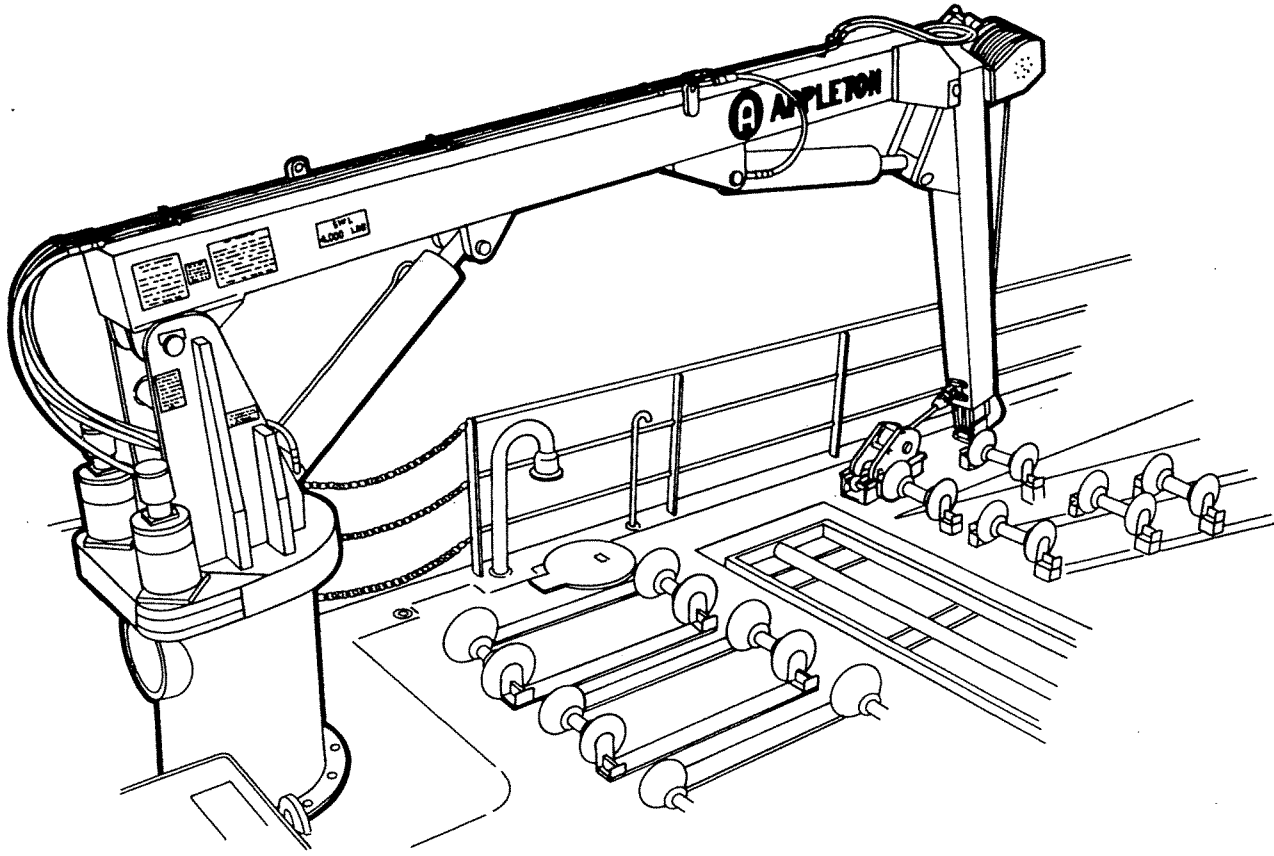


Figure 1-34. Crane
(Main Deck, Aft Frame 16, Starboard)

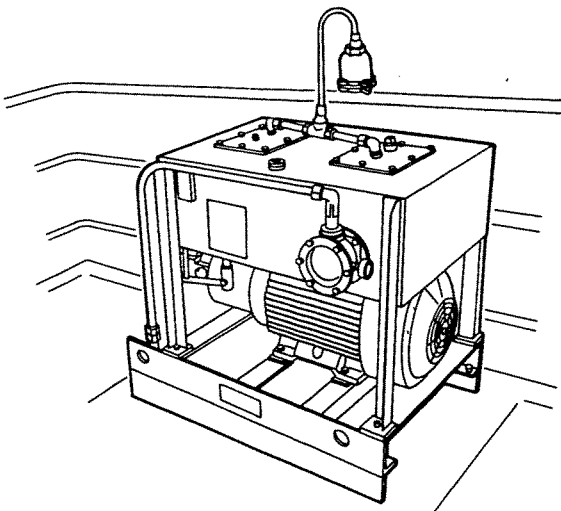


Figure 1-35. Crane Power Pack
(Bridge Deck, Frame 14, Port)

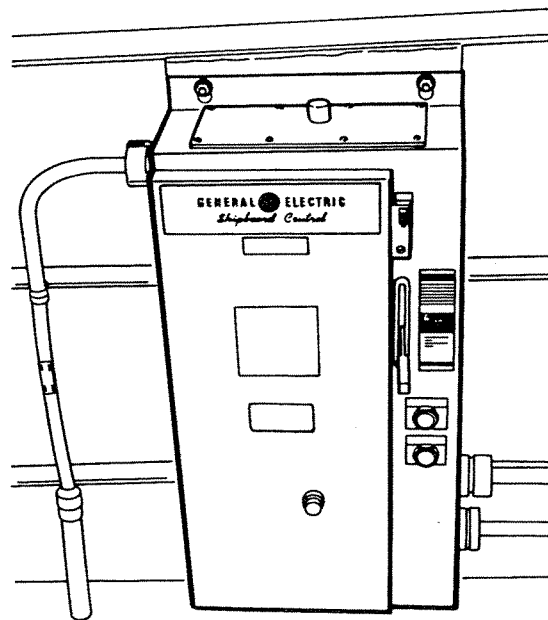


Figure 1-36. Crane Motor Controller
(Bridge Deck, Frame 14, Port)

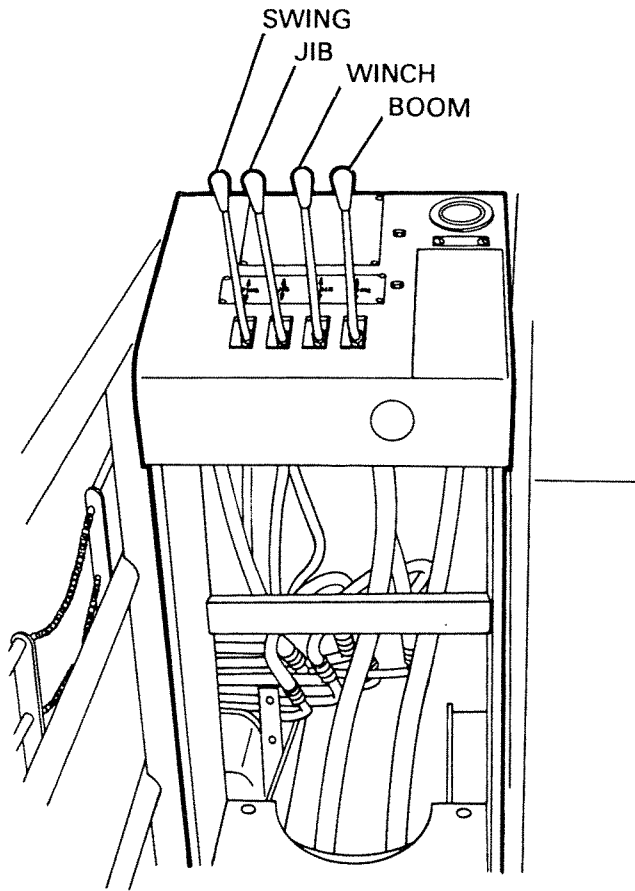


Figure 1-37. Crane Control Stand
(Bridge Deck, Frame 15, Starboard)

1-6.13. TORPEDO HANDLING SYSTEM. The purpose of the torpedo handling system is to safely in-haul torpedos from the water and transfer them to a secure stowage position on the torpedo rollers located on the main weather deck. The torpedo handling hydraulic system consists of the hydraulic power unit, the in-haul winch, the two transfer winches, the transfer carriage and the hydraulic control station.

1-6.13.1. The hydraulic power unit (Figure 1-38) to operate the in-haul winch, transfer winches and transfer carriage is located at frame 5 in the bow thruster space. The unit consists of an electric motor driven hydraulic pump, sump tank, relief valves, control valves, pressure gage, inlet filter and return line filter. Refer to onboard Technical Service Manual SG 700-AH-MMC-010 for complete details on the unit.

1-6.13.2. The torpedo in-haul winch (Figure 1-39) is located at frame 15-1/2 on the main deck, in line with the torpedo ramp. The winch has a maximum average line speed of 120 feet per minute and a maximum line pull of 1000 pounds. The winch drum contains 200 feet of 5/16-inch diameter cable and is fitted with a brake control. A reversing mechanism is also built into the winch.

1-6.13.3. The torpedo transfer carriage (Figure 1-40) is located between frames 19 and 20, recessed in the main deck. The transfer carriage is capable of lifting a 4500 pound torpedo clear of the torpedo rollers and transferring it to another set of rollers without binding. The raising and lowering of the transfer carriage is accomplished with hydraulic cylinders located at the head of the transfer carriage, port side. The traversing of the carriage is also accomplished hydraulically. Speed of the carriage is linear from 1-10 feet per minute. The carriage system includes a means of locking the track in the raised position. Retainer straps are provided on the carriage to retain the torpedo during movement.

1-6.13.4. The control station (Figure 1-41) for the torpedo winch and the transfer carriage is located forward of frame 16 on the main deck. The station is fitted with start-stop buttons for the hydraulic pump motor. The control valves for the hoist winch and the transfer carriage are also located at this station. Raise and lower and traverse port and starboard are controlled from this station. Protective guards are provided to protect the operator in case of equipment failure.

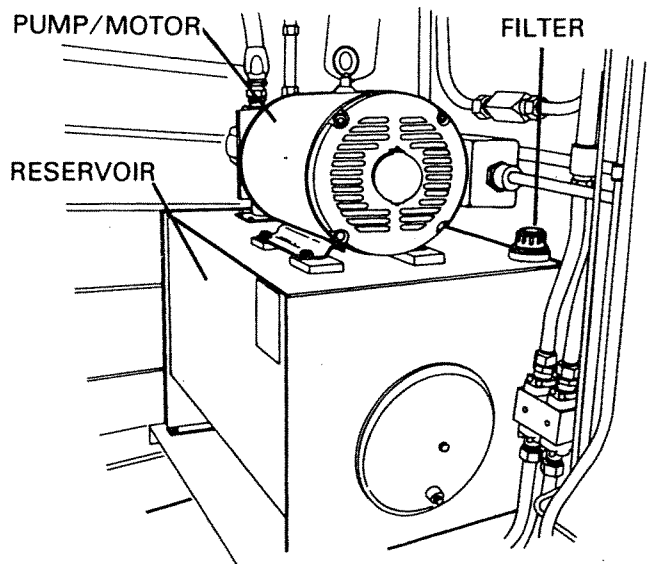


Figure 1-38. Hydraulic Power Unit
(Hold, Forward, Frame 6)

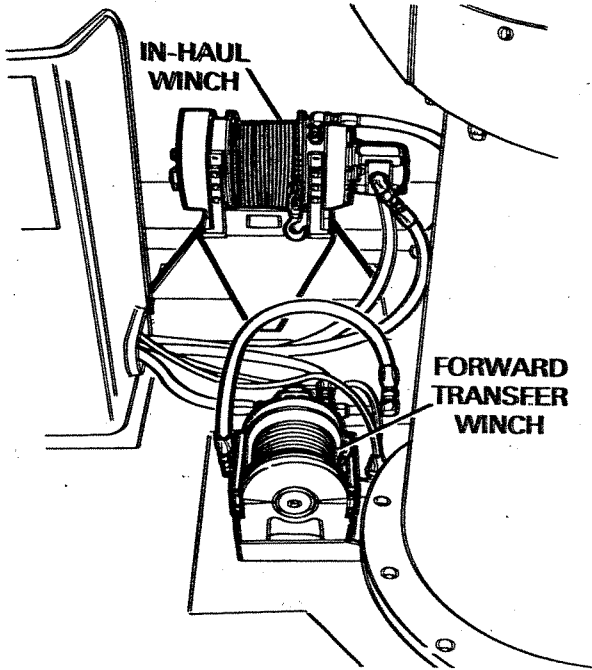


Figure I-39. In-Haul Winch and Transfer Winch
(Main Deck, Frame 15-1/2)

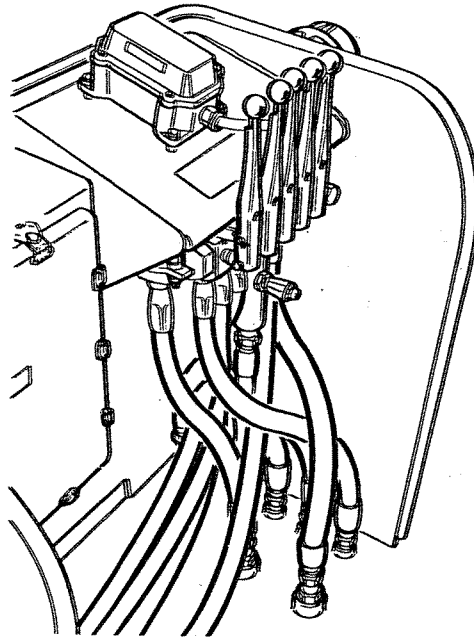


Figure I-41. Torpedo Winch, Transfer
Winch and Transfer Carriage Controls
(Main Deck Forward, Frame 16, Starboard)

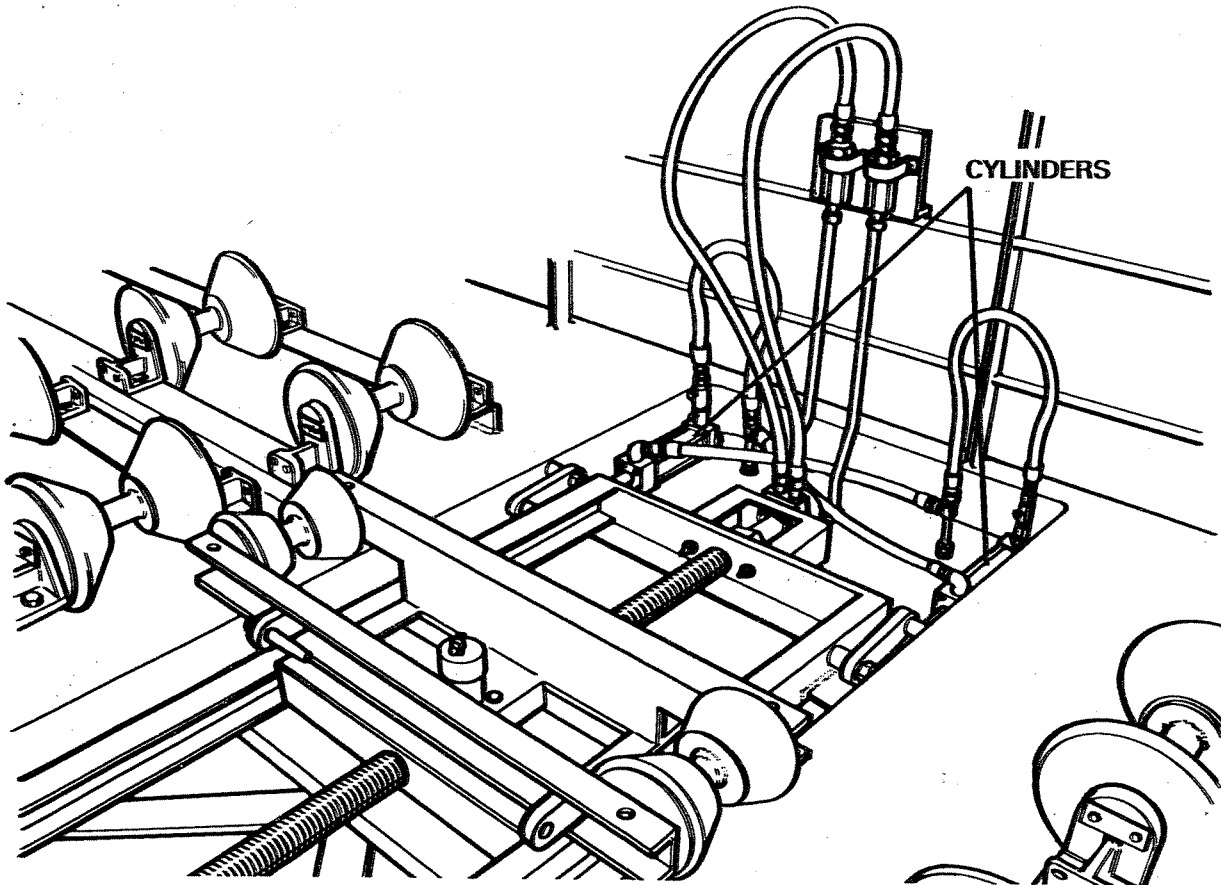


Figure I-40. Transfer Carriage
(Main Deck, Between Frames 19 and 20)

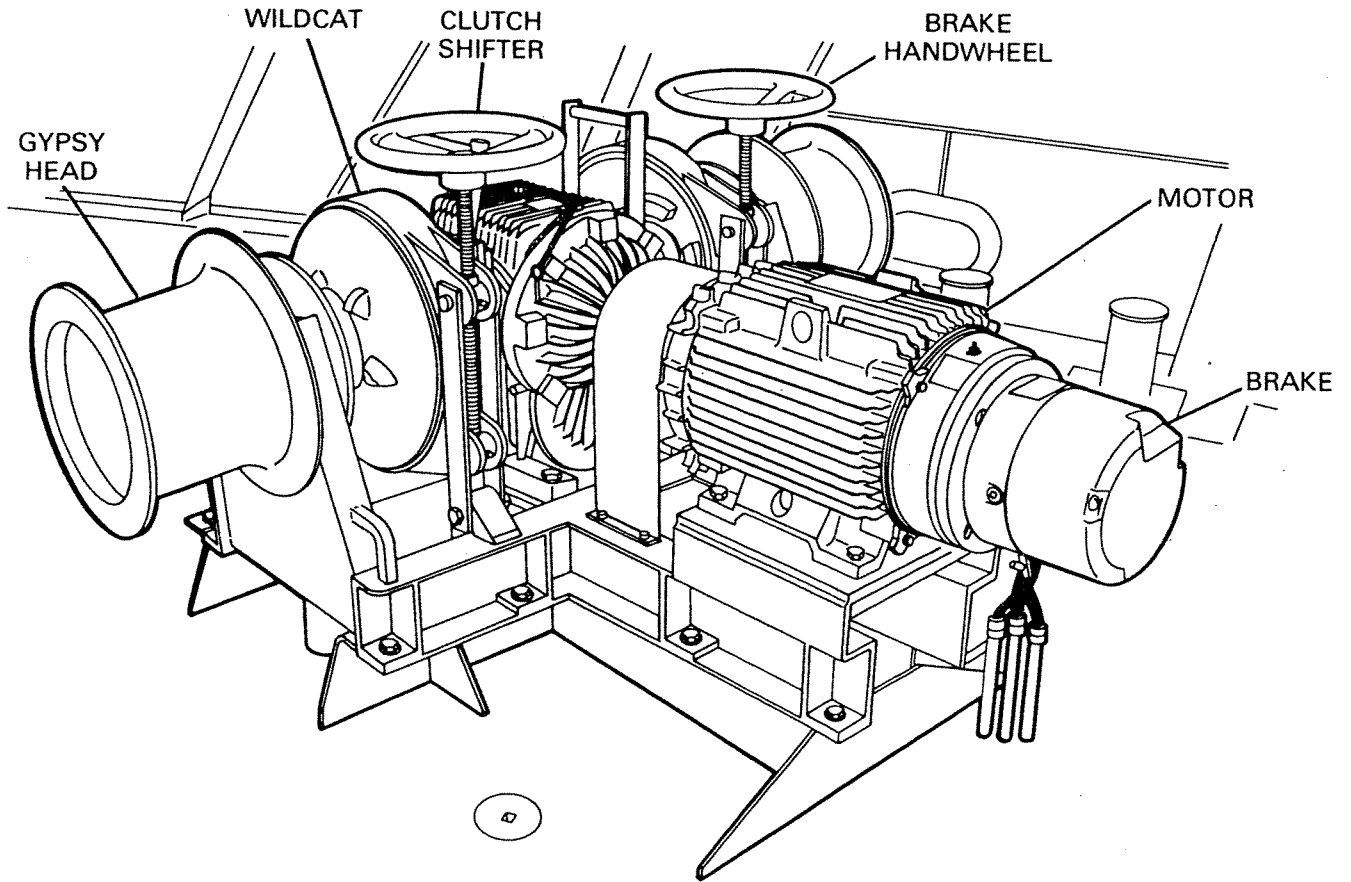


Figure 1-42. Anchor Windlass
(Main Deck, Frame 2)

1-6.14. ANCHOR HANDLING SYSTEM. The purpose of the anchor handling system is to insure efficient handling and securing of the anchors without damage to the hull, hull appendages or equipment when dropping, weighing or riding at anchor. The 350 pound anchors are raised and lowered by a motor driven windlass (Figure 1-42) with brake on the main deck at frame 2. The windlass is controlled at a pushbutton control station (Figure 1-43) on the deckhouse bulwark at frame 4-1/2. The anchor windlass consists of an electric motor, brake, gypsy heads, wildcat and magnetic controller. The magnetic controller for the windlass is located below deck.

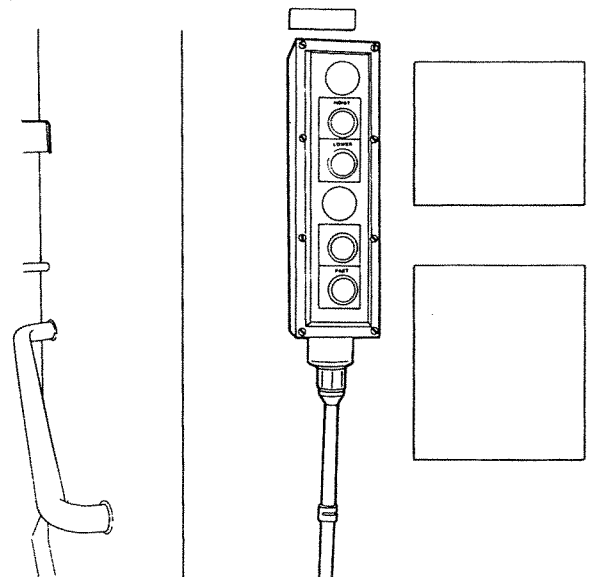


Figure 1-43. Anchor Windlass Control
(Deckhouse, Frame 4-1/2)

I-6.15. SEWAGE SYSTEM. The purpose of the sewage system is to collect sanitary waste, hold the waste in the holding tank and pump the water to shore facilities. The sewage system consists of the holding tank, discharge pump, valves and interconnecting piping. The sewage holding tank (Figure I-44) is located in the pump room at frame 13. The tank has a holding capacity of 400 gallons. Access covers are provided for cleaning and inspection of the tank. The sewage holding tank incorporates two vacuum switches and a level switch. When the tank

becomes filled to over 90 percent or improper vacuum is sensed, the "Summary Fault Alarm" lights will go on adjacent to the pilothouse alarm panel, the sewage control panel (Figure I-45) and each water closet. Deck pump-out connections (Figure I-46) are provided port and starboard aft of frame 17 to discharge sewage to a shore facility. The deck-key for the pump-out connection is mounted on the life rails aft of the engine room scuttle on the starboard side.

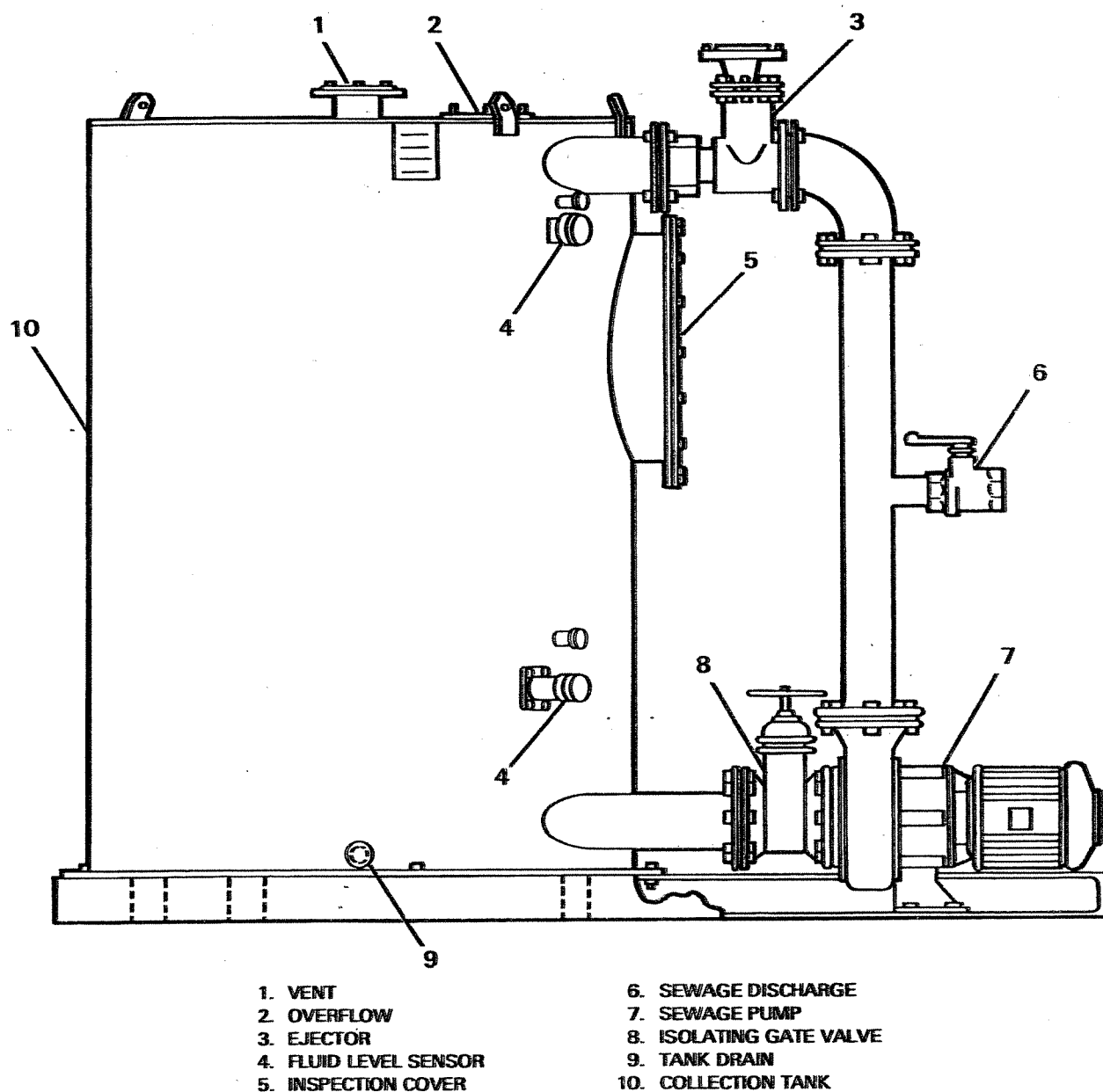


Figure I-44. Sewage Collection and Holding Tank
(Pump Room, Frame 13)

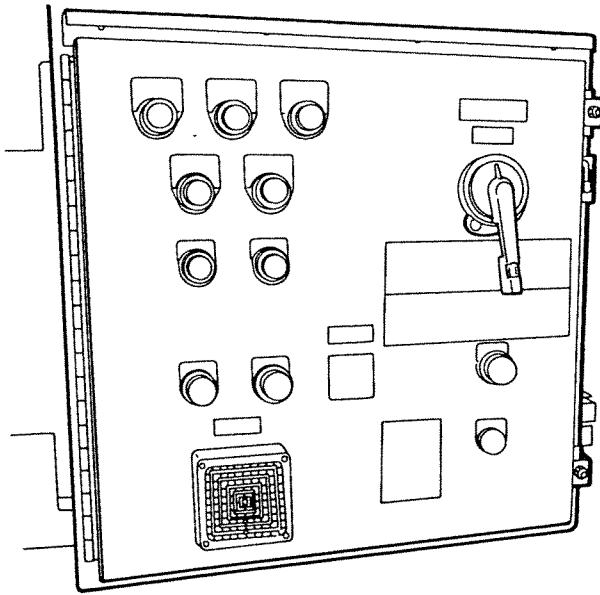


Figure 1-45. Sewage Alarm Panel
(Pilothouse, Frame 8)

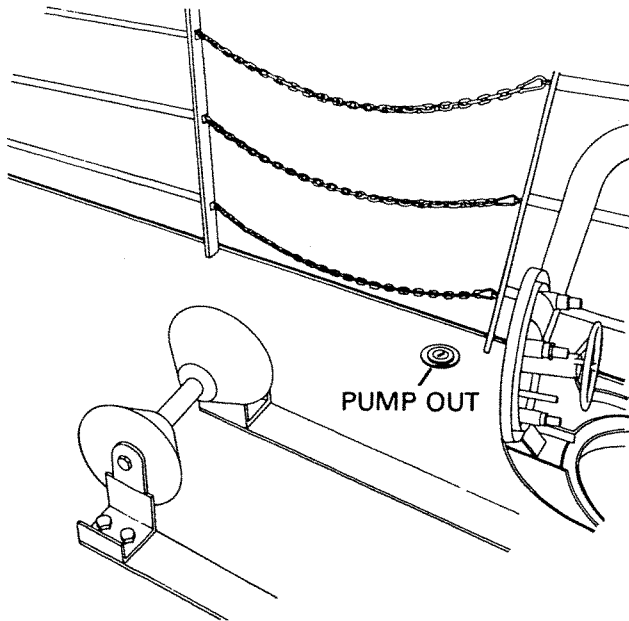


Figure 1-46. Sewage Pump-Out Connection
(Frame 17, Port and Starboard)

1-6.16. **PLUMBING AND DECK DRAINS.** Drains are installed to prevent accumulation of water on weather decks, sanitary space decks and commissary decks. The pilothouse top is self draining. The main deck is drained by scuppers in the bulwarks port and starboard. The

refrigerator/freezer, the coffee maker and the water cooler have drains that discharge through an air gap to the waste drain system. Cleanout connections are installed in accessible locations for all drains to permit cleaning of drain pipes. A sump tank is provided in the pump room at frame 13 to receive gray water from showers, sinks, etc. The tank is emptied with an automatic sump pump (Figure 1-47) to the overboard discharge.

1-6.17. **HEATING VENTILATION AND AIR CONDITIONING.** The heating and cooling system is a central mechanical system with the temperature controlled air ducted from a central expansion coil through the air handler to the various spaces served. Both duct heaters and space heaters are employed for heating (Figures 1-48 and 1-49). The ventilation system provides mechanical air supply and natural exhaust for all machinery spaces or other spaces that require removal of internal heat gain. Ventilation for the galley provides both mechanical supply and exhaust. The air conditioning unit (Figure 1-50) supplies cooling air for all spaces in the system. Gages and controls are provided in the system to monitor and control operation. Refer to Chapter 2 for detail information on components of the HVAC system.

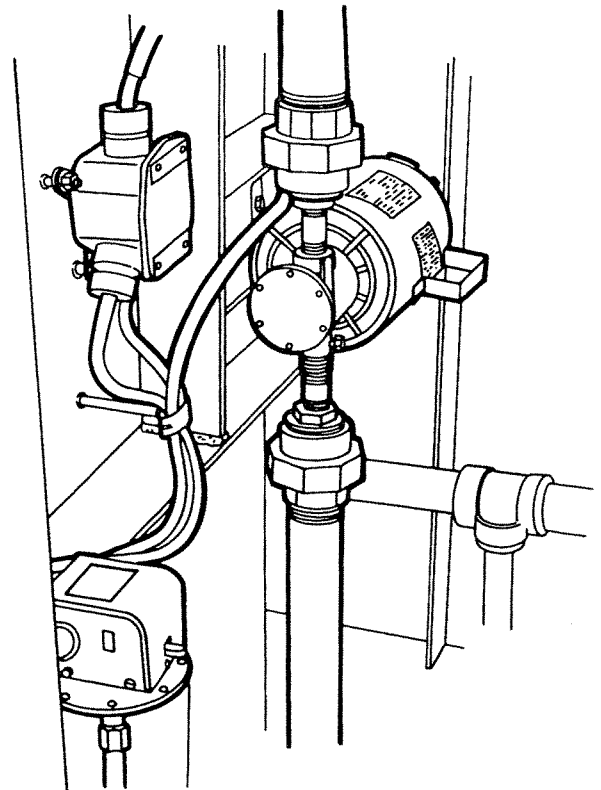


Figure 1-47. Sump Tank Pump
(Pump Room, Frame 13)

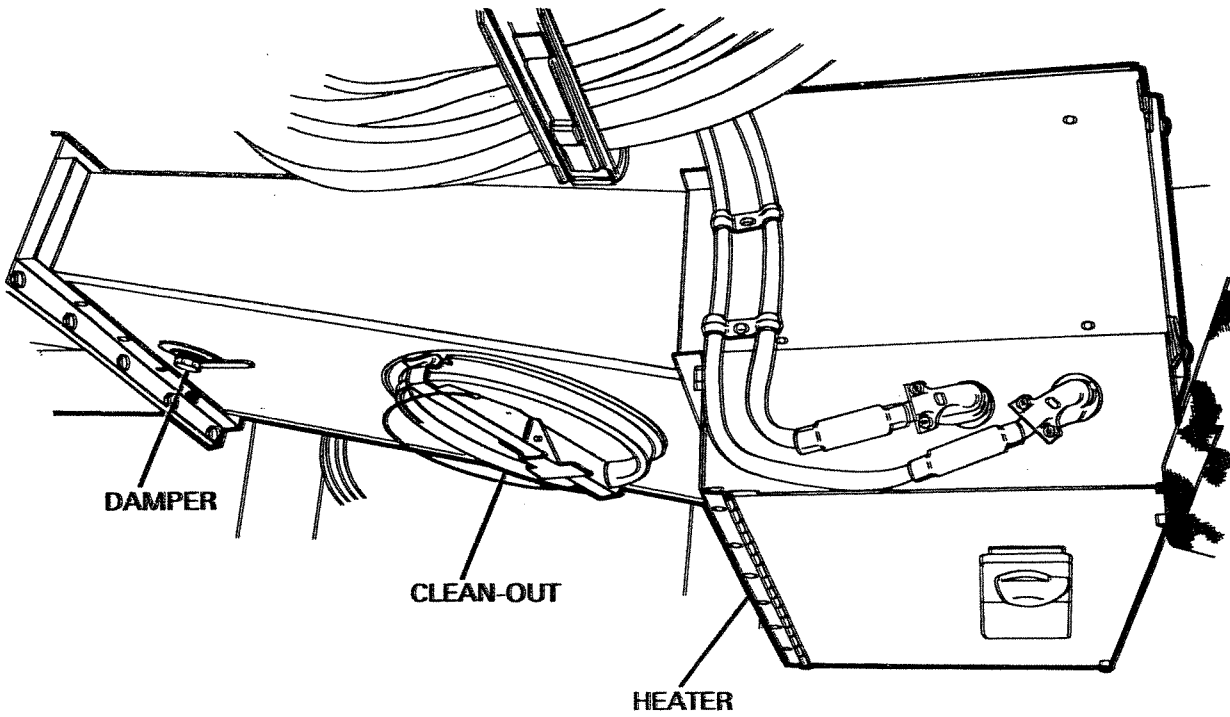
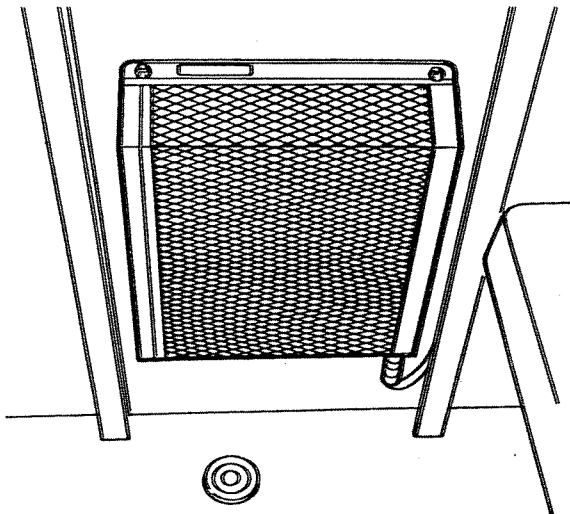
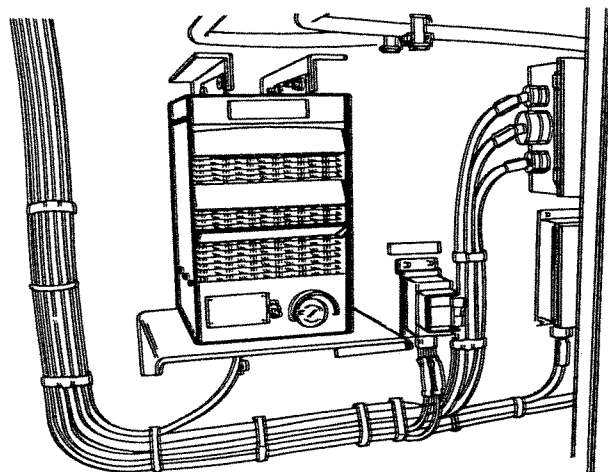


Figure I-48. Duct Heater
(Various Locations)



MAIN DECK WASH ROOM, FRAME 8
FIRST PLATFORM WASH ROOM, FRAME 9



ENGINE ROOM, FRAME 23
LAZARETTE, FRAME 25

Figure I-49. Space Heaters

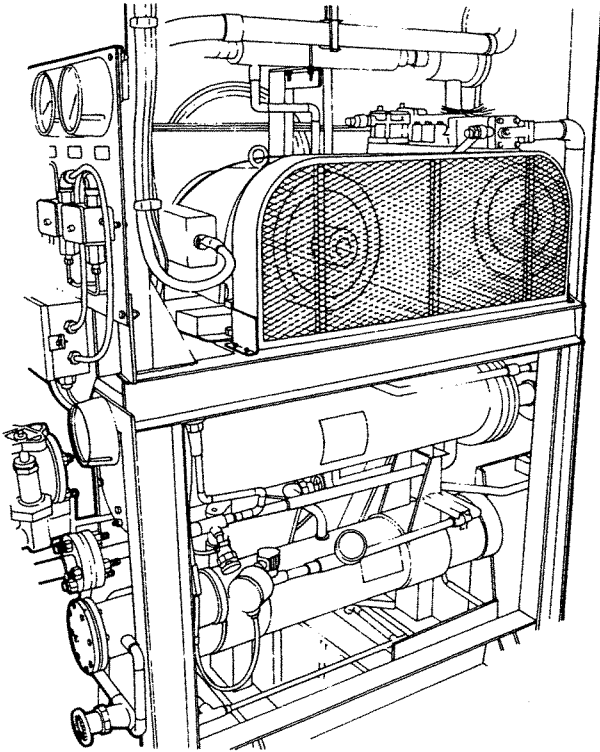


Figure 1-50. Air Conditioning Plant
(Engine Room, Frame 19)

1-6.18. COMPRESSED AIR SYSTEM. Compressed air is supplied to the air horn and torpedo ramp area for purging by an air compressor and interconnected air lines. Two compressed air outlets are provided in the engine room for use at the workbench and for blow down of the sea chests. The compressor (Figure 1-51) is located in the engine room aft of frame 16, starboard.

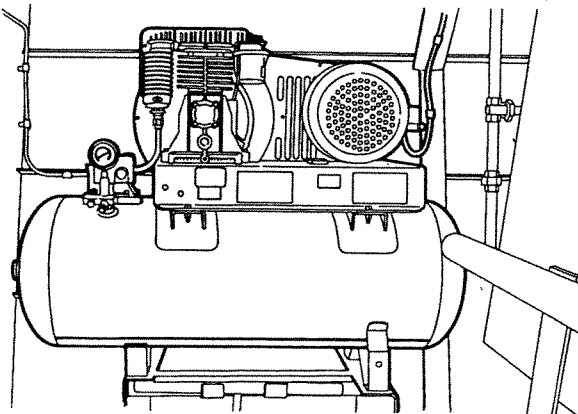


Figure 1-51. Air Compressor
(Engine Room, Aft Frame 16)

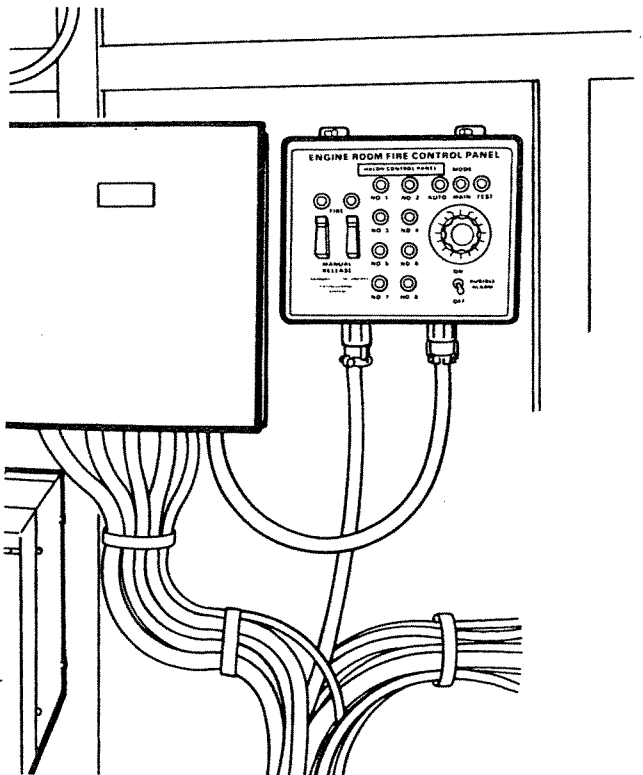


Figure 1-52. Halon Control Panel
(Pilothouse, Frame 7-1/2, Port)

1-6.19. FIXED HALON SYSTEM. The purpose of the fixed Halon system is to detect fire in the engine room and discharge Halon immediately to prevent fire from spreading. The fixed Halon system in the engine room utilizes optical sensors for detection. The sensors are located in strategic positions above the machinery in the engine room where flames or fire must be detected immediately. Four Halon cylinders are located between frames 19 and 20 starboard side and four more cylinders are located aft of frame 18, centerline. Eight 180 degree fan nozzles located fore and aft of each engine will release approximately 7 per cent of Halon, by volume, within two seconds. The Halon system is interlocked with the engine room exhaust fans so that upon release of Halon exhaust fans will de-energize. The Halon system control panel (Figure 1-52) is located in the pilothouse between frames 7 and 8 port side. Emergency break glass manual releases (Figure 1-53) are located starboard side of mess lounge door at frame 14. T-handles for full manual release of Halon are located at the top of inclined ladder in the pump room above the engine shutdown handles (Figure 1-54). Discharge of the Halon activates audible alarms at the control panel and in the engine room. A visual alarm is also provided at the control panel.

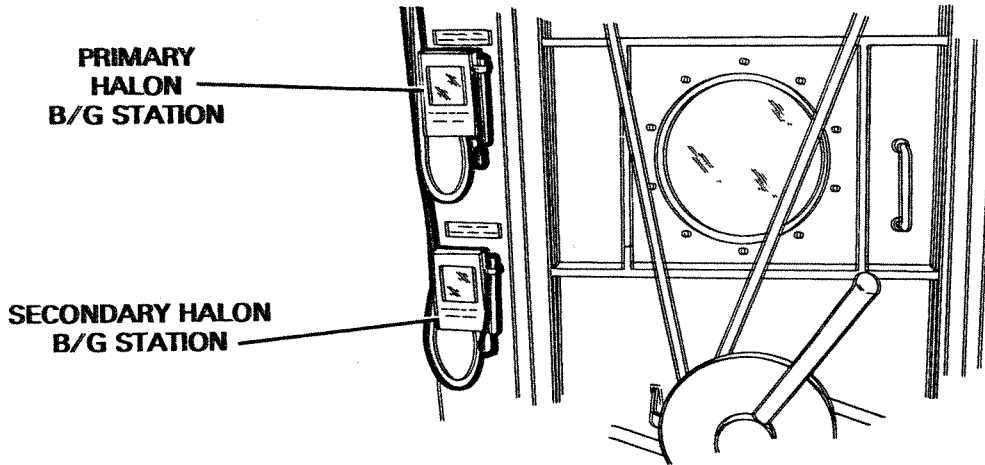


Figure I-53. Emergency Halon Break Glass Stations
(Mess Lounge Door, Frame 14, Starboard)

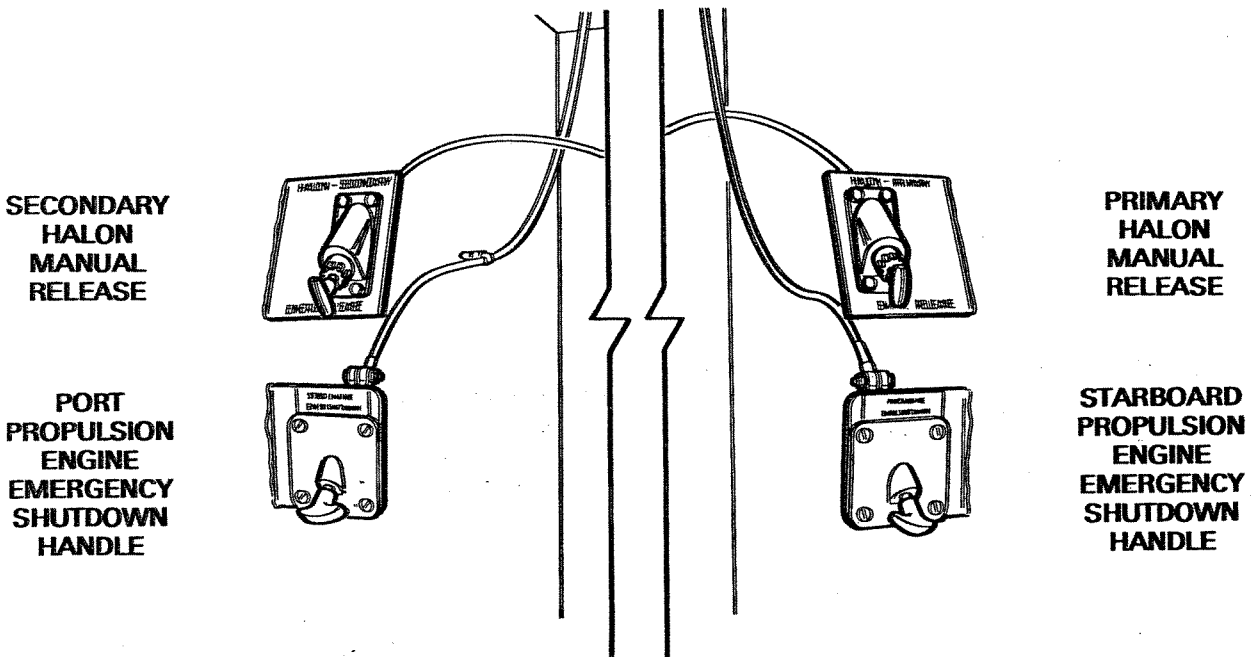


Figure I-54. Emergency Halon Release Manual T-Handles
and Propulsion Engine Emergency Shutdown T-Handles
(Pump Room, Top of Ladder, Frame 13-1/2, Starboard)

1-6.20. **GALLEY FIRE SUPPRESSION SYSTEM.** An Ansul R-101 Model 20 system is installed in the galley to provide automatic fire suppression in the event of a fire at the range. A fusible link, which is mounted in the galley hood, will separate at 360°F to activate release of dry chemical extinguishing agent. The system can also be activated manually at the galley release box or in the lounge above the ice maker by removing the lead-wire seal and pushing the release button (Figures 1-55 and 1-56). Refer to Chapter 3 for details of operation.

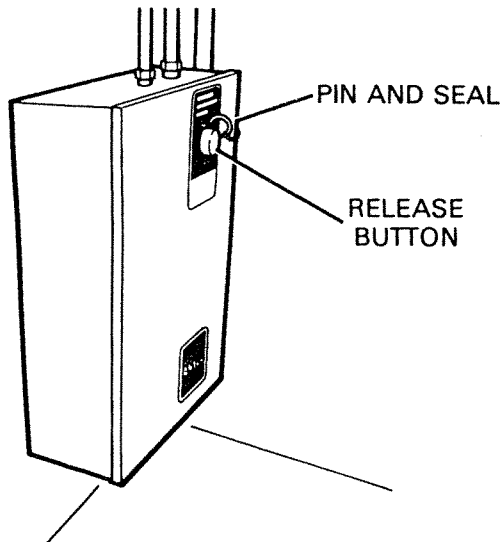


Figure 1-55. Galley Fire Suppression System Release Box (Galley, Frame 10)

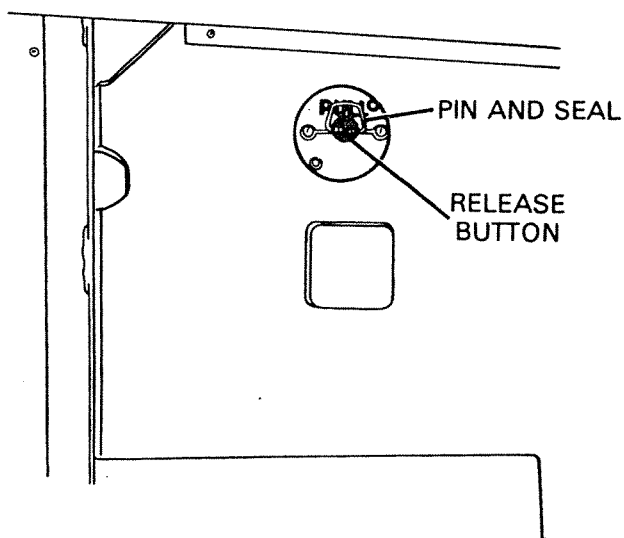


Figure 1-56. Galley Fire Suppression Release (Mess/Lounge, Frame 11)

1-6.21. PORTABLE FIRE EXTINGUISHERS.

1-6.21.1. **Main Deck.** Five 20-pound potassium bicarbonate fire extinguishers are located on the main deck; two at frame 15 port and starboard, one in the galley aft of frame 10, and two aft of frame 6, port and starboard of centerline. One 10-pound dry chemical fire extinguisher is located aft of frame 12, starboard of the centerline. One 5-pound dry chemical fire extinguisher is located in the passageway between frame 7 and 8 port side of centerline.

1-6.21.2. **Hold and First Platform.** Four 20-pound potassium bicarbonate fire extinguishers are located on the first platform and in the hold; two in the engine room forward of frame 23 and aft of frame 18, one in the crew berthing area at frame 9-1/2 and one in the observer's berthing on the bulkhead forward of frame 10. Three 10-pound dry chemical fire extinguishers are located in the engine room, one aft of frame 16, one forward of frame 18, starboard side and one aft of frame 21 port side of centerline. One 5-pound dry chemical fire extinguisher is located on the starboard bulkhead forward of frame 11 in the passageway. Brackets are provided for mounting the fire extinguishers to the bulkheads. One spare fire extinguisher of each type is supplied and stowed on a shelf in the bosun's stores.

1-6.21.3. Fifteen cans of liquid foam (type AFFF) are supplied on the craft with pickup tubes and nozzles. These cans are located as follows:

1. Main deck, port side next to the battery box at frame 4-1/2.
2. Main deck, aft, next to the life jacket locker at frame 15.
3. Bridge deck behind the pilothouse at frame 10.
4. First platform passageway, port side, at frame 10.
5. Port and starboard side of the engine room aft of frame 20.
6. Pump room, starboard side.

1-6.22. **ELECTRICAL POWER SYSTEM.** Normal electrical power for the craft is supplied by the diesel engine driven ships service generators. All electrical equipment is designed to operate from 450 VAC, 3 phase, 60 hertz or 120 volt, single phase, 60 hertz or 24 VDC power sources. All power is distributed through circuit breakers.

1-6.22.1. The diesel driven generators are Caterpillar Models 3304 NA, 64 KW, 450 volt, 3 phase, 60 hertz. Each is of sufficient size to carry the normal at sea loads which are with the second generator held in reserve. During normal cruising the ships load is carried with one diesel generator operating. During torpedo retrieval the second diesel generator must be put into operation due to the extra load on the electrical system from the in-haul

winch and transfer winches. The generator sets are complete with instrument boards, filters, coolers, starting motors, pumps and automatic shutdown on overspeed, low oil pressure and high water temperature.

1-6.22.2. A shore power receptacle is provided to connect the craft to power when diesel generator engines are secured. An indicating light above the shore power connection will glow when shore power is being used. The receptacle is located aft side of the deckhouse near centerline (Figure 1-57). The shore power cable is stowed on brackets attached to the life rails on the bridge deck at frame 15.

1-6.22.3. The output of the generators or shore power is controlled and distributed from the electric plant control panel P400 (Figure 1-58). The control panel contains two buses with a bus tie circuit breaker to allow both buses to be tied together to allow for manual paralleling of the two generators. There is a ground detection warning light on the control panel for each bus.

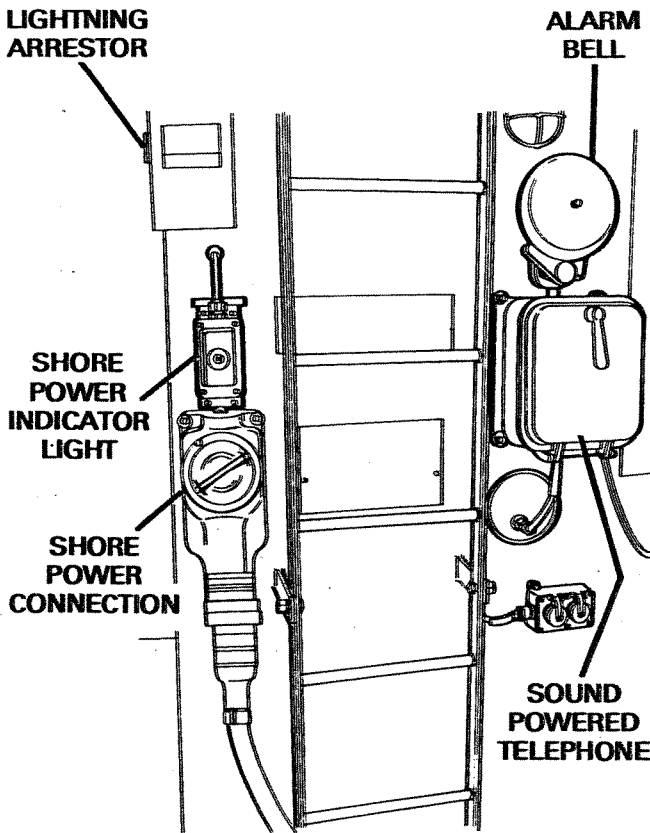


Figure 1-57. Shore Power Connection
(Bridge Deck, Frame 15)

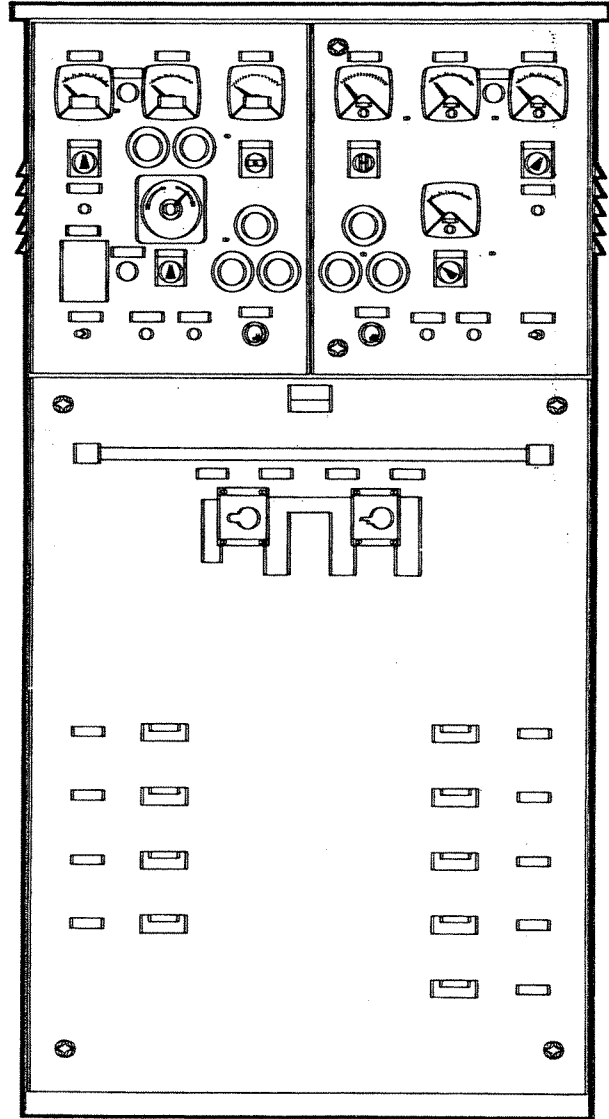


Figure 1-58. Electric Plant Control Panel P400
(Engine Room, Frames 22 to 23, Port)

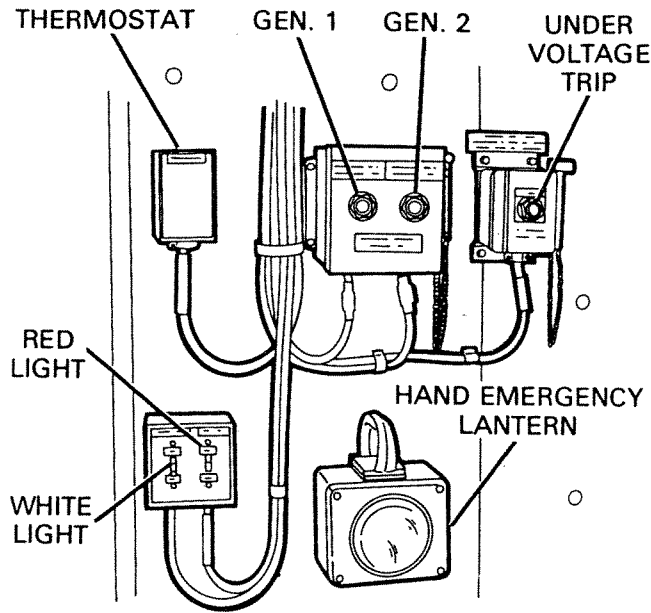


Figure 1-59. Generator Engine Emergency Shut-Down (Lazarette Hatch, Frame 27, Engine Room, Frame 29, Pilohouse, Frame 7)

1-6.22.4. All power from the electric plant control panel is distributed through circuit breakers to steering system, air conditioning compressor, deck crane and torpedo handling power unit. The main control also distributes power to the lighting transformer for reduction to 120 volt service, four 120 volt lighting panels and three 450 volt power panels.

1-6.22.5. Power for 24 VDC equipment is developed from two rectifier units, one for diesel engine starting and the other for pilohouse equipment. There are separate battery banks for engine starting and emergency 24 volt service which are charged by the rectifiers units.

1-6.22.6. Emergency engine shut-down for the diesel generator engines is provided at the lazarette hatch at frame 27, at the engine room scuttle, frame 19 and in the pilohouse on the console. An emergency break glass station for shut-down of the diesel generator engines is located in the mess/lounge, port side of the door at frame 14 (Figure 1-59).

1-6.23. NAVIGATION SYSTEMS. Onboard electronic navigation equipment is as follows:

NOTE

For complete description on these systems refer to onboard Technical Service Manuals listed in Table 1-3.

1. Loran "C" NAV-XL Set, EPSCO Marine Model 5070. Located above pilohouse chart table.

2. Satellite Navigation Set, Magnavox Model MX5102. Used with speed log and gyrocompass. Located above pilohouse chart table.
3. Position Plotting Unit, EPSCO C-plat, 2-track Model 4080. Located on pilohouse chart table.
4. Automatic Direction Finder, Furuno Model FD-171-ADF. Located above pilohouse chart table.
5. Depth Indicator Set, Raytheon Marine Model F-360-D. Located on pilohouse console (Figure 1-5).
6. Surface Search Radar Unit, Canadian Marconi Model KAAR LN-66. Located on pilohouse console (Figure 1-5).

Onboard electrical navigation equipment is as follows:

1. Gyrocompass, Mark 27, Model 1. Located on pilohouse console (Figure 1-5).
2. Underwater Log Unit, Datamarine International Model 3200. Located on pilohouse console (Figure 1-5).
3. Conventional magnetic compass is also provided which is located on the pilohouse console (Figure 1-5).

1-6.24. COMMUNICATIONS SYSTEMS. Onboard communications systems is as follows:

NOTE

For complete description on these systems refer to onboard Technical Service Manuals listed in Table 1-3.

1. Six sound-powered telephone sets, one each in the pilohouse, auxiliary conning station, aft weather deck, forward lookout, engine room and lazarette.
2. Two shore dial telephones in the pilohouse and mess/lounge.
3. General alarm/intership announcing systems, Marine Electric Model E-3750 with speakers, loudhailer, handset and microphone.
4. Ships entertainment sets, Radio Shack Model 12-1543 in the mess room, CO stateroom, CPO berthing space and crew berthing space.
5. HF/VHF Radio Set AN/URC-94 (1.5 - 30 MHz AM, 30 - 80 MHz FM).
6. VHF Radio System (156 - 163 MHz).
7. UHF Radio System AN/ARC-159 (225 - 400 MHz).
8. Sonar, Type AN/WQC-2A (Underwater Communication).

NOTE

Radio and sonar equipment is located on the pilohouse radio rack except sonar receiver/transmitter which is located in the electrical equipment room.

1-6.25. ALARM AND MONITORING SYSTEMS.

The primary alarm panel (Figure 1-60) is the pilothouse alarm panel which monitors diesel engine oil pressure and temperature, steering system power and motor overload, bilge level, halon release, and steering system header tank oil level. Warning lights on the panel indicate failure or abnormal operating conditions. A remote alarm (information) panel (Figure 1-61) is located in the engine room. This panel monitors the steering system for power failure, motor overload and header tank oil level. Warning lights on the panel indicate malfunction of the system. A warning horn also sounds to audibly indicate malfunction.

1-6.25.1. The ship's alarm for general alarm, collision alarm and chemical attack is actuated with contactors on the pilothouse console (Figure 1-5).

1-6.25.2. There are control panels which also give visual indication of system malfunction as follows:

1. Halon control panel (Figure 1-52).
2. Sewage control panel (Figure 1-45).
3. Sewage holding tank alarm lights (located in pilothouse and toilet spaces).
4. Bow thruster control panels (Figures 1-5 and 1-6).

1-6.25.3. Indicating systems aboard the ship are:

1. Tachometer indicator for propulsion engines (Figures 1-5 and 1-6).
2. Rudder angle indicator (Figure 1-6).
3. Diesel engine gage boards (located on each diesel engine).
4. Air conditioning unit gage board (located on unit).

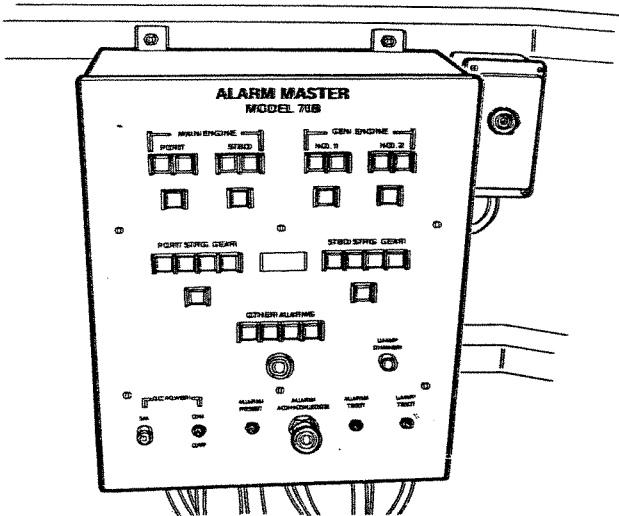


Figure 1-60. Alarm Master Panel
(Pilothouse, Frame 6, Port)

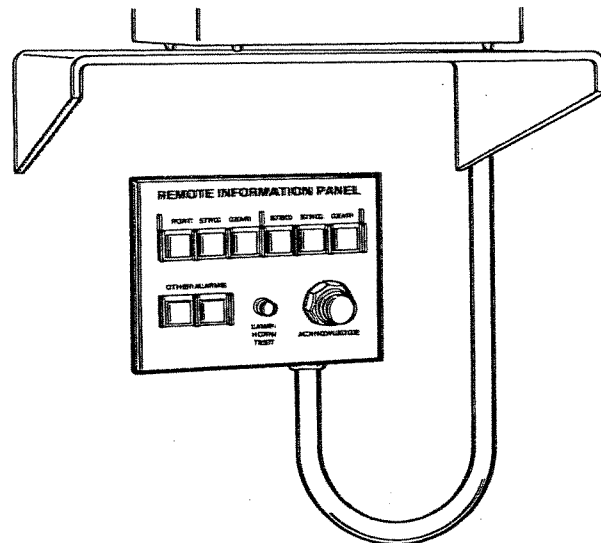


Figure 1-61. Remote Alarm Panel
(Engine Room, Frame 23, Port)

Section III
SUPPORT DATA

I-7. ONBOARD DRAWINGS.

Refer to Table 1-2 for a complete listing of onboard

drawings supplied with the craft. One complete set of onboard drawings is located in the lazarette.

Table 1-2. Onboard Drawings

NAVSEA Drawing No.	Title
111-6003300	Shell Expansion
113-6003301	Inner Bottom and 1st Platform
114-6003302	Skeg
116-6003303	Longitudinal Framing and Girders
117-6003304	Trans Bulkheads Below Main Deck
117-6003305	Transverse Ordinary Frames
121-6003306	Long Bulkheads Below Main Deck
130-6003307	Main Deck Structure
150-6003308	Superstructure - Decks
150-6003309	Superstructure - Trans. Frames and Bulkheads
150-6003310	Superstructure - Long Frames and Bulkheads
161-6003311	Shaft Struts and Barrels
163-6003312	Sea Chest
167-6003313	Water Tight Closures
170-6003314	Masts and Jack Shafts
185-6003316	A/C Salt Water Cooling Pump and Strainer Fdn.
185-6003319	Fuel Oil Transfer Pump Foundation
185-6003324	Starting Batteries and Rectifier Fdn.
185-6003325	Elect. Equipment Room Foundations
185-6003326	Electric Plant Control Panel Foundation
185-6003329	Transformers Foundation
185-6003333	Flood Lights Foundation
185-6003334	Signal Searchlights Foundation
185-6003335	Telephone Booth — Acoustic Foundation
185-6003336	Pilothouse Top Foundations
185-6003338	Pilothouse Radios Foundations
185-6003339	Underwater Comm. System Foundation
185-6003342	Air Handler Foundation
185-6003343	Misc. Fans Foundation
185-6003345	Forced Air Heater Foundation
185-6003346	A/C Condensing Unit Foundation
185-6003347	Fire Pump Foundation
185-6003349	Hydraulic Pump Unit and Tank Foundation (for Torpedo Handling)
185-6003350	Potable Water Pump Foundation
185-6003351	Hot Water Heater Foundation
185-6003352	Bow Thruster Installation Foundation
185-6003353	Deck Crane Hydraulic Unit Fdn. and Control Console
185-6003354	Anchor Windlass Foundation

Table 1-2. Onboard Drawings — Continued.

NAVSEA Drawing No.	Title
185-6003355	Sewage System Fdn.
185-6003360	Sump Drain Pump Foundation
185-6003364	Exhaust Pipes Foundation
185-6003365	Torpedo Handling Winch Foundation
185-6003366	Rope Stowage Reel Foundation
185-6003521	Potable Water Filter Foundation
185-6003522	Air Compressor Foundation
185-6003526	Rudder Stop and Bearing Housing Foundation
185-6003528	Steering Gear Pump Foundation
185-6003529	Booster Water Heater Foundation
185-6003530	Halon Bottles Foundation
201-6003367	Machinery Arrangement
233-6003368	Propulsion Engine Installation Detail
243-6003369	Shafting Arrangement and Details
245-6003370	Propeller Design
252-6003371	Propulsion Controls
252-6003372	Console, Arrangements and Details
256-6003373	Machinery S.W. and Cooling Water System Diagram
256-6003374	Machinery S.W. and Cooling Water System A/D
259-6003375	Internal Combustion Engine Exhaust System A/D
261-6003376	Fuel Oil Piping Diagram
261-6003377	Fuel Oil Piping A/D
261-6003516	Oily Water Tank
262-6003378	Lubricating Oil Piping Diagram
262-6003379	Lubricating Oil Piping A/D
262-6003517	Waste Oil Tank (250 Gal.)
270-6003382	Lift Beams and Padeyes
298-6003381	List of Lubricants
300-6003383	Electrical Load Analysis
303-6003384	Electrical Short Circuit Analysis
303-6003385	Protective Device Coordination Analysis
305-6003386	Electrical Label Plates
320-6003387	Electrical One Line Diagram
320-6003388	Electrical Power System Deck Plan
321-6003389	Electrical Wireways
330-6003390	Lighting System Deck Plan
421-6003391	Non-Electric Navigational Aids
422-6003392	Electric Navigation Aids Wiring Diagram
423-6003393	Electronic Navigation Aids Elementary and Deck Wiring Diagram
424-6003394	Depth Sounder and Underwater Log Wiring Diagram
426-6003395	Gyrocompass System Wiring Diagram
426-6003396	N.F.U. Steering and Bow Thruster Electric Control Wiring Diagram
432-6003397	Telephone Systems Wiring Diagram
433-6003398	Announcing Systems Wiring Diagram
434-6003399	Entertainment Systems Wiring Diagram
436-6003400	Halon System Wiring Diagram
436-6003401	Pilothouse Alarm Panel Wiring Diagram

Table 1-2. Onboard Drawings — Continued.

NAVSEA Drawing No.	Title
436-6003402	Miscellaneous Alarm System Wiring Diagram
437-6003403	Tachometers and Rudder Angle Indicator Wiring Diagram
437-6003404	HVAC Electric Control Wiring Diagram
437-6003405	Miscellaneous Control and Indicating Systems Wiring Diagram
441-6003406	Radio Systems Elementary and Deck Wiring Diagram
442-6003407	Underwater Communication System Elementary and Deck Wiring Diagram
451-6003408	Radar System Elementary and Deck Wiring Diagram
505-6003409	Valve Remote Operators
506-6003410	Vents S.T. and Overflows Diagram
506-6003411	Vents S.T. and Overflows A/D
506-6003412	Containment Coamings
507-6107743	Machinery Label Plates
507-6003413	Piping Label Plates
507-6107735	HVAC Label Plates
508-6003414	Machinery Piping Insulation
512-6003415	HVAC Diagram
512-6003416	HVAC Installation — Hold
512-6003417	HVAC Installation — Main Deck
512-6003418	HVAC Parts List
512-6003518	HVAC Installation 1st Plate Frs. 2-12
514-6003419	A/C Refriger. Piping Diagram
514-6003420	A/C Refrig. Piping A/D
521-6003421	Firemain System A/D
526-6003422	Exterior Deck Drains A/D
528-6003423	Plumb and Deck Drain Sewage Ovbd. Diagram
528-6003424	Plumb and Deck Drain A/D
528-6003520	Sump Drain Tank
529-6003425	Bilge, Ballast and Firemain System Diagram
529-6003426	Bilge and Ballast System A/D
533-6003427	Freshwater System Diagram
533-6003428	Freshwater System A/D
533-6003429	Potable Water Tank
533-6003430	Chlorine Treatment Mixing Tank
551-6003523	Compressed Air System Diagram
551-6003524	Compressed Air System A/D
555-6003431	Fire Extinguishing System Diagram
555-6003432	Fire Extinguishing System A/D
556-6003433	Bow Thruster Hyd. System and Str. Syst. Hyd. Diagram
556-6003434	Bow Thruster Hyd. System A/D
556-6107742	Bow Thruster Hydraulic Head Tank (10 Gal.)
560-6003435	Steering System Hyd. A/D
561-6003436	Steering Gear Arrangement
562-6003437	Rudder and Steering Gear Details
568-6003438	Bow Thruster Arrangement
568-6003439	Bow Thruster Reservoir Installation
581-6003440	Anchor Handling A/D

Table 1-2. Onboard Drawings — Continued.

NAVSEA Drawing No.	Title
582-6003441	Mooring and Towing A/D
583-6003442	Boat Handling and Stowage
593-6003443	Sewage Collection, Holding and Trans A/D
601-6003445	Outboard Profile
601-6003446	Inboard Profile
601-6003447	General Arrangement
602-6003448	Hull Label Plates
603-6003449	Draft Marks
604-6003450	Locks, Keys and Tags
610-6003451	Lifesaving and Firefighting
611-6003452	Hull Fenders
612-6003453	Rails, Lifelines
613-6003454	Rigging and Canvas
622-6003456	Machinery Space Floor Plates
622-6003455	Grating Outside Machinery Space
623-6003457	Vertical and Inclined Ladders
624-6003458	Joiner Doors
625-6003459	Windows and Airports
631-6003460	Painting
633-6003461	Cathodic Protection (Zincs)
634-6003462	Deck Covering
635-6003463	Hull Insulation
637-6003464	Joiner Bulkheads Sheathing-Hold
637-6003527	Joiner Bulkheads Sheathing and Ceilings Main Deck
640-6003465	Furniture
665-6107744	Engine Room Workbench
651-6003466	Galley Arrangement
671-6003467	Lockers and Special Stowages
672-6003468	Storerooms
752-6003470	Torpedo Handling
752-6003519	Torpedo Transfer Carriage
801-6003471	Curves of Form
801-6003472	Tank Capacity Curves
801-6003473	Capacity Plan
801-6003474	Cross Curves of Stability
801-6003475	Lines Plan
801-6003476	Subdivision Curve
801-6003477	Tank Sounding Tables
801-6003478	Bonjean Curves
801-6003479	Docking Plan
801-6107741	Stability Analysis
801-6003297	Std. Struct. Details Booklet
801-6003298	Std. Welding Detail Booklet
801-6003299	Welding Table
843-6003497	Inclining Arrangement
986-6003481	Radiographic Inspection

1-8. ONBOARD TECHNICAL MANUALS.

Table 1-3 contains a list of components and systems on which specific maintenance instructions are provided.

The list is in alphabetical order by manual title followed by the manual identification number. One complete set of Technical Manuals is stowed in the lazarette.

Table 1-3. OnBoard Technical Manuals

Equipment	Manual ID No.
Air Conditioning Plant	S9514-B5-MMC-010
Alarm Panel	SE168-AK-MMC-010
Anchor Windlass	S9581-A2-MMC-010
Announcing System	SE101-AP-MMC-010
Antenna	EE110-AH-OMI-010
Battery Charger	SG270-AY-MMC-010
Blower, Hot Air	S9511-AT-MMC-010
Bow Thruster	S9568-AM-MMC-010
Compressor, Air	S6220-CZ-MM0-010
Control, Engine	S9252-A2-MMC-010
Control, Torpedo Winch	SG813-BH-MMC-010
Cooler, Water	S9533-AZ-MMC-010
Crane	SG811-A4-MMC-010
Direction Finder	SE176-AB-MMC-010
Direction Finder	SE176-AB-MMC-020
Dispenser, Ice/Flake	S6151-DT-MMA-010
Engine, Propulsion & Reduction Gear	Commercial
Fans, Hull Ventilation	S9512-BM-MMC-010
Filter, Fresh Water	S9533-AX-MMC-010
Galley Fire Suppression System	S9555-BU-MM0-010
Generator, Ship Diesel	Commercial
Gyrocompass	0924-038-1020
Halon Fire Extinguisher System	S9555-B6-MMC-010/11941
Heater, Booster Water	S6161-HV-FSE-010
Heater, Convection	S9511-AR-MMC-010
Heater, Convection	S9511-AW-MMC-010
Heater, Duct	S9511-AS-MMC-010
Heater, Space	S9511-AV-MMC-010
Heater, Space	S9511-AU-MMC-010
Heater, Hot Water	S9533-AY-MMC-010
Hood, Galley	S6161-HT-FSE-010
Horn, Navigation	0970-LP-002-5010
Indicator, Depth	SE360-AP-MMC-010
Lube Oil Change System	S9262-AU-MMC-010
Motor Controller	S6263-AZ-MMC-010
Motor Controller	S6263-AY-MMC-010
Motor Controller	S6263-AX-MMC-010
Motor Controller	S6263-A1-MMC-010
Motor Controller	S6263-A2-MMC-010
Motor, Outboard	S9236-AA-MMC-010
Navigator, Satellite	SE174-AA-MMC-010
Navigator, Satellite	SE174-AA-MMC-020
Oven, Microwave	S6161-BC-FSE-010

Table 1-3. OnBoard Technical Manuals — Continued.

Equipment	Manual ID No.
Panel, Electric Plant	S9324-BH-MMC-010
Panel, Navigation Lgt.	S9422-AH-MMC-010
Plotter	SE171-AD-MMC-010
Power Unit, Hydraulic	SG700-AH-MMC-010
Pressure Set	S9533-AS-MMC-010
Pump, A/C Seawater	S6225-SR-MMC-010
Pump, Fire	S6225-SS-MMC-010
Pump, Fire	0947-LP-238-5010
Pump, Fuel Oil Transfer	S6225-SQ-MMC-010
Pump, Lube Oil Transfer	S6225-GL-MMC-010
Pump, Fuel Stripping	S6225-XQ-MMC-010
Pump, Potable Water	Not Available
Pump, Sump Drain	S6225-BQ-MMA-010
Radar System, LN66	SE211-AB-MMA-010
Radar System, LN66	SE211-AB-MMA-020
Radio Cassette Player	SE101-AN-MMC-010
Radio System, HF/VHF	EE100-EA-OMP-010
Radio System, HF/VHF (Supplement)	EE100-EA-SUP-010
Radio System, HF/VHF Antenna	EE100-EA-OMP-020
Radio System, HF/VHF Antenna Coupler	EE100-EB-OMP-010
Radio System, UHF	NA16-30-ARC159
Radio Telephone	SE150-AV-MMC-010
Radio Telephone	SE150-AV-MMC-020
Range, Electric	S6161-HW-FSE-010
Receiver	SE171-AC-MMC-010
Receiver	SE125-AQ-MMC-010
Refrigerator/Freezer	0934-088-9010
Searchlight	S9422-AG-MMC-010
Searchlight	S9422-AF-MMC-010
Searchlight, Signal	0366-507-9000
Separator, Water Filter	S9550-BA-MMC-010
Sewage System	S9593-BP-MMC-010
Sonar Communication System	0967-LP-490-1640
Steering System	S9561-BD-MMC-010
Telephone System	SE165-AR-MMO-01A
Toaster	0934-096-3010
True Bearing Unit	SE211-AB-MMC-010
Underwater Log System	SE350-AA-EIM-010
Urn, Coffee	S6161-HU-FSE-010
Winch, Torpedo Hoist	SG813-BF-MMC-010
Winch, Torpedo Handling	SG813-BG-MMC-010
Window Wiper	S9422-AD-MMA-010