

MILBOATSTECHMAN/BK-02

VERSION 3

MILITARY EMERGENCY BOAT SERVICE TECHNICAL MANUAL BOOK 02

PATROL BOAT 230 CLASS

PUBLISHED BY DIRECTION OF COMMANDER, NEW YORK NAVAL MILITIA

5 August 2014

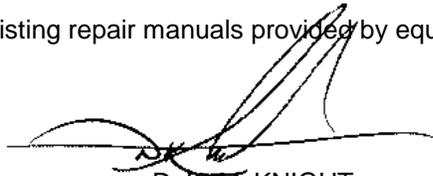
MILBOATSTECHMAN/BK-02
PB 230 CLASS

5 August 2014

From: Commander, New York State Military Emergency Boat Service

Subj: PROMULGATION OF MILITARY BOATS TECHNICAL MANUAL SERIES
BOOK 2; PB 230 CLASS PATROL BOAT

1. The New York State Military Emergency Boat Service Technical Manuals (MILBOATSTECHMAN) are consolidated information for each class of patrol boat in the boat service. They are intended to provide basic information regarding each class, with an overview on operational parameters, missions, equipment layout, and some basic troubleshooting guides if not provided by commercial owner's manuals.
2. Book 2 of the MILBOATSTECHMAN covers the PB 230 Class patrol boat.
3. This manual does not replace existing repair manuals provided by equipment suppliers.



D. K. MCKNIGHT
CDR NYNM

This Page Intentionally Left Blank

MILBOATSTECHMAN/BK-02
PB 230 CLASS



PB 230 Underway, Great South Bay

This Page Intentionally Left Blank

MILBOATSTECHMAN/BK-02
PB 230 CLASS

**PB 230 CLASS PATROL BOAT
INFORMATION AND OPERATIONAL CAPABILITIES**

A. General.

The PB 230 Class patrol boat is a 23 foot boat with twin outboard engines, and includes an accompanying trailer.

The class consists of one boat, purchased COTS from Aluminum Chambered Boats (ACB), of Bellingham, Washington. The boat was received in March 2006.

- 1) The model of boat is: 2006, ACB DV-R (Dive Rescue).
- 2) Length: 25 feet 1 inch
- 3) Beam: 7 feet 6 inches
- 4) Hull type: "Deep V"
- 5) Draft: Vessel (operational-full load): 14 inches; Motor lowered: 30 inches
- 6) Freeboard: 36 inches
- 7) Air draft: 8 feet 0 inches with radar mast folded down
- 8) Average weight: 11,000 lbs.
- 9) Fuel capacity: 130 gallons (gasoline)
- 10) Crew size: 2—4 persons (Maximum 10 persons)
- 11) Propulsion: Two Mercury 4-stroke 150 hp outboard motors
- 12) The hull, decking, superstructure, and tubing are constructed of marine-grade aluminum.
- 13) The boat and trailer are capable of being air lifted in a C-17 military aircraft.

B. Operational Parameters.

The boat capabilities fall within the following parameters:

- 1) Capable of operating with a wind speed of 30 knots with a sea height of 4 feet.
- 2) Capable of surviving with a wind speed of 50 knots with a sea height of 6 feet.
- 3) Capable of operating in air temperatures of 0 – 100 degrees Fahrenheit.
- 4) Capable of operating in water temperatures of 28 – 95 degrees Fahrenheit.
- 5) Capable of operating in harbor ice 3 inches thick.

C. Missions.

The boat is capable of several missions. With an enclosed and heated pilot house, it is suitable for year-round operations. The class of boat was designed for maritime patrolling, but is also capable of search and rescue, dive rescue, commuting, and hauling large amounts of supplies. The hull includes

flotation chambers to aide in stability and reducing shock. This class of boat has easy access to the bow area from the pilot house. For the purposes of NYNM, PB 230 class is considered and all around workboat and patrol boat.

D. Features.

The boat includes the following features and components:

1. Hull:
 - a. Aluminum construction, with ¼-inch bottom plate, and ¼-inch side plate.
 - b. Beaching plate, ¼-inch thick
 - c. Reverse chines to assist stability and turns
 - d. 3/16-inch aluminum plate flotation chambers
2. Deck:
 - a. Non-skid
 - b. High volume self bailing scuppers
 - c. (5) 10-inch welded cleats (3 forward, 2 aft)
 - d. Lifting eyes (2 aft, 1 forward)
 - e. Two step removable ladder for gunwhales
 - f. Swim ladder – stored in lazarette
3. Cabin:
 - a. Windshield of ¼-inch Diamond SeaGlaze tempered glass
 - b. Windows of ¼-inch DSG tinted tempered glass (sliding)
 - c. Windshield wipers, 2-speed
 - d. Door to bow and aft decks
 - e. Cabin fan (2) - Bergstrom
 - f. Cabin deck drains
 - g. Interior roof rails
 - h. Lighting; cabin (3), map (1)
 - i. Spotlight – Hella Marine handheld, located on console
 - j. Cabin heater – Webasto diesel fuel operated
 - k. Carbon Monoxide monitor – Xintex
 - l. Armory cabinet

MILBOATSTECHMAN/BK-02
PB 230 CLASS

- m. Seats (2), bench (1 pax)
- 4. Engine:
 - a. Twin outboards; 150 hp Mercury four-stroke
- 5. Steering:
 - a. Hydraulic w/ SS wheel – Sea Star HH5271
- 6. Fuel system:
 - a. Single 130 gallon tank
 - b. Fuel access on starboard side
- 7. Electrical system (see electrical diagram at end of manual):
 - a. Three batteries; main (2), auxiliary (1)
 - b. 13-breaker electrical panel and wiring
- 8. Lighting:
 - a. Navigation lights fore and aft – Aqua Signal
 - b. Single blue strobe light on roof – Grote 7701
 - c. Spotlight on cabin roof - Guest
- 9. Navigation and electronics:
 - a. Marine radar - Furuno model 1623, includes 6-inch monochrome display and 15-inch radome antenna. Range from 1/8-nautical mile to 16 nautical miles.
 - b. Magnetic compass - Ritchie binnacle
 - c. GPS – Furuno 1650WF
 - d. VHF Radio –in-dash mounted Standard Horizon radio.
- 10. Gauges:
 - a. Voltmeter (2)
 - b. Engine trim (2)
 - c. Fuel tank
 - d. Miles Per Hour (MPH)
 - e. Engine hours (2)
 - f. Depthsounder – Raymarine ST60

11. Ground tackle:
 - a. Anchor
12. Safety equipment:
 - a. Fire extinguisher – 5 lb., ABC
 - b. PDFs
 - c. Emergency flare
 - d. Ring buoy
 - e. Horn, 14-inch single trumpet
 - f. Spotlight, handheld
 - g. Paddle, with mounting bracket
13. Trailer:
 - a. Painted trailer w/ hand winch – EZ Loader model 6-TEZB23-25/27 7500
 - b. Overall length is 26 feet 3 inches. Weight is 1657 lbs. Trailer is 32 feet in length, 8 feet 6 inches wide, when combined with boat
 - c. Surge brakes
 - d. GVWR: 9200 lbs
 - e. Rated capacity – 7500 lbs
 - e. Requires F-250 (or compatible) truck for towing

E. General Maintenance.

1. Mercury Outboard Engines:
 - a. BEFORE EACH USE:
 - (1) Check engine oil level. See Fuel and Oil Checking and Adding Engine Oil.
 - (2) Check that lanyard stop switch stops the engine.
 - (3) Inspect the outboard for tightness to the boat transom. If any looseness of the outboard or mounting fasteners exist, re-torque the outboard mounting fasteners to the specified torque. When looking for signs of looseness, look for loss of outboard transom bracket material or paint caused by movement between the outboard mounting fasteners and the outboard transom brackets. Also look for signs of movement between the outboard transom brackets and the boat transom (lift plate/setback bracket).
 - (4) Visually inspect the fuel system for deterioration or leaks.
 - (5) Check steering system for binding or loose components.

MILBOATSTECHMAN/BK-02
PB 230 CLASS

(6) Check propeller blades for damage.

b. After Each Use:

(1) Flush out the outboard cooling system if operating in salt, polluted, or muddy water.

(2) Wash off all salt deposits and flush out the exhaust outlet of the propeller and gear-case with fresh water if operating in saltwater.

(3) If operating in saltwater, inspect the power-head and power-head components for salt buildup.

c. EVERY 100 HOURS OF USE OR ONCE YEARLY, WHICHEVER OCCURS FIRST

(1) Change engine oil and replace the oil filter. The oil should be changed more often when the engine is operated under adverse conditions, such as extended trolling.

(2) Inspect the thermostat visually for corrosion or a broken spring. Ensure the thermostat closes completely at room temperature.

(3) Check low pressure fuel filter for contaminants. Replace filter if required.

(4) Re-torque the outboard mounting fasteners that fasten the outboard to the boat transom. Tighten the fasteners to the specified torque.

(5) Check corrosion control anodes. Check more frequently when used in saltwater.

(6) Drain and replace gear-case lubricant.

(7) Inspect battery.

(8) In saltwater usage, remove spark plugs and apply a thin coating of Anti-Seize Compound only on the threads of the spark plugs. Reinstall spark plugs.

(9) Check wiring and connectors.

(10) Check tightness of bolts, nuts, and other fasteners.

(11) Check cowl seals to ensure seals are intact and not damaged.

(12) Check internal cowl sound reduction foam (if equipped) to ensure foam is intact and not damaged.

(13) Check that the intake silencer (if equipped) is in place.

(14) Check that the idle relief muffler (if equipped) is in place.

(15) Check for loose hose clamps and rubber boots (if equipped) on the air intake assembly.

- d. EVERY 300 HOURS OF USE OR THREE YEARS
 - (1) Check power trim fluid.
 - (2) Replace water pump impeller (more often if overheating occurs or reduced water pressure is noted).
 - (3) Lubricate the splines on the upper driveshaft.
 - (4) Replace alternator drive belt.
- 2. Furuno Radar:
 - a. Every 3 – 6 months:
Check fixing bolts on antenna unit for corrosion and tightness. Replace corroded bolts. Coat new bolts with anti-corrosive sealant.
Check antenna unit for cleanliness. Clean antenna with fresh water cloth. Do not use commercial cleaners.
Check antenna unit for cracks. If crack is found, it should be temporarily repaired by using a small amount of sealing compound or adhesive. The unit should be brought to an authorized dealer for permanent repairs.
Wipe the LCD gently with a soft cloth. Do not use commercial cleaners.
 - b. Every 6 – 12 months:
Check display connectors for tight connection and corrosion. If corroded, contact dealer for replacement.
- 3. EPIRB:
 - a. Yearly:
Replace 9-volt lithium battery pack
 - b. Every two years:
Replace HRU (see owners manual)
- 4. VHF Antennas:
 - a. Every 3 – 6 months:
Check antenna unit cover for cracks. If crack is found, it should be temporarily repaired using a small amount of sealing compound or adhesive. The unit should be brought to an authorized dealer for permanent repairs.
 - b. Every 6 -12 months:
Check display unit connectors for tightness and corrosion. If corroded, contact dealer for replacement.
- 5. Hydraulic Steering:
 - a. Monthly:
Inspect hydraulic fluid reservoir (at top of helm pump) to make certain that fluid level is at full.
 - b. Annually:
Remove, clean and grease the support rod with quality marine grease
Replace any hoses showing signs of wear.

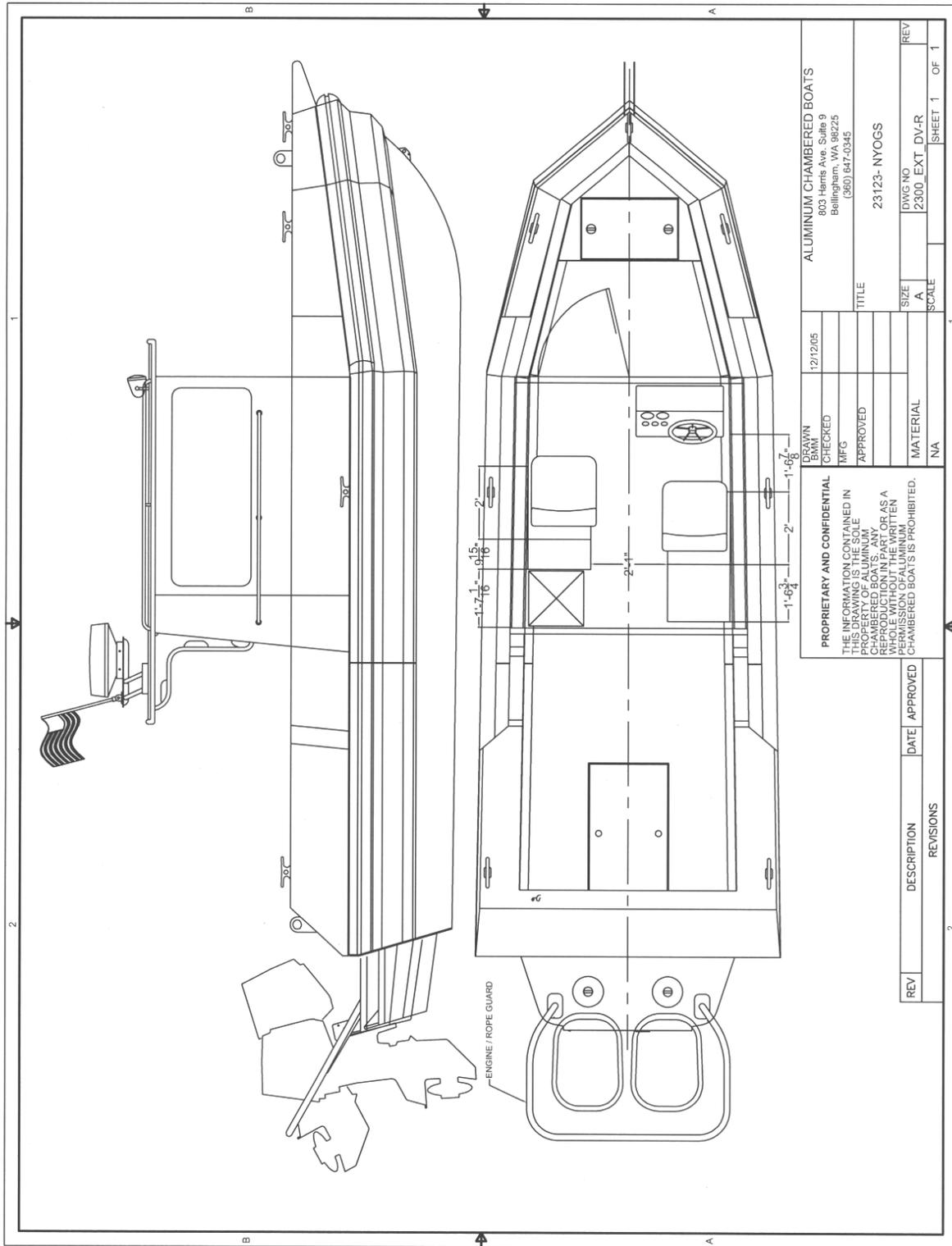
MILBOATSTECHMAN/BK-02
PB 230 CLASS

Check fittings and seals for leaks and damage. Service as necessary.

6. Fire Extinguishers:

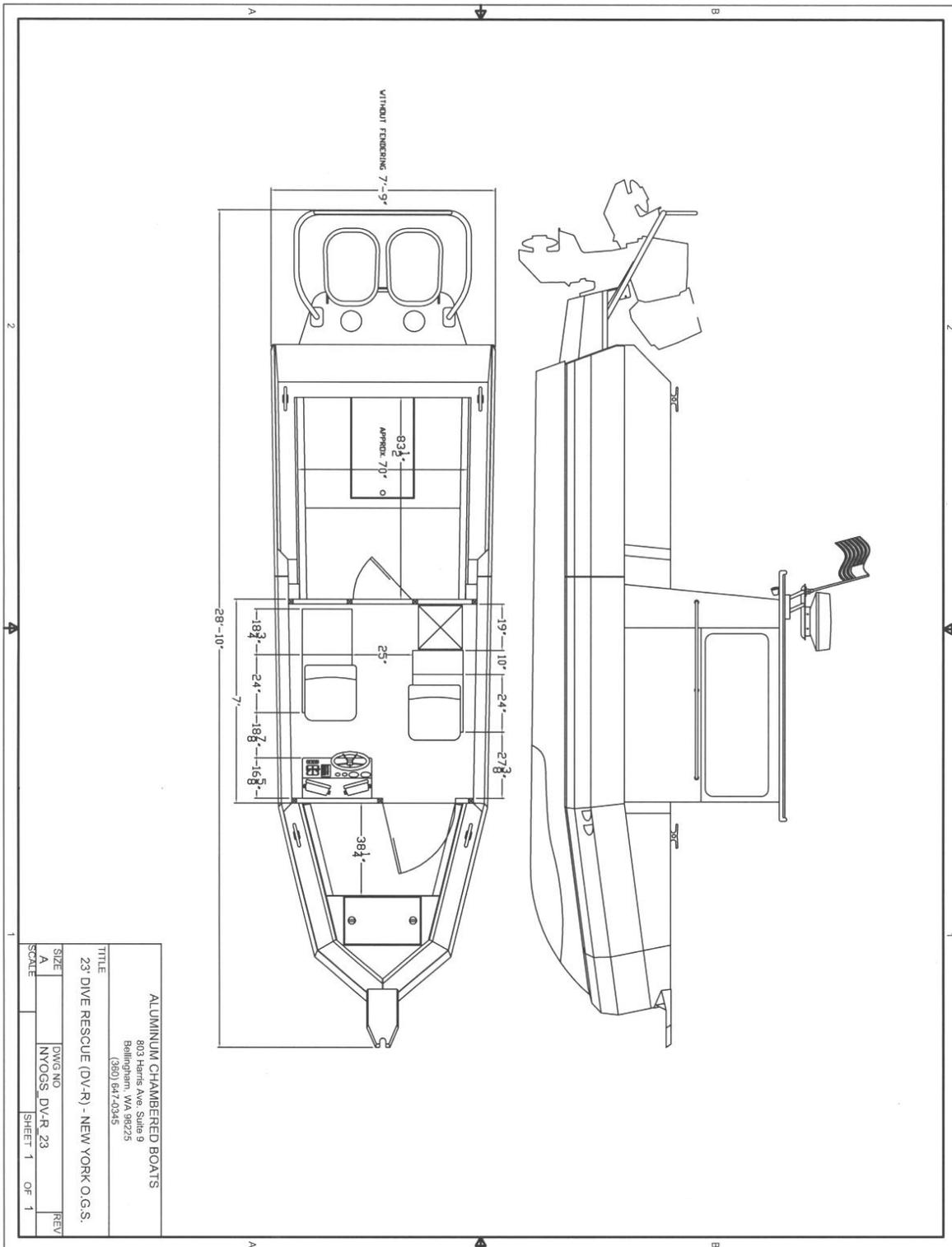
- a. Annually:
Check and either refill or replace.
Check brackets for corrosion, and repair or replace as needed.

MILBOATSTECHEMAN/BK-02
PB 230 CLASS



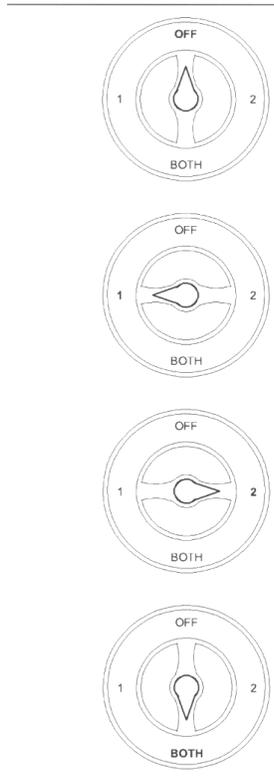
PB 230 Class Patrol Boat

MILBOATSTECHMAN/BK-02
PB 230 CLASS



BATTERY SELECTION / ISOLATION TWIN ENGINES

Our equipment consists of two battery switches with four positions each and three group 31 combination batteries.



1. PORT engine battery switch in #1 position, the PORT engine battery starts and is charged by the PORT engine. In #2 position, the auxiliary battery starts and is charged by the PORT engine. In BOTH position, PORT and auxiliary batteries start and are charged by the PORT engine.

2. STBD engine switch repeats the above for the STBD engine battery. Whichever battery combination is selected by this switch also powers the house breaker panels.

3. For total bank isolation (no paralleled start batteries), have PORT battery switch to position 1 and STBD switch to position 1, this will also energize the house breaker panels from, STBD engine battery.

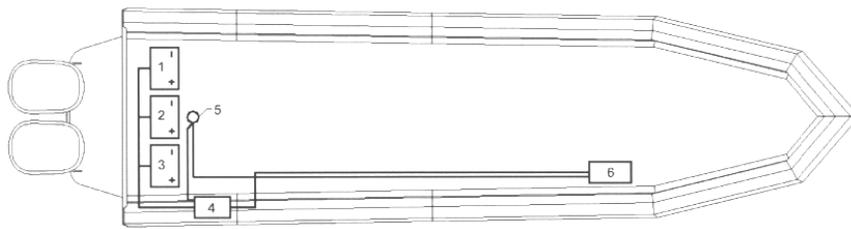
4. To parallel all batteries, go to BOTH on PORT and STBD battery switches. In this mode all batteries are feeding (and being charged by) both motors and the house breaker panels. **Caution: In order to charge a battery, it must be selected. It is recommended that both battery switches be on "BOTH" in normal operation.**

5. Inside of the battery switch enclosure are two circuit breakers, one for the house and one for the bilge pump auto function. The house breaker is accessed by opening the enclosure and reset by pushing up flag. The bilge pump breaker reset is outside the enclosure on the aft face. Reset by depressing indicator. Battery problems select "both" on port and starboard switches and drive on. Normally when leaving the boat, we turn all switches off. This leaves the bilge pump auto function energized and as the only potential draw.



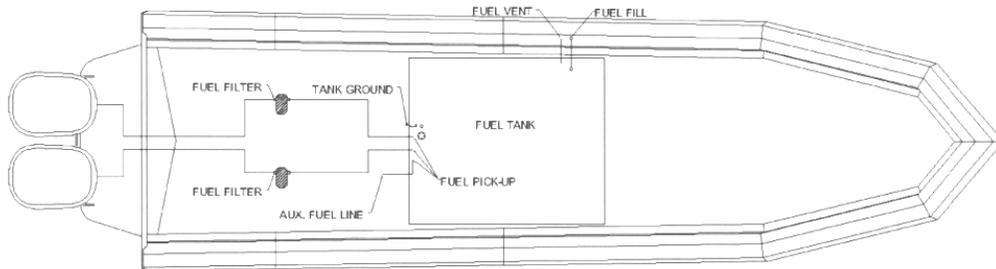
Battery Equipment Locations

- 1) PORT BATTERY
- 2) AUX. BATTERY
- 3) STBD BATTERY
- 4) BATTERY SWITCH BOX
- 5) BILGE PUMP
- 6) DC PANELS

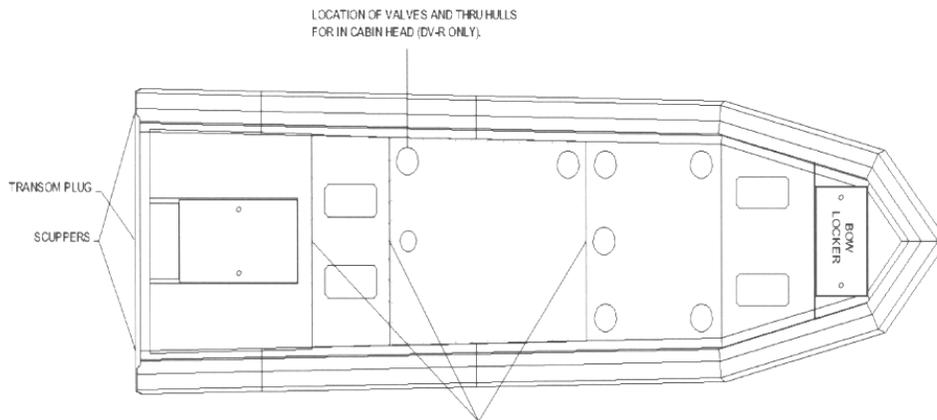


MILBOATSTECHMAN/BK-02
PB 230 CLASS

Fuel System Diagram



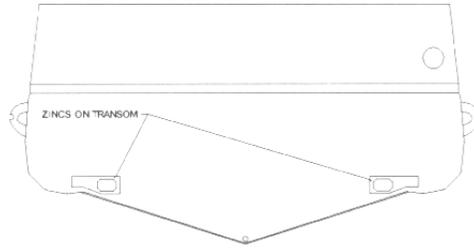
Hatches, Valves and Drains



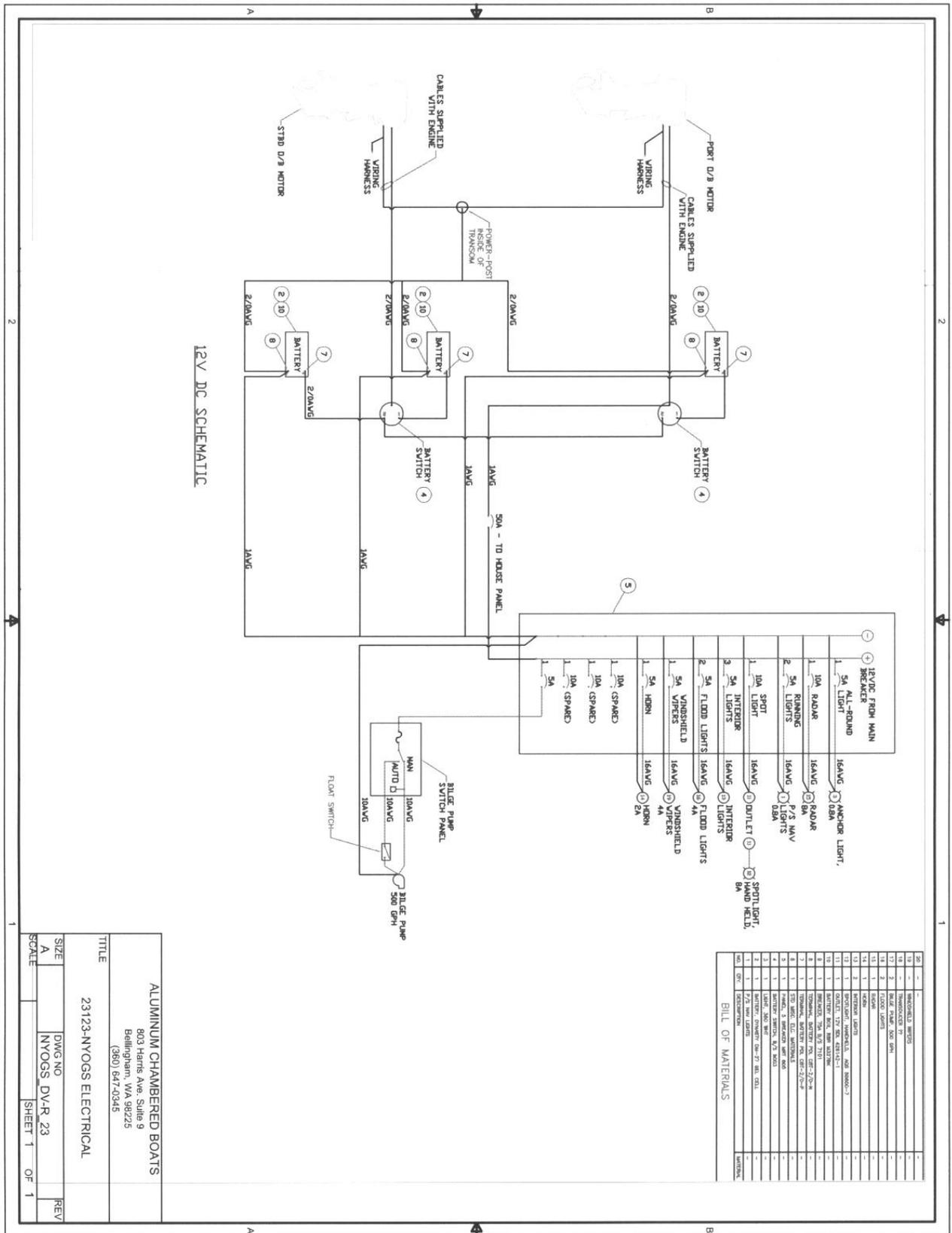
NOTE
LAYOUT IS FOR STANDARD BOATS.
CONFIGURATION MAY VARY
DEPENDENT ON BOAT OPTIONS

DRAIN PLUGS ARE ACCESSIBLE AT EACH BULKHEAD

Anode Placement Diagram



MILBOATSTECHMAN/BK-02
PB 230 CLASS



PB 230 Class Electrical Diagram

MILBOATSTECHMAN/BK-02
PB 230 CLASS



(PB 230 Bow view)



(PB 230 Cabin)



(Anchor Locker)



(Helm console)



(Engine controller)



(Electrical panel)

Operations Checklist/ PB 230 Class

1) Pre-operations

- a) Read and understand training or operational letter of instruction.
- b) Ensure at least one life-jacket is available for each person embarked.
- c) Complete Float Plan and Crew Manifest. Leave in designated location.
- d) Ensure the following items are available:
 - (1) boat fuel log and credit card is available.
 - (2) first aid kit
 - (3) lines and fenders
 - (4) extra POL
 - (5) boat plug
 - (6) area charts
 - (7) boat keys
 - (8) boat hook
 - (9) life ring
 - (10) tool kit
- e) Ensure adequate fuel. This boat may be fueled on the trailer at a truck stop.
Note: Gasoline for engines goes on port side. Diesel for the cabin heater goes on starboard side.
- f) Check oil reservoir to ensure adequate lubrication is available.
- g) Visually inspect boat and trailer for any deficiencies, including trailer lights.

2) Trailer and dock-side Launching

- a) Prior to entering ramp area, remove all tie-downs and bow safety chain, with the exception of the bow strap.
- b) Inspect water cooling indicator discharge for dirt and clogging. Clean with small piece of wire if necessary.
- c) Raise antenna and light pole.
- d) Rig life ring, fenders, and lines.
- e) Insert boat plug into stern drain opening. This is a threaded plug that is normally stored on the dash board or in the orange go-box.**
- f) Using a safety observer, back the trailer into the water. The trailer wheels should be just submerged, and the boat will float slightly off the rub rails.
- g) Turn battery selector switch to "BOTH".
- h) Lower engine into water, using the trim button on either the throttle or side of engine. Do not lower the engine so far that the propeller will strike the bottom.

- i) Turn ignition key and start engine. For cold starts, push the high-idle button on the left side and at the base of the throttle handle.
- j) Observe cooling water discharge to ensure adequate engine cooling. If no water discharge is seen after 30 seconds, shut down the engine and determine/fix the cause.
- k) Lower engine completely when there is adequate water under the keel.
- l) Energize appropriate equipment on electrical panel.
- m) Slip the boat strap, and with at least two members embarked, back the boat off the trailer and proceed on mission.
- o) Notify the JFHQ-NY JOC at 518-786-6104.

3) Vessel recovery on trailer

- a) Back trailer straight into the water, as close to parallel with the ramp dock. Trailer wheels should be submerged.
- b) NOTE: Ramp areas are shallow. Raise engines enough that the props will not strike the bottom, but will allow continued cooling water intake. The propellers must stay below the surface of the water. Taking into account the wind and current, drive the vessel straight onto the trailer as close to the bow stopper as possible. Do not ram the bow stopper.
- c) The boat must be in alignment with the trailer and the rub rails before securing it.
- d) Connect bow strap and winch it in. Use boat power if necessary to get the bow as close to the bow stopper as possible.
- e) Stop and raise engine.
- f) When boat is in alignment with trailer, pull the trailer out of the water. The boat will settle on the rails as it emerges from the water.
- g) When you have cleared the ramp area, complete the securing of the boat to the trailer. Attach all tie-down straps and safety chain.
- h) Stow all gear.
- i) Lower antenna and light pole.
- j) Turn battery selector switch to "OFF"
- k) Notify JFHQ-NY JOC at 518-786-6104.
- l) Visually inspect boat and trailer for deficiencies, including trailer lights.
- m) Remove drain plug and store on dashboard or in orange go-box.

This page left blank.

MILBOATSTECHMAN/BK-02
PB 230 CLASS

**NEW YORK NAVAL MILITIA
MILITARY EMERGENCY BOAT SERVICE**