

MILBOATSTECHMAN/BK-03

VERSION 4

MILITARY EMERGENCY BOAT SERVICE TECHNICAL MANUAL BOOK 03

PATROL BOAT 280 CLASS

DISTRIBUTION STATEMENT: APPROVED FOR PUBLIC RELEASE, DISTRIBUTION IS UNLIMITED.

PUBLISHED BY DIRECTION OF COMMANDER, NEW YORK NAVAL MILITIA

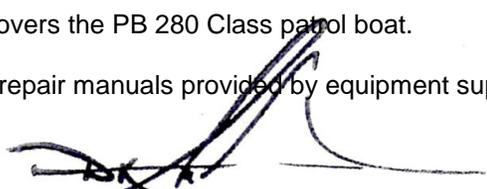
11 March 2015

11 March 2015

From: Commander, New York State Military Emergency Boat Service

Subj: PROMULGATION OF MILITARY BOATS TECHNICAL MANUAL SERIES
BOOK 3; PB 280 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 3 of the MILBOATSTECHMAN covers the PB 280 Class patrol boat.
3. This manual does not replace existing repair manuals provided by equipment suppliers.



D. K. MCKNIGHT
CDR NYNM

MILBOATSTECHMAN/BK-03
PB 280 CLASS

This Page Intentionally Left Blank

MILBOATSTECHMAN/BK-03
PB 280 CLASS



PB 281 Underway Sackets Harbor

MILBOATSTECHMAN/BK-03
PB 280 CLASS

This Page Intentionally Left Blank

**PB 280 CLASS PATROL BOAT
INFORMATION AND OPERATIONAL CAPABILITIES**

A. General.

The PB 280 Class patrol boat is a 34 foot boat with twin outboard engines, and includes an accompanying trailer.

The class consists of two boats, purchased COTS from Almar (now North River) Boats, of Roseburg, Oregon. The boats were received in 2003

Engines were replaced and upgraded to Mercury Optimax 250 HP in 2014.

1. The model of boat is: Almar Sounder
2. Length: 34 feet
3. Beam: 9 feet 6 inches
4. Bottom-dead rise aft in degrees: 24
5. Bottom-dead rise forward in degrees: 55
6. Hull type: Deep V hull
7. Draft: 36 inches
8. Air draft: 9 feet 7 inches
9. Freeboard: 32 inches
10. Total weight, with trailer: 10510 lbs.
11. Trailer weight: 1700 lbs.
12. Fuel capacity: 150 gallons (gasoline)
13. Crew size: 2-3 (Maximum 12 persons)
14. Propulsion: Two 250 hp (2-stroke) outboard motors
 - a. Maximum speed: 41 MPH at 5500 RPM
15. The hull, decking, superstructure, and tubing are constructed of marine-grade aluminum.

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 5 feet.
2. Capable of surviving with a wind speed of 50 knots with a sea height of 7 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.

MILBOATSTECHMAN/BK-03
PB 280 CLASS

C. Missions.

The boat is capable of several missions. With an enclosed and heated cabin, it is suitable for year-round operations. The boat is capable of operating in all waters in or contiguous to New York State. With a deep V bow and high freeboard, it is designed to operate in rough offshore waters. The boat is heavy to the bow. For the purposes of NYNM, the primary mission is maritime patrol.

D. Features.

The boat includes the following features and components:

1. Hull:
 - a. Aluminum construction, with ¼-inch bottom plate, and 3/16-inch side plate.
 - b. 3/8-inch stem bar
 - c. Chines to assist stability and turns
 - d. Galvanic isolator - Guest
 - e. Welded aluminum bow, stern, roof, and aft cabin rails
 - f. Towing bracket
 - g. Rubber rail along gunwales
2. Deck:
 - a. Deck grill aft
 - b. Self bailing scuppers
 - c. (4) 10-inch welded cleats
 - d. (1) bollard forward, 2 aft on each quarter, (1) towing bit aft
 - e. Transom storage with drains
 - f. Transom tie downs
 - g. (2) gun mounts aft (port and starboard)
3. Cabin:
 - a. Forward leaning windshield with ¼-inch clear, tempered glass – Diamond Sea Glaze
 - b. Sliding side windows, with screen inserts
 - c. Full 8-foot aluminum hardtop with “Alaskan bulkhead” (aft) and door
 - d. Windshield wipers – AM Equipment

- e. Air conditioner – Coleman Mach
 - f. V-berth forward, (2) windows and hatch to bow
 - g. Porta-john – Sanipottie
 - h. Electric 1500 watt heater – King Dial-a-Watt
 - i. Cabin Fans (2) – Guest model 900
 - j. Cabin lights, overhead (3), with red night light
4. Engine:
- a. Twin outboards; 250 hp Mercury Optimax, counter rotating
 - HP / kW 250 / 184
 - Engine type V-6
 - Displacement (L) 3.0
 - Full throttle RPM 5500-6000
 - Fuel induction system 2-stage Direct Fuel Injection (DFI)
 - Alternator amp / Watt 60 amp / 756 watt (Belt-Driven)
 - Recommended fuel 87% octane / up to 10% ethanol
 - Recommended oil Mercury OptiMax/DFI Outboard Oil
 - Engine protection operator warning system
 - Low oil level
 - Over-rev
 - Overheat
 - SmartCraft Engine Guardian
 - Controls Remote Mechanical
 - Shaft length 30" / 762 mm
 - Gearcase ratio 1.75:1
 - Dry weight *Lightest model available
505 lbs / 229 kg
 - b. Controllers at helm – Mercury model MCC 4502
 - c. Tilt lift buttons on controllers, and auxiliary tilt buttons located on right-hand side of each engine.
5. Generator:
- a. Gasoline powered electric generator – Honda EB6500SX
 - b. Located port side aft of cabin
6. Steering:
- a. Hydraulic – Sea Star Teleflex model HH 5271
7. Fuel system:
- a. Single 150 gallon tank – fill starboard quarter
 - b. Oil reservoir aft – fill port quarter

MILBOATSTECHMAN/BK-03
PB 280 CLASS

8. Electrical system:
 - a. Dual heavy-duty marine batteries located aft with selector switch.
*Note that the selector switch (red) is under the transom
 - b. 2000 GPH bilge pump (3)
 - c. 12VDC outlet (2), in dash
 - d. GCFI outlets (2), in cabin (port and starboard)
 - e. Battery charger – Guest model 2621
9. Lighting:
 - a. Navigation/anchor lights
 - b. Dual blue strobe lights on roof – Galls model 1000
 - c. Spotlight – Jabsco model 62026
 - d. Deck lights (4) – Hobbs
10. Navigation and electronics:
 - a. Marine radar – Furuno model 1712
 - b. Binnacle compass – Ritchie Voyager
 - c. Marine VHF Radios (2) – Standard Horizon models GX2355S and Quantum GX2360S, and hailer – Standard Horizon model 240 SW
 - c. VHF low and high band radio – Kenwood TK 690 and TK 790
NOTE: RADIOS MUST BE TURNED OFF WHEN ENGINES ARE NOT OPERATING.
 - e. GPS –Furuno model GP-1650WF with C-Map NT
11. Gauges:
 - a. Speedometer – Mercury Smartcraft
 - b. Tachometer – Mercury Smartcraft
12. Ground tackle:
 - a. Anchor
 - b. Located in anchor locker under hatch on bow
13. Safety equipment:
 - a. Fire extinguisher (2) – 15 lb., ABC dry chemical
 - b. PDFs (Type 1)
 - c. Emergency flare

- d. Ring buoy with light
 - e. Horn, dual trumpet – AFI model CTD
14. Trailer:
- a. Painted trailer – EZ Loader model 4-TEZB28-30 8500
 - b. Two axles
 - c. 8,500 lb capacity
 - d. Trailer is 61 feet, in length; 9 feet 8 inches in width; when combined with truck and boat
 - e. Trailer and boat combined length is 37 feet 6 inches
 - f. Trailer measurements by itself are: 31 feet in length, 8 feet 3 inches wide
 - g. Boat and trailer must be towed with an F-350 (or compatible) truck
 - h. Air draft of boat on trailer is 13 feet 2 inches (to top of anchor light)
 - i. Winch – Powerwinch model T4000
 - j. Hitch ball: 2 5/16 inch

E. Operating the Boat

1. Preparing the boat to enter the water

- a. Ensure that boat plug is installed in drain hole located on stern just above the keel.
- b. Ensure that all lines and fenders are rigged and prepared for use.
- c. Ensure that all radio and GPS antennas are raised and in a locked position.
- d. Raise the flag staff and attach national ensign and state flag.
- e. Ensure that all safety equipment is deployed, including life ring and fire extinguishers.
- f. Remove transom tie-downs before backing boat trailer into water.
- g. Disengage the engine tilt support lever that supports the engines in the raised position. First, raise the engines slightly. Then, push in and rotate the lever control knob located on the transom bracket. Rotate the lever downward.
- g. Remove winch safety chain before backing boat trailer into water.
- h. Remove winch strap/cable when boat is in water, and ready for underway.

2. Preparing for underway operations – Engines (Ref: Mercury 250 Optimax Manual; 90-8M0080078 413)

- a. Ensure that fuel and oil levels are sufficient.

MILBOATSTECHMAN/BK-03
PB 280 CLASS

- b. Lower both engines into the water. Ensure that sufficient water depth is available so that propellers do not strike bottom or objects in water. Controls for raising and lowering the engines are on the port throttle shift handle (“UP”/“DN”), and also on the right-hand side of the individual engines themselves.



- c. Throttle controls must be in neutral to start the engines. Using the ignition keys, start the engines. If the engine will not start, move the throttle controls back and forth and return to neutral.
- d. After the engine starts, check to ensure that a steady stream of water is coming from the aft, right-hand side. This is the water pump indicator stream, and is a critical indicator that sufficient cooling water is available to the engine.
- e. To use “high” idle feature, depress the black “Throttle Only” button on the side of the throttle shift housing, and then move the handle forward to desired level of idle. By depressing this button, the propellers will not engage. Do this only after starting the engine.
- f. Shift engines into forward or reverse in a quick movement to engage the clutch. Ensure that engine is at idle speed before engaging clutch. Once engaged either forward or astern, slowly and smoothly advance the throttle to the desired engine speed. Avoid long, drawn-out engagements of the clutch.
3. Preparing for underway operations – Electrical
- a. Ensure that all electrical and electronic components are in the off position.
- b. Under the transom, starboard side, find the battery selector switch and AC Rotary “House” Switch. On the battery selector switch, turn the control knob from “OFF” to “BOTH”.

MILBOATSTECHMAN/BK-03
PB 280 CLASS



Battery Selector



AC Rotary "House" Switch

- c. Turn the orange AC Rotary Switch to "HOUSE".
- d. Check the "House Breaker" to ensure that the black lever is not descended. If it is descended, re-engage by pushing it up into position. The red push button will trip this breaker.



House Breaker Set



House Breaker "Tripped"

- e. Individual components can now be energized with the equipment on/off switches.
 - f. Install VHF low and high band antenna whips to the "NMO" antenna mounts located on the cabin roof. Safeguard the protective weather caps.
4. Securing from underway operations – Engines
 - a. Slow engine to idle speed.
 - b. Place throttles in neutral.
 - c. Turn ignition key to "OFF".
 - d. When boat is loaded onto a trailer, lift the engines to the raised position with the "UP/DN" button on the port throttle control handle. Engage the tilt support lever by rotating the control knob. Lower the engines so that they rest on the tilt support levers.
 - e. If necessary, flush the engines.
 5. Securing from underway operations – Electrical
 - a. Turn off all electrical and electronic equipment using the individual "ON/OFF" switch.

MILBOATSTECHMAN/BK-03
PB 280 CLASS

- b. Turn the "House Switch" to off.
- d. Turn the battery selector switch to off.
- e. Remove and store VHF low and high band antennas from cabin roof. Place covers over antenna "NMO" mounts.

6. Shore power

- a. When the engines are not operating, power can be supplied through AC circuits from either shore power or onboard generator power. Power cannot be provided by both sources at once.
- b. Turn off the shore power breaker before connecting the shore power cable.



120V/AC Main

- c. Connect 30 amp shore power cable to inlet on starboard side of the cabin.



Shore Power Inlet

- d. If reverse polarity indicator is lit, immediately disconnect the cable.
- e. Connect other end of shore power cable to the riser on the dock.
- f. Move breaker switch to "Shore Power".
- g. Turn on desired house current components.

7. Generator power

- a. When engines are not operating, and no source of shore power is available, the generator can power the boat's house current components.
- b. Remove covers and access panels to the generator compartment to reduce heat build-up.
- c. Ensure the generator is filled with gasoline.

- d. Check for adequate lube oil.
- e. Isolate the power by opening the generator breaker at the helm console.
- f. Insert the power plug located in the generator compartment into the 30 amp AC receptacle, located on the generator's front – right side.
- g. Start the generator using the key.
- h. After the generator is running, close the generator breaker under the helm console.
- i. Turn on desired house current components.

F. General Maintenance Requirements.

1. Mercury Outboard Engines:

- a. Before Each Use:
 - Visually inspect fuel system for deterioration and leaks
 - Check outboards for tightness on transom
 - Visually check steering for binding or loose components
 - Check propeller blades for damage
 - Check oil reservoir
- b. After Each Use:
 - Flush outboard cooling system if operated in salt water
 - Wash off all salt deposits
 - Flush exhaust outlet of propeller and gear case with fresh water if operated in salt water
- c. Every 100 hours of operation:
 - Lubricate all lube points
 - Inspect spark plugs and replace if necessary
 - Replace fuel filter
 - Replace compressor air intake filter
 - Inspect alternator belt
 - Check corrosion anodes
 - Drain and replace gear case lubricant
 - Check control cable adjustments
 - Lubricate splines on drive shafts and shift shafts
 - Check tightness of bolts, nuts, and other fasteners
- d. Every 300 hours of operation:
 - Replace water pump

2. Generator:

- a. Each Use:
 - Check engine oil
 - Check air filter
 - Check ground fault circuit interrupter (GFCI)
- b. Every 3 months or 50 hours of operation:
 - Clean air filter
- c. Every 6 months or 100 hours of operation:

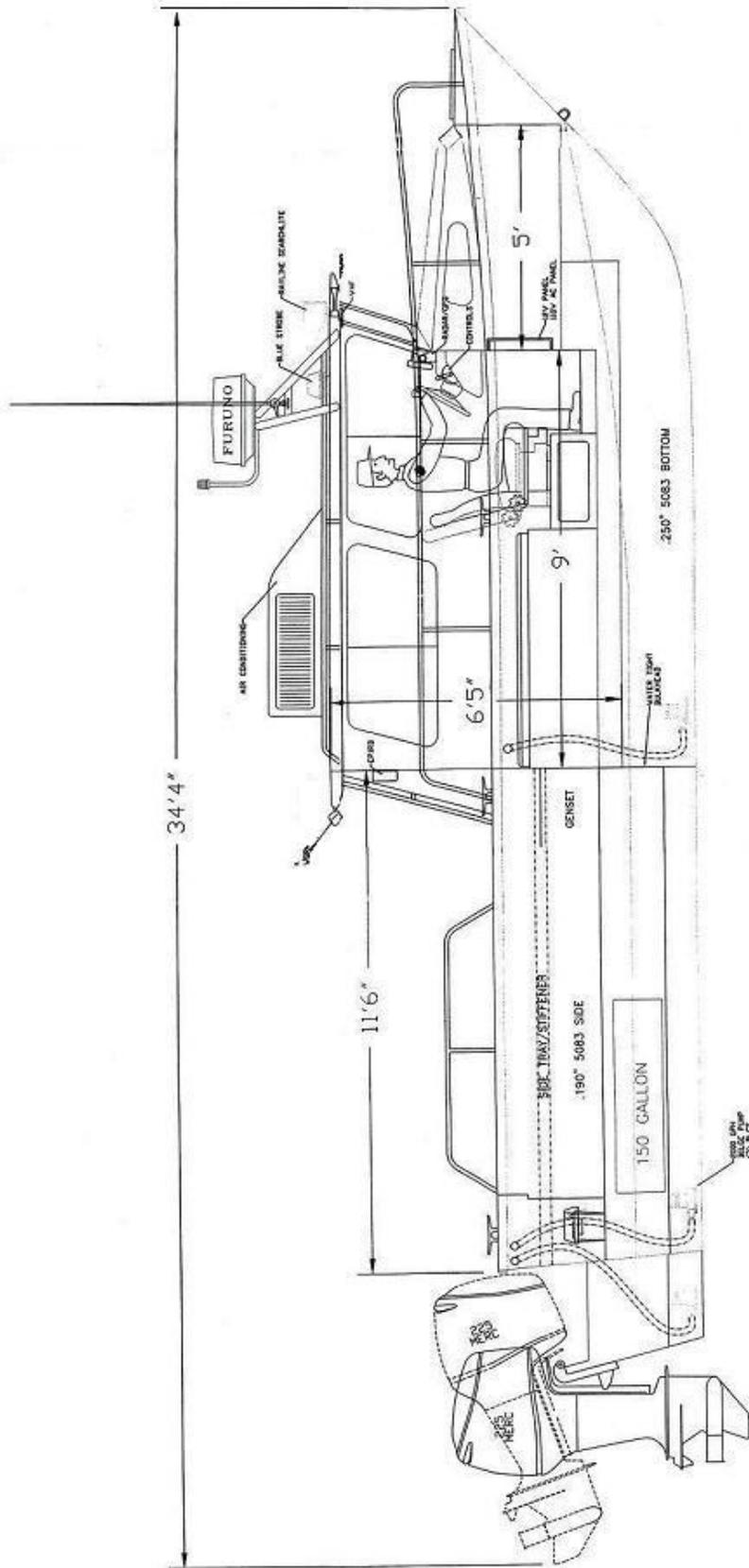
MILBOATSTECHMAN/BK-03
PB 280 CLASS

- Replace engine oil
- Clean sediment cup
- Check/adjust spark plug
- Clean spark arrestor
- Clean fuel tank and filter (service dealer only)
- d. Ever 12 months or 300 hours of operation:
 - Replace spark plug
 - Check/adjust idle speed (service dealer only)
 - Check/adjust valve clearance (service dealer only)
- 3. 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.
- 4. EPIRB:
 - a. Yearly:
 - Replace 9-volt lithium battery pack
 - b. Every two years:
 - Replace HRU (see owners manual)
- 5. Marine 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.
- 6. 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.
 - Check fittings and seals for leaks and damage. Service as necessary.

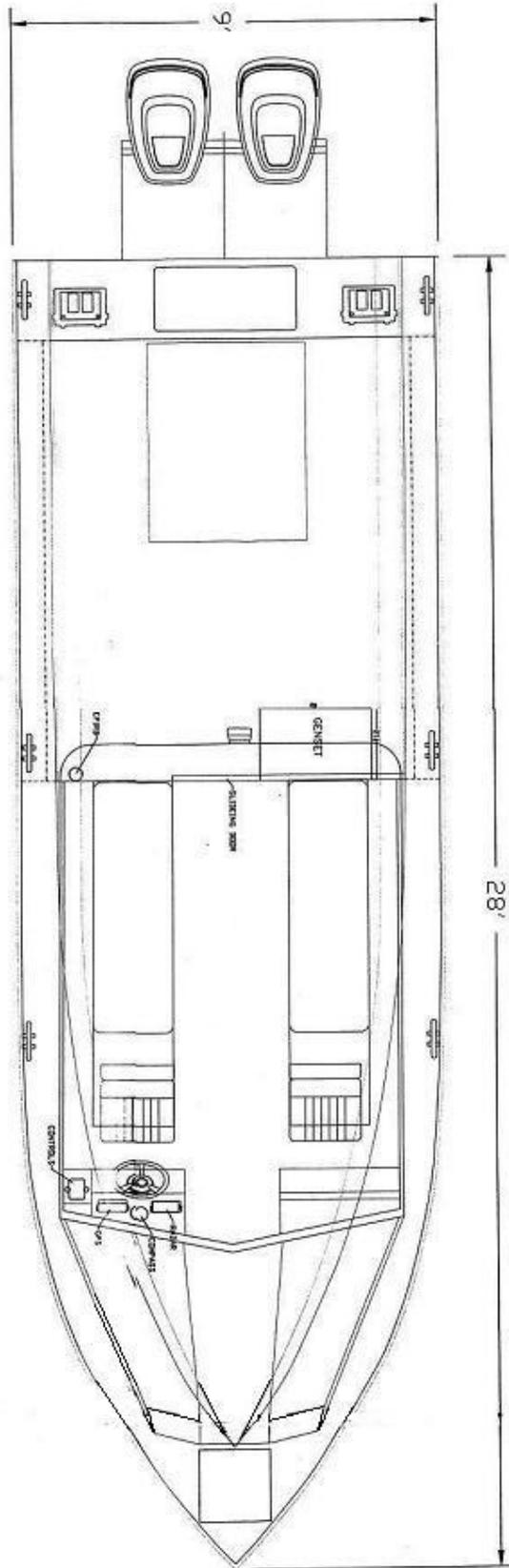
7. Air Conditioning:
 - a. Every two weeks, or as needed:
Clean or replace filters when necessary.

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

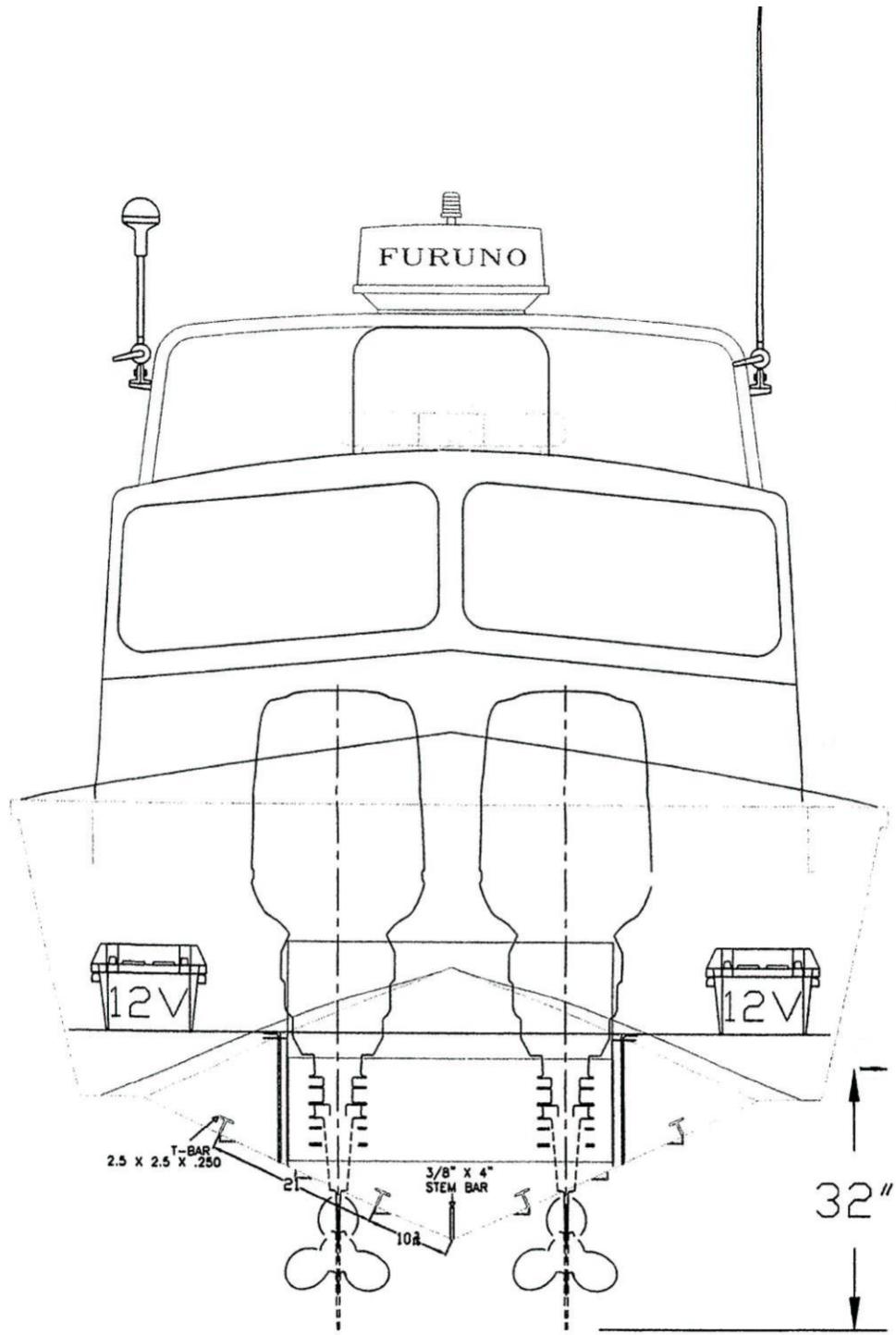
MILBOATSTECHMAN/BK-03
PB 280 CLASS



MILBOATSTECHMAN/BK-03
PB 280 CLASS



MILBOATSTECHMAN/BK-03
PB 280 CLASS



MILBOATSTECHEMAN/BK-03
PB 280 CLASS



(PB 281 Bow View)



(PB 281 Aft View)



(PB 281 Cabin)



(Helm Console)



(Porta-john)



(Anchor Locker)

MILBOATSTECHMAN/BK-03
PB 280 CLASS



(Generator Top View)



Left-hand Access



Right-hand Access)



(Battery Compartment Under Transom)



(Battery Isolator – Starboard Side Aft)



(Fuel Water Separators)



(Engine Oil Reservoirs)



(Fuse Panel Under Helm Console)



(Electrical Panel Under Dash)



(Electrical Switches On Dash)



(Searchlight Controller On Dash)

QUICK USE GUIDE SMARTCRAFT GAUGES

This guide should only be used once you are familiar with the Smart-Craft operation information inside the SmartCraft Operation Manual.
Selecting Display Screens

Press the **MODE** key to select the display screens.

Press the **MODE** key for 2 seconds to reverse to prior screen.



ENGINE BREAK-IN
ENGINE TEMPERATURE
ENGINE OIL PRESSURE
TRIM ANGLE WITH ENGINE RPM
TRIM ANGLE WITH WATER PRESSURE
WATER PRESSURE
BATTERY VOLTAGE AND HOUR METER
FUEL FLOW AND FUEL USED
ENGINE RPM
DEPTH



BOAT SPEED
FUEL USED
COG/SOG (W/GPS NAVIGATION INPUT)
DISTANCE/FUEL TO WAYPOINT (W/GPS NAVIGATION INPUT)
CLOCK, WATER/AIR TEMPERATURE
TANK LEVEL READINGS
TWIN ENGINE RPM SYNCHRONIZER
TWIN ENGINE TRIM SYNCHRONIZER
ESTIMATED TRAVEL RANGE
FUEL ECONOMY
TRIP ODOMETER

NOTE: The SmartCraft gauges will display only the screens that are applicable to your engine model.

Resetting Fuel Used, Trip Odometer, and Average Fuel Consumption Rate "AVG"

Select the display screen, then press **TROLL** **MODE** keys.

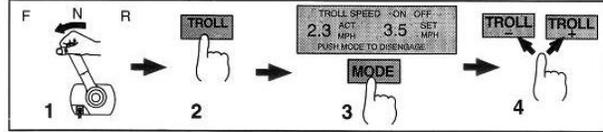


Operating Troll Control

NOTE: Troll Control is not applicable for all models.

SETTING TROLL CONTROL

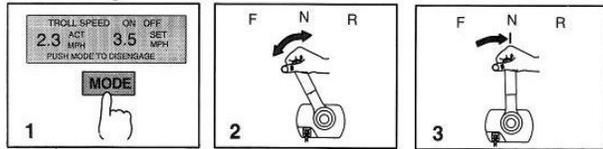
1. Shift engine into gear. Set engine speed at idle.
2. Press **TROLL** or **TROLL** key to bring up the troll display screen.
3. Press **MODE** key to engage.
4. Press **TROLL** or **TROLL** key to select desired troll speed.



TURNING OFF TROLL CONTROL

Use one of the three ways shown:

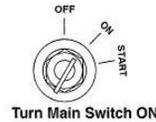
1. Press the **MODE** key when in the troll display screen.
2. Move the throttle to a different speed.
3. Shift engine into neutral.



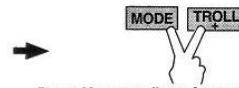
Adjusting light Brightness and Contrast

Press **MODE** **TROLL** momentarily to access Quick Cal screen.

Access to Gauge Calibration



Turn Main Switch ON



Press Momentarily to Access Quick Cal
Hold Approximately 6 Seconds to Access Cal 1
Hold Approximately 8 Seconds to Access Cal 2

MILBOATSTECHMAN/BK-03
PB 280 CLASS

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