

CUTTERBOAT – LARGE (CB-L) OPERATOR’S HANDBOOK

U.S. Department of
Homeland Security

United States
Coast Guard



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Cutterboat – Large (CB-L) Operator’s Handbook

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Subj: CUTTERBOAT-LARGE (CB-L) OPERATOR'S HANDBOOK

- Ref: (a) Naval Engineering Manual, COMDTINST M9000.6 (series)
 (b) Boat Management Manual, COMDTINST M16114.4 (series)
 (c) U.S. Coast Guard Boat Operations and Training (BOAT) Manual Volume II, COMDTINST M16114.33 (series)
 (d) U.S. Coast Guard Boat Operations and Training (BOAT) Manual Volume I, COMDTINST M16114.32 (series)
 (e) U.S. Coast Guard Regulations, COMDTINST M5000.3 (series)
 (f) Rescue and Survival Systems Manual, COMDTINST M10470.10 (series)
 (g) Casualty Reporting (CASREP) Procedures (MATERIEL), COMDTINST M3501.3 (series)
 (h) U.S. Coast Guard Maritime Law Enforcement Manual (MLEM), COMDTINST M16247.1 (series)
 (i) Coatings and Color Manual, COMDTINST M10360.3 (series)

- PURPOSE. This manual provides technical orientation, performance characteristics, and basic operating procedures for the Cutterboat-Large (CB-L). It also standardizes boat outfit, storage and equipment layout.
- ACTION. All Coast Guard unit commanders, commanding officers, officers-in-charge, deputy/assistant commandants, and chiefs of headquarters staff elements shall comply with the provisions of the Manual. Internet release is authorized.
- DIRECTIVES AFFECTED. None.
- DISCUSSION. This manual contains information necessary to safely and efficiently operate the CB-L. The operational capabilities, limitations, and emergency procedures are clearly stipulated. The fittings, outfit list, and physical characteristics of the boat are described in detail.

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NON-STANDARD DISTRIBUTION LIST: *Ba: COMDT (CG-731) (10), Bn: Boat Forces Center (10)

5. PROCEDURE. Operational commanders and unit commanders with a CB-L shall ensure the procedures and limitations detailed within this manual are followed. Forward any comments, corrections, recommendations, and questions regarding this manual to the Cutterboat Facility Manager in accordance with Chapter 1, Section C.1 of this manual. Design and structural change requests shall be submitted as outlined in reference (a).
6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. Environmental aspects and impact considerations were examined in the development of the manual and have been determined to be not applicable.
7. FORMS/ REPORTS. None.

PAUL E. WIEDENHOEFT/s/
Captain, U.S. Coast Guard
Acting Assistant Commandant for
Capability



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Chapter 1

Introduction

Introduction This handbook contains information necessary for the safe and effective operation of the Cutterboat–Large (CB-L). It defines operational capabilities, limitations, and emergency procedures. In addition, it shows or describes the fittings, outfit list, and physical characteristics of the boat.

In this chapter This chapter contains the following sections:

Section	Topic	See Page
A	Warnings, Cautions, and Notes	1-2
B	Facility Manager	1-3
C	Changes	1-4
D	Action	1-5



Section A. Warnings, Cautions, and Notes

Introduction

The following definitions apply to Warnings, Cautions, and Notes found throughout the handbook.

A.1. Warning

WARNING 

To avoid personal injury or loss of life, operating procedures and techniques must be carefully followed.

A.2. Caution

CAUTION !

Operating procedures or techniques must be carefully followed to avoid equipment damage.

A.3. Note

NOTE 

An operating procedure or technique is essential to emphasize.



Section B. Facility Manager

Introduction

Commandant (CG-731) is the Facility Manager for the CB-L. The CB-L is a standard boat as defined in the *Boat Management Manual*, COMDTINST M16114.4 (series) and the *Naval Engineering Manual*, COMDTINST M9000.6 (series). The Boat Forces Center, through the Standardization Team (STAN Team), provides expertise in all aspects of the boat's operation and maintenance. The STAN Team reviews the boat, its equipment, crew procedures, operational reports, casualty reports (CASREPS), Abstract of Operations (AOPS)/Training Management Tool (TMT), Rigging and Battery Logs, Boat Records and Hull History, etc., and technical manuals continuously to update this information.



Section C. Changes

Introduction

Commandant (CG-731) promulgates this handbook and its changes. Submit recommendations for changes to Commandant (CG-731). For more information, contact Commandant (CG-731), Cutterboat Facility Manager at (202) 372-2464.

The address for CG-731 is:

COMMANDANT (CG-731)
ATTN CUTTERBOAT FACILITY MANAGER
US COAST GUARD
2100 2nd ST SW STOP 7356
WASHINGTON DC 20593-7356

Attn: Cutterboat Facility Manager

C.1. Time Compliance Technical Orders (TCTO)

All Time Compliance Technical Orders (TCTO) issued since the CB-L has been in service are provided in *Appendix B*. TCTO issued after the date of this revision supersede information in this handbook where applicable.



Section D. Action

Introduction Operating and supervisory commands and boat crews will comply with the procedures and limitations specified in this publication and any duly issued changes.

D.1. Configuration control Configuration control for the CB-L is critical for standardization of equipment and safety of operations.

NOTE  To maintain fleet wide standardization, unit commanders shall not change or vary the type or location of equipment carried except where noted. Design or structural alterations are prohibited unless specifically authorized by Small Boat Product Line (SBPL).

NOTE  Prototype testing of the CB-L configuration changes may only be carried out with the specific authorization of Small Boat Product Line (SBPL).



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Chapter 2

Boat Characteristics

Introduction

This chapter describes standard CB-L features. The general location of the major hull and system components is presented in this chapter. Detailed information about hull and system components is provided in *Chapter 3, Boat Systems*.

NOTE

All illustrations in this Boat Operator’s Handbook are for familiarization only. The location of hull fittings and system components in these illustrations may not accurately reflect proper placement and installation on all hulls. Any discrepancies between the Boat Operator’s Handbook and the CB-L shall be clarified by contacting the Cutterboat Asset Line Manager at the Small Boat Product Line (SBPL).

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	General Description	2-2
B	Basic Hull and Deck Construction (Interior and Exterior)	2-6
C	Location of Interior and Exterior Hull Fittings (Structural)	2-7
D	Location of Major Hull Systems and Components	2-23



Section A. General Description

A.1. Design	The CB-L is an aluminum boat.
A.1.a. Construction	Hull, deck and transverse bulkheads of the CB-L are fabricated using 5086 marine grade aluminum.
A.1.b. Walking surfaces	All deck walking surfaces on the CB-L are covered with non-skid.
A.1.c. Air/foam hybrid collar	An air/foam hybrid collar is mechanically attached to the hull structure. The collar is constructed from fabric which consists of an external layer of woven nylon coated with polyurethane.
A.2. Manufacturer	The CB-L (Figure 2-1) was designed by: <div style="text-align: center;">Aluminum Chambered Boats, Inc. 809 Harris Avenue Bellingham, WA 98225</div>



Figure 2-1
Cutterboat – Large (CB-L)

NOTE 

The CB-L may have optional packages installed and your unit's CB-L may not exactly match the photographs in this handbook. Optional items vary by unit and may include a taft rail or jump seats aft of the navigation and communications console seats. Please contact the Small Boat Product Line (SBPL) for questions or clarifications.

A.3. Missions

The CB-L is embarked on the 210 FT RELIANCE Class Medium Endurance Cutter (WMEC), the 225 FT and JUNIPER Class Seagoing Buoy Tender (WLB), and the 378 HAMILTON Class High Endurance Cutter (WHEC). The boat is designed for use in several mission activities to include search and rescue (SAR); law enforcement (LE); marine environmental response (MER); and ports, waterways and coastal security (PWCS) missions.



A.4. Boat specifications

The following provides a list of all CB-L specifications.

A.4.a. Physical characteristics	Length Overall (LOA) with outdrive trimmed up	23 FT 11 inches (7.29 meters)
	Length of Rigid Hull (transom to top of bow)	22 FT 8 inches (6.91 meters)
	Beam (hull)	7 FT 6 inches (2.29 meters)
	Beam (overall, with sponson)	8 FT 10 inches (2.69 meters)
	Air/Foam Hybrid Collar Diameter	13 inches (0.33 meters)
	Draft (outdrive tilted up)	13.75 inches (0.35 meters)
	Freeboard Amidship (maximum weight, no crew)	19.5 inches (0.5 meters)

WARNING 

Hoisting Weight of 3,820 lbs includes the weight of two installed jump seats. Each installed seat weighs 80 lbs.

	Hoisting Weight (maximum allowable) (fully outfitted, no crew)	3,820 lbs (1,733 kg)
	Propulsion Machinery	Single Cummins Mercruiser diesel engine, 230 HP with Mercruiser Bravo 1X Outdrive
	Fuel Tank Capacity	25 gallons (94.6 liters)
	Speed	30+ KTS
	Fixed Height Above the Waterline (to the top of all-around light)	9 FT 4 inches (2.84 meters)

A.4.b.	Crew Capacity (seated with installed)	5
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 Operational characteristics and parameters

jump seats)	
Crew Capacity (seated without installed jump seats)	3
Maximum Personnel (including crew)	12
Maximum Seas	6 FT (1.8 meters)
Maximum Winds	30 KTS
Range (NM) (20 KTS in calm water)	100 NM (185.2 kilometers)
Maximum Operating Distance from the Cutter	12 NM (22.2 kilometers)
Top RPM and Speed	30+ KTS at 3,875 RPM
Cruise Speed	20 KTS at 2,700 RPM
Towing Capacity (urgent search and rescue (SAR) only)	Like size vessels
Ice Breaking Capability	None



Section B. Basic Hull and Deck Construction (Interior and Exterior)

Introduction

The hull and deck of the CB-L is constructed from marine aluminum alloy 5086.

B.1. Hull construction

The CB-L hull is plated with $\frac{5}{32}$ inch thick aluminum.

B.1.a. Hull

The CB-L aluminum hull has two planing strakes, port and starboard, and an aluminum transom.

B.1.b. Transverse bulkheads

Transverse bulkheads in the CB-L are aluminum.

B.1.c. Air/foam hybrid collar

The air/foam hybrid collar cradle on the CB-L is welded to the aluminum hull.

B.2. Deck construction

The CB-L deck is $\frac{1}{8}$ inch thick aluminum.



Section C. Location of Interior and Exterior Hull Fittings (Structural)

Introduction

This section describes the location of all interior and exterior hull fittings of the CB-L.

WARNING

Only the lift points described in C.1 shall be used when lifting or hoisting the boat. Tie-down fixtures described in C.2 shall not be used for lifting.

C.1. Single-Point Davit (SPD) sling attachment points

The boat is equipped with four sling attachment points. Two are located on the inside of the hull, port and starboard on the foredeck (**Figure 2-2**). Two are located on the top of the transom; port and starboard (**Figure 2-3**).



Figure 2-2
Forward Single-Point Davit Sling Attachment Point, Port Side

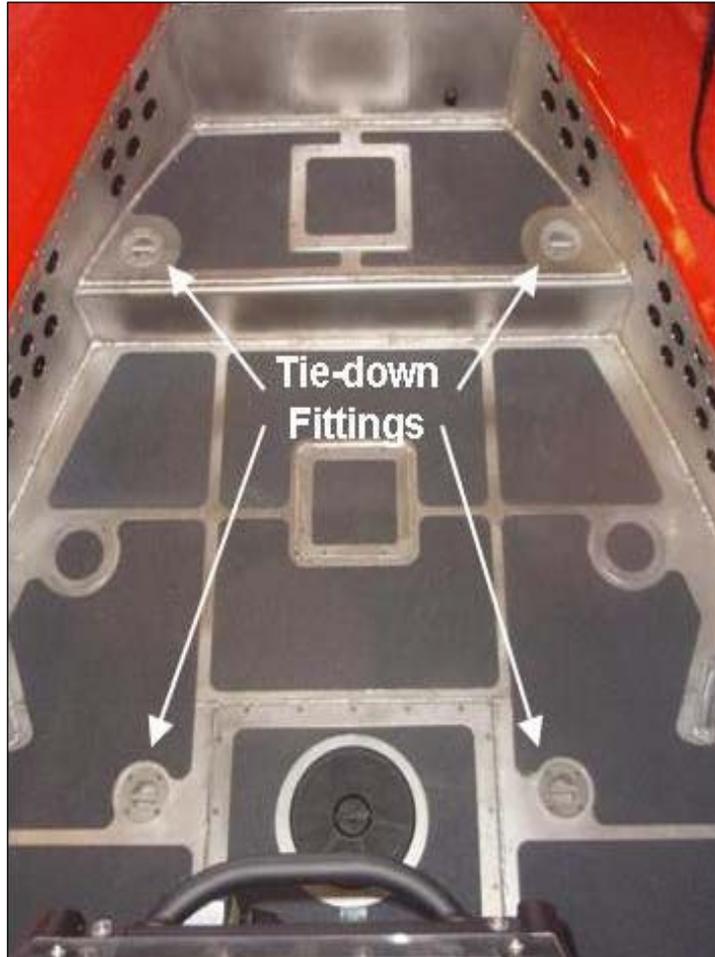


Figure 2-3
Aft Single-Point Davit Sling Attachment Point



C.2. Equipment tie-downs

Four flush deck equipment tie-downs (**Figure 2-4**) are located on the foredeck. These are only used to secure equipment and not to be used as lift points.



**Figure 2-4
Equipment Tie-Downs**



C.3. Mooring cleats

The CB-L is equipped with two mooring cleats (**Figure 2-5**) mounted on top of the engine compartment cover, port and starboard.

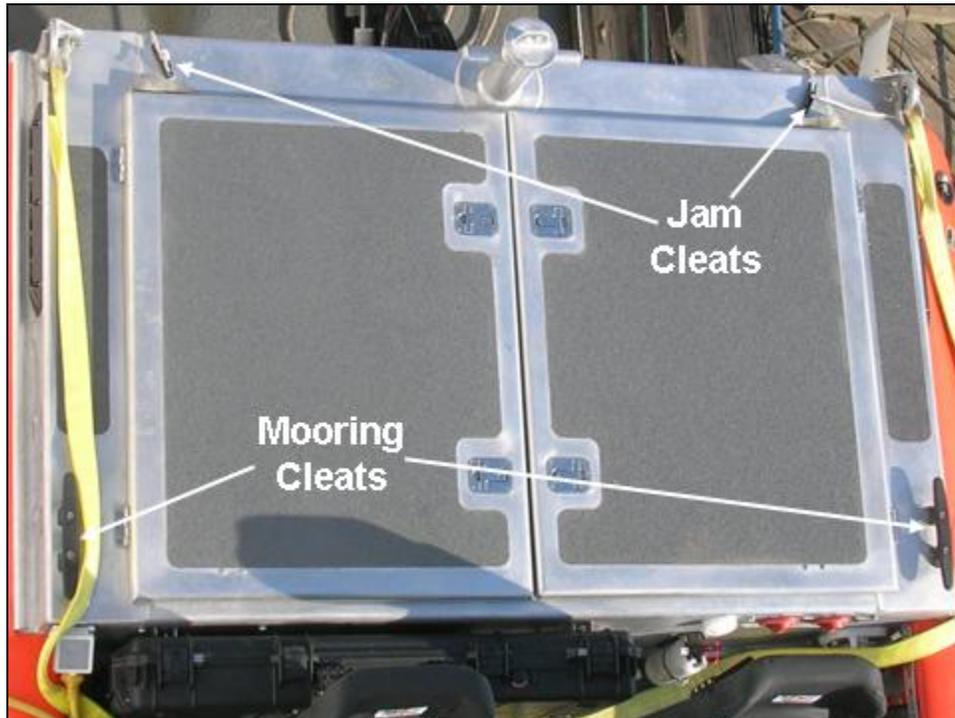


Figure 2-5
Mooring and Jam Cleats



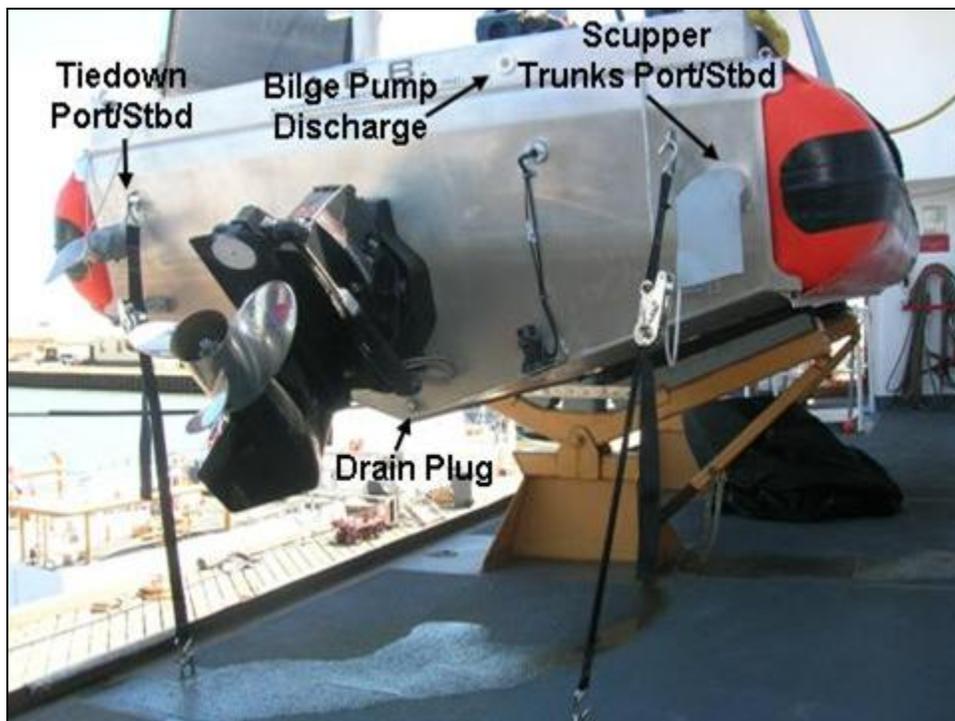
C.4. Transom fittings

Two jam cleats (**Figure 2-5**) are located on the top of the transom, port and starboard.

Two transom tie-downs (**Figure 2-6**) are located on the aft face of the transom.

C.4.a. Deck drains

Two self-bailing deck drains are fitted with one-way scupper trunks (**Figure 2-6**) mounted on the transom. The scupper trunks are equipped with lines led to the jam cleats, so the trunks can be raised above the waterline and secured.



**Figure 2-6
Transom Fittings**

C.4.b. Hull drain plug

A threaded hull drain plug (**Figure 2-6**) is installed at the bottom of the transom/hull interface.

C.4.c. Bilge pump discharge

The electric bilge pump discharge (**Figure 2-6**) is located on the aft face of the transom, starboard side of centerline.



C.5. Antenna arch

The CB-L incorporates an antenna arch (**Figure 2-7**) that is attached to mounting brackets with four bolts (**Figure 2-8**).



Figure 2-7
Antenna Arch

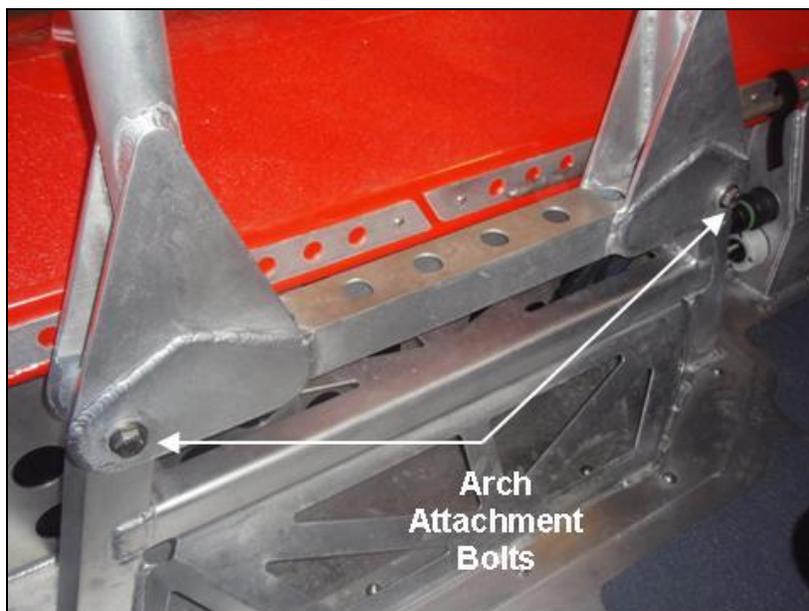


Figure 2-8
Antenna Arch Deck Fitting, Port Side



C.5.a. Lightning rod

The antenna arch has a socket for a lightning rod. The socket is located aft of the all-around white light on top of the arch (**Figure 2-9**). The lightning rod is stowed in Velcro straps on the aft starboard side of the boat (**Figure 2-10**).

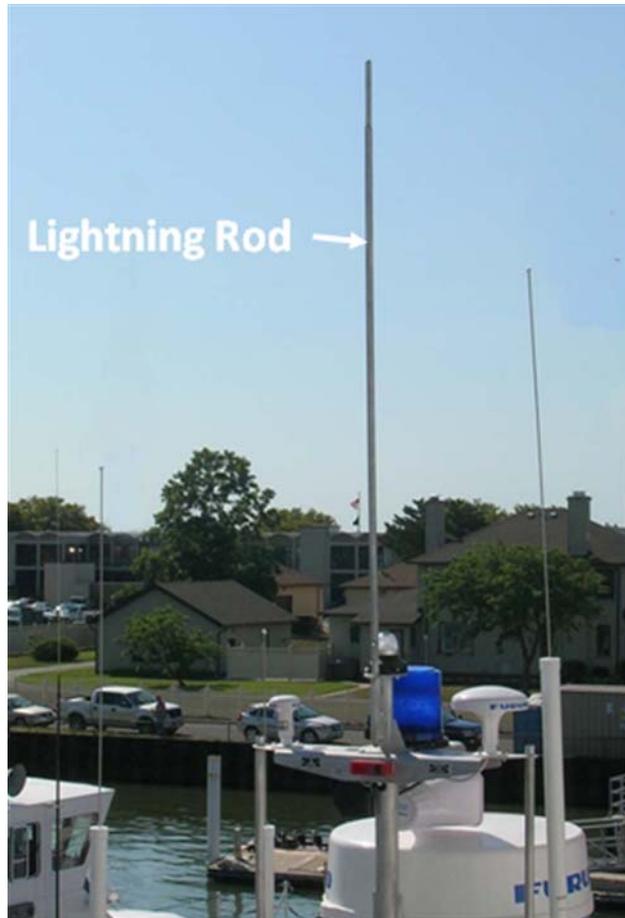


Figure 2-9
Lightning Rod Mounted on Antenna Arch



Figure 2-10
Lightning Rod Stowage, Starboard Side



C.6. Crew seats

Three shock absorbing seats are provided for the crew (**Figure 2-11**) with two optional crewmember jump seats with the LE Package:

- a) Coxswain seat (1)
- b) Crewmember seats (2)
- c) Other crewmember jump seats (2)

To ensure safety of the crewmembers, grabrails and seatbelts (**Figure 2-12**) are provided.

NOTE 

Jump seats do not have seatbelts, only handholds are provided.



**Figure 2-11
CB-L Seating**



Figure 2-12
CB-L Seatbelt

C.6.a. Coxswain seat The forward seat is for the Coxswain and is mounted on centerline.

C.6.b. Crewmember seats Two seats with waterproof communications and navigation consoles are mounted amidship in the boat, port and starboard of centerline.

WARNING 

The jump seats weigh a combined weight of 80 lbs and must be taken into account as added weight for hoisting and towing purposes.



C.6.c. Other crewmember seats

Other crewmember seats are jump seats attached to the navigation and communications console seats. The jump seats lock in the raised or lowered position. The lock is released by raising a D-ring handle (**Figure 2-13**). These seats have their own connection to the Boat Crew Communications System (BCCS) located on the inboard sides of the navigation and communications consoles.



Figure 2-13
Crew Jump Seat

C.6.d. Grabrails

Grabrails are mounted forward of the crewmember seats for crew safety.

C.6.e. Footrests

Footrests are mounted on the Coxswain, communications and navigation consoles to assist crewmembers in maintaining position.



WARNING 

When operating the boat, no one shall be seated on the hybrid collar system unless authorized by the Coxswain.

C.7. Access covers and hatches

The CB-L has watertight deck fittings providing access to cables, hose connections and equipment located in the bilge.

C.7.a. Forward access covers

Two flush mounted, access covers are located just forward of the control console. They provide access to the fuel fill pipe and the fuel shut-off valve (**Figure 2-14**).

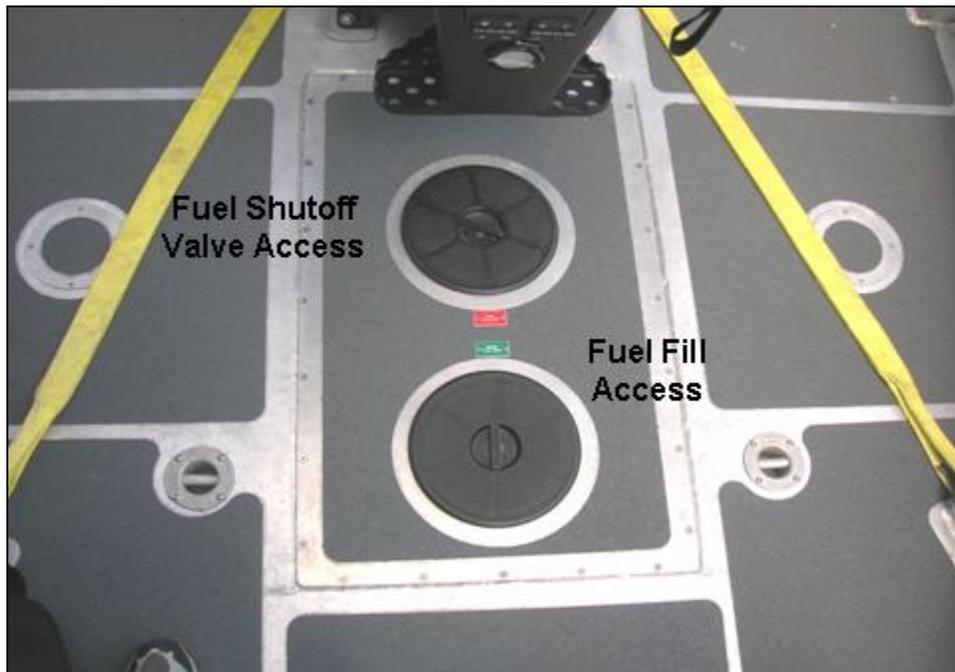


Figure 2-14
Forward Access Covers



C.7.b. Aft deck hatches

Two flush-mounted deck hatches (**Figure 2-15**) are located just forward of the transom. They provide access to the engine compartment.



Figure 2-15
Engine Compartment Hatches



**C.8. Towing
bitts**

Towing bitts are located forward (**Figure 2-16**) and aft (**Figure 2-17**). The forward towing bitt serves as a gun mount.



Figure 2-16
Towing Bitt – Fwd



Figure 2-17
Towing Bitt - Aft



C.9. Gun case

A waterproof gun case (**Figure 2-18**) holds a rifle or a shotgun, and is located aft, just forward of the engine compartment.



Figure 2-18
Gun Case



C.10. Taft Rail

An aluminum taft rail (**Figure 2-19**) is bolted to the transom. It is designed to prevent boat from being pulled under the 225 FT WLB during launch and recovery operations.



Figure 2-19
Taft Rail

NOTE 

The taft rail may be considered “optional” equipment when the CB-L is employed on WMEC and WHEC class cutters. The installation of the taft rail is mandatory for all operations when used by WLB cutters. All units are required to maintain the taft rail as permanent boat outfit and shall transfer the taft rail with the boat.



Section D. Location of Major Hull Systems and Components

Introduction

This section describes the location of the major hull systems and components installed on the CB-L.

D.1. Batteries

Two 12 VDC marine grade batteries are installed inside the engine compartment (**Figure 2-20**). One is located on the port side of the engine and the other is located on the starboard side of the engine.

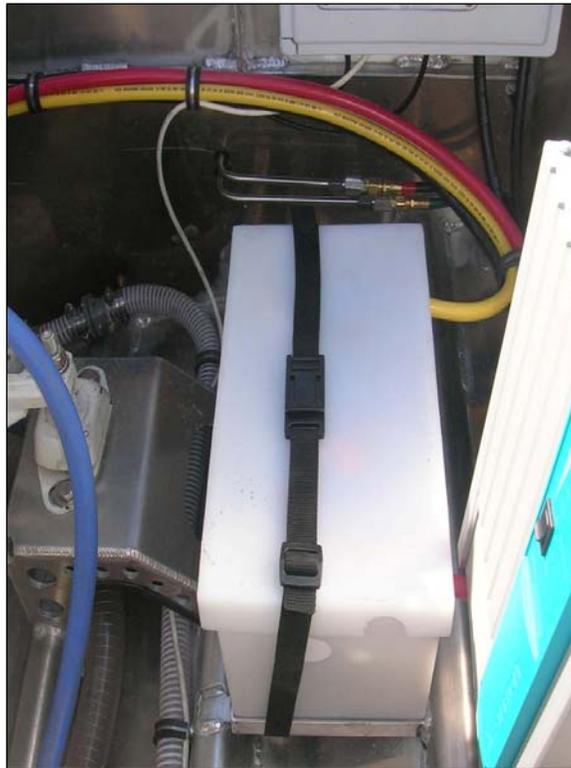


Figure 2-20
Battery Holder (inside engine compartment)

D.2. Engine and outdrive

A single Cummins Mercruiser 230 HP diesel engine (**Figure 2-21**) coupled with a Mercruiser Bravo 1X outdrive (**Figure 2-22**) is installed. The engine is mounted inside the hull and the outdrive is bolted to the transom.



Figure 2-21
Diesel Engine



Figure 2-22
Outdrive



D.3. Fuel system A single 25 gallon fuel tank is installed inside the hull beneath the foredeck. The fuel fill port is located on the forward deck (**Figure 2-23**).



Figure 2-23 Fuel Fill Port



D.4. Coxswain console

The Coxswain console (**Figure 2-24**) is located forward on the centerline of the hull. The Coxswain console contains the Furuno RD-30 Multi-display (see **Figure 3-47**), the SmartCraft (see **Figure 3-49**) engine monitoring display and the engine and lighting controls. The console provides for engine and steering operations, boat systems control and monitoring, and navigation equipment (depth finder) control.

The Coxswain console seat flips up and has stowage space for boat outfit items.



Figure 2-24
Coxswain Console



D.5. Navigation and communications

The navigation and communications components are located:

- a) On the Coxswain's console,
 - b) On the communications console (port side), and
 - c) On the navigation console (starboard side).
-

D.5.a. Boat Crew Communications System (BCCS)

The Boat Crew Communications System (BCCS) has two Radio Operators Control Boxes that interface with the VHF-FM and UHF-FM radio systems (**Figure 2-25**). They are located on the port side of the Coxswain console and the inboard side of the communications console. A Push to Talk (PTT) switch is mounted on the throttle for the Coxswain.



Figure 2-25
Radio Operator Control Box



Four BCCS Crew Control Boxes (**Figure 2-26**), are located:

1. One on the forward side of the Coxswain console, providing an access point for the gunner position headset.
2. One on the inboard side of the communications console providing an access point for a crewmember in the port jump seat.
3. Two on the inboard side of the navigation console for the crewmember at the console and a crewmember in the starboard jump seat.

These Control Boxes allow the crew members to conference with each other.



Figure 2-26
Crew Control Box



D.5.b.
Communications
Console

The communications console (**Figure 2-27**) contains the tactical UHF-FM and VHF-FM transceiver control heads, and the VHF-FM radio/loudhailer enclosed in the flip-top housing. The console contains a drain that drains water that enters the housing to the deck.

The communications console seat flips up and holds stowage space for boat outfit items. This console is located on the port-side of the CB-L.



Figure 2-27
Communications Console



D.5.c. Navigation Console

The Navigation Console (**Figure 2-28**) contains the Furuno SINS and GPS/WAAS display panel.

The navigation console seat flips up and holds stowage space for boat outfit items. This console is located on the starboard-side of the CB-L.



Figure 2-28
Navigation Console



D.5.d. Antenna arch

An antenna arch is mounted amidships. The antenna arch provides mounting for the following components (**Figure 2-29**):

1. Primary and secondary VHF-FM antennas
2. UHF-FM antenna
3. GPS antenna
4. AIS antenna
5. 24-inch radome
6. Blue strobe light
7. All-around white navigation light
8. Red/green navigation lights
9. Loudhailer speaker
10. Horn

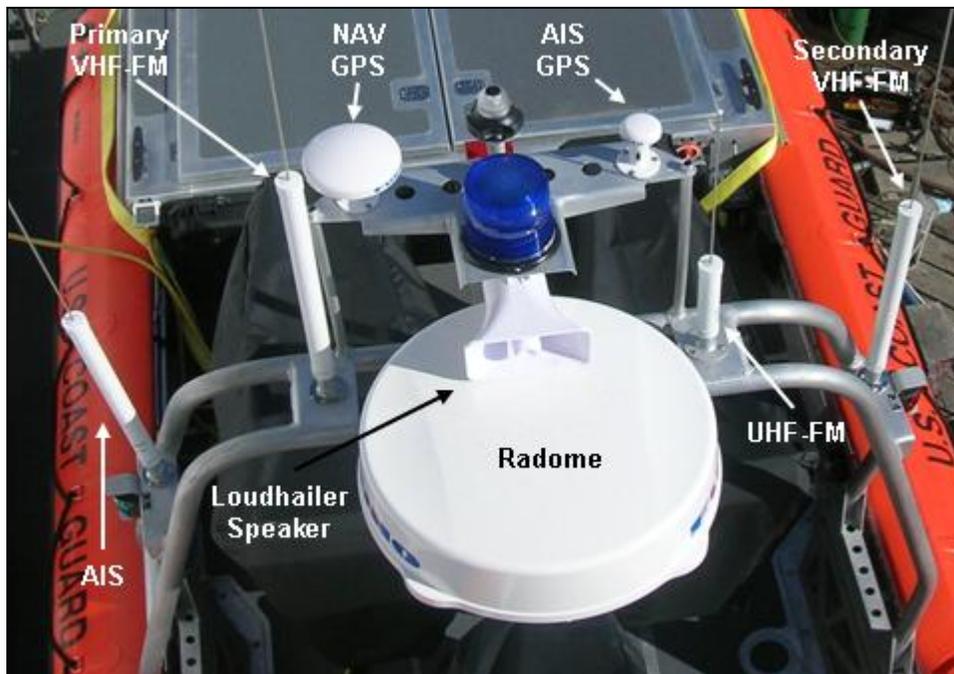


Figure 2-29
Antenna Arch Components



D.6. Steering system

Hydraulic steering (**Figure 2-30**) for the outdrive consists of the following components:

- a) Steering wheel
 - b) Helm pump
 - c) Interconnecting hoses and tubing
 - d) Steering actuator
-

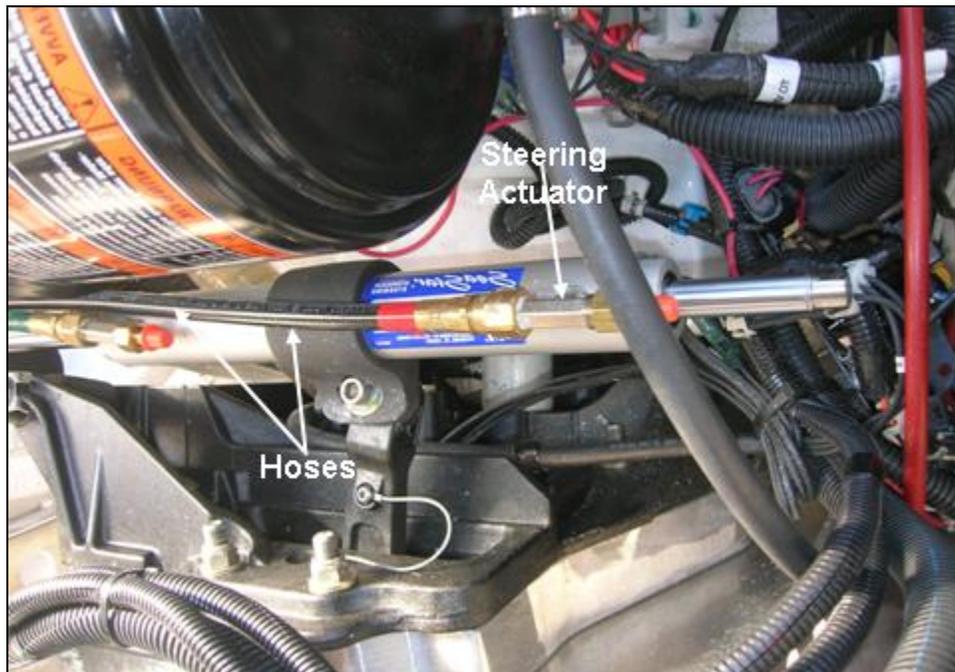
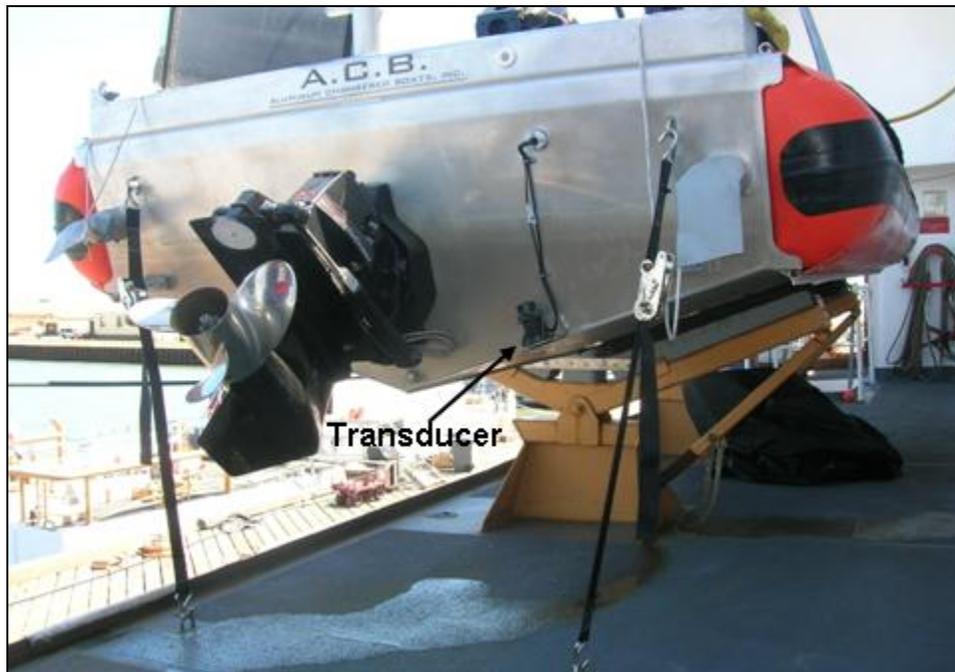


Figure 2-30
Steering System



**D.7. Depth
sounder
transducer**

The depth sounder transducer is mounted at the bottom of the transom, starboard of the centerline (**Figure 2-31**).



**Figure 2-31
Transducer**



D.8. Bilge pump The electric bilge pump (**Figure 2-32**) is located on the bilge centerline just forward of the engine. The bilge pump is controlled by an MAN-OFF-AUTO switch on the Coxswain's console.

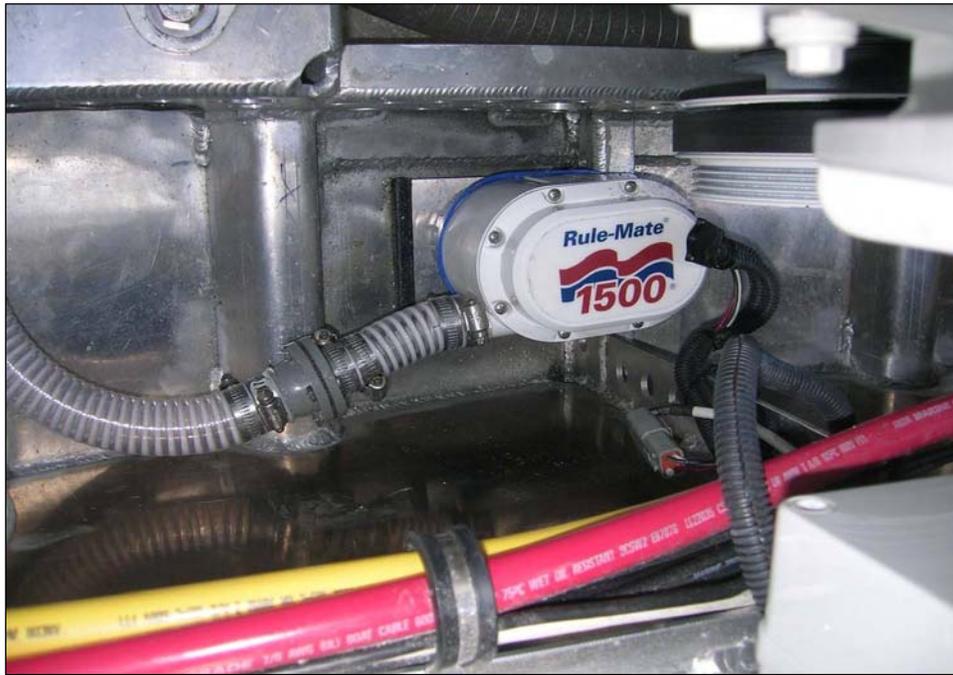


Figure 2-32
1500 GPH Bilge Pump (with Automatic Float Switch)

D.9. Emergency Position Indicating Radio Beacon (EPIRB) An EPIRB (**Figure 2-33**) is stowed on the port side, aft, by the battery switches.

D.10. Portable fire extinguishers One portable, 2½ lb, dry chemical agent, fire extinguisher (**Figure 2-33**) is located on the port side, aft, next to the battery switches. A fire port above the extinguisher allows discharging the fire extinguisher into the engine compartment without opening the engine compartment hatches. A second portable, 2½ lb, dry chemical agent, fire extinguisher (**Figure 2-34**) is located on the aft side of the Coxswain's seat.

D.11. Ring buoy A 20-inch ring buoy (**Figure 2-34**) is located on the aft side of the Coxswain's seat.

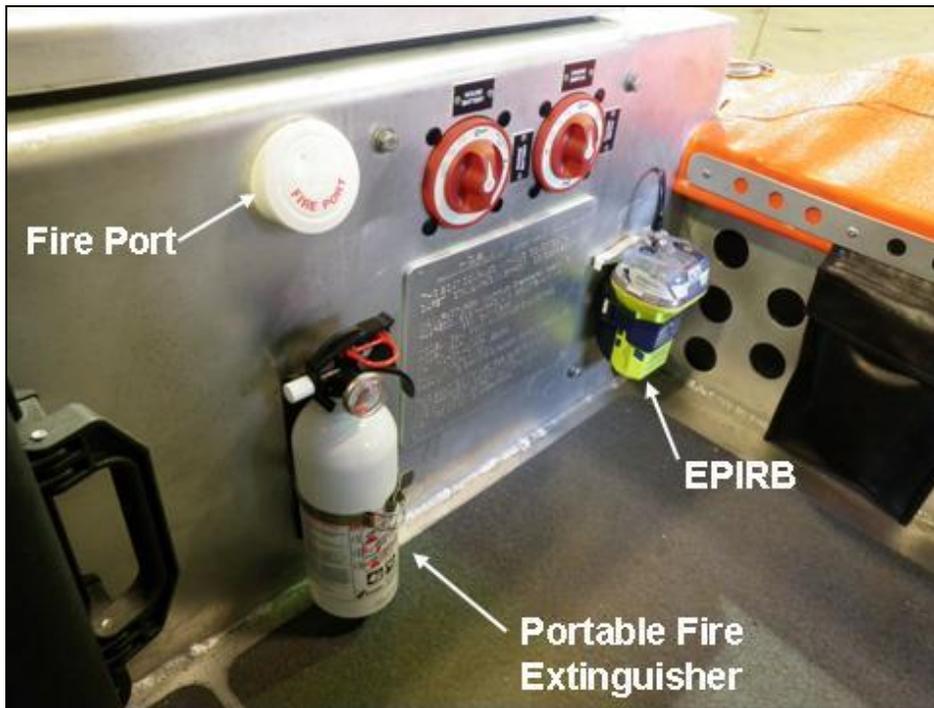


Figure 2-33
Portable Fire Extinguisher, Fire Port and EPIRB





Figure 2-34
Portable Fire Extinguisher and Ring Buoy

D.12. Boat hook A telescoping boathook is mounted in clips on the starboard side of the engine compartment (**Figure 2-35**).



Figure 2-35
Boat Hook



D.13. Paddles

Two paddles are mounted in clips on the port side of the engine compartment (Figure 2-36).



Figure 2-36
Paddles



Chapter 3 Boat Systems

Introduction This chapter discusses the boat’s mechanical, electrical and communications/navigation systems. It describes basic characteristics and provides information to allow the boat’s crew to operate safely and effectively.

In this chapter This chapter contains the following sections:

Section	Topic	See Page
A	Propulsion System	3-2
B	Hull Fuel System	3-21
C	Hull System	3-28
D	Electrical System	3-34
E	Communications/Navigation System	3-47
F	Fire Suppression System	3-56
G	Trailing	3-57



Section A. Propulsion System

Introduction

The CB-L is powered by a single Cummins QSD 2.8 diesel engine and attached Bravo 1X Mercruiser outdrive. This section provides a brief description of the subsystems and equipment comprising the propulsion system.

A.1. Cummins Mercruiser diesel engine

The engine (**Figure 3-1**) is an in-line four-cylinder, water-cooled, four-cycle diesel engine with a rated intermittent output of 230 HP at 3,800 RPM

NOTE

The engine is rated for use in variable load applications where full power is limited to one hour out of every eight hours of operation. This rating is for applications operating less than 500 hours per year.

A.1.a. Speed

The minimum idle speed is 700 RPM.

A.1.b. Characteristics

The engine incorporates a turbocharger with seawater aftercooling, electronically controlled Bosch fuel injection system, and rotates *counter-clockwise* as viewed from the flywheel.

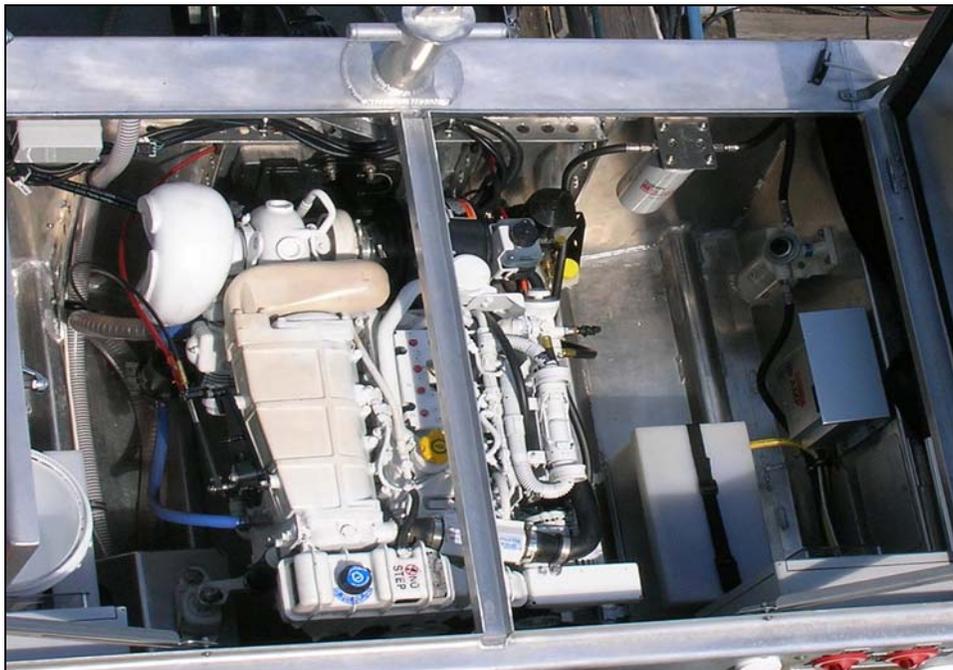




Figure 3-1
Cummins Mercruiser Diesel Engine

A.1.c. Location The engine is mounted to the hull using two forward rubber isolator mounts, (**Figure 3-2**) one on each of the port and starboard sides of the engine. It is supported by two engine mounting points at the engine-to-outdrive interface at the rear of the engine (**Figure 3-3**).

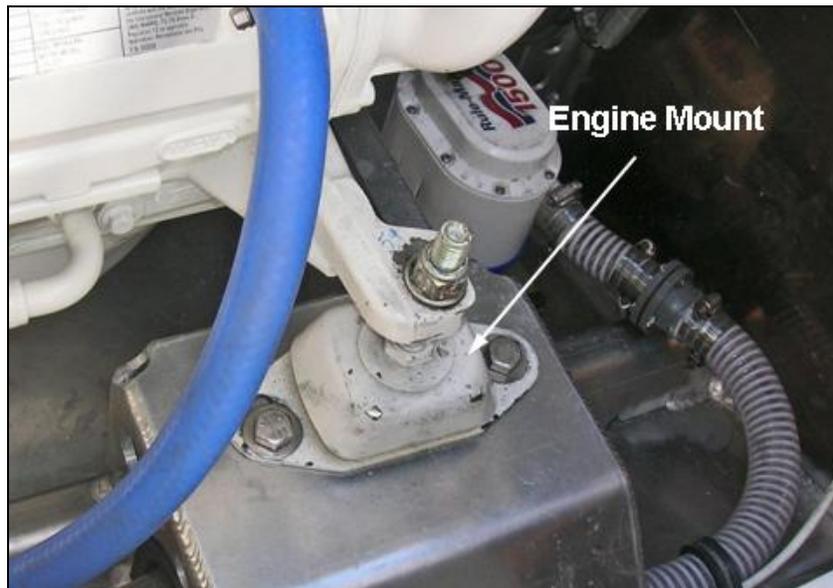


Figure 3-2
Forward, Starboard Engine Mount

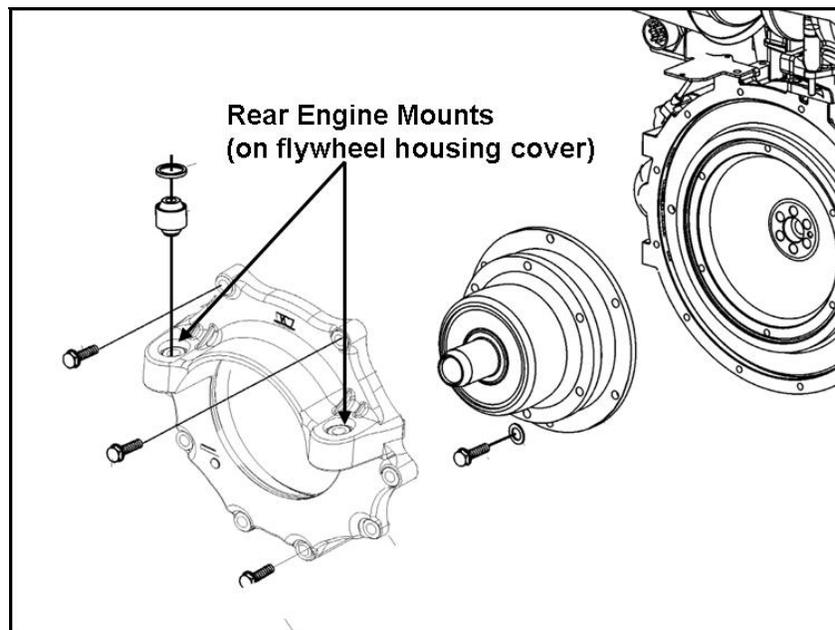


Figure 3-3
Rear Engine Mounts

A.2. Engine fuel system

The engine fuel system incorporates a Bosch rail type fuel injection system (**Figure 3-4**) mounted on the port side of the engine.

A.2.a. Fuel priming pump

A manual fuel priming pump on top of the fuel filter is used to bleed air from the system (**Figure 3-4**).

A.2.b. Fuel filter

The engine mounted fuel filter is a spin on type with an integrated water-in fuel (WIF) sensor (**Figure 3-4**).

A.2.c. Injection nozzles

The fuel from the injection pump is delivered to four injectors, each having an electronically controlled actuator built into the body of the injector. The movement of the actuator controls the amount of fuel entering the cylinder.

A.2.d. Fuel oil cooler

A fuel oil cooler is incorporated into the system and uses seawater as the cooling medium.

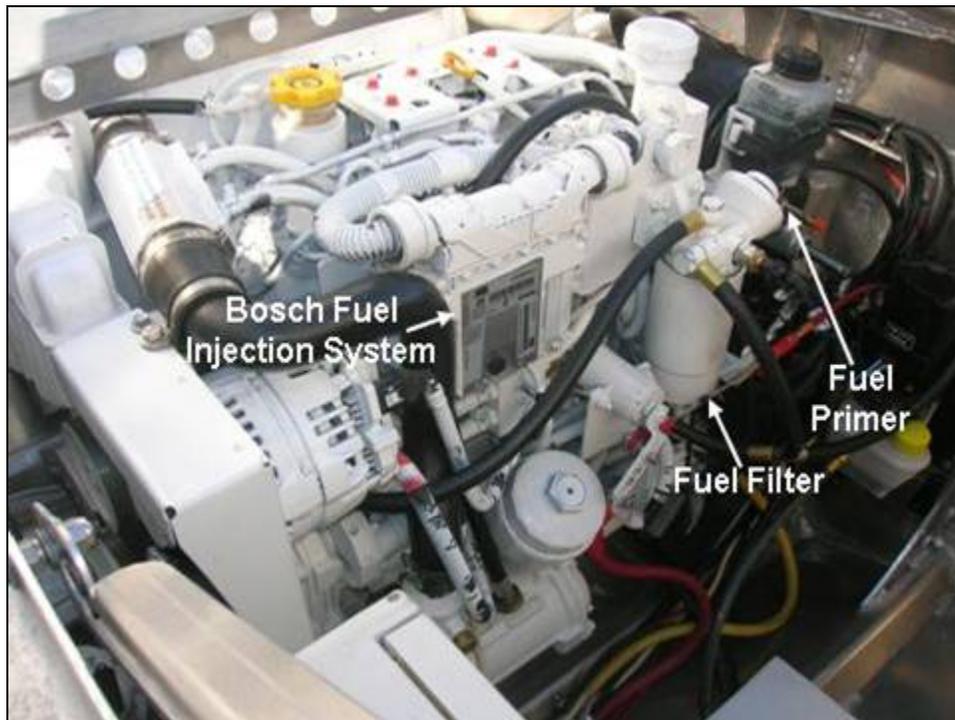


Figure 3-4
Engine Mounted Fuel Filter

A.3. Engine cooling water system

The engine cooling water system (**Figure 3-5**) uses seawater to cool jacket water in order to maintain engine operating temperatures.

A.3.a. Jacket water pump

The jacket water pump is belt driven and is mounted to starboard, on the forward side of the engine.

A.3.b. Seawater cooling pump

The seawater cooling pump is belt driven and is mounted to port, on the forward side of the engine.

A.3.c. Jacket water cooler

The jacket water cooler is a shell and tube type cooler. It is located on the starboard side of the engine and functions as follows:

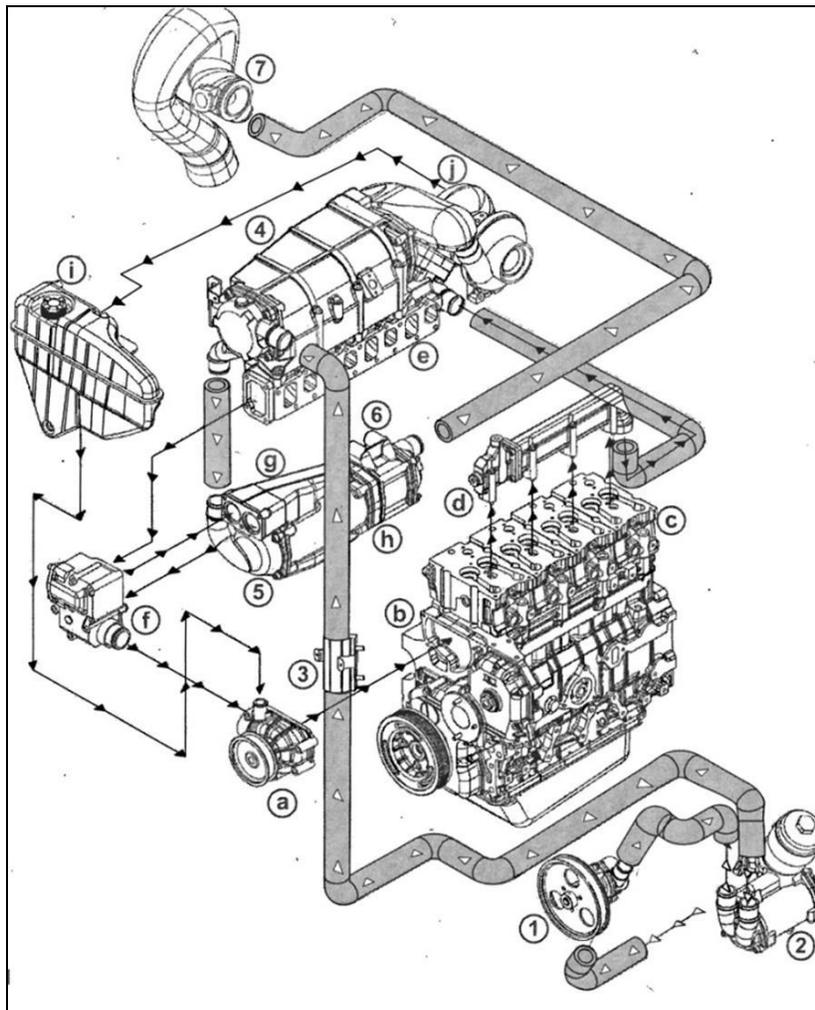
1. Seawater is used as a cooling medium and is circulated through the tubes.
2. Jacket water is circulated around the tubes of the cooler.
3. The jacket water from the cooler is circulated by the jacket water pump throughout the engine to cool the engine cylinders,



turbocharger and engine oil.

A.3.d. Jacket
water tank

An engine mounted jacket water tank with a pressure actuated filler cap is located on the top, front of the engine. The coolant system has a capacity of 2.9 gallons.



**Figure 3-5
Engine Jacket Water System**

Seawater system

1. 2.8 seawater pump (seawater inlet)
2. Engine oil cooler
3. Fuel cooler
4. Aftercooler
5. Heat exchanger (Jacket water cooler)
6. Fluid cooler (NOT ON CB-L)
7. Sterndrive model exhaust riser or inboard model exhaust elbow (seawater overboard) (NOT ON CB-L)

Closed cooling system

- a. Engine water circulating pump
- b. Engine block
- c. Cylinder heads
- d. Coolant manifold
- e. Intake and exhaust manifold
- f. Thermostat housing
- g. Heat exchanger (Jacket water cooler)
- h. Fluid cooler (NOT ON CB-L)
- i. Expansion tank (Jacket water tank)
- j. Turbocharger



**A.4.
Lubrication
system**

The engine oil lubrication system is a wet-sump, pressure type system. It utilizes:

- a) An integral gear oil pump mounted on the front of the engine.
- b) A cartridge type oil filter (**Figure 3-6**) mounted in a housing on the port side of the engine.
- c) An engine oil cooler, utilizing jacket water as a cooling medium, mounted adjacent to the oil filter on the port side of the engine.

A.4.a. Oil fill cap

The oil fill cap (**Figure 3-7**) is forward, on top of the engine valve cover.

A.4.b. Dipstick

A dipstick (**Figure 3-7**) to check the engine oil level is located on the top of the engine, near the oil fill cap. The engine oil capacity is 9.4 quarts.

CAUTION !

The oil drain hose fitting is provided with a cap. The cap should be securely in place before running the engine.

A.4.c. Oil drain

The engine is fitted with an oil drain hose (**Figure 3-6**) connected to the engine oil sump. The hose can be connected to a pump to remove oil from the pan.

A.4.d. Lube oil

Engine lube oil with the American Petroleum Institute (API) Classification of CG-4 or CH-4 and an SAE 15W40 viscosity is specified for this engine.

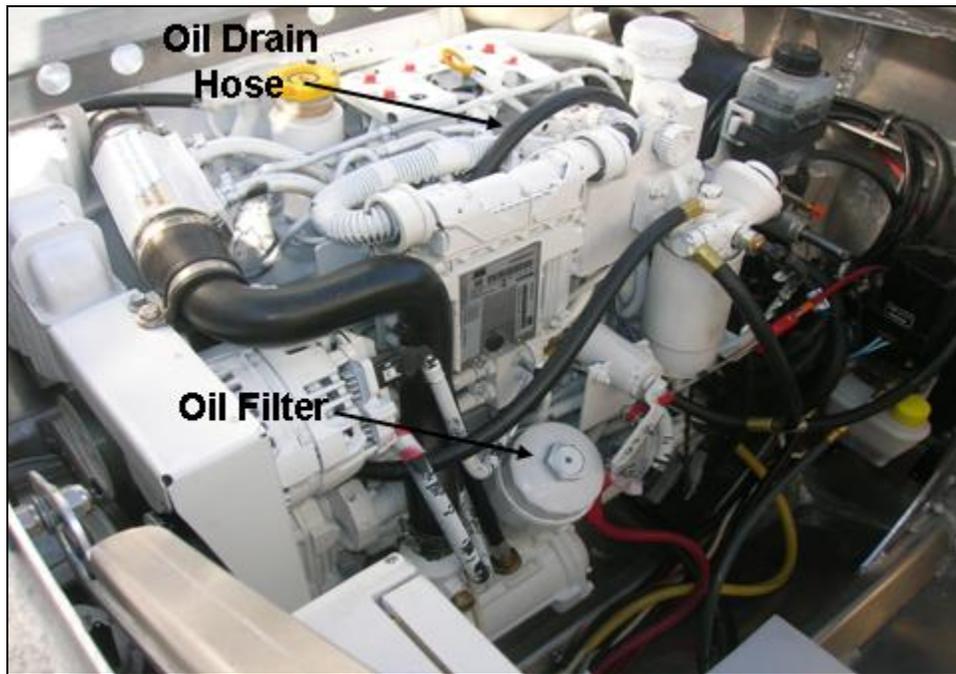


Figure 3-6
Engine Oil Filter and Drain Hose

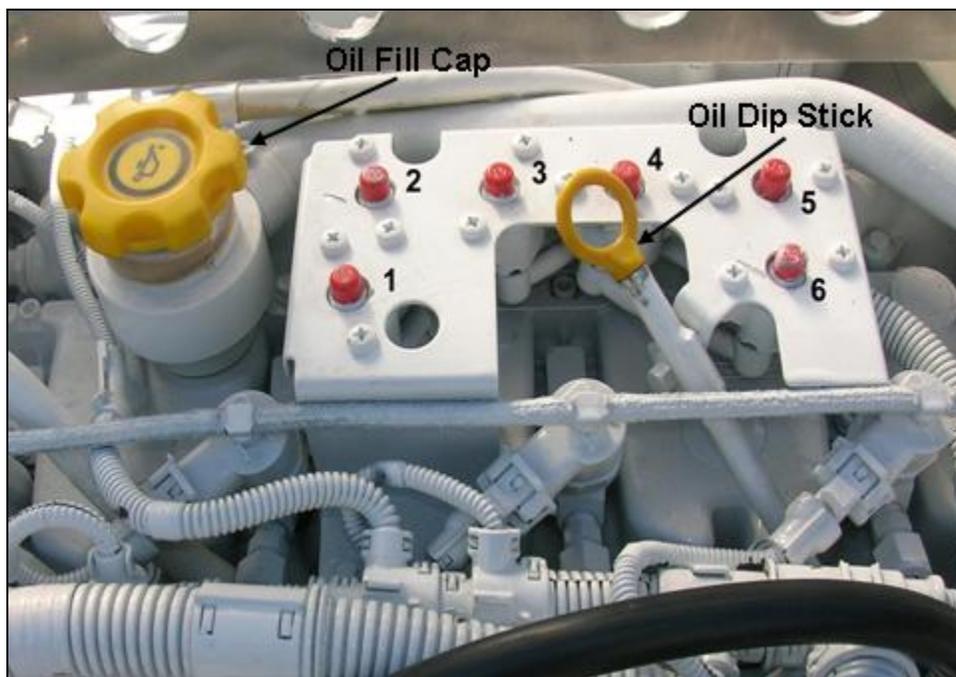


Figure 3-7
Oil Fill Cap, Oil Dipstick and Engine Circuit Breakers



A.5. Engine circuit breakers

The engine is fitted with six circuit breakers (**Figure 3-7**), mounted on top of the engine to protect the engine’s electrical circuits.

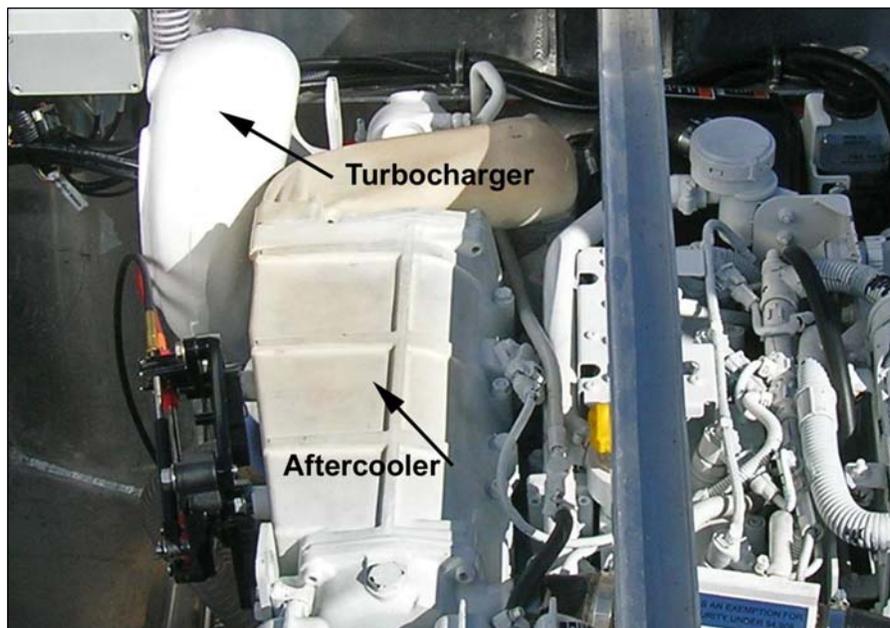
A.5.a. Circuit breaker functions

The circuit breakers on the engines have the following functions:

<u>Breaker No.</u>	<u>Amps</u>	<u>Function</u>
1	20	Key unswitched power to the helm
2	10	Switched power to the Electronic Control Module (ECM)
3	10	Key switch to the ECM
4	15	Switched power to the ECM
5	15	ECM switched power to interface module
6	5	Power- diagnostic connector

A.6. Turbocharger and intercooler

A turbocharger (**Figure 3-8**), mounted on the rear of the engine is driven by exhaust gases. It draws air through a filter, boosts the air pressure and directs it through a seawater cooled aftercooler and then to the cylinder intake valves.



**Figure 3-8
Turbocharger**



A.6.a. Anti-corrosion zincs

Anti-corrosion zincs are provided in the aftercooler, the jacket water cooler and after the oil cooler to inhibit corrosion.

A.7. Engine monitoring display

The SmartCraft engine monitoring display (**Figure 3-9**) is mounted on the Coxswain's console. It monitors the following engine parameters:

- a) Oil pressure
 - b) Oil temperature
 - c) Coolant temperature
 - d) Engine speed (RPM)
 - e) Rail fuel pressure
 - f) Aftercooler pressure and temperature
 - g) Water in Fuel (WIF)
 - h) Throttle position
-



Figure 3-9
Engine Monitoring Display



NOTE *↪*

The current SmartCraft link oil pressure gauge is a 5.5 bar (80 psi) gauge. The engine oil pressures will routinely reach this maximum value or even exceed it. As a result, this gauge will often be “pegged” at normal operating conditions (the gauge will reach the end of the scale and stop increasing). This is not a problem with the engine, although the actual oil pressure may not be known while the gauge is pegged.

A.7.a. Vessel Interface Panel

The Vessel Interface Panel (**Figure 3-10**) is mounted aft on the starboard side of the engine compartment. The panel receives signals from the engine control module on the engine and processes them for display on the SmartCraft engine monitoring display.

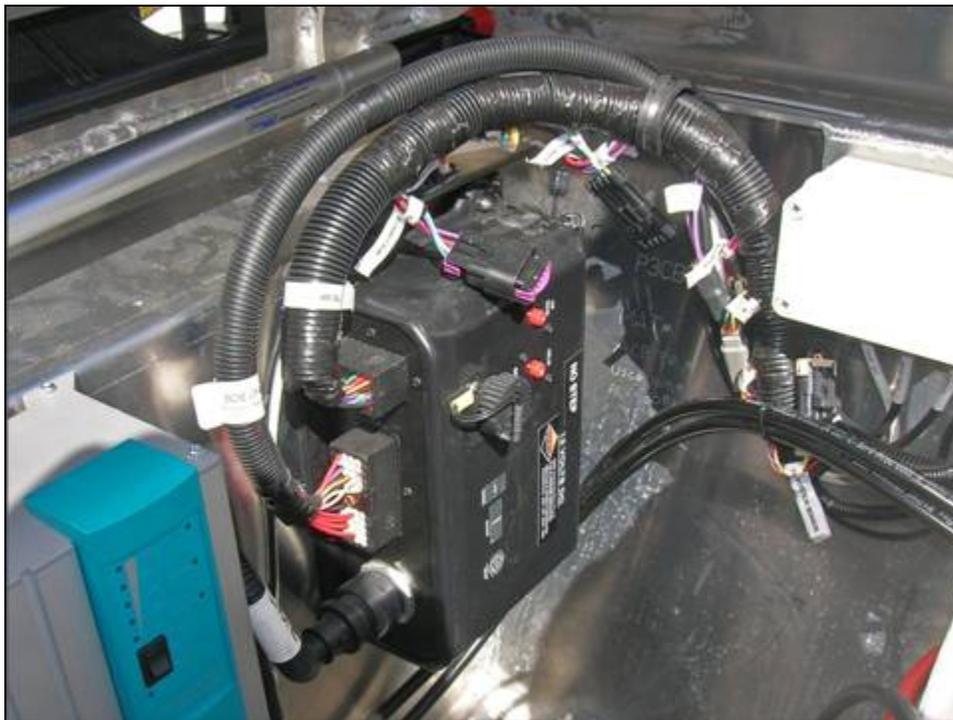


Figure 3-10
Vessel Interface Panel



A.8. Cold weather start system

The engine is provided with a Hotstart system to enhance starting when the temperature is below 32° F (0° C). The Hotstart heater (**Figure 3-11**) is located on the starboard side of the engine. It is connected to the Cutter via the shore power cable.



Figure 3-11
Hotstart Heater

A.9. Engine exhaust system

The engine exhaust is used to drive the turbocharger. The exhaust gases are mixed with seawater from the jacket water cooler, then discharged overboard through the transom.



**A.10.
Mercruiser
Bravo 1X
outdrive**

The outdrive (**Figure 3-12**) is coupled to the engine using a splined drive shaft and universal joint.

**A.10.a.
Hydraulic trim
actuators**

Two hydraulic trim actuators connect the stern drive unit to the transom mounting fixture. Control of the trim actuators is accomplished using a switch on the control handle. This switch is used for trimming the outdrive unit while underway. A trim indicator is located on the Coxswain's console's SmartCraft display.



**Figure 3-12
Mercruiser Bravo 1X Outdrive**



A.10.b. Electro-hydraulic trim pump

The electro-hydraulic trim pump (**Figure 3-13**) is mounted near the centerline of the transom. The pump has an integral reservoir for the trim hydraulic systems.

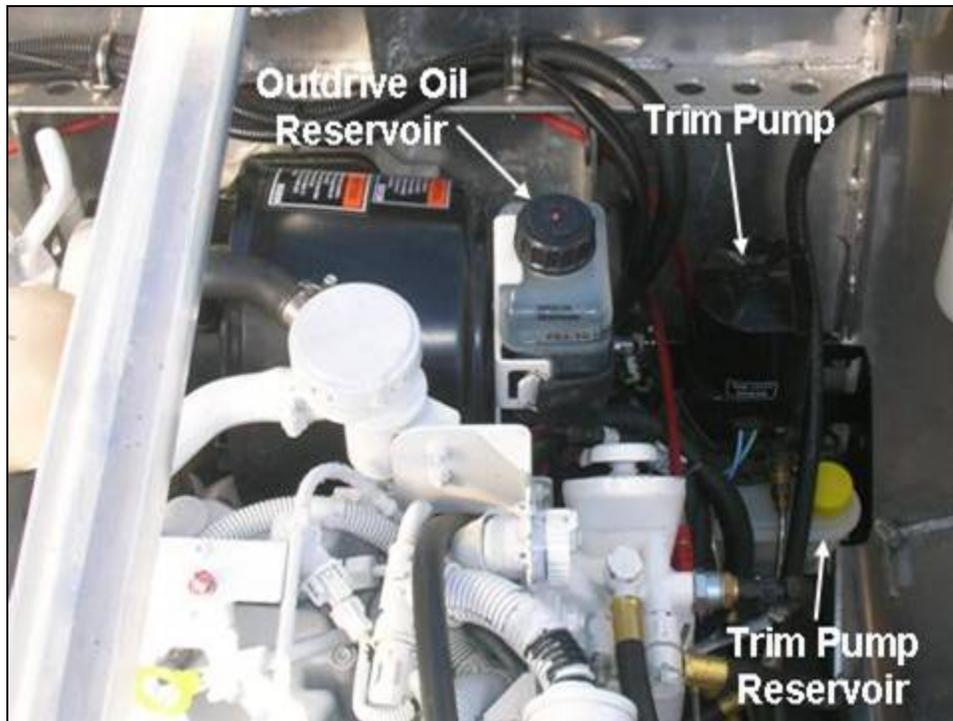


Figure 3-13
Outdrive System Components

A.10.c. Outdrive oil system

The outdrive oil system holds 2.9 quarts of gear lube oil. An outdrive lube oil monitor/reservoir is mounted near the transom, port side, in the engine compartment (**Figure 3-13**). The monitor provides a small amount of additional gear lube for the system to account for small fluid losses or evaporation. A level switch in the reservoir will provide a gear oil low alarm at the SmartCraft display unit on the Coxswain's console. Cooling water intake holes located on the forward, leading edge of the lower outdrive unit provide for conduction cooling of outdrive lubricating oil.

NOTE 

The gear lube level in the gear lube monitor will rise and fall during sterndrive operation; always check the gear lube level when the sterndrive is cool and the engine is shut down.



A.10.d.
Mercathode
controller

The Mercathode controller on the CB-L is located on the inner transom below the power trim reservoir. The controller uses 12 VDC to provide a small amount of current to a cathodic protection electrode mounted on the underside of the gimbal housing. The Mercathode system is designed to retard galvanic corrosion on the outdrive unit. Additional sacrificial anodes (zincs) are mounted on the aft end of the trim cylinder actuators, in front of the propeller on the drive shaft bearing carrier and on top of the horizontal plane of the outdrive unit to deter corrosion.

A.10.e.
Propeller

The CB-L utilizes a Bravo 1X stainless steel, three-bladed propeller, mounted to the splined output shaft of the outdrive and retained by a lockwasher and nut. The propeller on the CB-L has a 15¼ inch diameter and 19 inch pitch.

**A.11. Engine
controls**

The engine ignition switch and the START buttons are located on the starboard side of the Coxswain's console (**Figure 3-14**). An engine kill switch is located below the engine throttle control handle (**Figure 3-15**).

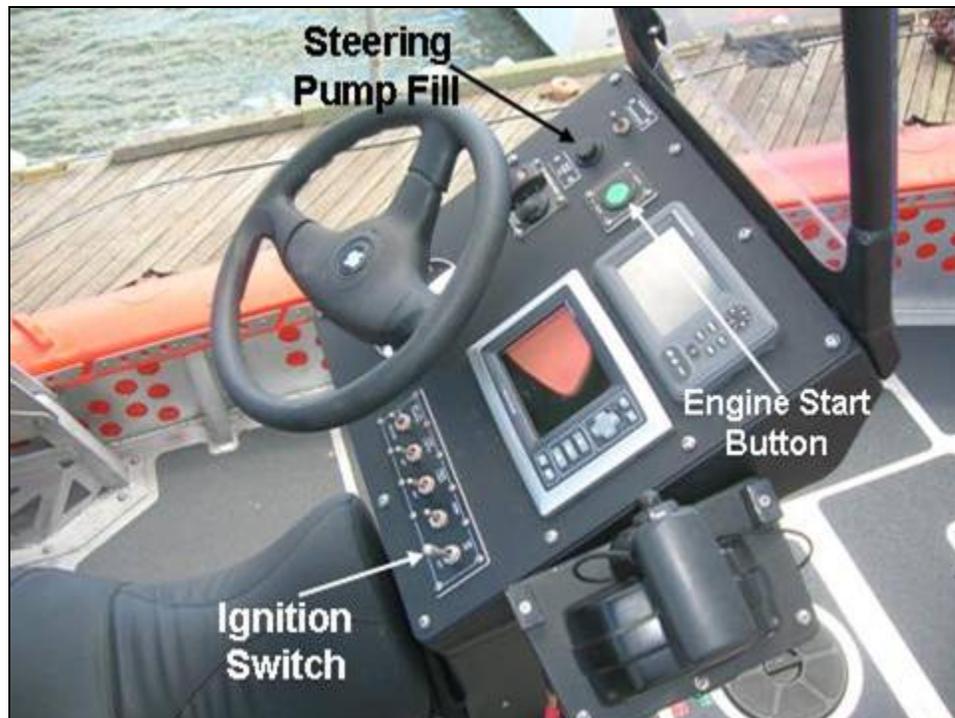


Figure 3-14
Coxswain's Console



A.11.a. Starter Turning the engine ignition toggle switch to ON and pressing the START button actuates a 12 VDC starter mounted on the port side of the engine.

A.11.b. Stopping the engine The engine is stopped by turning the ignition toggle switch (**Figure 3-14**) to the OFF position.

A.11.c. Engine kill switch The engine kill switch (**Figure 3-15**) is located on the aft side of the throttle control handle mount. The clip must be installed over the toggle switch prior to engine start. The lanyard for the kill switch must be attached to the Coxswain's personal flotation device (PFD) or survival vest.

When properly rigged, the kill switch will immediately shut down the engine if the Coxswain is ejected from the boat.

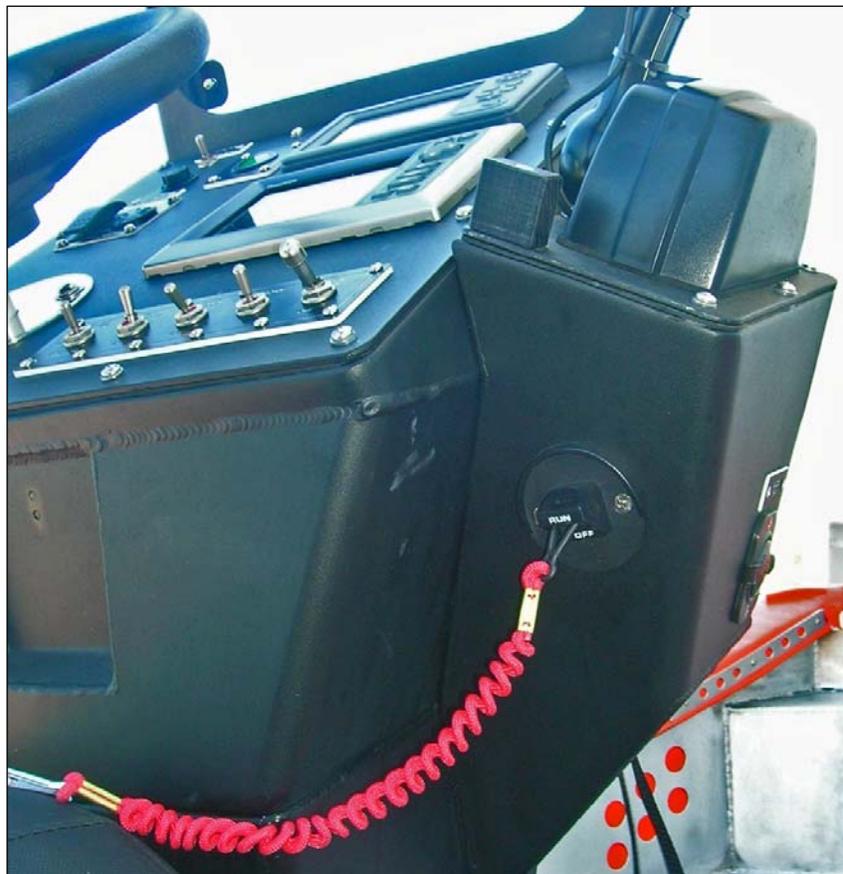


Figure 3-15
Engine Kill Switch



A.12. Engine throttle control handle

The engine throttle control handle on the Coxswain's console (**Figure 3-16**) is connected to the engine by two cables. It selects outdrive *neutral*, *forward* and *reverse*, and controls the engine speed. A switch on the control handle actuates the outdrive hydraulic trim actuators. Flexible cable assemblies and bellcranks (**Figure 3-17**, **Figure 3-18**) mounted on the engine transmit the Coxswain throttle movements to the engine throttle and ahead and astern controls.

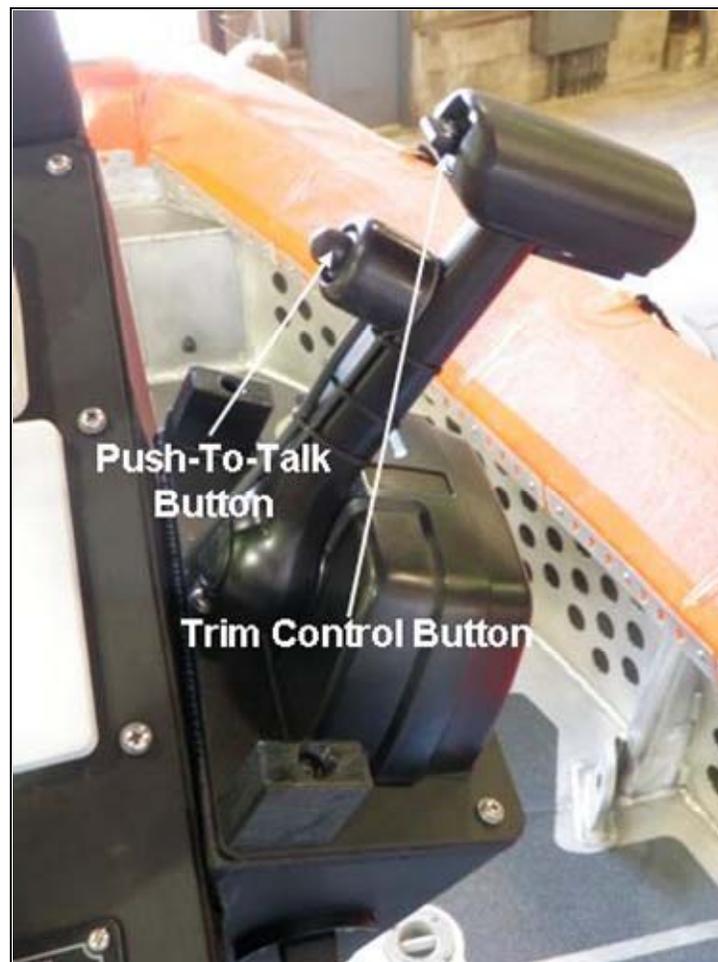


Figure 3-16
Engine Throttle Control Handle

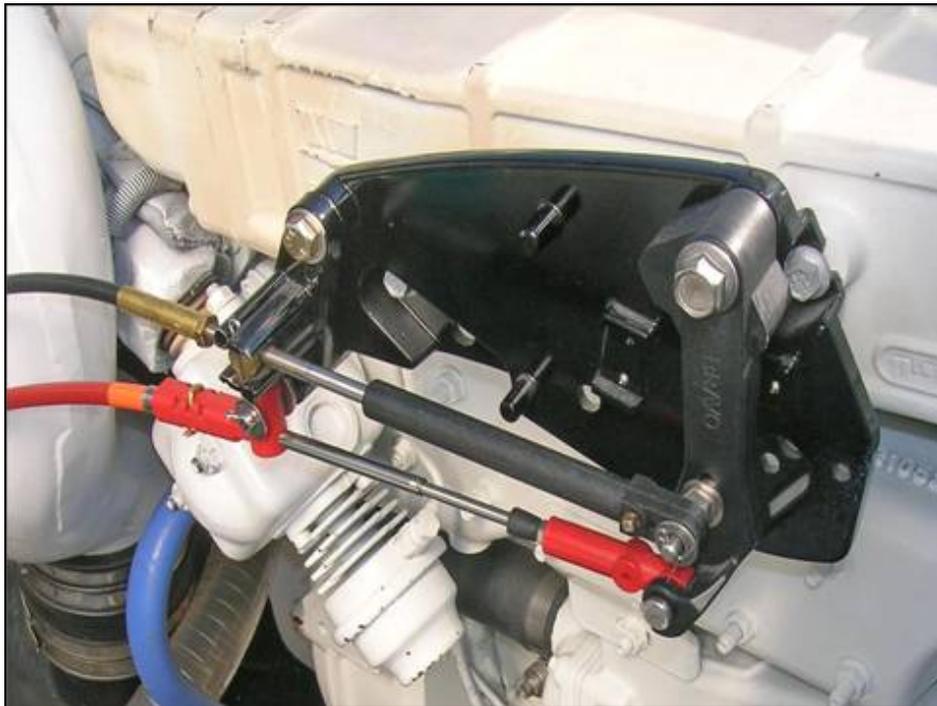


Figure 3-17
Shift Cable Attachment (starboard side of engine)

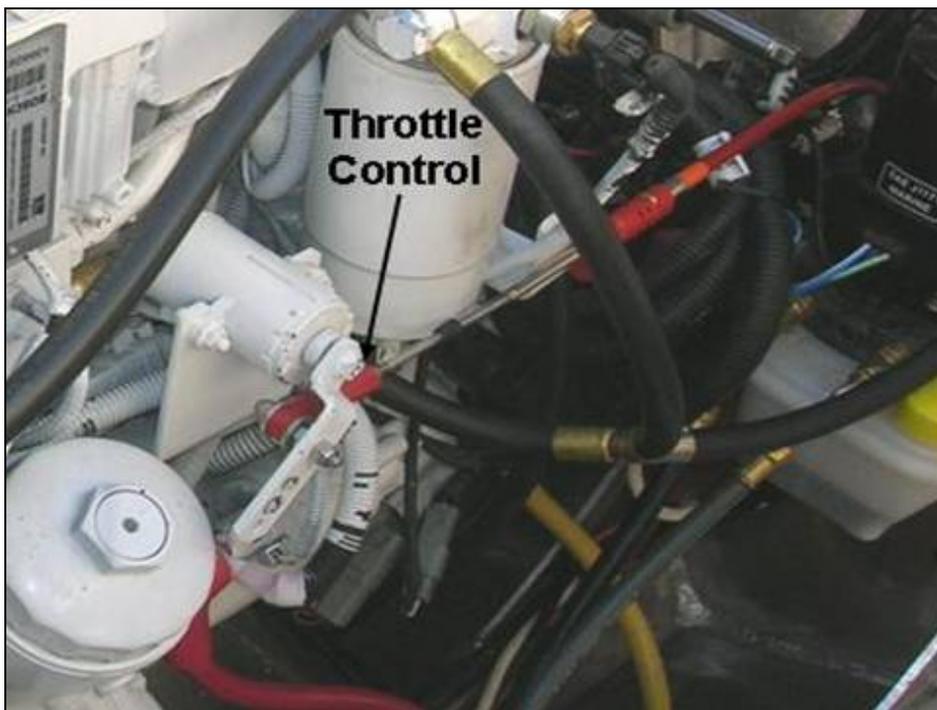


Figure 3-18
Throttle Cable Attachment (port side of engine)



A.13. Steering system

The CB-L uses a Sea Star helm system with a single steering wheel and helm pump mounted on the Coxswain’s console. The steering system consists of:

- a) Steering wheel (**Figure 3-14**)
- b) Helm pump, located within the Coxswain’s console, with a fill cap on the console (**Figure 3-14**)
- c) Interconnecting hoses
- d) Steering actuator (**Figure 3-19**).

A.13.a. Steering actuator

A single steering actuator (**Figure 3-19**) attaches to the steering lever of the outdrive unit. The steering actuator is located inside the engine compartment forward of the transom.

Note 

The CB-L does not incorporate any power steering or autopilot system.

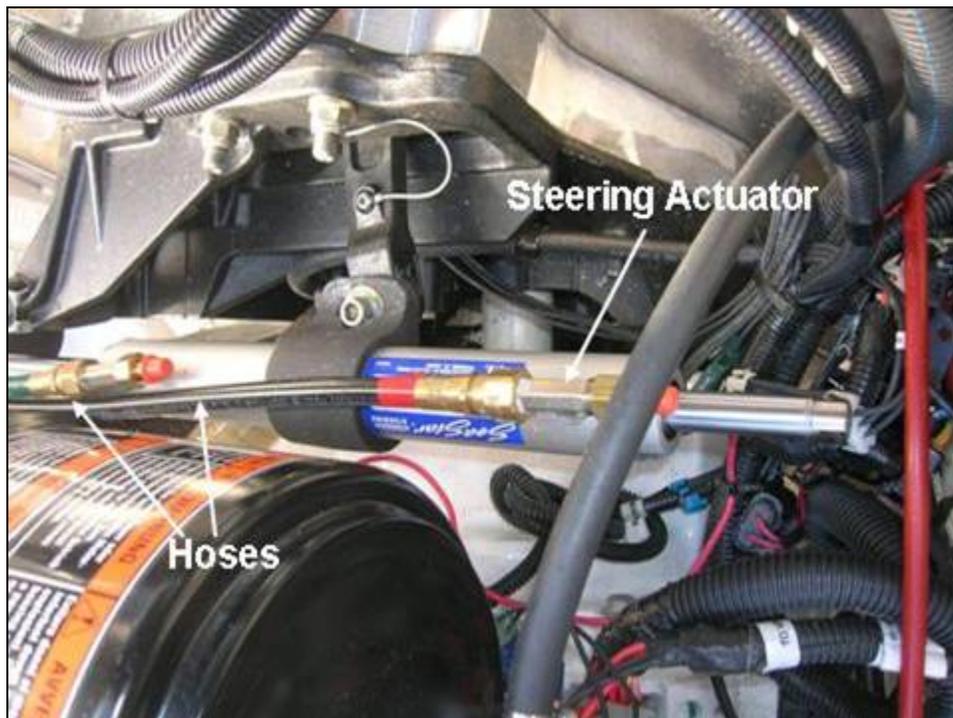


Figure 3-19
Steering Cylinder



Section B. Hull Fuel System

Introduction

The fuel tank for the CB-L is a 25 gallon aluminum tank with an integral fuel gauge sending unit, mounted forward in the hull. Access to the fuel tank is accomplished through two access covers located forward of the Coxswain's console.

B.1. Principles of operation

Fuel flows from the tank through a quarter-turn shutoff valve to two filters mounted in the engine compartment (**Figure 3-20**). Fuel then flows through a secondary filter mounted on the engine to the Bosch fuel control system. Unused fuel is cooled by a sea-water heat exchanger and returned to a "Y" fitting where it is fed back into the fuel supply line.



Figure 3-20
Fuel Filters



-
- B.1.a. Tank fill The fuel tank fill cap is located beneath the forward-most access cover (Figure 3-21).
-
- B.1.b. Tank vent A tank vent fitting is located on the bow bulkhead, to starboard of the towing bitt.
-

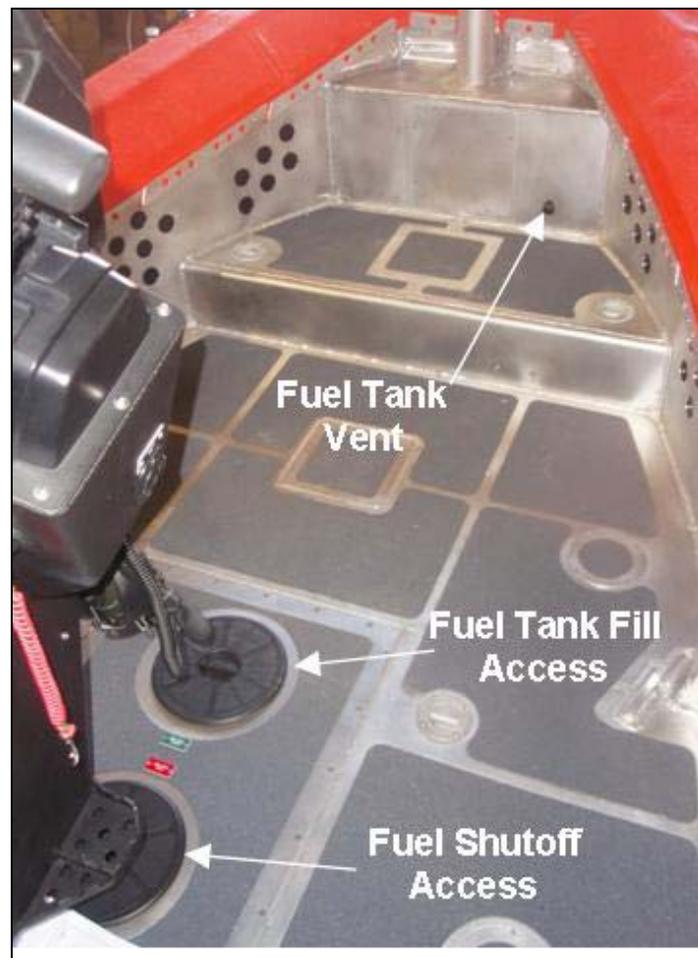


Figure 3-21
Fuel Tank Access and Vents

CAUTION !

When replacing the cover, turn the center handle finger-tight. Do not over-tighten



B.1.c. Access cover

The access covers for the fuel fill and fuel shutoff valve are made of plastic and held in place by a built-in clamp (**Figure 3-22**). Release the clamp by turning the center handle counter-clockwise, slide the cover to one side until the clamp is clear of the opening, then tilt the cover up to remove it.



Figure 3-22
Access Cover and Fuel Fill Cap



B.1.e. Fuel shutoff valve and tank level sensor

The fuel shutoff valve is a quarter-turn valve (**Figure 3-23**) located under the access plate immediately forward of the Coxswain's console. The fuel tank level sensor is located forward of the valve.

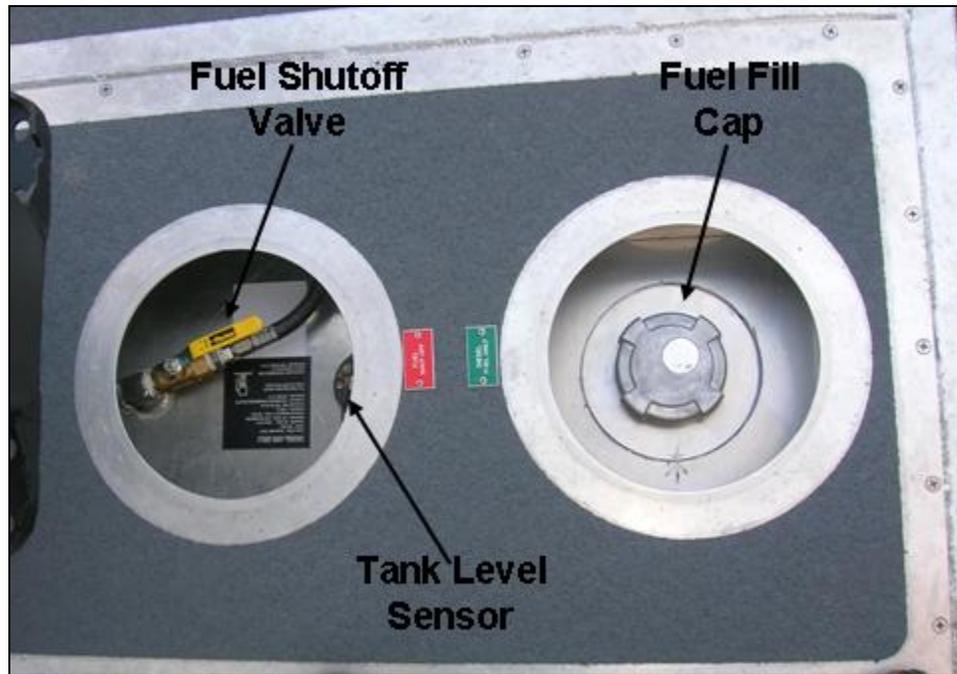


Figure 3-23
Fuel Tank Fill, Fuel Shutoff, and Tank Level Sensor



B.1.f. Primary fuel filter

The primary fuel filter is a Parker-Hannifin 10-micron, 60 GPH fuel-water separator with a built-in primer (Figure 3-24). Water can be drained by removing a plug on the bottom of the filter.



Figure 3-24
Primary Fuel Filter



B.1.g. Lubricity filter

A Cummins fuel lubricity filter (**Figure 3-25**) is installed between the primary and secondary filters. This filter has a slow-release fuel additive to reduce wear of engine components.



Figure 3-25
Lubricity Filter



B.1.h.
Secondary fuel
filter

The secondary fuel filter is mounted on the port side of the engine, aft (**Figure 3-26**). This filter has a built-in primer and a water-in-fuel sensor. Water can be drained from the filter by removing a plug on the bottom of the filter.



Figure 3-26
Secondary Fuel Filter



Section C. Hull System

Introduction The hull and deck of the CB-L are fabricated from 5086 marine aluminum with an attached air/foam hybrid collar.

C.1. Transom The transom of the CB-L is 5086 marine aluminum.

C.2. Engine hatch covers The engine hatch covers (**Figure 3-27**) are made of aluminum plate and are fitted with twist-lock latches and a gasket. The cover is supported in the open position by a brace.



Figure 3-27
Engine Compartment Hatch Cover



C.3. Transverse bulkheads The CB-L has aluminum bulkheads.

C.4. Self-bailing deck drains Two self-bailing deck drains are fitted with one-way scupper trunks (Figure 3-28) mounted on the transom. The scupper trunks are equipped with lines led to jam cleats, so the trunks can be raised above the waterline and secured.

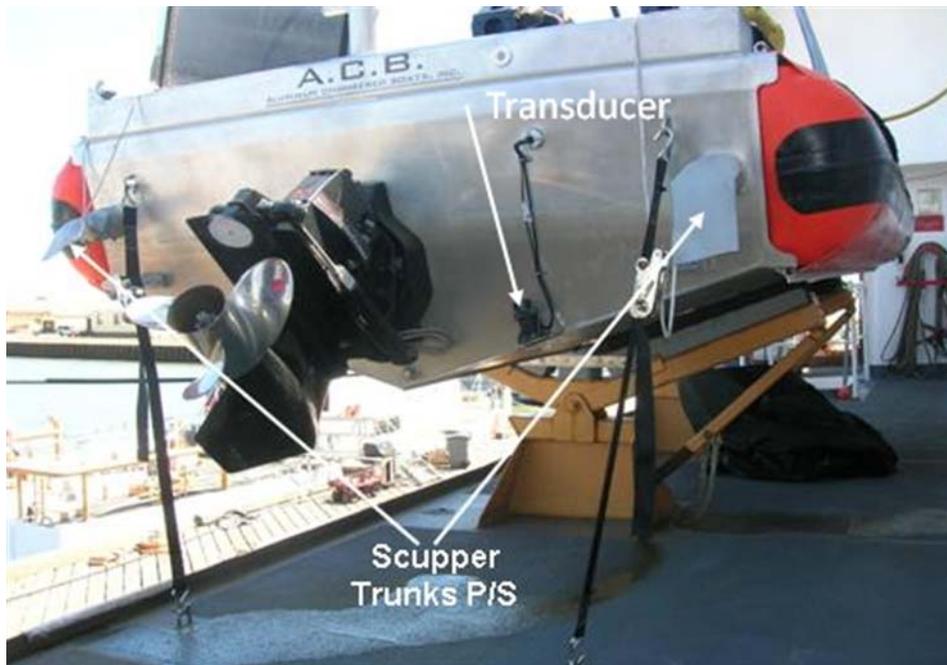


Figure 3-28
Scupper Trunks



C.5. Mooring cleats

Two mooring cleats (**Figure 3-29**) are mounted on top of the engine compartment cover, port and starboard

C.6. Jam cleats

Jam cleats (**Figure 3-29**) are located outboard, atop the transom and are used to secure the nylon line for the scupper trunks.

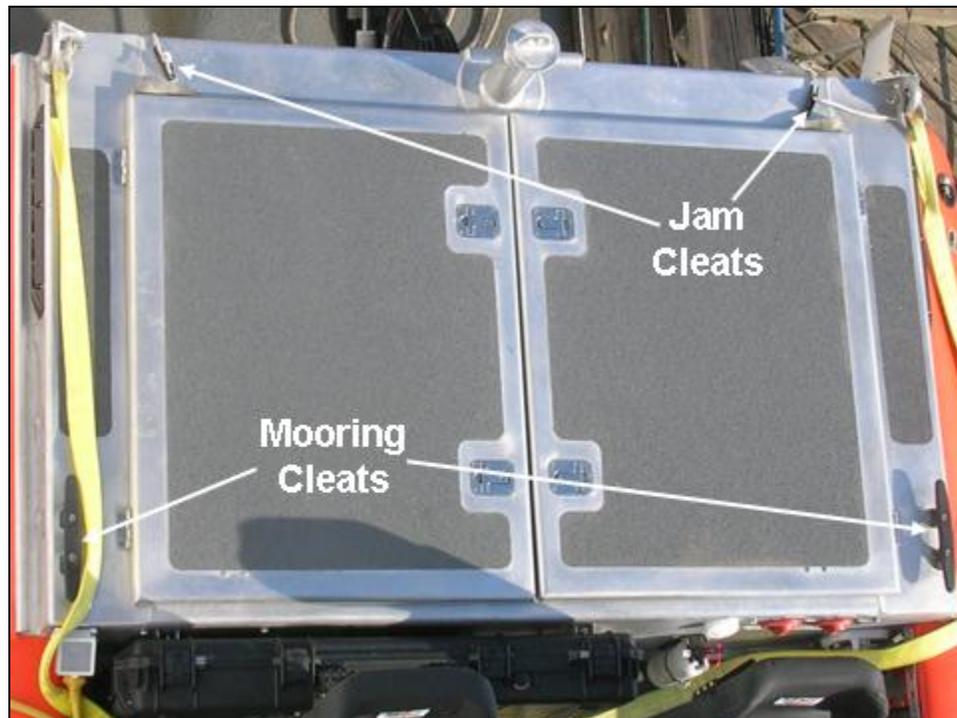


Figure 3-29
Mooring and Jam Cleats



C.7. Air/Foam hybrid collar

The air/foam hybrid collar (**Figure 3-30**) is sheathed with polyurethane fabric. The fender material is fuel-resistant, abrasion-resistant and suitable for use in temperatures from -25° F to $+160^{\circ}$ F. Working pressure of the collar is 5 psi.

C.7.a. Rubbing strake

A rubbing strake protects the outboard surface of the collar.

C.7.b. Life line

A life line runs the length of the hybrid collar.



Figure 3-30
Air/Foam Hybrid Collar



C.7.c. Chambers The collar is made up of two chambers, one per side. Each chamber is equipped with a manual fill valve. The valves are located aft on the inboard gunwale, port and starboard (**Figure 3-31**).



Figure 3-31
Collar Fill Valve (typical)

C.7.d. Molded cradle The collar system rests in a molded cradle formed by the perimeter of the deck and is bolted to the hull.



C.7.e. Manual pump

A foot operated collar inflation pump (**Figure 3-32**), is stowed under the seat for the navigation console (starboard side). The hose from the pump is inserted in the fill valve and the pump operated until air pressure reaches 5 psi, measured using the pressure gauge.



Figure 3-32
Inflation Pump



Section D. Electrical System

Introduction

The electrical system consists of the following components:

- 1) Alternator
- 2) Two marine grade batteries
- 3) Starter
- 4) Battery switches
- 5) 12 VDC breaker panel
- 6) In-line fuses
- 7) Navigation lights
- 8) Deck lights
- 9) 12 VDC outlets
- 10) Shore power connector
- 11) Isolation transformer
- 12) 12 VAC breaker panel
- 13) Battery charger

D.1. Alternator

The alternator (**Figure 3-33**) is mounted on the port, forward side of the engine and is belt driven by a pulley mounted on the main crankshaft. The alternator is rated at 12 VDC, 110 amps.



Figure 3-33
Alternator



D.2. Batteries

Two 12 VDC, marine grade, lead-acid batteries (**Figure 3-34**) are located in the engine compartment, one on either side of the engine, in plastic boxes.

D.3. Starter

The 12 VDC starter is mounted on the port side of the engine.



Figure 3-34
Battery



CAUTION !

During normal operations, the house battery switch shall be in the ON position and the engine battery switch in the one position.

D.4. Battery switches

The CB-L has two battery switches (**Figure 3-35**) located on the engine compartment forward bulkhead, port side. The inboard switch is for the house battery and the outboard switch is for the engine starting battery. The house battery switch has an OFF and ON position. The engine battery switch has four positions:

- a) Position 0 - OFF – no battery is connected to the engine starter.
- b) Position 1 - The engine battery is connected to the engine starter. This is the normal operating position for this switch.
- c) Position 2 - The house battery is connected to the engine starter. This is only used to start the engine when the engine start battery has lost its charge.
- d) Position 1+2 - Both the house and the engine start battery are connected to the engine starter. This is only used when neither battery by itself has enough charge to start the engine.



**Figure 3-35
Battery Switches**



D.5. Coxswain console switches and circuit breakers

The following switches with corresponding circuit breakers for electrical/electronic system components are located on the Coxswain's console, under the steering wheel (**Figure 3-36**):

- a) Nav lights/Anchor light
- b) Courtesy lights (deck lights)
- c) Emergency light
- d) Horn
- e) Ignition



Figure 3-36
Coxswain Console Switch Panel



D.6. CB-L fuse locations

Fuses for 12 VDC powered electrical components on the CB-L are located in each of the three consoles. Access to the fuses is through a panel on the forward side of each console (**Figure 3-37**).



Figure 3-37
Console Fuse Holder (typical)



D.6.a. Coxswain
console fuses

The following in-line fuses are located inside the Coxswain's console:

Remote Display	1 amp	Bilge Pump	5 amp
Emergency Light	3 amp	High Water Alarm	1 amp
Navigation Light	1 amp	Heading Sensor	1 amp
Courtesy Lights	1 amp		
Horn	10 amp		
12 VDC Outlet	15 amp		

D.6.b.
Navigation
console fuses

The following in-line fuses are located inside the navigation (starboard) console:

Chart Plotter	15 amp
GPS Receiver	1 amp
AIS	10 amp
NMEA Multiplexer	1 amp
Transducer	1 amp

D.6.c.
Communications
console fuses

The communications (port) console contains a fuse panel with the following fuses:

Siren	3 amp	Pri. HF-FM Radio	20 amp
Pri. VHF-FM Head	5 amp	UHF-FM Radio	20 amp
Pri. VHF-FM Head	5 amp	12 VDC Outlet	15 amp
VHF-FM Head	5 amp	Intercom	3 amp
UHF-FM Head	3 amp		
Sec. VHF-FM Head	7.5 amp		



D.7. Navigation lights

The following 12 VDC navigation lights are mounted on the CB-L:

- a) Red/Green side lights on antenna arch (**Figure 3-38**)
 - b) White Light (All-Around Navigation) on antenna arch (**Figure 3-38**)
-

D.8. Law Enforcement Light

A blue strobe light is mounted on the antenna arch (**Figure 3-38**).

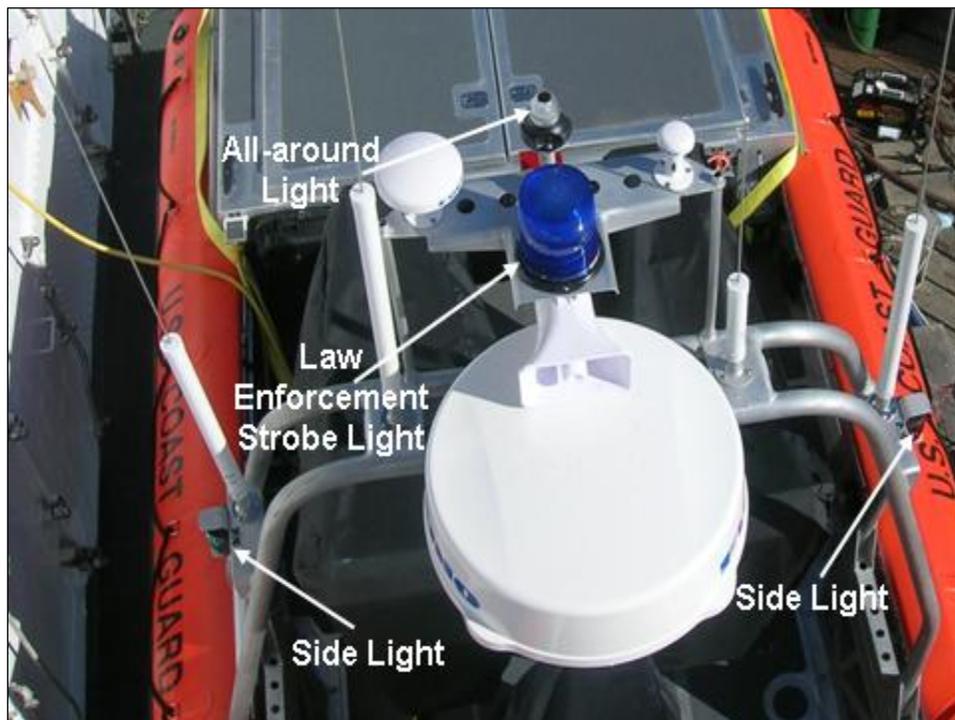


Figure 3-38
Antenna Arch Lights



D.9. Courtesy (deck) lights

Deck lights are built into the forward face of the Coxswain's console and into the hull structure (**Figure 3-39**), port and starboard, aft of the antenna arch.

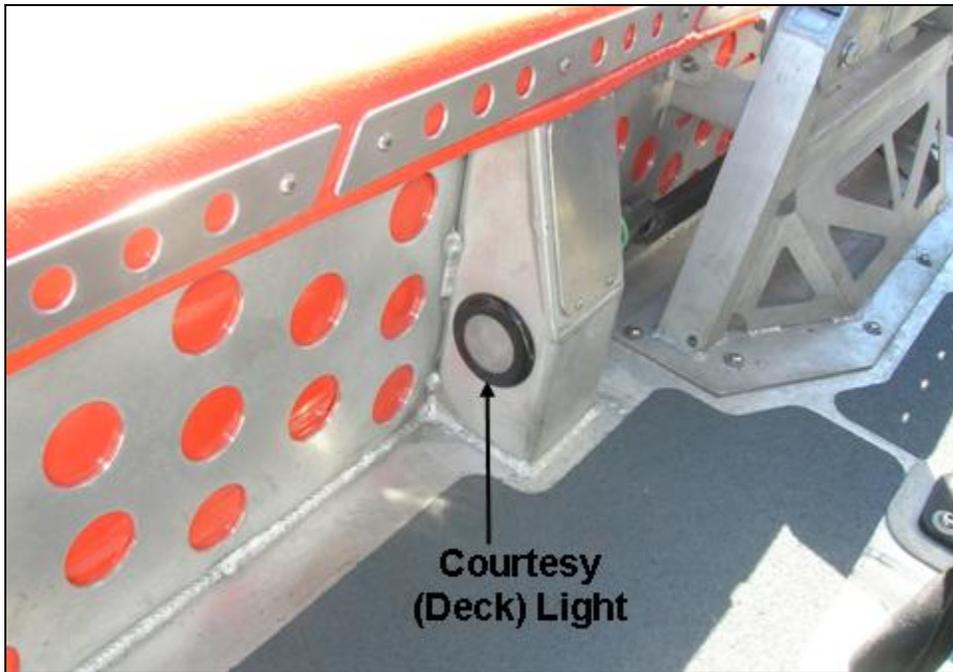


Figure 3-39
Courtesy (Deck) Light



D.10. 12 VDC outlets

One 12 VDC outlet (**Figure 3-40**) is located on the starboard side of the Coxswain's console and one is located on the port side of the communications console. A 12 VDC handheld searchlight can be plugged into either of these outlets.



Figure 3-40
12 VDC Outlet – Communications Console



D.11. Shore power connector

The shore power connector (**Figure 3-41**) is located on the forward bulkhead of the engine compartment, starboard side. The connector is rated at 30 amps, 110 VAC. The connector supplies power from the Cutter's 110 VAC system through the AC breaker panel.



Figure 3-41
Shore Power Connection



CAUTION !

The isolation transformer has an ON-OFF rocker switch on the panel face that can easily be bumped during maintenance work in the engine compartment. If the switch is accidentally moved to the OFF position, the battery charger and engine heater will no longer receive power.

D.12. Isolation transformer

An isolation transformer (**Figure 3-42**) protects the CB-L from galvanic corrosion due to connection to shore power. The isolation transformer is located in the engine compartment, starboard side.

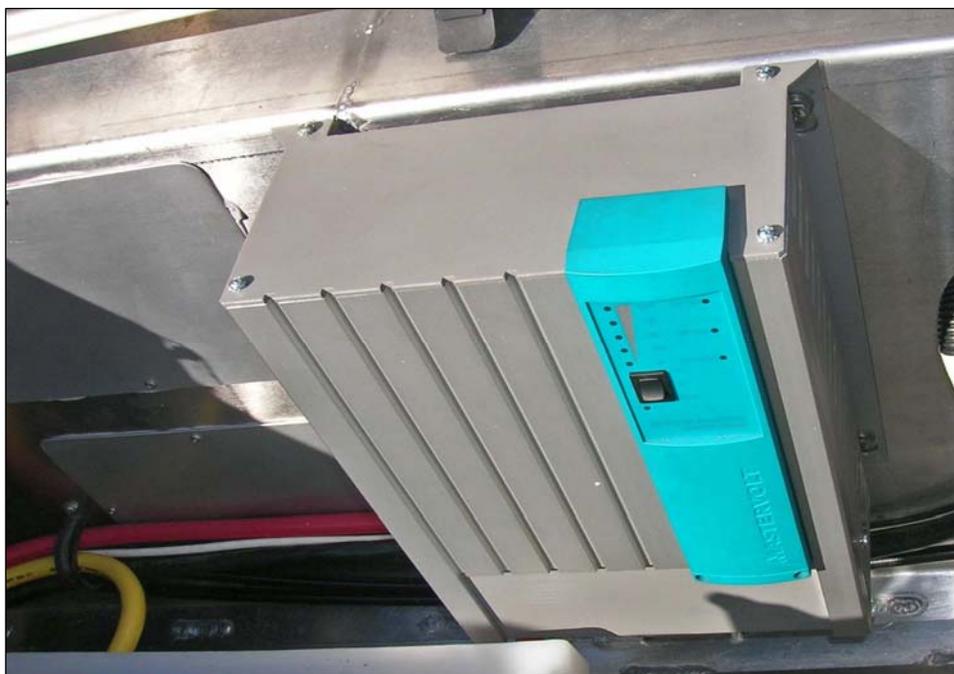


Figure 3-42
Isolation Transformer



D.13. 110 VAC Distribution Panel

The 110 VAC distribution panel (**Figure 3-43**) is mounted inside the engine compartment, starboard side, forward, and provides breaker protection for the 110 VAC voltage source from shore power, through the isolation transformer. The four installed breakers on this panel are labeled as follows:

On the CB-L:

- a) Main 30 amp
- b) Battery Charger 10 amp
- c) Block Heater 15 amp
- d) Spare 15 amp

Switches located on the inboard1 side of the panel control power flow to the battery charger and the block heater.



Figure 3-43
110 VAC Distribution Panel



D.14. Battery charger

The battery charger (**Figure 3-44**) on the CB-L is located on the port side of the engine compartment. The charger receives 110 VAC from the shore power receptacle and provides an output to maintain the charge in the batteries.

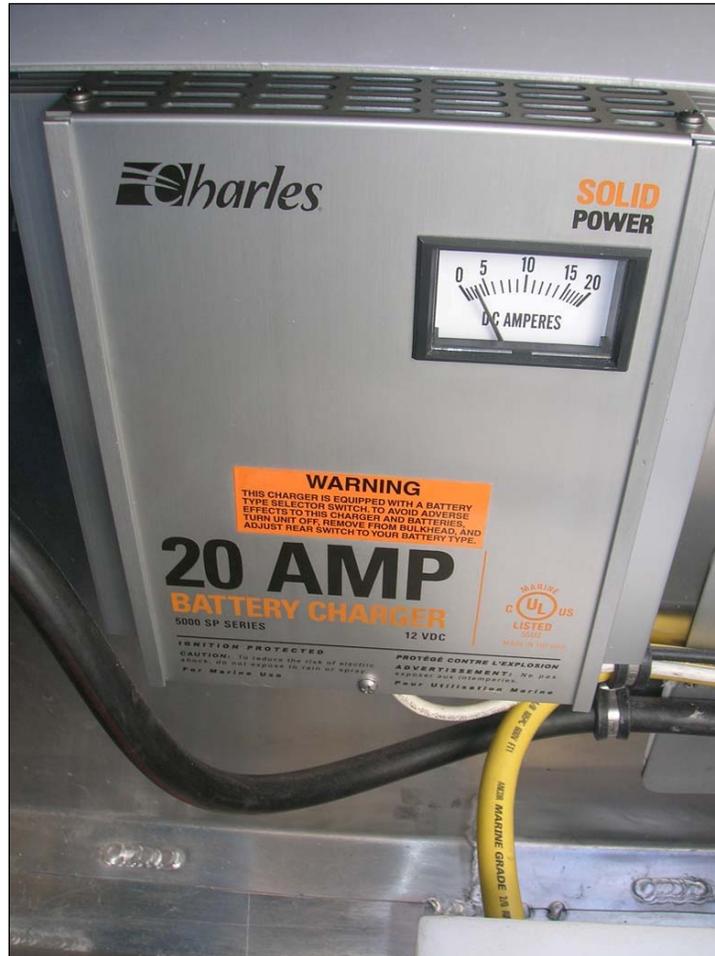


Figure 3-44
Battery Charger



Section E. Communications/Navigation System

Introduction

Most of the standard marine communications equipment is contained in the port crewmember console (communications console) and the navigation equipment is contained in the starboard crewmember console (navigation console).

E.1. Starboard operator's (navigation) console

The navigation console (**Figure 3-45**) on the CB-L contains the Furuno NavNet display and the Furuno GP-37 GPS display. A L³ Communications AIS is located within the console and is accessible through the panel on the forward face of the console. Crewmembers using this equipment shall be certified in accordance with reference (c).

E.1.a. Furuno NavNet

The Furuno NavNet is a multi-function display. It displays radar information and can also display chart and GPS data, heading and depth data.



Figure 3-45
Navigation (Starboard) Console



E.1.b. Furuno DGPS system/
chart plotter

The Furuno Differential Global Positioning System (DGPS)/chart plotter, GP-37, is mounted in the navigation console of the CB-L. It utilizes a GPA-019 antenna mounted on top of the antenna arch. The Furuno GP-37 can accept the following navigational signals:

1. Standard GPS
2. Ground-based DGPS
3. Satellite DGPS

E.2.
Communication console

The Communication Console on the CB-L (**Figure 3-46**) contains the following equipment, from top to bottom:

- a) Motorola XTL 5000 Tactical VHF-FM Radio Control Head
- b) Motorola XTL 5000 Tactical UHF-FM Radio Control Head
- c) Standard Horizon GX 85000 VHF-FM radio with loudhailer and navigational horn signal features

The console has an ICCS Radio Operator Control Box on the inboard side.



Figure 3-46
Communication Console



E.2.a. Motorola VHF-FM XTL-5000 transceiver control head	The Motorola VHF-FM XTL 5000 transceiver control head is installed at the top of the console. The radio operates in digital format across the 136-174 MHz frequency range. It is Over the Air Re-keying (OTAR) compatible and interoperable with the Coast Guard's Rescue-21 system. Multi-key format options hold a minimum of 32 separate encryption keys and the ability to operate with encrypted communications in the AES, DES, DES-XL & DES-OFB modes.
<hr/>	
E.2.b. Motorola UHF-FM XTL-5000 transceiver control head	The radio operates in digital format across the 380-420 MHz frequency range and is programmed to operate in the 406.1 to 420 MHz range. It is trunking enabled, fully interoperable with the Department of Defense (DoD) Enterprise Land Mobile Radio (ELMR) Force-Protection/Counter-Terrorism radio network. It is OTAR compatible and interoperable with the Coast Guard's Rescue-21 infrastructure. The Multikey format options are able to hold a minimum of 32 separate encryption keys. The radio is able to operate with encrypted communications in the AES, DES, DES-XL & DES-OFB modes, and is Code-Plug programmable from 10 to 50 Watts.
<hr/>	
E.2.c. Standard Horizon Quantum GX 5000S VHF-FM radio	<p>The Standard Horizon Quantum GX 5000S VHF-FM radio has Digital Selective Calling (DSC) capability. The radio has a loudhailer mode with a listen-back feature. The radio has the following preset restricted visibility signal tones:</p> <ol style="list-style-type: none"> 1. UNDERWAY - power-driven vessel underway and making way 2. SAIL - sailing vessel underway, fishing vessel (underway or anchored), vessel not under command, a vessel restricted in its ability to maneuver (underway or at anchor), or a vessel towing or pushing another ahead 3. TOW - vessel under tow (manned) 4. STOP - power driven vessel underway but stopped (not making way) 5. ANCHOR - vessel at anchor 6. AGROUND - vessel aground



E.3. Coxswain console

The Coxswain's console contains the Furuno RD-30 multi display, and the SmartCraft engine monitoring display.

E.3.a. Furuno RD-30 multi-display and depth sounder

The Furuno RD-30 multi-display (**Figure 3-47**) is mounted on the Coxswain's console. The depth sounder transducer (**Figure 3-48**), mounted on a transom bracket, starboard side of the centerline.

When first turned ON, the display will show the current depth. The depth sounder memorizes the minimum and maximum depth while it is turned ON and these quantities can be recalled and displayed.

The depth sounder also employs a depth trend indicator to indicate a rising or lowering sea bed. Deep and shallow threshold limits can be programmed into the depth sounder to activate deep and shallow depth alarms. The display can be programmed to show other NavNet information such as course and speed.



Figure 3-47
RD-30 Display



Figure 3-48
Depth Sounder Transducer

E.3.b. PG-500 heading sensor

The PG-500 heading sensor is an electronic compass that provides magnetic heading information to the NavNet system. The sensor unit is located in the boat's bow step.

CAUTION !

Magnetic material must be kept at least 3 FT away from the heading sensor.



E.3.c.
SmartCraft
display

The SmartCraft engine monitoring display (**Figure 3-49**) is mounted on the Coxswain's console. It monitors the following engine parameters:

1. Oil pressure
2. Oil temperature
3. Coolant temperature
4. Engine speed (RPM)
5. Rail pressure
6. Aftercooler pressure and temperature
7. Water in fuel
8. Throttle position



Figure 3-49
SmartCraft Engine Monitoring Display



E.4. Intercom system

The CB-L intercom system consists of Crew Control Boxes and Radio Operator Control Boxes. One of these is located at each crew seat. The Crew Control Boxes are accessed by the crewmember at the navigation console, the crewmembers in the jump seats and a crewmember positioned at the bow. These Control Boxes allow each of these crewmembers to communicate with each other over the intercom system.

Each Crew Control Box has a jack to plug in a headset (**Figure 3-50**), a separate volume control and a toggle switch to activate the microphone.

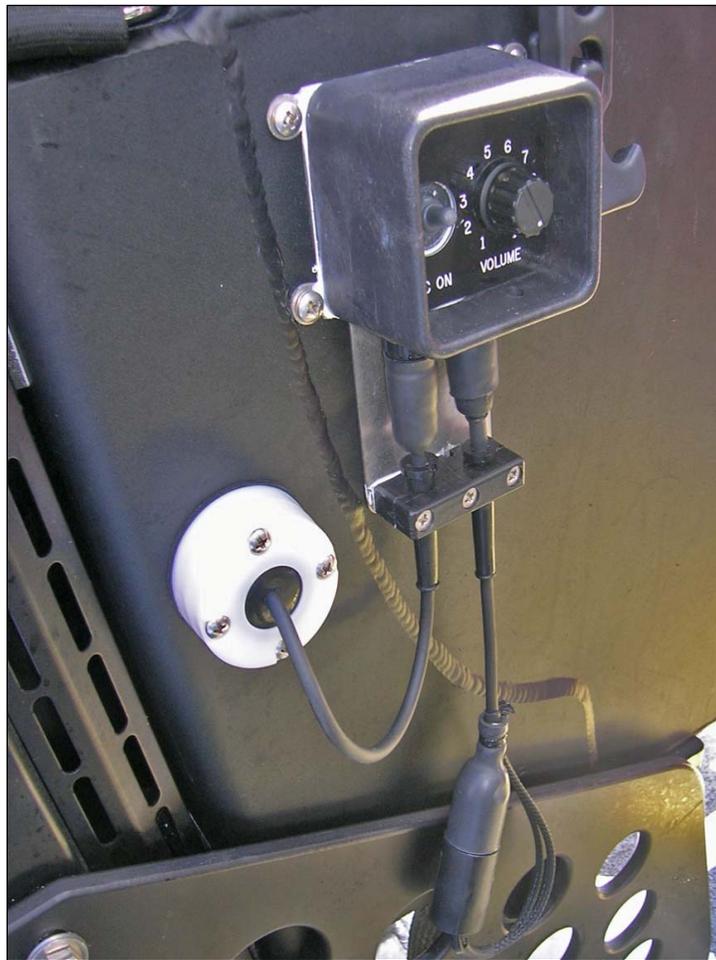


Figure 3-50
Crew Control Box



Radio Operator Control Boxes are located at the Coxswain's console and at the communications console. These Control Boxes give each of these crewmembers both intercom and radio interface capabilities (**Figure 3-51**). Each Radio Operator Control Box has a radio selector switch, a microphone selector switch, a volume control and a radio monitoring selector switch which allows one radio to be monitored when switched to a different radio.



Figure 3-51
Radio Operator Control Box



**E.5. 406 MHz
Emergency
Position
Indicating Radio
Beacon (EPIRB)**

A Category 2, 406 MHz EPIRB (**Figure 3-52**) is mounted on the port side of the engine compartment forward bulkhead and provides a distress alert signal through the Search and Rescue Satellite Aided Tracking (SARSAT) system. The unit is designed to be manually released and can be automatically or manually activated.

NOTE 

The EPIRB is designed to operate while floating in the water. It should not be hand-held while operating.



**Figure 3-52
Emergency Position Indicating Radio Beacon (EPIRB)**



Section F. Fire Suppression System

Introduction

The CB-L is equipped with a two hand-held fire extinguishers rated 5-BC. One extinguisher is located directly behind the Coxswain's seat. The second extinguisher is located at the forward bulkhead of the engine compartment, port side.

F.1. Fire port

The forward bulkhead of the engine compartment is fitted with a fire port (**Figure 3-53**) that allows discharge of the extinguishers into the engine compartment without opening the compartment hatch covers.



Figure 3-53
Fire Port



Section G. Trailing

Introduction

The Boatmaster® trailer (**Figure 3-54** and **Figure 3-55**) that accompanies the CB-L is custom built by JDCI Enterprises Inc., Ft. Myers, FL. It is designed to transport the CB-L on roadways.

WARNING

Lack of preventative maintenance contributes to a significant amount of trailering mishaps each year. CB-L Preventive Maintenance System (PMS) requirements for the boat's trailer is contained in the CB-L PMS. It is imperative that PMS is completed in accordance with this manual. If care and maintenance of the trailer is neglected, the safety of the boat, the crew, and the public may be endangered.

NOTE

The only trailer authorized for the CB-L is the Boatmaster® trailer designed for this class of boat.

G.1. General

The boat trailer and associated equipment are an important part of your boat's readiness. All too often, the trailer and tow vehicle do not receive the attention required to ensure proper operation. Proper maintenance and continual care of all trailering equipment is necessary.



Figure 3-54
Boat Trailer



Figure 3-55
CB-L and Trailer



G.2. Tow vehicle

The tow vehicle must be capable of handling the weight of the trailer (with boat and equipment), as well as the weight of the passengers and equipment carried inside the vehicle. This may require that the tow vehicle be specially equipped with the following:

- a) Engine of adequate power
- b) Transmission and rear-end designed for towing
- c) Larger cooling systems for the engine and transmission
- d) Heavy-duty brakes
- e) Load bearing hitch attached to the frame, not the bumper
- f) Heavy duty suspension

The towing vehicle must be rated at the combined weight of the boat and trailer. The combine weight of the boat and trailer is approximately 5,500 lbs (fully outfitted, no crew). The vehicle's towing limitations can be found in the owner's manual and can be found on the manufacturer label on the starboard side of the trailer frame.

If the combined weight of the boat, trailer, personnel, and equipment is too close to the tow vehicle's rating, consider using a second vehicle to transport some of the personnel and equipment to provide an additional safety margin.

G.3. Hitch

The trailer hitch is attached to the tow vehicle's frame providing a secure fitting from which to attach the receiver and ball mount.

The hitch shall be at a minimum a Class V hitch capable of carrying 10,000 lbs or greater. The hitch must be stamped (by the manufacturer) or have a sticker affixed from the manufacturer stating the class and the rated towing capacity (10,000 lbs or greater).



G.4. Ball mount and ball

The ball mount attaches to the trailer hitch providing a secure fitting to mount the trailer ball.

The ball mount must be capable of carrying trailer weight of 10,000 lbs or greater. The ball mount must be stamped (by the manufacturer) or have a sticker affixed from the manufacturer stating the rated towing capacity (10,000 lbs or greater). If using a ball mount that requires the hardware (bolts and nuts), hardware must have a rating of 10,000 lbs or greater.

The ball must be $2\frac{5}{16}$ inches, and have a rating of 10,000 lbs or greater. It shall be stamped and clearly legible. The ball should be inspected often for cracks, abnormal wear, and proper lubrication (**Figure 3-56**).

The height of the ball mount should be positioned so that the trailer will be pulled level. The tongue weight should be 500 lbs or less when the trailer is level. Adjusting the height of the ball mount is critical to ensure this condition is met.



Figure 3-56
Hitch, Ball Mount, and Ball Assembly



G.5. Trailer coupler, safety chains and hydraulic brake actuator

The trailer coupler attaches to the ball of the tow vehicle. The coupler engages the ball and provides a positive mechanical lock between the trailer and the tow vehicle. The coupler must be $2\frac{5}{16}$ inches and have a rating of 10,000 lbs or greater.

Two safety cables (**Figure 3-57**) attached to the trailer provide trailer retention to the vehicle should the coupler disengage from the ball. One end of the safety cables is bolted directly to the trailer. The bitter ends are to be attached to the tow vehicle's hitch with safety hooks.

The breakaway lever actuating chain (hydraulic brake actuator) is attached to the vehicle during towing operations. Should the coupler disengage from the ball, the breakaway lever actuating chain will be pulled forward actuating the breakaway lever automatically applying the trailer's brakes. The hydraulic brake actuator safety wire must be attached to the hitch using the S-hook. The breakaway lever actuating wire is a standard length and should not be altered in any way (**Figure 3-57**).

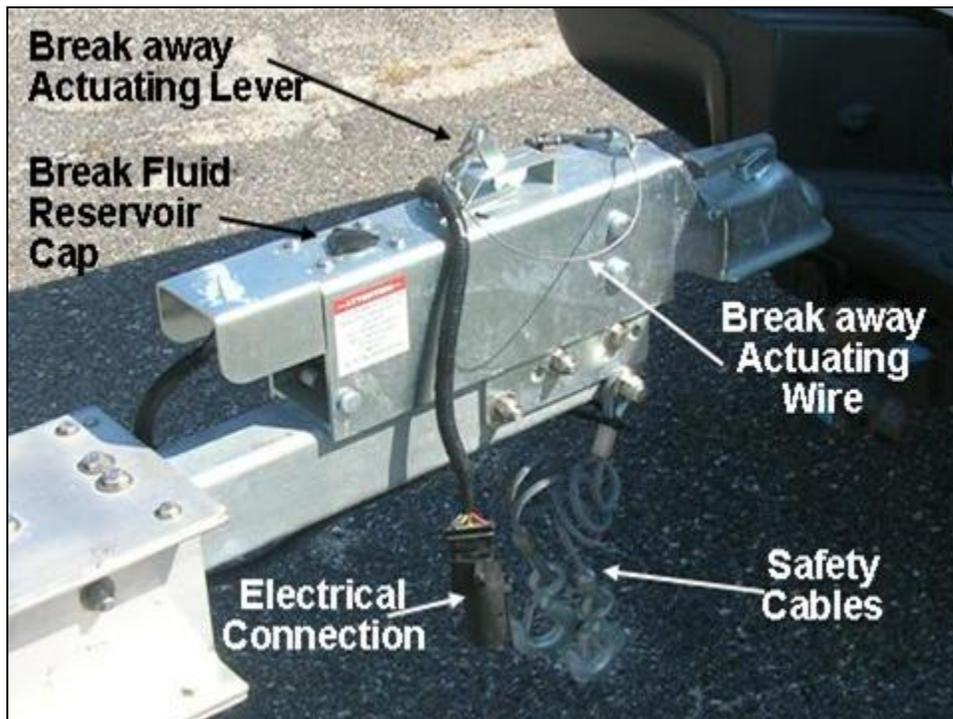


Figure 3-57
Trailer Coupling Assembly



G.6. Trailer construction and equipment

The primary frame of the trailer is made up of aluminum I-beams. The suspension is a torsion axle system. The trailer is a four-wheel configuration (two on each side) with one spare. The trailer uses light emitting diodes (LED) for the brake, tail, and clearance lights.

WARNING 

Always use a designated “spotter” when hooking up the trailer. The spotter can provide detailed instructions to the tow vehicle operator when backing up which will prevent damage to both the tow vehicle and trailer and minimize the chance of injury to personnel.

G.7. Hooking up the trailer

When hooking the tow vehicle up to the trailer, the same procedures should be accomplished each time. Whether you are transiting to a local boat ramp just down the road, or going on a long trip, the trailer should always be completely attached to the tow vehicle.

Follow these steps for attaching the trailer to the tow vehicle:

Step	Procedure
1	Using a spotter, carefully back the tow vehicle so that the trailer ball is aligned under the trailer’s coupler.
2	Using the hand-crank jack, lower the trailer coupler until it is completely seated on the trailer ball.
3	Engage the coupler latch and insert the coupler latch pin to ensure it does not come undone during transit.
NOTE 	The coupler latch pin should have a lanyard long enough to facilitate insertion and removal.
4	Attach the safety cables. They shall be crisscrossed and have enough slack to allow for sharp turns in both directions yet short enough to not drag on the ground.
5	Attach the breakaway level actuating cable ensuring there is enough slack to allow for sharp turns in both directions.
6	Check the brake fluid reservoir. It should be full of DOT 3 brake fluid
7	Connect the wiring harness to the tow vehicle. The wiring harness (pigtail) should have enough slack to allow sharp turns in both directions and short enough as to not drag on the ground.
8	Check trailer lights to ensure they are operating properly.



NOTE 

The wiring on the trailer's wiring harness should be a 7-4-2 configuration.

CAUTION !

Once connected to the tow vehicle, ensure the trailer is being towed level to the ground. If the trailer is not level to the ground, a drop bar/ball mount of a different height may be necessary and/or the trailer coupler may need adjustment.

WARNING 

Do not exceed the maximum weight rating on the trailer. Exceeding the maximum rating voids the manufacturer's warranty and may lead to failure of the trailer causing damage to the boat and creating an unsafe towing condition.

G.8. Securing the boat to the trailer

Before taking the trailer and boat into tow, you must first ensure that the boat is properly secured to the trailer. **Damage to the boat and trailer could result if the two are not connected.**

Tie-down straps must be attached and tightened between the U-bolts found on the boat's transom and the trailer prior to transporting the boat. Placement is as follows:

- a) One tie-down strap on each side of the transom (**Figure 3-58**).
- b) The forward safety cable must be connected to the lower hole in the bow eye.

Tie-downs shall be rated for at least 6,000 lbs.

NOTE 

Trailer chafing skids or "bunks" must be kept in good condition to prevent scratching and gouging of the hull.

The bow of the CB-L must be held snug against the bow stops by the winch cable (**Figure 3-59**). A safety chain is attached between the bow padeye and the trailer.



Figure 3-58
Trailer to Transom Tie Down



Figure 3-59
Boat Trailer, Bow Tie Down



WARNING 

Do not tow any trailer faster than 55 MPH – in some states speed limit for towing is 45 MPH.

WARNING 

Do not overload the trailer by carrying additional equipment or personal gear in the boat.

CAUTION!

Use a spotter when backing or maneuvering in tight quarters. The boat and trailer will hinder the driver’s ability to judge distances and negotiate turns.

CAUTION!

Collar may need to be partially deflated to comply with federal, state or local trailer width restrictions.

G.9. Towing precautions

Pulling a trailer presents several problems:

- a) More time is required to brake, accelerate, pass, and stop.
- b) The presence of the boat on the trailer will increase the size of the vehicle’s blind spots, especially when using rear view mirrors for backing.
- c) The turning radius is also much greater; curbs and roadside barriers must be given a wide berth when negotiating corners.

Prior to operating on the open road, the vehicle operator should practice turning, backing up, and other maneuvers on a level, non-congested parking area. Backing a trailer is a challenge even to the most experienced drivers and requires considerable practice.

The CB-L boat and trailer is closely matched to the minimum trailer-truck-hitch requirements. Safe trailering requires that the trailer be properly balanced and loaded. Overloading a trailer on the highway is as dangerous as overloading your boat on the water. Carrying additional equipment (beyond the boat outfit) or personal gear on the boat may add substantially to the trailer’s gross weight and play havoc with the load distribution.

NOTE 

Many units require tow vehicle operators to complete a unit generated Performance Qualification Standard (PQS) before they tow a trailer.



G.10. Trailering checklist

Before your trip, ensure the following items have been checked:

- a) Check intended routes for restrictions on bridges and tunnels, and low overhead clearances.
 - b) Ensure that width of CB-L complies with travel width restrictions. Deflate the collar if necessary.
 - c) Ensure that the lightning rod has been stowed and that the antenna arch has been folded down into its lowered position.
 - d) Ensure the tow ball and coupler are the same size and bolts with washers are tightly secured. The vibration of road travel can loosen them.
 - e) Confirm the coupler is completely over the ball and the latching mechanism is locked down and secured with locking pin.
 - f) Ensure the safety cables are securely attached, crisscrossing under the coupler, to the hitch of the tow vehicle. If the ball were to break, the trailer's tongue would be held up by the cables allowing the trailer to follow in a straight line and prevent the coupler from dragging on the road.
 - g) Ensure the hydraulic brake actuator safety cable is attached to the hitch.
 - h) Ensure the jack is fully cranked up.
 - i) The side-view mirrors of towing vehicles should be large enough and adjusted to provide an unobstructed rear view on both sides of the vehicle.
 - j) Check that the wiring is properly connected – not touching the road, but loose enough to make turns without disconnecting or damaging the wires. Make sure all trailer running lights, brake lights, turn signals, and hazard lights are working on both the tow vehicle and trailer. When trailer lights are submerged during launching/recovery they have a greater chance of failure and should be serviced more frequently. Always disconnect the trailer-wiring harness from tow vehicle before submerging the trailers lights.
 - k) Check the brakes. Lightly test before getting on a major road. On a level parking area, roll forward and apply the brakes several times at increased speeds to determine a safe stopping distance.
-



-
- l) Check tires, including the trailer's spare tire and towing vehicle tires for condition and proper inflation. Improper inflation may cause difficulty in steering. Read the tire sidewall to determine tire pressure required. Also check for tire wear, cracks, bubbles, or foreign objects imbedded in the tire. When trailer wheels are immersed in water (especially salt water) the bearings should be inspected and greased on a regular basis in accordance with PMS procedures. Make sure the wheel lug nuts/bolts on the tow vehicle and trailer are tightened to the correct torque.
 - m) Check all spaces for standing water (rainwater or water from cleaning). Standing water is undesirable for many reasons, but mainly because a collection of it can rapidly increase weight on the trailer, often beyond its capacity. Furthermore, the extra weight may shift with the movement of the trailer and cause a dangerous situation.
 - n) Check load distribution to make sure the tow vehicle and trailer are properly balanced front and back and side to side. Too much weight on the hitch will cause the rear of the tow vehicle to sag and may make steering more difficult. This can also cause your headlights to shine into the eyes of oncoming traffic.
 - o) Use wheel chocks when parking the trailer.
 - p) Double check all connections, safety chains, breakaway lever actuating chain, wiring harness, and tie down straps are properly secured/connected.
-



CAUTION !

Always use a spotter when backing a trailer! Vehicle windows should be open and radio turned off.

G.11. Launching the boat

Once at the boat ramp, use the following procedures to launch the boat:

Step	Procedure
1	Using a spotter, carefully back the trailer down the boat ramp to the water’s edge. Set parking break.
2	Remove all of the tie-down straps that secure the boat to the trailer. DO NOT disconnect the trailer winch connection.
3	Disconnect trailer-wiring harness from tow vehicle.
4	Visually inspect the boat’s hull and outdrive for any damage that may have occurred during transit.
5	Place crew onboard the boat and have crewmember stand-by to release the trailer winch connection.
6	Carefully back the trailer into the water until approximately three-quarters of the boat is floating free of the trailer. Set the towing vehicle’s parking break.
7	Check spaces for flooding.
8	Lower outdrive into the water and start. Ensure the water level in the vicinity of the outdrive is sufficient for operation and clear of hazards.
9	Raise antenna arch and install lightning rod in arch socket.
10	If crew is satisfied with condition of boat/engine and is ready to get underway, release the trailer winch connection and carefully push/power the boat back off the trailer.
11	Carefully pull tow vehicle forward clear of boat ramp.

NOTE 

After launching or recovering the boat, always rinse down the trailer with fresh water and check the trailer lights for proper operation.

**CAUTION !**

During recovery, ensure 1 to 2 inches of space remains between the bow and the bow stops. This will ensure proper loading and weight distribution.

**G.12.
Recovering the
boat**

When finished with boat operations, use the following procedures to recover the boat:

Step	Procedure
1	Disconnect trailer-wiring harness from tow vehicle. Set parking brake.
2	Using a spotter, carefully back trailer down the ramp until approximately three-quarters of the trailer is submerged.
3	Align the center of the boat with the center of the trailer and carefully maneuver the boat onto the trailer. Check water level in the vicinity of the trailer and trim outdrive up or secure as needed.
4	Attach trailer winch to bow of boat and pull boat forward onto the trailer. Always ensure boat stays centered on trailer.
5	Secure engine on boat (if still running).
6	Raise outdrive.
7	Slowly pull the tow vehicle forward until the trailer is clear of the water.
8	Attach all tie-down straps securing the boat to the trailer. Lower antennas arch before transporting on roadways.
9	Ensure trailer lighting is operating properly.
10	Remove and stow the lightning rod and fold the antenna arch to its lowered position.
11	Do a complete visual inspection of the tow vehicle, trailer, and boat before transiting on highway.



Chapter 4 Crew Requirements

Introduction

Minimum standards and guidelines for competence on board the CB-L are provided in reference (c). Each crewmember should be familiar with the duties of the other crewmembers in addition to his/her own duties. It is important for a crewmember to know and commit to memory all important characteristics of the boat and its equipment, and which procedures to follow in the event of a casualty. Each crewmember should mentally rehearse the procedures each member of the crew would follow during any operational casualty. Teamwork is the common thread that allows the crew to succeed. Whenever the opportunity is available, the crew should get the boat underway to practice operational and emergency procedures.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Minimum Crew	4-2
B	Coxswain	4-3
C	Engineer	4-4
D	Boat Crew Members	4-5
E	Passengers	4-6
F	Safety Equipment	4-7



Section A. Minimum Crew

Introduction

Units shall comply with the minimum boat crew requirements prescribed in reference (d).

A.1. Certified crewmembers

All crewmembers shall meet the qualification requirements prescribed in reference (c).



Section B. Coxswain

Introduction

The U.S. Coast Guard places great trust in each Coxswain and his or her ability to accomplish the assigned missions in a safe and professional manner even under adverse conditions. The position of Coxswain is one of high regard and great responsibility.

The Coxswain is responsible for the boat, its crew, and passengers during every mission. The Coxswain assigns and directs all onboard functions during each operation.

B.1. Authority and responsibility

The extent of the authority and responsibility of the Coxswain is specified in reference (e), as follows:

“The Coxswain shall be responsible, in order of precedence, for the safety and conduct of passengers and crew; the safe operation and navigation of the boat assigned; and the completion of the sortie or mission(s) assigned or undertaken pursuant to U.S. Coast Guard policy and regulations. An underway Coxswain will at all times respond within the limits of capabilities and legal authority to observed hazards to life or property, and violations of law or regulations.”

The Coxswain is the direct representative of the CO or Officer-in-Charge (OIC) and as such, (subject to *Articles 88-89* of the *UCMJ*) has the authority and responsibilities that are independent of rank or seniority in relation to other personnel embarked. The authority and responsibility of the Coxswain exist only when the boat is engaged on a specific sortie or mission.

B.2. Relief of responsibility

The only person embarked in the boat who may relieve the Coxswain of the responsibility as described above is:

- a) The CO, OIC, Executive Officer (XO), or Executive Petty Officer (XPO).
 - b) A senior officer at the scene of a distress emergency, or other abnormal situation, who exercises authority under the provisions of *U.S. Coast Guard Regulations*, COMDTINST M5000.3 (series), whether or not other units are involved.
-



Section C. Engineer

Introduction The position of Engineer is one of great responsibility. The knowledge and skill of the Engineer can make the difference in completing the mission under adverse conditions.

C.1. Qualifications The Engineer must be a certified Boat Crew Member prior to obtaining certification as an Engineer since this individual is required to perform duties in both capacities.

C.2. Responsibilities The primary responsibilities of this position include operational and underway maintenance of the propulsion and auxiliary systems.

The Engineer may also serve as:

- a) Senior Boat Crew Member
 - b) Safety Observer
 - c) Boarding Officer (BO)
 - d) Line Handler
 - e) Helmsman
 - f) Surface Swimmer
 - g) Emergency Medical Technician (EMT)
 - h) Or other such duties as may be assigned by the Coxswain in support of operational and training sorties or missions
-



Section D. Boat Crew Members

Introduction

Under direct supervision of the Coxswain, the crew is responsible for line handling, acting as lookout, and assisting the Coxswain as required during all evolutions and maneuvers.

D.1. Certified Boat Crew Member

The Boat Crew Member must be certified in accordance with the requirements in references (c) and (d).

Additionally, the Boat Crew Member may be responsible for operating the communications/navigation equipment when directed by the Coxswain.

D.2. Additional crewmembers

Additional crewmembers are assigned by the Coxswain and certified by the CO/OIC based upon mission requirements.



Section E. Passengers

Introduction

The CB-L is designed to carry a Coxswain, Engineer, and up to three additional crewmembers or passengers while carrying out high-speed mission activities. Additional passengers can be carried for other missions, not to exceed designed weight capacity (see *Chapter 2, A.4.*). Passengers shall be seated as directed by the Coxswain.



Section F. Safety Equipment

WARNING

The use of the kill switch is required whenever the boat is started or has way on. The kill switch is located below the throttle (**Figure 3-14**). The activation clip (with red plastic cap) for the kill switch must be inserted into the switch body to start the engine. The lanyard must be properly attached to the Coxswain at all times during boat operation. A second kill switch lanyard with activation clip must be carried onboard to enable remaining crewmembers to operate the boat in the event the Coxswain is ejected.

F.1. Personal protective equipment

During all CB-L operations, crewmembers shall wear personal protective equipment (PPE) as required by reference (f).

NOTE

The Coxswain is responsible for ensuring that all required PPE is worn, and worn correctly by the boat crew and all passengers.



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Chapter 5 Operational Guidelines

Introduction

This chapter describes how to use the CB-L in the safest and most efficient manner. These policies and performance criteria should be used as guidelines for CB-L operations. Within these guidelines, consider local operating conditions, district regulations and the skill of the crew to determine how the CB-L capability is to be used. These factors must be considered prior to each sortie or mission.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Operating Parameters	5-2
B	Performance Data	5-7



Section A. Operating Parameters

Introduction

The readiness of the CB-L shall be continuously monitored to ensure that it is capable of unrestricted operations. This monitoring is accomplished through a variety of programs, including daily boat checks, the boat PMS schedule, engineering inspections, and Ready for Operations (RFO) evaluations and Standardization Team (STAN Team) inspections.

Operating parameters for the CB-L and crewmembers include the following areas:

- 1) Disabling casualties
- 2) Restrictive discrepancies
- 3) Major discrepancies
- 4) Minor discrepancies
- 5) Responsibilities
- 6) Environmental limits

Table 5-1 summarizes the information provided in A.1 through A.4 and how it relates to casualty/discrepancy, consequences, and required action to be taken.

A.1. Disabling casualties

Disabling casualties are those that make the boat not serviceable. *Appendix D* contains a listing of disabling casualties.

A.1.a. Reporting disabling casualties

Disabling casualties shall be reported to the Operational Commander (Cutter CO) by the most expeditious means, followed up by a boat status message as soon as possible, but no later than 12 hours after the casualty is discovered. If the casualty cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of discovery of the casualty in accordance with reference (g). Operational Commanders are responsible for monitoring the status of repairs to disabling casualties.

A.1.b. Actions underway for disabling casualties

In the event a boat sustains a disabling casualty while underway, the boat shall immediately return to the nearest safe mooring, if able, and immediately be placed into “Charlie” status. In many cases, the boat will require assistance from another vessel.



A.1.c. Actions for disabling casualties while stowed in cradle

If a disabling casualty is identified while the boat is in its cradle or moored, the boat is not authorized to get underway until the casualty is corrected. The boat shall immediately be placed into “Charlie” status and repaired. Dockside materiel inspections may continue after discovery of a disabling casualty, but the boat shall not get underway for full power trial or underway exercises until all disabling casualties are fully repaired and tested underway.

A.2. Restrictive discrepancies

Restrictive discrepancies are those which restrict the operations of the boat such that it can perform some activities, but not all activities, safely. Boats with restrictive discrepancies shall only be operated if the Operational Commander has issued a written waiver. A verbal waiver is authorized, as long as it is followed with a written waiver within four hours. The ultimate authority for boat waivers resides with the Operational Commander. This authority may not be delegated for cutter boats and must remain with the Operational Commander. *Appendix E* contains a listing of restrictive discrepancies.

A.2.a. Reporting restrictive discrepancies

Restrictive discrepancies shall be reported to the Operational Commander if the discrepancy cannot be repaired within one hour. The boat shall be immediately placed in a “Charlie” status and shall not get underway until the discrepancy is corrected, or a waiver has been received. If the discrepancy cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the discrepancy. The Operational Commander is responsible for monitoring the progress of repairs to these discrepancies

A.2.b. Actions underway for restrictive discrepancies

In the event the boat sustains a restrictive discrepancy while underway, the Coxswain shall immediately notify the parent unit with all pertinent information and a recommendation as whether to continue or abort the mission. The parent unit shall pass along the information pertaining to the casualty, the current mission, and recommendations to the Operational Commander who shall immediately notify the unit as to whether or not continuing the mission is authorized, the conditions under which the boat may be operated, and precautions to be taken to lessen the hazards posed by the discrepancy.



A.2.c. Actions for restrictive discrepancies while stowed in cradle

The boat shall not get underway until the discrepancy is corrected, or a waiver has been received. Dockside materiel inspections may continue after discovery of a restrictive discrepancy, but the boat shall not get underway for full power trial or underway exercises until all restrictive discrepancies are fully repaired or have been waived by the Operational Commander.

A.3. Major discrepancies

Major discrepancies are those that degrade the effectiveness or safe operation of the boat, and/or the boat: equipment, outfit, and/or machinery's ability to operate in its designed or intended capacity without causing further damage or serious safety risk. *Appendix E* contains a listing of major discrepancies. Major discrepancies shall be documented, and a plan to correct these discrepancies shall be formulated and carried out by the unit. Operational Commanders are responsible for monitoring the status of the repairs to major discrepancies. It is suggested that, in conjunction with unit materiel inspections, Operational Commanders receive monthly reports as to the status of major discrepancies.

A.4. Minor discrepancies

Minor discrepancies do not affect the operational readiness of the boat, equipment, machinery, or outfit and has not yet reached a level of major degradation. However, a boat with minor discrepancies does not meet the standardization criteria established for the boat. The occurrence and repair of minor discrepancies shall be documented and monitored at the unit level.

A.4.a. Additional Equipment

In the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs, units are authorized to temporarily carry this extra equipment. This authorization is on a case-by-case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

NOTE 

For all cutter boats the Operational Commander is the Cutter Commanding Officer.
A written waiver may be a letter, log entry, memorandum, e-mail, or record message traffic. The written waiver shall: (1) identify the specific discrepancy which is waived, (2) describe the conditions under which the CB-L may be operated, and (3) concur on the measures to be taken to lessen or negate the hazard posed by the discrepancy.
Written waivers shall be maintained as an annotation to Part 3 of the CB-L record. Additional guidance regarding written waivers may be found in reference (d).



**Table 5-1
Operating Parameters**

Casualty/Discrepancy	Consequence	Required Action
<p><u>Disabling Casualty</u> “Boat is not serviceable.”</p>	<p>Not authorized to get underway. Notify the Operational Commander expeditiously.</p>	<p>Immediately return to nearest safe mooring. Assign “Charlie” status to the boat, and commence repairs immediately. Submit boat status message within 12 hours. Submit CASREP if applicable within 24 hours.</p>
<p><u>Restrictive Discrepancy</u> “Boat and crew cannot perform <u>all</u> activities safely.”</p>	<p>Operations allowed only with waiver from Operational Commander. Notify Operational Commander if repairs cannot be made in 1 hour.</p>	<p>Immediately notify the parent unit with information and recommendation on whether or not to continue mission. Operational Commander shall monitor progress of repairs. Any operations before restrictive discrepancies are repaired require written waiver. Submit CASREP if applicable within 24 hours.</p>
<p><u>Major Discrepancy</u> “Boat and crew can perform all missions but <u>some</u> degradation in effectiveness or safe operation of boat and/or equipment should be expected.”</p>	<p>Operations unrestricted. Discrepancy occurrence and repair is documented.</p>	<p>Maintenance plan is carried out. Operational Commander shall monitor status of repairs to the discrepancies.</p>
<p><u>Minor Discrepancy</u> “Boat and crew readiness not affected nor impaired. Boat does not meet standards.”</p>	<p>Operations unrestricted. Discrepancy occurrence and repair is documented.</p>	<p>Maintenance plan is carried out. Repair status to be monitored at the unit level.</p>



A.5. Responsibilities

The Coxswain is always responsible for the safe operation of the boat. The Coxswain must decide if the mission warrants subjecting the crew and boat to the danger defined by the mission, weather and sea conditions anticipated.

A.5.a. Disabling casualty – underway

In the event that the boat sustains a disabling casualty while underway, the boat shall immediately contact the cutter or base and return to same, if possible.

A.5.b. Restrictive discrepancy – underway

In the event the boat sustains a restrictive discrepancy while underway, the Coxswain shall not proceed without authorization. The situation and recommendations must be effectively communicated to the Operational Commander to allow for prudent risk assessment by all levels. The following is the procedure for communicating the discrepancy while underway:

Step	Procedure
1	The Coxswain shall immediately notify the parent unit with all pertinent information and a recommendation as whether to continue or abort the mission.
2	The parent unit shall pass along the information pertaining to the discrepancy, the current mission, and recommendations to the Operational Commander.
3	The Operational Commander shall immediately notify the unit as to whether or not continuing the mission is authorized, the conditions under which the boat may be operated, and precautions to be taken to lessen the hazards posed by the discrepancy.

A.6. Environmental limits

The following warnings apply to operation of the CB-L:

WARNING 

The following is a critical operational and environmental limitation:
A thorough risk assessment shall be conducted prior to employing the CB-L in seas greater than specified in *Chapter 2, Section A* of this handbook.

WARNING 

Do not operate in breaking seas or surf conditions.
A thorough risk assessment shall be conducted prior to employing the CB-L in seas greater than specified in *Chapter 2, Section A* of this handbook.



Section B. Performance Data

B.1. Fuel consumption

Fuel consumption and operating range is affected by engine tuning, weather conditions, trim, type of evolution and operating area. **Figure 5-1** shows typical fuel consumption at full load condition in calm water.

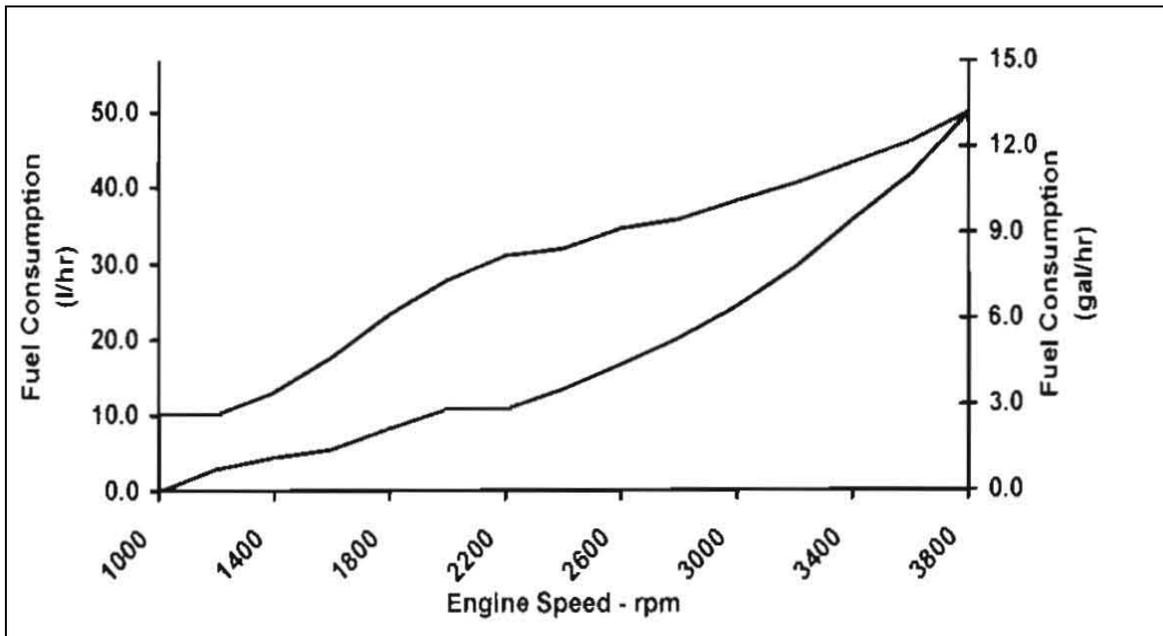


Figure 5-1
Fuel Consumption



B.2. Seakeeping Positioning the boat with respect to the wind, seas, and other craft, is essential to prevent damage to the hull or injuries to the crew.

WARNING 

The position of the boat in relation to a breaking wave crest is critical. Severe wave slap will occur in the area approximately two boat lengths in either direction of the breaking water, however, this area presents less danger of capsize.

WARNING 

When operating “in beam seas”, do not allow the boat to become “dead-in-the-water” (DIW) and be hit broadside by a wave.

B.2.a. Operating in beam seas Operating with the seas on the beam is more uncomfortable than dangerous when following basic small boat handling guidelines. Use the following techniques to minimize danger:

1. Tacking – With large seas on your beam, tack across the seas at a slight angle in a zigzag fashion. This prevents exposure of the beam to heavy swells.
 2. Changing Course – To change course heading, allow the boat to lose headway, turn the wheel hard over, and apply power to come smartly to the new heading.
-

WARNING 

Do not power the boat over the crest of a wave and into the trough of the next wave or bury the bow into the back of the next wave.

B.2.b. Operating in following seas Following seas present the greatest dangers to the CB-L. The boat does not have the balanced buoyancy or ability to lay-to in a following sea. The operational limitations are the controlling guideline and must be followed at all times.

B.3. Stability By virtue of hull design and equipment placement, the CB-L displays positive buoyancy. Ensuring the bilge areas are always free of water and eliminating the free surface affect of liquids in the bilges are essential to maintaining stability of the CB-L.



B.4. Speed

The CB-L achieves a maximum speed of over 30 KTS.

WARNING 

Do not use rapid accelerations from DIW to full speed except when necessary. This minimizes ejection of passengers and crewmembers and helps to conserve fuel and prolong engine life.

NOTE 

Maximum speed/power should be used only when operationally necessary. Under non-urgent conditions, proceed at cruise speed.



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Chapter 6

Mission Performance

Introduction

The actions and techniques described in this chapter are products of field experience. They are intended to give boat crewmembers information on how the CB-L performs and reacts in various mission scenarios. The information is not intended to provide the “only way” to perform an action or complete a mission. Boat crews should use effective communications and teamwork skills along with this general information to adapt their actions to each unique mission scenario.

Information in this section alone does not qualify a crewmember. Observe these procedures and apply skills developed through practice to effectively use the CB-L to perform missions.

In this chapter

This chapter contains the following sections:

Section	Topic	See Page
A	Boat Davit Operations	6-2
B	Starting Procedures	6-5
C	Underway	6-7
D	Going Alongside	6-8
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F	Operating with Helicopters	6-12
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Section A. Boat Davit Operations

Introduction

The CB-L is equipped with four lifting eyes located on reinforced sections of the transom and on the bow framing forward of the Coxswain's console. The Single Point Davit (SPD) uses a four-legged sling attached to the lifting eyes.

WARNING

The davit, sling and deck fitting weight limitations shall not be exceeded during launch and recovery evolutions. See the appropriate technical publications and the online Fleet Management Information System (FMIS) for weight handling limitations.

NOTE

Fully outfitted weight with boat outfit and full fluids is approximately 3,840 lbs. Normal load condition, 200 lbs of gear, with three persons onboard (POB) at 220 lbs is approximately 4,500 lbs. Full load condition of normal load condition plus additional nine POB is approximately 6,480 lbs.

NOTE

The subsequent procedures are general in nature and DO NOT replace specific U.S. Coast Guard instructions or shipboard standard operating procedures (SOP).

NOTE

The Cutter should be placed on the best course and speed that provides protection from winds and seaspray and one that minimizes the shock loading of the davit, cutterboat and crew during launch and recovery operations.

A.1. Launching

The following actions are recommended to be performed in sequence when preparing for launch:

Step	Action
1	Remove stowage covers and verify required equipment is on-board.
WARNING	<p>Any time the boat is started or has way on, the Coxswain <u>must</u> have the lanyard of the engine kill switch clipped to his/her survival vest or PFD. A second kill switch activation clip and lanyard <u>must</u> be carried onboard to enable remaining crewmembers to operate the boat in the event the Coxswain is ejected.</p>
2	Visually inspect the boat and davit to ensure they are ready for operations.



3	Take slight tension on the hook and inspect all connections for correct and secure attachment.
4	Release all gripes or tie-downs.
5	Lift the boat to clear the cradle. The boat should take a slight bow up attitude.
6	Slew out so the boat is clear of the Cutter.
7	Lower the boat to the appropriate deck.
8	Slew in and crib the boat at the rail.
9	Load crew, passengers and gear, ensure weight limitations are not exceeded.
<div style="border: 2px solid black; padding: 5px; display: inline-block;"> <p>CAUTION ! The outdrive unit must be in the water before starting the engine.</p> </div>	
10	Coxswain ensure kill switch activation clip is installed and lanyard is attached to the survival vest.
11	Slew out as necessary.
12	Lower the boat.
13	Use the painter to maintain the fore and aft alignment of the CB-L. Use tending lines to keep the cutterboat parallel to the Cutter and prevent the cutterboat from swinging wide.
14	Once waterborne, immediately start the boat and release the hook.
15	Power up electronics.
16	Load additional passengers and gear as required.
17	Order the tending lines released.
18	Boat Coxswain then maneuvers away from the Cutter, increases speed and gives command “release the painter” to the Boat Crew Member.
19	The sea painter tender recovers the painter and immediately makes it ready to recover the boat.



A.2. Recovery

The following actions shall be performed in sequence when preparing for recovery:

NOTE

Ensure the tubes are properly inflated prior to coming alongside the Cutter.

Step	Action
1	Receive permission to come alongside.
2	The Coxswain matches the course and speed of the Cutter at a distance safe for current sea state.
3	The Coxswain orders the sea painter passed while maintaining station on the Cutter.
4	Once the painter has been rigged, the Coxswain eases off on the throttle and allows the boat to fall back and lay alongside the Cutter.
5	Tending lines are passed.
CAUTION !	When conducting an SPD hoisting evolution, the lifting sling MUST be attached to the SPD sling attachment points PRIOR to the start of the hoisting evolution.
6	Unnecessary recovery personnel and gear are unloaded.
7	The hook is lowered and rigged.
8	Use the painter to maintain the fore and aft alignment of the boat. Use tending lines to keep the cutterboat parallel to the Cutter and prevent the cutterboat from swinging wide.
9	Hoist the boat, slew in and crib at the rail.
10	Secure the electronics. The boat crew debarks the boat and mission equipment is removed.
11	Slew out as necessary and hoist the boat.
12	Slew in and lower the boat into the cradle.
13	Gripe the boat.
14	Washdown and fuel the boat.



Section B. Starting Procedures

Introduction

A number of checks and procedures must be performed prior to, during, and after engine start.

CAUTION!

The CB-L should not be started until it is in the water or until water is provided to the water pump from another source. Serious damage to the engine will occur if no cooling water is provided.

B.1. Checking the boat while boat is in the cradle

The following checks may be conducted with the boat in the cradle:

Step	Action
1	Verify daily boat checks have been completed.
2	Ensure bilge area is free of all liquids.
3	Check fuel tank level; 95% full is 23.75 gallons.
4	Check engine oil level.
5	If necessary, prime the fuel system using pump atop engine fuel filters.
6	Check jacket water/coolant level.
7	Check oil level in stern drive and power trim reservoirs.
8	Check hybrid collar for obvious damage and for proper inflation.
9	Check all belts on engine for condition and proper tension.
10	Check condition of hull and deck areas for obvious damage.
11	Turn battery switches to ON position.
12	Remove and stow Console covers.
13	Ensure the Coxswain has the engine kill switch activation clip and lanyard properly attached.



Once the CB-L is in the water, start the engine as follows:

Step	Action
1	Trim down the outdrive as directed.
2	Insert the activation clip in the engine kill switch.
3	Ensure that the throttle is in neutral.
4	Turn ignition toggle switch on
5	Push START button and release once engine is running.
6	Verify normal engine operating parameters on available gauges and indicators.

B.2. Raising the lightning rod

The lightning rod should normally be kept in place on the antenna arch except when trailering. If the lightning rod is stowed, and all engine operating conditions have been verified as normal, Coxswain can direct that the lightning rod be put in place.

B.3. Turning on communications/navigation gear

After all checks have been performed, the Coxswain may direct the crewmembers to turn on all required communications/navigation gear. Ensure all crewmembers are wearing communication headsets.

B.4. Establishing communication channels

At the discretion of the Coxswain, conduct checks of all essential electronic gear and establish required communication channels as directed.



Section C. Underway

Introduction

After getting underway, the Coxswain shall observe all appropriate gauges and report status to the Cutter as directed. The Coxswain, using the interior communications system, will keep the crew alert of any course or speed changes. If an abnormal condition occurs, take corrective action immediately to prevent further damage.

WARNING

The use of the kill switch is required whenever the boat is started or has way on. The kill switch is located below the throttle (**Figure 3-15**) The activation clip (with red plastic cap) for the kill switch must be inserted into the switch body to start the engine. The 36 inch lanyard must be properly attached to the Coxswain at all times during boat operation. A second kill switch lanyard with activation clip must be carried onboard to enable remaining crewmembers to operate the boat in the event the Coxswain is ejected.

C.1. Communication

Crew communications and coordination is the key to safe operations. All assigned crewmembers are provided with headsets that interface with the Boat Crew Communications System (BCCS).



Section D. Going Alongside

Introduction

The following is a generic procedure for going alongside. The CB-L crews must be familiar with the applicable U.S. Coast Guard Instructions and the Cutter’s SOP for going alongside a vessel of interest.

Step	Action
1	Ensure that communications between the CB-L and the Cutter are established and reliable.
2	Attempt to make and establish contact with the vessel of interest on designated marine band frequencies.
WARNING	Pick a contact point well clear of a larger vessel’s propeller (including in the area of suction screw current), rudder, and quarter wave. Forces from these could cause loss of control.
3	Make approach preparations and inform the crew. Coxswain determines where to make contact with the vessel.
4	Conditions permitting, match your speed to the other vessel, and then start closing in from the side.
5	Close at a 15° to 30° angle to the other vessel’s heading. This should provide a safe rate of lateral closure at no more than one-half the forward speed.
NOTE	If your initial heading was parallel to the other vessel, you will have to increase speed slightly when you start to close at an angle.
WARNING	Applicable U.S. Coast Guard instructions and the Cutter’s SOP must be strictly adhered to when/if the CB-L is in close proximity of any vessel that fails to identify itself.
6	If contact had been made with the vessel of interest, determine if a boarding ladder (if necessary) is available and rigged.



<p>NOTE </p>	<p>As both the CB-L and vessel of interest have headway, the pressure of the water on the boat’s bow will cause it to sheer away from the ship. Use this force by touching on the helm to control sheer, in or out, by catching the current on one side of the bow or the other side</p>
<p>NOTE </p>	<p>When sheering in or out, apply rudder slowly and be prepared to counteract the tendency of the boat to close or open quickly.</p>
<p>7</p>	<p>Come alongside the vessel, matching its course and speed.</p>
<p>8</p>	<p>Use helm to hold the boat at the desired position alongside or at some distance off the vessel.</p>
<p>CAUTION !</p>	<p>Use care when going alongside a vessel of interest so as not to damage the boat’s hull.</p>
<p>9</p>	<p>Make contact with the forward sections of your boat (about halfway between the bow and amidships). Use helm and power to hold the bow into the other vessel at the same forward speed. Do not use so much helm or power that you cause the other vessel to change course.</p>
<p>10</p>	<p>When alongside, do what has to be done. Ensure that communication with the Cutter is established to update the status of the assigned mission. If personnel are to be embarked/disembarked on the vessel of interest, utilize a boarding ladder as provided. Minimize the time alongside. If necessary, and following U.S. Coast Guard instructions and the Cutter’s SOP, “make-up” to the other vessel rather than relying on helm and power to maintain contact.</p>
<p>11</p>	<p>When the mission is complete, embark all personnel. Sheer the stern in with the helm to get the bow out. Avoid getting set toward the side or stern of the vessel.</p>
<p>CAUTION !</p>	<p>Never back down when clearing alongside, parallel to another vessel that is making way.</p>
<p>12</p>	<p>Apply gradual power to gain slight relative speed. Maneuver the CB-L away from the vessel of interest. Continue to update position and status of the mission with the Cutter.</p>



Section E. Handling Characteristics

Introduction

Boat handling is a complex skill that requires knowledge and practical underway experience to build confidence and skill level. Always use forethought and finesse when handling the CB-L. Know the boat's handling features, monitor weather conditions and be aware of the operating limitations of the craft.

E.1. Turning and pivoting

E.1.a. Turning

Because the CB-L incorporates an outdrive unit that uses propulsion thrust for directional control, the boat can make a much tighter turn than the same craft with a shaft, propeller and rudder.

Coxswains should become familiar with the fact that the stern of the CB-L will have a tendency to skid outward more when making a turn than that of a conventionally-driven craft. The Coxswain should practice steering and turning with one hand while the other hand is free to adjust the throttle.

The boat, due to the outdrive, develops a rotational torque that can cause a “pull” in steering or when negotiating a sharp starboard turn. Coxswains should be aware of this turning action and should overcome this torque-lock by immediately reducing the engine RPM and counter-steering.

E.1.b. Pivoting

The CB-L rotates in a transverse direction about a vertical axis on its pivot point. The fore and aft location is slightly aft of amidship when the boat is at rest. As the boat moves ahead or astern, the pivot point moves either forward or aft, respectively. Excessive or unequal trim can cause the pivot point to be positioned where it can cause instability at high speeds and especially when negotiating turns.

E.2. Head seas and buoyancy

E.2.a. Head seas

Traveling into head seas does not present any problems to the CB-L if the boat is properly trimmed and being operated within its operational parameters.



E.2.b. Buoyancy The buoyancy of the hull enhanced by the buoyancy and stability provided by the inflatable “air/foam” hybrid collar makes the boat handle well in head seas. When operating at or near the maximum sea limiting factor, the Coxswain must use both hands to operate the steering and throttle to keep the bow from burying into the seas. CB-L Coxswains shall avoid breaking seas.

E.3. Beam seas and following seas

E.3.a. Beam seas In large beam seas, the wave action will cause the boat to roll. The rolling of the hull will have a great affect on the steering response. The hybrid collar of the boat will greatly retard the rolling action of the craft.

E.3.b. Following seas Keeping the CB-L in control and stable is more challenging in a following sea. Due to the low transom of the CB-L, even a small following wave can flood the hull and exceed the self-bailing capabilities of the craft. In large following seas, the boat can slip down the back of seas and heel strongly. Adjust the speed of the CB-L to ensure that the boat is not over-run by following seas or that it does not drive into the back of the next wave ahead.

E.4. Effects of wind

E.4.a. Afloat and properly trimmed The CB-L possesses approximately 19 inches of freeboard with the boat in its Normal load condition. When afloat and properly trimmed, the bow of the boat is higher than the transom, and the boat will tend to ride stern to the wind.

E.5. Station keeping

E.5.a. Navigational orientation The CB-L is capable of station keeping on an object or vessel utilizing the installed radar and GPS systems. However, the Coxswain must manage the effects of environmental forces to keep station. The Coxswain should be aware of:

1. Maintaining distance, position and aspect with respect to another vessel or object.
 2. Formulating a technique for matching craft drift rate with other vessels and then overcoming that vessel.
 3. Developing a safe escape route to get clear of a vessel or object.
 4. Utilizing techniques to safely pace the CB-L to another vessel and maneuver around it.
-



Section F. Operating with Helicopters

Introduction

The CB-L has installed communications and navigation equipment to operate with helicopters on assigned marine and aviation frequencies for all missions.

The tactical mission of the CB-L and its coordination with helicopter operations has been promulgated in reference (h).



Section G. Securing Procedures

Introduction

Upon returning from a mission and the boat is secured in its storage cradle, take the following steps, in the given order, to secure the boat properly and to prepare it for the next mission:

Step	Procedure
1	Secure the battery switch.
2	Top off fuel level.
3	Conduct visual inspection of outdrive.
4	Stow all gear on boat.
5	Wash down boat with fresh water.
6	Cover the Helm, Navigation and Communication Consoles with their protective coverings, as required.
6	Complete underway Abstract of Operations (AOPS) and notify the Engineering Officer (EO) of any discrepancies. The mission is NOT complete until the boat is ready for the next mission.



Chapter 7

Emergency Procedures

Introduction

Responding to equipment casualties and emergencies aboard the CB-L should be second nature to all members of the crew. The ability of crewmembers to take immediate action to control emergency situations is critical to prevent a bad situation from getting worse. While every event is different, step-by-step procedures help gain control of the casualty and aid in troubleshooting.

The first step in responding to all casualties is to protect the immediate safety of all crewmembers and to communicate the nature of the casualty to the crewmembers. It is the Coxswain’s responsibility to keep the Operational Commander informed of all emergencies encountered during the operation of the boat.

The Coxswain and crew should work together to determine if equipment casualties can be safely repaired while underway. The Coxswain must decide whether a casualty has impacted the ability of the boat and crew to complete the mission. The Coxswain should not make the decision in a vacuum; input from other crewmembers, as well as communication with Cutter personnel, should be used to determine whether to continue with the mission. The following factors should be considered:

	Factors
1	The safety and physical condition of the crew and boat.
2	Equipment limitations due to the casualty.
3	Current and forecasted weather and sea conditions.
4	The urgency of the mission.



In this chapter This chapter contains the following sections:

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C	Steering Casualty (Hydraulic)	7-5
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Section A. Capsizing

A.1. Symptom(s) Because of the design of the CB-L and the installed hybrid collar, it is unlikely that the boat will capsize.

A.2. Actions If the boat is bottom side up, take the following actions:

Step	Action
WARNING	If a crewmember is trapped under the boat, they should get clear of the boat prior to inflating their PFD.
1	Inflate PFD.
2	Swim clear of the boat.
3	If nighttime, activate strobe/personnel marker light (PML).
4	Account for all crewmembers.
5	Locate EPIRB and ensure it activates - EPIRB does not self deploy.
6	Stay as close to the boat as possible. If possible, climb back atop the capsized hull to aid in search and rescue (SAR) efforts.
NOTE	After capsize, if possible climb atop the hull. The boat is inherently buoyant even after capsize. The boat is designed to remain afloat with crewmembers on it in capsize position.



Section B. Collision With Submerged Object (or Bottom)

B.1. Symptom(s) The boat strikes a submerged object or temporarily runs aground.

B.2. Actions Take the following actions:

Step	Action
1	Reduce RPM on engine to neutral.
2	Notify crew of casualty.
3	Determine what was hit, where the object is located, and if it can still be seen.
4	Verify current position, depth of water, evaluate situation and notify the Operational Commander.
5	Engineer check engine space and outdrive for obvious flooding or damage.
6	Crewmember check bilges for flooding or obvious damage.
7	Coxswain check for steering system damage.
8	Engineer check for proper cooling water circulation or debris in the raw water strainer.
9	Crewmember check forward access plate for flooding or obvious damage.
10	Coxswain conduct steering check for limitations.
11	Coxswain will check engine RPM (in both neutral and engaged) at various speeds while Engineer is checking for vibration/flooding and to assess damage to propulsion system.
12	Return to unit at reduced speed, if warranted, to prevent additional damage or vibration.
13	Coxswain coordinate with the Operational Commander for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operation.
NOTE 	The boat should be hoisted to determine extent of damage; especially if there is a vibration.



Section C. Steering Casualty (Hydraulic)

C.1. Symptom(s) The helm turns in either direction with no response (caused by a failure within the hydraulic system.)

C.2. Actions When a partial or complete loss of steering control occurs, take the following actions.

Step	Action
1	The Coxswain should reduce engine RPMs to clutch ahead.
2	Notify crew of casualty.
3	Inspect for loss of fluid or obstruction to out drive. Secure engine if necessary.
4	Verify current position, evaluate situation and notify Operational Commander.
5	Crewmember rig the anchor as directed by Coxswain.
6	Engineer check bilges and engine compartment for obvious leaks.
7	Coxswain coordinate with unit for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continued operations.



Section D. Steering Casualty (Electrical)

Not applicable on this platform.



Section E. Running Gear Failure (Outdrive/Reduction Gear/Waterjet)

E.1. Symptom(s) Engine RPM increases but does not correspond to an increase in the boat's speed or direction.

E.2. Actions When the outdrive fails, take the following action:

Step	Action
1	Reduce RPM on engine to neutral.
2	Coxswain direct crewmembers to investigate for cause of casualty.
3	Coxswain report casualty to the Operational Commander.
4	Crewmembers should: <ul style="list-style-type: none"> a) Check outdrive fluid level in reservoir located on transom, b) Check the engine to outdrive interface, c) Check the sea aft of the transom for any visible oil sheen, and d) Report all findings to Coxswain.
5	Coxswain report status of casualty to the Operational Commander.



Section F. Fire in the Engine Room

F.1. Symptom(s)

Smoke is sensed by sight or smell coming from the engine space.

F.2. Actions

When presence of fire is confirmed, take the following actions.

Step	Action
1	Reduce RPM on engine to neutral.
2	Notify crew and Operational Commander of casualty.
3	Engineer check engine space through engine room vents to assess situation.
4	Coxswain secure engine with ignition toggle switch at helm, verify position.
5	Coxswain close fuel shutoff valve located forward of the helm.
6	Utilize portable extinguishers through access port.
7	Crewmember secure all non-essential electrical power breakers (all except VHF-FM radio) with Coxswain concurrence.
8	Crewmember to rig anchor as directed by Coxswain.
9	Establish fire watch, with portable fire extinguisher.
10	Coxswain coordinate with Operational Commander for tow or other assistance, emphasizing crew safety.

WARNING 

It is extremely dangerous to open the engine compartment during or after a fire. Any introduction of oxygen into the compartment may ignite a fire re-flash. Keep the space sealed until moored and secured.



Section G. Fire in the Auxiliary Machinery Compartment Room

Not applicable on this platform.



Section H. Loss of Control of Engine RPM

H.1. Symptom(s)

Engine fails to respond properly to throttle control.

H.2. Actions

Identify the cause, prevent further damage, and take the following actions:

Step	Action
1	The Coxswain should reduce engine RPM to clutch ahead.
2	Notify crew of casualty, verify position and notify Operational Commander.
3	Open engine compartment, and attempt to control RPM manually.
4	Use engine ignition toggle switch to secure engine.
5	If engine fails to secure, Engineer close fuel shutoff valve for engine.



Section I. Loss of Fuel Oil Pressure

I.1. Symptom(s)

The CB-L experiences erratic or unstable RPMs or engine stops completely.

I.2. Actions

Take the following actions:

Step	Action
1	The Coxswain should reduce engine RPM to clutch ahead.
2	The Coxswain inform crew of casualty, verify position, evaluate situation and notify Operational Commander.
3	Crewmember to rig anchor as directed by Coxswain.
4	Engineer check bilge for fuel oil.
5	Check the emergency fuel shutoff valve to ensure that it is open.
6	Check the fuel filters for accumulated sediment and water in the bowls. Replace if suspect. Re-prime the system.
7	Check the entire fuel system for obvious leaks; check fuel tank level.
8	Identify and correct source of problem or request additional assistance from Operational Commander.



Section J. Loss of Lube Oil Pressure

J.1. Symptom(s)

The alarm sounds and displays a warning on the SmartCraft display panel.

J.2. Actions

Take the following actions:

Step	Action
1	The Coxswain should reduce engine RPM to clutch ahead.
NOTE <i>↪</i>	The lube oil alarm is variable, which means that at any given engine RPM, the oil pressure must be within a certain range or the alarm will sound. The lube oil alarm may be directly related to engine temperature; an overheating engine may set the lube oil alarm off.
2	Coxswain immediately secure the engine, inform crewmembers of the casualty, verify position and notify Operational Commander.
3	Crewmember to rig anchor as directed by Coxswain.
4	Engineer check the bilge for oil and obvious lube oil leaks.
5	Engineer check the engine lube oil for quantity and quality.
6	If the cause is not correctable, do not restart the engine.



Section K. Main Engine High Water Temperature

K.1. Symptom(s) The alarm sounds and displays a high cooling water temperature warning on the SmartCraft display panel.

K.2. Actions Take the following actions:

Step	Action
1	Coxswain should reduce engine RPM to clutch ahead and determine that engine has overheated.
2	Coxswain notify crew of casualty, verify position and contact Operational Commander.
3	Coxswain secure engine if temp exceeds 221° F.
4	Engineer check engine temperature as indicated on gauge, check bilges and engine for obvious leaks.
5	Check the raw water strainer and clean the strainer as necessary.
6	If the strainer is clean, check the raw water pump cover lightly with the back of the hand for coolness.
7	Check the engine and bilge for leakage. Correct casualty, and then replace fluid if necessary.
WARNING 	If steam is flowing from the expansion tank vent, the engine should be secured and cooled naturally. Do not remove the expansion tank cover of a hot engine. The coolant will either flash to steam or boil with a serious potential for injury.
NOTE 	Anti-freeze is poisonous. Do not inhale the fumes.



8	Inspect the jacket water pump for normal function.
9	Check lube oil for proper quantity and quality.
10	If jacket water leaks are found, the pump is inoperative, or temperatures continue to climb, secure the engine.
NOTE 	Oil alarms and sensors are directly related to engine temperature. An overheating engine will often set off lube oil alarms.
CAUTION !	If after all efforts have been made at casualty control, including reducing the engine load, the engine temperatures do not decrease, secure the engine. The manufacturer recommends shutdown of the engine if the temperature exceeds 212° F.



Section L. Low Voltage Alarm Loss of Electrical Charging System

Not applicable on this platform.



Section M. Flooding

Not applicable on this platform.



Section N. Hard Grounding

N.1. Symptom(s) The CB-L hits bottom and becomes hard aground (unable to initially float free).

N.2. Actions Assess the resulting damages; take the following actions:

Step	Action
1	Reduce RPM on engine to neutral.
2	Notify crew of casualty and assess condition of crew.
3	Evaluate the situation. Verify current position, depth of water, and notify Operational Commander.
4	Engineer inspect engine space/deck access plates for obvious flooding or damage.
5	Engineer check for proper cooling water circulation or debris in strainer. Secure engine if cooling is inadequate or excessive debris (especially sand) is observed.
6	Crewmember to rig anchor as directed by Coxswain.
7	Crewmember take depth sounding all around the boat. Coxswain determines deepest water, extent of grounding, and potential for underwater damage.
8	Consider present and future state of tide, current or other weather conditions with regard to re-floating or salvage operations.
9	Coxswain determine safest direction to deep water and method for extracting boat safely with least damage.
10	Conduct checks of propulsion system integrity prior to attempting re-floating or salvage. Take caution to reduce further damage.
11	Conduct check of steering system integrity. Check for limitations. Take caution to reduce further damage.
12	Coxswain maneuver into safe water and conduct steering check. Identify limitations and isolate areas of damage.
13	Coxswain check engine RPM (in both neutral and engaged) at various speeds.



Step	Action
14	Return to unit or appropriate haul-out facility at reduced speed to prevent additional damage, if necessary.
15	Coxswain coordinate with Operational Commander for tow or other assistance when risk assessment indicates crew or boat safety will be jeopardized through continuous operation.



Section O. Damage to Hull Plating, Foam Collar, or Inflatable Sponson

O.1. Symptom(s)

Sections of hybrid collar appear deflated.
 Obvious rips and tears to collar.

O.2. Actions

If damage to the collar occurs, take the following actions:

Step	Action
1	Coxswain notifies the Operational Commander and continues to steer the boat on course as directed.
2	Coxswain directs the crew to check for obvious damage and report findings.
3	Crewmembers should: <ul style="list-style-type: none"> a) Check the physical condition of the collar, b) Check the security of all manual inflation valves on the collar, and c) Report all findings to Coxswain.
4	Coxswain reports status of casualty to the Operational Commander.



Section P. Loss of Power to Communications/Navigation Equipment

P.1. Symptom(s)

UHF, VHF-FM, Radar, or GPS system(s) fail to operate properly.

P.2. Actions

If there is no power to operate the communications/navigation equipment, take the following actions:

Step	Action
1	Coxswain, if able, notify the Operational Commander.
2	Coxswain direct crewmembers to investigate for cause of casualty.
3	Engineer check the engine compartment and verify the condition of the alternator belts and that the electrical connections to the alternator are secure.
4	Engineer ensures that all SINS switches are on and that no fuses have blown.
5	Crewmembers report all findings to Coxswain.
6	Coxswain report status of casualty to the Operational Commander.



Section Q. Generator Emergency Procedures

Not applicable on this platform.



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Appendix A. Outfit List & Stowage Plan

Introduction

This appendix is the standard stowage plan for the CB-L outfit. No deviation from this list is authorized, except in the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs, units are authorized to temporarily carry this extra equipment.

This authorization is on a case-by-case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat’s standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

In this Appendix

This appendix will contain the outfit list and stowage plan for the boat when provided by the U.S. Coast Guard.

WARNING

Any time the boat is started or has way on, the Coxswain must have the lanyard of the engine kill switch clipped to his/her survival vest or PFD. A second kill switch activation clip and lanyard must be carried onboard to enable remaining crewmembers to operate the boat in the event the Coxswain is ejected.



Item	Quantity
ANCHOR BAG CONTAINING (required inland and near coastal only):	
Fortress FX-7 Anchor (installed to bracket on face of the step below the forward anchor bit) or (kept in anchor bag).	1 each
$\frac{3}{8}$ inch Galvanized Anchor Shackle	1 each
$\frac{1}{4}$ inch x 4 FT PVC Coated Anchor Chain	1 each
$\frac{3}{8}$ inch Galvanized Shackle (attached to swivel)	1 each
$\frac{3}{8}$ inch Galvanized Swivel (eye to eye)	1 each
$\frac{5}{8}$ inch Galvanized Shackle (attached to thimble/swivel)	1 each
$\frac{5}{8}$ inch Anchor Line Thimble (spliced in eye)	1 each
Anchor/towline (the same line) ($\frac{5}{8}$ inch circumference DBN x 150 feet)	1 each

Item	Quantity
MAIN DECK	
Fire Extinguisher Type 5B:C (mounted behind Coxswain console, seat)	1 each
Fire Extinguisher Type 5B:C (mounted on engine compartment bulkhead, port side)	1 each
20 inch Throwable Life Ring (behind Coxswain seat)	1 each
Life Ring Strobe Light (behind Coxswain seat)	1 each
406 MHz Category II EPIRB (mounted on engine compartment bulkhead, port side)	1 each
Headsets (stored at each station)	3, or 5 if jump seats are installed
Trailer Tie-Down (under Coxswain seat)	2 each
Sponson Repair Kit (under Coxswain seat)	1 each
Sponson Pressure Gauge (under Coxswain seat)	1 each
Paddles (Engine Compartment – port side)	2 each
Boat Hook (Engine Compartment – starboard side)	1 each
National Ensign (portside mast)	1 each
Coast Guard Ensign (starboard side mast)	1 each
Lightning Rod (stowed starboard side, aft)	1 each
Hoisting sling- four leg (4,500 lbs capacity)	1 each
Gun Case (aft, starboard side)	1 each
Kill switch lanyard at the Coxswain station	1 each



Item	Quantity
MAIN DECK	
20' Mooring Lines/Frapping Lines (1/2 inch diameter DBN)	4 each
Throw Line Bag (attached to Coxswain's console)	1 each
Shore Tie Cable (stored aboard Cutter)	1 each

Item	Quantity
NAV KIT CONTAINING (required inland and near coastal only, stored port side pod lower console):	1 kit
Briefcase with Coast Guard Logo	1 each
Charts (as required per Area of Responsibility (AOR))	various
Pencils	1 min
China Markers (grease pencils)	1 min
Stop Watch	1 each
Search Pattern Slide Rule	1 each
Parallel Rule	1 each
Weems Plotter	1each
Gum Eraser	1 each
Pencil Lead Sharpening Pad	1 each
Tide Book (pages as required)	various
Coast Pilot (pages as required)	various
Navigation Rules (NAVRULS)	1 each
Light List (pages as required)	various
Nautical Slide Rule	1 each
Chart One	1 each
Note Pad	1 each
Flashlight with Red Lens	1 each
Compass and Dividers	1 each



Item	Quantity
TOOL KIT CONTAINING (stored starboard side pod lower console storage):	1 kit
Spare Kill Switch Lanyard	1 each
Phillips Slotted Screw Drivers	1 each
Racor Filter	1 each
Raw Water Impeller	1 each
Impeller Gasket	1 each
Wire Ties	4 min
Various Fuses (1 amp to 30 amp)	2 each
Flashlight (no larger than 2D cell in size)	1 each

Item	Quantity
STARBOARD SIDE POD LOWER CONSOLE STORAGE:	
Portable Searchlight	1 each
Inflation Foot Pump	1 each
Binoculars 7 x 50 Marine Waterproof	1 each
Fieldtex Small Six Person First Aid pack	1each
Reed Mouth Horn or Air Horn	1 each
Hand Bilge Pump	1 each
Radar Reflector	1 each
Dewatering Pump Straps	As required
Transom Tie-Down	2 each



Appendix B. Time Compliance Technical Orders (TCTOs)

Introduction This appendix contains a list of authorized TCTO for the CB-L.

NOTE *~*

For a complete breakdown of the Time Compliance Technical Order Number, see Chapter 41 of reference (a).

In this Appendix This appendix contains the TCTOs for the CB-L.

Topic	See Page
Time Compliance Technical Orders (TCTOs)	B-2



Appendix C. Materiel Inspection Checklist

Introduction This appendix is meant to be a systematic means to inspect ANY CB-L and to ensure the entire boat is prepared to meet mission demands.

This checklist may be locally reproduced.

In this appendix This appendix contains the Materiel Inspection Checklist for the CB-L. This inspection list covers the following areas of the boat:

NOTE *~*

This Material Inspection Checklist must be completed annually and immediately prior to any boat transfer.

No.	Area	See Page
I	Hull	C-4
II	Deck	C-5
III	Engine Compartment Bilge Area	C-7
IV	Engine Compartment	C-8
V	Boat Trailer	C-10



Materiel Inspection Checklist

Boat number: _____

Station: _____

Date: _____

References:

- 1) Reference (a)
- 2) Reference (f)
- 3) Reference (i)

WARNING 

The engine kill switch lanyard and activation clip must be inspected daily. Damaged, deteriorated or frayed lanyards must be replaced prior to engine start. Engine kill switch operation must be tested weekly.

Inspection standards:

The following inspection standards apply to the CB-L's hull, machinery, equipment, outfit, and all installed systems and accessories:

- 1) Operates smoothly and correctly.
- 2) Free of grease, oil, rust, and corrosion.
- 3) All fluid levels and pressure readings are within tolerances.
- 4) Protective coatings applied correctly and neatly.
- 5) Free of rips, tears, abrasions, and cracks.
- 6) Outfit and equipment correctly installed, adjusted and stowed to specs and design (see *Appendix A*).
- 7) Labels, test dates and placards properly indicated.
- 8) Free of non-standard/unapproved installations or equipment.
- 9) Maintained according to current manufacturer's guidelines and Commandant Directives.



**Inspection
guidelines:**

Inspection requires a minimum of *two* personnel, preferably one Boatswain’s Mate and one Machinery Technician, who possess extensive CB-L experience and a strong working knowledge of the contents of all references listed above. This materiel inspection checklist is only applicable to boats in a “Bravo” or “Ready for Sea” condition. Each item on the checklist should be judged against applicable standards and references. Additional discrepancies including uninstalled TCTO should be listed.

Inspected By: _____ Date: _____

Inspected By: _____ Date: _____



I. Hull

WARNING

Any time the boat is started or has way on, the Coxswain must have the lanyard of the engine kill switch clipped to his/her survival vest or PFD. A second kill switch activation clip and lanyard must be carried onboard to enable remaining crewmembers to operate the boat in the event the Coxswain is ejected.

ITEM	SAT	UNSAT	REMARKS
Hull (visible surfaces)			
Air/Foam Hybrid Collar			
Transom			
Cleats			
Tie-downs			
Outdrive			
Trim Actuators			
Lettering/Numbering/Decals			
Self-Bailing One Way Scuppers			

REMARKS: _____



II. Deck

ITEM	SAT	UNSAT	REMARKS
Antenna Arch Attachment Fittings			
Lifting Eyes and Tie-downs			
Lifting Sling and Last Weight Test Date _____			
Fuel Fill Station (fill, vent)			
Console Foundations			
Deck Covering (non-skid)			
Engine Compartment Cover			
Water Proof Equipment Covers			
Port Console			
Starboard Console			
Integrated Crew Communications System			
EPIRB			
Engine Kill Switch Lanyard and Activation Clip (2)			
Portable Fire Extinguisher (2)			
Coxswain Console and Windscreen			



ITEM	SAT	UNSAT	REMARKS
Antenna Arch Components			
Primary VHF-FM Antenna			
Secondary VHF-FM Antenna			
AIS VHF-FM Antenna			
UHF-FM Antenna			
Nav GPS Antenna			
AIS GPS Antenna			
Radome			
White Light			
Blue Light			
Loudhailer Speaker			
Red/Green Lights			
Port Console			
VHF-FM Radio Control Head			
UHF-FM Radio Control Head			
VHF-FM Radio/Loudhailer			
Starboard Console (SINS)			
Starboard Console AIS			

REMARKS: _____



III. Engine Compartment Bilge Area

ITEM	SAT	UNSAT	REMARKS
Electric Bilge Pump			

REMARKS: _____



IV. Engine Compartment

ITEM	SAT	UNSAT	REMARKS
Engine			
Starter			
Alternator			
Engine Mounts			
Control Cables/Bellcrank			
Jacket Water Tank			
Jacket Water Cooler			
Jacket Water Pump			
Engine Drive Belts			
Turbocharger			
Primary Fuel Filter			
Secondary Fuel Filter			
Fuel Lubricity Filter			
Lube Oil Filter			
Dipstick			
Lube Oil Cooler			



ITEM	SAT	UNSAT	REMARKS
Fuel Cooler			
Engine Block Heater			
Outdrive Components			
Trim Pump and Reservoir			
Outdrive Oil Reservoir			
Mercathode Controller			
Steering Actuator and Hoses			
Engine-to-Outdrive Interface			
All Flexible Hoses			

REMARKS: _____



V. Boat Trailer

ITEM	SAT	UNSAT	REMARKS
Trailer Plug Connector			
Safety Chains			
Breakaway Lever Actuating Chain			
Brake Actuator Fluid Level			
Emergency Brake Latch			
Tongue Jack			
Trailer Winch			
Bow Stop			
Brake Lights			
Bearing Seals			
Lug Nut(s)			
Tires			
Fenders			
Frame			
Bunks			



ITEM	SAT	UNSAT	REMARKS
Brakes			
Axles			
Wiring			

REMARKS: _____



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Appendix D. Disabling Casualties

Introduction This appendix contains disabling casualties for the CB-L. Refer to *Chapter 5, Section A* of this handbook for steps to follow if any of these casualties occur.

In this appendix The disabling casualties list covers the following subject areas:

Topic	See Page
Engine parameters	D-2
Engineering system components	D-2
Boat outfit	D-3
Electronics/ navigation	D-3
Safety	D-3
General materiel	D-3



Disabling Casualty List - Underway

Engine parameters

- 1) Engine speed less than 2500 RPM or greater than 3875 RPM.
 - 2) Any fuel oil or lube oil leak falling on a hot surface (hot surface is defined as a surface greater than 400° F or around turbocharger).
 - 3) Engine lube oil pressure less than 30.5 PSI or alarm is activated:
 - 4) Engine jacket water temperature above 221° F or alarm is activated.
 - 5) Lube oil pressure alarm inoperative.
 - 6) Jacket water temperature alarm inoperative.
 - 7) Exhaust cooling water alarm activated or alarm inoperative.
 - 8) Jacket water level alarm activated or alarm inoperative.
 - 9) Gear oil level alarm activated or alarm inoperative.
 - 10) Fuel filter separator alarm activated or alarm inoperative.
 - 11) Inoperable visual and audible alarms.
 - 12) Inoperable pressure and temperature gauges.
 - 13) Uncontrollable Overheat
-

Engineering system components

- 1) Engine fails to start.
 - 2) Metallic/non-metallic noise: metal on metal/fuel knock/bearing/clicking.
 - 3) Excessive outdrive or engine vibration.
 - 4) Loose/missing/damaged/fittings, nuts, bolts, brackets, etc.:
 - a) Engine outdrive interface.
 - 5) Engine surging/over speed (over 50 RPM).
 - 6) Loss of engine control.
 - 7) Engine oil level; empty (no oil on the dipstick).
 - 8) Water in engine lube oil (emulsified white milky oil).
 - 9) Lube oil in engine jacket water. More than a light sheen.
 - a) Floating unmixed lube oil separated from the water.
 - 10) Charging system faulty or inoperative.
 - 11) Continuous electrical breaker trip.
 - 12) Continuous failure of fuses.
 - 13) Steering system inoperative.
 - 14) Engine mounts hardware loose or missing.
 - 15) Flexible hoses and gauge lines used for petroleum based products not either fire rated or fire sleeved (fire sleeve properly banded at both
-



	<p>ends).</p> <p>16) Loose or missing propeller coupling nut/cotter pin.</p> <p>17) Loose/disconnected engine control hardware.</p> <p>18) Loose/disconnected steering actuator hardware.</p> <p>19) Missing fuel cap.</p> <p>20) Lower unit oil level; empty (no oil in reservoir).</p> <p>21) Tilt trim reservoir oil level; empty.</p> <p>22) Installed bilge pump missing/inoperative.</p> <p>23) SmartCraft system inoperative.</p>
Boat outfit	<p>1) Missing engine kill switch activation clip and lanyard (includes spare).</p> <p>2) Both portable fire extinguishers missing or unserviceable.</p>
Electronics/ navigation	<p>1) No installed electronic means of signaling distress (i.e., radio and EPIRB not installed or unserviceable).</p> <p>2) 12 VDC system will not energize.</p> <p>3) No means of signaling distress (i.e. loudhailer, horn, and reed mouth horn/air horn missing or inoperative).</p>
Safety	<p>1) Davit past inspection date/not rated.</p> <p>2) Truck and complete hitch system (hitch, ball mount, and ball) not rated at 10,000 lbs or greater, rating <u>must</u> be marked by manufacturers sticker or stamp.</p> <p>3) Any wiring insulation damaged or chafed resulting in an exposed conductor.</p> <p>4) Electrical arcing and sparking.</p> <p>5) Odor of insulation overheating.</p>
General materiel	<p>1) Hull/transom plating breach below the waterline.</p> <p>2) Damage to air/foam hybrid collar/valves (unable to hold air).</p>



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Appendix E. Restrictive Discrepancies

Introduction This appendix contains restrictive discrepancies for the CB-L. Refer to *Chapter 5* of this handbook for steps to follow if any of these casualties occur.

In this appendix This appendix contains the following information:

Topic	See Page
Engine and boat systems	E-2
Boat outfit	E-2
Electronics/navigation	E-3
General materiel and safety	E-3
Trailer	E-3



Engine and boat systems

- 1) Engine performance:
 - a) Engine speed less than 3,500 RPM.
- 2) Leaks more than 15 drops per minute:
 - a) Lube oil falling onto a surface which is not hot.
 - b) Raw water
 - c) Jacket water.
 - d) Steering actuator.
- 3) Any fuel oil leak (piping/fittings/tank) falling onto a surface which is not hot.
- 4) Emulsified oil in lower unit.
- 5) Inoperative fuel gauge.
- 6) Loose/missing/damaged/fittings, nuts, bolts, brackets, etc.:
 - a) Steering system, on the console.
 - b) Steering actuator bell crank bolts/nuts/pins.
- 7) Inoperable tilt/trim system.
- 8) Battery charge alarm activated or alarm inoperative.

Boat outfit

- 1) Antenna arch support bracket hardware loose/missing.
 - 2) Missing anchor/line/shackles.
EPIRB not Installed or unserviceable.
 - 3) One portable fire extinguisher missing or unserviceable/expired weight test.
 - 4) Manual air/foam hybrid collar pump missing/inoperative.
 - 5) Tie down straps/not rated for 6000lbs.
 - 6) Missing life ring and/or distress light.
-



**Electronics/navi
gation**

- 1) Electronic (Fluxgate) compass deviation greater than 5° and unit unable to calibrate compass.
 - 2) Navigation lights inoperative or displaying improper characteristics/ anchor lights extinguished or one or more extinguished LEDs.
 - 3) Electronics:
 - a) VHF-FM radio inoperative.
 - b) Depth sounder inoperative.
 - c) DGPS inoperative.
 - d) Radar inoperative.
 - e) UHF-FM radio inoperative.
-

**General
materiel and
safety**

- 1) One or more grips damaged/ripped and or missing.
 - 2) Portable fire extinguishers not secured in bracket.
 - 3) Holes/cracks in the hull/transom plate above the waterline.
 - 4) Missing non-skid section (8½ x 11 inches) in a working area.
-

Trailer

- 1) Damage or disfigurement of the wheel rim flange which results in exposure of the tire bead (sealing surface) and/or damage or disfigurement which warps the circular shape of the rim.
 - 2) Two or more brake rotors damaged.
 - 3) Tire air pressure below 25 PSI.
 - 4) Tire treads depth less than 1/8 inch.
 - 5) Brake/tail extinguished or one or more LEDs extinguished in the light.
 - 6) Missing/loose lug nut(s).
 - 7) Improper size tire(s).
 - 8) Damage to the tire side wall exposing the inner belt.
 - 9) Any brake fluid leak from the brake system.
 - 10) Brake actuator or back up solenoid inoperative or no fluid.
 - 11) Wheel bearings or brakes have excessive noise or play.
 - 12) Structural cracks.
 - 13) Missing safety chains or breakaway brake actuator safety chain.
 - 14) Emergency brake latch improper configuration or inoperative.
 - 15) Missing tie down straps (two required/not including winch strap).
-



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Appendix F. Major Discrepancies

Introduction This appendix contains major discrepancies for the CB-L. Refer to *Chapter 5* of this handbook for steps to follow if any of these casualties occur.

In this appendix This appendix contains the following information:

Topic	See Page
Engine and boat systems	F-2
Boat outfit	F-3
Electronics/navigation	F-3
General materiel and safety	F-3
Trailer	F-3



Engine and boat systems

- 1) Engine speed greater than 3850 RPM.
 - 2) Leaks less than 15 drops per minute:
 - a) Lube oil falling onto a surface which is not hot.
 - b) Jacket water.
 - c) Raw water.
 - d) Steering actuator.
 - 3) Engine jacket water temperature gauge indicates below 176° F.
 - 4) Bilge pump hoses missing hose clamps.
 - 5) Loose/missing/damaged fittings, nuts, bolts, brackets:
 - a) Hardware on the engines used for attaching equipment.
 - b) Battery terminals loose or corroded.
 - c) Battery not secured.
 - d) Engine control cables loose
 - e) Any loose wire terminal.
 - f) Fluid levels below minimum required.
 - 6) Any wiring insulation damaged or chafed, without exposing the conductor.
 - 7) Fuel consumption SmartCraft feature inoperative.
 - 8) Zincs corroded more than 50%.
 - 9) Damaged/inoperative console latch/locks.
 - 10) Inoperative engine cover latch.
-



Boat outfit

- 11) Missing/damaged headsets.
 - 12) Missing one or more mooring lines.
 - 13) Missing reed mouth horn or air horn.
 - 14) Missing/inoperative flashlight.
 - 15) Missing/inoperative boat hook.
 - 16) Missing/inoperative manual bilge pump.
 - 17) Missing/improperly outfitted/expired first aid kit.
 - 18) Missing/improperly outfitted sponson patch kit
 - 19) Fire extinguisher PMS not recorded on equipment tag or improperly completed.
 - 20) Improperly stored gear (to include non-standard gear/additional gear).
-

Electronics / navigation

- 1) Damaged/inoperative blue light.
 - 2) Transducer bracket damaged or loose hardware.
-

General materiel and safety

- 1) Improperly repaired damage to hull or hybrid collar.
 - 2) Damage to antenna arch.
 - 3) Loose/missing/damaged/fittings, nuts, bolts, brackets.
 - 4) Torn seat exposing metal creating a safety hazard.
 - 5) Loose/missing/damaged hardware on seat brackets.
 - 6) Inoperative/cut/torn seat belt.
-

Trailer

- 1) Loose/missing/damaged/fittings, nuts, bolts, brackets.
 - 2) Brake fluid level low.
 - 3) Damage to brake lines.
 - 4) Brake lines not properly installed.
 - 5) Brakes remain locked during back up operations.
 - 6) One/two brake rotors damaged.
 - 7) Brake rotor locked.
 - 8) Damaged/missing trailer jack.
 - 9) Missing section of Department of Transportation (DOT) reflective tape.
 - 10) Tire air pressure 25-54 PSI.
 - 11) Clearance light/marker lights with one or more extinguished LEDs.
 - 12) Bearing lubricator/damaged or missing.
-



-
- 13) Damage to the tire side wall not exposing the inner belt.
 - 14) Damage or disfigurement of the wheel rim flange which does not result in exposure of the tire bead (sealing surface).
-



Appendix G. RFO, STAN Team Inspection List

Boat on Cutter inspection

NOTE 

When the CB-L is inspected in the cradle, any disabling or restrictive discrepancies found on the trailer will not affect the CB-L from completing a full power trial.

Boat on trailer inspection

NOTE 

When the CB-L is inspected on the trailer, any disabling or restrictive discrepancies found on the Cutter will not affect the CB-L from completing a full power trial.

- 1) Ensure boat is on the trailer with truck and all safety chains/cables hooked up.
- 2) Ensure all tie downs and outfit listed items are on the boat.
- 3) Energize the truck/trailer lights.
- 4) Check the operation of the brake and turn signal lights.
- 5) Start the truck and take the truck and boat/trailer to an open area to perform the brake back up solenoid test. Inclined areas do not affect the results of the test.
- 6) Unplug cannon plug from the truck.
- 7) Back up boat/trailer, back up solenoid will close and brakes will lock.
- 8) Pull forward to release the brakes.
- 9) Plug the cannon plug back into the truck outlet.
- 10) Back up boat/trailer, back up solenoid should remain open and allow boat/trailer to back up freely.

Pre-U/W Trial

- 1) After completion of materiel inspection.
- 2) Hook up flushing ears to the lower unit.
- 3) After water is being supplied to the lower unit, start-up the engine.
- 4) Check for overboard discharge.
- 5) Check the operation of all the gauges, note results.
- 6) Pull kill switch, engine should shutdown.
- 7) Place the kill switch back on and place throttle into gear.
- 8) Attempt to start while in gear. Engine should not start while in gear.



Underway Trial After all disabling casualties are corrected and restrictive discrepancies either corrected or waived the boat may get underway for a power trial.

- 1) Put boat into the water.
- 2) Start the engine and energize all equipment and ensure the following:
 - a) Satisfactory radio checks.
 - b) GPS locks on.
 - c) Depth finder operates.
 - d) Radar transmits.
- 3) Get the boat underway, trim lower unit all the way down and bring it to a location where it can run full power for 5 minutes.
- 4) While U/W compare electronic compass with GPS. If there is more than 5° difference between electronic compass and GPS, electronic compass deviation can be determined by steering on a fixed range and known course. While steering on known course, compare course with electronic compass. If deviation is greater than 5° the electronic compass will need to be calibrated. After compass has been calibrated, complete a new test.
- 5) Bring the engines up to minimum 3,500 RPM.
- 6) Check the boat for any vibrations.
- 7) Check the throttle handles to see if they hold 3,800 RPM or creep back. If they creep back, have the operator hold the throttles at 3,800 RPM for the 5 minute period.
- 8) On the return trip, check full power, noting engine speed and RPM. Engine cannot run above 3850 RPM.

Once back at the pier, check the engines, fuel system, and steering system for evidence of leaks.



Appendix H. Vehicle – Trailer Matching Checklist

Introduction This appendix is meant to help the unit match an appropriate vehicle to a specific towing mission.

NOTE 

When obtaining weights, units should ensure that vehicles have a “normal” load in them. If a crew of four normally deploys and carries gear with them, then ALL weights should be obtained with the same people in vehicle with the same gear.

In this appendix This section includes the following information:

Topic	See Page
Trailer	H-2
Tow Vehicle	H-2
Hitch System	H-3



Trailer-Truck-Hitch Matching Checklist

Trailer

1. _____ **GROSS TRAILER WEIGHT (GTW):** Obtained from trailer, boat and normal “load” sitting detached from tow vehicle on scales. Boats should be at full fuel level and loaded with whatever gear is normally onboard during trailering operations.

 2. _____ **TRAILER TONGUE WEIGHT (TTW):** This is usually obtained from detaching the trailer with normal load from the tow vehicle and weighing only the weight produced by the jack stand or nose-wheel. It is important to have the trailer adjusted to the height that it would be towed at.
-

Tow Vehicle

3. _____ **BASE CURB WEIGHT (BCW):** This is the weight of the vehicle with fuel and no passengers or cargo. This number can be obtained from the vehicle owner’s manual or the manufacturer.

4. _____ **GROSS VEHICLE WEIGHT (GVW):** This is the Base Curb Weight (BCW) plus the weight of any passengers and cargo. To obtain this weight, detach the trailer from the tow vehicle and weigh the vehicle with the passengers and cargo onboard.

5. _____ **GROSS AXLE WEIGHT – FRONT (FRONT GAW):** This is the total weight placed on the front axle. To determine your FRONT GAW, drive your vehicle to a scale and with the trailer attached park only the front wheels of the tow vehicle on the scale. This is your FRONT GAW.

6. _____ **GROSS AXLE WEIGHT RATING – FRONT (FRONT GAWR):** This is the total weight the front axle is capable of carrying. This information is printed on the safety placard located on the driver’s door.

7. _____ **GROSS AXLE WEIGHT REAR (REAR GAW):** This is the total weight placed on the rear axle during towing operations. To obtain the REAR GAW place all four wheels of the tow vehicle leaving the trailer wheels off of the scale. From this number, subtract your FRONT GAW. This is your REAR GAW.



8. _____ **GROSS AXLE WEIGHT RATING – REAR (REAR GAWR):** This is the total weight the rear axle is capable of carrying. This information is printed on the safety placard located on the driver’s door.
9. _____ **GROSS VEHICLE WEIGHT RATING (GVWR):** This is the maximum allowable weight of the fully loaded vehicle.
10. _____ **GROSS COMBINATION WEIGHT (GCW):** This is the weight of the towing vehicle and fully loaded trailer, including passengers and any cargo.
11. _____ **GROSS COMBINATION WEIGHT RATING (GCWR):** This is the maximum allowable weight of the towing vehicle and fully loaded trailer, including passengers and any cargo. This number is typically found in the owner’s manual or through your local dealer.
12. _____ **MAXIMUM TRAILER TOWING RATING (MTTR):** Maximum amount the vehicle is designed to tow. This number is typically found in the owner’s manual or through the manufacturer’s representative.
-

Hitch System

13. _____ **HITCH CAPACITY (HC):** This is the weight that the hitch is designed to safely tow. This information is typically found on a plate attached to the hitch frame.
14. _____ **TOW BALL RATING (TBR):** This is the weight that the towing ball is designed to safely handle. It is typically stamped onto the top of the ball.
15. _____ **TONGUE WEIGHT RATING (TWR):** This is the weight that the hitch system is designed to safely support. This number is typically stamped on the hitch frame.
16. _____ **DRAW BAR TONGUE RATING (DBTR):** This is the tongue weight that the draw bar is designed to safely carry. This is typically found stamped on the top of the draw bar.



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Appendix I. List of Acronyms and Abbreviations

Introduction This appendix contains a list of the acronyms used throughout the handbook.

In this appendix This appendix contains the following information:

Topic	See Page
List of Acronyms and Abbreviations	I-2



ACRONYM	DEFINITION
A/C	Air Conditioning
AC	Alternating Current
AES	Advanced Encryption Standard
AIS	Automatic Identification System
AOPS	Abstract of Operations
AOR	Area of Responsibility
API	American Petroleum Institute
BCW	Boat Curve Weight
BO	Boarding Officer
CASREP	Casualty Report
CB-L	Cutterboat-Large
CO	Commanding Officer
COMDTINST	Commandant Instruction
DBN	Double Braided Nylon
DES	Digital Encryption Standard
DGPS	Differential Global Positioning System
DIW	Dead-in-the-Water
DoD	Department of Defense
DOT	Department of Transportation
DSC	Digital Selective Calling
ELMR	Enterprise Land Mobile Radio
EMT	Emergency Medical Technician
EO	Engineering Officer
EPIRB	Emergency Position Indicating Radio Beacon
GPH	Gallons Per Hour
GPS	Global Positioning System
FMIS	Fleet Management Information System
HF	High Frequency
HP	Horsepower
ICCS	Integrated Crew Communications System



ACRONYM	DEFINITION
KTS	Knots
kW	Kilowatt
LED	Light Emitting Diode
LOA	Length Overall
MLEM	Maritime Law Enforcement Manual
MPH	Miles per Hour
MSST	Marine Safety and Security Team
NAVRULS	Navigation Rules
NM	Nautical Mile(s)
OIC	Officer-in-Charge
OTAR	Over the Air Re-keying
PFD	Personal Flotation Device
PML	Personnel Marker Light
PMS	Preventive Maintenance System
POB	Person Onboard
PPE	Personal Protective Equipment
PQS	Performance Qualification Standard
PSI	Pounds per Square Inch
PTT	Push To Talk
PWCS	Ports, Waterways and Coastal Security
RFO	Ready for Operations
RPM	Revolutions per Minute
SAR	Search and Rescue
SATCOM	Satellite Communication
SBPL	Small Boat Product Line
SF	Safety Factor
SINS	Scalable Integrated Navigation System
SOP	Standard Operating Procedure
SPD	Single-Point Davit
STAN Team	Standardization Team



ACRONYM	DEFINITION
TCTO	Time Compliance Technical Orders
UHF	Ultra High Frequency
UHF-FM	Ultra High Frequency - Frequency Modulation
UHMW	Ultra High Molecular Weight
VAC	Volts Alternating Current
VDC	Volts Direct Current
VHF-FM	Very High Frequency-Frequency Modulation
WAAS	Wide Area Augmentation System
WLB	Seagoing Buoy Tender (Juniper Class)
WHEC	High Endurance Cutter (Hamilton Class)
WMEC	Medium Endurance Cutter (Reliance Class)
WIF	water-in fuel sensor
XO	Executive Officer
XPO	Executive Petty Officer



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