

OPERATIONS MANUAL

Wanderful



Welcome aboard! It's a HYBRID!

We are happy you have chosen “Wanderful” for your vacation. We are sure you will enjoy cruising the lovely islands of the Pacific Northwest.

Wanderful has a lightweight hybrid hull and is powered by either an efficient single 220 horsepower diesel engine or an EV electric motor for economical and clean travel.

Her European design is modern and functional. She is equally suited for a day of fun on the water or a week's long cruise of the islands.

We trust this manual will help you become familiar with the boat. If you have questions about the boat or about places to visit, please do not hesitate to ask the AYC staff.

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BOAT OPERATION

Engine Inspection

Remember your “**WOBBS**” every morning: **W**ater (Coolant), **O**il, **B**ilges (Inspect and Pump-out), **B**elts and **S**ea Strainer.

Check the level of COOLANT in the plastic expansion tank located at the front of the engine. Check the level of OIL in the engine by checking your dipstick located at starboard side, middle of the engine. Look at the etch marks on the dipstick that indicate the proper oil level. **DO NOT OVERFILL OIL!** Only fill if oil level is below the ½ way mark. Ensure the valve on the RAW WATER THRU-HULL is in the ‘open’ position (lever in-line with valve). Observe the glass of each RAW WATER STRAINER for debris. If necessary, close the seacock, open the strainer cover, clean the strainer, and reassemble. Remember to reopen the seacock. Confirm water flow from exhaust(s).

Start-Up: Electric or Diesel Drive

Before starting the engine, do your WOBBS inspection. Turn on your Thrusters.

Turn on the rocker switch on the top right to activate the helm panel electronics. Make sure that the engine throttle lever is in neutral position. Unlock the helm station with the electronic fob by holding it in front of the e-key panel. Press the IGNITION button to switch the ignition on. A green light in the IGNITION button indicates that the ignition is on. Volvo gauges turn on.



Start-Up: Volvo Diesel Engine

Set the HYBRID switch to DIESEL. Yellow light on panel under DIESEL switches on. Wait for approximately 3 seconds for the system to set to the diesel drive and to activate the clutch. It is ready when you see the word “Gen” in the round display. To start, press the START/STOP button once to start the diesel engine. Check gauges for RPM, TEMP, PRESSURE, VOLTAGE. Use the throttle to maneuver the boat forward or in reverse.

Note -- If oil pressure is low, shut down engine, and inspect engine compartment and look for possible cause (for example, loss of oil.) Caution -- If an engine is overheating or there is lack of raw water expelled in the engine exhaust, stop the engine immediately. Recheck the raw water-cooling system to ensure the seacock is ‘open’ (handle in-line with valve). Next, check the raw water strainer for debris. Remove the strainer, clean, re-assemble, and reopen the raw water intake valve (seacock). Restart the engine and re-check water flow from the exhaust. If water is not flowing properly, the RAW WATER PUMP may need to be serviced. Seek help.

Shut-Down: Volvo Diesel Engine

Before shutting down, allow the engines to ‘idle’ for about 5 minutes to cool them gradually and uniformly. The time engaged in preparing to dock the boat is usually sufficient. Ensure the THROTTLE is in the ‘neutral’ position. Turn off engines by pressing the stop button. Please remember to follow the shut down procedure when anchoring as well.

Start-Up: Mahle Electric Motor

Make sure that the Diesel is not running. Set the HYBRID switch to ELECTRIC. Green light under ELECTRIC switches on. Wait for approximately 3 seconds for the system to set to the electric drive and to activate the clutch. It is ready when you see the word “Motor” in the round display. Use the throttle to maneuver the boat forward or in reverse.

Shutdown: Mahle Electric Motor

Ensure the THROTTLE is in the ‘neutral’ position. Press the IGNITION button to switch the ignition off.

Switching from Diesel to Electric

Ensure the THROTTLE is in the ‘neutral’ position. **Turn off engines by pressing the stop button.** Follow the “Start-Up: Mahle Electric Motor” procedure.

Switching from Electric to Diesel

Ensure the THROTTLE is in the ‘neutral’ position. Follow the “Start-up: Volvo Diesel Engine” procedure.

Getting Underway

DISCONNECT the shore power cord (see 120-Volt in Boat Electrical section). Close the PORTHOLES, WINDOWS, and FORWARD HATCH. Turn on your VHF and electronics. ASSIGN crew members their various positions. Once outside the marina, idle the engines while crew brings in fenders and lines. Use both the bow and stern thrusters to hold the bow to the dock while the bowline is removed. Hold the thruster for 2-3 seconds at a time, DO NOT HOLD DOWN THRUSTER FOR MORE THAN 5 SECONDS. Holding the thruster longer will burn out the thruster motor.

Cruising

Diesel Engine - Cruising speed is a maximum of about 12 knots at 3500 RPMS, which will use 10 gallons of diesel per hour. If you run at 3200 RPMS you will cruise at 10.5 knots and use 8 gallons of diesel per hour. If you run at 3000 RPMS you will cruise at 10 knots and use only 7 gallons of diesel per hour.

Electric Motor - Max speed is approximately 6 knots. At 6 knots you should get approximately 40 minutes out of the batteries that operate the electric hybrid motor. Power consumption is a cubic curve, meaning small decreases in speed have large impact on runtime. Monitor the digital Electric Motor charging gauge on the helm, make adjustments in speed and watch the change in estimated runtime. When low on electric motor battery power as seen on the digital gauges to the left of the thruster controls, switch to diesel engines and they will recharge the Electric Motor Batteries. When charging the Electric Motor Batteries via the Diesel engine, running at 2000 RPM will maximize charge rate while minimizing fuel consumption.

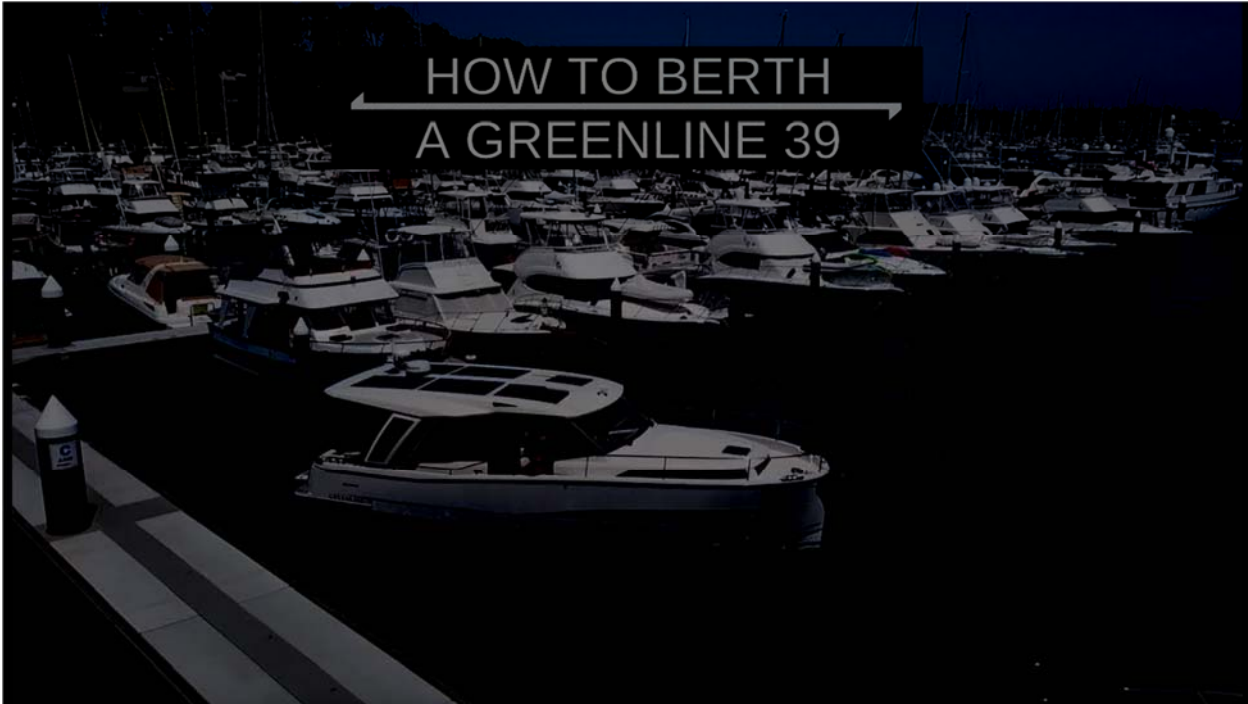
Your speed will vary depending upon the weight and load and weather conditions. TRIM TABS can be adjusted for comfort and visibility by putting in the “bow down” position.

*Note -- Avoid higher engine speeds as it causes higher engine temperature, possible damage, and higher fuel consumption. In general, **lower RPMs result in much improved fuel economy.***

Docking - Ideal via Electric EV Motor

Have your crew make ready the lines and fenders and give clear instructions on how you will be docking. Often times your crew will need to step off from the boat with the stern line. Another crew member will need to be at the bow to hand over the next lines. Use the boat's bow and stern thruster to aid docking. Hold the thruster for 2-3 seconds at a time, DO NOT HOLD DOWN THRUSTER FOR MORE THAN 5 SECONDS. Holding the thruster longer will burn out the thruster motor.

Prior to docking, rock TRIM TAB switches to the ‘bow up’ position (8 to 10 seconds) to make slow-speed backing and turning easier. While moving slowly to the dock or mooring location, center the WHEEL (e.g. rudders straight) and use only the THROTTLE and THRUSTERS to maneuver the boat.



Fueling Up

OPEN FILLER CAP, located on the starboard side of the boat.

MAKE SURE YOU HAVE THE RIGHT FUEL! DIESEL! DIESEL! DIESEL! MAKE SURE IT IS GOING INTO THE RIGHT DECK FILL! DOUBLE-CHECK!

Before pumping, have oil/fuel sorbs handy to soak up spilled fuel. Have someone watch the fuel gauge on the Simarine screen during fueling progress. They may have to press the page down button to get to the fuel tank display.

As the tank fills, the sound will rise in pitch or gurgle. Pay attention to the TANK OVERFLOW VENT on the outside of the hull near the tank opening. The sound may indicate that the tank is nearly full. Top off carefully, and be prepared to catch spilled fuel. Spillage may result in a nasty fine from law enforcement.

Replace the tank cap. *Caution -- Clean up splatter and spillage immediately for environmental and health reasons. Wash hands with soap and water thoroughly.*

BOAT ELECTRICAL

The electrical system is divided into two distribution systems: 120-volt AC and 12-volt DC.

The systems are controlled from the AC/DC ELECTRICAL PANEL, and BATTERY SWITCHES are located underneath and to the port side of the helm. When not connected to shore power, batteries and the inverter are providing all power. You can monitor the use of battery levels with the battery gauges located on the Simarine panel, and on the hybrid battery panel for the propulsion batteries. The house battery bank consists of ~4 kWh of AGM batteries, which can be charged via the 4 solar panels at up to 1 kW rate, or via the hybrid propulsion batteries, or via the alternator when the diesel engine is running. During sunny summer days, one can expect about 1 day of usage from every 1-2 days of charging. If AC, stove and water heater usage are limited, the solar panels alone are almost enough to live “off grid”. The solar charging can be monitored via the Victron Cerbo display on the instrument panel.

120 Volt AC System



SHORE POWER supports all AC equipment and receptacles on board, as well as the battery chargers.

To connect to shore power, plug the 120V 30amp POWER CORD into the boat and then into the dock receptacle. Check the power rating/plug size of the nearest dock receptacle (that is 50amp, 30amp, 20 amp, or 15 amp). If necessary, add a CORD ADAPTER located in the lazarette. Turn the dock power on. Cords coming off the bow can be wrapped loosely around the bow line or bow rail.

At the ELECTRICAL PANEL, flip the SHORE switch/CIRCUIT BREAKER on. Check for reverse polarity. Then turn on appropriate switches/breakers for battery charger, refrigeration, water heater, and what you need. Watch your amp meter for load. If the load exceeds amperage, you will pop your breaker. If this occurs, turn off some items (e.g. water heater) and wait to turn on one of your systems until your use of electricity drops.

If your outlets fail to work, check your GFIs to make sure that they have not been tripped. Be aware that one GFI breaker may supply plug-ins in several areas.

Inverter Power

The INVERTER provides AC power to the 120-volt receptacle plugs when the boat is disconnected from shore power. The inverter does also provide power to the water heater, cooktop, and microwave on this vessel which is unique. Your inverter panel is also located under the helm seat. Make certain that it is on. The actual inverter is located in the small room under the floor of the helm.



The inverter's power source are the 22kwh hybrid propulsion batteries located under the floor of the guest berth. The quantity of AC power is limited to the capacity of these batteries. Therefore, running AC, water heater, hair dryers, toaster, coffeepots, space heater, etc. and will discharge the propulsion batteries. Feel free to use these items, but monitor your battery usage carefully! If anticipated power usage is heavy, start engines to keep batteries charged or ensure that there's plenty of sunlight.

When connected to shore power, the inverter automatically becomes a battery charger for the HYBRID BATTERIES. Make sure you have the "battery charger" breaker on, so that the Hybrid batteries will charge the 12V house batteries. Should you detect the inverter failing to charge the house batteries, check the circuit breaker in the AC Panel and the inverter control panel.

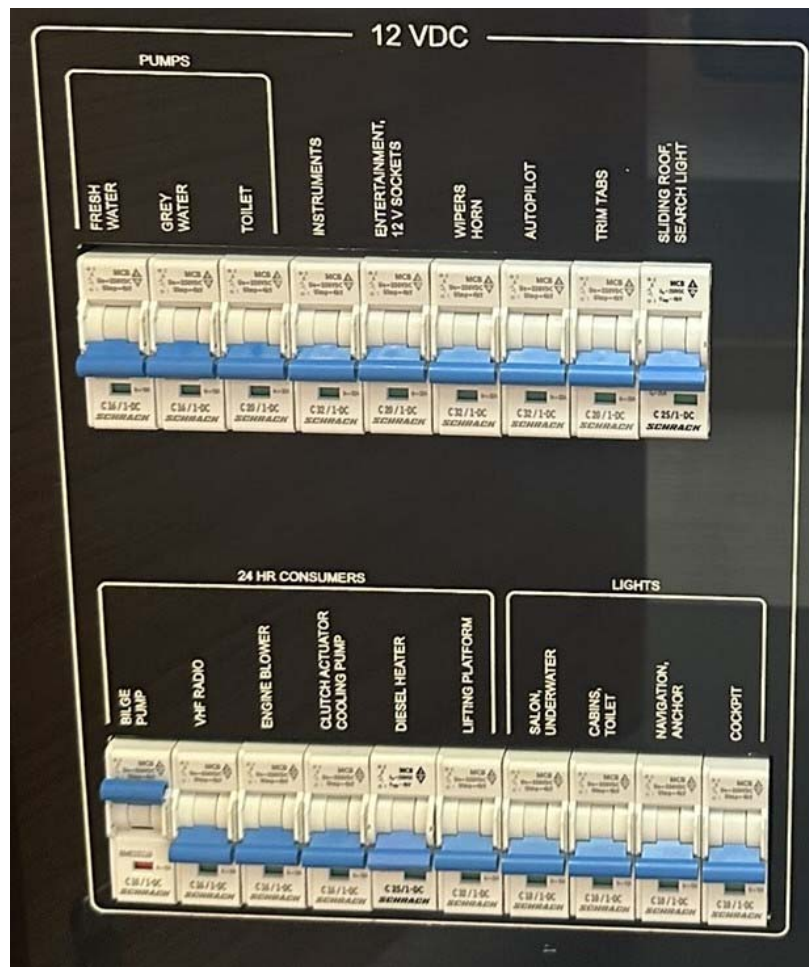
The boat is not equipped with a diesel Generator.

House (12-volt) System

4 battery banks support 12-volt DC power: 1) engine battery 2) house battery bank 3) Bow/stern thruster batteries.

Normally you do not need to worry about the thruster battery switches, just leave them on. Also, just leave ENGINE and HOUSE SWITCHES in the 'ON' position. *Note -- Do not change the position of the switches while the engines are running or the alternator diodes will be damaged. Change positions with the engines off.*

Your 12 volt panel shows all the systems supported by your batteries. Primarily you will be turning on the breakers for your lights, water pressure, electronics, etc. **Bilge pumps must always be left on.**



House Battery Bank & Switch

The HOUSE BATTERY BANK provides power for all DC systems, except the engines and automatic bilge pumps. When disconnected from shore power, all 12-volt devices drain the house battery. Use devices as needed. The Simarine display at the helm will show battery capacity readings for each 12-volt battery bank.

Battery Parallel Switch

Turn on the BATTERY PARALLEL SWITCH only in the unlikely case that the engine battery can't start the engine. Turn off after the engines start up.

Bow/Stern Thruster Breaker

The switch for the bow/stern thruster is located right below the thruster Toggles. It is wise to always test your thruster before untying from the dock or while approaching a moorage. If they fail to turn on at the helm station, check the breaker(s). Be aware that the thruster controls turn off automatically after a few minutes and need to be re-armed on the helm control.

SANITATION SYSTEM

Marine Toilet

It is important that every member of the crew be informed on the proper use of the MARINE TOILET. The valves, openings, and pumps are small and may clog easily. If the toilet clogs, it is YOUR RESPONSIBILITY!

Always flush the head for children, so you can make sure nothing foreign is being flushed.

Caution – *Never* put paper towels, tampons, Kleenex, sanitary napkins, household toilet paper, or food into the marine toilet. Use only the special dissolving marine toilet tissue provided by AYC.

To use the toilet, ensure that the “Toilet” breaker is on. Then choose the appropriate action from the control panel above and to the left of the toilet. Monitor the Black Water Tank gauge daily and ideally empty at $\frac{3}{4}$ full.



Fill: Adds water to the bowl only.

Pump Out: Flushes.

Holding Tank

The sanitation HOLDING TANK holds approximately 20 gallons. Be aware of the rate of waste production. (about 1 gallon per flush). With an overfilled tank, it is possible to break a hose, clog a vent, or burst the tank. The result will be a disgusting catastrophe and an EXPENSIVE FIX to you. Empty the tank EVERY OTHER DAY to avoid this problem. Flushing a few ounces of AYC provided deodorizer will help eliminate odors. Check the gauge often! The holding tank gauge is powered on with the Toilet breaker. It will read empty to full, and is located above the Toilet Flush Panel in the head.



The holding tank is emptied in one of two ways:

- #1 At the Marine Pump-Out Station, remove the WASTE CAP located starboard side, outside the head/shower area on the side deck. Insert the pump-out nozzle into the waste opening. Hold nozzle firmly against the deck fitting to ensure a tight seal. Turn on pump and open valve located on handle. When pumping is finished, close lever on handle and turn off pump. Remove from deck fitting. If there is a fresh water hose on the dock, rinse the tank by adding 2 minutes of water into tank. Then re-pump to leave the tank rinsed for the next charter. This also eliminates head odors.
- #2 The tank's contents can be discharged by opening the black water outlet valve (THRU-HULL is located below the removable floor cover outside the head and outside the berths) only in Canadian waters. There's no macerator, gravity does the work. Close the valve after emptying.

WATER SYSTEM

Fresh Water Tank(s)

The FRESH WATER TANKS hold 100 gallons total. Observe the water level by referring to the Simarine gauge at the helm station. Waste water from the sinks and showers drain into the grey water sump box below the stairs leading forward, before then being automatically pumped overboard

To refill the tanks, remove the WATER CAP(S) located port side, forward of the cockpit. Avoid flushing debris from the deck into the tank opening. DO NOT fill water and diesel at the same time!

Fresh Water Pressure Pump

The WATER PRESSURE PUMP is located on the starboard aft engine room bulkhead. Activate pump at the DC panel by turning on the breaker. If the water pump continues to run, you are either out of water or might have an air lock and need to bleed the system by opening up a faucet. If you run out of water SHUT OFF YOUR HOT WATER HEATER on the AC panel. Serious damage can occur!

Hot Water Tank

The HOT WATER HEATER has a 6 gallon capacity tank and is available when connected to shore power or via a heat exchanger underway. To use on shore power, flip on the water heater circuit breaker on the AC electrical panel. Do not use the water heater if the water tank level is very low. The water heater is located in the port aft end of the engine room.

Shower

Before taking a SHOWER, make sure water pressure and shower sump breakers are on. Take only very short “boat” showers (turning off water between soaping up and rinsing). To keep shower tidy wipe down the shower stall and floor. Check for accumulation of hair in the shower and sink drains. An additional fresh water shower is located in the starboard aft cockpit. Ensure that the faucets and nozzle are completely off after use.

GALLEY

Stove/oven

The 2 burner stove is induction. All the provided pots, pans and kettles work with induction. There's also an electric oven with convection and air fry functions.

Refrigerator

The REFRIGERATOR is 120volt & requires shore power or the inverter to run. Monitor the use of the refrigerator when the engines are not charging the 12-volt battery system. It can be turned down to the lowest position when anchored or moored or turned off when turning in for the night. Minimizing openings helps a lot!

HEATING SYSTEM

Diesel Heater (DC)

The DIESEL FORCED-AIR FURNACE located in the aft port side salon provides heat in the same way as a household furnace. Turn on the breaker located on the 12v panel. The on/off and temperature control are located on the side of the cabinetry that houses the stove. Set the thermostat to the desired temperature.

Check the furnace EXHAUST PORT located on the starboard aft hull for any obstruction such as fenders or lines. Do not block this opening when operating the furnace. Heat will damage fiberglass or rubber. Once it is on, allow it to run for at least 15 minutes before turning it off. Turn 'off' the furnace heater by turning switch back off.

ELECTRONICS

All electronic manuals are located in the top cabinet above the fridge.

VHF Radio

There are two VHF RADIOS. The first is located at the helm, below the steering wheel, behind the wood panel. The breaker is located at the 12v panel. There is a second portable VHF RADIO located in the cabinet above the fridge, as a backup or when out on the dinghy. Always monitor channel 16 while underway.

Chart Plotter / Depth Sounder / Radar / Autopilot / Fish finder

There is one DEPTH SOUNDER displayed on both Garmin displays at the helm station. Set the scale, shallow alarm, and deep alarm as desired. The sounder should provide reliable readings in shallow waters. If in doubt, switch it off, then turn it back on to reset sounder. If your reading is blinking, it is a FALSE reading. False readings can occur in depths of more than 200 feet or in areas of strong currents or tides.

Radar

Remember you are not allowed to travel in FOG or at NIGHT. To operate the Garmin Radar, select Radar from the home menu. Press TX to transmit, and press Stop Tx to turn off on the starboard screen.

Note -- GPS is considered a navigation aid. Do not rely on it. Compasses, charts, and dividers are the tools to plot position, course, and speed.

ENTERTAINMENT SYSTEMS

Bluetooth Sound System

The Fusion Bluetooth sound system is located above the electrical control panel. Pair to your phone or tablet to stream your favorite music or podcasts. To connect to the unit via Bluetooth, go to the menu and select discoverable.

TV

A 32inch HD TV is stored in the retractable entertainment cabinet. To use, press the toggle switch to the right of the Fusion Stereo “up” to bring up the TV. To retract press “down”. Please retract the TV into the stowed position when under way.

ANCHORING

The primary WORKING ANCHOR is a PLOW and is attached to 250 ft chain passed through the deck from the ANCHOR LOCKER. The locker can be accessed through the bow port hatch. If there is an anchor keeper, release it.

The WINDLASS CONTROL is located hanging in the anchor locker. Tap gently on the ‘down’ control button to provide a small amount of slack in the chain. Tip the anchor just over center and gently begin lowering the anchor. If necessary, guide the anchor over the anchor roller to prevent binding on the pulpit. Be careful of pinch points.

The Controller is equipped with an anchor chain counter that measures the length of anchor chain you have let out.

Let out sufficient ANCHOR CHAIN before setting the anchor. If the anchorage is crowded put down at least a 3 to 1 scope (60 feet for 20 feet of water), back the anchor in with a short burst from the engine. Then let out additional scope dependent upon conditions.

To raise the anchor, turn ‘on’ the WINDLASS SWITCH and take up slack to remove pressure on chain. Remove the stopper from the chain. As the boat moves toward the anchor, press the ‘up’ control to take up slack line. Give the windlass short rests as you are pulling it up. If necessary, idle the boat forward with then engines by placing briefly in gear to put slack in chain. Place yourself in position to guide the anchor onto the roller. As the anchor rises, be careful not to allow it to swing against the hull. Wash it down with the hose before it goes into anchor locker.

A SPARE 13 lb Aluminum ANCHOR is normally stowed in the spare anchor locker. The 220 ft SPARE ANCHOR RODE is located there as well. Attach the rode securely to the chain shackle.

Mooring Cans

Mooring cans have a metal triangle at the top upon which is a metal ring. The metal ring is attached to the chain which secures your boat. IT IS VERY HEAVY. The strongest member of your crew should be picked for this job.

Come up to the CAN into the wind or current as you would for anchoring. Have crew members on the bow, one with a boat hook and one with a mooring line secured like a bow line. As you are coming slowly up to the can have the crew holding the boat hook point at the can with the hook so the skipper always knows where it is. Hook the can and bring the ring up to the boat to allow the second crew to thread the ring with the line. Release the hold with the boat hook. If your mooring line is led out the starboard chock bring the end of the line back through the port chock. You will essentially create a bridle with about 10 feet of slack from the chalk to the can.

BARBECUE

The BARBECUE and MOUNTING BRACKET are stored in the lazarette.

Attach the BBQ mount to the Rail mount located on the starboard rail. Reverse the procedure to dismount barbecue. Attach a PROPANE BOTTLE to the REGULATOR found in the port starboard seat locker. Carefully light the unit, preferably with a long-stem butane lighter. The barbecue generates a lot of heat and cooks hot and fast. Store the barbecue unit back in the bag and lazarette. Please wipe with a paper towel before storing to prevent grease and dirt soiling the boat.

Note: Propane bottles are provided by AYC. If you anticipate needing an additional bottle, please ask AYC staff. Caution -- For safety reasons, do not store an opened propane bottle within the salon or engine compartment. Chances are these will leak slightly once opened and propane gas could settle into low spaces. Store these bottles in the cockpit cabinet. Ensure gasoline and flammable materials are not near the barbecue.

DINGHY & OUTBOARD MOTOR

Your Takacat T300LX DINGHY is powered by a 1kW (3hp equivalent) propulsion electric motor and 1 kWh battery. It has a capacity of about 600 pounds (motor, equipment, and 4 people). The boat weighs about 65 lbs, while the motor and battery weigh about 30 lbs. **The battery can be easily removed to be charged in between uses. To charge, connect the charger to the battery first and then plug in. Charging takes about 3 hours. The battery has a run time of ~50 mins when fully charged at full throttle, or ~2 hours at half throttle (500 W).**

To deploy the dinghy, holding the dinghy and the line, detach the STANDOFF BARS, and lower the dinghy with the line into the water, noting that the dinghy gets heavier as it nears the water. To retrieve, reverse this process.

Coast Guard regulations state that any child 14 and under must wear a life jacket in a dinghy. It is a good idea for EVERYONE to follow this rule.

CRABBING & FISHING

Always check the fishing and crabbing requirements before you leave on your cruise. You will need a license. Many areas are CLOSED to crabbing and fishing on certain months.

CRAB AWAY FROM THE BOAT! Lines can get wrapped around props. Fish-flavored cat food or with the pop-up ringed lids or frozen chicken backs work the best for a nice neat way to bait the ring. After 15-20 minutes, retrieve the crab line and ring quickly. Be certain of water depth before lowering crab rings or pots; make certain the buoy line is long enough for the depth. Measure the crabs using the **CRAB MEASURING GAUGE** normally located in the tackle box. Keep the male crabs of proper size (usually 6 ¼ inches across the carapace). Boil crabs about 12 minutes to cook.

After using, wash equipment thoroughly with fresh water when docked. *Note -- Please do not store wet rings and gear inside the boat.*

OTHER: Safety & Bilge Pumps

SAFETY should be paramount in your daily cruising. A **MAN OVERBOARD DRILL** should be discussed and perhaps even practiced with a life jacket. Remember your lifejackets are stowed under the aft port cockpit seat. A few should always be out and ready. Your flares and safety equipment are located under the salon stairs.

The boat is equipped with an **AUTOMATIC BILGE PUMP**. The master switch is located on the electrical panel. The switch should always be left in the **AUTO** position.

The **ENGINE SPARES BOX** (plastic blue color) is stowed in the engine room. This includes oil filter, raw water impeller, pump parts, injectors, and other small parts.

THRU-HULL LOCATIONS

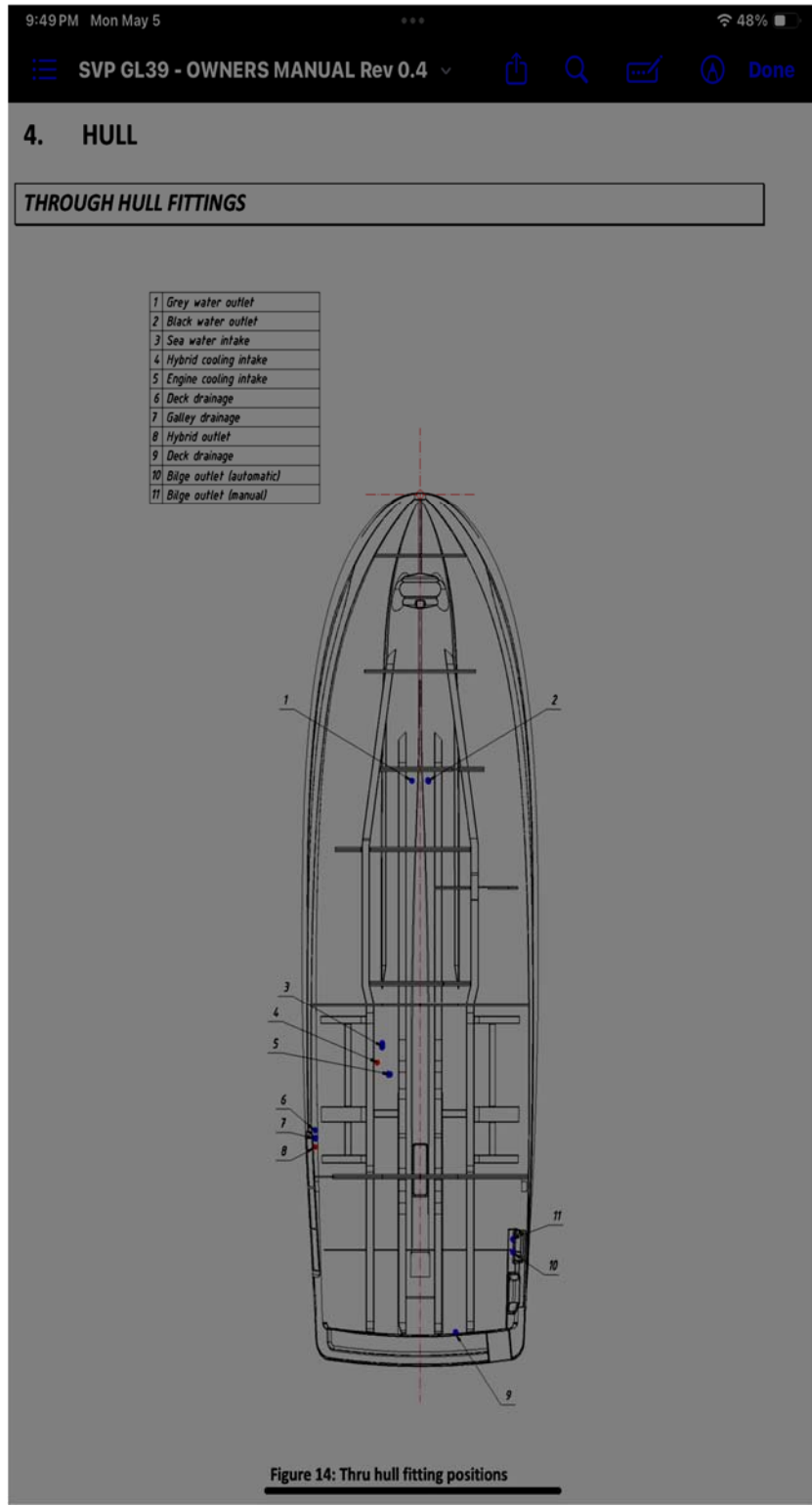


Figure 14: Thru hull fitting positions