

Serenity Houseboat



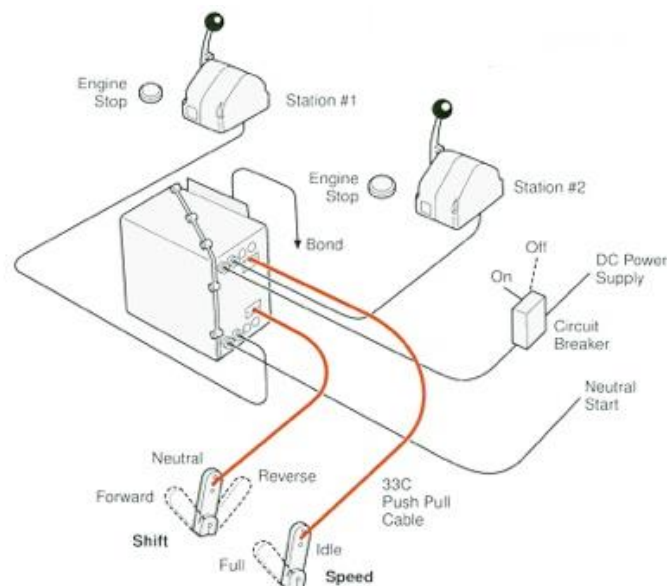
Standard Operating Procedures for:

Main Engines and Controls

I. Overview

The Serenity has twin inboard/outboard (I/O) engines controlled by MicroCommander 91102 Controls. The engines are Mercruiser 3.0L, inline 4-cylinder engines coupled with Alpha One outdrives, which produce 135-HP per engine for a total horsepower rating for the Serenity of 270-HP. Coupled with the alpha drive, these engines are one of the lightest, most dependable and fuel-efficient engines in their class. Maximum revolutions per minute is 4000-rpm and should yield a speed of around 11-mph (note the engine redline is 4400-rpm, but this is not attainable with the current propeller pitch). Cruising speed is 2800-rpm, which should yield a speed of about 8-mph. The propellers are 11 pitch, meaning that one full revolution under ideal conditions would move the propeller forward 11-inches.

The MicroCommander 91102 Control System is an electronic control system that actuates the mechanical throttle and shifter linkages on the main engines. It can be referred to as a drive by wire system; user inputs are through electronic control heads, which are received by the control boxes in the engine compartment and translated into mechanical control cables through electric motor actuators. The Serenity has two control stations, one at the main/lower helm and one at the flying bridge.



II. Before Starting

- a. **Inspect the Engine.**
 - i. Always check engine and outdrive oil levels prior to starting.
 - ii. Always visually inspect engine (belts, houses, etc.) prior to starting.
- b. **Ventilate the Engine Compartment.** Run the engine compartment blower for at least 5-minutes prior to starting the engines or generator.
- c. **Ensure Stern is Clear.** Check to make sure the area around the stern is clear (no one swimming, no lines in the water, no floating debris, etc.)
- d. **Post at Stern Watch.** Post a lookout on the stern for start-up and close quarters maneuvering when operating astern propulsion.
- e. **Turn on Electronics.** Turn on all navigation equipment (VHF Radio, GPS/ChartPlotter, Rear View Camera, and anything else necessary for getting underway).
- f. **Tilt.** The outdrives should be in the down position for getting underway; the power tilt is controlled with switch panels at the back of the center engine compartment hatch.

III. Starting Main Engines

- a. **Throttle Control.**
 - i. Make sure all throttles are in the NEUTRAL position.
 - ii. Turn key to ON position (Not START) and an intermittent tone will sound at both throttle stations indicating that no station has control.
 - iii. Depress the Transfer button to take control at the desired station. Once this is done, the tone should stop at both stations and the Red indicator light on the top of the control head should come on.
 - iv. Only one station has control at a time.
 - v. Note there is throttle interlock that will prevent the engine from starting if the MicroCommander has no power, if there is no station in control, or if the engine is in gear.
 - vi. Note that it is illegal to operate the houseboat from the flying bridge in the marina; when coming into or leaving the dock you must pilot the houseboat from the lower helm station to ensure visibility of other watercraft, fixed objects, and people.
- b. **Starting the Main Engines.**
 - i. Start one engine at a time, turning the key to the START position in order to engage the starter.
 - ii. If the engines do not start easily, you can engage a Warm-up mode on the throttles to allow you to throttle up the engines without putting them in gear. To do this:
 1. Depress and hold the Transfer button.
 2. While holding the Transfer button, move the Throttle Lever into the idle ahead position and then release the Transfer button.
 3. The Red indicator light on top of the control head should blink.
 4. The operator can now move the lever throughout the speed range without engaging the clutch.
 5. To reset the control head, simply return the Throttle Lever to the NEUTRAL position.
 - iii. Allow engines to warm up for 5-minutes prior to maneuvering.
- c. **Maintain Ventilation.** Keep the engine compartment blower running until the houseboat is underway and making way. Once the houseboat is moving through the water, the engine compartment should be passively ventilated by the ventilation scoops on the port side; then the engine compartment blower may be secured.

IV. Operation Instructions

a. Transferring Control

- i. The Serenity has a hydraulic steering system and each steering station is essentially just a pump that pushes fluid from one hydraulic line to another. For this reason, both stations are able to control the steering at all times and no transfer of steering control is required. This is something of which to be aware and ensure that the station not being used to control the houseboat is not inadvertently sending steering commands to the engines.
- ii. Only one Throttle Control Head has control at one time and if you wish to change operating stations you must transfer control by:
 1. It is easiest to place all throttles in the NEUTRAL position, but transfer can be completed while the engines are in gear if necessary.
 2. Place the Control Head taking control in the NEUTRAL position.
 3. Press the Transfer button at the Control Head taking control.
 4. Control should be shifted to this station, the Red indicator light will come ON solid once the station has control. The indicator light at the other station will go OFF.
 5. Once station is in control, if you had the engines in gear, you can then quickly move the Throttle Levers to approximate the position of the other Control Head.

b. MicroCommander Warning Tones

- i. **Low Rate Repeating Tone.** This is normal when power is first applied (key is turned to the ON position) and indicates that no station has control. To silence this Alarm, simply take control at the desired station by pressing the Transfer button.
- ii. **High Rate Repeating Tone.** This indicates strain on the electric actuator motors due to an abnormally high push/pull load on the Throttle or Clutch linkage cables. This can usually be silenced by undoing any throttle input that was just made and going back to the previous throttle position. The cause of the high push/pull cable load must be determined and resolved for continued operation.
- iii. **Steady Tone.** This indicates a system fault due to voltage problem or component failure. You can check the voltage supplied and ensure it is between 12- and 32-V and that there are no momentary voltage drops. Depressing the Transfer button may resolve the issue. The unit will need to be serviced to determine cause of fault.

V. Maintenance.

- a. **Main Engine.** The only regular maintenance that is likely to be performed by the owner operator is changing the oil on the main engines. The full synthetic oil is recommended to be changed every 200-hours. If this regular maintenance item comes up during your week on the houseboat, it is your responsibility to ensure that is complete before the next owner takes possession of the boat. The procedure for changing the oil is outlined below, but you also have the option of having Executive Services to complete this regular maintenance item.
 - i. Run the engine to bring it up to temperature.
 - ii. Shut down the engine.
 - iii. Locate the oil sump drain hose on the bottom of the engine and remove the plug.
 - iv. Connect an oil sump pump to the oil sump drain hose.
 - v. Pump out all the oil from the sump.
 - vi. Disconnect the pump and replace the plug.

- vii. Change the oil filter.
 - viii. Refill the oil with 4-quarts, check the oil level and then top off to desired range.
- b. **Steering System.** The steering system requires little maintenance, but may suffer from low steering fluid level, which will degrade steering performance and may result in the flying bridge steering station failure. In order to top off the steering system fluid follow the procedure below.
 - i. Check the Steering System Fluid level at the flying bridge helm station by removing the plug on the top of the steering wheel hub. DO NOT check the level at the lower/main helm station as gravity draining will result in fluid leakage out of the fill hole.
 - ii. If the fluid level is low, add hydraulic fluid (ATF) to the system:
 - 1. Get the oil can labeled ATF stored in the engine compartment.
 - 2. Pump ATF into the fill hole on the wheel hub.
 - 3. Work the wheel slowly right and left to burp air from the system and allow it to fill with hydraulic fluid.
 - 4. Repeat the process until the system is full.