

Optimus 360 Configuration and Commissioning

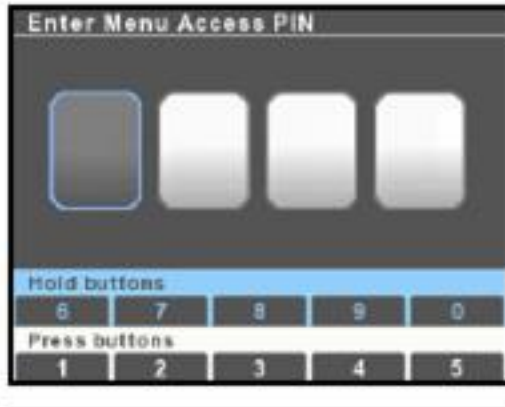


Figure D-5.

All setup and configuration tools are reached from the Dealer Menu, which authorized installers can access with a four digit PIN code (if you don't have a code contact SeaStar Solutions technical support). From the main run screen, press and hold **Menu** until you see the PIN entry screen.

Use the buttons to enter your four digit PIN code. Press the buttons briefly for digits 1-5, press and hold for digits 5-9.

If you enter the code incorrectly you will exit the screen and be placed into the user menu. Press and hold **Menu** again to get back to the PIN entry screen.

Once you have entered the correct code you will go directly to the Dealer Menu. You won't need to enter the code again unless you cycle system power.

NOTICE

The Dealer Menu can be unlocked when faults are active. Faults are suppressed during setup and system updates.

Optimus 360 Joystick Tuning

Joystick Tuning Overview

The joystick's electronics manage the complex task of converting joystick input into the gear, throttle, and steering outputs required to move the boat in the commanded direction. To accommodate a variety of hull designs and motor/propeller configurations, there are a large number of parameters used by the joystick control. You will tune these parameters in this part of the installation.

Figure 9-2 shows an overview of the tuning procedure. Each step is detailed in the sections that follow.

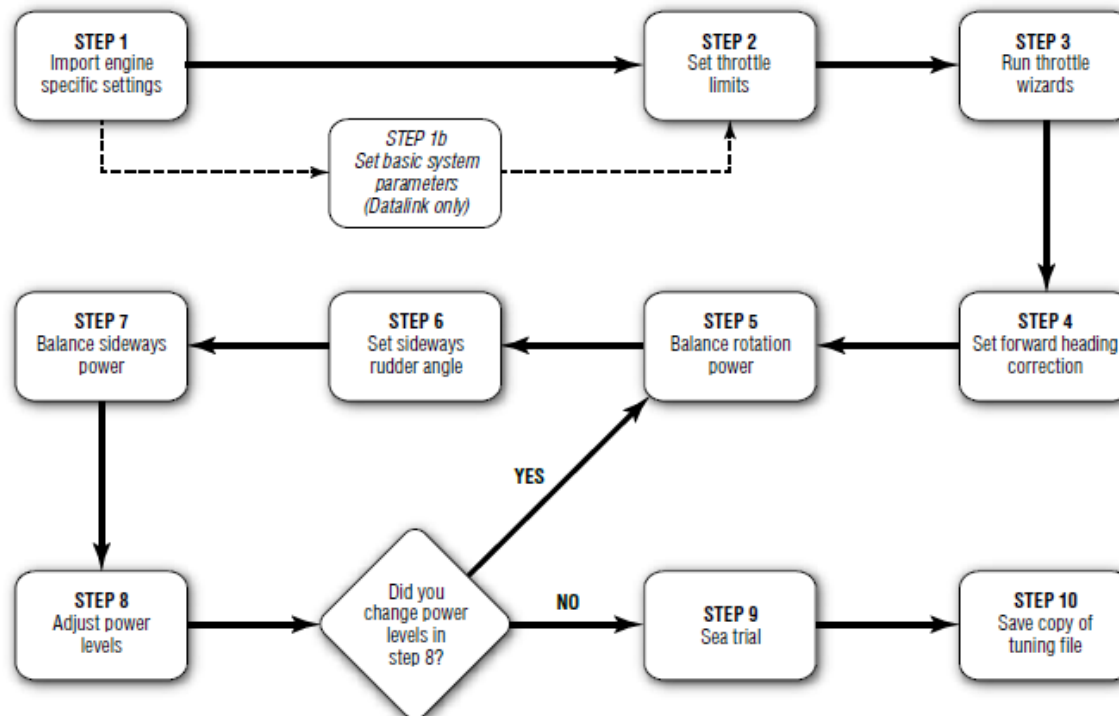
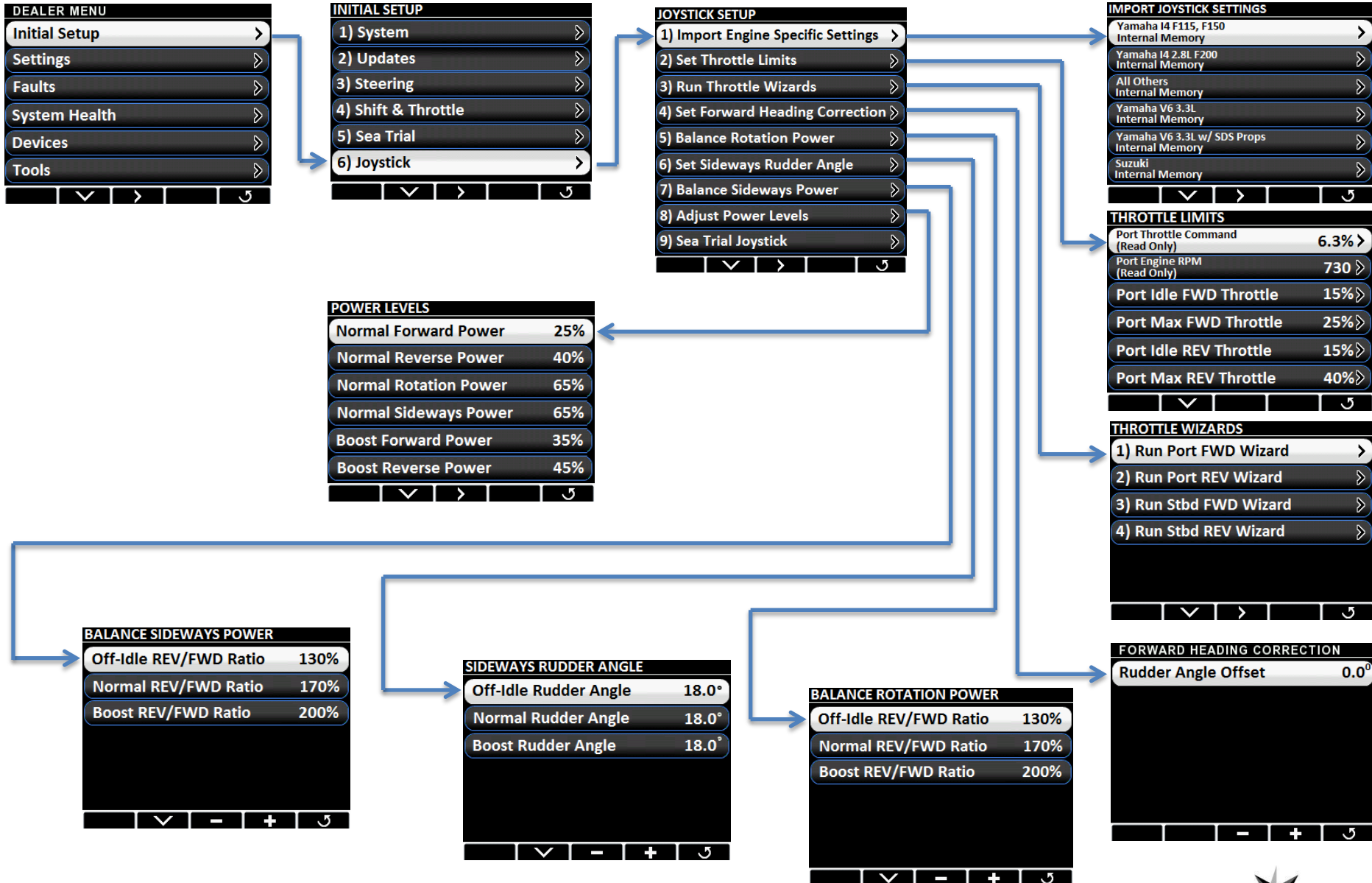


Figure 9-2. Joystick Tuning procedure.

Optimus 360 Joystick Tuning



Optimus 360 Joystick Tuning

Joystick Tuning Procedure

NOTICE

The joystick tuning procedure will require maneuvering of the boat. Some of these procedures can be performed at dock with the boat securely restrained, but others will require open water with adequate maneuvering space.

NOTICE

NOTICE

Perform the joystick tuning from the main station. The system is programmed to ignore a second station during the tuning procedure.

The joystick tuning procedure is organized into ten steps, detailed in the following sections. The entire procedure can be performed with either the color CANtrak display, as shown in this section, or with Datalink, as shown in Appendix B. Tuning with the CANtrak has the advantage that it will simultaneously tune all connected joysticks, which makes it simpler to tune dual station boats.

General Notes

- The joystick tuning procedure consists of several steps, each of which may contain several sub-steps. To differentiate between these we use all capital letters to denote the main STEPS, and lower case letters to indicate the sub-steps.

Example: Adjust the parameter as shown in step 7 of STEP 8.

Before You Start

- Trim both engines down and ensure that the correct propellers are installed. You will need to repeat the joystick tuning procedure if you change the propellers afterward.
- Warm up the engines thoroughly before you begin.

Erratic engine performance, stalling, or other engine control issues will affect the operation of the joystick control system. Any such issues must be addressed before attempting joystick setup.

Optimus 360 Joystick Tuning

STEP 1 – Import Engine-Specific Settings

There are some system parameters that need to be set for specific engines. You will do this by importing these settings with a simple wizard on the CANtrak display.

1. On the display, navigate to **Dealer Menu > Initial Setup > Joystick**. This is your home base for the joystick tuning procedure, and the numbered steps will help lead you through the tuning process.



Figure 9-3.

Optimus 360 Joystick Tuning

2. Select **Import Engine Specific Settings** and press **>**. This will take you to the Import screen.

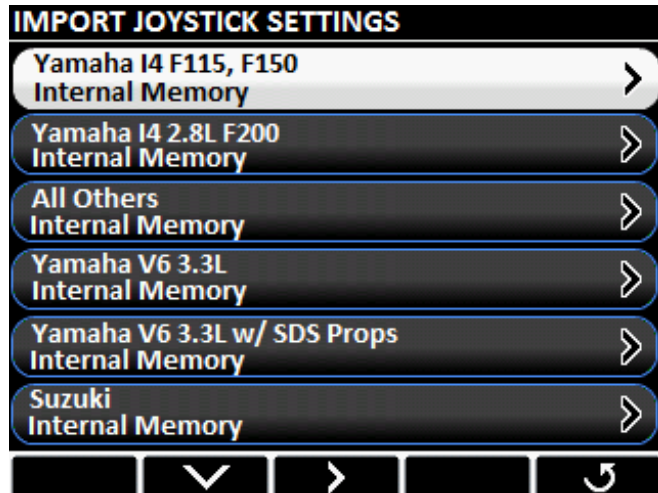


Figure 9-4.

3. Scroll down the list and look for your engine manufacturer and/or model. If your engine is not listed, use All Others. Once you've highlighted the correct item, press **Select**.
4. At the confirmation screen, press **Yes** to confirm the import.



Figure 9-5.

5. The settings will be imported to all joysticks connected to your system. When the import is finished a completion screen will be displayed. Press **↶** to return to the Joystick Setup menu.

Optimus 360 Joystick Tuning

STEP 2 – Set Throttle Limits

In this step you will configure:

- the maximum throttle percent at which the engines are at idle and
- the maximum throttle percent intended for joystick use.

Perform this step with the boat safely secured, or in an open area.

1. Go to **Dealer Menu > Initial Setup > Joystick > Set Throttle Limits**. On the menu you'll be given options for both port and starboard throttle limits.
2. Enter the Port Throttle Limits menu. At the top of the display are two feedback items that will show the current throttle position and the current engine RPM.
3. Use the control lever to put the port engine in forward gear and very slowly increase the throttle. Watch the feedback display and note the maximum Port Throttle Position at which the engine is *still at idle*.
4. Select **Port Idle Fwd Throttle** and use the + and – buttons to adjust the value to match the maximum Port Throttle Position you noted in step 3.

THROTTLE LIMITS	
Port Throttle Command (Read Only)	6.3% >
Port Engine RPM (Read Only)	730 >>
Port Idle FWD Throttle	15%>>
Port Max FWD Throttle	25%>>
Port Idle REV Throttle	15%>>
Port Max REV Throttle	40%>>
<div>⏮ ⏪ ⏩ ⏭ ↺</div>	

← 2100 RPM Target

← 3100-3400 RPM
Target

Optimus 360 Joystick Tuning

5. Repeat steps 2 and 3 with the port engine in reverse gear. This time, change the **Port Idle Rev Throttle** parameter.
6. Put the port engine in forward gear and slowly increase the throttle until the engine reaches approximately 1800 RPM. Adjust the **Port Max Fwd Throttle** parameter so it matches the current Port Throttle Position.
7. Put the port engine in reverse gear and slowly increase the throttle until the engine reaches the maximum desired RPM for joystick operation. This will be either:
 - a. The maximum throttle just before cavitation, or
 - b. if cavitation does not occur, the maximum throttle for comfortable use.Adjust the **Port Max Rev Throttle** parameter until it matches the current Port Throttle Position.
8. Press **Save** to save changes and return to the previous menu. Repeat these steps for the starboard engine.

Optimus 360 Joystick Tuning

STEP 3 – Run Throttle Wizards

The throttle wizards will use the values acquired in STEP 2 to develop a relationship between throttle and RPM that the joystick will use to improve its control of the vessel. Perform this step with the boat safely secured, or in an open area.

NOTICE

If you abort any of the wizards before they finish you must run them again.

1. Navigate to **Dealer Menu > Initial Setup > Joystick > Run Throttle Wizards.**

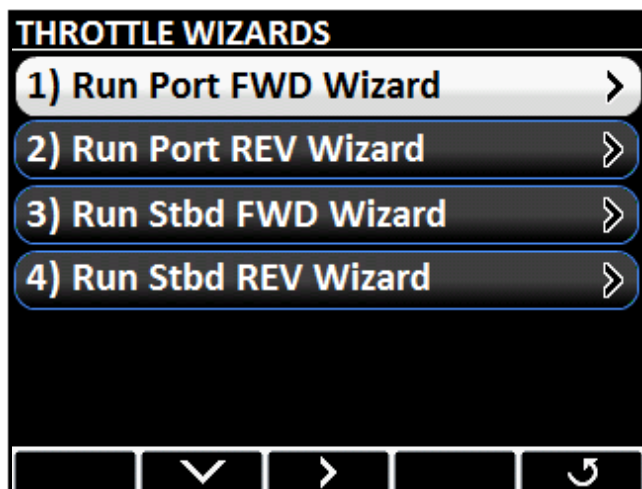


Figure 9-8.

Optimus 360 Joystick Tuning

2. Press **Take Command** on the joystick. Ensure boost mode is *off*.
3. On the display, select **Run Port Fwd Throttle Wizard**. The Throttle Wizard status screen will be displayed, and the joystick's A LED will flash to indicate that the port wizard is running.



Figure 9-9.

4. Push and hold the joystick all the way forward. The wizard will increase throttle from maximum idle throttle to maximum joystick throttle (recorded in STEP 2) in increments, returning to zero throttle before each increment.
 - a. If necessary, rotate the joystick to correct the boat's heading. To abort the wizard release the joystick. You will need to run the wizard again.
 - b. The wizard takes about one minute to run. When it finishes the A LED will stop flashing, the forward gear will engage, and the engine speed will increase to max forward joystick. Release the joystick at this point. The display will return to the Throttle Wizards menu.
5. Repeat, this time selecting **Run Port REV Wizard** and holding the joystick in full reverse.
6. When you've run both forward and reverse wizards on the port engine, run the starboard wizards.

Optimus 360 Joystick Tuning

STEP 4 – Set Forward Heading Correction

In this step you will adjust the rudder angles to minimize sideways drift when piloting the boat straight ahead with the joystick. For best results, perform in an area with as little wind and current as possible.

1. Navigate to **Dealer Menu > Initial Setup > Joystick > Set Forward Heading Correction**.

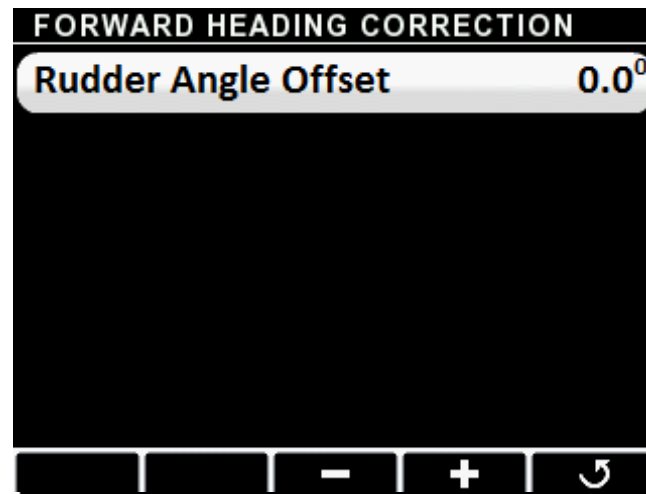


Figure 9-10.

2. Press **Take Command** on the joystick. Ensure boost mode is *off*.
3. Push the joystick all the way forward without rotating the knob. If the boat holds a straight course no adjustment is necessary. Move on to STEP 5.
4. Use the display's + and – buttons to change the Rudder Angle Offset until the boat holds a straight course. If the boat drifts to port, enter a positive value. If the boat drifts to starboard, enter a negative value.
5. Press **Save** to save the change and return to the Joystick Setup menu.

Optimus 360 Joystick Tuning

STEP 5 – Balance Rotation Power

In this step you will tune the power ratio between the FWD and REV engines to yield tight circles in rotation (ROT) mode. For best results, perform in an area with as little wind and current as possible.

1. Bring the boat to a stop with boost mode off.
2. On the display, navigate to **Dealer Menu > Initial Setup > Joystick > Balance Rotation Power**. Select **Normal REV/FWD Ratio**. The default parameter values may be different on your installation.

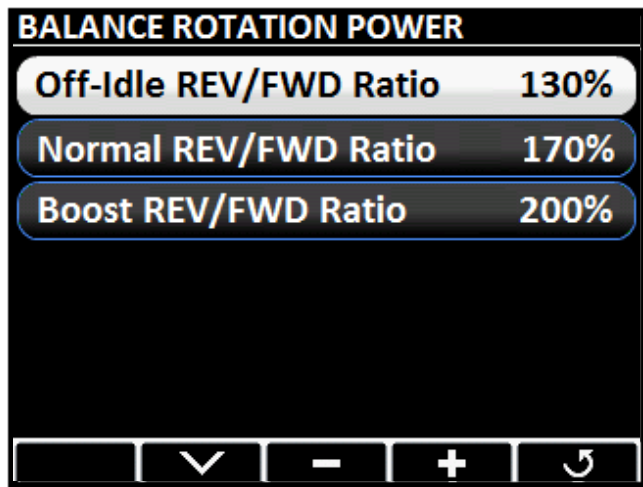


Figure 9-11.

3. Rotate the joystick all the way clockwise (CW).
 - a. If the boat moves aft while rotating, press – to decrease the ratio. If it moves forward, press + to increase the ratio. To start, adjust in increments of at least 20%. Reduce the size of the increment as you get closer to zero fore/aft movement.
 - b. Press **Save**.
 - c. Repeat until the boat rotates on the spot with no fore/aft movement.
4. Press **Boost** on the joystick to enable boost mode, and select **Boost REV/FWD Ratio** on the display. Repeat step 3.
5. Turn boost mode off on the joystick. Select **Off-Idle REV/FWD Ratio** on the display and adjust the value so that it is the same as the Normal REV/FWD Ratio parameter.

In many cases the off-idle rotation power balance will be adequate at this point, but you may find the vessel drifts aft at small joystick inputs, especially when the joystick is tuned with higher peak power levels. You can improve the off-idle performance with the optional step below.
6. Optional: Keep an eye on your *port* engine tachometer and slowly rotate the joystick clockwise (CW) until the engine comes *just* off idle. Hold the joystick at this point.
 - a. If the boat moves aft, decrease the Off-Idle REV/FWD Ratio.
 - b. If the boat moves forward, try rotating the joystick a little more. If the boat still doesn't move aft there is no adjustment to make. Leave the Off-Idle REV/FWD Ratio the same as the Normal REV/FWD Ratio. It should never be higher.
 - c. Press **Save**.
 - d. Repeat until the boat rotates on the spot with no fore/aft movement.

Optimus 360 Joystick Tuning

STEP 6 – Set Sideways Rudder Angle

When moving sideways we don't want the boat to rotate. We achieve this by tuning the Sideways Rudder Angle parameters. For best results, perform in an area with as little wind and current as possible.

This step only adjusts for rotation during sideways movement. Fore/aft movement during sideways motion will be adjusted in STEP 7.

1. Bring the boat to a stop with boost mode off.
2. On the display, navigate to **Dealer Menu > Initial Setup > Joystick > Set Sideways Rudder Angle**. Select **Normal Rudder Angle**. The default parameter values may be different on your installation.

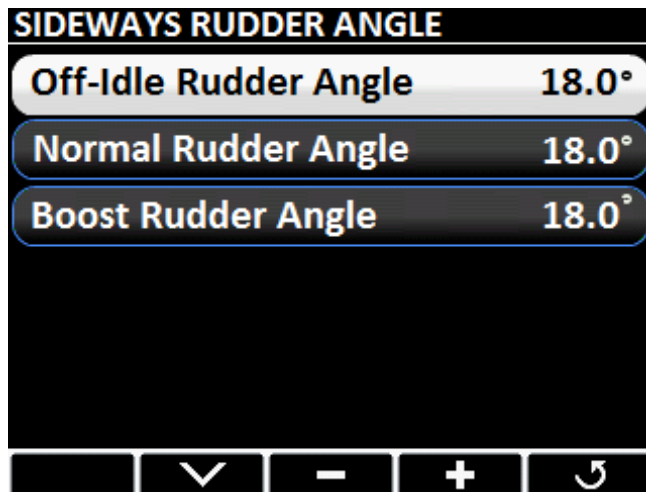


Figure 9-12.

3. Move the joystick sideways fully to port.
 - a. If the boat rotates clockwise as it starts to move, press – to decrease the ratio by up to two units. If it rotates counter clockwise, press + to increase the ratio.
 - Note: the boat will rotate counterclockwise as it gains speed. This is normal – our objective is to remove rotation during *initial* movement.
 - b. Press **Save**.
 - c. Repeat until the boat's initial movement is directly sideways.
4. Press **Boost** on the joystick to enable boost mode, and select **Boost Rudder Angle** on the display. Repeat step 3.
5. Turn boost mode off on the joystick. Select **Off-Idle Rudder Angle** on the display and adjust the value so that it is the same as the Normal Rudder Angle parameter.

In many cases the off-idle rudder angle will be adequate at this point, but you may find the vessel rotates clockwise at small joystick inputs, especially when the joystick is tuned with higher peak power levels. You can improve the off-idle performance with the optional step below.
6. Optional: Keep an eye on your *starboard* engine tachometer and slowly move the joystick to port until the engine comes *just* off idle. Hold the joystick at this point.
 - a. If the boat rotates clockwise, decrease the Off-Idle Rudder Angle.
 - b. If the boat rotates counterclockwise, try moving the joystick a little more. If the boat still doesn't rotate clockwise there is no adjustment to make. Leave the Off-Idle Rudder Angle the same as the Normal Rudder Angle. It should never be higher.
 - c. Press **Save**.
 - d. Repeat until the boat's initial movement is directly sideways.

Optimus 360 Joystick Tuning

STEP 7 – Balance Sideways Power

In this step you will adjust the power ratio between the REV and FWD engines to eliminate fore/aft movement when moving the boat sideways. Perform in an area with no wind or current to remove outside interference.

1. Bring the boat to a stop with boost mode off.
2. On the display, navigate to **Dealer Menu > Initial Setup > Joystick > Balance Sideways Power**. Select **Normal REV/FWD Ratio**. The default parameter values may be different on your installation.

BALANCE SIDeways POWER	
Off-Idle REV/FWD Ratio	130%
Normal REV/FWD Ratio	170%
Boost REV/FWD Ratio	200%

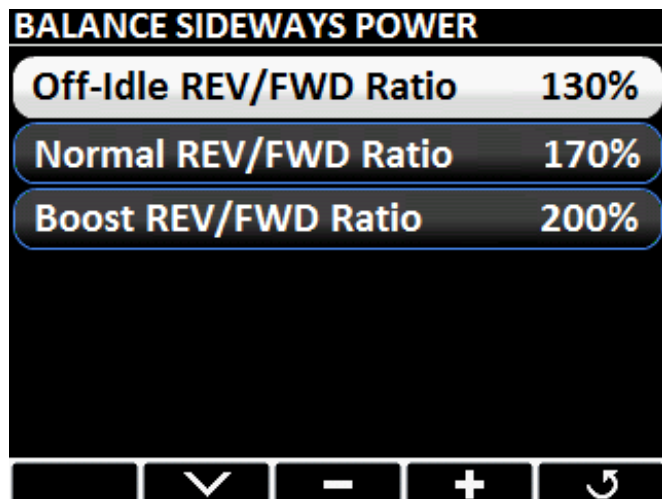


Figure 9-13.

3. Move the joystick sideways fully to port. You can rotate the knob if necessary to keep the bow from rotating as you speed up.
 - a. If the boat moves aft, press – to decrease the ratio. If it moves forward, press + to increase the ratio. To start, adjust in increments of at least 20%. Reduce the size of the increment as you get closer to zero fore/aft movement.
 - b. Press **Save**.
 - c. Repeat until the boat moves directly sideways.
4. Press Boost on the joystick to enable boost mode, and select Boost REV/FWD Ratio on the display. Repeat step 3.
5. Turn boost mode off on the joystick. Select Off-Idle REV/FWD Ratio on the display and adjust the value so that it is the same as the Normal REV/FWD Ratio parameter.

In many cases the off-idle sideways power balance will be adequate at this point, but you may find the vessel drifts aft at small joystick inputs, especially when the joystick is tuned with higher peak power levels. You can improve the off-idle performance with the optional step below.
6. Optional: Keep an eye on your *starboard* engine tachometer and slowly move the joystick to port until the engine comes just off idle. Hold the joystick at this point.
 - a. If the boat moves aft, decrease the Off-Idle REV/FWD Ratio.
 - b. If the boat moves forward, try moving the joystick a little more. If the boat still doesn't move aft there is no adjustment to make. Leave the Off-Idle REV/FWD Ratio the same as the Normal REV/FWD Ratio. It should never be higher.
 - c. Press **Save**.
 - d. Repeat until the boat moves directly sideways.

Optimus 360 Joystick Tuning

STEP 8 – Adjust Power Levels

In this step you will customize the boat's response by fine-tuning the power levels associated with each direction. Note that large changes can affect the parameters you tuned in STEP 4 through STEP 7.

Note: When fine-tuning power levels, always return the joystick to the center position after making any adjustment. Make small changes and press **Save** after every change.

1. Ensure boost mode is off.
2. Navigate to **Dealer Menu > Initial Setup > Joystick > Adjust Power Levels**.

POWER LEVELS	
Normal Forward Power	25%
Normal Reverse Power	40%
Normal Rotation Power	65%
Normal Sideways Power	65%
Boost Forward Power	35%
Boost Reverse Power	45%

Figure 9-14.

3. Move the joystick all the way forward and adjust Normal Forward Power until the boat's speed over water (SOW) is 3–4 knots.
4. Move the joystick to full forward and hold until the boat is at speed. Abruptly move the joystick to full reverse and hold until the boat stops its forward motion.
 - a. If the boat does not stop quickly enough, increase Normal Reverse Power and repeat until you are satisfied with the stopping time.
5. Move the joystick all the way port and adjust Normal Sideways Power until the boat moves sideways at a comfortable close-quarters docking speed.
6. Rotate the joystick all the way clockwise and adjust Normal Rotation Power until the boat rotates at a comfortable close-quarters docking speed.
7. Press **Boost** to enable boost mode.
8. Move the joystick all the way forward and adjust Boost Forward Power until the boat's SOW is 4–5 knots.
9. Move the joystick to full forward and hold until the boat is at speed. Abruptly move the joystick to full reverse and hold until the boat stops its forward motion.
 - a. If the boat does not stop quickly enough, increase Boost Reverse Power and repeat until you are satisfied with the stopping time.
10. Move the joystick all the way port and adjust Boost Sideways Power until the boat moves sideways noticeably faster than in normal mode.
11. Rotate the joystick all the way clockwise and adjust Boost Rotation Power until the boat rotates noticeably faster than in Normal mode.
12. *Changes in these values can affect previously calibrated parameters. If you changed any of these parameters by more than 5 units, repeat STEPS 5 through 7.*

Optimus 360 Joystick Tuning

STEP 9 – Sea Trial

Now that the basic setup procedure is completed, it is time to conduct a basic sea trial to confirm good joystick performance. Perform the sea trial in an open area and pay particular attention to gear engagement, boat response and stopping power.

Gear Engagement

Perform the following actions and check that the gear shifts occur within approximately two seconds. If you find that gear engagement is taking longer contact SeaStar Solutions technical support.

1. Engage Boost mode.
2. Move the joystick all the way to port for a few seconds.
3. Move the joystick all the way to starboard for a few seconds.
4. Move the joystick back to port.
5. Repeat, pausing at the neutral position for one second when changing directions.

Boat Response

Step through all the Joystick Modes of Operation shown on the Optimus 360 Joystick Quick Reference Guide and confirm that:

1. boat response is predictable
2. speeds are safe for operation in a marina
3. boost mode gives noticeably higher thrust than normal mode.

If the boat performance does not meet all of these requirements, return to STEP 8 and adjust the power levels according to the instructions. If further adjustments do not help, or if you need assistance, contact SeaStar Solutions technical support.

Stopping Power

1. In normal mode, hold the joystick all the way forward until the boat reaches its maximum speed.
2. Abruptly move the joystick all the way into reverse.
3. Confirm that the boat's stopping power is adequate.
4. Repeat the test in boost mode.

If the stopping power is insufficient for safe operation, return to STEP 8 and increase the Reverse Power parameters as required.

Optimus 360 Joystick Tuning

STEP 10 – Save the Joystick Tuning File

The joystick tuning file should be saved as a backup in the event of a joystick failure. You will also need to email a copy of the tuning file to SeaStar Solutions as part of the post-installation warranty checklist.

1. Insert a USB flash drive in the USB port on the back of the CANtrak display.
2. Navigate to **Dealer Menu > Devices > Main Joystick > Export Settings**. You will see the Export Settings menu, with options for Internal Memory and USB Memory.



Figure 9-15.

3. Highlight **USB Memory** and press **Select**.

4. The display will save the configuration file to the USB drive and display a message when finished.

Notes:

- The display will create a folder on the USB drive called 'Optimus,' and a sub-folder named 'Joystick,' into which the configuration file will be saved.
- It will save the configuration file with the name *[serial number of the joystick].xcu*. Be sure to give the file a unique, meaningful name for later use. You can't do this from the display; you will need to insert the USB drive into a computer to rename the file. (See Appendix E of the Optimus EPS Installation Manual (Book 50) for recommendations.)
- Configuration files exported by the display have the extension .xcu. This is different than the .ecu extension generated by Datalink. Only .xcu files can be imported using the CANtrak display. Don't change the extension when you rename the file.