

Zero Off

User Manual

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Introduction

What is Zero Off?

Zero Off, a speed control system for boats, uses GPS technology to control boat speed for recreational and tournament water sports such as slalom and jump water skiing, wakeboarding, and trick water skiing. Simply set the desired boat speed, open up the throttle, and let Zero Off take care of the rest.

Zero Off uses true closed loop control of boat speed. This means that as long as the boat motor has enough power, the boat automatically tracks the desired speed without having to enter complicated setup information into the system. With Zero Off in control of the boat speed, all that the driver has to focus on is maintaining his boat path.

For slalom and jump skiing, Zero Off can control the boat speed with the same precision and similar feel as an expert hand driver. Zero Off responds to how the skier pulls on the boat, and adjusts accordingly to allow the skier to get free of the boat at the appropriate times as they pass through the course.

Zero Off developers work closely with world-class slalom and jump skiers to ensure that the boat speed and course timing are controlled accurately and smoothly. Zero Off is developed to provide an outstanding “feel” of the pull and a pull that is in synch with the skier’s needs while skiing a course. The Zero Off faceplate has the following features:



- A. • 128 x 64 Back Lit Display Screen
- B. • Select Button
- C. • Scroll Down Button
- D. • Scroll Up Button
- E. • On/Off Menu

Using the Faceplate Buttons

Use the four buttons, **SELECT**, **ON/OFF MENU**, and the **DOWN** and **UP** arrow keys to move around the screen and modify parameters.



Button	Action	Description
SELECT	Tap	On the screens, it moves around the screen and highlights areas that can be modified. On the main menu, it moves to the next option.
UP or DOWN	Tap	On the screens, modifies the value that has been highlighted. On the main menu, selects an option.
ON/OFF MENU	Tap	Turns Zero Off on or off.
	Hold	Displays the main menu at the top of any screen.





The button actions are:

Tap – press and **release** the button in less than 1 second.

Hold – press and **hold** the button approximately 2 seconds.

Displaying the Main Menu

Hold the **ON/OFF MENU** button for approximately 2 seconds and the main menu bar is displayed at the top of any Zero Off screen.

Option	Description
	Selects Recreational, Tournament, Speed Plot, Diagnostics, or Timing screens.
	Displays system settings. Settings include warning timer, backlight/contrast adjustment, English or Metric units, Time Zone adjustment, and Key Code entry.
	Displays screens to select and map a course.
	Displays screens to select and create a skier profile.

Starting Zero Off

Zero Off automatically starts when the boat's ignition switch is turned ON. Zero Off starts in the same configuration in which it was turned off, provided the battery was not disconnected. This means the same configuration settings for boat speed and setup selections are retained for the next operating session provided the battery was not disconnected. If the battery was disconnected, Zero Off starts in default mode.

While bringing the boat up to speed to the point where the Zero Off speed control engages, you can manipulate the throttle as desired to pull the skier up and line the boat up for entry to the course. The Zero Off system beeps to acknowledge the point of engagement. Once the boat has achieved the target speed, it is very important to ensure that the throttle handle is pushed all the way forward. Failure to advance the throttle to the full open setting while running the course may result in slow times since throttle handle position provides an upper limit on how much torque the engine is allowed to produce. A wide-open throttle handle position frees up the engine to produce its maximum torque output and allows the speed control to operate at its optimum level.

NOTE: Zero Off must have a satisfactory GPS fix to operate in speed control mode, which usually occurs within 5-10 seconds after turning on the ignition.

Quick Start Guide

Slalom Skiing Quick Start

Step 1: Map a Course

Important: When mapping a slalom course live, you must TAP the SELECT button when the GPS antenna crosses the plane of the entry and exit gates.

Action	How to Perform Action
1. Display main menu	HOLD MENU button
2. Highlight MAP	TAP UP or DOWN
3. Select Open	TAP UP or DOWN button, then SELECT button
4. Highlight Live Course Mapping	TAP UP or DOWN button, then SELECT button
5. Follow on-screen directions	Important: When mapping a slalom course live, you must TAP the SELECT button when the <u>GPS antenna crosses the plane of the entry and exit gates.</u>


Step 2: Select Pull Type

Action	How to Perform Action
1. Highlight Pull Type	TAP SELECT to highlight items on the screen
2. Select from A1, A2, A3, B1, B2, B3, C1, C2, or C3 Pull type	TAP UP or DOWN button

Step 3: Adjust Boat Throttle

For Slalom skiing, it is recommended that after the throttle is engaged, you push up the throttle at least 2 inches further (or to the stops) to allow Zero Off enough compensation as needed.

Step 4: Select Recreational, Tournament, or Timing Recap Screen

Action	How to Perform Action
1. Highlight Page Icon  .	TAP SELECT to highlight items on the screen
2. Scroll to the Recreational, Tournament, or Timing Recap screens	TAP UP or DOWN button

Jump Skiing Quick Start

Step 1: Important Note

Important: Zero Off strongly recommends that you read the complete information guide for JUMP skiing. See the section *Events, Jump* on page 37.

Step 2: Jump Letter Selection

Action	How to Perform Action
1. Display Main Menu	HOLD MENU button
2. Highlight SET	TAP UP or DOWN button, then SELECT button
3. Select Jump Letter Select	TAP UP or DOWN button, then SELECT button
4. Follow the on-screen directions	TAP MENU several times to back out of screens

Step 3: Map a Course

Important: When mapping a jump course live, you must TAP the SELECT button when the boat pylon crosses the plane of the entry and exit gates.


Action	How to Perform Action
1. Display main menu	HOLD MENU button
2. Highlight MAP	TAP UP or DOWN button, then SELECT button
3. Select Open	TAP UP or DOWN button, then SELECT button
4. Highlight Live Course Mapping	TAP UP or DOWN button, then SELECT button
5. Follow on-screen directions	Important: When mapping a Jump course live, TAP the SELECT button when the <u>boat pylon</u> crosses the plane of the entry and exit gates.

Step 4: Adjust Boat Throttle

For Jump skiing, it is recommended that after the point of engagement, you push the throttle handle to the stops. This is done to make sure the speed control has full control of the motor to apply the necessary input. On a DBW boat, the maximum power output from the engine is limited by the throttle handle position.

WARNING: For 2009 Indmar engines that have Throttle Override turned “On”, **YOU MUST KEEP THE THROTTLE MOVING ALL THE WAY TO THE STOPS. YOU DO NOT HAVE TO IMMEDIATELY FLOOR IT, JUST KEEP THE THROTTLE MOVING.** If you stop throttle movement at engagement and then start moving it again, the boat will “take off” at full throttle because the Throttle Override is taking control.

Step 5: Select Tournament or Timing Recap Screen

Action	How to Perform Action
1. Highlight Page Icon 	TAP SELECT to highlight items on the screen
2. Scroll to the Tournament, or Timing Recap screens	TAP UP or DOWN button

Trick Skiing Quick Start

Step 1: Select Pull Type

Action	How to Perform Action
3. Highlight Pull Type	TAP SELECT to highlight items on the screen
4. Select from A1, A2, A3, B1, B2, B3, C1, C2, or C3 Pull type	TAP UP or DOWN button

Step 2: Set Boat Speed

Action	How to Perform Action
1. Highlight Set Speed	TAP SELECT to highlight items on the screen
2. Select the desired boat speed	TAP UP or DOWN button

Waypoint Quick Start

Map a Course

Action	How to Perform Action
1. Display main menu	HOLD MENU button
2. Highlight MAP	TAP UP or DOWN button, then SELECT button
3. Select Open	TAP UP or DOWN button, then SELECT button
4. Highlight Live Course Mapping	TAP UP or DOWN button, then SELECT button
5. Follow on-screen directions	TAP MENU several times to back out of screens

Wakeboarding Quick Start

Step 1: Select Pull Type

Action	How to Perform Action
1. Highlight Pull Type	TAP SELECT to highlight items on the screen
2. Select from A1, A2, A3, B1, B2, B3, C1, C2, or C3 Pull type	TAP UP or DOWN button

Step 2: Set Boat Speed

Action	How to Perform Action
1. Highlight Set Speed	TAP SELECT to highlight items on the screen
2. Select the desired boat speed	TAP UP or DOWN button

Zero Off Screens

Main Menu

From the main menu you can access the screens, map a course, create a skier profile, and adjust system parameters.



To display the main menu from any Zero Off Screen, HOLD the MENU button for approximately 2 seconds. The main menu is displayed.

SCRN

The SCRN option provides a list of several of the Zero Off screens.




Recreational Screen

The recreational screen is displayed when the boat is turned on and is used for slalom skiing, Trick skiing, and the Waypoint feature.



NOTE: If no skier or course is selected, Latitude and Longitude are shown at the bottom of the screen. Also, by holding down the **SELECT** button on this screen (for approximately 2 seconds), it will automatically bring you to the tournament screen.

The following items can be highlighted and modified:

- Event Type – selects the event: Slalom, Jump, Trick, Waypoint, and Wakeboarding (if purchased)
- Set Speed – sets the speed for the boat
- RPM Set Speed – sets the RPM speed for the boat
- Page Icon  - scrolls to the next screen

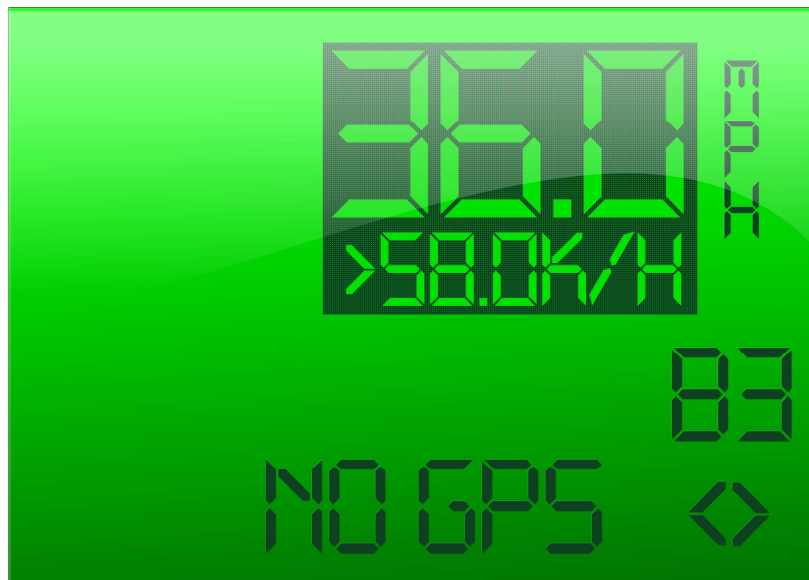
These two items are displayed on the Recreational screen but are modified on other screens:

- Skier Pull Type – See section **Main Menu, WHO** for additional information.
- Course Name – See section **Main Menu, MAP** for additional information

The remaining items on the Recreational screen provide information such as the time and date and the actual boat speeds.


Tournament Screen

The Tournament screen is used for Slalom skiing, Jump skiing, and Trick skiing.



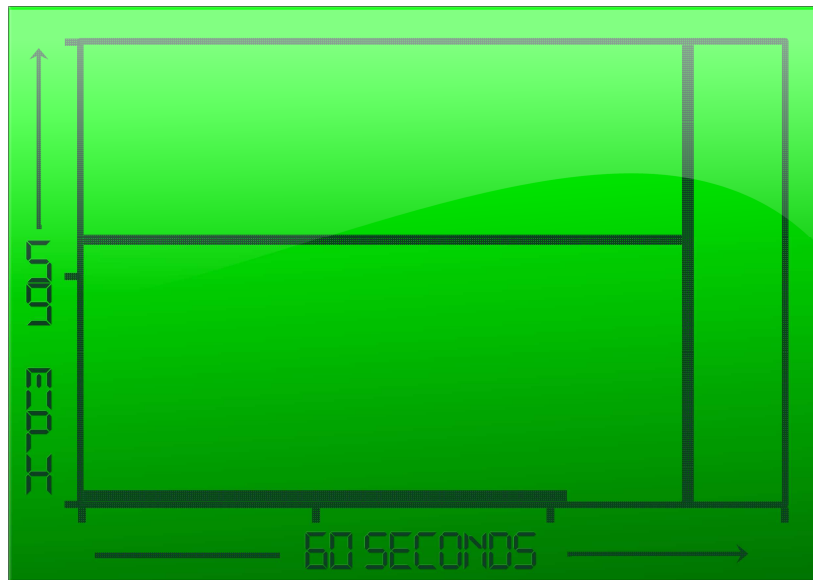
NOTE: By holding down the **SELECT** button (for approximately 2 seconds), it will automatically bring up the Timing Recap Screen.

The following items on the screen can be highlighted and modified:

- Set Speed – sets the speed for the boat
- Skier Pull Type – Selects the value for the Skier Profile (A1, A2, A3, B1, B2, B3, C1, C2, C3, or J if Jump skiing)
- Course Selection – Selects the course
- ON / OFF – Turns cruise control ON or Off
- Page Icon  - Scrolls to the next screen

Speed Plot Screen

The Speed Plot screen visually displays the boat's speed versus time. The axes can be scaled up or down in the Speed Plot submenus.

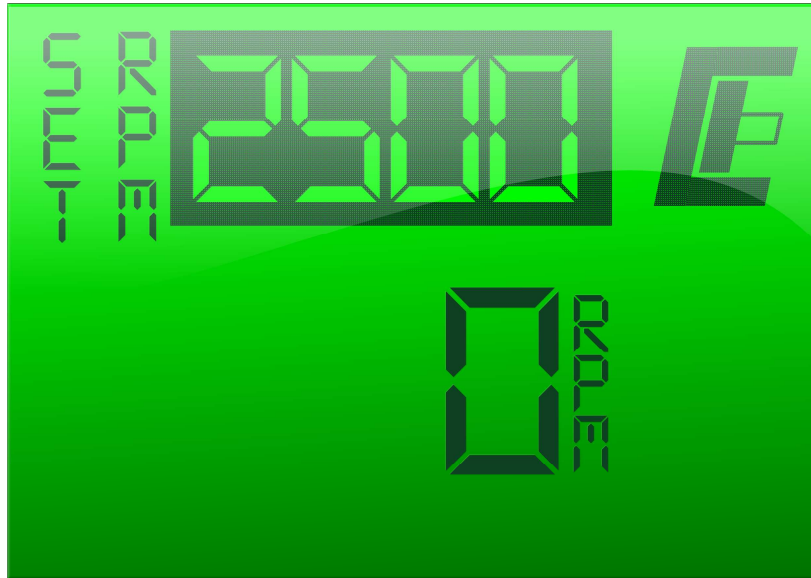


To adjust the Speed Range and Timebase,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SCRN**.
3. **TAP SELECT** button to display the list of screens.
4. **TAP UP** or **DOWN** button to highlight **SPD PLOT**.
5. **TAP SELECT** button. The **Speed Plot Selected** screen is displayed.
6. **TAP UP** or **DOWN** buttons to adjust the Timebase.
7. **TAP SELECT** button to move to the Adjust Speed Range screen.
8. **TAP UP** or **DOWN** buttons to adjust the Speed Range.
9. **TAP ON/OFF MENU** button three times. The system returns to the list of screens, then the main menu bar, and then displays the speed plot graph. The graph shows the relationship of boat speed to seconds.
10. **TAP ON/OFF MENU** button to display a real-time graph tracking the boat speed versus time.
11. **HOLD ON/OFF MENU** button to return to the main menu bar.

RPM Speed Only Screen

The RPM Only screen provides a large font display of the RPM setpoint and actual value. It is intended for those who prefer larger font sizes on a display screen and who want to run in RPM mode.

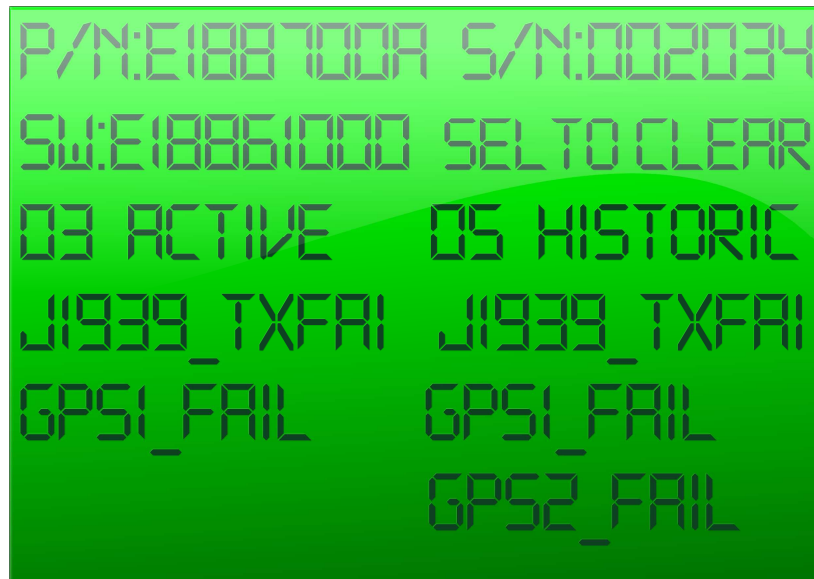


To modify the RPM ONLY,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SCRN**.
3. **TAP SELECT** button to display the list of screens.
4. **TAP UP** or **DOWN** button to highlight **RPM ONLY**.
5. **TAP SELECT** button.
6. **TAP ON/OFF MENU** button twice. The main menu bar is cleared and the **RPM ONLY** screen is displayed.
7. **TAP SELECT** button to highlight the RPM Speed.
8. **TAP UP** or **DOWN** buttons to adjust the RPM Speed.
9. **TAP ON/OFF MENU** button to return to the main menu.

Diagnostics Screen

The Diagnostics screen lists the active and historical error codes. See Diagnostics section for detailed Error Code and Diagnostics information.



Timing Recap Screen

Slalom Skiing

The Slalom Timing Recap tracks when the boat drives through the buoys. The time at the bottom of the **Latest** column automatically moves over to the **Historical Last** column (column on the right) when the **Latest** column is full and another time is captured.



NOTE: By holding down the SELECT button (for approximately 2 seconds) it will automatically bring you to the Tournament Screen.

Jump Skiing

The Jump Timing Recap tracks times for each of the timed segments defined for the jump course by AWSA. These include the time from ST gate to the 52meter point (52*), from the 52meter point to the MT gate (30*), from the ST gate to the MT gate (82*) and from the MT gate to the ET gate (41*).

	LATEST	LAST
52*	0.00	0.00
30*	0.00	0.00
82*	0.00	0.00
41*	0.00	0.00
	0.0	0.0

NOTE: By holding down the SELECT button (for approximately 2 seconds) it will automatically bring you to the Tournament Screen.

SET

SET is a list of the system parameters that can be modified to change the appearance or volume of the system features.



Jump Letter Select

Jump Letter Select calculates the Jumper Weight and Jumper Distance to give a suggested starting Jump Letter. This Jump Letter represents how much throttle will be applied once the Rope Switch is closed as the skier pulls. The higher the Jump Letter selected the more aggressive the pull.

To choose a jump letter,

1. **HOLD ON/OFF MENU** button until the menu bar is displayed.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of system options that can be modified.
4. **TAP UP** or **DOWN** buttons to highlight the **Jump Letter Select** option.
5. **TAP SELECT** button to display the Jump Letter Select screen.
6. Follow on screen directions to enter the skier's weight.
7. **TAP SELECT** button to change to Distance mode. Follow the screen directions to enter the jumper's distance.
8. After entering the jumper's distance, **TAP MENU** button three times to return to the Tournament screen.



An alternate shortcut is available for Jump Letter Select. Simply highlight the jump letter on the jump tournament screen, and hold the SELECT button until the system jumps directly to the jump letter select screen. Then proceed as described above from #6 on.

Slalom Wait Time Adjust Screen

Warning Timer is the amount of time a skier can wait in the water before the warning timer starts to beep indicating it is time to pull up the skier. As the warning timer nears the end, a beeper starts beeping slowly to indicate the amount of warning time is close to the end. The beeping continues to increase in speed and volume in relation to the amount of warning time remaining.

NOTE: To disable the warning timer, set the value to 0 as instructed on the screen. Note this is a change from last year, when the timer was disabled by setting the value to 180.

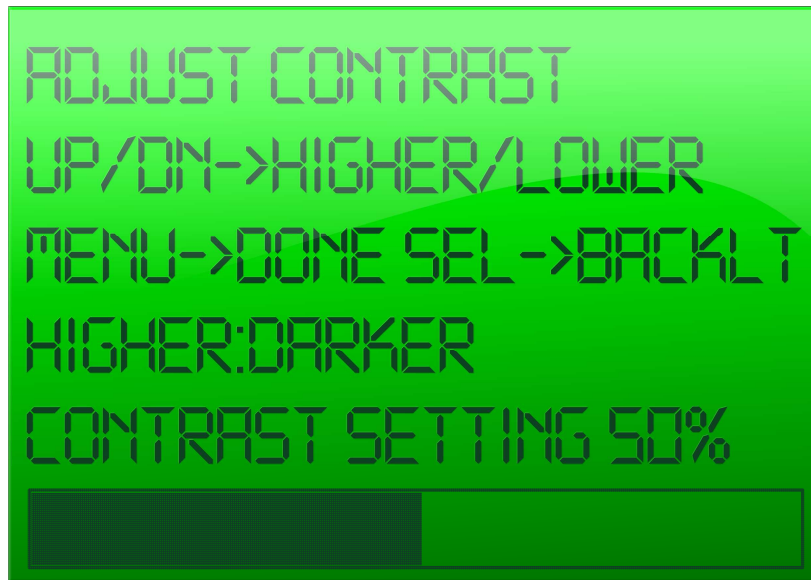
To adjust the warning timer,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. **TAP UP** or **DOWN** buttons to highlight **Slalom Wait Time**.
5. **TAP SELECT** button. The **Warn Timer** screen is displayed.
6. Use the on screen directions to adjust the warning timer.
7. **TAP ON/OFF MENU** button to exit the screen.



Backlight/Contrast Adjust Screen

You can adjust the backlight to make the system screens brighter or dimmer. You can adjust the brightness contrast to the system screens.

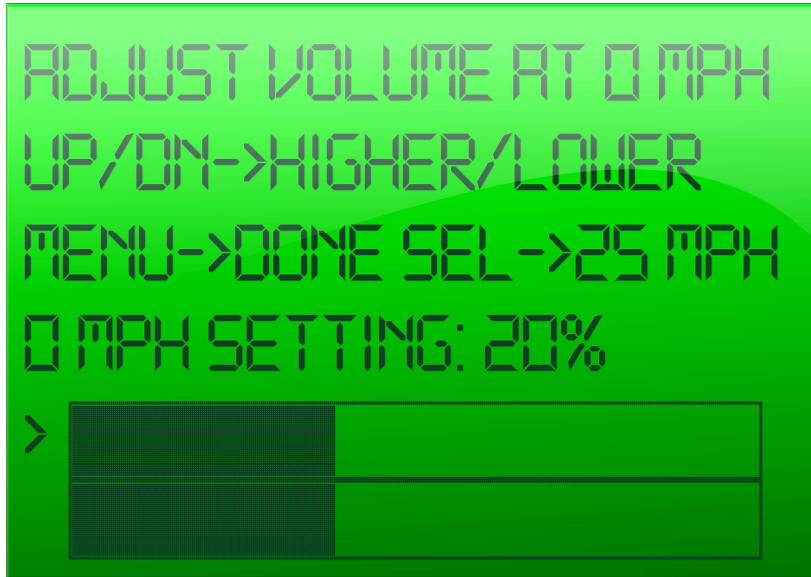


To adjust the backlight,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. Use the arrow buttons to highlight **Backlt/Contrast Adjust**.
5. **TAP SELECT** button. The **Backlt/Contrast Adjust** screen is displayed.
6. Use the on screen directions to adjust the settings. The sliding bar at the bottom of the screen visually shows the change and the screen brightness automatically adjusts as you select a new setting.
7. **TAP ON/OFF MENU** button to exit the screen.

Buzzer Volume Adjust Screen

The Buzzer Volume adjustment compensates for the increased engine noise as the boat speed increases. As the boat speed increases and therefore the noise of the motor and wind noise increases, the volume of the buzzer increases proportionally to boat speed between 0 and 25mph (40.2 km/h) to allow you to continue to hear the buzzer over the increasing background noise without being annoying while at rest. No further increase occurs at speeds above 25mph (40.2 km/h).

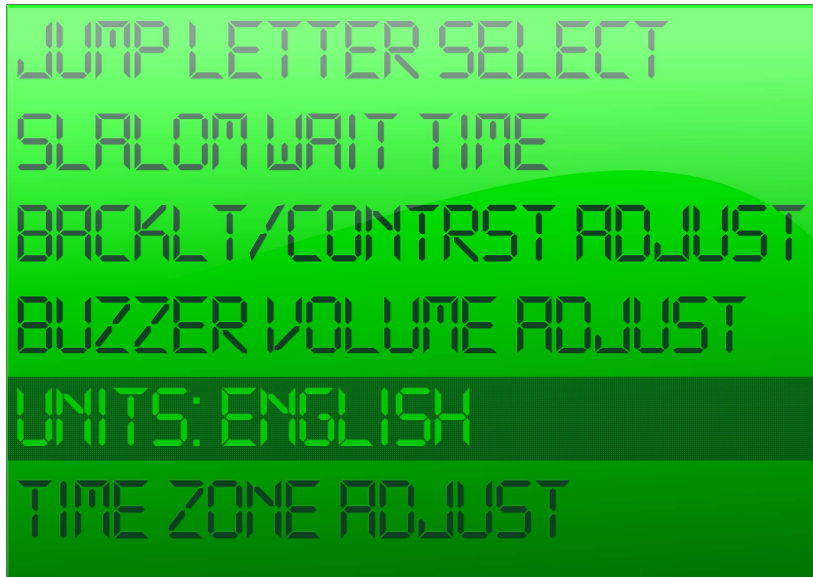


To adjust the 25mph (40.2 km/h) buzzer setting,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. **TAP UP** or **DOWN** button to highlight **Buzzer Volume Adjust**.
5. **TAP SELECT** button. The **Buzzer Volume Adjust** screen is displayed.
6. **TAP SEL** to select which of the two volume levels is to be adjusted, 0 or 25mph (40.2 km/h).
7. **TAP UP** or **DOWN** button to make the selected buzzer volume higher or lower. The sliding bar at the bottom of the screen visually shows the change and you can hear the beeper volume as it adjusts.
8. **TAP ON/OFF MENU** button to exit the screen.

Units: English or Metric Screen

You can select English units (mph) or Metric units (kph)

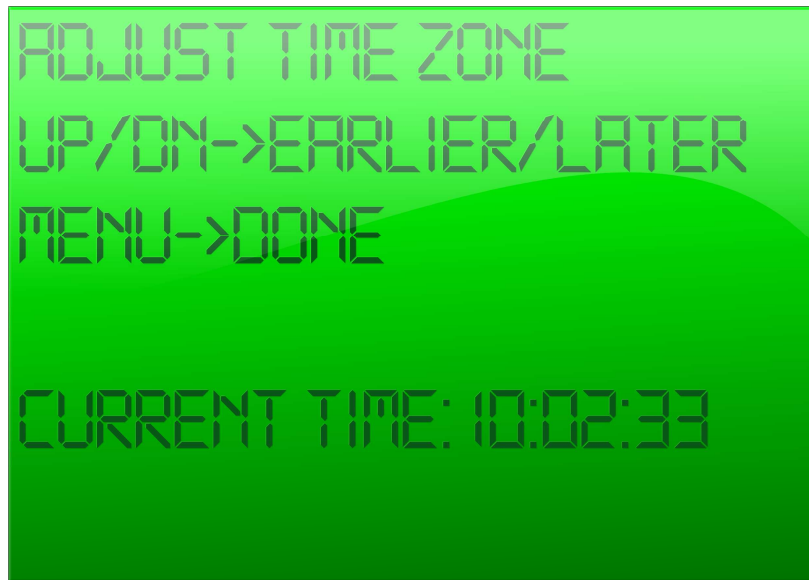


To change the Units,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. **TAP UP** or **DOWN** button to highlight **UNITS: ENGLISH**.
5. **TAP SELECT** button. The system briefly displays a message indicating the **units** were changed. The list of settings redisplay with the new Units listed.
6. **TAP ON/OFF MENU** button to exit the screen.

Time Zone Adjust Screen

You can adjust the clock in the Zero Off system to match the time zone of the area where you are located.



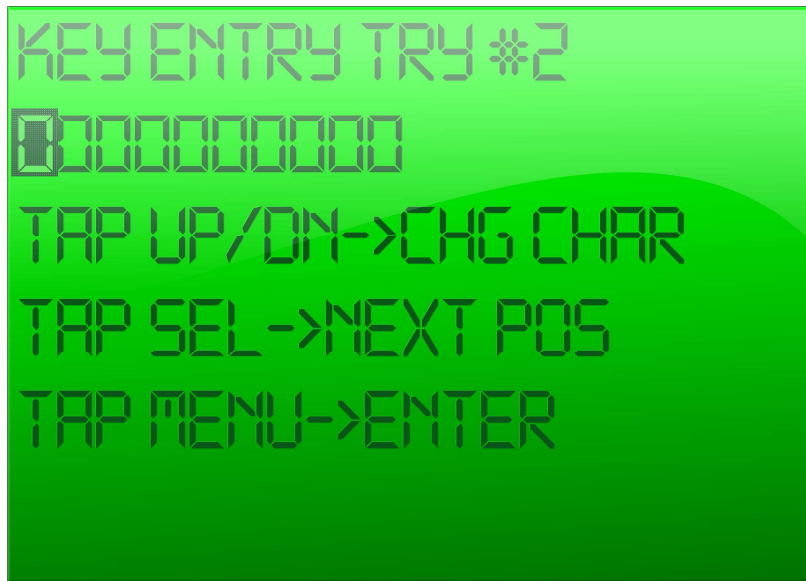
To change adjust the Time Zone,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. **TAP UP** or **DOWN** button to highlight **TIME ZONE Adjust**.
5. **TAP SELECT** button. The Adjust Time Zone screen is displayed.
6. **TAP UP** or **DOWN** button to adjust the displayed Current Time to the desired time.
7. **TAP ON/OFF MENU** button to exit the screen.

Key Entry Adjust Screen

Zero Off is factory shipped as either a 3 Event (Slalom, Jump, and Trick) or Wakeboard system. You may purchase an unlock code to convert your system from Wakeboard to 3 Event or 3 Event to Wakeboard by contacting Zero Off.

You need to enter the provided code on the Key Entry screen. You are given five tries to enter the correct code. If after five tries the correct code has not been entered, the system prohibits you from trying again until you power down and restart the system.

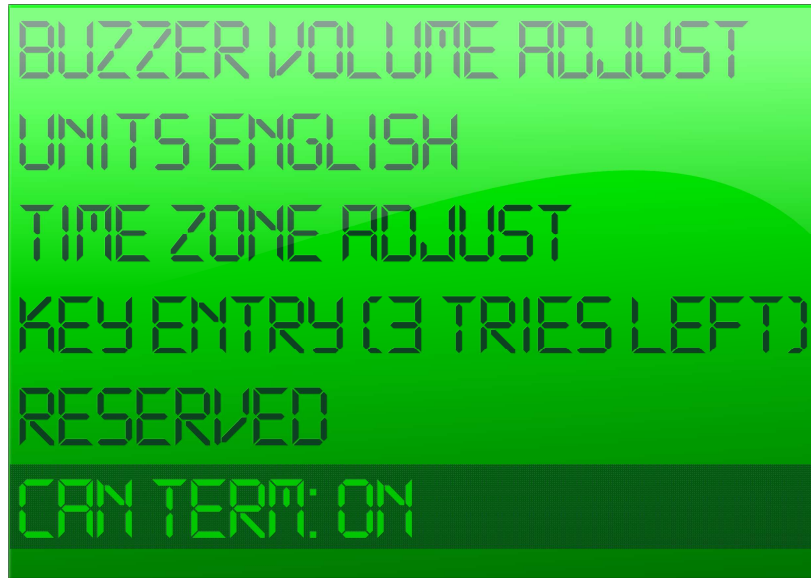


To enter the code,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. **TAP UP** or **DOWN** button to highlight **KEY Entry**.
5. **TAP SELECT** button. The Key Entry Try # screen is displayed.
6. Use the instructions on the screen to enter the code. The numerals scroll 0 through 9.
7. **TAP ON/OFF MENU** button to enter the code. A message is displayed indicating the code has Passed or Failed. If the code failed, the number of remaining tries is displayed on the list of settings screen.

Change CAN Term to ON or OFF Screen

You can turn the CAN termination on or off. This feature is provided to allow for boats where there are many different configurations of gauges which use the CAN communications link to share information. If the system's diagnostic page shows an error related to J1939, try turning CAN termination off or on as an initial attempt to solve the problem.



To turn the CAN on or off,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SET**.
3. **TAP SELECT** button to display the list of settings.
4. **TAP UP** or **DOWN** button to highlight **CAN Term**.
5. **TAP SELECT** button. A message is displayed indicating **CAN Termination** was changed to either ON or OFF (the opposite of what it was). Then the **SET** screen redisplay listing the new setting for **CAN Term**.

MAP

MAP displays a screen listing the Course Names. MAP also has screens to map a course using either **Live Course Mapping** or **Course Coordinate Entry**. You map a course for Slalom and Jump skiing.

Course Name List

The Course Names list is displayed after you highlight MAP on the Main Menu. A maximum of 10 course maps may be stored.

Select a Course Name

1. **HOLD ON/OFF MENU** button approximately 2 seconds. The main menu bar is displayed.
2. **TAP UP** or **DOWN** button to highlight **MAP**.
3. **TAP SELECT** button. A list of course names is displayed.



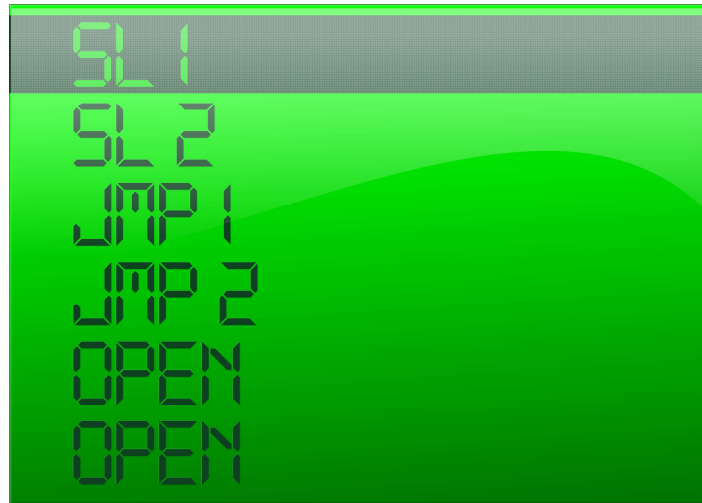
4. **TAP UP** or **DOWN** button to highlight the desired **course name**.
5. **TAP SELECT** button to display the selected course name. The selected course name is displayed on the Recreational screen.

NOTE: The first time a course entry is mapped, the system will automatically allocate a unique name that reflects whether it is a jump or slalom course. The user can later change these names to something more personalized if desired. Existing courses can also be deleted if desired. Customized course names will be lost if a course is deleted.

Course Mapping Screen

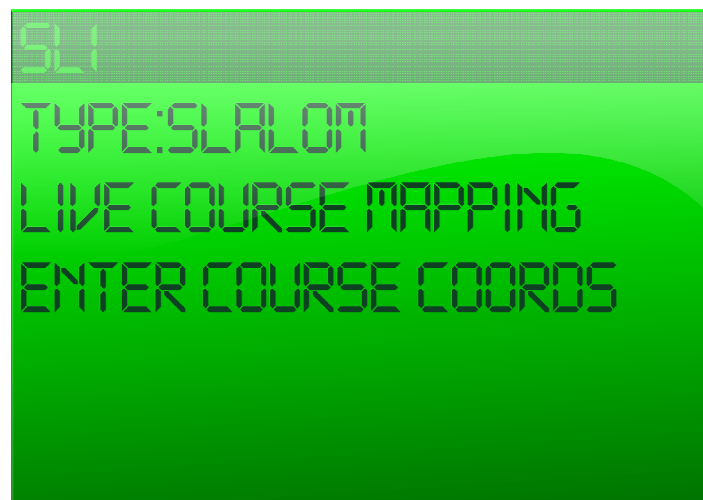
Live Course Mapping

Distance down the course is calculated using knowledge of how fast the boat is traveling rather than triggering on the individual gate GPS coordinates. Since speed is known with high accuracy, these distances are calculated with high accuracy, and are not subject to the slow +/- 1-2 meter drift inherent in the GPS position estimates. Thus, buoy time measurements are not subject to errors caused by normal GPS position estimate drift. GPS based velocity measurements are inherently more accurate than position estimates since they are based on a different physical measurement technique.



To map a course using Live Course Mapping,

1. **HOLD ON/OFF MENU** button until the menu bar is displayed.
2. **TAP SELECT** to highlight MAP option.
3. **TAP UP** or **DOWN** button to highlight the desired course name.
4. **TAP SELECT** button. An asterisk is placed next to the selected course name.
5. **TAP SELECT** button to display the selected course name screen.



6. To rename the course, highlight the course name. **TAP SELECT** and follow the on screen directions. You can only rename a course **after** it has been mapped.

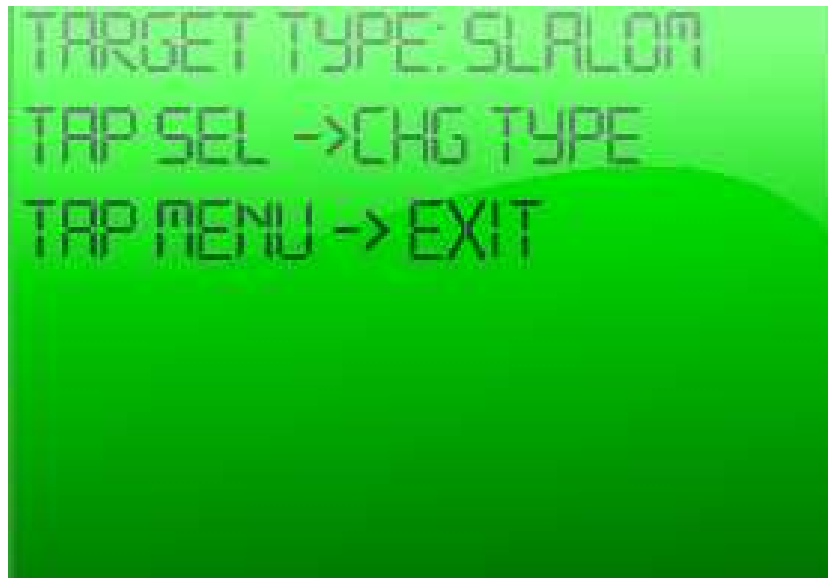
NOTE: TAP UP/DOWN button to move the block cursor around the characters. Choose the location in the text string where you want to start making changes, and then **TAP SELECT** to switch to the character change mode. The cursor will change to an underline cursor, and the **UP/DOWN** buttons will now cause that character to scroll up or down through the alphabet. It allows upper and lower case alphabet characters along with the numbers 0-9 and the space character to be selected.

When the character is modified to the desired value, **TAP SELECT** and the cursor will move to the next character (to the right). Repeat the **UP/DOWN** process until that character is as desired. Repeat this for as many characters as you want to enter.

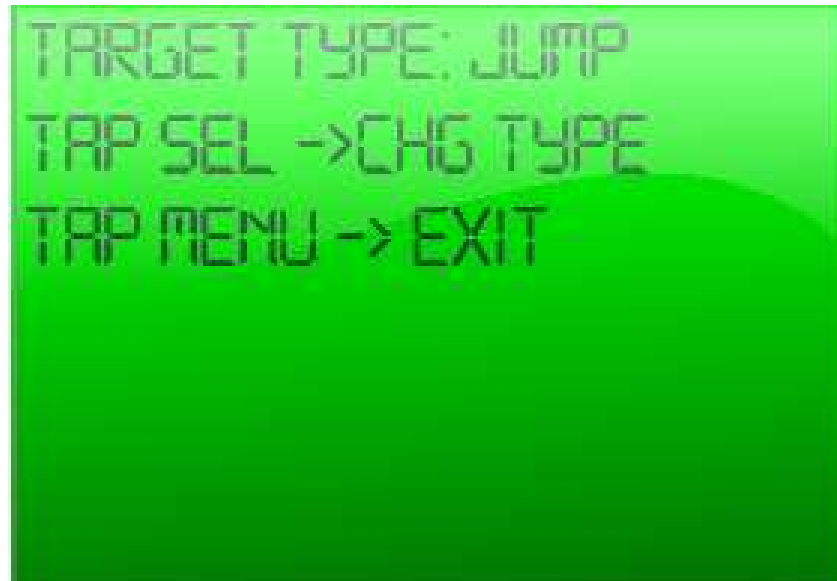
If you want to go back to an earlier character to further modify it or correct an error, simply keep **TAPPING** the **SELECT** button and the highlight underline cursor will move to the right until it reaches the last character, and will then wrap back to the beginning of the text string.

7. When you have completed a course name, **TAP MENU** button several times to return to the Course Mapping screen.

8. To change the Target TYPE, highlight **Target Type**. **TAP SELECT** button to display the Target Type screen.



9. Follow the on screen directions until Target TYPE displays **Jump, Slalom 6, Slalom 8, or Waypoint***, depending on the type of course you are mapping.



10. **TAP MENU** button to return to the previous screen.

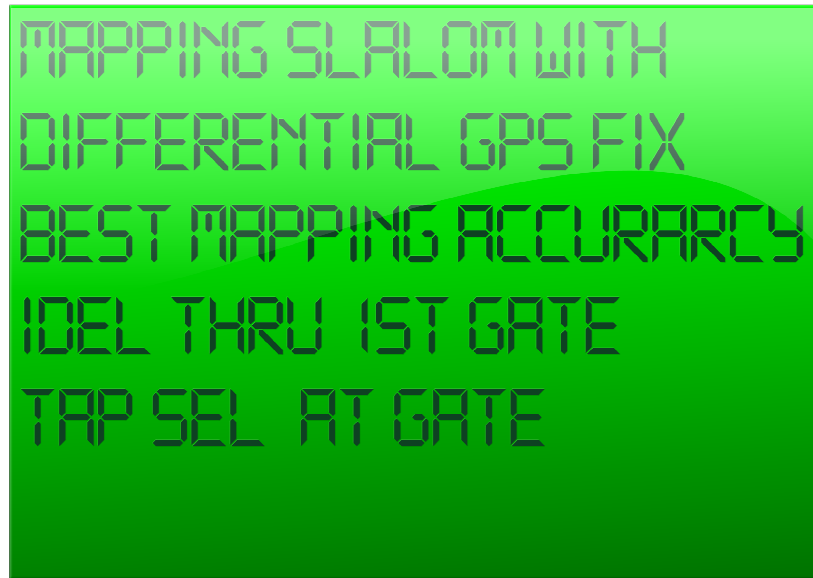
11. **TAP UP** or **DOWN** buttons to highlight **Live Course Mapping**.



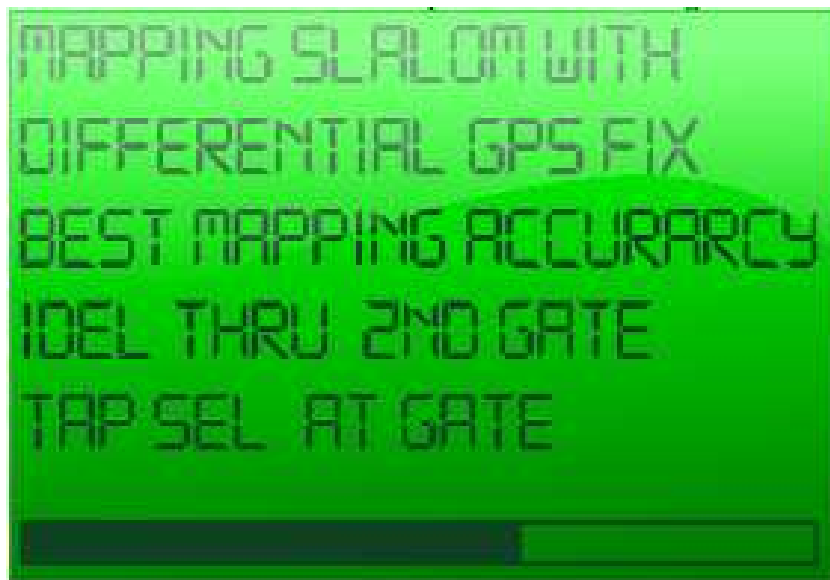
12. **TAP SELECT** button to enter the Live Course Mapping screen.

13. For **Slalom skiing**, perform the following:

- Drive the boat to the entry gate and **TAP SELECT** when the **GPS antenna crosses the plane** of the entry gate.



- Drive the boat to the exit gate and **TAP SELECT** when the **GPS antenna crosses the plane** of the exit gate.



14. For **Jump skiing**, perform the following.

- Idle through the 1st set of Jump course buoys and as the **PYLON passes the buoy line TAP the SELECT** button.
- As you pass through the 82-meter mid course buoys, **TAP SELECT button as the PYLON passes through the buoys.**

- When you are done **TAP MENU** button twice to return to the Tournament Screen.

NOTE: In the future, the jump program recognizes any mapped course and chooses it automatically as you approach the course. To choose a course manually, see the procedure *Override an Auto-Detected Course*.

15. For **Waypoint**, **TAP SELECT** button where you want your waypoint reference.
16. When you are done **TAP MENU** button several times to exit the screens.

Manually Enter Course Coordinates

You can also map a course by manually entering the course coordinates. You need to know the course latitude and longitude within accuracy down to 0.00001 of a minute.

It may take longer to go through the process required to enter the course coordinates than it does to run the boat through the course using the Live Course Mapping option.

NOTE: Due to the large range of values that have to be supported for Course coordinates, (360 degree range with a resolution of 0.00001 minutes for longitude) the scrolling starts out slow to allow small changes to be made when you're close to the desired value, but progressively accelerates to a faster rate the longer you hold it.

To enter course coordinates,

1. **HOLD ON/OFF MENU** button approximately 2 seconds. The main menu bar is displayed.
2. **TAP UP** or **DOWN** button to highlight **MAP**.
3. **TAP SELECT** button. A list of course names is displayed.
4. **TAP UP** or **DOWN** button to highlight the desired course name.
5. **TAP SELECT** button to display the selected course name.
6. **TAP UP** or **DOWN** button to highlight **Enter Course Coords**.
7. **TAP SELECT** button. The Enter Course Coordinates screen is displayed.



8. Use the onscreen directions to change the longitude and latitudes.
9. **HOLD SELECT** button to save the entered coordinates.
10. **TAP MENU** button to exit the screen.

Remap an Already Mapped Course

1. On the **Course Name** screen, highlight the desired course name.



2. **HOLD SELECT** button (you need to hear 2 beeps) to modify the course map variables.

Override an Auto-Detected Course

Zero Off auto-detects previously mapped courses within a 1-km radius of the boat. The auto-detected course is displayed at the bottom of the Recreational Slalom screen. You may want to override the auto-detected course.

To override an auto-detected course,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **MAP**.
3. **TAP SELECT** button. A list of previously entered course maps is displayed.
4. **TAP UP** or **DOWN** button to highlight the desired course name.
5. **TAP ON/OFF MENU** to exit the screen.

The course you selected is displayed at the bottom of the Recreational Slalom screen. Auto detect will be re-enabled any time the user changes modes between slalom, jump or waypoint.

WHO

WHO displays a list of the Skier Profiles. It also has a screen to create Skier Profiles. Skier Profiles are used for Slalom and Jump skiing.

Skier Profile List

The Skier Profiles list is displayed after you select **WHO** from the Main Menu. A Skier Profile indicates a previously created skier profile. **Unused** indicates a profile has not been mapped (unless someone mapped a profile and kept Unused as the skier profile name). A maximum of 10 skier profiles may be stored.

Select a Skier Profile

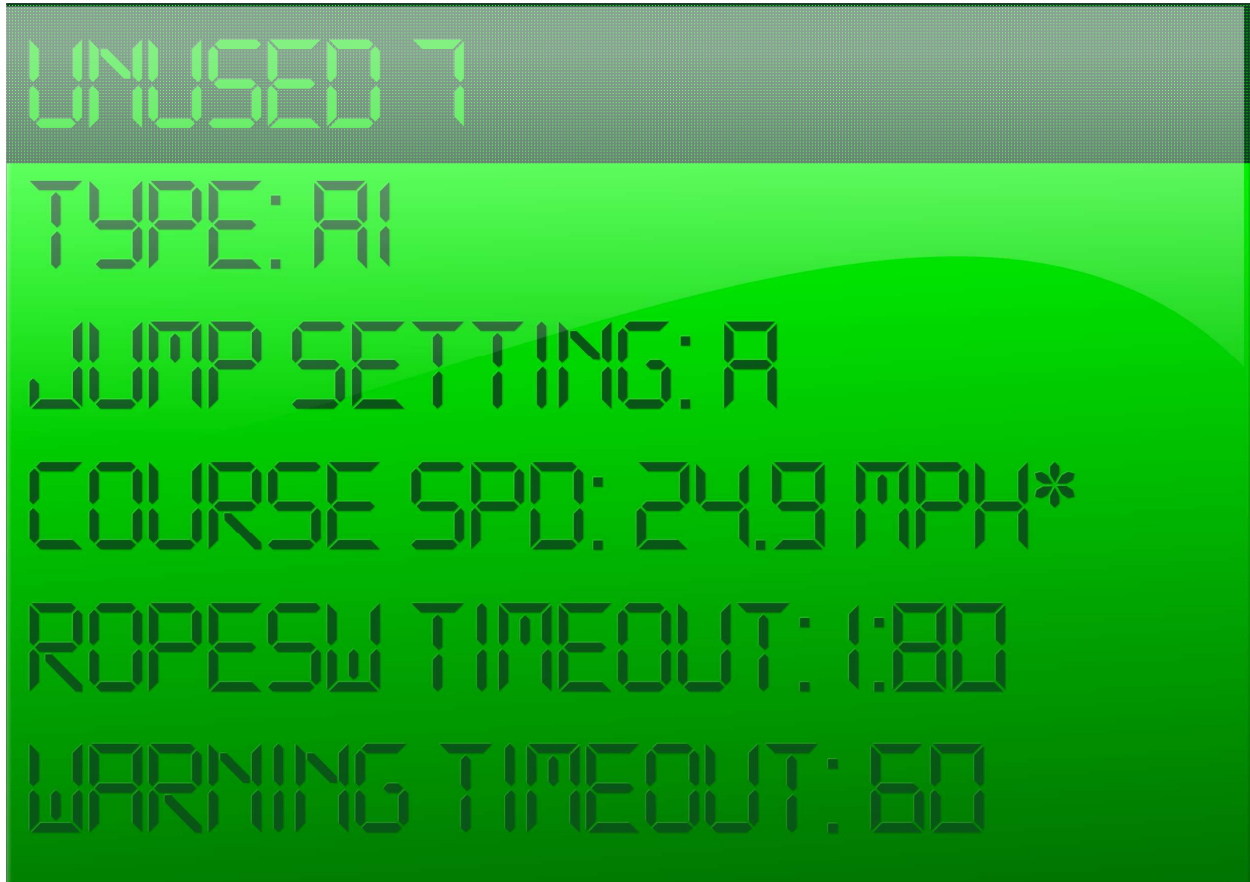
1. **HOLD ON/OFF MENU** button.
2. **TAP UP** or **DOWN** button to highlight **WHO**.
3. **TAP SELECT** button. A list of skier profiles is displayed.



4. **TAP UP** or **DOWN** button to highlight desired skier profile.
5. **TAP SELECT** button. An asterisk is displayed next to the selected skier profile.
6. **TAP MENU** button to exit the screen. The skier you selected is displayed in the bottom left corner of the Recreational screen.

Skier Profile Screen

You create a skier profile that includes the information: Type, Setting, Course Speed, Rope switch, and Warning Timeout. Once the Skier Profile is created it is displayed in the Skier Profile list.



Display the Skier Profile Screen

1. **HOLD ON/OFF MENU** button.
2. **TAP UP** or **DOWN** button to highlight **WHO**.
3. **TAP SELECT** button.
4. **TAP UP** or **DOWN** button to highlight **Unused**.
5. **HOLD SELECT** button. The Skier Profile screen is displayed.

Enter a Name

1. From the **Skier Profile** screen, **TAP UP** or **DOWN** button to highlight **Unused**. **An asterisk is placed next to the profile.**
2. **HOLD SELECT** button. The Skier Profile screen is displayed.
3. **TAP UP** or **DOWN** button to highlight **Unused**.
4. **TAP SELECT** button. The Name screen is displayed.
5. **TAP SELECT** button to move the cursor to the letters in the name.

6. **TAP UP** or **DOWN** button to scroll through the alphabet to select the desired character.
7. When the name is completed, **TAP MENU** button to exit the screen.

Enter a Type

1. From the Skier Profile screen, **TAP UP** or **DOWN** button to highlight **TYPE**.
2. **TAP SELECT** button. The Type screen is displayed.
3. **TAP SELECT** button to change the Type. Skier type is the amount of pull felt by the skier.

Skier Pull Types

A - Slower engine response out of the buoy, but the boat will tend to move ahead as the skier approaches the buoy.
B - Moderate engine response compared to A and C .
C - Faster engine response out of the buoy, but the boat will tend to hold back as the skier approaches the buoy.
1 - Requires the lowest amount of load before the system initiates an rpm spread. This provides for a softer pull behind the boat.
2 - Provides for a moderate pull behind the boat as compared to 1 and 3 .
3 - Requires the highest amount of load before the system initiates an rpm spread.

*J = Jumper

4. **TAP MENU** button to exit the screen.

Enter a Jump Setting

1. From the **Skier Profile** screen, **TAP UP** or **DOWN** button to highlight **Jump Setting**.
2. **TAP SELECT** button. The Jump Setting screen is displayed.
3. **TAP UP** or **DOWN** button to change the Jump Setting. Jump Setting is the letter used to give the boat a “bump” in speed upon switch engagement and has a target speed depression for the more aggressive jumper. Letter A will run at a constant speed and will have no reaction to the switch engagement. The higher the letter the more the baseline will depreciate until reaching a maximum amount, and will call for more boat speed sooner at switch engagement.
4. **TAP MENU** button to exit the screen.

Enter a Course Speed

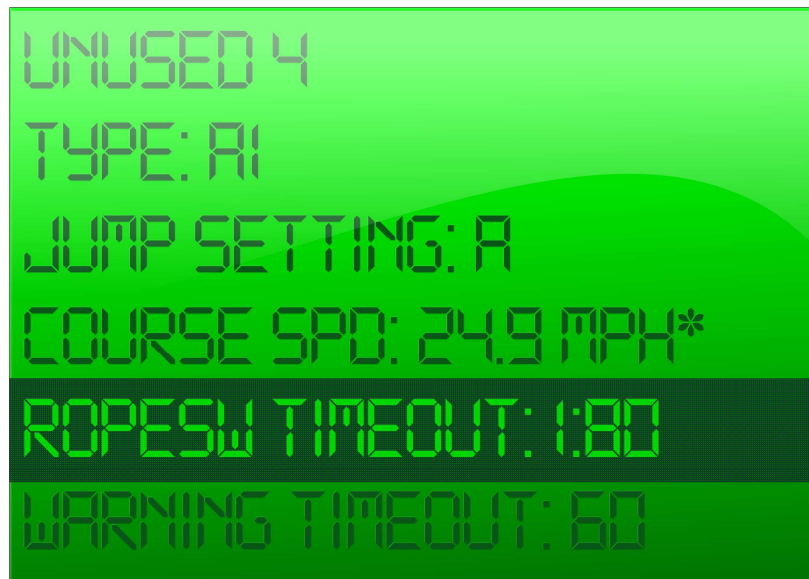
1. From the **Skier Profile** screen, **TAP UP** or **DOWN** button to highlight **Course Spd**.
2. **TAP SELECT** button. The Course Speed screen is displayed.
3. **TAP UP** or **DOWN** button to change the Course Speed.
 - slowly change the speed by .01 increments **TAP UP** or **DOWN** button
 - quickly change the speeds by larger increments **HOLD UP** or **DOWN** button

- at the tournament speeds, the system pauses briefly and an asterisk is displayed.

4. **TAP MENU** button to exit the screen.

Enter a ROPESW Timeout

1. From the **Skier Profile** screen, **TAP UP** or **DOWN** button to highlight **RopeSW Timeout**.
2. **TAP SELECT** button. The Rope Switch Timeout screen is displayed.
3. **TAP UP** or **DOWN** button to change the RopeSW
 - slowly change the speed by 0.1 increments **TAP UP** or **DOWN** button
 - quickly change the speeds by larger increments **HOLD UP** or **DOWN** button
4. **TAP MENU** button to exit the screen.



Enter a Warning Timeout

1. From the **Skier Profile** screen, **TAP UP** or **DOWN** button to highlight **RopeSW Timeout**.
2. **TAP SELECT** button. The Warning Timeout screen is displayed.
3. **TAP UP** or **DOWN** button to change the RopeSW
 - slowly change the speed by .01 increments **TAP UP** or **DOWN** button
 - quickly change the speeds by larger increments **HOLD UP** or **DOWN** button
4. **TAP MENU** button to exit the screen.

Events

Slalom

The Slalom event type is used for recreational and tournament skiing.

Recreational Slalom

The Recreational Slalom screen has the following information.



Name	Description
Time and Date	Time format is XX:XX:XX Date format is MM/DD/YY
Number of Satellites	X = Number of satellite fix, (1 through 12). D = Differential, if present.
Page Icon	Selects Recreational, Tournament, and Timing Recap screens. NOTE: Recreational, Tournament, or Timing Recap screens are also available from the Main Menu bar, SCRN option.
Event Type or Directional Arrow	Selects Jump, Slalom, Trick, and Waypoint events. NOTE: If Event Type is not active, a directional arrow is displayed. The arrow shows the direction the boat is moving. When boat velocity is less than 1 mph, the directional arrow freezes. If an event type is active and the system detects a mapped course, the arrow changes shape and shows deviations of boat direction from the centerline of the course.
RPM Set Speed	With the system is in RPM mode, you can select an RPM speed for the boat. NOTE: RPM Set Speed is only available for Recreational skiing.
RPM Actual Speed	RPM speed that the boat is actually going.
Boat Set Speed	Sets the MPH or KPH boat speed.
Actual Boat Speed	MPH or KPH speed that the boat is actually going.
Official Tournament Set Speed	Sets the tournament set speed
Pull Type / Skier Selection	Skier pull type (A1-A3, B1-B3, C1-C3) and the name of the currently selected skier. NOTE: If a skier has not been selected, Latitude is displayed.
Course Selection	Name of the currently selected course. NOTE: If a course has not been selected, Longitude is displayed.

Set Event Type to Slalom

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Event Type**.
2. With Event Type highlighted, **TAP UP** button until you see **Slm**. **Slm** is the **Event Type** for Slalom skiing.

Set Boat Speed

NOTE: While changing the set speed, the system pauses briefly at the **Official Tournament Set Speeds** and displays an asterisk (*).

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Set Speed**. The Set Speed is highlighted.



2. To increase the setspeed:
 - slowly, by increments of 0.1, **TAP UP** button.
 - quickly, with larger increments, **HOLD UP** button
3. To decrease the setspeed:
 - slowly, by increments of 0.1, **TAP DOWN** button.
 - quickly, with larger increments, **HOLD DOWN** button.

The boat speed is adjusted according to the selected speed.

Set RPM Boat Speed


1. From the **Recreational** screen, **TAP SELECT** button to highlight the **RPM Set Speed**. The RPM Set Speed is highlighted.



2. To increase the RPM speed:
 - slowly, by increments of 10, **TAP UP** button.
 - quickly, with larger increments, **HOLD UP** button
3. To decrease the setspeed:
 - slowly, by increments of 10, **TAP DOWN** button.
 - quickly, with larger increments, **HOLD DOWN** button.

The engine RPM speed is adjusted according to the selected speed. Note that this mode does not guarantee any particular boat speed.

Move to the Next Screen

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Page Icon** .
2. With Page Icon highlighted, **TAP UP** button to scroll to the Tournament screen and the Timing Recap screen.

View Timing Recap Information

After you have driven the course, you can view the **Timing Recap** screen. The Timing Recap screen tracks the time the boat drove past each buoy for the most recently completed run(Latest), and the preceding one (Last)

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Page Icon** .
2. **TAP UP** button and scroll to the **Timing Recap** screen. The Timing Recap screen for Slalom is displayed.



	LATEST		LAST
	2.85	15.86	2.85 15.86
	7.21	20.23	7.21 20.23
	11.54	24.60	11.54 24.60
		27.45	


NOTE: The times in the **Latest** columns automatically moves over to the Historical **Last** column (column on the right) when a new course run is initiated

Tournament Slalom

The timing has all changed. Now, the left side displays only the 6 buoy times, with the timing error being replaced by a buoy count label. The latest buoy/gate time is displayed in the center above the course name, so that upon exit from the course, the 6 buoy times and labels are shown (in a new larger font) and the exit gate time is in the center position.

The tournament Slalom screen has the following formation.



Name	Description
Timing Display	Displays the most recent run. NOTE: The Timing Display is only displayed when you have a GPS fix.
	Displays actual times for buoys 1-6. Displays deviations from ideal time for the current set speed (shown in hundredths of a second). 1st underline time displays Mid Course Time. 2nd underline time displays Exit Time.
Boat Speed	Displays the boat speed while moving above 5mph (8.1 km/h), otherwise displays speed setpoint. While moving, if the speed setpoint is changed, setspeed will be displayed for 2 seconds before reverting to live boat speed
Icon Target Speed Notification	When the boat is locked on a target speed, the MPH (or km/h) icon is highlighted and the system beeps.
Official Tournament Set Speed	An asterisk is shown if the set speed chosen is an official tournament speed. NOTE: For slalom and jump events only.
Page Icon	Selects Recreational, Tournament, and Timing Recap screens. NOTE: Recreational, Tournament, or Timing Recap screens are also available from the Main Menu bar, SCRN option.

Last Buoy Timing	Updates to the most recent buoy timing as the boat travels thru the course. B1 through B6 is Buoy 1 through Buoy 6. EX is the Exit Time.
Pull Type	Three levels of "pull" the skier feels as the boat adjusts to maintain the set speed while driving the course. Level A1 – A3 = Mild pull felt by the skier. Level B1 – B3 = Moderate pull felt by the skier. Level C1 – C3 = Sharp and aggressive pull felt by the skier. Used by advanced skiers. RTB = Return to Base *See Skier Pull Type for more details.*
Operating Mode / Course	Slalom is displayed until a course is detected or selected. Zero Off has automatic course detection that finds the nearest slalom course within 1mile radius of the boat. NOTE: You can manually select another course from Main Menu bar, Map option.
On / Off	Turns the system On and Off.

Set Boat Speed

1. From the **Tournament** screen, **TAP SELECT** button to highlight the **Set Speed**.

The Set Speed is highlighted.



2. To change the speed,

- **TAP UP** button to increase the speed.
- **TAP DOWN** button to decrease the speed

Zero Off scrolls through the available tournament set speeds. The upper larger font number displays the setspeed in the units selected (MPH or KPH), while the corresponding alternate units value is displayed below in a smaller font.

Slalom Event Tournament Speeds (MPH)		Slalom Event Tournament Speeds (KM/H)	
15.5	26.7	24.9	42.9
17.4	28.6	28.0	45.1
19.3	30.4	31.1	50.1
21.1	32.3	33.9	54.5
23.0	34.2	37.0	59.5
24.9	36.0	40.1	64.5

The boat speed is adjusted according to the selected speed.

Select a Skier Pull Type

A Skier Pull Type is the level of “pull” felt by the skier as the boat adjusts to maintain the set speed.

1. From the **Tournament Slalom** screen, **TAP SELECT** to highlight the **Skier Pull Type**. The Skier Pull Type is highlighted.




2. **TAP UP** button to select the Skier Pull Type. The Skier Pull Types are defined as follows:

A1 – A3 = Mild pull felt by the skier.

B1 – B3 = Moderate pull felt by the skier.


C1 – C3 = Sharp and aggressive pull felt by the skier. Used by advanced skiers.

Move to the Next Screen

1. From the **Tournament** screen, **TAP SELECT** button to highlight the **Page Icon** .
2. With Page Icon highlighted, **TAP UP** button to scroll to the Recreational screens and the Timing Recap screens.

View Timing Recap Information

After you have driven the course, you can view the **Timing Recap** screen. The Timing Recap screen tracks the time the boat drove past each buoy.

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **PAGE ICON** .
2. **TAP UP** button and scroll to the **Timing Recap** screen. The Timing Recap screen for Slalom is displayed.



The image shows a digital display with a green background and black text. It is divided into two columns: 'LATEST' on the left and 'LAST' on the right. Each column has five rows of data. The first row shows '2.85' and '15.86' for both columns. The second row shows '7.21' and '20.23'. The third row shows '11.54' and '24.60'. The fourth row shows '27.45' and '27.45'. The 'LATEST' column has a small black box over the '11.54' value, and the 'LAST' column has a small black box over its '11.54' value.

LATEST	LAST
2.85	15.86
7.21	20.23
11.54	24.60
27.45	27.45

NOTE: The time at the bottom of the **Latest** column automatically moves over to the **Historical Last** column (column on the right) when the **Latest** column is full and another time is captured.

Jump Event

The Jump program is designed to conform to AWSA rules governing boat performance during jump competitions, providing options for running the different official AWSA Jump course speeds and speed profile limitations. It supports the use of a rope switch to provide the appropriate engine/boat speed responses when the jumper is making cuts.


COUNTER CUTS

Counter cuts are when the skier is attempting to find a position as wide as possible from the boat in preparation for making their final cut to the ramp. Aggressiveness of the boat's response to counter cuts is dependent on the Jump Letter selected (A to ZZ, bottom left corner of Tournament screen). For Jump Letter A, the boat runs at the base course speed and simply tries to hold that speed constant when the skier performs their cut. As higher letters are selected, the boat depresses the base speed by increasing percentages of the base course speed selected, and provides increasing "speed bumps" in response triggering the rope switch.

CUTS TO THE RAMP

In this case, a complex sequence of events is triggered when the jumper triggers the rope switch while cutting to the ramp in the first course segment. Depending on the jump letter chosen, the boat will be traveling at a speed depressed below the official course speed by up to 1.9% of baseline speed. When the jump switch triggers, boat speed is bumped by a letter dependent amount, which increases with higher letters. Speed then ramps upward also at a letter dependent rate, more aggressively before the jumper is at the wakes, and then less aggressively from the wakes to the ramp. From the wakes to the ramp, the system is also evaluating the timing of the jump and will accelerate more or less aggressively in this part of the course in an attempt to make a good time. There are limits on how much the acceleration can be increased or decreased to avoid unexpected transitions for the jumper. To get a jump that is more aggressive late in the cut, choose a lower letter so the boat is working harder at the end to make a good time, conversely for a jump that is less aggressive at the ramp, choose a higher letter to get more bump early.

USE TOURNAMENT SCREEN FOR JUMPS

Zero Off strongly recommends using the Tournament Screen for the all jump activity. If you would like to run an unofficial tournament speed, go to the Tournament Screen and set up all jump parameters, then using the "Page Icon"  move to the recreational screen. Then highlight the speed option by using the select button and choose your desired speed. You may then run the jump program and when you are done return to the Tournament Screen.

Tournament Jump Screen

The Tournament Jump Screen has the following information



Name	Description
4 Segment Jump Times (Not shown)	4 times are displayed: 52meter segment time, 30meter segment time, 82meter segment time (52m time + 30m time) and 41meter segment time.
Deviation Time	This is the amount of deviation from the actual time. If the number time is faster than actual this number will be highlighted, if it is slower than actual the number is as show above.
Boat Speed	Tournament speed selected for the boat to travel.
Official Tournament Set Speed	An asterisk shows that the speed is an official Tournament speed. NOTE: Available for Slalom and Jump events only. On a Tournament screen, the set speed is always an official speed unless it has been modified to some intermediate value on a Recreational screen.
Page Icon	Highlight this icon using the SELECT button, then use the UP or DOWN buttons to scroll through the Tournament, Timing, and General Screens.
MPH or KPH	Shows either MPH or KPH.
Boat Strength Number	This number either increases or decreases the intensity of the “bump” value upon jump switch engagement depending on how strong or weak the boat is. The number on the left side of the “:” is for the first segment in the jump and the number on the right side of the “:” is for the second segment of the jump. For a weak boat you want to raise this number to help you achieve a balanced time, and for a stronger boat you use a lower number. Contact the boat manufacturer to recommend the boat strength number that is best for your boat.
Jump Letter	This letter is used to give the boat a “bump” in speed upon switch engagement and has a target speed depression for the more

	aggressive jumper. Letter A will run at a constant speed and will have no reaction to the switch engagement. The higher the letter the more the baseline will depreciate until reaching a maximum amount, and will call for more boat speed sooner at switch engagement.
RTB Setting	This is the RTB setting which is used for a beginner or more novice jumper that wants the boat to slow down more in the 3rd course segment to help make riding out the jumps easier. To reach the RTB alphabet, simply highlight the jump letter and use the UP or DOWN buttons to cycle through the letter chart until you see the letters "RTB" above the desired letter.
Boat Speed 2 nd Segment to 3 rd Segment	This is the speed that the boat is traveling as it passes through the MT gates.
Mode / Course Selection	This is used to scroll through the Jump, Slalom, and Trick modes. When a course has been mapped the course name will show here. To scroll from Jump to another event screen simply highlight this area and use the DOWN arrow to scroll to the desired event.
On / Off Switch	If highlighted, and you press the MENU ON/OFF button. The system will turn on and off.

Abort Key

If at any time you would like to cancel or abort the jump program after it has recognized and entered a jump course, press the **UP** button to cancel the jump course initiation. The driver can press the **UP** button and the skier will only get counter cut gas rather than to the ramp gas.

Set Boat Speed

1. From the **Tournament** screen, **TAP SELECT** button to highlight the **Set Speed**. The Set Speed is highlighted.
2. To change the speed,
 - **TAP UP** button to increase the speed
 - **TAP DOWN** button to decrease the speed

Jump Event Tournament Speeds (MPH)		Jump Event Tournament Speeds (KM/H)	
24.2	31.7	38.9	51.0
26.1	33.6	42.0	54.1
28.0	35.4	45.1	57.0
29.8		47.9	

Zero Off scrolls through the available tournament set speeds.

Select a Jump Letter

A Skier Pull Type is the level of “pull” felt by the skier as the boat adjusts to maintain the set speed.

1. From the **Tournament Jump** screen, **TAP SELECT** to highlight the **Jump Letter**.
2. **TAP UP** or **DOWN** buttons to cycle through the letter chart until you see the desired letter.

See the *Set, Jump Letter Select* section for more information about the Jump Letter. RTB is used for a beginner or more novice jumper that wants the boat to slow down more in the 3rd course segment to help make riding out the jumps easier.

View Timing Recap Screen

After you have driven the course, you can view the **Timing Recap** screen. The Timing Recap screen tracks the time the boat drove past the start and end buoys.

1. From the **Tournament** screen, **TAP SELECT** button to highlight the **Page Icon**.
2. **TAP UP** button and scroll to the **Timing Recap** screen. The Timing Recap screen for Jump is displayed.



	LATEST	LAST
52*	0.00	0.00
30*	0.00	0.00
82*	0.00	0.00
41*	0.00	0.00
	0.0	0.0

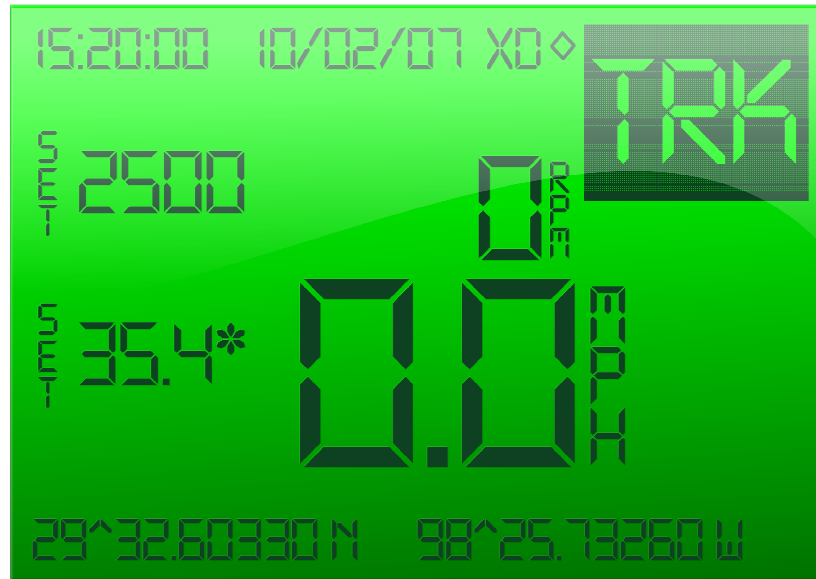
NOTE: The time at the bottom of the **Latest** column automatically moves over to the **Historical Last** column (column on the right) when the **Latest** column is full and another time is captured.

Trick

Trick skiing does not use a mapped course or collect any timing information.

Recreational Trick Screen

The Recreational Trick screen has the following information.



Name	Description
Time and Date	Time format is XX:XX:XX Date format is MM/DD/YY
Number of Satellites	X = Number of satellite fix, (1 through 12). D = Differential, if present.
Page Icon	Selects Recreational, Tournament, and Timing Recap screens. NOTE: Recreational, Tournament, or Timing Recap screens are also available from the Main Menu bar, SCRN option.
Event Type or Directional Arrow	Selects Jump, Slalom, Trick, and Waypoint events. NOTE: If Event Type is not active, a directional arrow is displayed. The arrow shows the direction the boat is moving. When boat velocity is less than 1 mph (1.6 km/h), the directional arrow freezes.
RPM Set Speed	With the system is in RPM mode, you can select an RPM speed for the boat. NOTE: RPM Set Speed is only available for Recreational skiing.
RPM Actual Speed	RPM speed that the boat is actually going.
Boat Set Speed MPH or KPH	Sets the MPH or KPH boat speed.
Actual Boat Speed	MPH or KPH speed that the boat is actually going.
Pull Type / Skier Selection	Skier pull type (A1-A3, B1-B3, C1-C3) and the name of the currently selected skier. NOTE: If a skier has not been selected, Latitude is displayed.
Course Selection	Name of the currently selected course. NOTE: If a course has not been selected, Longitude is displayed.

Set Event Type to Trick

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Event Type**.
2. With Event Type highlighted, **TAP UP** button until you see **Trk**. **Trk** is the **Event Type** for Trick skiing.

Set Boat Speed

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Set Speed**. The Set Speed is highlighted.



2. To increase the setspeed:

- slowly, by increments of 0.1, **TAP UP** button.
- quickly, with larger increments, **HOLD UP** button

3. To decrease the setspeed:

- slowly, by increments of 0.1, **TAP DOWN** button.
- quickly, with larger increments, **HOLD DOWN** button.

The boat speed is adjusted according to the selected speed.

Set RPM Boat Speed

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **RPM Set Speed**. The RPM Set Speed is highlighted.



2. To increase the RPM speed:
 - slowly, by increments of 10, **TAP UP** button.
 - quickly, with larger increments, **HOLD UP** button
3. To decrease the setspeed:
 - slowly, by increments of 10, **TAP DOWN** button.
 - quickly, with larger increments, **HOLD DOWN** button.

The RPM boat speed is adjusted according to the selected speed.

Move to the Next Screen

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Page Icon** .
2. With Page Icon highlighted, **TAP UP** button to scroll to the Tournament screen.


Tournament

The Tournament Trick screen has the following formation.



Name	Description
Boat Speed	Displays the actual boat speed.
Icon Target Speed Notification	An asterisk is shown if the set speed chosen is an official tournament speed. NOTE: For slalom and jump events only.
Page Icon	Selects Recreational, Tournament, and Timing Recap screens. NOTE: Recreational, Tournament, or Timing Recap screens are also available from the Main Menu bar, SCRN option.
Pull Type	Three levels of “pull” the skier feels as the boat adjusts to maintain the set speed while driving the course. Level A1 – A3 = Mild pull felt by the skier. Level B1 – B3 = Moderate pull felt by the skier. Level C1 – C3 = Sharp and aggressive pull felt by the skier. Used by advanced skiers.
Operating Mode / Course	Displays TRICK until a course is detected or selected. Zero Off has automatic course detection that finds the nearest slalom course within 1mile radius of the boat. NOTE: You can manually select another course from Main Menu bar, Map option.
On / Off Button	Turns the cruise control On and Off.

Move to the Next Screen

1. From the **Tournament** screen, **TAP SELECT** button to highlight the **Page Icon** .
2. With Page Icon highlighted, **TAP UP** button to scroll to the Recreational and Timing Recap screens.

Set Boat Speed

1. From the **Tournament** screen, **TAP SELECT** button to highlight the **Set SPD.** The Set Speed is highlighted.



2. To change the speed,

- **TAP UP** button to increase the speed.
- **TAP DOWN** button to decrease the speed

The boat speed is adjusted according to the selected speed. Note that alternate unit setspeed is displayed below in smaller font.

Select a Skier Pull Type

A Skier Pull Type is the level of “pull” felt by the skier as the boat adjusts to maintain the set speed.

1. From the **Tournament Trick** screen, **TAP SELECT** to highlight the **Skier Pull Type**. The Skier Pull Type is highlighted.



2. **TAP UP** button to select the **Skier Pull Type**. The Skier Pull Types are defined as follows:

A1 – A3 = Mild pull felt by the skier.

B1 – B3 = Moderate pull felt by the skier.

C1 – C3 = Sharp and aggressive pull felt by the skier. Used by advanced skiers.

*Please refer to **Skier Pull Types** for more details.

Wakeboard

The Recreational Wakeboarding screen has the following information.



Name	Description
Logo Box	
Actual Boat Speed	MPH or KPH speed that the boat is actually travelling
Set Speed	Changes the set speed for the boat
Page Icon	Selects Recreational, Tournament, and Timing Recap screens. NOTE: Recreational, Tournament, or Timing Recap screens are also available from the Main Menu bar, SCRN option.
ON / OFF	Turns the cruise control On and Off

Set Boat Speed

1. From the Recreational Trick screen, **TAP SELECT** button to highlight the **Set Speed**.
2. To increase the setspeed:
 - **TAP UP** button to increase by increments of .01,
 - **HOLD UP** button to increase with larger increments
3. To decrease the setspeed:
 - **TAP DOWN** button to decrease by increments of 10,
 - **HOLD DOWN** button to decrease with larger increments

Waypoint

You can use Way Point to map a location on the lake. The location can be a favorite skiing spot or a location that you want to remember for the next boating season.

From the Recreational screen, Zero Off automatically enables Waypoint mode. If a waypoint has been mapped and is within a 1-mile radius of the boat, the system displays the name and distance away. Also the directional arrow is displayed showing which direction to steer the boat to reach the waypoint.

Start driving the boat and the directional arrow indicates the direction to steer the boat to find the waypoint. The Waypoint screen has the following information.



Name	Description
Time and Date	Time format is XX:XX:XX Date format is MM/DD/YY
Number of Satellites	X = Number of satellite fix, (1through 12). D = Differential, if present.
Page Icon	Selects Recreational, Tournament, and Timing Recap screens. NOTE: Recreational, Tournament, or Timing Recap screens are also available from the Main Menu bar, SCRN option.
Directional Arrow Waypoint Event	Directional Arrow: Active when no waypoint is selected. Directional arrow will show what direction the boat is moving in. Arrow freezes when boat velocity is less than 1 mph (1.6 km/h). Different rounded arrow is active when waypoint is selected and points in the direction of the waypoint.
RPM Set Speed	Increases or decreases the set speed by 10RPM or larger increments.
RPM Actual Speed	RPM speed that the boat is actually going.
Boat Set Speed MPH or KPH	Sets the MPH or KPH boat speed.
Actual Boat Speed	MPH or KPH speed that the boat is actually going.
Distance to Waypoint	If a waypoint is selected, DIST will equal the distance to the waypoint in units selected. If no waypoint is selected latitude and longitude are shown.
Waypoint Map	Name of the currently selected waypoint map.

Set Event Type to Waypoint

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Event Type**.
2. With Event Type highlighted, **TAP UP** button until you see **Wpt.** **Wpt** is the **Event Type** for Waypoint.

Set Boat Speed

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **Set Speed**. The Set Speed is highlighted.



2. To increase the setspeed:

- slowly, by increments of 0.1, **TAP UP** button.
- quickly, with larger increments, **HOLD UP** button

3. To decrease the setspeed:

- slowly, by increments of 0.1, **TAP DOWN** button.
- quickly, with larger increments, **HOLD DOWN** button.

The boat speed is adjusted according to the selected speed.

Set RPM Boat Speed

1. From the **Recreational** screen, **TAP SELECT** button to highlight the **RPM Set Speed**. The RPM Set Speed is highlighted.



2. To increase the RPM speed:

- slowly, by increments of 10, **TAP UP** button.
- quickly, with larger increments, **HOLD UP** button

3. To decrease the setspeed:

- slowly, by increments of 10, **TAP DOWN** button.
- quickly, with larger increments, **HOLD DOWN** button.

The RPM boat speed is adjusted according to the selected speed.

Diagnosics

Diagnostic Screen

The Diagnostic Screen displays the Error Codes. The error codes assist you in isolating any issues you are having with the system.

To display the Diagnostic screen,

1. **HOLD ON/OFF MENU** button to display the main menu bar.
2. **TAP UP** or **DOWN** button to highlight **SCRN**.
3. **TAP SELECT** button to display the list of screens.
4. **TAP UP** or **DOWN** button to highlight **Diagnosics**.
5. **TAP SELECT** button. An asterisk is next to **Diagnosics**.
6. **TAP ON/OFF MENU** button twice. The main menu bar is cleared and the Diagnostic screen is displayed.

Diagnostic Screen	Description
P/N	Part Number of the system
S/N	Serial Number of the system
SW	Software version loaded on the system
SEL to Clear	TAP SELECT button to clear the error codes
??Active Column	1 st column of Error Codes. Lists the most recent error codes. Header line shows how many codes are present (??)
??Historic Column	2 nd column of Error Codes. Lists the archived error codes that have been generated for the system. Header line shows how many codes are present (??)

7. To clear the error codes, **TAP SELECT** button.
8. **TAP UP** or **DOWN** buttons to move to the Recreational screen.
9. **HOLD ON/OFF MENU** to return to the main menu bar.

Error Codes

The Diagnostic Error Codes are described in the following table.

Error Code	Description
V_max	Battery supply Voltage too high (> 32 volts)
V_min	Battery supply Voltage too low (< 9.5 volts)
VE5_max	5V output supply too high (>5.4 volts)
VE5_min	5V output supply too low (>4.6 volts)
COPfail	Main CPU timeout failure, should be very rare
RTI1	Main CPU failure, should be very rare
RTI2	Main CPU failure, should be very rare
RTI3	Main CPU failure, should be very rare
ADloss	Main CPU failure, should be very rare
interrupt	Main CPU failure, should be very rare
flash_fail	Main CPU flash memory failure, should be very rare
RAM_fail	Main CPU RAM memory failure, should be very rare
J1939_Txfai	CAN link failure, probably not connected
J1939_Rxfai	CAN link failure, probably power supply related or poor connections
V_CONTR_max	LCD display contrast voltage too high, indicates circuit Board failure
V_CONTR_min	LCD display contrast voltage too low, indicates circuit Board
Xout_max	Onboard sensor voltage high, indicates circuit board failure
Xout_min	Onboard sensor voltage low, indicates circuit board failure
Yout_max	Onboard sensor voltage high, indicates circuit board failure
Yout_min	Onboard sensor voltage low, indicates circuit board failure
Zout_max	Onboard sensor voltage high, indicates circuit board failure
Zout_min	Onboard sensor voltage low, indicates circuit board failure
GPS1_fail	Primary GPS antenna communications not established, either bad wiring or failed primary GPS antenna
GPS2_fail	Secondary GPS antenna communications not established, either bad wiring or failed secondary GPS antenna, only on 3Event systems
GPS1_GPS2_s	Secondary GPS data substituting for primary, not critical and should be transparent to user
GPS1_In_sub	System estimating data to substitute for primary GPS, not critical and should be transparent to user
GPS2_In_sub	System estimating data to substitute for secondary GPS, not critical and should be transparent to user
LCD_fail	LCD display failure
GPS_BadPos	System detects unusual variation in GPS position measurement, not critical and should be transparent to user
EE_Write	Onboard permanent memory write failure, indicates circuit board failure
EE_Read	Onboard permanent memory read failure, indicates circuit board failure