

RAGE RC

LightWave

INSTRUCTION MANUAL



Specifications

Hull Length:	10" (254mm)
Overall length:	11 5/8" (300mm)
Width:	3" (80mm)
Height:	2 5/8" (67mm)
Weight:	6.6 oz. (187g)
Battery:	7.4V 500mAh Lithium-Ion
Motor:	180A brushed water-cooled
Charger:	USB charger
Transmitter:	2-channel, 2.4GHz
Servo:	9g waterproof proportional
On-Board Electronics:	2-in-1 combo w/ ESC & 2.4GHz receiver

The RageRC LightWave is a micro-size boat that's perfect for racing across a large swimming pool or your local pond. A water-cooled 180-size motor combines with a 500mAh Lithium-Ion battery pack to generate fast speeds and long run times. And, like most other Rage RC boats, if the LightWave ever flips over when making a tight turn or running in choppy waters, the self-righting feature quickly turns the boat right side up, so you can continue to race. Plus, the unique new Hi-Vis LED light strip provides great visibility, even when running the LightWave in the dark!

The LightWave is a RTR (Ready-To-Run) boat with a durable ABS hull that comes painted and printed in two attractive racing style trim schemes (red or blue) for a fast, sleek, look. The LightWave arrives 100% factory-assembled with a 2-channel, 2.4 GHz proportional radio system that features a waterproof 9-gram servo for precise steering control and an electronic speed control for linear throttle feel. In addition to the battery, the LightWave includes a convenient USB charger that connects to any USB outlet. All you need to add are the AA batteries for the transmitter and you can be racing your LightWave across your local pool or pond within minutes of opening the box!

LIGHTWAVE CONTENTS



QUICK START GUIDE

If you're an experienced RC driver or pilot, this list will give you all the information you need to get started driving your new boat as quickly as possible. If this is your first RC vehicle, it is strongly recommended that you read the ENTIRE manual before you attempt to operate your new boat.

Before Boating

1. Install your fully charged batteries in the boat and fresh batteries in the transmitter. Make sure you use the hook and loop on your battery to securely attach it to the hook and loop at the bottom of the boat's hull.
2. Turn on your transmitter.
3. Connect the battery plug to the ESC plug inside the boat.
4. Make sure the boat is bound to the transmitter. If not, bind the boat to the transmitter using the binding instructions.
5. There is no need to arm the motor, so it will run when you first pull the trigger.
6. Make sure all controls – rudder and throttle – move freely and are turning in the correct direction. If not, refer to the transmitter instructions on pages 7 through 10 of this manual.
7. Make sure the motor mount is secured to the hull so that the motor does not move during operation.
8. Adjust the steering rate on your transmitter, as desired.
9. Find a safe and open boating area.
10. Plan a safe boating route for the water and wind conditions.

After Boating

1. Always unplug the battery from the ESC before turning off your transmitter to make sure the boat cannot be controlled by another device.
2. Remove the battery pack from the boat.
3. Make sure the outside of the boat and inside of the hull are completely dried out before storing your boat. Keep the hatch off the boat during storage to ensure that mold and mildew are not allowed to grow and damage the components.
4. Repair any damage or wear to the boat before running it again.
5. Make sure to lubricate the flex shaft after 2 to 3 hours of running time.
6. Make note of lessons learned from each operation of the boat – including trimming needed, and water and wind conditions.

Have fun boating!

WARNING

Please make sure you read the entire instruction manual to become familiar with the features of the LightWave before operating. Failure to operate this product correctly can result in damage to the product or personal property, and even cause serious injury.

Please understand that this is a sophisticated hobby product and it is not a toy. It must be operated with caution and common sense. Note that it does require some mechanical ability to correctly operate this product. Failure to operate in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt to disassemble or operate with incompatible components or make changes to the product without the approval of Rage RC.

This manual contains instructions for safety, operation, and maintenance. It is essential to read and follow all the instructions and warnings in the manual prior to final assembly, setup, or use.

SAFETY PRECAUTIONS

As the owner and user of this product, you are solely responsible for operating it in a manner that does not endanger yourself and others or result in damage to the product or property.

- Never attempt to swim to retrieve a stalled RC boat.
- Never operate your boat while standing in water.
- Never operate your boat in the presence of swimmers.
- The running hardware on RC boats can be very sharp, so use caution when working on or around these parts.
- Be cautious with the propeller when the motor is running. Do not come into contact with it or serious injury could result.
- Due to the sharp hardware, do not operate near or around inflatable objects.
- Keep a safe distance in all directions around your boat to avoid possible collisions or injury. This boat is controlled by a radio signal that is subject to interference from many outside sources and could result in a momentary loss of control.
- Always avoid water exposure to all equipment not specifically designed and protected for this purpose. Moisture can damage unprotected electronics.
- Make sure to keep all chemicals, small parts, and anything electrical out of the reach of children.

BATTERY SAFETY PRECAUTIONS

Important Note: Lithium batteries are more volatile than other batteries used in RC applications. All instructions and warnings must be followed exactly to prevent possible personal injury or damage to property, including by fire. By handling, charging, or using the included Li-ion battery you assume all potential risks. If you do not agree with these conditions, please return your complete product in new, unused condition to the place of purchase immediately.

Important - Please read the following safety instructions and warnings before handling, charging, or using the included battery.

- You must charge your Li-ion battery in a safe area away from any flammable materials.
- Never charge the Li-ion battery unattended at any time. When charging the battery you should always remain in constant observation of the battery to monitor the process and react immediately to potential problems you observe.
- After discharging the battery during running the boat you must allow it to cool to ambient room temperature before attempting to recharge. Also, it is NOT recommended that you completely discharge the battery before charging. It is safe to charge partially discharged batteries when using an appropriate Li-ion charge
- For charging the battery you must use only the included charger or a suitably compatible Li-ion battery charger. Failure to do so may result in a fire causing property damage and/or personal injury. DO NOT use a NiCd or NiMh charger to charge your new Li-ion battery.
- If at any time during the charge or discharge process the battery begins to “balloon” or swell, discontinue charging or discharging immediately! Quickly and safely disconnect the battery before placing it in a safe, open area away from flammable materials for observation for at least 15 minutes. Continuing to charge or discharge a battery that has started to “balloon” or swell can result in a fire. Important note: A battery that has “ballooned” or swollen even a small amount must be removed from service immediately and completely.
- Always disconnect a battery from the ESC when the product is not in use.
- Avoid continually operating the battery to LVC (Low Voltage Cutoff) as this could result in damage to the battery.
- Store the battery partially charged (approximately 50% charged or 3.85V per cell) at room temperature (approximately 68 to 77° Fahrenheit) in a dry area for best results.
- When transporting or temporarily storing the battery, the temperature range should be between 40 to 100° F. Do not store the battery or boat in a hot car or in direct sunlight whenever possible or the battery could be damaged or even catch fire.
- Li-ion cells should not be discharged to below 3.0 volts per cell. In the case of this 2-cell, 7.4V battery you should not allow the voltage to fall below 6.0V during operation.
- Do not over-discharge the Li-ion battery, which could result in reduced power, lower run times or complete failure of the battery.

NOTE: The included ESC features a “soft” LVC (Low Voltage Cutoff) that smoothly reduces power to the motor (regardless of your throttle position) to let you know that the voltage to the battery is near the 6.0V minimum and avoid damage to your battery.

However, even before the LVC takes place, if you find that more than typical throttle is needed to power the boat you should drive it back to you and disconnect the battery immediately to avoid over-discharge. It is NOT recommended that you continue to drive the boat after LVC occurs or permanent damage to the battery could occur leading to reduced power and run times with future use. Note that operation of the battery is NOT covered under warranty.

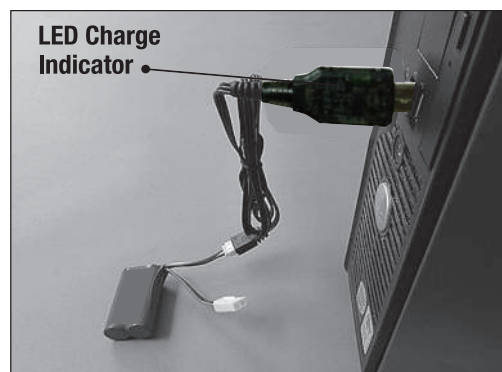
It is also not recommended that you continually run the battery to the “soft” LVC with each operation. You should be aware of the power level of the battery each time you drive the boat and as soon as you find that it requires more throttle than normal to maintain speed you should drive the boat back to you and disconnect the battery immediately. Continually running the battery to the soft LVC can cause permanent damage to the battery, so it is best to keep track of your run time and discontinue use prior to reaching the soft LVC.

Important Note: Do not leave the battery connected to the ESC unless you are ready to run the boat. If the battery is left connected when it is not in use, it will become over-discharged and the battery will become damaged and unusable.

Important Note: Do not store the battery fully charged

For improved safety and longevity of the battery it is recommended that it be stored partially charged for any length of time. Storing the Li-ion battery at approximately 50% charge (approximately 3.85V per cell) is typically best. This will take some management of the charge time and the use of a voltmeter. If you do not have the equipment or experience to maintain the 50% charge, simply be sure not to store the battery fully charged whenever possible. In fact, as long as the battery will be stored at approximately room temperature and for no more than a few weeks before the next use, it is better to store the battery in the discharged state after the last use – as long as it was not over-discharged below the LVC.

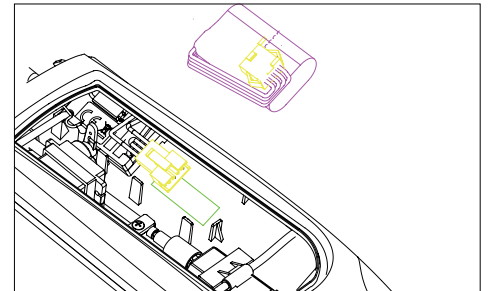
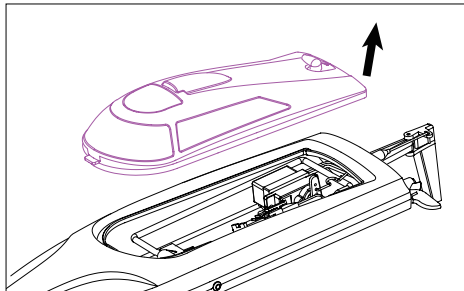
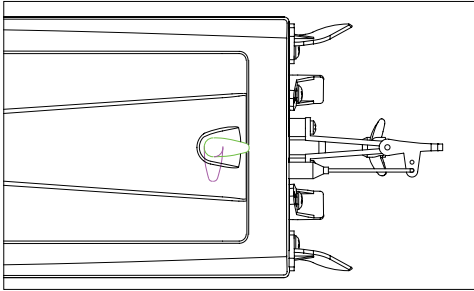
CHARGING INSTRUCTIONS



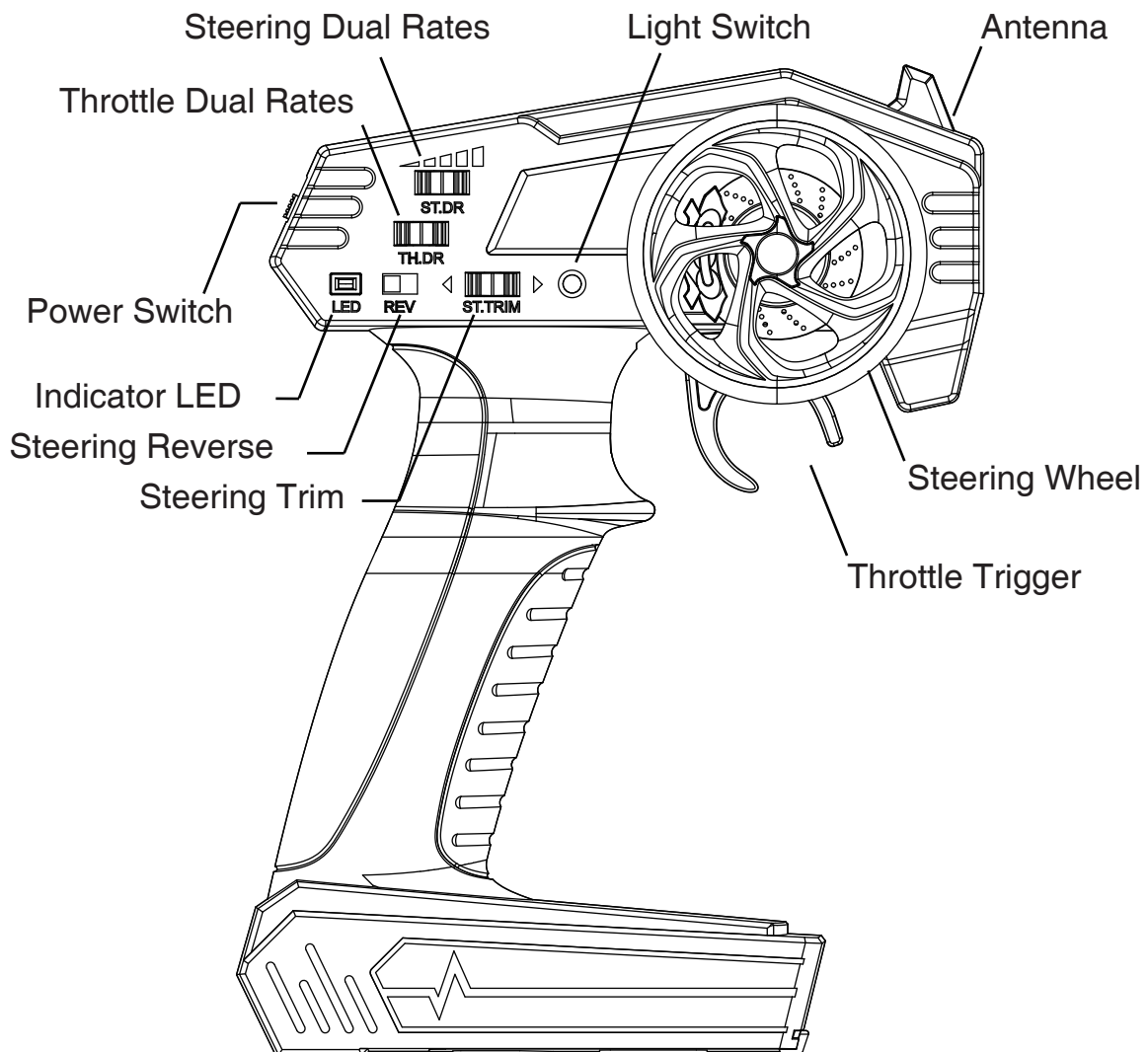
1. Power off your boat.
2. Carefully plug the charger into the USB port on your computer or USB adaptor.
3. Connect the battery to the charger.
4. The charging process may take up to 3 hours. As a safety precaution, never charge the battery for longer than 4 hours. The red LED will light up solid when the charger is plugged into a power source. The LED will flash when a battery is plugged in, indicating it is charging. The LED will turn off when the charging cycle is complete.

BATTERY INSTALLATION

1. Rotate the hatch lock on the hull cover clockwise to unlock the hatch.
2. Remove the hull cover.
3. Place the battery to the open side of the interior of the hull inside the alignment tabs and plug into the speed control.
4. Ensure that the wires and plug are facing the front of the boat.

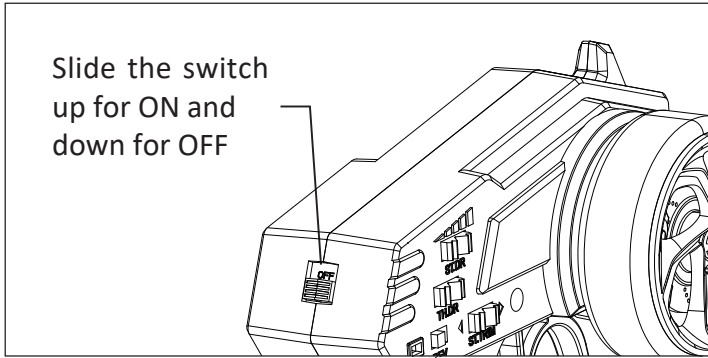


TRANSMITTER FUNCTIONS



ON/OFF SWITCH

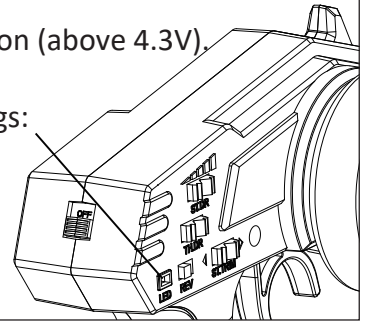
Slide the switch up for ON and down for OFF



BATTERY LED MONITOR

Solid red:
Battery is in good condition (above 4.3V).

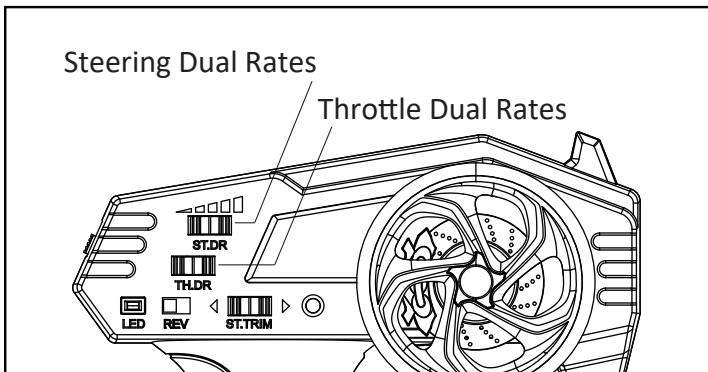
Flashing red with beepings:
Battery is at low voltage.
Replace batteries
(below 4.3V).



DUAL-RATE FUNCTIONS

Steering Dual Rates

Throttle Dual Rates

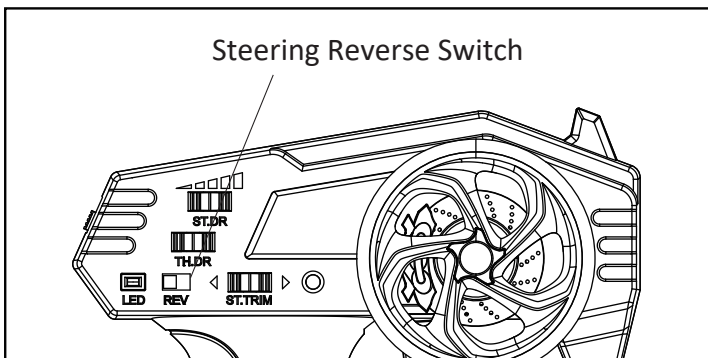


Adjust the steering control by pressing the switch to the left or to the right. Press the switch to the right for more steering control and to the left for less steering control (beginner setting).

Adjust the throttle control by pressing the switch to the left or to the right. Pressing the switch to the right will give maximum throttle. Pressing the switch to the left will limit the throttle and the speed (for beginners or when there is limited space, such as a pool).

SERVO REVERSE SWITCH

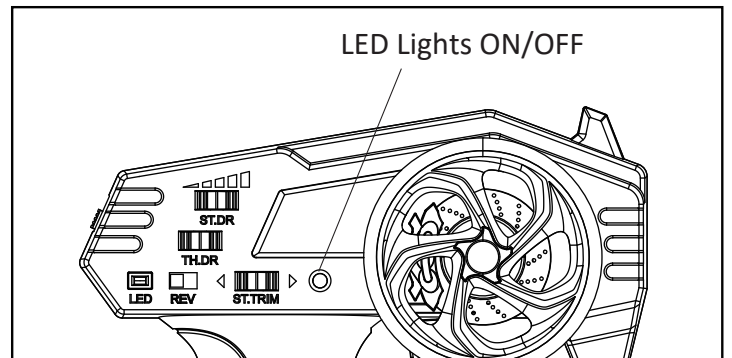
Steering Reverse Switch



If the direction of the travel on the steering is backwards, slide the Servo Reverse Switch in the opposite direction.

LED LIGHTS BUTTON

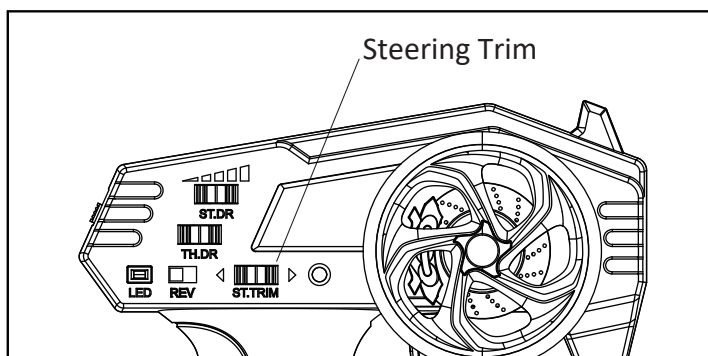
LED Lights ON/OFF



To turn the LED light strip off and on, short press this button while the battery is plugged in.

STEERING TRIM

Steering Trim



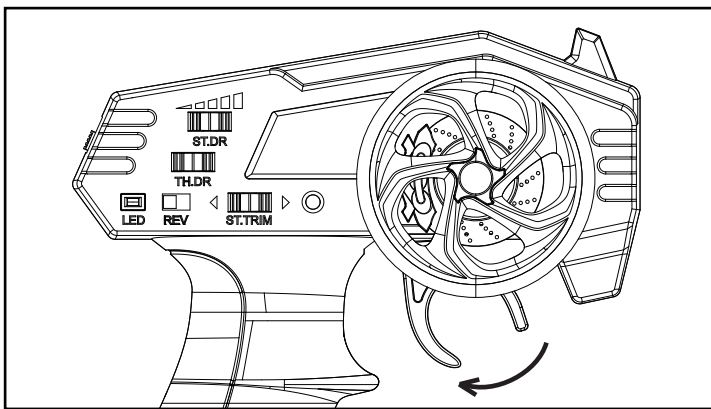
The steering trim is used if the steering is not centered when the steering wheel is in neutral position. Holding this switch to the right or the left will adjust the steering position by small movements until it is centered when the steering wheel is in center, or neutral position.

RECEIVER CONNECTION AND BINDING

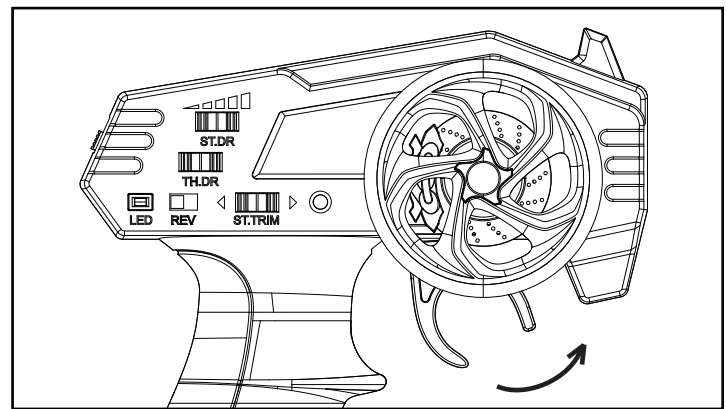
Binding is the process of programming the receiver to recognize the GUID (Global Unique Identifier) code of a single specific transmitter. When a receiver is bound to a transmitter, the receiver will only respond to that specific transmitter. If you need to rebind for any reason, please follow these steps:

1. Make sure that the transmitter is turned off.
2. Plug in the battery in the boat to power up the receiver.
3. Turn on the transmitter within 5 seconds of powering up the receiver.
4. The receiver and transmitter will auto-bind within a few seconds and you will have control over all functions and be ready to run.
5. If binding is successful, the blinking light will turn solid. If not, start the binding process again with step 1.

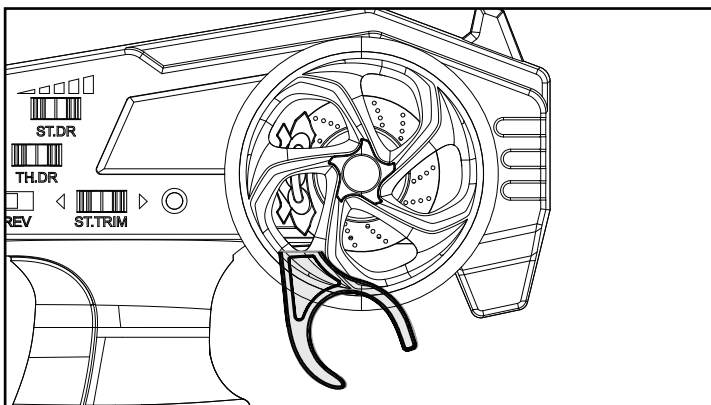
HOW TO OPERATE YOUR BOAT



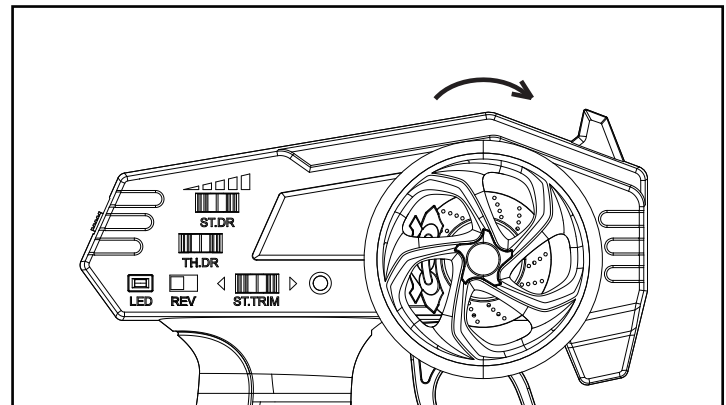
With the LightWave, there is no need to arm the motor. Simply squeeze the trigger in, or towards the driver for the boat to move forward.



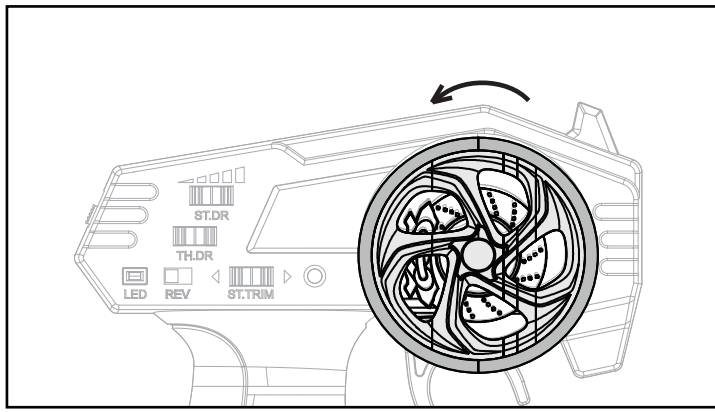
Pushing the trigger in the opposite direction, or away from the driver, will move the boat in the reverse direction.



With the proportional speed control, the further you pull the trigger, the faster your boat will go. To stop, release the trigger.



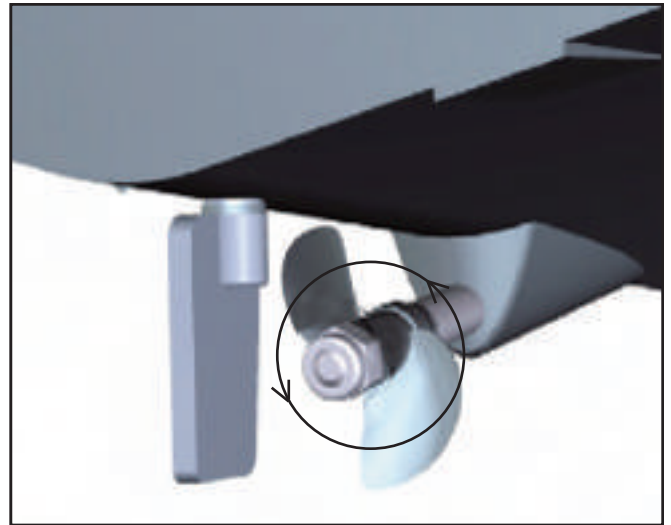
Rotate the steering wheel to the right, or clockwise to turn the boat to the right. If you need more control, move the Dual Rate switch up for tighter turns.



Rotate the steering wheel to the left, or counter-clockwise to turn the boat to the left. If you find that you need more control, move the Dual Rate switch up for tighter turns.

CHECKING THE RADIO SYSTEM AND GETTING STARTED

1. Power on the transmitter by turning on the switch on the left top end.
2. Connect a fully charged battery by plugging it into the ESC inside the hull.
3. Before placing the boat in the water, test the control of the transmitter by using the throttle "trigger" on the transmitter. Once the propeller is operating, make sure it is running counterclockwise as you face the stern.
4. Before driving, make sure the rudder moves to centered position once the battery is plugged into the ESC. If not, you will need to adjust the steering trim located on the transmitter to the left of the wheel. See the transmitter instructions earlier in this manual for directions.
5. Once the rudder is centered, make sure that it moves in the corresponding direction when the steering wheel is moved to the right or the left.
6. Once you carefully place the boat in the water, begin driving slowly as you become familiar with the operation. Stay near the shoreline at first if you are driving your boat in a pond or lake. Note that steering the boat right or left is completed by turning the steering wheel on the transmitter in the same direction you want the boat to turn. Begin with small movements of the wheel for wider turns and progress to sharper turns as your skills increase.
7. Make sure you avoid objects in the water at all times while operating the boat.
8. To avoid LVC (Low Voltage Cutoff) drive the boat back to shore or the edge of the pool when it begins to lose speed.
9. Power off by disconnecting the battery pack and then turn off the transmitter.
10. Allow the motor, ESC, and battery packs to cool before charging or operating the boat again.



Tip: If it seems you have to use a lot of steering trim on the transmitter to have the boat drive straight, return the steering trim to neutral and mechanically center the rudder. To do this, open the hull and either shorten or lengthen the bend in the control wire connecting the servo to the rudder horn until the rudder is centered.

Notice: Always power on the transmitter before plugging in the ESC. Make sure the transmitter is NOT turned off first or the receiver may pick up stray signals from other devices and run out of control. Never transport the boat with the battery connected to the ESC.

CAUTION: Always keep all body parts, hair, and loose items away from a spinning propeller as items can become easily entangled.

WHEN FINISHED RUNNING

- First, power off the ESC by disconnecting the battery.
- Next, turn the transmitter off.
- Then, remove the battery from the boat.

Tip: Always store the boat open – with the hatch removed, so that the inside of the boat is allowed to completely dry. Excessive moisture allowed to remain in the hull can allow mold or mildew to grow and damage the components.

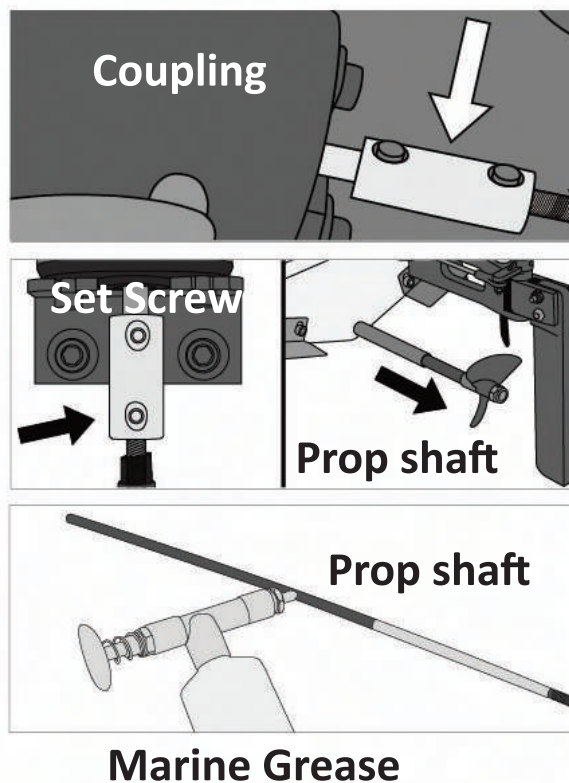
BOAT MAINTENANCE

Always replace the shaft when it is damaged or shows visible wear. Running the boat with a damaged shaft will not only damage the boat and void the warranty, but could also cause personal injury or property damage.

Lubricating the shaft regularly is vital to the life of the drivetrain. The lubricant also acts as a water seal, keeping water from entering the hull through the stuffing box. Make sure this is done after every 2 to 3 hours of operation. Always replace any parts that show excessive wear or damage.

Lubricating or Replacing the Drive Shaft

1. To remove the shaft, first loosen the coupling between the motor and the shaft.
2. Then, loosen the set screw from the shaft and remove the shaft from the back of the boat.
Tip: Use paper or cloth to hold the shaft when it is being removed.
3. Remove the drive shaft by sliding it out of the stuffing box. Wipe excessive lubricant and other materials from the shaft.
4. Lubricate the full length of the shaft assembly using marine grease.
5. Apply thread lock to the coupling set screw. Thread lock will help prevent the shaft from loosening during use.
6. Carefully reinstall the drive shaft, ensuring that there is a 1 to 2 mm gap between the prop shaft and coupling to allow shaft shrinkage under load.



Notice: Running the boat in salt water could cause some parts to corrode. If you run the boat in salt water, make sure it is rinsed thoroughly in fresh water after each use and lubricate the drive system. Because of the corrosive effects, running the boat in salt water is at the discretion of the owner and will void the boat's warranty.

Problem	Possible Cause	Solution
Extra noise or extra vibration	Damaged propeller, shaft or motor	Replace damaged parts
	Propeller is out of balance	Balance or replace propeller
Reduced run time or boat underpowered	Boat battery charge is low	Completely recharge battery
	Boat battery is damaged	Replace boat battery and follow battery instructions
	Friction on shaft or propeller	Disassemble, lubricate and correctly align parts
	Boat conditions may be too cold	Make sure battery is warm before use
	Battery capacity may be too low for conditions	Replace battery or use a larger capacity battery
	Too little lubrication on driveshaft	Fully lubricate driveshaft
	Vegetation or other obstacles are blocking the rudder or propeller	Remove boat from the water and remove obstacles
Boat will not Bind (during binding) to transmitter	Transmitter is too close to boat during binding process	Move powered transmitter a few feet from boat, disconnect and reconnect battery to boat
	Boat or transmitter is too close to large metal object, wireless source or another transmitter	Move boat and transmitter to another location and attempt binding again
	Boat battery/Transmitter battery charge is too low	Replace / recharge batteries
	Another compatible transmitter is powered on within range of the ESC	Turn off all compatible transmitters except the one you are trying to bind

Problem	Possible Cause	Solution
Boat will not connect (after binding) to transmitter	Boat or transmitter is too close to large metal object, wireless source or another transmitter	Move boat and transmitter to another location and attempt connecting again
	Boat battery/transmitter battery charge is too low	Replace/recharge batteries
Boat tends to dive in the water or takes on water	The boat hull is not completely closed	Dry out the boat and ensure the hatch is fully closed on the hull before returning the boat to the water
	Center of gravity is too far forward	Move battery back in the hull
Boat tends to turn one direction	Rudder or rudder trim is not centered	Repair rudder or adjust rudder and rudder trim for straight running when control is at neutral
	Rudder, linkage or servo damaged	Replace or repair damaged parts and adjust controls
Rudder does not move	Rudder, linkage or servo damage	Replace or repair damaged parts and adjust controls
	Wire is damaged or connections are loose	Do a check of wires and connections, connect or replace as needed
	Transmitter is not bound correctly	Re-bind receiver to the transmitter
Controls reversed	Transmitter settings are reversed	Do Control Direction Test and adjust controls on transmitter appropriately
Motor overheats	Blocked water cooler tubes	Clean or replace water tubes
Motor power pulses then motor loses power	Weather conditions might be too cold	Postpone until weather is warmer
	Battery is old, worn out or damaged	Replace battery
	Battery C rating might be too small	Use recommended battery

MOTOR CARE

- You can prolong motor life by preventing conditions that overheat the motor. Driving with frequent starts, stops, turns or pushing items in the water can overheat the motor. Other driving conditions like continually running at high speed or through rough water or water vegetation will also cause excessive heat and damage the motor. Make sure you avoid these situations whenever possible.
- Though the ESC is equipped with overheat protection, it does not protect the motor from overheating due to extra resistance from the driving conditions mentioned above.

BOATING TIPS

- Avoid boating near other watercraft, stationary objects, waves, wakes and other rapidly moving water. Also make sure to avoid operating the boat near wildlife, floating debris, or overhanging trees that come near the surface of the water. You should also be cautious to avoid boating in areas where there are people swimming or in park waterways and fishing areas. Before using on a pond or lake consult local laws and ordinances.
- You should only drive at maximum speeds when the water conditions are smooth and there is minimal wind. A sharp turn, wind, or waves can turn over a boat when it is moving quickly.
- When running your boat for the first time, it is recommended that you look for calm wind and water conditions so that you can learn how the boat responds to your control. When making turns, it is suggested that you decrease the throttle slightly to avoid flipping the boat over.
- Never operate your boat in less than 3 inches (8cm) of water.

Notice: When running at full speed in choppy waters, the prop may exit and re-enter the water quickly and repeatedly. This will subject the propeller to some stress which may eventually cause damage to the point it will need to be replaced.

Caution: Do not operate this product in vinyl covered or inflatable pools. Sharp components may cause damage to these materials.

Caution: Never retrieve your boat from the water in extreme temperatures, turbulence or without supervision.

REPLACEMENT PARTS LIST

Part Number	Part Description
RGRB1132	LightWave Micro RTR Boat; Blue
RGRB1133	LightWave Micro RTR Boat; Red
RGRB1160	Replacement Printed Hull; Blue
RGRB1161	Replacement Printed Hull; Red
RGRB1162	Replacement Canopy & Latch; Blue
RGRB1167	Replacement Canopy & Latch; Red
RGRB1163	Motor Mount
RGRB1164	Motor Coupler
RGRB1165	Blue LED Light Strip
RGRB1166	Red LED Light Strip
RGRB1168	7.4v, 500mAh Li-ion Battery
RGRB1118	9g Marine Rudder Servo
RGRB1123	Li-Ion USB Charger
RGRB1138	180A Motor w/ Adapter
RGRB1139	2-in-1 Receiver/ESC Combo
RGRB1140	Water Cooling Tube w/ Adapter
RGRB1141	Running Hardware Set
RGRB1142	Rudder Push Rod (2)
RGRB1143	Rudder and Mount
RGRB1144	Propeller and Shaft
RGRB1145	Propellers (2)
RGRB1169	2.4GHz Transmitter
RGRB1152	Canopy Latch

See your local hobby shop or place of purchase first. If unavailable, parts can be ordered direct at www.ragerc.com or call 1-866-724-3811 M-F 8:00-5:00PM Mountain Time.

LIMITED WARRANTY

Warranty Period: Rage RC warrants that the LightWave ("Product") will be free from original factory defects in materials and workmanship upon purchase ("Warranty Period").

What is Not Covered - This warranty is not transferable and does not cover (a) cosmetic damage, (b) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (c) modification to any part of the Product, (d) attempted service by anyone other than a Rage RC authorized service center, or (e) Product not purchased from an authorized Rage RC dealer.

OTHER THAN THE EXPRESS WARRANTY ABOVE, RAGE RC MAKES NO OTHER WARRANTY OR REPRESENTATION, AND THEREFORE DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND SUITABILITY FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Purchaser's Remedy - Rage RC's sole obligation and purchaser's sole and exclusive remedy shall be that Rage RC will, at its option, either (a) service, or (b) replace, any Product determined by Rage RC to be defective. Rage RC reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Rage RC. Proof of purchase is required for all warranty claims.

SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

Limitation of Liability - RAGE RC SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF RAGE R/C HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Further, in no event shall the liability of Rage RC exceed the individual price of the Product on which liability is asserted. As Rage RC has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

Law - These terms are governed by Utah law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Rage RC reserves the right to change or modify this warranty at any time.

RAGE RC

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