

BUG

Rigging Manual

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Bug Rigging Instructions

The Bug rigging instructions are a guide to rigging your boat.

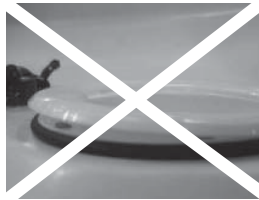
Important information



1. There are two hatches and one transom drain bung on the Bug, these must all be checked to ensure tightness and correct fit prior to sailing:



2. On the centerline of the aft deck and aft face of the daggerboard thwart.



Example of INCORRECT hatch fit:



3. Check that the transom drain bung is closed securely by turning it in a clockwise direction until hand tight.

1. Glossary

Aft: Rearward
Batten: A thin stiffening strip in the sail to support the leach
Boom: Spar at the bottom of the mainsail
Bow: Front of the boat
Burgee: Wind direction indicator (usually a small flag)
Clew: Aft lower corner of a sail
Cunningham: Purchase system for tightening the forward edge/luff of the sail
Daggerboard: The large board generally found in the middle of a dinghy to aid in going upwind and add righting moment
Foot: Bottom edge of the sail
Fore: Forward
Gudgeon: Fitting on the transom and rudder used to hang rudder
Gunwale: The outermost edge of the boat
Head: Top corner of sail
Leach: Rear edge of the sail
Luff: Forward edge of the sail
Mast: Main vertical spar supporting the rig/sails

Mast Heel: Bottom edge/foot of the mast
Mast Step: Integral tube where the mast heel/foot of the mast is located
Outhaul: Purchase system for tightening the bottom edge/foot of the sail
Painter: Rope exiting through the bow/front of the boat used for leading/towing or tying the boat to a jetty or buoy.
Pintle: The male portion of the rudder hanging system found on the rudder of the Bug
Rudder: Blade and attachments used for steering the boat
Sheet: Rope for controlling the inward/outward position of the sail
Stern: Back of the boat
Tack: Forward lower corner of sail
Transom: Surface that forms the stern of the boat
Vang: Purchase system for tightening the rear edge/leach of the sail

2. Useful Boat Terminology

Nautical Terminology

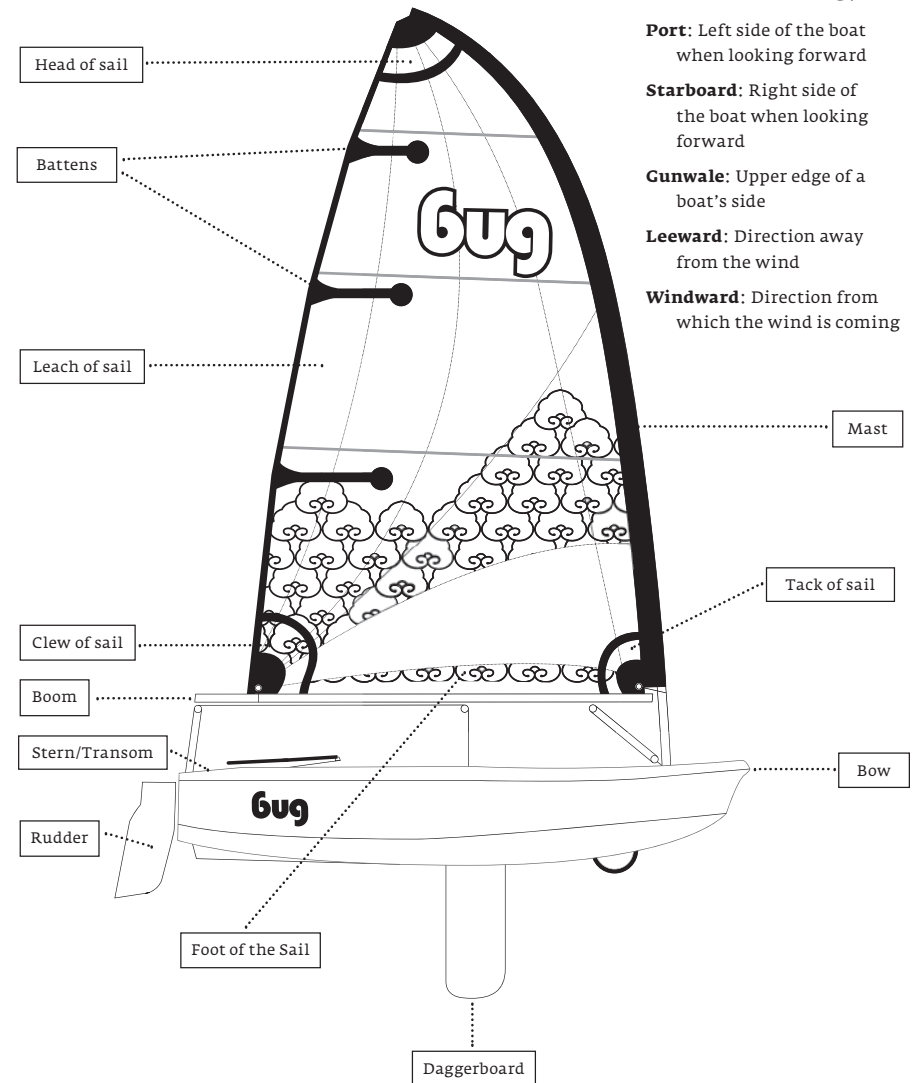
Port: Left side of the boat when looking forward

Starboard: Right side of the boat when looking forward

Gunwale: Upper edge of a boat's side

Leeward: Direction away from the wind

Windward: Direction from which the wind is coming



Useful knots to know

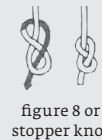


figure 8 or stopper knot



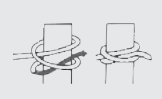
square knot



cleave

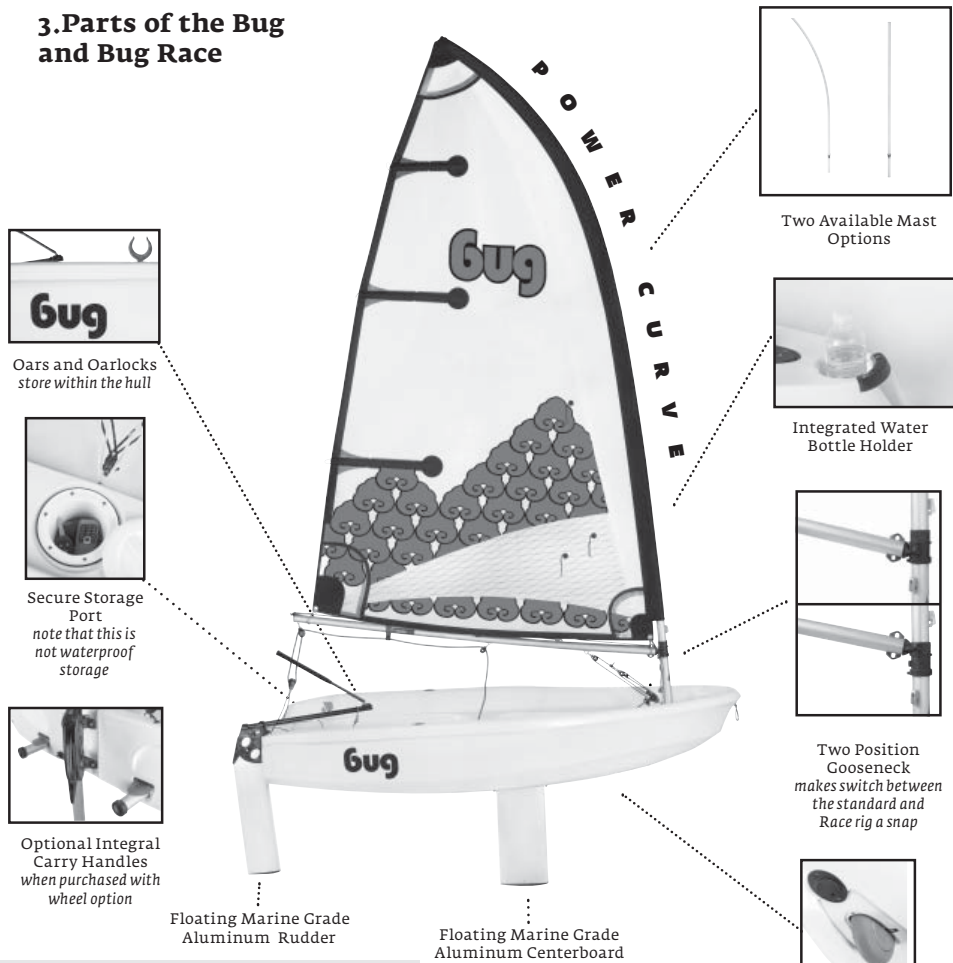


bowline



clove hitch

3. Parts of the Bug and Bug Race



bug		
length ft/m	8.53	2.60
beam ft/m	4.27	1.30
draft ft/m	2.95	0.90
sail area ft ² /m ²	40.90	3.80
hull weight lb/kg	101.41	46.00
capacity	1-2 people	
skill level	beginner – advanced	
race level	club – international	
optimal weight* lb/kg	66/154	30/70
transport	cartoppable	

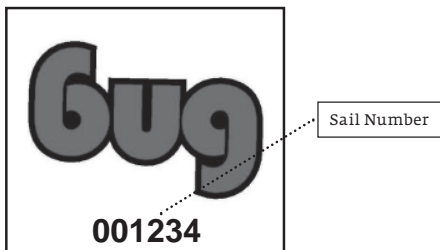
bug race		
sail area ft ² /m ²	57.05	5.30
max weight when used as a tender 352lb/160kg		

4. Maintenance and Service

1. Keep the equipment clean by frequently flushing with fresh water. In corrosive atmospheres stainless parts may show discoloration/brown staining around screw holes and rivets, this is not serious and can be removed with a fine abrasive.
2. Excess water should be removed from the hull.
3. Ropes, rigging and fittings should be checked at regular intervals for wear and tear.
4. All moving parts should be lightly lubricated to avoid jamming, i.e., McLube, Dry Teflon or a dry silicone based spray. Do not use oil.
5. Inspect all shackles to ensure they are tight. (Pliers should be used for this operation).
6. Damaged or worn parts should be replaced.
7. Sails should be thoroughly washed down with fresh water, dried and stored in a dry place.
8. Trailers and launching trollies should be rinsed with fresh water and checked at regular intervals. It is recommended that trailers be serviced annually.
9. Repairs to the polyethylene hull should be undertaken only by those with the relevant equipment and skills. Contact LaserPerformance for advice.
10. UV light will cause fading to some components and fittings, a waterproof/breathable cover is recommended to reduce UV degradation.
11. Do not leave the rig under tension when not sailing or during storage.
12. Your Bug should only be used in conjunction with the Bug specific LaserPerformance launching trolley. The use of any other launching trolley may damage the hull and invalidate your warranty.
13. The hull should NOT be left on a pebble beach, as the polyethylene could dent.
14. Care must be taken to support the hull adequately if storing on racking or in a similar manner. Any sustained point loading could permanently dent or distort the hull.

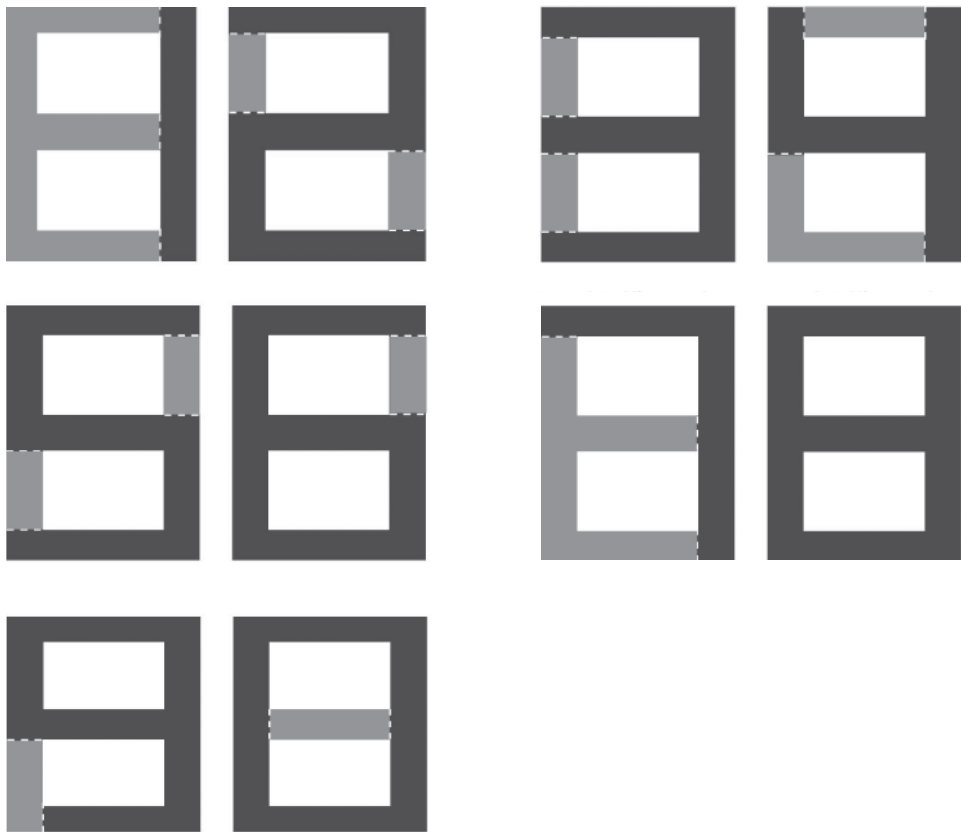
5. Sail Numbers

1. Identify the sail number of your LaserPerformance Bug by referring to the builder's serial number plate positioned on the starboard (right hand) side of the rear sub deck inner tank side.



2. Cut the required sail numbers from the generic digital 8's supplied using the following guidance:

Cut on the dotted line to make the specified number



3. Apply the sail numbers in a dry, clean and wind free environment using the following guidance:

Standard Sail

1. Lay the sail on a flat surface starboard/right hand side up.
2. The numbers on the starboard/right hand side of a sail are always higher than that of the port/left hand side.
3. Mark a line 90 degrees to the leach at 50% of the total leach length. (Use tape)
4. Measure 100 mm in from the leach on this line.
5. The left hand side of the first number should be positioned 100 mm in from the leach with the top of the number against the aforementioned tape line.
6. The numbers should be positioned 60 mm apart.
7. Turn over the sail and position the port/left numbers 60 mm below the lower edge and parallel to the starboard/right hand side numbers.



Bug Race

1. Lay the sail on a flat surface starboard/right hand side up.
2. The numbers on the starboard/right hand side of a sail are always higher than that of the port/left hand side.
3. Measure 200 mm down, from the second batten pocket of the sail.
4. Mark a line parallel to the batten pocket. (Use tape)
5. Measure 100 mm in from the leech on this line.
6. The left hand side of the first number should be positioned 100 mm in from the leach with the top of the number against the aforementioned tape line.
7. The numbers should be positioned 60mm apart.
8. Turn over the sail and position the port/left numbers 60 mm below the lower edge and parallel to the starboard/right hand side numbers.

BUG RACE - 57.05 ft²/ 5.30 m²



6. Rigging and Raising the Mast

1. Unwrap the spars and insert the lower end of the upper mast into the upper end of the lower mast. (figure 1)
2. When unwrapping the "Power Curve" top section (Bug Race only) use caution as one of the vang purchase blocks is attached to the Power Curve top section or its packaging. You will need this block to rig the 6:1 Race vang. (Vang rigging described on page 12 section 8). (figure 2)
3. Lay the sail on a clean and dry ground surface and slide the mast into the sail luff tube from the foot of the sail working gently upwards. (figure 3)
4. Take care to ensure the upper edge of the topmast goes right to the head/top of the sail until it bears up against the webbing strap at the very top of the luff tube aperture. (figure 3)
5. Ensure the sail battens (Race sail only) are located securely in their batten pockets.
6. Place the bow of the boat facing directly in to the wind.
7. Push the mast retainer swing arm in to its "open" position in readiness for mast insertion. (figure 4)
8. Place the lower end of the complete mast assembly into the mast step tube before pushing the mast retainer swing arm back to its "closed" position. (figure 5)

Note: The mast retainer swing arm prevents rig loss upon capsize!

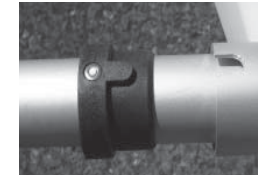


figure 1

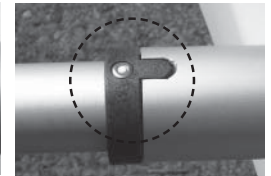


figure 2



figure 3

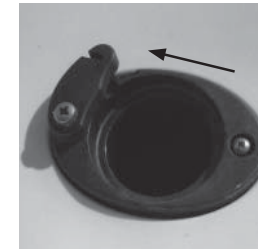


figure 4

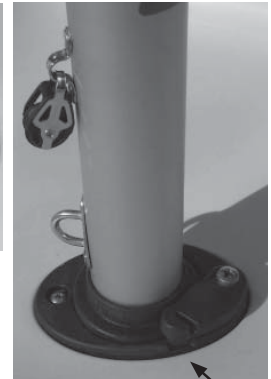


figure 5

7. Rigging and Fitting the Boom

1. Take the outhaul control line and tie a double half hitch stopper knot in one end.
2. Pass the untied end through:
 - a. The starboard/right aft/rear boom end.
 - b. The outhaul clew strap eye.
 - c. The port/left aft rear boom end.

This creates a 2:1 purchase cascade system as shown. (figure 6)

3. Pass the remaining loose end of the outhaul control forward and through the outhaul cleat on the top surface of the boom. (figure 7)

4. Continue forward this time passing the loose end through the plastic fairlead at the forward most top surface of the boom before passing it aft/backward again. (figure 8)

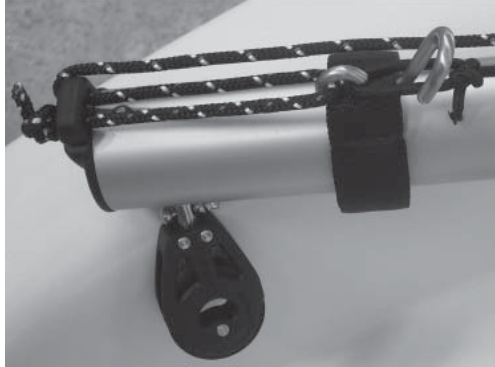


figure 6

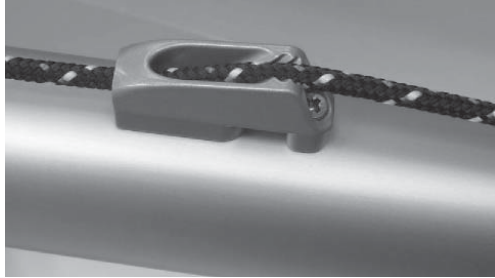


figure 7

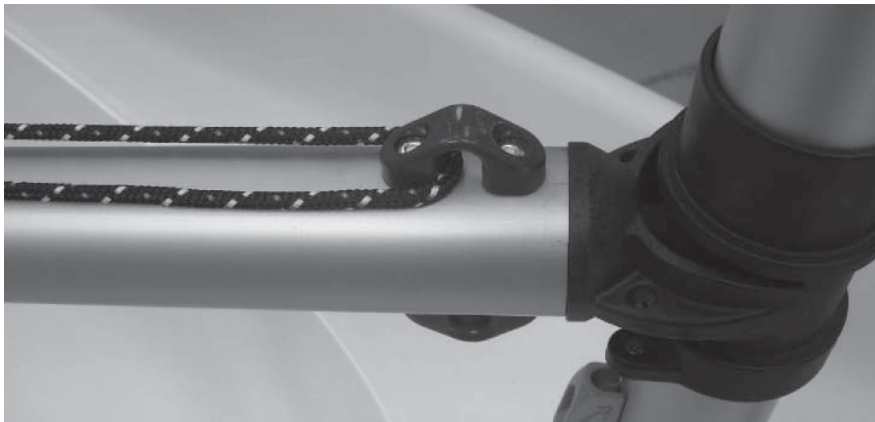


figure 8

5. Tie the loose end of the outhaul control line directly to one end of the outhaul bungee as shown. (figure 9)

6. Tie the remaining end of the outhaul bungee directly back on to the outhaul clew strap eye as shown. (figure 10)

Note: This slightly elaborate outhaul arrangement creates a tidy and convenient endless system that can remain rigged on the boom once initially setup for your first sail.

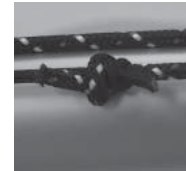


figure 9



figure 10

Standard Bug Rig

7. When using the Standard Bug sail the inboard boom end gooseneck fitting should be fitted onto the mast collar as shown. (figure 11)

Note: This ensures the mast is able to "freely rotate" thus enabling the reefing option supported by the standard rig to function. (It also raises the boom height to a less intrusive level for the non race/performance sailor).



figure 11

Bug Race Rig

8. When using the Bug Race sail the inboard boom end gooseneck fitting should be fitted onto the mast collar as shown. (figure 12a)

Care should be taken to ensure the mast collar spigot pin is successfully placed into the recipient slot in the "mate" surface of the inboard boom end gooseneck fitting. (figure 12b)

Note: This ensures the mast is NOT able to "freely rotate" thus keeping the bent topmast in parallel with the boom to maintain the best sail shape possible.



figure 12a



figure 12b

9. Hook the mainsail clew on to the clew outhaul hook. (figure 13)



figure 13

8. Vang

Note:

- *Standard Rig is supplied with a 3:1 vang purchase cascade. (2 block system)*
- *Race Rig is supplied with a 6:1 vang purchase cascade. (3 block system)*

1. Attach the lower block to the eye bracket on the aft face of the mast immediately above deck level.
2. Attach the uppermost block to the webbing strap on the lower face of the boom.
3. Rope up the vang purchase system as shown.

Standard Rig (3:1)



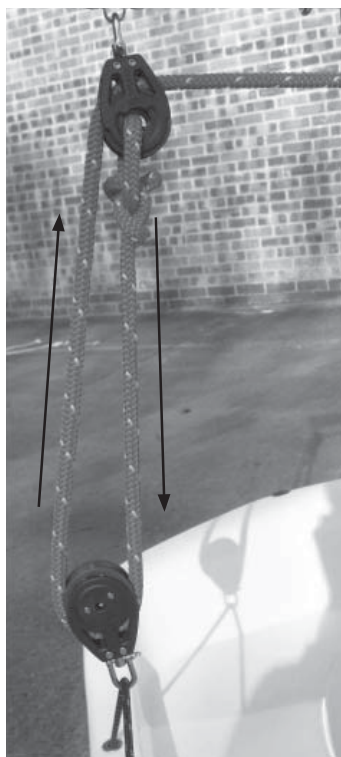
Race Rig (6:1)



Note: The additional mid-cascade block required is supplied only with the power curve topmast.

9. Mainsheet

1. When standing on the starboard side of the hull, take the mainsheet and tie a bowline loop on the center of the mainsheet block located on the lower aft/rear surface of the boom.
2. Pass the remaining loose end downward and through the auto ratchet traveler block.
3. There are arrows on the auto ratchet traveler block to depict the correct direction the rope should pass. This will ensure that when under load the auto ratchet block engages correctly.



4. Pass the remaining loose end upward and through the mainsheet block on the lower aft/rear surface of the boom traveling in a clockwise direction before leading it forward along the boom.

5. Pass the loose end through the webbing sling immediately above the helm's cockpit area. (figure 14)

Note: This prevents the rope from sagging and getting tangled up around the helmsman during tacks and jibes!

6. Pass the loose end in a clockwise direction through the remaining mainsheet block positioned on the lower mid-section of the boom. (figure 15)

7. Finally pass the loose end through the hole in the front end of the daggerboard top cap before tying a half hitch stopper knot. (figure 16)

Note: This knot in the mainsheet prevents daggerboard loss upon capsize!



figure 14



figure 15

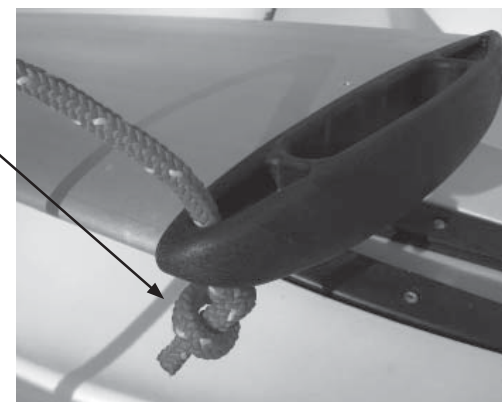


figure 16

Standard Rig

When using the Standard sail the cunningham control line should be configured to incorporate usage of the D-ring on the forward edge of the luff tube and the clam cleat on the front face of the lower mast immediately above the gooseneck collar as depicted.

Note: This ensures the mast is able to “freely rotate” thus enabling the reefing option supported by the standard rig to function.



standard rig

Race Rig

When using the Race sail, tie a double half hitch stopper knot in one end of the cunningham line before passing the remaining loose end:

a. Upward through the lug on the lower port side of gooseneck collar.

b. Upward through the lug on the port side of the inboard boom end gooseneck fitting.

c. Through the tack eye traveling in a port/left to starboard/right direction.

d. Downward and through the plastic fairlead on the underside of the inboard end of the boom traveling in a starboard/right to port/left direction

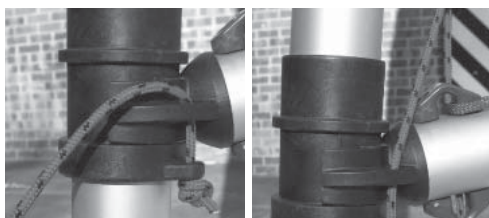
e. Upward and for the second time, through the tack eye traveling in a port/left to starboard/right direction.

f. Downward and through the lug on the starboard side of the inboard boom end gooseneck fitting.

g. Downward and through the clam cleat on the starboard side of the mast immediately below the gooseneck collar.

h. Downward and through the pulley block immediately below the aforementioned clam cleat before tying a 100 mm rope handle at the end of the control line.

Note: This ensures the mast is NOT able to “freely rotate” thus keeping the bent topmast in parallel with the boom to maintain the best sail shape possible.



race rig



1. Take the loose tiller arm and carefully remove the pre-taped retaining screw from the aft/rear end of the tube.

2. Insert the aft/rear end of the tiller arm tube in to the rudder head tiller arm hood travelling in a forward to aft/rearward direction.

3. Line up the tiller arm retaining screw hole with its corresponding recess/hole on the uppermost aft/rear surface of the rudder head tiller arm hood.

4. Re-locate the tiller arm retaining screw, driving it carefully through both the rudder head tiller arm hood and the tiller arm. (figure 17)

5. Clip the tiller extension to its mounting bracket on the uppermost forward surface of the tiller arm. (figure 18a-b)

6. Take the rudder assembly and pass the tiller extension and tiller arm under the mainsheet bridle strop at the aft/stern edge of the boat.

7. Lower the rudder head assembly onto the rudder gudgeons situated on the stern/transom of the boat. (figure 19)

8. Ensure the integral rudder gudgeon clip (blue) is successfully engaged, resulting in the rudder head automatic “clicking” in to place securely. (figure 20)

9. Fit the secondary rudder retaining split ring through the upper pintle pin.

Note: To remove the rudder assembly from the transom gudgeons, the rudder retaining split ring must be removed and the integral rudder gudgeon clip (blue) pressed inward.

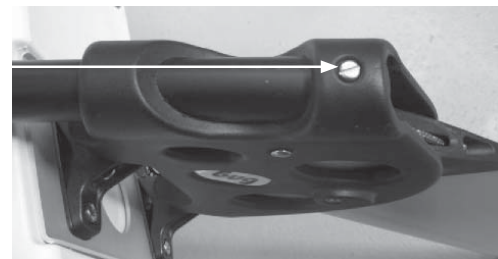


figure 17



figure 18a



figure 18b



figure 19



figure 20

10. When adjusting the kick-up cleat mechanism on your Bug rudder, we strongly recommend that you set the cam at the minimum setting and progressively increase it to suit your experience and style of sailing. If racing and sailing in strong winds you will want to set the kick-up load higher. If recreational sailing off the beach you will want to set the kick up much lower.

Warning: Running aground with the kick-up set incorrectly could damage your rudder and the hull.

The auto-release cleat provides the neatest and best solution to the problem of how to lock-down a rudder blade yet allow it to flip up if it hits the bottom or a solid obstacle in the water. The cleat holds ropes securely, yet will release them immediately when the cleat is overloaded. Once tripped, it can be easily reset in seconds by just pushing the cleat back down into its base. (figure 21)

The cleat is also fitted with an adjustable cam so that the release tension can be set to suit the boat and local conditions. The cam is adjusted until the rudder blade is held down reliably under maximum sailing conditions. The cleat will then be set so that the least strain is put on the rudder if it hits an obstacle.

Setting the Release Load

1. Test release load with “cam” at minimum setting.
2. To increase load use a screwdriver to rotate “cam” towards maximum. (figure 22)

Warning: To avoid damaging equipment, make small adjustments and test each increase. Tests show that release loads of 240kg (530lbs) are possible with the cam at “maximum” setting. Smaller or worn ropes release at higher loads than larger new ropes.

12. Mainsail Reefing

Note: This function is only applicable to the Standard Rig. (figure 23)
The architecture of the Race Rig does NOT support this function.

1. Unhook the lower vang block from the eye bracket on the aft face of the mast immediately above deck level.
2. Ease the outhaul control line tension while simultaneously rotating the mast through 720 degrees (two complete turns) in either direction.
3. Reattach the lower vang block to the eye bracket on the aft face of the mast immediately above deck level.

Your Bug Is Now Ready For Launching!



figure 21

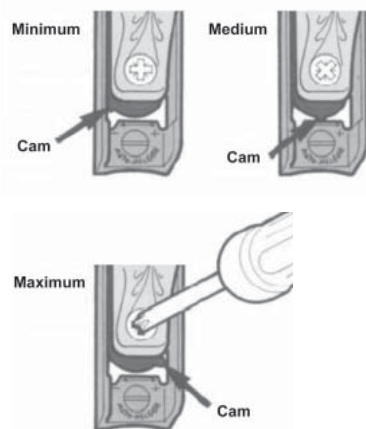


figure 22



figure 23

13. Rowing & Outboard Engine Usage

Rowlocks (Standard Equipment)

1. Bug rowlocks have a nonsymmetrical lower end which engages in a keyway in the bottom of each rowlock socket to prevent disengagement or loss while rowing.
2. Rowlocks should be presented in the correct orientation to pass through the “open” part of the keyway in the bottom of each rowlock socket.
3. When the “open” part of the keyway is found, the rowlock will seat down completely at which point the rowlock should be rotated through 180 degrees before placing the oar in the rowlock and rowing.
4. Bug rowlocks are designed for convenient storage in the rear aft sub deck storage compartment when not in use.

Oars (LaserPerformance Accessory Option)

1. Bug oars are designed to be collapsible to enable convenient storage in the internal hull cavity when not in use.
2. The oars are a great accessory should you encounter a change in weather conditions that would prevent you getting home in a safe and timely manner.

Outboard Engine Bracket (LaserPerformance Accessory Option)

1. The Bug outboard engine bracket can be fitted within seconds without the use of tools or permanent fixings.
2. Remove the protective plastic thumb screw from the special insert on the starboard side of the transom's aft face.
3. Position the bracket's pintle pin into the special insert positioned in the crown of the starboard rear deck.
4. Screw the eye bolt through the bracket and into the special insert on the transom (starboard side).
5. Always make sure that the outboard engine is fastened securely.
6. Always use a safety leash between the engine and the engine bracket's securing eye bolt.
7. The maximum recommended engine size for the Bug is 1.5 kw/2 hp/13 kg's.

Transom Drain Port Bungs (LaserPerformance Accessory Option)

1. The bungs are designed to close the transom drain ports so water doesn't enter the cockpit when rowing or using an outboard engine.
2. To enable this, both the cockpit drain “well” bung (standard equipment) and the transom drain port bungs should be fitted.
3. All bungs are designed for convenient storage in the rear aft sub deck storage compartment when not in use.

14. Launching and Basic Safety on the Water

Before You Go Sailing:

1. Check you are wearing suitable clothing and safety equipment for the conditions and time of year.
2. Always wear a buoyancy aid or life jacket
3. Make sure a third party knows where you are sailing and how many of you are sailing.
4. Check the weather forecast
5. Check the time of high and low tides if applicable.
6. Seek advice on the local conditions if you are sailing in a new area.
7. Always check the condition of your craft before setting off.
8. Check for overhead cables when rigging, launching and recovering.
9. The use of a LaserPerformance supplied Bug mast head float is highly advisable.
(This device will assist in the prevention of complete inversion in the event of capsizing).

Launching

1. Raise the rig with the boat facing into the wind.
2. Launch the boat using the appropriate launching trolley.
3. Take the boat into the water with the bow facing into the wind.
4. Ensure that there is enough water to float the boat off the trolley/dolly.
5. When there is enough water below you, lower the daggerboard and rudder fully.
6. Cleat the rudder downhaul in the cleat on the tiller.
7. The rudder and the daggerboard should be raised before coming ashore.

On The Water

1. Conform to the sailing rules of the road.
2. Look out for changing weather conditions.
3. Never sail beyond your ability or that of your crew.
4. Be competent in your sailing skills and righting techniques.

Care, Maintenance and Service of your LaserPerformance Product

Before rigging your boat, read and familiarize yourself with the rigging manual. Failure to adhere to these guide-lines could invalidate your warranty.

Maintenance

- Keep the equipment clean by frequently flushing with fresh water. In corrosive atmospheres, stainless parts may show discoloration/brown staining around screw holes and rivets. This is not serious and can be removed with a fine abrasive.
- Excess water should be removed from the hull.
- Ropes, rigging and fittings should be checked at regular intervals for wear and tear, including winch gear.
- All moving parts should be lightly lubricated to avoid jamming, i.e., McLube, dry Teflon or a dry silicone based spray. Do not use oil.
- Inspect shackles, pins and clevis rings and tape up to stop snagging sails, ropes and clothing and to prevent them from coming undone.
- When refastening screws do not over tighten as this may strip the thread and do not reuse Nyloc nuts more than three times.
- Damaged or worn parts should be replaced.
- Sails should be thoroughly washed down with fresh water, dried and stored in a dry place.

Trailers and Trolleys/Dollies

- It is highly recommended that a trolley/dolly is used to launch and recover your boat. Dragging your hull up onto a beach or slip way will wear away the gel coat or polyethylene and damage the boat. Also, the hull should not be left on a pebble beach as the hull skin could be dented.
- Trailers should be rinsed with fresh water and checked at regular intervals. It is recommended that trailers be serviced annually. The trailer and road base should never be immersed in water.
- Trailers and trolleys supplied by LaserPerformance are designed to transport the hull in the best possible manner to avoid damaging the hull. For instance, LaserPerformance does not recommend support hulls on rollers except on the keel line and only where there is a reinforced keelson. We also recommend gunwale hung trolleys for our smaller products. Hulls supported by a trolley bunk or wide strap must have the ability to drain water away from the hull. Trolley bunks padded with carpet or foam can cause blistering in the gel coat and changes to the hull color. Please do not transport your LaserPerformance product on a trailer or trolley that has not been specifically designed for the product. Hulls damaged through using an incorrectly designed or wrongly set up trailer or trolley are not covered under warranty.
- When securing your boat to a trailer for transport be very careful that ratchet straps and ropes are not over tightened and that there is sufficient padding under the strap or rope to prevent the hull/deck from being damaged through abrasion or pressure.
- Top covers must not be allowed to “flap” when driving at speed. This can abrade the surface of the hull and damage it. It is recommended if you are towing and plan to use your top cover that an under cover is fitted first to prevent cover flap damage to the top sides of the hull.
- Repairs to the polyethylene or GRP hulls should be undertaken by persons with the relevant equipment and skills. Contact LaserPerformance for advice.

Storage

- Your boat should always be tied down securely to the ground when not in use.
- UV light will cause fading to some components and fittings. A cover is recommended to reduce the UV degradation.
- Do not leave the rig under tension when not sailing or during storage.
- Care must be taken to support the hull adequately if storing on racking or similar. Any sustained point loading could permanently dent or distort the hull.
- Under covers for LaserPerformance products should be produced from a breathable or semi breathable fabric to allow moisture to evaporate away from the hull. This is essential to prevent damage to the hull skin. Also, the hull should never be left in the under cover wet or damp. A combination of moisture and heat over an extended period can also damage the hull. The under cover is designed to protect the hull when being transported and should be removed when the hull is being stored. Typical damage includes small bubbles or blisters, excessive print through of glass reinforcement, foam or wood and color change.
- Rudders and centerboards must never be stored wet in carry/combo bags. This can cause blistering, print through and warpage.
- All our GRP products are designed to be dry sailed. In other words stored on dry land. If you intend to leave your boat on a mooring for any length of time it is essential that you apply an osmosis barrier coat. LaserPerformance can recommend a suitable product.

On Water

- When wearing a trapeze harness, take particular care when climbing on to the centerboard and back into the boat after a capsize. The trapeze harness hook could easily damage the hull or deck.

On Water Towing

- Towing your LaserPerformance product at high speed (10 – 20 knots) behind a rib or power boat can seriously damage the hull. Boats damaged in this manner are not covered by the warranty. LaserPerformance recommends a maximum towing speed of 6 knots.

Owner Information

hull identification number

purchased from date of purchase

contact name phone #

address:

city / state / county zip / postal code

hull color: sail #:

registration information (if applicable)

trailer vin #

license plate number

registration number state / county registered in

insurance information

maintenance



LaserPerformance NORTH AMERICA

300 Highpoint Avenue
Portsmouth, Rhode Island 02871
t +1 800 966 SAIL
f +1 401 683 0990

LaserPerformance EUROPE

Station Works, Long Buckby
Northamptonshire NN6 7PF
United Kingdom
t +44 (0) 1327 841600
f +44 (0) 1327 841601

LaserPerformance ASIA

Room 3415
China Merchants Tower
Shun Tak Centre
No. 168-200 Connaught Road Central
Hong Kong
t +852 2902 2818
f +852 2587 7868

LaserPerformance AUSTRALIA

t +61 (0) 3 9016 4151

LaserPerformance MIDDLE EAST

T5 Middle East LLC
Knotika Marine Mall, Sheikh Zayed Road
PO Box 54070
Dubai, UAE
t +971 (4) 3039 840
f +971 (4) 3039 839

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