



Grabber Manual.

Blue Robotics Grabber for Boxfish ROV



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1 Overview

This document contains instructions for:

1. Attaching the Blue Robotics grabber to its mount on your Boxfish ROV
2. How to open/close the grabber arms using buttons on the Control Station
3. How to detach the grabber from your ROV if you wish to dive without it.
4. Reattaching the grabber again after disconnecting it.



Boxfish ROV shown with grabber accessory installed

2 About the grabber accessory

The grabber is shown below as it appears when detached from its mounting point on the ROV.



2.1 Grabber specifications

The grabber is the Newton Subsea Gripper made by Blue Robotics. Some specifications are provided below, for full details see <https://bluerobotics.com>.

- Depth rating: 300m
- Jaw opening at tip: 62mm
- Grip force at tip/middle: 97N/124N
- Weight in air (with cable): 616g
- Overall length closed/open: 294mm/300mm.

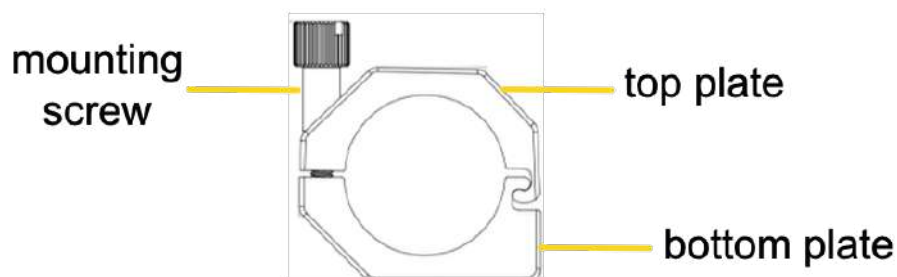


3 Mounting the grabber to the ROV

3.1 Mounting components

The mount for the grabber consists of:

- A float, which is permanently mounted to the bottom front of the ROV
- A mounting bracket for the grabber. The bracket has a top and bottom plate and a screw to tighten the plates together to hold the grabber in place.



Mounting bracket to hold the grabber in place.

We have permanently attached the bottom plate of the bracket to the float.

3.2 Mounting configuration for shipping/storage

When you receive your Boxfish ROV, the grabber will be mounted to the ROV, but it will be facing backwards so that it can fit in the ROV box for transport.

The grabber cable will be plugged into the penetrator port marked 'GRAB' on the side of the ROV.

When storing your ROV after a dive, you can return the grabber to this configuration before putting the ROV in its storage case.



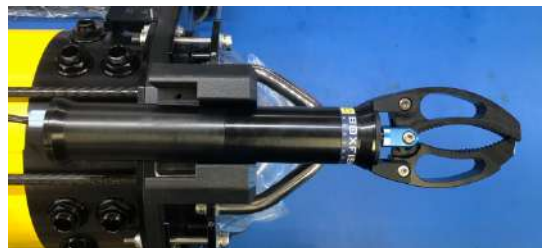
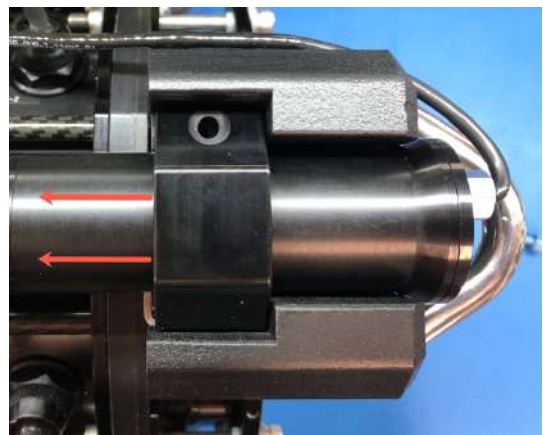
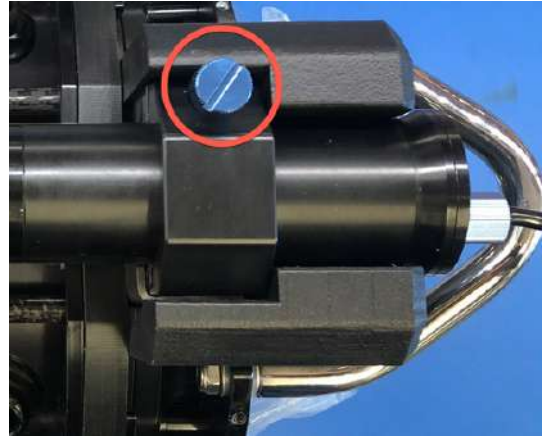
Grabber mounted backwards on the Boxfish ROV so it can fit in the ROV case for storage and shipping.



3.3 Mounting the grabber for a dive

To turn the grabber around so that it's facing forward for a dive, you will need to access the underside of the ROV.

1. Turn the ROV upside down or onto its side so that you can access the grabber mount. Unscrew the fastener holding the top plate of the mounting bracket to the bottom plate. Note that mounting screw may differ from picture shown.
2. Take out the screw and remove the top of the mounting bracket by sliding it horizontally, towards the middle of the ROV.
3. Turn the grabber around so that it extends out beyond the front of the ROV. You can choose how far out you want the grabber to extend, and whether to orient it so the jaws are horizontal or vertical.
4. Slide the top bracket onto the bottom bracket, so that the top bracket is hooked onto the bottom on the side opposite the screw. Then replace the blue screw until it is firm.

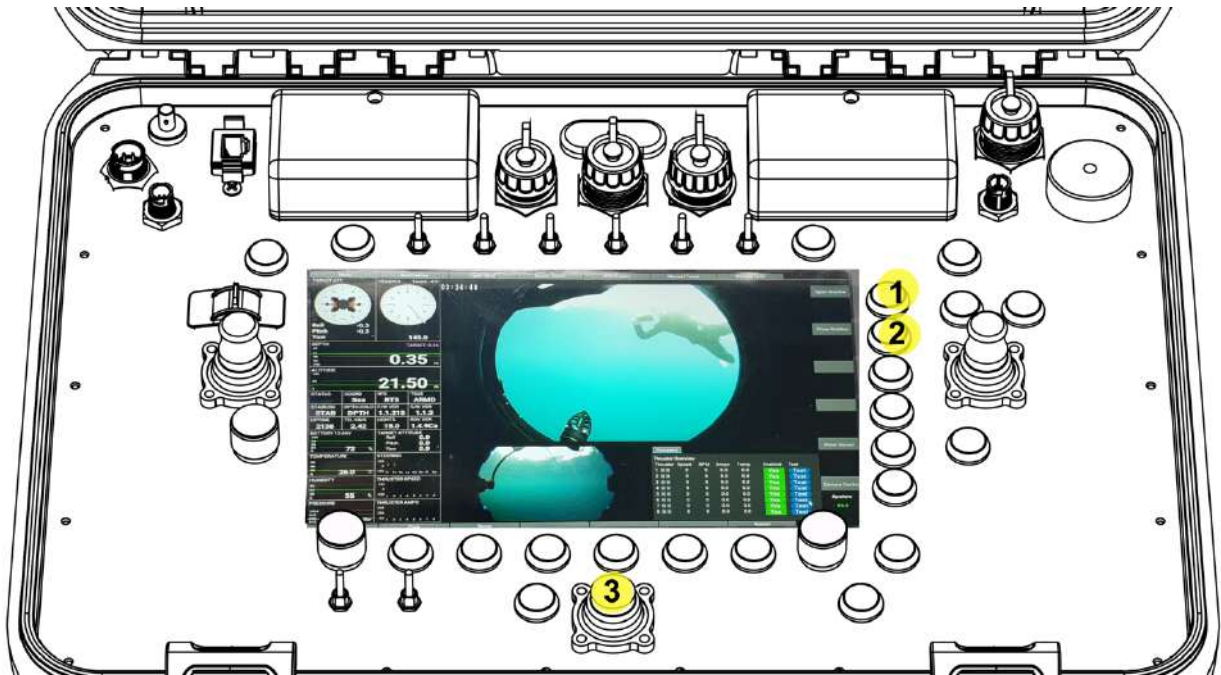




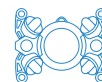
4 How to control the grabber using the Control Station

Note: For Alpha ROVs, see the next section.

To use the grabber, power on the ROV and Control Station. You will use the controls shown below.



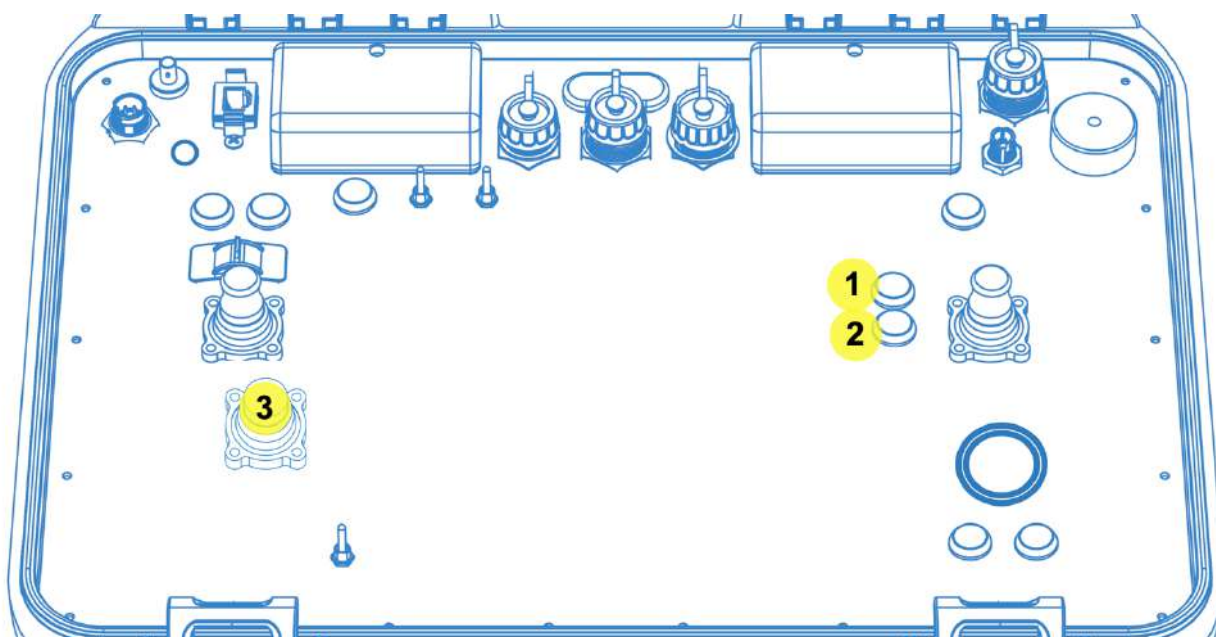
1. **Grabber open control button.** Press and hold the button to open the grabber arms. While holding the button, the arms will move slowly apart until the grabber is fully open. Release the button when you'd like the arms to stop opening, or when the arms are fully open.
2. **Grabber close control button.** Press down and hold the button to start to close the grabber arms. The arms will move slowly together until the grabber is fully closed. Release the button to stop moving the arms towards the closed position.
3. **Pitch/roll joystick:** You may need to pitch the ROV forward to pick up objects from the bottom. Use the roll settings too if the object is at an angle. Both pitch and roll are controlled by the centre joystick on the Control Station.



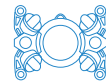
5 How to control the grabber using Boxfish Alpha Control Station

To use the grabber, power on the ROV and Control Station. You will use the controls shown below.

The grabber will be visible in the front camera on the 17” screen in the Control Station lid.



1. **Grabber open control button.** Press and hold the button to open the grabber arms. While holding the button, the arms will move slowly apart until the grabber is fully open. Release the button when you'd like the arms to stop opening, or when the arms are fully open.
2. **Grabber close control button.** Press down and hold the button to start to close the grabber arms. The arms will move slowly together until the grabber is fully closed. Release the button to stop moving the arms towards the closed position.
3. **Pitch/roll joystick:** You may need to pitch the ROV forward to pick up objects from the bottom. Use the roll settings too if the object is at an angle. Both pitch and roll are controlled by the centre joystick on the Control Station.



6 Care of your grabber after a dive

Thoroughly rinse the grabber with fresh water after a dive, along with the ROV.



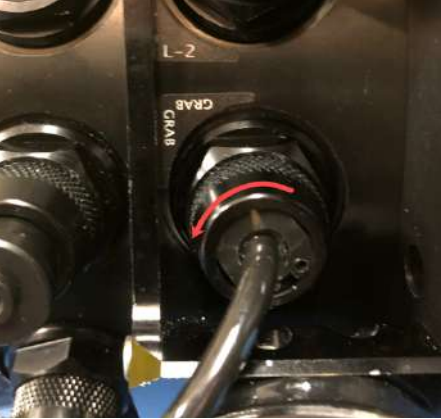
7 How to use the ROV without a grabber

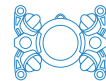
You can dive with the grabber mounted backwards if it is not needed for a dive.

If you wish to dive without the grabber, you must remove the whole device including its cable into the ROV.

7.1 How to remove grabber cable

This procedure involves releasing the vacuum from the ROV so that you can remove the grabber port plug from the pressure vessel. You will also need to locate a port plug from your accessories box to replace the grabber cable plug.

<p>1. Ensure the ROV is powered off. Then, unscrew the black knurled collar from the vacuum port at the rear of the ROV.</p>	
<p>2. Pull out the valve to release the vacuum. As soon as the vacuum is released, replace the cap onto vacuum port.</p>	
<p>3. After the vacuum is released, locate the port for the grabber cable (it will be labelled 'GRAB').</p> <p>4. Unscrew the black knurled collar with your fingers.</p>	



5. When the collar is off, pull out the plug by pulling on its black cable. It is held in place with two o-rings so you will need enough strength to pull past these.



6. Remove the cable from the ROV. Note: You may need to cut cable ties where the cable is tied to other cables.
7. Store the cable safely in your accessories box. Note that the penetrator plug has a single pin protruding from it so please store it with adequate protection.



8. Put a port plug in the grabber port and screw in the collar. Before you do this, apply a thin coating of silicone grease to the two o-rings on the plug. This helps lubricate the o-rings to ensure water-tightness.
9. Check that the ROV can hold a vacuum with this new port plug. Apply a vacuum to the ROV (875mBar) and monitor the pressure on the Control Station to ensure it is maintained for 10 minutes. For instructions, see the Boxfish ROV Owner's Manual.





8 How to reattach the grabber

To use the ROV with the grabber again, you must reattach the grabber cable.

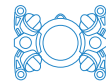
You will find it easier to turn the ROV upside down or onto its side for this procedure.

1. **Ensure the ROV is powered off** and follow the steps in the previous section to release the vacuum from inside the ROV.
2. Put your grabber into its operational position so that you can find the best route for the cable. Also make sure that the grabber plug can reach its port in both front and back mounting positions.
3. Lubricate the o-rings on the grabber cable plug by applying a thin coating of silicone grease.
4. Unscrew the collar from the port plug in the 'GRAB' port and take the port plug out.
5. Line up the grabber cable plug with the port. The grabber cable plug contains a 3-way pin. To ensure it is oriented correctly, align the pin protruding from the plug into its hole in the port; the hole is shown in the picture below. You might need to shine a light onto the port to see it.



Grabber port. Arrow shows the hole for the grabber plug

6. Insert the grabber cable penetrator into the port and push it in as far as it will go, once you are sure the pin is aligned. Then, screw in the black knurled collar until it is fingertight.
7. Check that the ROV can hold a vacuum. Apply a vacuum to the ROV (875mBar) and monitor the pressure on the Control Station to ensure it is maintained for 10 minutes. For instructions, see the Boxfish ROV Owner's Manual.





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