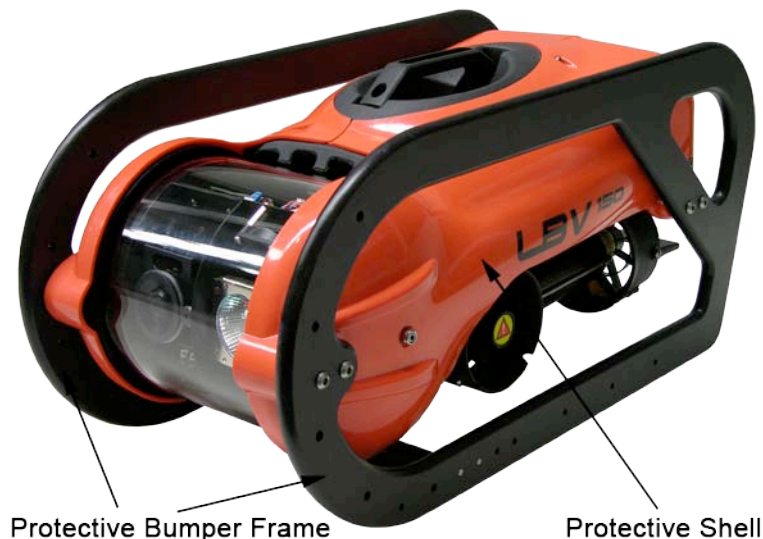


Protective Shell & Bumper Frame

Introduction

LBV² is fitted with a Protective Shell and Bumper Frame. The purpose of the protective shell is to protect the internal components as well as provide a more hydrodynamic shape through the water. In addition, the LBV² systems are fitted with a protective bumper frame offering further protection, mounting for the ballast weight and various optional accessories.



Work Environment

Prior to beginning ensure you have a clean and dry workspace. Locate the required tools and parts and have paper towels available. It is a good idea to have a container to keep fasteners in as they are removed. Read through the instructions fully prior to beginning and make sure you understand what they are asking you to do.

Reading Manual

Below is a list of the required tools, estimated time to complete and level of difficulty. Next to each step where a tool is required the tool is listed. Some of the steps have special notes that must be observed.



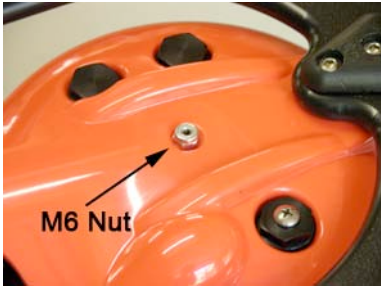

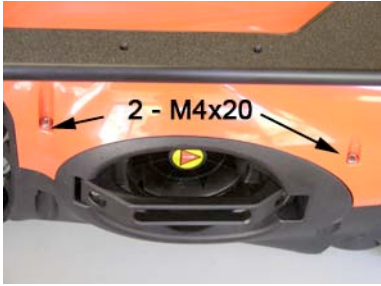
Tools Required	Time to complete	Level of Difficulty
<ul style="list-style-type: none"> #2 Phillips Screwdriver 10mm Socket Head Driver 	<ul style="list-style-type: none"> 10 minutes removal 10 minutes install 	<ul style="list-style-type: none"> Easy

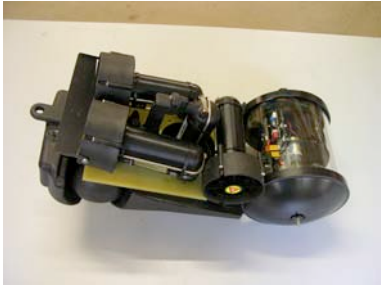


Prior to working on the LBV make sure the power is off and the umbilical is DISCONNECTED.

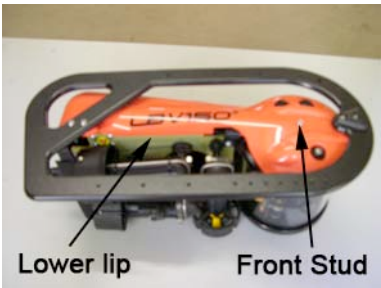
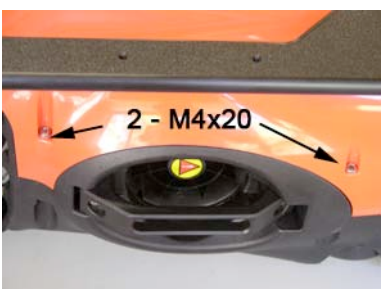
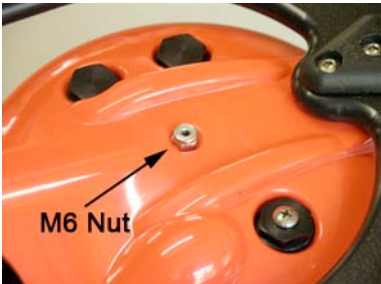
Removal




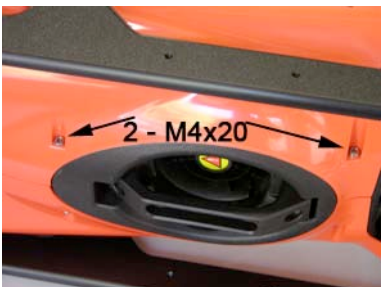
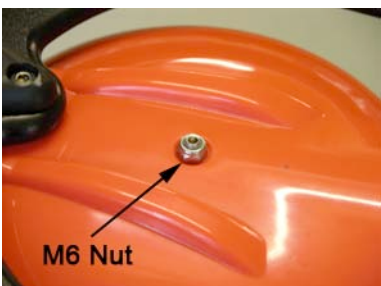
	<p><u>Step 1</u></p> <p>Place the LBV on its starboard side.</p>
 <p>2 - M5 x 12</p>	<p><u>Step 2 – Phillips #2 Screwdriver</u></p> <p>Remove the 2 M5 x 12 Button head socket screws securing the crossbar to the starboard bumper frame rail.</p> <p>Note: there is a washer with each screw.</p>
 <p>M6 Nut</p>	<p><u>Step 3 – 10mm Socket Head Driver</u></p> <p>Remove the M6 hex nut from the front of the port shell.</p>
 <p>M4x10</p>	<p><u>Step 4 – Phillips #2 Screwdriver</u></p> <p>Remove the M4 x 10 Phillips pan head screw from the rear of the port shell securing it to the float.</p>
 <p>2 - M4x20</p>	<p><u>Step 5 – Phillips #2 Screwdriver</u></p> <p>Remove the 2 M4 x 20 Phillips pan head screws from the port shell securing it to the float.</p> <p>Note: you will have to work in around the bumper frame rail.</p>

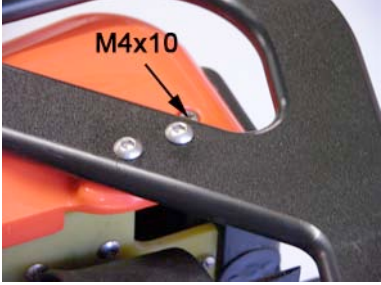
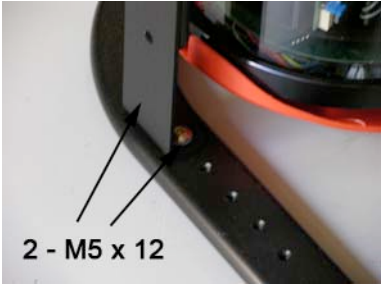

	<p><u>Step 6</u></p> <p>Lift off the port shell and bumper frame assembly.</p> <p>Note: be careful not to scratch the view port with the crossbar.</p>
	<p><u>Step 7</u></p> <p>Turn the LBV over and place on its port side.</p>
 <p>M6 Nut</p>	<p><u>Step 8 – 10mm Socket Head Driver</u></p> <p>Repeating a similar process to the port shell remove the 10mm hex nut at the front of the starboard shell.</p>
 <p>M4x50</p>	<p><u>Step 9 – Phillips #2 Screwdriver</u></p> <p>Remove the M4 x 50 Phillips Pan Head screw from the rear of the shell.</p> <p>Note: a gray plastic tube acts as a spacer between the shell and the float. This spacer will fall out when you remove the screw.</p>
 <p>2 - M4x20</p>	<p><u>Step 10 – Phillips #2 Screwdriver</u></p> <p>Remove the 2 M4 x 20 Phillips pan head screws from the top of the shell.</p> <p>Note: again you will have to work around the bumper frame.</p>

	<p><u>Step 11</u></p> <p>Lift off the shell and bumper frame assembly then place LBV on its back.</p> <p><u>Removal process complete.</u></p>
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Installation

	<p><u>Step 1</u></p> <p>Place the LBV on its port side with the accessory ports up.</p>
 <p>Lower lip Front Stud</p>	<p><u>Step 2</u></p> <p>Take the protective shell and bumper frame assembly and lower onto the LBV. Line up the forward stud and the under lip of the shell to the back plane.</p>
 <p>2 - M4x20</p>	<p><u>Step 3 – Phillips #2 Screwdriver</u></p> <p>Insert and tighten 2 M4x20 Phillips pan head screws in top of shell to float.</p>
 <p>M6 Nut</p>	<p><u>Step 4 – 10mm Socket Head Driver</u></p> <p>Screw on M6 hex nut to threaded stud and tighten.</p>

 <p>M4x50</p>	<p><u>Step 5 – Phillips #2 Screwdriver</u></p> <p>Insert the M4 x 50 Phillips pan head screw into the rear of the shell. Guide the screw through the gray plastic spacer and tighten into the float insert.</p>
	<p><u>Step 6</u></p> <p>Turn the LBV over onto its starboard side.</p>
	<p><u>Step 7</u></p> <p>Lower the port shell and bumper frame assembly onto the LBV aligning the forward threaded stud and lip under the shell to back plane as you did with the starboard shell.</p> <p>Note: be careful not to scratch the view port with the center crossbar.</p>
 <p>2 - M4x20</p>	<p><u>Step 8 – Phillips #2 Screwdriver</u></p> <p>Insert and tighten 2 M4x20 Phillips pan head screws into the top of the shell.</p>
 <p>M6 Nut</p>	<p><u>Step 9 – 10mm Socket Head Driver</u></p> <p>Screw on the 10mm hex nut onto the threaded stud at the front of the shell.</p>

 <p>M4x10</p>	<p><u>Step 10 – Phillips #2 Screwdriver</u></p> <p>Insert and tighten the M4 x 10 Phillips pan head screw into the rear of the shell.</p>
 <p>2 - M5 x 12</p>	<p><u>Step 11 – Phillips #2 Screwdriver</u></p> <p>Insert and tighten the 2 M5 x 12 button head screws securing the crossbar to the port bumper frame rail.</p> <p>Note: careful not to over tighten.</p>
	<p>Procedure Complete</p>