



# Liberty Sidemount

## **MANUAL**

# Content

- Introduction** . . . . . 2
- Use of this manual** . . . . . 2
  - Responsibility of the Liberty Sidemount user . . . . . 2
  - Notice . . . . . 3
- System of documentation** . . . . . 3
  - Version . . . . . 3
  - Technical guidelines . . . . . 3
  - Update of printed documentation . . . . . 3
  - User support . . . . . 3
  - Use . . . . . 3
- Description** . . . . . 4
  - Conversion . . . . . 4
  - Carrier . . . . . 6
  - Cylinders . . . . . 6
  - Valves . . . . . 6
  - First stages . . . . . 6
  - Counterlungs . . . . . 7
  - Scrubber . . . . . 7
  - Water trap . . . . . 8
  - Manual addition valves . . . . . 8
  - ADV . . . . . 9
  - ADV isolator . . . . . 9
  - HUD . . . . . 9
  - Handsets . . . . . 9
- Assembling** . . . . . 10
- Setting the diver's harness** . . . . . 18
- Fastening to a diver's body** . . . . . 19
- Individual adjustments of breathing hoses** . . . . . 19
- Setting procedure** . . . . . 19
- Maintenance** . . . . . 20



# Introduction

## Use of this manual

This is the Liberty Sidemount rebreather manual. The manual only deals with the specifics of the sidemount version of Liberty and is only a manual supplementing the basic functions and controls described in the Liberty main manual. Operation of bailout rebreather mode features is described in the stand-alone Bailout standby mode manual.

**To understand the full functionality of the device, read the CCR Liberty main manual.**

The Liberty Sidemount is intended for use exclusively by a trained person who is capable of fully understanding the instructions contained in this manual or is in the process of training with the Liberty Sidemount in a course accredited by the manufacturer. The initial requirements of such a training course include qualification for diving with trimix recognized by a training agency and sufficient experience with technical diving.

## Responsibility of the Liberty Sidemount user

Strong emphasis was placed on reliability during the development of the CCR Liberty Sidemount. Individual internal parts are separated in order to minimize the impact that failure of a given part may have on the rebreather's basic functionality. A number of systems have multiple backups. The logic of the Liberty Sidemount's control never prohibits the start of a dive even in the event that malfunctions are detected; it only indicates the status if able to do so in light of the damage. When cave diving, the inability to submerge can mean not being able to return from a dive; therefore, the Liberty Sidemount does not impede submersion.

The user must always decide responsibly whether he/she switches to a backup apparatus or even starts a dive with a partially malfunctioning rebreather.

A Liberty Sidemount user must accept the fact that diving involves risk. Following everything that the user has learned in the Liberty Sidemount's technical documentation and in training on diving with this rebreather can reduce the risk but cannot eliminate it. Safety when diving is further improved by regular training, methodical education and following good diving practices. Diving with a rebreather requires a far higher degree of carefulness and discipline than diving with an open-circuit apparatus.

If you do not accept the risk and you are not a trained, careful and disciplined diver, do not dive with the Liberty Sidemount.

The manufacturer does not bear any responsibility for use of the Liberty Sidemount if the apparatus has been modified in any way that is not stated in this manual or in the technical guidelines issued by the manufacturer.

### **Notice**

The Liberty Sidemount is not a buoyancy compensator, nor a harness for attaching the device to the diver's body.

## **System of documentation**

### **Version**

The technical documentation is subjected to a process of continual development and improvement. Therefore, please regularly check the website at [www.CCRLiberty.com](http://www.CCRLiberty.com) for updates.

### **Technical guidelines**

The manufacturer can issue technical guidelines. It is strongly recommended that the user regularly checks [www.CCRLiberty.com](http://www.CCRLiberty.com) for new guidelines. Registered users will receive notifications by e-mail.

### **Update of printed documentation**

The electronic form of the manual is always available in its complete, updated form.

The electronic and printed forms of the manual may not be completely identical. In case of insignificant changes (correction of minor typing errors, for example), only the electronic version is updated.

### **User support**

Registered users are entitled to technical support. The extent of free support can be limited.

The technical support department at Liberty systems s.r.o. will provide limited support for potential and unregistered users. Prior to submitting a question, please familiarize yourself with the general principles of rebreather diving with trimix and the freely available CCR Liberty technical documentation.

### **Use**

Sidemount Liberty Rebreather is a modification of the original Liberty Rebreather. Liberty Sidemount retains the complete head of the device including electronics, handsets and all sensors. However, the device configuration is designed to be worn on the side. This allows the device to be used in low-ceiling areas such as caves or wrecks



## Description

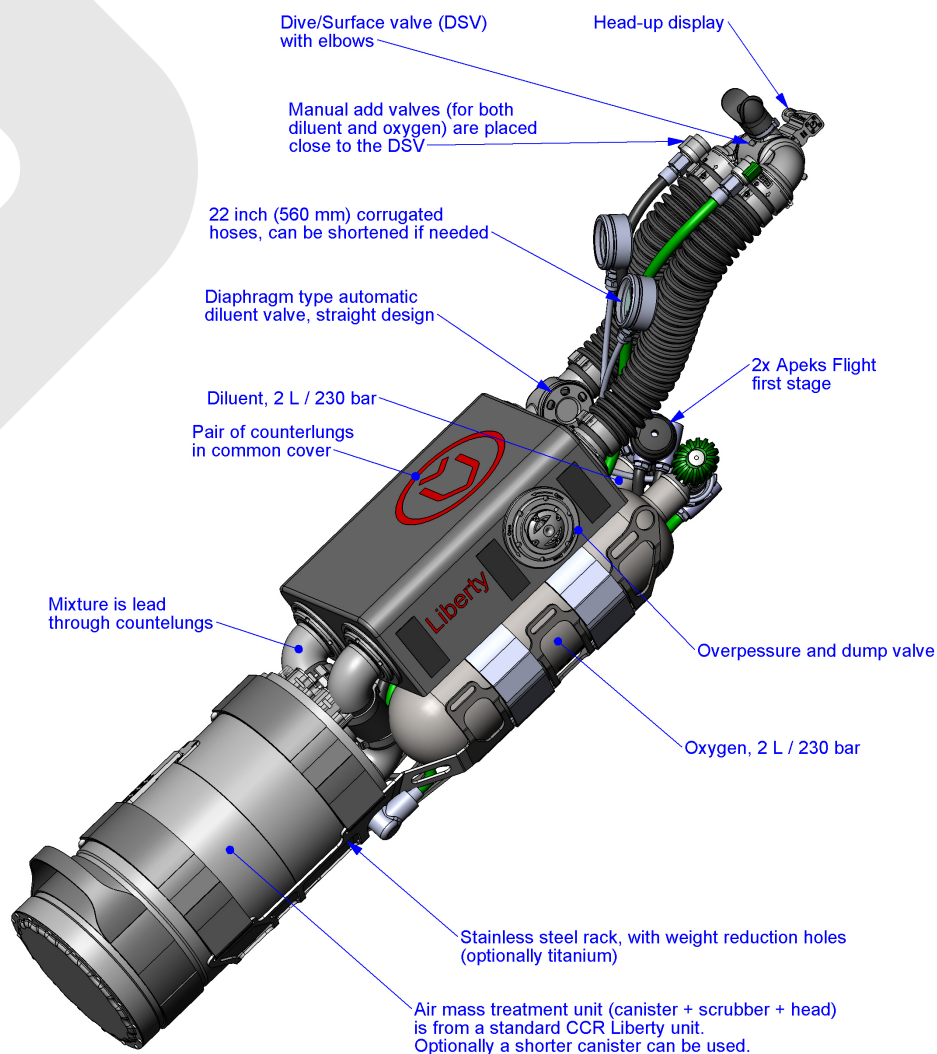
Liberty Sidemount can be used in a number of different configurations consisting of mutually compatible parts. The device's own configuration can be created in the online configurator <https://ccrliberty.com/configurator>.

## Conversion

Liberty Sidemount is compatible with the standard CCR Liberty , so it's possible to convert CCR Liberty to Liberty Sidemount using a conversion kit. The conversion kit includes Titanium rack, counterlungs, connecting hoses, all medium pressure and high pressure hoses, breathing hoses, mouthpiece, manual valves, pressure gauges, first stages, 2 litre cylinders, valves, OPV and HUD with longer cable.

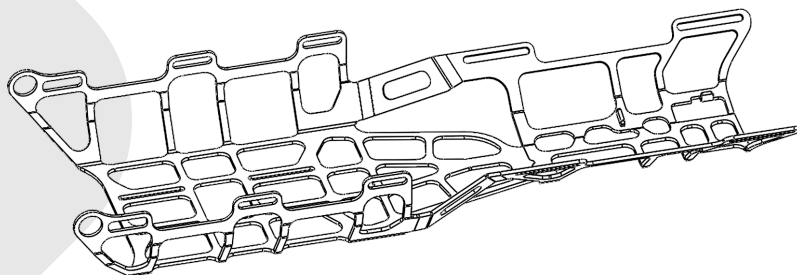
The head including the handset and the buddy display, canister and scrubber are used from the back-mounted device. Alternatively, it is possible to replace the scrubber with a canister for a shortened version. This version is not a standard part of the conversion kit, and needs to be requested separately.

By purchasing the conversion kit to the back unit, Liberty Sidemount can be rebuilt to classic CCR Liberty.



Sidemount CCR is based on CCR Liberty (used air mass treatment unit, electronic systems, DSV, valves, fittings and some others parts).

## Carrier



The unit carrier is an open structure designed to connect and carry the individual parts of the device. Design is made of titanium and relieve cut-outs in order to achieve neutral buoyancy. At the front of the carrier there are anchors on both sides for attaching a carabiner, in the area where the pressure cylinders are fastened are points for securing the counterlungs. The straps for fastening the head and the canister can be found in the back of the unit. The carrier also allows for optimal routing of the high and middle pressure hoses.

## Cylinders

Two-litre steel or aluminium (US) bottles with a working pressure of 200 bar.

## Valves

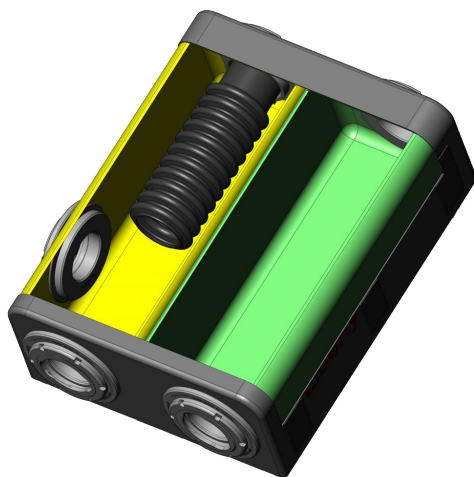


High-quality valves for diluent (black knob) and oxygen (green knob). In the US, the valves are equipped with a burst disc.

## First stages

The first stage Apeks Flight are used to achieve a minimum weight. The first stages are fitted with overpressure valves.

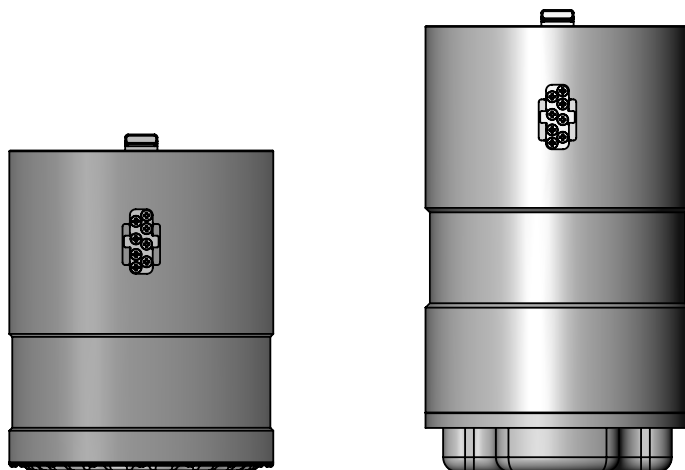
## Counterlungs



Both counterlungs (inhalation and exhalation) are located in one protective package. The exhalation lung is equipped with a water trap to prevent ingress of water into the head and scrubber. On the side of the exhalation lung is located the overpressure valve (OPV).

The overpressure valve is provided with a pulling cord. The valve diaphragm prevents ingress of water when the valve is opened.

## Scrubber



Two types of scrubbers can be used for Liberty Sidemount – standard and short. The standard scrubber is identical to the CCR Liberty scrubber. A shortened scrubber results in 8 cm shorter unit length, which improves the overall manoeuvrability of the device.

A shortened scrubber is more difficult to fill with sorbent, and user caution and precision is required, since the maximum and minimum sorbent levels are very close together.

The shortening of the canister was achieved by densifying the inner space of the canister. This has a negative impact on the device's buoyancy.

**ATTENTION!** The shortened canister and scrubber is not compatible with the standard canister and scrubber and the parts must not be interchanged.

### **Water trap**

The water trap of the shortened scrubber is solved by a sponge at the bottom of the device. Before the dive, it is necessary to check if the sponge is dry. With a standard scrubber, the water trap does not change.

### **Manual addition valves**



Manual addition valves for oxygen and diluent are placed next to the mouthpiece for better ergonomics and intuitive control. The MAV of oxygen has limited flow to prevent high dose of oxygen at depth.



## ADV



The device is equipped with a 2nd-stage underpressure ADV. The ADV is placed on the inhaler hose just behind the counterlung. This position with respect to the position of the lungs guarantees ideal gas dosing during descent or whenever the loop volume is too small.

### ADV isolator

Only when requested. The ADV isolator is only available on request for devices that will be used as primary devices. Installing the isolator onto a device that is to be used as a backup rebreather is not recommended for the risk of its accidental closure. Closed ADV during descent can cause an underpressure in the loop, which can result in catastrophic flooding of the device, or damage vital parts of the rebreather. In the event of an inhalation attempt, the device in negative pressure can rapidly suck air from the lungs, resulting in a stressful situation, which may end up in a potentially fatal scenario.

### HUD

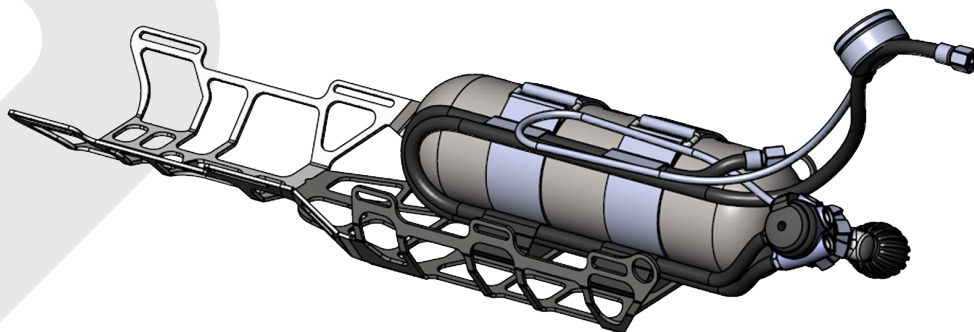
The Head-up Display is the same as CCR Liberty, only difference is an extended cable to loop around longer breathing hoses.

### Handsets

Sidemount Liberty uses the same handsets as CCR Liberty. The unused handset should be placed under the rubber bungee on the body of the device or you can alternatively replace the handset with the supplied connector plug

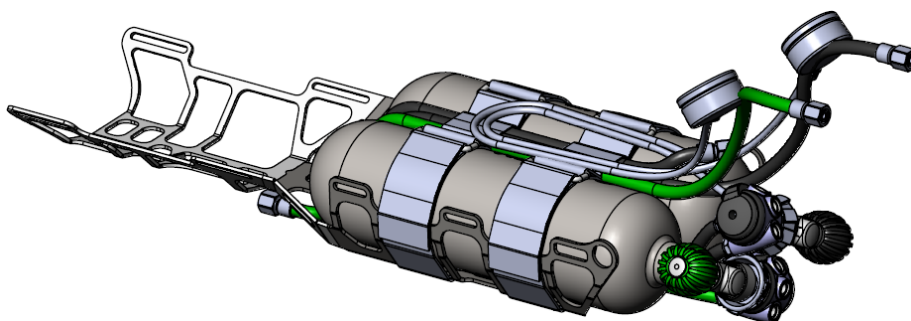
## Assembling

### 1. DIL cylinder – fitted on left side



Place the diluent cylinder on the left side of the titanium carrier and fasten the velcro straps. The valve spindle must be sloping downwards. The position of the bottles can be later adjusted with respect to the position of the head of the instrument. Already at this stage, it is necessary to ensure proper hose routing. The hoses lead from the first stages to the bottom of the titanium carrier whilst being secured with velcro fasteners in the middle. It comes back around the top of the bottles, again fastened with velcro strips.

### 2. O<sub>2</sub> cylinder – fitted on right side



Attach the oxygen cylinder to the right side of the titanium carrier. The valve spindle must slope upwards. Always pay attention to the precise routing of medium pressure and high pressure hoses.

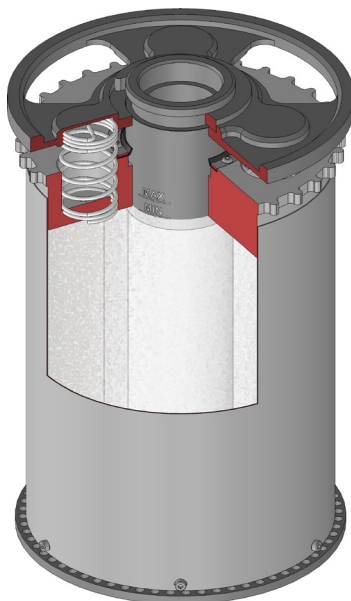
### 3. Attach the first stages to the valves

ATTENTION! this step is critical: When attaching the first stages, make sure that the oxygen first stage is mounted onto the oxygen bottle and the diluent first stage is mounted onto the diluent bottle.

#### **4. Water trap installed on the bottom of the scrubber canister**

Ensure that a water trap is present. In the standard scrubber, this is a plastic part that is fitted with an O-ring. For a shortened version of the scrubber, the water trap is designed with a sponge on the bottom of the canister. In this case, it is necessary to check whether the sponge is sufficiently dry to absorb the condensate during the dive.

#### **5. Scrubber well packed with Sofnolime 797 and scrubber residual time is sufficient for planned dive**



Correct filling of the absorber is described in the CCR Liberty Manual. The procedure does not change. The difference is only for the shortened version of the scrubber, where there is very little difference between the maximum and minimum sorbent levels. Always shake the sorbent properly and always check that the scrubber level has not receded below the minimum mark.

#### **6. Scrubber (filled with Sofnolime 797) is installed inside the canister**

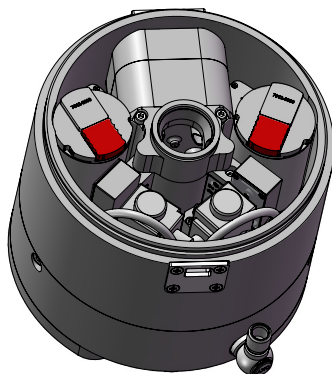
Put the scrubber into the canister so that it sits on the water trap

#### **7. Head O-ring well lubed, clean and not damaged**

Check the O-rings on the head, both outside and inside (on the start of the inhale tube). These two O-rings are essential for the watertightness and safe operation of the device. O-rings must not show signs of damage, wear or dirt. Insufficiently lubricated O-rings make it difficult to attach the head to the canister, this can cause O-ring damage and consequent leakage. If the fault is found, replace the O-ring immediately. Do not start the dive if the O-ring is not replaced

by a new one, adequately lubricated with silicone grease. In the case of dirty O-rings, carefully remove the O-rings by gently pressing the O-ring on the sides. Wipe the O-ring with a paper towel and also wipe the O-ring groove carefully to get rid of any residue. Re-lubricate the O-ring and return it to the groove.

#### 8. Safety plugs (jumpers) connected to batteries



#### 9. Head fits easily to canister – no visible gap between head and the canister



Attach the head to the canister by first inserting the wider opening of the lock on the head of the canister lock lever. Push the head of with your hand so that there is no visible gap between the head and the canister.

### 10. Oxygen sensors calibrated

Calibrate the sensors according to the instructions in the main manual. Calibration is a crucial step. Do not dive if you are not sure that the device is properly calibrated.

An uncalibrated device may cause serious injury or death.

### 11. Short head connection hoses between head and counter lungs V-shape connected.



Connect the short connecting hose with the elbows to the head. The elbows are marked by location:

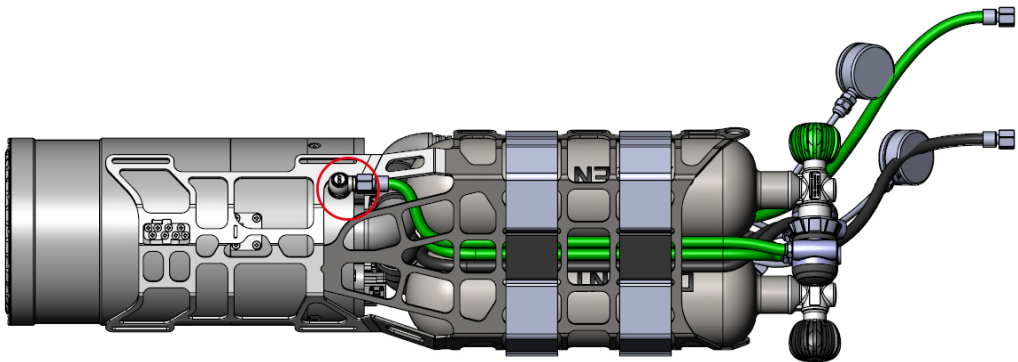
H – Center

H – Rim

The mark C is for the counterlung side.

Insert the bayonets into the appropriate holes and rotate to lock them in position. The hoses should be holding a V. The order in which the hoses are assembled does not matter.

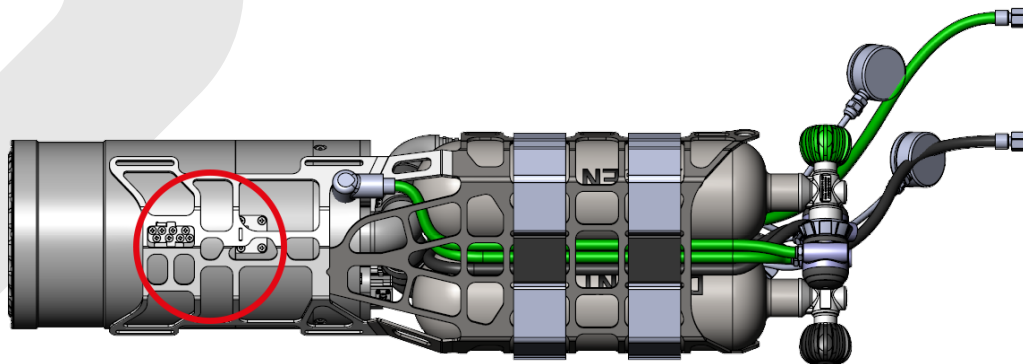
### 12. Oxygen supply hose connected to head





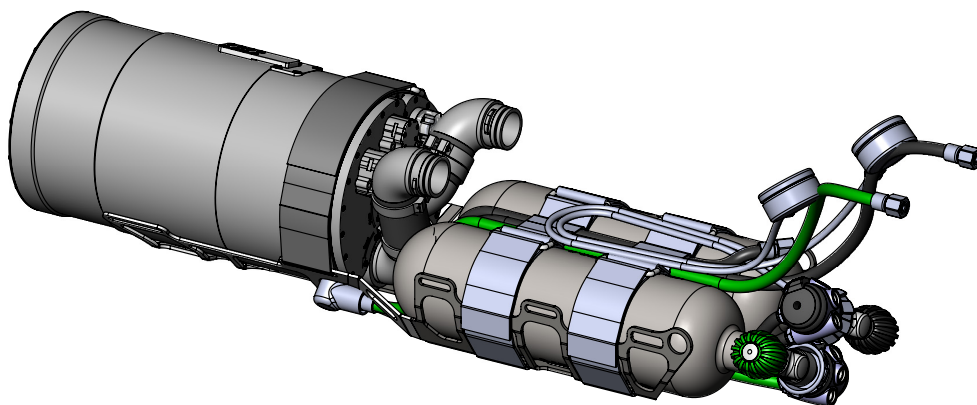
Put the head onto the titanium bracket and screw the medium pressure hose connection to the banjo thread on the head of the unit. Cover the banjo with a plastic cap attached to the hose. Before using for the first time, it is advisable to stretch the cap slightly with your fingers.

### 13. Locks on the head and scrubber are secured with pins on the frame



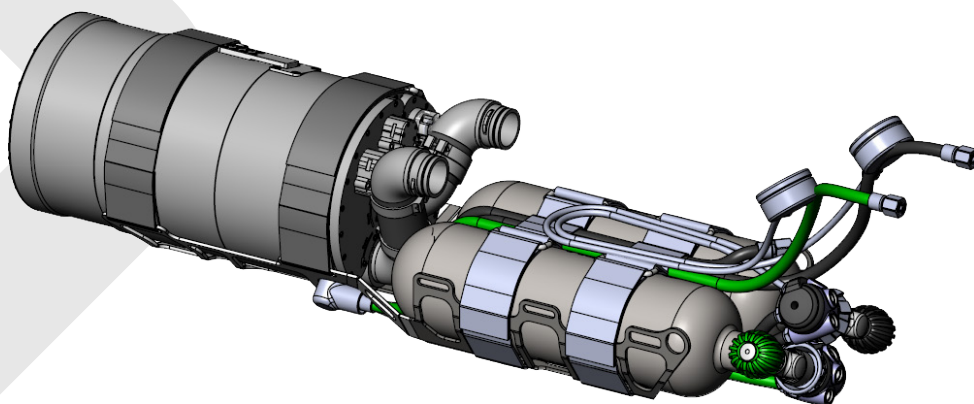
Place the body of the rebreather in the carrier so that both pins on the carrier fit into the openings of the head and the canister. **This step is crucial. For safety reasons, It is necessary to carefully check that both pins fit into both holes and the head is secured against disconnection. Disconnecting the head and the canister will cause fatal flooding.**

### 14. Head strap tightened



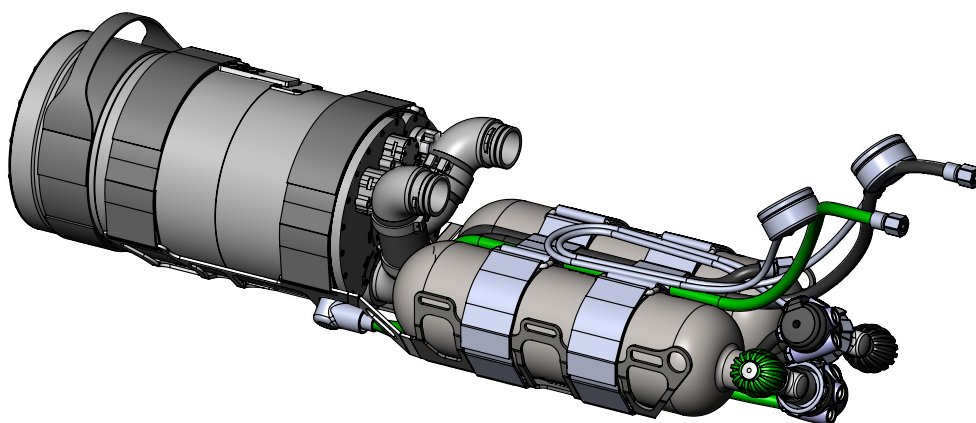
Lead the strap through the holes and tighten it

#### 15. Scrubber can strap tightened



Lead the strap through the holes and tighten it well. Re-check if the lock and pins on the carrier were not dislocated when the straps were being manipulated with.

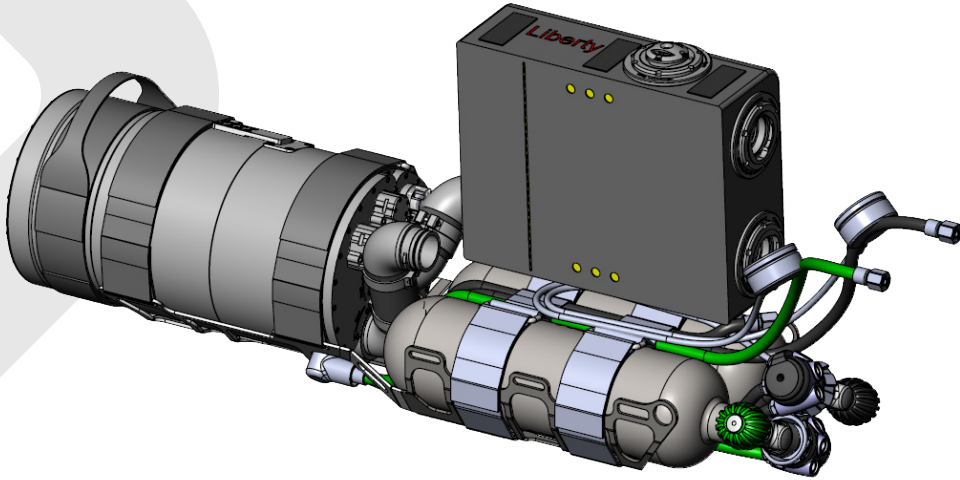
#### 16. Scrubber handle fitted



Fasten the handle into the recess on the canister. The handle is only for surface manipulation and can be removed just before the dive.

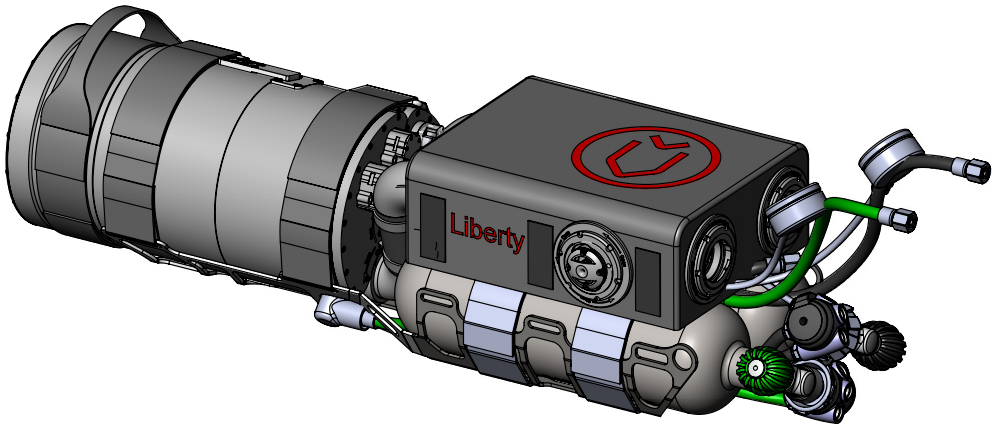
#### 17. HUD and Handset cables routed through the center of the rig beneath the lungs

#### 18. Counterlungs connected to short connection hoses



First place the counterlungs on their side so that the OPV is up and towards the front. Connect the left short hose to the bottom port of the counterlung. Tilt the counterlung to the right so that the OPV is on the right and the embroidered logo is at the top. Attach the second hose (it is necessary to turn the port slightly away from you).

#### 19. Counterlungs attached to the frame with all Velcro straps



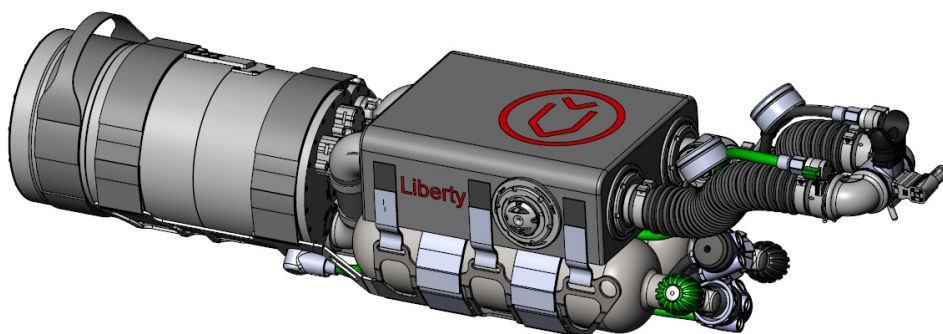
## 20. OPV connected on the right side

## 21. Corrugated hoses mushroom valve directional flow test

Place the mouthpiece in your mouth and open it. Close the inhalation end of the hose with the supplied plug. Inhale from the hose so that the hose contracts. Leave the mouthpiece open and observe if the hose does not expand. Put the mouthpiece to your ear to make sure you do not hear the passing air. If everything is OK, put the cap on the exhalation end of the hose and exhale until the hose is stretched. Do not close the mouthpiece and observe if the hose does not contract again. Put the mouthpiece back to your ear again to listen for passing air. This test is very important. Damaged or leaking mouthpiece can cause serious injury or death.

## 22. Corrugated hoses well connected

Connect each hose to the neck of its counterlung.



## 23. ADV connected to LP DIL

Connect the medium pressure diluent hose to the ADV. If you have an ADV isolator installed, make sure the isolator is open.

**Warning:** Using ADV Isolator (shut off valve) when the unit is used as a bailout rebreather is strongly discouraged.

## 24. DIL MAV connected to LP DIL

Lead a medium pressure diluent hose through the rubber band on the breathing hose and connect to diluent MAV.

## 25. O<sub>2</sub> MAV connected to oxygen

Lead a medium pressure diluent hose through the rubber band on the breathing hose and connect to oxygen MAV.

## **26. Fasten manometers under the rubber bandage on the breathing hoses**

### **27. DIL valve fully open**

Check and record the diluent pressure.

### **28. O<sub>2</sub> valve fully open**

Check and record the oxygen pressure

### **29. ADV, O<sub>2</sub> and diluent buttons are feeding and do not leak**

Gradually squeeze the ADV, Oxygen and diluent MAVs to determine if they dose gas and do not leak.

### **30. HUD connected to DSV**

Thread the HUD cable along the right breathing hose and slide it into the mouthpiece groove. The HUD can be secured by moving the metal hooks of the snap rings to prevent accidental disconnects of the HUD.

### **31. Pre-dive check done with no failure**

Perform a complete Pre-dive check and prebreathing as instructed in the main manual.

## **Setting the diver's harness**

Harness or buoyancy compensator is not a part of the Liberty Sidemount. We recommend selecting a reliable harness that allows a comfortable fitting of the device to the diver's body and a compensator with sufficient capacity to cover the loss of buoyancy in case of catastrophic flooding of the device.

The device can be attached to both the left and right sides of the diver's body according to the diver's preference. The right-hand configuration is more advantageous because the open circuit bailout remains on the left, as is common with most divers. Furthermore, the OPV is also on the outside, thanks to which it is better controlled by the right hand. The assembly on the left side is better for flushing water out of counterlungs.

For right-hand mounting:

1. Attach the carabiner to the left front of the carrier as close as possible, without unnecessary slack.
2. Attach the carabiner to the left side of the head strap, pointing towards the counterlung.
3. Adjust the rubber bungee on the harness to firmly attach the device to the diver's body.



## **Fastening to a diver's body**

The device works best if it is totally parallel to the diver's body in the horizontal position and has very little or no side diversion. For this purpose, a Sidemount harness with a firm lumbar shoulder strap has to be perfectly adjusted.

1. Attach the carabiner on the side strap to the harness.
2. Attach the carabiner on the left front of the carrier to the chest d-ring.
3. Drag the rubber bungee through the oxygen valve so that the bungee does not limit the control of the oxygen valve in any way.

Test the instrument in the trim position. If the device is not perfectly parallel to the diver's body, it is possible to adjust the position by moving the carabiner on the head strap, by moving the D-ring on the harness on the lumbar strap (usually it is too far back) and adjusting the force of the rubber bungee of the harness.

## **Individual adjustments of breathing hoses**

The hoses are deliberately delivered somewhat longer than needed to allow the diver to adapt the length of one or the other hose to a shape that allows the diver to hold the mouthpiece freely.

## **Setting procedure**

Place two or three tight loops of rubber bungee on the breathing hose of the unit. Place the instrument on the edge of the table so that you can indicate the trim position next to it. Put the mouthpiece in your mouth and move the hoses towards each other so that you can easily hold the mouthpiece in the mouth without resistance. For gentler tuning, loosen the rubber hose clamping rings at the elbows and rotate the hoses to the desired position. After setting the hose position, tighten the screws again.

By moving the hoses in the rubber loops, an asymmetry of the length of the breathing hoses results in a small loop. Longer the hose can be shortened (approximately 3 rings). Shorten the hose carefully, preferably by small margins from the counterlung side. First, however, with a set hose, make several dives to verify that the hose settings suit you. To reassemble the hose, use the supplied narrow snap ring which can be placed between the individual wraps.

## **Maintenance**

After each dive in salty or polluted water, the device must be washed with clean, fresh water.

After each day of diving, disassemble the device.

For dismantling, use the reverse assembly procedure. The breathing hoses are secured against release. It is first necessary to push towards the counterlungs until it is possible to rotate the bayonet neck and release the hose.

Put caps on the MAV and ADV connectors and disinfect the entire loop, including the counterlungs, and rinse with drinking water. Let it dry in a shady, well-ventilated place.

Treat the head of the device as shown in the main manual.



# **LIBERTY SIDEMOUNT USER MANUAL**

Date of issue: 12 March 2019; rev. 2.0

CU HW rev.1.4, HS HW rev. 3.0, FW 2.11

Author: Jakub Šimánek

Published by Liberty systems s.r.o., [CCRLiberty.com](http://CCRLiberty.com)