Leak Sentinel™ V5 XB

Pre–dive and dive leak detection system for underwater camera housings with

TEMPERATURE COMPENSATION
LOW BATTERY INDICATION
OVERNIGHT FUNCTION
RESET FUNCTION



USER MANUAL

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Thank you for choosing **Leak Sentinel V5 XB**, the premier pre-dive vacuum leak detection system for underwater camera housings.

Please read this manual carefully before installing and using the Leak Sentinel V5 XB

1. Safety precautions

Never dive or immerse the housing in any water without the protective cap. The rubber valve is not watertight and serves only to hold the vacuum during the evacuating process. Diving or immersing the housing without the protective cap will result in flood and/or damage to your housing, camera and Leak Sentinel. Replace the protective cap immediately after acheiving pre-dive testing vacuum.

Follow the standard pre-dive testing procedure immediately after installation to confirm there is no leak. All units are tested thoroughly prior to shipping. In case your test shows there is a leak, re-check the seal between the Leak Sentinel and the housing. It is the sole responsibility of the user to ensure the tightness between the Leak Sentinel and the housing. Vivid Housings will not be held responsible for any damage that may result from the faulty installation and/or use of the product. If a problem persists, please do not use the product and contact the manufacturer.

When screwing or unscrewing the protective cap and/or pump cap, always hold the valve body with the opposite hand to ensure the housing body does not turn, loosening it from the camera housing. A loose Leak Sentinel housing can cause a camera housing to leak.
It is not advisable to dive without a negative vacuum on the camera housing with the Leak Sentinel installed. While diving with a negative vacuum on the housing should not result in any damage, it is advised to always test the water-tightness of the housing and Leak Sentinel prior to diving. After all, peace of mind, knowing the camera housing is secure, is the reason for installing the Leak Sentinel in the first place. One should plan the dive so there is time for pre-dive testing by performing the pre-dive procedures listed below in Section 4. It may also be noted that many leaks occur in the rinse tank; this is because the o-rings seal better under pressure and there is very little water pressure in a rinse tank.

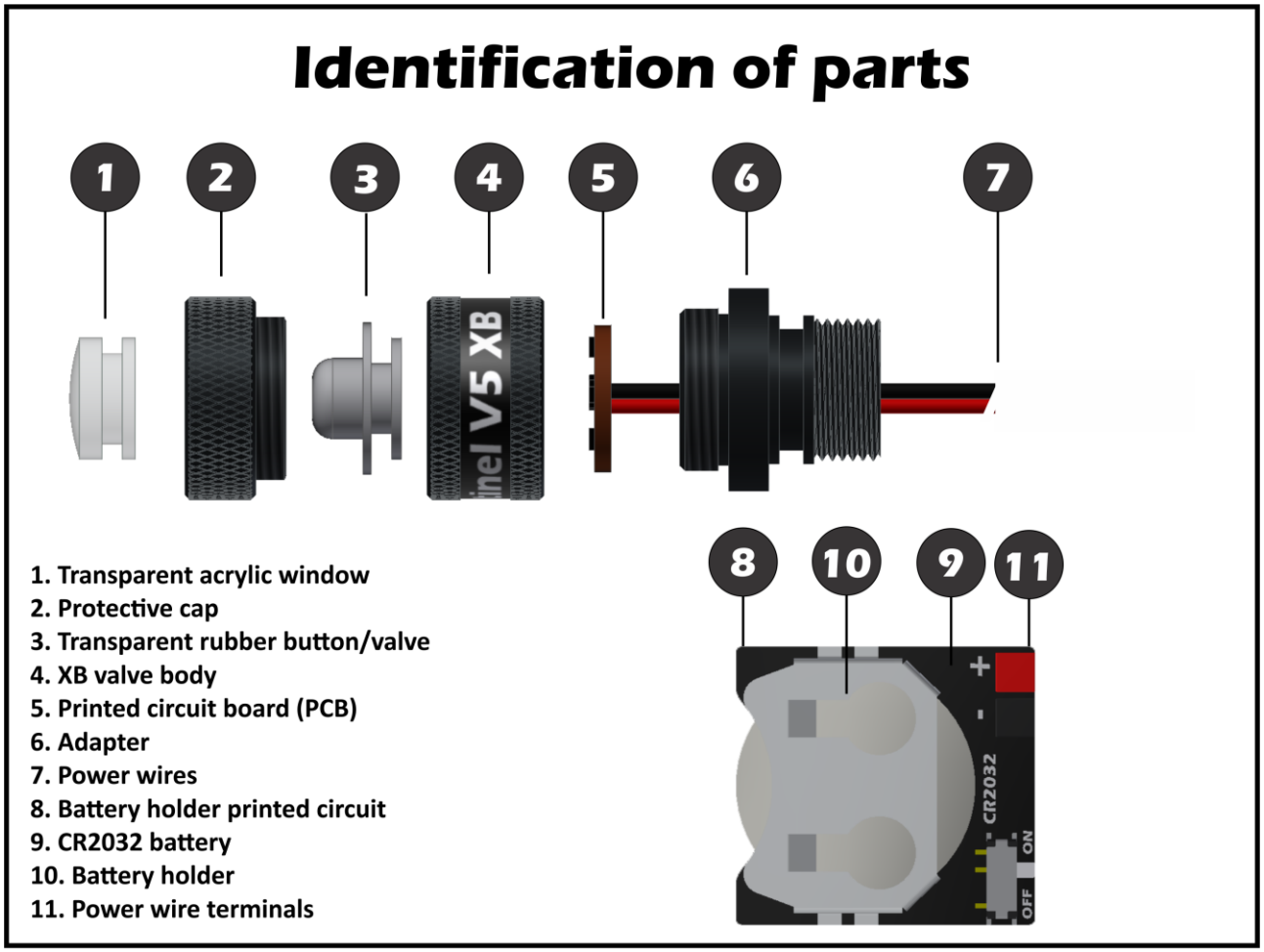
The vacuum causes additional pressure on the o-rings which will help prevent rinse tank floods.

Always perform any test procedures in a dry place. The rubber valve that is pressed to switch the Leak Sentinel on and off, as well as release the vacuum is not watertight. Any water inside the unit could damage the circuit. Activate the unit and create a vacuum before boarding small boats. The power consumption of the circuit is minimal and the battery capacity is sufficient for many hours, so there is no need to risk getting the inside of the unit wet by trying to conserve battery power, especially as the CR2032 battery has almost twice the capacity of the batteries used in previous models, which also means the number of dives with one battery is doubled in comparison with previous models.

Dry the outside of the device thoroughly after the dive, remove the protective cap and make sure there is no water around the valve before attempting to equalize the pressure! If there is even a small droplet of water left near the valve, it will be sucked into the device and onto the circuit board, which may damage the components and render the device unusable.

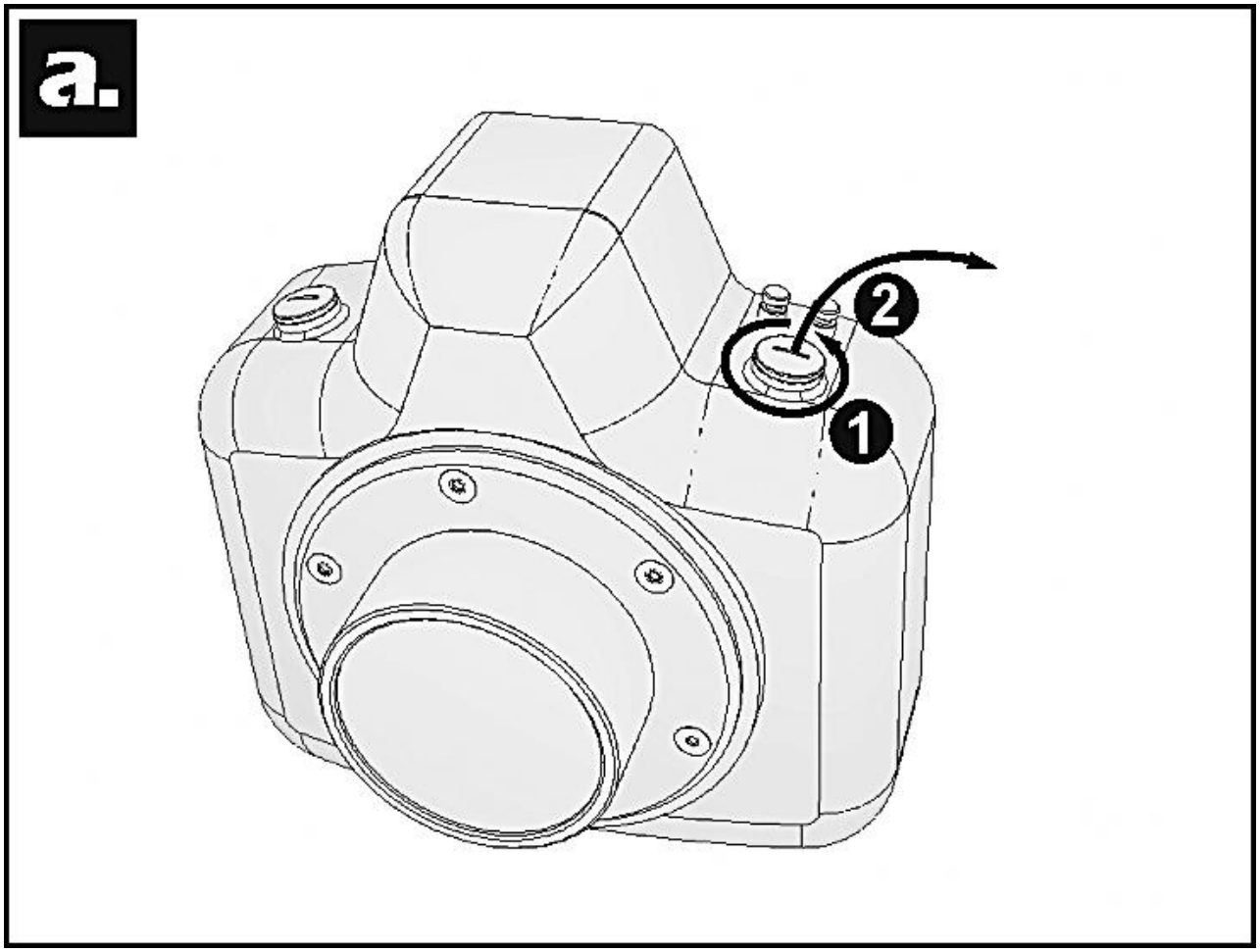
2. Warranty

Vivid Housings will repair or replace at it's option any product that proves to be defective in construction or materials within one year from the date of purchase.
Vivid Housing is not liable for damage to the equipment caused by leakage of water into the housing, nor for loss of data or income that may result from such leakage, or any accident during which Leak Sentinel was in use.
This warranty is void in case of negligent handling of the Leak Sentinel including, but not limited to, physical damage, immersion of the unprotected electronic circuit in water, modifications by other than the manufacturer and improper care.
There is no express or implied warranty, except as stated above.
The buyer understands and agrees that, because of the nature of this product, he/she uses Leak Sentinel at his/her own risk and agrees to hold Vivid Housing harmless, except as stated above.

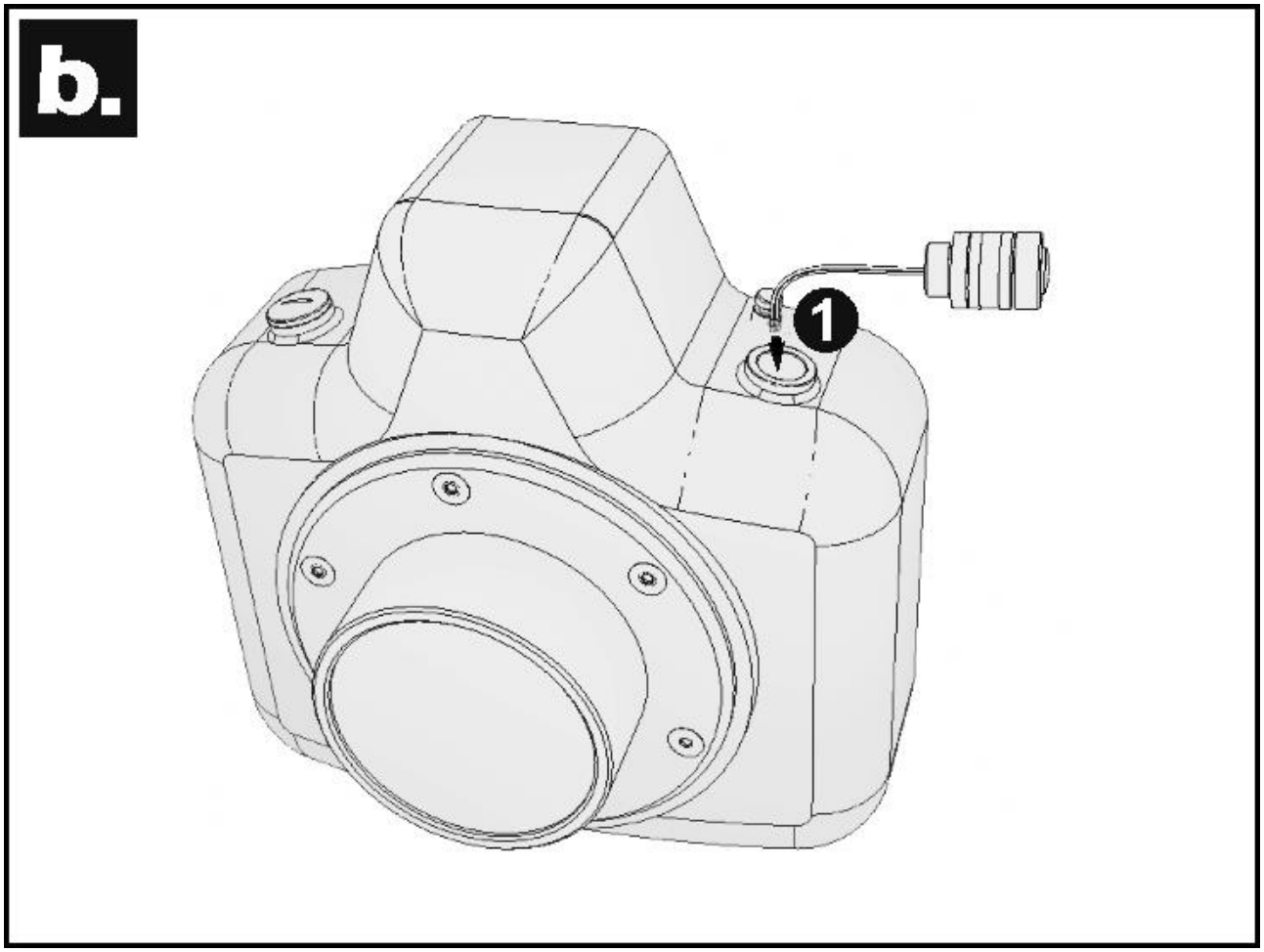


3. Installation

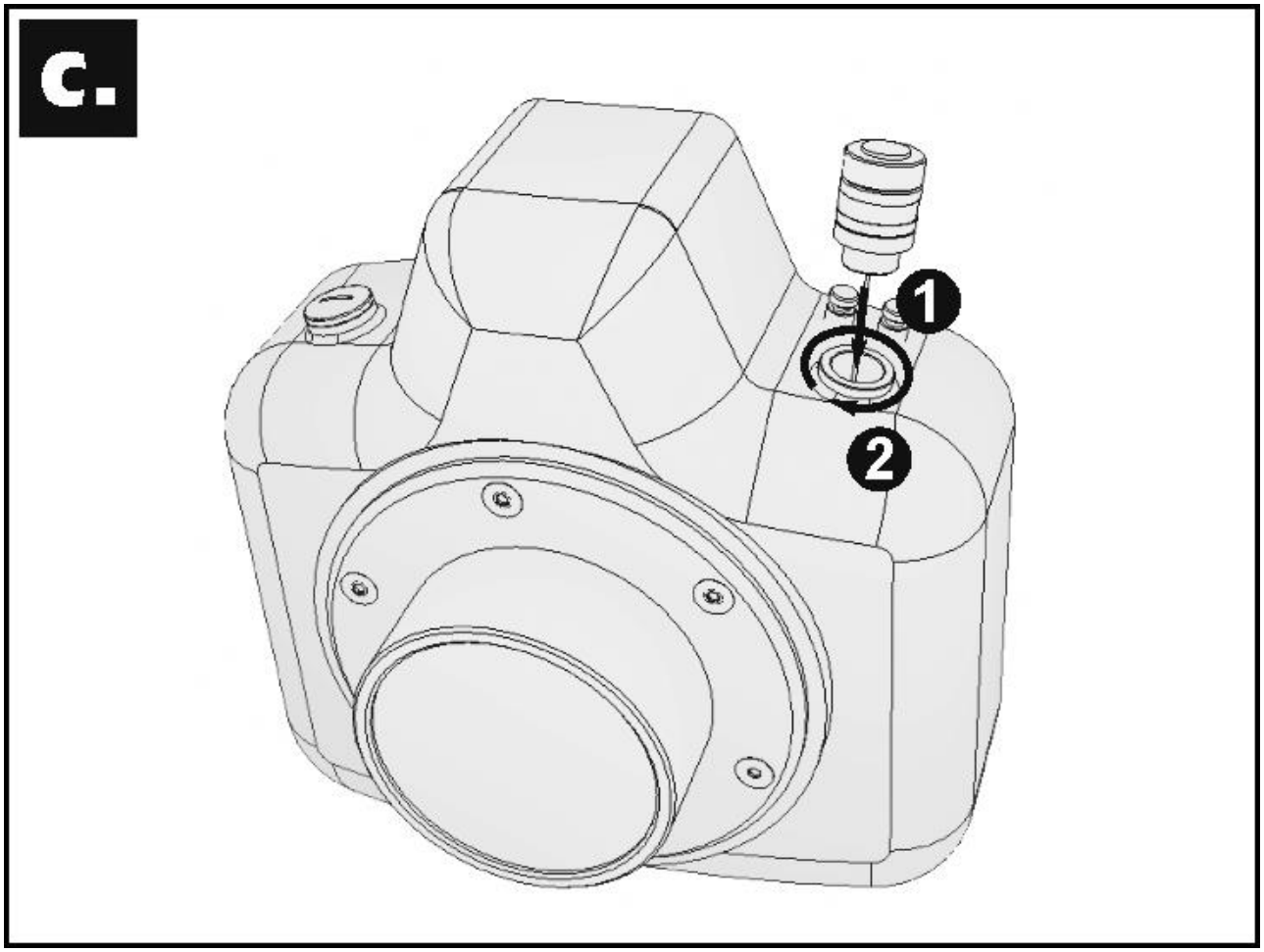
Before installation and operation of your Leak Sentinel, please familiarize yourself with the parts by referencing the figure above!
Do not disassemble the valve body and the adapter – there are no user serviceable parts inside the valve body and opening the compartment may result in the damage to the circuit. The installation procedure depends on the type of adapter and camera housing. In general, the steps are as follows:



a. Depending on your housing type, remove the lid from the accessory port (Nauticam, Aquatica, Isotta, Hugyfot, Seacam, Nexus, Subal etc.), the bulkhead cap (Sea&Sea), the control gland (Ikelite) or the bulkhead itself (Sea&Sea etc.).



b. Push the cable attached to the device through the accessory port from the outside.



c. In case of installing into a threaded port, screw the adapter into the accessory port and tighten snugly by hand, using more force than you would to screw the protective cap, but not so much as to break anything. In case of non – threaded ports, consult your housing's manual for details about installing and removing port attachments. Also see the Appendix 1 at the end of this manual.



d. Find the appropriate place for battery board installation. If possible, choose a spot on the same side as the accessory port so that the cables don't get in the way of camera and/or other equipment. Also try to avoid installing the holder directly at the bottom of the housing if not absolutely necessary, to keep the battery dry in case of spillage etc. If there is no other option, adding an absorbent soldering cleaning pad between the board and the housing bottom might help keep the battery dry. If necessary, trim the excess wires with sharp scissors, wire cutters or similar tool. DO NOT STRIP THE INSULATION FROM THE WIRE ENDS!

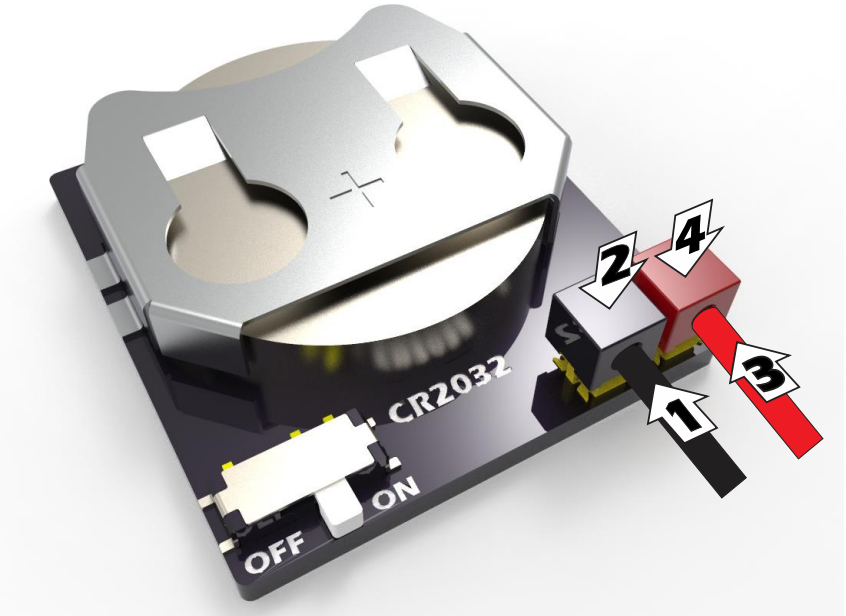
1. Push the black wire into the hole on the plastic lid on the (-) terminal. Keep pushing until the wire hits the back wall (about 3mm).

2. Put the board on the flat hard surface and press the lid downwards until it almost touches the board, to obtain good electrical and mechanical contact. You can use some hard flat object of pushing with finger is too hard.

3. Push the red wire into the hole on the plastic lid on the (+) terminal. Keep pushing until the wire hits the back wall (about 3mm).

4. Put the board on the flat hard surface and press the lid downwards until it almost touches the board, to obtain good electrical and mechanical contact. You can use some hard flat object of pushing with finger is too hard.

5. To preserve the battery, push the switch on the battery board to OFF position after use, and especially if the device will not be used for a longer periods of time.



4. Pre-Dive Procedures and Operation

1. Remove the protective cap by unscrewing the cap in a counter-clockwise motion, being sure to hold the Leak Sentinel body to avoid loosening the Leak Sentinel from the camera housing.
2. Gently press the translucent button on the rubber valve in a downward motion, until the switch clicks, which can be felt by the finger.
3. The red LED will give one long blink, then will start blinking steadily, indicating the circuit is active. At this time, ambient pressure is measured and memorized by the unit.
4. Detach the tubing from the pump cap. Screw the pump cap into the valve body. Attach the tubing back to the pump cap.
5. Start pumping by pulling in and out on the pump handle, or by simply pressing the pump's ON button in case you are using the Leak Sentinel electric pump.The LED should start alternating with a red and green LED light. The red and green alternating LED is indicating that a pressure change is detected and the circuit is active.
6. After the number of strokes needed to achieve the proper vacuum, which depends on the housing volume, the green LED will perform one long blink, then keep blinking steadily. Stop pumping after two consecutive green blinks after the long green blink.
7. Detach the tubing from the pump cap and remove the pump cap.
8. Replace and tighten the protective cap. Be sure the protective cap o-ring is lubricated with a small amount of o-ring grease.
   Now, observe the LED. If the green LED still blinks after 15-20 minutes then no leakage is present and the housing is ready for immersion in water. If the green LED stops blinking and the alternating red-green or red LED starts blinking, there is a leak, so it is not safe for any type of immersion in water. If there is a leak, then a procedure for locating and eliminating the cause of the leak should be followed. Be sure and test the camera housing again with the Leak Sentinel after any repairs are made to the camera housing and/or its o-rings.

9. During the dive, be sure to occasionally observe the LED. If the green LED stops blinking and an alternate red/green or red LED starts blinking, this indicates the rise of internal housing pressure and a possible leak. If there is a possible leak, it is advisable to immediately ascend to minimize the risk of flooding. **Be sure to follow all dive safety procedures when ascending!** It is advisable to point the housing port downwards to cause any water in the housing to flow into the port and away from the camera and housing electronics.

5. Post Dive Procedures

1. After every dive, rinse and dry the valve body along with the camera housing. There is no need to remove the Leak Sentinel from the camera housing to rinse the housing and/or Leak Sentinel. To remove the Leak Sentinel from the housing during rinsing procedures could cause the housing to flood.
2. After thoroughly drying the housing, remove the protective cap.
3. Switch the circuit off, pressing the rubber valve button.
4. Gently move the rubber button sideways to equalize the pressure. You will hear the air hissing into the housing as the pressure within the camera housing equalizes with the outside air pressure. When the air pressure starts to equalize with outside pressure the red LED will start blinking. Be careful not to pull the bottom rubber disc from the other side of the lid; if this happens, remove the upper lid and pull the lower disc through the hole, then reinstall the upper cover.
5. Replace the protective cap, being sure the o-ring is greased and clean of debris.

6. Special functions

- **Temperature compensation**

The Leak Sentinel V5 has temperature compensation. Temperature compensation means that the circuit constantly monitors temperature changes and compensates for the pressure changes accordingly. This feature eliminates the possibility of false alarms in situations where the housing is set up in a cold environment and used in a warmer environment. No user action for this feature is required; this feature is always on when the circuit is active.

- **Overnight function**

The Leak Sentinel V5 offers the possibility of setting up the housing in advance. For instance one might want to set the housing up the night before the dive. To do so, just switch the Leak Sentinel off by pressing the rubber valve on/off button without equalizing the pressure. When the circuit is switched on again, by again pressing the rubber valve on/off button the Leak Sentinel will automatically detect the vacuum, taking the present pressure as a reference and keep monitoring by blinking green after a brief red blink.

- **Low battery indication**

The Leak Sentinel V5 will indicate if the battery is low. If the red LED starts flashing rapidly after the circuit is switched on, the battery should be changed soon since the battery is exhausted and may shortly malfunction. Although it is possible that the battery could last for another hour or two, it is recommended to change the battery as soon as possible.

- **Reset function**

The circuit can be reset at any time by pressing the rubber valve button for more than 3 seconds.

FUNCTION	USER ACTION/DESCRIPTION	LED INDICATION
Start/Power on	Short press on the rubber valve button	1 second red flash>steady red flashing
Low battery	After turning the unit on	1 second red flash>fast red flashing
Pressure change	Pumping/Leak alarm	Alternate red/green flashing
Vacuum hold	Monitoring	Steady green flashing
Reset	Press and hold for 3 seconds	Short green flash>steady red flashing

8. Maintenance

- Do not remove the device from the housing between the dives. The device is designed to stay installed on the housing at all times and should only be removed for servicing reasons, migration to other housing, periodical o-ring changes and similar purposes.

- Do not open the valve body without a good reason, i.e. following the manufacturer's instructions in case of malfunction. There are no user serviceable parts in the valve body and opening it can only cause the damage to the circuit.

- Do not let the housing and the device sit in the sun if it can be avoided.

- Soak and rinse the device in fresh water after every salt water dive. Soak longer if the salt had a chance to dry. Clean the outside of the device with soft cloth, or if more thorough cleaning is required, with a mildly soaped wet cloth or sponge. If cleaned with soap or detergent, rinse off the soap residue after the cleaning. Thoroughly remove any salt and/or dirt residue from the device. The protective cap can be rinsed with fresh water.

- Clean the manual or electric pump with dry or damp cloth. Do not rinse or submerge the pump in water.

- Check the cap o-ring after every dive, clean it and only apply a thin film of silicone grease. There is no need to over-lubricate the o-ring. All the o-rings in the device are made of Nitrile rubber (NBR). Unlike silicone rubber o-rings, NBR o-rings are not prone to swelling, so the type of silicone grease is not critical. Change the o-rings periodically or in case you detect any damage.

- To keep the rubber valve working flawlessly, occasionally lift the silicone flapper valve's upper lip and apply a dab of silicone grease between the lip and metal part of the housing the lip seals against. Rotate the valve pressing lightly downwards to spread the grease evenly. Greasing the valve will ensure a proper seal.

9. Troubleshooting

To remove the threaded adapter from the housing if it cannot be done manually

Locate the left-hand threaded M5 bolt and nut in the product bag.

Remove the printed circuit and the power wires from the adapter.

Push the bolt from the top through the adapter hole and wind the nut from inside. Tighten with Allen wrench (turning in the counterclockwise diredtion) until the nut gains enough traction against the adapter bottom. If necessary, use the wrench or small pliers to hold the nut.

Keep turning the wrench in the same direction to unscrew the adapter completely.

The device won't turn on when the button is pressed

Make sure the power cables are connected and the wire colors match. If not, correct the error and try switching the device on again. Disconnect and reconnect the cables even if the wire colors match.

Make sure the battery is inserted correctly into the battery holder and that the battery's positive (+) side is facing up. Make sure the two positive (+) contacts on the battery holder are above the battery and pressing against the battery's outer edge. See the illustrations in Chapter 7 on "Inserting and replacing the battery".
If the battery is not inserted correctly, remove the battery using the procedures in Chapter 7 and correctly reinsert the battery. After reinserting the battery, try to switch the device on again.

If the battery is inserted in the holder correctly and the Leak Sentinel's LED is not blinking, try using a fresh battery.

If the problem persists, contact your seller for service.

The LED indicator is solid red or flashes alternately red/green upon startup

Try to reset the circuit pressing and holding the button for more than 3 seconds. The device should flash green briefly, then keep on flashing red steadily. See Chapter 6 on »RESET function«.

Disconnect and reconnect the power cables or remove and reinsert the battery to reset the circuit. If the reset was successful, the device should flash green briefly, then keep on flashing red steadily. See Chapter 6. on " RESET function".

If the problem persists, contact your seller for service.

Pumping is difficult, it is hard or impossible to vacuum the housing sufficiently

Check that there are TWO o-rings installed on your pump attachment on top of each other. If one of them is removed or lost, the attachment may press on the rubber valve and block the air flow partially or even completely. Replace the missing o-ring and try pumping again.

If the problem persists, contact your seller for service.

Package includes:

1X Leak Sentinel V5 XB with adapter (valve body with adapter and cable + battery holder with cable)
1X Spare o-ring for protective cap, metric 15X2, NBR 70SH black
1X Spare o-ring for adapter/top side, metric 15X2, NBR 70SH black
4X Transparent plastic disk*

** A transparent disk is attached to the bottom of the rubber valve inside the valve body with silicone grease. The transparent disk facilitates switching the unit on and off. Without the disk, switching the unit on and off could be more difficult. In case the circuit compartment was opened for any reason, please check if the transparent disk is still attached to the valve bottom. In case the transparent disk is missing, replace the disk with one of the spare disks supplied with the Leak Sentinel. The transparent disk sits right below valve bottom. No special procedures are needed to replace the disk. Just drop the transparent disk onto the valve bottom and then close the valve body.*

Appendix 1 – Installation instructions for non – threaded ports

Sea&Sea

Remove the circlip fastener from your bulkhead/lid, remove the bulkhead lid and push the Leak Sentinel adapter through the port, matching the flat cutout. Replace the circlip fastener.

Aquatica

Type 1: Unscrew the jam nut and washer from the bottom of your bulkhead/lid, remove the bulkhead lid and push the Leak sentinel adapter through the port. Replace the jam nut and washer.

Type 2: Remove the retaining o-ring from the bottom of your bulkhead/lid, remove the bulkhead lid and push the Leak Sentinel adapter through the port. Replace the jam nut and washer.

Ikelite

Replacing the 3/8''-24 UNF control gland: Use the small Allen wrench to remove the knob from the control shaft, pull the control shaft out from the inside, and unscrew the control gland from the housing's wall. Follow the installation instructions for threaded ports.

For installation in the 1/2''-20 UNF accessory port: Follow the installation instructions for threaded ports.