



Fantasea Line
**Hybrid Vacuum
Safety System M16C**
(Cat. No. 6619)
Instruction Manual



** Image for illustration purposes only*



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DISCLAIMER

While every effort has been made in order to ensure that the information included in this instruction manual is accurate and complete, no liability will be accepted for any errors or omissions. Fantasea Line reserves the right to change product specifications and features described herein at any time without prior notice. No part of this instruction manual may be copied, translated or reproduced without the prior written permission of Fantasea Line. Fantasea Line makes no warranties aside from limited product warranty as described at the end of this manual.

INTRODUCTION

Important Notices

1. Please read this manual carefully in order to properly install and operate the **Hybrid Vacuum Safety System M16C**. Store this manual in a safe place for further reference once you have read it.
2. **Use of the Hybrid Vacuum Safety System must not replace any of the other safety measures conducted in order to ensure a complete watertight seal of the housing before and during the dive.**

General Information

The **Hybrid Vacuum Safety System M16C** is an optional pre-dive vacuum test and leak detector safety system. The system allows confirming the watertight seal of the housing prior to the dive using the vacuum system and monitoring the housing seal during the dive using the moisture detector.

Compatibility

The **Hybrid Vacuum Safety System M16C** can be installed inside and used with the following housings:

1. Fantasea housings equipped with an M16 port*.
2. Other brands housings equipped with an M16 port, as long as the following requirements are met:
 - a. Housing's M16 port features a thread type that is compatible with the thread type featured on the vacuum valve of the Hybrid Vacuum Safety System M16C.



- b. Housing consists of sufficient internal space to accommodate all vacuum safety system components in a manner that does not interfere with housing operation and allows operating the vacuum safety system. Please refer to the *Features & Specifications* section for components dimensions.
- c. Housing features a transparent area through which the LED indicator of the vacuum safety system can be observed and monitored.

* **Fantasea FA6500 Housings** labeled with a serial number within the range of **187402 – 187617** require installing the *Fantasea M16 Coarse to Fine Thread Insert Converter* on the housing’s M16 port in order to accommodate the Hybrid Vacuum Safety System M16C. Please contact *Fantasea Line* or an authorized Fantasea dealer to order this converter.

Important Notice	Compatibility information provided above consists of general outlines only. Prior to ordering the Hybrid Vacuum Safety System M16C and in order to make sure it is fully compatible with your housing, it is recommended to consult with an authorized Fantasea dealer or to contact <i>Fantasea Line</i> .
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Features & Specifications

- Depth rated to 100 meters / 330 feet
- Vacuum valve material: black anodized aluminum alloy
- Moisture sensor material: flexible printed circuit board
- Battery: 3.7V 110mAh Lithium rechargeable battery
- Charging port: 5V micro-USB
- Charging duration: approx. 45 minutes
- Battery life: approx. 4 days
- Alarm: audio + visual (LED)
- Vacuum analysis duration: 4 minutes
- Dimensions:
 - Vacuum valve – 24 x 35 mm / 0.94 x 1.38 inch (D x L)
 - Main PC board – 28 x 18 x 7 mm / 1.1 x 0.7 x 0.27 inch (L x W x H)
 - Signal board – 30 x 14 x 7 mm / 1.18 x 0.55 x 0.27 inch (L x W x H)
 - Moisture sensor – can be trimmed if required
 - Connection cable – 140 mm / 5.51 inch (long cable) OR 75 mm / 2.95 inch (short cable)
- Weight (including all system components): 30.2 g / 1.06 oz
- Included in package: vacuum valve, vacuum pump, Multi purpose key, double-sided stickers, main PC board, signal board, moisture sensor, Cabled LED indicator, 2 x connection cables

IDENTIFICATION OF PARTS

1. Vacuum pump
2. Rubber fitting for pump
3. Multi purpose key
4. Double-sided stickers
5. Vacuum valve M16C
6. Main PC board
7. Moisture sensor
8. Cabled LED Indicator
9. Long connection cable
10. Signal Board
11. Short connection cable





SYSTEM INSTALLATION

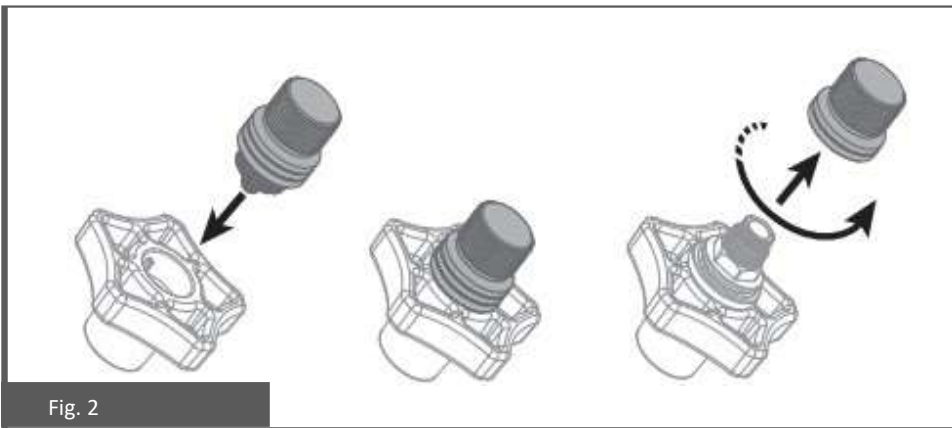
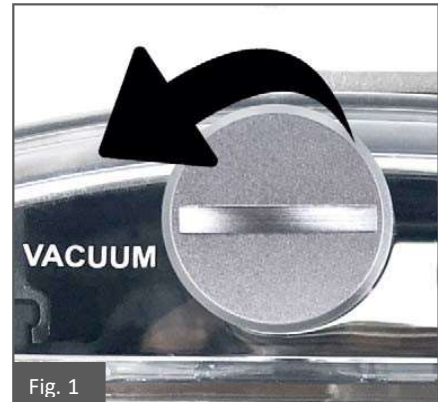
Important Notices

1. If installing the Hybrid Vacuum Safety System M16C inside a Fantasea Housing, please visit the *Fantasea Line* website or contact *Fantasea Line* for installation instructions that are specific to your housing model.
2. Installation instructions provided below consist of general guidance which applies to most housings. However, it is best to consult with an authorized Fantasea dealer prior to installing the system inside the housing regarding installation guidelines that are specific to your housing model.
3. Figures introduced in the following sections feature a specific Fantasea housing model and serve for illustrational purposes only. Note that vacuum safety system components should most likely be placed and positioned differently in various housings.



INSTALLING THE VACUUM VALVE

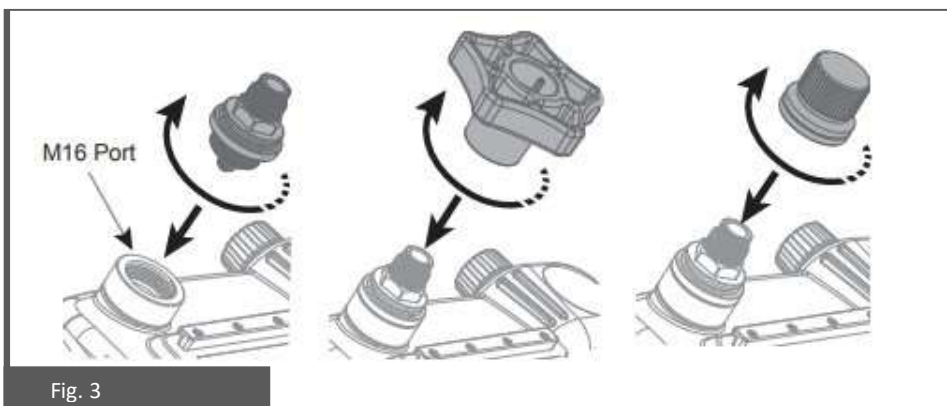
1. Remove the M16 Cap from the housing's M16 Port by screwing it counterclockwise all the way out (Fig. 1). Store in a safe place for future use.
2. Using the top side of the Multi purpose key, separate the Vacuum Valve from its protective cap (Fig. 2).



3. Screw the valve into the housing M16 Port in a clockwise direction and then tighten it in using the Multi purpose key (Fig. 3).

Make sure you do not over tighten the valve as this may damage the housing!

Screw in the Vacuum Valve protective cap (make sure that you do not over tighten the cap over the valve).





INSTALLING VACUUM SYSTEM COMPONENTS INSIDE THE HOUSING

1. Note that there are two optional setups for the system to be installed inside the housing. Select the setup that works best with your housing, depending on the space available and convenience of use (Fig. 4):
 - a. **SETUP A** – In this setup, the Cabled LED Indicator is connected to a dedicated port on the Signal Board. All visual indications during the pre-dive vacuum test and on-dive leak detection are signaled by the Cabled LED Indicator. The LED unit featured at the end of the Cabled LED Indicator should therefore be placed and secured facing a transparent area in the housing, so it can be easily observed and monitored.
 - b. **SETUP B** – In this setup, the Cabled LED Indicator is disconnected from the Signal Board and removed from the system. All visual indications during the pre-dive vacuum test and on-dive leak detection are then signaled by the Signal Board’s built-in LED, positioned right next to the power switch. The Signal Board should therefore be placed and secured with the built-in LED facing a transparent area in the housing, so it can be easily observed and monitored.

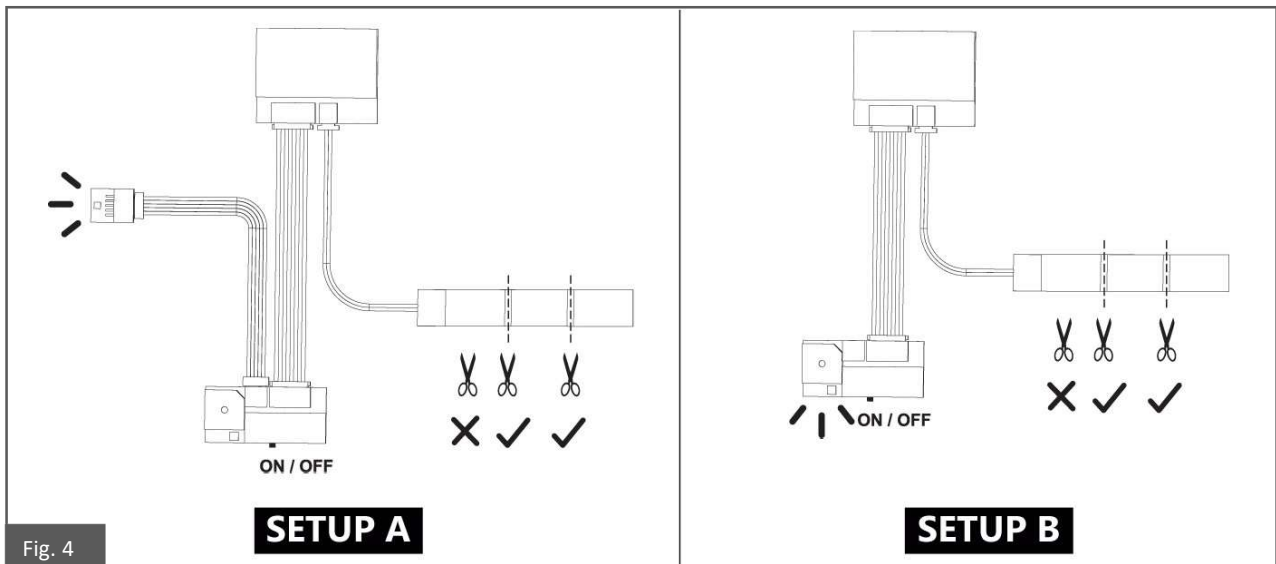


Fig. 4



2. Select a proper location and position for each system component inside the housing, based on the following considerations:
 - a. **All system components, including connection cables, should be placed and secured in a way that does not interfere with the watertight seal of the housing or normal operation of the camera, housing and any accessories installed inside the housing.** Take special notice of camera and housing features which might be altered during the dive, such as a built-in flash that pops up or a housing control with a swiveling shaft. In addition, take into consideration that during the dive water pressure exerted on the housing might draw internal elements closer to each other. Therefore, it's best to place system components within a safe distance from functional elements inside the housing, so they don't clash and interfere with proper operation.
 - b. The Moisture Sensor should be positioned at the bottom panel of the housing in order to ensure the moisture alarm goes off as soon as first water drops enter the housing and drip to the bottom (Fig. 5). Note that the Moisture Sensor can be trimmed if required, leaving at least one third of it close to the cable connection.
 - c. The LED Indicator (either Cabled LED Indicator or Signal Board's built-in LED Indicator, depending on the setup selected), should be placed facing a transparent area in the housing, so it can be easily observed and monitored (Fig. 5).
 - d. The Signal Board should be positioned in a way that provides easy access to the power switch and charging port (Fig. 5).

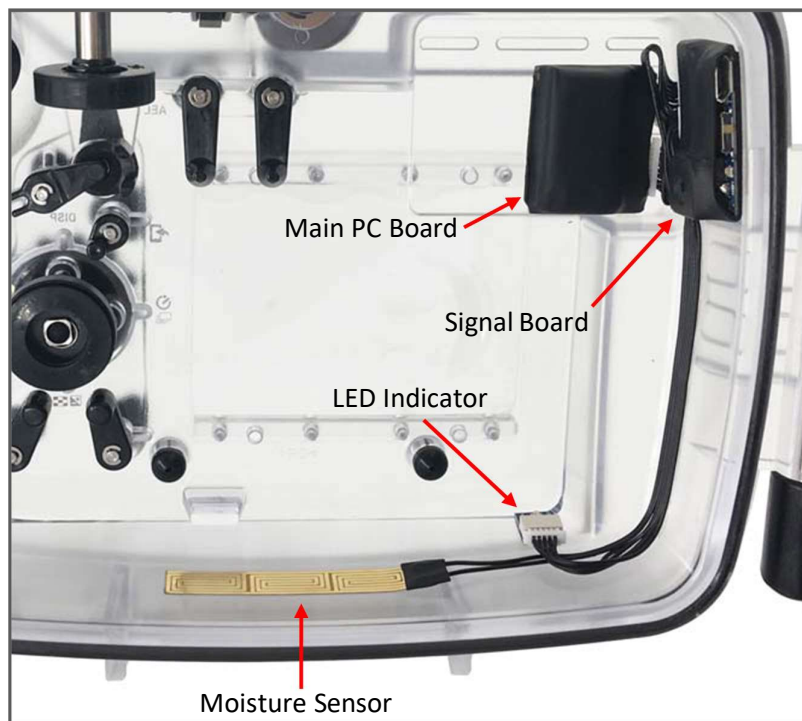


Image provided for illustrational purposes only. Note that vacuum safety system components should most likely be placed and positioned differently in various housings.

Fig. 5



- e. The Main PC Board should be placed within a safe distance from the camera, as the camera might heat up during the dive and warm up the battery contained inside the Main PC Board if close-fitted to the camera.
 - f. Note that there are two alternative connection cables included in the package for connecting the Main PC Board to the Signal Board. Upon placing the components inside the housing, select and connect the cable which is most appropriate for your setup. Use the shorter cable if the distance between the Main PC Board and Signal Board allows so. This will assist avoiding superfluous cable length, which might interfere with housing operation.
3. Use the double-sided stickers included in order to secure system components within their selected positions.
 4. Make sure all cables are properly connected.
 5. Test the system as described in the section - *Using the Hybrid Vacuum Safety System*.

USING THE HYBRID VACUUM SAFETY SYSTEM

Important Notice

Use of the Hybrid Vacuum Safety System must not replace any of the other safety measures conducted in order to ensure a complete watertight seal of the housing before and during the dive.

Charging the Unit

1. Turn the unit on using the power switch featured on the Signal Board.
2. The LED Indicator will start flashing blue:
 - a. Slow flashing (approx. 1 flash per second) indicates a charged battery.
 - b. Rapid flashing (approx. 4 flashes per second) indicates low battery.
3. To charge the unit, connect it to a USB charger using a standard Micro-USB cable (not included). Note that it is best using an android phone charger unit for this purpose.
4. Connect the micro-USB end of the cable to the Micro-USB port on the Signal Board (Fig. 6). Connect the other end of the cable to a USB port or USB charger.



Fig. 6



5. The unit should start charging and the LED Indicator should start flashing green.
6. **Make sure to keep the unit turned on during charging.**
7. When charging is complete, the LED Indicator stops flashing and remains green.
8. Disconnect the cable and turn the unit off using the power switch on the Signal Board to save battery power. If the unit is left turned on, the battery will drain within a few days.
9. During charging, keep the charger away from highly flammable materials or products and never leave the charger unattended when in use.
10. Never apply any type of pressure on the battery, expose it to direct heat or chemicals.
11. Battery must not be charged in temperatures below freezing or above 50°C (122°F).
12. To extend the battery's lifespan:
 - a. Avoid draining the battery all the way to 0%. Even though the unit can handle a few more dives even when the LED Indicator starts rapidly flashing blue, it is best to connect the unit to a charger at this point.
 - b. During long periods of storage, the unit should be stored partially charged in a cool and dry area.

Performing a Pre-Dive Check

1. Prior to closing the housing, turn the unit on using the power switch on the Signal Board. The switch should be pushed leftwards in order for the unit to be turned on. Make sure the unit is properly charged and that the LED indicator flashes slowly (approx. 1 flash per second).
2. Lock the housing and all other accessories which their installation might have an effect on the watertight seal of the housing. **Camera should be turned off prior to the pre-dive check.**

Important Notice

The housing should be completely set up for the dive prior to performing the vacuum pre-dive check. Any modifications carried out on the housing after the pre-dive test has been completed necessarily turn the check results irrelevant and require performing an additional pre-dive check.

The check should be carried out in a temperature controlled and shaded environment as extreme temperatures may cause a vacuum check failure.

3. Remove the protective cap from the Vacuum Valve by gently turning it counterclockwise and screwing it out. Make sure you're only removing the protective cap when turning it, rather than the complete valve. If the valve screws out together with its cap, use the Multi purpose key included to remove the cap from the valve (Fig. 2).

4. Install the Rubber Fitting on the Vacuum Pump. Hold the Rubber Fitting against the Vacuum Pump so its wide opening faces the funnel of the pump. Insert the funnel of the pump into the Rubber Fitting and then push the fitting against the funnel until it is fully inserted (Fig. 7).
5. Place the housing on a flat surface in a shaded area and in a manner that enables the housing to be left stable and uninterrupted during the pre-dive check.
6. Connect the Vacuum Pump to the Vacuum Valve by gently pushing the exposed valve all the way into the Rubber Fitting of the pump.
7. Use the Vacuum Pump to pump air out of the housing by gently and steadily pulling and releasing its handle (Fig. 8). While doing so, carefully watch the LED Indicator through the back door of the housing to monitor the air pressure inside the housing as it progresses through the following stages:



Fig. 7

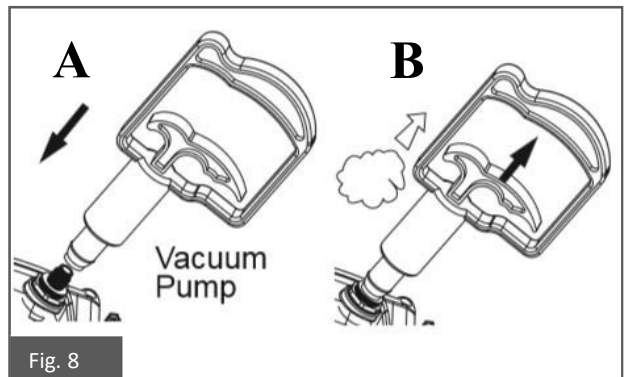


Fig. 8

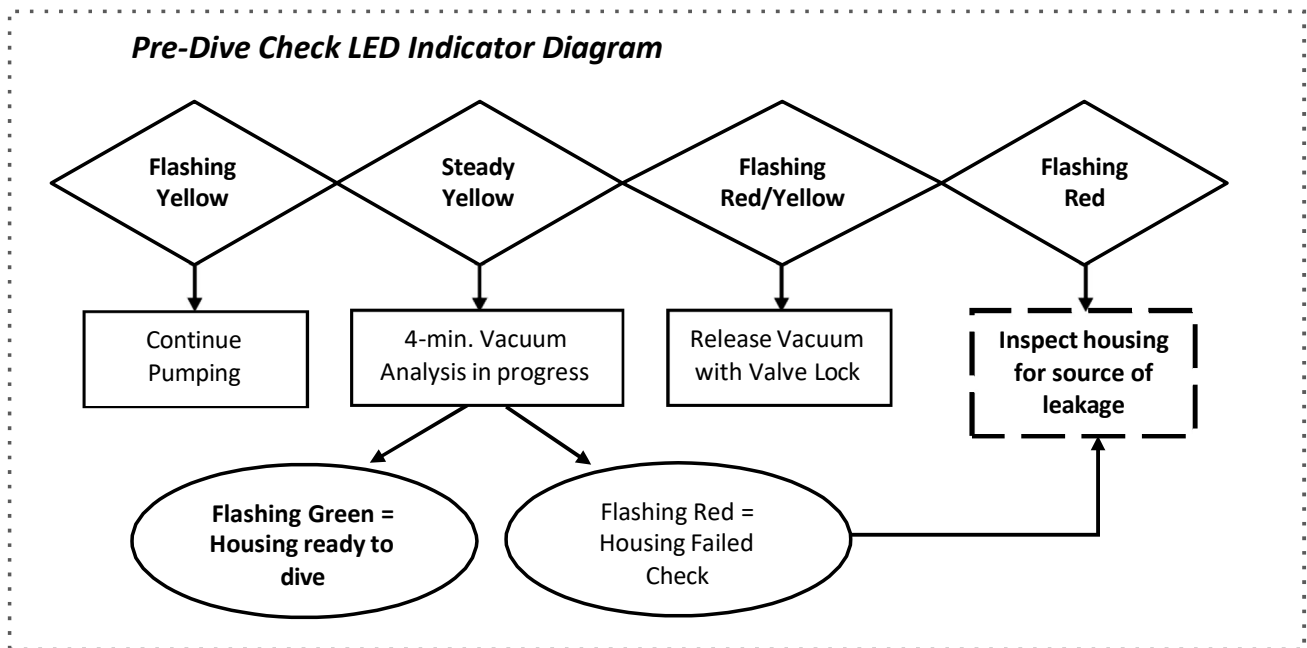
- a. Yellow flashing rapidly – air pressure has started to drop. Continue pumping.
- b. Yellow flashing slowly – air pressure continues to drop. Continue pumping. Note that that pumping should be carried out at a slower pace as the Indicator LED flashes slower and air pressure approaches the optimal level.
- c. Steady yellow (no flashing) – air pressure has reached the optimal level. Stop pumping and allow the analysis to begin.

- d. Yellow & Red flashing alternately – indicates over pumping and under pressure inside the housing. Stop pumping and carefully release a bit of the vacuum by turning the Vacuum Release Tip counterclockwise and pulling it out (Fig. 9) until the LED Indicator turns steady yellow, indicating a proper pressure for the check. If the LED Indicator starts flashing yellow again, overpressure has been produced inside the housing due to excessive vacuum release. Use the Vacuum Pump to extract air again until the LED indicator turns steady yellow.



Fig. 9

- 8. The analysis begins once the LED Indicator turns steady yellow. Carefully disconnect the Vacuum Pump from the Vacuum Valve and reinstall the Protective Cap over the valve.
- 9. **Analysis duration is approx. 3-4 minutes. During this time, the housing must be left uninterrupted.** Avoid moving the housing or pushing any of the housing controls during the analysis.
- 10. Once the analysis is complete, the LED Indicator will turn either red or green, depending on the results:
 - a. Green flashing – The housing passed the check. It is watertight sealed and ready for the dive.
 - b. Red flashing – The housing failed the check. Inspect the housing for potential leakage sources. If failing to find the source, it is recommended to reinstall and lock all system components, visually inspect all o-rings and make sure nothing interferes with the watertight seal of the housing.
- 11. If during the analysis the LED Indicator starts flashing in yellow or alternately red and green, the analysis has been interrupted by over-pressure or under-pressure correspondingly. Follow the steps below to allow the analysis to properly continue:
 - a. Yellow flashing - Use the Vacuum Pump to extract air again until the LED indicator turns steady yellow.
 - b. Red and Green flashing - Release a bit of the vacuum by turning the Vacuum Release Tip counterclockwise and pulling it out (Fig. 9) until the LED Indicator turns steady yellow.
- 12. In case of a significant air leakage detected anytime during the process, the LED Indicator will turn flashing red.



13. Once the pre-dive check is complete and the watertight seal of the housing has been confirmed:
 - a. Reinstall the Protective Cap over the Vacuum Valve if it hasn't been reinstalled yet. Note that the Vacuum Valve is watertight even without the Protective Cap, as long as the Vacuum Release Tip isn't pulled out during the dive. However, the Protective Cap ensures the Vacuum Valve remains locked during the dive, so it's recommended to reinstall it prior to diving with the housing.
 - b. Dive with the housing without detaching or attaching any accessories which their installation might have an effect on the watertight seal of the housing.

Important Notice	The <u>Vacuum Safety System</u> was designed to test and confirm the watertight seal of the housing <u>prior to the dive only</u> . Monitoring the watertight seal of the housing <u>during the dive</u> is carried out using the <u>Moisture Detector</u> included in the system. See "Moisture Detector" section below for further information.
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14. After the dive:
 - a. **Prior to opening the housing, make sure to completely release the vacuum** by turning the Vacuum Release Tip counterclockwise and pulling it out (Fig. 9). This prevents stressing the housing Latch Dial.
 - b. Turn the system off using the power switch on the Signal Board to save battery life.



Moisture Detector

The Moisture Detector allows monitoring the watertight seal of the housing during the dive. Moisture detectors are very sensitive, so whenever moisture is detected by the sensor, the LED Indicator starts flashing red and a warning alarm starts beeping, thereby alerting of a possible leak.

1. You can test the Moisture Detector (Fig. 10) by placing a wet finger over the moisture sensor unit at the bottom of the housing.
2. In order to silence the alarm after it starts beeping:
 - a. Gently wipe the Moisture Sensor unit with a soft dry cloth in order to dry it off.
 - b. Switch the Vacuum System off using the power switch on the Signal Board.



Fig. 10

Vacuum Valve Removal

1. In case of removing the Vacuum Valve for whatever reason, follow the steps below:
 - a. Remove the Vacuum Valve from its port using the Multi purpose key.
 - b. Install the M16 Cap on the Vacuum Valve port by screwing it all the way in (Fig. 11). Make sure the O-ring is installed on the cap to ensure a proper watertight seal.



Fig. 11

Important Notices

Once the Vacuum Valve has been removed and an M16 port cap has been installed on the port, it is important to carry out the first dive with the housing empty (no camera installed inside) in order to verify that the housing watertight seal has not been affected during the replacement.



TROUBLESHOOTING

Problem	Suggested Solution
Slave strobes are no longer triggered since vacuum system has been installed	One of the vacuum safety system components might be blocking the camera's built-in flash from popping up, thereby preventing the built-in flash from firing and triggering the slave strobes. Try repositioning vacuum safety system components farther away from the camera's built-in flash.
One of the camera or housing functions cannot be operated since vacuum system has been installed	One of the vacuum safety system components might be interfering with normal operation of this feature, perhaps even only during the dive, as water exerts pressure on the housing and internal elements are drawn closer to each other. Try repositioning vacuum safety system components farther away from the malfunctioning feature.
Pre-dive vacuum test keeps failing, thus alerting of a possible leak	One of the vacuum safety system components might be interfering with a proper watertight seal of the housing. Try repositioning all vacuum safety system components away from housing seals. Otherwise, inspect the housing for other potential leakage sources. If failing to find the source, it is recommended to reinstall and lock all system components, visually inspect all o-rings and make sure nothing interferes with the watertight seal of the housing.

For further assistance, please contact us at info@fantasea.com or any authorized Fantasea dealer.

CARE & MAINTENANCE

1. You can use the Multi purpose key included periodically to make sure the Vacuum Valve is tightly screwed into its port and was not accidentally loosened when unscrewing the protective cap. Do not over tighten the Vacuum Valve or this may damage the Port or the Valve!
2. The O-ring positioned between the Vacuum Valve and its protective cap should be maintained periodically:
 - a. Visually inspect the O-ring after removing the cap. If there is any debris present, including dirt, sand, dust, hair or any other matter, it must be cleaned to ensure a proper watertight seal.
 - b. In order to clean the O-ring, first remove it from the Vacuum Valve.
 - c. Cleaning the O-ring is a simple matter of wiping it with a damp, soft cloth to remove the



- foreign matter. Be careful the cloth you use does not leave any of its own material behind as this can also affect the effectiveness of the seal.
- d. Apply a slight layer of Fantasea Silicone Grease on the O-ring. Note that the amount of lubrication required on the O-ring is only enough to allow it to slip into place without friction, so it does not twist or become dislodged. More grease is not necessarily better, and in some cases might interfere with the watertight seal of the housing.
 - e. Reinstall the O-ring and then reinstall the cap.
 - f. Confirm that the housing watertight seal hasn't been interfered using the vacuum pre-dive check prior to diving with the housing again.
3. **Never soak or wash the interior of the housing with water. This will cause irreparable damage to all Hybrid Vacuum Safety System electronic components!**

FANTASEA PRODUCT CONSUMER LIMITED WARRANTY

"Fantasea" warrants this Fantasea Line branded product against defects in materials and workmanship under reasonable use for a period of ONE (1) YEAR, (two years, where required by law as determined by the origin of the authorized dealer). This warranty is effective from the date of retail purchase from Fantasea or an authorized Fantasea dealer, by the original end-user purchaser ("Warranty Period"). This warranty does not cover any commercial use of the product. If a product defect arises and a valid claim is received within the Warranty Period, at its option, Fantasea, or its authorized service facilities will either (1) repair the product defect at no charge, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product. The warranty will not extend beyond the original warranty period. Your Fantasea Product should be registered within 30 days of purchase. You must keep the proof of purchase which indicates the date on which the purchase was made; as you may be required to show proof of purchase if you need warranty service. The following conditions apply: 1. This warranty extends to the original purchaser only. It is not assignable or transferable. 2. The warranty does not cover damage resulting from misuse, abuse, negligence, or accidents. Proper maintenance of the Product is the responsibility of the owner. 3. The warranty does not cover damage directly or indirectly resulting from the use of unauthorized replacement parts or service performed by unauthorized facilities. 4. This warranty does not cover any damage to any other product used in conjunction with the Fantasea product, including cameras and lenses, and resulting from any defect in the product materials or workmanship. 5. The cost of sending the product back to Fantasea or its authorized service facilities is the responsibility of the customer. 6. The warranty does not cover any incidental damages resulting from any defects in the product. This expressly includes any travel reimbursements or any other costs associated with the purchaser's optional use of the product. The conditions of this warranty are expressly in lieu of all other expressed warranties, including the payment of consequential or incidental damages for the breach of any warranty. Please register your product on line at this URL: <http://www.fantasea.com/registration>.

For further information, please visit our website www.fantasea.com or contact us at info@fantasea.com