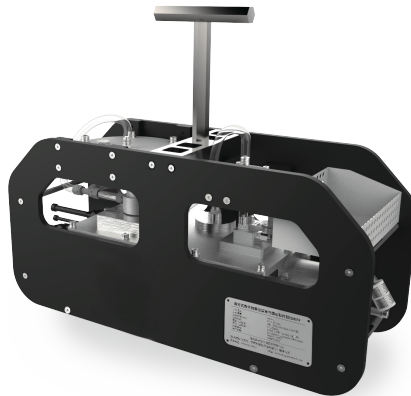




Self-contained Microbiological in Situ Enrichment and Fixed Sample **(ISMIEFF) Product Manuals**



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Dear users:

Thank you for choosing our microbial in situ sampler (full name: Self-contained microbiological in situ enrichment and fixed sample) (ISMIFF). In order to facilitate the operation of this product, please read this manual carefully before use, please be sure to read "safety precautions", not mentioned, welcome users to consult the company's after-sales. The shortcomings of this book, welcome the majority of users to put forward valuable opinions!

The product is manufactured according to the invention patent of the Institute of Deep-Sea Science and Engineering, CAS (patent number: ZL201510937260.6).

Safety Caution

1. When plugging the plug, starter or debugging line, please dry the water at the interface to ensure that the interface is dry. Do not touch the equipment interface under the power state, otherwise there is a danger of electric shock!
2. When carrying the product by hand, please be sure to grasp the shell of the product, carefully take and put, pay attention to the object at any time to prevent tripping or falling, otherwise there is a risk of injury or product damage!
3. Please measure the battery voltage before use. When the battery voltage is less than 23V, please do not use it. Please use it after charging! No prohibited during charging!
4. Please use the required power supply and the supporting charger equipment!
5. Non-professional personnel are strictly prohibited to conduct product installation, wiring, maintenance, maintenance, inspection or part replacement!
6. Do not continue to use damaged machines as greater damage.

Caution

1. Before use, please clean the pipeline according to the operation procedures in

this manual to avoid sample contamination!

2. After use, please clean the pipe according to the operation steps in this manual to avoid the crystallization of the fixative and affect the use of the pump!
3. When installation and use, the hose can not be bent or folded, otherwise the hose may be blocked!
4. Do not throw this product to the ground or be hit strongly!

Product Introduction

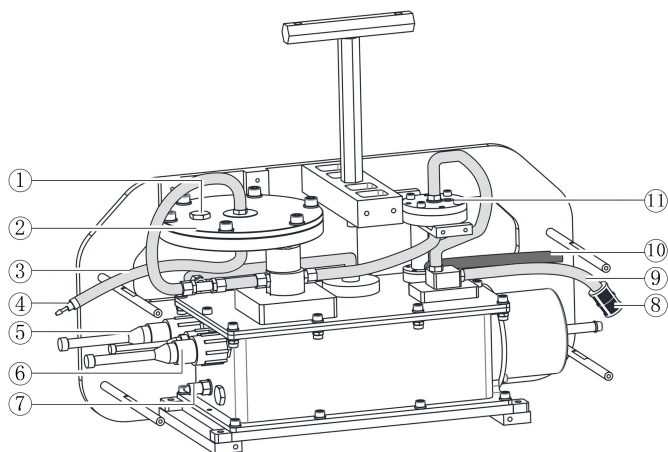
This product is an automatic collection device for the whole sea depth, which is developed to solve the problems such as the difficulty, low efficiency and poor quality of microbiological sampling in deep-sea water. It can realize the mass filtration and in-situ fixation of seawater. It has completed the carrying application on the "Tianya" abyss landing vehicle, "Hippocampus" ROV, "Deep Sea Warrior" and "Striver" manned submersibles, with mature technology and stable and reliable performance.

■ Container loading list

Host * 1, charger * 1, start head * 1, reagent bag * 1, product manual * 1, operation guidance * 1, factory test report * 1, operation software U disk * 1.

Spare parts and tools: G1 / 8- φ 4 pipe joint * 1, G1 / 8- φ 6 pipe joint * 1, M5 * 20 screw * 1, M8 * 20 screw * 1, G1 / 8 plug * 1 * 1 * 1, M 3 * 1, M 4 hexagon wrench * 1, M 5 hexagon wrench * 1, M 6 * 1, 12-14 open wrench * 1, 13-15 open wrench * 1.

■ Component instructions



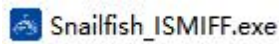
Note: the picture is for reference only, the specific shape is subject to the physical object.

Order number	Name	Function Declaration
1	Exhaust block head	exhaust
2	The 142-mm filter membrane cavity	Enriched organisms (membrane pore size requirement $\geq 0.22 \mu m$)
3	Delivery port	Out of the seawater
4	Check valve	The seawater can only go out
5	The Start / Charge port	Insert the start head for internal power supply
6	External power supply port	Connect to the external power supply for the external power supply
7	Oil filling opening	When the pressure compensator is short of oil, inject the oil from here
8	Strainer	Filter the dust, stones and other large particles
9	Water inlet	Seawater entrance
10	Implant inlet	Connect the reagent bag and pass the fixative solution
11	47mm filter membrane cavity	Enriched larvae (membrane pore size requirement $\geq 3 \mu m$)

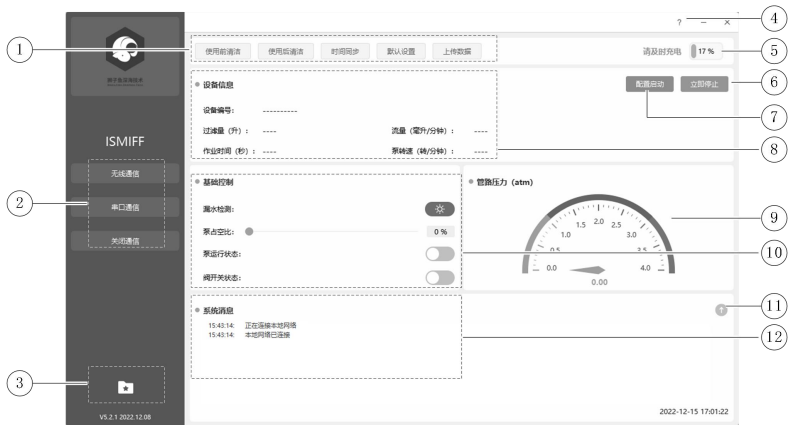
Software description

The supporting software package name is: Snailfish_ISMIFF_XXXXXXX, where "XXXXXXX" is the software update date, such as: 20210315.

The software is named: Snailfish_ISMIFF.exe



software interface:



Order number	Explain	Order number	Explain
1	Commonly used functions	2	communication junction
3	Upload the data folder	4	Help documentation
5	battery status	6	emergency stop
7	Parameter configuration	8	Job parameters are shown
9	Line pressure display	10	Leakage detection, pump and valve control
11	Communication signal	12	System message

Click the [Configure Start] button to enter the parameter configuration interface, which is as follows:

微生物富集 （当海水量与过滤时间满足其一时，设备停止过滤海水）

海水量 (升) :

0

过滤时间 (分钟) :

0

管路压力上线 (atm) :

1.9

占空比调整时间 (秒) :

10

微生物固定

固定液时间 (分钟) :

0

(建议时长不少于 20 分钟)

管路压力上线 (atm) :

1.9

占空比调整时间 (秒) :

10

定时运行

启动时间:

2022-12-15 17:02

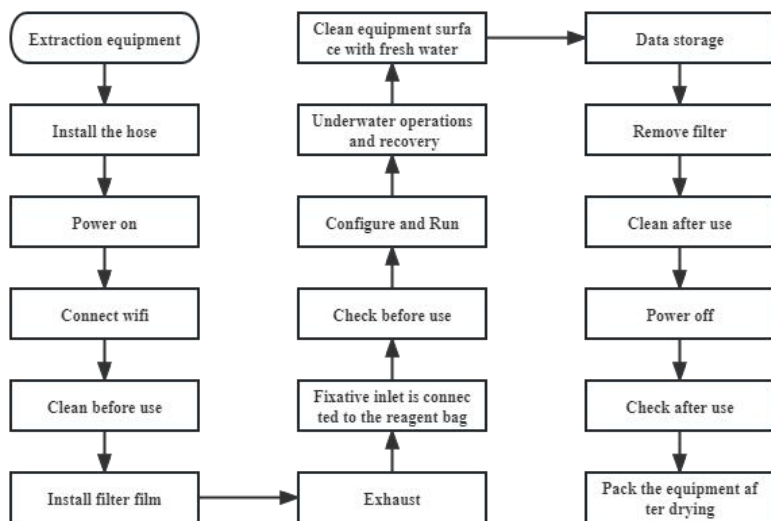
取消

确认

Order number	Name	Explain
1	Microbial enrichment	<p>If the amount of seawater and filtration time reach the set value, the filtration will stop.</p> <ul style="list-style-type: none"> Sea volume: Set the amount of seawater to be filtered; Filtration time: Set the time when the seawater needs to be filtered; Upper limit of pipeline pressure: set the upper limit of pipeline pressure; Duty cycle adjustment time: after the pipeline pressure reaches the upper limit, the duty ratio will be adjusted to reduce the pipeline pressure.
2	Microbial fixation	<p>When the injection reaches the time set value of fixative, the injection of fixative stops.</p> <ul style="list-style-type: none"> Fixation time: Set the time for injection of fixative; Upper limit of pipeline pressure: set the upper limit of pipeline pressure; Duty cycle adjustment time: after the pipeline pressure reaches the upper limit, the duty ratio will be adjusted to reduce the pipeline pressure.

3	Regular operation	The system will start running at the set Start time.
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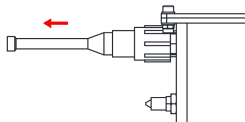
Direction for Use



Note: See below for detailed procedures.



- Internal power supply and external power supply cannot be used at the same time!
- If using the internal power supply (install the start head), make sure the equipment is fully charged before use!
- If the external power supply is used, please check whether the power supply is normal before the equipment is powered on!
- Watertight connector installed and removed when maintaining vertical, do not shake left to right!

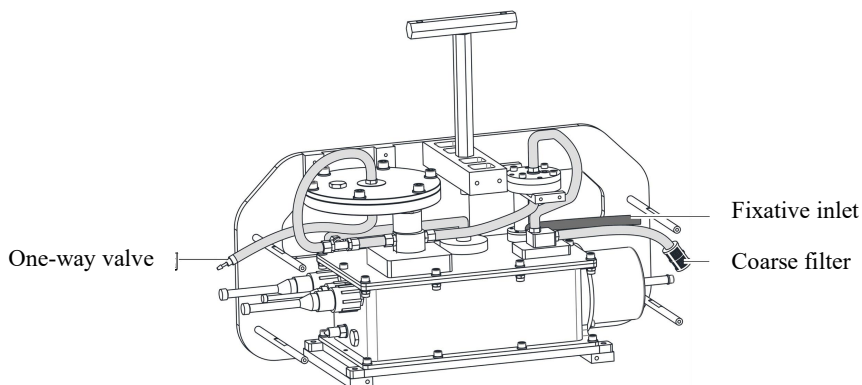


- Before installing the watertight connector, clean the plug surface and the beads in the hole, and apply a layer of lubricating silicone grease.
 - Do not touch the pin of the interface during use!
 - Make sure that the water inlet is connected to the coarse filter, to avoid dust, stones and other large particles into the instrument, resulting in the pump damage!
 - When installation and use, the hose can not be bent or folded, otherwise the hose may be blocked!
 - Set the duty cycle before manually starting the pump.
-

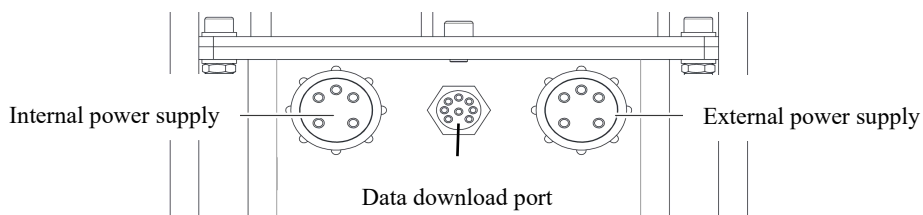
■ Install the hose

Install the hose as shown in the figure below, and connect the hose at the inlet to the coarse filter, and connect the hose at the outlet to the one-way valve to ensure reliable connection. Tube hose is recommended for polyurethane material with sizes of 6 / 8 and 4 / 6 (inner diameter / outer diameter, mm). Size 4 / 6 hose is suitable for fixative connection, the rest uses size 6 / 8 hose.

Note: It is recommended to replace a new hose before each voyage.



■ Power on and Power off



There are two ways to power on and power off:

Mode 1: internal power supply

Power on Unplug the Start / Charge plug and plug in the start head.

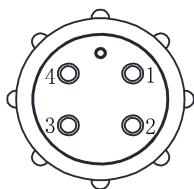
Power off Unplug the start had and plug in the Start / Charge " plug.

Method 2: external power supply

Power on Unplug the external power supply plug and plug the power line in the external power supply interface to connect the external power supply.

Power off Unplug the external power supply cable and plug in the "external power supply" plug.

Definition of external supply socket:



BH 4M (Subconn)

Pin 1 -GND

Pin 2 -T

Pin 3 -R

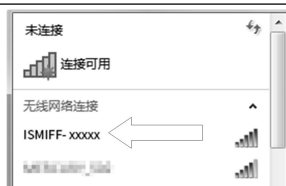
Pin 4 -24V+



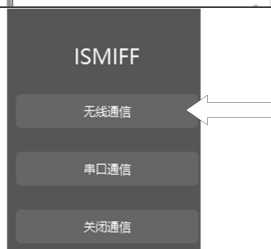
- Use the Start / Charge port for charging. When charging, there will be two red lights on the charger. When it becomes red and green, it indicates that the charging is complete.

■ Connect wifi

- Search for device wifi on the computer side and connect, wifi name is generally ISMIF-XXXX (corresponding number);

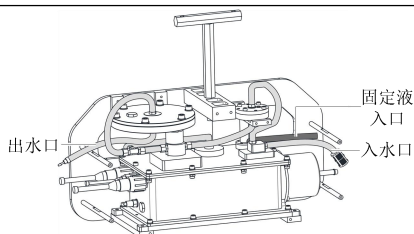


- Open the software and click the [Wireless connection] button. When the indicator light flashes, the connection is successful.



■ Clean before use

- The water inlet and fixative inlet are connected with distilled water.

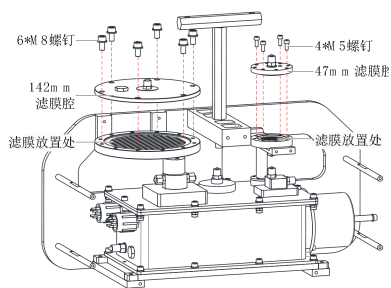


- 2) Open the software and click the [Clean before Use] button. When the pump stops the operation (the software interface pump speed is 0), the cleaning is over.



■ Install filter film

- 1) Unscrew 6 M8 screws on the 142mm chamber and install 142mm filter; unscrew 4 M5 screws on the 47mm chamber and install 47mm membrane.



- 2) After installing the filter film, tighten the corresponding screws.

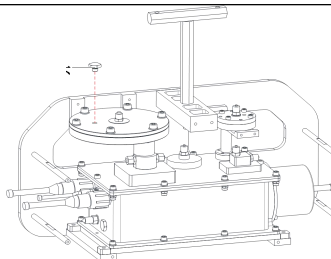


- Before installing the chamber cover plate, make sure the O-ring is in the chamber and installed correctly.

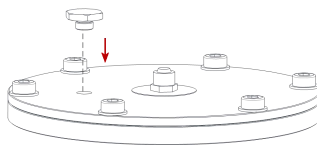
■ Exhaust

- 1) The water inlet is connected to the distilled water.

- 2) Open the exhaust plug on the 142mm filter chamber.



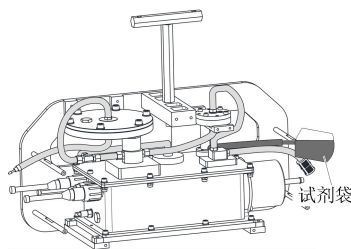
- 3) Start the pump on the software (duty cycle recommended to 20-30), close the pump after the vent overflows the water, and tighten the exhaust plug.



■ Fixative inlet is connected to the reagent bag

- 1) Seal the reagent bag into the fixative; -
- 2) Discharge the gas from the reagent bag; -

- 3) Connect the reagent bag to the inlet of fixative and fix the reagent bag.



■ Check before use

Order number	Inspection requirements	(√/×)
1	If the internal power supply is used (install the starter head), the equipment is fully charged.	
2	The system has been powered on.	
3	Start/charging, external power supply, and debugging port plug have been blocked.	
4	The filter plate has been installed with the filter membrane for reliable connection.	
5	The exhaust treatment has been performed.	
6	The reagent kit has been installed at the inlet and the fixative.	
7	The reagent bag was well sealed without leakage.	

8	Pipe connection is correct and without leakage.	
9	No oil leakage in the overall appearance.	
10	The compensation fluid level meets the requirements.	
11	Handle connection is reliable.	
12	The outer frame is firmly connected.	
13	The pump can be turned on / off normally.	
14	The valve can be opened / closed normally.	
15	There is feedback on pump speed.	
16	There is a feedback on the pressure gauge readings.	

■ Configure and Run

- 1) Open the software and click [Time Sync] and [Default Setting] to initialize the system.

Software interface showing initialization options: 使用前清洗 (Clean before use), 时间同步 (Time sync), and 默认设置 (Default settings). Below, under 设备信息 (Device information), fields for 设备编号 (Device ID), 过滤量 (升) (Filtration volume (L)), 作业时间 (秒) (Working time (s)), 流量 (毫升/分) (Flow rate (mL/min)), and 泵转速 (转/分) (Pump speed (RPM)) are displayed.

- 2) Click the [Configuration Start] button to pop up the operation parameter configuration screen.

Configuration Start button interface with 配置启动 (Configure start) and 立即停止 (Stop immediately) buttons.

- 3) For microbial enrichment, microbial fixation, and timing running parameters configuration on the parameter configuration interface, click [Confirm] after the configuration is completed.

Parameter configuration interface (配置启动参数) for microbial enrichment and timing. It includes sections for 微生物富集 (Microbial enrichment) and 微生物固定 (Microbial fixation), each with fields for 海水量 (升) (Seawater volume (L)), 过滤时间 (分钟) (Filtration time (min)), 管路压力上限 (atm) (Pipe pressure upper limit (atm)), and 占空比调整时间 (秒) (Duty cycle adjustment time (s)). A 定时运行 (Timed operation) section includes 启动时间 (Start time) and a 确认 (Confirm) button.



- When the "seawater quantity" and "filtration time" meet its temporary, the equipment stops filtering seawater;

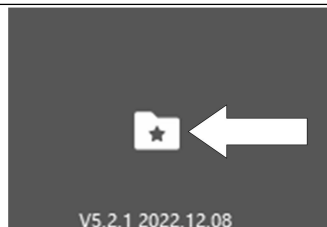
- "Line pressure online" and "Duty cycle adjustment time" are 1.9 and 10 respectively.

■ Data storage

- 1) Open the software, connect to wifi, and click [Upload data] to upload the data files.

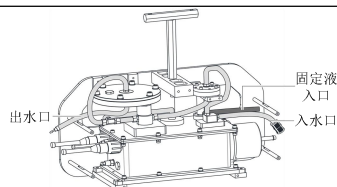


- 2) After successful uploading, the system message will prompt the location of the file upload, or you can directly click the data folder icon to directly enter the data folder.



■ Clean after use

- 1) The inlet and fixing inlet are connected to fresh water.



- 2) Open the software and click the [Clean after use] button. When the pump stops the operation (the software interface pump speed is 0), the cleaning is over.



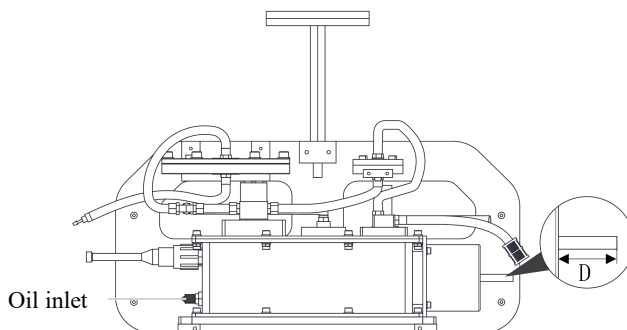
■ Check after use

Order number	Inspection requirements	(√/×)
1	Test data were exported.	
2	The filter membrane has been removed.	
3	The system has been powered off.	
4	Start/charging, external power supply, and debugging	

	port plug have been blocked.	
5	Clean the whole equipment and the pipeline with fresh water.	

Maintenance

1. Before cleaning the equipment, always turn off the switch and disconnect the power supply.
2. After use, please use the fresh water cleaning equipment in time.
3. After use, please charge the device in time.
4. The product shall be stored in a dry place.
5. Before storing the equipment, ensure that the product is clean and dry.
6. When the product is not working properly, please immediately cut off the power supply to restart the system.
7. When the oil quantity of the pressure compensator is insufficient, that is, the distance from D in the following figure is less than 40mm, please inject oil in time. The hydraulic oil model is No.22.



Technical Specifications

Wording depth	6000m (standard, 11000m optional)
Water filtration speed	0.2-1.5L/min
Continuous working hours	24h(0.5L/min 2bar, Internal power supply)
Filter specification	47-142mm

Weight (including handle)	8.8kg (in freshwater), 18.8kg (in air)
Dimensions (including the handle)	Length 550mm×width 200mm×height 450mm
External power supply	2A@23~29V DC

Fault Analysis and Troubleshooting

Fault phenomenon	Analysis of causes	Fault treatment
The equipment started normally, but the filtered seawater was less or no water outflow	The pore size of the filter membrane placed in the filter membrane cavity is too small	The 47mm membrane aperture is $\geq 3\mu\text{m}$ and 142mm membrane aperture is $\geq 0.22\mu\text{m}$
After installing the equipment, start the switch, and the equipment does not work	Power is insufficient	Charge in time
	No communication connection was established	Check the wifi connection status and verify that it is correctly connected to the product
	The product is charging, due to program protection, the product cannot operate	Use after it is fully charged
Downtime in use	Product power is insufficient	Check whether the voltage is too low, and charge it in time
The product can not charge electricity	Poor connection of the charging cable	Check the charging cable connection status to ensure the normal connection
The filter chamber is leaking	The membrane chamber is not properly installed and the screws are not completely tightened, resulting in lax sealing of the membrane cavity	Check the installation status of the O-ring to ensure normal installation; tighten the screws as required
No water flows in the pipe during the	Exhaust valve not open	Make sure the exhaust valve is opened

exhaust operation		
After power on, the pump does not work	Due to poor cleaning, liquid crystallization or other impurities block the internal gear of the pump	Under the guidance of after-sale, remove three screws on the head of the pump to clean impurities; cannot solve the problem, send to after-sale maintenance
After power on, the valve does not work	Due to poor cleaning, liquid crystallization or other impurities block the internal channel	Use water with syringe to remove impurities, or blow impurities with dust gun; cannot solve the problem, send to after-sale maintenance

- If the problem cannot be solved, do not remove the machine without permission, please contact the after-sale maintenance.
- If the above content is inconsistent due to the model or parts change and the physical object, please take the physical object shall prevail, without further notice, please understand!

Product Warranty Statement

Dear users, thank you for choosing our products, please read the content of the warranty statement, to protect your following rights and interests.

(一) Warranty:

- The whole machine warranty of 1 year, product quality problems of 7 days package return, 15 days package replacement.
- You can enjoy the free warranty period and the preferential services outside the warranty period.
- The date of the valid warranty certificate (invoice, purchase record) is used as the starting date of the warranty period.

(二) Non-warranty scope:

- Damage caused by irresistible natural disasters;
- Product damage caused by improper handling, use, maintenance and storage;
- The warranty certificate is inconsistent with the physical object or altered;
- Beyond the specified warranty period;
- Malfunction or damage caused by third-party products, software, services or actions;
- Normal decolorization, wear and consumption occurred during the use of the products;
- Lost or damaged data;
- Consumed parts, such as hoses, check valves, coarse filters, etc., consumed over time, unless faulty due to material or process defects;
- The completeness and appearance status of the product are not covered by the warranty, you should inspect the product to the spot and dispute any inconsistency.



Contact Us

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This manual is subject to any update without prior notice.