QYSEA

FIFISH E-MASTER

User Manual
V1.2

E-Series ROV Comparison

Specs \ Model	 E-MASTER NAVI	 E-MASTER PLUS	 E-MASTER Standard
Depth Rating	200m		
Inertial Navigation System	√	Optional	Optional
Downward Station Lock Hovering	√	Optional	Optional
Downward Collision Avoidance	√	Optional	Optional
Forward Inertial Navigation System	√	√	Optional
Forward Station Lock Hovering	√	√	Optional
Forward Collision Avoidance	√	√	Optional
Smart & Adaptive Measurements	√	√	Optional
Bathymetric Survey	√	√	√
Altitude Tracking & Locking	√	√	√

Sensor & Function

Sensor	Function
Downward Q-DVL	Inertial Navigation System
	Downward Station Lock Hovering
	Downward Collision Avoidance
Forward Q-DVL	Forward Inertial Navigation System
	Forward Station Lock Hovering
	Forward Collision Avoidance
Laser Scaler	Smart & Adaptive Measurements
Ecosounder/Altitude Sensor	Bathymetric Survey
	Altitude Tracking & Locking

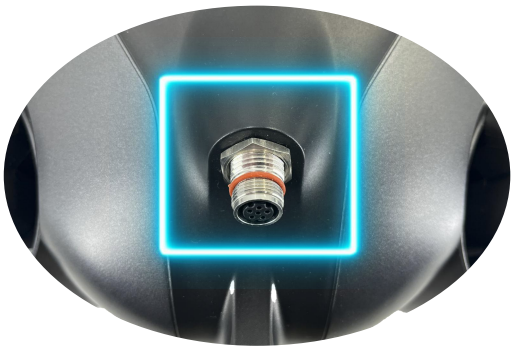
Foreword

Please pay attention to the content:

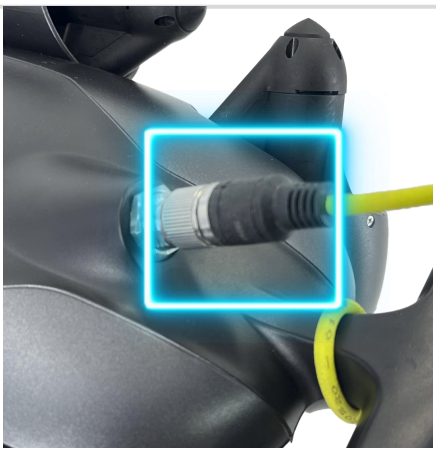
CAUTION: If you do not follow the instructions correctly, it may cause personal injury or equipment damage.

TIPS: If you do not follow the instructions correctly, you may not be able to operate smoothly.

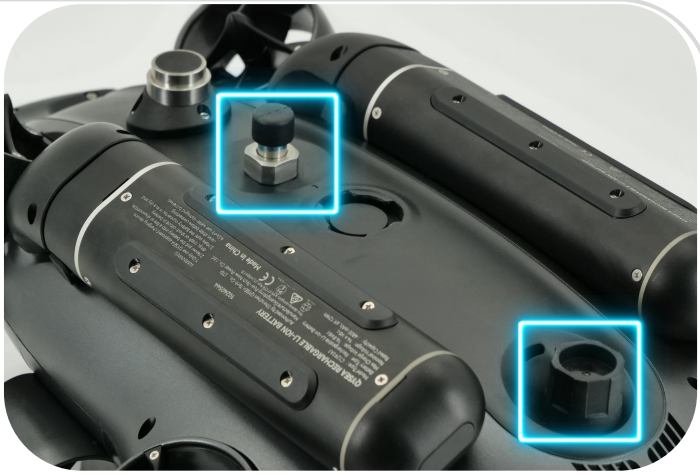
Operation Precaution



1.Before connecting the ROV, please check the O-ring at the tether port, the Q interfaces, and inside the SD card slot to ensure they are intact and dry.

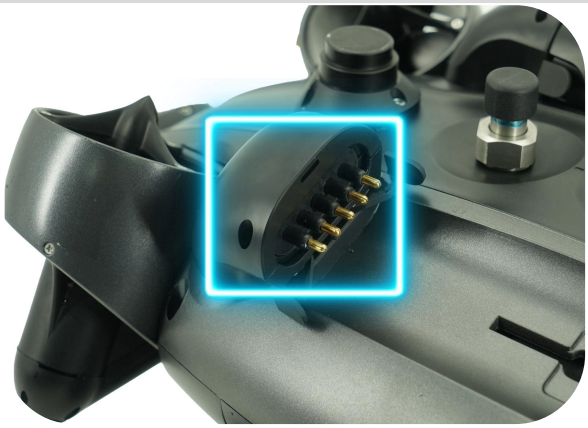
2.Before putting the ROV in water, please check the connection status of the ROV's tether port to ensure a secure connection between the ROV and the tether spool.

3.Before putting the ROV in water, please check the protective caps of both the Q interfaces and the SD card slot to ensure they are securely tightened.

Operation Precaution

4.Before putting the ROV in water, please check the ROV's battery connection to ensure the correct connection, please scan the QR code to check the video:
(MOLYKOTE 111 grease recommended for battery connectors and O-ring.)



5.Before use, please ensure that the male and female connectors of the battery are dry and clean. After use, wipe off any water stains on the male and female connectors of the battery.

6.Regarding motor maintenance, please refer to page 68 or scan the QR code to check relevant manuals:

Content

Backgrounds

Safety and Regulations

Please read and watch the following documents and videos before using FIFISH E-MASTER:
1. User Manual
*2. Tutorial Video in '**FIFISH APP - Help - QYSEA Academy**'(iOS) or in Homepage (Android system)*

Do NOT touch the running propeller

Avoid overheating of motors, do NOT run the thrusters in air for over 30 seconds

Do NOT throw the ROV when deploying into the water

Do NOT look directly to the LEDs, and do NOT touch the LEDs when they are ON

Laser Radiation Class 3B. Avoid direct exposure to eyes.

Beware of the environment while operating the ROV (tide, water level, water traffics, etc.)

Avoid the reefs, rocks, seaweeds, fishline or other objects that may cause damage to or entanglement of the ROV or tether

Be part of marine protection and conservation for the local coral and marine life

Maintain after dive, check the Maintenance Guide

Backgrounds
Disclaimer

We provide customers with after-sale services, excluding the following circumstances-

- Crashes damage caused by non-manufacturing factors, including but not limited to, pilot errors.
- Damage caused by unauthorized modification, disassembly, or shell opening not in accordance with official instructions or manuals.
- Damage caused by improper installation, incorrect use, or operation not in accordance with official instructions or manuals.
- Damage caused by a non-authorized service provider.
- Damage caused by unauthorized modification of circuits and mismatch or misuse of the battery and charger.
- Damage caused by dives which do not follow instruction and manual recommendations.
- Damage caused by operation in bad water conditions (i.e. strong currents, huge waves, etc.)
- Damage caused by operating the product in an environment with electromagnetic interference (i.e. in mining areas or close to radio transmission towers, caves, muddy condition, radiations, tunnels, etc.).
- Damage caused by operating the product in an environment suffering from interference from other wireless devices (i.e. transmitter, video-downlink, Wi-Fi signals, etc.).
- Damage caused by a forced dive when components have aged or been damaged.
- Damage caused by reliability or compatibility issues when using unauthorized third-party parts.
- Damage caused by operating the unit with a low-charged or defective battery.
- Uninterrupted or error-free operation of a product.
- Loss of, or damage to, your data by a product.
- Any software programs, whether provided with the product or installed subsequently.
- Failure of, or damage caused by, any third-party products, including those that QYSEA may provide or integrate into the QYSEA product at your request.
- Damage resulting from any non-QYSEA technical or other support, such as assistance with "how-to" questions or inaccurate product set-up, installation, and firmware upgrade.
- Damage caused by operating the ROV in the sensitive zone (military, natural resource protection zoning, marine conservation and ocean conservation, etc.)
- Damage caused by unpredictable factors (current, cave collapse, swallow by animal, etc.)
- Products or parts with an altered identification label or from which the identification label has been removed.
- The presence of water droplets or water stains on the ROV may be due to the running tests in water performed at our factory. This will not affect the features and function of FIFISH underwater robot.
- Please check the QYSEA After-sales Policy published by official website (https://www.qysea.com/support/after-sales/) for more detail.

For more information, please check our website for tuition videos, or read FAQ in FIFISH APP/help/FAQ.
For latest version of use guide/manuals and other instructions, check on our website.
Contact our technical support, email us support@qysea.com

NOTE:

This content is subject to change without prior notice.

Introduction

E-MASTER ROV Definition

FIFISH E-MASTER

1. 4K UHD Underwater Camera
2. 5,000 lumens LED * 2
3. Thrusters (Aluminum alloy propeller) * 6
4. Upper Mounting Port
5. Upper Q-interface (accessory port)
6. ROV Tether Port
7. Rear Fin[1]
8. Forward-facing DVL
9. Drain Holes
10. microSD Hot Shoes
11. Swappable Battery * 2
12. Lower Mounting Port

13. Lower Q-Interface(accessory port)
14. Downward Sonar

CAUTION:

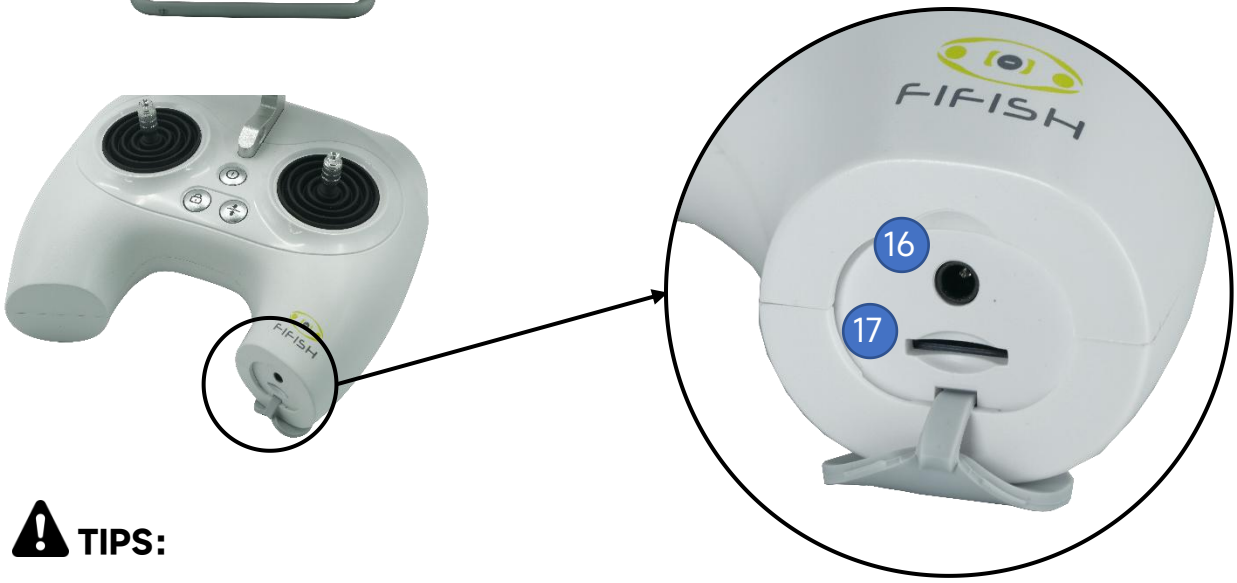
[1] Do NOT shake or swing while holding the rear fin.

Introduction

Remote Controller Definition

RC (Remote Controller)

1. ON/OFF
2. Depth Holding (ON/OFF)
3. Thrusters LOCK/UNLOCK
4. Left Control Stick
5. Right Control Stick
6. Right Wheel
7. Left Wheel
8. Video (Record/Stop)[1]
9. Control Mode (Attitude / Sport / Combine)
10. Tether Port
11. Ethernet Port (mini USB)
12. LED Brightness (OFF, 1,2)
13. Photo (Snap)[2]
14. Clamp Release Button
15. Clamp for Smart Device
16. Charging Port
17. microSD Card Slot



TIPS:

[1] In photo mode, press and hold about 1 second, will switch to video mode.
[2] In video mode, press and hold about 1 second, will switch to photo mode.

Introduction

Tether Spool Definition

Tether Spool

1.Spool Handle

2.Spool Frame[1]

3.Foldable Handle[2][3]

4.Secure Loop

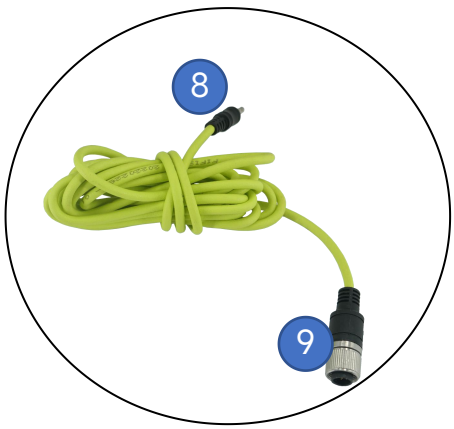
5.Tether Regulator

6.ROV Plug

7.6-Pin Female Socket

8.RC Plug (3.5mm head port)

9.6-Pin Male Plug



CAUTION:

[1] Please don't make the spool frame hit hard.
[2] The handle can be folded by pulling the handle.
[3] Please pay attention to the use of foldable rocker to avoid violent breaking.

Pre-Dive

Install FIFISH App

Checking List

1. Gears checking
2. Battery is full (ROV, RC, cell/tablet)
3. ROV sensor calibration [1]
4. Smart device compatibility [2]
5. Enough memory for recording/picture
6. Team role setting (pilot, tether man, guide)
7. Entanglement threats, such as, the boat engine, underwater structures, and corals etc.

NOTE:

1. If you travel to elevated lakes, low land lakes, or air pressure has changed. Do a ROV sensor calibration is highly recommended(please check page 13 for details)
2. The best compatible smart devices list in, in FIFISH App, help/FAQ/Before Dive, #6

FIFISH App download and Installations

Option 1. Scan the above QR code to download FIFISH App.
Option 2. Search the FIFISH on App Store (iOS) or Google Play (Android).
Option 3. Go to QYSEA's website at https://www.qysea.com/support/app-download/

3.2. Hardware Connection

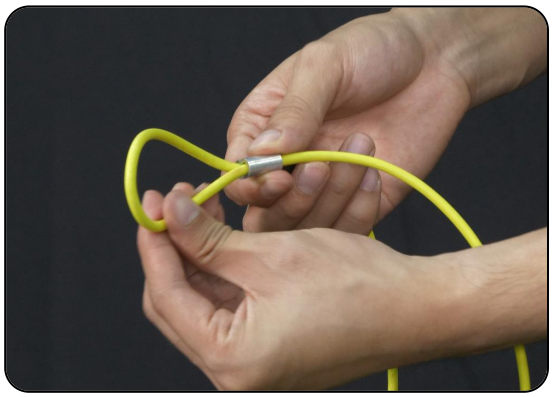
Overview

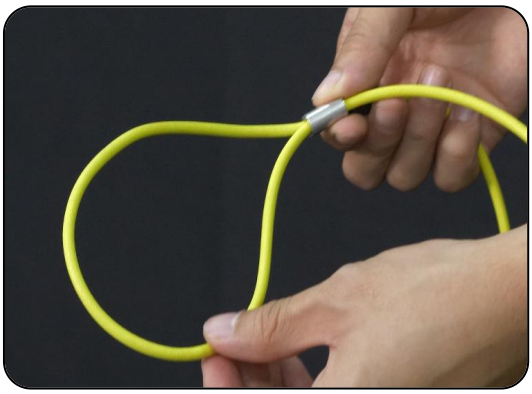
3.2.1. Plug the tether (3.5 mm head) into remote controller

TIPS:
The cable (3.5 mm head) can be inserted into the remote controller after bypassing the bottom bracket and tying the safety knot to avoid the accident that the cable is pulled out.

3.2.2. Plug 6-pin male plug into the socket of the spool

3.2.3. Pull the cable to release the secure loop

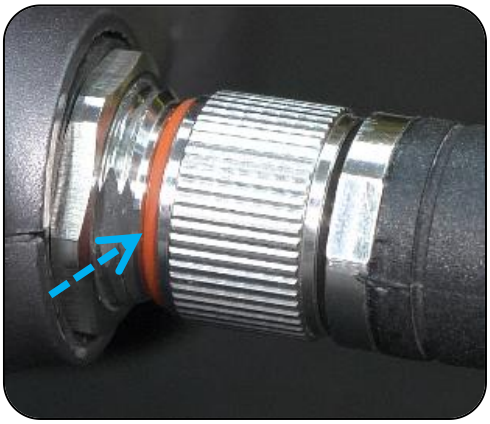




3.2.4. Put the secure loop around the rear fin and fasten it

3.2.5 Unscrew the protective cap (please keep it properly).[1]

3.2.6. Align the tether port with the cable port at the ROV, connect it and tighten the bolt[2][3]



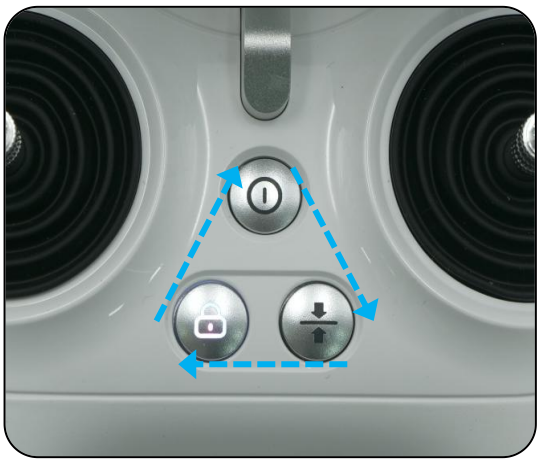
CAUTION:
[1] Please take good care of the protective cap, and cover it when the interface is dry after use
[2] Make sure the connector and interface are in a dry state before connecting
[3] Check whether the bolt is screwed to squeeze the O-ring

3.2.6. Turn ON the RC. Press and hold the ON/OFF button (3 seconds)

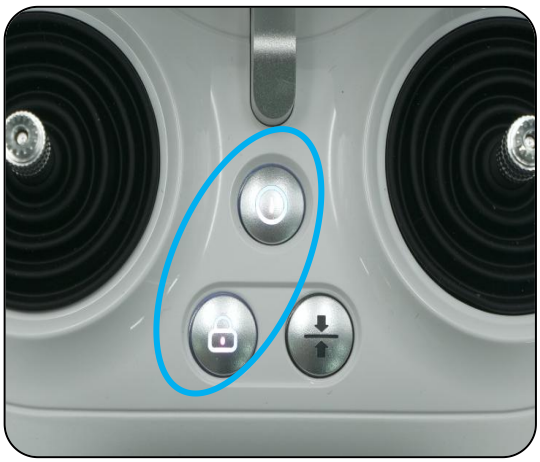
- RC will play 7 chimes from low to high (Do, Re, Mi, Fa, Sol, La, Ti)
- ROV will turn on automatically, and play 5 chimes (Do, Re, Mi, Do, Mi)

3.2.7. System connecting

The “ON/OFF”, “Depth Holding" and "LOCK/UNLOCK” will flash and rotate clockwise, which indicates "Ready to be connected“
In about 30 seconds, the "ON/OFF” and "LOCK/UNLOCK” buttons will stay solid that indicates the hardware connection successfully



3.2.7.1 connecting

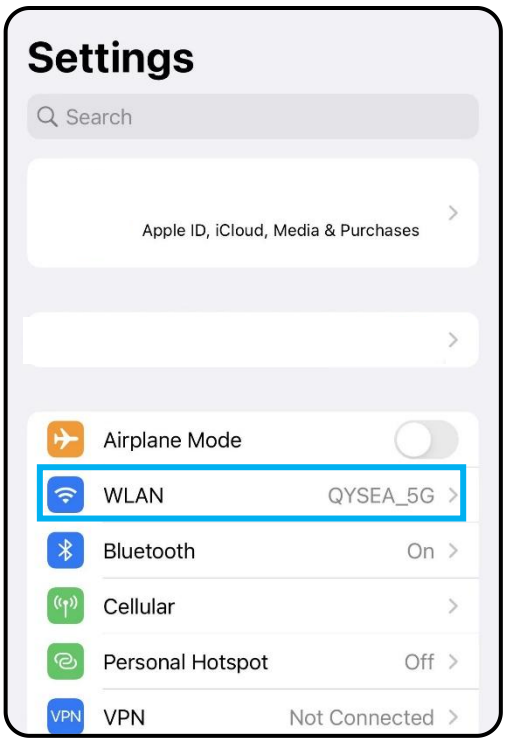


3.2.7.2 connected

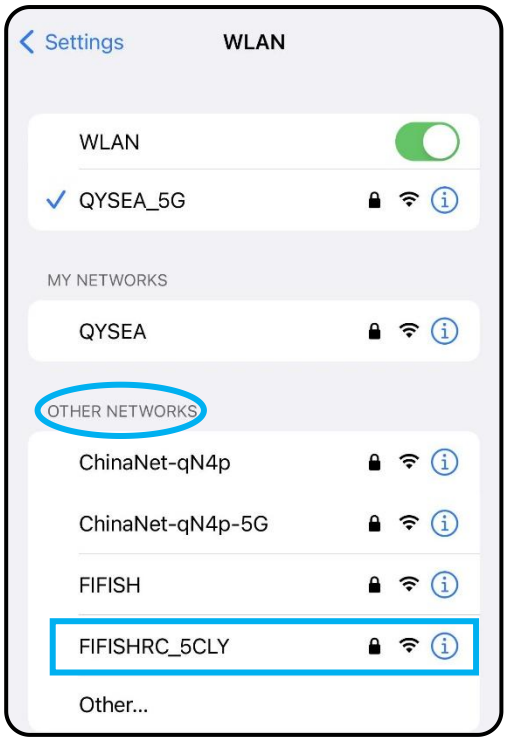
3.3. Software Connection

3.3.1. Smart device connect with the RC's Wi-Fi (5 GHz)

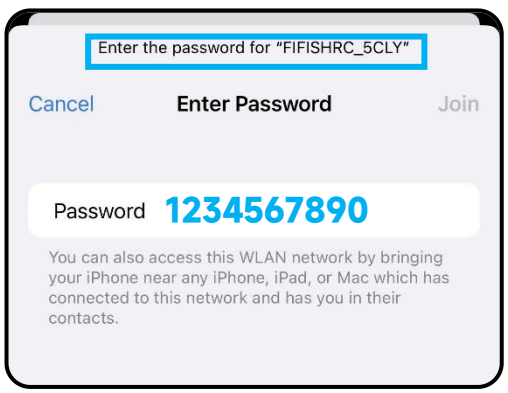
- Go to “Settings”, then “WLAN”
- Find the Wi-Fi network name “FIFISHRC_xxxx”
- Enter the password to connect, the default password is “1234567890”



3.3.1.1 System settings



3.3.1.2 Select RC’s Wi-Fi



3.3.1.3 Enter password

3.3.1.4 Connected

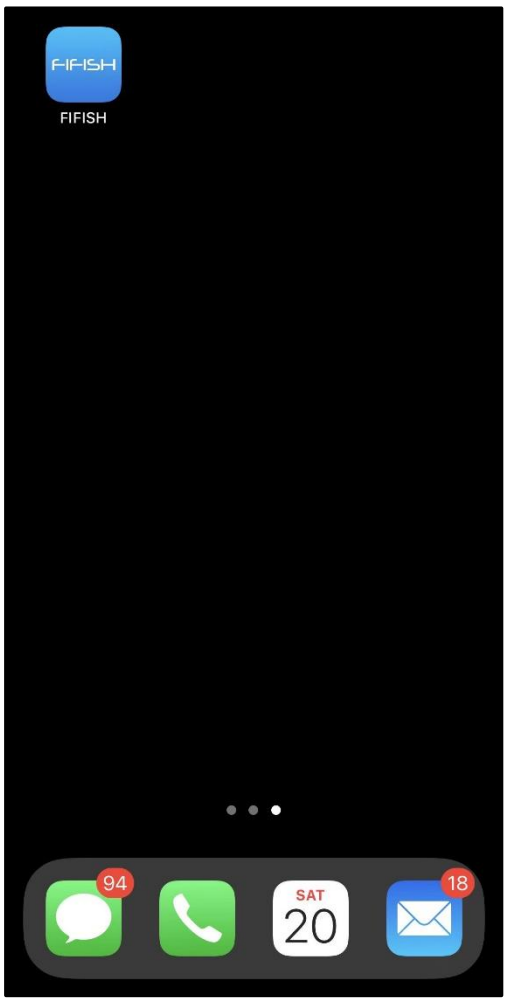
NOTE:

*You might see the note “No Internet Connection”, keep this connection and do **NOT** use your cell data.*

3.3. Software Connection

3.3.2. Open FIFISH App, then press "**Connect**"

- Allow access to photo albums, location, and notifications
- Even the network did not connect to internet, select the "**Keep Trying WLAN**" for iOS user, "**Stay Connected**" for Android user.



3.3.2.1 Open FIFISH App

3.3.2.2 Connected

3.4. Sensor Calibration

3.4.1. Go to **General Setting**
3.4.2. Select the **Sensor Icon**
3.4.3. Follow the hit on FIFISH App step by step, first ***Gyro-Acce*** then ***Mag***
3.4.4. **Reboot ROV** in FIFISH App, and Power ON/OFF RC if necessary

3.5. Deploy the ROV

- ONLY pulling on the tether to deploy the ROV into the water.
- Unlock the thrusters then start to dive.

NOTE:

The depth shall greater than 1 meter (about 3 feet) for better operate experiences.

3.6. Retrieve

6.1. **LOCK** the thrusters
6.2. **STOP RECORDING** the video before closing the FIFISH App
6.3. **ONLY PULLING** on the tether to retrieve the ROV

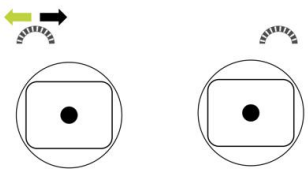
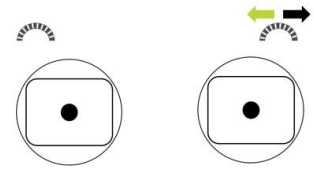
Controlling
Definition

Definition of Controlling

The FIFISH E-MASTER PLUS uses the patented ***Smart Thruster Array***™ to ensure the ultimate maneuverability and delivers the 6 DOF (degree of freedom).

- E-MASTER can move in descend & ascend, left and right, forward and backward.
- E-MASTER can rotate in 360 yaw (z-axis), 360 pitch (y-axis), 360 roll (x-axis).

We have simplified the Left Control Stick, Right Control Stick, Left Wheel and Right Wheel into the following symbol. The arrows on RC indicate the command and the arrows on ROV indicate the actual movements.

Simplified RC Command	Control Preferences	
	ROV Modes (USA/JPN/CHN)	UAV Modes (USA/JPN/CHN)
	 Ascend Descend	 Pitch Up Pitch Down
	Left  Right	Roll Counter Clockwise  Roll Clockwise

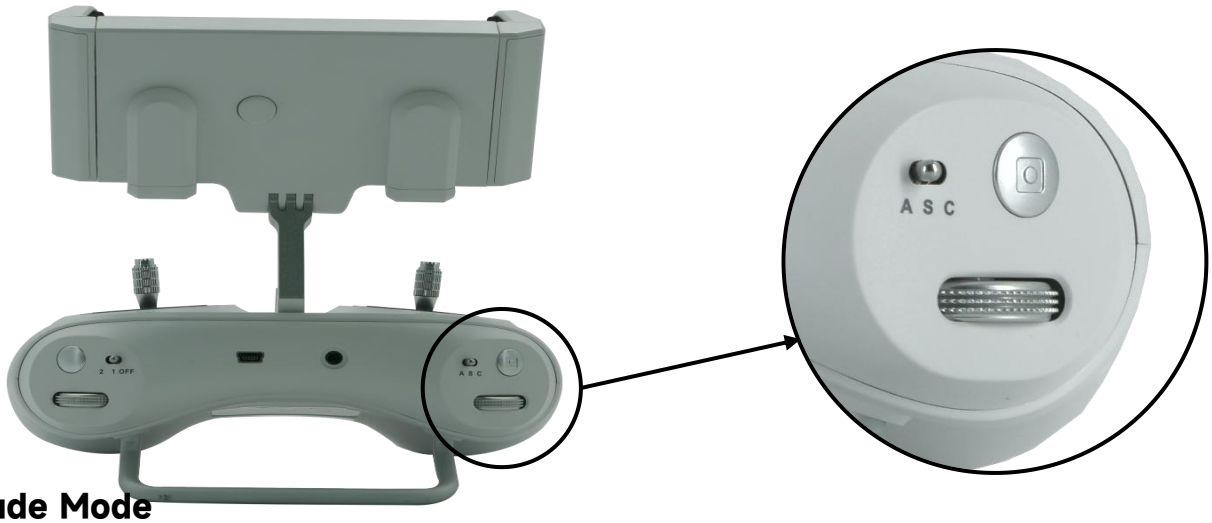
NOTE:

From the FPV (first person view) the **green** is rolling counterclockwise and **black** is rolling clockwise, and the rolling can activate in Sport or Combination Mode.

Controlling
Controlling Mode

Controlling Modes

FIFISH E-MASTER supports 3 modes for control: A, S, and C.
A is Attitude mode, S is Sport mode, C is the Combination mode.



Attitude Mode

Attitude mode is designed for beginners. The ROV will not roll in Attitude mode. The ROV will stay in same depth moving when depth holding is ON. Even with pitch angle, the depth will be the same.

Sport Mode

Sport mode is designed for skillful pilots. Sport mode will enable the rolling freedom, so, you will access all 6 degree of freedom of the ROV. Controlling and moving based on the FPV (Frist Person View), do not operate in third person view. The ROV will only stay in the same depth with no command input, when depth holding ON.

Combination Mode

User puts the mobile phone into VR glasses after turning ON VR mode in the FIFISH APP toolbox, and turns the controller to C mode. Combination mode activate the head tracking controlling via VR Goggle[1], which allow pilot to use the VR Goggle[1] to pitch, roll and yaw. Combination mode delivers the intuitive control and immersive experiences. Combination mode supports head tracking and remote controller working together.

Accessories Attached

The right wheel will **ONLY** be working in Attitude mode or Combination mode for motor driven accessories. *For example, robotic arm, water sampler, robotic fish clamp, and compass ruler, and Mud sampler etc.*

NOTE:

[1] To use Combination mode, users need to have user's own VR glasses or FIFISH VR Goggle ready

Post-Dive
Data Copy

5.1. Video/Photo Download

5.1.1. Connect with RC and ROV with the tether
5.1.2. Insert a microSD card in the RC
5.1.3. Software connecting

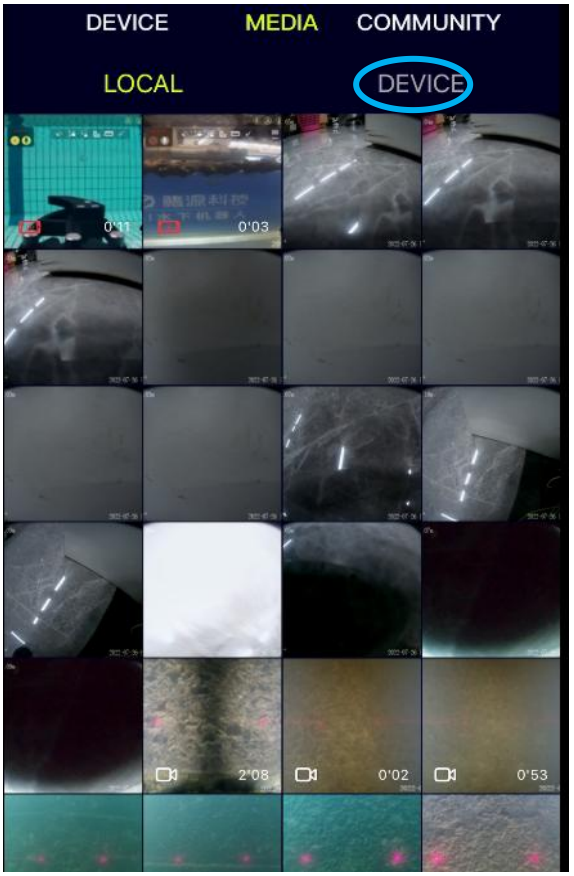
Post-Dive
Data Copy

5.1. Video/Photo Download

5.1.4. Please keep the remote control connected to the ROV when it is turned on.Turn ON the Depth Holding

5.1.5. Press **MEDIA**, then Press **DEVICE**

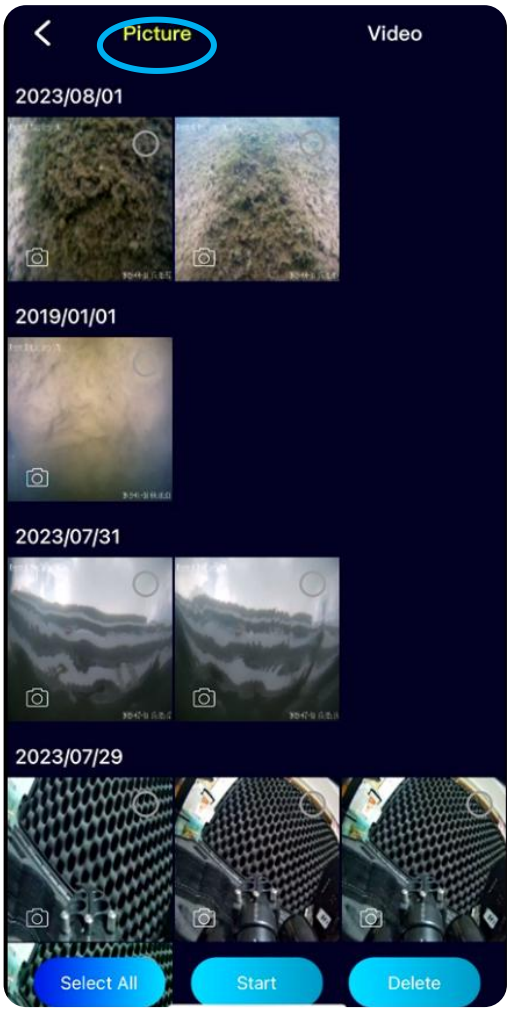
5.1.6. Select the Camera, SDCard 1 is the main camera, SDCard 2 is the secondary camera (Note: SDCard 2 only be displayed if equipped with Q-Camera)

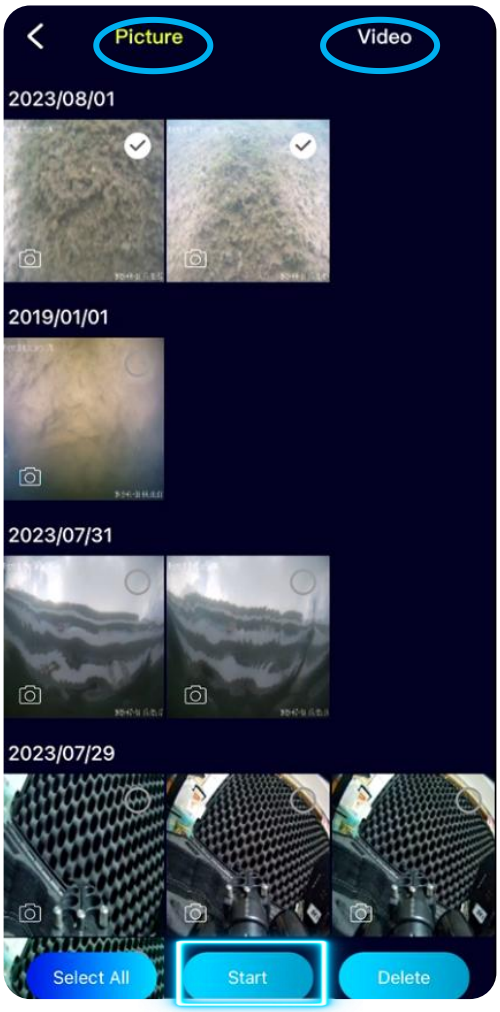


Post-Dive
Data Copy

5.1. Video/Photo Download

5.1.7. The default is **Picture**, select **Video** if you only want to copy out the videos
5.1.8. Press and hold on desired clip over 1 second, then you can select the clip(s) you would like to copy
5.1.9. After you satisfied then press the **Start**



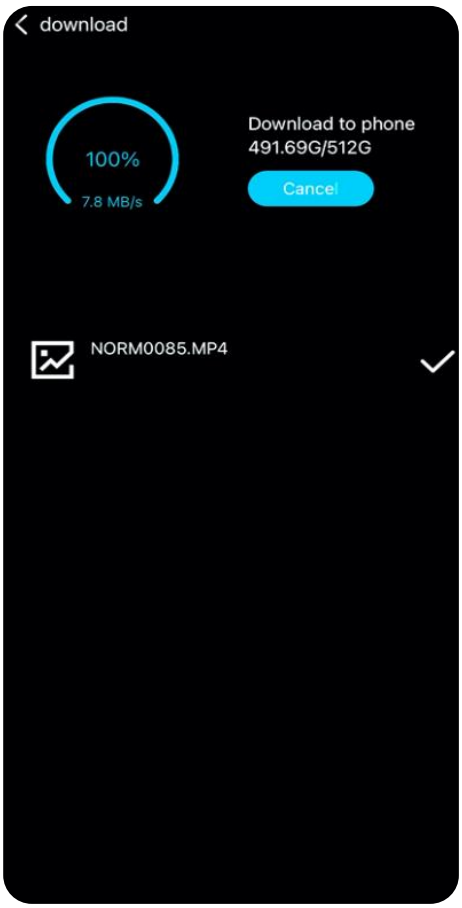


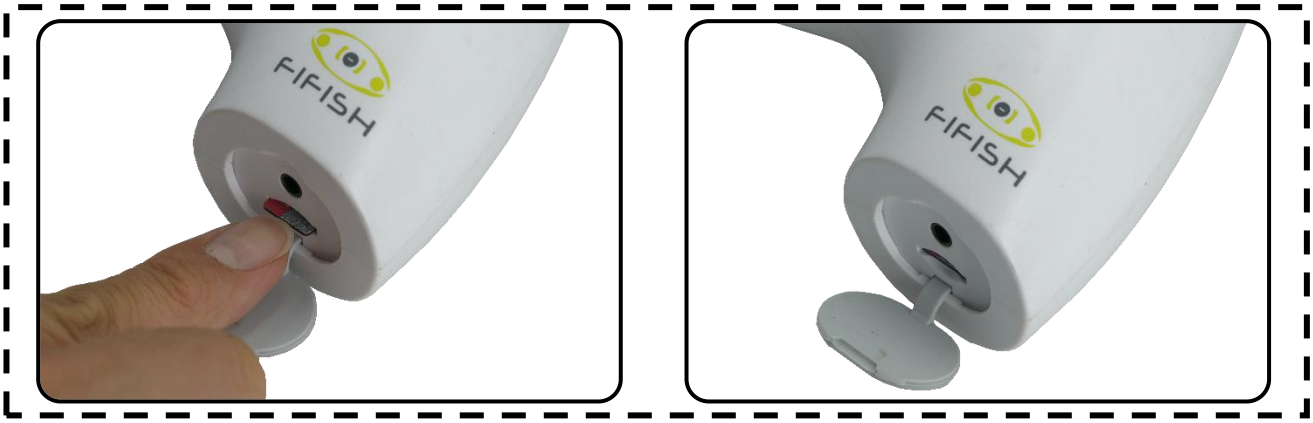
Post-Dive
Data Copy

5.1. Video/Photo Download

5.1.10. Select the place to copy

5.1.11. Do **NOT** minimize the FIFISH App while downloading





TIPS:

Please make sure that the remote control has an SD card inserted if you want to copy them to the remote control;

Post-Dive

Battery Installation & ROV Charging

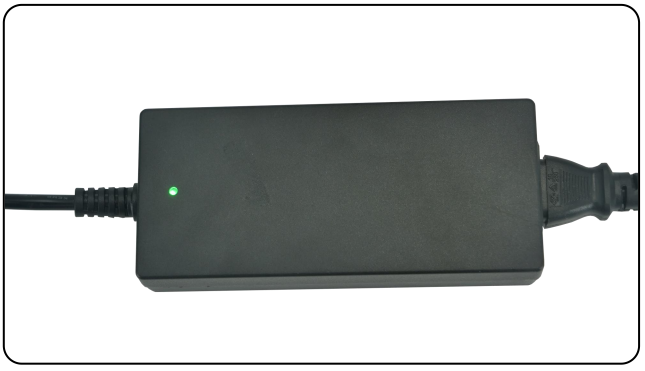
5.2. Battery Installation

5.2.1. Press the side buttons to unlock with one hand while pulling the battery with the other

5.2.2. Align two tabs on the battery to slots before pushing it to lock in place

5.3. ROV Charging

5.3.1. Unscrew the protective cap and connect the power adapter connector to the main cable connector and turn on the power.



5.3.2. The indicator light of the power adapter will turn red until it is fully charged and then turn green.

Caution:
The provided power adapter is exclusively designed for the FIFISH E-MASTER. It is strictly forbidden to use it with any other V6 series underwater ROVs. Any such usage is strictly prohibited and may result in damage to the ROV.

5.4. RC Charging

Flashing ON/OFF button means RC is charging
White steady ON/OFF button, RC is fully charged.

Red, less than 30%

Yellow, 30% to 70%

White, 70% or higher

TIPS: **NOT** plug into the tether port

Post-Dive

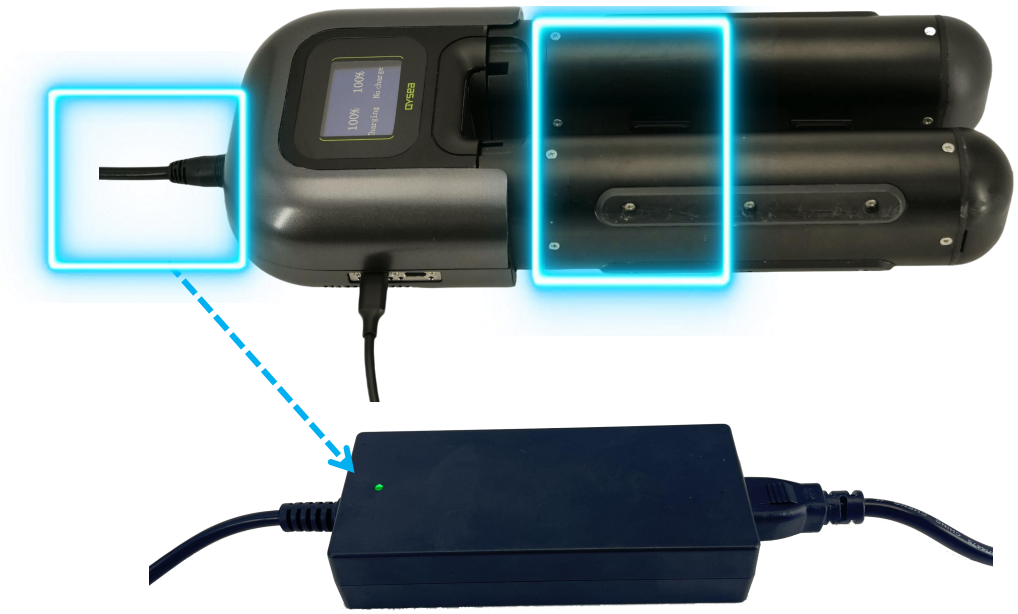
Q-Energy Station (Optional)

5.5.The Q-energy station comes with other accessories

5.5.1.The energy station comes with 1 type C cable and 1 type C to 3.5mm conversion connector.

Post-Dive
Q-Energy Station (Optional)

5.6.The main function of the Q-energy station
5.6.1.The energy station can be used to charge the underwater ROV's battery.



Note:
1.Only compatible with E-MASTER ROV's charger.
2.When using the underwater ROV's battery to power the energy station, please ensure that the battery's small connection ports remain clean and dry.

5.6.2.The energy station can be used to charge the underwater ROV's battery.

Post-Dive

Q-Energy Station (Optional)

5.6.3.The energy station can be used to charge the underwater ROV's battery while providing power to the HDMI box.

Post-Dive

Q-Energy Station (Optional)

5.6.4.The energy station can be used to charge the underwater ROV's battery and remote controller simultaneously.

Post-Dive
Q-Energy Station (Optional)

5.7.The Q-energy station can be used to supply power to other accessories
5.7.1.The energy station can be used to power the HDMI box.

Post-Dive
Q-Energy Station (Optional)

5.7.2.The energy station can be used to charge the remote controller.

Post-Dive

Q-Energy Station (Optional)

5.8.The underwater ROV's battery can be used as an external power source for the Q-energy station

5.8.1.The underwater ROV's battery can be used as an external power supply for the energy station to power the HDMI box when the charger is not around.

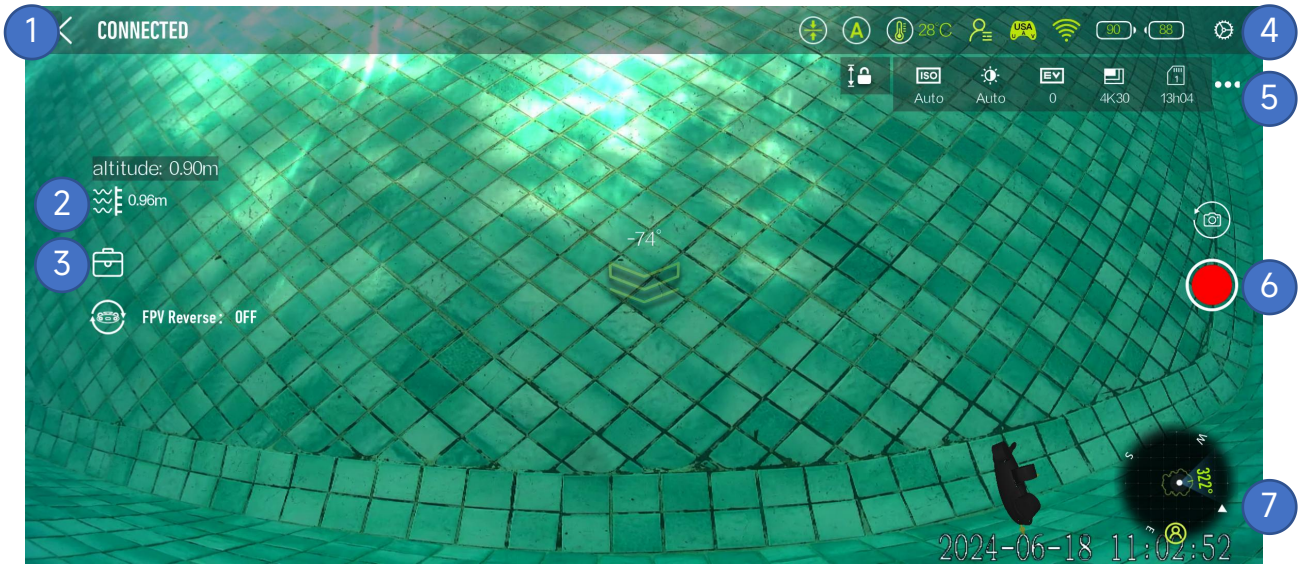
Post-Dive

Q-Energy Station (Optional)

5.8.2.The underwater ROV's battery can be used as an external power supply for the energy station to charge the remote controller when the charger is not around.

FIFISH App

User Interface



FPV Interface in FIFISH App

1. Status
2. Depth
3. Toolbox
4. General Settings
5. Image/Video Setting Shortcut
6. Image/Video Button
7. Compass

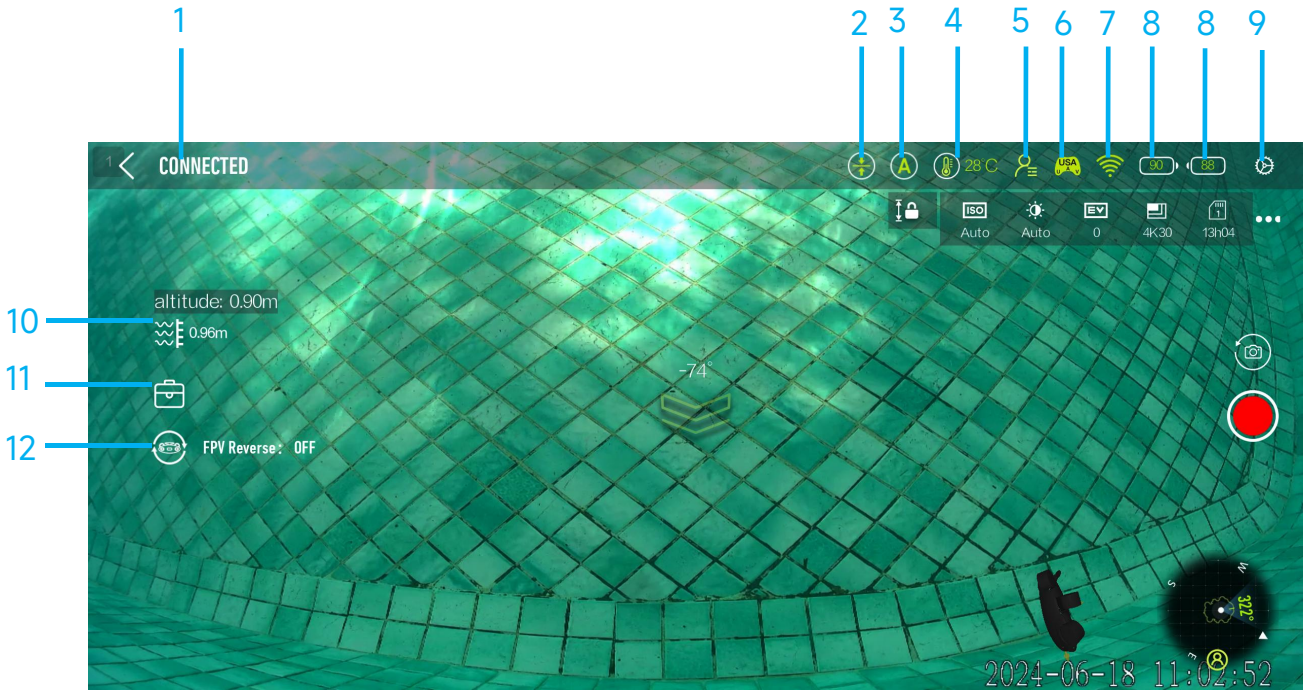
Note:

The FIFISH application interface is Android version of 4.9.0. To provide a better user experience, QYSEA software team will continuously update FIFISH application. Please contact our technical support team if you encounter any problems.

Email: support@qysea.com

FIFISH App

User Interface



1.System Status: Connected and Offline status

2.Depth Holding: ON/OFF

3.Control Mode: Displays the current flight mode

4.Water Temperature: Displays the current water temperature in C/F

5.Pilot or Spector Status: Displays the current observer player

6.Controlling Preference: Displays the current cotrolling preference

7.RC's Wi-Fi Signal: Display the remoter controller Wi-Fi status

8.ROV's Battery: Displays the current battery level

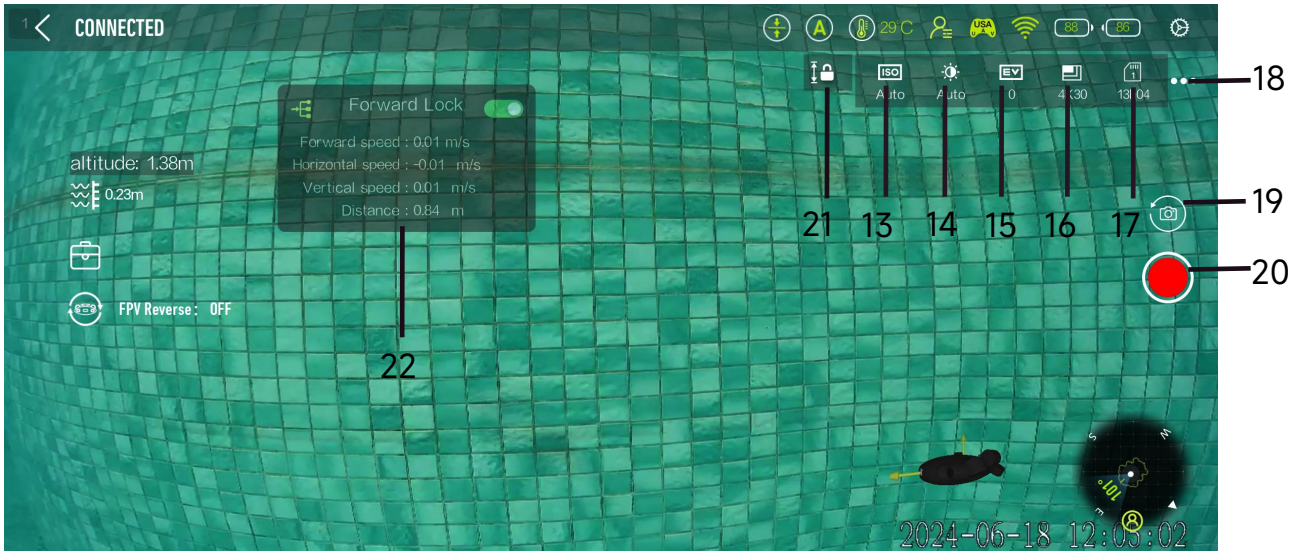
9.General Setting: General settings provide information about system setting, Controlling Preferences, Sensor Calibration and Main Camera Internal Storage.

10.Depth: The distance from water surface to depth gauge

11.Toolbox: Contains Special Features and Attachment Features

12.FPV Reverse: The ROV and the lens will both turn over simultaneously.

FIFISH App
User Interface



13.ISO: Setting the ISO between 100 to 6400

14.White Balance: Setting the parameter of WB

15.Exposure Value: Setting the exposure value

16.Resolution Frames Rate: Setting the number of pixels displayed on a screen

17.Remaining Time / Pics: Displays the remaining number of photos or video recoding time on the current micro SD card

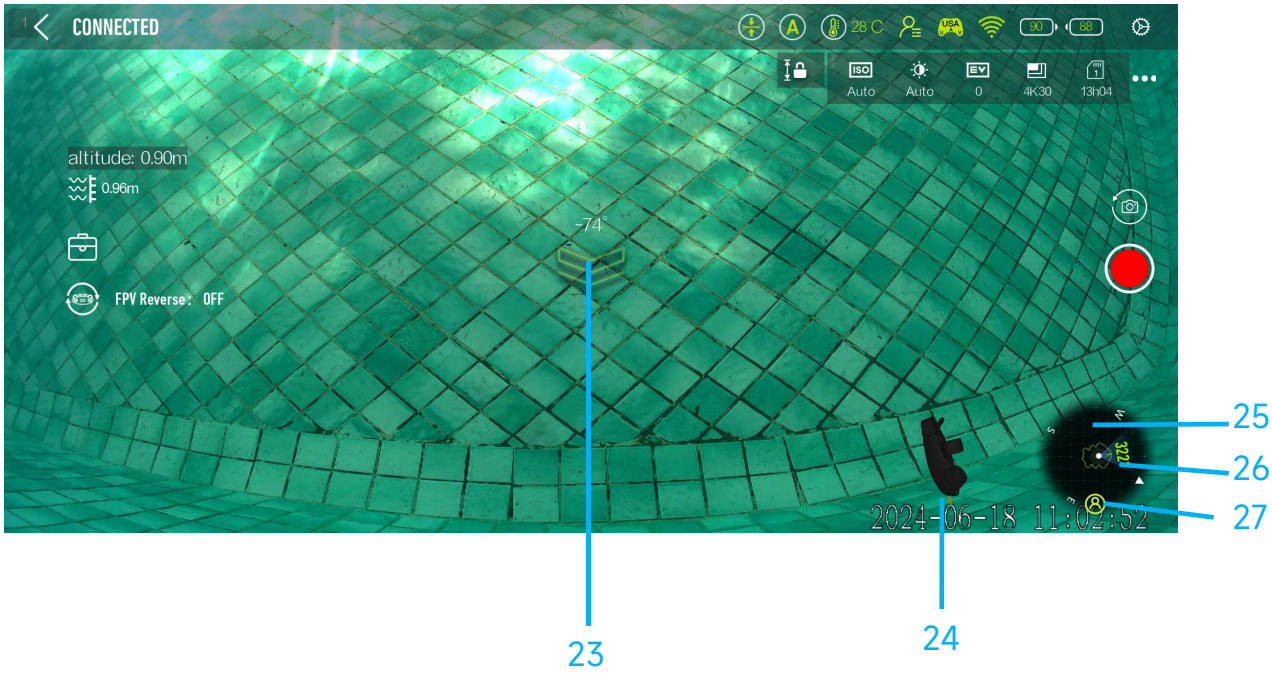
18.Camera Setting: Provides more setting of camera

19.Video / Photo Mode Switch: Tap to switch the Video and Photo mode

20.Record / Stop / Snap

21.Altitude Lock: Maintain a fixed distance between the ROV and the seabed

22.Forward Lock: Maintain a fixed position or hold station in the water despite currents



Navigation Information

23.Pitch Angle: Displays the current pitch angle, Heading down is in a minus digit degree with downward arrow; Heading up is in a positive digit degrees with upward arrow

24.Posture in 3D Model: Displays the current ROV posture

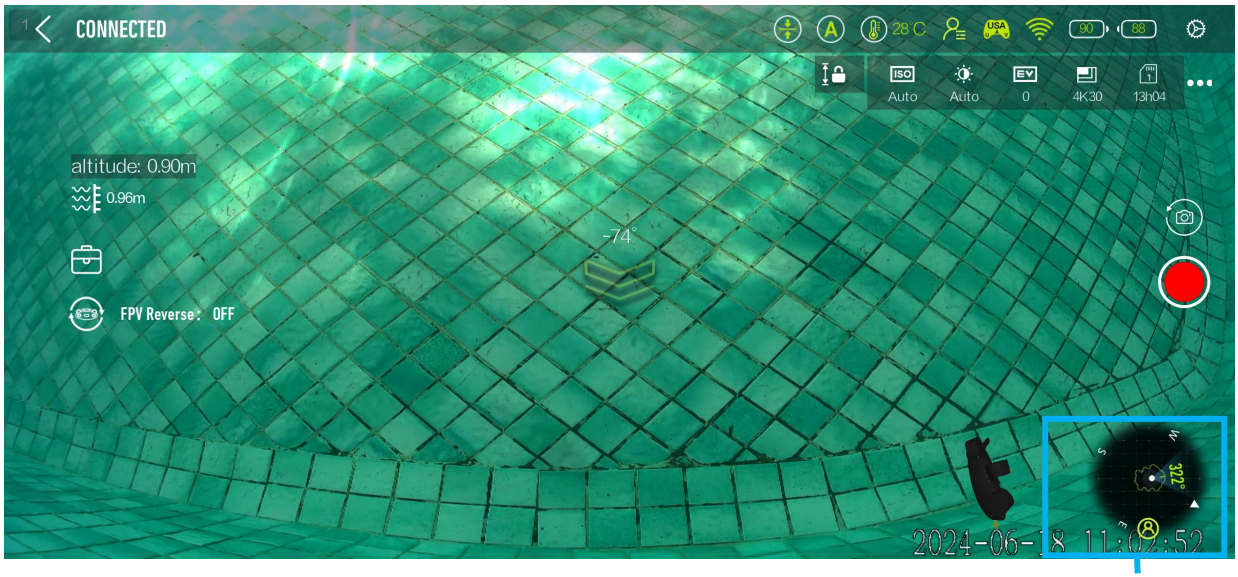
25.Compass: Match with the smart device, shows the cardinal directions used for geographic orientation

26.Heading in Degrees: 0° is North, 90° is East, 180° is South, 270° is West.

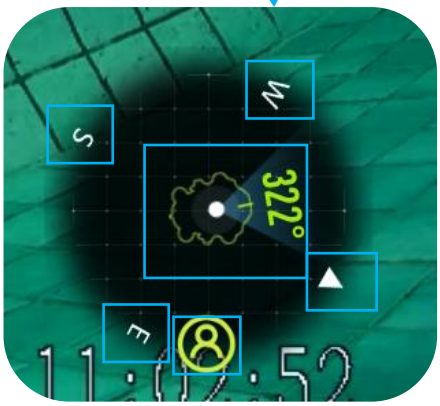
For Example, 322° is facing North West

27.Pilot's Facing Direction: The icon showing on the compass.

For Example, the pilot is North East



Pilot's Facing Direction & ROV's Heading:



1. As shown in green, the pilot icon is located between North and East, so the pilot's orientation is East of North.

2. As shown in blue, the heading degree of the ROV is 322°, which lies between the North and the West.

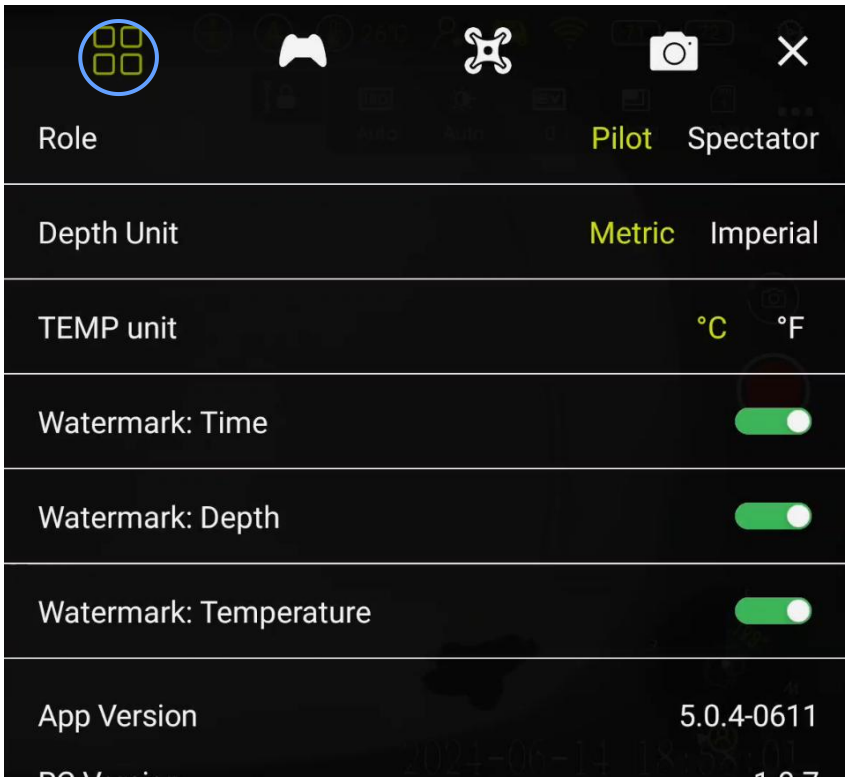
NOTE:

1. It can not be recognized the relative position directly by the controller's orientation and the heading degree of the ROV.

2. The most intuitive way to judge the position of the ROV relative to the operator is to float the ROV to the surface or visually observe the position of the ROV along the tether direction.

FIFISH App
System Setting

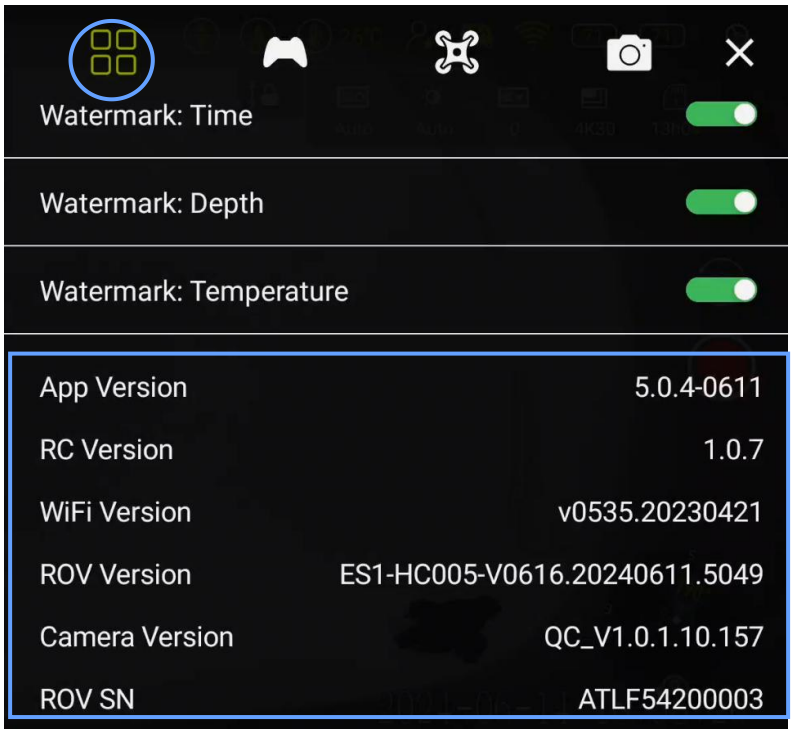
General Settings, Select **System Setting Icon** in 1st column



- If you have 2 devices connect to the RC, role are including **Pilot** and **Spectator**
- ONLY the "**Pilot**" can manipulate the settings, such as control preferences, camera settings, etc.
- The "**Watermark**" ON will record to video or write on photo, "Watermark" OFF then no trace on video or photo
- Watermark in Time, FIFISH Logo, ROV Depth, Water Temperature

FIFISH App
System Setting

Scroll down the system setting, the system version information will show up



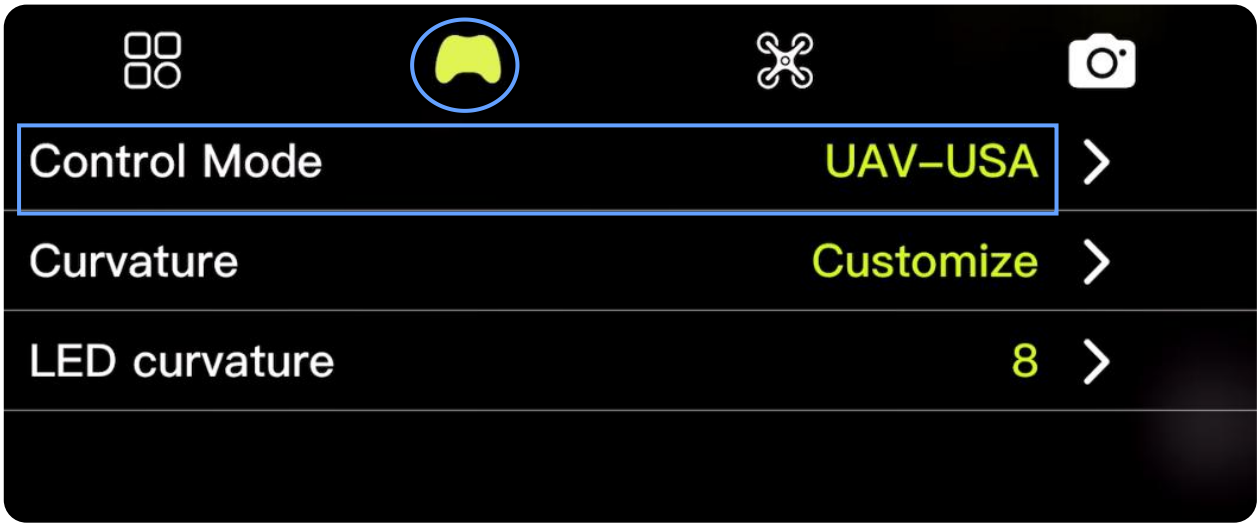
- The App Version is the FIFISH App version in your cell or tablet
- The RC Version is the RC's motherboard version
- WiFi Version is the RC's Wi-Fi module version
- ROV Version is the ROV's current software version
- Camera Version is the camera module software version
- ROV SN is the identical SN for this ROV

NOTE:
Screen shot of these versions for remote technical support when you are facing any issues.

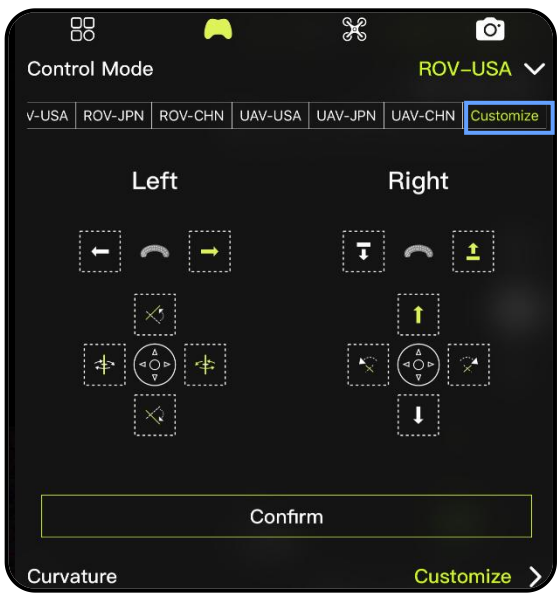
FIFISH App
Control Setting

Controlling Preferences

General Settings, Select **Controlling Preferences Icon**  in 2nd column



- Click "**Control Mode**", the default is ROV-USA Control Mode, you can select your preferences if you like
- Click "**Confirm**", after setting

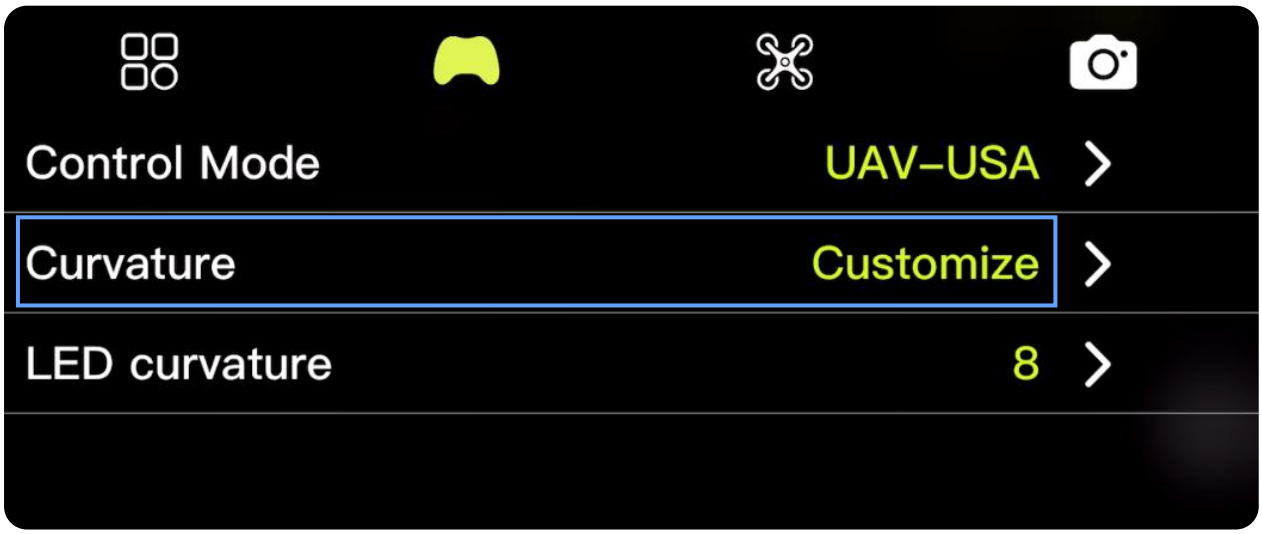


***As for advance level pilot seek for customized setting demo. Please check FIFISH authorized local Dealer or Service Center for more details and training programs.*

FIFISH App
Control Setting

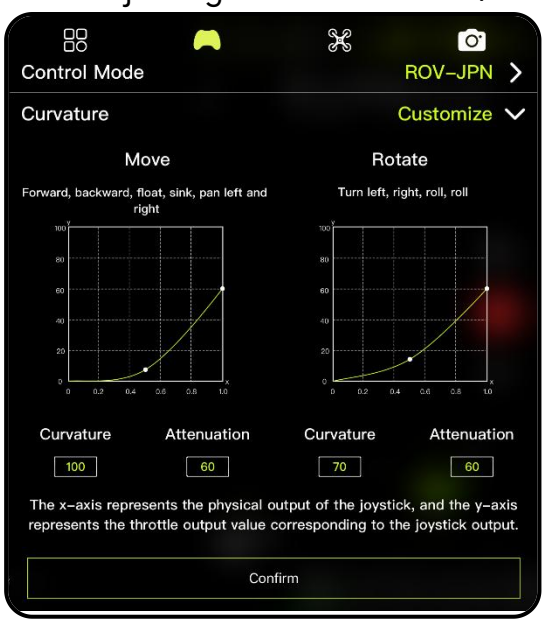
Control Curvature

For the advance level pilot, the curvature setting can provide more **Accurate** and **Smooth** operating experiences.



Set the Move & Rotate

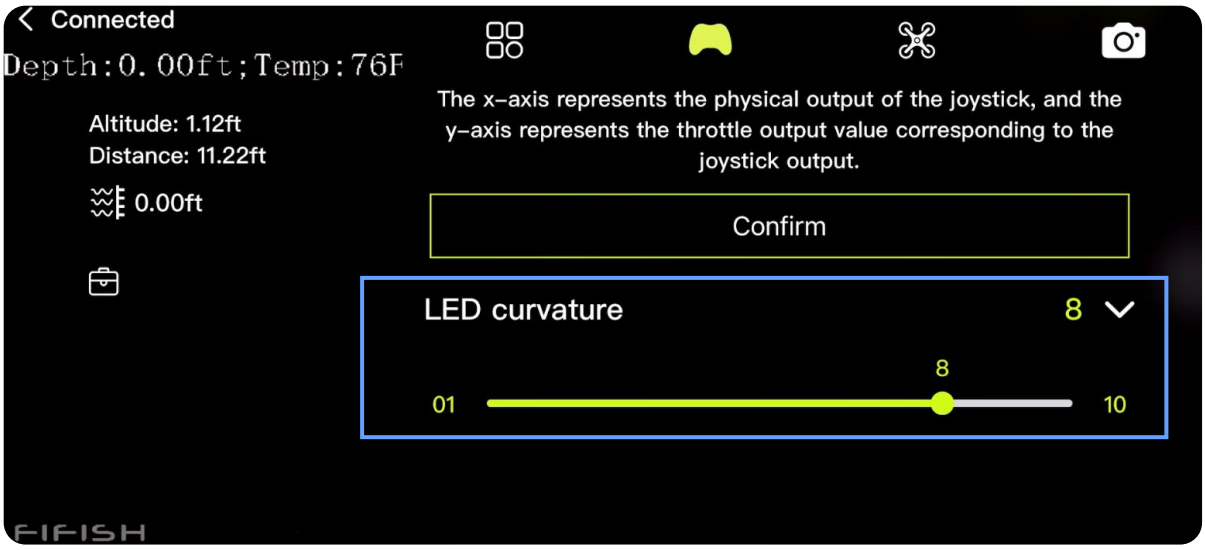
- Adjusting the curvature (set the center sector output sensitivity)
- Adjusting the attenuation (set the maximum output)



***As for advance level pilot seek for explore curvature setting tips. Please check FIFISH authorized local Dealer or Service Center for more details and training programs.*

LED Curvature

For LED curvature, more brightness level adjustment can be made by dragging.

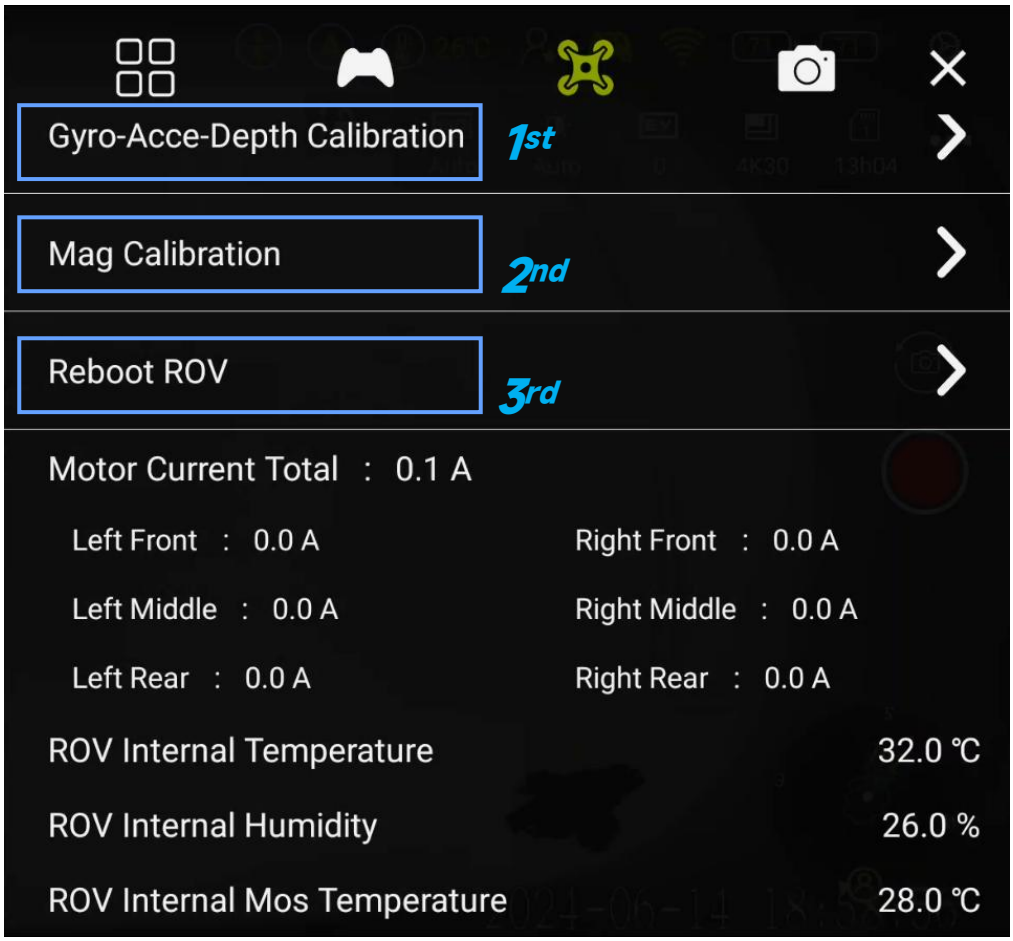


CAUTION:
Avoid extended use of the LED fill light near water, as prolonged exposure to high temperatures may lead to the LED module burning out.

FIFISH App
Sensor Calibration

Sensor Calibration

Select the **Sensor Icon** in 3rd column



- Follow the hit on FIFISH App step by step, first **Gyro-Acce** then **Mag**
- **Reboot ROV** in FIFISH App, and Power ON/OFF RC if necessary
- ROV internal status monitoring

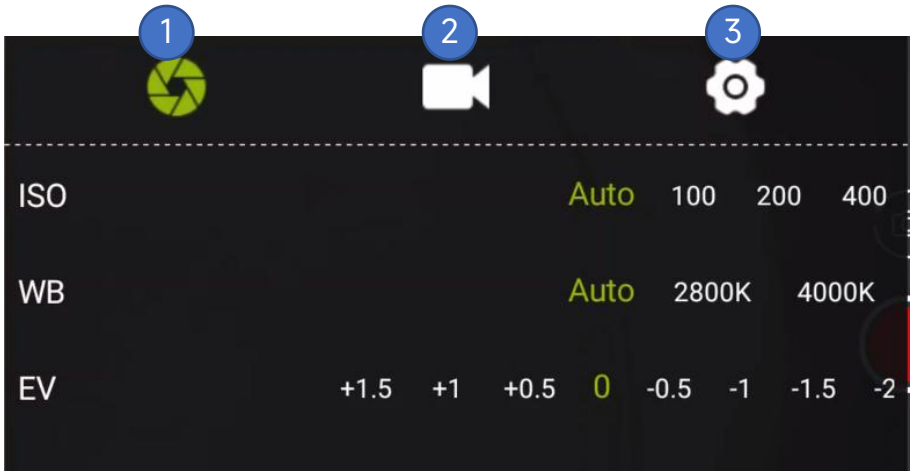
FIFISH App

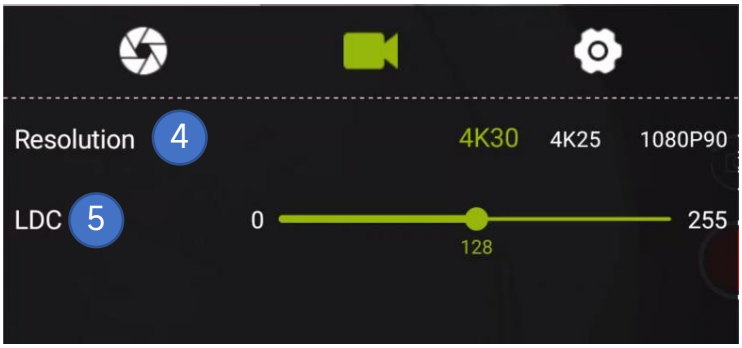
Storage

The **Main Camera Internal Storage** is ROV's main camera internal memory status.

- Click "**Main camera internal storage format**" will erase the internal memory of main camera
- Click "**restore factory settings**" will reset to default camera settings

FIFISH App
Camera Setting





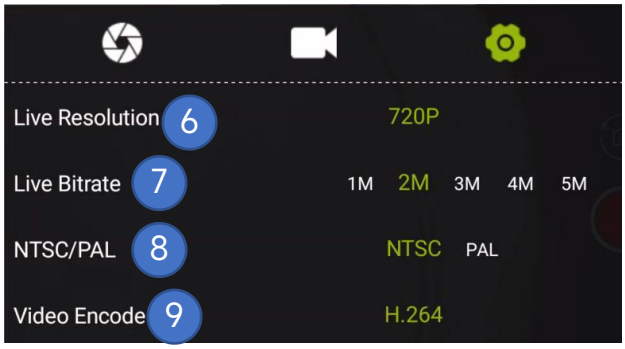


Image Settings

1. Exposure and WB
2. Video Setting
3. Camera General Setting
4. Resolution
5. LDC

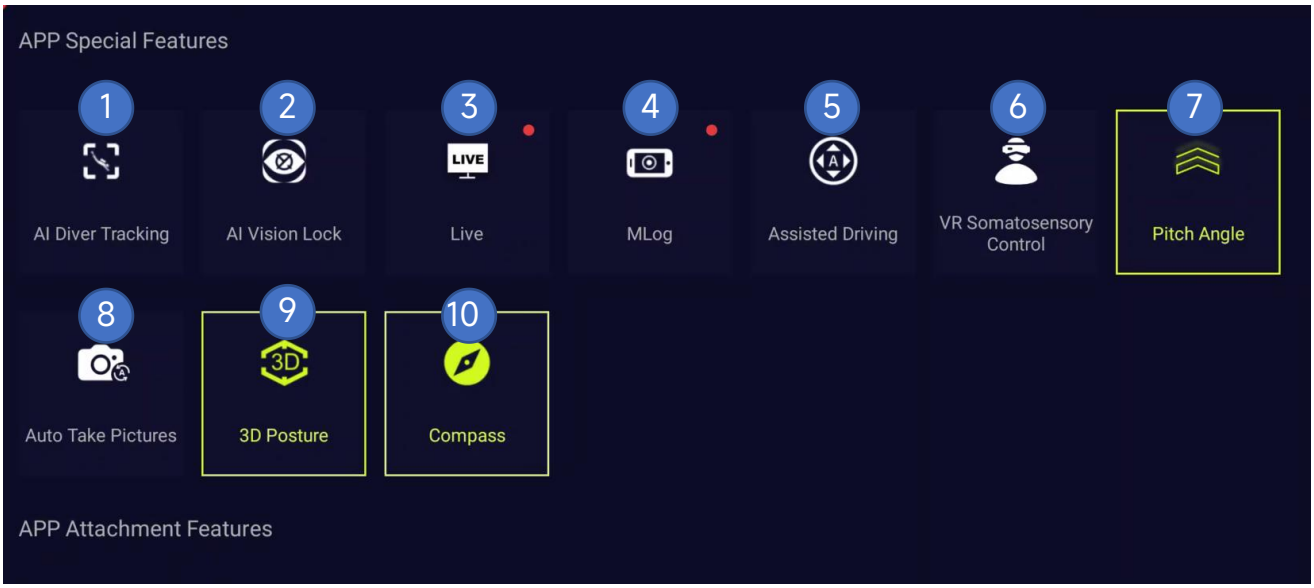
Camera General Setting

6. Live Resolution on FPV
7. Live Bitrate on FPV
8. NTSC/PAL
9. Video Encode

NOTE:

Shortcut camera setting will have the same results.

FIFISH App
ToolBox



Special Features:

1. Diver Tracking
2. Vision Lock
3. Live Streaming
4. M-log
5. Assisted Driving
6. VR Mode
7. Pitch Angle ON/OFF
8. Auto Take Pictures
9. 3D Posture Model
10. Compass

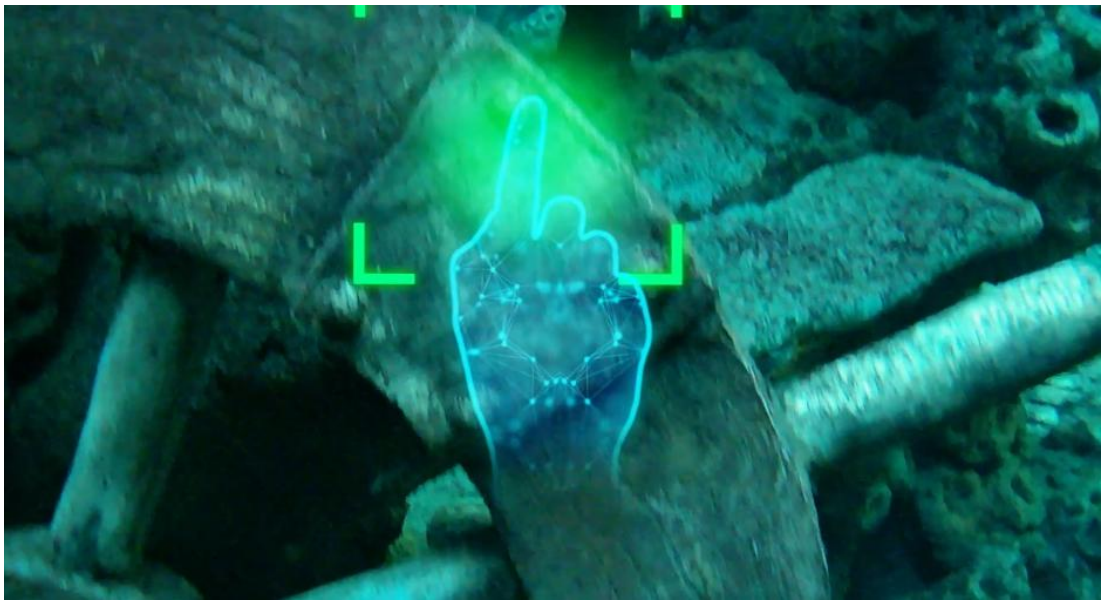
Note:
The 'Attachment Features' can only be enabled with a specific accessory. Please refer to the user manual of the corresponding accessory for detailed operation.

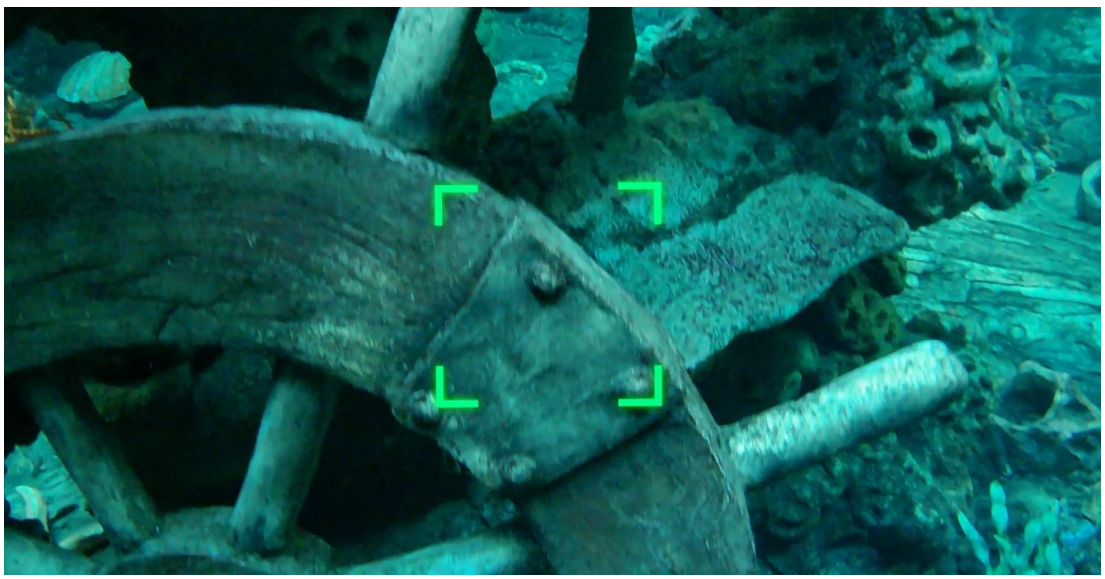
Vision Lock

Lock the positions of objects at focus

Click the icon  to activate vision lock

1. Click the position on the screen, and the ROV will move and adjust the clicked area to the centre of the field of vision





NOTE:

It is not recommended to use this Vision Lock in an unfamiliar environment

Vision Lock

Lock the positions of objects at focus

Click the icon  to activate vision lock

2. Touch the screen for a few seconds with your finger and drag it in the (up/down/left/right) direction, which can realize the dragging of the visual field in the screen.

NOTE:

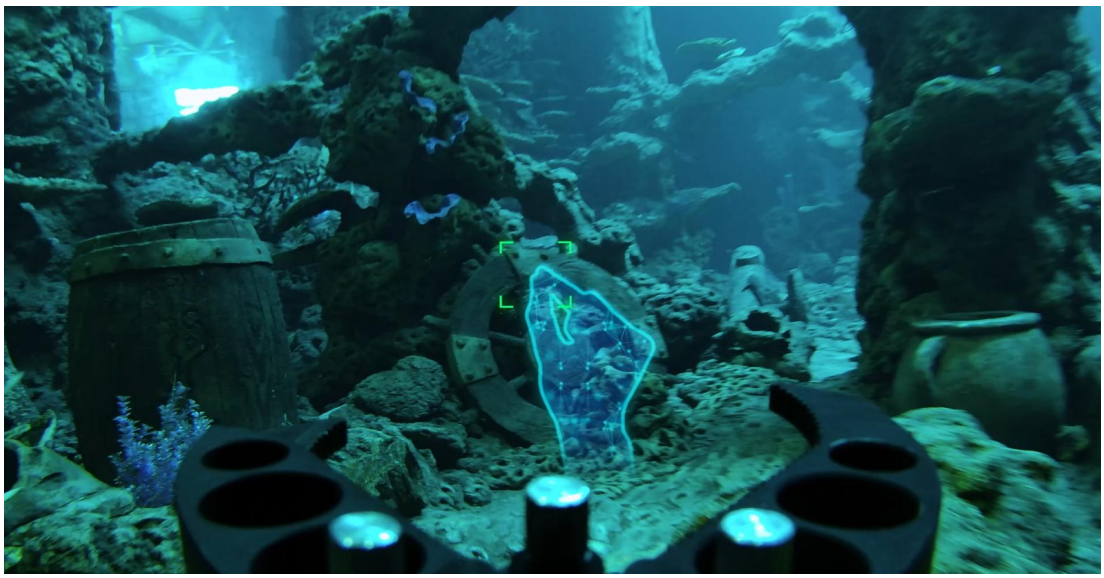
It is not recommended to use this Vision Lock in an unfamiliar environment

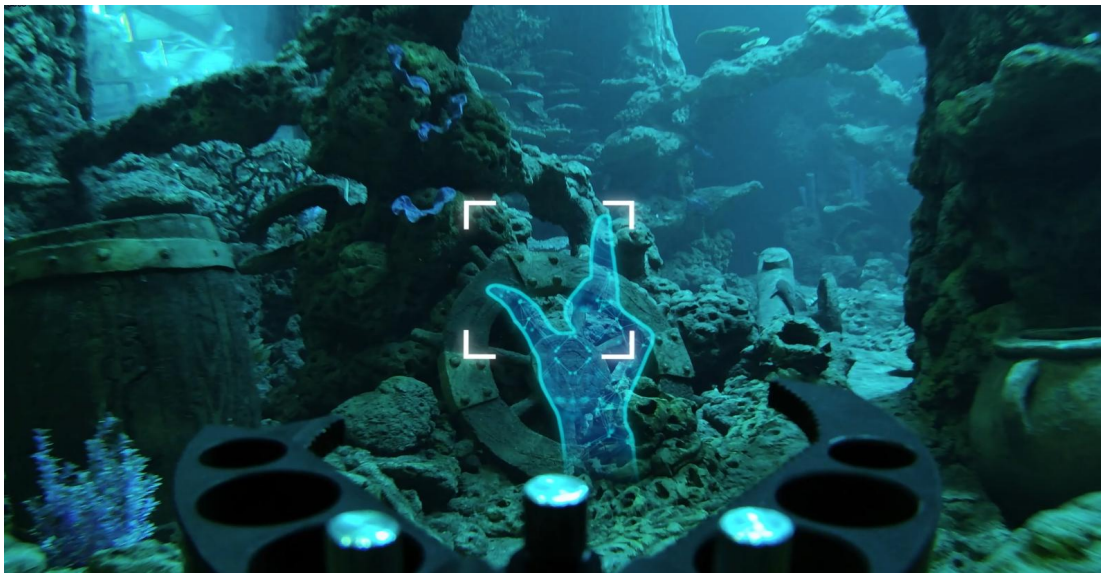
Vision Lock

Lock the positions of objects at focus

Click the icon  to activate vision lock

3. Two fingers press the screen for seconds, and when you open/clamp your fingers to make a zoom-in/zoom-out gesture, you can zoom in/out the current picture of the camera's field of vision





NOTE:

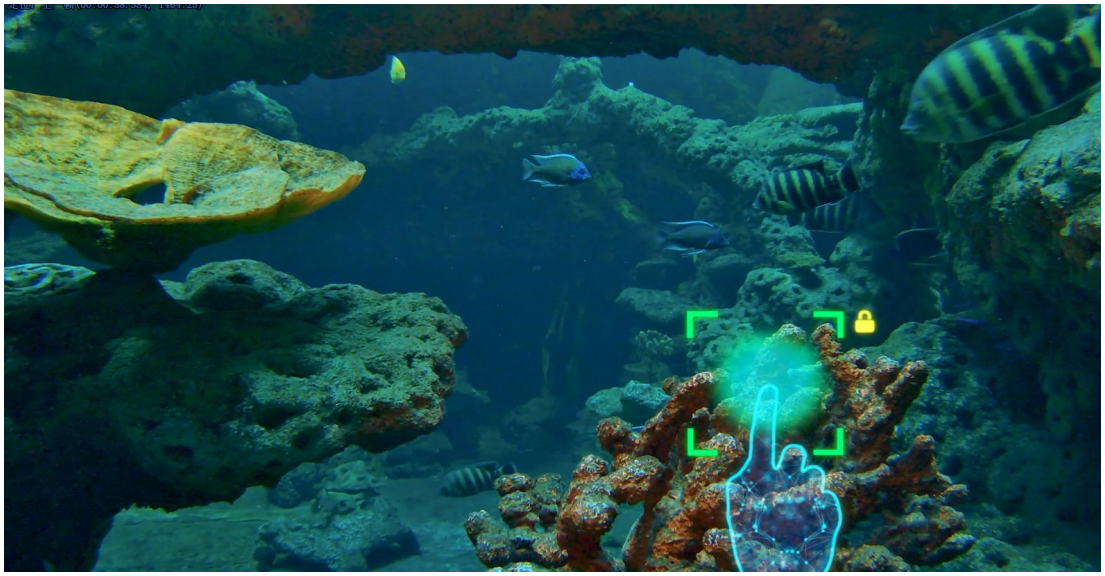
It is not recommended to use this Vision Lock in an unfamiliar environment

Vision Lock

Lock the positions of objects at focus

Click the icon  to activate vision lock

4. Touch the target area for seconds to lock the area/static object in a fixed position on the screen, so that the field of vision can be fixed at the current position without refocusing on other moving objects.



NOTE:

It is not recommended to use this Vision Lock in an unfamiliar environment

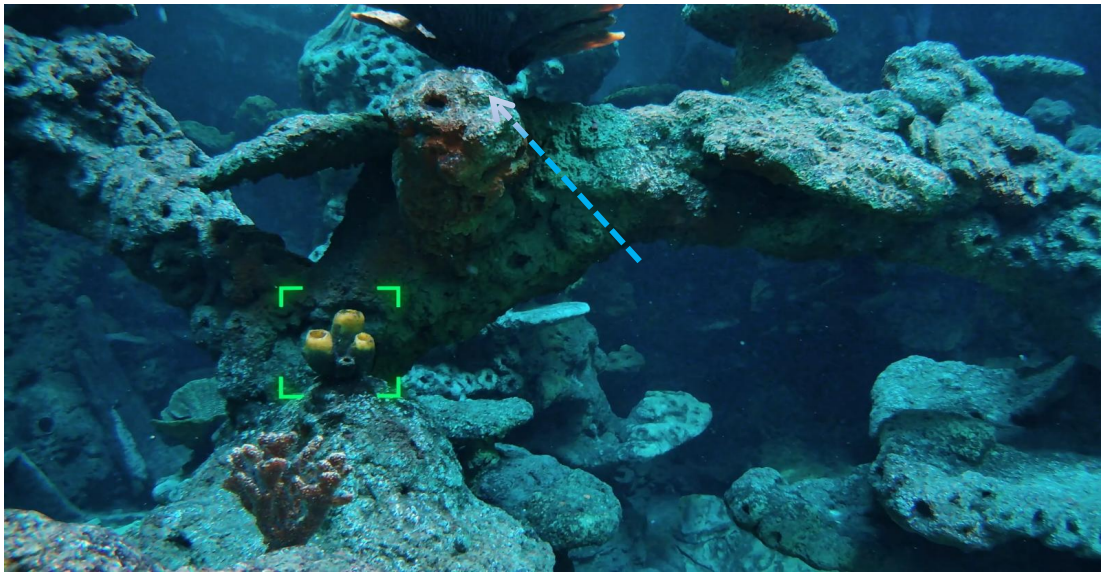
Vision Lock

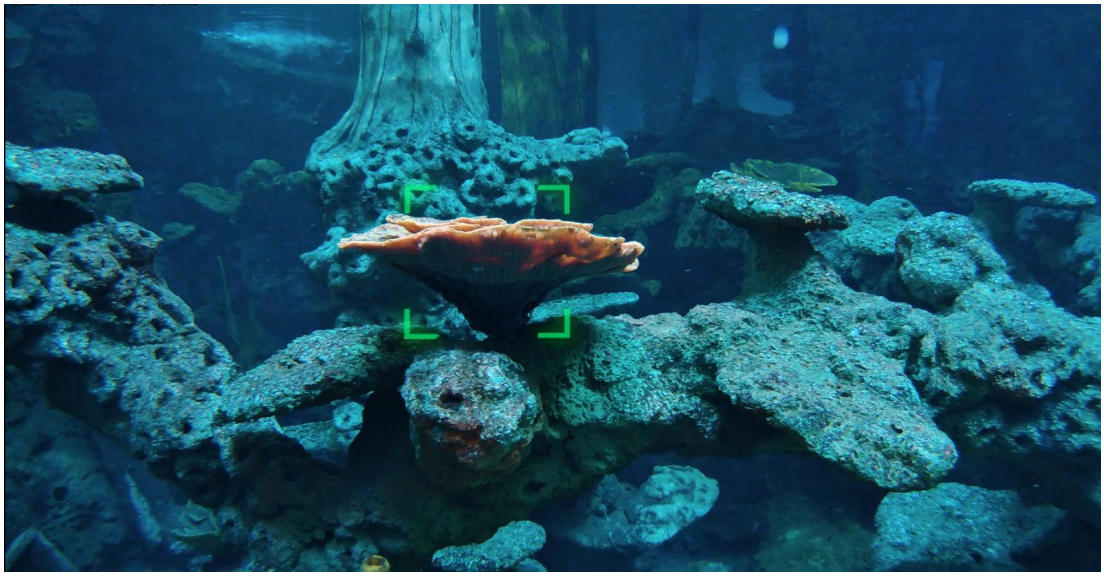
Lock the positions of objects at focus

Click the icon to activate vision lock

5. Click the icon to use dynamic lock

When controlling the ROV to move (forward/backwards, left/right lateral, ascend/descend), the algorithm will recognize the object again and refocus it.





NOTE:

It is not recommended to use this Vision Lock in an unfamiliar environment

Vision Lock

Lock the positions of objects at focus

Click the icon  to activate vision lock

How do realize the Surround shooting?

Move the certain stick to perform turning left/right or pitching up/down.

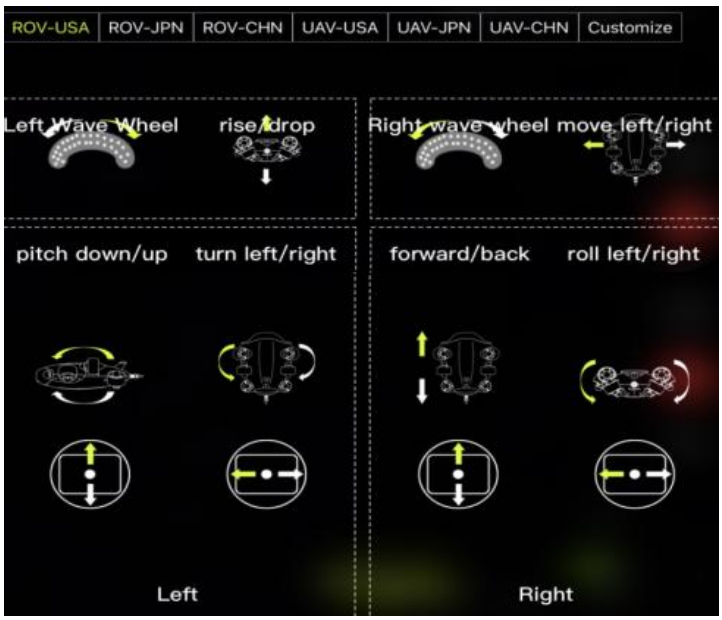
Taking the ROV-USA mode, for example, push the Left stick on RC in a single direction.

(Note: Keep the focused object on the screen)

The reason fail to perform:

1. The target is moved out of the view of the ROV

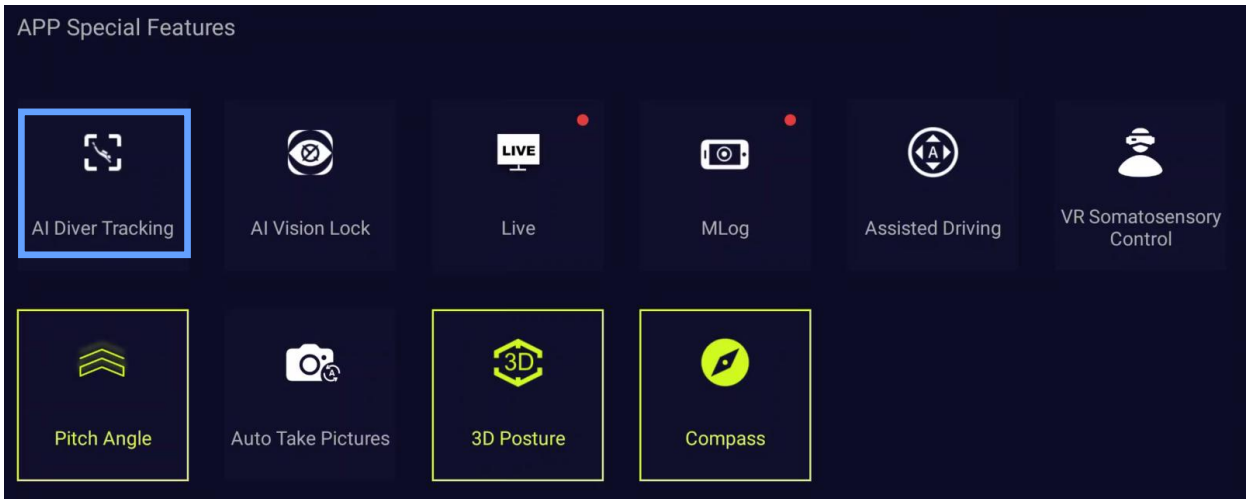
2. Move the driving stick/rod the perform moving forward/ backward/ left/ right/ rising/ dropping, which enable the ROV to unlock the object.



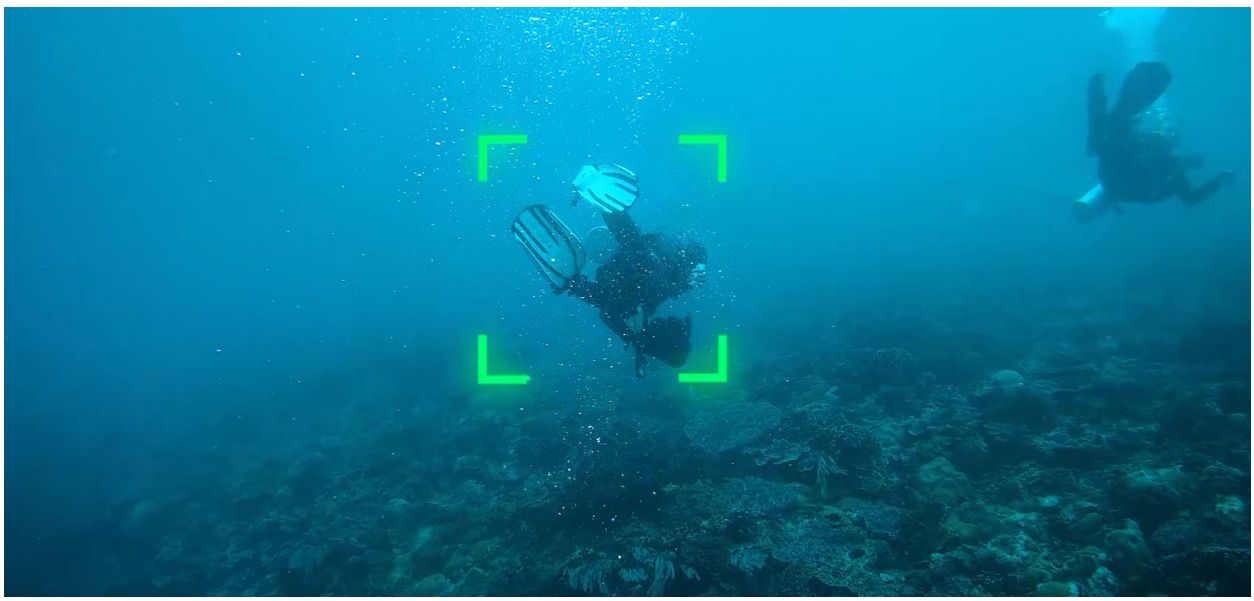
Diver Tracking

Track the real-time position of the diver underwater

Click the icon  to use the tracking function of the ROV



Click the icon  to enable the tracking of a single diver

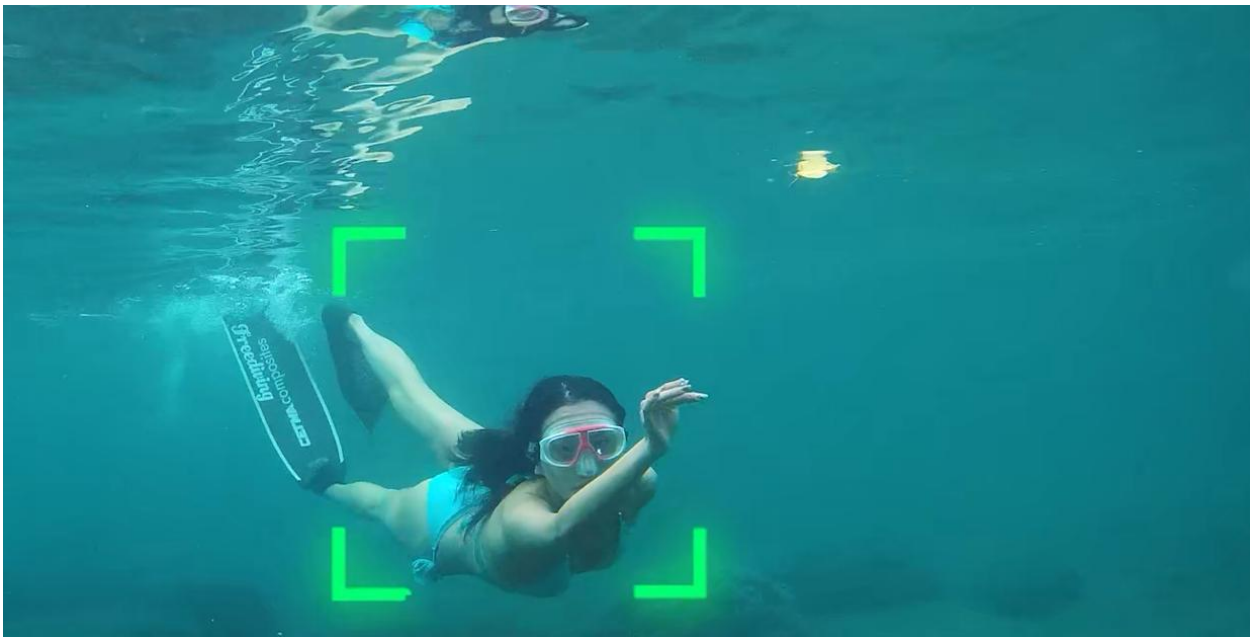


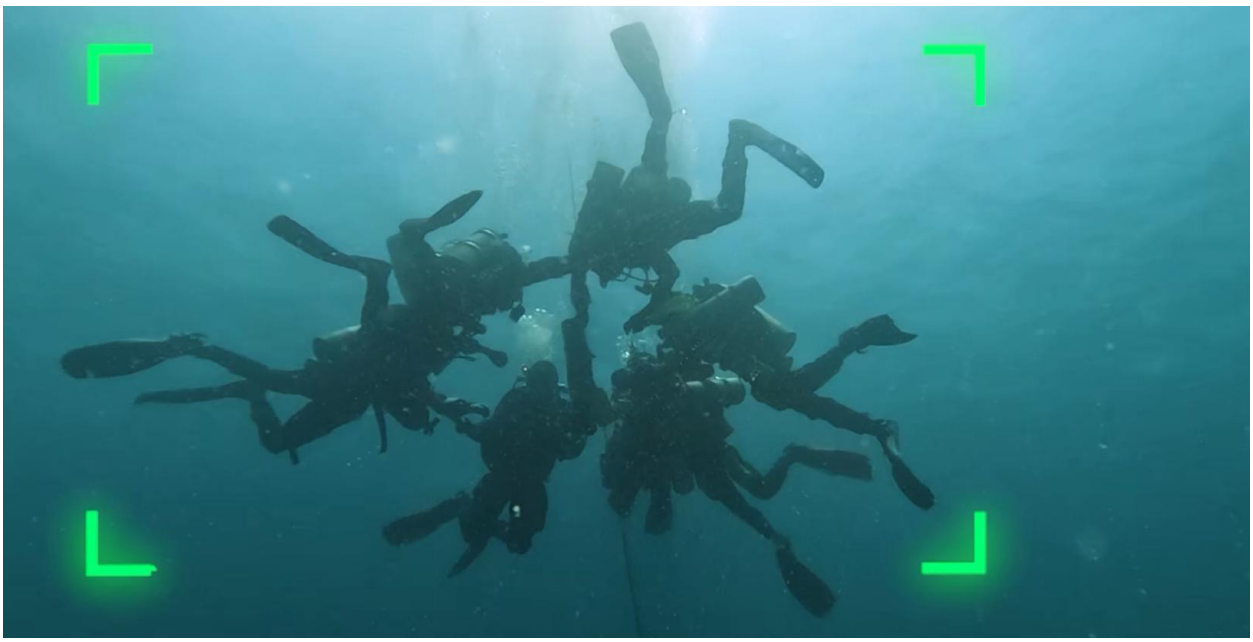
Diver Tracking

Track the real-time position of the diver underwater

Click the icon  to enable the tracking of either a single diver or a group of divers simultaneously

Click the icon  to adjust the distance between the ROV and diver

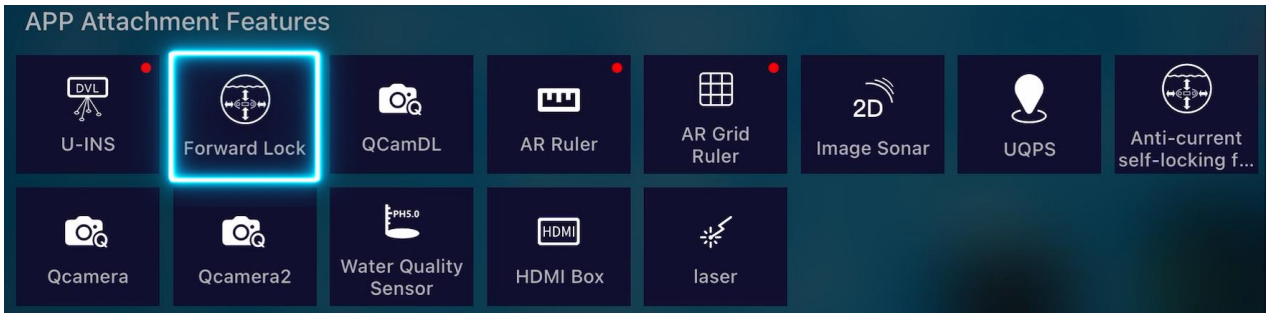




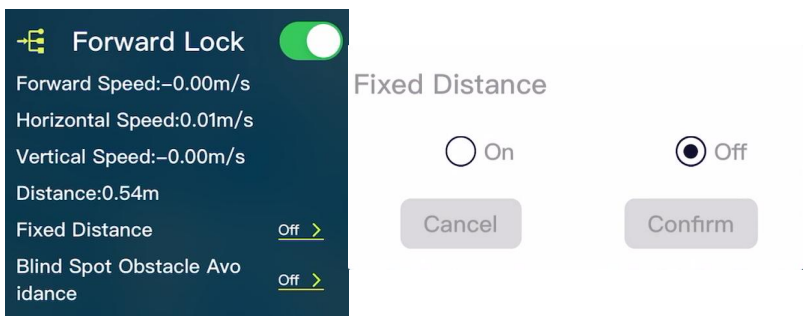
Forward Lock

To enhance the stability and efficiency of underwater ROVs for underwater tasks.

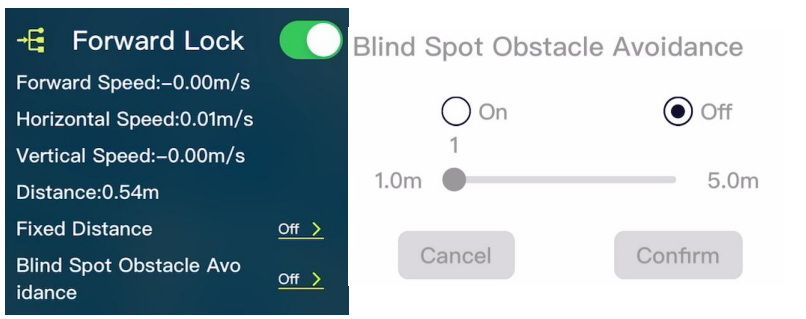
Click the front lock icon to activate the station lock function



Select the 'fixed distance' option and click 'on,' the ROV will its current position as a reference point to maintain a constant distance from an object at the front. When the forward joystick on the remote control is triggered, the ROV will move a fixed distance and then automatically return to its initial position.



Select the "blind spot obstacle avoidance" option to set a fixed horizontal distance between the ROV and the object in front. The adjustable distance range is from 1m to 5m. With this function on, the ROV will stop moving forward when the distance between the ROV and the target object falls within the set range even though the forward joystick on the remote control is triggered.



Laser Scaler

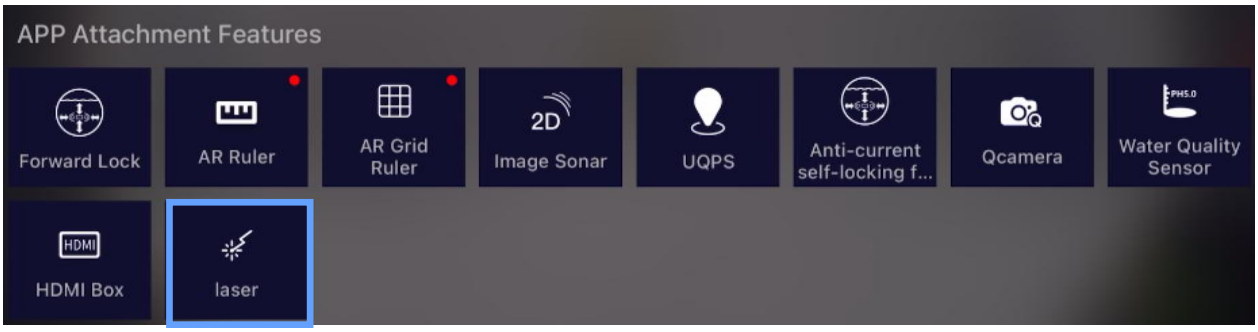
The laser function is designed to work with the QYMT measurement tool to enable real-time analysis of underwater objects and achieve efficient underwater measurements

Click the link below to check the information of the QYMT measurement tool:

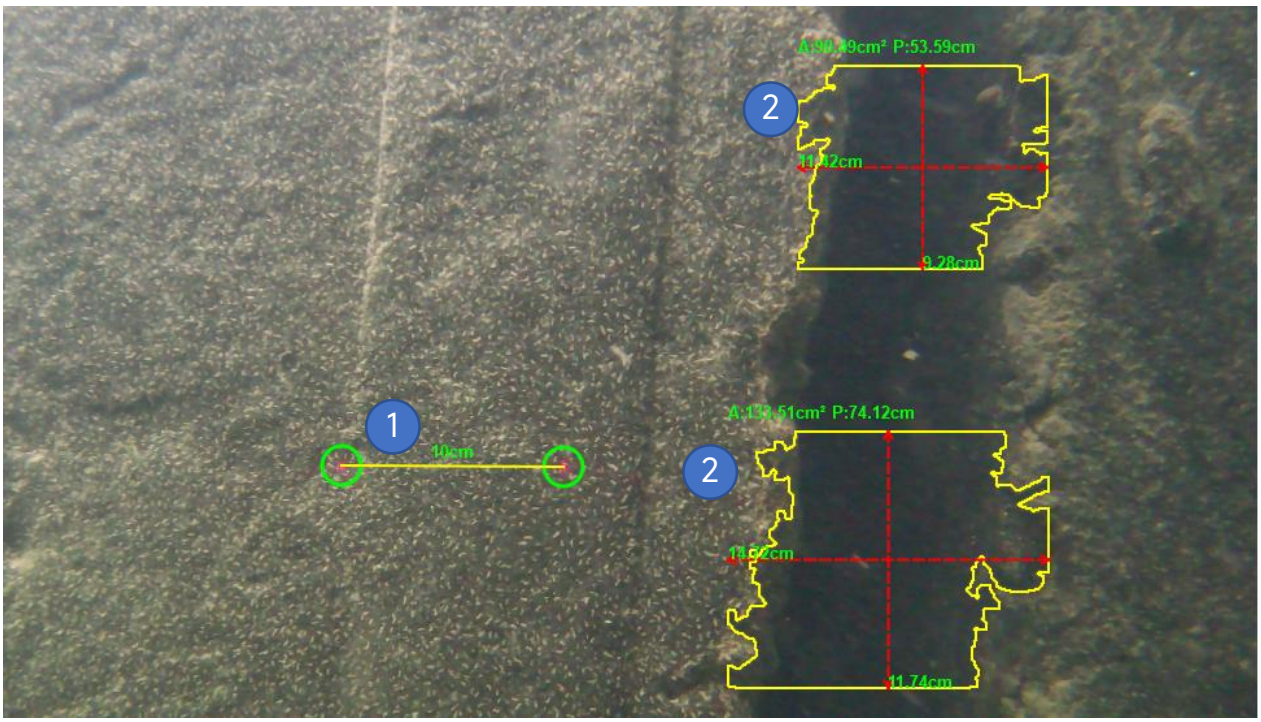
https://drive.google.com/drive/folders/13fhjh9RNgnyL8mu0PHvnuk-1_d8_5lV8?usp=sharing

Click the laser scaler icon 

to activate the laser function



For example, when the laser is working with the QYMT measurement tool, '1' refers to the reference line formed by two laser dots, and '2' refers to the crack measurement on the dam.

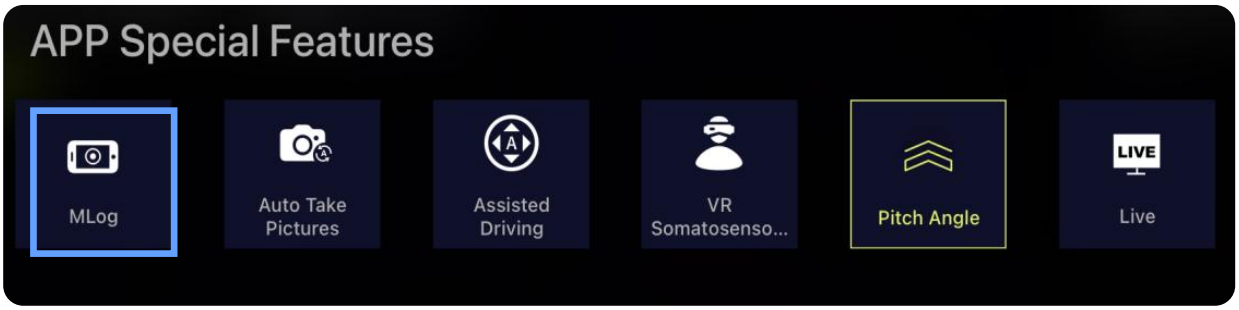


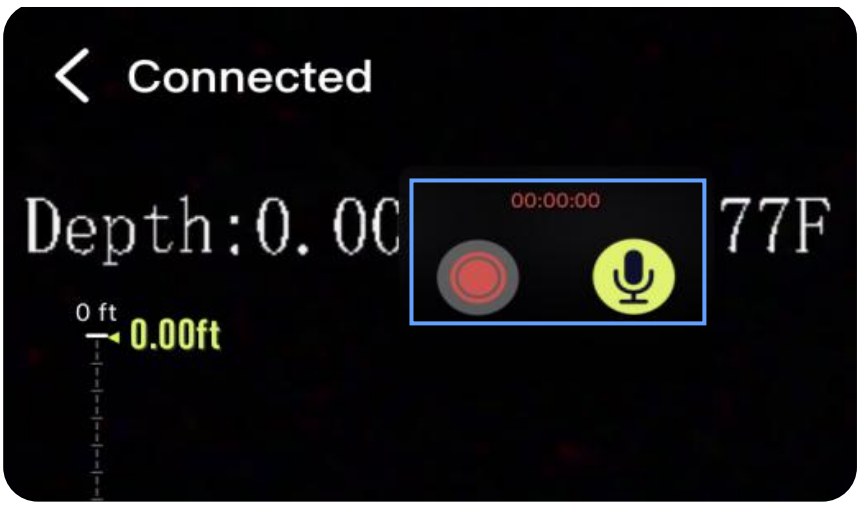
Mission Log(M-Log)

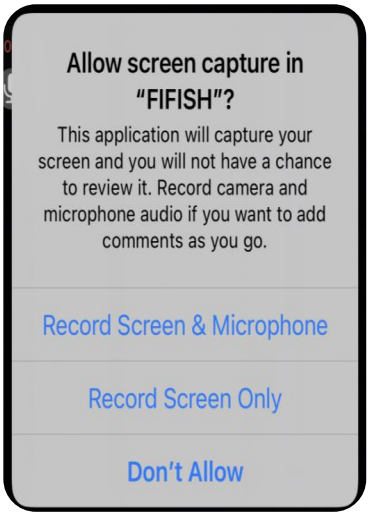
Record the screen and voice

1. Click the icon 

to open M-Log
2. The M-Log screen recording button and voice recording button will be displayed
3. Click “Record Screen & Microphone” to allow screen capture
4. Press video recoding button to start
5. Optional recorded quality: High/Medium/Low







NOTE:

1. Record files are directly stored in the smart devices. Please check storage of smart devices.

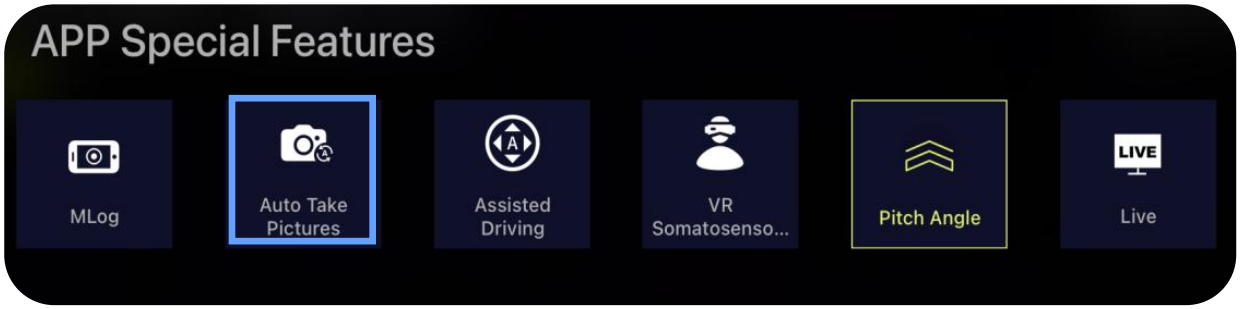
2. NOT place FIFISH APP to the background during recording, otherwise the recording will be stopped, and the recorded files will be saved in the smart device album and local media library in APP

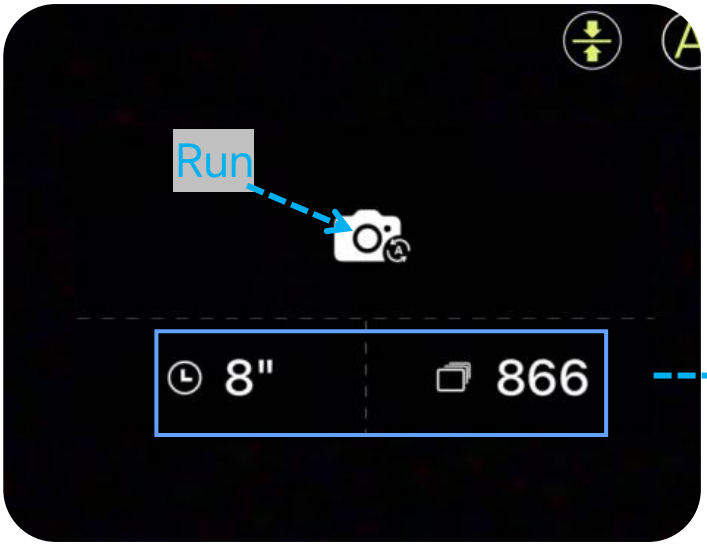
3. The microphone is turned off by default.

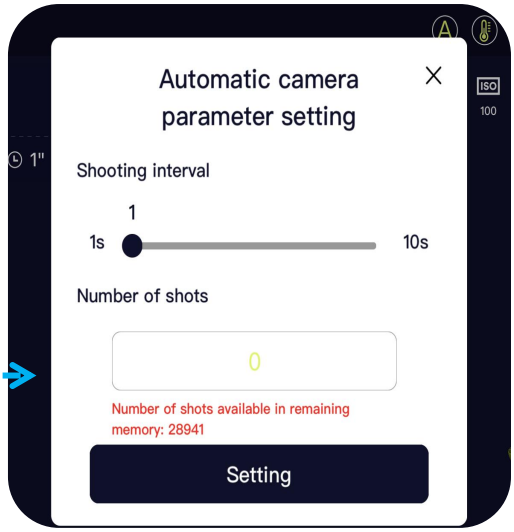
Auto Take Pictures

Take a preset number of photos with preset time interval

1. Click the auto take pictures icon
2. Click the time interval icon or photo number to open setting interface
3. The number of photos that can be stored in the memory card is displayed below.
4. After setting the parameters, click the Auto Photo icon  to run the function.







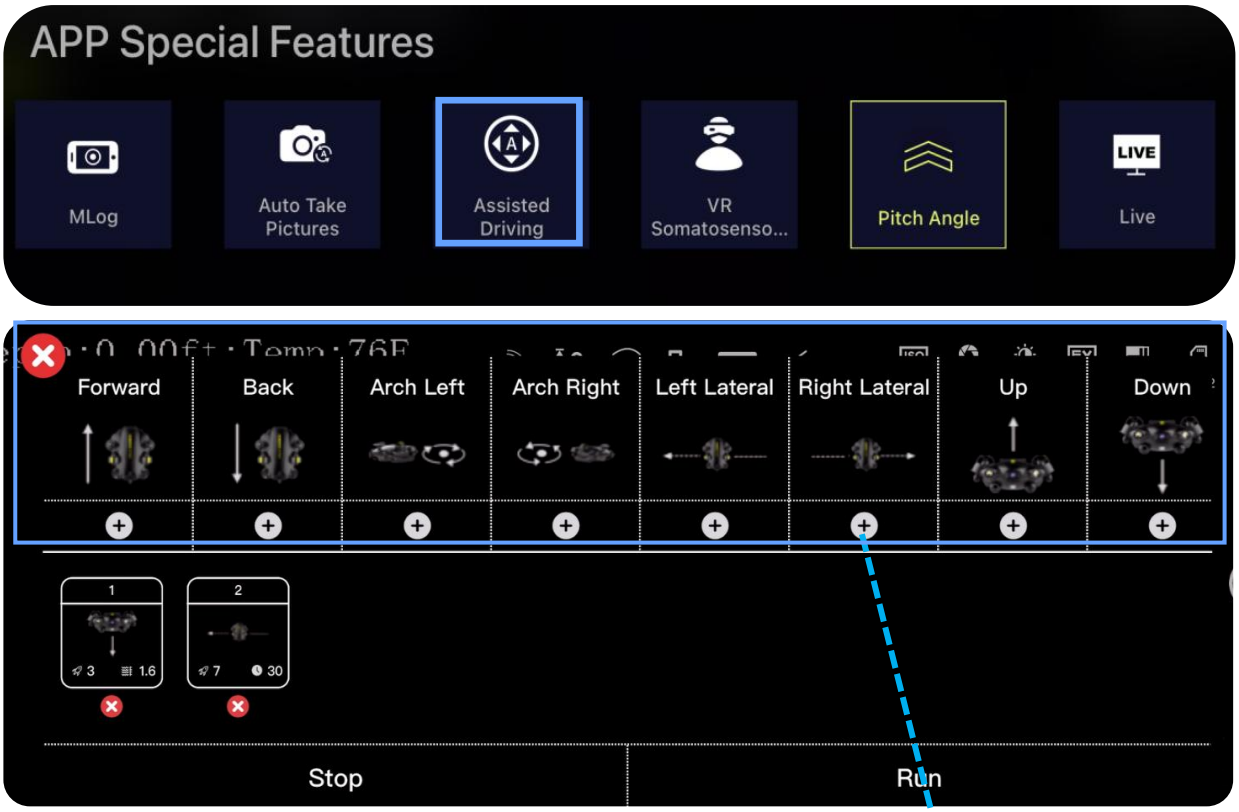
FIFISH App

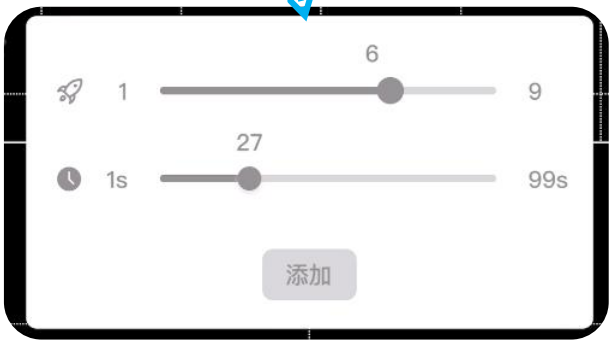
Toolbox, Assisted Driving

Assisted Driving

Drive automatically with preset performance, speed and running time

1. Press the Icon
2. Select moving behavior
3. Set speed/time
4. Click "Run" to activate Assisted Driving

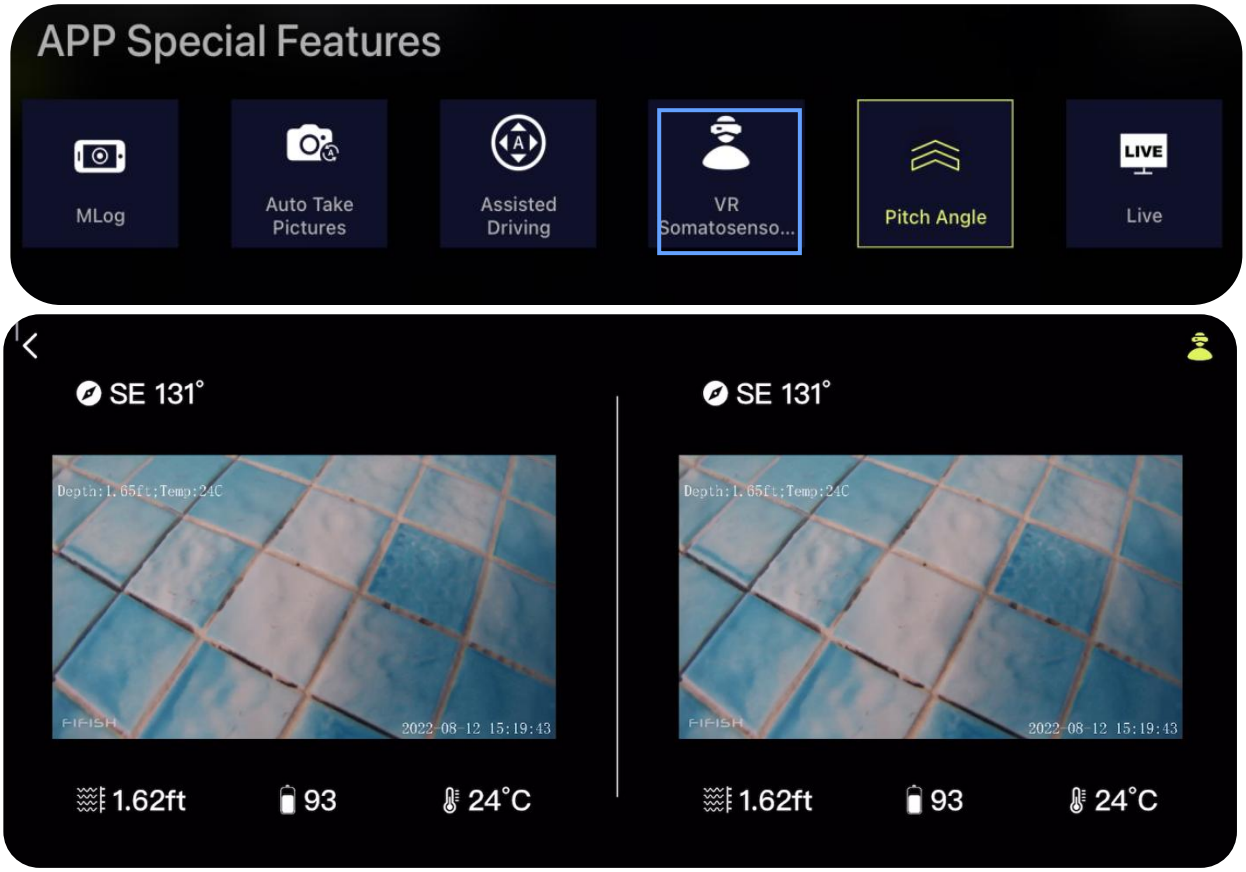




VR control

Somatosensory control through VR goggle

1. Click the VR icon in the tool box
2. Install the device to the VR bracket
3. Wear the VR goggle
4. Adjust the view by moving the sliders
5. Turn remote control to mode C



VR control

Somatosensory control through VR goggle[1]

1. Click the VR icon in the tool box
2. Install the device to the VR bracket
3. Wear the VR goggle
4. Adjust the view by moving the sliders
5. Turn remote control to mode C

Note: To ensure a better experience, please align the white line on the screen with the groove on the bracket.

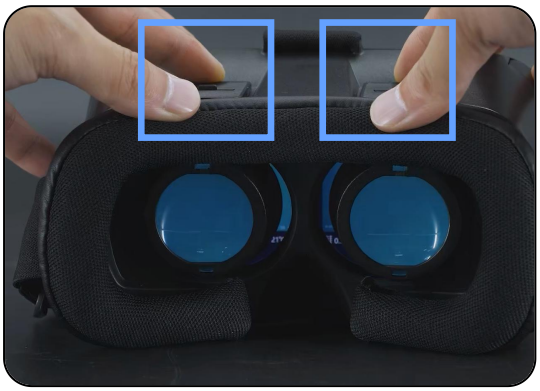
NOTE:

[1] To use Combination mode, users need to have user's own VR glasses or FIFISH VR Goggle ready

VR control

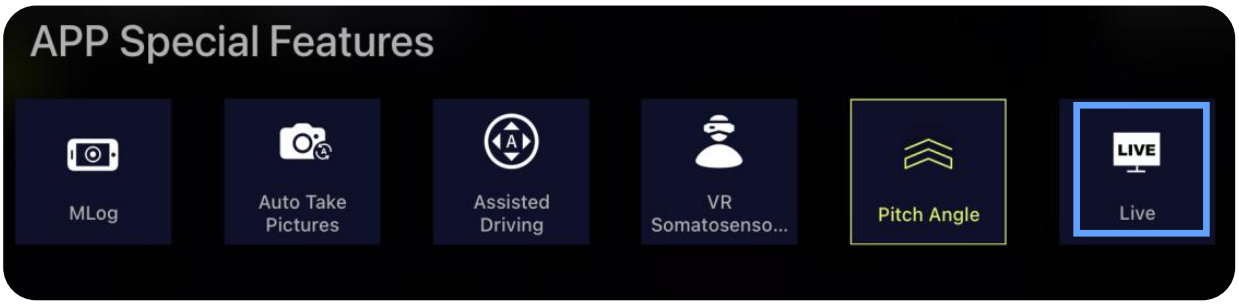
Somatosensory control through VR goggle

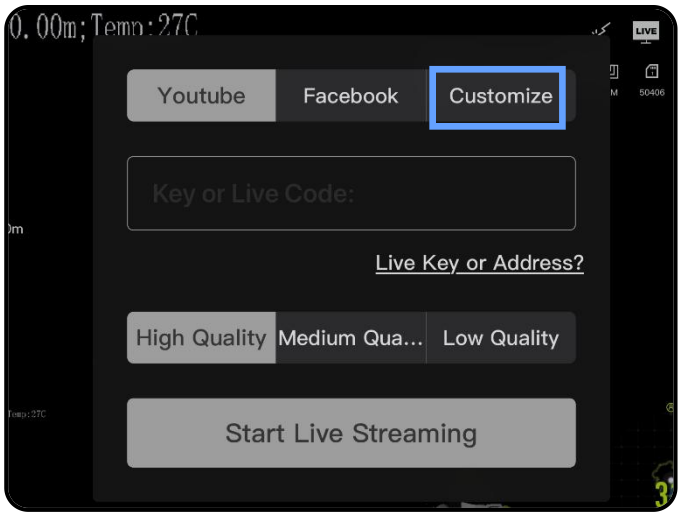
1. Click the VR icon in the tool box
2. Install the device to the VR bracket
3. Wear the VR goggle
4. Adjust the view by moving the sliders
5. Turn remote control to mode C



LIVE Streaming

*Board casting directly on **YouTube, Facebook** or other social media network.*[1]





1. Generate a **Stream Key** and **Stream URL** on YouTube or Facebook
2. Click the **LIVE** icon
3. Paste the **Stream URL** and **Stream Key** in column
4. Select the LIVE quality (High, Medium, and Low) [2, 3]
5. Click "**Start Live Streaming**"

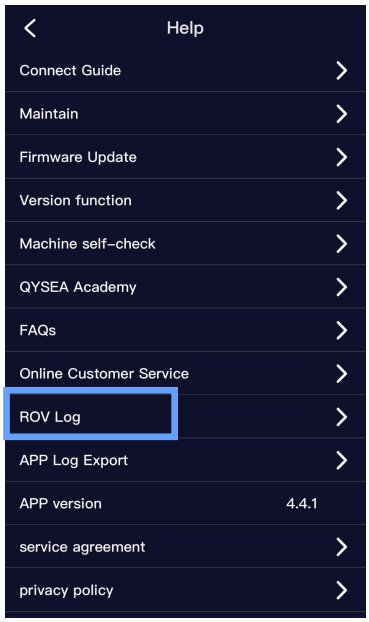
NOTE:

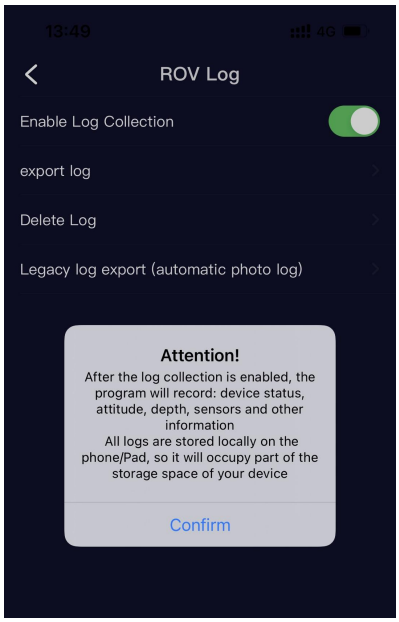
1. This feature will request to use the **iOS devices**. For example, **iPhone** or **iPad** SIM card version.
2. LIVE stream feature will consume your **Cellular Data**, make sure you have enough Cellular Data in your data plan.
3. LIVE stream quality is depending on the local **4G or 5G network speed**.

ROV Log

The navigation information can be recorded and output as a document

1. Return the main homepage and click Help in the lower right corner
2. Select ROV Log
3. Turn ON the Log Collection
4. Click 'Connect' and control the ROV to collect data
5. Export log





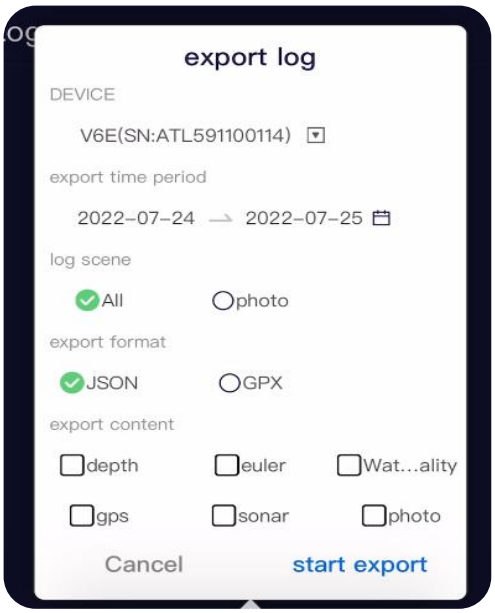
Note:

- The data only be collected after turning on the Log collection
- Data would start to be collected after clicking 'Connect' whether the ROV is in the water or not
- The collecting frequency of navigation data is twice per second
- Only the collecting frequency of QPS data is once per second

ROV Log

The navigation information can be recorded and output as a document

1. Return the homepage and click Help in the lower right corner
2. Select ROV Log
3. Turn ON the Log Collection
4. Click 'Connect' and control the ROV to collect data
5. Export log



1. Log scene:
'All' - Output all data collected twice per second
'photo' - Output the related data to photos which took present

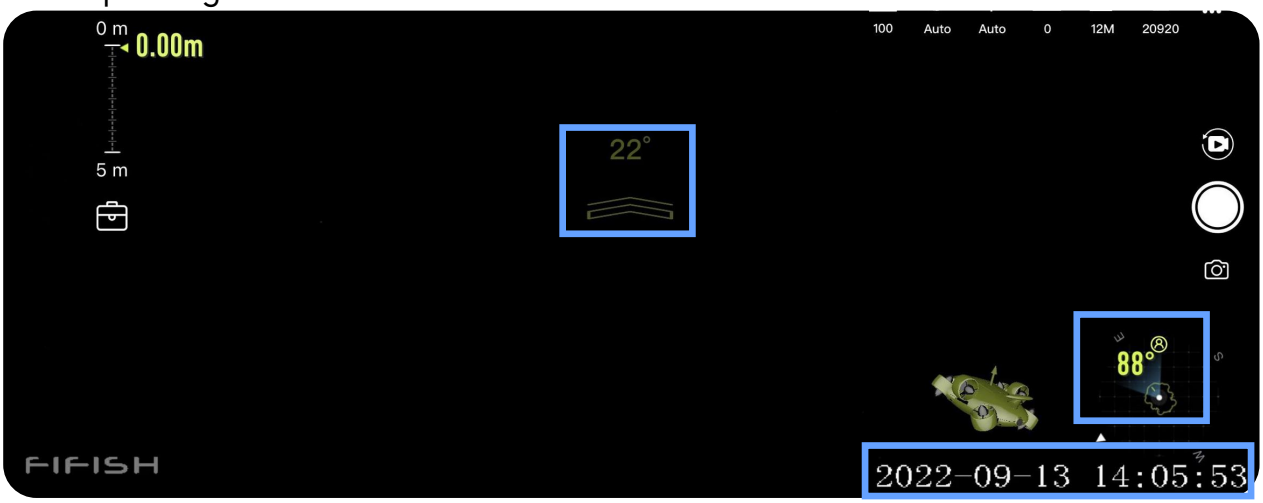
2. Export format:
'JSON' - A standard text-based format for representing structured data based on JavaScript object syntax. which can be converted to excel format.
'GPX' - An XML file format for storing coordinate data. (required to equip U-QPS to collect)

3. Export content:
'depth' - The corresponding dive depth
'euler' - Posture data including pitch angle, roll angle and yaw angle
'water quality' - Water quality data including dissolved oxygen, turbidity, salinity and pH (required to equip related sensor to collect)
'gps' - Coordinate data including longitude and latitude(required to equip U-QPS to collect)
'sonar' - Frontal sonar and Downward sonar data (required to equip Altimeter and Distance meter module to collect)

ROV Log

The navigation information can be recorded and output as a document

1. Return the homepage and click Help in the lower right corner
2. Select ROV Log
3. Turn ON the Log Collection
4. Click 'Connect' and control the ROV to collect data
5. Export log



FIFISH APP screen shoot

tch":"-90.0","roll":"0.0","yaw":"134.0"},"timestamp":1663049168.140764,"type":"attitude","date":"2022-09-13 14:06:08"},{"payload":{"pitc
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6:01"},{"payload":{"pitch":"-67.0","roll":"-5.0","yaw":"131.0"},"timestamp":1663049160.6407781,"type":"attitude","date":"2022-09-13 14:0
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","yaw":"39.0"},"timestamp":1663049113.4927468,"type":"attitude","date":"2022-09-13 14:05:13"},{"payload":{"pitch":"-90.0","roll":"0.0",

The original json format

	A	B	C	D	E	F
1	payload/pitch	payload/roll	payload/yaw	timestamp	type	date
2	0.0	-1.0	100.0	1663049156.638566	attitude	2022-09-13 14:05:56
3	0.0	0.0	100.0	1663049156.174783	attitude	2022-09-13 14:05:56
4	2.0	3.0	99.0	1663049155.638969	attitude	2022-09-13 14:05:55
5	9.0	2.0	92.0	1663049155.1385531	attitude	2022-09-13 14:05:55
6	21.0	3.0	88.0	1663049154.638114	attitude	2022-09-13 14:05:54
7	22.0	3.0	88.0	1663049154.142657	attitude	2022-09-13 14:05:54
8	22.0	2.0	87.0	1663049153.63833	attitude	2022-09-13 14:05:53
9	22.0	2.0	88.0	1663049153.141131	attitude	2022-09-13 14:05:53
10	20.0	3.0	99.0	1663049152.638188	attitude	2022-09-13 14:05:52
11	23.0	3.0	107.0	1663049152.142138	attitude	2022-09-13 14:05:52
12	24.0	3.0	107.0	1663049151.637951	attitude	2022-09-13 14:05:51
13	24.0	3.0	107.0	1663049151.139433	attitude	2022-09-13 14:05:51
14	25.0	3.0	106.0	1663049150.638698	attitude	2022-09-13 14:05:50
15	24.0	3.0	105.0	1663049150.163193	attitude	2022-09-13 14:05:50

The converted excel format

Appendix
Specifications

ROV:

Dimension	430 mm(L) × 345 mm(W) × 185 mm(H)
Weight	6.5 kg
Thrusters	6 (4 × Vector + 2 × Horizontal)
Maneuverability	6 DOF (Degree of Freedom): Moving: left & right, up & down, forward & backwardRotation: 360° yaw, 360° pitch, 360° roll
Posture Lock™	± 0.1° pitch angle or ± 0.1° roll angle and moving in any direction
Depth Holding	Suspending in ± 1 cm
Speed	> 3 knots (1.5 m/s) in still water
Depth Rating	200 m (656 ft)
Operating Temp.	-10 °C ~ 60 °C (14 °F ~ 140 °F)

Camera:

Sensor	1/1.8” Effective Pixels 12MP ISO Range 100-3200 in Auto / Manual
Lens	Field of View (in water) H:120° ; V:70°; D:146° Aperture f/2.5 Min Focusing Distance 0.1m
Shutter	5~1/5000 second; Auto/Manual (Electronic Shutter Speed)
Burst shooting	1 / 3 / 5 / 10 frames
White Balance	2,500K ~ 7,500K; For Seawater/Freshwater, Auto/Manual
Exposure Compensation	- 3 EV ~ + 3 EV (Auto/Manual)
Photo Resolution	4:3 = 4000 x 3000， 16:9 = 3840 x 2160
Photo Format	JPEG, DNG
Video Resolution	4K UHD: 25/30 fps 1080P FHD: 25/30/50/60/100/120 fps 720P HD: 25/30/50/60/75/90/100/120/150/180 fps
Video Encode	H.264
Image Stabilization	EIS (Electronic Image Stabilization)
Color System	NTSC and PAL
Internal Storage	standard 128GB, expandable up to 512GB

Battery:

Battery capacity	69.12Wh
Number of Batteries	2 pcs
Battery Life	1 ~ 4 hours
Charging Time	1 hour fast charging (90%)

Appendix
Specifications

LED Beams:

Brightness	5,000 lumen x 2
CCT	5,500 K (Correlated Color Temperature)
Beam Angle	160°
LED Beads	4 pcs

Remote Controller:

Wireless	5GHz WiFi: 802.11a/n/ac
Battery Life	about 4 hours
Copy &Download	Support Micro SD Card FAT32 and exFAT format (≦128GB)

Charger:

ROV	Input: 100-240 V AC, 50/60 Hz, 2.5 A MAX Output: 18 V DC, @10A
RC	Input: 100-240 V AC, 50/60 Hz, 0.5 A MAX Output: 5 V DC, @3A

Spool & Tether:

Length	200m (656 ft) on Spool
Breaking Force	130 kgf (220 lbsf)
Tether Diameter	4.6mm

Robotic Arm & Parallel Gripper (Optional):

Claws Opening	120 mm
Gripping Force	100N

Sensor:

Forward DVL	Detection range 0.15m-10m
Downward Sonar	Detection range 0.3m-50m
Laser Scaler	Wavelength 660nm(Red)

Q-DVL (for NAVI Model):

Detection Range	0.15m-60m
Weight	465g in air, 250g in water

Appendix
SD Card Removal

3.1. SD Card Removal[1]

3.1.1. Remove the snap-fit protective cover for the protective cap of the SD card slot cap

3.1.2. Remove the protective cover and use it to turn the SD card slot cap counterclockwise to remove it

⚠ CAUTION:

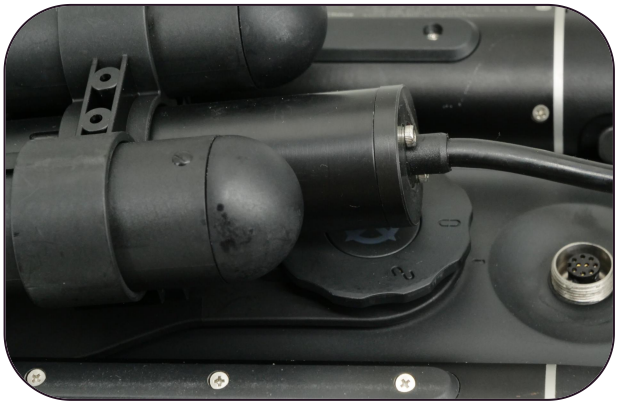
[1] Please perform this installation with the power off

Appendix
Robotic Arm Installation (Optional)

3.2.Hardware connection-manipulator installation [1]

3.2.1. Snap the front hook of the robotic arm into the drain holes of the ROV

3.2.2. Turn the locking knot to secure the robotic arm in place

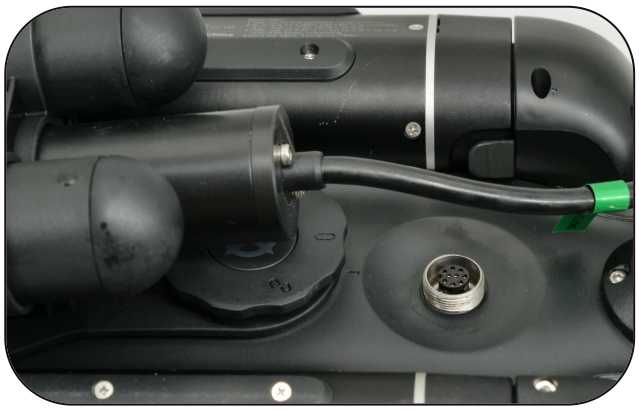


⚠CAUTION:

[1] Please perform this installation with the power off

Appendix
Robotic Arm Installation (Optional)

3.2.3. Remove the protective cap for the bottom Q-interface, and orient the black alignment pin to the small cut of the Q-interface before connecting[1]



3.2.4. Tighten the connection to finish the installation

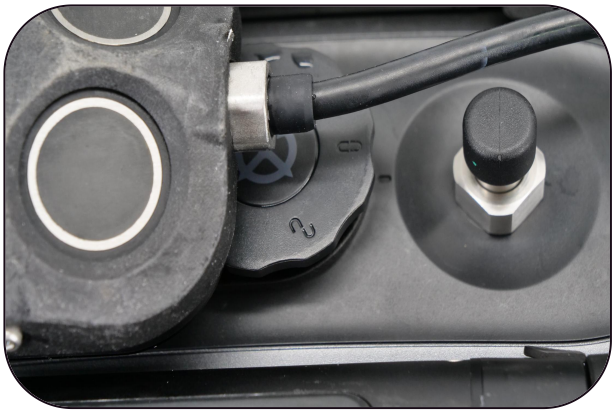
CAUTION:

[1] Please perform this installation with the power off

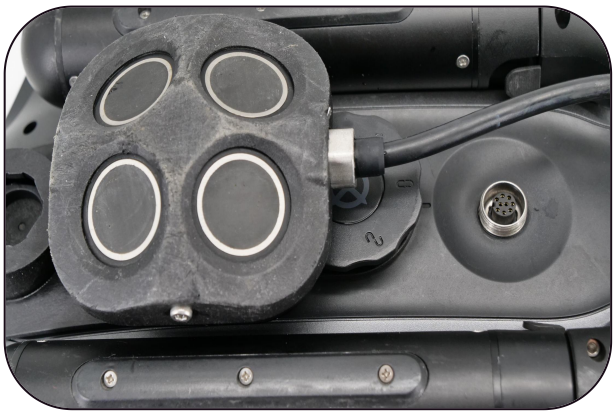
Appendix
Q-DVL (for NAVI Model)

3.3.Hardware Q-DVL Installation [1]

3.3.1. Secure the front hook of the bracket into the drain holes and lock it using the knob.



3.3.2. Remove the protective cap of the Q-interface and attach the connector of the Q-DVL to it.



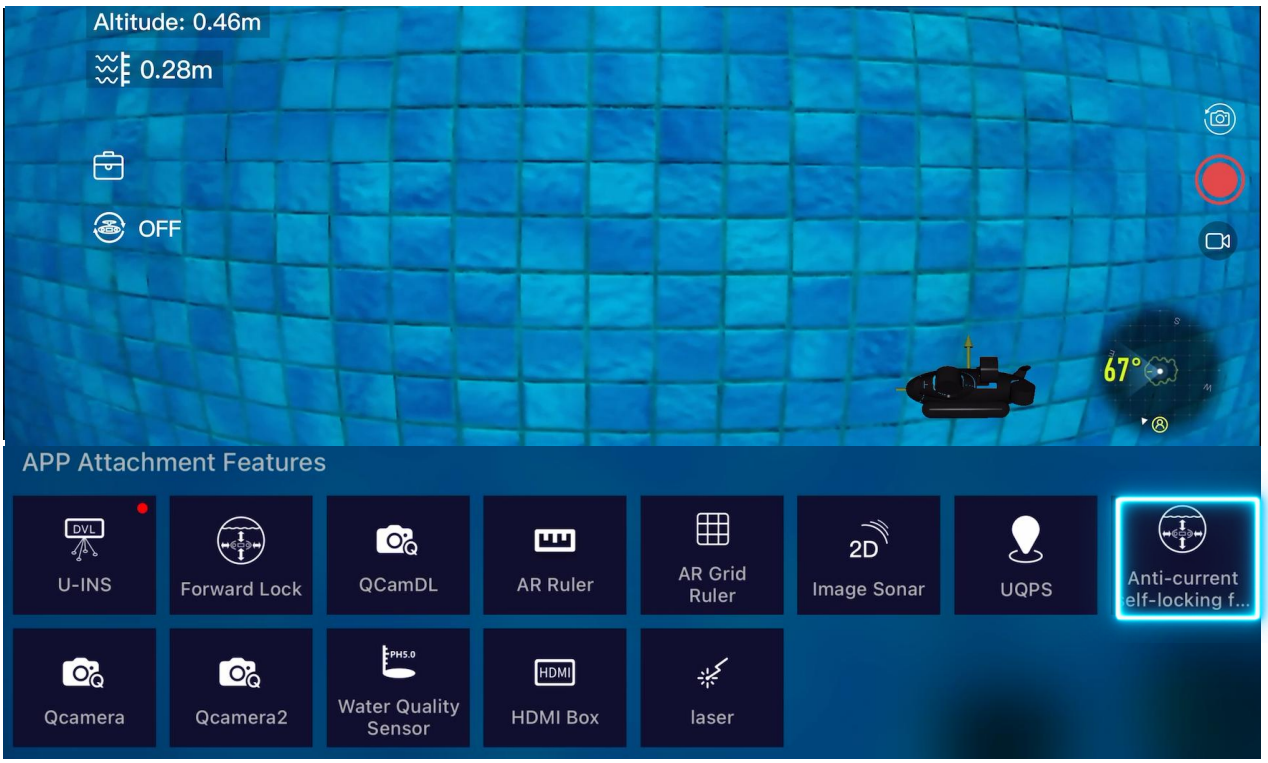
CAUTION:

[1] Please perform this installation with the power off

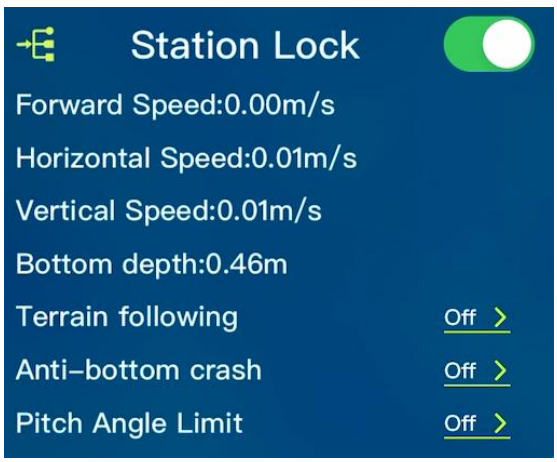
Appendix
Q-DVL (for NAVI Model)

3.4.Q-DVL Operation (Downward DVL)

3.4.1. Get the ROV system connected and activated. Open the FIFISH app, click on the toolbox icon to turn on the station lock funtion.



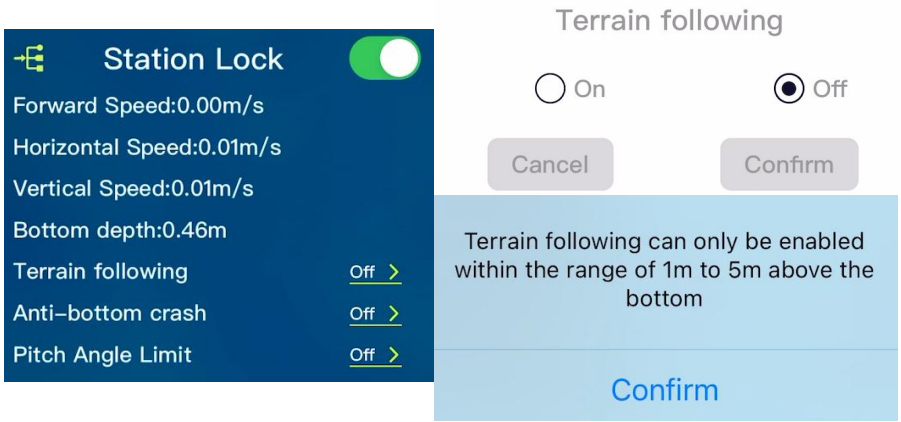
3.4.2. When the station lock function is turned on, the ROV's forward speed, horizontal speed, vertical speed and bottom depth will be displayed on the APP interface.



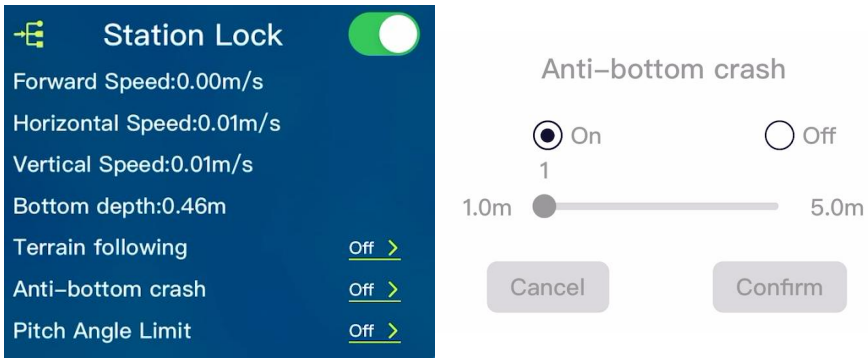
Appendix
Q-DVL (for NAVI Model)

3.4.Q-DVL Operation (Downward DVL)

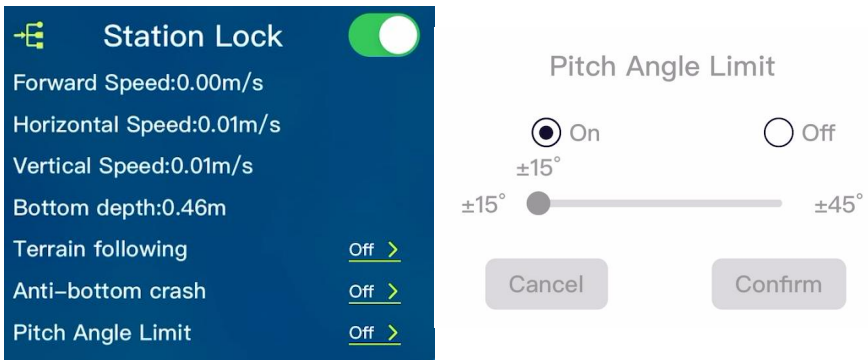
3.4.3. The 'Terrain Follow' feature allows the ROV to keep a constant altitude in water conditions with irregular underwater terrain and it can be activated within an settable altitude range from 1m to 5m.



3.4.4. The 'Anti-collision bottom' feature allows the ROV to detect and avoid obstacles located beneath it, and the settable detection range is from 1m to 5m.



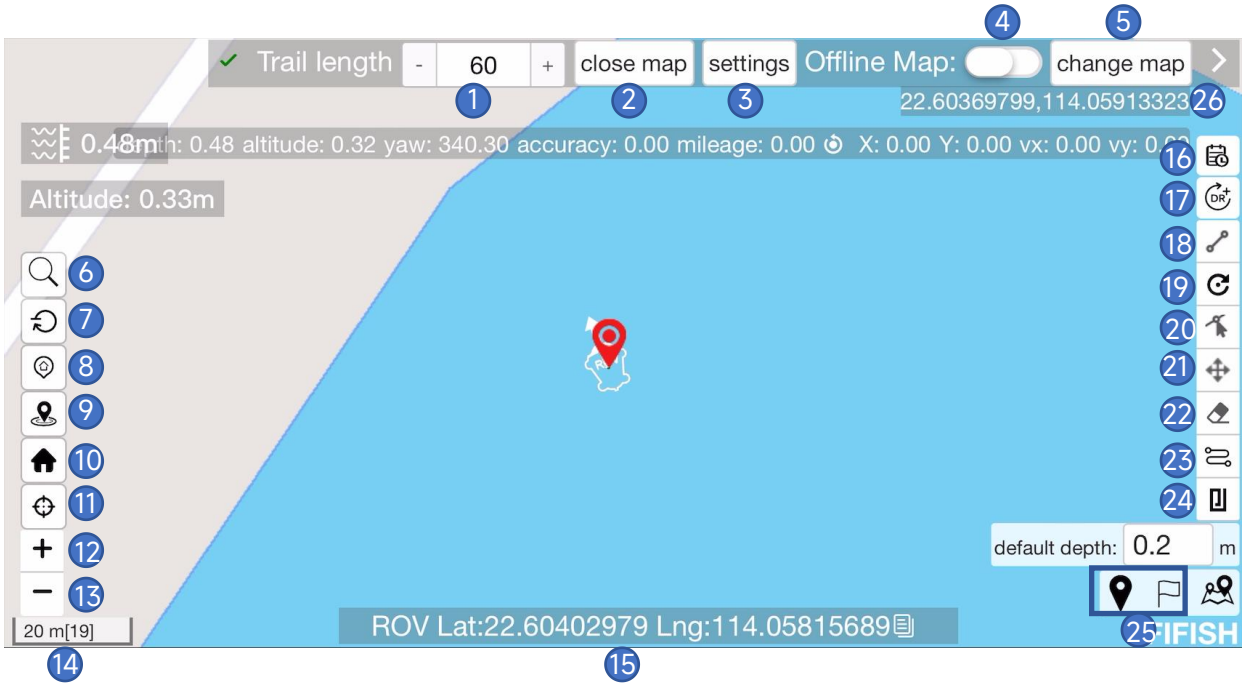
3.4.5.The pitch limit feature allows the pitch angle of the ROV to be locked, with a pitching angle range from 15° to 45°.



Appendix
Q-DVL (for NAVI Model)

3.5.U-INS Feature

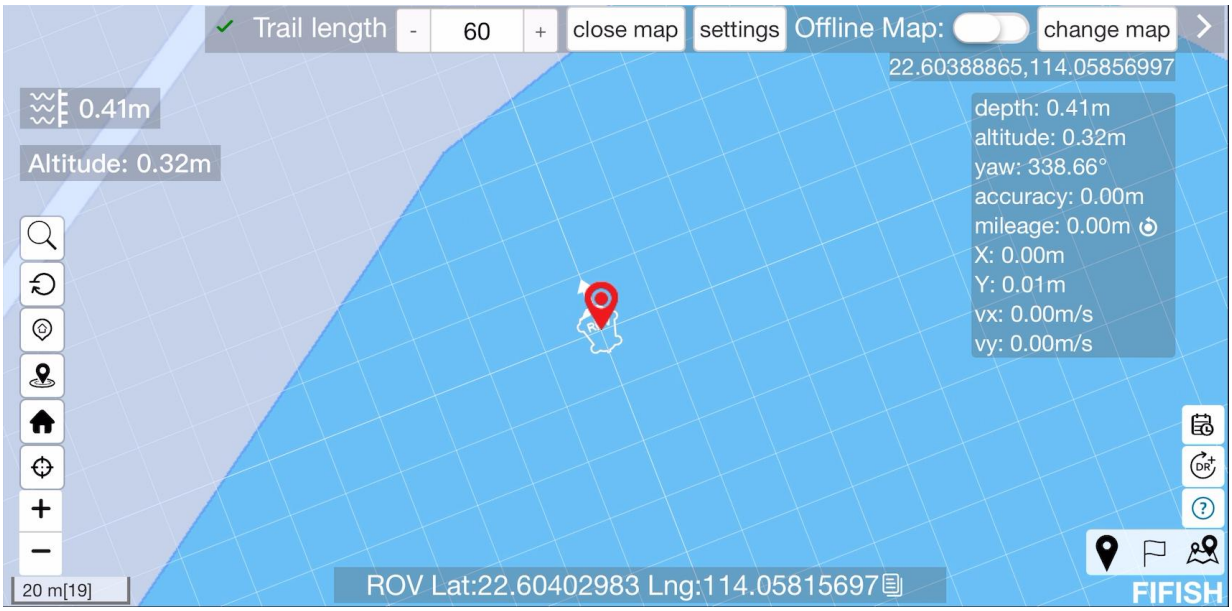
3.5.1. Please check all buttons in the Underwater Inertial Navigation System (U-INS).



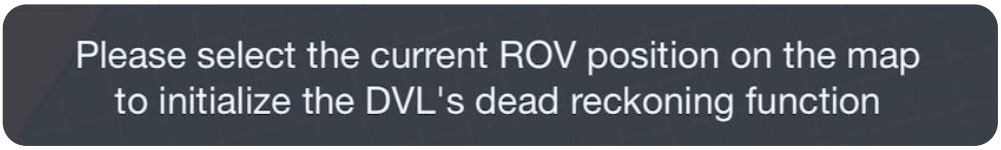
1. ROV's Trajectory Display
2. Close Map
3. Settings
4. Offline Map
5. Change Map Type
6. Search Icon
7. Return to the Home Point
8. Set a Home Point
9. Locate the Position of the Mobile Device
10. Locate the First Starting Point
11. Locate the Position of the ROV Icon
12. Zoom in the Map
13. Zoom out the Map
14. Zoom Scale
15. ROV's Coordinate
16. Logging Icon
17. Set a Starting Point
18. Draw a Navigation Route
19. Rotate a Navigation Route
20. Edit a Route
21. Change the position of the navigation route
22. Delete a Route
23. Zigzag Route Pattern
24. Spiral Route Pattern
25. Set a POI(Point of Interest)
26. Ping a Random Point on the Map

3.5.U-INS Feature

3.5.2. Initial Waypoint Setting
3.5.2.1. When using the U-INS, click the 'DR' icon to set a starting point before setting POI(Point of Interest) or navigation route for automatic navigation.



3.5.2.2. The following prompt windows will appear after clicking the 'DR' icon. Click any point on the map to set the initial reference point.

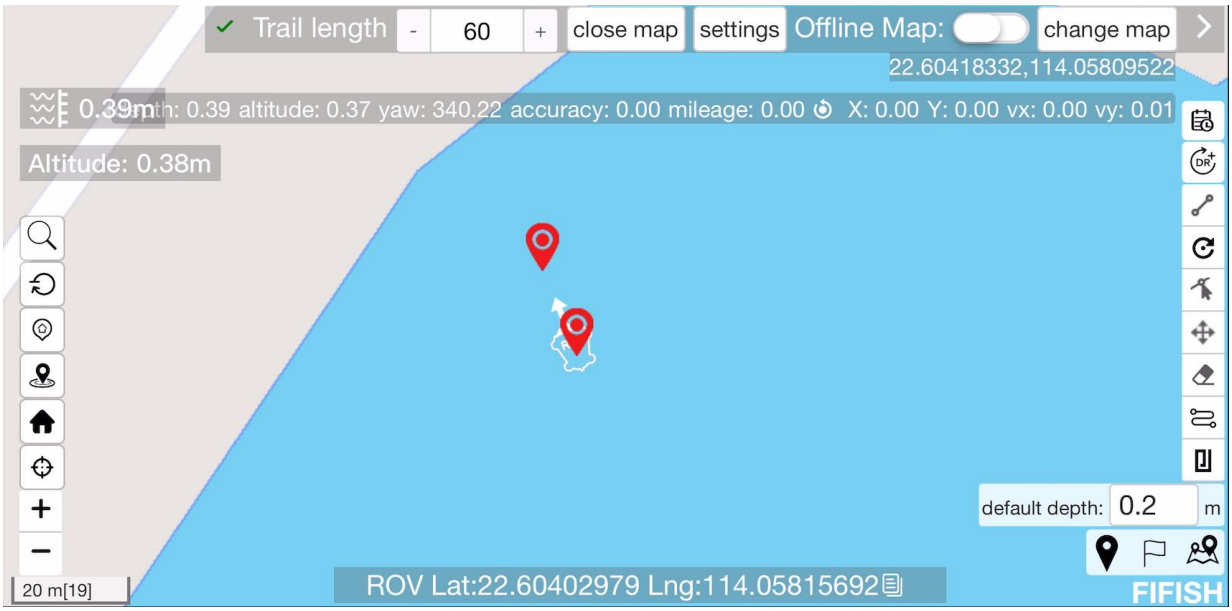


A prompt will appear if the setting is a success.

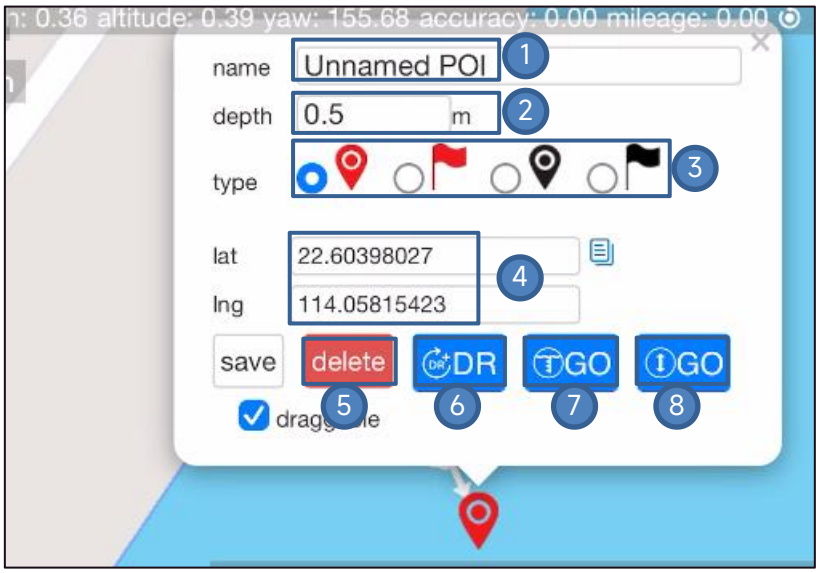
Appendix
Q-DVL (for NAVI Model)

3.5.U-INS Feature

3.5.3. POI(Point of Interest) Setting
3.5.3.1. Click the POI icon to set a location of interest on the map.



3.5.3.2. Click the point on the map to customize it (as shown below).



1. Name a POI
2. Depth Setting
3. Change the POI Icon
4. Coordinate of the POI
5. Delete a POI
6. Set as Starting Point
7. Navigate at the Same Depth
8. Navigate at the Same Altitude[1]

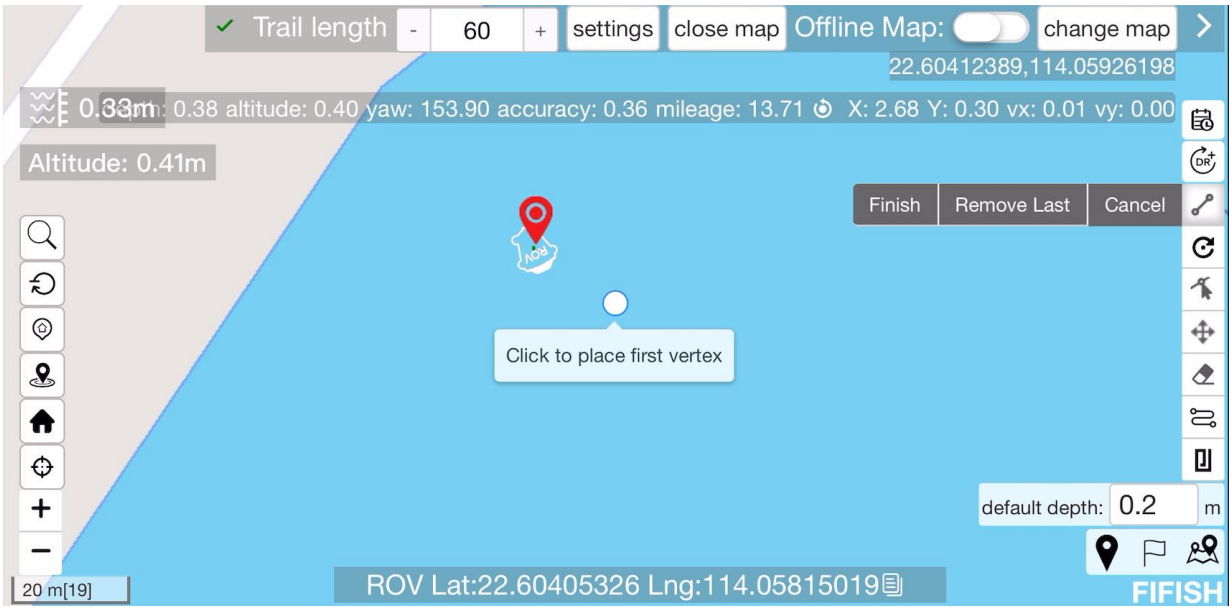
Configure a POI

Note: The altitude refers to the vertical distance between the ROV and waterbed.

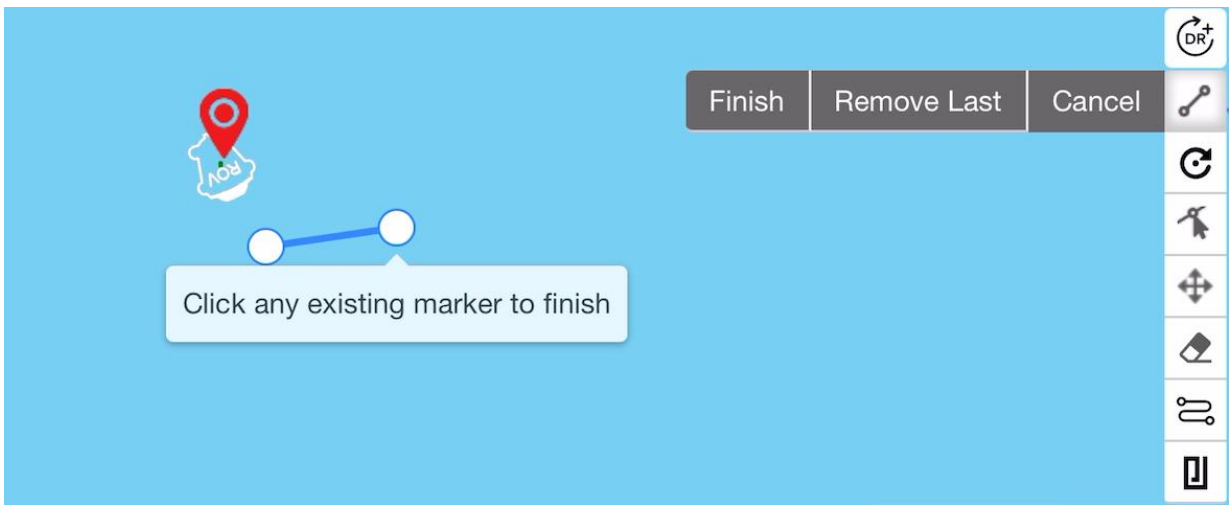
Appendix
Q-DVL (for NAVI Model)

3.5.U-INS Feature

3.5.4. Route Planning
3.5.4.1. Click the 'Path-drawing' icon to place the first waypoint before drawing a navigation route.

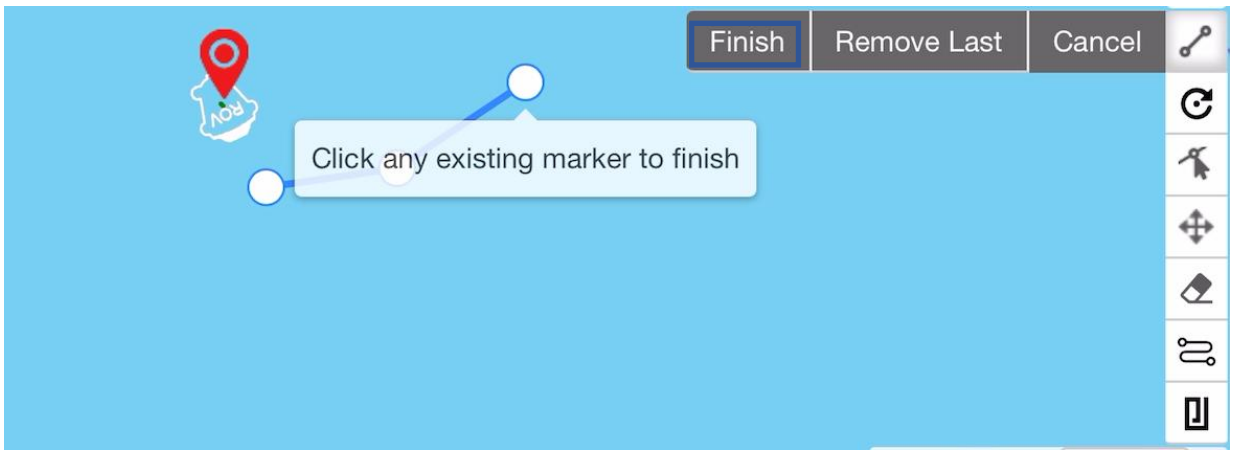


3.5.4.2. Click any point on the map to set a new point and connect it with the original point to form a navigation path.

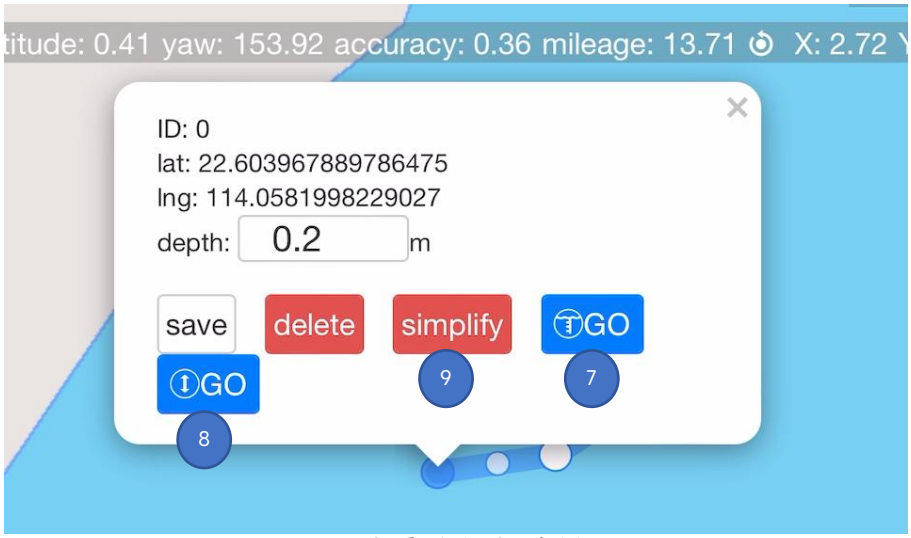


3.5.U-INS Feature

3.5.4.3. Click the ‘Finish’ option to complete the route-drawing for the ROV when the final waypoint is confirmed.



3.5.4.4. Click the blue waypoint on the navigation path to start automatic navigation.



7. Navigate at the Same Depth
8. Navigate at the Same Altitude
9. Remove Excess Points and Simplify the Navigation Route

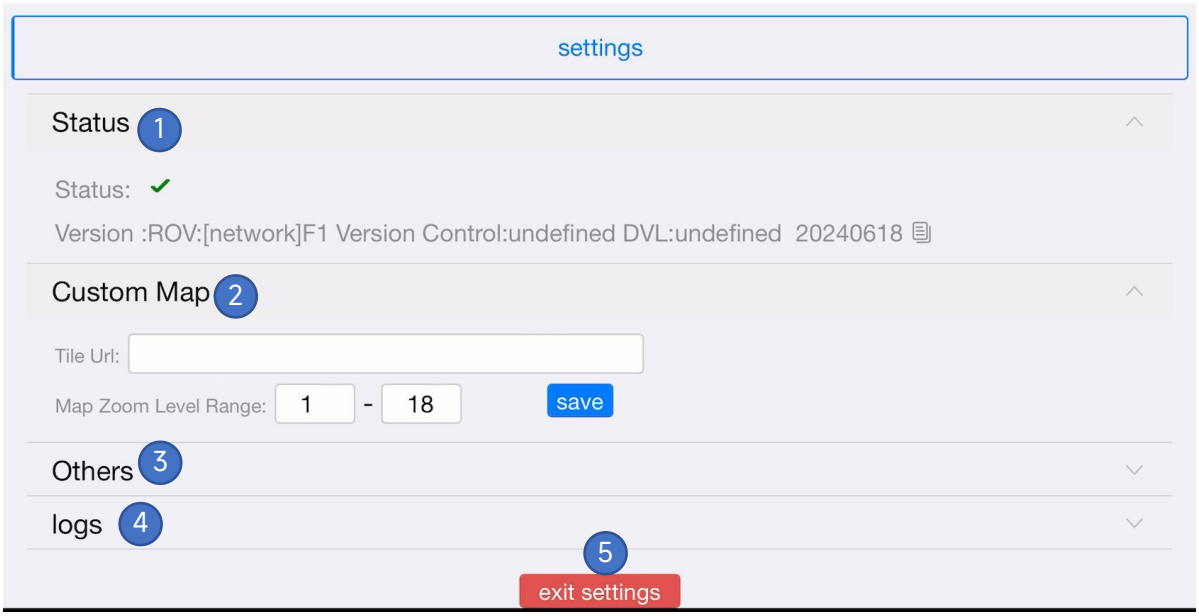
自定义航行路线

3.5.4.4. The 'Stop' and 'Pause' navigation commands will appear when the ROV is performing automatic navigation.

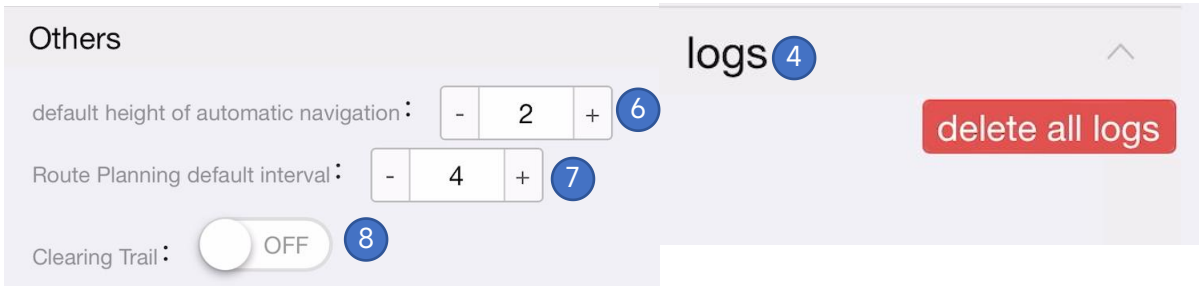
Appendix
Q-DVL (for NAVI Model)

3.5.U-INS Feature

3.5.5.1. Please check the definition of the setting page below.



1. Q-DVL Working Status
2. Custom Map (The custom map section allows users to insert Google tile maps and narrative drawings for targeted observations)
3. Others (automatic navigation, route planning interval and 'clearing trail' option are accessible)
4. Log (check the ROV log recording)
5. Exist Settings and Return to the Map



6. Set the vertical distance between the ROV and waterbed
7. The distance between dots on a navigation route
8. ROV's Trajectory line display for all movements

Appendix
Maintenance

Motors Maintenance (After Every Dive)

(1) Connect the RC to E-MASTER and open the FIFISH App (see Hardware Connection section, in Quick Start Guide).

(2) Make sure every motor is immersed inside fresh water, see the picture (vertical soaking in bucket will have same results).

(3) Open FIFISH App, homepage, Click "Help" on the bottom right corner. Click "Maintain/Thrusters", then press "Start". All motors will rotate slowly.

(4) In about 10 mins this cleaning program will stop.
Air dry E-MASTER in the cool place and avoid direct sunlight.

Battery Maintenance

(1) Keep 50% to 60% battery level before long term storage.

(2) Charge to full once every 90 days.

(3) If you haven't used FIFISH E-MASTER for more than 30 days, you need to use a charger to activate it.