

User Manual

OUTLAND ROV 3000

Outland Technology, Inc.

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Congratulations on the purchase of your OUTLAND ROV!

Outland Technology takes great pride in supplying this high-quality underwater video system.

Your Outland ROV has been rigorously tested. The quality and performance of this system comes with the full confidence and backing of Outland Technology, Inc. As a measure of that confidence, your ROV comes with a Limited one-year warranty that the unit remains free of defects in workmanship and materials. A complete copy of the warranty statement can be found in the Manual.

Please familiarize yourself with the entire manual and view the Video before placing your ROV into service.

Owner's Record

Record the serial number of your ROV and have it available whenever contacting Outland Technology regarding this product.

Serial Number: _____

Besides the Paper Manual a USB THUMB DRIVE can be found that contains the following:

- 1) Photos, (Photos of the complete ROV system).
- 2) ROV Manual, (Electronic copy of the paper manual)
- 3) ROV Video, (Complete video on how to hook up and use the ROV)
- 4) ROV 3000.pdf, (Spec/data sheet on the ROV).

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LIMITED WARRANTY

Outland has a strong commitment to high quality production. Each ROV system has a twelve (12) month limited warranty against defects in workmanship or materials except for those outlined in the limitations and exclusions. Outland will repair or replace at its discretion the defective components.

Limitations and Exclusions

- The limited warranty does not cover damage caused by improper use, poor maintenance or accidental damage of the ROV or its components.
- The limited warranty does not cover items subject to wear including but not limited to view ports, O-rings, frame, umbilical and propellers unless found to be defective in workmanship and/or materials.
- The limited warranty does not cover any modification made to the ROV without authorization from Outland Technology Inc.
- The limited warranty does not cover components damaged due to incorrect power connection per user's manual.

Advertising claims made by us represent our honest opinion of the qualities and features offered by the product described. We disclaim any warranties expressed or implied, including warranties of merchantability and fitness for a particular purpose, except as provided herein. In no event shall Outland Technology be liable for consequential damages of any kind.

Shipping

All returns for warranty service must be authorized by Outland. You must call or email Outland for an RMA number (Returned Materials Authorization). The assigned RMA number must be clearly indicated on each item returned for service.

NOTE: To submit an ROV or its components for warranty an RMA form must be completed. Please complete as best and detailed as possible.

For warranty shipping within the first 30 days, Outland will pay for ground shipment on ROV System domestic orders incoming and outgoing to a maximum of \$75.00 each way. International shipments will be credited up to \$75.00 US for incoming and outgoing freight charges to Outland Technology, Inc.

During the first 30 days of the warranty period, should faster delivery service be requested, a \$75.00 US credit towards expedited freight for each applicable leg will be given.

After 30 days the client is solely responsible for shipping to and from Outland Technology Inc.

If you have any questions regarding the installation and operation of this equipment, or if more information is needed contact:

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Legend



Warning/
Caution



High Voltage



Hints and Tips

Safety



Warning

The ROV-3000 system is supplied with 400V_{DC}. Improper use may result in electrical shock or electrocution. Only trained and experienced personnel should operate the equipment.



Caution

When propellers are active keep hands, feet and objects away from vehicle.



Caution

NEVER PLUG OR UNPLUG ELECTRONICS WITH POWER ON! Damage or personal injury may result.



Caution

Do not operate the thrusters in air at high speeds or for extended durations. Damage to thruster may result.

ROV General Guidelines

I. ROV Connecting/ Disconnecting

- 1.1 Never connect or disconnect any equipment while power is applied to system.
- 1.2 Turn off power and let set for 10 seconds prior to disconnecting the umbilical from the console or ROV. This will allow power inside the console to dissipate.
- 1.3 Unplug the connectors by holding the body of the connector and not by pulling on the cable.
- 1.4 Always use proper dummy plug when connection is not mated to avoid damage to the unplugged connector.
- 1.5 Normally devices plugged into the Control bottle do not need to be unplugged from the bottle. But if situations require device removal, be mindful of the device mating position when reconnecting. Ensure that the sonar connector and all other dry mate connectors are clean and dry with no moisture present. Ensure all wet mate connectors are clean and lubricated with waterproof silicone grease, even when using a dummy plug.

II. POWER SUPPLY

- 2.1 Ensure the power connection has a good ground.
- 2.2 Connect the Green wire to earth ground for added protection.
- 2.3 If using a generator or Inverter, a minimum of 4,000 watts is necessary for the Model 3000 system.



If using an inverted generator be sure the operating wattage is at least 4000 watts. Also, when using a generator with smart throttle technology you must turn it off when operating ROV.

III. ROV DEPLOYMENT

- 3.1 Be sure to clean and reapply silicon grease (very lightly) on the Umbilical Connectors.
- 3.2 When mating umbilical, hold electronics bottle.
- 3.3 Secure all loose cables inside the ROV. Any loose cables could be pulled into a propeller, damaging, or destroying cable.
- 3.4 **Never activate the Auto Depth or Auto Heading in air.**
- 3.5 When ready to dive, activate Auto-Heading and Depth Trim with trim knob at zero. This will keep the ROV from spinning and level on the way down. (Gyro may take a few minutes to stabilize completely)
- 3.6 Activate auto functions once vehicle is placed in the water.
- 3.7 Moving the Depth Thumbwheel UP/DOWN in auto-depth will move the ROV in 0.1 inch increments.
- 3.8 To move downward or upward quickly active trim and put trim knob at zero. This will enable auto pitch control while allowing you to move quickly.

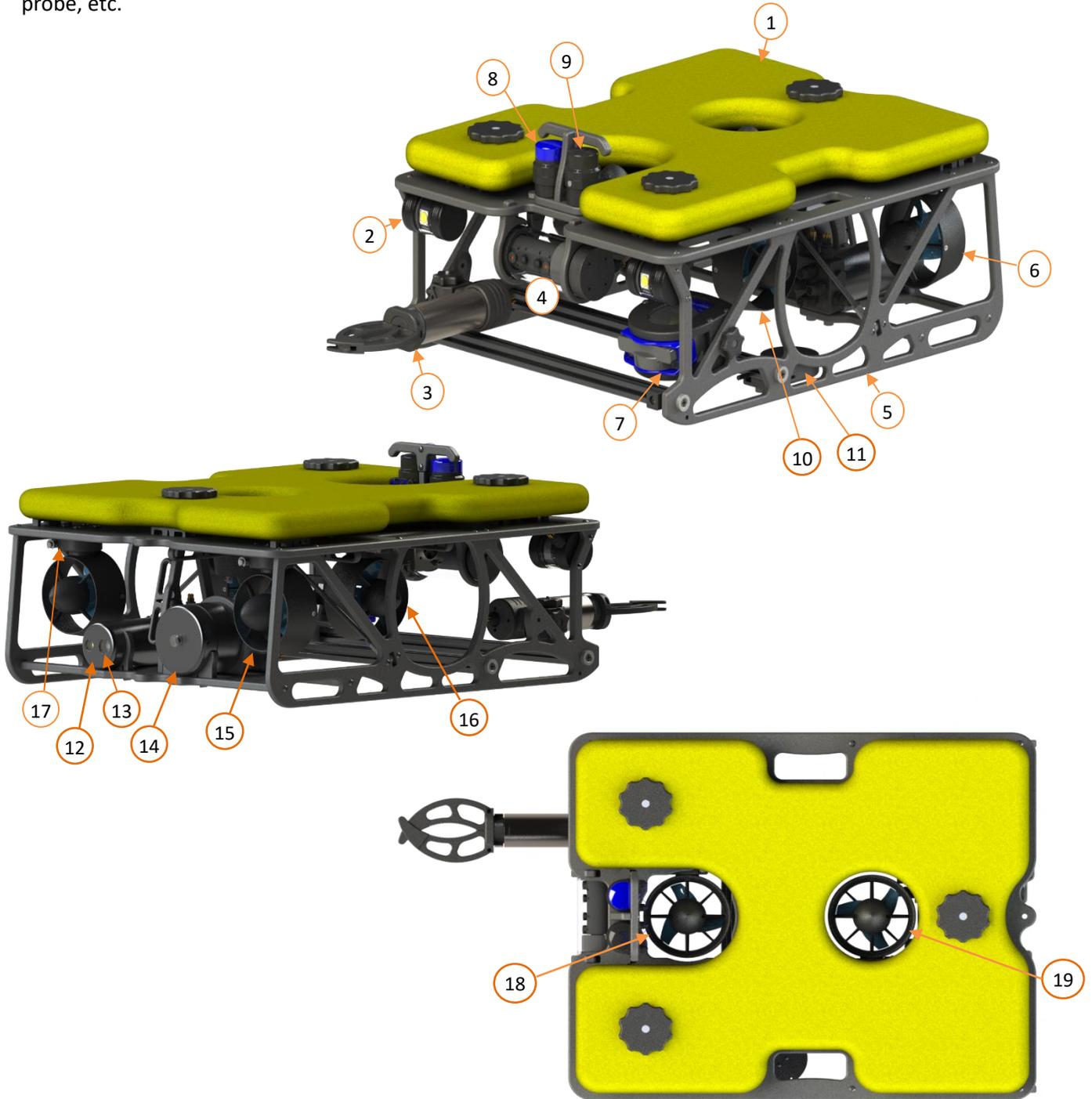
IV. ROV storage and shipping.

- 4.1 Clean and flush with fresh water.
- 4.2 Dry the cable and ROV before closing storage boxes. This will minimize mold, mildew and corrosion on equipment and interior of boxes.

System Overview

Outland ROV 3000

The Outland ROV systems are robust, powerful Class II vehicles capable of handling harsh conditions. System components have been designed for maximum reliability while incorporating the latest technology. The robust frame allows for additional sensors and equipment to be mounted and integrated into the vehicle. The tether allows for simultaneous streaming of up to 3 cameras with lengths of 1000+ feet. Options such as Sonar, VDSL, CP probe, etc.



1. Flotation Cell

Flotation is closed cell polyurethane Foam with Fiberglass covering. The foam has been pressure tested to 500 PSI.

2. Front Lights (x2)

There are 2 UWL-505 lights equipped. (5000 lumens 3000K).

3. Manipulator (Optional)

The manipulator is an Outland MP-100 Two Function Manipulator. See datasheet or manual on website for more information on this product.

4. Front Camera (with scaling lasers)

The front camera is an Outland UWC-360 Camera. The UWC-360 is attached to the ROV frame and can rotate 360° continuously. It is equipped with scaling lasers that can be turned off or on with the controller pan inputs. It is a High Definition 1080P color camera.

5. ROV Frame

The OUTLAND ROV frames are made of Starboard, 80/20 rails, and threaded rods with rod ends for rigidity. On the underneath of the top part of the frame there are V-carved instructions for ease of use during maintenance or trouble shooting.

6. Port Thruster (Fwd/Rev function) (CCW prop)

Flooded brushless DC thrusters are used on the ROV 3000. The control electronics (esc's) are mounted in the ROV Power Bottle. Do not operate the thrusters out of water at high speeds or for extended periods of time as damage may result to the bearings.

7. Multibeam Sonar (Optional)

To see more information on the sonar see the operation manual or datasheet of the Sonar equipped on your ROV. The mount that the sonar is encased in can be mounted on the left or right side of the frame and can be adjusted in 10° increments.

8. USBL (Optional)

See operation manual for USBL equipped on your ROV.

9. Scanning Sonar

See operation manual for Scanning Sonar equipped on your ROV.

10. Port Lateral Thruster (CCW prop)

Refer to item 6.

11. DVL (Optional)

The default DVL (doppler velocity log) is responsible for helping keep the ROV in location and in certain modes help hold depth. See the manual or datasheet for DVL equipped on your ROV.

12. Control Bottle

The control bottle is responsible for connecting, processing and communicating data between the ROV and the top side control. The ROV umbilical connects to the bottle, the power bottle, as well as all accessories located on the vehicle. There are multiple ports on this bottle that are labeled with letters, these will be explained further in a later section.

13. Rear Camera

The rear camera is a fixed camera on the inside of the control bottle. This camera is often used to monitor tether management during flight.

14. Power Bottle

The power bottle is responsible distributing power to all the thrusters and the control bottle. The tether connects directly to this bottle.

15. Starboard Thruster (FWD/REV function) (CW prop)

Refer to item 6.

16. Starboard Lateral Thruster (CW prop)

Refer to item 6.

17. Thruster Quick Release (x6)

The thruster quick releases were designed to make it fast and easy to do maintenance on the thruster on the ROV-3000. There is one of these quick releases on each one of the thrusters. To remove a thruster, press the metal button on the quick release and pull the thruster out. To reinstall, press the button and push the thruster all the way in then release the button.

18. Front Vertical Thruster (CW prop)

Refer to item 6.

19. Rear Vertical Thruster (CW prop)

Refer to item 6.

Control Console

The control console (CON-1500) houses the monitor (15", 1600 nit LCD), HD DVR, video conditioning, signal routing and connections for the ROV Cable (data connection), Hand Controller, and auxiliary controllers in a waterproof case.

1. Sun Shield

2. Monitor

Displays video and is interface for ROV.

3. DVR

Is responsible for video recording and video type writing.

4. Power Switch

This is the main power switch used to put power to the entire ROV system.

5. USB connection

There are 2 connections used for overlay and 2 connections for the DVR.

6. Hand Controller Connection

This is where you plug the main hand controller into the console.

7. Auxiliary Controller Connection

Any auxiliary controllers used, should be plugged in here. Such as, a tool controller.

8. Tether Connection

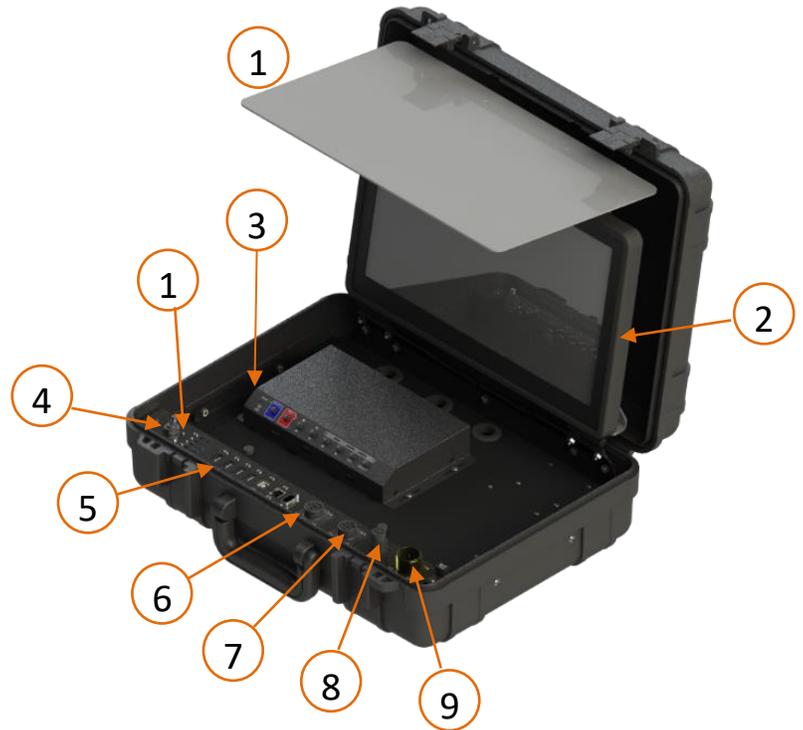
The 8-pin male tether connection plugs in here.

9. Power Supply Connection

The power supply plug goes into here to power the console.

10. GFI Trip Indication Light

This indicates if the GFI is tripped or not. More information is shared on the GFI on the power supply.

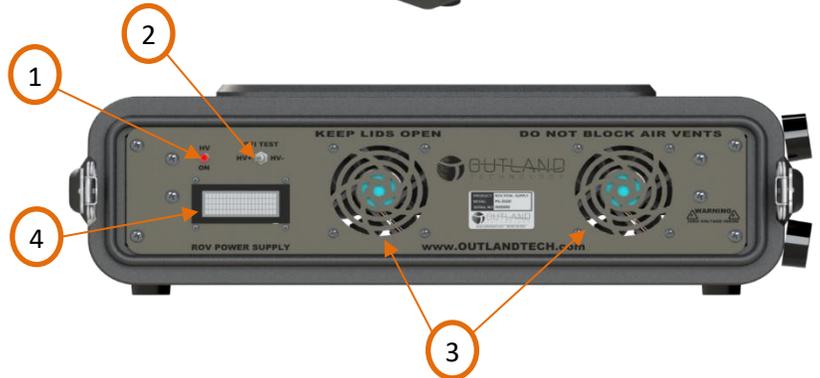




For full output power to the vehicle, it is recommended to use 240VAC for both PS-3500

Power Supply

The power supply (PS-3500) provides DC power to the vehicle and incorporates safety circuits to keep the operator, divers, and the equipment safe in case of a fault. The power supply converts 120/240 VAC (50/60Hz) to floating 400 VDC. The power supply is equipped with Outland's Exclusive Line Insulation Monitor (LIM)/Ground-Fault Circuit Interrupter (GFCI). In the event water leaks into the cable, ROV Control Bottle or thrusters the LIM circuit will trip and protect the Operator and ROV from any high voltage damage.



1. High Voltage Indication Light

Indicates High Voltage Output power is ON. This light will flash if there is a fault in the system.

2. GFI Test Switch

Move switch to HV+ or HV- to test fault on each line. This is purposefully creating a fault in system to test to make sure fault system is working properly. To reset you will need to power down and power up again with the console power switch.

3. Cooling Fans

There are two cooling fans equipped on the power supply. These always run when power is on. Please keep covers off the power supply during operation.

4. LCD Diagnostic Screen

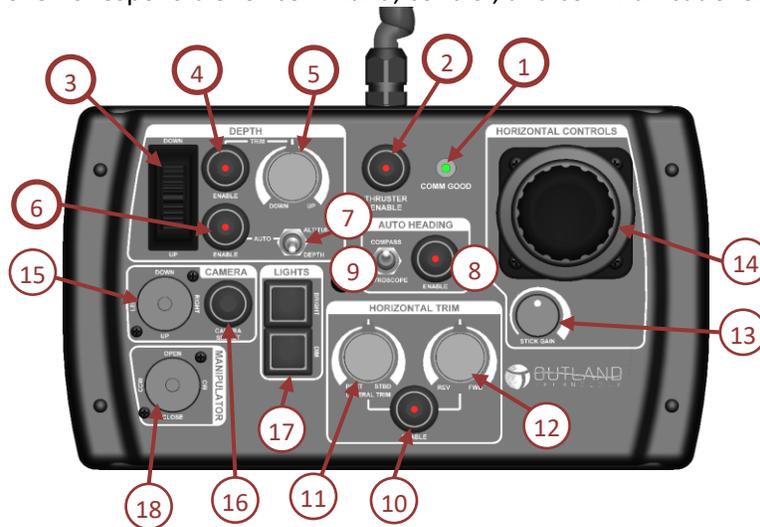
Indicates system status, voltage, current, high voltage bias, run time and fault history.



- System Status: Indicates Current System Status: "Good" or "Fault" and type of fault.
- Output DC Voltage: Voltage supplied to tether. Measured at topside power supply output.
- Output Current: Tether cable current.
- Output Voltage Bias: Indicates leakage current from high voltage positive to chassis ground and high voltage negative to chassis ground. HVBias > ±2% indicates potential water leak. See troubleshooting guide for additional information.
- Run Time: Cumulative run time of power supply.
- Fault History Log: Log of last 8 power cycles, newest results are on the right. A dot indicates normal operation, + indicates Pos-Side Leak, and - indicates Neg-Side Leak.

Hand Controller

The Hand Controller is responsible for command, control, and communications.



- 1. COMM Good LED**

Indicates the Hand Controller is communicating with the vehicle. If the light is not illuminated check Hand Controller and Tether connections. Refer to Troubleshooting guide for more information.
- 2. Thruster Enable Button**

Press button to enable thrusters. LED will flash for a few moments while each thruster is tested. LED should stay illuminated indicating the thrusters are working properly.
- 3. Depth Thumbwheel**

Controls vehicle to descend or ascend. In auto depth/altitude mode the control moves the target depth/altitude set point in 0.1ft increments.
- 4. Depth Trim Enable**

Press button to enable depth trim. LED will illuminate when active. You can now use depth trim knob (5) to adjust upward or downward thrust.
- 5. Depth Trim Knob**

Pressing the Depth Trim Enable button will activate this control. Use control the aid in holding vehicle in a vertical direction. Can also be used to drive vehicle at steady speed.
- 6. Auto Depth/Altitude Enable Button**

Press button to enable auto depth/altitude mode. The active mode is selected by the Altitude/Depth switch. In auto depth/altitude the vehicle will hold vehicle at vertical position. The Depth Thumbwheel can be used to change the set point up or down in 0.1ft increments.
- 7. Altitude/Depth Switch**

Toggle the switch up or down to choose either altitude or depth hold modes.
- 8. Auto Heading Enable Button**

Press button to enable auto heading mode. LED will illuminate when active. If the bottom surface is in range of the DVL this button will also hold location.
- 9. Auto Heading Switch**

Toggle switch up and down to choose between Gyroscope and compass auto heading. Use the Gyroscope setting if you are around a large magnetic object that send incorrect readings to compass.

Note: If all buttons are flashing it means the hand controller is asking to be calibrated. To do this, zero all controls and click thruster enable. To force a calibration process hold down lights brighter and lights dimmer buttons on startup.

10. Horizontal Trim Enable Button

Press button to enable horizontal trim. The LED will illuminate when active.

11. Lateral Trim Knob

Rotate knob counterclockwise to add port lateral trim. Rotate knob clockwise to add starboard lateral trim.

12. Forward/Reverse Trim Knob

Rotate knob counterclockwise to add reverse trim. Rotate knob clockwise to add forward trim.

13. Stick Gain Knob

Turn the knob clockwise to increase the maximum stick drive signal to the thrusters from 25-100%. 100% means full power will go to the thruster when the stick control is at 100%.

14. Horizontal Control Joystick

Controls the orientation and movement of the ROV.

15. Camera Control

Use the camera control switch to control movement of the camera. The standard 360 camera will use the up and down portion to rotate clockwise/counterclockwise. The left/right controls are for using the scaling lasers.

16. Camera Select Switch

Press the camera select switch to switch between cameras (up to 3 total). Standard vehicle is equipped with front and rear camera.

17. Light Control Buttons

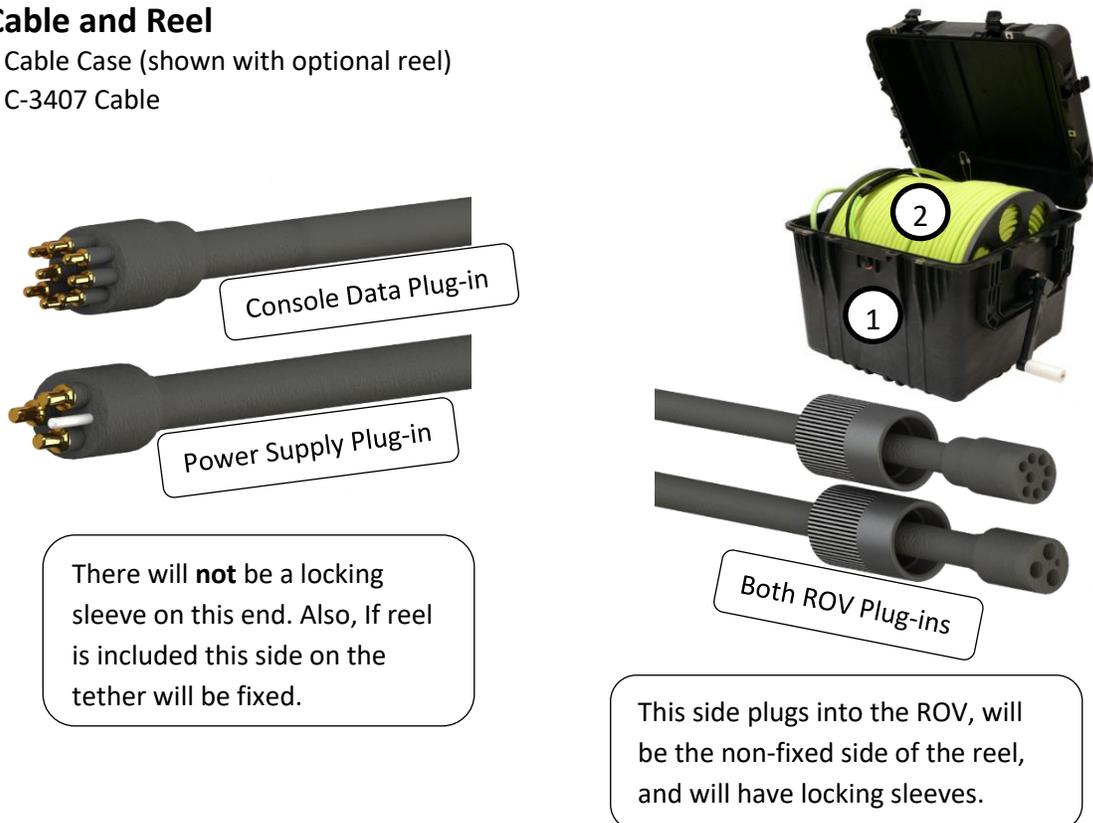
Press the Bright (top) button to increase brightness of the ROV front and rear lights. Press the Dim (bottom) button to decrease the brightness of the ROV lights.

18. Manipulator Control

Controls the open/close and rotation of manipulator.

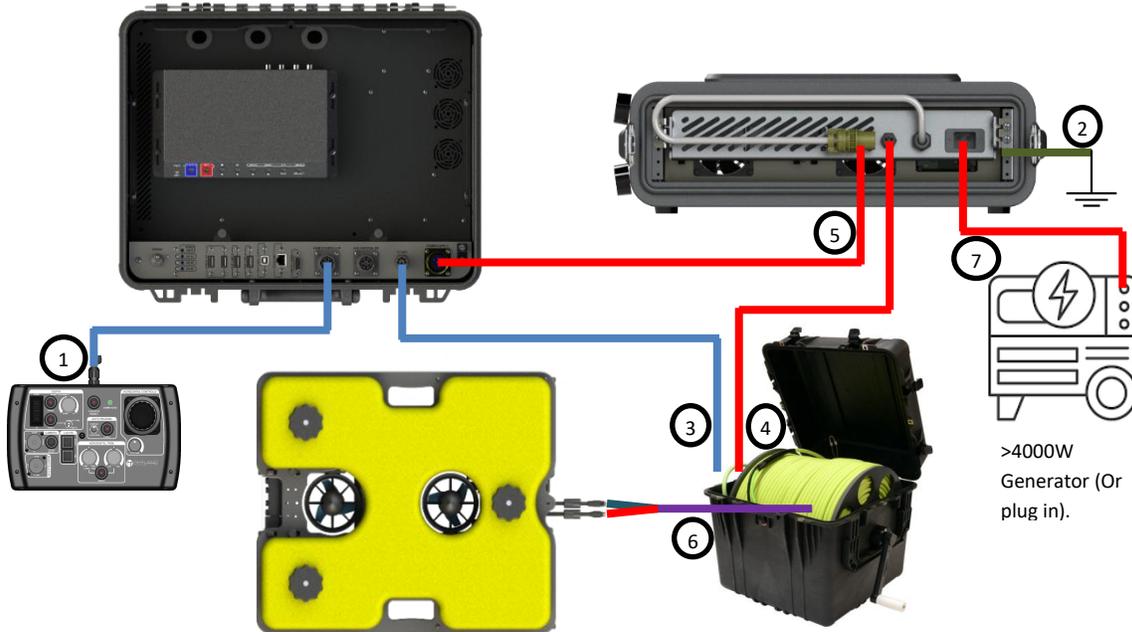
ROV Cable and Reel

1. Cable Case (shown with optional reel)
2. C-3407 Cable



System Startup

The diagram below shows the plug-in order of the ROV system. There is a video of how to do this on thumb drive.



Setup ROV System

1. Set Control Console unit in desired location.
2. Un-Fold monitor into desired position. Place sunshield into desired location.
3. Take covers off Power Supply and place into desired location.
4. Connect the Hand controller into HAND CONTROLLER port (1) (Do not get this connector or controller wet).
5. Connect Aux Controller to AUX Controller port (for use with optional accessories).
6. Connect ground lug to earth ground (2).
7. Connect ROV Data cable (8pin) to Console (3).
8. Connect ROV Power Cable (3pin) to Power Supply (4).
9. Connect Console power cable to console from Power Supply (5) (Do not get this connector wet).
10. Apply thin coat of silicon grease to connectors and plug the connectors into ROV.
11. Ethernet to VDSL connection (optional).
12. Video Output Connection typically connected to DVR.
13. Make sure the Main power switch on the is off.
14. Connect input power to power source (7) (DO NOT get this connector wet).
15. Connect cable grip to the ROV (The ROV should be able to be picked up from all direction using tether without tugging on cable connections).
16. Secure connectors with locking sleeves.
17. Turn on system using power switch on console.



NOTE: Do not over tighten the locking sleeves, only finger tighten.

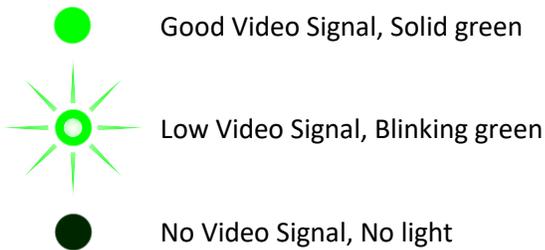
Video Adjustments

The ROV Control Console is equipped with video conditioning hardware which allows the user to adjust the video signal. The console is setup from the factory for the system cable length. Adding or removing cable length may require slight adjustments to the video.



The image to the left shows the Video Amplifier adjustment section. The red Low Voltage (LV) light indicates low voltage is good and the green lights indicate video signal.

If the video signal is too low (no video) or too high (washed out) or loss of color (long cable lengths).



Use a small screwdriver to adjust the video. Use gain to adjust the signal of all channels and the Length Compensation to adjust the level per channel. First set the gain then adjust each channel as needed.

Perform Preflight Check



NOTE: When performing dry testing, limit amount of operating time of the thruster out of water. The thruster contains bearings requiring water for proper operation. Extended time or high-speed operations may result in damage to thruster.

1. Test the GFI by moving GFI Test switch on the power supply towards HV+ or HV-. The HV ON light will flash indicating the GFI has tripped. Reset by power cycling the unit. Test the other HV line and verify GFI trips. **If test fails**, contact Outland for support.
2. Navigate to the Diagnostic screen and verify **HV bias** is $\leq 2\%$. Greater than 2 indicates a potential water leak. The last 8 power cycles are logged and displayed below the HV Bias reading. A dot indicates normal power cycle, + indicates HV+ trip and - indicates HV- trip.
3. Zero all knobs on Hand Controller.
4. Press the Enable Thrusters Button.



Indicator will blink then remain illuminated indicating thrusters are powered. If Indicator blinks and goes out this indicates an issue. Refer to manual and troubleshooting guide for details.

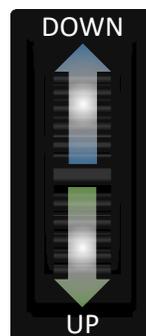


Keep hand, feet and objects clear of propellers when power is applied to vehicle.

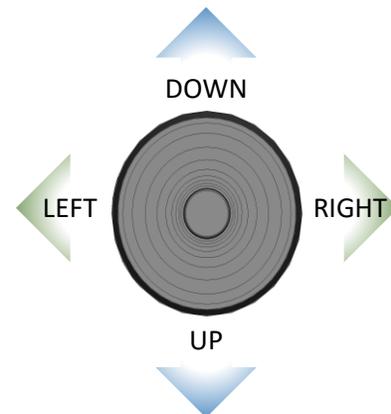
5. Test all the controls below:



Move Control joystick in each direction and verify associated thruster activates.



Move Depth Thumbwheel up and down to verify thruster activates.



Test forward camera rotate function. Test pan if optional pan and tilt camera installed.



Press Camera Select to cycle through available cameras. Verify video is displayed on monitor.



Do not run lights for more than 60s in air.

Flight

When ready for mission, enable thrusters. Below is a list of available flight modes. In any mode manual controls are active.

Flight Modes

Please reference [Hand Controller](#) section for all the button number callouts. Highly suggest having hand controller in front of you while reading this section.

Manual

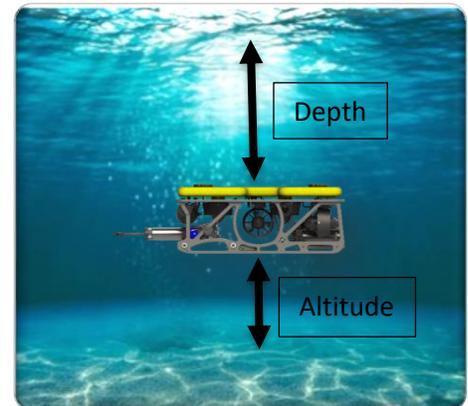
Manual mode passes the pilot inputs directly to the thrusters. All Outland ROV's default to manual mode.

Depth Hold

Depth Hold mode holds the vehicle at the set point depth. Activate using the Auto Depth Enable Button (button 6) and Altitude/Depth toggle switch (button 7) to Depth mode. Moving the depth thumbwheel (thumbwheel 3) up or down will increment the depth set point by 0.1ft. With Depth hold enabled it also enables auto pitch control.

Altitude Hold (Optional)

Altitude Hold mode holds the vehicle at the set altitude. Activate using the Auto Depth Enable Button (button 6) and Altitude/Depth toggle switch (switch 7) to Altitude mode. Moving the depth thumbwheel (thumbwheel 3) up or down will increment the depth set point by 0.1ft. With Altitude hold enabled it also enables auto pitch control.



Heading Hold

Heading hold maintains the heading when enabled. Activate using the Auto Heading Enable Button (button 8). The joystick can be used to adjust the heading to desired heading and when you release the joystick the vehicle will maintain the new heading. Auto heading can use either Compass or Gyroscope sensors. It is recommended to use compass unless flying near magnetic materials. If DVL is equipped auto heading will also hold you in position translationally if the surface is close enough for DVL to get data.

Trim

Trim is available in each direction. If depth trim is enabled and the depth trim knob is at zero the ROV will automatically pitch itself. However, there is no way to manually pitch vehicle.

Stick Gain

Stick gain controls the maximum control stick drive signal from 100% to 25% output. 100% means full power will go to the thruster when stick control is at 100%.

Video Overlay Interface

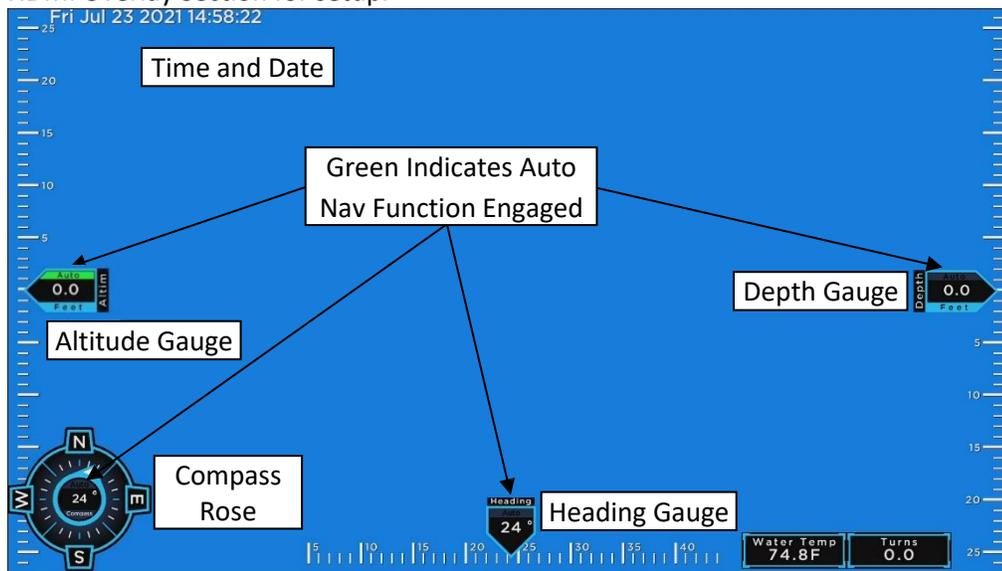
Outland's Video Overlay system monitors data communications between the Top Side unit and the ROV. The interface is used to display system data in real time and setup the ROV system. There are 8 pages available to input text. The overlay will default to Text Page 1 and will display the current time, date and a compass. This view will be superimposed over video if supplied.

Menu Navigation

Navigating the menu system requires the use a standard USB mouse connected to one of the Overlay USB ports.

Pilot View

The Pilot View is used to monitor video and vehicle data while flying. Typical setup shown. The overlay displays a blue background (RGBA=0,121,241,1) which can then be removed via chroma key compositing. When using OTI-1080-4C this is easily accomplished using the Overlay Output as the HDMI input. Refer to DVR Manual, HDMI Overlay Section for setup.



Menu (Navigation Drawer Icon)

The menu is activated by moving the mouse to the upper left corner, upon which a Navigation Drawer Icon will appear. Press the Navigation Drawer Icon to reveal the Menu Options. While navigating the menus an x in the upper right corner or exit button will be available to return to the Fly View. A left mouse click will also exit to the Fly View.

Available Menus:

Edit Mode: Edit mode allows for the text to be added to the screen. There are 8 pages of text available.

Diagnostics: The diagnostics menu displays system diagnostic information.

HUD Options: The HUD Options menu is to select and place the overlay data as well as custom logo placement.

Devices: The devices menu displays 4 currently connected devices. This menu is used during vehicle troubleshooting.

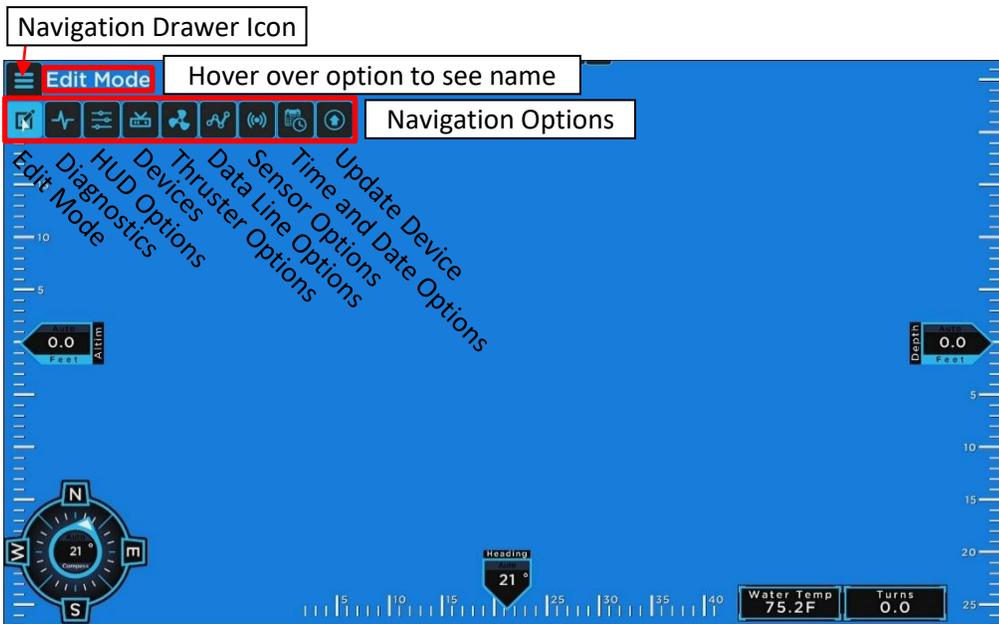
Thruster Options: The thruster menu allows for the thruster function and direction to be chosen.

Data Line Options: The data lines options menu is used to select the function of the 2 available spare line in the tether.

Sensor Options: The sensor options menu is used to select units, water type and zero various sensors.

Time and Date Options: The time and date menu allow for the overlay time and date to be updated.

Update Device: The update device menu allows for individual device updates to be pushed, send manual commands to devices, update the overlay software, and save/delete the overlay setup.



Edit Mode

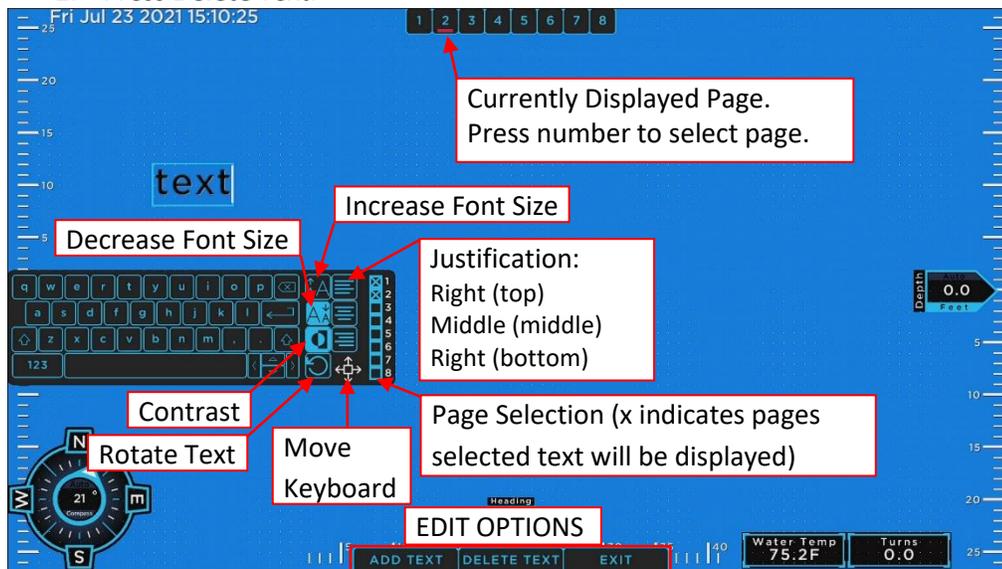
Edit mode is used to add text to the screen. The overlay allows for 8 pages of text.

Add Text

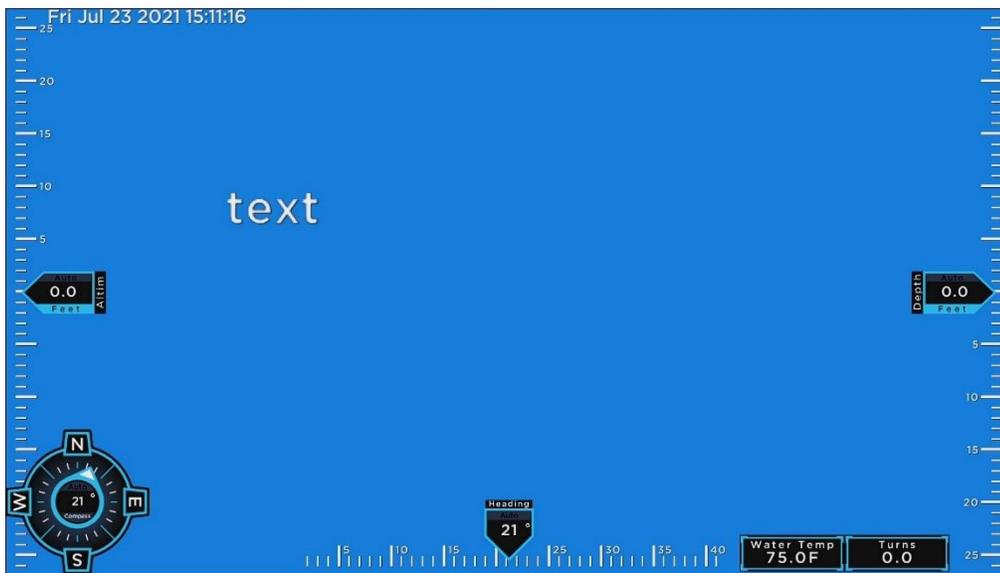
1. Press **Add Text** to add a text box to the screen.
2. Type desired text.
3. Select location of text.
4. Set Text size, Justification and rotation using the on-screen keyboard.
5. Text can be re-positioned by clicking and dragging.

Remove Text

1. Select text to delete.
2. Press **Delete Text**.



Displayed Text View



Diagnostic Display

The system diagnostic display provides the operator with critical data.

Control: Bar Graph displaying the Hand Controller input for thruster control. Thrusters must be enabled to see display update.



When determining the ROV buoyancy, use the vertical control percent. If the vertical control is greater or equal to 30% the vertical thruster is working hard to maintain depth. Adjustments to the ballast are necessary to minimize the positive buoyancy.

Communications: Displays the connected devices in the topside control unit and ROV.

Setup: Current Spare Line setup.

Top Voltage: Top Side Power Supply Voltage.

Amperage: Total ROV Current in Amps.

ROV Voltage: Voltage seen at input to the ROV.

HV Bias: Measurement of high voltage leakage. Typical value is $0\pm 2\%$. Any value greater than 2 indicates a potential leakage in the ROV cable. Any value greater than 30 will trip the GFCI.

Video Channels: Displays connected video channels and if high definition (HD) or standard definition (SD) camera.

Light Control: Bar graph indicating the percent of light control.

Fault History: Display of last 8 power cycles, latest on the right. Green Check indicates no fault. Red + for positive side fault and Red – for negative side fault.

Compass: Direction in degrees from north.

Depth: Current ROV Depth in selected units.

Depth Rating: Depth transducer maximum rating in PSI.

Altimeter: Current ROV altitude in selected units (if equipped).

HUD Options

The HUD Options (Heads Up Display) menu is used for selecting the information to be display on the overlay.

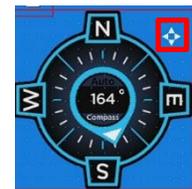
1. Select Desired Gauges and data to be added to the overlay by checking box next to desired options.
2. Select Edit Layout.



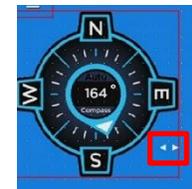
Edit Layout Mode



3. Hover over the gauge to move.
4. When the cursor changes to a diamond shape, click and drag the gauges/data to the desired location.
5. Gauges can be resized by hovering over the desired direction to expand until two triangles are shown. The direction (horizontal or vertical) of the triangles indicates the direction of change.
6. Click and drag gauge until desired size is achieved.
7. Once desired HUD is setup, press the Exit Layout Button.
8. The setup is automatically saved.



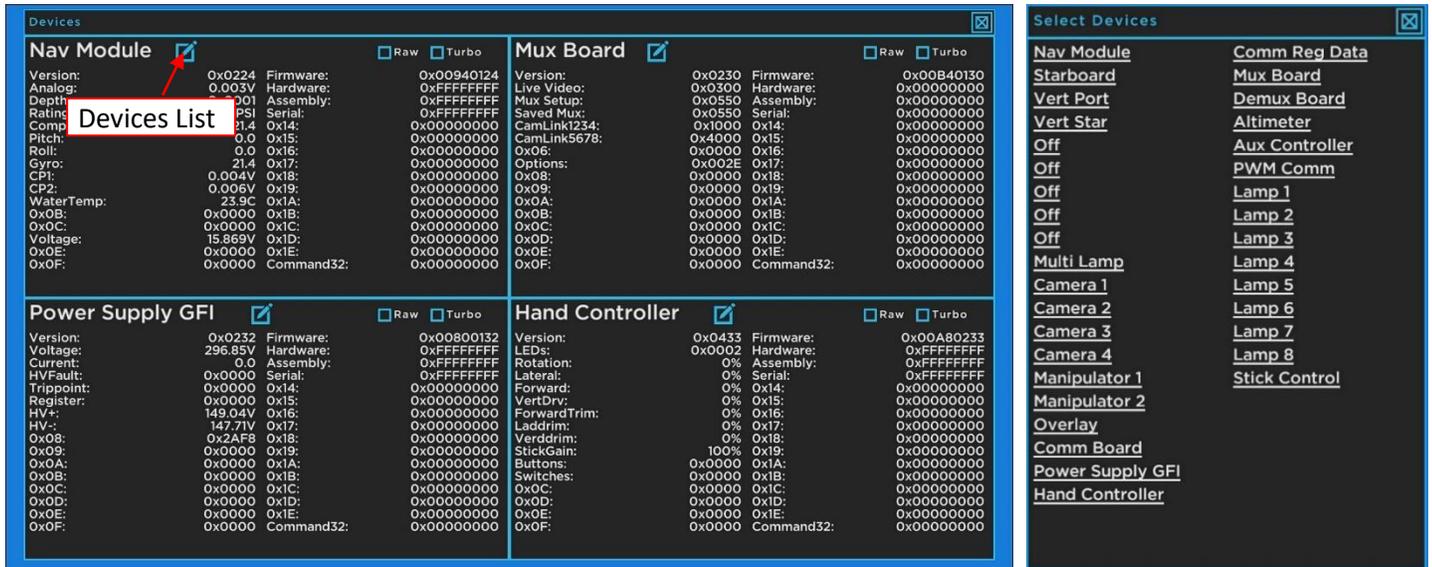
Move



Resize

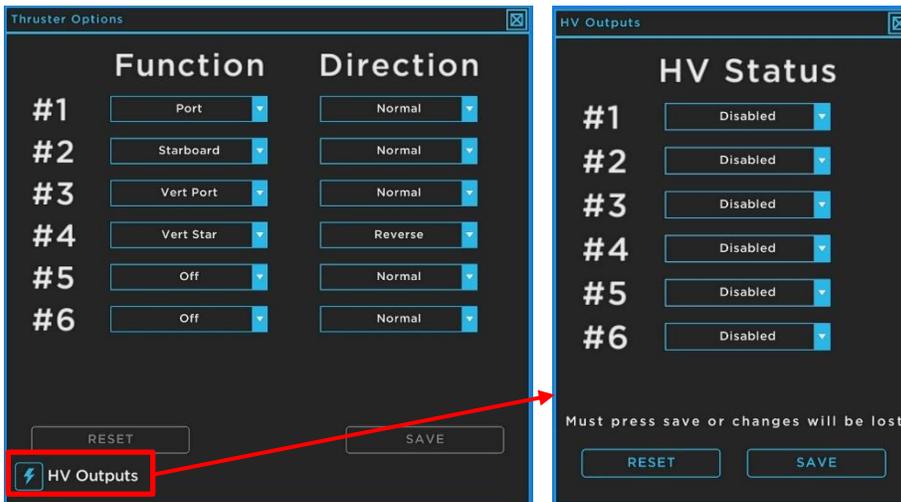
Devices

The devices screen presents the user with 4 devices data simultaneously. These screens are intended to be used for troubleshooting purposes. To show data from other devices than show press the Devices List button. Raw Mode shows the data in hexadecimal. Turbo mode puts all data from that device in extreme priority.



Thruster Options

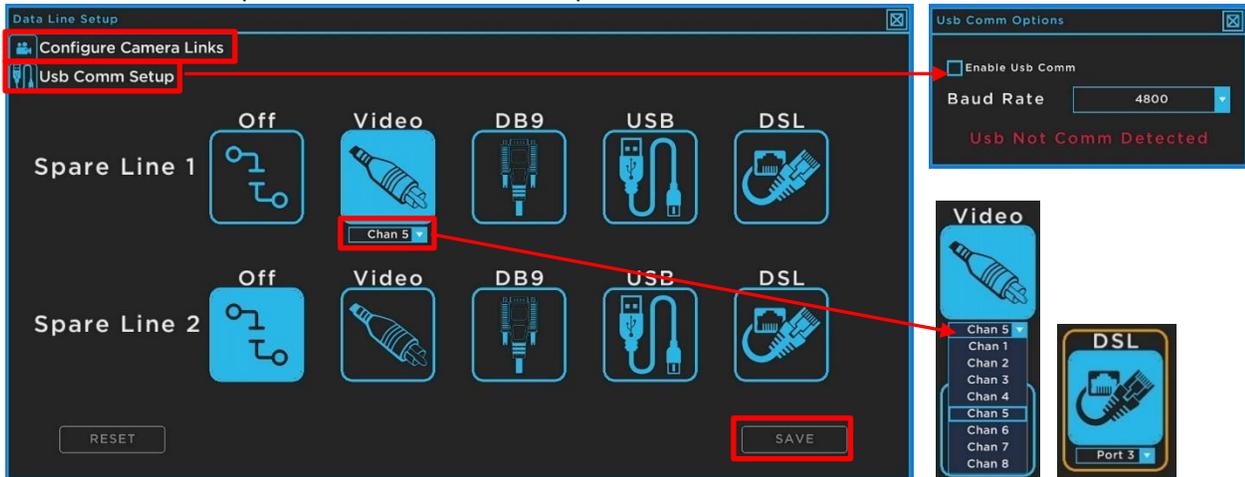
The Thruster Options menu is used to select the function and direction of the thruster. Typically, this does not need updated unless the thrusters were moved around on the vehicle in relation to the connection. The Direction selection allows for the direction to be reversed.



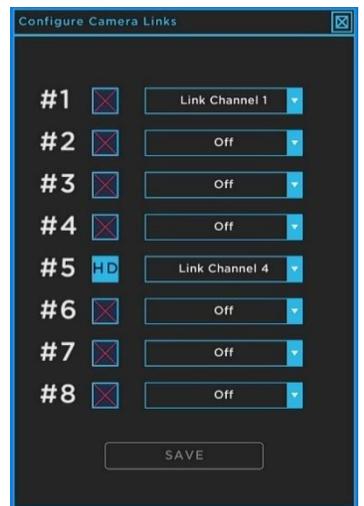
The HV Outputs allows for individual thrusters to be disabled. The HV Status is only implemented on the BTL-100 (ROV-1000, 2000, and 2500).

Data Line Options

The Data Line Options is used to select the spare line connections.



1. Select desired spare line option and press the SAVE button.
2. When selecting Video, Press the Video button. Then use the drop-down box to select the Video channel to be displayed. If unsure which video channels are available, use the diagnostic screen to view available video channels.
3. When selecting DSL(if installed), select spare line 2 and use the drop-down menu to select port 3.
4. When selecting USB , select the USB Comm Setup Button to set the desired baud rate and check the enable USB Comm check box if not checked.
5. The Configure Camera Links option links Cameras to the communication channel. This is a factory setting and should not need changed.



Sensor Options

The sensor Options menu is used to select units, water type and zero sensors.

Zero North

1. Point Vehicle towards known North (use external compass to verify)
2. Press Zero North button.
3. The Compass Rose will now to point north.



When performing Zero North the ROV must not be near any metal objects.

Zero Depth

1. Place vehicle in water (on surface).
2. Press Zero Depth button.

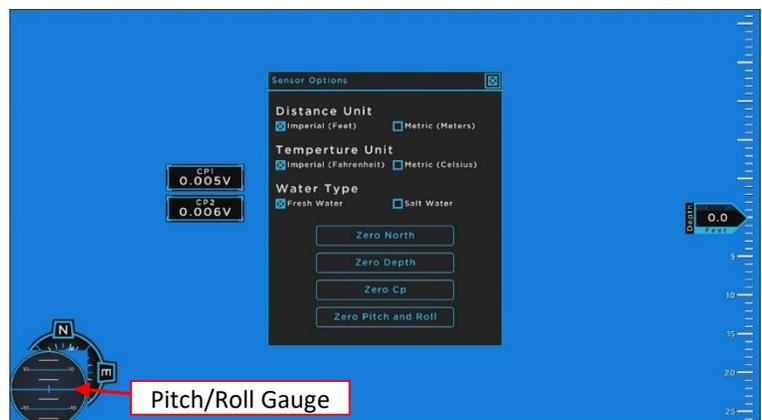


Only zero depth with ROV in the water on the surface with depth mode disabled.

Zero Cp: Connect the supplied CP Zero Dummy plug into port D where the CP would be connecting on the control bottle, now press Zero Cp.



Only zero CP when vehicle is out of the water.



Zero Pitch and Roll

1. Place vehicle on flat level surface and press Zero Pitch and Roll button.
2. The roll/pitch gauge will now show level.



Do not zero pitch and roll on a rocking boat.

Time and Date Options

The Time and Date menu is used to set the time and date. The overlay is equipped with a battery backup for the clock that will hold time and date between power cycles.

1. Set Current Time and Date.
2. Select Font Size.
3. Press Update Time Button.



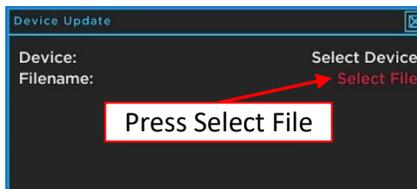
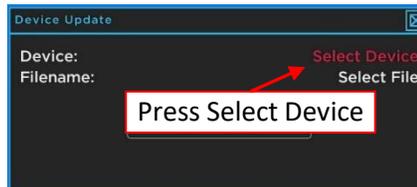
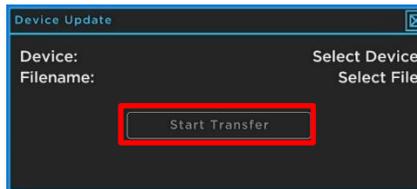
Update Device

The update device menu is used to update devices and settings.

Contact Outland Before attempting to update any device

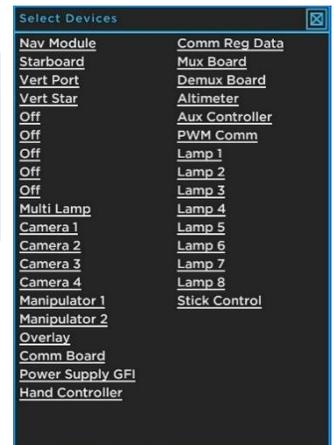
Update ROV Device: The option is used to update individual devices in the system.

1. Press Select Device and select device to Update.
2. Press Select File and select update file.
3. Press Start Transfer.
4. Wait for transfer to complete. Note this may take up to 10min.
5. Once completed power cycle vehicle.

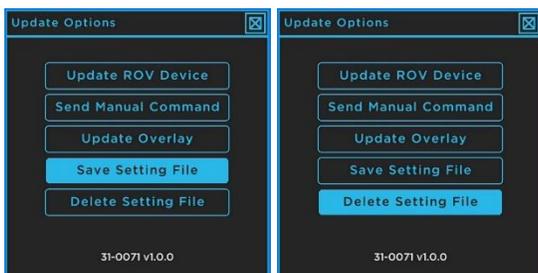


Send Manual Command: This option is used to change factory settings not available through the overlay. This option is only to be used with direct assistance from Outland Technology.

Save Settings File: Use this button to save the current overlay setup.



Delete Settings File: Use this button to delete the current overlay setup file



System Maintenance

The Outland ROVs are designed to be low maintenance. However, operating the vehicle in saltwater requires additional maintenance to minimize corrosion and assure continual proper operation of the ROV. The following daily and periodic maintenance should be carried out.

Daily Maintenance

1. Flush the entire ROV with clean fresh water.
2. Ensure thruster propellers freely spin, are free of debris and are not damaged.
3. Inspect ROV and umbilical for any visible damage, contact Outland if issues are discovered.
4. Backup all video files. Refer to DVR Operational Manual for backup procedure.

Periodic Maintenance

Perform the following maintenance after job completion or monthly if it is an extended job.

1. Ensure thruster propellers freely spin, are free of debris and are not damaged.
2. Clean the ROV Power and Data connectors and reapply a reasonable amount of grease. Inspect the connectors prior to assembly for any debris or bristles, remove if found.
3. Inspect the ROV cable for any cuts or abrasions. Repair as needed.
4. Make all hardware is tight. With screw driver tighten all hardware to be sure nothing has vibrated loose.

Connector Maintenance

Greasing Connectors

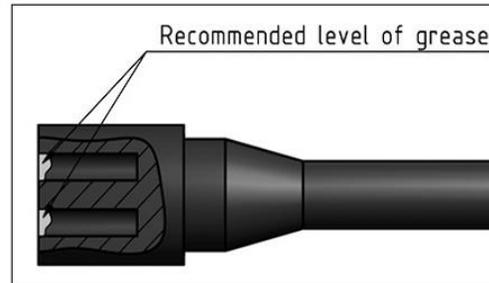
Grease has been applied to most connectors prior to leaving outland. However, it is good practice to make sure a proper amount of grease is on all connectors. This section will give a break down of how to properly grease and clean connectors. There is Molykote 111 grease in the spares kit that Outland supplied. Disclaimer, some of the verbiage and images were used from Macartney.com in this section.

Supplied Grease:



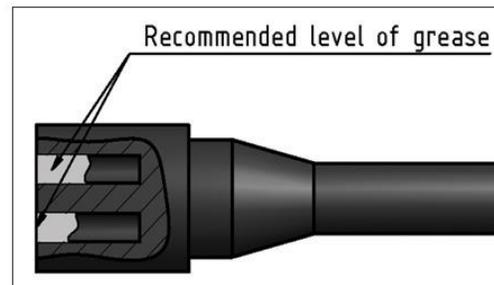
DO NOT USE ANY OTHER
TYPES OF GREASE

Greasing and mating above water (dry mate):



- Connectors must be greased with Molykote 111 before every mating.
- A layer of grease corresponding to minimum 1/10 of socket depth should be applied to the female connector.
- The inner edge of all sockets should be completely covered, and a thin transparent layer of grease left visible on the face of the connector.
- After greasing, fully mate the male and female connector to secure optimal distribution of grease on pins and in sockets.
- To confirm that grease has been sufficiently applied, de-mate and check for grease on every male pin. Then re-mate the connector.

Greasing and mating under water (wet mate):



- Connectors must be greased with Molykote 111 before every mating.
- A layer of grease corresponding to approximately 1/3 of socket depth should be applied to the female connector.
- All sockets should be completely sealed, and a transparent layer of grease left visible on the face of the connector.
- After greasing, fully mate the male and female connector and remove any excess grease from the connector joint.

Cleaning Connectors

For cleaning connectors DO NOT use harsh chemicals. Accepted cleaning products consist of isopropyl alcohol and liquid soap and water. After cleaning be sure to re-apply grease.

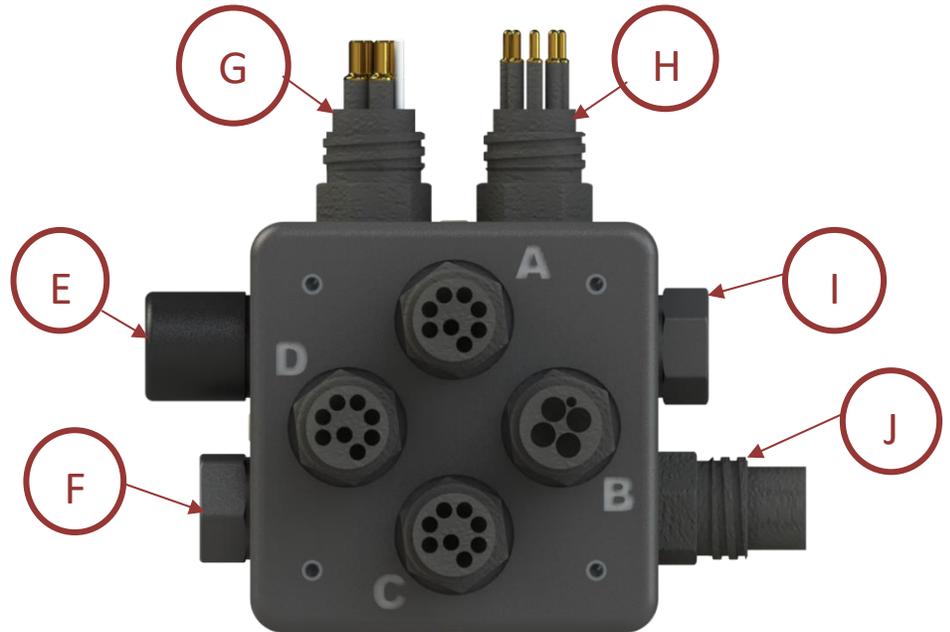
Electrical Interface

Control Bottle (BTL-350)

The control bottle is responsible for distributing all the low voltage power to the ROV. This section will explain what each plug on the control bottle does to make it simple for the user to understand where to plug in the equipment they are using. All the letters that are called out on the picture in this section are engraved onto the control bottle.

Plug identification list:

- A. Sonar/IP (8 Pin Female)
- B. Manipulator and Lights (4 Pin Female)
- C. Camera (8 Pin Female)
- D. CP Probe (8 Pin Female)
- E. Pressure and Temp Sensor (No Pins)
- F. Spare #1 (Varies)
- G. Link between power bottle and control bottle (4 Pin Male)
- H. ROV cable (8 Pin Male)
- I. Spare #2 (Varies)
- J. DVL (8 Pin Female)



Note: Since the manipulator and the lights plug into the same port on the control bottle there will be a whip that plugs into the manipulator and splits off to the lights.

Important Note: Any time you unplug a port and do not plug anything back into it you must put a dummy plug into that port there are some of these in the spares box.

Important Note: Be sure to power down with console switch before connecting or disconnecting plugs.

Power Bottle (BTL-300)

The power bottle is responsible for distributing all high voltage power to the thrusters. As seen in image below the bottle is labeled and each label can be linked to a certain thruster. These labels are engraved onto the frame as well.

Plug Identification list:

- M1:** Port Forward/Backward Thruster (CCW).
- M2:** Starboard Forward/Backward Thruster (CW).
- M3:** Port Lateral Thruster (CCW).
- M4:** Starboard Lateral Thruster (CW).
- M5:** Front Vertical Thruster (CW).
- M6:** Rear Vertical Thruster (CCW).
- M7:** Spare Thruster/Tool
- HV Tether Conn:** High Voltage Tether Connector.



Interlink: Link between the control bottle and the Power Bottle.



In general, if a connector is male there is no voltage or dead and if a connector is female there is voltage present or live.

Indication light:

On the opposite side of the connectors there is a clear cap. If you look through that cap there is a red and green LED light that can be seen. When the bottle has power the light will illuminate red. When there is a signal being passed to the bottle the light will flash green while remaining illuminated red. See images below for examples.



Power Bottle Connector:

HV TETHER COMM

Connector: MC-BH-3-M

Pin	Function	Description
1	Power	+200 VDC (Relative to pin 3)
2	Power	- 200 VDC (Relative to pin 3)
3	Power	Chassis Ground

INTERLINK

Pin	Function	Description
1	24V Ground	Primary ground return for 24V Power
2	24V Power	+24VDC Power
3	COMM+	Differential Communication
4	COMM-	

M1-M7 (Thruster Connections)

Connector: Outland #21-0008-14 (All Thruster Connections)

Pin	Signal	Function	Description
1	Phase A	Thruster Drive	Three phase motor drive
2	Phase B	Thruster Drive	Three phase motor drive
3	Phase C	Thruster Drive	Three phase motor drive

Control Bottle Connections

(A) IP #1

Pin	Signal	Function	Description
1	24V GND	Power	
2			
3	DSL TX+		
4	DSL TX-		
5	+24V	Power	
6			
7	DSL RX+		
8	DSL RX-		

(B) Light and Manipulator Connection

Connector: MC-BH-4-F

Pin	Signal	Function	Description
1	24V GND	Power	Primary ground return for 24V power
2	24V	Power	+24VDC
3	COMM +	Bi-directional	Differential Communication
4	COMM -		

(C) Camera Connection

Connector: MC-BH-8-F

Pin	Signal	Function	Description
1	GND	Power	Primary ground return for 12V power
2	Video 1	Input	75ohm Composite Video Input (SD or HD)
3	COMM +	Bi-directional	Differential Communication
4	COMM -		

(D) CP Connection/Twisted Pair

Connector: MC-BH-8-F

Pin	Signal	Function	Description
1	24V GND	Power	Primary ground return for 24V power
2	Twisted Pair 1 +	Bi-directional	Extra twisted Pair for differential signal or CP ground on Pin 8
8	Twisted Pair 1 -/CP ground		
3	Twisted Pair 2+	Bi-directional	2 extra twisted pair
4	Twisted Pair 2-		
5	+24V	Power	+24 VDC
6	CP1	CP 1 input	Dual input from dual CP probe
7	CP2	CP 2 input	

(F) IP #2 (Optional)

Pin	Signal	Function	Description
1	24V GND	Power	
2			
3	DSL TX+		
4	DSL TX-		
5	+24V	Power	
6			
7	DSL RX+		
8	DSL RX-		

(G) Interlink (Link between power bottle and control bottle)

Pin	Signal	Function	Description
1	24V GND	Power	Primary ground return for 24V power
2	24V +	Power	Primary Power
3	COMM +	Bi-directional	Differential Communication
4	COMM -		

(H) ROV Cable (Data Connection)

Connector: MC-BH-8:

Pin	Signal	Function	Description
1	Video 1 +	Output	Differential video output
2	Video 1-		
3	Comm +	Bi-directional	Differential Communication
4	Comm-		
5	Line3+	Bi-directional	Differential spare line
6	Line3-		
7	Line4 +	Bi-directional	Differential spare line
8	Line4 -		

(J) Spare 2/DVL

Connector: MC-BH-8-F

Pin	Signal	Function	Description
1	24V GND	Power	Primary ground return for 24V power
2	DVL RX		
8	DVL TX		
3	COMM +	Bi-directional	Differential Communication
4	COMM -		
5	+24V	Power	+24 VDC
6	Twisted Pair 3 +	Bi-directional	Extra twisted pair for differential signal
7	Twisted Pair 3 -		