

User Manual

OTPS1KW-ASM-ROV-R1/OTPS1KW-ASM-TOPSIDE-R1

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Contents

Safety at a Glance	3
System Overview	4
Power Supply Unit: OTPS1KW-ASM-TOPSIDE-R1.....	4
ROV Power Supply Enclosure: OTPS1KW-ASM-ROV-R1	5
System Status Display.....	5
User Access Area.....	5
Installation.....	5
Quick Start Guide.....	6
Troubleshooting	6
Electrical Interface	7

Safety at a Glance

1. Environmental Considerations

- The power supply console is not IP rated for water or dust ingress. Be aware of the working conditions. Do not operate in rain and protect console from spray.
- The connector on the tether is only IP rated when mated. Replace cap when storing in box with wet tether.

2. Operation

- Test the Ground Fault Interrupter (GFI) prior to use. If the GFI fails return for service.
- Do not close the lid of the power supply or block fan inlets and outlets during operation. The unit requires air flow for proper cooling.
- The power supply allows for continuous operation of the vehicle. Limit amount of time at full throttle to avoid potential overheating of motor drive components.

3. Maintenance and Upkeep

- Do not use cracked, cut, or damaged tether. **Discontinue use and replace if damaged.**
- Inspect connectors and penetrations for any signs of wear or damage prior to use.
- Always grease wet mate connectors prior to use.
- There are no user serviceable parts in the OTPS1KW-ASM-ROV-R1 or OTPS1KW-ASM-TOPSIDE-R1 except for the user access area. Do not attempt to open either the OTPS1KW-ASM-ROV-R1 or OTPS1KW-ASM-TOPSIDE-R1.

Legend



Warning/
Caution



High Voltage

Safety



Warning

The OTPS1KW-ASM-ROV-R1 system is supplied with 400V_{DC}. Improper use may result in electrical shock or electrocution. Only trained and experienced personnel should operate the equipment.



Warning

The OTPS1KW-ASM-TOPSIDE-R1 system is supplied with 100-240V_{AC} and supplies 400V_{DC}. Improper use may result in electrical shock or electrocution. Only trained and experienced personnel should operate the equipment.



Warning

Troubleshooting described in this manual is to be done only by qualified service personnel. To avoid electrical shock or equipment damage, do not troubleshoot or service any components unless you are qualified to do so.



Caution

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

System Overview

The battery replacement system package is a drop-in replacement for the BlueROV2 battery watertight enclosure. The battery replacement system is comprised of three parts: the OTPS1KW-ASM-TOPSIDE-R1, OTPS1KW-ASM-ROV-R1, and tether. The OTPS1KW-ASM-ROV-R1 ROV enclosure easily replaces the Battery Enclosure utilizing the same dimensions and mounting. The OTPS1KW-ASM-ROV-R1 utilizes wet mate connectors allowing the tether to be removed. The enclosure provides 1000W @ 15V to the vehicle and as well as data pass through. Connections to the BlueROV2 Electronics Enclosure are maintained utilizing Blue Robotics penetrators. Power connection uses the standard 3.5mm bullet connector and 0.1" (2.54mm) crimp connector for Fathom-X communications and spare twisted wire pair. The tether is comprised of two twisted pairs. The power conductors allow for operation out to 300m. The top side power supply, OTPS1KW-ASM-TOPSIDE-R1, provides 400VDC to the OTPS1KW-ASM-ROV-R1. The supply incorporates a GFI for user safety, and status indicator which reports power supply output voltage, current and run time.

Power Supply Unit: OTPS1KW-ASM-TOPSIDE-R1

Specifications

Input Voltage: 100-240VAC 50/60Hz

Input Current_(MAX): 15A

Input Power_(MAX): 1800W

Output Voltage: 400VDC

Output Current_(MAX): 4A

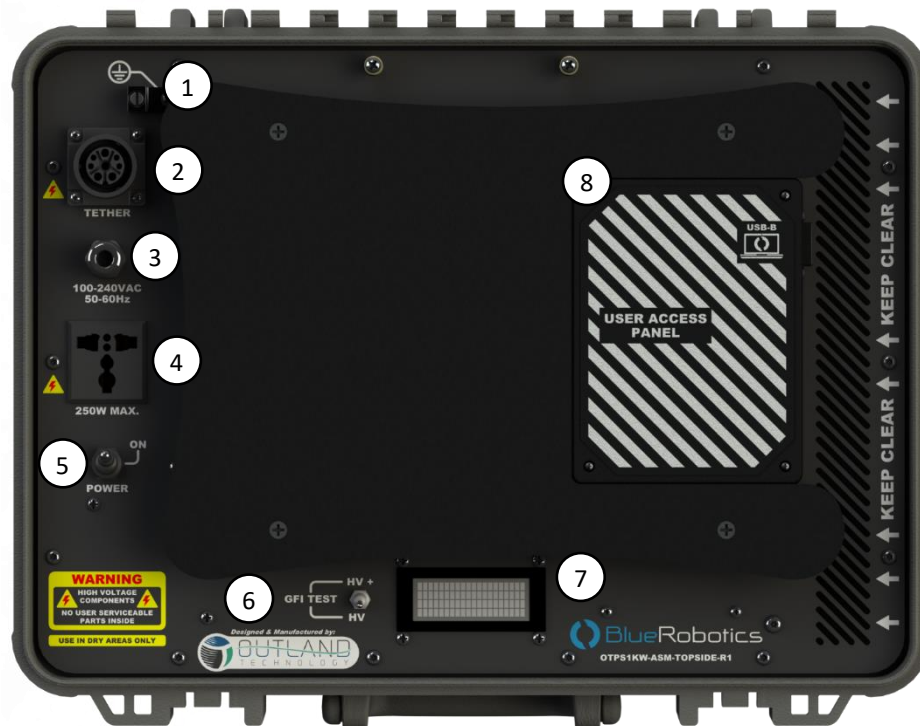
Output Power_(MAX): 1600W

Efficiency_(NOM): 90.5%

Operating Temperature: -30°C to +50°C

Humidity: 10-95% RH non-condensing

IP rating: IP20



- 1. Green wire ground connection
- 2. Tether connection

- 3. Input Power (100-240VAC)
- 4. Laptop power outlet
- 5. Power Switch

- 6. GFI Test Switch
- 7. System Status Display
- 8. User Access Panel

ROV Power Supply Bottle: OTPS1KW-ASM-ROV-R1

Specifications

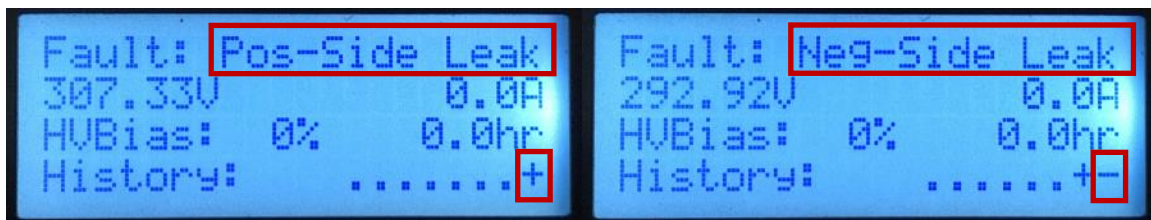
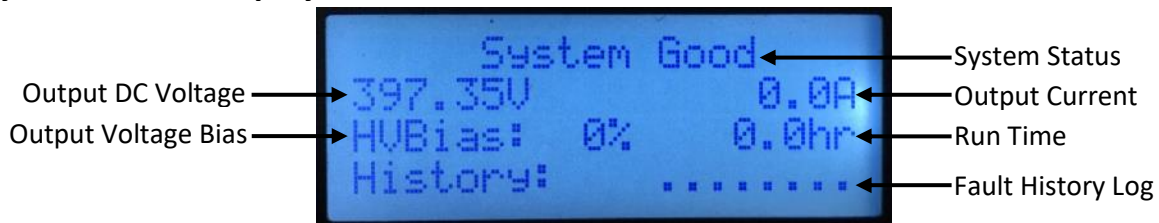
Output Voltage_(NOM): 15VDC

Output Current_(MAX): 66.8A

Output Power_(MAX): 1000W

Efficiency_(NOM): 92%

System Status Display



- System Status: Indicates Current System Status: “Good” or “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 on the high voltage between power supply and OTPS1KW-ASM-ROV-R1. See troubleshooting.
- Run Time: Cumulative run time of power supply console
- 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.

User Access Area

Within the laptop tray resides a user access area. This area is isolated from the internal high voltage and is available for users to mount custom interface electronics. The standard package is equipped with a Fathom-X interface board and ethernet to USB adapter. The spare pairs and 12V power for the Fathom-X are also available in the User Access Area.

Installation

The OTPS1KW-ASM-ROV-R1 bottle is delivered ready for install. Follow the standard procedure for the Blue ROV2 Assembly.

[Outland Technology Power Supply BlueROV2 Integration Guide](#)



Caution: Once the power cord is connected to an outlet, AC voltage is present in the console and at the Laptop charging outlet.



Note: Voltage applied to power supply is also present at the laptop port. Example: 220V input will result in 220V at laptop charging port.

Quick Start Guide

1. Ensure the power connection has a good ground.
2. Connect supplied Green Wire to earth ground for added protection. Refer to OTPS1KW-ASM-TOPSIDE-R1 image above for mounting location.
3. Inspect tether and bottle connectors for damage and lubricate with waterproof silicone grease. Grease procedure: [Subconn Handling Instructions](#)
4. Connect tether to OTPS1KW-ASM-ROV-R1 and OTPS1KW-ASM-TOPSIDE-R1. Be mindful of the of the connector mating position when connecting.
5. Test GFI
 - a. Disconnect tether from power supply.
 - b. Turn on Power.



Caution: Once the power is switched on, High Voltage is present on the tether output.

- c. Move GFI Test switch to HV+. Power supply will shut off. Fans will stop and LCD will indicate fault to HV+ side, if not see subsection 6F.
 - d. Cycle power to unit by turning main power switch to Off and then back On.
 - e. Move GFI Test switch to HV-. Power supply will shut off. Fans will stop and LCD will indicate fault to HV- side, if not see subsection 6F.
 - f. If either test fails, stop all operation and disconnect main power, see troubleshooting guide.
6. Turn off power
7. Connect tether to power supply
8. Connect USB data connection to computer. Follow the [Blue Robotics Network Setup instructions](#) for proper setup.
9. Power unit and run standard preflight checks.

Caution: Once the power is switched on, High Voltage is present on the tether output. If vehicle is connected to tether it will also be powered at this time, stay clear of all propellers. Do not connect or disconnect tether with the power supply turned on.



10. Commence mission.

Troubleshooting

1. HV bias > $\pm 2\%$ indicated on System Status Display, Vehicle still operational.
 - The Vehicle will continue to operate but the High Voltage leak needs investigated.

- Turn Off system power, disconnect ROV tether from the OTPS1KW-ASM-TOPSIDE-R1. Turn On system power and observe the HV bias reading. If reading anything over $\pm 2\%$, there is an issue with the power supply. Return for repair.
- If the HV Bias is $<\pm 2\%$ with tether disconnected, turn Off system power and reconnect tether to the OTPS1KW-ASM-TOPSIDE-R1. Disconnect the tether from the vehicle, and attach 3pin male and 8 pin male dummy plugs to the ROV end of the tether. Submerge as much of the tether as possible, turn On power and observe the HV Bias reading. If $>\pm 2\%$ return tether for repair. If a spare tether is available, repeat test with second tether.
- If HV Bias is $<\pm 2\%$ with dummy plugged tether, power down unit and reconnect to vehicle. Turn on power and observe the HV bias reading. If HV Bias $>\pm 2\%$ return OTPS1KW-ASM-ROV-R1 for repair.

2. HV Bias Trips GFI

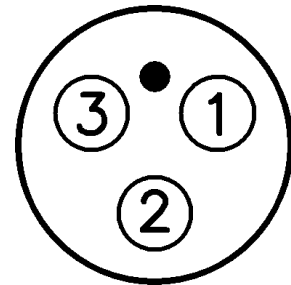
Repeat steps from bias condition above and return faulty components for repair.

Electrical Interface

Tether to OTPS1KW-ASM-ROV-R1 Input Power Connection

Connector: Subconn/Seacon MC-BH-3-M

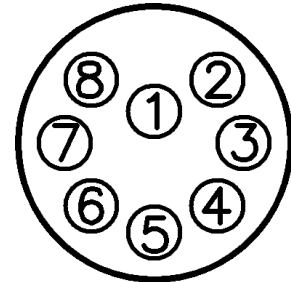
Pin	Signal	Function	Description
1	HV +	Power	+200 VDC
2	HV -	Power	- 200 VDC
3	Chassis	Power	Chassis Ground



Tether to OTPS1KW-ASM-ROV-R1 Input Data Connection

Connector: Subconn/Seacon MC-BH-8-F

Pin	Signal	Wire Color	Description
1	Spare	Orange	Spare twisted pair
2	Spare	Orange/White	Spare twisted pair
3	N.C. on tether ¹	Green	Spare twisted pair
4	N.C. on tether	Green/White	Spare twisted pair
5	N.C. on tether	Brown	Spare twisted pair
6	N.C. on tether	Brown/White	Spare twisted pair
7	Fathom-X -	Blue	Fathom-X pair
8	Fathom-X +	Blue/White	Fathom-X pair



OTPS1KW-ASM-ROV-R1 to BLUE ROV2 Electronics Bottle Power Connection

Power Cable: 03-0161

Pin	Signal	Function	Description
1	+15V	ROV Power	15V, 1000W supply
2	GND	GND	Ground Input

¹ N.C. = No Connect

OTPS1KW-ASM-ROV-R1 to BLUE ROV2 Electronics Bottle Power Connection

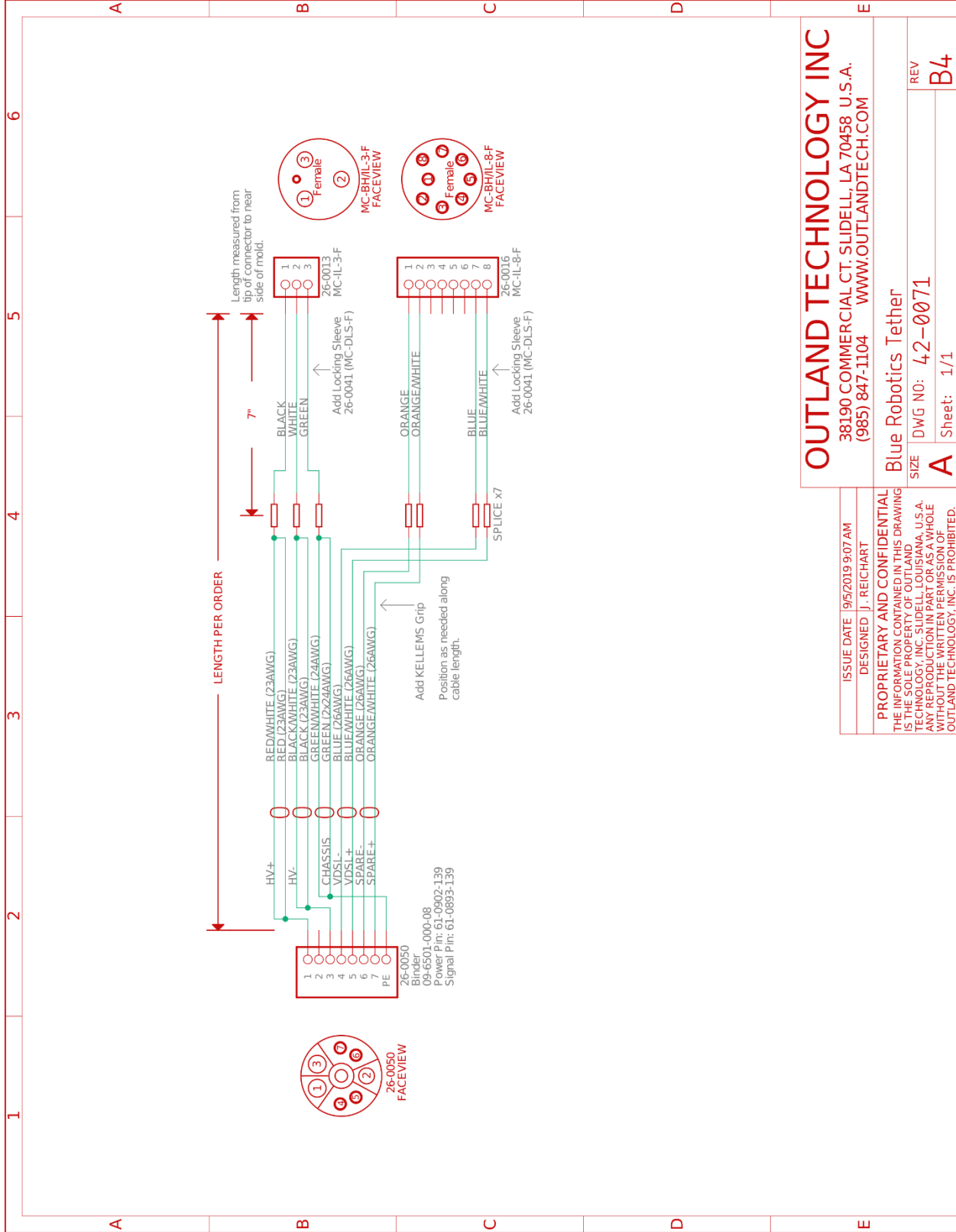
Data Cable: 03-0162

Pin	Signal	Wire Color	Description
1	Spare	Orange	Spare twisted pair
2	Spare	Orange/White	
3	Spare	Green	Spare twisted pair ²
4	Spare	Green/White	
5	Spare	Brown	Spare twisted pair
6	Spare	Brown/White	
7	Fathom-X -	Blue	Fathom-X pair
8	Fathom-X +	Blue/White	

Note: All 4 pairs are wired up to the 8pin tether connector using a 1-1 connection by wire color.

² Green and Brown spare twisted pairs are connected in the OTPS1KW-ASM-ROV-R1 for possible future expansion.

Tether Wiring



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Blue Robotics Tether
SIZE DWG NO: 42-0071
A Sheet: 1/1

ISSUE DATE 9/5/2019 9:07 AM
DESIGNED J. REICHART

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