

# GENESIS 2.0

Diver Propulsion Vehicle (DPV)  
Owner's manual



**LOGIC**  
DIVE GEAR  
Nellis Engineering, Inc.



## Preface:

**IT IS IMPERATIVE TO READ AND UNDERSTAND THIS MANUAL** so that you know the capabilities, limitations and hazards of the Genesis DPV. Reread it occasionally to refresh yourself with the operational and maintenance requirements and refresh yourself on the proper responses should you experience difficulties with the DPV underwater or on land. By not fully reading and understanding this manual, you would be leaving essential safety information out of the water, which is no different than leaving essential dive safety equipment on the shore, where it will do you no good when you need it most. If you have any question, contact the factory for guidance.

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## Changes to the manual

Changes to the manual from the previous revision can be identified by a vertical black bar in the right margin where the change occurs.



## Warnings & Cautions

### **WARNING**

A warning means that injury or death is possible if the instructions are not obeyed.

### **CAUTION**

A caution means that damage to equipment is possible.

### **Note**

A note is added to give more information, usually in a procedure.

**WARNING:** Keep hands, long hair and equipment away from propeller. The propeller spinning at high power settings creates significant suction within 16 inches (40 cm) of the nozzle inlet and can draw in hands, hair or anything within range. The DPV is equipped with safety features that will stop the propeller rotation when enough resistance is present, but injury is still possible.

**WARNING:** Always rotate the trigger lock tab to block trigger operation AND adjust the speed control lever to OFF when not in use to avoid accidental operation.

**WARNING:** Never allow the battery to charge unattended or attempt to charge a damaged battery. The Lithium Ion battery has a high energy density and can catch fire or explode if incorrectly wired, abused or damaged. Only recharge in a safe location, free of flammable materials, under direct supervision and only using the supplied charger. Do not attempt to charge the battery immediately after fully discharging at high power. The battery will heat up the most during the end of a deep discharge and should be allowed to cool for one hour before recharging. For the best battery life, avoid deeply discharging the battery, if possible.

**WARNING:** Do not leave the DPV battery (alone or installed in DPV) in direct sunlight or a hot car. Temperatures of 140°F (60°C) or above can damage the battery, resulting in fire or explosion. Internal temperatures of a car in the sun can easily exceed 140°F (60°C)

**WARNING:** Do not attempt to charge the battery when they are at or below freezing (32°F/0°C). Permanent damage to the batteries will result, decreasing both battery safety and capacity. While the outside of the DPV may be above freezing, the battery may not. Ensure ample time is spent in a warm environment for thermal equilibrium across the pack before charging, following exposure to freezing temperatures.



**WARNING:** Do not use the DPV to ascend from depth. Having the scooter tow you towards the surface from depth can result in a rapid ascent which can result in ear drum rupture, lung over expansion, decompression illness or death. Do not operate any DPV without proper training.

**WARNING:** Do not rely on the DPV to save your life. The DPV is capable of taking you places that you may not be able to swim back from if the DPV fails. It is not and was never intended to be life support equipment, so do not rely on it as such.

**WARNING:** Be prepared to separate yourself from the DPV should it become uncontrollable, a dangerous restriction to movement or extremely negatively buoyant from flooding.

**WARNING:** The DPV is capable of compensating for diver buoyancy trim changes with little indication of the change in buoyancy detectable by the diver until they stop. Operating the DPV over varying depths can result in the diver becoming very positively or negatively buoyant when they stop, resulting in an out of control ascent or descent. Ensure proper trim adjustments are made when changing depths while scootering and be prepared for this when stopping.

**WARNING:** Powerful magnets are used in the magnetic coupling for the propeller. When the propeller assembly is removed from the tail section, it can be attracted to magnetic surfaces with great force. Treat the propeller assembly with extreme caution when removed to avoid pinching hands and fingers and also damaging the coupling.

**CAUTION:** Avoid running the DPV until battery cutout. Deeply discharging the battery shortens the battery life and can lead to over-discharge of the battery. Should the DPV be run until cutout, remove the recharge plug cover on the nose of the DPV after exiting the water and recharge the battery at your earliest opportunity.

**CAUTION:** Ensure the DPV recharge connector cover is installed prior to entering the water. Corrosion of the connector can occur if left off for extended periods in the water.

**CAUTION:** The propeller is capable of ingesting rocks off the bottom, sea life and other objects at high power settings, which can damage the propeller. Use caution when operating near loose objects and dive responsibly near sea life.

**CAUTION:** Always inspect the o-ring grooves and sealing surfaces for dirt, sand or debris and remove if present to ensure a good seal. Check that the o-rings between the body and tail section are clean, undamaged and lubricated when assembling the DPV. Ensure the body/tail connection is properly aligned before engaging the seals and do not force the connection together if abnormal resistance is felt. Poor attention to assembly can result in damage to the sealing surfaces and flooding of the DPV.

**Always remember to remove the recharge plug cover when not in use or the batteries may be permanently damaged by over discharge. Over discharge is not covered by the warranty!**



## Assembly

Before diving the DPV for the first time, the body of the DPV must be connected to the tail section. Review the **Warp Core User Manual** to ensure the battery is properly assembled. Lower the battery into the DPV body with the cable from the nose of the DPV body on the side of the battery with the Charge Control circuit board. Stop 3 to 4 inches before the tube opening and connect the cable to the white 4 pin connector (Figure 1). Rotate the 2 black locking bars clear of the notches in the red aluminum plate (Figure 2) and finish lowering the battery into the DPV body so the gray bars align with the notches in the red plate of the battery. Rotate the black lock bars into the slot in the gray bars to lock the battery in place and install the two red thumb screws finger tight (Figure 3).

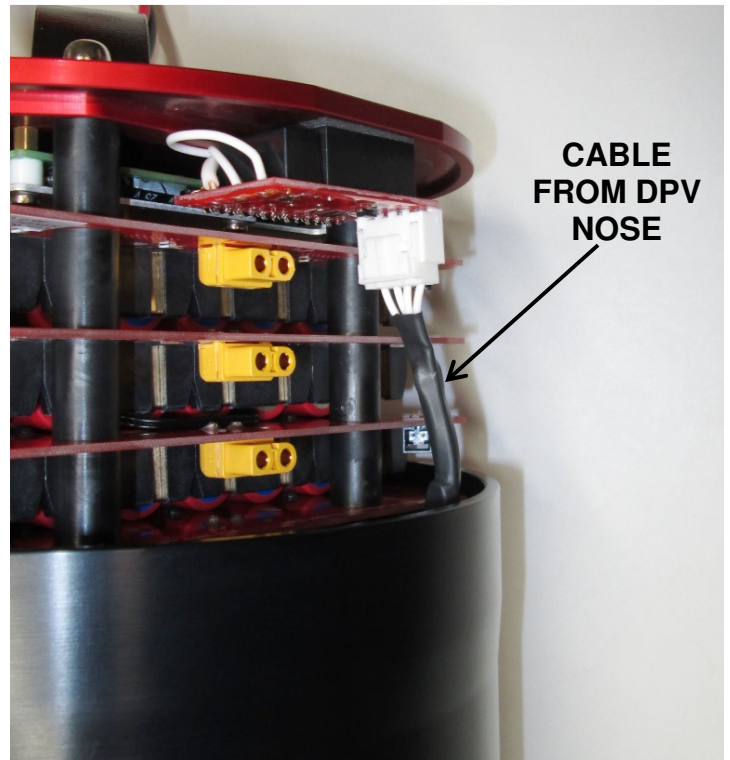


Figure 1



Figure 2

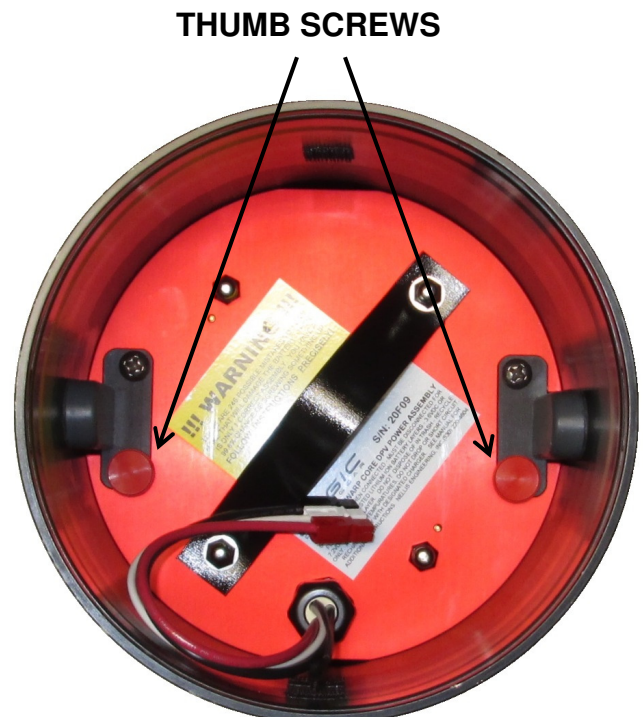


Figure 3



Ensure the two o-rings on the tail are clean and generously greased with Molykote 111 silicone lubricant. Insufficient grease or debris on the sealing surfaces can result in flooding of the scooter. (Never grease the grooves used by the lock strips.) Ensure the nose plug cover is not installed, the trigger is locked OFF with the tab behind the trigger (Figure 4) to prevent operation and the speed lever is rotated down to the OFF position before connecting the battery. Stand the DPV body on the nose, connect the battery to the tail/motor of the DPV and gently place the tail onto the body, ensuring wires are not pinched. Ensure that the gap between the tail and body is equal all the way around and the tail is properly aligned to the body. Position the nozzle struts at the 3 and 9 o'clock, directly above the slot in the body for the locking strips (Figure 5). Press the tail straight down into the body tube and hold it down while installing the orange lock strips. A slight pressure is created inside the DPV by this, which is why the tail must be pushed down onto the body when opening and closing. Slide the large rubber band rearward to cover the two slots and joint between the tail and body, all the way around. This is to keep sediment out of the seal area.

### Note

The rubber band is not needed to retain the locking strips or seal the DPV. It is there solely to keep sand, silt or other debris out of the joint, which may get into the o-ring groove when the DPV is opened. At the end of the diving day, the rubber band should be slid forward so fresh water can flow around the joint when it is rinsed and left clear of the joint until the next dive, so water can drain/dry out.

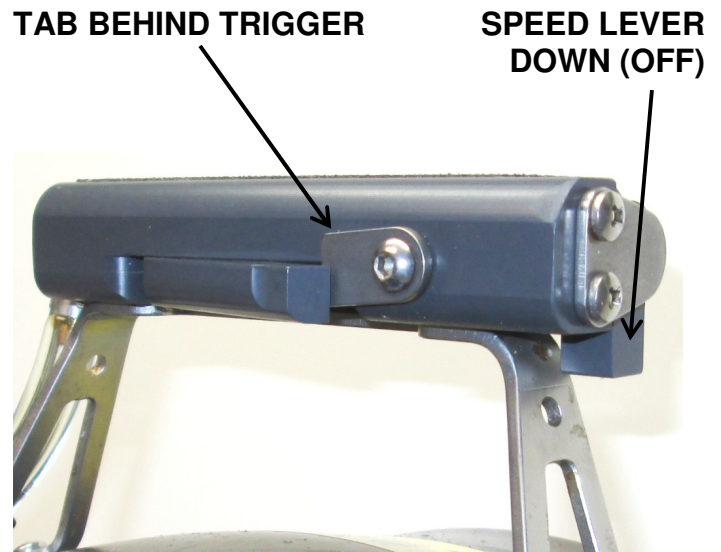


Figure 4 – Trigger Locked OFF

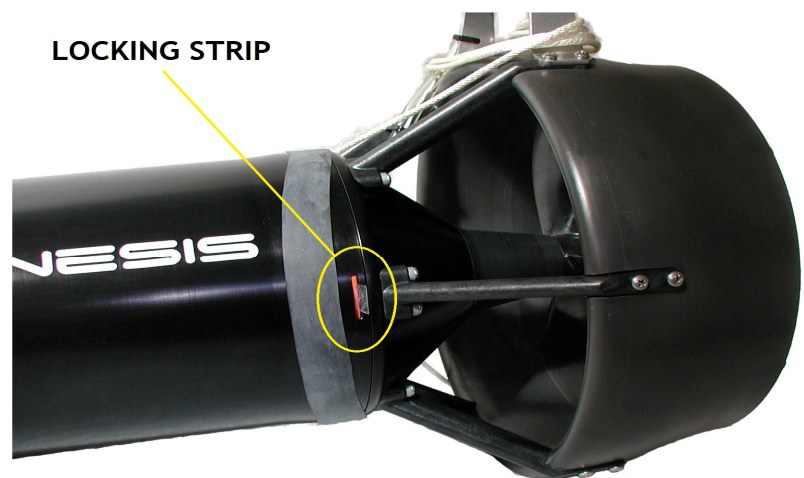


Figure 5



### Note

It is possible to have a slight vacuum or pressure inside the DPV body from changes in altitude or atmospheric that prevents the tail section from being removed. A test port plug (Figure 6) on the nose of the DPV can be removed with an 11/16" socket to equalize the pressure. This is the pressure/vacuum test port that will be discussed later.

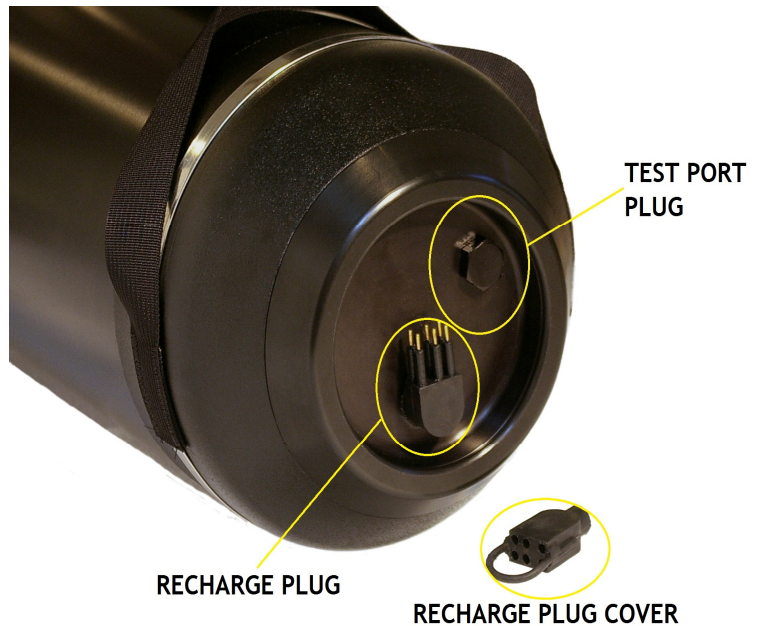


Figure 6

The recharge plug cover on the nose of the DPV should only be installed when you are ready to dive. It contains a circuit that enables the motor controller and should be thought of as an ignition key for an automobile. When the plug cover is installed, the batteries will begin discharging slowly. **Do not leave the plug cover installed when storing the DPV, or the batteries may be damaged by over discharge!** Remove the plug cover at the end of the diving day or after exiting the water, if the DPV is run until battery cutout. The recharge plug cover is rather expensive, so do not lose it. If you do lose it or forget it before a dive, the DPV can still be used. The water will complete the circuit to enable the motor controller, but doing this regularly/long term will eventually lead to corrosion on the electrical pins.

Before entering the water, install the recharge plug cover and test that the DPV operates normally by depressing the trigger and operating the variable speed up and down with the propeller speed tracking the commanded speed. Always lock the trigger OFF and adjust the speed lever to OFF while entering and exiting the water.

## Charging the Battery

Only recharge the battery in a safe location where it can be monitored. Do not charge the DPV unattended. The lithium ion batteries do not off gas while charging, so the DPV body can remain sealed during charging. Obey all warnings and cautions previously listed on pages 3 & 4.

Plug the charger into the DPV first and then plug the charger into the wall outlet. The power light should be on and charging lights should change from green to red within one minute, indicating that the batteries are charging. At the end of charging, the CHARGING LED will turn green.

The Genesis batteries should only be charged when you intend to use the DPV. Charge them 12 to 24 hours before you plan to dive. When storing the DPV for more than a few days, the batteries



should receive a partial charge to bring the voltage into the storage range of 62V to 67V if the voltage is lower. Under normal operation, it is recommended to plan your dives so that the batteries are only discharged about 80% of the available capacity, to avoid deep cycling the cells, which decreases their service life. Battery voltage can be checked via the Bluetooth phone app or the Sentry DPV Dashboard will read the battery voltage while charging, if installed.

The charger output is approximately 275Watts. This means that during the bulk charge period (first 90% of capacity), the 2.1 battery will increase about 30% of the total capacity per hour up to approximately 90% and the 2.2 batteries will increase about 15% per hour, up to approximately 90%. During the last 10% of the charge, the current decreases as it approaches full charge and the final 10% of charge takes approximately 1.5 and 3.0 hours to finish, respectively. As an example for the Genesis 2.1, if during a dive, you used 50% of the battery capacity and then recharged it for one hour during your surface interval, the battery capacity would be at approximately 80% for the next dive.

## Tow Cord

The tow cord comes installed between the left side of the handle mounting bracket and the nozzle strut at the 5 o'clock position when viewed from behind with the handle horizontal at 12 o'clock. If you prefer that the tow cord be mounted between the 3 and 9 o'clock positions Extra screws are provided. The proper length screw MUST be used to ensure the correct thread engagement and that they are not too long, so as to damage the nozzle by protruding in to the inner diameter of the nozzle. Ensure the correct length screw is used between the nozzle/strut connections. A #10-24 x 7/8 inch thread length screw is used to attach the struts to the nozzle with no stainless plate installed. A #10-24 x 1.0 inch thread length screw is used where one stainless plate is attached. A #10-24 x 1-1/8 inch thread length screw is used where two stainless plates are attached. Installing too long of a screw length will result in the screw piercing the inside diameter of the nozzle and cracking the material around where it exits. Torque to 30 in-lb.

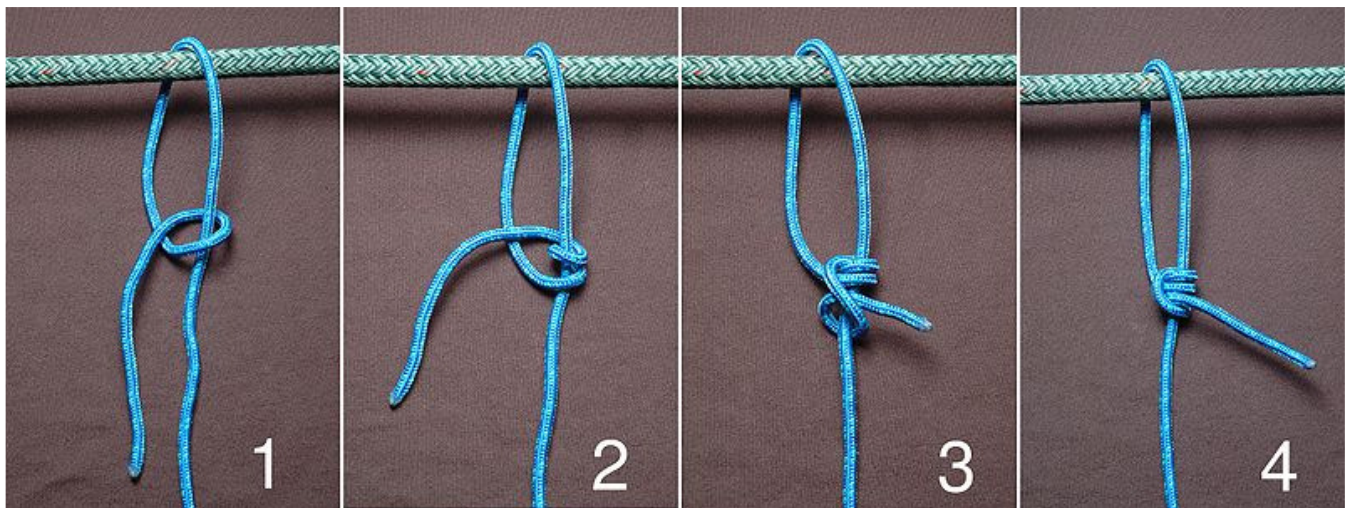


Figure 7 - Taut line hitch sequence



## Trimming

The DPV should be trimmed with weight inside so as to have the proper buoyancy characteristics in the water. Typically, DPVs are trimmed neutral to slightly positive when diving in open water and neutral when diving in an overhead environment. The amount of weight needed inside will change noticeably from saltwater to fresh water and slightly from warm to cold water. Two weight pouches with lead shot are included. Adding items to the DPV like a compass, camera mount or bolt-snap on the nose will affect the trim, so ensure it is configured with all accessories before trimming.

## Operation

A DPV training course is recommended for anyone without experience operating a DPV. The operation section of the manual is not a substitute for proper training and does not address the numerous hazards and issues you may encounter while operating any DPV.

Once in the water, attach the DPV tow cord to your crotch strap D-ring and adjust the length to a comfortable, but not over extended reach length. Do not attempt to operate the DPV without it being securely attached to a proper towing attachment point on your harness. Do not lend it to another diver without a proper towing attachment point on their harness. When starting out, it is easiest to start with the tow cord adjusted shorter than necessary and gradually lengthen it, instead of starting with the tow cord adjusted too long. The tow cord length is adjusted via a taut-line hitch which locks up under tension, but can be adjusted by hand when not. (Figure 7)

When you are ready to dive, submerge and make yourself neutrally buoyant before rotating the trigger lock tab 180° out of the way (Figure 8). Adjust the speed lever to a middle position and squeeze the trigger completely. The DPV has a soft start on the motor to prevent it from jerking you when you squeeze the trigger. The speed lever can be adjusted at anytime, before or after squeezing the trigger. The tab used to lock the trigger in the OFF position can also be used to lock the trigger in the ON position (Figure 9) for extended cruising. It is recommended that you do not use the locking tab to keep the trigger ON until you have gained ample experience with the DPV and then only use it when your hand is on the handle. Rotate the locking tab out of the way of the trigger when transitioning into a restrictive area or area congested



Figure 8 - Lock tab 180° from trigger



with divers or sea life. When not using the DPV, always rotate the speed lever to the OFF position and rotate the locking tab under the trigger to prevent accidental actuation. (Figure 4)

### **WARNING**

Anytime you remove your hand from the handle (to place a reel, deploy a lift bag, etc.) even if only for a few seconds, ensure the trigger is locked in the OFF position and the speed lever is set to OFF. A runaway scooter will typically wrap around behind a diver and spin them in circles with the handle out of reach.



Figure 8 - Trigger Locked ON

Always keep hands and equipment away from the propeller inlet and exit. Should enough resistance be put on the propeller rotation, the magnetic coupling will slip causing a noticeable vibration. Releasing the trigger will allow it to recouple when the motor stops spinning and operate normally after the blades are cleared. No damage or wear will result from the motor running with the propeller decoupled. If line has been ingested and becomes wrapped around the propeller, remove the propeller assembly by pulling it straight out the back of the nozzle. Underwater, there is more resistance when removing the propeller as the water needs to flow into the area of the coupling as it is removed. It is recommended you practice removing the propeller underwater a few times in a controlled situation so you know how much force is required, before having to do it after the propeller becomes entangled.

When the battery voltage drops below approximately 57 volts, the battery is down to the final 10 to 15% of its capacity. At this voltage, the motor controller will limit the scooter's power to roughly 300 watts, which is about 40 lbs of thrust. At this point you should be headed back to the shore or boat. On the Genesis 2.1 you will have 15-20 minutes of run time at that power and 30-40 minutes on the 1200. By decreasing your speed on either DPV, you can increase the runtime to get you back to the shore or boat. It should also be noted that most divers do not use more than 40 lbs of thrust in regular operation, and you may never notice the reduction in power if you are already operating below the reduced power level. With proper dive planning, you should never be operating in the last 10% of the battery capacity.

While scootering around at top speed is fun, it consumes 5-7 times as much power as normal cruising speeds. While you are learning the performance and runtime characteristics of the Genesis DPV, it is best to do it in non-challenging conditions.

Should the DPV begin running on its own while the trigger is not depressed, the first response should be to turn the speed adjust lever down to the OFF position. If the motor continues to run and the DPV cannot be controlled, an option to stop the propeller rotation is to insert a non-life-



support piece of equipment into the nozzle inlet, such as a liftbag or line from a spool or tow cord. This should decouple the magnetic propeller coupling and allow the propeller assembly to be removed by hand once the propeller has stopped spinning, even though the motor inside is still running. **NEVER NEVER NEVER use your hand to attempt to stop a rotating propeller, even at the slowest speed !!!**

**IF THE DPV CANNOT BE CONTROLLED, SEPARATE YOURSELF FROM IT IMMEDIATELY!**

If the DPV becomes abnormally negatively buoyant during a dive, it may be flooding. If conditions permit, swim it to the surface and remove it from the water. If it becomes too heavy or deco obligations prohibit swimming it up, in open water, disconnect it from yourself, connect the tow cord to a lift bag and send it to the surface with a lift bag that has at least 50lbs of lift for the Genesis 2.2 and 40lbs of lift for the Genesis 2.1. In confined water, disconnect it from yourself, attach a lift bag to the scooter to maintain neutral buoyancy and swim it to open water, or leave tied off to something in the cave or wreck to be retrieved later.

## Post Dive

### Caution

The propeller coupling has very strong magnets that require a quick, strong pull to remove from the tail. When reinstalling the propeller assembly into the tail section, ensure you have a firm grip on the propeller hub, insert it slowly and expect a very strong pull as it goes in. Do not let it be sucked in unrestrained, as bearing damage can result.

For freshwater diving, at the end of the last dive of the day, slide the rubber band that covers the body/tail connection forward and remove the recharge plug cover from the nose of the DPV. Remove the propeller assembly, drain any water from the propeller coupling cavity and carefully reinsert the propeller.

For saltwater diving, slide the rubber band that covers the body/tail connection forward and remove the propeller from the tail section. Rinse the propeller by dunking it in fresh water a few times and then rinse the DPV by submerging it in fresh water for 10-20 minutes. Remove the recharge plug cover from the nose when the DPV is removed from the rinse bath. If a rinse bath is not available, remove one orange plastic locking strip between the tail and the body, rinse the strip and direct the flow of fresh water from a hose, into the slot for a minute or two. Reinstall the first strip and repeat the process with the second strip removed and then rinse the rest of the DPV. Drain any water from the propeller coupling cavity and carefully reinsert the propeller.

If you think you may have discharged the battery below 20% capacity, recharge the battery before storing the DPV as suggested in the Recharging section of the manual.



If you will be storing the DPV for more than one month before the next dive, it is recommended to monitor the battery voltage monthly via the Bluetooth app and charge as needed to keep the voltage in the 62V to 67V range.

**Always remember to remove the recharge plug cover when not in use or the battery may be permanently damaged by over discharge. Over discharge is not covered by the warranty!**

## **Care and Maintenance**

The Genesis DPVs are designed so that minimum maintenance is required. A thorough rinse after diving in salt water is the most important preventative maintenance item. Always slide the rubber band forward of the body/tail connection to allow water to drain and dry between days of diving. Whenever the DPV is opened, carefully check the o-rings, o-ring grooves and body sealing surfaces for dirt or debris. Check the o-rings for nicks or deformation and generously grease with Dow Corning Molykote 111 valve lubricant or equivalent. The body o-rings are Buna-N, size -168, 70 durometer. Two spare body o-rings are included as spares and it is best to keep them pre-greased in a plastic bag with the spare orange plastic lock strips, inside the DPV, so they are always available, should you need them.

Lubricate the recharge connector on the nose as needed with silicone spray lubricant or a very, very small amount of silicone grease. Too much grease will attract sand and dirt which can damage the sealing surfaces of the connector and also become packed in the bottom of the cover and charger cable holes, preventing good contact.

### **CAUTION**

Do not apply any petroleum based lubricants to the recharging connector plug, cover or charger cable.

If the vacuum/pressure test plug on the nose has been removed, inspect the o-ring carefully and replace if necessary (spare included). Use a Buna-N, size -904, 70 or 90 durometer o-ring and a generous amount of silicone grease. Install the plug and then wipe off the excess grease.

The thick washers used on the 12 screws that fasten the nozzle struts to the tail cone are zinc anodes. Should they develop a white powdery film, clean them with a toothbrush or soft wire brush following a dive, as the powdery material will be softer when wet. The white powdery



residue must be cleaned off for them to properly function as anodes. Do not apply any lubricant or protectant coatings to the anodes. They are sacrificial and must be allowed to corrode, to protect the DPV. You may remove these 12 screws to inspect for corrosion on the threaded holes in the tail cone. Grease the holes (using a toothpick to get the grease in side) and screws with AquaShield (formerly know as AquaLube) marine lubricant from the DA Stuart Company prior to reassembly and replace the anodes as necessary. Torque screws to 35 in-lb. Additionally, check the torque on the 12 screws that attach the nozzle struts to the nozzle (torque 30 in-lb).

## **Vacuum & Pressure Testing**

The test port on the nose of the DPV can be used for leak testing the DPV. A test gauge assembly can be ordered from the factory or assembled by the owner with off-the-shelf fittings. A list of materials is available on request. A bicycle pump is all that is required for a simple pressure test.

### **Procedure**

1. Remove the battery assembly from the DPV and also the test port plug from the nose, using an 11/16" socket.
2. Remove the screw from the small plate next to the connectors on the tail section. This will allow air to flow freely between the tail and body. Failing to remove this screw can give a false indication of a leak.
3. Install the body onto the tail section and install the lock strips as usual.
4. Install the test gauge into the test port only hand snug. Over tightening the fitting can damage the anodizing and lead to corrosion at the test port.
5. Pressurize the DPV to 3-5 psi with a bicycle pump or similar.

### **Note**

It is possible to have slight pressure changes during the pressure test due to changes in temperature. Do not rely on visual gauge indication of no pressure change, when ruling out a leak.

11. If a leak is suspected, the DPV should be immersed in water during the pressure test. It will be significantly buoyant with the battery removed.
12. When finished, vent the body with the relief valve on the gauge assembly and remove it. Reinstall the test port plug and the screw next to battery connectors.



## Power charts (Planning)

The power charts on the following page can be used to estimate performance and battery duration. Actual battery capacity should be verified before it is relied upon. The "Speed to Power Estimate" chart was based on data from average sized divers configured in drysuits with a single tank on a back plate and wing. Adjustments should be made for higher or lower drag diver configurations. Highly loaded technical divers (doubles and stages) and larger individuals should expect a 10-20% decrease in speed from the charted value, at the same power level. Smaller divers or divers with wetsuits will see a speed increase.

To estimate speed and range for planning purposes, first obtain the corrected speed for your configuration. Next, enter the chart with the corrected speed until the first line is intersected. Proceed vertically down until the second line is intersected and then horizontally to the right to the power estimate. You should never plan on using 100% of the battery capacity, 70-80% is a good capacity to plan on and leaves room for issues that may arise, but 66% is used for the rule of thirds. Even more conservative battery capacity calculations should be used, if you might be required to tow another diver with a dead DPV, as that will increase drag, and the power required to cover the same distance in the same time. Multiply the battery capacity by the percentage of battery planned for, and divide by the power estimate from the chart to obtain a run time in hours. Multiply the run time by 60 (min/hour) and the intended speed to calculate the range.

### Example:

Intended speed 175 ft/min (fpm)

Increased drag correction: +15% (doubles and two stages)

Actual battery capacity: 800 Wh

Planned battery capacity to use: 66%

Adjusted speed for higher drag (add 15%):  $175 \text{ fpm} \times 1.15 = 201 \text{ fpm}$

Into chart with 201 fpm results in 300 W of power required

Battery reduction:  $800 \text{ Wh} \times .66 = 528 \text{ Wh}$

Runtime:  $528 \text{ Wh} / 300 \text{ W} = 1.76 \text{ hours}$

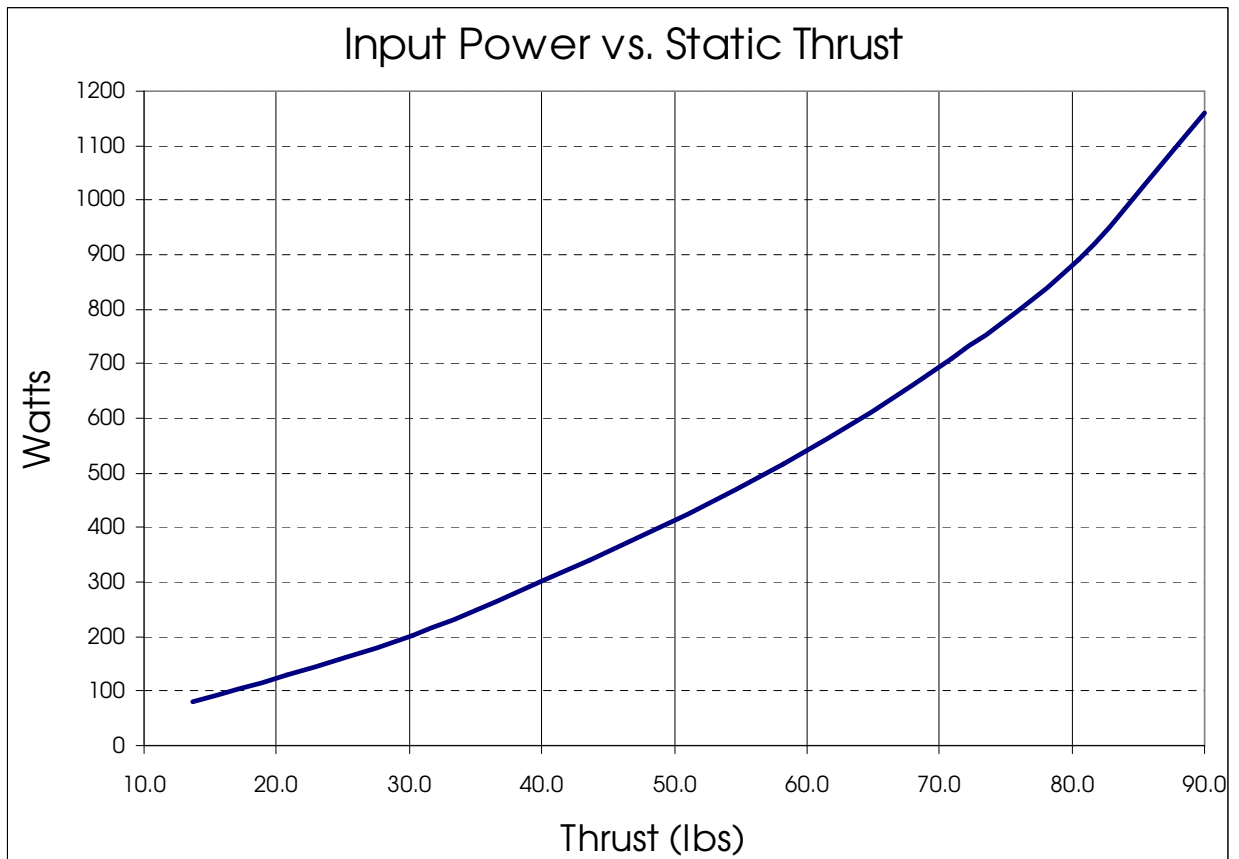
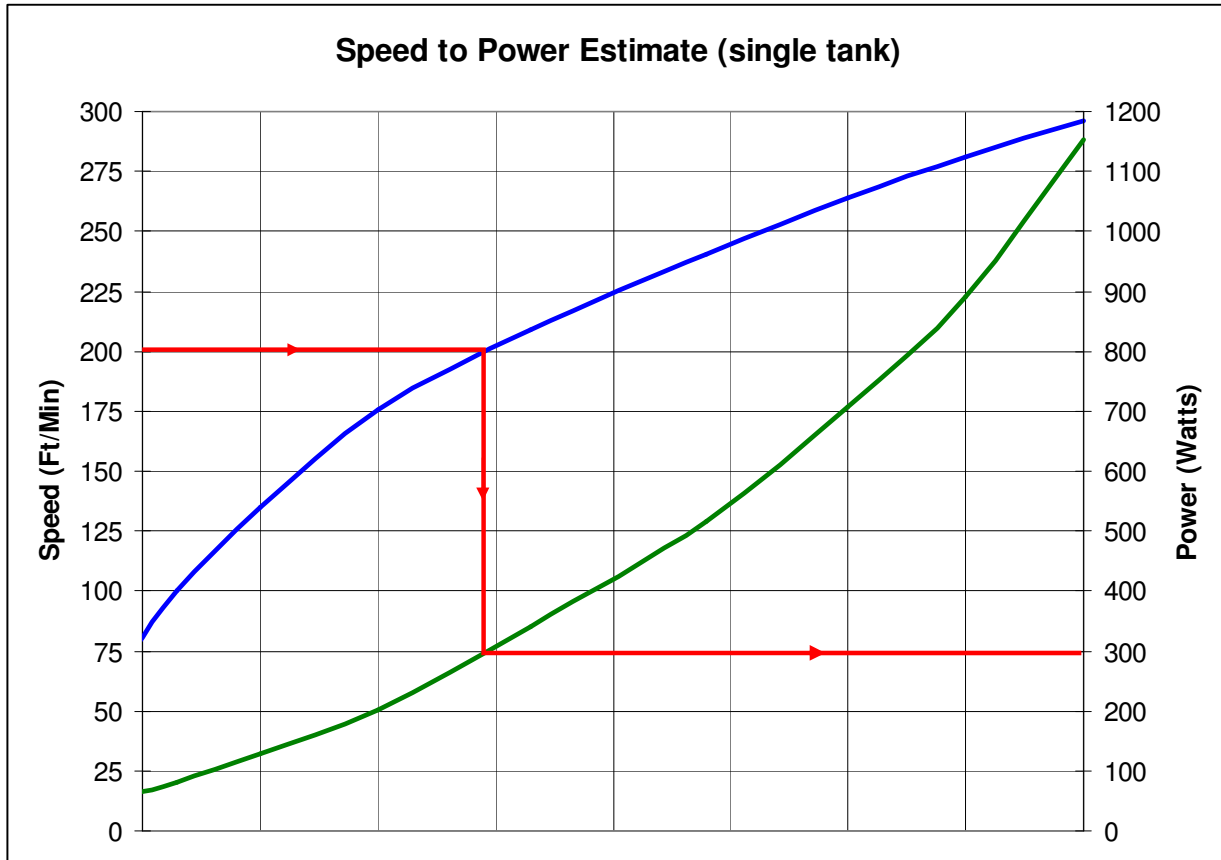
If diving out and back, divide by 2 for time each direction.

Distance:  $1.76 \text{ hrs} \times 60 \text{ min/hr} \times 175 \text{ fpm} = 18480 \text{ feet or } 3.5 \text{ miles}$

If diving out and back, divide by 2 for distance each direction.

\*Actually maintaining the intended speed requires experience and should be practiced before a critical dive.







## Warranty

The Genesis DPV and battery charger have a 1 year limited warranty on all materials and workmanship provided by Nellis Engineering Inc, when used for their intended purposes under normal conditions, with the following exceptions.

1. The Warp Core battery has a one year warranty on materials and workmanship from date of delivery. The battery warranty does not cover abuse, neglect or operator error.
2. Damage from flooding of the DPV due the failure of o-ring(s) that are serviceable by the owner or from damage to the DPV structure, is not covered under this warranty. All DPVs pass an extensive pressure and vacuum leak test before shipping to ensure they are leak free when delivered from the factory.
3. The battery charger is not covered for water damage.
4. Structural or cosmetic damage from abuse or corrosion is not covered.
5. Damage from modification, or attempted modification.
6. Damage from servicing by unauthorized individuals.
7. Nellis Engineering, Inc. will not be liable for any loss, damages or expenses, to include incidental, special, consequential or collateral damages, arising directly or indirectly from the sale or use of the equipment.

THIS WRITTEN WARRANTY IS THE SOLE WARRANTY AND SUPERSEDES ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING WARRANTY OF FITNESS OR MERCHANTABILITY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. SHOULD AN IMPLIED WARRANTY BE REQUIRED BY LAW, IT IS LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY.

To receive warranty repair, contact the factory for an RMA number prior to returning any equipment for repair. All shipping charges to and from the factory are the responsibility of the equipment owner.