GENESIS

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 batteries to charge unattended or attempt to charge damaged batteries. The Lithium Ion polymer batteries have a high energy density and can catch fire or explode if 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 batteries immediately after fully discharging them at hi power. The batteries 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 batteries if possible.

WARNING: Do not leave the DPV batteries (alone or installed in DPV) in direct sunlight or a hot car. Temperatures of 160°F (70°C) or above can damage the batteries resulting in fire or explosion.

WARNING: Do not attempt to charge the batteries 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 batteries may be above freezing, the centers 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 batteries. 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 batteries 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 charging the DPV for the first time, the batteries must be connected to the tail section internally. The DPV can be opened by sliding the large rubber band forward to expose the orange plastic locking strips (2ea) at the 3 & 9 O'clock positions (Fig. 1). Remove the two locking strips by pulling on the clear tab to lift the strip out of the groove and then grasp the tab and strip before pulling it free of the housing. It may be necessary to compress the tail section into the body to free the locking strip, as a slight pressure inside the DPV can cause them to bind. With the locking strips removed, stand the DPV on its nose and lift the tail section off of the body.

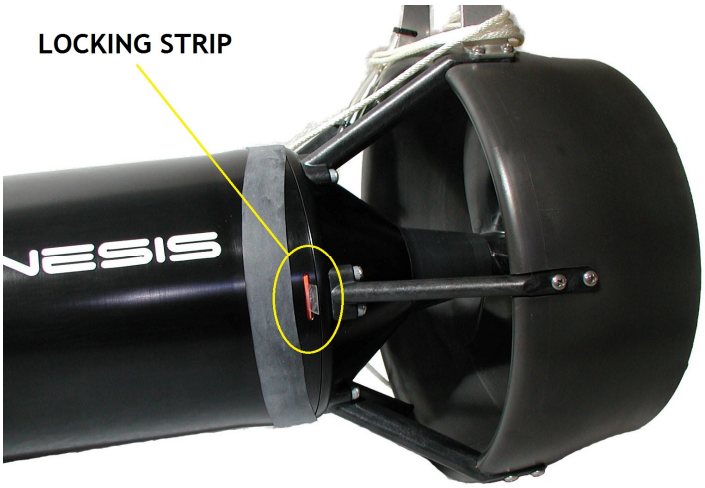


Figure 1
Lock strip slot view

Note

It is possible to have a slight vacuum or pressure inside the DPV body that prevents the tail section from being removed. A test port plug (Fig. 2) 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.

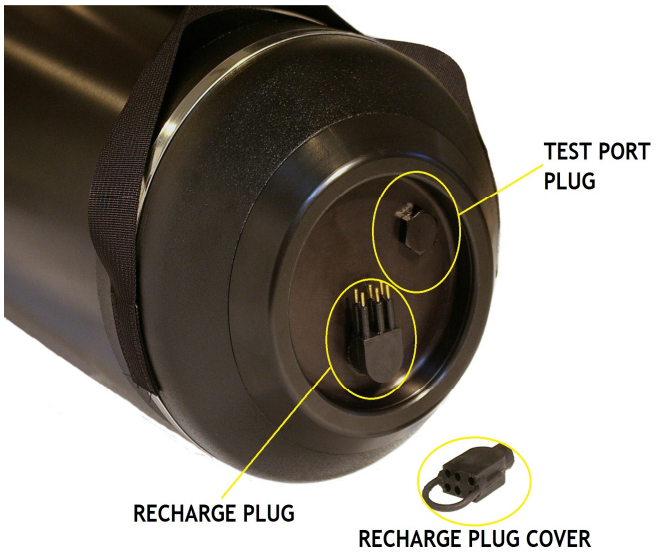


Figure 2
Nose cone view

Next, ensure the battery locks are engaged and the batteries cannot move inside the body. If the battery assembly was removed, it will need to be reinstalled in the proper orientation. The battery packs are slightly heavier on the side opposite from where the wires exit. This side should be installed on the right hand side of the scooter to help counteract the motor torque when running (Fig. 3) and the wires from the front of the scooter should run along the bottom.

Figure 3
Battery orientation

There are three connections inside the DPV that need to be mated (Fig. 4). First, ensure the trigger is locked OFF (small tab rotated underneath trigger to prevent it from being depressed) and the speed lever set to the OFF position (pointing towards the nozzle - Fig. 5) and then connect the two battery plug sets to the tail section. You should expect a spark when the second battery is connected; it is due to the capacitors in the motor controller charging. It does not matter which battery is connected to which plug set on the tail. The batteries are connected in series, once they are plugged into the tail section. After the batteries are connected, plug in the circular connector, paying attention to the key, which is towards the center of the tail section and turn the locking ring clockwise to secure it.

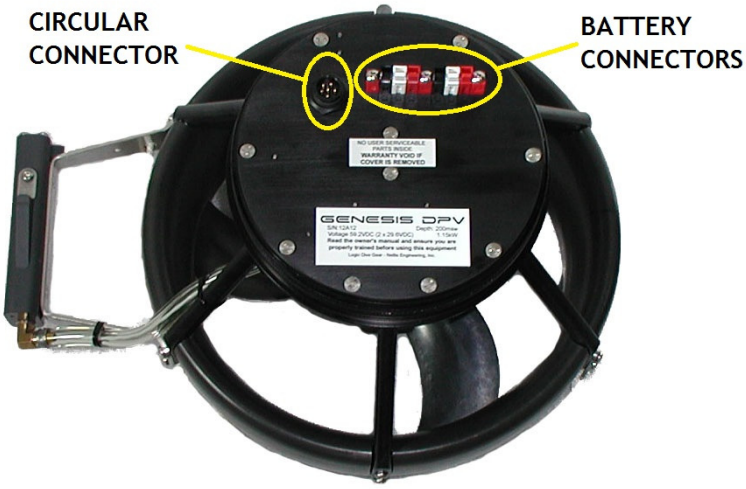


Figure 4
Tail section inside view

Ensure the o-rings and sealing surfaces 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. Install the tail section into the body carefully, ensuring an even gap all the way around before engaging the o-ring seals. The slot openings for the orange plastic locking strips should be at 3 and 9 o'clock with the pins of the recharge connector on the nose, pointing up. The slots line up with the nozzle struts at 3 and 9 o'clock for reference. Install the orange plastic lock strips and slide the rubber band over the joint. Never grease the grooves used by the lock strips.

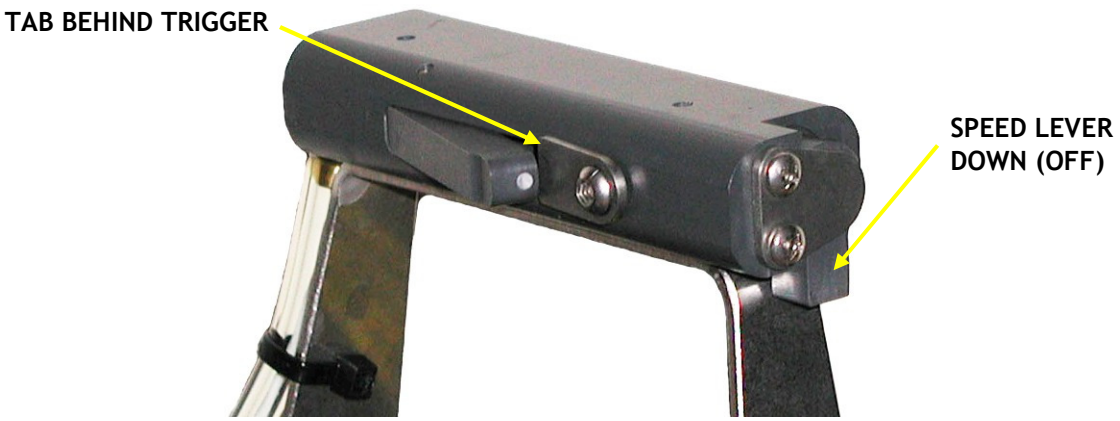


Figure 5 - Trigger locked off

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.

The recharge plug cover 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 cover is installed the batteries will begin discharging slowly, so do not leave the cover installed when storing the scooter, or the batteries may be damaged by over discharge. Remove the 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.

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.

Batteries and charging

Only recharge the batteries in a safe location where they can be monitored. Do not charge them unattended. The lithium ion polymer batteries do not off gas while charging like lead acid or NiMH, so the DPV body can remain sealed during charging. It is recommended to remove the orange plastic lock strips from the DPV prior to charging in the unlikely event the batteries fail and vent. By standing the DPV on its tail to recharge, the weight of the body with the batteries inside will maintain the seal unless internal pressure builds up inside. Obey all warning and cautions previously listed on pages 3 & 4.

When the batteries and circular connector are plugged into the tail section, they can then be recharged via the supplied charger. Plug the charger into the DPV first, 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 LEDs will turn green, but most likely not at the same exact time. The batteries are connected in series inside the DPV, so both batteries need to be charged together, whenever it needs charging.

If one or both lights turn green after plugging the cord into the outlet and the batteries have not been previously charged, it is an indication of low battery voltage and a possible over discharge. Reseat all the connectors and try charging again. If they still do not begin charging, disconnect the batteries from the tail section and contact the factory.

CAUTION

The batteries should never be charged directly from the supplied charger with any kind of adapter. There is a protection circuit in the DPV tail section that prevents power from being present at the recharge plug on the nose, should the cover not be installed in the water. This circuit decreases the charger voltage and bypassing it would result in excessive voltage applied to the batteries.

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 29.0 to 30.0V. 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. If you suspect that less than 80% the capacity was used, a storage charge is not necessary. While the battery voltages cannot be checked at the recharge connector pins, it is possible to install power meters such as the "Watts-Up", "Doc Wattson" or similar meters in the recharge cable to read the voltage and power during recharge. Contact the factory for instructions on how to install these, should you choose to. The Sentry DPV Dashboard will read the battery voltages while charging, if installed.

The charger output is approximately 3A, which equates to a 0.3C charge rate on the Genesis 600 and a 0.15C charge rate on the Genesis 1200. This means that during the bulk charge period (first 90% of capacity), the 600 batteries will increase about 30% of the total capacity per hour up to approximately 90% and the 1200 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 600, 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.

Genesis DPV battery capacity based on *resting* voltage

(i.e. motor not running)

100%	33.6V
90%	32.7V
80%	32.0V
70%	31.4V
60%	30.9V

50%	30.5V
40%	30.2V
30%	30.0V
20%	29.6V
10%	29.0V

Battery Reset Instructions

The Battery Management System (BMS) in the Genesis DPV batteries can go into "sleep" mode, when the nose plug that enables the motor is accidentally left installed for days or weeks or the scooter is stored for long periods (months) without use. **The proper operation of the batteries can be identified easiest by ensuring that the green LEDs on the charger both turn red when the batteries begin charging.** If one or both LEDs remain green for more than 60 seconds after connecting the charger, it is an indication that one or both of the batteries may be in "sleep" mode. The following instructions detail how to reset the BMS to "wake" the battery up. If a battery goes into sleep mode frequently or not for one of the reasons stated above, contact the factory.

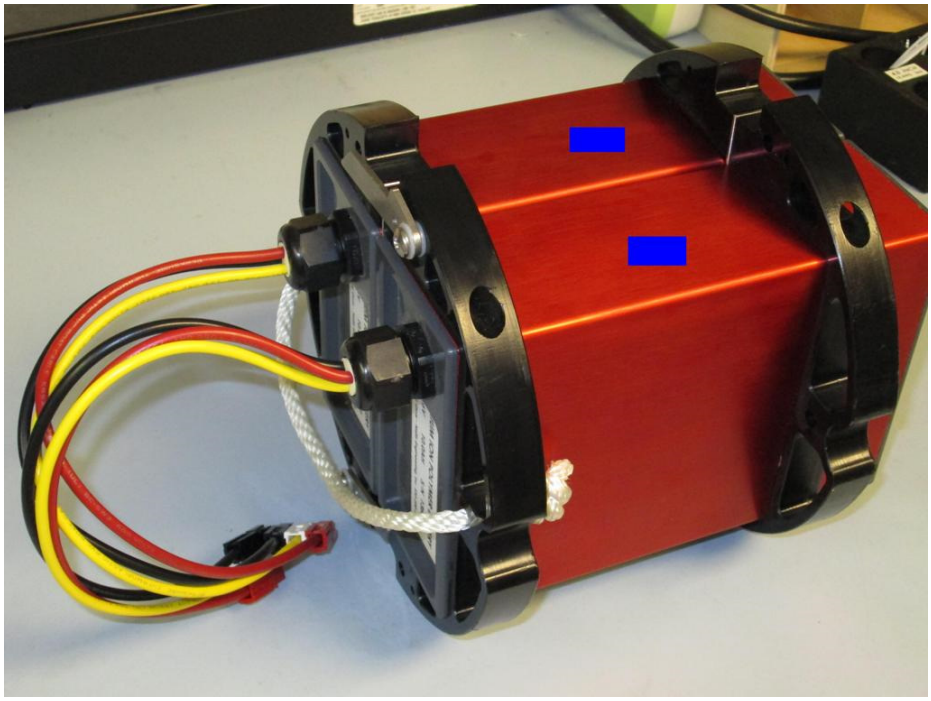
First, it is recommended that you check the voltage of each battery with a quality Digital Voltage Meter (DVM). Low quality meters may not read the voltage correctly when a battery is shut off. Fully charged voltage will be 33.2 – 33.6VDC. The shutdown voltage is approximately 24.5VDC. A voltage below 20.0VDC should be returned to the factory for an evaluation of the cells and a low current recovery charge.

To reset the BMS:

1. Remove the propeller from the tail. The magnets on the propeller coupling will be used to activate the reed switch in the battery.

2. Open the scooter, if not already open, and check the battery voltage between the Red and Black connectors on each battery pack to verify at least 20.0VDC.

3. Remove the batteries from the body and wave the magnetic end of the propeller coupling over the location of the reed switch inside the battery pack shown below (blue rectangle). The location is the same distance from the wire sealing gland on all batteries, regardless of size. It is approximately 3.5" (90mm) from the end of the battery housing, directly behind the sealing gland.



4. While not necessary, you may visually confirm a battery reset by plugging the batteries into the tail along with the circular plastic connector from the nose and the charger plugged into the outside nose of the scooter, but not plugged into the wall yet. This is done with the DPV open and the batteries removed for the body.

5. Once everything is connected, plug in the wall socket and wave the magnetic end of the propeller coupling over the blue rectangular area show above. A battery that is charging will stop charging when a magnet is passed over the reed switch and resume charging when it is removed. A battery that is NOT charging should begin charging when a magnet is passed over the reed switch AND removed.

It is not necessary to connect the charger to a battery to reset the BMS. A magnet simply needs to pass over the reed switch at any time to reset the BMS. Also note, that the charger has a "time-out" that shuts off power output after approximately 2 minutes of no output. Should one of the charger's LEDs remain green for more than 2 minutes, that charger will turn off all output to the DPV. The charger will need to be unplugged from the wall for 10-15 seconds and then plugged in again to restart the output. (Note: there are actually two independent chargers inside the charger case)

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. An extra mount point and 1.0" long screws are included if you prefer that the tow cord be mounted between the 3 and 9 o'clock positions. Ensure the correct length screw is used between the nozzle to strut connection. A #10-24 x 1.0 inch thread length screw is used for the handle mounting bracket and tow attachment points. A #10-24 x 7/8 inch thread length screw is used where nothing else is attached. Installing the 1.0 inch screw length in a location with nothing attached 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.

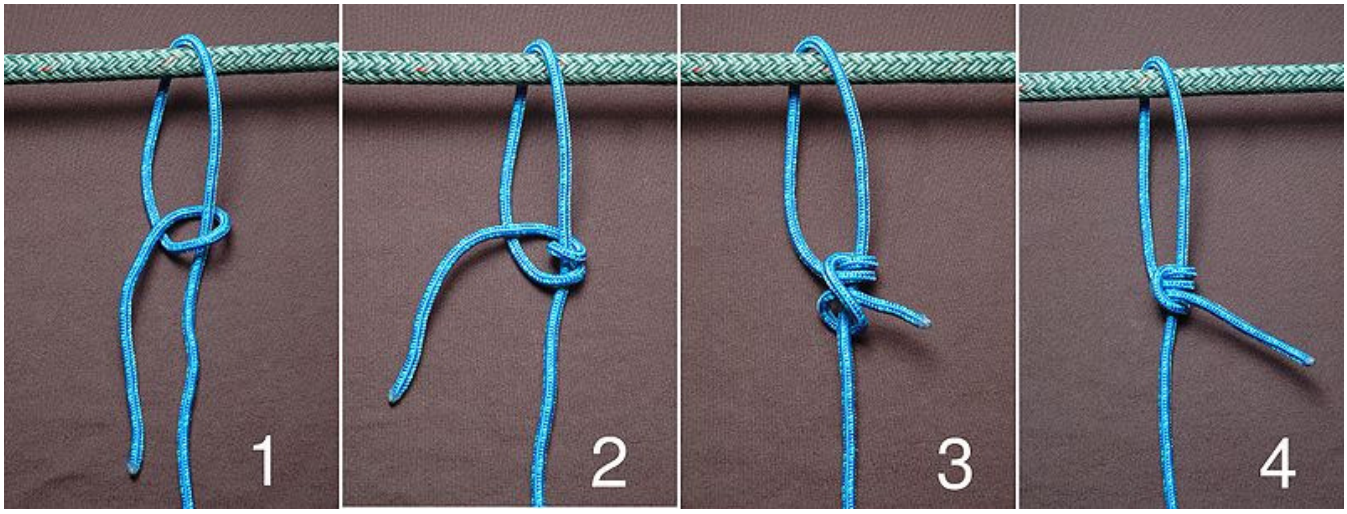


Figure 6 - Taut line hitch sequence

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 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 with an adhesive patch of Velcro for each. Install one adhesive patch to the inside of the nose and one to the flat plate on the inside of the tail assembly. 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 in not a substitute for proper training and does not address the multitude of issues you may encounter while operating your 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 or 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. (See Fig. 6)

When you are ready to dive, submerge and make yourself neutrally buoyant before rotating the trigger lock tab 180° out of the way (see Fig. 7). 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 (see Fig. 8) 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 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 7 - Lock tab 180° from trigger

Figure 8 - Trigger Locked on

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.

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 combined battery voltage drops below approximately 57 volts, the batteries are down to the final 10% of their 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 600 you will have 5-7 minutes of run time at that power and 10-15 minutes on the 1200. By decreasing you 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. A data recorder can be installed between the batteries and the tail section, should you want to monitor the power consumption during your dives, to gauge battery capacity. Consult the factory for assistance in connecting a data recorder.

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 to the OFF position (towards the nozzle). If it continues to run, remove the recharge connector cover on the nose to disable the motor controller. In salt water, the cover may need to be partially installed over 3 pins (Fig. 9) to interrupt the connection since saltwater is much more conductive than fresh water. Another 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!

Figure 9 - Cover installation to disable motor controller in salt water

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 1200 and 40lbs of lift for the Genesis 600. 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.

A small amount of water in the body is generally not a concern even if it is salt water. Remove the battery module and dry it. Also, wipe out the inside of the body. If the leak source can be located and repaired, it is recommended to still let everything air dry at least 12 hours in a warm, dry environment before closing the DPV up.

If a large amount of water enters the DPV or it floods completely, dry off everything possible and return it to the factory for repair as soon as possible.

Post Dive

Note

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.

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 twenty 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 batteries below 40% capacity, recharge the batteries 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 open the DPV and disconnect the batteries. This will prevent the need for a maintenance charge being performed due to a very small voltage drain needed by the charger, to sense the batteries.

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!

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 body is removed, 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 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. 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 center screw from the row of battery 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 batteries 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 for the battery connectors.

Data Loggers

If you wish to install a data logger to monitor power consumption, it will need to be configured per the diagram below (Fig. 10) The scooter voltage can be as high as 67.0V and the current as high as 20A, so the data logger needs to be rated accordingly. You will need to make a jumper to connect the two batteries in series. To avoid a high current spike on to the data logger, ensure the circular connector is removed and plug the batteries into the tail section to charge up the capacitors before installing the logger. Install the logger per the diagram, connecting it to the batteries first ant the tail second before connecting the circular connector. You will not be able the recharge the DPV with the data logger installed.

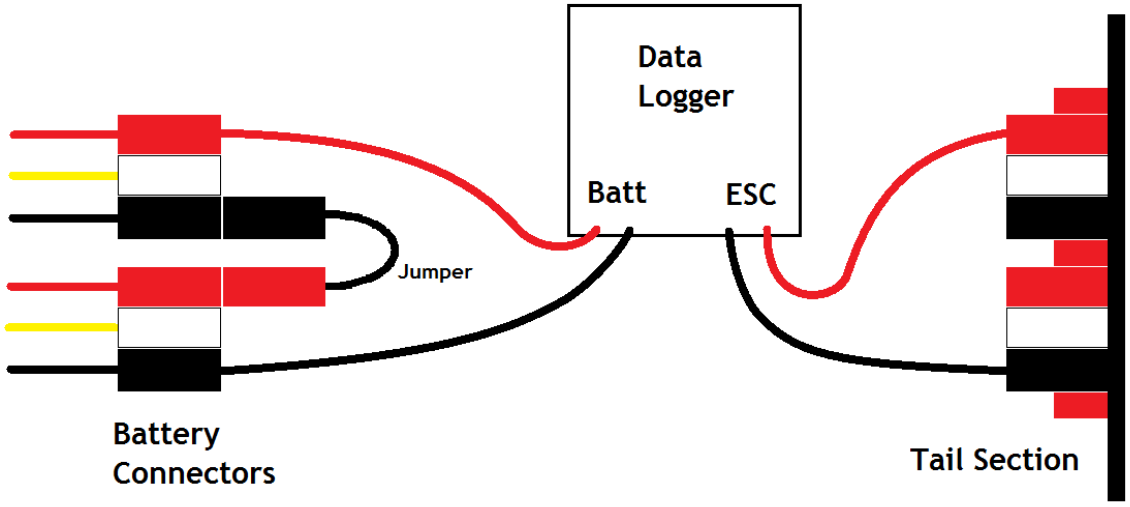


Figure 10 - Data logger connection diagram

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 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.

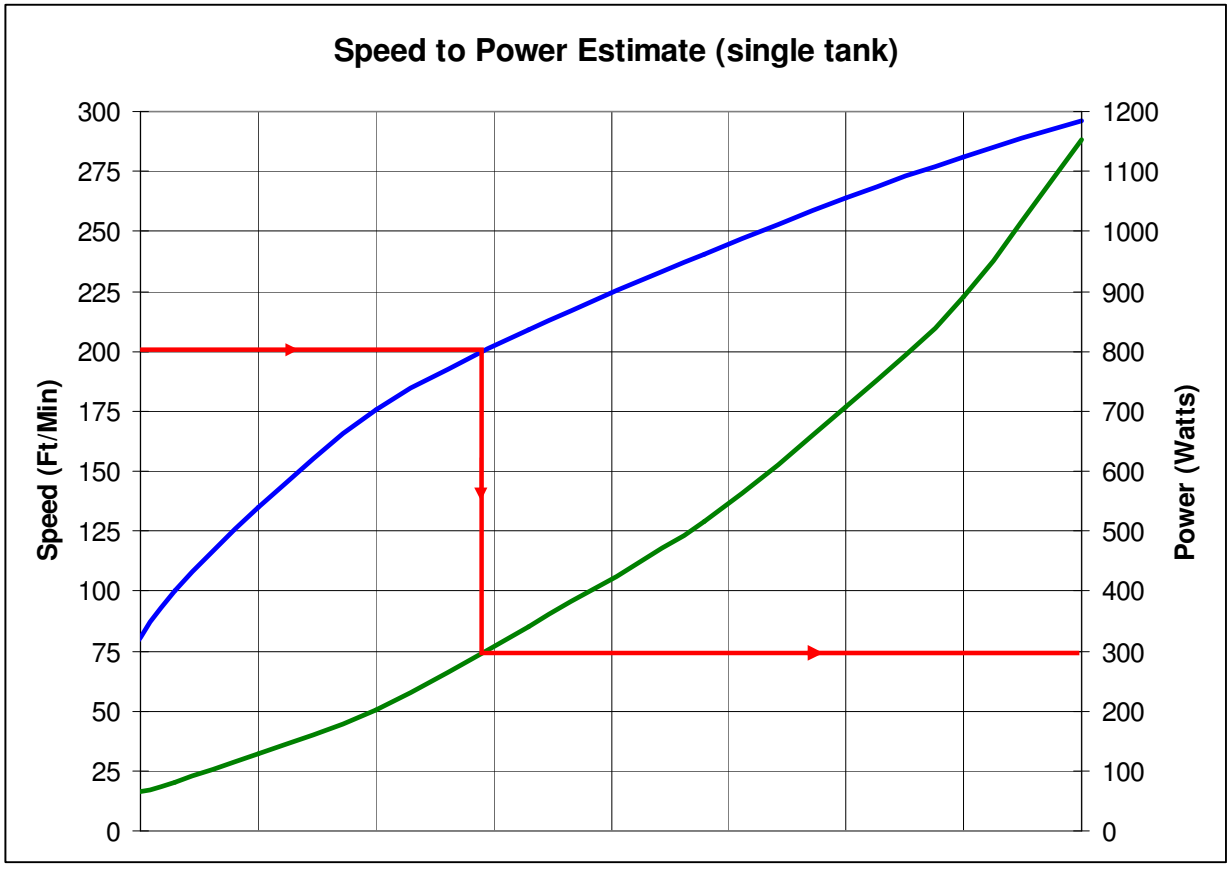
Example:
Intended speed 175 ft/min (fpm)
Increased drag correction: +15% (doubles and two stages)
Actual battery capacity: 610 Wh
Planned battery capacity to use: 66%

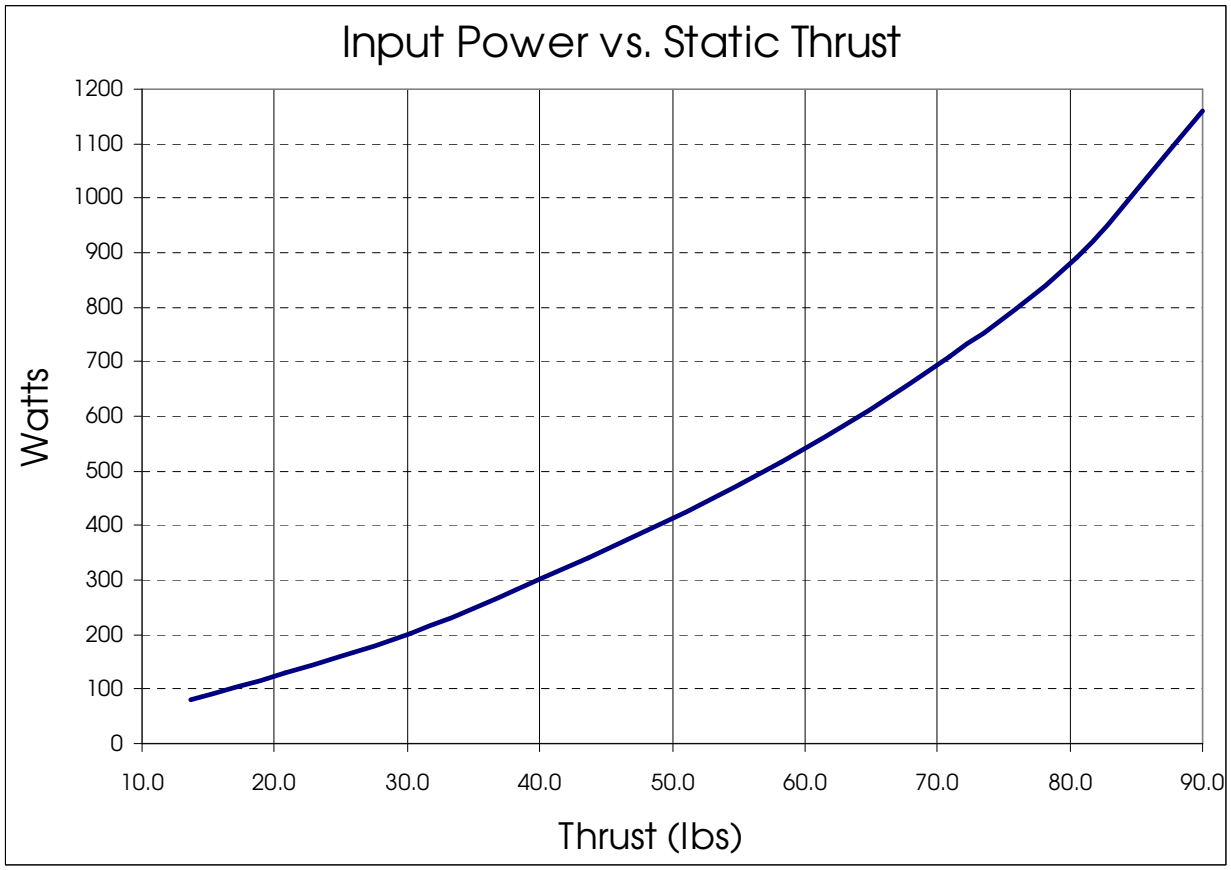
Corrected speed: 175 fpm x 1.15 = 201 fpm
Into chart with 201 fpm results in 300 W of power req'd

Battery reduction: 610 Wh x .66 = 402 Wh
Runtime: 402 Wh/300 W = 1.34 hours

Distance: 1.34 hrs x 60 min/hr x 175 fpm = 14070 feet or 2.66 miles

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





SPECIFICATIONS	600	1200	1500
Weight - lbs (kg)	33.5 (15.2)	44.9 (20.4)	49.5 (22.5)
Length - inch (cm)	24.3 (61.7)	30.8 (78.1)	33.6 (85.2)
Max Static Thrust - lbs (kg) [N]	90 (41) [400]		
Approx. Range at 150 fpm (45mpm) - mi (km)	6.9 (11.1)	13.8 (22.2)	17.3 (27.8)
Approximate Range at 2 knts	5.0 (6.4)	10.0 (12.9)	12.5 (16.1)
Standard Depth Rating	660fsw / 200msw		
Battery Type	Lithium Ion Polymer		
Nominal Battery Capacity - Wh	675	1350	1687
Nominal Battery Voltage	2ea at 29.6V in series (59.2V Total)		
Charger Input Voltage	96-264VAC		
Recharge Time	5 hours	10 hours	12 hours

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 batteries have 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.

