H-160 & H-320 Vehicle User's Guide

Hollis H-160 and H-320 Users' Guide, Doc. No. 12-4020

2002 Davis Street
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LIMITED WARRANTY
For details, refer to the Product Warranty section on the Hollis web site:

www.hollisgear.com

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Introduction

This User's Guide describes the unique functions and features of the Hollis H-160 and H-320 line of Dive Propulsion Vehicles. The more acquainted that you become with your new DPV, the more you will enjoy your diving experience. By following the instructions in this guide, you will understand how your Hollis DPV works allowing the best use of its features. It is very important to first read the entire contents of this manual before attempting to use your new Hollis DPV. **Hollis strongly advises anyone attempting to dive using a Diver Propulsion Vehicle to first receive proper training in proper DPV use from a recognized training agency.**

The H-160 and H-320 are manufactured with pride in the USA. All Hollis vehicles are tested for function and water integrity before leaving the factory. Hollis products are constructed with the highest quality materials and utilize the latest computer aided design and manufacturing techniques to ensure their highest performance and reliability.

As you embark on your excursions, remember that with the added freedom that a Hollis DPV provides comes added responsibility. You alone are responsible for your safety and the safety of those who dive with you.

 **WARNING**: This indicates a potential hazardous situation which, if not avoided, may result in serious injury or death.

 **CAUTION**: This denotes instances that if not handled properly could result in damage to the equipment.

NOTE: Represents important information.

 WARNINGS:

- **It is essential that the diver read this guide to familiarize themselves with the proper setup, care, and use of any Hollis H-160 and H-320. If the instructions given in this guide are not understood and followed; serious damage to the vehicle, possible injury, or death may result.**
- **DO NOT run the vehicle out of the water for more than ten seconds. Doing so will result in damage to the main shaft seal and does not constitute a warrantable manufacturing defect.**
- **DO NOT block the vents of the charger case, or charge the vehicle in a closed area. This will cause an extreme build up of heat, which will result in damage to the charger and the batteries.**
- **DO NOT interchange NiMh and LiPo batteries. The electronics on each model vehicle and charger are designed specifically for that model's intended battery type. Using the wrong battery may cause combustion and injury.**

- **Avoid exposing the vehicle to heat exceeding 100˚F (37.7˚C), such as in the trunk of a car, furnace rooms, engine rooms, etc. Prolonged exposure to heat will shorten the life of the batteries and possibly damage them.**
- **Make sure your alternate regulator second stage is out of the way of the vehicle's prop wash to avoid accidental purging of the regulator.**
- **DO NOT use any chargers other than an authorized Hollis charger to recharge your vehicle. Doing so may cause severe damage to the batteries, and will void the warranty.**
- **DO NOT expose the charger to moisture, salt air, sand, or dust. Keep it clean and dry at all times.**
- **DO NOT store the vehicle with the battery connected to the motor. Prior to storage for any length of time, it is critical to ensure that the power leads have been disconnected.**
- **Never store the vehicle with the housing assembled. Allow the housing to vent by setting the housing in place but not threading it onto the main assembly.**
- **If moisture has entered the vehicle, DO NOT attempt to operate or store it with the housing assembled. Take the vehicle to your Authorized Hollis Dealer immediately, where it should receive a factory authorized service and inspection.**
- **DO NOT use the vehicle as a means to ascend or descend. Doing so will invariably cause you to exceed safe ascent/descent rates. While using your Hollis DPV be very careful to monitor your depth gauge to avoid rapid changes in depth.**
- **If air can be seen leaking from the vehicle's housing, indicating that water has entered, the vehicle should be considered inoperative and returned to the surface immediately in a safe manner. As soon as possible remove the housing and DO NOT re-seal until the vehicle has received factory authorized service by an Authorized Hollis Dealer.**
- **DO NOT store the vehicle in a discharged state, or with the batteries connected to the motor.**
- **Always begin your dive traveling against the current.**
- **Before using a Hollis DPV, a specialty class in DPV diving from a recognized scuba training agency is recommended.**
- **Always keep hands, fingers, equipment; etc. clear of the prop.**
- **Carry a cutting device and be prepared to free yourself from the DPV if necessary.**
- **DO NOT use any aerosols on the inside of the vehicle; as it could damage internal components or cause a fire hazard.**
- **Lock the control trigger in the off position to avoid any accidental activation when not in use.**
- **DO NOT open the charger case.**

Getting Started

Before proceeding to the next section, take the time to familiarize yourself with the H-160's and H-320's various components, as shown in figure 1.1 and 1.2.

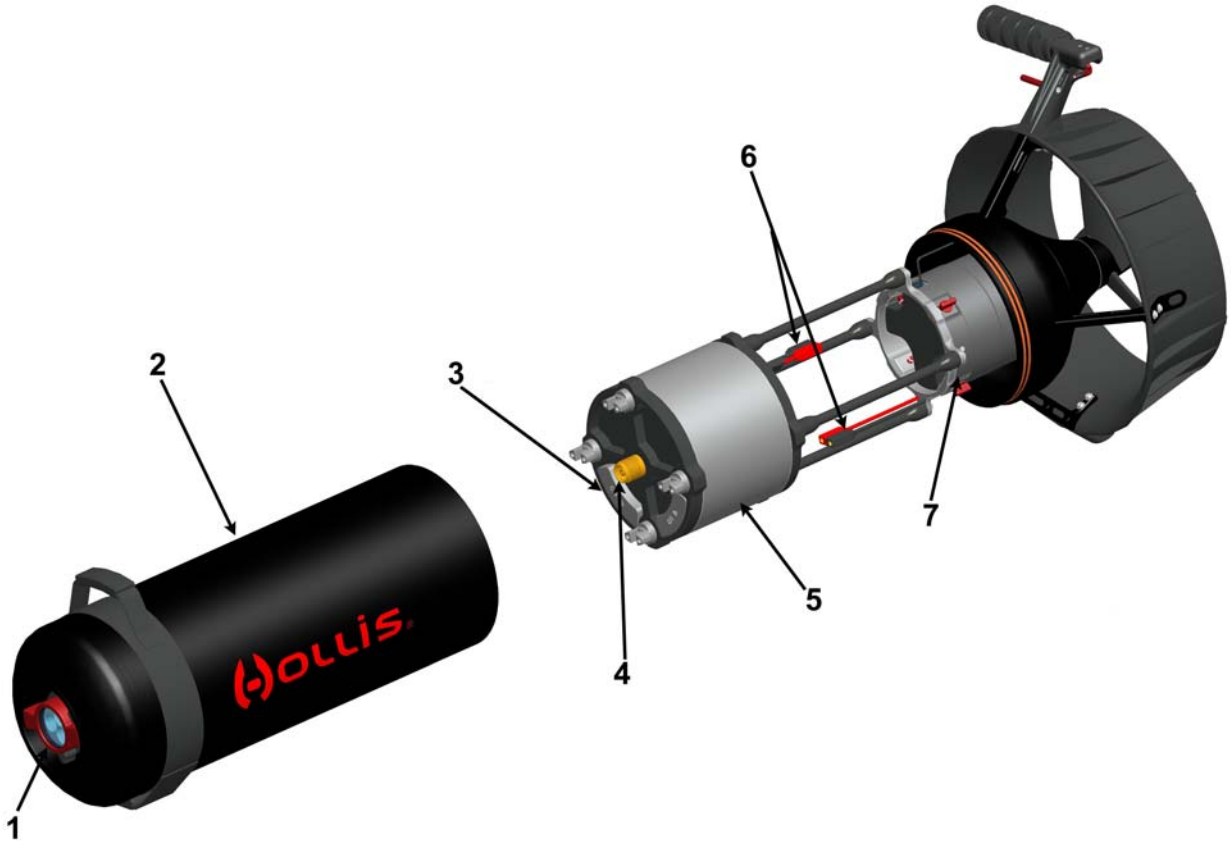

Fig. 1.1

1	Hub (pictured with optional 3 X 3 light)
2	Vehicle Housing
3	Trim Weight
4	Threaded Hub Mount
5	Battery Housing
6	Battery Connectors
7	Motor / Electronics Housing

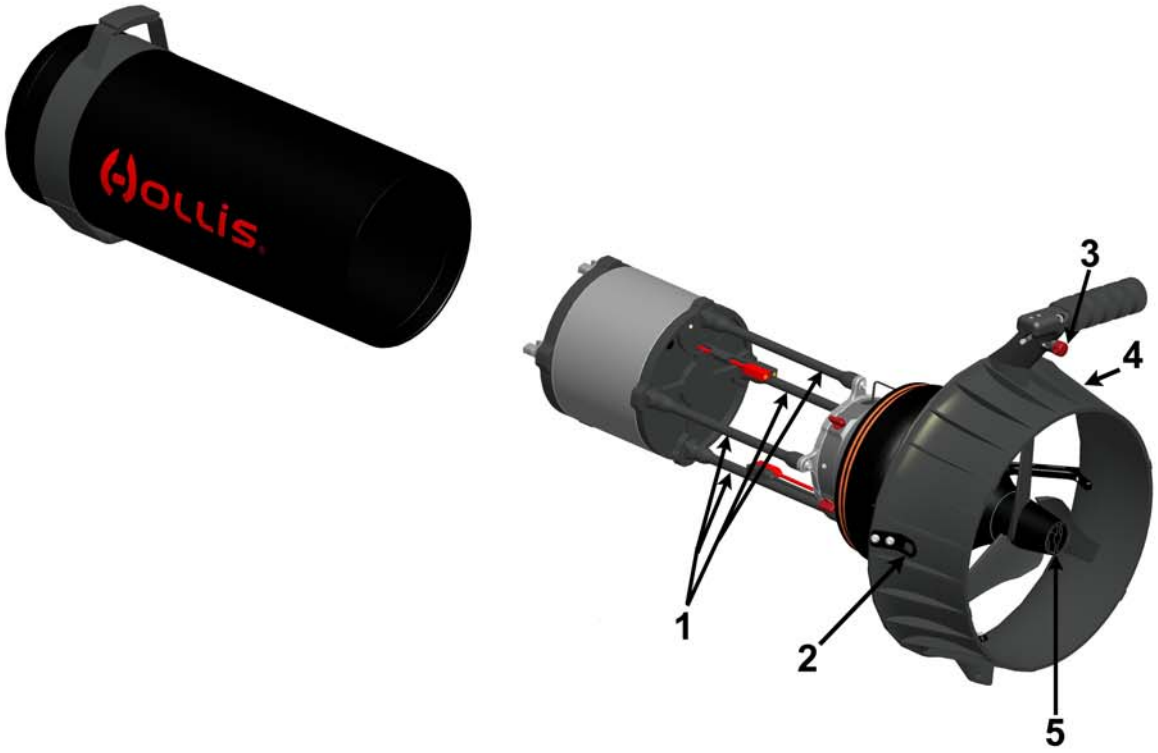

Fig. 1.2

1	Battery Mount Posts
2	Eye Hole (Tow Line)
3	Thumb Lock / Safety Switch
4	Shroud
5	Prop Pitch Adjustment Knob

Installing and Connecting the Battery Assembly

The battery housing is attached to the Battery Mounting Posts using wing nuts to secure the posts to the assembly. The mounts are keyed so they will only assemble in one orientation (see * in Fig. 2.1). Connect the lower end of the Mounts to the lower housing matching the index marks together and tighten the four locking knobs (see item 1 in fig 2.2). Then connect the battery terminals if the vehicle is to be used. When storing the vehicle the battery should be disconnected.

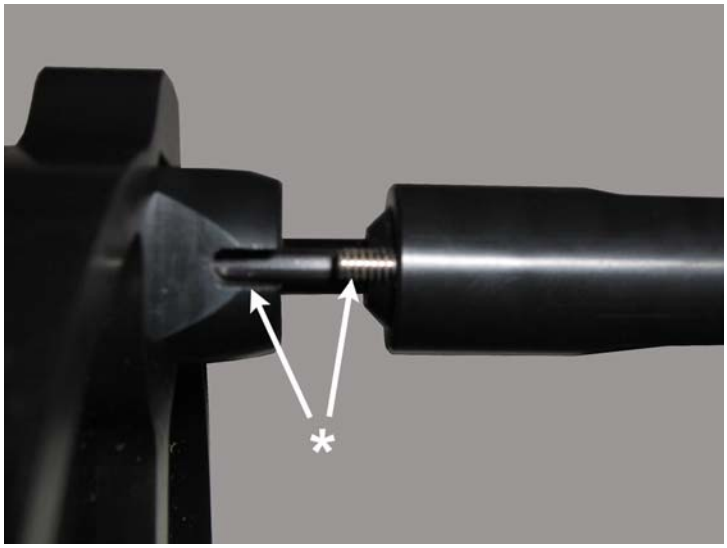

Fig. 2.1

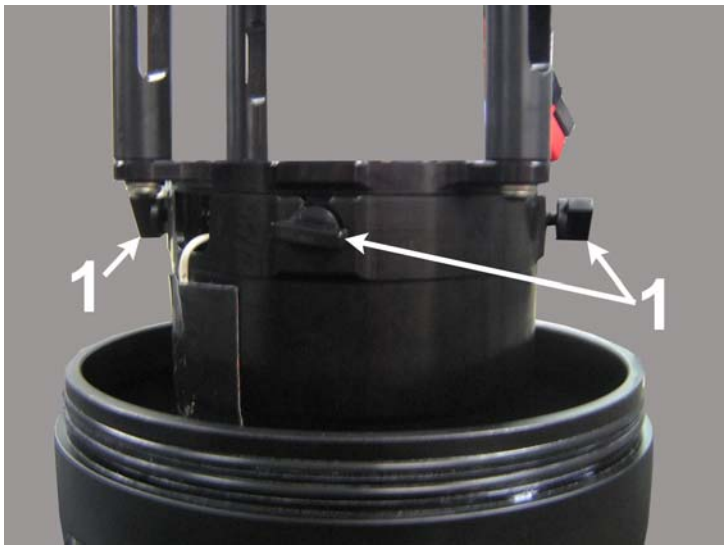

Fig. 2.2

Assembling and Disassembling the Housing

The vehicle housing is held in place by a threaded hub located on the nose of the housing. The threaded hub receiver requires periodic lubrication with silicone. Turning the hub clockwise presses the housing in place. Turning the hub counterclockwise pulls the housing apart from the rear assembly. Always be sure the threads and the housing are aligned. DO NOT force the assembly. If there is resistance, disassemble and realign the housing before installation. Inspect O-rings for debris or signs of damage. If any sealing O-ring is damaged, it must be replaced. See your Authorized Hollis dealer for the proper Hollis O-ring to replace the damaged one. Sealing o-rings should be lubricated periodically with silicone. When properly lubricated the O-rings should look wet without any excess build up of silicone.

NOTE:
-DO NOT over lubricate the seals.
-DO NOT use a spray silicone; as the over-spray may damage other internal parts.
-To reduce wear on the Hub seals always rinse the hub with fresh water before turning to remove any sand, silt, or mud particles.

Charging the Batteries

CAUTION: The batteries for the H-160 and H-320 are not interchangeable. The internal electronics of each vehicle model are of a different design. Interchanging the NiMH and LiPo batteries will damage your Hollis vehicle.

See H-160 NiMH Battery Charger User Guide Doc. # 12-4021

See H-320 LiPo Battery Charger User Guide Doc. # 12-4022

Balancing a Hollis Vehicle's Trim

The H-160 and H-360 have trim weights designed specifically to fit inside the vehicle housing. For best results use only these specially designed weights. Doing so will avoid any possible internal damage that could be caused by shifting weights.

Hollis Vehicle Operation

 **CAUTION: DO NOT attempt to operate the vehicle if any abnormal noises are heard while the motor is running. Return the vehicle to your nearest Authorized Hollis Dealer, where it should receive a factory authorized inspection and service.**

Always perform a visual inspection of the vehicle before use. Note whether the sealing o-rings and trigger mechanism are in good condition. If they are not in good working order, they will need to be serviced before diving with the vehicle (see "Guideline for Hollis H-160 and H-320 Service Intervals" section)

Your new Hollis vehicle has three different power settings. They are operated by a trigger mechanism utilizing a reed switch.

The unit powers the motor up gradually using a soft start for safety. Use your finger to pull the trigger and hold it with either your finger or the built in thumb lock / safety switch mechanism (see item 1 thumb lock in Fig. 3.1). To increase the vehicle's power setting release the trigger and quickly pull it again, to step up power. There are three power settings 50%, 75%, and 100%.

To turn off the vehicle simply release the trigger for more than 1 second. This also acts as a safety feature. For example, if you where to lose control of a vehicle not locked on with the thumb lock, the vehicle will shut off 1 second after you let go. If you do use the thumb lock feature, there is a provision to mount a lanyard through the hole in the thumb lock (see 2 in Fig. 3.1). This lanyard can then be looped around the driver's wrist and in this manner be used as a safety lock release allowing the vehicle to shut off.

The vehicle is designed with an Electronic Overload function that acts as a clutch. The electronics will shut the motor off if the blades of the prop become obstructed with debris. The electronics will not allow the restart of the motor for five seconds. At which time if the prop is not cleared of debris the Electronic Overload function will be triggered again. If the obstruction is cleared the motor will function after waiting the five seconds.

To protect the battery, and as a warning indicator, when the battery runs low the electronic control will shut off and restart the vehicle on a lower power setting. The system will do this only once as a warning. When restarted the vehicle will only run for a few minutes more until the battery is discharged completely.

NOTE:
The vehicle may power itself off for the following reasons.
- over-speeding the Prop

- Prop entanglement /obstruction
- over-heating
- to protect the battery

See the specifications at the end of this guide for estimated run times.

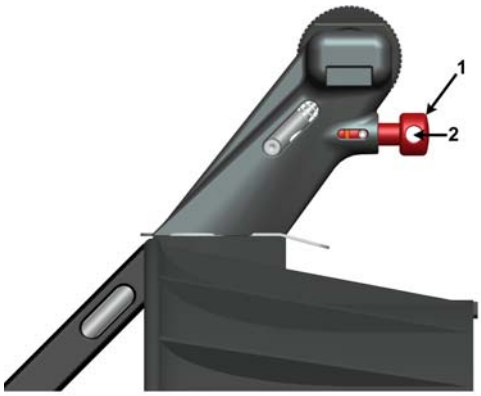

Fig. 3.1

3 X 3 LED Knob Light

The 3 X 3 light (if equipped) is turned on and off using the black Circular Ring Switch (See * in Fig. 3.2). Turn the ring clockwise to turn on the light and counterclockwise to turn the light off. Use the 3 X 3 light only for a short duration outside of water.

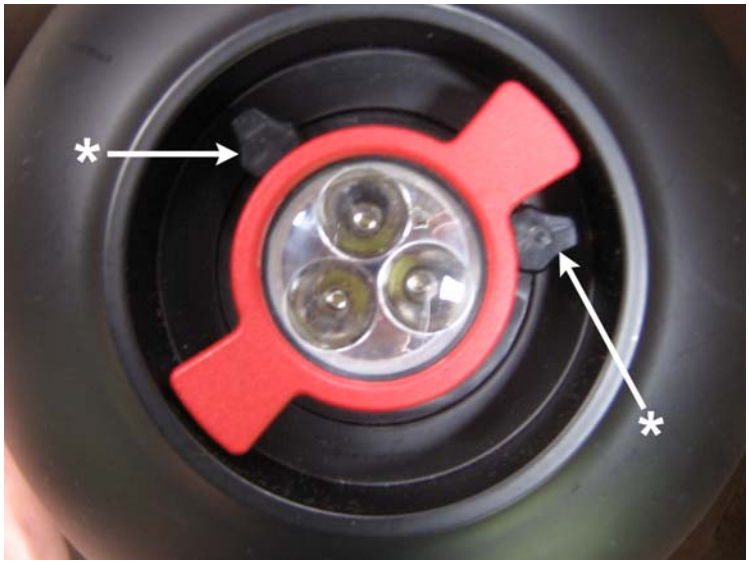

Fig. 3.2

Adjusting Propeller Pitch

The Hollis vehicle's variable pitch propeller allows you to choose whether to run the vehicle at a slower speed that will provide a longer running time, or at faster speeds that will shorten the running time. Although the range of the vehicle will remain approximately the same, you may wish to consider other factors, such as air consumption, No-Decompression bottom time, currents; etc. Unless you are really in a hurry with a lot of ground to cover, you may find it more relaxing and less fatiguing to operate the vehicle at a lower pitch setting.

You may also find it necessary to adjust your pitch setting to better match your dive buddy's speed in the interest of avoiding buddy separation. Your buddy's speed may be different for multiple reasons including his size, weight, the amount of drag created by his equipment configuration; etc. It is very important to remember, however, that different pitch settings will provide different running times, and the dive should be planned accordingly. Generally speaking, the higher the pitch setting the shorter the burn time of the battery cycle.

You select the desired pitch of the propeller by turning the adjustment knob located at its center (Fig. 4.1). First, sight through the grooved slot at the outer edge of the knob to find the numbered pitch settings (1 through 9). You may need to rotate the propeller until the number comes into view.

WARNING: DO NOT touch the activation trigger while adjusting the propeller pitch, or allow them to otherwise be depressed. The motor must not be activated while performing this procedure.

To set the knob more precisely, hold the propeller secure with one hand while turning the knob with the other. To select a higher setting with increased pitch, turn the knob clockwise. Turn it counter-clockwise to select a lower setting with less pitch.

Fig. 4.1

Post Dive Care

1. Rinse any sand, dirt, and salt from the vehicle.
2. Open the vehicle by turning the hub located on the nose counter clockwise.
3. Unplug the battery
4. Set the housing back on the vehicle's main assembly but do not tighten the hub. This is to allow any possible gas vented from the batteries from building up pressure.
5. Store the Vehicle upright sitting on the Prop shrouding.

Rigging a Tow Line

A tow line can be attached to two eye holes found on the sides of the shrouding (see Fig. 1.2). The line should be fed through the closed end of a bolt snap. The use of a bolt snap allows for quick attachment to a crotch strap tow ring (D-ring). The Clip should be allowed to slide freely on the line to allow for smooth transitions while turning the vehicle. The length of the line used should allow for the vehicle to rest comfortably in one arm at or near full arms length with the vehicle slightly below the diver. The prop wash should be directed so as not to hit the diver or any equipment during use.

Adjustable Cruise Seat

The Hollis Adjustable cruise seat eliminates arm fatigue by automatically positioning the diver for maximum efficiency, range, and allows for one handed operation.

To attach the adjustable cruise seat to your Hollis vehicle, clip each strap end onto the tow bar brackets.

The cruise seat length may be adjusted to accommodate divers of different sizes. To shorten or lengthen the seat, loosen the 1 in (2.5 cm) nylon webbing threaded through the 1 in (2.5 cm) tri-glide and slide the tri-glide (toward the vehicle to shorten; or away from the vehicle to lengthen) to the desired position. Excess webbing should be looped back through the tri-glide for added security.

For optimal efficiency and comfort, the cruise seat should be adjusted to attain proper diver positioning.

Technical Specifications

Length	28.75 in (73.03 cm)
Weight	48 lbs (21.77 kg)
Speed	approx. 3 mph (4.8 km/h)
Max Thrust	H-160 60 lbs (27.22 kg); H-320 65lbs (29.48 kg)
Approx. Running Time	@ 100% power: H-160 1 hr; H-320 2 hr
Charging Time	approx. 5 hrs
Service Interval	Visual inspection before every dive; Annual Inspection and Service from a dealer
Batteries	H-160 uses 250.1201 (16 A/h) NiMh; H-320 uses 250.1202 (32 A/h) LiPo
Maximum Operating Depth	656 ft (200 m)
Motor	Hollis High Torque Brushed Motor
Body	6061 T6 Aluminum, hard anodized, with a marine finish
Inline Fuses	Battery to Motor: 25 Amp ATM (blade type) Battery to Optional 3X3 Light: 3 Amp ATM (bade type)

Troubleshooting

Problem	Possible Cause	Treatment
Motor Does Not Run	1. Batteries are discharged	Recharge batteries
	2. Batteries are not connected	Check battery connection
	3. Damaged reed switch	Return to Authorized Hollis Dealer for service
	4. Damaged Start Up PCB	Return to Authorized Hollis Dealer for service
	5. Loose connection	Return to Authorized Hollis Dealer for service
Moisture has entered the vehicle	1. Housing O-rings are worn or damaged	Return to Authorized Hollis Dealer for service
	2. O-ring seating surface is damaged	Return to Authorized Hollis Dealer for service
	3. Rotary Propeller shaft seal is damaged	Return to Authorized Hollis Dealer for service
Short battery burn time	1. Motor Damaged	Return to Authorized Hollis Dealer for service
	2. Battery Damaged	Replace Battery

Guideline for Hollis H-160 and H-320 Service Intervals

O-rings should be inspected and lubricated with silicone periodically. Visually inspect the O-rings before each use. Inspect for burs, cracks, or any other signs of wear. Replace only with Authentic Hollis O-rings to insure water integrity.

The Trigger Mechanism and Thumb Lock / Safety Switch should be inspected before every dive. If the mechanical operation is obstructed by sand or debris; use compressed air and fresh water to clean.

Batteries should be replaced after 300 – 500 charge cycles depending on how well the battery is cared for. To get the most life out of the batteries they should be put through a charge discharge cycle once a month. A Hollis Battery Discharger / Equalizer may be used to accomplish this if in water use of the unit is not possible on a monthly basis. Follow any and all instructions included with the Hollis Discharger/Equalizer.

Your Hollis vehicle will bring you many years of use if properly cared for. It should be inspected and serviced by an Authorized Hollis Vehicle Dealer. This should be done annually. If there is any question about the condition of your vehicle it should be inspected sooner.

RECORDS

Date of Purchase: _____

Hollis Dealer: _____

Dealer Phone No.: _____

Inspections & Service

Date	Service Performed	Dealer / Technician

NOTES:

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