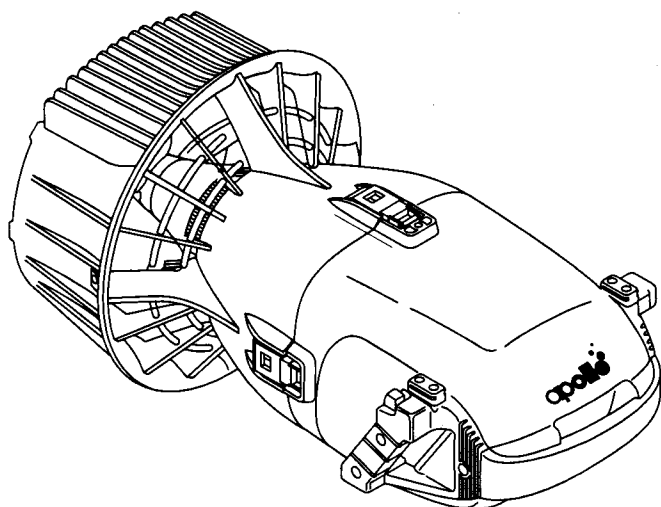


scooter

apollo scooter av-1



apollo scooter av-1

Width x Length:	34cm x 61cm
Scooter Weight:	approx. 8kg
Battery Weight:	approx. 8.6kg
Underwater Weight:	approx. 650 g
Speed:	1.8 - 4.0 km/h
Running Time:	25-60 minutes
Thrust:	8-18 kg
Maximum Distance:	approx. 4km
Max.Depth:	50m
Max.Diving Depth:	40m
Body:	ABS Durable Plastic
Motor:	DC 12V magnetic field motor
Reduction gear:	Planet gear
Accelerator:	Variable pitch propeller
Safety devices:	Thermal switch (auto-shutoff at excess internal motor temperature) Leak sensor (auto-shutoff if body begins flooding) Clutch to prevent excessive load

Battery Charger AV-300

Size:	8.6 x 10 x 11.7 cm
Power Output:	DC 12V/2.5A equipped with floating recharge
Input Voltage:	AC 100V 50/60 Hz
LED Indications:	"Charging"/"Full"
Safety device:	Circuit Breaker

Accessories

Battery:	Japan Battery (GS) PE 24A-12R Sealed-type 12V 24AH Rechargeable Weight approx. 8.6kg Recharge Time 5-9 hours
O-rings:	Spare body-seal rings (2 types, one each) Silicone grease
Options	Accessory light bracket Head light (sold separately) Float

Product features

■ Extension of underwater movement

The Apollo Scooter was developed to expand freedom of movement underwater. The Apollo Scooter allows the user to move without having to kick much, thus saving air. A greater distance can therefore be covered.

■ To protect against water damage, the motor has been divided into three separate compartments which are easy to maintain.

Because of the three-part structure, damage is minimized if water should happen to enter the scooter body. In particular, the motor itself is protected from damage. In addition, the clutch housing, where water can enter easily, is designed to simplify inspection and care after each dive.

■ 3-speed control

Depending on the size of the person using the unit and on the load being pulled, one of 3 convenient speed controls (Hi-Mid-Slow) can be used.

care when using the scooter

■ Precautions

- The scooter should not be operated at depths of more than 40 meters.
- The motor should not be run out of water for longer than 10 seconds. (This can cause deterioration of the axis seals.)
- If during operation, the sound of the motor changes and power decreases, scooter operation should be stopped. (Repeated use of the battery until full electric discharge is reached may reduce the life of the battery.)
- Be sure to pay careful attention to even the smallest details when assembling the body seal and the clutch housing.
- After each use, check to see that no water has leaked into the clutch housing. As part of the design of the housing, it is not uncommon that some water will have entered. When this happens, be sure to empty any sea water that may have entered the compartment and rinse lightly with clean fresh water (allow to dry before assembly).
- When using the unit near the surface, be sure that the propeller does not protrude above the surface. If the propeller is above the surface it may cause the propeller resistance balance to become unstable leading to vibrations in the propeller shaft and possible water leaks.
- When scuba diving, be sure not to exceed the safe ascent rate (18 m/min) or the safe descent rate (22 m/min). Be sure to continue breathing while rising towards the surface.
- As a standard rule for cave divers, it is important to use 1/3 of the air supply when diving, 1/3 when returning and to leave 1/3 as a backup.
- Be sure to remove the battery cord connector when shipping, storing or transporting the unit.
- Be sure to keep the container in which the scooter comes. It will be necessary if the scooter must be returned for maintenance. Any damage to the scooter unit that results from improper packing is not covered by the warranty.
- Be sure to keep straps, belts and other lines out of contact with the propellers. It is best to keep these in B.C. pockets during a dive.

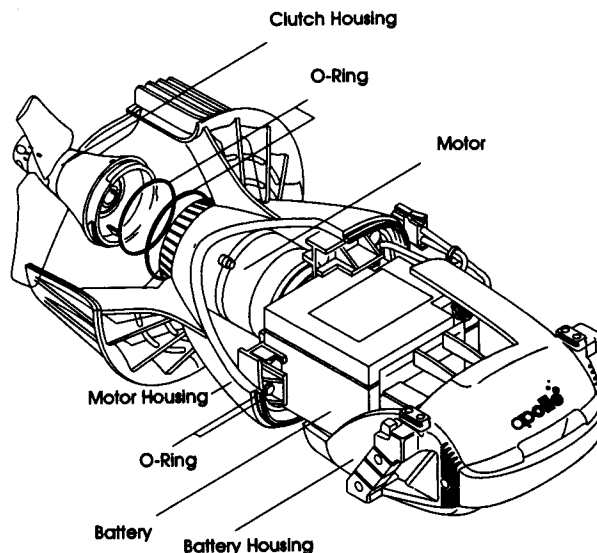
checking seals

■ Three-part body construction

Because of the three-part construction, leakproof seals are found in two places. Because these seals are extremely important for the maintenance of the scooter, a thorough check both before and after use is essential.

Since silicone grease is applied where the seal joins the unit, it is quite easy for dirt and sand to adhere. When removing the various housing parts, be especially careful about where the parts are laid. Do not lay them on the sand or ground or in places where they may be exposed to dirt and debris. In addition, after inspection and maintenance has been completed, assemble the unit as soon as possible.

Usually, the primary reason for the leakage of water into the unit is seal trouble. Be extremely careful when handling the seals and be sure to inspect them when the housing is disassembled.



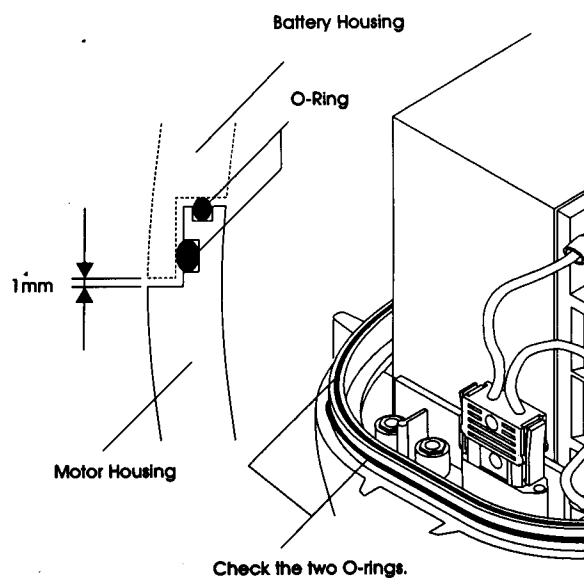
scooter

checking seals

■ Checking the body seal

Two O-ring seals are used between the battery housing and the motor housing. Since the function of these seals is to prevent water from entering and causing damage, care and maintenance is a must.

- 1) Check to be sure that no dirt, sand, or other foreign substance has adhered to the O-rings or the areas where the O-rings fit. Also, be on the lookout for any defects or damage to the surrounding area.
- 2) Be sure that enough silicone grease has been applied.
- 3) After fitting the battery housing and the motor housing together, be sure that there is a uniform gap of approximately 1 mm all the way around. (If the gap is any less than this or if there is no gap at all, it means that the O-ring has not been put in or has been installed improperly. Be sure to check carefully because if the gap is not uniform around the circumference, the O-ring may come out or allow leakage)
- 4) Check that the four locking buckles are fastened.



•Caution

To prevent water leakage, when assembling the battery housing and the motor housing, be sure that the serial numbers are the same.

■ Body maintenance

If any damage or flaws are ever spotted in the area where the O-rings fit, return the part to Apollo or your local Apollo Dealer for repair.

If the O-rings themselves become damaged then they should be replaced.

An appropriate amount of silicone grease should be applied to the O-rings and the area where the O-rings are fitted. Any excess grease should be wiped away with a soft, lint free cloth like gauze.

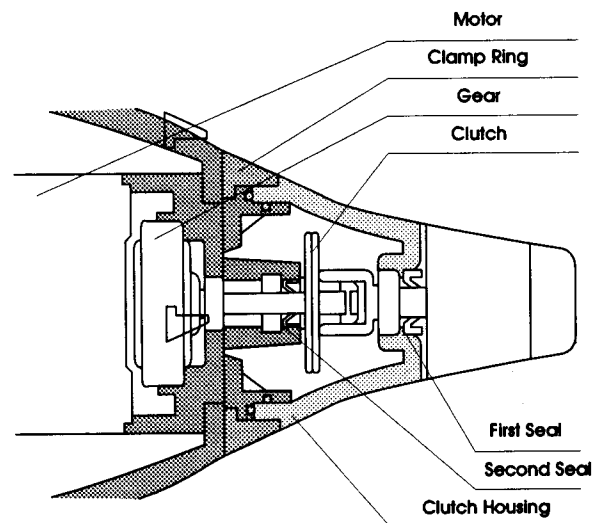
When removing the O-rings from their fittings, do not use a screwdriver or other sharp instrument. Use a dull plastic tool.

clutch housing

■ The functions of the clutch housing

With the underwater vehicles that have been produced up to this time, it has been common for water leakage to occur through the propeller shaft. The water would then enter the motor chamber and cause the motor and bearings to corrode leading to frequent breakdowns.

With the AV-1, the chances of this occurring have been reduced through improvement in the design of the unit. In addition to having double seals in the propeller shaft, an extra chamber (the clutch housing) has been added. Because of this, if sea water should happen to enter past the first seal, only a small amount will be able to penetrate and the second seal will stop the sea water from entering the motor chamber.



■ Checking the clutch housing seal

- 1) Check to be sure that the O-ring, the O-ring groove, and the area around the O-ring are free from dirt and/or damage.
- 2) Be sure that a sufficient amount of silicone grease has been applied.
- 3) Be sure that the clamp locks have been evenly secured.

abnormalities during use

■ Changes in motor sounds

As the battery begins to lose its charge, the motor begins to make a lower pitched sound. If the scooter is allowed to run like this until all of the charge is used up, it will shorten the life of the battery, cause hydrogen gas to be emitted, and thus create a potentially dangerous situation. When the sound of the motor changes, turn off the unit and tow it back to have the battery recharged.

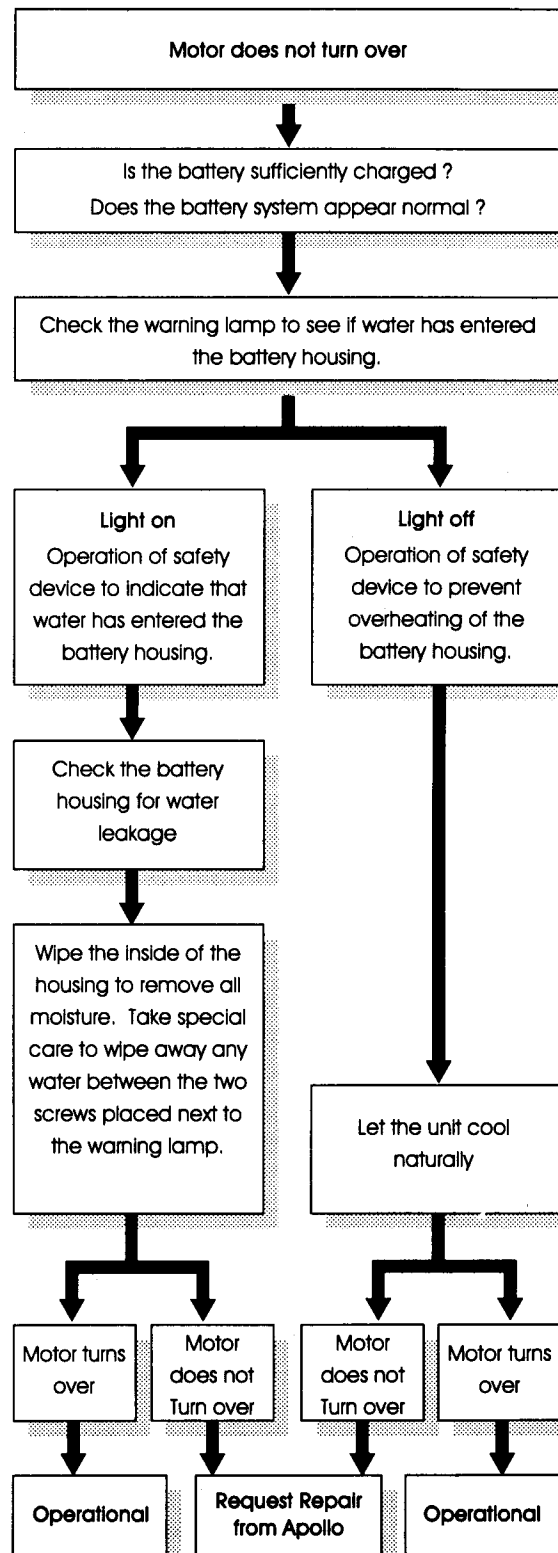
■ The motor sounds but the propeller does not turn

The motor is designed so that when an excessive load is applied, a safety clutch automatically disengages the propeller from the motor. When this occurs, the motor continues to run but the propeller does not turn.

Stop operation immediately and remove the obstacle hindering the scooter or stopping the propeller.

When the obstacle is removed, the clutch will again automatically engage the propeller and operation will resume. If after removing the obstacle, the propeller still will not engage, surface and tow the scooter back to be inspected.

■ Flow chart for motor malfunctions



scooter

battery charger av-300

■ Precautions for battery charger av-300

- The unit is designed for use with AC 100 V and should not be used in any areas where the voltage exceeds that level. (Chargers adapted for foreign voltage specifications are available.)
- An internal breaker is incorporated in the design to cut power to the unit when a problem or excessive current flows to the charger are encountered. If the breaker does not function properly, check for an electrical short.
- The unit is equipped with a floating charge, so there is no problem leaving the charger connected after it has fully recharged the unit. But, do not leave it attached for more than three days.
- When charging a unit that has lost all power, the charger will become very hot. Be sure not to block the ventilation openings. Do not allow the charger to overheat, for it may damage the unit.
- The charger is not water-resistant. Do not use it in an area that is exposed to rain, sea water or salt air.

■ Precautions during charging

- Approximately five to nine hours are required to charge the unit. The charging unit is equipped with a floating charge, so even if left attached after the battery is fully charged, there will not be a problem with damage from excessive charging. However, the charger should not be left attached for more than three days.
- Always use the AV-300 charger when charging, do not use other chargers.
- During charging, a small amount of hydrogen gas is released from the battery. The following points should be kept in mind:
 - 1) Be sure to charge the battery in a properly ventilated area.
 - 2) Do not expose the charger to direct sunlight or use near a heater or radiator, or in any other place where the temperature exceeds 40 C°. Between 20 and 30 C° is the suitable temperature range when charging.
 - 3) If the unit is charged at low temperatures (under zero C°), twice the normal amount of time is required. It is best to charge the unit under the above specified conditions.
 - 4) Do not smoke near the unit while charging the battery or expose it to any open flame.
- A charged battery continues to release hydrogen gas for a short time after it is detached from the charger. Always wait at least 30 minutes before installing the battery in the scooter.
- If a problem develops or excessive current flows in the charger, the internal circuit breaker will engage to cut the power. Confirm that no electrical problems have occurred with the battery connections and reset the unit by depressing the yellow circuit breaker button. If the breaker engages a second time it is indicative of a problem in the battery, charger or connector. Contact Apollo for details.
- When charging a unit that has lost all its power, the charger becomes very hot. Be sure not to block ventilation opening. Do not allow the charger to overheat for it may damage the unit.

■ Battery maintenance

- The battery is not charged at the time of purchase. Be sure to charge it before use.
- Heat causes battery deterioration. Keep the battery out of direct sunlight and away from heaters, radiators and other places such as car trunks where the temperature rises to high levels.
- Be sure to charge the battery fully within 24 hours after use.
- Do not use the battery until there is no power left in it at all (when the motor slows or ceases to function). Failure to charge before this point can gravely reduce battery life. If the sound of the motor changes or if the scooter ceases to function, recharge the battery as soon as possible.
- If the battery is not fully charged, it can dramatically shorten the battery life. Always be sure to maintain it in fully charged condition.
- Do not use any battery charger other than the AV-300. If another charger is used, there is a possibility of undercharging or overcharging the unit, leading to improper functioning and/or damage to the battery. Any problems that result from the use of improper chargers are not covered by the warranty.
- Do not smoke near the battery or place it near open flame.
- Replace the battery after recharging approximately 200 times. Use of a battery exceeding this limit can result in a highly dangerous situation due to the release of hydrogen gas.

safety devices

■ Motor stopped by water leak sensor

When water enters the battery housing or the motor housing, a leak sensor activates and shuts down the operation of the motor. The red warning lamp which has been placed on the partition wall will light to verify that water has entered the chamber.

- When the red warning lamp is on, do not try to start the motor.

- Be sure to wipe dry the inside of the battery housing. In particular, use a dry cloth and wipe the area around the two screws to the right of the warning lamp.

If after doing, this the light still will not go off, assume that the problem is that water has entered the motor housing. The engine cannot be taken apart and repaired by the operator so the scooter should be returned to Apollo or your local Apollo Dealer for repair.

- Even if the motor operates after wiping up the moisture, it should not be used before investigating the cause of the water leakage and taking adequate measures.

■ Motor stopped by thermal switch

A thermal switch has been installed to protect the motor, battery, and other electrical units from the dangerous effects of overheating.

- After long periods of continual use, the temperature within the housing unit may become exceptionally hot. When this happens, a safety device is activated which shuts down the motor.

If the motor does shut down for this reason, allow the scooter rest in order to cool down and then resume operation.

If after sufficient cooling has taken place, the motor still does not operate, surface, take the scooter out of the water, and inspect it for damage.

- If the scooter is left in direct sunlight or in a place such as a closed vehicle where the temperature may be extremely high, the temperature within the housing unit will increase and the safety mechanism will activate.

This can often lead to problems when starting the scooter. Keep the scooter in the shade or in the water to prevent the temperature from rising.

- If the temperature within the housing unit reaches 60 degrees Celsius, hydrogen gas can be released from the battery leading to a dangerous situation.

When storing the scooter, always remember to keep it in the shade or in a place where the temperature will not rise too high.

