

# Get the most out of car batteries

*Keep your fleet charged up and ready to go by following a few simple rules on battery maintenance.*

by Lee R. Hill

**T**he proper installation, care and preventive maintenance of golf car batteries are essential for profitable and satisfactory operation. The batteries, the heart of the golf car, are the least understood and the most frequently blamed for car ills. Yet, with good care, two and sometimes three seasons of use can be obtained by fleets, and more by individual golf car owners.

Batteries must be installed so that the positive and negative posts are in the positions specified by the manufacturer of the car. The positive post of the battery is always at the right hand side when the battery is seen from the front or name plate side. Batteries installed backwards or incorrectly may cause chargers to blow fuses, or may result in short range, reduced battery life, or complete failure of the car to run.

The holddown should be firmly tightened but not so tight as to distort the flexible battery case. Too much holddown pressure can cause the case sides to separate from the tar seal and allow acid leaks.

Before connecting the battery cables, the terminals of the batteries and cable ends should be cleaned and wire brushed. Connections must be tight. Loose cables create high electrical resistance, loss of power, improper charging, and, occasionally, melted battery terminals. The spark from a loose connection may cause batteries to explode. Coating the battery terminals and cable ends with a non-metallic petroleum grease will reduce corrosion. Aerosol sprays also are available for the same purpose.

Newly installed batteries, mechanically tight new cars, or batteries that have been stored for the winter will not give maximum range. Cold weather further reduces the power of batteries. These conditions can be overcome by making certain batteries are fully charged and limiting their use to 18 holes for the first several rounds. Placing batteries on charge immediately after use will greatly aid in developing the full battery power.

Good maintenance of golf car batteries should include daily, weekly, monthly, and annual scheduled care. Each day, golf cars should be cleaned and the batteries recharged. Cars used for 9 holes or more should be placed on charge each night.

Charging should start as soon as possible after the car's use. Not only are the batteries warm and better able to accept the charge, but the demand current portion of the electric bill will be reduced. Battery caps should be in place during charging.

To insure adequate charging time and maximum battery life, car rotation is essential. The last car to go on charge at night should be the last car to be used the following day. Many cases of short range can be traced to undercharging from failure to follow rotation procedures.

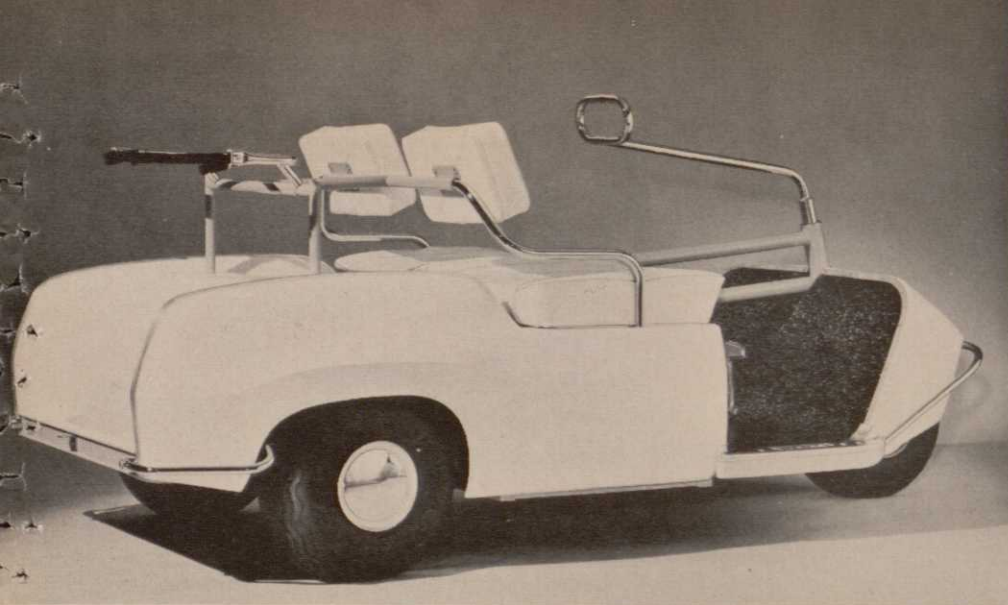
Each week, car batteries should be watered, washed and cleaned. The watering of batteries must be done after coming off charge. They should be filled with water free from minerals or metals; distilled water is preferred. The use of automatic cut-off fillers will help fill to the proper level. This level is usually indicated by a ledge, square, circle or triangle depending upon the brand.

Weekly, bring electrolyte level up to indicator with pure water. All cells must be checked and filled. Overfilling as well as underfilling will shorten battery life and range. Boiling or overflow of electrolyte during charging usually is a result of overfilling the battery.

When the caps have been replaced after watering, a solution of 4 tablespoons of baking soda per gallon of water should be sprayed or brushed on the battery tops, cable ends, battery sides, and carrier to neutralize acid and eliminate corrosion. The soda solution should be applied until the bubbling or fizzing reaction between acid and soda has stopped. The batteries must then be flushed off with water and allowed to air dry.

In very humid climates or damp weather, the tops of the batteries should be dried with compressed air or wiped off. Keeping tops of batteries clean eliminates current drain and corrosion. It also improves charging and range.

Each month the battery connections should be tightened. Twice a year these cables should be removed and cleaned with a wire brush. Monthly, each cell should be checked with a hydrometer, after charge, but before water is added. If the specific gravity is lower by 10 points or more than



that specified by the battery manufacturer for the full charge condition, an additional equalize charge is recommended.

If one battery is lower in all cells by 25 points or more, the low battery should be charged on an individual battery charger to the same state of charge or specific gravity as the other batteries. Should a battery have one or two cells lower by 50 points or more than the other cells, the battery should be individually charged and then given a 75 amp capacity discharge test to determine the condition of the battery. From 60-70 minutes of 75 ampere discharge capacity to 5.25 volts per battery is needed for 36 holes average range.

**S**hould one defective battery need to be replaced in the set, it is better to replace all batteries if the batteries are over one year old. The five good batteries may be used to replace batteries of similar age in other cars of the fleet.

Whether batteries are stored during the winter in or out of the car, both the weekly and monthly maintenance procedures should be followed prior to storage. During the winter, the batteries must be kept fully charged by charging every two weeks. Monthly spot hydrometer checks must be made after charging to be sure batteries are adequately charged.

The cooler the storage area, the less frequent will be the need for charge. Fully charged batteries will not freeze, but partially charged batteries may freeze causing damage to plates and cases.

Proper charging is as important to battery performance as battery care. Adequate wiring, proper fusing and sufficient power supply must be available. Tap set transformer chargers should be correctly adjusted to AC line voltage. All chargers should have good ventilation. All connections, both AC and charger to car, should be tight. Overheating of contacts indicates high resistance and a bad connection.

Excessive water usage indicates overcharging of the batteries. This may cause swelling of battery cases and short battery life. Either the charging rate or the length of the charge time should be reduced to eliminate overcharging. Undercharging, as indicated by low specific gravity or short range, should

be corrected by a higher charging rate or longer charge time.

Completely discharged batteries need 20-25 amps of initial charge and should finish below 5 amps. Non-automatic chargers should be adjusted so they will operate within the above range.

Proper installation of batteries, charging and scheduled preventative maintenance takes time. With the above program and care, however, your car batteries will give the desired range and long life for economical and satisfactory service. □



Above left, the Viking I electric golf car from Versal, Inc. Viking I consists of a three-piece sectional fiberglass body with a hard-finish permanently molded into the body. It features positive automatic breaking system, long-life nylon rear-suspension bushings, single solenoid switch system and a choice of tiller or wheel steering. Viking II golf car, also electric, is made of all-steel construction. Above, Electric Carrier electric golf car available in six models with tiller and automotive steering. It features a vertical bag rack that protects the club grips.