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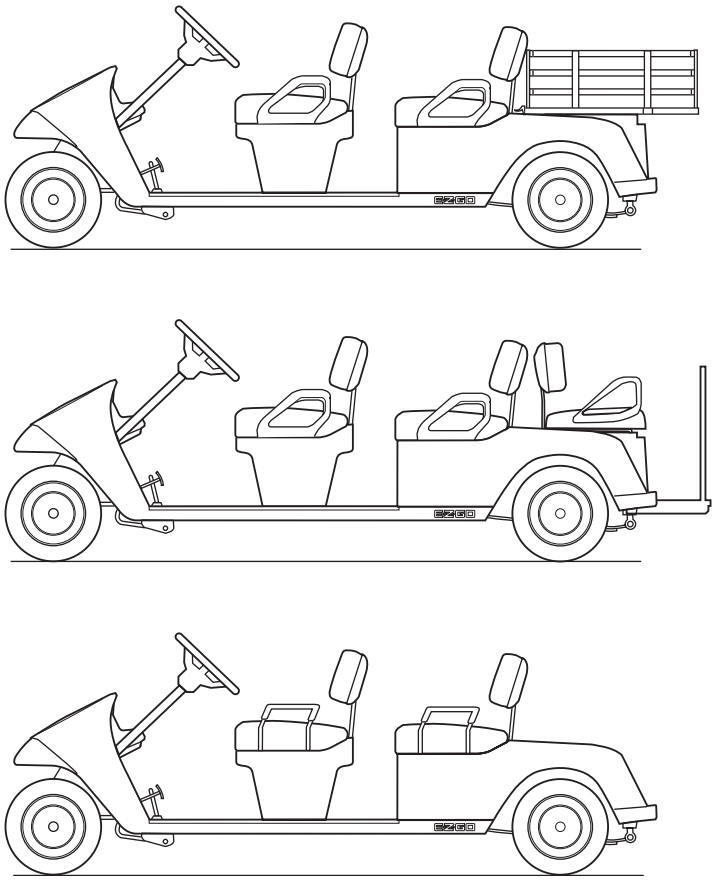
English

EZGO
a TEXTRON Company

OWNER'S MANUAL AND SERVICE GUIDE



ELECTRIC POWERED PERSONNEL CARRIERS AND GOLF CAR

STARTING MODEL YEAR: 2001

SAFETY

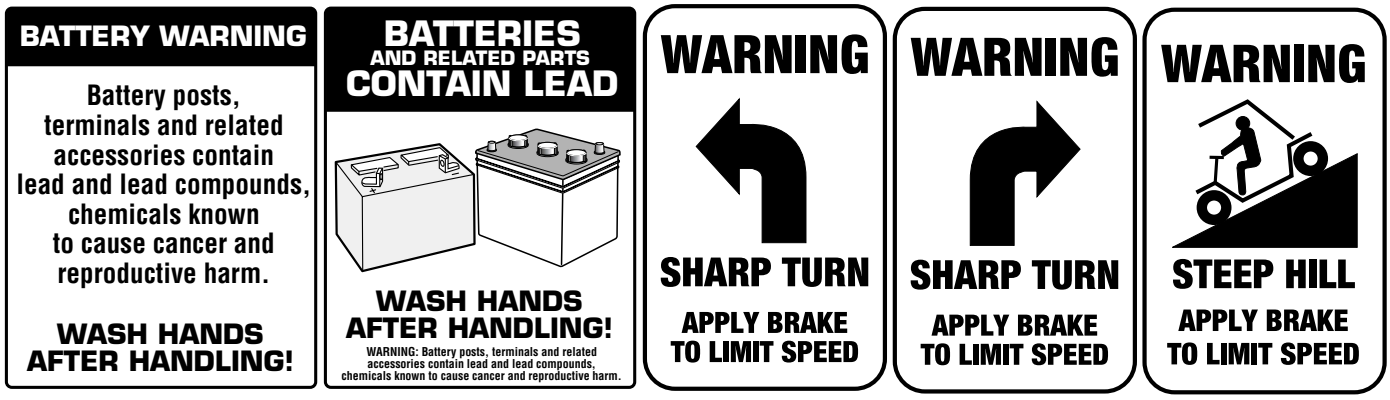
Read and understand all labels located on the vehicle. For any questions on any of the information, contact an E-Z-GO representative for clarification.

Always replace any damaged or missing labels.

On steep hills it is possible for vehicles to coast at greater than normal speeds encountered on a flat surface. To prevent loss of vehicle control and possible serious injury, speeds should be limited to no more than the maximum speed on level ground. (See vehicle specification.) Limit speed by applying the service brake.

Catastrophic damage to the drive train components due to excessive speed may result from driving the vehicle above specified speed. Damage caused by excessive speed may cause a loss of vehicle control, is costly, is considered abuse and will not be covered under warranty.

If the vehicle is to be used in a commercial environment, signs similar to the ones illustrated should be used to warn of situations that could result in an unsafe condition.



Be sure that this manual remains as part of the permanent service record should the vehicle be resold.

NOTES, CAUTIONS AND WARNINGS

Throughout this guide **NOTE, CAUTION** and **WARNING** will be used.

NOTE *A **NOTE** indicates a condition that should be observed.*

CAUTION **A CAUTION indicates a condition that may result in damage to the vehicle.**

⚠ WARNING ⚠ ***A WARNING indicates a hazardous condition that could result in severe injury or death.***

Please observe these **NOTES, CAUTIONS** and **WARNINGS;** be aware that servicing a vehicle requires mechanical skill and a regard for conditions that could be hazardous. Improper service or repair may damage the vehicle or render it unsafe.

⚠ WARNING ⚠ ***Battery posts, terminals and related accessories contain lead and lead compounds. Wash hands after handling.***

(NOTES, CAUTIONS AND WARNINGS CONTINUED ON INSIDE OF BACK COVER)

OWNER'S MANUAL AND SERVICE GUIDE

ELECTRIC POWERED CARGO, PERSONNEL CARRIER AND GOLF CARS

VEHICLES

Shuttle 4

Shuttle 6

TE5

TE5 PDS

CUSTOMER SERVICE DEPARTMENT IN USA PHONE: 1-800-241-5855 FAX: 1-800-448-8124

OUTSIDE USA PHONE: 010-1-706-798-4311 FAX: 010-1-706-771-4609

E-Z-GO DIVISION OF TEXTRON, INC., P.O.BOX 388, AUGUSTA, GEORGIA USA 30903-0388

NOTES

To obtain a copy of the limited warranty applicable to the vehicle, call or write a local distributor, E-Z-GO Branch or E-Z-GO Warranty Department with vehicle serial number and manufacturer code.

The use of non E-Z-GO parts may void the warranty.

Overfilling batteries may void the warranty.

BATTERY PROLONGED STORAGE

All batteries will self discharge over time. The rate of self discharge varies depending on the ambient temperature and the age and condition of the batteries.

A fully charged battery will not freeze in winter temperatures unless the temperature falls below -75° F (-60° C).

For winter storage, the batteries must be clean, fully charged and disconnected from any source of electrical drain, such as the battery charger. Disconnect the battery charger cable from the vehicle batteries when not charging.

As with all electric vehicles, the batteries must be checked and recharged as required or at a minimum of 30 day intervals.

Refer to the 'Prolonged Storage' section within the BATTERIES AND CHARGING section of this manual.

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SAFETY INFORMATION

This manual has been designed to assist the owner-operator in maintaining the vehicle in accordance with procedures developed by E-Z-GO. Adherence to these procedures and troubleshooting tips will ensure the best possible service from the product. To reduce the chance of personal injury and/or property damage, the following instructions must be carefully observed:

GENERAL

Many vehicles are used for a variety of tasks beyond the original intended use of the vehicle; therefore it is impossible to anticipate and warn against every possible combination of circumstances that may occur. No warnings can take the place of good common sense and prudent driving practices.

Good common sense and prudent driving practices do more to prevent accidents and injury than all of the warnings and instructions combined. E-Z-GO strongly suggests that the owner-operator read this entire manual paying particular attention to the CAUTIONS and WARNINGS contained therein. It is further recommended that employees and other operators be encouraged to do the same.

If you have any questions, contact your closest E-Z-GO representative or write to the address on the back cover of this publication, Attention: Product Service Department.

E-Z-GO Division of Textron reserves the right to make design changes without obligation to make these changes on units previously sold and the information contained in this manual is subject to change without notice.

E-Z-GO Division of Textron is not liable for errors in this manual or for incidental or consequential damages that result from the use of the material in this manual.

This vehicle conforms to the current applicable standard for safety and performance requirements.

These vehicles are designed and manufactured for off-road use. They do not conform to Federal Motor Vehicle Safety Standards and are not equipped for operation on public streets. Some communities may permit these vehicles to be operated on their streets on a limited basis and in accordance with local ordinances.

With electric powered vehicles, be sure that all electrical accessories are grounded directly to the battery (-) post. **Never use the chassis or body as a ground connection.**

Refer to GENERAL SPECIFICATIONS for vehicle seating capacity.

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability or increase the speed beyond the factory specification. Such modifications can cause serious personal injury or death. Modifications that increase the speed and/or weight of the vehicle will extend the stopping distance and may reduce the stability of the vehicle. Do not make any such modifications or changes. E-Z-GO prohibits and disclaims responsibility for any such modifications or any other alteration which would adversely affect the safety of the vehicle.

Vehicles that are capable of higher speeds must limit their speed to no more than the speed of similar vehicles when used in the same environment. Additionally, speed should be further moderated by the environmental conditions, locale and common sense.

GENERAL OPERATION

Always use the vehicle in a responsible manner and maintain the vehicle in safe operating condition.

Always read and observe all warnings and operation instruction labels affixed to the vehicle.

Always follow all safety rules established in the area where the vehicle is being operated.

Always reduce speed to compensate for poor terrain or conditions.

Always apply service brake to control speed on steep grades.

Always maintain adequate distance between vehicles.

Always reduce speed in wet areas.

Always use extreme caution when approaching sharp or blind turns.

Always use extreme caution when driving over loose terrain.

Always use extreme caution in areas where pedestrians are present.

MAINTENANCE

Always maintain your vehicle in accordance with the manufacturer's periodic service schedule.

Always ensure that mechanics performing repairs are trained and qualified to do so.

Always follow the manufacturer's directions if you do any maintenance on your vehicle. Be sure to disable the vehicle before performing any maintenance. Disabling includes removing the key from the key switch and removal of a battery wire.

Always insulate any tools used within the battery area in order to prevent sparks or battery explosion caused by shorting the battery terminals or associated wiring. Remove the batteries or cover exposed terminals with an insulating material.

Always check the polarity of each battery terminal and be sure to rewire the batteries correctly.

Always use specified replacement parts. Never use replacement parts of lesser quality.

Always use recommended tools.

Always determine that tools and procedures not specifically recommended by the manufacturer will not compromise the safety of personnel nor jeopardize the safe operation of the vehicle.

Always support the vehicle using wheel chocks and safety stands. Never get under a vehicle that is supported by a jack. Lift the vehicle in accordance with the manufacturer's instructions.

Never attempt to maintain a vehicle in an area where exposed flame is present or persons are smoking.

Always be aware that a vehicle that is not performing as designed is a potential hazard and must not be operated.

The manufacturer cannot anticipate all situations, therefore people attempting to maintain or repair the vehicle must have the skill and experience to recognize and protect themselves from potential situations that could result in severe personal injury or death and damage to the vehicle. Use extreme caution and, if unsure as to the potential for injury, refer the repair or maintenance to a qualified mechanic.

Always test drive the vehicle after any repairs or maintenance. All tests must be conducted in a safe area that is free of both vehicular and pedestrian traffic.

Always replace damaged or missing warning, caution or information labels.

Always keep complete records of the maintenance history of the vehicle.

VENTILATION

Hydrogen gas is generated in the charging cycle of batteries and is explosive in concentrations as low as 4%. Because hydrogen gas is lighter than air, it will collect in the ceiling of buildings necessitating proper ventilation. Five air exchanges per hour is considered the minimum requirement.

Never charge a vehicle in an area that is subject to flame or spark. Pay particular attention to natural gas or propane gas water heaters and furnaces.

Always use a dedicated circuit for each battery charger. Do not permit other appliances to be plugged into the receptacle when the charger is in operation.

Chargers must be installed and operated in accordance with charger manufacturer's recommendations or applicable electrical code (whichever is more restrictive).

Notes:

GENERAL

The following text is provided as recommended by part II of ASME/ANSI B56.8-1988. E-Z-GO strongly endorses the contents of this specification.

PART II
FOR THE USER

4 GENERAL SAFETY PRACTICES

4.1 Introduction

4.1.1 Like other machines, carriers can cause injury if improperly used or maintained. Part II contains broad safety practices applicable to carrier operations. Before operation, the user shall establish such additional specific safety practices as may reasonably be required for safe operation.

4.2 Stability

4.2.1 Experience has shown that this vehicle, which complies with this standard, is stable when properly operated and when operated in accordance with specific safety rules and practices established to meet actual operating terrain and conditions. However, improper operation, faulty maintenance, or poor housekeeping may contribute to a condition of instability and defeat the purpose of the standard. Some of the conditions which may affect stability are failure of the user to follow safety practices; also, ground and floor conditions, grade, speed, loading, the operation of the carrier with improper loads, battery weight, dynamic and static forces, and the judgement exercised by the carrier operator.

(a) The user shall train carrier operators to adhere strictly to the operating instructions stated in this Standard.

(b) The user shall survey specific operating conditions and environment, and establish and train carrier operators to comply with additional, specific safety practices.

4.3 Nameplates, Markings, Capacity, and Modifications

4.3.1 The user shall maintain in a legible condition all nameplates, warnings, and instructions which are supplied by the manufacturer.

4.3.2 The user shall not perform any modification or addition which affects capacity or safe operation, or make any change not in accordance with the owner's manual without the manufacturer's prior written authorization. Where authorized modifications have been made, the user shall ensure that capacity, operation, warning, and maintenance instruction plates, tags, or decals are changed accordingly.

4.3.3 As required under paras. 4.3.1 or 4.3.2, the manufacturer shall be contacted to secure new nameplates, warnings, or instructions which shall then be affixed in their proper place on the carrier.

4.4 Fuel Handling and Storage

4.4.1 The user shall supervise the storage and handling of liquid fuels (when used) to be certain that it is in accordance with appropriate paragraphs of ANSI/NFPA 505 and ANSI/NFPA 30.

4.4.2 Storage and handling of liquefied petroleum gas fuels shall be in accordance with appropriate paragraphs of ANSI/NFPA 505 and ANSI/NFPA 58. If such storage or handling is not in compliance with these standards, the user shall prevent the carrier from being used until such storage and handling is in compliance with these standards.

4.5 Changing and Charging Storage Batteries for Electric Personnel and Burden Carriers

4.5.1 The user shall require battery changing and charging facilities and procedures to be in accordance with appropriate paragraphs of ANSI/NFPA 505.

4.5.2 The user shall periodically inspect facilities and review procedures to be certain that appropriate paragraphs of ANSI/NFPA 505, are strictly complied with, and shall familiarize carrier operators with it.

4.6 Hazardous Locations

4.6.1 The user shall determine the hazard classification of the particular atmosphere or location in which the carrier is to be used in accordance with ANSI/NFPA 505.

4.6.2 The user shall permit in hazardous areas only those carriers approved and of the type required by ANSI/NFPA 505.

4.7 Lighting for Operating Areas

4.7.1 The user, in accordance with his responsibility to survey the environment and operating conditions, shall determine if the carrier requires lights and, if so, shall equip the carrier with appropriate lights in accordance with the manufacturer's recommendations.

4.8 Control of Noxious Gases and Fumes

4.8.1 When equipment powered by internal combustion engines is used in enclosed areas, the atmosphere shall be maintained within limits specified in the American Conference of Governmental Industrial Hygienists publication, "Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment". This shall be accomplished by ventilation provided by the user, and/or the installation, use, and proper maintenance of emission control equipment recommended or provided by the manufacturer of the equipment.

4.9 Warning Device(s)

4.9.1 The user shall make periodic inspections of the carrier to be certain that the sound-producing and/or visual device(s) are maintained in good operating condition.

4.9.2 The user shall determine if operating conditions require the carrier to be equipped with additional sound-producing and/or visual devices and be responsible for providing and maintaining such devices, in accordance with the manufacturer's recommendations.

5 OPERATING SAFETY RULES AND PRACTICES

5.1 Personnel and Burden Carrier Operator Qualifications

5.1.1 Only persons who are trained in the proper operation of the carrier shall be authorized to operate the carrier. Operators shall be qualified as to visual, auditory, physical, and mental ability to safely operate the equipment according to Section 5 and all other applicable parts of this Standard.

5.2 Personnel and Burden Carrier Operators' Training

5.2.1 The user shall conduct an operators' training program.

5.2.2 Successful completion of the operators' training program shall be required by the user before operation of the carrier. The program shall be presented in its entirety to all new operators and not condensed for those claiming previous experience.

5.2.3 The user should include in the operators' training program the following:

(a) instructional material provided by the manufacturer;

(b) emphasis on safety of passengers, material loads, carrier operator, and other employees;

(c) general safety rules contained within this Standard and the additional specific rules determined by the user in accordance with this Standard, and why they were formulated;

(d) introduction of equipment, control locations and functions, and explanation of how they work when used properly and when used improperly, and surface conditions, grade, and other conditions of the environment in which the carrier is to be operated;

(e) operational performance tests and evaluations during, and at completion of, the program.

5.3 Personnel and Burden Carrier Operator Responsibility

5.3.1 Operators shall abide by the following safety rules and practices in paras. 5.4, 5.5, 5.6, and 5.7.

5.4 General

5.4.1 Safeguard the pedestrians at all times. Do not drive carrier in a manner that would endanger anyone.

5.4.2 Riding on the carrier by persons other than the operator is authorized only on personnel seat(s) provided by the manufacturer. All parts of the body shall remain within the plan view outline of the carrier.

5.4.3 When a carrier is to be left unattended, stop carrier, apply the parking brake, stop the engine or turn off power, turn off the control or ignition circuit, and remove the key if provided. Block the wheels if machine is on an incline.

5.4.4 A carrier is considered unattended when the operator is 25 ft. (7.6 m) or more from the carrier which remains in his view, or whenever the operator leaves the carrier and it is not within his view. When the operator is dismounted and within 25 ft. (7.6 m) of the carrier still in his view, he still must have controls neutralized, and the parking brake(s) set to prevent movement.

5.4.5 Maintain a safe distance from the edge of ramps and platforms.

5.4.6 Use only approved carriers in hazardous locations, as defined in the appropriate safety standards.

5.4.7 Report all accidents involving personnel, building structures, and equipment.

5.4.8 Operators shall not add to, or modify, the carrier.

5.4.9 Carriers shall not be parked or left unattended such that they block or obstruct fire aisles, access to stairways, or fire equipment.

5.5 Traveling

5.5.1 Observe all traffic regulations, including authorized speed limits. Under normal traffic conditions keep to the right. Maintain a safe distance, based on speed of travel, from a carrier or vehicle ahead; and keep the carrier under control at all times.

5.5.2 Yield the right of way to pedestrians, ambulances, fire trucks, or other carriers or vehicles in emergency situations.

5.5.3 Do not pass another carrier or vehicle traveling in the same direction at intersections, blind spots, or at other dangerous locations.

5.5.4 Keep a clear view of the path of travel, observe other traffic and personnel, and maintain a safe clearance.

5.5.5 Slow down or stop, as conditions dictate, and activate the sound-producing warning device at cross aisles and when visibility is obstructed at other locations.

5.5.6 Ascend or descend grades slowly.

5.5.7 Avoid turning, if possible, and use extreme caution on grades, ramps, or inclines; normally travel straight up and down.

5.5.8 Under all travel conditions the carrier shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

5.5.9 Make starts, stops, turns, or direction reversals in a smooth manner so as not to shift the load, endanger passengers, or overturn the carrier.

5.5.10 Do not indulge in dangerous activities, such as stunt driving or horseplay.

5.5.11 Slow down when approaching, or on, wet or slippery surfaces.

5.5.12 Do not drive carrier onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off power, and set parking brakes. It is advisable that all other personnel leave the elevator before a carrier is allowed to enter or exit.

5.5.13 Avoid running over loose objects, potholes, and bumps.

5.5.14 To negotiate turns, reduce speed to improve stability, then turn hand steering wheel or tiller in a smooth, sweeping motion.

5.6 Loading

5.6.1 Handle only stable and safely arranged loads. When handling off-center loads which cannot be centered, operate with extra caution.

5.6.2 Handle only loads within the capacity of the carrier as specified on the nameplate.

5.6.3 Handle loads exceeding the dimensions used to establish carrier capacity with extra caution. Stability and maneuverability may be adversely affected.

5.7 Operator Care of Personnel and Burden Carriers

5.7.1 At the beginning of each shift during which the carrier will be used, the operator shall check the carrier condition and inspect the tires, warning devices, lights, battery(s), speed and directional controllers, brakes, and steering mechanism. If the carrier is found to be in need of repair, or in any way unsafe, the matter shall be reported immediately to the designated authority and the carrier shall not be operated until it has been restored to safe operating condition.

5.7.2 If during operation the carrier becomes unsafe in any way, the matter shall be reported immediately to the designated authority, and the carrier shall not be operated until it has been restored to safe operating condition.

5.7.3 Do not make repairs or adjustments unless specifically authorized to do so.

5.7.4 The engine shall be stopped and the operator shall leave the carrier while refueling.

5.7.5 Spillage of oil or fuel shall be carefully and completely absorbed or evaporated and fuel tank cap replaced before starting engine.

5.7.6 Do not operate a carrier with a leak in the fuel system or battery(s).

5.7.7 Do not use open flames for checking electrolyte level in storage battery(s) or liquid level in fuel tanks.

6 MAINTENANCE PRACTICES

6.1 Introduction

6.1.1 Carriers may become hazardous if maintenance is neglected. Therefore, maintenance facilities, trained personnel, and procedures shall be provided. Such facilities may be on or off the premises.

6.2 Maintenance Procedures

6.2.1 Maintenance and inspection of all carriers shall be performed in conformance with the manufacturer's recommendations and the following practices.

(a) A scheduled preventive maintenance, lubrication, and inspection system shall be followed.

(b) Only qualified and authorized personnel shall be permitted to maintain, repair, adjust, and inspect carriers.

(c) Before undertaking maintenance or repair, follow the manufacturer's recommendations for immobilizing the carrier.

(d) Block chassis before working underneath it.

(e) Before disconnecting any part of the engine fuel system of a gasoline or diesel powered carrier with gravity feed fuel systems, be sure shutoff valve is closed, and run engine until fuel system is depleted and engine stops running.

(f) Before disconnecting any part of the engine fuel system of LP gas powered carriers, close the LP gas cylinder valve and run the engine until fuel in the system is depleted and the engine stops running.

(g) Operation to check performance of the carrier shall be conducted in an authorized area where safe clearance exists.

(h) Before commencing operation of the carrier, follow the manufacturer's instructions and recommended procedures.

(i) Avoid fire hazards and have fire protection equipment present in the work area. Do not use an open flame to check level or leakage of fuel, battery electrolyte, or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

(j) Properly ventilate the work area.

(k) Handle LP gas cylinders with care. Physical damage, such as dents, scrapes, or gouges, may dangerously weaken the tank and make it unsafe for use.

(l) Brakes, steering mechanisms, speed and directional control mechanisms, warning devices, lights, governors, guards, and safety devices shall be inspected regularly and maintained in a safe operating condition.

(m) Special carriers or devices designed and approved for hazardous area operation shall be inspected to ensure that maintenance preserves the original approved safe operating features.

(n) Fuel systems shall be checked for leaks and condition of parts. If a leak is found, action shall be taken to prevent the use of the carrier until the leak has been eliminated.

(o) The carrier manufacturer's capacity, operation, and maintenance instruction plates, tags, or decals shall be maintained in legible condition.

(p) Batteries, motors, speed and directional controllers, limit switches, protective devices, electrical conductors, and connections shall be inspected and maintained in conformance with manufacturers recommended procedures.

(q) Carriers shall be kept in a clean condition to minimize fire hazards and facilitate detection of loose or defective parts.

(r) Modifications and additions which affect capacity and safe machine operation shall not be performed by the customer or user without manufacturer's prior written authorization; where authorized modifications have been made, the user shall ensure that capacity, operation, warning, and maintenance instruction plates, tags, or decals are changed accordingly.

(s) Care shall be taken to ensure that all replacement parts are interchangeable with the original parts and of a quality at least equal to that provided in the original equipment.

END OF ASME/ANSI B56.8 - 1988 TEXT

GENERAL

The following text is provided as recommended by part II of ANSI / GCMA Z130.1 - 1993. E-Z-GO, as a member of the National Golf Car Manufacturers Association (NGCMA), strongly endorses the contents of this specification.

PART II

MAINTENANCE AND OPERATIONS

5. GENERAL SAFETY PRACTICES

5.1. Introduction

Like other machines, golf cars can cause injury if improperly used or maintained. This section contains broad safety practices recommended for safe golf car operations. Before operation, the controlling party should establish such additional specific safety practices as may be reasonably required for safe operations.

Experience has shown that golf cars which comply with the provisions stated in Part II of this Standard are safe when properly operated in accordance with the safety and operation warnings affixed to every golf car. The safe operation is enhanced when the golf cars are operated within a specific set of operation instructions, safety rules and practices established to meet actual operating terrain and conditions.

The safety information contained in Part II is intended to provide the controlling party with basic safety information and to encourage the controlling party to implement a golf car safety program.

It is suggested and recommended that Part II be reprinted in the golf car manufacturer's operation and service manuals to encourage safe operations and practices at the controlling party's facility.

5.2. Safety Survey

The controlling party shall perform a safety survey periodically, and as conditions warrant to their premises, to identify areas where golf cars should not be operated and to identify possible hazards.

5.2.1. Steep Grade

In areas where steep grades exist, golf car operations should be restricted to the designated golf car pathways where possible, and shall be identified with a suitable warning giving the following information: "Warning, steep grade, descend slowly with one foot on brake."

5.2.2. Wet Areas

Wet grassy areas may cause a golf car to lose traction and may affect stability. Wet areas shall be chained or roped off to prevent golf car operations or be identified by a suitable warning not to operate golf cars in this area due to wet terrain.

5.2.3. Sharp Turns, Blind Corners, Bridge Approaches

Sharp turns, blind spots, bridge approaches and other potentially hazardous areas shall be either chained or roped off to prevent golf car operations or identified with a suitable warning to the operator of the nature of the hazard and stating the proper precautions to be taken to avoid the hazard.

5.2.4. Loose Terrain

Loose terrain may cause a golf car to lose traction and may affect stability. Areas of loose terrain should be repaired if possible, or chained or roped off to prevent golf car operation or identified by a suitable warning to operators not to operate golf cars in this area due to loose terrain or possible hazardous conditions.

5.2.5. Golf Car/Pedestrian Interference Areas

Areas where pedestrians and golf cars interfere shall be avoided whenever possible by rerouting the golf car traffic or the pedestrian traffic to eliminate the interference. If elimination of the interference is not possible or is highly impractical, signs shall be erected warning pedestrians of the golf car traffic and golf car operators of the pedestrian traffic and to drive slowly and use extreme caution.

6. MAINTENANCE

6.1. Introduction

6.1.1. Golf cars may become hazardous if maintenance is neglected or improperly performed. Therefore maintenance facilities, trained personnel and procedures in accordance with the manufacturer's recommendations should be provided by the controlling party.

6.2. Preventive Maintenance

A regularly scheduled inspection and preventive maintenance program in accordance with the manufacturer's recommendations should be established. Such a program will be a valuable tool in providing the golfing patron with a safe, properly operating golf car and thereby help to avoid accidents.

6.2.1. Personnel

Only qualified, trained and authorized personnel shall be permitted to inspect, adjust and maintain golf cars.

6.2.2. Parts and Materials

Only manufacturer's recommended replacement parts and materials shall be used.

6.2.3. Ventilation

Maintenance and storage areas shall be properly ventilated to avoid fire hazards in accordance with applicable fire codes and ordinances.

6.2.3.1. Ventilation for gasoline powered golf cars shall be provided to remove flammable vapors, fumes and other flammable materials. Consult applicable fire codes for specific levels of ventilation.

6.2.3.2. Ventilation for electric powered golf cars shall be provided to remove the accumulation of flammable hydrogen gas emitted during the charging process. The amount of hydrogen gas emitted depends upon a number of factors such as the condition of the batteries, the output rate of the battery charger and the amount of time the batteries are on charge. Hydrogen emissions are generally considered to be in the area of 10 to 20 cubic liters per car per charge. Because of the highly volatile nature of hydrogen gas and its propensity to rise and accumulate at the ceiling in pockets, a minimum of 5 air changes per hour is recommended. The controlling party shall consult applicable fire and safety codes for the specific ventilation levels required as well as the use of explosion proof electrical apparatus.

6.2.4. Maintenance Procedures

All maintenance shall be performed in accordance with the manufacturer's recommended maintenance procedures as outlined in the manufacturer's operation and service manuals.

6.2.5. Maintenance Safety Procedures

All maintenance shall be performed in accordance with the manufacturer's recommended safety procedures as outlined in the manufacturer's operation and service manuals. The following list of recommended safety procedures are general in nature and in no way supersede the manufacturer's specific instructions.

6.2.5.1. Follow manufacturer's instructions for immobilizing golf car before beginning any maintenance.

6.2.5.2. Block chassis before working underneath golf car.

6.2.5.3. Before disconnecting any part of the fuel system, drain the system and turn all shut off valves to the 'OFF' position to prevent leakage or accumulation of flammable fuels in the work area.

6.2.5.4. Avoid fire hazards and have fire protection equipment available.

6.2.5.5. Before performing any maintenance on an electric golf car, disable the electrical system in accordance with the manufacturer's instructions.

6.2.5.6. Use only properly insulated tools when working on electrically powered golf cars or around batteries.

6.2.5.7. Brakes, steering mechanisms, warning devices,

governors and all other safety devices shall be inspected and maintained in a safe and proper operating condition and shall not be modified as supplied by the manufacturer.

6.2.5.8. After each maintenance or repair the golf car shall be driven by qualified, trained and authorized personnel to ensure proper operation and adjustment.

6.2.5.9. Driving golf car to check for proper operation and adjustment after repair shall be performed in an area that is free of vehicular and pedestrian traffic.

6.2.5.10. Record all maintenance performed in a maintenance record log by date, name of person performing maintenance and type of maintenance. Controlling party management should periodically inspect maintenance log to ensure currency and completeness of entries.

6.2.5.11. Provide operator comment cards to assist in identifying non-periodic maintenance needs for specific golf cars.

6.2.6. The controlling party shall maintain in a legible condition all nameplates, warnings and instructions which are supplied by the manufacturer.

6.2.7. The controlling party shall not perform any modification or addition which affects capacity or safe operation, or make any change not in accordance with the owner's manual without the manufacturer's prior written authorization. Where authorized modifications have been made, the controlling party shall ensure that capacity, operation, warning and maintenance instruction plates, tags or decals are changed accordingly.

6.2.8. As required under paragraphs 6.2.6 and 6.2.7 the manufacturer shall be contacted to secure new nameplates, warnings or instructions which shall then be affixed in their proper place on the golf car.

7. FUELS HANDLING AND STORAGE/ BATTERY CHARGING

7.1. The controlling party shall supervise the storage and handling of liquid fuels in accordance with applicable fire and safety requirements.

7.2. Storage and handling of liquefied petroleum gas fuels shall be in accordance with American Gas Association recommendations and applicable fire safety requirements.

7.3. The controlling party shall require battery changing and charging facilities and procedures to be in accordance with applicable ordinances or regulations (also see paragraph 6.2.3.2).

7.4. The controlling party shall periodically inspect facilities and review procedures to be certain that the procedures in paragraphs 6.2.3.2 and 7.3 are being followed.

8. OPERATING SAFETY RULES AND PRACTICES

8.1. Operator Qualifications

8.1.1. Only authorized persons shall be allowed to operate golf cars. It is recommended that no persons be allowed to operate golf cars except those persons who posses a valid motor vehicle driver's license.

8.1.2. The controlling party shall display the operation and safety instructions as recommended by the golf car manufacturers and the golf course safety rules in a conspicuous place near the golf car rental area or golf car pick-up area. It is also recommended, as with all motor vehicles, that the warning "Do not operate golf cars when under the influence of alcohol or drugs." be posted in a conspicuous location.

SAFETY INFORMATION

Read all of manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notes, Cautions and Warnings

Notes:

Read all of manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notes, Cautions and Warnings

Thank you for your purchase. The vehicle is equipped with an electronic speed control unit that is the most advanced in the industry. Before driving the vehicle, we ask you to spend some time reading this Owner's Manual and Service Guide. This guide contains information that will assist you in maintaining your highly reliable vehicle. This guide covers the operation of several vehicles, therefore some pictorial views may not represent your vehicle. Physical differences in controls will be illustrated. Some illustrations may show items that are optional for your vehicle.

Most of the service procedures in this guide can be accomplished by an individual using common automotive hand tools. Refer to an authorized service representative for information on servicing the vehicle in accordance with the Periodic Service Schedule.

To facilitate maintenance, a Service Parts Manual and a Technician's Repair and Service Manual is available from a local Distributor, an authorized Branch or the E-Z-GO Service Parts Department. When ordering parts or requesting information for your vehicle, provide vehicle model, serial number and manufacture code.

BEFORE INITIAL USE

Read, understand and follow safety label on the instrument panel. Be sure you understand the vehicle, its equipment and how to use it safely. Although the vehicles have been designed to provide safe and reliable operation, maintaining good performance depends to a large extent on the operator.

⚠ WARNING ⚠ ***Hydrogen gas is generated as a natural part of the lead acid battery charging process. A 4% concentration of hydrogen gas is explosive and could cause severe injury or death. Charging must take place in an area that is adequately ventilated (minimum of 5 air exchanges per hour).***

To reduce the chance of battery explosion that could result in severe injury or death, never smoke around or charge batteries in an area that has open flame or electrical equipment that could cause an electrical arc.

Hydrogen gas is generated in the charging cycle of batteries and is explosive in concentrations as low as 4%. Because hydrogen gas is lighter than air, it will collect in the ceiling of buildings necessitating proper ventilation. Five air exchanges per hour is considered the minimum requirement.

Never charge a vehicle in an area that is subject to flame or spark. Pay particular attention to natural gas or propane gas water heaters and furnaces.

Before a new vehicle is put into operation, it is recommended that the items shown in the INITIAL SERVICE CHART be performed (Ref Fig. 1 on page 1).

ITEM	SERVICE OPERATION
Charger	Remove from vehicle and properly mount
Batteries	Charge batteries
Seats	Remove protective plastic covering
Brakes	Check hydraulic brake fluid level
	Check operation and adjust if necessary
Tires	Check air pressure (see SPECIFICATIONS)

Fig. 1 Initial Service Chart

Vehicle batteries must be fully charged before initial use.

Preparation of Seats for Service

Remove the protective plastic coverings from the seats before placing the vehicle in service. The only function of the plastic covering is to protect the seat bottom and back rest during shipping. If the plastic covering is left on the seat and becomes torn, dirt may get under the plastic covering and be ground into the cover material. Water getting under the plastic covering can become trapped and eventually will damage the seat assembly.

Charger Installation

⚠ WARNING ⚠ ***To prevent overheating that may cause serious damage to the charger and create the potential for fire, do not block or obstruct the airways. Portable chargers must be mounted on a platform above the ground or in such a manner as to permit the maximum air flow underneath and around the charger.***

If the charger is operated in an outdoor location, rain and sun protection must be provided (Ref. Fig. 2 on page 2).

A dedicated circuit is required for the charger. Refer to the charger manual for appropriate circuit protection. The charger may remain plugged into the AC outlet. To charge the vehicle, refer to the instruction labels on the charger. Insert the DC plug completely into the vehicle receptacle located on the panel underneath the driver's seat (Ref Fig. 3 on page 2). After inserting the polarized DC plug, wait a few seconds and observe ammeter on

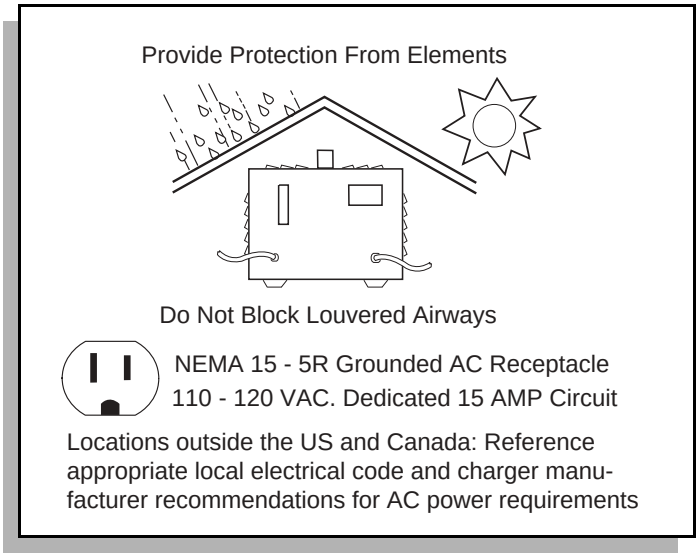


Fig. 2 Charger Installation

charger to make sure it moves indicating that charger is charging.

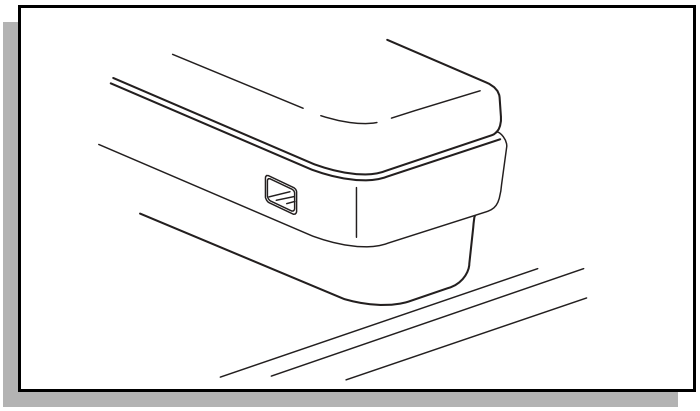


Fig. 3 Charger Receptacle

The charger will automatically start a few seconds after plug insertion. The charger will automatically stop when batteries are fully charged and the DC plug can be removed to permit use of the vehicle.

⚠ WARNING ⚠ ***To prevent a physical hazard that could result in an electrical shock or electrocution, be sure that the charger plug is not damaged and is inserted into a grounded receptacle.***

The power (AC) cord is equipped with a grounded plug, do not attempt to pull out, cut or bend the ground post.

NOTE *If vehicle is to be charged with a non - E-Z-GO charger, refer to the manufacturer's instructions supplied with the charger.*

SERIAL NUMBER PLATE LOCATION

The serial and manufacturing numbers are located on a plate on the passenger side of the dash panel (Ref Fig. 4 on page 2).

Design changes take place on an ongoing basis. In order to obtain correct components for the vehicle, the manufacturing date and serial number must be provided when ordering service parts.

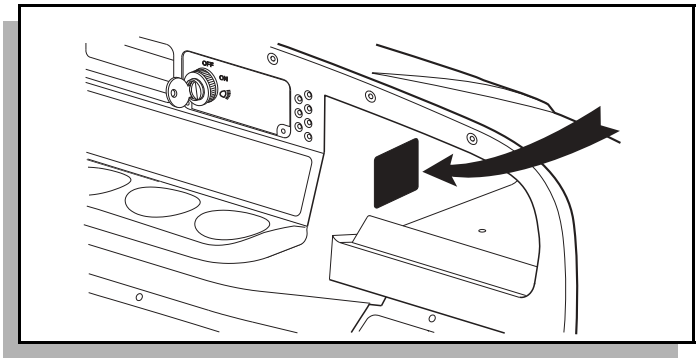


Fig. 4 Serial Number Plate Location

CONTROLS AND INDICATORS

The controls on the vehicle consist of:

- key/light switch
- accelerator pedal
- service brake pedal
- parking brake pedal or handle
- direction selector lever or switch
- horn
- state of charge meter
- run - tow/maintenance switch (PDS only)

Key/Light Switch

The vehicles are equipped with a combination key/light switch. Located on the dash panel, this switch enables the basic electrical system of the vehicle to be turned on and off by turning the key. If the vehicle is equipped with lights, this switch also has a position for operating the lights. The lights will illuminate only when the key is turned to the light icon position (Ref Fig. 5 on page 3).

To prevent inadvertent operation of the vehicle when left unattended, the key should be turned to the 'OFF' position and removed.

NOTE *If the vehicle is equipped with E-Z-GO installed custom accessories, some accessories remain operational with the key switch in the 'OFF' position.*

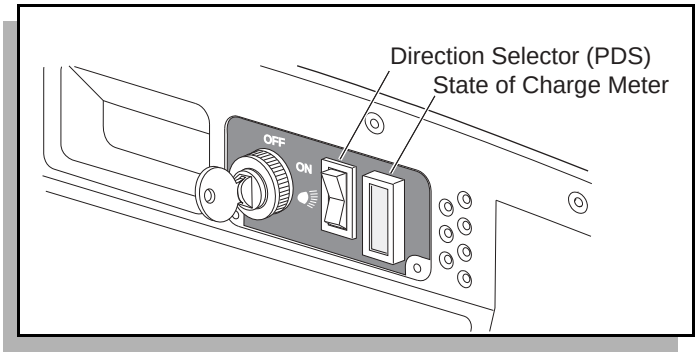


Fig. 5 Key/Light Switch

Accelerator Pedal

⚠ WARNING ⚠ ***If the key switch is 'ON' and the parking brake is engaged, depressing the accelerator inadvertently will release the parking brake and cause the vehicle to move which could cause severe injury or death. Always turn the key switch to 'OFF' when leaving the vehicle in 'Park'.***

Depressing the accelerator pedal starts the motor. When the pedal is released, the motor will stop. To stop the vehicle more quickly, depress the service brake. Depressing the accelerator pedal also releases the floor mounted parking brake (Ref Fig. 6 on page 3).

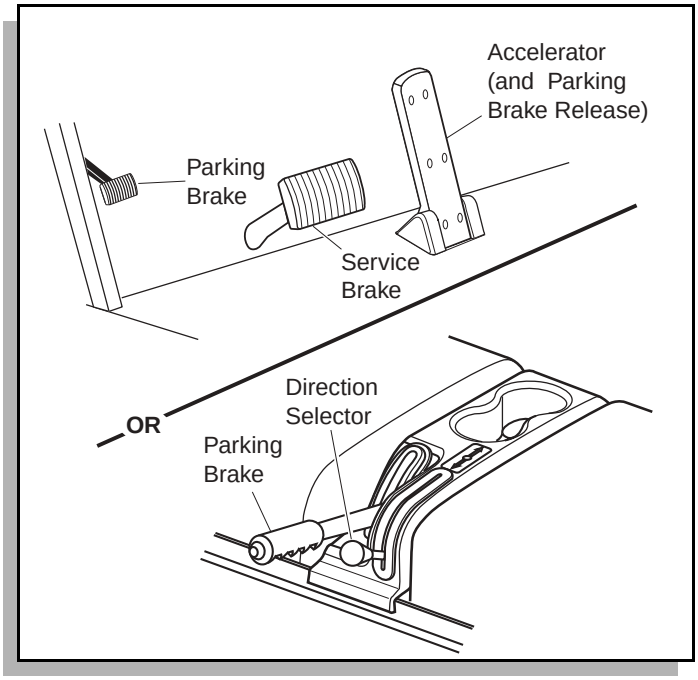


Fig. 6 Accelerator and Brake Controls

Service Brake Pedal

Depressing the foot operated service brake pedal activates the brakes (Ref Fig. 6 on page 3).

Parking Brake

Depending on the vehicle model, the parking brake may be either foot or hand operated (Ref Fig. 6 on page 3).

The foot operated parking brake is located at the left side of the instrument panel just above the floor. The brake is engaged when the pedal is depressed and is disengaged when the accelerator pedal is depressed.

The hand operated parking brake is located between the front seats. The brake is engaged when the handle is raised and is disengaged when the handle is parallel to the seat bottom. When leaving the vehicle unattended, engage the parking brake by raising the handle until it is locked in place. To release the parking brake, depress the release button in the end of the handle while slightly raising the handle, then lower the parking brake handle. The motor will not start unless the handle is **fully** released, or lowered to it's lowest position.

Direction Selector

Located either on the seat support panel, between the front seats in the console or in the dash panel, this lever or switch permits the selection of either forward, reverse or neutral (the position between FORWARD and REVERSE) (Ref. Fig. 6 on page 3) (Ref Fig. 7 on page 3). It should be left in neutral when the vehicle is unattended.

CAUTION **To prevent component damage, the vehicle must be completely stopped before moving the direction selector.**

On PDS models, if the direction selector is shifted before the vehicle comes to a complete stop, a warning beeper will activate.

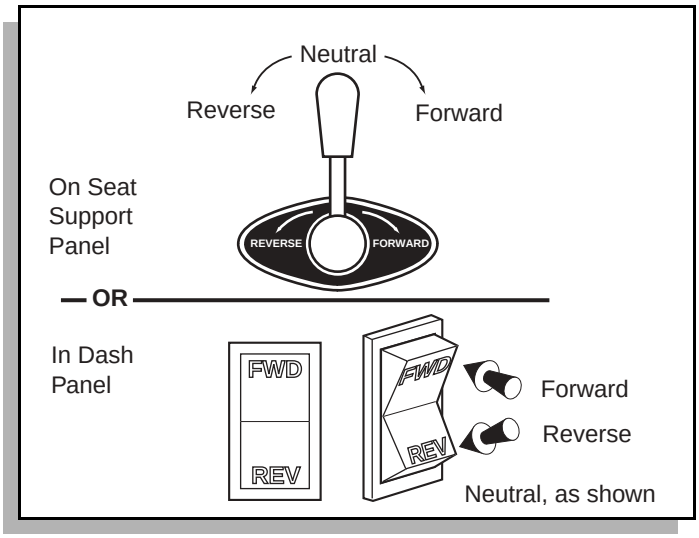


Fig. 7 Direction Selector

Horn

The horn activating button is located either on the steering column or on the floor to the left of the brake pedal (Ref Fig. 8 on page 4). The horn is located under the seat on the driver side.

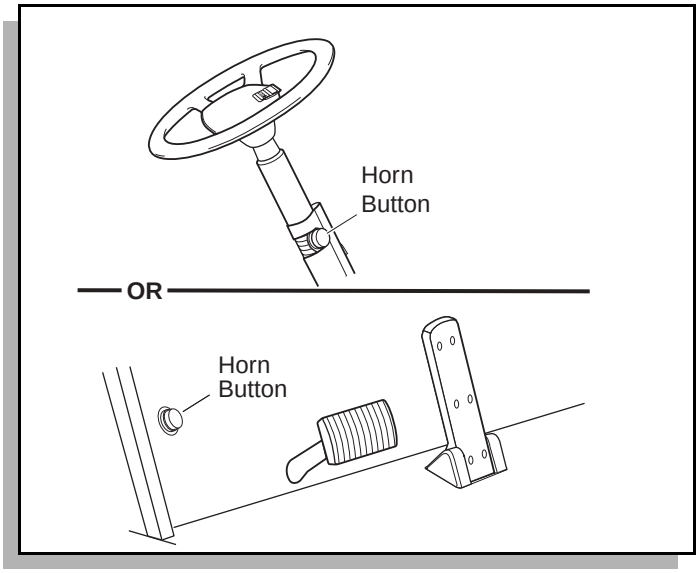


Fig. 8 Horn Button

State of Charge Meter

Located in the dash, the state of charge meter indicates the amount of usable power in the batteries (Ref. Fig. 5 on page 3).

Run - Tow/Maintenance Switch (on PDS vehicles only)

The PDS vehicle is equipped with a two position switch located under the passenger side of the rear seat (Ref Fig. 9 on page 4).

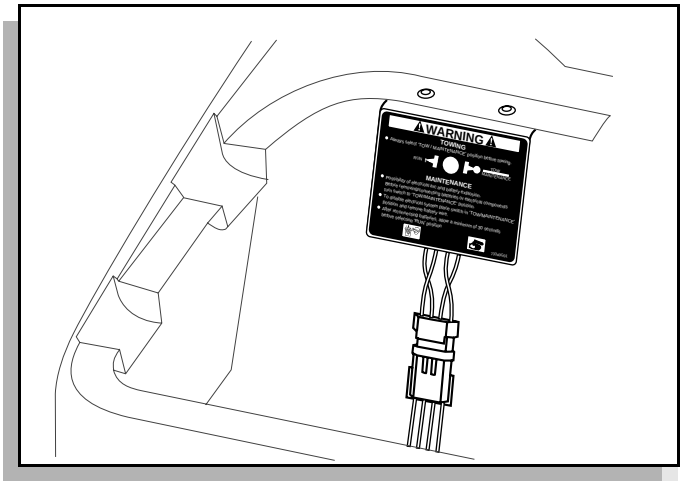


Fig. 9 Run-Tow/Maintenance Switch

With the switch in 'TOW/MAINTENANCE' position:

- the controller is deactivated
- the electronic braking system is deactivated which allows the vehicle to be towed or roll freely
- the warning beeper is deactivated

With the switch in 'RUN' position:

- the controller is activated
- the electronic braking system and warning beeper features are activated

NOTE *PDS vehicles operate only in the 'RUN' position.*

If all of the following events occur with the switch in 'RUN' position:

a) the vehicle has been stopped for more than 1.5 seconds
b) the accelerator pedal has been released for more than one second
c) the vehicle begins to roll above 2 mph (3 kph)

the electronic braking will limit speed to approximately 2 mph (3 kph) and the warning beeper will sound. When the accelerator pedal is depressed, the electronic braking and warning beeper will be overridden and normal vehicle operation resumes. Any unusual situation sensed by the PDS system will cause a similar response. The system functions in all key switch positions.

⚠ WARNING ⚠ ***To prevent the possibility of loss of control that could cause severe injury or death, use service brake to control speed. The PDS system is not a substitute for the service brake.***

If all of the following events occur with the switch in 'RUN' position:

a) the vehicle is being driven down a slope
b) the vehicle speed exceeds the designed speed with the accelerator pedal depressed **or** released

the electronic braking will limit the speed of the vehicle to the designed speed range (the warning beeper will **not** sound). When the electronic braking system is activated by this sequence of events, the motor generates power which is returned to the batteries. PDS models are equipped with a regenerative motor control system.

If the operator attempts to override the electronic braking feature by moving the direction selector or key switch to another position, the warning beeper will sound and the vehicle will brake **rapidly** until it reaches the speed of approximately 2 mph (3 kph).

The PDS is a low power consumption unit but it will drain the vehicle batteries over a period of time if not recharged. If the vehicle is to be stored for a prolonged period of time, the PDS should be disconnected from the batteries by selecting the 'TOW/MAINTENANCE' position on the Run-Tow/Maintenance switch located under the rear passenger seat.

Controller Diagnostics (PDS vehicles only)

In the unlikely event of a speed sensor failure, a welded solenoid or low battery voltage, the PDS controller will default to a mode that will permit the vehicle to operate, but at a very reduced speed.

This feature allows the vehicle to be driven back to its storage facility where the problem can be diagnosed.

The controller will report the failure mode.

BEFORE ENTERING VEHICLE

1. Check for correct tire inflation.
2. Inspect for fluid leaks.
3. Be sure everything is properly stored and secured.
4. Check to see that the Run-Tow/Maintenance switch is in the 'RUN' position on PDS model vehicles.

Some vehicles may be equipped with an interlock system that disables the controller and prevents the vehicle from being operated while the charger is connected. The interlock functions even if the DC plug is not fully connected in the vehicle receptacle. Remove charger plug from vehicle receptacle and properly store cable prior to moving vehicle.

OPERATING THE VEHICLE

CAUTION **Improper use of the vehicle or the lack of proper maintenance may result in decreased performance or damage to the vehicle.**

Read and understand the following warnings before attempting to operate the vehicle:

⚠ WARNING ⚠ ***To reduce the possibility of severe injury or death resulting from loss of vehicle control, the following warnings must be observed:***

Drive the vehicle only as fast as terrain and safety considerations allow. Consider the terrain, traffic conditions and the environmental factors which effect the terrain and the ability to control the vehicle.

Use extra care and reduced speed when driving on poor surfaces, such as loose dirt, wet grass, gravel, etc.

Avoid extremely rough terrain.

Avoid driving fast down hill. A sudden stop or change of direction may result in loss of control. Use service brake to control speed when traveling down an incline.

To prevent loss of control, do not move the direction selector of a PDS vehicle while the vehicle is in motion. Moving the selector will result in a sudden slowing of the vehicle and the beeping of a warning device.

Slow down before and during turns. All turns should be executed at reduced speed.

All travel should be directly up or down hills.

Use extra care when driving the vehicle across any incline.

⚠ WARNING ⚠ ***Stay in designated areas and avoid steep slopes. To reduce the possibility of severe injury or death resulting from improper vehicle operation, the following warnings must be observed:***

Refer to GENERAL SPECIFICATIONS for seating capacity.

Depressing accelerator pedal will release foot operated park brake and may cause inadvertent vehicle movement. Turn the key to the 'OFF' position whenever the vehicle is parked.

Make sure that the direction selector is in correct position before attempting to start the vehicle.

Do not take vehicle out of 'gear' while in motion (coast).

Check the area behind the vehicle before operating in reverse.

Always bring the vehicle to a complete stop before shifting the direction selector.

Always remain seated and hold on while the vehicle is in motion. Keep feet, legs, hands and arms inside the vehicle at all times.

To prevent inadvertent movement when the vehicle is to be left unattended, engage the parking brake, move direction selector to neutral position, turn key to 'OFF' position and remove key.

Additional Warnings and Cautions (applicable to PDS vehicles)

⚠ WARNING ⚠ ***To prevent loss of control, do not move PDS vehicle direction selector while the vehicle is in motion. Moving the selector will result in a sudden slowing of the vehicle and the beeping of a warning device.***

Permitting the vehicle to coast down an incline at speeds in excess of 2 mph (3 kph) with the accelerator pedal released after bringing the vehicle to a complete stop will cause an electronic braking force to be applied and a beeping from the warning device. Depressing the accelerator pedal will return control to the operator and deactivate the warning beeper.

CAUTION **Before attempting to tow vehicle, move the Run-Tow/Maintenance switch to the 'Tow/Maintenance' position. Failure to do so will damage the controller or motor.**

Before disconnecting or connecting a battery, or any other wiring, move the Run-Tow/Maintenance switch to the 'Tow/Maintenance' position.

After connecting a battery, or any other wiring, wait a minimum of 30 seconds before moving the Run-Tow/Maintenance switch to the 'Run' position.

STARTING VEHICLE ON A HILL

General

There are two parking brakes available on this series of vehicles, the foot operated pedal and the hand operated handle. The foot pedal will release when the accelerator is depressed to start the motor. The hand operated park brake must be released by hand. The hand operated park brake must be **fully** released, in the lowest position possible, in order for the motor to start.

PDS Vehicle

To start the PDS vehicle on a hill: With the left foot, apply the service brake. Turn the key to the 'ON' position. Move the direction selector to the direction desired. **Fully release** the hand operated parking brake. With the right foot, depress the accelerator pedal to start the motor and release the service brake as the vehicle starts to move.

⚠ WARNING ⚠ ***Unless the hand operated parking brake is fully released, the motor will not start. The vehicle may roll slowly and an audible alarm will beep indicating that vehicle is in 'walk away' condition.***

Bringing vehicle to a complete stop, releasing accelerator and again depressing accelerator will return vehicle to normal operation.

NOTE *When the direction selector is in the reverse position, a warning signal will sound. This is a device to indicate the vehicle is ready to run in reverse.*

The motor stops when the accelerator pedal is released. To stop the vehicle more quickly, depress the service brake pedal.

Non PDS Vehicle (with hand operated park brake)

CAUTION **Do not hold vehicle on hill by using accelerator and motor. Leaving motor in a stalled condition for more than 3-4 seconds will cause permanent damage to motor.**

When starting the electric vehicle on a hill, it is important to follow the procedure below to prevent excessive roll-back or permanent damage to the motor. Do not hold vehicle on hill by using accelerator and motor. Leaving motor in a stalled condition for more than 3 - 4 seconds will raise the commutator bars resulting in unacceptable noise and accelerated brush wear and cause permanent damage to motor.

To start the electric vehicle on a hill: Place left foot on the service brake. Place the key in the key switch, and turn the key to the 'ON' position. Move the direction selector to the direction desired. Place right foot on accelerator. **Fully** release park brake. Depress the accelerator pedal to start the motor and release the service brake as the vehicle starts to move.

Non PDS Vehicle (with foot operated park brake)

CAUTION **Do not hold vehicle on hill by using accelerator and motor. Leaving motor in a stalled condition for more than 3-4 seconds will cause permanent damage to motor.**

When starting the electric vehicle on a hill, it is important to follow the procedure below to prevent excessive roll-back or permanent damage to the motor. Do not hold vehicle on hill by using accelerator and motor. Leaving motor in a stalled condition for more than 3 - 4 seconds will raise the commutator bars resulting in unacceptable noise and accelerated brush wear and cause permanent damage to motor.

To start the electric vehicle on a hill: Place left foot on the service brake. Place the key in the key switch, and turn the key to the 'ON' position. Move the direction selector to the direction desired. Place right foot on accelerator. Release park brake by applying the accelerator pedal to start the motor. Release the service brake as the vehicle starts to move.

Anti-Stall Feature (PDS Vehicle)

⚠ WARNING ⚠ ***To prevent possible injury or vehicle damage, never walk or stand behind a vehicle stopped on a hill. Always maintain adequate clearance between cars in front and behind your vehicle.***

PDS vehicles incorporate an anti-stall feature to protect the motor from damage. If the controller senses that the accelerator pedal is depressed (power applied to motor) and the motor is stalled long enough to cause motor damage, it will momentarily interrupt power to the motor. This brief interruption will permit the car to roll backwards slightly before again stopping in the stalled condition. This process will repeat itself periodically until the car is moved from the stalled condition.

If the brake is engaged while the accelerator is depressed, the controller will sense a stalled motor condition and remove power from the motor. When the brake pedal is released, the car will roll backwards slightly before power is returned to the motor.

COASTING

Vehicle with PDS

The PDS controls the top speed of the vehicle while moving down hill. Therefore, overspeed coasting does not occur with PDS model vehicles. The PDS is not a substitute for the service brake which should be used to control the speed of the vehicle.

NOTE *Some PDS models are equipped with a feature (compression braking) which slows the vehicle's speed when the accelerator pedal is released.*

When the accelerator pedal is released, a braking force is applied to the motor (compression braking) which simulates the engine compression braking of an internal combustion engine.

Vehicle without PDS

⚠ WARNING ⚠ ***To prevent injury or death resulting from coasting at above recommended speeds, limit speed with service brake.***

On steep hills, it is possible for non-PDS vehicles to coast at faster than normal speeds that may be encountered on a flat surface. To prevent loss of vehicle control, speeds should be limited to no more than the maximum speed on level ground (see GENERAL SPECIFICATIONS). Limit speed by releasing the accelerator and applying service brake. Severe damage to the drive train components due to excessive speed may result from driving the vehicle above specified speed. Damage caused by excessive speed may cause a loss of control, is costly, is considered abuse and will not be covered under warranty.

SERVICING THE ELECTRIC VEHICLE

⚠ WARNING ⚠ ***To prevent severe injury or death, resulting from improper servicing techniques, observe the following Warnings:***

Do not attempt any type of servicing operations before reading and understanding all notes, cautions and warnings in this manual.

Any servicing requiring adjustments to be made to the powertrain while the motor is running must be made with both drive wheels raised.

Wear eye protection when working on the vehicle. In particular, use care when working around batteries, or using solvents or compressed air.

To reduce the possibility of causing an electrical arc, which could result in a battery explosion, turn off all electrical loads from the batteries before removing any heavy gauge battery wires.

To prevent the possibility of motor disintegration, never operate vehicle at full throttle for more than 4 - 5 seconds while vehicle is in a 'no load' condition.

It is in the best interest of both vehicle owner and servicing dealer to carefully follow the procedures recommended in this manual. Adequate preventative maintenance applied at regular intervals is the best guarantee for keeping the vehicle both dependable and economical.

CAUTION **Before any electrical service is performed on PDS model vehicles, the 'Run-Tow/Maintenance' switch be placed in the 'Tow/Maintenance' position.**

If a power wire (battery, motor or controller) is disconnected for any reason on the PDS model vehicle, the 'Run-Tow/Maintenance' switch must be left in the 'Tow/Maintenance' position for at least 30 seconds after the circuit is restored.

DIRECTION SELECTOR ADJUSTMENT

To ensure forward and reverse will fully engage when selected with the handle, adjust handle linkage at trunnion. Ensure handle travel is permitting the direction selector mechanism to fully engage both forward and reverse (Ref. Fig. 10 on page 8). To adjust the trunnion, remove the cotter pin from the trunnion and screw the trunnion up or down the connecting rod as needed to achieve full engagement of both forward and reverse.

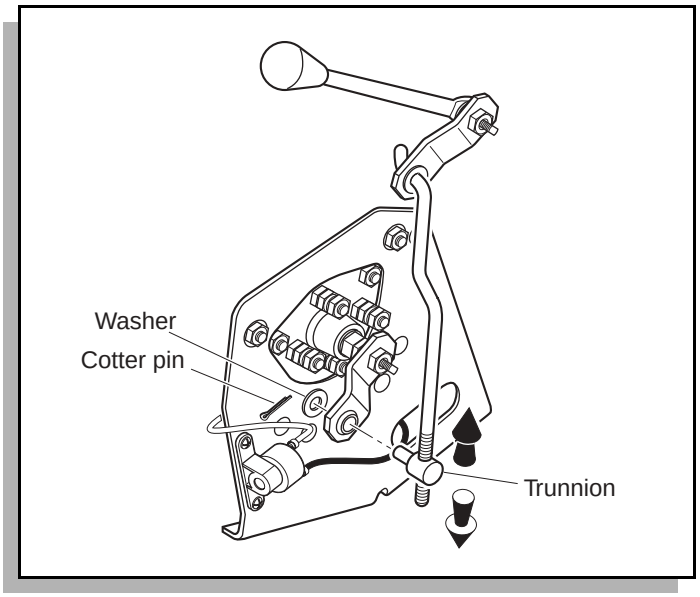


Fig. 10 Direction Selector Adjustment

TOWING

Tow bars are available from the E-Z-GO Service Parts Department.

CAUTION **For non-PDS vehicles, place direction selector in neutral position prior to towing to prevent possible damage to electric motor. Release park brake.**

For PDS vehicles, place Run-Tow/Maintenance switch in 'Tow/Maintenance' position prior to towing to prevent damage to electric motor and controller.

PDS model vehicles are equipped with a 'Run-Tow/Maintenance' switch located underneath the seat on the passenger side. The 'Tow/Maintenance' position allows the vehicle to roll freely without activating the warning beeper and eliminating potential damage to controller or motor (Ref Fig. 9 on page 4). Check to see that vehicles to be towed are switched to the 'Tow/Maintenance' position.

⚠ WARNING ⚠ ***To prevent personal injury or death, do not ride on vehicle being towed.***

Do not attempt to tow the vehicle with ropes, chains or any device other than a factory approved tow bar. Towing a disabled vehicle can be dangerous and requires extra caution. Attempting to tow with devices other than an approved tow bar may result in severe personal injury or death.

CAUTION **Use extra caution when towing vehicle. Do not tow in excess of 12 mph (19 kph). Towing vehicle at above recommended speed may result in damage to vehicle and other property.**

Tow bars are not intended for road use.

Tow bars are designed to tow only one vehicle at a maximum speed of 12 mph (19 kph). Tow bars are not intended for highway use. Before towing, place direction selector in neutral. Do not ride on vehicle being towed.

LIFTING THE VEHICLE

Tool List	**Qty. Required**
Floor jack	1
Jack stands	4
Chocks	4

Some servicing operations may require the front wheels, the rear wheels or the entire vehicle be lifted.

⚠ WARNING ⚠ ***To prevent possible injury or death resulting from a vehicle falling from a jack, be sure the vehicle is on a firm and level surface. Never get under a vehicle while it is supported by a jack. Use jack stands and test the stability of the vehicle on the stands. Always place chocks in front and behind the wheels not being raised. Use extreme care since the vehicle is extremely unstable during the lifting process.***

CAUTION **When lifting vehicle, position jacks and jack stands only on the areas indicated.**

To raise the entire vehicle, install chocks in front and behind each front wheel (Ref Fig. 11 on page 9). Center the jack under the rear frame crossmember. Raise the vehicle and locate a jack stand under the outer ends of the rear axle.

Lower the jack and test the stability of the vehicle on the two jack stands.

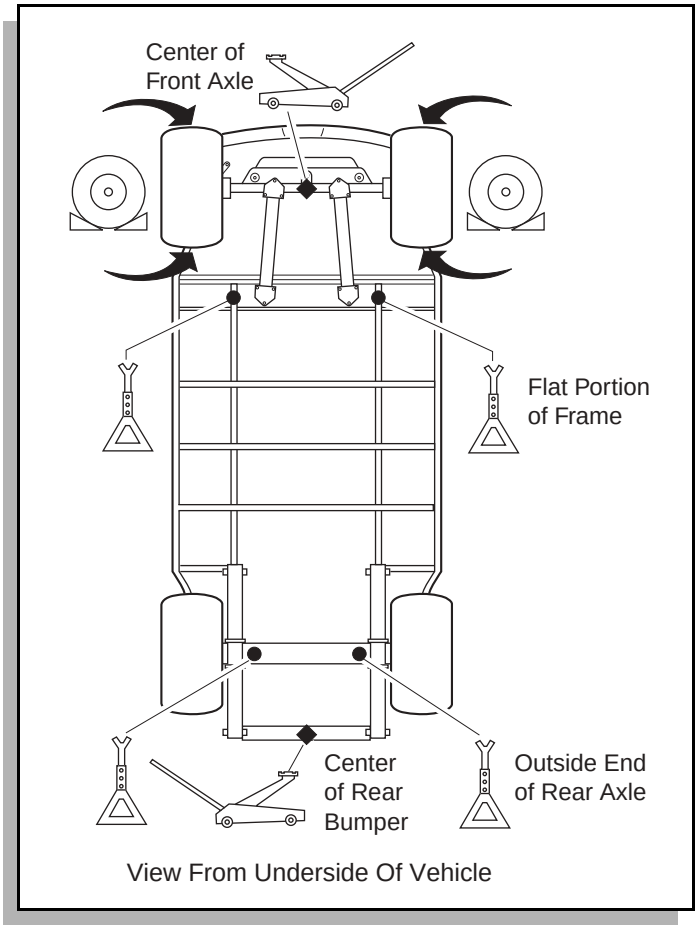


Fig. 11 Lifting the Vehicle

Place the jack at the center of the front axle. Raise the vehicle and position jack stands under the inner frame member as indicated.

Lower the jack and test the stability of the vehicle on all four jack stands.

If only the front or rear of the vehicle is to be raised, place the chocks in front and behind each wheel not being raised in order to stabilize the vehicle.

Lower the vehicle by reversing the lifting sequence.

ROUTINE MAINTENANCE

This vehicle will give years of satisfactory service, providing it receives regular maintenance. Refer to the Periodic Service Schedule for appropriate service intervals (Ref. Fig. 17 on page 14). Refer to Lubrication Points for appropriate lubrication locations (Ref Fig. 12 on page 9).

NOTE *Some maintenance items must be serviced more frequently on vehicles used under severe driving conditions.*

CAUTION **Use maximum of three pumps of grease for each grease fitting - Over greasing may damage grease seals.**

Putting more than three pumps of grease in a grease fitting could damage grease seals and cause premature bearing failure.

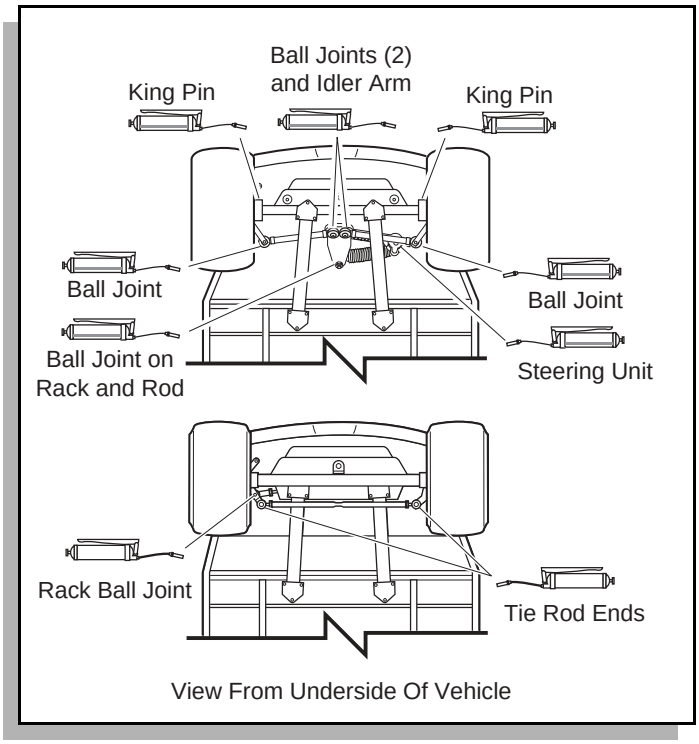


Fig. 12 Lubrication Points

REAR AXLE

The only maintenance required for the first five years is the periodic inspection of the lubricant level. The rear axle is provided with a lubricant level check/fill plug located on the bottom of the differential. Unless leakage is evident, the lubricant need only be replaced after five years.

Checking the Lubricant Level

With the vehicle on level ground, clean the area around the check/fill plug and remove plug. The correct lubricant level is just below the bottom of the threaded hole. If lubricant is low, add as required. Add lubricant slowly until lubricant starts to seep from the hole. Install the check/fill plug. In the event that the lubricant is to be replaced, the vehicle must be elevated and the oil pan removed or the oil siphoned out through the check/fill hole (Ref Fig. 13 on page 10).

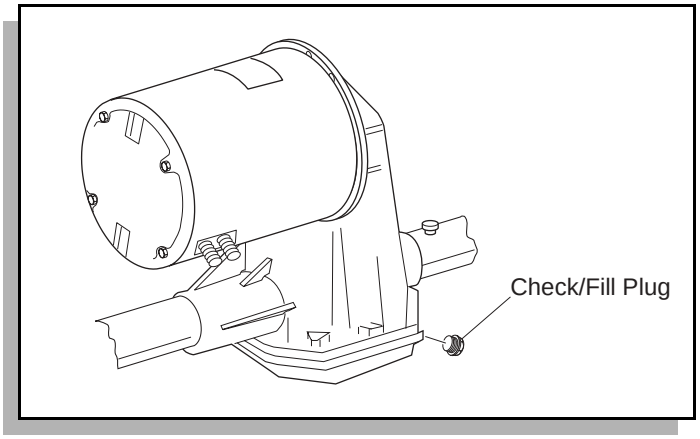


Fig. 13 Add, Check and Drain Rear Axle Lubricant

BRAKES

It is important to periodically check and maintain proper fluid levels in the brake master cylinder. The fill cap for the cylinder is located under the front seat. When checking the fluid, wipe off any dirt from the fill cap before removing it to prevent contamination. Fluid level should be maintained at 1/8" (3 mm) below the top of the housing. If fluid must be added, inspect system for fluid leaks. Perform the daily brake test following procedure indicated.

Daily Brake Test

After the vehicle has been put into service, it is recommended that the brakes be checked daily by performing the following test:

⚠ WARNING ⚠ ***To prevent severe injury or death resulting from operating a vehicle with improperly operating brake system, the braking system must be properly maintained. All driving brake tests must be done in a safe location with regard for the safety of all personnel.***

Depress the brake pedal. The pedal should have some free travel and then become hard. A brake pedal that has no free travel, excessive free travel or a spongy feel indicates that a brake inspection is required. A brake pedal that falls after it is applied indicates a leak in the master or wheel cylinders. Check for adequate brake fluid level. Adjust brakes if required and inspect system for fluid leaks.

PDS MODEL VEHICLES

Test the PDS system at regular intervals by allowing the vehicle to roll down an incline with the accelerator pedal released. Braking force should be felt at approximately 2 mph (3 kph) indicating that the PDS system is functioning. If vehicle speed continues to rise, apply the service brake and have vehicle inspected by a trained mechanic.

TIRES

Tools List	Qty. Required
Lug wrench, 3/4"	1
Impact wrench, 1/2" drive	1
Impact socket, 3/4", 1/2" drive	1
Torque wrench, 1/2" drive, ft. lbs.	1

Tire condition should be inspected per the Periodic Service Schedule (Ref. Fig. 17 on page 14). Inflation pressures should be checked when the tires are cool.

⚠ WARNING ⚠ ***A tire explosion can cause severe injury or death. Never exceed inflation pressure rating on tire sidewall.***

To prevent tire explosion, pressurize tire with small amount of air applied intermittently to seat beads. Never exceed the tire manufacturer's recommendation when seating a bead. Protect face and eyes from escaping air when removing valve core.

To prevent injury caused by a broken socket, use only sockets designed for impact wrench use. Never use a conventional socket.

Use caution when inflating tires. Due to the low volume of these small tires, overinflation can occur in a matter of seconds. Overinflation could cause the tire to separate from the wheel or cause the tire to explode, either of which could cause personal injury.

Use caution when inflating tires. Due to the low volume of these small tires, overinflation can occur in a matter of seconds. Overinflation could cause the tire to separate from the wheel or cause the tire to explode, either of which could cause personal injury.

Tire inflation should be determined by the condition of the terrain. See GENERAL SPECIFICATIONS section for recommended tire inflation pressure. For outdoor applications with major use on grassy areas, the following should be considered. On hard turf, it is desirable to have a **slightly** higher inflation pressure. On very soft turf, a

lower pressure prevents tires from cutting into the turf. For vehicles being used on paved or hard surfaces, tire inflation pressure should be in the higher allowable range, but under no condition should inflation pressure be higher than recommended on tire sidewall. **All four tires** should have the same pressure for optimum handling characteristics. Be careful not to overinflate. Due to the low volume of these small tires, overinflation can occur in a matter of seconds. Be sure to install the valve dust cap after checking or inflating.

Tire Repair

The vehicle is fitted with low pressure tubeless tires mounted on one piece rims.

Generally, the most cost effective way to repair a flat tire resulting from a puncture in the tread portion of the tire is to use a commercial tire plug.

NOTE *Tire plug tools and plugs are available at most automotive parts outlets and have the advantage of not requiring the tire be removed from the wheel.*

If the tire is flat, remove the wheel and inflate the tire to the maximum recommended pressure for the tire. Immerse the tire in water to locate the leak and mark with chalk. Insert tire plug in accordance with manufacturer's specifications.

If the tire is to be removed or mounted, the tire changing machine manufacturer's recommendations must be followed in order to minimize the possibility of personal injury.

⚠ WARNING ⚠ ***To prevent injury, be sure mounting/demounting machine is anchored to floor. Wear OSHA approved safety equipment when mounting/demounting tires.***

Follow all instructions and safety warnings provided by the mounting/demounting machine manufacturer.

Wheel Installation

With the valve stem to the outside, mount the wheel onto the hub with lug nuts. Finger tighten lug nuts in a 'cross sequence' pattern (Ref Fig. 14 on page 11). Then, tighten lug nuts to 50 - 85 ft. lbs. (70 - 115 Nm) torque in 20 ft. lbs. (30 Nm) increments following the same 'cross sequence' pattern.

NOTE *It is important to follow the 'cross sequence' pattern when installing lug nuts. This will assure even seating of the wheel against the hub.*

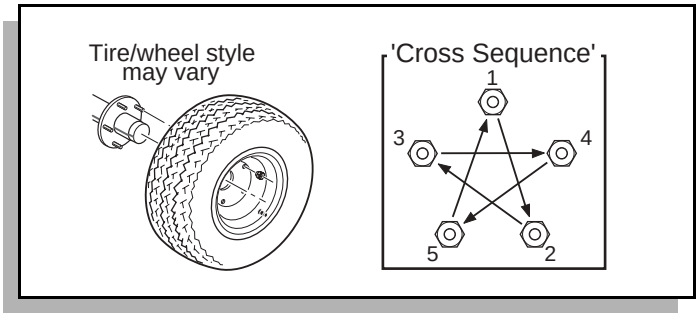


Fig. 14 Wheel Installation

⚠ WARNING ⚠ ***To prevent injury caused by a broken socket, use only sockets designed for impact wrench use.***

Tire condition should be inspected on a daily basis. Inflation pressures should be checked on a weekly basis when the tires are cool. When removing wheels with an impact wrench, use only impact sockets. Regular sockets are not designed for impact pressures exerted by power tools.

CAUTION **Do not tighten lug nuts to more than 85 ft. lbs. (115 Nm) torque.**

LIGHT BULB REPLACEMENT

CAUTION **To prevent premature bulb failure, do not touch new bulbs with bare fingers. Use a clean, dry tissue or paper towel to handle the glass portion of the bulb.**

Always hold bulbs with a clean, dry tissue or paper towel. Natural oils from fingers will cause halogen bulbs to fail prematurely.

Determine which bulb needs to be replaced. Reach underneath light bar to access bulb from rear. Turn the bulb socket a quarter turn counterclockwise to unlock and pull out bulb. Insert new bulb and rotate quarter turn clockwise to secure.

To replace the taillight bulb, remove hardware securing lens and remove lens. Install replacement bulb and reinstall lens.

CARE AND CLEANING OF THE VEHICLE

CAUTION **To prevent cosmetic damage, do not use any abrasive or reactive solvents to clean plastic parts.**

It is important that proper techniques and cleaning materials be used.

Normal cleaning of vinyl seats and plastic or rubber trim requires the use of a mild soap solution applied with a sponge or soft brush and wiping with a damp cloth.

Removal of oil, tar, asphalt, shoe polish, etc. will require the use of a commercially available vinyl/rubber cleaner.

The painted surfaces of the vehicle provide attractive appearance and durable protection. Frequent washing with lukewarm or cold water is the best method of preserving the painted surfaces.

Do not use hot water, strong soap or harsh chemical detergents.

Rubber parts should be cleaned with non-abrasive household cleaner.

Occasional cleaning and waxing with non-abrasive products designed for 'clear coat' automotive finishes will enhance the appearance and durability of the painted surfaces.

Corrosive materials used as fertilizers or for dust control can collect on the underbody of the vehicle. These materials could cause corrosion of underbody parts. It is recommended that the underbody be flushed occasionally with plain water. Thoroughly clean any areas where mud or other debris can collect. Sediment packed in closed areas should be loosened to ease removal, taking care not to chip or otherwise damage paint.

VEHICLE CARE PRODUCTS

To help maintain the vehicle there are several products available through local Distributors, authorized Branches or the E-Z-GO Service Parts Department.

- Touch-up paint specially formulated to match vehicle colors for use on both metal and TPE (plastic) bodies. (P/N 28140-G** and 28432-G**)
- Multi-purpose Battery Protectant formulated to form a long-term, flexible, non-tacky, dry coating that will not crack, peel or flake over a wide temperature range. (P/N 75500-G01)
- White Lithium Grease designed to provide lubrication protection in areas where staining or discoloring is a problem, or in areas of extreme temperature ranges. (P/N 75502-G01)
- Penetrant/Lubricant, a 4-in-1 product that penetrates the most stubborn of frozen parts, lubricates leaving a light lubricating film, prevents corrosion by adhering to wet or dry surfaces and displaces moisture, sealing against future moisture return. (P/N 75503-G01)
- Multi-purpose Cleaner and Degreaser that contains natural, environmentally safe solvents. (P/N 75504-G01)
- Multi-purpose Hand Cleaner is an industrial strength cleaner containing no harsh solvents, yet gently lifts grease off hands. May be used with or without water. (P/N 75505-G01)
- Battery Cleaner that promotes easy, non-violent neutralization of battery acids and battery acid crystals. The resulting sodium salts are water soluble and easily washed away. (P/N 75506-G01)
- Battery Maintenance Kit for complete battery cleaning and watering, with battery maintenance instructions. (P/N 25587-G01)
- Biodegradable Cleaner that cleans the toughest dirt and heavy soils by breaking down grease to be easily wiped or rinsed away. (P/N 75507-G01)
- Multi-purpose Value Pack sampler package including 4 ounce (118 ml) aerosol cans of Battery Protector, Penetrant/Lubricant, White Lithium Grease, and Carburetor and Choke Cleaner. (P/N 75508-G01)
- Plexus plastic cleaner and polish removes minor scratches from windshield. (P/N 28433-G**)

TOP AND WINDSHIELD

⚠ WARNING ⚠ ***The top does not provide protection from roll over or falling objects.***

The windshield does not provide protection from tree limbs or flying objects.

The top and windshield are designed for weather protection only.

Clean with lots of water and a clean cloth. Minor scratches may be removed using a commercial plastic polish or Plexus plastic cleaner available from the E-Z-GO Service Parts Department.

TRAILERING

⚠ WARNING ⚠ ***To prevent personal injury to occupants of other highway vehicles, be sure that the vehicle and contents are adequately secured to trailer.***

Do not ride on vehicle being trailered.

Remove windshield before trailering.

Maximum speed with top is 50 mph (80 kph).

If the vehicle is to be transported on a trailer at highway speeds, the windshield and top must be removed and the seat bottoms secured. Always check that the vehicle and contents are adequately secured before trailering the vehicle. The rated capacity of the trailer must exceed the weight of the vehicle and load plus 1000 pounds (see GENERAL SPECIFICATION section for vehicle weight). Lock the parking brake and secure the vehicle to the trailer using ratchet tie downs.

HARDWARE

Periodically, the vehicle should be inspected for loose fasteners. Fasteners should be tightened in accordance with the Torque Specifications table (Ref Fig. 16 on page 13).

Use care when tightening fasteners and refer to the Technician's Repair and Service Manual for specific torque values.

In general, two grades of hardware are used in the vehicle. Grade 5 hardware can be identified by the three marks on the hexagonal head. Unmarked hardware is Grade 2 (Ref Fig. 15 on page 13).

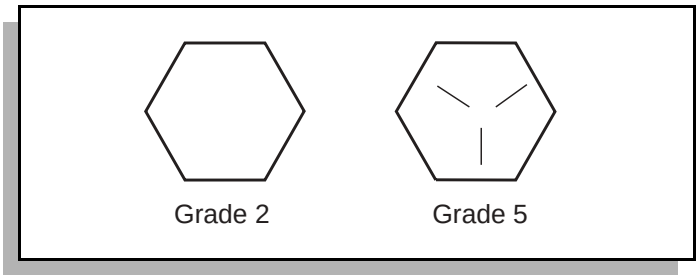


Fig. 15 Bolt Grades

TORQUE SPECIFICATIONS

ALL TORQUE FIGURES ARE IN FT. LBS. (Nm)
Unless otherwise noted in text, tighten all hardware in accordance with this chart.
The table below specifies 'lubricated' torque figures. Fasteners that are plated or lubricated when installed are considered 'wet' and require approximately 80% of the torque required for 'dry' fasteners.

BOLT SIZE	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"
Grade 2	4 (5)	8 (11)	15 (20)	24 (33)	35 (47)	55 (75)	75 (102)	130 (176)	125 (169)	190 (258)
Grade 5	6 (8)	13 (18)	23 (31)	35 (47)	55 (75)	80 (108)	110 (149)	200 (271)	320 (434)	480 (651)

Fig. 16 Torque Specifications

Read all of manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notes, Cautions and Warnings

PERIODIC SERVICE SCHEDULE

✓ Check ♦ Clean, Adjust, etc. ▲ Replace

NOTE: *Some maintenance items must be serviced more frequently on vehicles used under severe driving conditions*

DAILY	
BODY	♦ Clean body components as required
SERVICE BRAKE	✓ Check brake performance, smooth operation and adjust if required
PARKING BRAKE	✓ Check brake performance and adjust if required
REVERSE WARNING DEVICE	✓ Check operation when direction selector is in reverse
TIRES	✓ Examine for cuts, excessive wear and pressure (See GENERAL SPECIFICATIONS)
WHEELS	✓ Check for bent rims, missing or loose lug nuts
BATTERIES	♦ Recharge to full charge state after each day's use
CHARGER / RECEPTACLE	✓ Inspect connector system at each charge
MONTHLY - 20 HOURS (includes items listed in previous table & the following)	
BATTERIES	♦ Clean battery & terminals with 1/4 cup (60 ml) baking soda to 1 1/2 gallons (6 liters) water solution, rinse with clear water ✓ Check charge condition and all connections
HYDRAULIC BRAKE FLUID	✓ Check level, add if required and check for leakage (DOT 3)
WIRING	✓ Check all wiring for loose connections and broken/missing insulation
ACCELERATOR	✓ Check for smooth movement
CHARGER / RECEPTACLE	♦ Clean connections, keep receptacles free of dirt and foreign matter
DIRECTION SELECTOR	✓ Check attachment, tighten as required
STEERING ASSEMBLY	✓ Check for abnormal play, tightness of all hardware
TIE RODS/LINKAGES	✓ Check for excessive play, bent components or loose connections
REAR AXLE	✓ Check for leakage, add SAE 30 oil as required
PDS CONTROLLER	✓ Check PDS Controller braking force (See PDS MODEL VEHICLES in text)
QUARTERLY - 50 HOURS (includes items listed in previous tables & the following)	
FRONT AXLE	✓ Check for damage to axle and loose or missing hardware
FRONT SHOCK ABSORBERS	✓ Check for oil leakage and loose fasteners
FRONT SPRINGS	✓ Check for loose hardware, cracks at attachments
FRONT WHEEL ALIGNMENT	✓ Check for unusual tire wear, align if required
PARKING BRAKE	✓ Check for damage or wear ♦ Lubricate, use light oil. DO NOT LUBRICATE CABLES
REAR SHOCK ABSORBERS	✓ Check for oil leakage, loose mounting hardware

Fig. 17 Periodic Service Schedule

SEMI-ANNUAL - 125 HOURS (includes items listed in previous tables & the following)	
DIRECTION SELECTOR	✓ Check for wear and smooth movement (lubricate shaft with light oil if required)
KING PINS	✓ Check for excessive play and tightness of retaining nuts ♦ Lubricate if equipped with grease fitting with wheel bearing grease
STEERING ASSEMBLY	♦ Lubricate linkage, use wheel bearing grease ✓ Check bellows and pinion seal for damage or grease leakage
TIE RODS/LINKAGES	♦ Lubricate, use wheel bearing grease
REAR AXLE	✓ Check for unusual noise and mounting hardware
SERVICE BRAKES	♦ Clean and adjust, see Technician's Repair and Service Manual ✓ Check brake shoe linings, see Technician's Repair and Service Manual
ANNUAL - 250-300 HOURS (includes items listed in previous tables & the following)	
FRONT WHEEL BEARINGS	♦ Adjust, see Technician's Repair and Service Manual ♦ Pack, use wheel bearing grease
REAR AXLE	✓ Check lubricant, add lubricant (SAE 30 oil) as required ▲ Replace lubricant after 5 years

Fig. 17 Periodic Service Schedule

Read all of manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notes, Cautions and Warnings

BATTERIES AND CHARGING

Safety

Always observe the following warnings when working on or near batteries:

⚠ WARNING ⚠ ***To prevent battery explosion that could result in severe personal injury or death, keep all smoking materials, open flame or sparks away from the batteries.***

Hydrogen gas is formed when charging batteries. Do not charge batteries without adequate ventilation. A 4% concentration of hydrogen gas is explosive.

Be sure that the key switch is off and all electrical accessories are turned off before starting work on vehicle.

Never disconnect a circuit under load at a battery terminal.

Batteries are heavy. Use proper lifting techniques when moving them. Always lift the battery with a commercially available battery lifting device. Use care not to tip batteries when removing or installing them; spilled electrolyte can cause burns and damage.

The electrolyte in a storage battery is an acid solution which can cause severe burns to the skin and eyes. Treat all electrolyte spills to the body and eyes with extended flushing with clear water. Contact a physician immediately.

Always wear a safety shield or approved safety goggles when adding water or charging batteries.

Any electrolyte spills should be neutralized with a solution of 1/4 cup (60 ml) sodium bicarbonate (baking soda) dissolved in 1 1/2 gallons (6 liters) of water and flushed with water.

Overfilling batteries may result in electrolyte being expelled from the battery during the charge cycle. Expelled electrolyte may cause damage to the vehicle and storage facility.

Aerosol containers of battery terminal protectant must be used with extreme care. Insulate metal container to prevent can from contacting battery terminals which could result in an explosion.

Wrap wrenches with vinyl tape to prevent the possibility of a dropped wrench from 'shorting out' a battery, which could result in an explosion and severe personal injury or death.

BATTERY

A battery is defined as two dissimilar metals immersed in an acid. If the acid is absent or if the metals are not dissimilar, a battery has not been created. The batteries most commonly used in these vehicles are lead acid.

A battery does not store electricity, but is able to produce electricity as the result of a chemical reaction which releases stored chemical energy in the form of electrical energy. The chemical reaction takes place faster in warm conditions and slower in cold conditions. Temperature is important when conducting tests on a battery and test results must be corrected to compensate for temperature differences.

As a battery ages, it still performs adequately except that its **capacity** is diminished. Capacity describes the time that a battery can continue to provide its design amperes from a full charge.

A battery has a maximum life, therefore good maintenance is designed to maximize the **available** life and reduce the factors that can reduce the life of the battery.

BATTERY MAINTENANCE

Tool List	**Qty. Required**
Insulated wrench, 9/16"	1
Battery carrier	1
Hydrometer	1
Battery maintenance kit P/N 25587-G01	1

At Each Charging Cycle

⚠ WARNING ⚠ ***To reduce the possibility of fire, never attach a battery charger to a vehicle that is to be unattended beyond the normal charging cycle. Overcharging could cause damage to the vehicle batteries and result in extreme overheating. The charger should be checked after 24 hours and unplugged after the charge cycle is complete.***

Before charging the batteries, inspect the plug of the battery charger and vehicle receptacle housing for dirt or debris.

Charge the batteries after each days use.

Monthly

- Inspect all wiring for fraying, loose terminations, corrosion or deterioration of insulation.
- Check that the electrolyte level is correct and add suitable water as required.
- Clean the batteries and wire terminations.

Electrolyte Level and Water

The correct level of the electrolyte is 1/2" (13 mm) above the plates in each cell (Ref Fig. 18 on page 17).

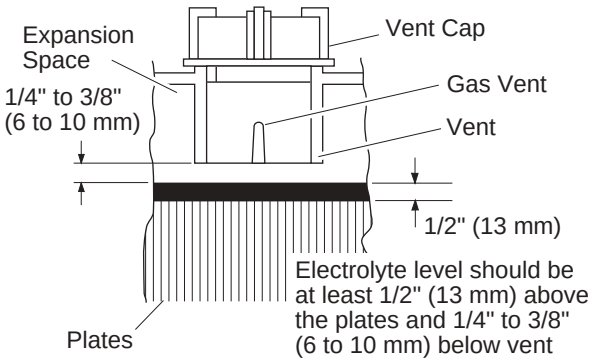


Fig. 18 Correct Electrolyte Level

This level will leave approximately 1/4" - 3/8" (6 - 10 mm) of space between the electrolyte and the vent tube. The electrolyte level is important since **any portion** of the plates exposed to air will be ruined beyond repair. Of equal importance is too much water which will result in electrolyte being forced out of the battery due to gassing and the increase in volume of the electrolyte that results from the charging cycle.

CAUTION **Do not overfill batteries. The charging cycle will expel electrolyte and result in component damage.**

A battery being charged will 'gas' with the majority of the gassing taking place at the end of the charging cycle. This gas is hydrogen which is lighter than air. Water and sulfuric acid droplets will be carried out of the battery vents by the hydrogen gas; however, this loss is minimal. If the battery electrolyte level is too high, the electrolyte will block the vent tube and the gas will **force** it out of the vent tube and battery cap. The water will evaporate but the sulfuric acid will remain where it can damage vehicle components and the storage facility floor. Sulfuric acid loss will weaken the concentration of acid within the electrolyte and reduce the life of the battery.

Over the life of the battery, a considerable amount of water is consumed. It is important that the water used be pure and free of contaminants that could reduce the life of the battery by reducing the chemical reaction. The water must be distilled or purified by an efficient filtration system. Water that is not distilled should be analyzed and if required, filtration installed to permit the water to meet the requirements of the water purity table (Ref Fig. 19 on page 17).

Impurity	Parts Per Million
Color	Clear
Suspended	Trace
Total Solids	100
Calcium & Magnesium Oxides	40
Iron	5
Ammonia	8
Organic & Volatile Matter	50
Nitrites	5
Nitrates	10
Chloride	5

Fig. 19 Water Purity Table

Even if the water is colorless, odorless, tasteless and fit for drinking, the water should be analyzed to see that it does not exceed the impurity levels specified in the table.

Automatic watering devices such as the one included in the E-Z-GO Battery Maintenance Kit (P/N 25587-G01) can be used with an approved water source (Ref Fig. 20 on page 18). These watering devices are **fast and accurate** to use and maintain the correct electrolyte level within the battery cells.

NOTE *The watering device should only be used if the electrolyte level is less than 1/2" (13 mm) above top of plates.*

Cleaning Batteries

When cleaning the outside of the batteries and terminals, do not use a water hose without first spraying with a solution of sodium bicarbonate (baking soda) and water to neutralize any acid deposits.

Use of a water hose without first neutralizing any acid, will move acid from the top of the batteries to another area of the vehicle or storage facility where it will attack the metal structure or the concrete/asphalt floor. After hosing down the batteries, a residue will be left on the batteries which is conductive and will contribute to the discharge of the batteries.

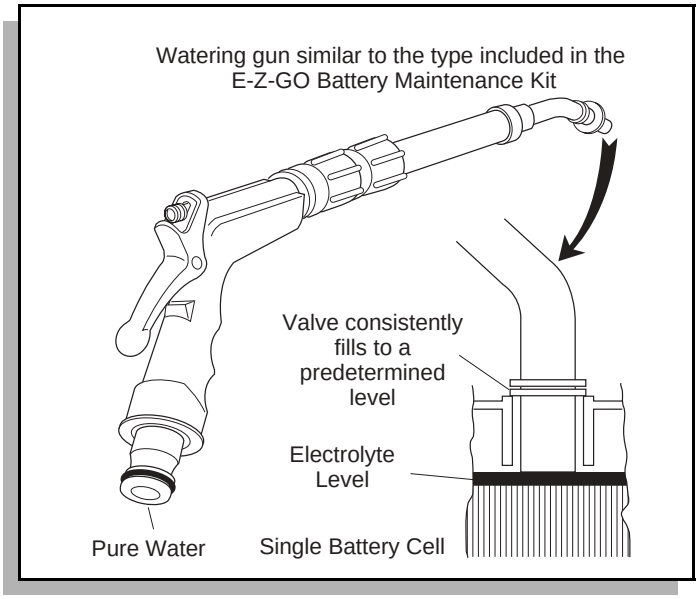


Fig. 20 Automatic Watering Gun

CAUTION **To prevent battery damage, be sure that all battery caps are tightly installed.**

The correct cleaning technique is to spray the top and sides of the batteries with a solution of sodium bicarbonate (baking soda) and water. This solution is best applied with a garden type sprayer equipped with a **non metallic spray wand**. The solution should consist of 1/4 cup (60 ml) of sodium bicarbonate (baking soda) mixed with 1 1/2 gallons (6 liters) of clear water (Ref Fig. 21 on page 18). In addition to the batteries, special attention should be paid to metallic components adjacent to the batteries which should also be sprayed with the sodium bicarbonate (baking soda) solution.

Allow the solution to sit for at least three minutes; use a soft bristle brush or cloth to wipe the tops of the batteries in order to remove any residue that could cause the self discharge of the battery. Rinse the entire area with low pressure clear water. All of the items required for complete battery cleaning and watering are contained in the E-Z-GO Battery Maintenance Kit (P/N 25587-G01).

Cleaning should take place once a month or more often under extreme conditions.

Prolonged Storage

CAUTION **The battery charger, controller and other electronic devices need to be disconnected since they will contribute to the premature discharge of batteries.**

During periods of storage, the batteries will need attention to keep them maintained and prevent discharge.

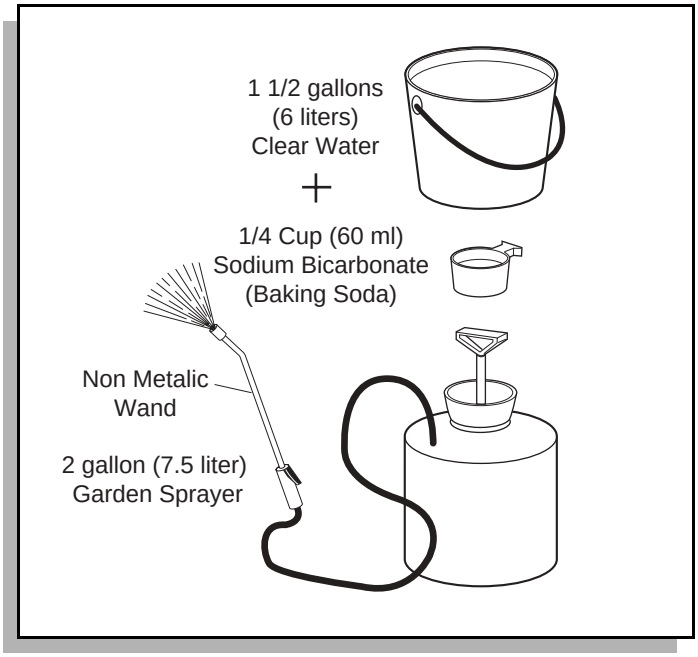


Fig. 21 Preparing Acid Neutralizing Solution

In high temperatures the chemical reaction is faster, while low temperatures cause the chemical reaction to slow down. A vehicle that is stored at 90° F (32° C) will lose .002 of specific gravity each day. If a fully charged battery has a specific gravity of 1.275, and the battery is allowed to sit unused, it will become partially discharged. When it reaches 1.240, which it will do in less than twenty days, it should be recharged. If a battery is left in a discharged state, sulfating takes place on and within the plates. This condition is not reversible and will cause permanent damage to the battery. In order to prevent damage, the battery should be recharged. A hydrometer can be used to determine the specific gravity and therefore the state of charge of a battery.

In winter conditions, the battery must be fully charged to prevent the possibility of freezing. (Ref Fig. 22 on page 19) A fully charged battery will not freeze in temperatures above -75° F (-60° C). Although the chemical reaction is slowed in cold temperatures, the battery must be stored fully charged, and disconnected from any circuit that could discharge the battery. For portable chargers, disconnect the charging plug from the vehicle receptacle. For on-board chargers, disconnect the charging harness from the batteries. The batteries must be cleaned and all deposits neutralized and removed from the battery case to prevent self discharge. The batteries should be tested or recharged at thirty day minimum intervals.

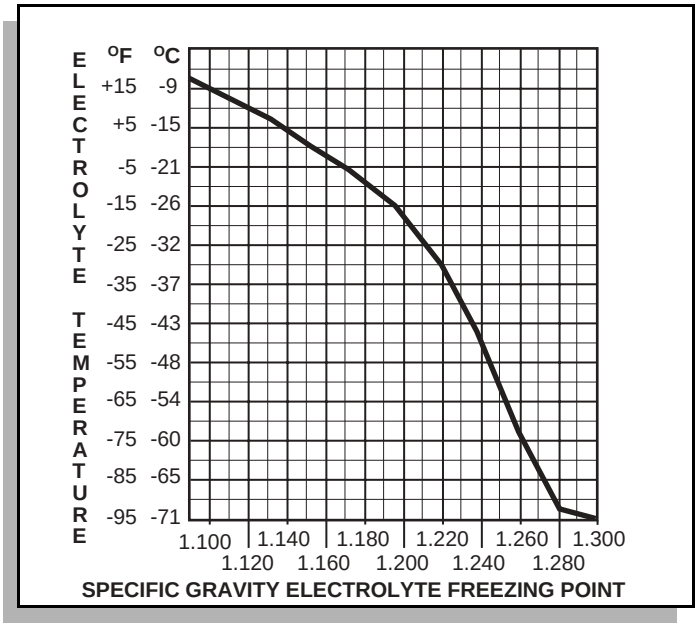


Fig. 22 Freezing Point of Electrolyte

Battery Installation

If the batteries have been cleaned and any acid in the battery rack area neutralized, no corrosion to the battery racks or surrounding area should be present. Any corrosion found should be immediately removed with a putty knife and a wire brush. The area should be washed with a solution of sodium bicarbonate (baking soda) and water and thoroughly dried before priming and painting with a corrosion resistant paint.

The batteries should be placed into the battery racks and the battery hold downs tightened to 45 - 55 in. lbs. (5 - 6 Nm) torque, to prevent movement but not tight enough to cause distortion of the battery cases.

Inspect all wires and terminals. Clean any corrosion from the battery terminals or the wire terminals with a solution of sodium bicarbonate (baking soda) and brush clean if required.

⚠ WARNING ⚠ ***To prevent battery explosion that could result in severe personal injury or death, extreme care must be used with aerosol containers of battery terminal protectant. Insulate the metal container to prevent the metal can from contacting battery terminals which could result in an explosion.***

Use care to connect the battery wires as shown. (Ref Fig. 23 on page 19) Tighten the battery post hardware to 60 - 70 in. lbs. (6 - 8 Nm) torque. Protect the battery terminals and battery wire terminals with a commercially available protective coating.

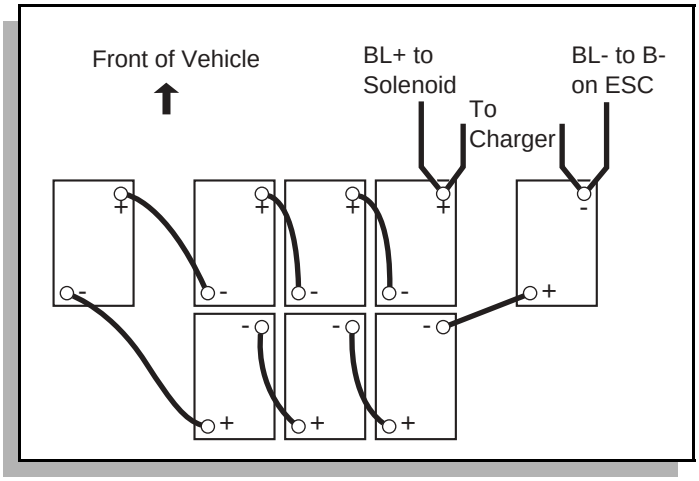


Fig. 23 Battery Connections

Battery Charging

The battery charger is designed to fully charge the battery set. If the batteries are severely deep cycled, some automatic battery chargers contain an electronic module that may not activate and the battery charger will not function. Automatic chargers will determine the correct duration of charge to the battery set and will shut off when the battery set is fully charged. Always refer to the instructions of the specific charger used.

Before charging, the following should be observed:

CAUTION **Do not overfill batteries. The charging cycle will expel electrolyte and result in component damage.**

- The electrolyte level in all cells must be at the recommended level and cover the plates.
- The charging must take place in an area that is well ventilated and capable of removing the hydrogen gas that is generated by the charging process. A **minimum** of five air exchanges per hour is recommended.
- The charging connector components are in good condition and free from dirt or debris.
- The charger connector is fully inserted into the vehicle receptacle.
- The charger connector/cord set is protected from damage and is located in an area to prevent injury that may result from personnel running over or tripping over the cord set.
- The charger is automatically turned off during the connect/disconnect cycle and therefore no electrical arc is generated at the DC plug/receptacle contacts.

NOTE *In some portable chargers there will be a rattle present in the body of the DC plug. This rattle is caused by an internal magnet contained within the charger plug. The magnet is part of the interlock system that prevents the vehicle from being driven when the charger plug is inserted in the vehicle charging receptacle.*

AC Voltage

Battery charger output is directly related to the input voltage. If multiple vehicles are receiving an incomplete charge in a normally adequate time period, low AC voltage could be the cause and the power company should be consulted.

TROUBLESHOOTING

In general, troubleshooting will be done for two distinct reasons. First, a battery that performs poorly and is outside of the manufacturers specification should be identified in order to replace it under the terms of the manufacturer's warranty. Different manufacturers have different requirements. Consult the battery manufacturer or an E-Z-GO representative for specific requirements.

The second reason is to determine why a particular vehicle does not perform adequately. Performance problems may result in a vehicle that runs slowly or in a vehicle that is unable to operate for the time required.

A new battery must **mature** before it will develop its maximum capacity. Maturing may take up to 100 charge/discharge cycles. After the maturing phase, the older a battery gets, the lower the capacity. The only way to determine the capacity of a battery is to perform a load test using a discharge machine.

A cost effective way to identify a poorly performing battery is to use a hydrometer to identify a battery in a set with a lower than normal specific gravity. Once the particular cell or cells that are the problem are identified, the suspect battery can be removed and replaced. At this point there is nothing that can be done to salvage the battery; however, the individual battery should be replaced with a good battery of the same brand, type and approximate age.

Hydrometer

A hydrometer (E-Z-GO P/N 50900-G1) is used to test the state of charge of a battery cell (Ref Fig. 24 on page 20). This is performed by measuring the density of the electrolyte, which is accomplished by measuring the specific gravity of the electrolyte. The greater the concentration of sulfuric acid, the more dense the electrolyte becomes. The higher the density, the higher the state of charge.

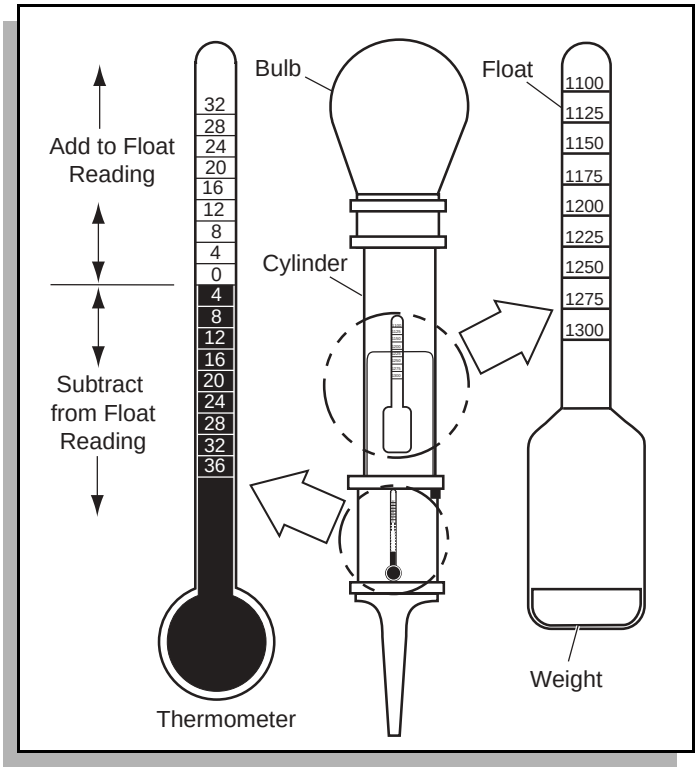


Fig. 24 Hydrometer

⚠ WARNING ⚠ ***To prevent battery explosion that could result in severe personal injury or death, never insert a metal thermometer into a battery. Use a hydrometer with a built in thermometer that is designed for testing batteries.***

Specific gravity is the measurement of a liquid that is compared to a baseline. The baseline is water which is assigned a base number of 1.000. The concentration of sulfuric acid to water in a new golf car battery is 1.280 which means that the electrolyte weighs 1.280 times the weight of the same volume of water. A fully charged battery will test at 1.275 - 1.280 while a discharged battery will read in the 1.140 range.

NOTE *Do not perform a hydrometer test on a battery that has just been watered. The battery must go through at least one charge and discharge cycle in order to permit the water to adequately mix with the electrolyte.*

The temperature of the **electrolyte** is important since the hydrometer reading must be corrected to 80° F (27° C). High quality hydrometers are equipped with an internal thermometer that will measure the temperature of the electrolyte and will include a conversion scale to correct the float reading. It is important to recognize that the electrolyte temperature is significantly different from the ambient temperature if the vehicle has been operated.

Using A Hydrometer

1. Draw electrolyte into the hydrometer several times to permit the thermometer to adjust to the electrolyte temperature and note the reading. Examine the color of the electrolyte. A brown or gray coloration indicates a problem with the battery and is a sign that the battery is nearing the end of its life.
2. Draw the minimum quantity of electrolyte into the hydrometer to permit the float to float freely without contacting the top or bottom of the cylinder.
3. Hold the hydrometer in a vertical position at eye level and note the reading where the electrolyte meets the scale on the float.
4. Add or subtract four points (.004) to the reading for every 10° F (6°C) the electrolyte temperature is above or below 80° F (27° C). Adjust the reading to conform with the electrolyte temperature, e.g., if the reading indicates a specific gravity of 1.250 and the electrolyte temperature is 90° F (32° C), **add** four points (.004) to the 1.250 which gives a corrected reading of 1.254. Similarly if the temperature was 70° F (21°C), **subtract** four points (.004) from the 1.250 to give a corrected reading of 1.246 (Ref Fig. 25 on page 21).
5. Test each cell and note the readings (corrected to 80° F or 27° C). A variation of fifty points between any two cell readings (example 1.250 - 1.200) indicates a problem with the low reading cell(s).

As a battery ages the specific gravity of the electrolyte will decrease at full charge. This is not a reason to replace the battery, providing all cells are within fifty points of each other.

Since the hydrometer test is in response to a vehicle exhibiting a performance problem, the vehicle should be recharged and the test repeated. If the results indicate a weak cell, the battery or batteries should be removed and replaced with a good battery of the same brand, type and approximate age.

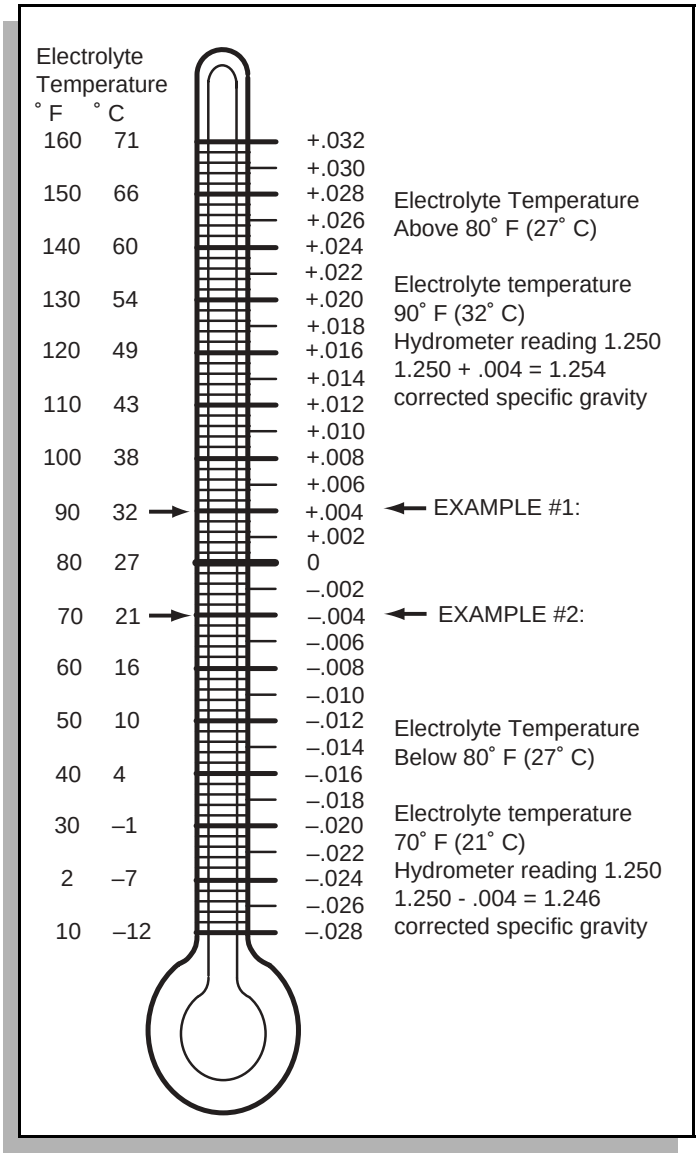


Fig. 25 Hydrometer Temperature Correction

BATTERY CHARGER MAINTENANCE

The only maintenance required of the charger is the periodic cleaning of the DC connector auxiliary contact.

To clean the auxiliary contact, slide an emery board between main contact and auxiliary contact located in the hole of the charger plug nearest the rounded corners (Ref Fig. 26 on page 21). Press emery board down to apply pressure to the auxiliary contact and slide board in and out of plug approximately 10 to 20 times, keeping pressure applied to the auxiliary contact surface.

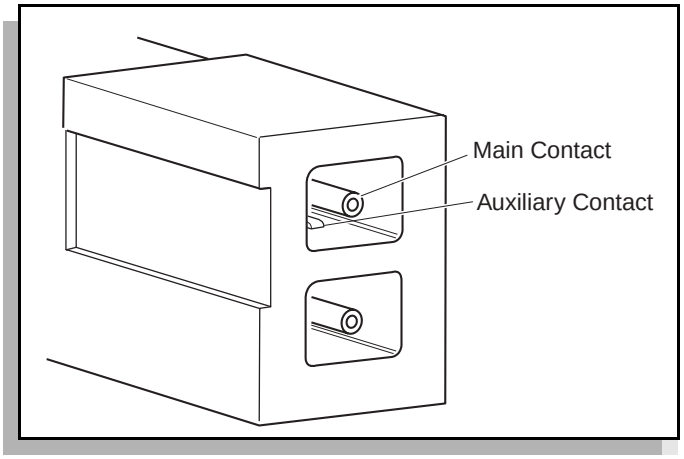


Fig. 26 Cleaning Auxiliary Contact in Charger Plug

Read all of manual to become thoroughly familiar with this vehicle. Pay particular attention to all Notes, Cautions and Warnings

Notes:

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

SHUTTLE 4

ELECTRIC POWERED PERSONNEL / CARGO CARRIER

WEIGHT (without batteries)	710 lbs. (322 kg)
TIRES (6 ply rated)	18 x 8.50 x 8
TIRE PRESSURE	18 - 22 psi (124 - 152 kPa)
LOAD CAPACITY (including operator, passengers, cargo and accessories)	1200 lbs. (544 kg)
CARGO BED	42.5 in. (108 cm) width 32 in. (80 cm) length 12 in. (31 cm) height
CHASSIS	Welded high yield strength tubular steel with Durashield™Powder Coat paint
BODY & FINISH	Durashield™ body of automotive quality injection molded TPE (thermoplastic elastomer). Automotive color coat/clear coat finish
SAFETY	Dash mounted key switch, reverse warning indicator, 'deadman' accelerator control, integral handgrip on hip restraints, manual forward/ reverse selector and electric horn
LIGHTING PACKAGE	Headlights, taillights, brake lights, optional turn signals
BRAKES (HYDRAULIC)	Dual rear wheel hydraulic, self-adjusting drum brakes. Park brake.
FRONT SUSPENSION	Leaf springs with hydraulic shock absorbers
REAR SUSPENSION	Leaf springs with hydraulic shock absorbers
STEERING	Self-compensating single reduction rack and pinion
DASH PANEL	Four drink holders of scuff resistant thermoplastic
SEATING	Formed, fabric-backed vinyl covers over cushion foam. Seating for two occupants per seat
MOTOR	48 volt DC high efficiency series wound, brazed armature, solid copper windings. 3.0 hp (2.2 kw) at 3800 rpm
DRIVE TRAIN	Direct motor shaft connected to transaxle pinion shaft
ELECTRICAL SYSTEM	48 volt DC, eight 6-volt deep cycle storage batteries
SPEED CONTROL	Solid State continuously variable speed controller
CHARGER	Fully automatic line compensating, 48 volt output
TRANSAXLE	High efficiency differential with helical gears, 14.7:1 ratio
SPEED	12 - 15 mph (19 - 24 kph)

* Specifications subject to change without notice

SHUTTLE 6

ELECTRIC POWERED PERSONNEL CARRIER

WEIGHT (without batteries)	710 lbs. (322 kg)
TIRES (6 ply rated)	18 x 8.50 x 8
TIRE PRESSURE	18 - 22 psi (124 - 152 kPa)
LOAD CAPACITY (including operator, passengers, cargo and accessories)	1200 lbs. (544 kg)
CHASSIS	Welded high yield strength tubular steel with Durashield™ Powder Coat paint
BODY & FINISH	Durashield™ body of automotive quality injection molded TPE (thermoplastic elastomer). Automotive color coat/clear coat finish
SAFETY	Dash mounted key switch, reverse warning indicator, 'deadman' accelerator control, integral handgrip on hip restraints, manual forward/ reverse selector and electric horn
LIGHTING PACKAGE	Headlights, taillights, brake lights, optional turn signals
BRAKES (HYDRAULIC)	Dual rear wheel hydraulic, self-adjusting drum brakes. Park brake.
FRONT SUSPENSION	Leaf springs with hydraulic shock absorbers
REAR SUSPENSION	Leaf springs with hydraulic shock absorbers
STEERING	Self-compensating single reduction rack and pinion
DASH PANEL	Four drink holders of scuff resistant thermoplastic
SEATING	Formed, fabric-backed vinyl covers over cushion foam. Seating for two occupants per seat.
MOTOR	48 volt DC high efficiency series wound, brazed armature, solid copper windings. 3.0 hp (2.2 kw) at 3800 rpm
DRIVE TRAIN	Direct motor shaft connected to transaxle pinion shaft
ELECTRICAL SYSTEM	48 volt DC, eight 6-volt deep cycle storage batteries
SPEED CONTROL	Solid State continuously variable speed controller
CHARGER	Fully automatic line compensating, 48 volt output
TRANSAXLE	High efficiency differential with helical gears, 14.7:1 ratio
SPEED	12 - 15 mph (19 - 24 kph)

* Specifications subject to change without notice

GENERAL SPECIFICATIONS

TE5

ELECTRIC POWERED 5 PASSENGER GOLF CAR

WEIGHT (without batteries)	710 lbs. (322 kg)
TIRES (6 ply rated)	18 x 8.50 x 8
TIRE PRESSURE	18 - 22 psi (124 - 152 kPa)
LOAD CAPACITY (including operator, passengers, cargo and accessories)	1200 lbs. (544 kg)
CHASSIS	Welded high yield strength tubular steel with Durashield™ Powder Coat paint
BODY & FINISH	Durashield™ body of automotive quality injection molded TPE (thermoplastic elastomer). Automotive color coat/clear coat finish
SAFETY	Dash mounted key switch, reverse warning indicator, 'deadman' accelerator control, integral handgrip on hip restraints, manual forward/ reverse selector and electric horn
LIGHTING PACKAGE	Optional Headlights, taillights, brake lights, turn signals
BRAKES (HYDRAULIC)	Dual rear wheel hydraulic, self-adjusting drum brakes. Park brake.
FRONT SUSPENSION	Leaf springs with hydraulic shock absorbers
REAR SUSPENSION	Leaf springs with hydraulic shock absorbers
STEERING	Self-compensating single reduction rack and pinion
DASH PANEL	Four drink holders of scuff resistant thermoplastic
SEATING	Formed, fabric-backed vinyl covers over cushion foam. Seating for two occupants per front seat, three occupants per rear seat
MOTOR	48 volt DC high efficiency series wound, brazed armature, solid copper windings. 3.0 hp (2.2 kw) at 3800 rpm
DRIVE TRAIN	Direct motor shaft connected to transaxle pinion shaft
ELECTRICAL SYSTEM	48 volt DC, eight 6-volt deep cycle storage batteries
SPEED CONTROL	Solid State continuously variable speed controller
CHARGER	Fully automatic line compensating, 48 volt output
TRANSAXLE	High efficiency differential with helical gears, 14.7:1 ratio
SPEED	12 - 15 mph (19 - 24 kph)

* Specifications subject to change without notice

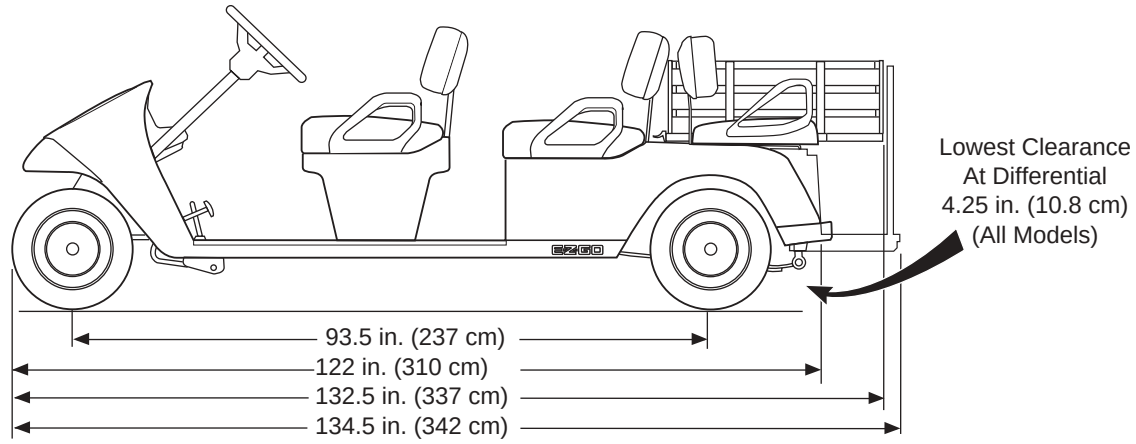
TE5 PDS

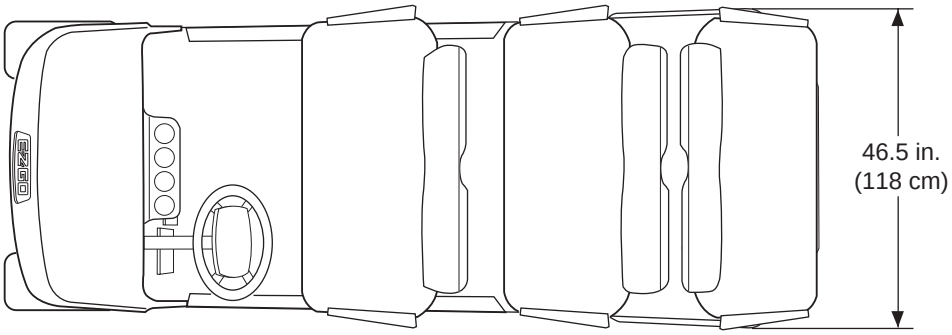
ELECTRIC POWERED 5 PASSENGER GOLF CAR

WEIGHT (without batteries)	710 lbs. (322 kg)
TIRES (6 ply rated)	18 x 8.50 x 8
TIRE PRESSURE	18 - 22 psi (124 - 152 kPa)
LOAD CAPACITY (including operator, passengers, cargo and accessories)	1200 lbs. (544 kg)
CHASSIS	Welded high yield strength tubular steel with Durashield™ Powder Coat paint
BODY & FINISH	Durashield™ body of automotive quality injection molded TPE (thermoplastic elastomer). Automotive color coat/clear coat finish
SAFETY	Dash mounted key switch, reverse warning indicator, 'deadman' accelerator control, integral handgrip on hip restraints, dash mounted manual forward/reverse selector and foot operated electric horn
LIGHTING PACKAGE	Optional Headlights, taillights, brake lights, turn signals
BRAKES (HYDRAULIC)	Dual rear wheel hydraulic, self-adjusting drum brakes, seat console mounted hand operated park brake.
FRONT SUSPENSION	Leaf springs with hydraulic shock absorbers
REAR SUSPENSION	Leaf springs with hydraulic shock absorbers
STEERING	Self-compensating single reduction rack and pinion
DASH PANEL	Four drink holders of scuff resistant thermoplastic
SEATING	Formed, fabric-backed vinyl covers over cushion foam. Seating for two occupants per front, three occupants per rear seat
MOTOR	48 volt DC high efficiency shunt wound, brazed armature, solid copper windings with speed sensor. 3.0 hp (2.2 kw) at 3800 rpm
DRIVE TRAIN	Direct motor shaft connected to transaxle pinion shaft
ELECTRICAL SYSTEM	48 volt DC, eight 6-volt deep cycle storage batteries
SPEED CONTROL	Solid State continuously variable speed controller
CHARGER	Fully automatic line compensating, 48 volt output
TRANSAXLE	High efficiency differential with helical gears, 14.7:1 ratio
SPEED	13 mph (21 kph)

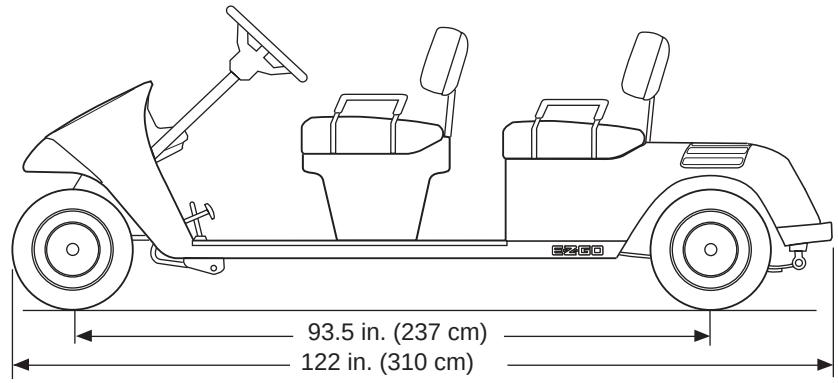
* Specifications subject to change without notice

SHUTTLE 4
SHUTTLE 6





TE5



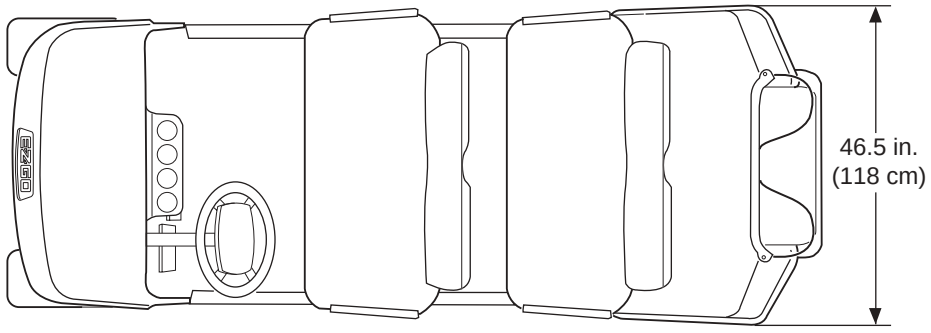
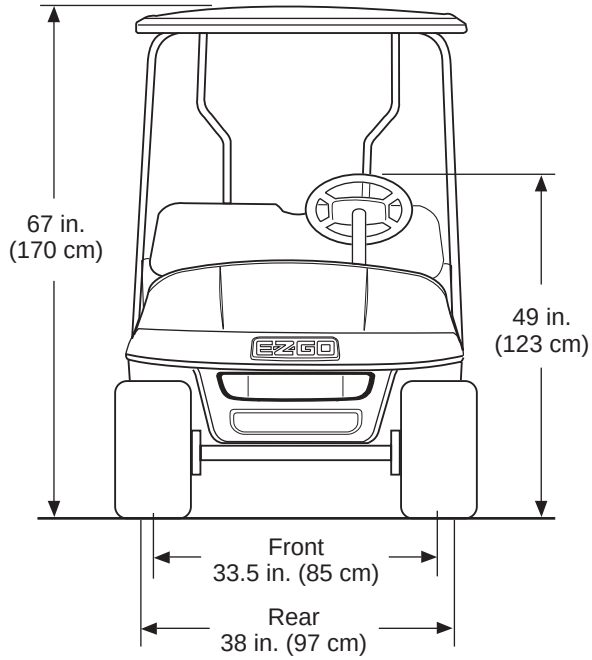
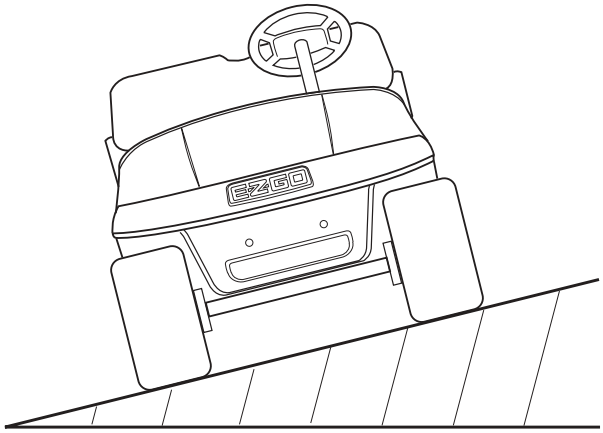


Fig. 27 Vehicle Dimensions





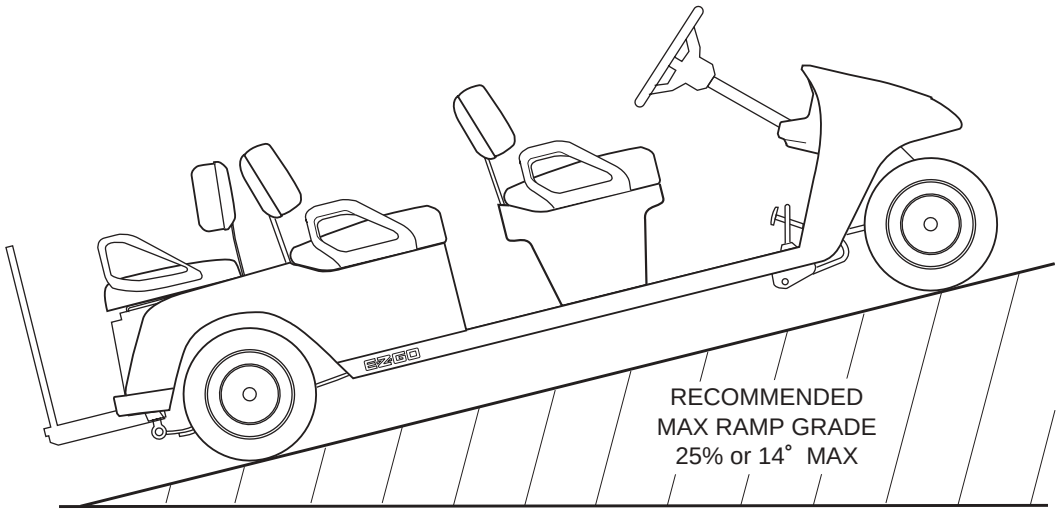


Fig. 28 Vehicle Dimensions and Incline Specifications

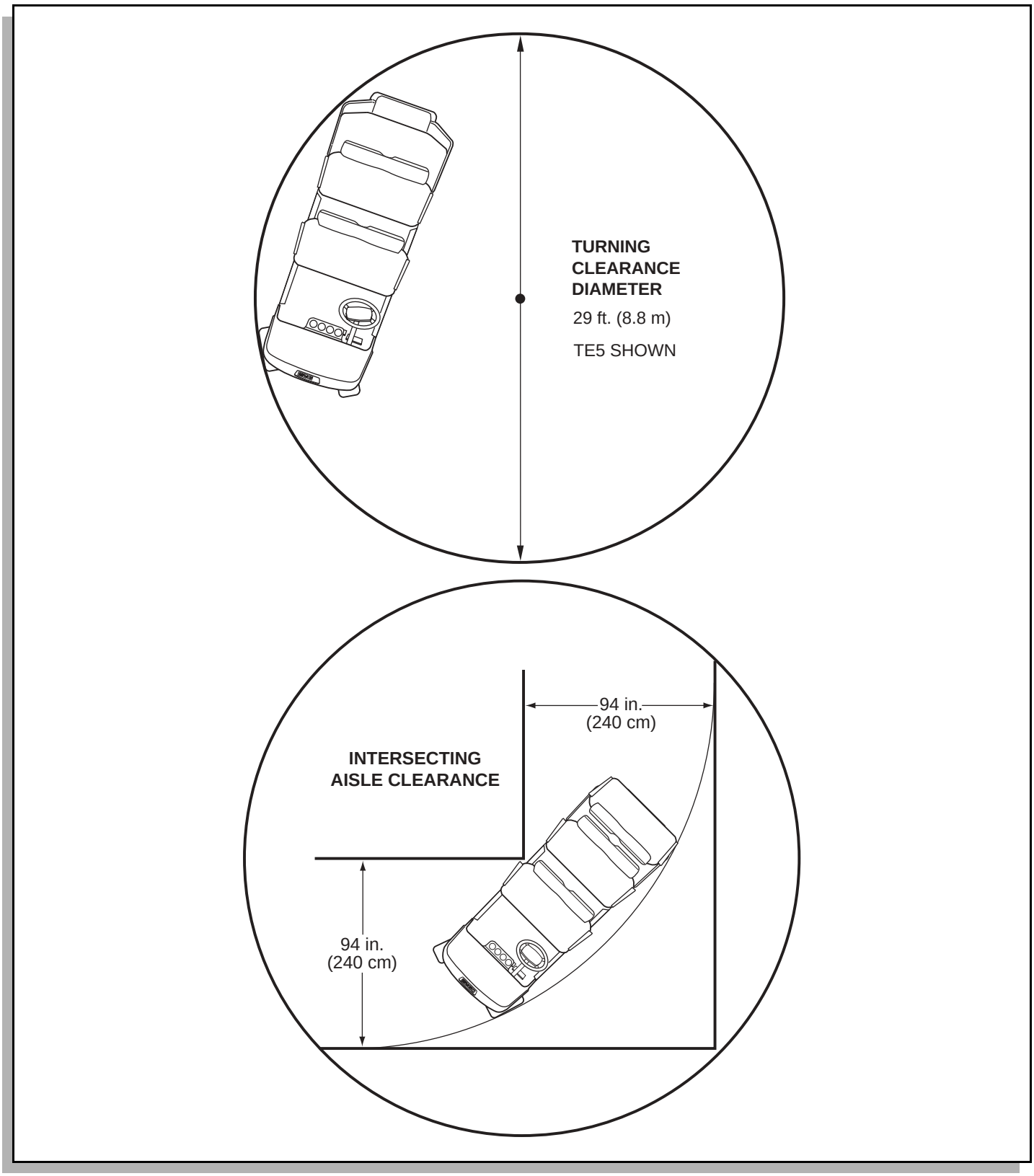


Fig. 29 Vehicle Turning Clearance

NOTE *Read and understand the following warnings before attempting to operate the vehicle:*

⚠ WARNING ⚠ ***To prevent personal injury or death, observe the following:***

When vehicle is to be left unattended, engage parking (PARK) brake, move direction selector to neutral, turn key to 'OFF' position and remove key.

Drive vehicle only as fast as terrain and safety considerations allow. Consider the terrain and traffic conditions. Consider environmental factors which effect the terrain and the ability to control the vehicle.

Avoid driving fast down hill. Sudden stops or change of direction may result in a loss of control. Use service brake to control speed when traveling down an incline.

Use extra care and reduced speed when driving on poor surfaces, such as loose dirt, wet pavement, gravel, etc.

All travel should be directly up or down hills.

Use extra care when driving the vehicle across an incline.

Stay in designated areas and avoid steep slopes. Use the parking brake whenever the vehicle is parked.

Keep feet, legs, hands and arms inside vehicle at all times.

Avoid extremely rough terrain.

Check area behind the vehicle before operating in reverse.

Make sure the direction selector is in correct position before attempting to start the vehicle.

Slow down before and during turns. All turns should be executed at reduced speed.

Always bring vehicle to a complete stop before shifting the direction selector.

See GENERAL SPECIFICATIONS for standard vehicle load and seating capacity.

NOTE *Read and understand the following text and warnings before attempting to service vehicle:*

In any product, components will eventually fail to perform properly as the result of normal use, age, wear or abuse.

It is virtually impossible to anticipate all possible component failures or the manner in which each component may fail.

Be aware that a vehicle requiring repair indicates that the vehicle is no longer functioning as designed and therefore should be considered potentially hazardous. Use extreme care when working on any vehicle. When diagnosing, removing or replacing any components that are not operating correctly, take time to consider the safety of yourself and others around you should the component move unexpectedly.

Some components are heavy, spring loaded, highly corrosive, explosive or may produce high amperage or reach high temperatures. Battery acid and hydrogen gas could result in serious bodily injury to the technician/ mechanic and bystanders if not treated with the utmost caution. Be careful not to place hands, face, feet or body in a location that could expose them to injury should an unforeseen situation occur.

⚠ WARNING ⚠ ***Before working on the vehicle, remove all jewelry (rings, watch, necklaces, etc.).***

Be sure no loose clothing or hair can contact moving parts.

Use care not to touch hot objects.

Raise rear of vehicle and support on jack stands before attempting to run or adjust powertrain.

Wear eye protection when working on or around the vehicle. In particular, use care when working around batteries, using solvents or compressed air.

Hydrogen gas is formed when charging batteries. Do not charge batteries without adequate ventilation.

Do not permit open flame or anyone to smoke in an area that is being used for charging batteries. A concentration of 4% hydrogen gas or more is explosive.

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