BAD BOY BUGGIES

LTO 48V OWNER'S MANUAL

617815

ISSUED FEBRUARY 2011

REVISED AUGUST 2012

SAFETY

For any questions on material contained in this manual, contact an authorized representative for clarification.

Read and understand all labels located on the vehicle. Always replace any damaged or missing labels.

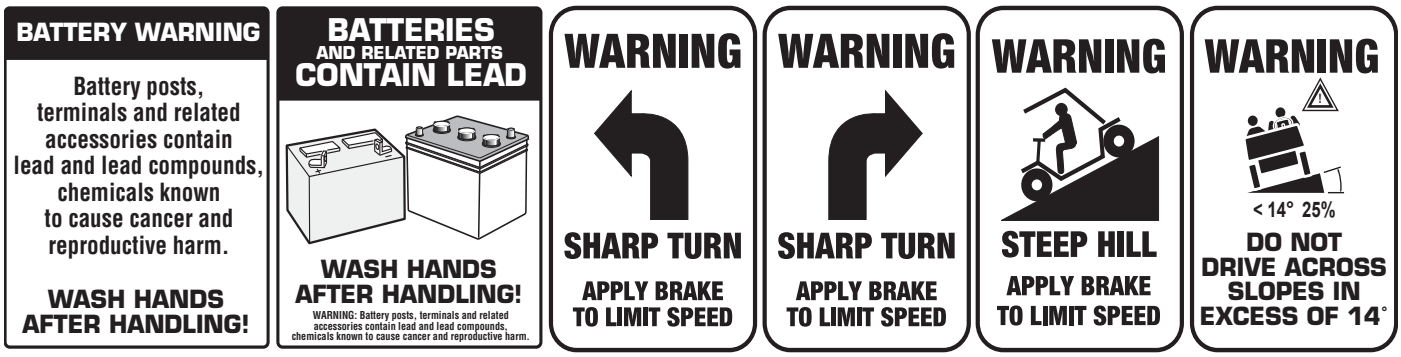
On steep hills it is possible for vehicles to coast at greater than normal speeds encountered on a flat surface. To prevent loss of vehicle control and possible serious injury, speeds should be limited to no more than the maximum speed on level ground. See GENERAL SPECIFICATIONS. Limit speed by applying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

Catastrophic damage to the drivetrain 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.

For towing/transporting vehicle, refer to “TRANSPORTING VEHICLE”.

Vehicles equipped with Precision Drive System™ (PDS) must be towed with the Run-Tow/Maintenance switch, located under the passenger seat, in the ‘Tow/Maintenance’ position.

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



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

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

NOTICE

Address practices not related to personal injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Please observe these **NOTES, CAUTIONS, WARNINGS and DANGERS**; 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, WARNINGS and DANGERS CONTINUED ON INSIDE OF BACK COVER)

OWNER'S GUIDE

ELECTRIC POWERED UTILITY VEHICLES

LTO 48V

Starting Model Year 2011

These are the original instructions as defined by 2006/42/EC.

TO CONTACT US

NORTH AMERICA:
TECHNICAL ASSISTANCE & WARRANTY PHONE: 1-800-774-3946, FAX: 1-800-448-8124
SERVICE PARTS PHONE: 1-888-GET-EZGO (1-888-438-3946), FAX: 1-800-752-6175

INTERNATIONAL:
PHONE: 001-706-798-4311, FAX: 001-706-771-4609

E-Z-GO DIVISION OF TEXTRON INC., 1451 MARVIN GRIFFIN ROAD, AUGUSTA, GEORGIA USA 30906-3852

GENERAL INFORMATION

This vehicle has been designed and manufactured in the United States of America (USA) as a 'World Vehicle'. The Standards and Specifications listed in the following text originate in the USA unless otherwise indicated.

The use of non Original Equipment Manufacturer (OEM) approved parts may void the warranty.

Overfilling battery 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. The battery charger and the controller are both sources of electrical drain. Unplug the battery charger DC plug from the vehicle receptacle.

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

TABLE OF CONTENTS

TABLE OF CONTENTS

SAFETY INFORMATION

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

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

⚠ CAUTION

Certain replacement parts can be used independently and/or in combination with other accessories to modify an E-Z-GO-manufactured vehicle to permit the vehicle to operate at or in excess of 20mph. When an E-Z-GO-manufactured vehicle is modified in any way by the Distributor, Dealer or customer to operate at or in excess of 20mph, UNDER FEDERAL LAW the modified product will be a Low Speed Vehicle (LSV) subject to the strictures and requirements of Federal Motor Vehicle Safety Standard 571.500. In these instances, pursuant to Federal law the Distributor or Dealer MUST equip the product with headlights, rear lights, turn signals, seat belts, top, horn and all other modifications for LSV's mandated in FMVSS 571.500, and affix a Vehicle Identification Number to the product in accordance with the requirements of FMVSS 571.565. Pursuant to FMVSS 571.500, and in accordance with the State laws applicable in the places of sale and use of the product, the Distributor, Dealer or customer modifying the vehicle also will be the Final Vehicle Manufacturer for the LSV, and required to title or register the vehicle as mandated by State law.

E-Z-GO will NOT approve Distributor, Dealer or customer modifications converting E-Z-GO products into LSV's.

The Company, in addition, recommends that all E-Z-GO products sold as personal transportation vehicles BE OPERATED ONLY BY PERSONS WITH VALID DRIVERS LICENSES, AND IN ACCORDANCE WITH APPLICABLE STATE REQUIREMENTS. This restriction is important to the SAFE USE AND OPERATION of the product. On behalf of E-Z-GO, I am directing that E-Z-GO Branch personnel, Distributors and Dealers advise all customers to adhere to this SAFETY RESTRICTION, in connection with the use of all products, new and used, the Distributor or Dealer has reason to believe may be operated in personal transportation applications.

Information on FMVSS 571.500 can be obtained at Title 49 of the Code of Federal Regulations, section 571.500, or through the Internet at the website for the U.S. Department of Transportation - at Dockets and Regulation, then to Title 49 of the Code of Federal Regulations (Transportation).

GENERAL

All vehicles can be 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 warning 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 all users and maintenance personnel read this entire manual paying particular attention to the CAUTIONS, WARNINGS and DANGERS contained therein.

If you have any questions regarding this vehicle, contact your E-Z-GO Dealer or write to the address on the back cover of this publication, Attention: Customer Care Department.

E-Z-GO 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 IS NOT LIABLE FOR ERRORS IN THIS MANUAL. E-Z-GO IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT RESULT FROM THE USE OF THE MATERIAL IN THIS MANUAL.

This vehicle conforms to the current applicable standard(s) 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 of the United States of America (USA) 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.

SAFETY INFORMATION

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability or increase the speed or extend the stopping distance beyond the factory specification. Such modifications can result in serious personal injury or death.

Do not make modifications or changes, E-Z-GO prohibits and disclaims responsibility for any such modifications or any alterations 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 other vehicles when used in a golf course environment. Additionally, speed should be further moderated by the environmental conditions, terrain and common sense.

Operation of the vehicle is limited to persons above the height of 59 inches (150 cm).

GENERAL OPERATION

ALWAYS:

- Use the vehicle in a responsible manner and maintain the vehicle in safe operating condition.
- Read and observe all warnings and operation instruction labels affixed to the vehicle.
- Follow all safety rules established in the area where the vehicle is being operated.
- Leave the vehicle when there is a risk of lightning.
- Reduce speed to compensate for poor terrain or conditions.
- Apply service brake to control speed on steep grades.
- Maintain adequate distance between vehicles.
- Reduce speed in wet areas.
- Use extreme caution when approaching sharp or blind turns.
- Use extreme caution when driving over loose terrain.
- Use extreme caution in areas where pedestrians are present.

MAINTENANCE

ALWAYS:

- Maintain the vehicle in accordance with the manufacturer's periodic service schedule.
- Ensure that repairs are performed by those that are trained and qualified to do so.
- Follow the manufacturer's maintenance procedures for the 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.
- 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 battery or cover exposed terminals with an insulating material.
- Check the polarity of each battery terminal and be sure to rewire the batteries correctly.
- Use specified replacement parts. Never use replacement parts of lesser quality.
- Use recommended tools.
- 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.
- Support the vehicle using wheel chocks and jack stands. Never get under a vehicle that is supported by a jack. Lift the vehicle in accordance with the manufacturer's instructions.
- Maintain the vehicle in an area away from exposed flame or persons who are smoking.
- Be aware that a vehicle that is not performing as designed is a potential hazard and must not be operated.
- 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.
- Replace damaged or missing warning, caution or information labels.
- Keep complete records of the maintenance history of the vehicle.

SAFETY INFORMATION

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

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.

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 manufacturers recommendations or applicable electrical code (whichever is higher).

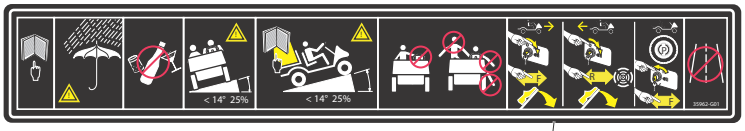
Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

NOTES:

LABELS AND PICTOGRAMS

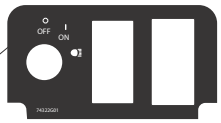
LABELS AND PICTOGRAMS

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.



601781

27653G01



74322G01

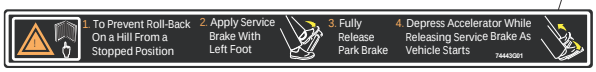
AUTHORIZED REPRESENTATIVE IN EC IS:

RANSOMES JACOBSEN LTD.
WEST ROAD, IPSWICH,
SUFFOLK, IP3 9TT, UK

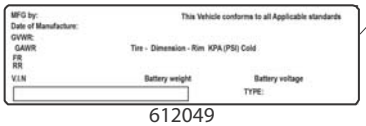
614068

614068

610631



74443G01



612049

This Label is located on Frame below front Seat.

35493G01

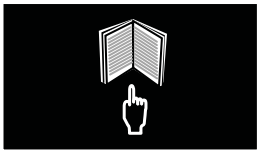
28203G01

LABELS AND PICTOGRAMS

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

1. 

WARNING

2. 

READ MANUAL

3. 

WARNING
USE CAUTION IN
INCLEMENT WEATHER

4. 

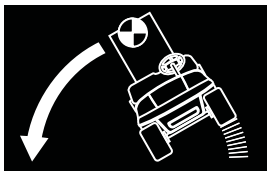
WARNING
DO NOT OPERATE
UNDER THE INFLUENCE
OF DRUGS OR ALCOHOL

5. 

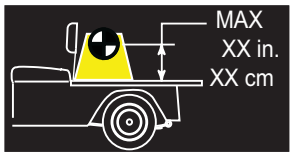
MAXIMUM
CROSS HILL/RAMP
ANGLE AS SPECIFIED

6. 

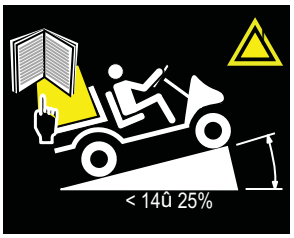
WARNING
MAXIMUM CROSS
HILL/RAMP ANGLE
AS SPECIFIED

7. 

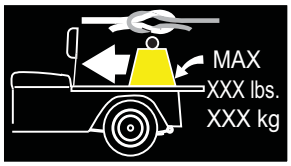
LOAD WITH
HIGH CENTER
OF GRAVITY
COULD RESULT
IN TIP OVER

8. 

LOAD
CENTER
OF GRAVITY,
MAXIMUM
HEIGHT

9. 

WARNING
READ MANUAL
FOR MAXIMUM
LOAD BED
CAPACITY.
MAXIMUM RAMP/HILL

10. 

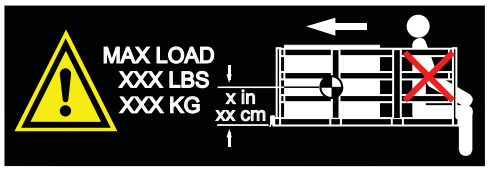
SECURE LOAD
AS FAR FORWARD
AS POSSIBLE.
MAXIMUM LOAD BED
CAPACITY

11. 

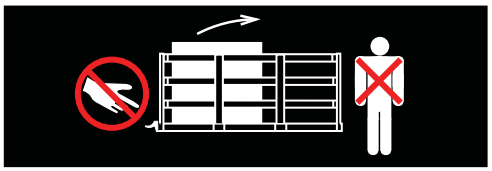
DO NOT RIDE IN
LOAD BED

12. 

DANGER OF EXPLOSION
DO NOT FILL GAS CAN
IN LOAD BED

13. 

WARNING
MAXIMUM LOAD
& CENTER OF
GRAVITY.
KEEP LOAD
AS FAR
FORWARD AS
POSSIBLE.
DO NOT RIDE
IN LOAD BED

14. 

KEEP HANDS &
FINGERS AWAY
FROM DUMP BED.
DO NOT STAND
BEHIND DUMP
BED

NOTE: All Pictograms may not apply to your product.

LABELS AND PICTOGRAMS

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

15. 

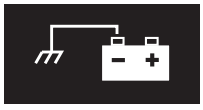
CLEAN UP GASOLINE SPILLS WITH WATER BEFORE STARTING ENGINE

16. 
UNLEADED GASOLINE

17. 
DO NOT SPILL FUEL ON A HOT ENGINE

18. 
GROUND FUEL PUMP

19. 
LOW OIL PRESSURE

20. 
NEGATIVE GROUND BATTERY

21. 
DO NOT CONNECT POSITIVE BATTERY TERMINAL TO GROUND

22. 
SHORTING BATTERY TERMINALS MAY CAUSE EXPLOSION

23. 
NO TAMPERING. KEEP HANDS OUT

24. 
WARNING CORROSIVE

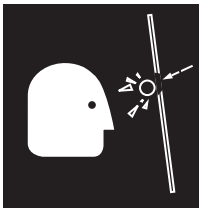
25. 
WARNING EXPLOSIVE

26. 
WARNING LETHAL VOLTAGE

27. 
DO NOT EXPOSE TO FLAME

28. 
DO NOT DISPOSE OF BATTERIES IN LANDFILL

29. 
DO NOT DRIVE ON HIGHWAY

30. 
WINDSHIELDS DO NOT PROVIDE PROTECTION FROM FLYING OBJECTS

31. 
BATTERIES ARE HEAVY. USE CARE LIFTING

32. 
USE INSULATED TOOLS

33. 
WEAR EYE PROTECTION

34. 
NO SMOKING

35. 
HOT SURFACE

36. 
OPERATE FROM DRIVERS SIDE ONLY

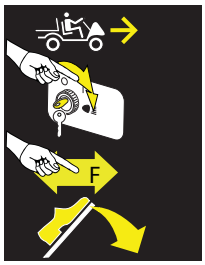
NOTE: All Pictograms may not apply to your product.

LABELS AND PICTOGRAMS

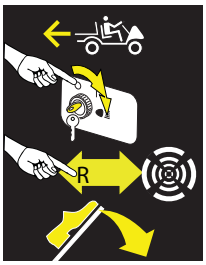
Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

37. 

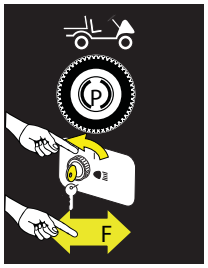
KEEP ARMS
AND LEGS
WITHIN VEHICLE

38. 

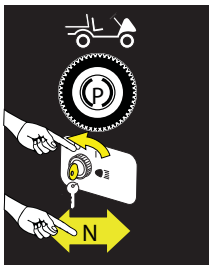
TO OPERATE VEHICLE IN FORWARD:
Q TURN KEY TO ON
Q MOVE DIRECTION SELECTOR TO FORWARD
Q DEPRESS ACCELERATOR PEDAL AND ACCELERATE SMOOTHLY

39. 

TO OPERATE VEHICLE IN REVERSE:
Q TURN KEY TO ON
Q MOVE DIRECTION SELECTOR TO REVERSE
Q AN AUDIBLE DEVICE WILL SOUND
Q DEPRESS ACCELERATOR PEDAL AND ACCELERATE SMOOTHLY

40. 

TO LEAVE A GASOLINE POWERED VEHICLE IN PARK:
Q APPLY PARKING BRAKE
Q TURN KEY TO OFF
Q MOVE DIRECTION SELECTOR TO FORWARD

41. 

TO LEAVE AN ELECTRIC POWERED VEHICLE IN PARK:
Q APPLY PARKING BRAKE
Q TURN KEY TO OFF
Q MOVE DIRECTION SELECTOR TO NEUTRAL

42. 

KEEP CLEAR
HAND OR
FINGERS CAN
BE TRAPPED

43. 

ON
POSITION

44. 

OFF
POSITION

45. 

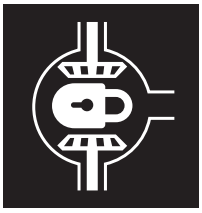
HEADLIGHTS

46. 

UNLOCKED

47. 

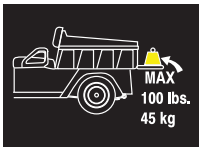
LOCKED

48. 

DIFFERENTIAL
LOCKED

49. 

WARNING
KEEP ENTIRE BODY
INSIDE CAR

50. 

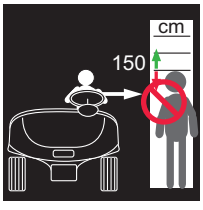
MAXIMUM
TAILGATE
LOAD

51. 

WARNING
POSSIBILE ELECTRIC
ARC OR BATTERY
EXPLOSION. WEAR
EYE PROTECTION.

52. 

LEAVE VEHICLE
WHEN LIGHTNING
IS IN THE AREA

53. 

MINUMUM HEIGHT
TO OPERATE VEHICLE

NOTE: All Pictograms may not apply to your product.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

NOTES:

OPERATION AND SERVICE INFORMATION

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

Thank you for purchasing this vehicle. Before driving the vehicle, we ask you to spend some time reading this Owner's Manual and Service Guide. This guide contains the information that will assist you in maintaining this highly reliable vehicle. Some illustrations may show items that are optional for your 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.

This vehicle has been designed and manufactured as a 'World Vehicle'. Some countries have individual requirements to comply with their specifications; therefore, some sections may not apply in your country.

Most of the service procedures in this guide can be accomplished using common automotive hand tools. Contact your service representative on servicing the vehicle in accordance with the Periodic Service Schedule.

Service Parts Manuals and Technician's Repair and Service Manuals are available from a local Distributor, an authorized Branch or the Service Parts Department. When ordering parts or requesting information for your vehicle, provide vehicle model, serial number and manufacture date code.

BEFORE INITIAL USE

Read, understand and follow the safety label on the instrument panel. Be sure you understand how to operate the vehicle, its equipment and how to use it safely. 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 water heaters and furnaces.

Before a new vehicle is put into operation, the items shown in the INITIAL SERVICE CHART must be performed.

Vehicle batteries must be fully charged before initial use.

Check for correct tire inflation. See GENERAL SPECIFICATIONS.

Determine and record braking distance required to stop vehicle for future brake performance tests.

Remove the protective clear plastic, that protect the seat bottom and back rest during shipping, before placing the vehicle in service.

ITEM	SERVICE OPERATION
Batteries	Charge batteries
Seats	Remove protective plastic covering
Brakes	Check operation and adjust if necessary
	Establish acceptable stopping distance (mechanical brakes only)
	Check hydraulic brake fluid level if equipped
Tires	Check air pressure (see SPECIFICATION)
Portable Charger	Remove from vehicle and properly mount

Fig. 1 Initial Service Chart

PORTABLE CHARGER INSTALLATION

⚠ WARNING

Use charger ONLY on 48 volt battery systems. Other usage may cause personal injury and damage. Lead acid batteries may generate explosive hydrogen gas during normal operation. Keep sparks, flames, and smoking materials away from batteries. Provide adequate ventilation during charging. Never charge a frozen battery. Study all battery manufacturers' specific precautions such as recommended rates of charge and removing or not removing cell caps while charging.

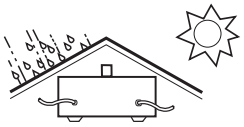
OPERATION AND SERVICE INFORMATION

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

⚠ DANGER

Risk of electric shock. Connect charger power cord to an outlet that has been properly installed and grounded in accordance with all local codes and ordinances. A grounded outlet is required to reduce risk of electric shock – do not use ground adapters or modify plug. Do not touch uninsulated portion of output connector or uninsulated battery terminal. Disconnect the DC supply before making or breaking the connections to the battery while charging. Do not open or disassemble charger. Do not operate charger if the AC supply cord is damaged or if the charger has received a sharp blow, been dropped, or otherwise damaged in any way – refer all repair work to qualified personnel. Not for use by children.

Provide Protection From Elements



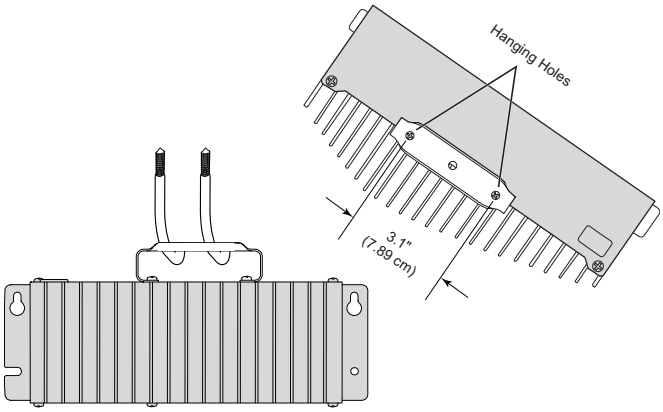
Keep cooling fins clean and free of dirt and debris

NEMA 15 - 5R Grounded AC Receptacle
110 - 120 VAC. Dedicated 15 AMP Circuit

Locations outside the US and Canada: Reference appropriate local electrical code and charger manufacturer recommendations for AC power requirements

Fig. 2 Proper Charger Installation

Portable chargers are shipped with the vehicles. Prior to vehicle or charger operation, the charger **must** be removed and mounted on a platform or wall above the ground to permit maximum air flow around and underneath the charger. **A dedicated circuit is required for the charger.** Refer to the charger manual for appropriate circuit protection. For optimum performance and shortest charge times, place the charger in an area with adequate ventilation. The charger should also be placed in an area that will be relatively free of dirt, mud, or dust since accumulations within the fins of the charger will reduce their heat-dissipating qualities. Optimal cooling also occurs when the charger is placed on a horizontal surface with the fins vertical. More airflow from below the charger will help cool the fins, so placement above open areas or areas with cut-outs for airflow is desirable. If the charger is operated in an outdoor location, rain and sun protection must be provided. The charger may get hot during operation and must be placed such that risk of contact by people is reduced. The charger may be mounted on a wall or shelf using #10-M5 screws. The charger's status display must be visible to the user.



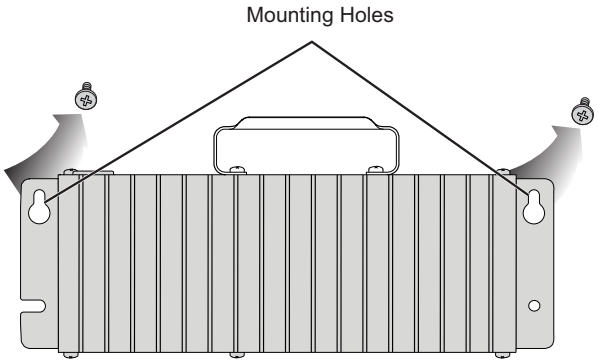


Fig. 3 Charger Mounting

NOTICE

Looping the DC cord through the steering wheel when charging serves as a good reminder to store the cord out of the way when finished with charging. The DC plug can be damaged by driving over or catching the cord on the vehicle when driving away.

⚠ WARNING

An ungrounded electrical device may become a physical hazard that could result in an electrical shock or electrocution.

Using the Charger

The charger may remain plugged into the AC outlet when not in use. To charge the vehicle refer to the instruction labels on the charger. Insert the polarized DC plug completely into the vehicle receptacle. The charger will automatically start a few seconds after the plug is in place. The charger will automatically stop when the

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.

The charging (DC) cord is equipped with a polarized connector that fits into a matching receptacle on the vehicle. The receptacle is located on the driver side of the vehicle just below the seat bottom.

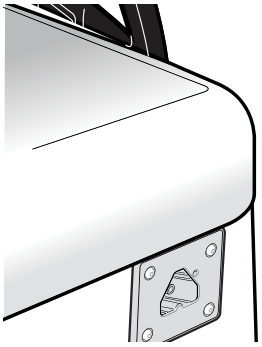


Fig. 4 Charger Receptacle

NOTICE

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

Understanding the Charger

Plugging the charger into the vehicle's charger receptacle will lock the vehicle out of operation. When the charger is plugged into the vehicle's charger receptacle, the charger will automatically turn on and the charger's LED and the vehicle receptacle's LED will start flashing GREEN to indicate the batteries are charging.

Once a minimum battery voltage of 2 volts per cell (Vpc) is reached, the charger's output current will change from a full current charge to the trickle rated charging current. The length of charge time will vary by how depleted the batteries are, the input AC voltage, and/or charger ambient temperatures. The charger's LED will give a SHORT flash if the charge is less than 80% and a LONG flash if the charge is greater than 80%. If the charger's LED is a steady GREEN the batteries are fully charged and the charger may be unplugged, although not necessary. The charger may be left plugged in for long periods of time to maintain the batteries charge level.

If a fault occurred anytime during the charging the charger's LED will quickly flash RED. The specific fault is indicated by the number of RED flashes that occur, there will be a pause and then the flashes will repeat again. There are several possible conditions that will generate errors. Some errors will require human intervention to first resolve the problem and then reset the charger by unplugging the DC cord from the vehicle.

If the AC voltage is interrupted and restored, the charger will turn back on automatically.

LED Operation Codes:

SHORT GREEN FLASH = less than 80% charged

LONG GREEN FLASH = more than 80% charged

SOLID GREEN = 100% charged

RED FLASH = fault code

LED Fault Codes:

RED FLASH: Light turns on briefly, but does not flash after that - check for valid AC voltage.

ONE RED FLASH: One flash, a pause and then again one flash and a pause - Charge Enable Fault: poor contact in the DC connector or dirty contacts or Battery Temperature Fault: battery temperature is greater than 122° F (50° C) or less than 14° F (-10° C).

TWO RED FLASHES: Two flashes, a pause and then again two flashes and a pause - Battery Voltage Fault: Battery pack is less than 36.0 Volts or more than 67.2 Volts. Battery pack is too discharged or over charged for the charger to work.

THREE RED FLASHES: Three flashes, a pause and then again three flashes and a pause - Battery Charge Time-out: Charge time exceeded 24 hours. This may indicate a problem with the battery pack or that the charger output current was severely reduced due to high ambient temperatures.

FOUR RED FLASHES: Four flashes, a pause and then again four flashes and a pause - Battery Fault: Charge time exceeded. This indicates a problem with the battery pack voltage not reaching the required nominal level within the maximum time allowed.

SIX RED FLASHES: Six flashes, a pause and then again six flashes and a pause - Charger Fault: An internal fault has been detected. If this fault is displayed again after unplugging the charger's DC power cord and plugging it back in, the charger must be taken to a qualified service center.

MAINTENANCE INSTRUCTIONS

1. For flooded lead-acid batteries, regularly check the water levels of each battery cell after charging and add distilled water as required to the level specified by the battery manufacturer. Follow the safety instruc-

tions recommended by the battery manufacturer.

2. Make sure the charger connections to the battery terminals are tight and clean. Check for any deformations or cracks in the plastic parts. Check the charger harness for chaffing and rubbing. Inspect all wiring for fraying, loose terminals, chaffing, corrosion or deterioration of the insulation.
3. Keep the cooling fins free of dirt and debris, do not expose the charger to oil, dirt, mud or to direct heavy water spray when cleaning equipment.
4. Inspect the plug of the battery charger and the vehicle receptacle housing for dirt or debris. Clean the DC connector monthly or more often if needed.

CONTROLS AND INDICATORS

Vehicle controls and indicators consist of:

- key/light switch
- direction selector
- state of charge meter
- hour meter
- accelerator pedal
- combination service and park brake pedal
- horn

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

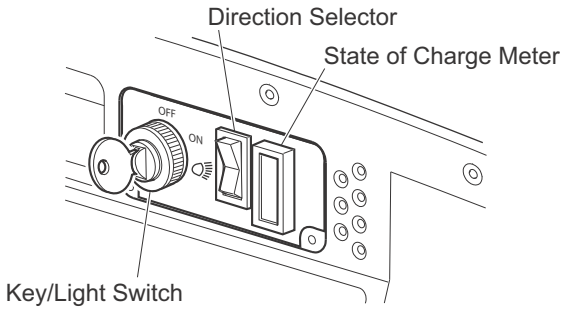


Fig. 5 Key/Light Switch & State of Charge Meter

If the vehicle is equipped with lights, the key switch has a position to operate them, indicated by the light icon.

NOTICE

If the vehicle is equipped with manufacturer installed custom accessories, some accessories remain operational with the key switch in the 'OFF' position.

DIRECTION SELECTOR

⚠ WARNING

To prevent loss of control, do not move 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.

⚠ CAUTION

To reduce the possibility of component damage, the vehicle must be completely stopped before moving the direction selector.

If the direction selector is shifted before the vehicle comes to a complete stop, a warning beeper will activate.

Located on the instrument panel, this switch permits the selection of either 'F' (forward), 'R' (reverse) or neutral (the position between forward and reverse). Vehicle should be left in neutral with park brake applied/locked when unattended ..

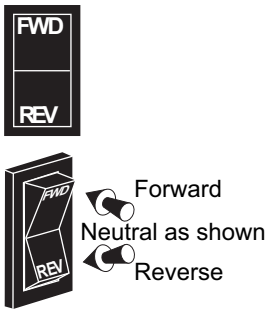


Fig. 6 Direction Selector

STATE OF CHARGE METER

Located in the dash, the state of charge meter indicates the amount of usable power in the batteries.

HOUR METER

The hour meter indicates total hours of operation.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

ACCELERATOR PEDAL

⚠ WARNING

Unintentional movement of the accelerator pedal will release the park brake and may cause the vehicle to move which could result in severe injury or death.

With the key switch 'ON', 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.

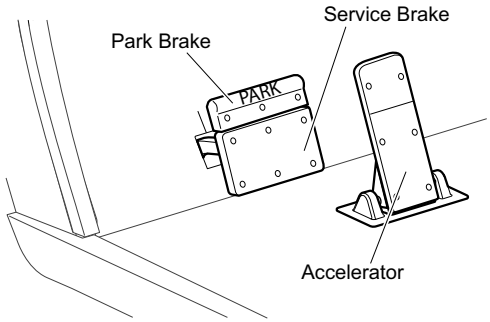


Fig. 7 Accelerator and Brake Controls

If key switch is 'ON' and park brake is set, depressing the accelerator inadvertently will release the park brake and will cause the vehicle to move which could cause severe injury or death.

Depressing the accelerator pedal will release the park brake if it is engaged. This is a feature to assure the vehicle is not driven with the park brake engaged. Depressing the accelerator pedal is **not** the preferred method of releasing the park brake.

NOTICE

Depressing the **lower section of the brake pedal** is the preferred method of releasing the park brake to assure the longest service life of brake components.

COMBINATION SERVICE BRAKE AND PARK BRAKE PEDAL

The brake pedal incorporates a park brake feature . To engage, push down on the upper section of the pedal until it locks in place. The park brake will release when the service brake pedal is depressed. Use the lower section of the brake pedal to operate the service brake system.

RUN - TOW/MAINTENANCE SWITCH

⚠ WARNING

To reduce the possibility of severe injury or death resulting from loss of vehicle control, consider the grade of the terrain the vehicle is on and set vehicle's park brake accordingly before switching the Run - Tow/Maintenance switch to the 'Tow/Maintenance' position. When in the 'Tow/Maintenance' position, the Anti-Roll Back and Walk-Away safety features of the system no longer function.

⚠ 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.

NOTICE

The Run/Tow switch should always be returned to the 'RUN' position after moving a stalled vehicle. If the switch is left in the 'TOW' position for an extended period of time, it will drain the batteries.

The Run/Tow switch is located under the seat on the passenger side of the vehicle.

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.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

OPERATING THE VEHICLE

⚠ CAUTION

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

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:

When driving vehicle, 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.

Stay in designated areas and avoid extremely rough terrain.

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

To prevent loss of control, do not move the direction selector of a 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 made at reduced speed.

Never drive vehicle up, down, or across an incline that exceeds 14° (25% grade).

⚠ WARNING

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.

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

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

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

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

Check the area behind the vehicle before operating in reverse.

All occupants must be seated. Keep entire body inside vehicle and hold on while vehicle is in motion

TRUCOURSE TECHNOLOGY SYSTEM™

TruCourse Technology System™ vehicles are operated in one of four modes or "performance options". All options have standard features that control, protect and diagnose the vehicle. The options are defined as follows:

NOTICE

TruCourse Technology vehicles operate only when the Run - Tow/Maintenance switch is in the 'RUN' position.

The options are defined as follows:

1. The Golf Flat performance option: The motor's speed is sensed and regulated to 14.8 mph (23.8 kph) directly by the controller, the vehicle's flat ground speed will not change with different ground surfaces. The speed sensor also allows for precise control of the downhill vehicle speed during compression braking. As the vehicle crests a hill and begins to descend, the speed will be smoothly regulated to 14.8 mph (23.8 kph). This option is enabled when there is a blank plug installed.
2. The Golf Steep Hill performance option: This option includes all of the driving features of the All-terrain option plus compression braking. Compression braking occurs when the throttle is released while the vehicle is moving. The motor will electrically retard the motion of the vehicle until the throttle is depressed again or the vehicle stops. This is the strongest of the two compression braking options. This is 12.8 mph

(20.6kph) option. This option is enabled when the blue plug is installed.

3. The Golf Mild Hill performance options: This option includes all of the driving features of the Steep Hill option, except that the compression braking feel milder, and the flat ground compression braking speeds are 13.8 mph (22.2 kph) instead of 14.8 mph (23.8 kph). This option is enabled when the yellow plug is installed.
4. The Freedom performance option: This option includes all of the driving features of the All-Terrain option except that the flat ground and downhill compression braking speeds are 18.5 mph (29.7 kph) instead of 13.2 mph (21 kph). This option is enabled when the red plug is installed.

The vehicle performance optin can be determiend without removing the ESC cover by placing the vehicle in dagnostic mode (See diagnostic mode instructions). The number of beeps heard immediately after entering diagnostic mode corresponds to the option per the above option numbers.

TRUCOURSE TECHNOLOGY (TCT) SYSTEM™ PERFORMANCE OPTIONS & DIAGNOSTICS:

- Anti-Roll back to limit backward motion of the vehicle down an incline to less than 2 mph (3 kph)
- Walk-Away to limit vehicle movement without driver input, slowing the vehicle to 2 mph (3 kph) and sounding an audible alarm (reverse beeper)
- Anti-Stall protection to prevent commutator damage from stalling the vehicle against an object or on a hill
- High pedal disable to prevent undesired acceleration if the direction selector lever is changed, or the key is turned on while the accelerator is depressed
- Diagnostic mode to ease troubleshooting

Performance Option	Top Speed	Compression Braking Strength	Anti-Stall Protection
1. Airport	4 - 8 mph (6 - 12.8 kmph)	None	Yes
2. Golf Flat	10.2-14.8 mph (16.4-23.8 kmph)	None	Yes
3. Golf Steep Hills	10.2-14.8 mph (16.4- 23.8 kmph)	Heavy	Yes
4. Golf Mild Hills	10.2-14.8 mph (16.4- 23.8 kmph)	Mild	Yes
5. Freedom	14.5 - 19.5 mph (23.3- 31.3 kmph)	None	Yes

Fig. 8 Performance Options

Changing Performance Options

The performance option may be changed if the existing option is not compatible with the terrain that the vehicle will be operated.

1. Raise the seat and ensure that the Run-Tow/Maintenance switch is in the 'RUN' position.
2. Ensure that the charger is unplugged from the vehicle.
3. Locate the vehicle diagnostic port and remove the environmental cover.
4. Connect the handheld diagnostic tool and select the desired performance setting.
5. Disconnect the handheld diagnostic tool, replace the environmental cover and seat.

At monthly intervals, test the TCT system 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 TCT system is functioning. If vehicle speed continues to rise, apply the service brake to control speed and proceed with diagnostic check.

NOTICE

Charging the vehicle will also de-activate the diagnostic mode and the handheld diagnostic tool will not operate

The two-position 'Run-Tow/Maintenance' switch is located under the passenger side of the seat on the ESC environmental cover.

OPERATION

With the switch in 'TOW/MAINTENANCE/STORAGE' position:

- the controller is deactivated.
- the electronic braking feature 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 feature and warning beeper features are activated.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

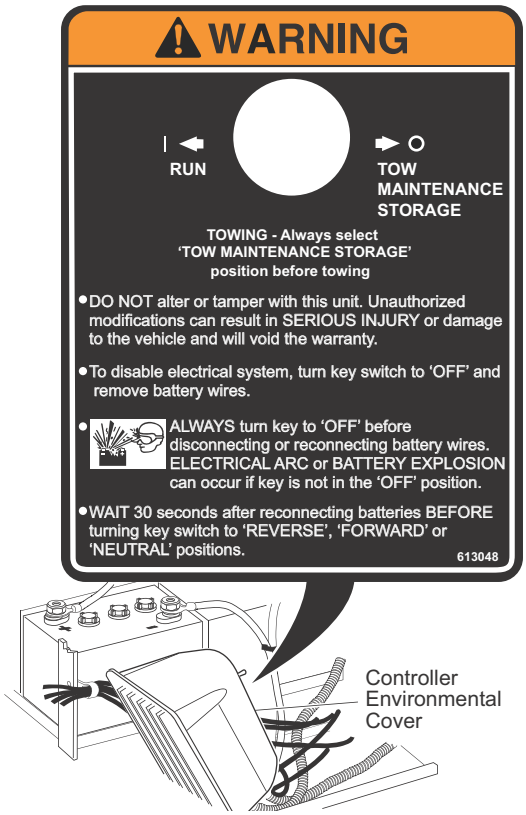


Fig. 9 Run-Tow Maintenance Storage Switch

NOTICE

TCT 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 one second.

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. The system functions in all key switch positions.

⚠ WARNING

The TCT system is not a substitute for the service brake which should be used to control speed and reduce possibility of injury.

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 regenerative braking will limit the speed of the vehicle to the designed speed range.When the regenerative braking feature is activated by this sequence of events, the motor generates power which is returned d to the batteries. TCT models are equipped with a regenerative motor control system.

The motor's speed is sensed and regulated directly by the controller. As a vehicle begins to accelerate while descending a hill, the speed sensor will cause the motor to electrically resist the speed of the vehicle through regenerative braking.

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 TCT system also incorporates an anti-stall protection feature that prevents commutator damage from stalling the vehicle against an obstacle or ascending a hill. The electrical power to the motor will be deactivated allowing the vehicle to roll freely before damage can be done.

In Performance Mode option features different degrees of regenerative breaking that takes place anytime that accelerator pedal is released. The Steep Hill option will rapidly slow the vehicle to a stop unless the accelerator pedal is depressed. The Mild Hill option will slow the vehicle to a stop at a slower rate unless the accelerator pedal is depressed.

The TCT has a low power consumption unit but it will drain the vehicle batteries over a period of time. If the vehicle is to be stored for a prolonged period of time, the TCT should be disconnected from the batteries by selecting the 'TOW/MAINTENANCE/STORAGE' position on the Run-Tow/Maintenance/Storage switch located under the passenger seat.

The Electronic Speed Control system consists of three separate units; a pedal box, speed sensor, and controller.

Regenerative Braking

⚠ WARNING

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

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

TruCourse Technology models are equipped with a regenerative motor control system.

Example: If all of the following events occur...

a) the vehicle is being driven down a slope
b) the vehicle attempts to exceed the specified top speed with the accelerator pedal depressed **or** released

the regenerative braking will limit the speed of the vehicle to the specified top speed (the warning beeper will **not** sound). When the regenerative braking system is activated by this sequence of events, the motor generates power which is returned to the batteries.

If the operator attempts to override the regenerative 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).

Pedal-Up Braking

Pedal-up braking is regenerative braking that occurs when the accelerator pedal is released while the vehicle is moving between 8 mph (13 kph) and the vehicle's top speed.

Example: If all of the following events occur...

a) the vehicle is being driven down a slope
b) the accelerator pedal is released for more than one second

the pedal-up braking will slow the vehicle (the warning beeper will **not** sound) until either the vehicle speed is reduced to 8 mph (13 kph), at which it freely coasts between 8 and 3 mph (5 kph), or the accelerator pedal is applied. When pedal-up braking system is activated by this sequence of events, the motor generates power which is returned to the batteries.

Terrain

The vehicle is designed for use on improved roads (but not on public highways). The vehicle may also be used on established trails or open terrain that is free from stumps, large rocks or holes.

The vehicle should not be used to cross water.

Walk-Away Feature

Walk-Away limits vehicle movement without driver input, slowing the vehicle to 2 mph (3 kph) and sounding an audible alarm (reverse beeper).

Example: If all of the following events occur...

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 TruCourse Technology system will cause a similar response. The system functions in all key switch positions.

Anti-Roll Back Feature

Anti-Roll Back, like Walk-Away, limits backward motion of the vehicle down an incline to less than 2 mph (3 kph). See 'Walk-Away Feature' above.

Anti-Stall Feature

Anti-Stall protection prevents motor damage from stalling the vehicle against an object or on a hill.

Example: If all of the following events occur...

a) the system senses that the accelerator pedal is depressed (power applied to motor)
b) the motor is stalled long enough that any more time may cause motor damage

the TruCourse Technology system 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.

Example: If all of the following events occur...

a) the system senses that the accelerator pedal is depressed (power applied to motor)
b) the brake is engaged so as to prevent vehicle motion

the TruCourse Technology system 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.

High Pedal Disable Feature

High pedal disable prevents undesired acceleration if the direction selector lever is changed, or the key is turned on while the accelerator is depressed.

Diagnostic Mode Feature

Diagnostic mode eases troubleshooting.

In the unlikely event of certain electrical system failures, theTruCourse Technology 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 can be put in diagnostic mode by the technician and the controller will report the failure mode.

MODIFICATIONS TO VEHICLE

⚠ WARNING

Changes to the weight distribution or the center of gravity may make vehicle unstable or prone to roll over which could result in severe injury or death to the operator or passengers.

Do not modify the vehicle in any manner that will change the weight distribution of the vehicle. Changes to the weight distribution or the center of gravity may make it unstable or prone to roll over which could result in severe injury or death to the operator or passengers.

STARTING AND DRIVING

⚠ WARNING

To reduce the possibility of roll-back which could result in severe injury or vehicle damage, do not release the service brake until motor has started.

All vehicles are equipped with an *interlock system* that disables the controller and prevents the vehicle from being operated or towed while the charger is connected. Remove the charger plug from the vehicle receptacle and properly store the cable prior to moving the vehicle.

To operate vehicle:

- Apply the service brake, place the key in the key switch and turn it to the 'ON' position.
- Move the direction selector to the direction desired.
- Release the park brake by depressing the service brake pedal until the park brake releases.
- Slowly depress the accelerator pedal to start the motor. Release service brake when motor starts.
- When the accelerator pedal is released, the motor stops. To stop the vehicle more quickly, depress the **service brake pedal**.

NOTICE

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

STARTING THE VEHICLE ON A HILL

⚠ WARNING

To reduce the possibility of roll-back which could result in severe injury or vehicle damage, do not release the service brake until motor has started.

⚠ 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.

To reduce the possibility of permanent damage to the drive system, it is important to prevent excessive roll-back when starting the vehicle on a hill.

Place left foot on service brake and release the park brake. Depress accelerator with right foot and release the service brake by lifting left foot.

COASTING

⚠ WARNING

To reduce the possibility of severe injury or death from coasting at above recommended speeds, limit speed with service brake.

Uncontrolled coasting does not occur with this model. However, this is not a substitute for the service brake which should be used to slow the speed of the vehicle quickly.

NOTICE

Some models are equipped with a feature (pedal-up braking) that slows the vehicle's speed when the accelerator pedal is released until the vehicle stops.

To prevent loss of vehicle control, speeds should be limited to no more than the maximum speed on level ground (see vehicle specification). 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.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

LABELS AND PICTOGRAMS

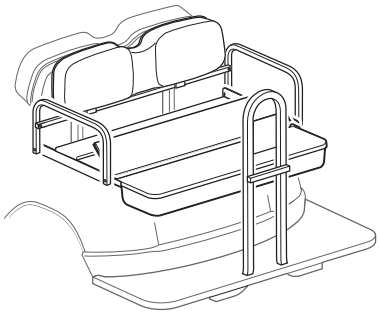
Vehicles may be labeled with pictograms as a method of conveying information or warnings. The LABELS AND PICTOGRAMS section illustrates and explains pictograms that may appear on the vehicle. Not all pictograms shown in the LABELS AND PICTOGRAMS section will be found on your vehicle.

VEHICLE CAPACITY

⚠ WARNING

Due to the variety of ways the vehicle may be used, it is important that the operator consider any potential hazards before use to prevent serious injury or death.

The weight of the driver and passengers plus any options or accessories must be deducted from the total payload rating to determine the cargo capacity. Never exceed the rated capacity of the load bed.



CONVERTIBLE CARRIER
(Rear Facing Seat/Cargo Platform)
2 Persons or cargo not to exceed 250 lbs(113 kg)
Maximum Vehicle Capacity 800 lbs(360kg)

Fig. 10 Convertible Carrier Configurations and Capacities

SUN TOP AND WINDSHIELD (If Equipped)

⚠ WARNING

The sun top does not provide protection from roll over or falling objects.

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

The sun top and windshield provide some protection from the elements; however, they will not keep the operator and passenger dry in a downpour. This vehicle is not equipped with seat belts and the sun top has not been designed to provide roll over protection. In addition, the sun top does not protect against falling objects nor does the windshield protect against flying objects and tree limbs. Keep arms and legs inside of vehicle while it is moving.

SEATING AND STORAGE

⚠ WARNING

To prevent severe injury or death, rear seat passengers should hold on to both the hip restraints and the rear hand hold when the vehicle is in motion. Always be sure that all passengers are seated and holding on before operating vehicle.

Be sure that all passengers are seated and holding onto both the hip restraint and the rear hand-hold (rear facing passengers) before operating vehicle.

CARGO PLATFORM

⚠ WARNING

Passengers should never be allowed to ride on the cargo platform. Severe injury or death could result if they should fall out or the vehicle is involved in an accident or sudden maneuver.

⚠ CAUTION

To prevent damage to rear seat, be sure to move any obstructing accessories mounted to rear handrail when folding seat up or down.

The cargo platform is accessed by folding the rear seat down (Ref Fig. 11 on page 12). Be careful when loading the vehicle. Tie down loads to prevent shifting. Do not overload vehicle. The cargo platform is limited to a maximum load of 250 lbs (113 kg). The load must be positioned on the platform as far forward as possible, its center of gravity must not be higher than 4" (10 cm) above the platform, and securely fastened. Failure to follow these instructions could cause personal injury, damage to the vehicle and/or cause the vehicle to tip over. Be aware that increased loads may effect driving characteristics.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

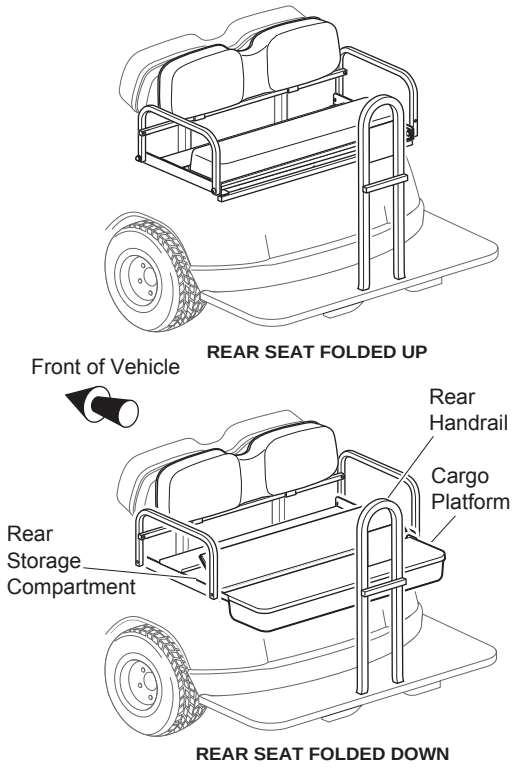


Fig. 11 Cargo Platform and Rear Compartment

REAR STORAGE COMPARTMENT

⚠ CAUTION

The rear storage compartment is not weather tight.

The rear storage compartment can be accessed with the rear seat folded down by reaching under the central portion of the cargo platform and lifting the platform up (Ref Fig. 11).

GLOVE COMPARTMENT

An optional lockable glove compartment is located on each side of the instrument panel (Ref Fig. 12).

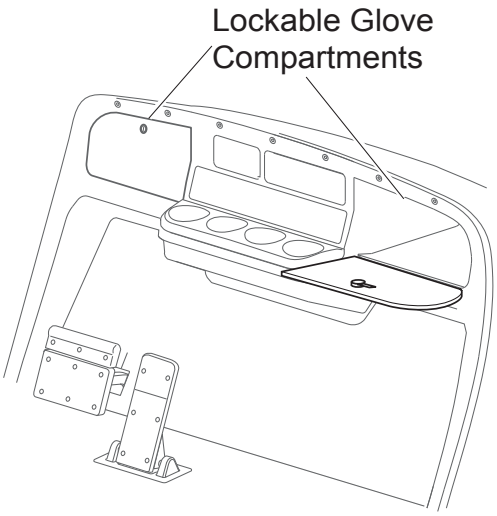


Fig. 12 Glove Compartments

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

VEHICLE CLEANING AND CARE

VEHICLE CLEANING

⚠ WARNING

To reduce the possibility of severe injury or vehicle damage, read and understand all instructions supplied by manufacturer of pressure washer.

⚠ CAUTION

When pressure washing exterior of vehicle, do not use pressure in excess of 700 psi (4825 Kpa). To reduce the possibility of 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. Using excessive water pressure may cause severe injury to operator or bystander, damage to seals, plastics, seat material, body finish or electrical system. Do not use pressure in excess of 700 psi (4825 Kpa) to wash exterior of vehicle.

Clean windshield 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 service parts department.

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 wipe 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 and mild detergent is required to preserve the painted surfaces.

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 will cause corrosion of underbody parts unless 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 it's removal, taking care not to chip or otherwise damage paint.

COMMON SENSE OPERATION

⚠ WARNING

To prevent severe injury or death, observe the following:

Never transport loaded firearms on or in vehicle.

Check that firearms are unloaded with the safety engaged and are properly secured with muzzle pointing in a safe direction before operating vehicle.

Be aware of other firearms in proximity to operator and passengers.

This vehicle is not a toy. If not operated properly and responsibly, it can cause severe injury or death to the operator, passengers or bystanders. All operators should possess a valid driver's license. Children should not be permitted to operate the vehicle. Children may not have the skill, judgement or strength to operate this or similar vehicles.

Alcohol, drugs and many over the counter medications reduce the ability of the driver to operate the vehicle safely. Always review side effects of any medication with a doctor or pharmacist before operating vehicle.

Protective clothing and an approved motorcycle helmet are recommended for operator and passengers when operating vehicle in rough or densely wooded terrain.

When driving at full speed on a dirt road, loose surfaces or wet grass, vehicle stopping distance will increase. If the vehicle is fully loaded, it will take longer to stop than with no load. When operating vehicle in wet weather conditions, remember that the brakes may need to be **lightly** applied in order to provide enough friction to dry the brake unit. If wet, the brakes will lose much of their effect.

Slow down when in unfamiliar terrain. Slow down when cresting a hill in an area that you are unfamiliar with.

Some hills are too steep to climb. If you attempt to climb a hill that is too steep or if you are unable to achieve adequate traction, **do not attempt to turn around on the hill. Slowly back straight down the hill using the service brake to control speed.**

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

ENVIRONMENTAL CONCERNS

⚠ WARNING

As a responsible user, practice respect for all wildlife and their habitat. Respect private property and comply with all local laws and regulations governing the use of light duty utility vehicles. To prevent severe injury or death while driving, be aware of the following:

Environmental hazards such as steep slopes, overhanging limbs, etc.

Danger of fire when vehicle is operated over dry combustible organic material.

When driving, be aware of environmental hazards such as steep slopes, overhanging limbs, etc. Be aware of the danger of fire when the gasoline powered vehicle is operated over dry combustible organic material.

REPAIR

LIFTING THE VEHICLE

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

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

⚠ WARNING

To reduce the possibility of severe injury or death 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 at the areas indicated only.

To raise the entire vehicle, install chocks in front and behind each front wheel (Ref Fig. 13 on page 14). Center the jack under the rear frame crossmember. Raise the vehicle enough to place 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.

Place the jack at the center of the front axle. Raise the vehicle enough to place jack stands under the frame crossmember 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 to stabilize the vehicle.

Lower the vehicle by reversing the lifting sequence.

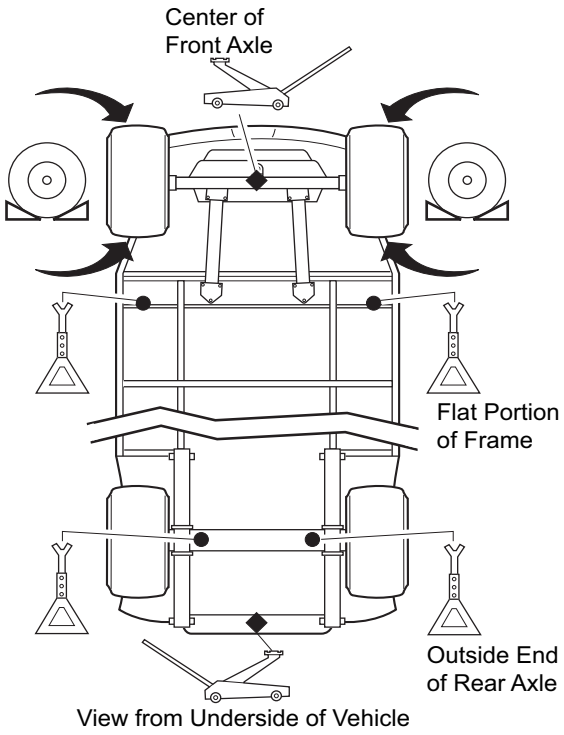


Fig. 13 Lifting the Vehicle

WHEELS AND TIRES

Tire Repair

Tool List	Qty.
Lug wrench, 3/4"	1
Impact socket, 3/4", 1/2" drive	1
Impact wrench, 1/2" drive	1
Torque wrench, 1/2” drive	1

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

⚠ WARNING

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

To reduce the possibility of tire explosion, pressurize tire with small amount of air applied intermittently to seat beads. Due to the low volume of the small tires, over inflation can occur in seconds. Never exceed the tire manufacturer's recommendation when seating a bead. Protect face and eyes from escaping air when removing valve core.

To reduce the possibility of severe injury caused by a broken socket when removing wheels, use only sockets designed for impact wrench use.

Use caution when inflating tires. Over inflation could cause the tire to separate from the wheel or cause the tire to explode, either of which could cause severe injury.

Do not use low inflation pressure tires on any E-Z-GO vehicle. Do not use any tire which has a recommended inflation pressure less than the inflation pressure recommended in Owner's Manual.

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

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 reduces the possibility of tires 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 sure to install the valve dust cap after checking or inflating.

The vehicle is fitted with low pressure tubeless tires mounted on one piece rims; therefore, the most cost effective way to repair a puncture in the tread is to use a commercial tire plug.

NOTICE

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 instructions.

⚠ WARNING

To reduce the possibility of severe injury, be sure mounting/demounting machine is anchored to floor. Wear OSHA approved safety equipment when mounting/demounting tires.

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

Wheel Installation

⚠ CAUTION

To reduce the possibility of component damage, do not tighten lug nuts to more than 85 ft. lbs. (115 Nm) torque.

NOTICE

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

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 16). Tighten lug nuts to 50 - 85 ft. lbs. (70 - 115 Nm) torque in 20 ft. lbs. (30 Nm) increments following the 'cross sequence' pattern.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

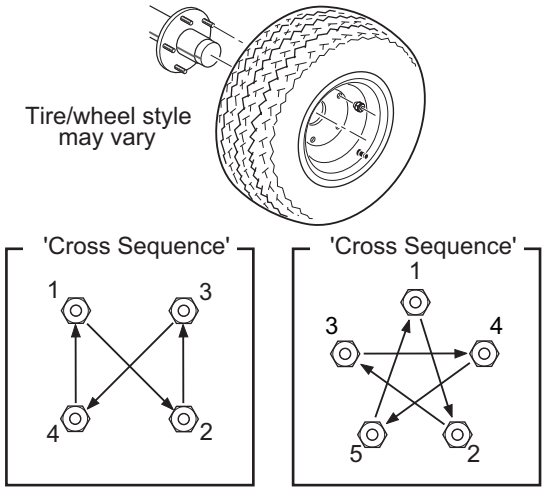


Fig. 14 Wheel Installation

UNIDIRECTIONAL TIRES

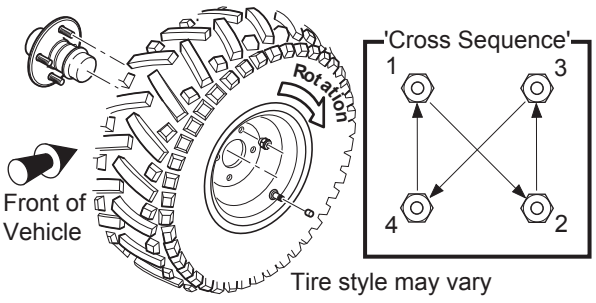


Fig. 15 Unidirectional Tire Wheel Installation

Some vehicles may be fitted with unidirectional tires. These tires may be identified by a directional arrow on the sidewall. Be sure to position the wheel on hub correctly with arrow indicating direction of rotation when moving forward.

LIGHT BULB REPLACEMENT

⚠ CAUTION

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

For vehicles with headlights mounted in cowl, locate the two screws on backside of cowl that secure headlight (Ref Fig. 16 on page 16). Remove screws, pull headlight out and disconnect wires. Connect wires to new headlight, install in cowl and secure with screws previously removed.

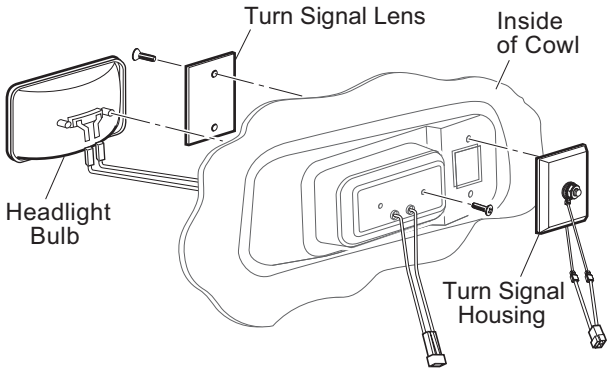


Fig. 16 Headlight and Turn Signal Bulb Replacement

To replace the turn signal light bulb, support turn signal housing from backside of cowl while removing two screws securing lens. Install new bulb and replace lens.

To replace the tail and brake light bulb, roll the rubber bezel from around the edge of the taillight and remove lens. Install replacement bulb and replace lens.

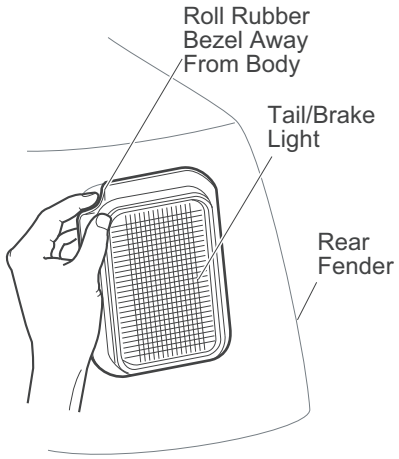


Fig. 17 Tail and Brake Light Bulb Replacement

FUSE REPLACEMENT

To replace fuses, locate the fuse block under the driver side seat. Pull out old fuse and replace with a new automotive type fuse. Headlight and taillight bulbs and fuses are available from a local Distributor, an authorized Branch or the Service Parts Department.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

TRANSPORTING VEHICLE

TOWING

⚠ WARNING

This vehicle is not designed to be towed.

It is recommended that the vehicle be moved by placing the entire vehicle on a trailer, flatbed truck or other suitable transport.

HAULING

⚠ WARNING

To reduce the possibility of severe injury or death while transporting vehicle:

Secure the vehicle and contents.

Never ride on vehicle being transported.

Always remove windshield before transporting.

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

If the vehicle is to be transported at highway speeds, the sun top must be removed and the seat bottom secured. When transporting vehicle below highway speeds, check for tightness of hardware and cracks in sun top at mounting points. Always remove windshield when transporting. Always check that the vehicle and contents are adequately secured before transporting. The rated capacity of the trailer or truck must exceed the weight of the vehicle (see GENERAL SPECIFICATIONS for vehicle weight) and load plus 1000 lbs. (454 kg). Lock the park brake and secure the vehicle using ratchet tie downs.

SERVICE AND MAINTENANCE

⚠ WARNING

To reduce the possibility of severe injury or death from improper servicing techniques:

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 and vehicle properly supported on jack stands.

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

Wear eye protection when working on the vehicle. Use extra 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 battery before removing battery wires.

Wrap wrenches with vinyl tape to reduce the possibility of a dropped wrench 'shorting out' a battery, which could result in an explosion.

The electrolyte in a 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.

Any electrolyte spills should be neutralized with a solution of 2 teaspoons (10 ml) sodium bicarbonate (baking soda) dissolved in 1 quart (1 liters) of water and flushed with water.

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

It is in the best interest of both vehicle owner and service technician, to carefully follow the procedures recommended in this manual. Preventative maintenance, applied at recommended intervals, is the best guarantee for keeping the vehicle both dependable and economical.

⚠ CAUTION

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

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

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

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. 19 on page 19). Refer to Lubrication Points for appropriate lubrication locations (Ref Fig. 21 on page 20)

⚠ CAUTION

To prolong vehicle life, some maintenance items must be serviced more frequently on vehicles used under severe driving conditions such as extreme temperatures, extreme dust/debris conditions, frequent use with maximum load.

To access powertrain for routine maintenance, lift or remove seat. For major repair, refer to appropriate Technician's Repair and Service Manual.

Some service procedures may require the vehicle to be lifted. Refer to LIFTING THE VEHICLE for proper lifting procedure and safety information.

SERIAL NUMBER PLATE AND LOCATION

The serial number and manufacture date code label are on the vehicle. One is placed on the body below the front, driver side of the seat. The other is located on the chassis under the seat.

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

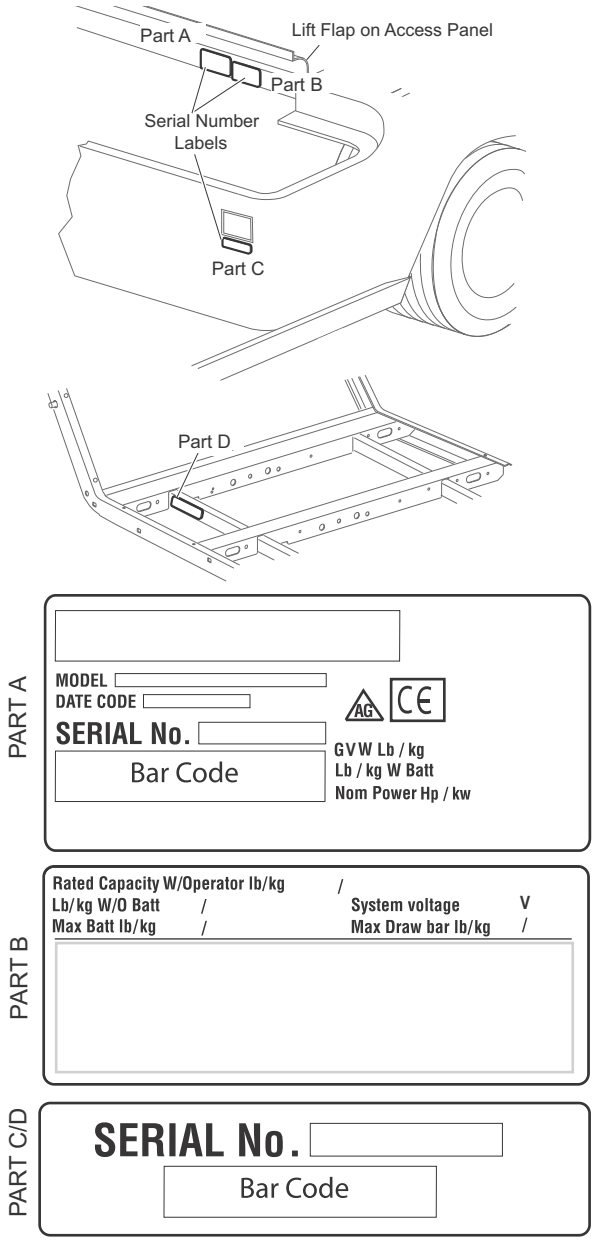


Fig. 18 Serial Number Plate and Location

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

PERIODIC SERVICE SCHEDULE

✓ Check ♦ Clean, Adjust, etc. ▲ Replace

To perform service that is listed in this schedule but not described in this manual, contact a local Service Representative or see the Repair and Service Manual for this vehicle.

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

DAILY	
	BEFORE USE: ✓ Check service brake general operation ✓ Check park brake function ✓ Check warning device function in reverse ✓ Check tire condition ✓ Check overall vehicle condition ♦ Recharge batteries to full state of charge after each day's use ✓ Inspect charger connector and receptacle at each charge
WEEKLY	
TIRES	✓ Examine for cuts, excessive wear and pressure (See GENERAL SPECIFICATIONS)
WHEELS	✓ Check for bent rims, missing or loose lug nuts
MONTHLY - 20 HOURS (includes items listed in previous table & the following)	
BATTERIES	♦ Clean batteries & terminals. See BATTERY CLEANING. ✓ Check charge condition and all connections ✓ Check battery water
WIRING	✓ Check all wiring for loose connections and broken/missing insulation
CHARGER / RECEPTACLE	♦ Clean connections, keep receptacles free of dirt and foreign matter
ACCELERATOR	✓ Check for smooth movement
SERVICE BRAKE (MECHANICAL BRAKES)	✓ Conduct brake performance test
PARK BRAKE	✓ Check brake performance and adjust if required
DIRECTION SELECTOR	✓ Check attachment, tighten if required
STEERING ASSEMBLY	✓ Check for abnormal play, tightness of all hardware
TIE ROD/LINKAGES	✓ Check for excessive play, bent components or loose connections
CONTROLLER	✓ Check for Controller braking force for proper operation of system
REAR AXLE	✓ Check for leakage, add SAE 30 oil as required
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
PARK BRAKE	✓ Check for bent/binding linkage rod ✓ Check for damage or wear to latch arm or catch bracket ♦ Lubricate as required, use light oil. DO NOT LUBRICATE CABLES OR BRAKE LATCH
REAR SHOCK ABSORBERS	✓ Check for oil leakage, loose mounting hardware
HARDWARE AND FASTENERS	✓ Check for loose or missing hardware and components ♦ Tighten or replace missing hardware

Fig. 19 Periodic Service Schedule

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

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
STEERING ASSEMBLY	✓ Check bellows and pinion seal for damage or grease leakage
RACK END BALL JOINT	♦ Lubricate, use wheel bearing grease
REAR AXLE	✓ Check for unusual noise and loose or missing mounting hardware
ANNUAL - 250-300 HOURS (includes items listed in previous tables & the following)	
FRONT WHEEL BEARINGS	✓ Check and adjust as required, see Technician's Repair and Service Manual
REAR AXLE	✓ Check lubricant, add lubricant (SAE 30 oil) as required
SERVICE BRAKES	♦ Clean and adjust, see Technician's Repair and Service Manual
	✓ Check brake shoe linings, see Technician's Repair and Service Manual

Fig. 19 Periodic Service Schedule

REAR AXLE

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

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 lubricant 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, vehicle must be elevated and the oil pan removed or the oil siphoned through the check/fill hole.

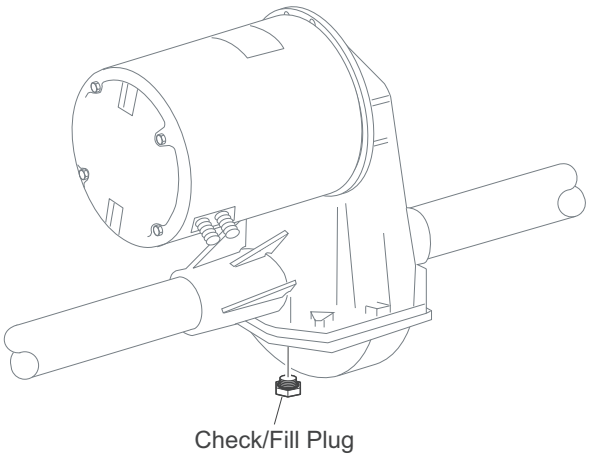


Fig. 20 Add, Check and Drain Axle Lubricant

LUBRICATION

⚠ CAUTION

Do not use more than three (3) pumps of grease in any grease fitting at any one time. Excess grease may cause grease seals to fail or grease migration into areas that could damage components.

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

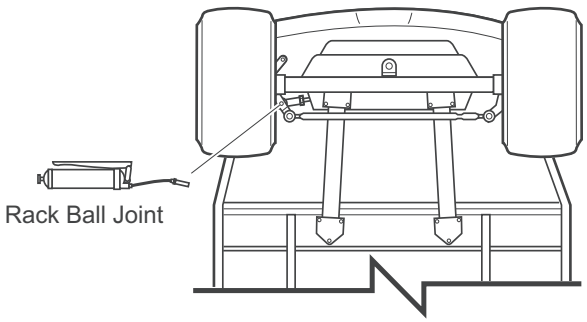


Fig. 21 Lubrication Points

TIRE INSPECTION

Tire condition should be inspected per the Periodic Service Schedule. Inflation pressures should be checked when the tires are cool. Be sure to install the valve dust cap after checking or inflating.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

BRAKES

⚠ WARNING

To reduce the possibility of severe injury or death, always evaluate pedal travel before operating a vehicle to verify some braking function is present.

All driving brake tests must be done in a safe location with regard for the safety of all personnel.

NOTICE

Over time, a subtle loss of performance may take place; therefore, it is important to establish the standard with a new vehicle.

The Periodic Brake Performance Test should be performed regularly (Ref. Fig. 22 on page 21) as an evaluation of braking system performance. It is useful as a method of identifying subtle loss of performance over time.

Periodic Brake Test for Mechanical Brakes

The purpose of this test is to compare the braking performance of the vehicle to the braking performance of new or 'known to be good' vehicles or to an established acceptable stopping distance. Actual stopping distances will be influenced by weather conditions, terrain, road surface condition, actual vehicle weight (accessories installed) and vehicle speed. No specific braking distance can be reliably specified. The test is conducted by latching the parking brake to eliminate different pedal pressures and to include the affects of linkage misadjustment.

Establish the acceptable stopping distance by testing a new or 'known to be good' vehicle and recording the stopping location or stopping distance. For fleets of vehicles, several vehicles should be tested when new and the range of stopping locations or distances recorded.

NOTICE

Over time, a subtle loss of performance may take place; therefore, it is important to establish the standard with a new vehicle.

Drive the vehicle at maximum speed on a flat, dry, clean, paved surface. Quickly depress the brake pedal to latch the parking brake at the line or marker in the test area and remove foot from pedal. The vehicle should stop aggressively. The wheel brakes may or may not lock. Observe the vehicle stopping location or measure the vehicle stopping distance from the point at which the brakes were latched. The vehicle should stop within the 'normal' range of stopping distances. If the vehicle stops more than 4 ft. (1.2 m) beyond the acceptable stopping distance or pulls to one side, the vehicle has failed the test and should be tested again.

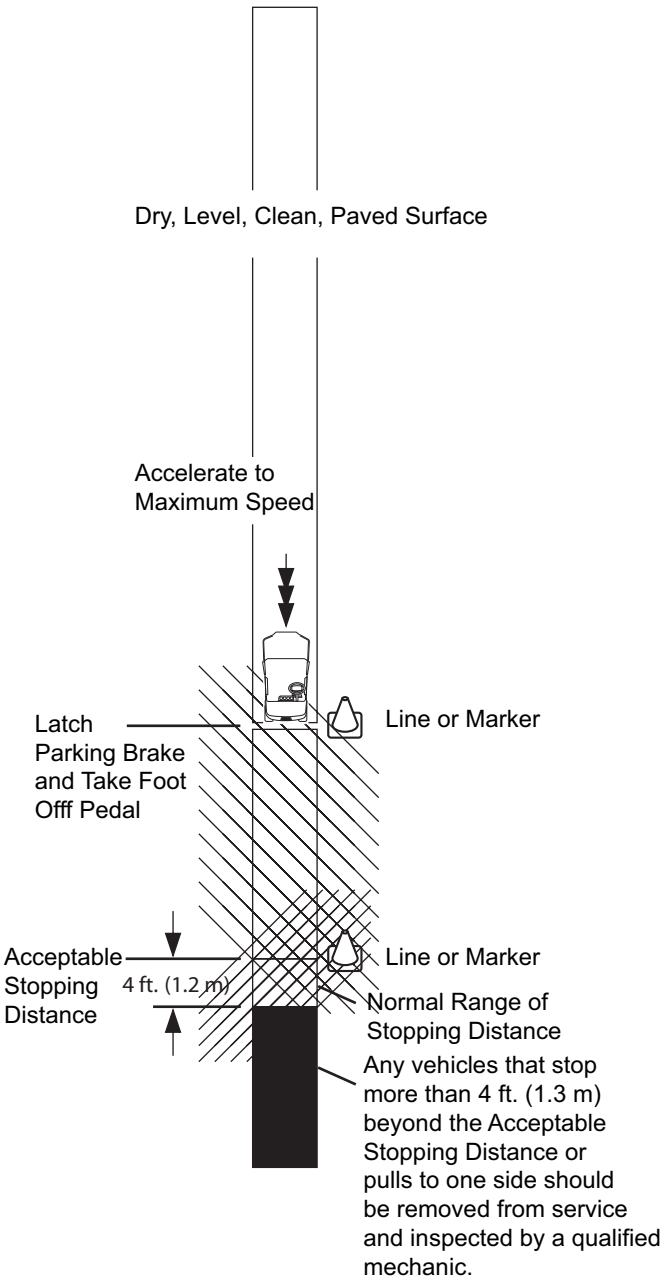


Fig. 22 Typical Brake Performance Test

If the vehicle fails the second test, it should **immediately** be removed from service. The vehicle **must** be inspected by a qualified mechanic who should refer to the TROUBLESHOOTING section in the Technician's Repair and Service Manual.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

HARDWARE

Periodically, the vehicle should be inspected for loose fasteners. Fasteners should be tightened in accordance with the Torque Specifications table.

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

Generally, three grades of hardware are used in the vehicle. Grade 5 hardware can be identified by the three marks on the hexagonal head and grade 8 hardware is identified by 6 marks on the head. Unmarked hardware is Grade 2.

CAPACITIES AND REPLACEMENT PARTS

Rear Axle Oil	40 oz (1.2 liters)
Fuse	15 amp (P/N 18392-G1)
Headlight Bulb	#894 (P/N 74004-G01)
Marker Bulb	#912 (P/N 74005-G01)
Turn Signal Bulb	#921 (P/N 74006-G01)
Tail Light Bulb	#1157 (P/N 21759-G1)

Fig. 23 Capacities and Replacement Parts

ALL TORQUE VALUES ARE IN FT. LBS. (Nm)
Unless otherwise noted in text, tighten all hardware in accordance with this chart.
This chart 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)
Grade 8	6 (8)	18 (24)	35 (47)	55 (75)	80 (108)	110 (149)	170 (230)	280 (380)	460 (624)	680 (922)
BOLT SIZE	M4	M5	M6	M8	M10	M12	M14			
Class 5.8 (Grade 2)	1 (2)	2 (3)	4 (6)	10 (14)	20 (27)	35 (47)	55 (76.4)			
Class 8.8 (Grade 5)	2 (3)	4 (6)	7 (10)	18 (24)	35 (47)	61 (83)	97 (131)			
Class 10.9 (Grade 8)	3 (4)	6 (8)	10 (14)	25 (34)	49 (66)	86 (117)	136 (184)			

Fig. 24 Torque Specifications and Bolt Grades

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

BATTERIES AND CHARGING

SAFETY

NOTICE

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. Do not 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.**
Insulated Wrench, 9/16"	1
Battery Carrier	1
Hydrometer	1
Battery Maintenance Kit P/N 25587-G01	1
Battery Protective Spray	1

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

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.

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.

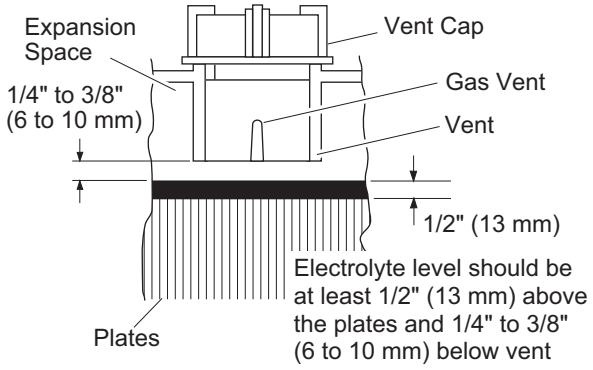


Fig. 25 Correct Electrolyte Level

⚠ 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.

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. 26 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 Battery Maintenance Kit (P/N 25587-G01) can be used with an approved water source (Ref Fig. 27 on page 25). These watering devices are **fast and accurate** to use and maintain the correct electrolyte level within the battery cells.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

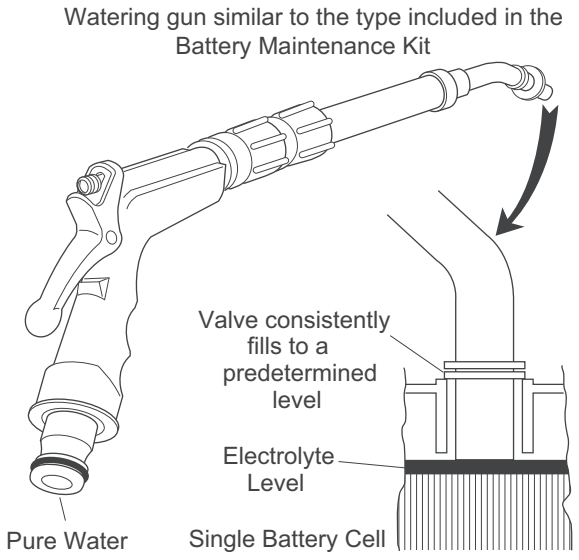


Fig. 27 Automatic Watering Gun

NOTICE

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

Battery Cleaning

⚠ CAUTION

To prevent battery damage, be sure that all battery caps (if equipped) are tightly installed.

To reduce the possibility of damage to vehicle or floor, neutralize acid before rinsing battery.

To reduce the possibility of damage to electrical components while cleaning, do not use a pressure washer.

Cleaning should take place per the Periodic Service Schedule (Ref. Fig. 19 on page 19).

When cleaning the outside of batteries and terminals, first spray with a solution of sodium bicarbonate (baking soda) and water to neutralize any acid deposits before rinsing with clear water.

Use of a water hose without first neutralizing any acid will move acid from the top of batteries to another area of the vehicle or storage facility where it will attack the metal structure or the concrete/asphalt floor. Additionally, conductive residue will remain on the batteries and contribute to their self discharge.

⚠ WARNING

To reduce the possibility of battery explosion that could result in severe injury or death, do not use metallic spray wand to clean battery and keep all smoking materials, open flame or sparks away from the battery.

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 or plastic spray bottle**. The solution should consist of the ingredients shown in the illustration (Ref Fig. 28 on page 25). In addition, special attention should be paid to metal components adjacent to the batteries which should also be sprayed with the 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 to remove any conductive residue. Rinse the entire area with low pressure clear water. Do not use a pressure washer. All of the items required for complete battery cleaning and watering (electric vehicles only) are contained in the Battery Maintenance Kit (P/N 25587-G01).

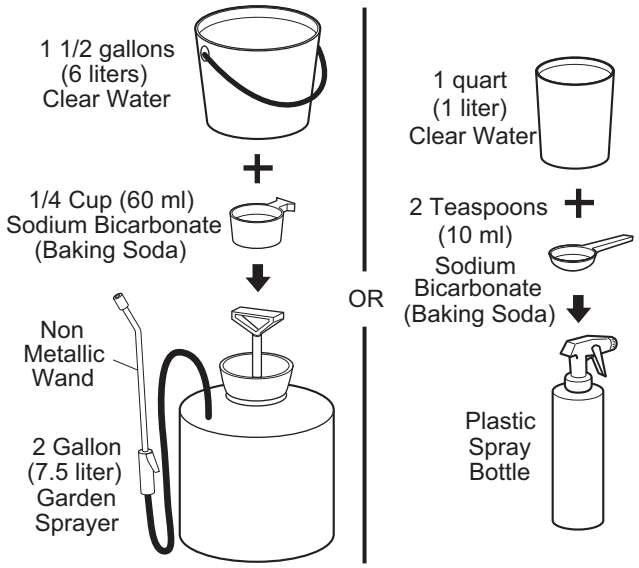


Fig. 28 Preparing Acid Neutralizing Solution

Battery Replacement

⚠ CAUTION

Before any electrical service is performed on TruCourse technology model vehicles, the Run-Tow/Maintenance switch must be placed in the 'Tow/Maintenance' position.

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

Remove battery hold downs and cables. Lift out batteries with a commercially available lifting device.

If the batteries have been cleaned and any acid in the battery rack area neutralized as recommended, 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 below. Tighten the battery post hardware to 90 - 100 in. lbs. (6 - 8 Nm) torque. Do not over-torque the terminal stud nut, this will cause a “mushroom” effect on the battery post which will prevent the terminal nut from being properly tightened.

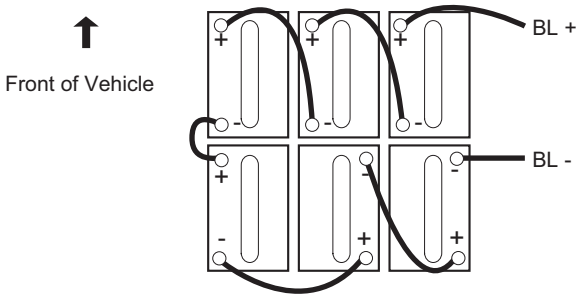


Fig. 29 Battery Connections

Prolonged Storage

⚠ CAUTION

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.

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. 30 on page 27). 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.

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.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

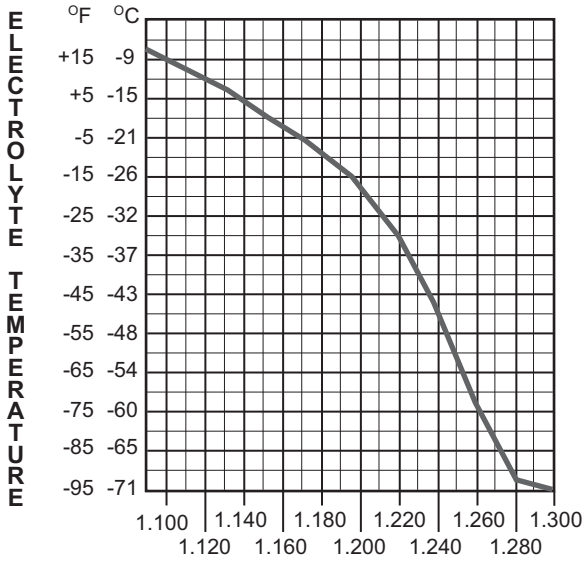


Fig. 30 Freezing Point of Electrolyte

⚠ CAUTION

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

Before charging, the following should be observed:

- 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.

NOTICE

In some portable chargers, there will be a rattle present in the body of the charger 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 a manufacturer 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 following manufacturer's recommendations.

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.

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

Hydrometer

A hydrometer is used to test the state of charge of a battery cell (Ref Fig. 31 on page 28). 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.

⚠ 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.

NOTICE

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.

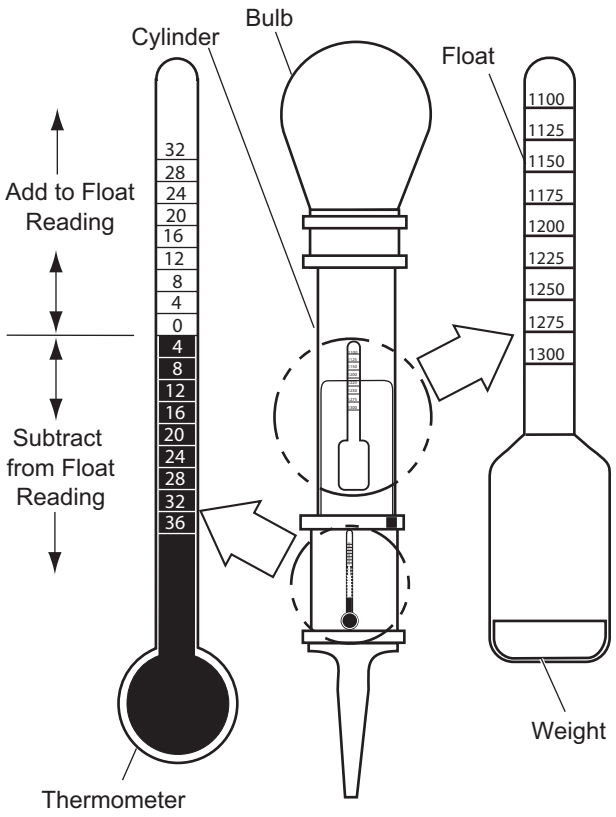


Fig. 31 Hydrometer

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

Using a Hydrometer

1. Draw electrolyte into the hydrometer several times to permit th e the rmometer to ad just to the e lectrolyte 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 th e m inimum q uantity of el ectrolyte into th e hydrometer to p ermit the fl oat to fl oat f reely wi thout 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 o r s ubtract fou r poi nts (.004) to the reading for every 10 ° F (6°C) the el ectrolyte temperature is above or below 80° F (27° C). Adjust the reading to conform wi th th e electrolyte te mperature, e.g., i f th e reading indicates a specific gravity of 1.250 and the electrolyte temperature i s 90° F (32° C), **add** fo ur points (.004) t o the 1.25 0 wh ich gi ves a co rrected reading of 1.254. Similarly if the temperature was 70° F (21° C), **subtract** four p oints (.004) fr om th e 1.250 to gi ve a corrected reading of 1.246 (Ref Fig. 32 on page 29).
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.

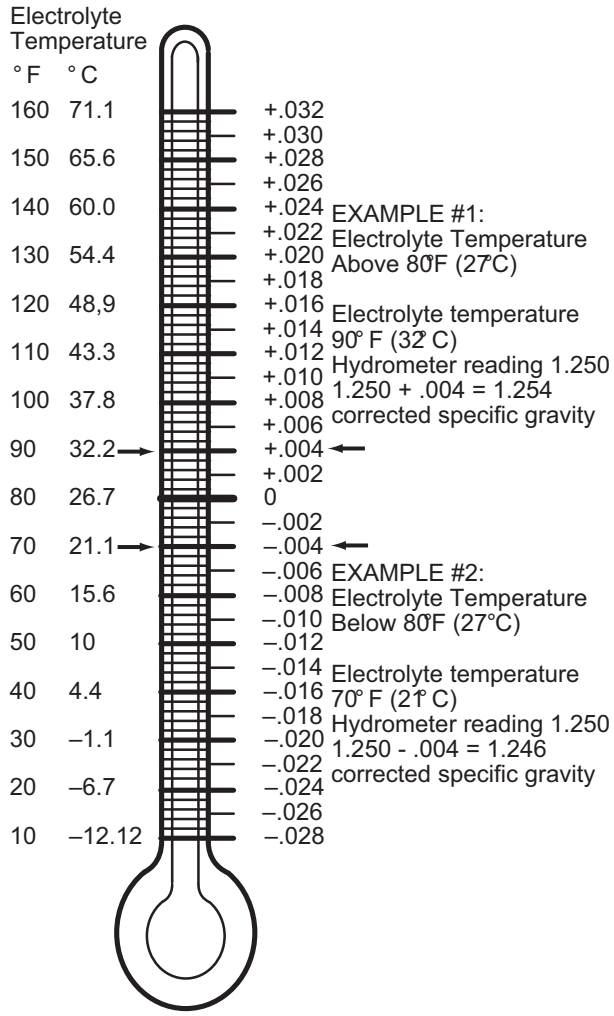


Fig. 32 Hydrometer Temperature Correction

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

NOTES:

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

MODEL: LTO Electric
TYPE: ELECTRIC POWERED PERSONNEL CARRIER
MODEL YEAR: 2011
Part No:. 617796

PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

TruCourse Technology: Programmable to multiple vehcle terrains, with expanded regenerative braking function, and vehicle charger lockout

- Solid State continuously variable seperately excited speed controller
- Dash mounted direction selector switch (Forward-Neutral-Reverse)
- Anti-roll back, walkaway braking and alarm
- Programmable regenerative braking, acceleration and speed
- Six, 8 Volt Deep Cycle Batteries
- Full torque, reduced speed reverse
- Inductive throttle sensor
- Handheld vehicle diagnostics and round tracking

Battery Charger: PowerWise 48QE high frequency, fully line compensating. 10ft (3m) DC Cord. Underwriters Lab. (U.L.) Listed, (C.S.A. Certified)

- Input: 120 Volts AC, 50/60Hz, 8 amps
- Output: 48 Volts DC at 13 amps

Motor: 48 Volt DC shunt wound, brazed armature, solid copper windings
Drive Train: Direct motor shaft connected to transaxle pinion shaft
Electrical System: 48 Volt DC, six, 8 volt deep cycle batteries (117 minute minimum, 170 amp-hour @ 20 hr. discharge rate)
Transaxle: Differential with helical gears
Brakes: Dual rear wheel mechanical self-adjusting drum brakes. Automatic single point park brake release with self-compensating system
Capacity: Seating for 4 persons. Rear Seat converts to Cargo Bed

PRODUCT OVERVIEW

Dimensions	
Overall Length	105.3.0 in (267 cm)
Overall Width	48.5 in (123 cm)
Overall Height (No Canopy)	52.4 in (133 cm) (Top of steering wheel)
Overall Height (With Canopy)	74.5.0 in (189cm) (Top of Sun Canopy)
Wheel Base	65.5 in (166 cm)
Front Wheel Track	38.0 in (97 cm)
Rear Wheel Track	38.5 in (98 cm)
Gnd Clearance @ Differential	5.5 in (14 cm)
Load Bed Width	40.0 in (102 cm)
Load Bed Length	32.0 in (81 cm)
Vehicle Power	
Power Source	48 Volts DC
Motor Type	Shunt Wound
Horsepower (kW)	3.0 HP (2.2kW) Continuous
Electrical System	48 Volt
Batteries (Qty, Type)	Six, 8 Volt Deep Cycle
Key or Pedal Start	Pedal Start
Battery Charger	48 VDC PowerWise™ QE, 120 VAC, UL/CSA
Speed Controller	250 Amp Solid State Controller
Drive Train	Motor Shaft Direct Drive
Transaxle	Differential with helical gears
Gear Selection	Dash Mounted Forward-Neutral-Reverse
Rear Axle Ratio	14.76:1

Performance	
Seating Capacity	4 Person
Dry Weight	675 lb (306kg) (Without Batteries)
Curb Weight	1040 lb (472kg) Trojan T-875
Vehicle load capacity	800 lb (363 kg)
Outside Clearance Circle	19 ft (5.8 m)
Intersecting Aisle Clearance	N/A
Speed (Level Ground)	17.5 mph ± 0.5 mph (28.2 kph ± 0.8 kph)
Towing Capacity	N/A
Steering & Suspension	
Steering	Self-compensating rack and pinion
Front Suspension	Leaf springs with hydraulic shock absorbers
Rear Suspension	Leaf springs with hydraulic shock absorbers
Service Brake	Rear wheel mechanical self-adjusting drum
Parking Brake	Self-compensating, single point engagement
Front Tires	Trail Wolf 20 x 11 - 10 Uni-directional
Rear Tires	Trail Wolf 20 x 11 - 10 Uni-directional
Body & Chassis	
Frame	Welded steel with DuraShield™ powder coat
Front Body & Finish	Injection Molded TPO
Rear Body & Finish	Injection molded TPO
Standard Color	Realtree™ AP

Some items shown may be optional equipment

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.

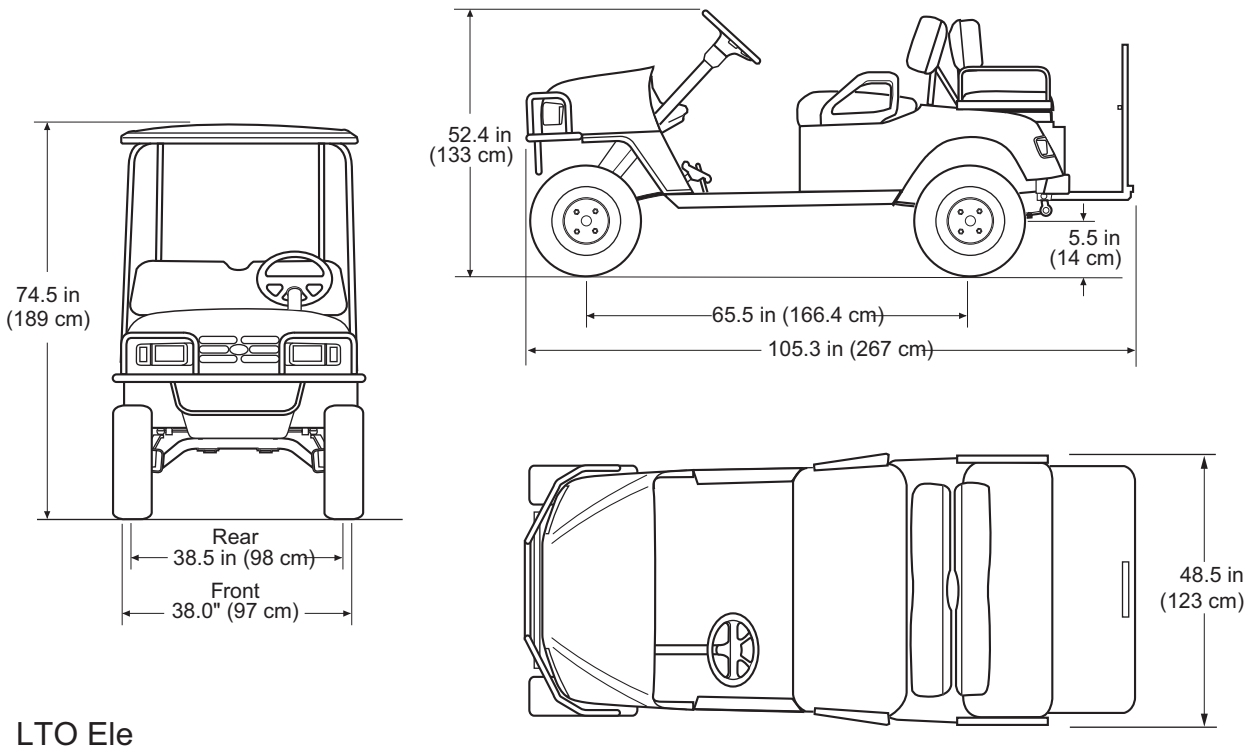
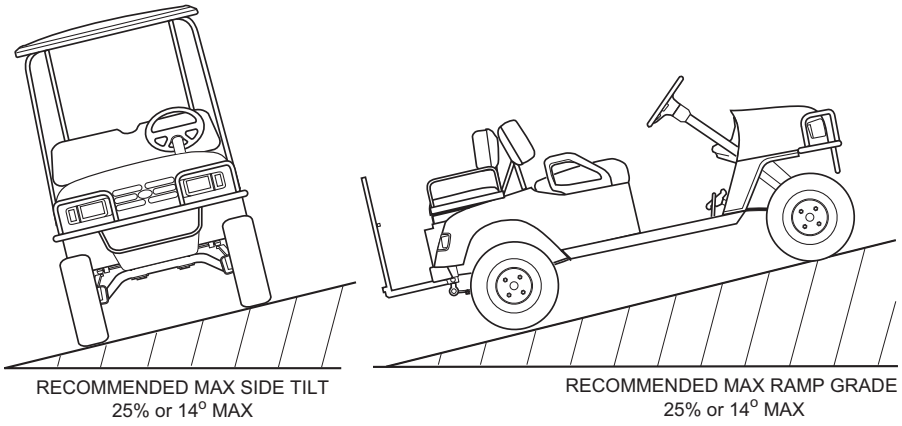


Fig. 33 Vehicle Dimension

Read all of manual to become familiar with vehicle. Pay attention to all NOTICES, CAUTIONS, WARNINGS and DANGERS.



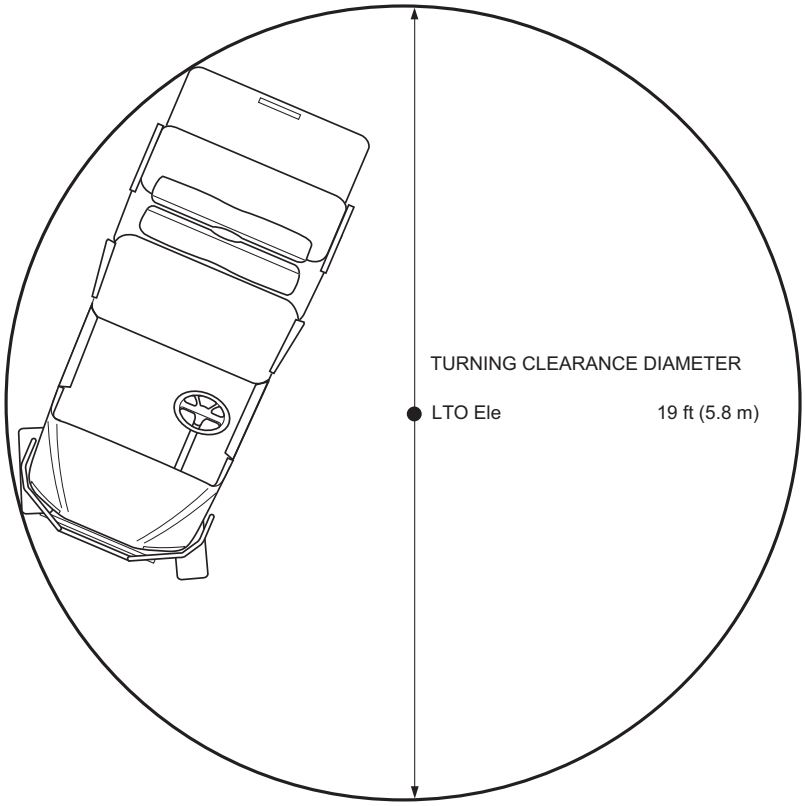


Fig. 34 Vehicle Dimensions, Incline Specifications and Turning Clearance Diameter

NOTICE

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 grass, 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.

NOTICE

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

To prevent personal injury or death, observe the following:

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.

BAD BOY
BUGGIES

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