



OWNER'S GUIDE
RECOIL iS

ISSUED JULY 2014

640689-K

REVISED JUNE 2016

WELCOME

Thank you for purchasing this vehicle. Before driving the vehicle, please take time to read and understand this entire Owner's Manual. This manual contains important safety information, as well as information that will assist in maintaining the vehicle for optimum performance.

This manual may cover the operation of several different models or show items that are optional; therefore, some illustrations/images may not be representative of all models.

Most service procedures can be accomplished using common tools. Perform service procedures at intervals shown in the Periodic Service Schedule located elsewhere in this manual.

Repair or replacement parts are available through your TEXTRON SPECIALIZED VEHICLES retailer.

The following information is needed when contacting us concerning service or parts for your vehicle:

Vehicle Model: _____

PIN or Serial Number: _____

Manufacture Date Code: _____

OWNER'S MANUAL ELECTRIC POWERED VEHICLE

RECOIL iS

STARTING MODEL YEAR 2015

CALIFORNIA Proposition 65 Warning

WARNING: Motor vehicles may contain fuels, oils and fluids, battery posts, terminals, and related accessories which contain lead and lead compounds and other chemicals identified by the State of California to potentially cause cancer, birth defects, and other reproductive harm. These chemicals are found in vehicles, vehicle parts and accessories, both new and replacements. During maintenance, these vehicles generate used oil, waste fluids, grease, fumes, and particulates, all identified by the State of California to potentially cause cancer, birth defects, and other reproductive harm.

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease its stability or increase the speed beyond the factory specifications. Such modifications can cause serious personal injury or death. Textron Specialized Vehicles prohibits and disclaims responsibility for any such modifications or any other alteration which would adversely affect the safety of the vehicle.

TSV reserves the right to incorporate engineering and design changes to products in this manual, without obligation to include these changes on units sold previously.

The information contained in this manual may be revised periodically by TSV, and therefore is subject to change without notice.

TSV DISCLAIMS LIABILITY FOR ERRORS IN THIS MANUAL, and SPECIFICALLY DISCLAIMS LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES resulting from the use of the information and materials in this manual.

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

TO CONTACT US:

Textron Specialized Vehicles, Inc.

1451 Marvin Griffin Road

Augusta, Georgia, USA 30906-3852

NORTH AMERICA:

Technical Assistance & Warranty PHONE: 1-800-774-3946, FAX: 1-800-448-8124

Service Parts PHONE: 1-888-438-3946, FAX: 1-800-752-6175

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

For parts and repair, contact local dealer. Dealers can be located at www.BADBOYOFFROAD.com

FORWARD

This vehicle has been designed and manufactured in the United States of America (USA). 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.

BATTERY PROLONGED STORAGE

Batteries self-discharge over time. The rate of self-discharge varies depending on the ambient temperature, the age and condition of the batteries.

Fully charged batteries 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 may be left connected to the vehicle to maintain a full charge on the batteries, provided the charger is plugged into an active electrical source. If power to the electrical source is disconnected or interrupted, the battery charger will continue to check the charge on the battery pack. This will draw power from the battery pack and eventually drain the batteries if power is not restored in a timely manner.

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

Check and maintain the proper fluid level in all battery cells during the storage period. Proper fluid level is required for maximum battery performance.

BATTERY DISPOSAL

Lead-acid batteries are recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For neutralized spills, place residue in acid-resistant containers with absorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

WARRANTY

Separate inserts supplied in packaging with the vehicle provide information on Product Warranty and Emissions Warranty. Failure to follow instructions for emission parts replacement may violate Federal Law (40 CFR part 1068.105 (b)) and be subject to fines and other penalties as described in the Clean Air Act.

SAFETY

GENERAL	1
NOTICES, CAUTIONS, WARNINGS, AND DANGERS	1
GENERAL OPERATION	2
MAINTENANCE	4
VENTILATION	4
LABELS AND PICTOGRAMS	5
LABELS AND PICTOGRAMS	6

GENERAL SPECIFICATIONS

VEHICLE DIMENSIONS AND INCLINE INFORMATION	8
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INTRODUCTION

FEATURES	11
General Information	11
Key Switch / Direction Selector	11
State of Charge Meter	11
Park Brake Light	11
Light Switch	11
Max Speed / Range Switch	12
Auxiliary Switch Positions	12
12 Volt Power Outlet	12
Cupholder	12
Accelerator Pedal	12
Brake Pedal	12
Park Brake	12
Charger Receptacle	12
Truck Bed Latch	13
Truck Bed	13
Taillights	13
Head Protection	13
Side Nets	13
Seat Belts	13
Rear Seat / Load Deck (If Equipped)	14
OPS / Top / Windshield	14

OPERATING PROCEDURES

TABLE OF CONTENTS

PIN AND SERIAL NUMBER LOCATION.....	15
BEFORE INITIAL USE.....	16
PORTABLE CHARGER.....	17
Using the Charger	18
OPERATING THE VEHICLE	19
Key Switch Operation	20
Max Speed / Range Switch	20
Light Switch Operation	20
Brake Operation	20
Park Brake Operation	20
Accelerator Operation	20
Truck Bed Latch Operation	21
Seat Belt Operation	21
COMMON SENSE OPERATION.....	22
ENVIRONMENTAL CONCERNS	22
STARTING AND DRIVING	22
Starting the Vehicle on a Hill	23
COASTING	23
TOWING A TRAILER.....	23
TERRAIN	23
TRUCK BED	24
REAR FACING SEAT / LOAD DECK	24
WINCH OPERATION (IF EQUIPPED WITH WINCH)	24
Winch Application	24

MAINTENANCE

VEHICLE CLEANING AND CARE.....	29
ROUTINE MAINTENANCE.....	29
LIFTING THE VEHICLE.....	30
Lift Entire Vehicle	30
Lift Front of Vehicle	30
Lift Rear of Vehicle	31
Lower Vehicle	31
LIGHT BULB REPLACEMENT	31
Headlight Bulb	31
Taillight Bulb	31

WHEELS AND TIRES	32
Tire Repair	32
Wheel Installation	33
Unidirectional Tires	33
WHEEL ALIGNMENT	33
Wheel Alignment	33
BRAKES.....	34
Master Cylinder	34
Bleeding Brakes	34
Park Brake Adjustment	35
POWERTRAIN.....	35
AXLES.....	36
Front and Rear Axles	36
Checking the Lubricant Level	36
BATTERY CHARGING AND MAINTENANCE	37
Battery Safety	37
Battery Disposal	37
Battery	38
Battery Maintenance	38
At Each Charging Cycle	38
Monthly	38
Temperature Affects Battery Capacity	39
Electrolyte Level and Water	39
Cleaning Batteries	41
Battery Removal and Installation	42
Prolonged Storage	42
Battery Charging	43
BATTERY TROUBLESHOOTING	43
HYDROMETER.....	43
Using A Hydrometer	44
HARDWARE	45
CAPACITIES AND REPLACEMENT PARTS	45
PERIODIC SERVICE SCHEDULE	
PERIODIC SERVICE SCHEDULE	47

TABLE OF CONTENTS

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

SAFETY

GENERAL

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

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

On steep hills, it is possible for vehicle to obtain higher speeds than possible on flat ground. To prevent loss of vehicle control and possible serious injury, speeds should be limited to no more than the maximum level ground speed. See GENERAL SPECIFICATIONS. Limit speed by applying the 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.

NOTICES, CAUTIONS, WARNINGS, AND DANGERS

Throughout this guide **NOTICE**, **CAUTION**, **WARNING**, and **DANGER** will be used. Please observe these **NOTICES**, **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.

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.

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 TSV manufactured vehicle to permit the vehicle to operate at or in excess of 20 mph on public streets or roads. When an TSV 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.

SAFETY

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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 web site for the U.S. Department of Transportation - at Dockets and Regulation, then to Title 49 of the Code of Federal Regulations (Transportation).

TSV will NOT approve Distributor, Dealer or customer modifications converting TSV products into LSV's.

The Company recommends that all TSV 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.

All customers should adhere to this SAFETY RESTRICTION, in connection with the use of all TSV products, new and used, the Distributor or Dealer has reason to believe may be operated in personal transportation applications.

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 replace 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. TSV strongly suggests that all users and maintenance personnel read this entire manual paying particular attention to the CAUTIONS, WARNINGS and DANGERS contained therein.

For questions regarding this vehicle, contact your TEXTRON SPECIALIZED VEHICLES dealer or write to the address on the back cover of this publication, Attention: Customer Care Department.

TSV reserves the right to make design changes without obligation to make these changes on units previously sold. The information contained in this manual is subject to change without notice.

TSV IS NOT LIABLE FOR ERRORS IN THIS MANUAL. TSV 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.

Vehicle is designed and manufactured for off-road use. It DOES NOT conform to Federal Motor Vehicle Safety Standards of the United States of America (USA) and is not equipped for operation on public streets.

Refer to GENERAL SPECIFICATIONS for vehicle seating capacity.

WARNING

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

Never modify the vehicle in any way that will alter the weight distribution of the vehicle, decrease it's stability, or increase the speed or extent the stopping distance beyond the factory specification. TSV prohibits and disclaims responsibility for all such modifications which would adversely affect the safety of the vehicle.

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

GENERAL OPERATION

Read 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, turn key to OFF position and remove key from switch.

Drive vehicle only as fast as terrain and safety considerations allow. Consider the terrain

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

and traffic conditions. Consider environmental factors which affect the terrain and the ability to control the vehicle.

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

Use extra care and reduced speed when driving in poor conditions or on poor surfaces.

Stay in designated areas where provided and avoid steep slopes.

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

Avoid extremely rough terrain.

Check area behind the vehicle before operating in reverse.

Ensure direction selector is in desired position before pressing the accelerator pedal.

Slow down before and during turns.

Always bring vehicle to a complete stop before changing direction.

See GENERAL SPECIFICATIONS for vehicle load and seating capacity.

NOTICE

Read the following text and warnings before attempting to service vehicle.

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

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

A vehicle requiring repair is no longer functioning as designed and therefore could be potentially hazardous. Therefore, 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.

Some components are heavy, spring-loaded, highly corrosive, explosive, may produce high amperage, or reach high temperatures. Exposure to battery acid and hydrogen gas could result in serious bodily injury. Be careful to protect hands, face, feet, and body from injury.

Always use the appropriate tools listed in the tool list and wear approved safety equipment.

WARNING

Before working on the vehicle, remove all jewelry.

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

Use care not to touch hot objects.

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

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 and seek shelter 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.

SAFETY

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

- Maintain adequate distance between vehicles.
- Reduce speed in wet areas.
- Reduce speed and use extreme caution when approaching sharp or blind turns.
- Reduce speed and use extreme caution when driving over loose terrain.
- Reduce speed and use extreme caution in areas where pedestrians are present.

MAINTENANCE

ALWAYS:

- Replace damaged or missing warning, caution or information labels.
- Maintain the vehicle in accordance with the manufacturer's periodic service schedule.
- Ensure that repairs are performed by trained and qualified personnel.
- Follow the manufacturer's maintenance procedures.
- Insulate any tools used within the battery area in order to prevent sparks or battery explosion.
- 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 in a safe area that is free of both vehicular and pedestrian traffic.
- Keep complete records of the maintenance history of the vehicle.

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.

Operate charger in accordance with charger manufacturers recommendations or applicable electrical code (whichever is higher).

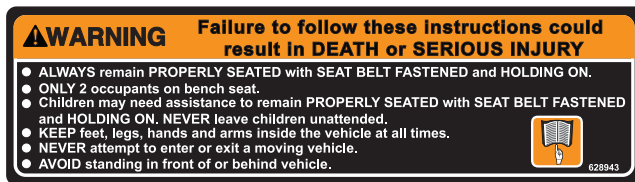
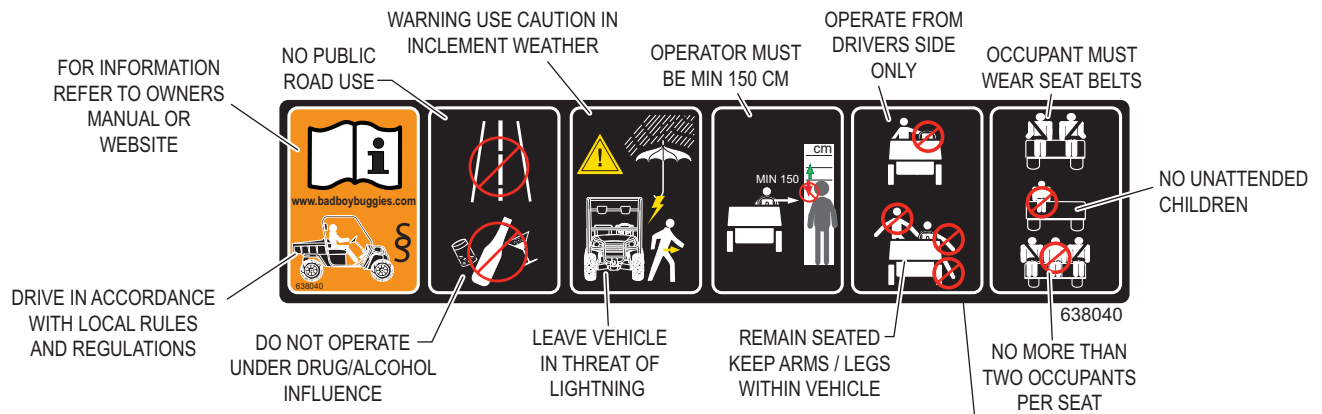
ALWAYS:

- Use a dedicated circuit for battery charger. Do not permit other appliances to be plugged into the receptacle when the charger is in operation.
- Charge vehicle in an area free of flames or sparks.
- Operate battery charger in accordance with manufacturers recommendations.

SAFETY

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

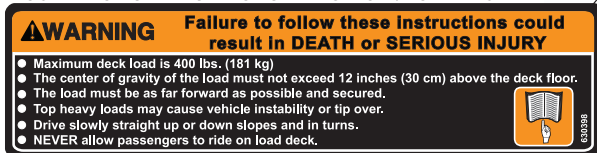
LABELS AND PICTOGRAMS



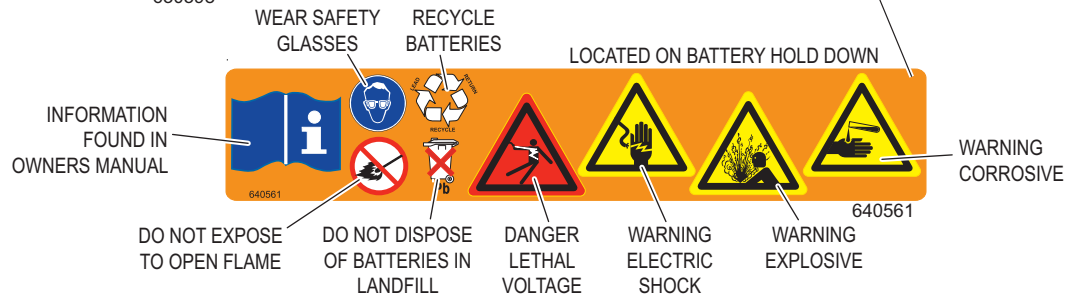
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LOCATED ON UNDERSIDE OF SEAT BOTTOM / LOAD DECK



630398



GENERAL SPECIFICATIONS

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

GENERAL SPECIFICATIONS



MODEL: RECOIL iS
TYPE: ELECTRIC OFF ROAD VEHICLE
MODEL YEAR: 2015
Part No: 640370G01



PRODUCT SPECIFICATION

CONFIGURATION HIGHLIGHTS

Programmable AC Drive System: Factory programmable to application

- Solid State variable frequency AC speed controllers
- Drive-by-wire electronic throttle control
- Dash mounted direction selector switch (Forward-Neutral-Reverse)
- Descent speed control
- Full-time regenerative braking
- 300 Amp AC Controllers
- Full torque, reduced speed reverse
- Sealed Hall effect throttle sensor
- Full diagnostic capability (Hand held diagnostic unit)
- Dash mounted Max Speed/Max Range speed selector switch

Motor: Two 72 Volt AC induction motors, solid copper windings. 19 hp (17.3 kW) peak. AC system reads motor speed for accurate speed control in all conditions. Regenerative braking for maximum economy

Battery Charger: Remote 72 VDC DPI Charger, 120 VAC 60 Hz or optional 230VAC 50Hz unit. (U.L. Certified)

Electrical System: 72 Volt DC, nine, 8 volt deep cycle storage batteries

Drive Train: Direct motor shaft connected to transaxle pinion shaft

Transaxle: Differential with reverse helical gears

Brakes: 4-wheel hydraulic disc brakes and Induction motor. Manual parking brake

Body Protection: Front Brush Guard

PRODUCT OVERVIEW

Dimensions

Overall Length	112.0 in	284 cm
Overall Width	52.0 in	132 cm
Overall Height	76.5 in	194 cm
Wheel Base	70.0 in	178 cm
Gnd Clearance @ Frame	16.0 in	41 cm
Gnd Clearance @ Differential	9.5 in	24 cm

Vehicle Power

Power Source	72 Volts DC	
Motor Type	72 Volts AC	
Horsepower (kW)	38 hp	17.3 kW
Electrical System	72 Volt	
Batteries (Qty, Type)	Nine, 8 Volt Deep Cycle	
Key or Pedal Start	Key Start	
Speed Controller	300 amp	
Drive Train	Motor Shaft Direct Drive	
Transaxle	Hardened Helical Gears	
Direction Selection	Dash mounted Forward-Neutral-Reverse	
Speed Selection	Dash mounted Speed/Range switch	
Rear Axle Ratio	12.49:1	
Front Axle Ratio	12.49:1	

Performance

Seating Capacity & Style	2 Persons - Bench Seat	
Curb Weight	1,795 lb	814 kg
Vehicle load capacity	940 lb	426 kg
Towing capacity	1,000 lb	454 kg
Gross Axle Weight Rating - F	735 lb	333 kg
Gross Axle Weight Rating - R	2,000 lb	907 kg
Outside Clearance Circle	24.5 ft	7.5 m
Speed - Low (Level Ground)	16.0 mph	25.7 kph
Speed - High (Level Ground)	24.5 mph	39.4 kph
Speed - Reverse	10.0 mph	16.1 kph

Steering & Suspension

Steering	Double Ended Rack & Pinion - 3.69 turns to lock
Front Suspension	MacPherson Strut
Rear Suspension	MacPherson Strut
Service Brake	4-Wheel Hydraulic Disc with Motor Regen
Parking Brake	Manual w/controller cut-out
Front Tires	Kenda 25x8-12 Uni-Directional
Rear Tires	Kenda 25x11-12 Uni-Directional

Body & Chassis

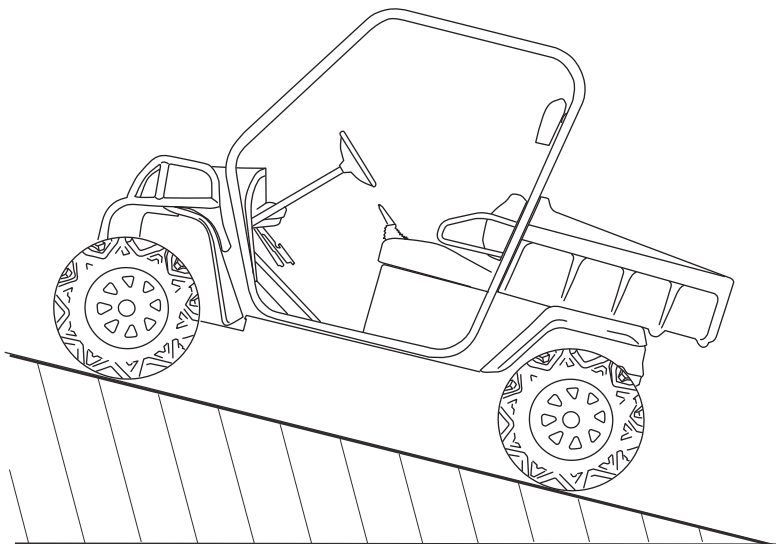
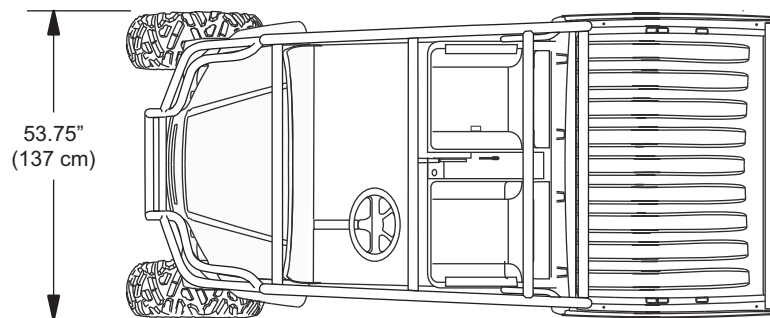
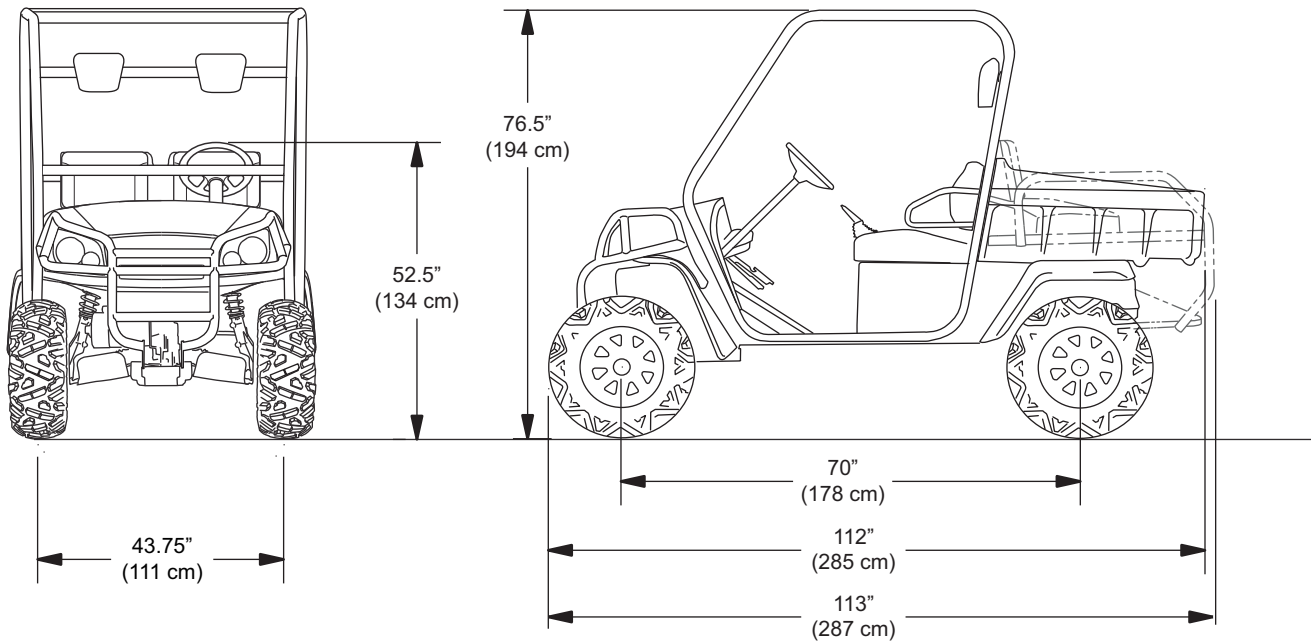
Frame	Welded Steel with DuraShield powder coat
Body & Finish	Injection Molded TPO & Automotive Style Paint
Standard Color	Matte Black
Cargo Bed	9.7 Cu. Ft. Polyethylene Bed

Some items shown may be optional equipment

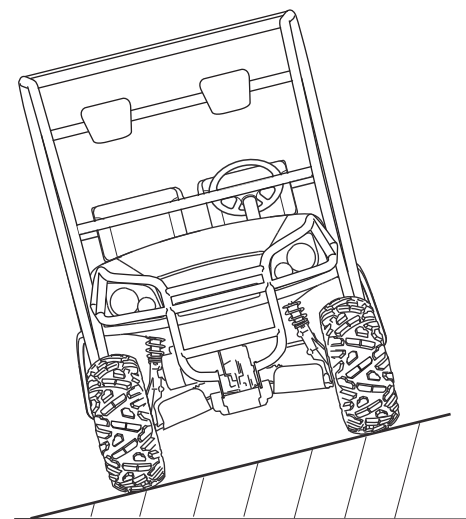
GENERAL SPECIFICATIONS

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VEHICLE DIMENSIONS AND INCLINE INFORMATION



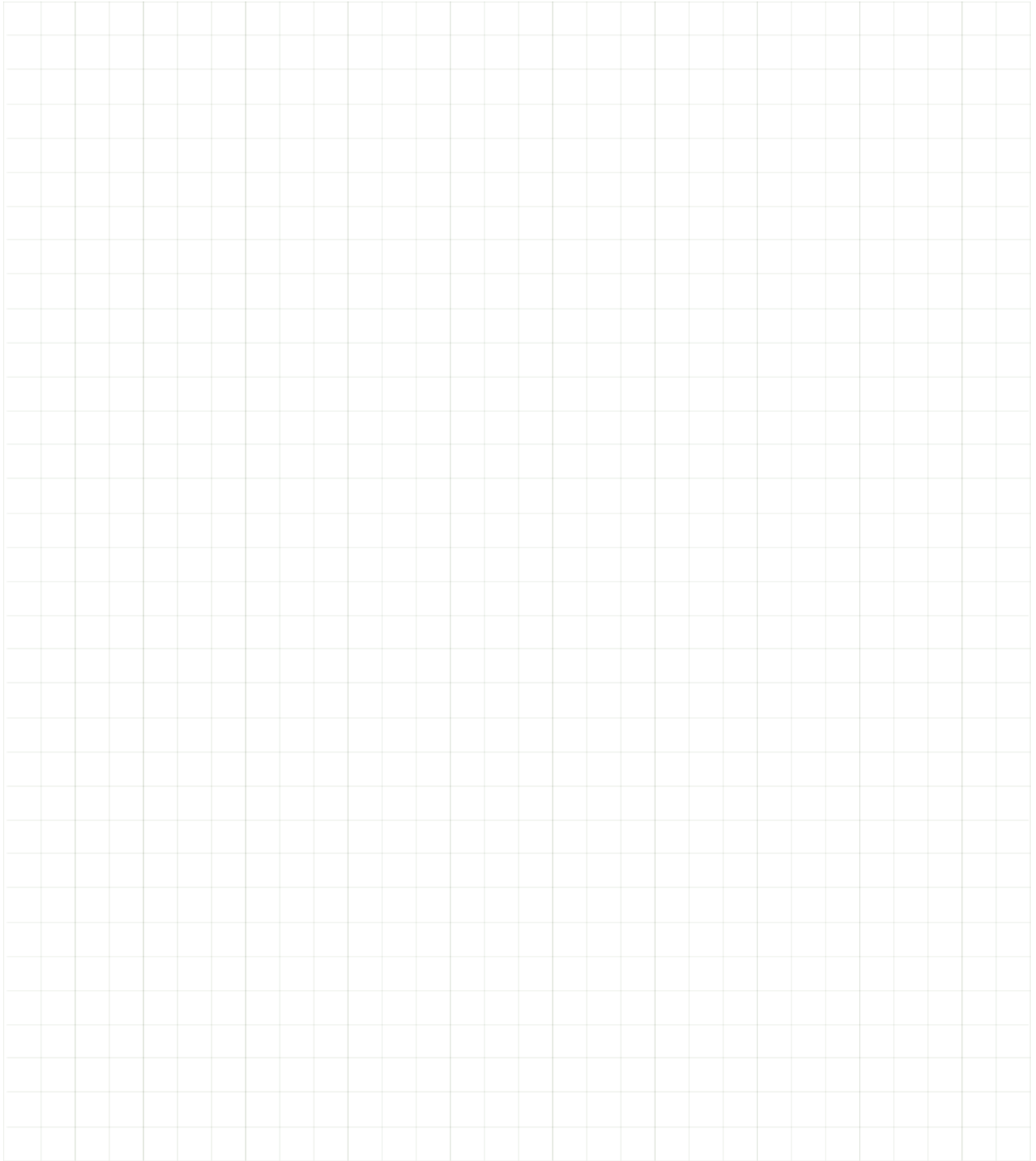
Maximum Recommended Ramp Grade
25% or 14° Max.



Maximum Recommended Side Tilt
25% or 14° Max.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Notes:

A large grid of 20 columns and 30 rows, intended for taking notes. The grid is composed of light gray lines on a white background.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Notes:

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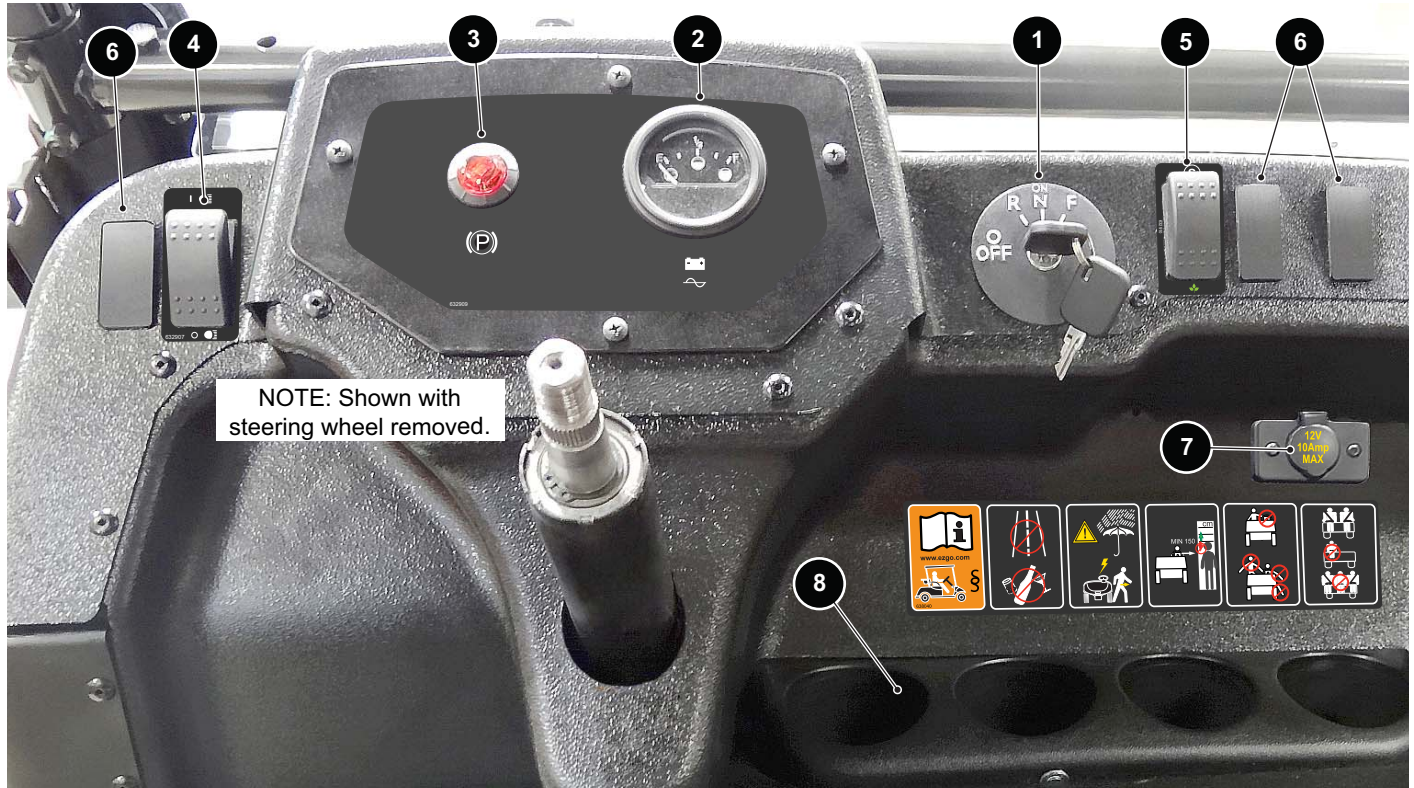
INTRODUCTION

FEATURES

General Information

NOTICE

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



1. Key Switch / Direction Selector

Located on the dash to the right of the steering wheel, this four position switch allows the vehicle electrical system to be activated. It also determines direction of travel. It allows the operator to turn the electrical system off completely by moving the key to the OFF position; or select Reverse, Neutral, or Forward by rotating key to the right.

2. State of Charge Meter

The illuminated state of charge meter is located on the dash. It indicates the amount of usable power in the batteries, with 'F' indicating a full charge on the battery pack and 'E' indicating the batteries are low.

3. Park Brake Light

The park brake light illuminates to indicate that the park brake is engaged.

4. Light Switch

Located on the left side of dash, this ON/OFF switch controls the lights. In the ON position, the headlights and taillights illuminate.

INTRODUCTION

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

5. Max Speed / Range Switch

This is a two position switch located on the dash to the right of the key switch.

The top position is the Max Speed setting. It allows the vehicle to travel up to 24.5 MPH. This setting diminishes distance capability for increased speed advantage.

The bottom position is the Max Range setting. It limits the top speed of the vehicle to 16 MPH, which conserves battery power in order to extend travel distance.

6. Auxiliary Switch Positions

There are three empty spaces on the dash to allow for additional switches to control added lights or accessories.

7. 12 Volt Power Outlet

Located in the lower part of the dash above the cup holder, the 12 volt outlet supplies constant power for additional equipment equipped with a 12 volt plug.

8. Cupholder

A cupholder is provided for convenience of vehicle occupants.

9. Accelerator Pedal

The accelerator pedal is located on the floorboard to the right of the brake pedal. Its function is to accelerate and control the speed of the vehicle.

10. Brake Pedal

The brake pedal is located on the floor to the left of the accelerator pedal. The brake pedal function is to slow or stop the moving vehicle.

11. Park Brake

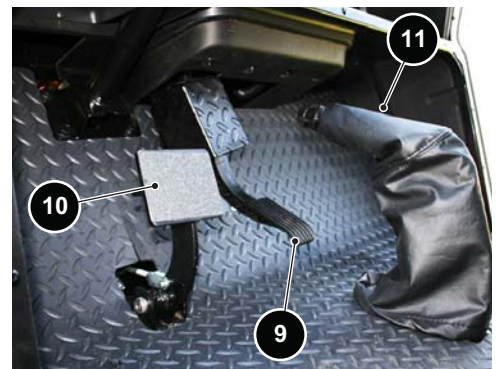
The hand operated park brake is located in the middle of the floorboard. The function of the park brake is to keep the vehicle from inadvertent movement when in a stationary position.

The brake is engaged when the handle is vertical and disengaged when the handle is almost parallel to the floor (as shown).

12. Charger Receptacle

The polarized receptacle for the batteries is located on the panel below the drivers seat. It is the receptacle for the charger cord when the batteries need to be charged.

If vehicle is equipped with optional onboard charger, receptacle is located on the back seat.



Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

13. Truck Bed Latch

A truck bed latch is located at the front of the manual lift truck bed. It is used to raise and lower the manual lift truck bed.



14. Truck Bed

The truck bed provides space to transport cargo. A molded plastic bed is standard; some vehicles may be equipped with an optional aluminum bed.

15. Taillights

The taillights are located at the rear of the truck, below the truck bed.



16. Head Protection

Rubber pads provide head protection while driving over rough terrain. They are a standard safety feature on the vehicle and should not be altered or removed.

17. Side Nets

Side nets are a standard safety feature provided with the vehicle and must be properly secured before operating vehicle.

18. Seat Belts

The vehicle is equipped with seat belts for the driver and front passenger. If vehicle has a rear seat, it is equipped with seat belts for two rear facing passengers. Seat belts must be worn at all times by all occupants when vehicle is in motion.

For more operational and safety information, see "Seat Belt Operation" on page 21.



INTRODUCTION

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

19. Rear Seat / Load Deck (If Equipped)

The rear facing seat is designed for two occupants.

The rear seat can be converted to a load deck by unfolding the seat bottom.



20. OPS / Top / Windshield

The standard vehicle is equipped with an OPS (Operator Protection System); vehicle may be equipped with an optional top, and/or windshield.

The OPS and top provide some protection from smaller falling objects, but will not protect against large falling objects such as trees or heavy limbs.

The windshield deflects oncoming wind from occupants, but will not protect against flying objects and tree limbs.

The top and windshield provide some protection from the elements; however, they will not keep occupants dry in a down-pour.

WARNING

The OPS and top do not provide protection from roll over or falling objects.

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

Remove windshield and store securely before transporting this vehicle on a trailer. The windshield is not designed to withstand highway speeds.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

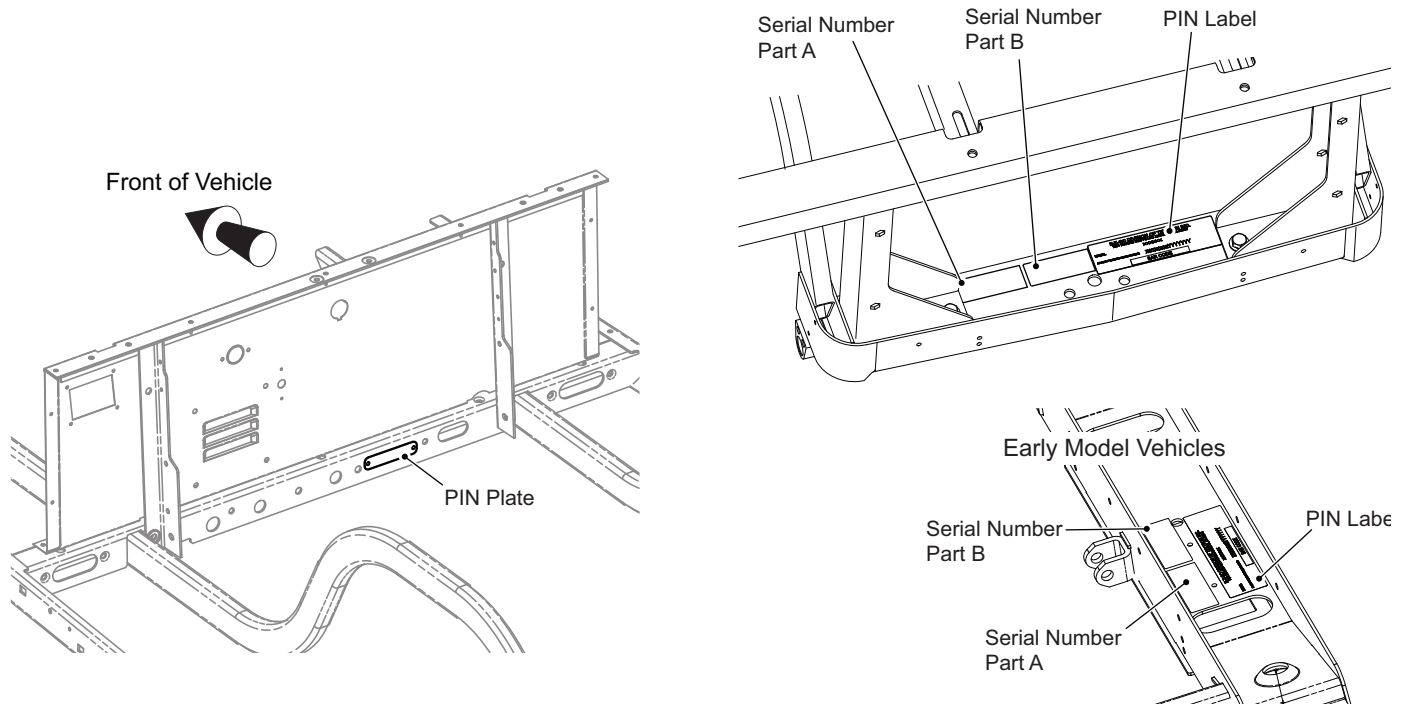
OPERATING PROCEDURES

PIN AND SERIAL NUMBER LOCATION

The PIN plate is riveted to the frame below the seat wrap panel.

Two serial number labels, Part A and Part B, and a PIN label are attached to the frame below the truck bed. On some early model vehicles, these labels are attached to the frame under the cowl on the driver's side.

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



WARNING

Improper use of this vehicle could result in severe injury or death. The buggy is a light duty utility vehicle, NOT an All Terrain Vehicle (ATV).

When driving vehicle, consider the terrain, traffic conditions and the environmental factors which affect 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 or gravel.

Maintain a safe speed when driving up or down a hill. Use 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 while the vehicle is in motion. Moving the direction selector will result in a sudden slowing of the vehicle.

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

OPERATING PROCEDURES

Read all of **SAFETY** and this section before attempting any procedure. Pay particular attention to **Notices, Cautions, Warnings and Dangers.**

Do not drive through water that is more than 12 inches (30 cm) deep.

To prevent inadvertent movement when the vehicle is left unattended, engage the parking brake, turn key to OFF position and remove key from switch.

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 area behind vehicle before operating in reverse.

All occupants must be seated with seat belts fastened and side nets latched. Keep entire body inside vehicle and hold on while vehicle is in motion.

This vehicle is not a toy and using it while engaging in horseplay is dangerous.

Plan carefully before using the vehicle to go significant distances over unfamiliar terrain. Remember that a one hour drive may take many hours to walk back should the batteries become discharged, or vehicle become stuck on unsuitable terrain.

BEFORE INITIAL USE

NOTICE

Record the four digit key number and store in a safe place. Individual keys can only be replaced if the key number is known. Without a key number the entire ignition switch will have to be replaced if keys are lost.

Make a note of the key number in the event that new keys must be ordered. The key number is stamped into the key and into the face of the ignition switch. Both numbers must match.

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

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



Key Number



INITIAL SERVICE CHART	
Item	Service Operation
Battery Charger	Remove from vehicle and read operating instructions.
Batteries	Charge. Batteries must be fully charged before initial use.
Seats	Remove protective plastic covering.
Brakes	Check operation; adjust if necessary.
	Check hydraulic fluid level; add if necessary.
Tires	Check air pressure; adjust if necessary. See "WHEELS AND TIRES" on page 32 for inflation recommendations.
Vehicle Inspection	Visually inspect overall vehicle for leaks or damage that may have developed in shipping.
	Inspect for loose hardware; tighten if necessary.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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.

PORTABLE CHARGER

WARNING

Use charger ONLY on 72 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.

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.

The portable charger is shipped with the vehicle. Prior to vehicle or charger operation, the charger **must** be removed from the vehicle. **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 and relatively free of dirt, mud, or dust. 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.

OPERATING PROCEDURES

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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

To reduce the possibility of 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.

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

Using the Charger

Before use, read the charger manufacturer's operation manual that is supplied with the charger.

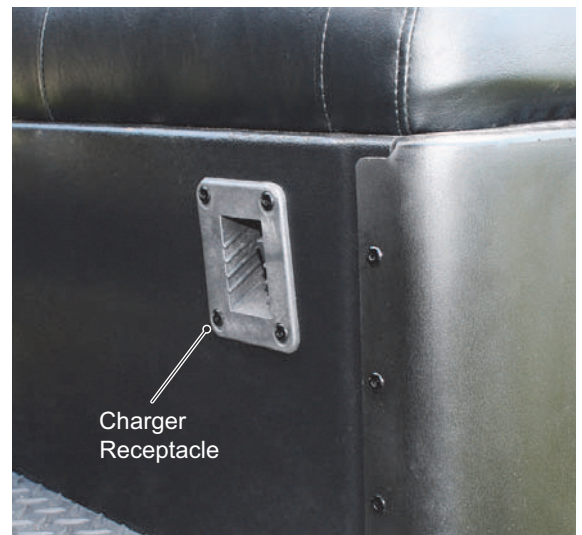
WARNING

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.

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

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

Always check to be sure the receptacle is free from dirt and debris before inserting the charger cord.



Read all of SAFETY and this section before attempting any procedure. Pay particular attention to 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 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.

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.

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).

Do not permit more occupants on the vehicle than it is designed to carry. Refer to GENERAL SPECIFICATIONS for seating capacity.

To reduce the possibility of severe injury or death resulting from improper vehicle operation, the following warnings must be observed:

To prevent inadvertent movement when the vehicle is left unattended, engage the park brake, turn key to 'OFF' position and remove key from switch.

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 with seat belts fastened and side nets latched. Keep entire body inside vehicle and hold on while vehicle is in motion.

OPERATING PROCEDURES

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Key Switch Operation

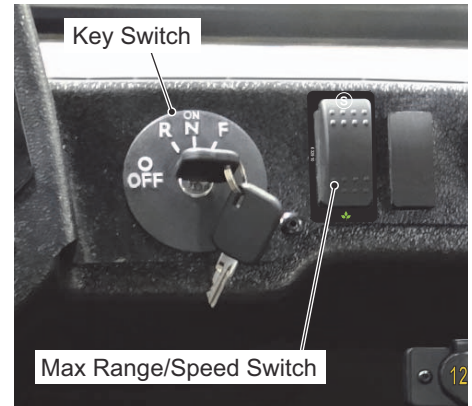
When the key is turned to the far left, the vehicle electrical system is off and not operational. Turn right to the first position, labeled R for reverse. The next position to the right, labeled N is neutral. Rotate to the far right position, labeled F, for forward.

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



CAUTION

To reduce the possibility of component damage, the vehicle must be stopped completely before turning the key.



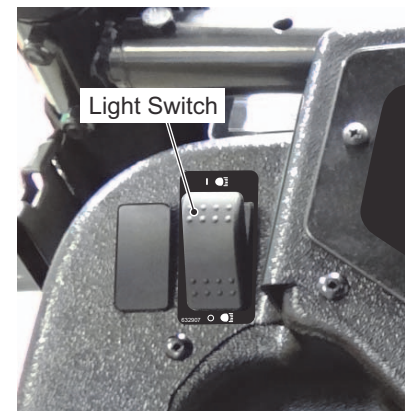
Max Speed / Range Switch

Press the top of the switch to select the Max Speed setting. This setting allows the vehicle to travel up to 24.5 MPH, diminishing distance capability for increased speed advantage.

Press the bottom of the two position switch to select the Max Range setting. This setting limits top speed to 16 MPH, which conserves battery power in order to extend the range of distance the vehicle is capable of traveling before the batteries need to be recharged.

Light Switch Operation

Press the top of the two position switch to activate the headlights and taillights. Press the bottom of the switch to turn them off.



Brake Operation

This vehicle is equipped with four wheel hydraulic brakes.

Press the brake pedal to control speed or bring vehicle to a stop.

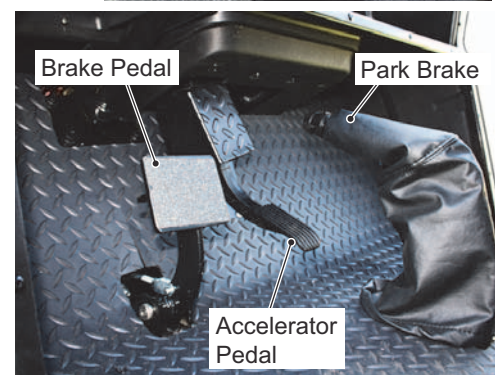
Park Brake Operation

The park brake should be engaged whenever the vehicle is in a stationary position or left unattended.

Pull the hand operated park brake handle up until it stops in a vertical position to engage the park brake. Push the handle down to disengage.

Accelerator Operation

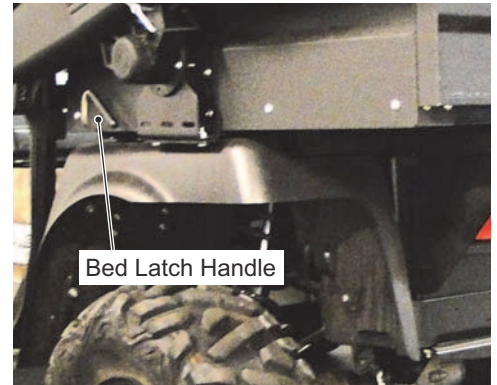
With the key switch ON, pressing the accelerator pedal starts the electric motor and activates the vehicle. When the pedal is released, the motor deactivates and the vehicle will decelerate. To stop the vehicle more quickly, press the brake pedal.



Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Truck Bed Latch Operation

Pull upward on the handle to release the truck bed latching mechanism, allowing the front of the bed to be raised.



Seat Belt Operation

WARNING

Seat belts must be worn by all occupants whenever vehicle is in motion.

Ensure seat belts are free from twists and latch securely.

Position shoulder belt across the top of the shoulder; do not place shoulder belt under the arm.

Keep belts snug and positioned low on hips. Loose fitting belts significantly reduce protection.

The vehicle is equipped with seat belts for the number of occupants it is designed to carry; do not exceed the recommended number of occupants for the vehicle.

Seat belts are designed for one occupant per belt. Do not attempt to secure more than one person in a seat belt.

Seat belts must be worn at all times by all occupants when vehicle is in motion.

To keep seat belts in proper working condition, do the following:

- Inspect the seat belt webbing and hardware periodically. Check for cuts, frays or loose parts. Replace components if excessive wear or damage is noticed.
- Keep seat belts clean and dry. To clean, use mild soap and warm water. Do not use bleach, dye or abrasive cleaners as this will weaken the belt webbing material.
- Do not insert any foreign objects into the retractor mechanism.
- Periodically check for smooth operation and replace if the mechanism is not operating properly.

To properly secure the seat belts:

1. Pull the metal tab on the seat belt across the body toward the appropriate buckle located near the center of the seat.
2. Insert tab into buckle. (A click will be heard when the tab is securely latched).
3. Position the lap belt as low as possible on the hips, not at the waist.
4. Adjust to ensure a snug fit by pulling the shoulder portion upward.

The retractor will lock the belt during sudden stops. It may also lock if occupant leans forward quickly. Slow, easy motions allow the belt to travel freely.

To release the safety belt, press the buckle release button and allow the belt to retract. If the belt does not retract, check for twisted straps.

OPERATING PROCEDURES

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

COMMON SENSE OPERATION



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, judgment 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 requires 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 lose much of their effect.

Slow down when on unfamiliar terrain. Slow down when cresting a hill in an area that is not familiar.

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

ENVIRONMENTAL CONCERNS



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

STARTING AND DRIVING

- Make sure that the park brake is engaged.
- Make sure that the accelerator pedal is NOT pressed (no pressure on it).
- Place key in switch and turn to desired position.
- Release parking brake.
- Press the accelerator pedal to move the vehicle.

Make sure the park brake is engaged, the key switch is in the OFF position and the key is removed from the switch before exiting the vehicle.

This vehicle is to be operated by licensed drivers only.

Do not attempt to operate the buggy while under the influence of drugs or alcohol.

Never turn the key switch to OFF while the buggy is in motion; doing so can cause loss of control and lead to serious injury or death.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

On a downhill slope, it is possible for the vehicle to achieve speeds greater than if it were operating on flat terrain. Limit downhill speed to 5 mph (8 kph) with use of the service brake.

Caution must also be used on an uphill slope and speed should be limited to no more than 5 mph (8 kph).

If allowed to travel too fast on an uphill or downhill slope, loss of control may occur, possibly causing serious injury or death.

Use caution when traveling through water and never operate vehicle in water over 12 inches (30 cm) deep.

Starting the Vehicle on a Hill



CAUTION

Do not hold vehicle on hill by using accelerator and motor. This will cause premature and excessive wear to drive train components.

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 brake pedal and disengage park brake. Press accelerator with right foot while releasing brake pedal.

COASTING



WARNING

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

On steep hills, it is possible for the vehicle to coast at greater speeds than possible on a flat surface. To reduce possible loss of vehicle control and severe drivetrain damage, speeds should be limited to no more than the maximum governed speed on level ground (see GENERAL SPECIFICATIONS). Limit speed by applying pressure to the brake pedal.

TOWING A TRAILER

The vehicle is equipped with a 2-inch receiver. The trailer and its load must not exceed 1000 lbs (454 kg) and no more than 100 lbs (46 kg) tongue weight may be attached to the hitch. Remember that the overall capacity of the vehicle, operator, passenger, contents of load bed and accessories must be reduced to compensate for the trailer and load.

The range of motion of the trailer is limited by the ball and hitch. The trailer should not be used on rough trails or over objects such as logs, large rocks, holes, etc.

Never install baskets or extensions using the hitch receivers. Such items will change the performance characteristics of vehicle and result in unsafe handling, possible roll over or vehicle damage.

TERRAIN

The vehicle is NOT designed for use on public roads. The vehicle may 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 that is more than 12 inches (30 cm) deep or fast moving water.

Be aware of steep slopes and overhanging limbs.

When traveling up or down steep slopes, do not attempt to turn the vehicle around on the slope.

Be aware that vehicle stopping distance increases when driving on wet grass, dirt roads or loose surfaces.

OPERATING PROCEDURES

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

TRUCK BED

WARNING

Do not allow passengers to ride in truck bed. Severe injury or death could result if a passenger should fall out, if vehicle is involved in an accident, or if vehicle makes a sudden maneuver.

Use caution when loading the vehicle. Secure loads to prevent shifting. Do not overload vehicle.

A bed warning label is affixed to the inside of the bed on the front panel. This label must be understood and observed at all times for safe use of the bed.

The bed is limited to a maximum load of 500 lbs. Position load in the bed as far forward as possible. Its center of gravity must not be higher than 12" (30 cm) above the bed floor, and it must be securely fastened down. Failure to follow these instructions could cause personal injury, damage to the vehicle and/or cause the vehicle to tip over. Operate the vehicle with awareness of the load.

Do not drive the vehicle with the truck bed raised or with the tailgate unsupported.

When using the optional electric dump, be sure to avoid backing up to the edge of a drop off, such as a loading dock or ravine. A misjudgment of distance or an unstable surface could result in the vehicle falling backwards.

Always ensure that no one is behind or close to the bed while the electric dump mechanism is being operated.

REAR FACING SEAT / LOAD DECK

WARNING

Do not allow passengers to ride on load deck. Severe injury or death could result if a passenger should fall out, if vehicle is involved in an accident, or if vehicle makes a sudden maneuver.

The rear facing seat will accommodate two passengers with a combined weight of less than 400 lbs (181 kg).

The seat bottom can be folded out to form a load deck. When using the load deck, position the load as far forward as possible and securely fasten it down. The maximum load is 400 lbs (181 kg) and the center of gravity must not be higher than 12" (30 cm) above the load deck.

WINCH OPERATION (IF EQUIPPED WITH WINCH)

This vehicle may be equipped with an optional winch. Read, understand and follow all of the information supplied with the winch on the operation and use of the winch before attempting to operate it.

Winch Application

A winch may be used for a number of purposes, including pulling the vehicle if it loses traction on unsuitable terrain.

WARNING

Improper use of the winch could result in a number of conditions that could cause severe injury or death to operator, occupants of vehicle or bystander.

It is impossible to predict all conditions that the winch could be used, therefore the following warnings should not be considered as complete. Before operating the winch, consider the possible dangers and take precautions to protect yourself, your passenger and any bystanders.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

WARNING

To prevent severe injury or death to operator, occupants or bystanders, consider the following when selecting an object to attach the cable to:

Make sure the object cannot be pulled over or otherwise damaged.

The object the winch cable is attached to could fall on the vehicle and it's occupants.

If attaching the winch to a dead tree, a section could fall.

When pulling vehicle with winch, pull straight only. Do not permit cable to contact the side of the drum.

Do not pull vehicle at an angle. If the vehicle is pulled at an angle, it could turn over causing severe injury or death to anyone in the area. The winch cable could also become overstressed and break causing severe injury or death to anyone struck by the cable.

The rear drive axle is equipped with a manually operated locking differential. With the differential unlocked, if one drive wheel loses traction, all available power is transferred to that wheel until it regains traction. In normal driving this is not a problem; however, if the vehicle becomes 'hung up' on an object, the vehicle will stop. With the differential locked, power is distributed to both drive wheels at all times. If both drive wheels lose traction as a result of vehicle becoming 'hung up' on an object, the vehicle will stop. If vehicle cannot be pushed off the obstruction, it will have to be pulled off using the winch.

WARNING

To prevent severe injury or death, read and understand the following warnings before attempting to use the winch:

The winch is not intended to be used in any hoisting operation.

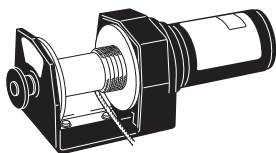
The rolling load capacity of the winch decreases with the steepness of the slope.

The winch is designed for intermittent duty only.

The electric motor should not be allowed to become excessively hot. If the motor becomes uncomfortably hot to the touch, stop winching and allow the motor to cool.

Always wear thick leather gloves when handling the wire cable.

Replace frayed wire cable with a direct factory replacement only.



Never operate the winch with less than five (5) full turns of cable around the drum.

If the winch motor stalls from overloading, do not continue to activate the winch remote control. The wire cable may become overstressed.

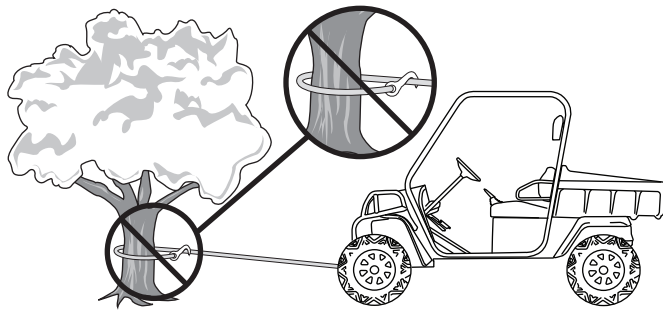
Do not attempt to pull loads exceeding the manufacturers maximum load rating.

Have all persons and pets leave the area while operating winch. Never allow anyone to remain in the vehicle.

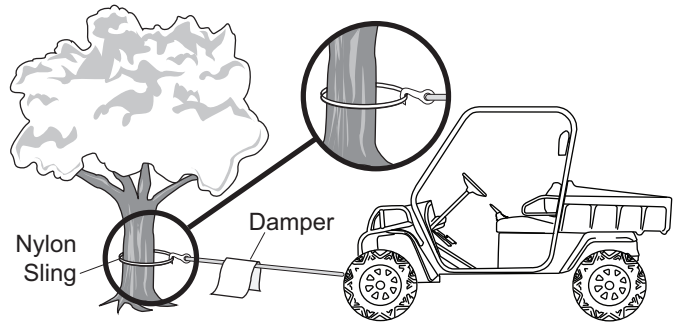
To prevent damage to the wire cable, never hook the cable to itself. Always use a nylon sling.

OPERATING PROCEDURES

Read all of **SAFETY** and this section before attempting any procedure. Pay particular attention to **Notices, Cautions, Warnings and Dangers.**



Do Not Hook Cable to Itself



Use a Nylon Sling and Install a Damper when Winching

Stay clear of the winch, the cable and the cable hook. Place a heavy cloth, jacket or blanket over the cable to act as a damper should the cable break when operating the winch.

When operating the winch, keep the entire area in view.

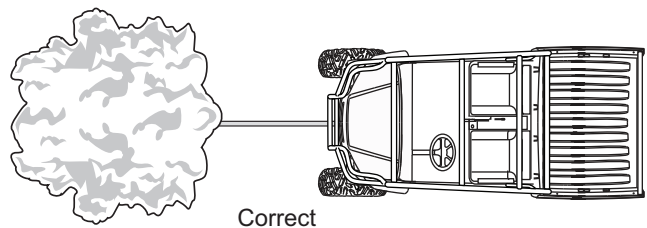
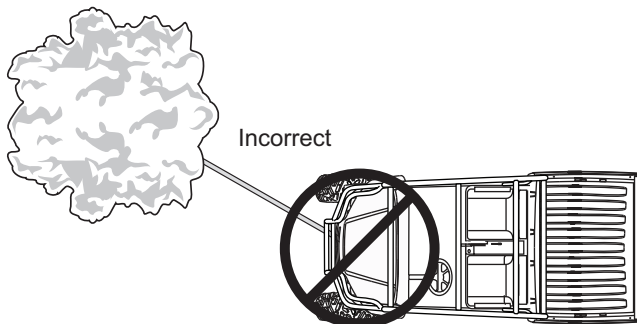
Never release the free spool clutch while the cable is under load.

Never work around the winch drum or the winch cable while it is under tension.

Unplug the winch switch before working on the winch drum in order to prevent inadvertent operation.

When operating winch, take up slack slowly. Stop winch before cable becomes tight and inspect all winching connections. Check winch attachment, hook attachment, nylon sling (if required) and load attachment.

Do not pull at an angle. This will cause the wire cable to pile up on one end of the winch. This may jam the winch causing damage to the cable and/or the winch. Pulling the vehicle at an angle can cause damage to the front suspension and may cause the vehicle to overturn. When pulling vehicle, pull straight only.



Do Not Pull at Angle

If the vehicle is being used as an anchor to winch a load, it should have the parking brake applied and chocks installed on all wheels.

Never use the winch to lift people or other overhead loads.

Do not use the winch to secure loads. Use a tie down designed for the job.

Do not apply shock loads to the winch.

Do not attempt to modify or weld the winch.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Notes:

OPERATING PROCEDURES

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Notes:

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

MAINTENANCE

VEHICLE CLEANING AND CARE

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 and maintain a 12" minimum distance from spray nozzle to painted surface. 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 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 as well as 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 dust control can collect on the under-body of the vehicle. These materials will cause corrosion of under-body 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 its removal, taking care not to chip or otherwise damage paint.

ROUTINE MAINTENANCE

Preventive maintenance, applied at recommended intervals, is the best guarantee for keeping the vehicle dependable.

This vehicle will give years of satisfactory service, providing it receives regular maintenance. Refer to the PERIODIC SERVICE SCHEDULE for appropriate service intervals.

MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

LIFTING THE VEHICLE

Tool List	Qty
Floor Jack.....	1
Jack Stands.....	4
Wheel Chocks.....	4

⚠ WARNING

To reduce the possibility of severe injury or death from a vehicle falling from a jack:

Always place chocks in front and behind the wheels not being raised.

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.

Use extreme care since the vehicle is very unstable during the lifting process.

⚠ CAUTION

When lifting the vehicle, position the jacks and jack stands at the areas indicated.

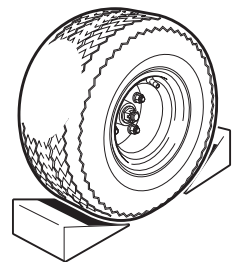
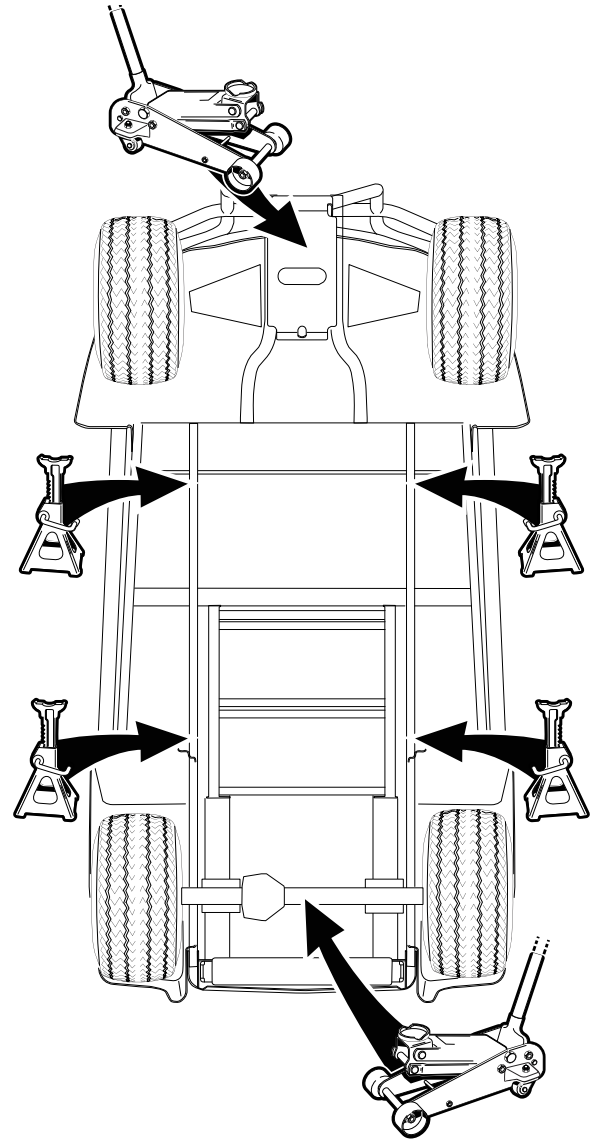
Remove payload from vehicle before lifting. No person(s) should be in or on the vehicle while lifting.

Lift Entire Vehicle

1. Place wheel chocks in front and behind each front wheel.
2. Center jack under rear axle tube next to differential housing or under the skid plate.
3. Raise vehicle and position jack stands under the frame where the leaf spring mounting bracket is welded to the frame.
4. Lower the jack and test the stability of the vehicle on the two jack stands.
5. Place the jack under the center front of the car just behind the bumper.
6. Raise the vehicle and position the jack stands under the frame where the instrument panel support is attached to the frame.
7. Lower the jack and test the stability of the vehicle on all four jack stands.

Lift Front of Vehicle

1. Place wheel chocks in front and behind rear wheels.
2. Place the jack under the center front of the car just behind the bumper.



Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

3. Raise the vehicle with jack and position the jack stands under the frame where the instrument panel support is attached to the frame.
4. Lower the jack and test the stability of the vehicle on jack stands.
5. The jack may be left under the center front of the frame while the front end of the vehicle is on the jackstands.

Lift Rear of Vehicle

1. Place wheel chocks in front and behind front wheels.
2. Center jack under rear axle tube next to differential housing or under the skid plate.
3. Raise vehicle with jack and position jack stands under the frame where the leaf spring mounting bracket is welded to the frame.
4. Lower the jack and test the stability of the vehicle on the two jack stands.
5. The jack may be left under rear axle tube while the rear end of the vehicle is on the jackstands.

Lower Vehicle

Lower the vehicle by reversing the lifting sequence.

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.

Headlight Bulb

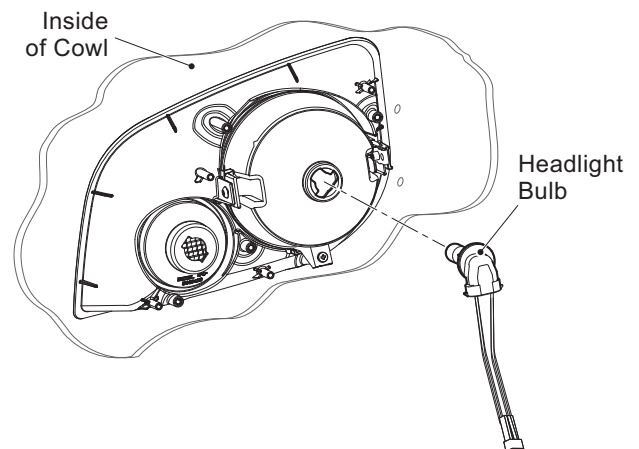
Turn key switch to OFF and remove key from switch.

Locate the headlight bulb socket on the backside of the light assembly.

Turn bulb socket a quarter turn counterclockwise to unlock.

Pull out bulb and socket, remove old bulb from the socket.

Insert new bulb in socket and position bulb socket into headlight housing and rotate socket a quarter turn clockwise to secure.



Taillight Bulb

The taillight contains an LED light board rather than a light bulb, if the LEDs burn out the whole light will have to be replaced.

MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

WHEELS AND TIRES

WARNING

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

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

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

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

Tire Repair

Tool List	Qty.	Tool List	Qty.
Lug Wrench, 3/4" (for steel rims)	1	Impact Socket, 3/4" (for steel rims)	1
Lug Wrench, 17mm (for aluminum rims)	1	Impact Socket, 17mm (for aluminum rims)	1
Impact Wrench	1	Torque Wrench, ft. lbs.	1

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

If the tire is flat, raise vehicle and remove wheel. Refer to 'Lifting the Vehicle' for proper lifting procedure and safety information. Inflate tire to the maximum recommended pressure, immerse tire in water to locate the leak and mark the leak with chalk. Insert tire plug in accordance with manufacturer's specifications.

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.

Recommended tire inflation pressure is 12 psi. 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 stem dust cap after checking or inflating. The vehicle is fitted with low volume tubeless tires mounted on one piece rims.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Wheel Installation



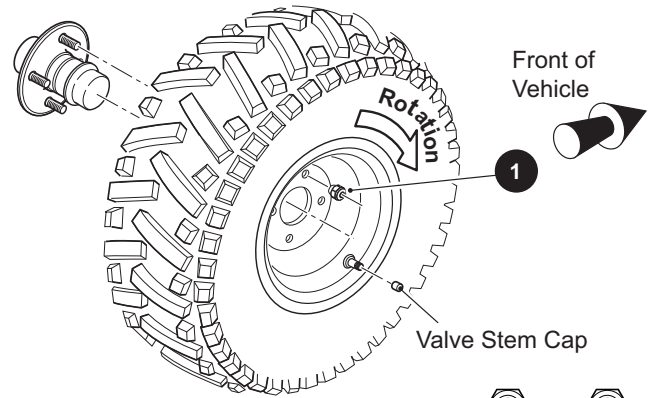
CAUTION

To reduce the possibility of component damage, do not tighten lug nuts to more than 75 ft. lbs. (101 Nm) torque.

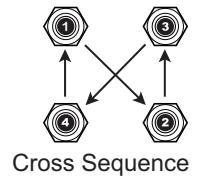
NOTICE

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 the lug nuts (1) in a 'cross sequence' pattern. Tighten the lug nuts to 65 to 75 ft. lbs. (88 to 101 Nm) torque in 20 ft. lbs. (27 Nm) increments following the 'cross sequence' pattern.



Tire style may vary



Unidirectional Tires

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

WHEEL ALIGNMENT

Driving over rough terrain may cause misalignment of the wheels. With four wheel independent suspension both front and rear wheels may need to be aligned.

Tool List	Qty.	Tool List	Qty.
Tape Measure.....	1	Open End Wrench, 12 mm.....	1
Open End Wrench, 17 mm.....	1	Open End Wrench, 19 mm.....	1

Park the buggy on a level surface, set the front wheels straight ahead. Turn the key switch to OFF, remove the key and set the parking brake.

With the buggy empty (no passengers or payload) measure the distance between the center of both the front and the rear sets of tires. Measure both in front and behind each tire set, keeping the tape measure parallel to the ground. The measurement behind the front tires should be 1/8" to 1/4" greater than the measurement taken at the front of the tires to produce a toe-in condition. The measurement behind the rear tires should be 0" to 1/8" greater than the measurement taken at the front of the tires to produce a toe-in condition.



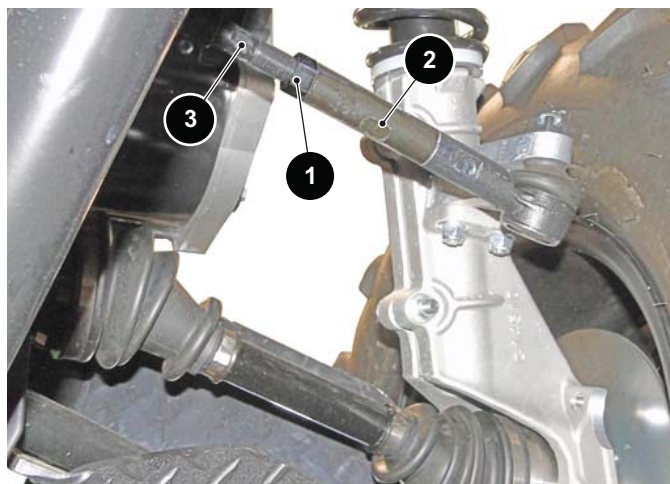
MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Front

Adjust both tie rods equally to obtain the correct toe-in. Hold tie rod (2) with an open end wrench, loosen the jam nut (1) and turn the adjustment shaft (3) to move the wheel in the desired direction.

Recheck the measurement at the front and at the rear of the front tires, if the 1/8" to 1/4" toe-in has been achieved tighten the lock nut (1) on each tie rod.

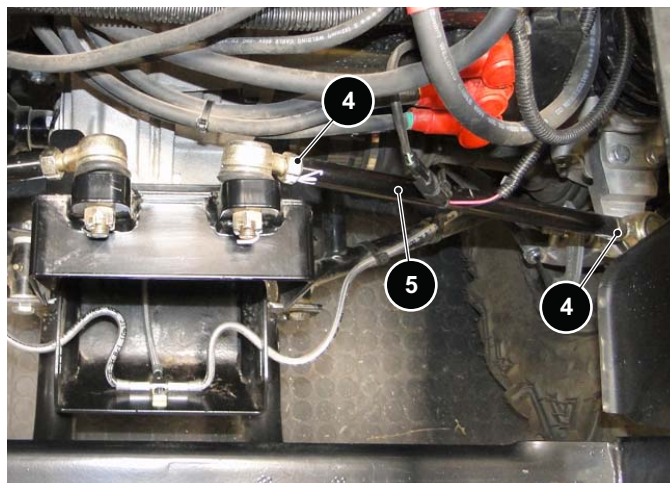


Rear

The rear tie rods have jam nuts (4) at each end, one end has the standard right hand threads and the other end has left hand threads.

Loosen the jam nuts (4) on both tie rods, turn the center tube (5) with an open end wrench to adjust the length of each tie rod equally.

Recheck the measurement at the front and at the rear of the rear tires, if the 0 to 1/8" toe-in has been achieved tighten the lock nuts (4) on each tie rod.



BRAKES

This vehicle is equipped with four wheel hydraulic disc brakes and a hand operated park brake. Check the fluid level at intervals specified in the PERIODIC SERVICE SCHEDULE; if fluid leaks are noticed or the brake pedal seems soft, check the fluid level immediately. If the brake pedal is soft, the brake system should be bled to remove air from the brake lines. Refer to "Bleeding Brakes" on page 34 for procedure.

Master Cylinder

The master cylinder is located behind the driver side front wheel, mounted to the frame. Before removing the reservoir cap, clean any dirt or debris from around the reservoir and cap.



Bleeding Brakes

Tool List

Hose A/R
Brake Fluid, DOT 3..... A/R

Qty.

Tool ListQty.

Clean Container 1
Wrench, 1/4" box end 1

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

The hydraulic brake system must be free of air to operate properly. Air can enter the system when hydraulic parts are disconnected for servicing or replacement, or when the fluid level in the master cylinder reservoir is very low. Air in the system will give the brake pedal a spongy feeling when pressed.

NOTICE

An assistant is necessary to perform this procedure.

1. Use a clean cloth to wipe off the master cylinder reservoir and wheel cylinder bleeder valves. Clean each fitting before opening to prevent contaminating the system.
2. Open the master cylinder reservoir and top off with standard automotive DOT 3 brake fluid.

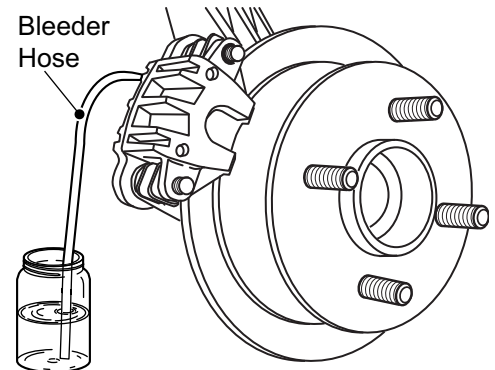
⚠ WARNING

Never return brake fluid to the original container or reuse brake fluid due to the possibility of contamination by dirt, grease, moisture. Contaminated brake fluid could cause failure of the braking system. Dispose of brake fluid in accordance with Federal, state and local codes.

3. Attach a short length of clear hose to the caliper bleed valve and insert the other end into a suitable clean container containing fresh, clean brake fluid.

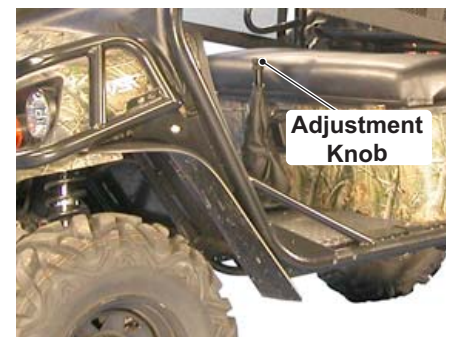
Check the fluid level in the master cylinder frequently during this operation to prevent air from entering the lines.

4. Start with the passenger side rear brake, then driver side rear brake, passenger side front brake and finish with driver side front brake. Bleeding the brakes requires an assistant to pump the brake pedal and keep pressure on the pedal. Bleed the brakes using the following procedure:
 - a. Build pressure in the brake system, if possible, by slowly pumping the brake pedal.
 - b. Open the bleeder valve while an assistant holds pressure on the brake pedal as the pedal slowly goes through the full stroke.
 - c. Close the bleeder valve and have the assistant slowly release the brake pedal.
 - d. Repeat the process until no bubbles can be seen leaving the bleeder valve.
 - e. Close the valve and move to the next brake.



Park Brake Adjustment

The floor mounted park brake has an adjustment knob on the end of the handle. If the vehicle starts to roll when the park brake is engaged on a hill, place one foot on the service brake pedal, turn the adjustment knob clockwise to increase tension on the brake, release the service brake and check to see if the park brake holds. Repeat the process if necessary.



POWERTRAIN

⚠ WARNING

*To reduce the possibility of severe injury or death from improper servicing techniques:
DO NOT attempt any type of servicing operations before reading all notes, cautions and*

MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

warnings in this manual.

Any servicing requiring adjustments to the powertrain while the motor is running must be made with all four 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.

Reduce the possibility of accidental starting by disconnecting battery at negative terminal before servicing.



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 electro-

lyte 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 liter) 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.

This vehicle will give years of satisfactory service, providing it receives regular maintenance. Refer to the PERIODIC SERVICE SCHEDULE for appropriate service intervals.



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, or frequent use with maximum load.

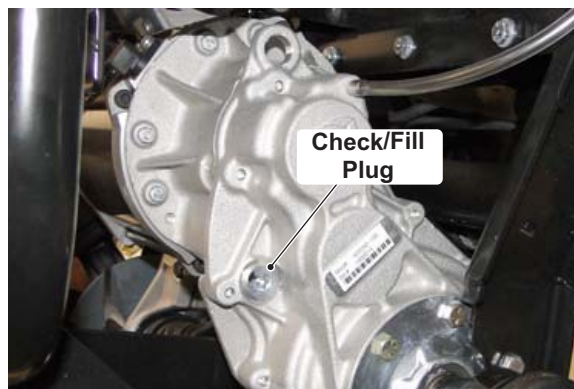
AXLES

Front and Rear Axles

The only maintenance required for the first five years is the periodic inspection of the axles for lubricant leakage. Unless leakage is evident, the lubricant need only be replaced after five years. Refer to the Service and Repair Manual for the fluid replacement procedure.

Checking the Lubricant Level

Clean the area around the check/fill plug and remove the 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 it starts to seep from the hole. Install the check/fill plug.



Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

BATTERY CHARGING AND MAINTENANCE

Battery Safety

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

WARNING

To prevent battery explosion that could result in severe personal injury or death, keep all smoking materials, open flames 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 the vehicle.

Never disconnect a circuit under load at a battery terminal.



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

Electrolyte in a storage battery is an acid solution which can cause severe burns to 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.

Neutralize electrolyte spills with a solution of 1/4 cup (60 ml) sodium bicarbonate (baking soda) dissolved in 1-1/2 gallons (6 liters) of water and flush with water.

Overfilling batteries may result in electrolyte being spilled 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 Disposal

Lead-acid batteries are recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For neutralized spills, place residue in acid-resistant containers with absorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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 continues to perform 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 finite 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.	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		

There is one battery under the cowl; the remaining batteries are located under the seat. The single battery under the cowl is equipped with a battery fill system tube that is located in the passenger side glove box. The batteries under the seat can be accessed by raising and removing the seat bottom and battery cover.

At Each Charging Cycle



To reduce the possibility of fire, never attach a battery charger to a vehicle that is to be unattended beyond the normal charging cycle.

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.
- Torque battery terminal nuts to 95 - 105 in. lbs. (11 - 12 Nm).
- Coat battery terminals with commercially available protectant.
- Replace all terminal covers.
- Replace battery compartment cover and note service date on chart.

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Temperature Affects Battery Capacity

Battery storage capacity is affected by the temperature; the colder it is, the less energy it is able to store; as temperature increases, so does the storage capacity of the battery.

The ideal battery temperature for deep cycle batteries is 77°F (25°C). At 32°F (0°C) the storage capacity of the battery will be reduced by 20%. This means in cold weather the vehicle will not travel as far as it would in warm weather.

Electrolyte Level and Water

The correct level of the electrolyte is 1/2" (13 mm) above the plates in each cell.

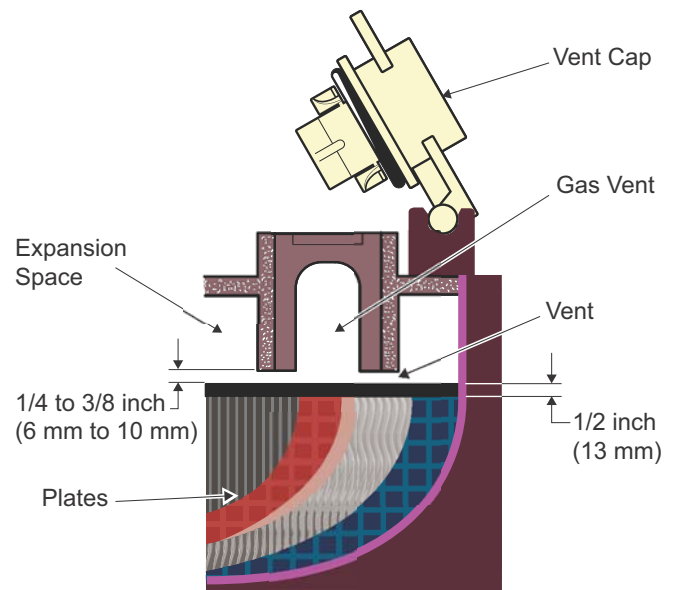
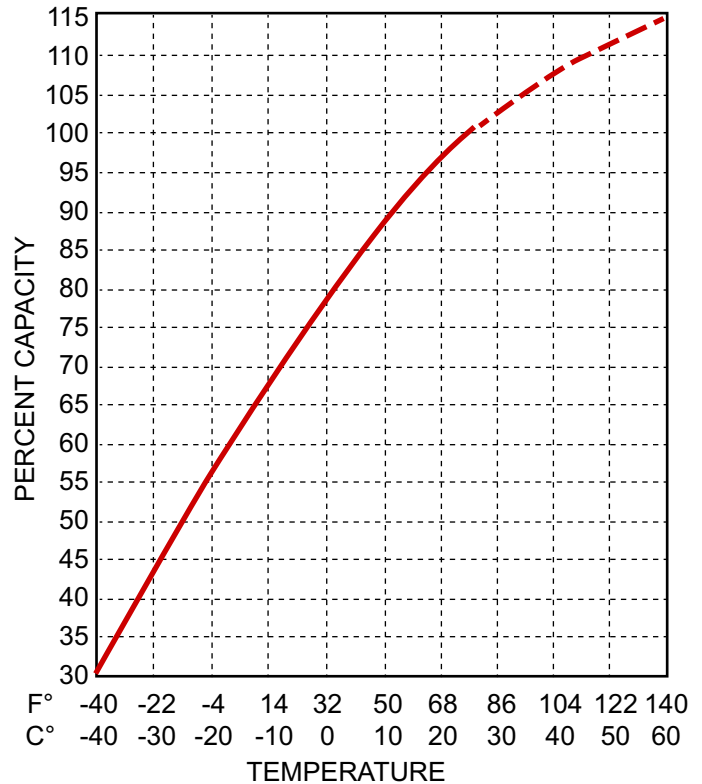
This level will leave approximately 1/4" - 3/8" (6 - 10 mm) of space between the electrolyte and the vent tube. The electrolyte level is important since any portion of the plates exposed to air will be ruined beyond repair. Also avoid filling with too much water, which will result in electrolyte being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



CAUTION

DO NOT overfill batteries. The charging cycle will expel electrolyte and result in component damage.

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.



Electrolyte level should be at least 1/2" (13 mm) above the plates and 1/4" to 3/8" (6 to 10 mm) below vent.

MAINTENANCE

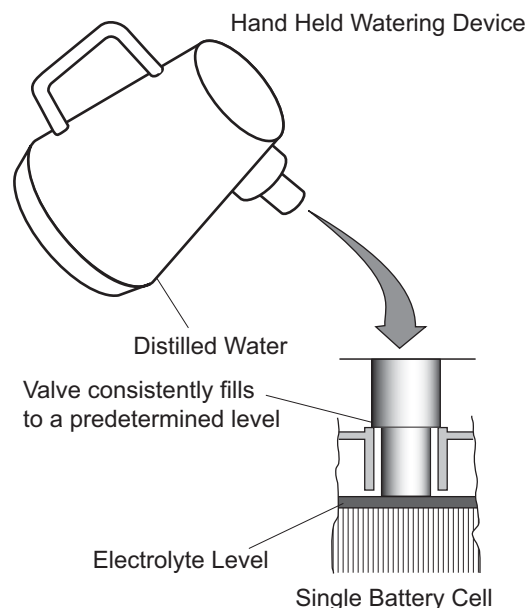
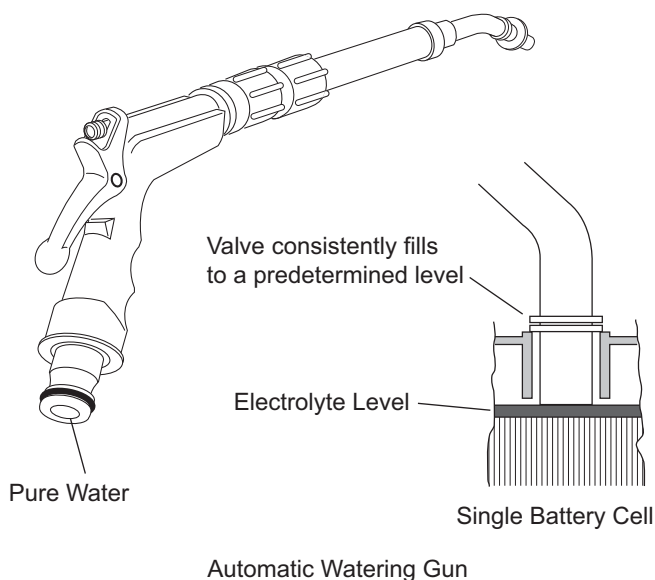
Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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. 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.

An automatic watering gun or a battery watering jug, available from many auto parts stores may be used to fill the batteries. These watering devices are accurate, easy to use and allow for rapid filling. They also maintain the correct electrolyte level within the battery cells.

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

Water Purity Table



NOTICE

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

WARNING

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.



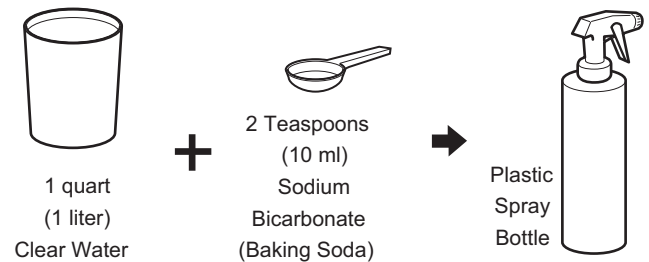
Any electrolyte spills should be neutralized with a solution of 2 teaspoons (10 ml) sodium bicarbonate (baking soda) dissolved in 1 quart (1 liter) of water and flushed with water.

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

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Cleaning Batteries

When cleaning the outside of the batteries and terminals, do not use a water hose without first spraying the batteries with a solution of baking soda (sodium bicarbonate) and water to neutralize any acid deposits. Use of a water hose without first neutralizing the acid will move the acid from the top of the batteries to another area of the vehicle or storage facility, where it will attack the metal structure or the concrete/asphalt floor. After hosing down the batteries, a residue will be left on the batteries, which is conductive and will contribute to the discharge of the batteries.



CAUTION

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

There is one battery under the cowl; the remaining batteries are located under the seat. The single battery under the cowl is equipped with a battery fill system tube that is located in the passenger side glove box. To access the battery for cleaning, remove the rivets from the access cover in the cowl and lift the cover. The batteries under the seat can be accessed by raising and removing the seat bottom and battery cover.

Clean batteries:

1. Use a plastic spray bottle to spray the top and sides of the batteries with a solution of baking soda and water. The solution should consist of 2 teaspoons (10 ml) sodium bicarbonate (baking soda) dissolved in 1 quart (1 liter) of water.
2. In addition to the batteries, pay special attention to metallic components adjacent to the batteries. Spray these with the baking soda solution also.
3. Allow the solution to set for at least three minutes; then use a soft bristle brush or cloth to wipe the tops of the batteries to remove any residue that could cause the batteries to self-discharge.
4. Rinse the entire area with low pressure clear water.



WARNING

To prevent battery explosion that could result in severe personal injury or death, use extreme care with aerosol containers of battery terminal protectant. Insulate the metal container to prevent the metal can from contacting battery terminals.

5. After batteries are clean and dry, coat terminals with a commercially available protectant. See previous WARNING.

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

MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Battery Removal and Installation

⚠ WARNING

Improper handling of high voltage wiring, batteries, or control systems could result in serious or fatal injury by electric shock. Only qualified technicians should repair or access high voltage wiring, battery packs, and associated systems.

To prevent battery explosion that could result in severe personal injury or death, use extreme care 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.

⚠ CAUTION

If the batteries are replaced, make sure they are the exact type and model originally supplied with the vehicle. Failure to follow this caution can result in damage to the vehicles electrical system.

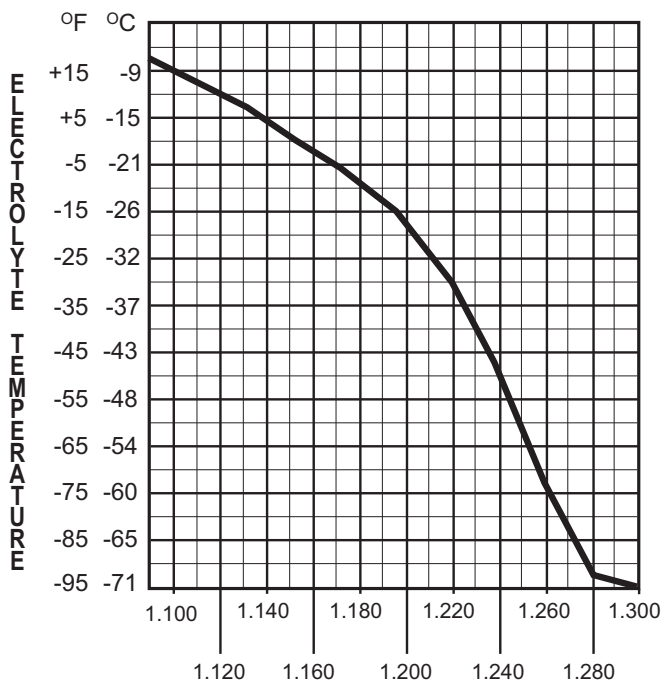
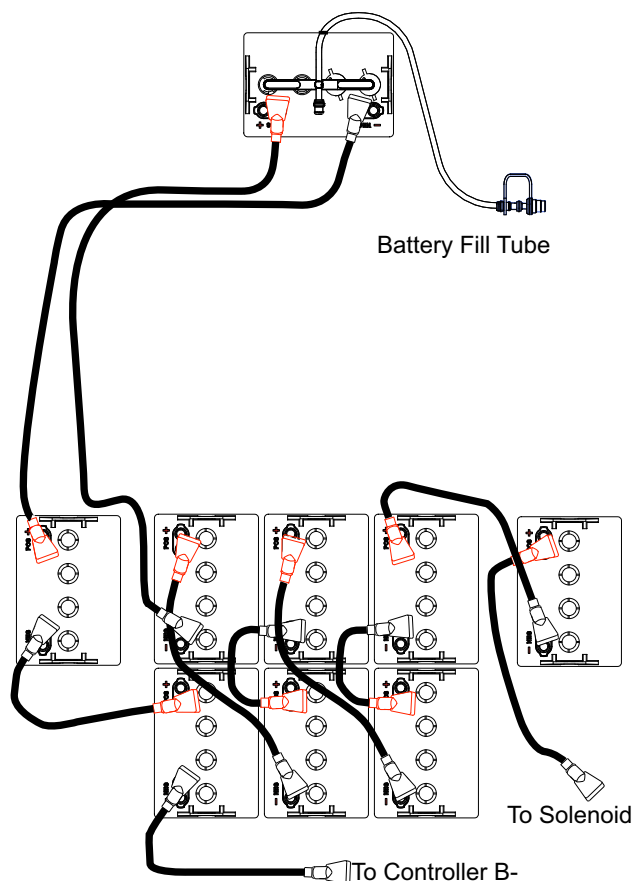
Prolonged Storage

During periods of storage, the batteries must be maintained to prevent discharge.

In winter conditions, the batteries must be fully charged to prevent the possibility of freezing. 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.

The batteries must be cleaned and all deposits neutralized and removed from the battery case to prevent self discharge.

The battery charger may be left connected to the vehicle to maintain a full charge on the batteries, provided the charger is plugged into an active electrical source. If power to the electrical source is disconnected or interrupted, the battery charger will continue to check the charge on the battery pack. This will draw power from the battery pack and eventually drain the batteries if power is not restored in a timely manner.



SPECIFIC GRAVITY ELECTROLYTE FREEZING POINT

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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 being used.

Before charging, the following should be observed:



CAUTION

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

- The electrolyte level in all cells must be at the recommended level and cover the plates.
- The charging must take place in an area that is well ventilated and capable of removing the hydrogen gas that is generated by the charging process. A **minimum** of five air exchanges per hour is recommended.
- The charging connector components must be in good condition and free from dirt or debris.
- The charger connector must be fully inserted into the vehicle receptacle.
- The charger connector/cord set must be 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.

BATTERY TROUBLESHOOTING

In general, troubleshooting will be done for two distinct reasons:

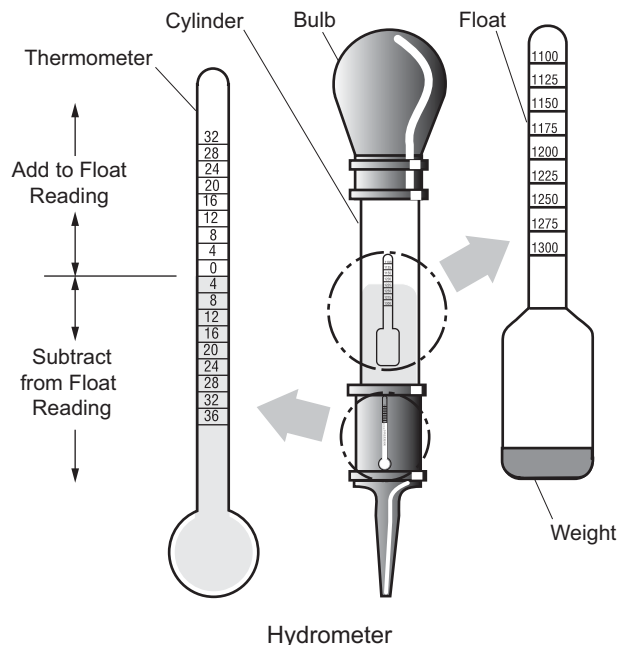
- A battery that performs poorly and is outside of the manufacturers specification should be identified in order to replace it under the terms of the manufacturer's warranty. Different manufacturers have different requirements. Consult the battery manufacturer or the manufacturer's representative for specific requirements.
- 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, as the battery ages, its capacity diminishes. 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 problematic cell or cells are identified, the suspect battery can be removed and replaced. At this point there is nothing that can be done to salvage the battery; however, the individual battery should be replaced with a good battery of the same brand, type and approximate age.

HYDROMETER

A hydrometer is used to test the state of charge of a battery cell. 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.



MAINTENANCE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

⚠ 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.

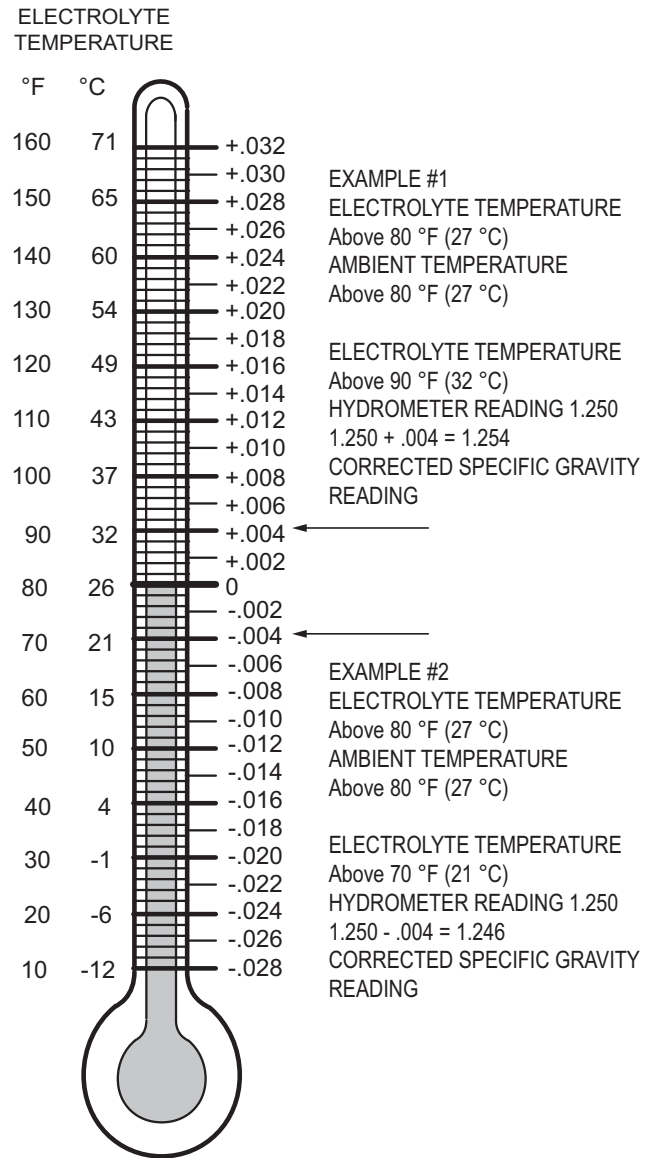
NOTICE

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.

Using A Hydrometer

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



Hydrometer Temperature Correction

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

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.

HARDWARE

Periodically, the vehicle should be inspected for loose fasteners. Use care when tightening fasteners, refer to the Technician's Repair and Service Manual for specific torque values.

Generally, three classes of standard hardware and two classes of metric hardware are used in the vehicle. Grade 5 hardware can be identified by the three marks on the hex head and grade 8 hardware is identified by six marks on the head. metric hardware is marked on the head with 8.8 or 10.9. Unmarked hardware is Grade 2.

ALL TORQUE FIGURES 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)			

Torque Specifications and Bolt Grades

CAPACITIES AND REPLACEMENT PARTS

CAPACITIES	
Front Axle Oil	13.8 oz. 90 wt. Gear Oil
Rear Axle Oil	13.8 oz. 90 wt. Gear Oil
Brake Fluid	DOT 3

REPLACEMENT PARTS	
LED Headlight Bulb	P/N 619101
Headlight Bulb	P/N 619100
ATC Type Fuse 10 Amp	P/N 35212G07
ATC Type Fuse 15 Amp	P/N 35212G01
ATC Type Fuse 20 Amp	P/N 35212G02

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Notes:

PERIODIC SERVICE SCHEDULE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

PERIODIC SERVICE SCHEDULE

PERIODIC SERVICE SCHEDULE

CH - CHECK

C&A - CHECK & ADJUST

CL - CLEAN

R - REPLACE

	Before each use DAILY	250 miles/415 kms MONTHLY	750 miles/1250 kms QUARTERLY	1500 miles/2500 kms SEMI-ANNUAL	3000 miles/5000 kms ANNUAL	REPLACE AFTER
Tires - pressure, condition of tires & rims	CH	CH	CH	CH	CH	
Hardware - loose or missing	CH	CH	CH	CH	CH	
Overall Vehicle Condition	CH	CH	CH	CH	CH	
Seat Belts - Inspect webbing for cuts, frays or any kind of damage or wear that could weaken the belt. Check latch mechanism for proper operation.	CH	CH	CH	CH	CH	
Batteries - state of charge, condition, loose terminals, corrosion, hold downs & hardware		CH	CL	CL	CL	
Batteries* - check electrolyte level, fill after charging if required (if plates are exposed before charging, add only enough water to cover any exposed plates and fill after charging)		C&A	C&A	C&A	C&A	
Brakes - Check fluid level in master cylinder		CH	CH	CH	CH	3000 miles/ 5000 kms
Brakes - smooth operation of pedal, stopping distance	CH	CH	CH	CH	CH	
Park Brake - ability to hold on a hill		C&A	C&A	C&A	C&A	
Accelerator - smooth operation	CH	CH	CH	CH	CH	
Wiring - loose connections, broken or missing insulation		CH	CH	CH	CH	
Charger Receptacle - inspect and clean receptacle at each charge		CL	CL	CL	CL	
Direction Selector - attachment and mechanism		C&A	C&A	C&A	C&A	
Steering Assembly - excessive play, loose or missing hardware		CH	CH	CH	CH	
Tie Rods - excessive play, bent rods, loose or missing hardware		CH	CH	CH	CH	
Front and Rear Axle - oil leakage, noise, loose or missing hardware		CH	CH	CH	CH	
Front and Rear Axle - drain and replace fluid						5000 miles/ 8000 kms
Front Suspension - strut oil leakage, excessive play in hubs or kingpins, worn bushings, loose or missing hardware		CH	CH	CH	CH	
Rear Suspension - strut oil leakage, worn bushings, loose or missing hardware			CH	CH	CH	
Front Wheel Alignment - unusual tire wear			C&A	C&A	C&A	

* Use only distilled or purified water that is free from contaminants to fill batteries.

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

PERIODIC SERVICE SCHEDULE

Read all of SAFETY and this section before attempting any procedure. Pay particular attention to Notices, Cautions, Warnings and Dangers.

Notes:

NOTICE

Read the following warnings before operating vehicle:

WARNING

To prevent personal injury or death, observe the following:

When vehicle is to be left unattended, engage park brake, move direction selector to neutral, turn key to OFF position and remove from key switch.

Drive vehicle only as fast as terrain and safety considerations allow. 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 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 if ever forced to drive across an incline.

Stay in designated areas and avoid steep slopes. Activate the park brake when 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 direction selector is in desired position before starting 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 direction selector.

See GENERAL SPECIFICATIONS for vehicle load and seating capacity.

NOTICE

Read the following information and warnings before operating 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 they may fail.

A vehicle requiring repair indicates that it is no longer functioning as designed and therefore should be considered potentially hazardous.

Use extreme care when working on vehicle. When diagnosing, removing or replacing any components that are not operating properly, 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, 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 utmost caution. Be careful not to place hands, face, feet or body in a location that could expose them to injury should an unexpected situation occur.

Always use the appropriate tools listed in the tool list and wear approved safety equipment.

WARNING

Before working on vehicle, remove all jewelry (rings, watches, 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 running or adjusting 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 forms when charging batteries. Do not charge batteries without adequate ventilation.

Do no permit open flame or smokers in an area being used for charging batteries. A concentration of 4% hydrogen gas or more is explosive.



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Phone: 1-888-438-3946, FAX: 1-800-752-6175

International:

Phone: 001-706-798-4311, FAX: 001-706-771-4609

Service Parts Manuals, as well as Repair and Service Manuals
are available from a local Distributor, an authorized Branch,
Parts & Accessories Department or at www.badboyoffroad.com.

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