GEM™

2005 Owner’s Manual

Introduction

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Introduction

ABOUT THIS MANUAL

Thank you for purchasing your GEM. Your vehicle is designed to operate exclusively on battery power. It is an emission free vehicle. The ideal application for a battery-powered vehicle occurs when the daily driving pattern is predictable and the distance is short.

Customer safety and satisfaction is of genuine concern to GEM. For this reason, we have supplied you with this Owner's Manual designed to acquaint you with the proper and safe use of your GEM vehicle. Please take the time to read and understand the manual before operating your vehicle. The Owner's Manual has been designed for your enjoyment and safety. Maintenance schedules and general care instructions are included.

This manual is applicable to all four of the GEM models: The GEM e2 (Two Passenger NEV), GEM e4 (Four Passenger NEV), GEM eS (Two Passenger Short-back NEV), and the GEM eL (Two Passenger Long-back NEV).

If questions arise after reading the manual, contact GEM Customer Service at **1-866-764-0616.** Please have your Vehicle Identification Number (VIN) and date of purchase information available.

NOTE: All information and specifications in this Owner's Manual are current at the time of printing. However, due to GEM's policy of continuous product developm2ent, we reserve the right to make changes, at any time, without written notice or obligation.

CAUTIONS, WARNINGS, AND NOTES

Throughout this book you will find the words "WARNING!" and "CAUTION!" These serve as reminders to be especially careful. "WARNING!" indicates an immediate hazard, which could result in an accident causing bodily injury. "CAUTION!" identifies something that could result in damage to your vehicle. You will also find information preceded by the word "NOTE." Notes are for your information and make procedures more easily understood.

Vehicle Identification and Specifications

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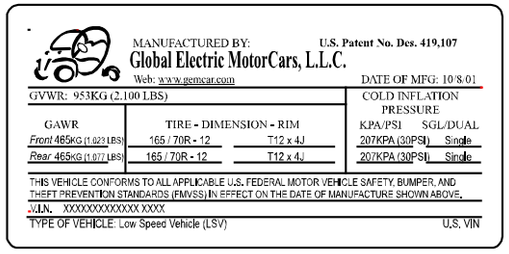
VEHICLE INFORMATION


MANUFACTURED BY: U.S. Patent No. Des. 419,107
Global Electric MotorCars, L.L.C.
Web: www.gemcar.com DATE OF MFG: 10/8/01
GVWR: 953KG (2,100 LBS) COLD INFLATION PRESSURE
GAWR | TIRE - DIMENSION - RIM | KPA/PSI SGL/DUAL
Front 465KG (1,023 LBS) | 165 / 70R - 12 | T12 x 4J | 207KPA (30PSI) Single
Rear 465KG (1,077 LBS) | 165 / 70R - 12 | T12 x 4J | 207KPA (30PSI) Single
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS (FMVSS) IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
V.I.N. XXXXXXXXXXXX XXXX
TYPE OF VEHICLE: Low Speed Vehicle (LSV) U.S. VIN

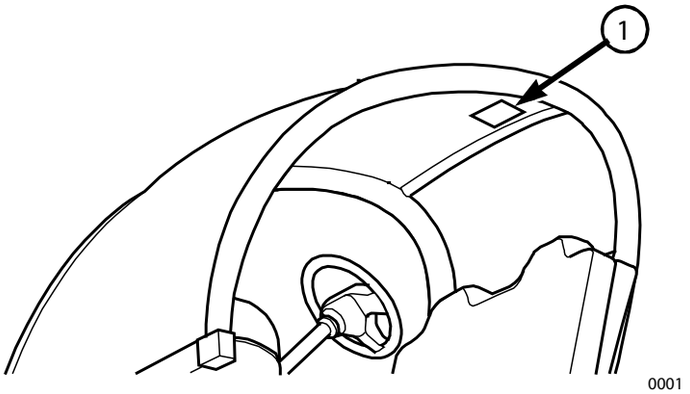


Figure 1 - VIN/Certification Label Location

For both the two and four-passenger model vehicles, the vehicle identification number (VIN) can be found on the VIN/Certification Label, located on the left rear, inside portion of the vehicle roof panel. The VIN indicates the model year, the model type and the serial number of the vehicle.

NOTE: Be sure to record the Vehicle Identification Number in the space provided.

Vehicle Identification Number (VIN):

__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

Key # _____

Optional Pak # _____

Date purchased: _____ /_____ /_____

GENERAL SPECIFICATIONS

GEM e2 Specifications

Motor:	72-volt shunt GE motor
Transmission:	Front wheel drive direct - couple Dana Spicer differential
Speed Control:	GE solid state controller with: * Motor thermal protection * Battery under-voltage protection * Regenerative brakes * Top speed regulation
Tire:	10” Two-ply street and turf rated tires
Battery Pack:	Six 12-volt flooded or gel batteries
Secondary Power Supply:	Dual output 30A DC/DC converter
On Board Charger:	Proprietary 72-volt DC charger 110-volt AC house current
Width:	55 inches
Length:	99 inches
Height:	68 inches
Turning Radius:	12’ 3”
Wheelbase:	72 inches
Curb Weight:	1078 lb.(EMPTY)
GVW:	1600 lb.(LOADED)

GENERAL SPECIFICATIONS

GEM e4 Specifications

Motor:	72-volt shunt GE motor
Transmission:	Front wheel drive direct - couple Dana Spicer differential
Speed Control:	GE solid state controller with: * Motor thermal protection * Battery under-voltage protection * Regenerative brakes * Top speed regulation
Tire:	12” Two-ply street rated tires
Battery Pack:	Six 12-volt flooded or gel batteries
Secondary Power Supply:	Dual output 30A DC/DC converter
On Board Charger:	Proprietary 72-volt DC charger 110-volt AC house current
Width:	55 inches
Length:	128 inches
Height:	70 inches
Turning Radius:	16’ 6”
Wheelbase:	102 inches
Curb Weight:	1271 lb.(EMPTY)
GVW:	2100 lb.(LOADED)

GENERAL SPECIFICATIONS

GEM eS Specifications

Motor:	72-volt shunt GE motor
Transmission:	Front wheel drive direct - couple Dana Spicer differential
Speed Control:	GE solid state controller with: * Motor thermal protection * Battery under-voltage protection * Regenerative brakes * Top speed regulation
Tire:	12” Two-ply street rated tires
Battery Pack:	Six 12-volt flooded or gel batteries
Secondary Power Supply:	Dual output 30A DC/DC converter
On Board Charger:	Proprietary 72-volt DC charger 110-volt AC house current
Width:	55 inches
Length:	108 inches
Height:	70 inches
Turning Radius:	12’ 3”
Wheelbase:	72 inches
Curb Weight:	1140 lb.(EMPTY)
GVW:	1850 lb.(LOADED)

GENERAL SPECIFICATIONS

GEM eL Specifications

Motor:	72-volt shunt GE motor
Transmission:	Front wheel drive direct - couple Dana Spicer differential
Speed Control:	GE solid state controller with: * Motor thermal protection * Battery under-voltage protection * Regenerative brakes * Top speed regulation
Tire:	12” Two-ply street rated tires
Battery Pack:	Six 12-volt flooded or gel batteries
Secondary Power Supply:	Dual output 30A DC/DC converter
On Board Charger:	Proprietary 72-volt DC charger 110-volt AC house current
Width:	55 inches
Length:	144 inches
Height:	70 inches
Turning Radius:	16’ 6”
Wheelbase:	102 inches
Curb Weight:	1192 lb.(EMPTY)
GVW:	2300 lb.(LOADED)

Things to Know Before You Operate Your Vehicle

CONTENTS

DRIVING AND ALCOHOL

Drunk driving is one of the most frequent causes of accidents. Your driving ability can be seriously impaired with blood alcohol levels far below the legal minimum. If you are drinking, don't drive. Ride with a designated non-drinking driver, call a cab, or use public transportation.

WARNING!
Driving after drinking alcohol can lead to an accident. Your perceptions are less sharp, your reflexes are slower, and your judgement is impaired when you have been drinking. Never drink and then drive.

SAFETY INFORMATION

WARNING!

Your vehicle is battery powered. Handled improperly, batteries can be dangerous. Follow the precautions provided on pages 12-13 during charging operations to avoid personal injury or damage to electrical components in the vehicle.

- Read the Owner's Manual before operating this vehicle.
- Charge batteries in a well-ventilated area only.
- Keep children away from the batteries during charging.
- Batteries can emit explosive hydrogen gases when charging. Keep sparks and flames away from the battery area of the vehicle. Tools, wires and metal objects can cause sparks when shorted across a battery. Follow all instructions carefully when dealing with batteries.
- The batteries in the GEM vehicle are either 12-volt flooded or gel batteries, specially built for electric vehicle application. Automotive batteries should neverbe used.
- Some electrolyte can leak from damaged or defective flooded batteries. Avoid contact with skin, eyes, or clothing.

- Batteries contain acid, which causes severe burns. If battery fluid is on your skin, flush the affected areas with water for at least 15 minutes and then seek medical assistance.
- Internal contact: Get medical assistance as soon as possible.
- Contact with eyes: Flush with water and get medical assistance as soon as possible. While you are being driven to get medical assistance, continue to rinse your eyes by using a sponge or soft cloth saturated with water.

WARNING!

The battery packs contain high voltage that could cause serious or fatal injury if not handled properly. Only qualified technicians should handle or service this vehicle, after consulting the service manual.

Understanding the Features of Your Vehicle

CONTENTS

INSTRUMENT POD

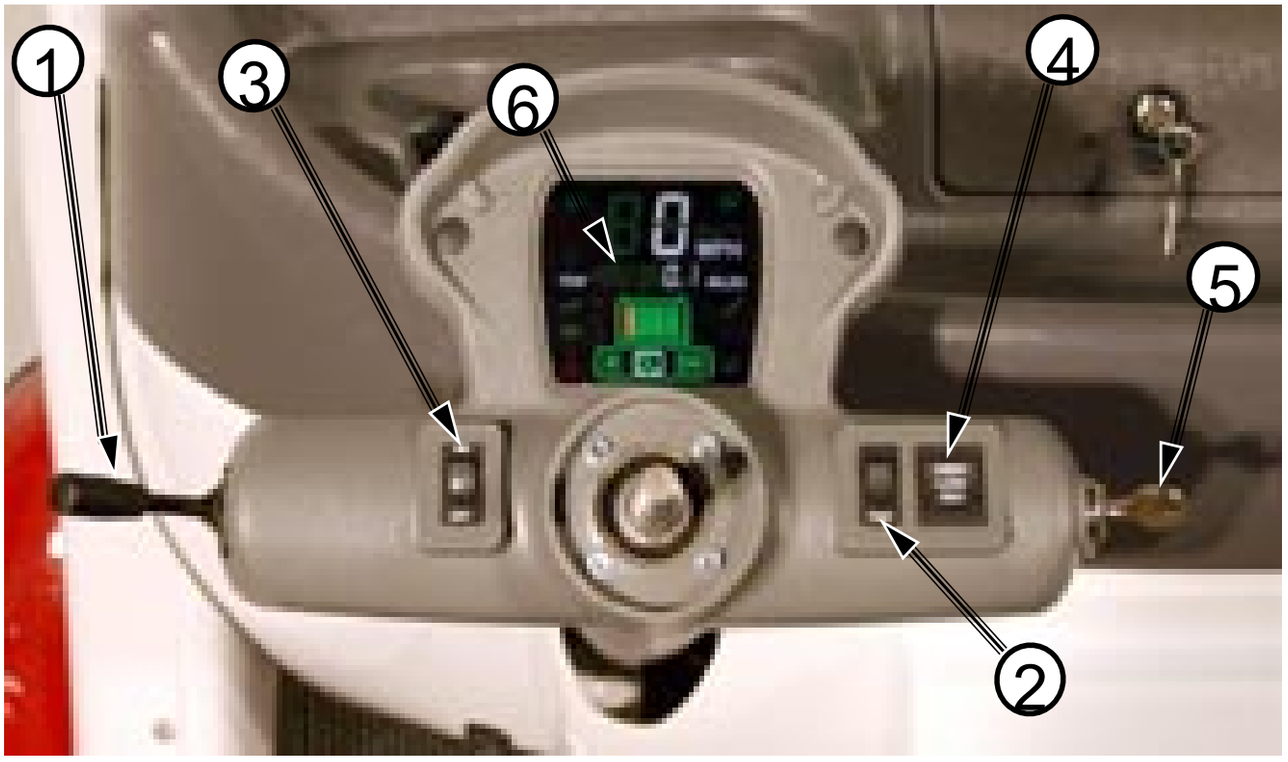


Figure 2 - Instrument Pod

1. Turn Signal/Windshield Wiper/Horn Lever
2. Trip/Odometer Switch
3. Headlight Switch
4. Vehicle Direction Switch
5. Key Switch
6. LCD Display

NOTE: Further explanation of these vehicle features are found on the next few pages.

Turn Signal/Windshield Wiper/Horn Lever

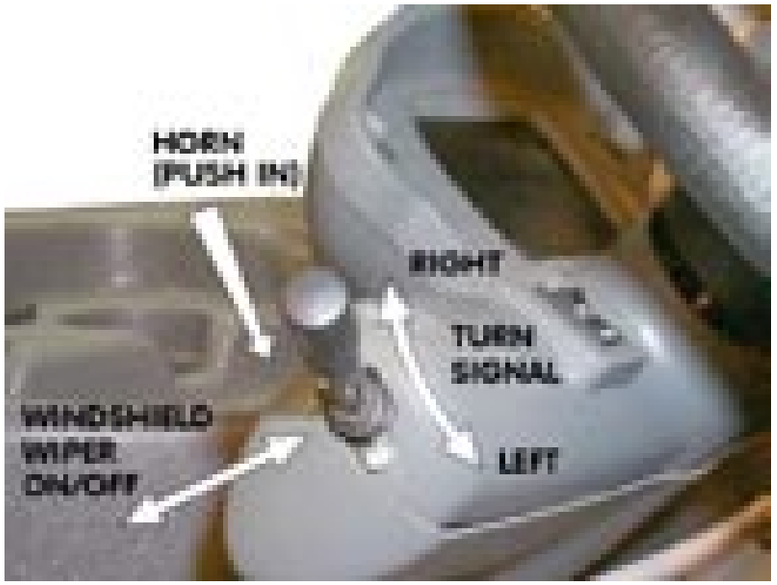


Figure 3 - Turn Signal Lever

The turn signal lever is multi-functional, controlling the turn signals, horn and wiper. Figure 3 illustrates how to activate the different functions.

Turn Signal

For a left turn, move the lever down until it clicks. For a right turn, move the lever up until it clicks.

CAUTION!
The turn signal lever is not self-canceling. After completing the turn, return the lever to the center

Horn

Press the turn signal lever inward, toward the instrument pod to activate the horn.

Windshield Wiper

Press the turn signal lever towards the steering wheel to turn on the windshield wiper. Pull the turn signal lever away from the steering whell to turn off.

Trip/Odometer Switch

The momentary trip switch has three functions: toggle between the odometer and the tripmeter; to reset the tripmeter; and to change the function of the speedometer and odometer from miles-per-hour (MPH) to kilometers-per-hour (km/h) and miles to kilometers.

Using the Trip/Odometer Switch

1. Pressing the trip switch for less than 2 seconds will toggle between the odometer and tripmeter modes on the display.
2. Pressing the trip switch for 3-9 seconds, while the display is in the trip mode, will reset the tripmeter to zero. (TRIP must be lit on the display - page 20).
3. Pressing the trip switch for 10-12 seconds, while the display is in the odometer mode will change the display functions from MPH to km/h and miles to km.

Headlight Switch

This switch turns the headlights and rear running lights on and off.

Vehicle Direction Switch

Drive High

With the key turned on and “High” selected, pushing down on the accelerator pedal will move the vehicle in a forward direction with the speed range of 0-25 mph. This mode refers to “APPROVED TRAFFIC” routes based on Low Speed Vehicle (LSV) regulations for your area.

Drive Low

With the key turned on and “Low” selected, pushing down on the accelerator pedal will move the vehicle in a forward direction with the speed range of 0-15 mph. When “Low” is selected, the acceleration and speed of the GEM is limited.

Reverse

With the key switch on and “Reverse” selected, pushing down on the accelerator pedal will move the vehicle in reverse. The top speed in the reverse direction is limited for safety.

NOTE: Your GEM is equipped with a reverse warning device that sounds when the key is on and the vehicle direction switch is in the reverse position.

CAUTION!
Always bring the vehicle to a complete stop before changing the position of the vehicle direction switch.

Key Switch

When the key is in the “ON” position (turned clockwise), the display will light up and all accessories may be turned on. When the key is in the “OFF” position, the car will not drive but accessories and lights will remain on for approximately 20 seconds.

CAUTION!
Do not leave the key in the “ON” position when not in use. Doing so discharge the batteries.

Zero Speed Detect

If the vehicle is moving when the key switch is on and accelerator pedal up, the electric motor will resist vehicle motion.

LCD Display

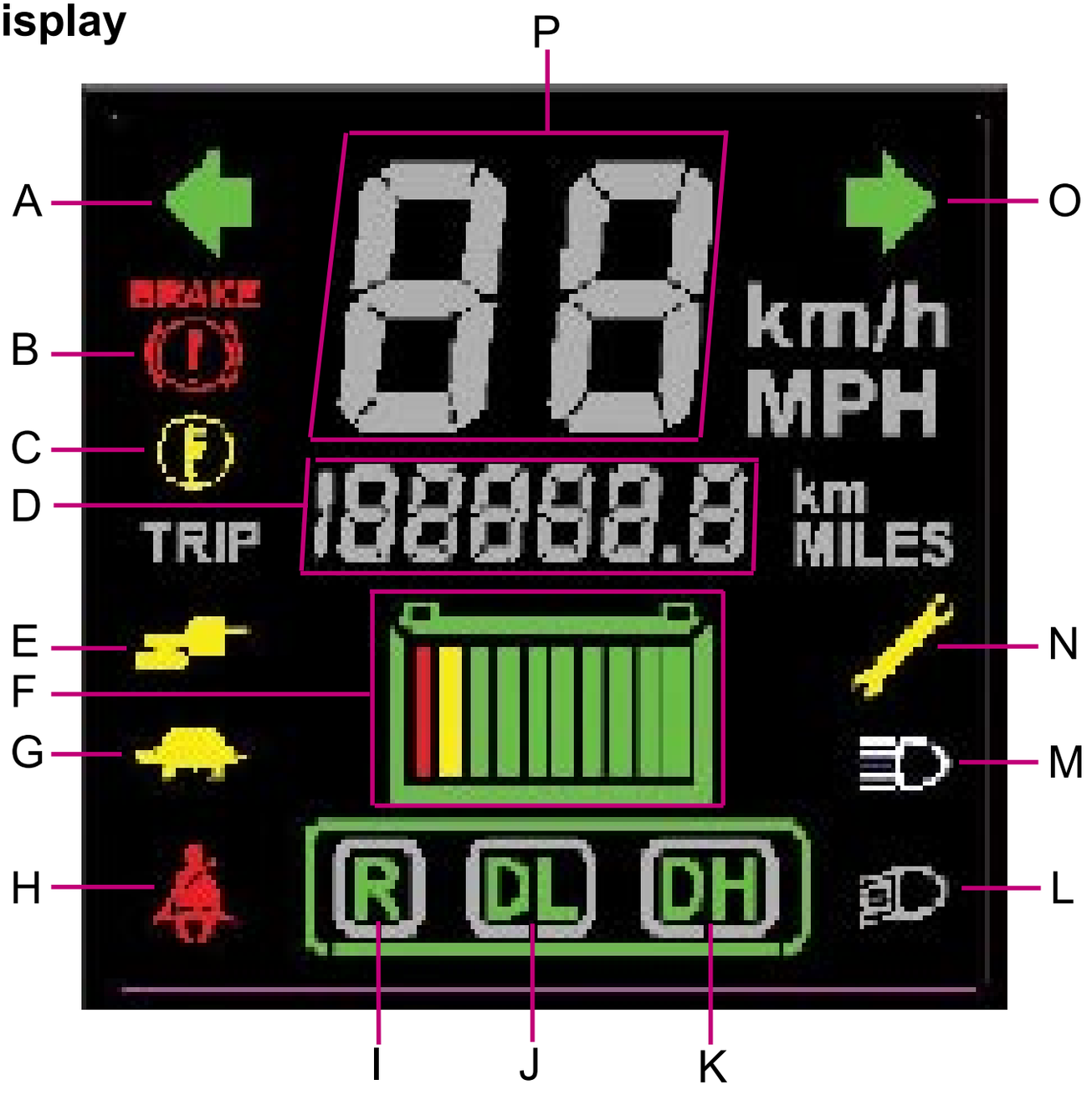


Figure 4 - LCD Display

LCD Display	Indicators
A	LEFT TURN
B	BRAKE FAILURE WARNING
C	HIGH MOTOR TEMPERATURE WARNING
D	ODOMETER / TRIPMETER
E	CHARGER CONNECTED
F	STATE OF CHARGE
G	CURRENT LIMITING MODE
H	SEAT BELT WARNING
I	REVERSE
J	DRIVE LOW
K	DRIVE HIGH
L	NOT USED
M	HEADLIGHTS
N	SERVICE
O	RIGHT TURN
P	SPEEDOMETER / ERROR CODE

NOTE: These indicators are defnined on the next several pages.

Turn Signals

The blinking turn signal arrows correspond to the direction of the turn signal lever.

Brake Failure Warning

If the brake warning icon is lit, there may be a problem with your braking system. It could be an indication of the following.

- Low brake fluid
- Air in the brake system

WARNING!
Have your brakes checked immediately by a trained service person if the brake failure warning indicator is lit.

High Motor Temperature

If the high motor temperature icon is lit, your motor may be overheating. This is usually a symptom of overworking the motor. Steep grades and heavy loads will quickly heat the motor and shorten motor life.

CAUTION!
If the high motor temperature warning indicator is lit, pull over and park the vehicle in a cool location as soon as possible. Wait until motor temperature is reduced and the high motor temperature icon turns off to drive. If this condition persists, contact your service provider.

Odometer/Tripmeter

The odometer indicates the total distance the vehicle has been driven. This is useful in keeping a record for maintenance. The odometer can be displayed in kilometers or miles. To change from miles to kilometers or to change from odometer to tripmeter, see the Trip/Odometer Switch section on page 17. The tripmeter is useful for keeping tack of specific distances traveled.

Speedometer/Error Code

The speedometer indicates driving speed in either miles-per-hour (MPH) or kilometers-per hour (km/h). To switch between MPH and km/h, see the Trip/Odometer Switch section on page 17. If the Service icon is lit, an error code will be displayed at the speedometer location. See page 44 for information regarding error codes.

Charger Connected

The charger connected icon and state of charge gauge turns on approximately 8-10 seconds after the extension cord is plugged in. After charging is done, both indicators remain lit. To know if the charge is complete, all ten bars on the state of charge should be lit. If both the charger connected and state of charge are not lit, the charger may not be charging. If this occurs, make sure the disconnect switch is in the “ON” position. More information on the charger and charging of the batteries is discussed on pages 46-50.

State of Charge

The state of charge gauge indicates how much capacity remains in the battery pack. There are 10 bars: 1 red, 1 yellow, and 8 green. After a full charge all the bars should be lit. The far right green bar will be the first to turn off once the battery pack voltage begins to drop. The percent full charge corresponding to each bar is shown below.

Bar	Color	% Full Charge
1	Red (Far Left)	Less Than 10
2	Yellow	10-20
3	Green	20-30
4	Green	30-40
5	Green	40-50
6	Green	50-60
7	Green	60-70
8	Green	70-80
9	Green	80-90
10	Green (Far Right)	90-100

Current Limiting Mode

The current limiting mode is designed to protect the batteries and motor. If the current limiting mode icon is lit, it is an indication of one of the following issues.

Battery Pack Over-Voltage

Battery over-voltage typically occurs when the vehicle is descending down hills after being fully charged. During descent, the regen mode is activated, which returns current to the battery by using the motor as a generator. In some extreme cases, the battery pack might get overcharged.

Battery Pack Under-Voltage

Battery under-voltage would coincide with a low charge reading on the state of charge gauge. If you continue to drive, the acceleration and power will begin to decrease. The controller will eventually shut the vehicle down before allowing battery damage to occur. If the charge is low and the current limiting icon is lit, pull the vehicle over to a safe location and charge the vehicle.

Seat Belt

The seat belt icon reminds you to fasten your seatbelt. The icon remains on for 45 seconds.

Drive High/Low/Reverse

The drive High/Low/Reverse corresponds to the position of the vehicle direction switch. More information regarding this switch can be found on pages 18.

Service

If the Service icon is lit, an error code will be displayed at the speedometer location. See page 44 for a description and explanation of common error codes.

WINDSHIELD WIPER

NOTE: Operation of the windshield wiper is interrupted should the current draw from the wiper motor become too high. This typically occurs when the wiper is dragging on a dry window. The interruption will usually only last a few seconds.

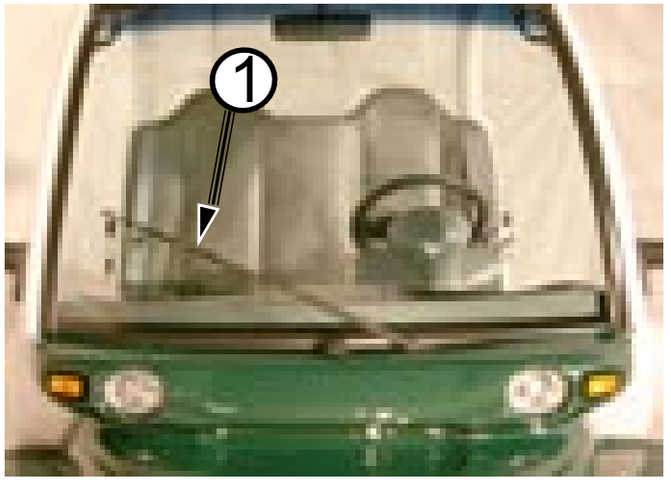


Figure 5- Windshield Wiper

1. Wiper Blade and Arm

CAUTION!
A damaged or worn wiper blade may reduce vision and prevent you from seeing well enough to drive safely. A worn blade could damage windshield glass. If your blade becomes damaged or worn, replace it.

FOOT CONTROLS

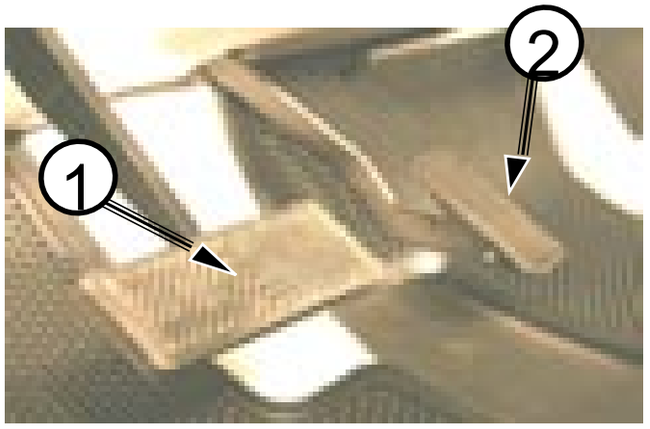


Figure 6 - Foot Controls

1. Brake Pedal
2. Accelerator Pedal

Brake Pedal

The foot brake pedal (Figure 6) is located on the floor to the left of the accelerator pedal. To slow or stop the vehicle, firmly press the foot brake pedal.

Accelerator Pedal

The accelerator pedal (Figure 6), is located on the floor, close to the center of the vehicle and is used to control your speed. Pressing down on the pedal will increase speed.

WARNING!
Always accelerate slowly to prevent possible injury to yourself or others.

PARKING BRAKE

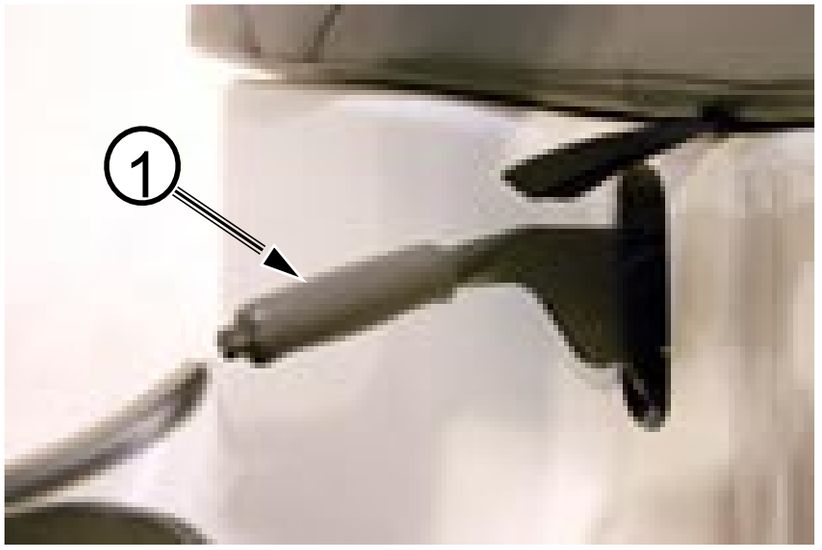


Figure 7 - Parking Brake (Two Passenger)

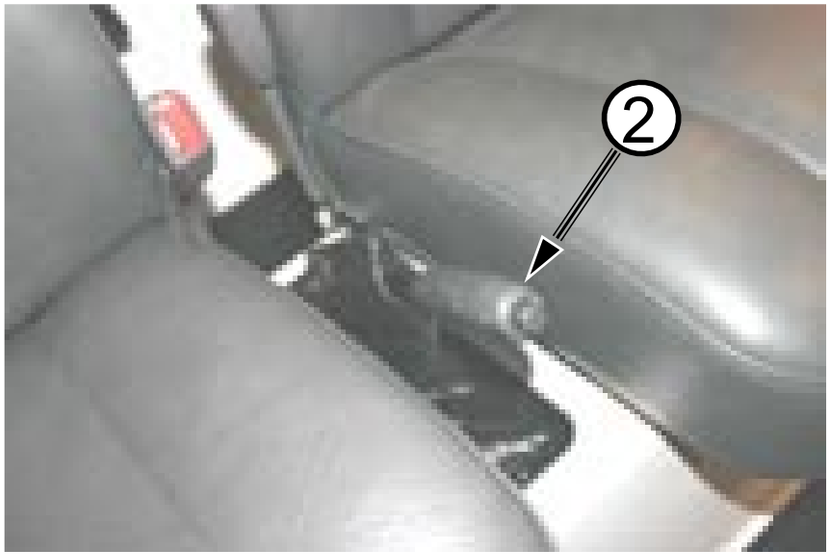


Figure 8 - Parking Brake (Four Passenger)

1. Parking Brake (Two Passenger)
2. Parking Brake (Four Passenger)

The parking brake is located to the right of the driver. To apply the parking brake, lift the handle. To release, press the button on the end of the handle and lower it. A warning will sound whenever you turn the key switch to the “OFF” position and have not applied the parking brake.

NOTE: The parking brake is adjustable and should be checked periodically by a trained service technician. Preview the vehicle maintenance schedule on page 68.

CAUTION!
Always engage the parking brake before leaving the vehicle.

MAIN DISCONNECT SWITCH

Figure 9 - Main Disconnect Switch

The main disconnect switch (Figure 9), is inside the fuse access panel on the lower dash. The switch is clearly labeled ON and OFF. The switch is intended to provide an easy way to disconnect all power to the vehicle during long-term storage. After disconnect is turned off, some power may still be in the system until all capacitors have drained.

NOTE: The main disconnect switch must be turned on for operation and charging. Also, it is recommended that if the vehicle is not to be used for 10 days or more, the main disconnect switch should be turned off to prolong battery life.

SEAT BELTS

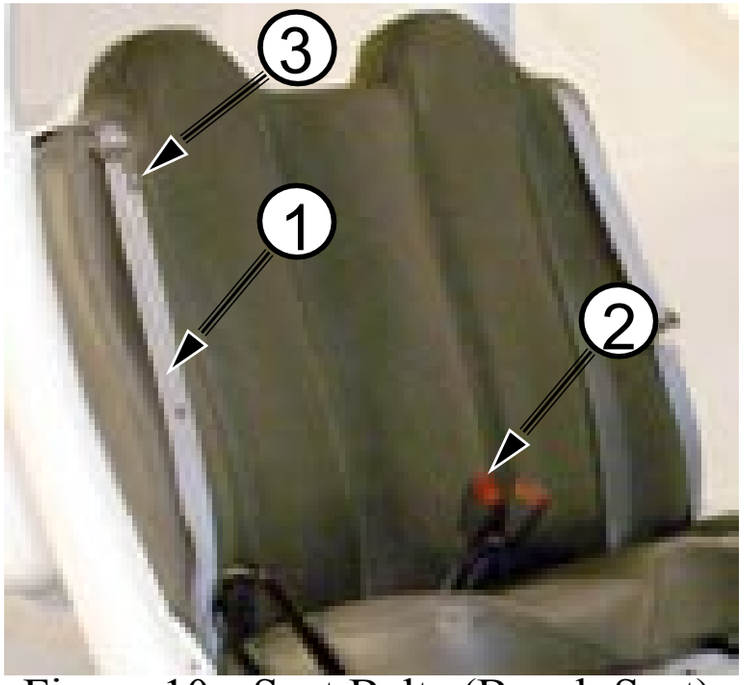


Figure 10 - Seat Belts (Bench Seat)

Figure 11 - Seat Belts (Bucket Seats)

1. Belt
2. Latch
3. Buckle

GEM is equipped with seat belts for both driver and passengers.

Research has shown that seat belts save lives. Seat belts can reduce the seriousness of injuries in a single vehicle accident. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts provide protection from that, and they reduce the risk of injury caused by striking the inside of the vehicle. Everyone needs to buckle up all the time, including short trips.

WARNING!

- Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision best.
- Wearing your belt incorrectly could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Use these instructions to insure you and your passengers are wearing the seatbelts properly.
- Two people should never be belted into a single seat belt. People belted together can crash into one another in an accident, causing injury. Never use a lap/shoulder belt for more than one person, no matter what their size.

Proper Use Of Your Seat Lap and Shoulder Belt

1. Enter the vehicle and sit back.
2. The seat belt latch plate is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.
3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a click.

CAUTION!
Make sure the button on the buckle faces upward or outward, so that you are able to unbuckle your seat belt quickly.

4. Position the lap belt plate across your thighs, below your abdomen. To remove slack in the lap belt portion, pull up a bit on the shoulder belt. To loosen the lap belt if it's too tight, tilt the latch plate and pull on the lap belt. A snug belt reduces the risk of sliding under the belt in a collision.
5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

6. To release the belt, push the red button on the buckle. If necessary, slide the latch plate down the webbing to allow it to retract fully.

WARNING!

- A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.
- A belt that is too loose will not protect you as well. In a sudden stop you could jerk too far forward, increasing the possibility of injury. Wear your seat belt snugly.
- A belt that is worn under your arm is very dangerous. Your body could strike the inside surfaces of the vehicle in a collision, increasing the possiblity of head and neck injury. A belt worn under the arm can cause internal injuries. Ribs are not as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will absorb the force in a collision.
- A shoulder belt placed behind you will not protect you from injury during a collision. You are more likely to hit your head in a collision if you do not wear your shoulder belt. The lap and shoulder belt are to be used together.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged.

CAUTION!

Maximum occupancy is limited to four people for your GEM four-passenger vehicle, and two people for your GEM two-passenger vehicle.

CONVENIENCE ITEMS

Seat Adjustment - 4 Passenger Only

The front seats on the 4 passenger models are equipped with manual seat adjustments. The seat adjustment handle is directly under the front of the seat. Move the handle to the side and move the seat to the desired position. Using body pressure, move forward and rearward on the seat to assure the seat adjusters have latched.

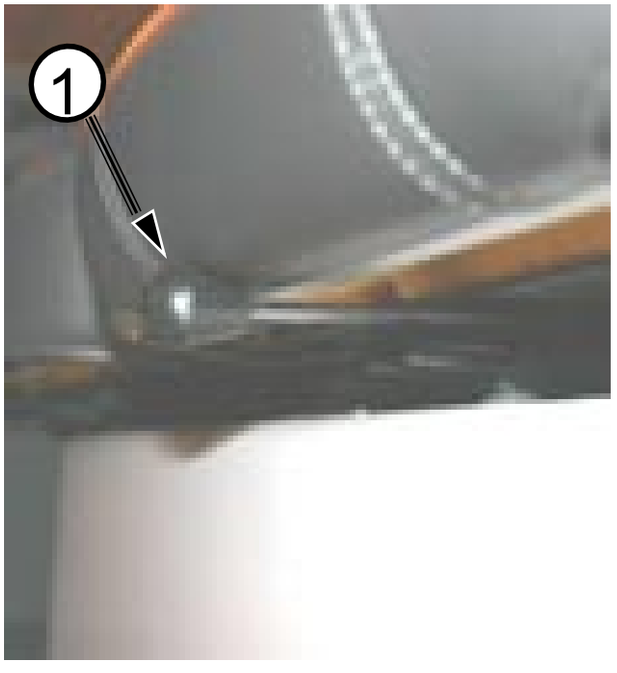


Figure 12 - Seat Adjustment Handle

1. Seat Adjustment Handle

Upper Dash

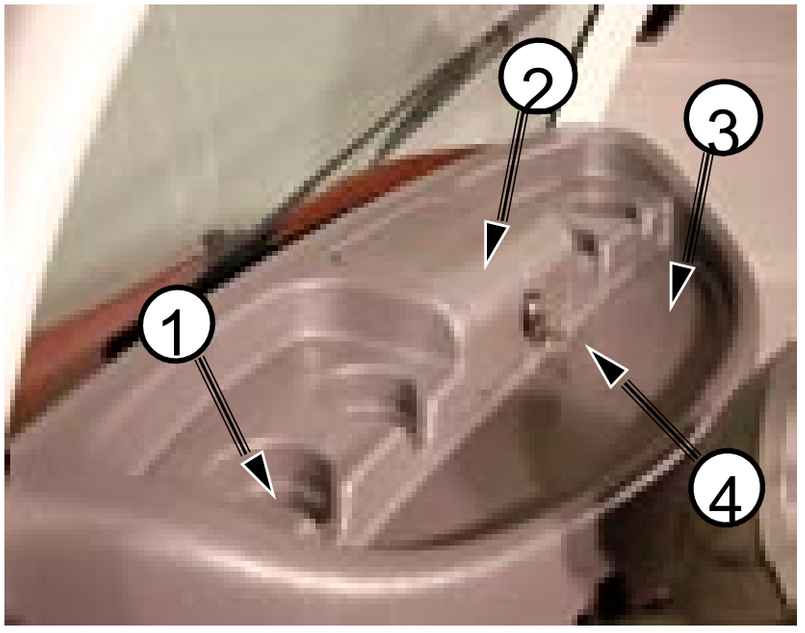


Figure 13 - Upper Dash

1. Cup Holder
2. Glove Box Door
3. Package Tray
4. Glove Box Key

The glove box (Figure 13), is located on the top center of the upper dash and is equipped with a lock to protect against theft or damage. The upper dash also contains a package tray and four cup holder locations.

WARNING!
Drinking alcohol can seriously impair your ability to operate this vehicle.

CAUTION!
Liquids can damage electrical components and the circuit board. Handle liquids with care. Do not spray water directly into the upper or lower dash.

Basketpak (Standard)

Figure 14 - Basketpak

Accessory Paks (Optional)

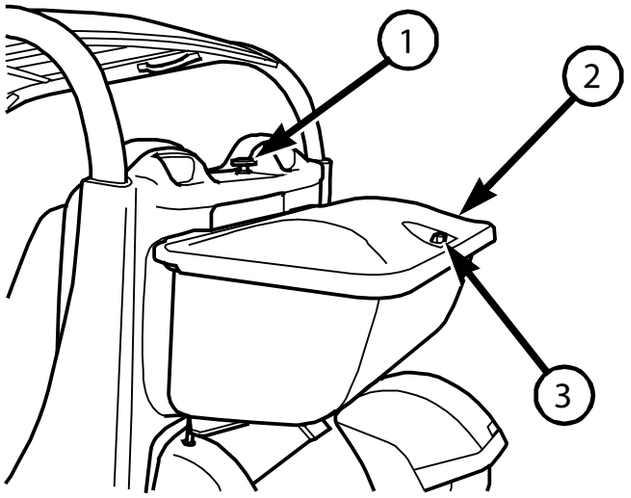


Figure 15 - Swivelpak™

Figure 16 - Linkspak™

1. Release Handle
2. Pak Cover
3. Pak Cover Lock

Paks are available from your dealer and they are interchangeable.

CAUTION!
Use only GEM approved Paks. Other Paks may cause damage to the Pak system or vehicle and will void warranty.

The release handle is located at the rear of the vehicle between the taillights.

To remove an installed Pak, or install a different one:

1. Empty Pak completely.
2. Steady the Pak to prevent it from falling.
3. Rotate the release handle clockwise to release the Pak.
4. Remove the Velcro safety strap.
5. Lift the empty Pak off the GEM.
6. Position the new Pak onto the brackets and apply the Velcro safety strap.
7. Push forward to engage lock. Test to make sure Pak is secure. This is a two stage locking system. If not secure, repeat procedure.

CAUTION!
Keep the Pak latch in a locked position when operating or transporting the vehicle.

WARNING!
The capacity of the Pak is not intended for any type of passenger use. Doing so could result in personal injury.

Accessory Plug (Optional)

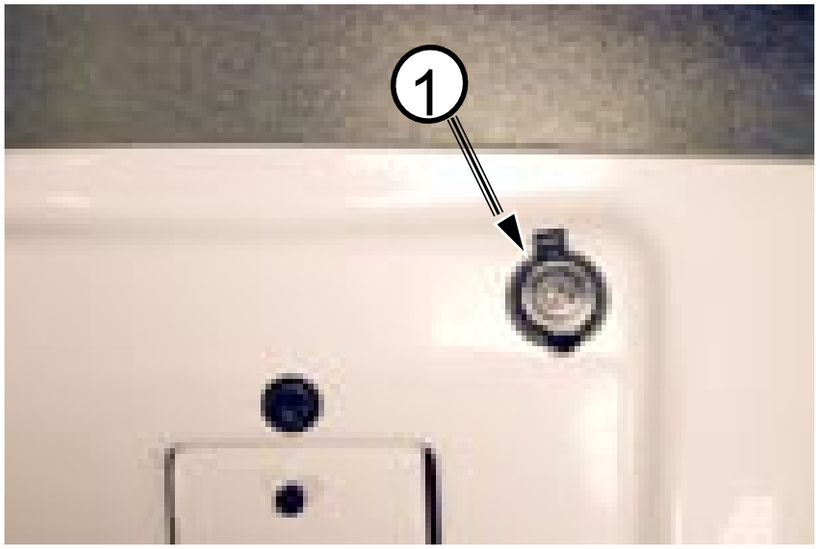


Figure 17 - Accessory Plug
1. Accessory Plug Cover

The optional accessory plug (Figure 17) is located on the lower dash, to the right of the fuse access panel. This plug will accept a standard automotive 12-volt accessory jack and is intended for moderately powered accessories such as a cellular phone. It or accessory plugs will not operate large current items such as cigarette lighters.

WARNING!
Damage to electrical components may occur from improper use.

Operation and Maintenance

CONTENTS

BASIC OPERATION

This is a basic list of how to operate the vehicle.

1. Make sure the disconnect switch is in the “ON” position.
2. Turn key switch on.
3. Fully release the parking brake.
4. Move direction switch to desired position.
5. Press accelerator pedal and go.

WHAT TO DO IN EMERGENCIES

Error Code Summary and Explanation

Error codes are used in the control system to indicate conditions that prevent the vehicle from operating. All error codes are accompanied by the service icon. The chart shown below summarizes the most frequent error codes and remedies.

Error Code	Condition	Remedy
-06	Pedal depressed and no direction is selected.	Release pedal and insure direction switch is “locked” into a position.
-11	Key on while pedal is pressed	Release accelerator pedal
-15	Low voltage on battery pack	Need to charge batteries before operating
-16	High voltage on battery pack	Turn lights on for several seconds, then turn key switch on and off.

NOTE: If any other codes are present, contact your GEM dealer or customer service for assistance.

Transporting Your Vehicle

The best way to transport your vehicle is in an enclosed trailer. If it is necessary to haul your vehicle on an open trailer, follow these guidelines:

1. Never haul your vehicle while the vehicle is facing rearward on the trailer.
2. With the vehicle facing forward, pull the trailer at speeds of 55 MPH or less.
3. Secure any items that could be affected by airflow through the vehicle.
4. **Do not secure across any plastic body or floor panel component of the vehicle.** Use tie down points on the frame identified with an “X” on

CAUTION!
TOWING THE VEHICLE IS NOT RECOMMENDED. This vehicle is not designed for dolly towing. Any vehicle failures resulting from dolly towing will void warranty.

BASIC MAINTENANCE

WARNING!
The main disconnect switch should be turned off before any vehicle maintenance is started.

Battery Charging

NOTE: THE TYPE OF BATTERIES USED IN THIS VEHICLE WILL PERFORM BETTER WHEN KEPT FULLY CHARGED. THEREFORE, WHENEVER POSSIBLE RECHARGE THE BATTERIES - NO MATTER WHAT THE STATE OF CHARGE.

The GEM vehicle has a battery control and recharge system especially designed for electric vehicle usage. Two of the six 12-volt flooded or gel batteries are located inside the short and long back bed (page 53) or the spat (page 54), and four are located under the bench seat cushion. The charging system is designed to maximize the battery pack life while recharging the pack, in the shortest time, with available household current (110-volt, 15 amp, A/C outlet). The following guidelines will insure that you get the maximum battery life and performance out of your GEM electric vehicle.

- New batteries will not perform to their fullest capacity until they have been discharged and recharged 20 to 30 times. Batteries should be fully charged before the first use of a new vehicle.
- When recharging, it is preferable to have the battery pack at room temperature. Do not charge in direct sunlight, on hot pavement or at temperatures of 110°F or higher.
- Batteries should be charged after each use.
- In the first few years of life, your batteries should provide a range of 25 miles at 72°F. At 32°F, your range may reduced to 12-15 miles. This is a normal characteristic of electric vehicles.

WARNING!

- Always wear safety glasses or approved eye protection when servicing the vehicle. Wear a full-face shield and gloves when working with or around batteries and electrical connectors.
- Always use insulated tools when working with or near batteries.

WARNING!

- Battery fluid is a corrosive acid solution and can burn or even blind you.
- Do not allow battery fluid to contact eyes, skin or clothing. If acid splashes in eyes or on the skin, flush the area immediately with large quantities of water.
- Battery gas is flammable and explosive. Keep flame or sparks away from the battery or any other booster source.
- Don't allow cable clamps to touch each other.
- Battery posts, terminals and related accessories contain lead and lead compounds. Wash your hands after handling.

CAUTION!

It is essential when replacing the cables on the battery that the positive cable is attached to the positive post and the negative cable is attached to the negative post. Battery posts are identified on the battery case as positive (+) and negative (-). Cable clamps should be tight on the terminal posts and free of corrosion.

Battery Charger

The battery pack should be charged whenever convenient and no matter what the state of charge. If no green bars are lit, the battery pack should be put on charge as soon as possible. A full recharge cycle (state of charge showing only 1 red bar) can take 8 hours or more. Most recharge cycles will be shorter.

NOTE: Recharge cycles are always encouraged. However, to condition a new set of batteries, it is recommended that you discharge the vehicle at least two green bars for the first 20 trips.

CAUTION!

- Charge batteries fully before storing.
- In hot climates, battery self-discharge will increase.
- In cold climates, batteries will freeze if not properly charged.
- Remember to turn the main disconnect switch "OFF" if the vehicle will not be used for 10 days or more.

Battery Charge Receptacle

Figure 18 - Charging Receptacle

1. Charging Receptacle

The Battery Charge Receptacle (Figure 18), is located on the hood. It accepts a standard, 3 wire, grounded, extension cord and should not exceed the following:

- 12 gauge wire 50 feet in length
- 14 gauge wire 25 feet in length

WARNING!
Use the correct gauge extension cord as defined above. An incorrect gauge extension cord could result in fire or heat damage.

Insert the proper extension cord into the battery charger receptacle (Figure 18), and then plug into a 110-volt A/C, 15amp-breaker outlet. GFI is recommended.

Battery Care

Your GEM vehicle is equipped with six 12-volt flooded or gel batteries. Both types are shown in Figure 19.

Figure 19 - Flooded and Gel batteries

1. Gel Battery
2. Flooded Battery

CAUTION!
Each vehicle is programmed at the factory for a particular battery type. Switching batteries can only be done by a GEM certified technician.

Flooded Battery Fill Well

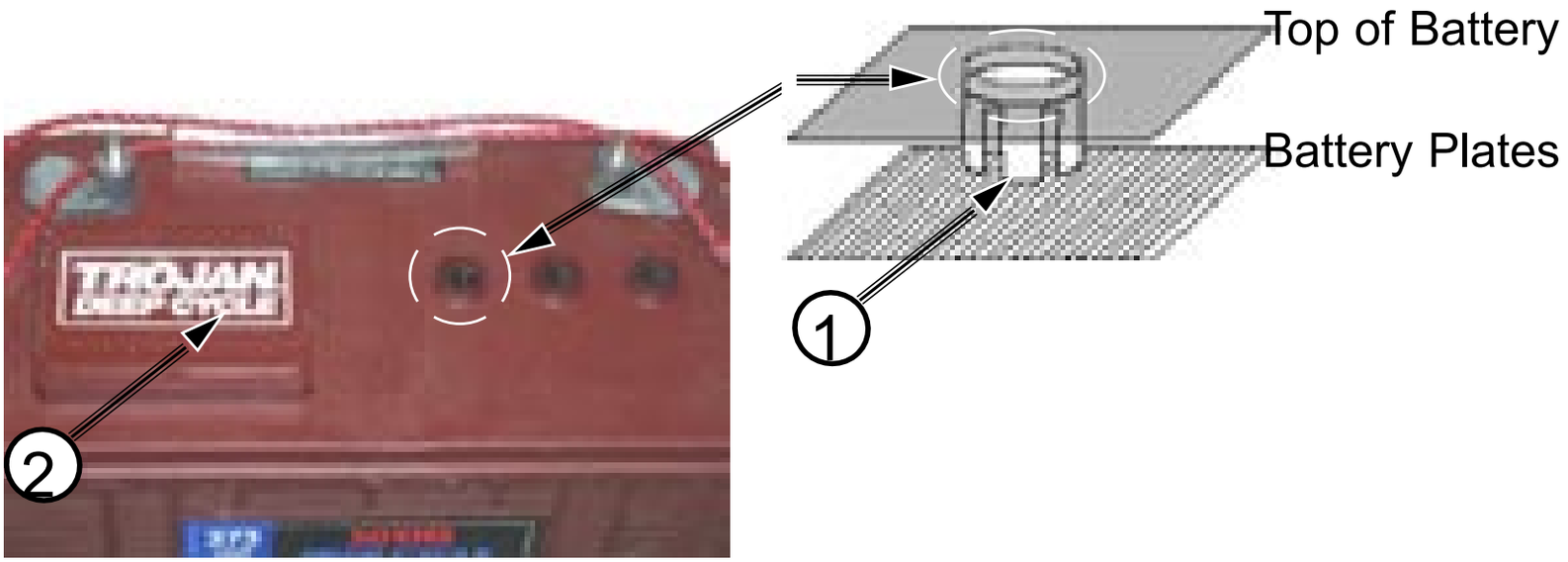


Figure 20 - Fill Wells of Flooded Battery

1. Bottom of Fill Well
2. Vent Cap

The detailed view in Figure 20 shows the internal features of a fill well. Each battery contains two vent caps and six fill wells. In Figure 20, only one vent cap was removed to expose the fill wells.

*See Page 55 for filling instructions

Two of the six batteries are located inside the short or long back bed, or the spat. Four are located under the bench seat. The bed and spat battery access covers are shown in Figures 21 and 22. Both covers can be removed by unscrewing four fasteners.

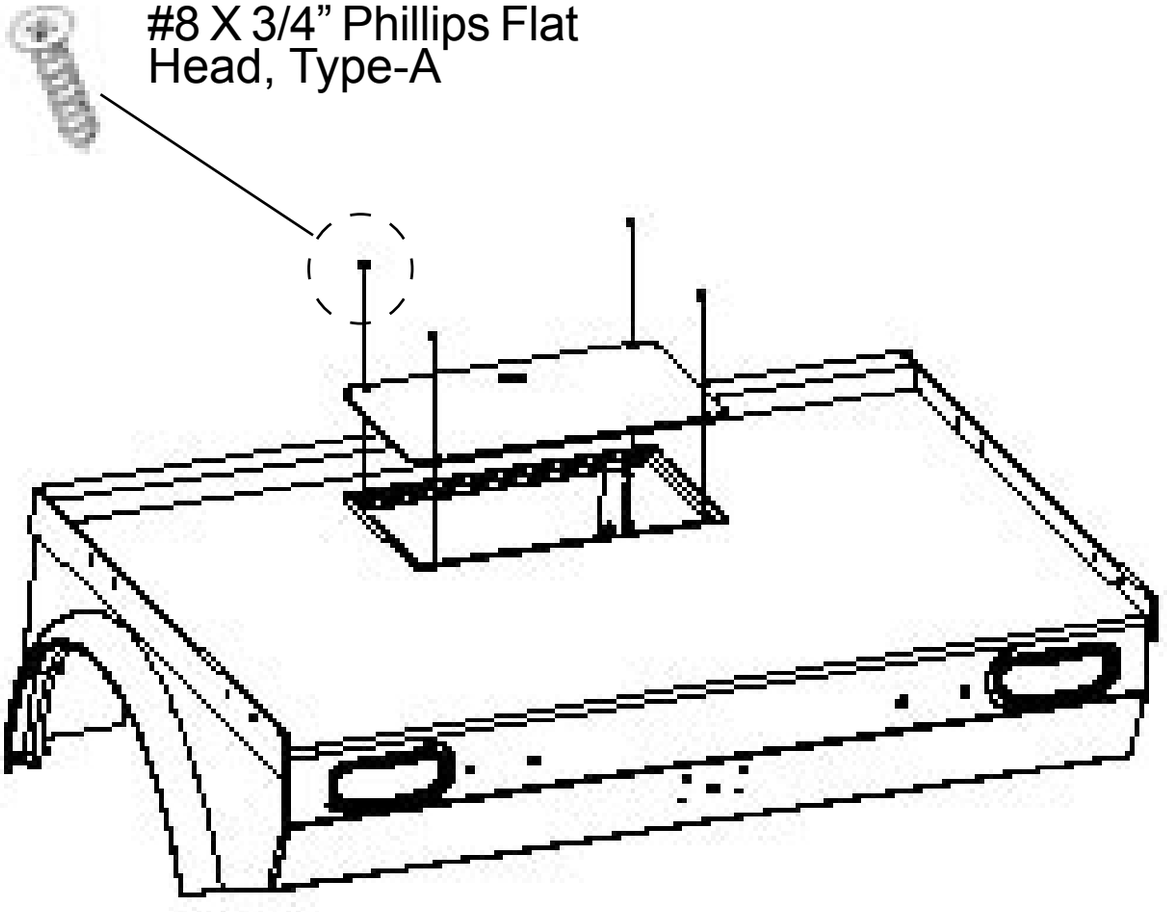


Figure 21 - Short back bed battery access

Figure 22 - Spat battery access

To keep batteries in good working condition, follow the maintenance schedule listed below and discussed on pages 55-56.

Monthly Tasks
1. Check water level (flooded only)
2. Wash tops and terminals of batteries.
3. Check terminal connection
4. Check battery hold down bar to insure batteries are tightly secured
5. Check for worn insulation or frayed wires

NOTE: For more information or if a problem exists, contact GEM Service.

1. The water level in the flooded batteries should be checked monthly. The level should be in between the battery plates and the bottom of the fill well (page 52). The battery plates should be visible when looking into the fill well. If not, use a flashlight. Add water only after charging unless the water level is below the top of the battery plates. In this case, add just enough water to cover the plates, charge then recheck the level.

NOTE: For best battery life, add only distilled water.

CAUTION!
Never charge batteries if plates are exposed above water level.

2. Batteries should be kept clean and free of corrosion. Wash the tops and terminals of batteries with a solution of baking soda and water (1 cup baking soda per gallon of water) once per month. Review the CAUTIONS on pages 46 and 47.

CAUTION!
Battery acid from cleaning batteries can damage driveway and garage floor.

NOTE: Do not allow the cleaning solution to enter the battery.

3. Be sure battery terminals are tight. If just cleaned, let terminals dry and then spray them with battery anti-corrosion spray.

CAUTION!
If battery cable terminals are damaged or corroded, they should be replaced or cleaned as necessary. Failure to do so may cause them to overheat during operation.

4. The hold down bars should be snug to keep batteries from moving while the vehicle is in motion, but not so tight as to crack or buckle the battery case.

5. Any worn insulation or frayed cables should be replaced immediately by a GEM certified technician.

NOTE: After each use, the batteries should be charged. The batteries should never be left discharged.

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.

Battery Care During Storage

To allow for extended storage time, your GEM vehicle has several features to enhance battery life.

A fully charged vehicle can be safely stored (with the power key switch in the “OFF” position), for up to 10 days. It will lose some of its charge during this period.

NOTE: To eliminate battery charge loss due to component current drain, the main disconnect switch must be turned off--- if the vehicle will be stored for more than 10 days. The main disconnect switch can be seen on page 30.

NOTE: Batteries should be fully charged, when storing longer then 48 hours.

For storing your vehicle for extended periods of time (30 days or more), it is recommended that you make arrangements to have the vehicle recharged every 30 days while in storage.

CAUTION!
Batteries can be permanently damaged (and the warranty voided) if they are allowed to remain 30 days or more with low charge.

Brake Fluid Level

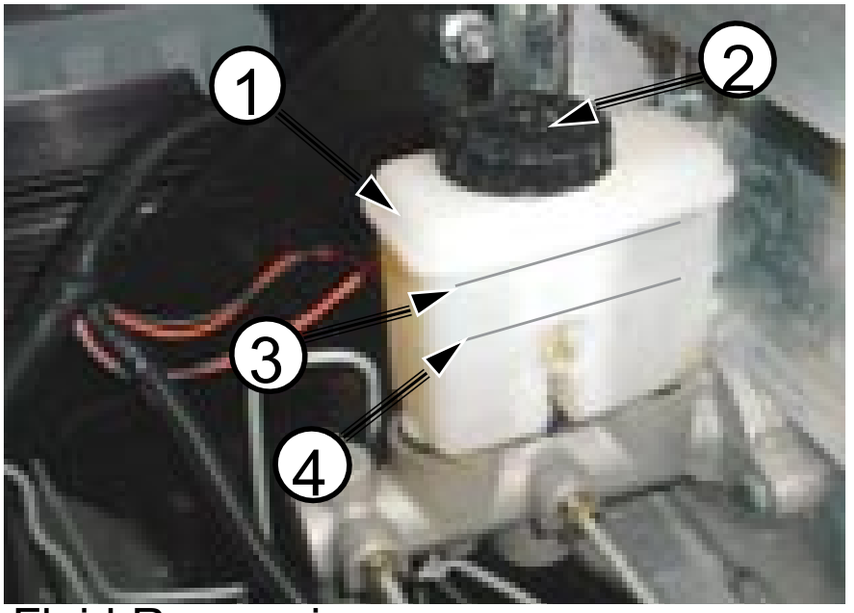


Figure 23 - Brake Fluid Reservoir

1. Reservoir
2. Cap
3. Maximum Level Mark
4. Minimum Level Mark

The Brake Fluid Reservoir (Figure 23) is located under the hood, above and to the rear of the left front tire. The fluid level of your brake system is a very important safety component. You should check it according to the Vehicle Maintenance Schedule, by observing the side of the reservoir and noting its level. The fluid level should be at the maximum level mark. If it approaches the minimum level mark, fill it with DOT3 brake fluid and see your dealer service or call Customer Service immediately.

NOTE: The vehicle is equipped with a four-wheel hydraulic braking system.

CAUTION!
Use standard DOT3 brake fluid.

Tires

Proper tire inflation pressure is essential to the safe and satisfactory operation of your vehicle. Tire inflation pressures are provided on your vehicle's VIN/Certification Label (Figure 1) and are also shown on the side of each tire.

Three primary areas are affected by improper tire pressure.

1. Safety

Under-inflation increases tire flexing and can result in tire failure. Over-inflation causes a tire to lose its ability to cushion shock. Objects on the road and potholes could cause tire damage that may result in tire failure. Unequal tire pressure can cause steering problems.

2. Economy

Improper inflation pressures can cause uneven wear patterns to develop across the tire tread. These abnormal wear patterns will reduce tread life resulting in premature replacement. Under-inflation increases tire rolling-resistance, resulting in lower vehicle range.

3. Ride Comfort and Vehicle Stability

Proper tire inflation contributes to a comfortable ride. Over-inflation produces a jarring and uncomfortable ride. Both under-inflation and over-inflation affect the stability of the vehicle and can produce a feeling of sluggish response or over responsiveness.

WARNING!
Improperly inflated tires are dangerous and can cause accidents. Always drive with each tire inflated to the recommended pressure located on the tire sidewall.

Replacement Tires

The tires on your new vehicle provide a balance of many characteristics. They should be inspected regularly for wear and correct inflation pressure. GEM strongly recommends that you use tires equivalent to the originals in quality and performance when replacement is needed. Failure to use equivalent replacement tires may adversely affect the safety, handling, and ride of your vehicle. We recommend that you contact your dealer or GEM Customer Service regarding any questions you may have on tire specifications or capability.

WARNING!

- Do not use a tire size other than that specified on your vehicles tire label.
- Improperly sized tires can cause vehicle components to wear out prematurely and may change your vehicles ride, handling, and steering behavior. In addition, it may affect the accuracy of your speedometer/odometer. Using tires sized other than specified on your vehicle's tire label could cause you to lose control resulting in serious injury or death.
- Never use a tire smaller than the minimum tire size listed on your vehicle's tire label. Using a smaller tire could result in tire overload and failure.
- Failure to equip your vehicle with tires having adequate speed capability can result in sudden tire failure and loss of vehicle control.
- Overloading your tires is dangerous. Like under inflation, overloading can cause tire failure. Use tires of the recommended load capacity for your vehicle and never overload them.

NOTE: The vehicle's tire information can be found on the VIN/Certification label (Figure 1).

Tire Changing and Jacking Points

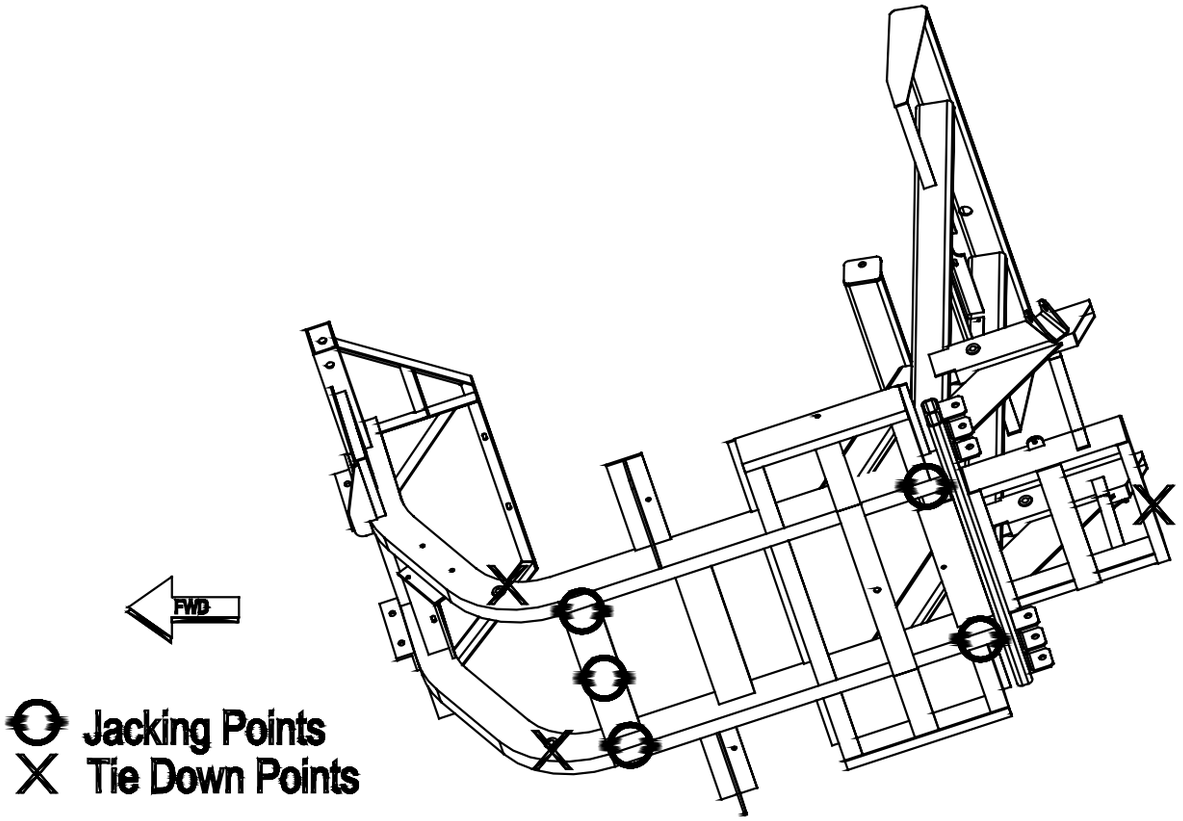


Figure 24 - Jacking and Tie Down Points

In the event of a flat tire, GEM recommends using the GEM dealer network or GEM Customer Service to change it, because they have the proper equipment. Should you choose to change the tire yourself, you need to observe the following precautions:

- Park the vehicle on a firm level surface; avoiding ice or slippery areas.

- Set the parking brake and block both the front and rear of the tire diagonally opposite the jacking position. For example, if the right front tire is being changed, block the left rear wheel.
- Use a small floor style jack, or low profile scissors jack only.
- Jack the vehicle only from the side of the vehicle, on the main frame rail, at the point where the tub or floor panel support and the main frame rail are welded (Figure 24). Alternative locations include the rear frame rail and the center of the front cross member.

Lug Nut Torque Specification: 50 ft-lbs, or 41 N-m

WARNING!

Getting under a jacked-up vehicle is dangerous. The vehicle could slip off the jack and fall on you. Never get any part of your body under a vehicle that is on a jack. Never start or run the motor when the vehicle is on a jack. If you need to get under the vehicle, make sure the vehicle is first located on a flat solid surface, and is supported securely by automotive jack stands or, take the vehicle to a service center where a technician can put it on a hoist.

CAUTION!

Jacking any location other than proper jacking points may cause major vehicle body damage.

Fuse Access Panel / Fuse Block

The fuse block (Figure 25) is located inside the fuse access panel (Figure 26), which is on the lower dash. The ignition key opens the fuse access panel. To open, turn the key counterclockwise a quarter turn.

Figure 25 - Fuse Block

Figure 26 - Fuse Access Panel

A sticker is attached to the inside of the fuse access panel showing the function and amp rating of each fuse as shown in Figure 27. The “Spare” and “Heater Coil” fuses are used for accessories.

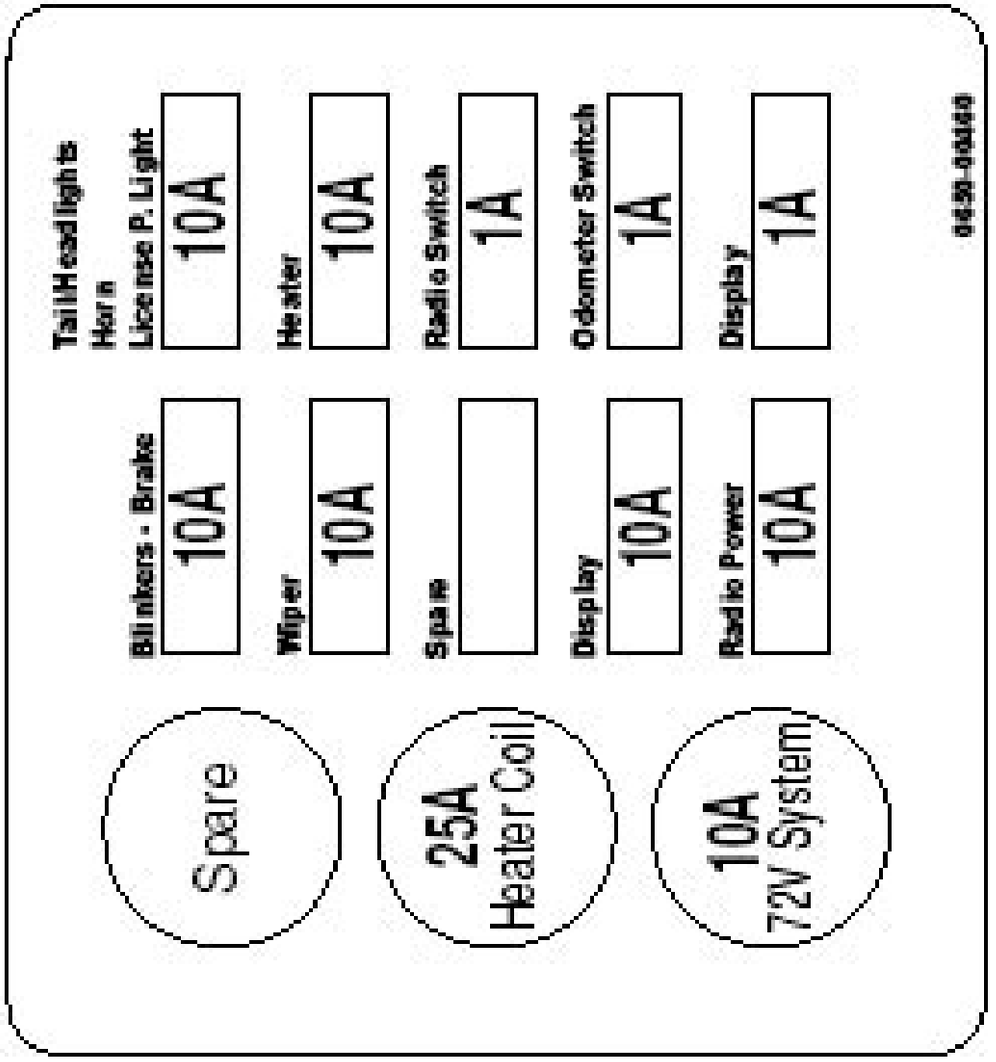


Figure 27 - Fuse Decal

Key Replacement

To obtain an extra or replacement key for your vehicle please call Global Electric Motorcars, LLC at 1-866-764-0616. Please have your key code and VIN number ready.

CARE AND CLEANING

Cleaning the Windshield or Sun Roof

Normal dust and dirt can be removed using a liquid household glass cleaner. Do not use abrasive cleaners on the windshield and sun roof, as they will cause scratches.

CAUTION!

Be very careful when cleaning the acrylic windows as they can be scratched or damaged. Do not use a cleaner with an abrasive, a combination cleaner and wax or any solvent that contains ethyl or methyl alcohol. Also, do not use products containing ammonia, soaps, or abrasives. Never use gasoline or cleaning solvent. These products scratch or destroy the surface of the windows.

To remove oil, grease or road tar use isopropyl alcohol. Then wash the windows with water. Dry gently with a soft cloth or chamois.

Cleaning the Seats

To clean the seats of your GEM vehicle, use warm water and rub with a clean, damp cloth to remove dirt.

Substances such as tar, asphalt, and other soils will stain if not removed quickly. Use a clean cloth and solvent type vinyl cleaner and then wash the area thoroughly with a damp cloth and mild liquid detergent. Finish by rinsing with cool water.

Cleaning the Interior

Use mild liquid detergent and warm water to clean the interior. Wipe using a cloth dampened with warm or cool water or remove detergent or deposits.

CAUTION!
Do not spray the interior of your vehicle. Water contact with the windshield, dash panel or instrument panel, could damage the electrical system.

Cleaning the Exterior

The best way to preserve your vehicles finish is to wash the vehicle regularly. Use mild liquid detergents only (no strong soaps or chemical detergents), and rinse promptly. Dry the finish with a soft, clean chamois or towel to avoid surface scratches and water spotting.

NOTE: To avoid spotting, do not wash your vehicle in direct sunlight.

Protection From the Elements

Covering your vehicle is optional, however, prolonged exposure to UV light may deteriorate the exterior and interior finish. Protecting the vehicle with a GEM custom vehicle cover or equivalent is recommended.

MONTHLY MAINTENANCE SCHEDULE

Monthly Tasks
1. Check all wet flooded batteries for proper water level.
3. Check battery terminals for tight connections.
4. Check tires for correct PSI and wear.
5. Check for proper operation of parking brake.
6. Check brake fluid reservoir for proper brake fluid level.
7. Check brake lines for leaks.
8. Check seat belts for proper operation.
9. Check headlights, horn, turn signal, windshield wiper and brake lights for proper operation.

Warranties and Customer Service

CONTENTS

WARRANTIES

12 Month-Factory Materials and Workmanship
We warrant to the original consumer, purchaser, or lessee that your GEM will be free from defects in factory materials and workmanship under normal use and service for a period of twelve months from the date of sale, subject to the terms and provisions contained herein.

The factory warranty for parts and labor shall include your GEM in its entirety. Battery and tires are excluded from warranty as they are warranted by their respective manufacturers. (See individual warranty terms and conditions in your owner's packet)

Additional Conditions
GEM will warrant all parts provided under this warranty. All GEM parts replaced under warranty become the property of GEM and must be returned to the factory for inspection, on request. Your authorized GEM dealer will provide parts return service.

Any other expenses incurred in obtaining warranty repairs, including transportation, are the responsibility of the purchaser, unless otherwise stated in this warranty.

Warranties and Customer Service

NOTE: To qualify for warranty protection, the selling dealer must file the warranty registration information on the Internet site “GEMConnect” within ten days after purchase. If this is not on file, we will not honor your warranty claim.

To obtain warranty service, you must contact the nearest GEM retailer and make your vehicle available for inspection and repair during the warranty period. Your GEM dealer should be able to provide service during normal business hours and within a reasonable time, depending upon workload and availability of necessary parts. Further information regarding warranty service may be obtained from

Global Electric Motorcars, LLC
1301 39th St NW Suite 2
Fargo, North Dakota 58102

Customer Service hours
7am - 7pm Monday - Thursday CST, 7am - 5pm Friday CST,
1-866-764-0616

Changes by GEM in design or equipment made during the course of ownership shall not apply to any GEM vehicle previously manufactured or purchased.

This Warranty shall not apply to damage or repair costs caused by:

1) Failures to operate, maintain, and service, as specified in the GEM Owner's Manual.
2) Abuse, misuse, neglect, accident, collision, or operation other than the specified design, use and speed.
3) Alteration or repair outside of factory specifications.
4) Use of components, including batteries, not specified in the applicable owner's manual or any damage avoidable with the proper use of specified GEM components.
5) Owner should contact selling dealer or GEM Service for currently approved battery manufacturer and model information.
6) Fading, deterioration or weathering of seats, floor mats, composite parts or paint caused by ordinary wear and tear of exposure.

This warranty shall not apply to normal maintenance. This maintenance includes, but is not limited to, battery fluid replenishment, brake adjustment, brake fluid replenishment, and brake shoes. Consumables such as: light bulbs, fuses, etc. are not covered.

Our dealers are independently owned and operated, and may sell products other than GEM. Therefore, you should understand that we are not, and cannot be, responsible for the quality, suitability or safety of any non-genuine GEM parts, accessories or design modifications, including labor, which may be sold and/or installed by a GEM dealer or anyone else, or any damage caused thereby.

Warranties and Customer Service

There are no other expressed warranties on your GEM beyond those set forth herein, and no implied warranties of merchantability or fitness to the full extent allowed by law. GEM and its dealers shall not be liable for loss of use, inconvenience, lost time, commercial loss or any incidental, consequential or other damages.

(Export GEM only) In the case of GEM NEV'S sold outside of the USA, defective parts must be returned to the selling dealer and transportation charges prepared by the purchaser. Your dealer or GEM will then replace all parts which inspection shall show to be defective under the warranty. GEM will cover the shipping charges of warranty parts to the 50 United States, but it is the purchaser's responsibility to cover the rest of the shipping charges outside the 50 United States. For further information concerning export GEM service, please contact:

Global Electric Motorcars,LLC
1301 39th St NW Suite 2
Fargo, North Dakota 58102

Customer Service hours
7am - 7pm Monday - Thursday CST, 7am - 5pm Friday CST,
1-866-764-0616

Warranties and Customer Service

GEM Business Hours
8am-5pm M-F CST
1-888-871-4367 Web Site: www.gemcar.com

Some states do not allow the exclusion or limitation of incidental, consequential or other damages, or limitation on the length of an implied warranty, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights. You may also have other rights, which vary from state to state.

NOTE: See your dealer to obtain a copy of a detailed warranty description.

Battery and Tire Warranty
The batteries and tires are warrantied through their respective manufacturers. The warranty information is in your Owner's Manual packet. Refer to the manufacturers warranty statements.

Extended Warranty
For information regarding purchase of an extended warranty, call or write to Global Electric Motorcars, LLC.

Global Electric Motorcars,LLC
1301 39th St NW Suite 2
Fargo, North Dakota 58102

Customer Service hours
7am - 7pm Monday - Thursday CST, 7am - 5pm Friday CST,
1-866-764-0616

CUSTOMER ASSISTANCE

Prepare For Appointment

If you're having warranty work done, be sure to have the right papers with you. Have your warranty folder. All work to be performed may not be covered by the warranty, discuss additional charges with the service provider. Keep a maintenance log of your vehicle's service history. This can often provide a clue to the current problem.

Prepare A List

Make a written list of your vehicle's problems or the specific work you want done. If you've had an accident, or work done that is not on your maintenance log, let the service provider know.

CHANGE OF ADDRESS/TRANSFER OF WARRANTY

Change of Address/2nd Owner Address

Please copy the form on page 77 and mail to GEM at the address below, so our warranty records can be kept current.

Transfer of Factory Warranty/Onsite

Please copy the form on page 78 and mail to GEM at the address below. Warranty will transfer upon completion of this form. Our Warranty Department can assist you in maintaining your new vehicle.

Global Electric Motorcars, LLC
Warranty Department
1301 39th St NW Suite 2
Fargo, North Dakota 58102
1-866-764-0616

CHANGE OF ADDRESS FORM / 2ND OWNER ADDRESS FORM

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

Vehicle Identification Number

(See Vehicle Identification and Specifications section)

_____

Last Name

_____

First Name

_____

Street Address

_____

City State Zip Code

_____

Phone #

TRANSFER OF FACTORY WARRANTY / ONSITE

(Transfer remainder of factory warranty 1 year from original date of sale)

|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|__|

Vehicle Identification Number

(See Vehicle Identification and Specifications section)

New Owner Informatin

_____

Last Name

_____

First Name

_____

Street Address

_____

City State Zip Code

_____

Phone #

☐ $125.00 Transfer Warranty - Parts & Labor Only

☐ $199.00 Transfer Onsite - Travel Fee Only

Credit Card #_____Exp.:__/__/__

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Notes

Notes

GEM™

Global Electric Motorcars, LLC

A DaimlerChrysler Company

1301 39th Street NW, Suite 2 ■ Fargo, ND 58102

Customer Service: 866.764.0616

www.gemcar.com