



**GEM**<sup>TM</sup>

**OWNER'S**  

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**MANUAL**  

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# INTRODUCTION

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## ABOUT THIS MANUAL

Thank you for purchasing your Global Electric Motorcars (GEM) Neighborhood Electric Vehicle. Your vehicle is designed to operate exclusively on battery power. It is an emission free vehicle. The ideal application for a battery-powered vehicle is 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. It has been designed for your enjoyment and safety. Maintenance schedules and general care instructions are also included.

This manual is applicable to all four of the GEM models: E825 Two Passenger, E825/4 Four Passenger, E825 Small Utility, and E825 Large Utility.

If questions arise after reading the manual, contact

GEM Customer Service at 1-866-764-0616. Please have your VIN and date of purchase information available when you contact our Customer Service Department.

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 development, 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 or 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 to make procedures more easily understood.

## VEHICLE INFORMATION

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# VEHICLE IDENTIFICATION AND SPECIFICATIONS

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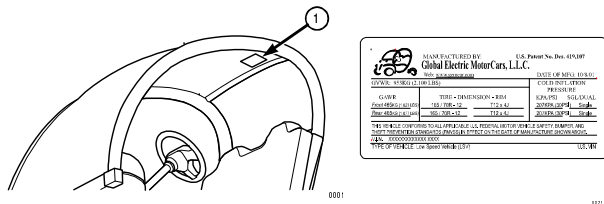


Figure 1 - VIN/Certification Label

### 1. VIN Location (two-passenger model shown)

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 to the right.

Vehicle Identification Number (VIN):

\_\_\_\_\_

Key # \_\_\_\_\_ Dash Key # \_\_\_\_\_

Pack Latch # \_\_\_\_\_

Date purchased: \_\_\_\_ / \_\_\_\_ / \_\_\_\_



## GENERAL SPECIFICATIONS

### GEM E825 Specifications

Motor: 72-volt shunt GE motor  
 Transmission: Front wheel drive direct - couple Dana Spicer differential  
 Speed Control: GE solid state controller with:  
     \* Key Switch Input                      \* High pedal disable  
     \* Under voltage detector            \* Thermal sensor protection  
     \* Zero speed detect "Anti-Runaway"  
 Tire: 10" Two-ply street and turf rated tires  
 Battery Pack: Six 12-volt deep-cycle batteries  
 On Board  
 Charger: Proprietary 72-volt DC charger with charge status LED/using 110-volt AC house current  
 Width: 55 inches                              Length: 98.5 inches  
 Height: 68 inches                             Turning Radius: 13' 5"  
 Wheelbase: 71.1 inches  
 Curb Weight: 1100 lb.                       GVW: 1600 lb.  
 (empty)                                        (loader)

### GEM E825 / 4 Four Passenger Specifications

Motor: 72-volt shunt GE motor  
 Transmission: Front wheel drive direct - couple Dana Spicer differential  
 Speed Control: GE solid state controller with:  
     \* Key Switch Input                      \* High pedal disable  
     \* Under voltage detector            \* Thermal sensor protection  
     \* Zero speed detect "Anti-Runaway"  
 Tire: 12" Two-ply street rated tires  
 Battery Pack: Six 12-volt deep-cycle batteries  
 On Board  
 Charger: Proprietary 72-volt DC charger with charge status LED/using 110-volt AC house current  
 Width: 55 inches                              Length: 126.5 inches  
 Height: 69.75 inches                        Turning Radius: 17' 6"  
 Wheelbase: 101 inches  
 Curb Weight: 1280 lb.                       GVW: 2100 lb.  
 (empty)                                        (loader)

## GEM E825 Utility Vehicle (Short Box) Specifications

Motor: 72-volt shunt GE motor  
 Transmission: Front wheel drive direct -  
 couple Dana Spicer differential  
 Speed Control: GE solid state controller with:

- \* Key Switch Input
- \* High pedal disable
- \* Under voltage detector
- \* Thermal sensor protection
- \* Zero speed detect "Anti-Runaway"

Aluminum Bed: 34 inches X 48 inches

Tire: 12" Two-ply street-rated tires

Battery Pack: Six 12-volt deep-cycle batteries

On Board

Charger: Proprietary 72-volt DC charger with charge status  
 LED/using 110-volt AC house current

Width: 55 inches                      Length: 109 inches

Height: 69.75 inches                      Turning Radius: 13' 7"

Wheelbase: 71.1 inches

Curb Weight: 1160 lb.                      GVW: 1850 lb.  
 (empty)                                      (loaded)

## GEM E825 Utility Vehicle (Long Box) Specifications

Motor: 72-volt shunt GE motor  
 Transmission: Front wheel drive direct -  
 couple Dana Spicer differential  
 Speed Control: GE solid state controller with:

- \* Key Switch Input
- \* High pedal disable
- \* Under voltage detector
- \* Thermal sensor protection
- \* Zero speed detect "Anti-Runaway"

Aluminum Bed: 73 inches X 48 inches

Tire: 12" Two-ply street-rated tires

Battery Pack: Six 12-volt deep-cycle batteries

On Board

Charger: Proprietary 72-volt DC charger with charge status  
 LED/using 110-volt AC house current

Width: 55 inches                      Length: 147 inches

Height: 69.75 inches                      Turning Radius: 16' 1"

Wheelbase: 101 inches

Curb Weight: 1240 lb.                      GVW: 2300 lb.  
 (empty)                                      (loaded)

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# THINGS TO KNOW BEFORE YOU OPERATE YOUR VEHICLE

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## 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 judgment is impaired when you have been drinking. Never drink and then drive.

## SAFETY INFORMATION

Your vehicle is battery powered. Handled improperly, batteries can be dangerous. Follow these precautions during charging and recharging operations to avoid personal injury or damage to electrical components in the vehicle.

- Read the Owner's Manual before operating this vehicle.
- Do not smoke! 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 12-volt deep cycle batteries, specially built for electric vehicle application. Automotive batteries should never be used.
- Charge batteries in a well-ventilated area only.
- Batteries contain acid, which causes severe burns.
- Some electrolyte can leak from damaged or defective batteries. Avoid contact with skin, eyes, or clothing.
- In case of external contact, flush with cold water for 15 minutes and call a physician immediately.
- Internal contact: Drink large quantities of milk or water followed with milk of magnesia or vegetable oil. Call a physician immediately.
- Contact with eyes: Flush with water for 15 minutes. Call a physician immediately.

### WARNING!

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

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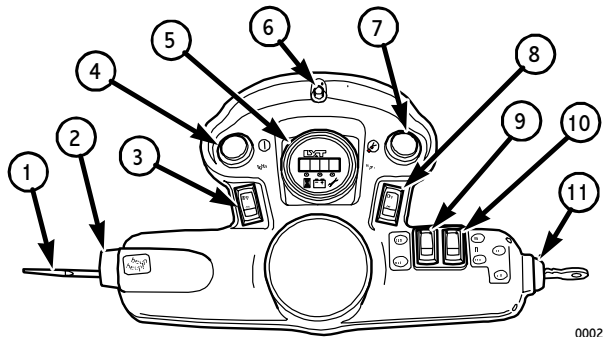
# UNDERSTANDING THE FEATURES OF YOUR VEHICLE

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## INSTRUMENT POD



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Figure 2 - Instrument Pod

- |                                      |  |
|--------------------------------------|--|
| 1. Turn Signal Lever                 | 7. R-Turn Signal/Seat Belt Warning Light |
| 2. Horn Button                       | 8. Windshield Wiper Switch               |
| 3. Light Switch                      | 9. Road/Turf Switch                      |
| 4. L-Turn Signal/Brake Warning Light | 10. Vehicle Direction Switch             |
| 5. Battery Discharge Indicator (BDI) | 11. Key Switch                           |
| 6. Charge Status Light               |  |

## INDICATORS

## Battery Discharge indicator (BDI)

The "Battery Discharge Indicator" (see figure 2), is located in the center of the Instrument Pod and performs the following functions.

1. Battery Discharge Indicator (BDI)
2. MPH Speed Indicator
3. Accumulated Miles
4. Error Code Display

At key on, with the parking brake released, the BDI will display the battery percent of charge. The indicator will then alternate between MPH and battery status. The battery status is displayed in 3 digits and the battery icon will light. For example, 100 equals 100% charge. When the key is turned off, the LED display will show the odometer reading and the hourglass icon will light.

**NOTE:** If an error code is displayed, it is preceded by a minus sign and the tool icon will light. For a description and explanation of common error codes see the Error Code Summary on page 26.

## Charge Status Light

The "Charge Status Light" (see figure 2), is located on the Instrument Pod directly above the BDI. This light will illuminate during charging. For additional information about the Charge Status Light and how it works, see the subject "Battery Charger" later in this manual.

## Left Turn Signal Indicator and Brake Warning Light

The "Brake Warning Light" (see figure 2), is a dual function indicator. It serves as a left turn signal indicator, and as a brake warning light. If the brake warning light is on, there may be a problem with your braking system. It could be an indication of:

- Low brake fluid
- Air in the brake system
- An out of adjustment switch

### CAUTION!

Have your brakes checked immediately by a trained service person if your brake warning light comes on when braking.

## Right Turn Signal Indicator and Seat Belt Warning Light

The "Seat Belt Warning Light" (see figure 2), is a dual function indicator. It serves as a right turn signal indicator, and as a seat belt warning light. This light will be displayed for 5 seconds after "Key-On" as a reminder to fasten your seat belt.

## CONTROLS

### Power Key Switch

The "Power Key Switch" (see figure 2), is located on the right side of the Instrument Pod. With the key in the switch, you have 2 positions. Turn the key switch forward for the on (power) position. Turning the key switch back to the straight up position will turn your vehicle off.

### Power Saver Features

- When the key switch is turned off, power to lights, radio, and all 12-volt accessories will turn off after about 20 seconds.

- With key on and no activity for about 30 seconds, the control system enters the "standby" mode. In this mode the main power relay turns off. This is noticeable by an audible click. When you resume motion, the relay closes with another click.

### Zero Speed Detect

- With the key on, accelerator pedal up and speed less than 1 MPH the electric motor armature will resist motion.
- Warning beeper pulses intermittently with vehicle motion. (This pulse is intended to indicate that an unattended vehicle may be moving.)

### Vehicle Direction Switch (VDS)

The VDS (see figure 2), is located on the right side of the Instrument Pod, next to the "Road/Turf Switch". This switch is labeled "FWD" and "REV."

**FWD:** With the Power Key switch turned on and the VDS in the "FWD" position, pushing down on the accelerator pedal will move the vehicle in a forward direction.

**REV:** With the Power Key switch on and the VDS in the "REV" position. Pushing down on the accelerator pedal will move the vehicle in reverse.

**NOTE:** Your GEM is equipped with a reverse warning device that sounds when the Power Key switch is on and the VDS switch is in the "REV" position.

### **CAUTION!**

Always bring the vehicle to a complete stop before changing the position of the VDS switch.

### Road/Turf Switch

The "Road/Turf Switch" (See figure 2), is located on the top, inside right of the Instrument Pod. The switch is labeled "TURF" and "ROAD".

**TURF:** When the switch is in this position, the acceleration and speed of the GEM is limited to prevent damage to soft surfaces.

**ROAD:** This mode refers to "APPROVED TRAFFIC" routes based on Low Speed Vehicle (LSV) regulations for your area. In the road position, higher speed and acceleration to the GEM is allowed.



## Turn Signal Lever

The "Turn Signal Lever" (see figure 2), is located on the lower, left side of the Instrument Pod. 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 a self-canceling turn signal unit. After completing the turn, return the lever to the center position.

## Horn Button

The "Horn Button" (see figure 2), is located on the top, left side of the Instrument Pod. You can sound the horn by pressing it.

## Light Switch

The "Light Switch" (see figure 2), is located on the left side of the Instrument Pod. The Switch is labeled, "ON" to turn the front headlamps and the rear tail lamps on. "OFF" to turn the lamps off.

## Window Wiper Switch

The "Window Wiper Switch" (see figure 2), is located on the Instrument Pod, directly under the seat belt warning light. This switch is labeled "ON" to operate and "OFF" to stop.

**NOTE:** The wiper has a current limiting feature, which interrupts operation if the current draw from the wiper motor gets too high. This typically occurs when the wiper is dragging on a dry window. The interruption will usually only last a few seconds.

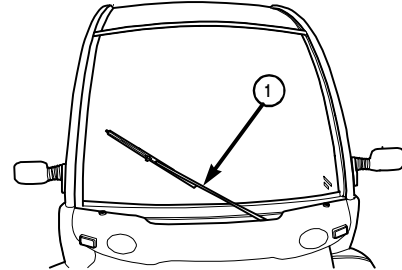


Figure 3 - Windshield Wiper

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 Brake Pedal

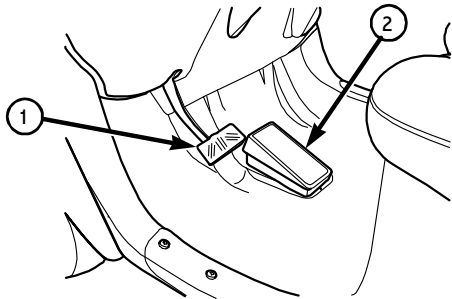


Figure 4 - Foot Controls

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1. Foot Brake Pedal
2. Accelerator Pedal

The "Foot Brake Pedal" (see figure 4), is located on the floor to the left of the accelerator pedal. To slow or stop the vehicle, firmly press the foot brake pedal.

**CAUTION!**

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

**CAUTION!**

When cleaning the GEM do not spray water directly on or in the accelerator pedal.

## Accelerator Pedal

The "Accelerator Pedal" (see figure 4), 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. Letting up on the pedal will reduce power to the electric motor and vehicle speed will slowly decrease.

## Parking Brake

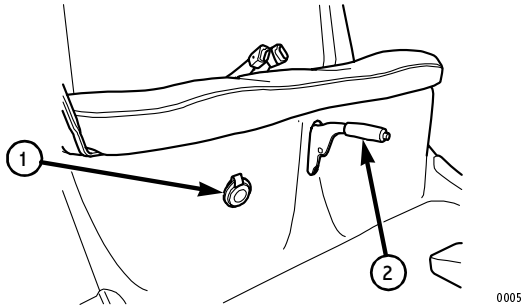


Figure 5 - Parking Brake

1. Charging Receptacle
2. Parking Brake (two passenger model shown)

The "Parking Brake" (see figure 5), 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 "OFF" and have not applied the Parking Brake. The warning is disabled in turf position.

## Parking Brake Control Logic

The GEM control logic will not allow vehicle motion without the Parking Brake being fully released. With the Key Switch in the "ON" position and the Parking Brake set, the BDI will display "-04" for an error code as a reminder to release the Parking Brake. When the Key Switch is turned to "OFF," a warning beep (road position only) will sound to remind you to set the Parking Brake.

**NOTE:** The Parking Brake is adjustable and should be checked periodically by a trained service technician. Check the Maintenance Schedule.

### WARNING!

When stopped on a hill, use the Parking Brake to hold your position.

### CAUTION!

Always engage the Parking Brake when you leave the vehicle.

## Master Disconnect Switch

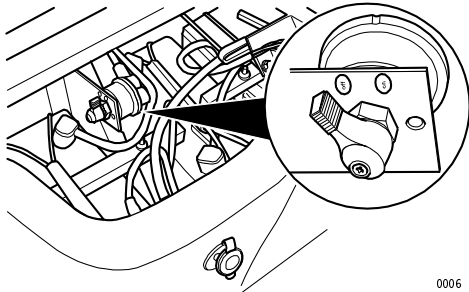


Figure 6 - Master Disconnect Switch

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The "Master Disconnect Switch" (see figure 6), is located under the bench seat on the passenger side (rear seat on four passenger models). You must first lift the seat cushion to observe the switch. It is clearly labeled ON and OFF. The switch is intended to provide an easy way to disconnect all power on 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 Master Disconnect Switch must be on for operation and charging.

## Seat Belts

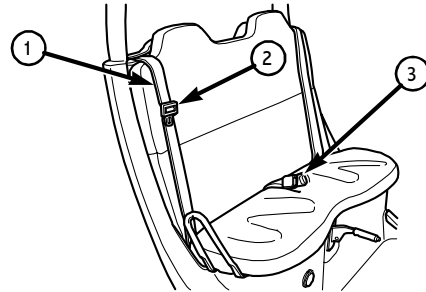


Figure 7 - Seat Belts

0008

1. Belt
2. Latch
3. Buckle

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

On the 2-passenger model and the rear seats on the 4-passenger model are equipped with Lap/Shoulder Belts. The front seats on the 4-passenger model are Lap Belts only.

Research has shown that seat belts save lives. And, they can reduce the seriousness of injuries in a collision. 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 by striking the inside of the vehicle. Everyone needs to buckle up all the time. Even on 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 the best.
- Wearing your belt in the wrong place 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. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.
- Two people should never be belted into a single seat belt. People belted together can crash into one another in an accident, hurting one another badly. Never use a lap/shoulder belt or lap belt for more than one person, no matter what their size.

### Proper Wear 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 hold the latch 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. The belt will automatically retract to its stowed position. 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 move to 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 head and neck injury. A belt worn under the arm can cause internal injuries. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take 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 (bent retractors, torn webbing, etc.).

**CAUTION!**

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

### Upper Dash

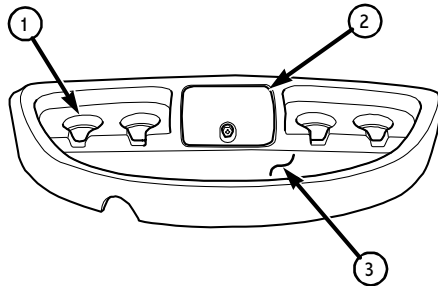


Figure 9 - Upper Dash

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

The "Glove box" (see figure 9), is located on the top center of the upper dash and is equipped with a lock to protect your items.

There is a package tray and four cup holder locations (see figure 9), on the upper dash. One package tray with two cup-holders on the driver side, and one package tray with two cup holders on the passenger side.

#### 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.

#### WARNING!

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

## Accessory Plug (Optional)

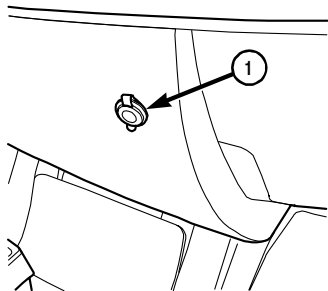


Figure 10 - Accessory Plug

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### 1. Accessory Plug Cover

The optional accessory plug (see figure 10) is located on the lower dash, above the passenger foot well. This plug will accept a standard automotive 12-volt accessory jack and is intended for moderate power accessories, such as a cellular phone. They will not operate large current items, such as cigarette lighters.

#### **WARNING!**

Damage to electrical components and circuit board may occur from improper use.

## Paks

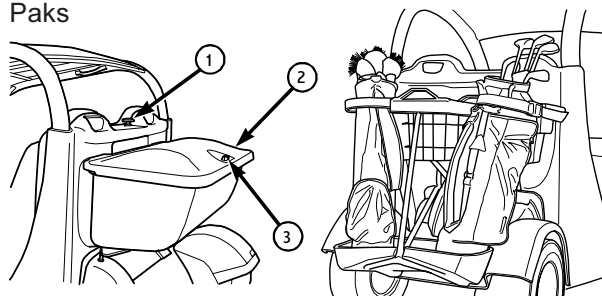


Figure 11 - Swivelpak and Linkspak

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.



At the rear of the vehicle, located between the taillights, is a release handle.

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 on the power portion of the back and reapply 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.
8. It is advised to 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.



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# OPERATION AND MAINTENANCE

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## BASIC OPERATION

The control and safety features of the GEM vehicle can seem confusing at first, so here is a simplified list of how to start the vehicle and drive it away.

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 by the control system to indicate conditions that prevent the vehicle from operating. All error codes are preceded by a minus sign. The following chart summarizes the most frequent error codes and their remedies.

Error Code	Condition	Remedy
-04	Parking Brake engaged at key on	Full release parking brake
-06	Pedal depressed while direction switch is in neutral	Release pedal and select desired direction
-11	Pedal depressed at key on	Release 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 cycle key switch

**NOTE:** If any other codes are present, contact your GEM dealer 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 the wind.
4. Do not secure across tub of the vehicle. There are steel handles located on the front and at the rear of the vehicle. Use these with tie downs into each corner of the trailer.

### **CAUTION!**

**TOWING THE VEHICLE IS NOT RECOMMENDED.**  
This vehicle is not designed for dolly towing. Any vehicle failures resulting from dolly towing may not be covered by warranty.

## **BASIC MAINTENANCE**

### **Battery Charging**

**NOTE:** Recharge cycles are encouraged anytime the BDI reads below 90%.

The GEM vehicle has a battery control and recharge system especially designed for electric vehicle usage. Two of the 6 12-volt lead acid deep-cycle batteries, are located under the hood 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 deliver their full capabilities until they have been discharged and recharged 10 to 20 times. Batteries should be fully charged before first use of new vehicle.
- When recharging, it is preferable to have the battery pack at close to room temperature. Do not have in direct sunlight, on hot pavement or in excess heat of 110f or higher.
- Batteries should be charged after each period of use.
- Lead Acid batteries do not develop a memory and need not fully discharge before recharging.

### **WARNING!**

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

**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 amounts of water.
- Battery gas is flammable and explosive. Keep flame or sparks away from the battery or any other booster source with an output greater than 12-volts.
- 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 charger is located under the dashboard and is an integral part of the vehicle.

When the battery charger is active, the control circuit prevents operation of the vehicle and the BDI is disabled. The indicator light will inform you of the battery charge status.

**Zivan Charger**

- RED LED shows that the battery is in the initial charge phase.
- BLINKING RED LED shows that the battery charger has reached 80% of charge.
- YELLOW LED shows that the battery charger has reached 90% of charge.
- GREEN LED shows that the battery has reached 100% of charge.

If the BDI reads between 25% and 90%, the battery pack should be recharged. If the BDI reads below 25% the battery pack should be put on charge as soon as possible.

A full recharge cycle (BDI indicating near 0%) can take up to 10 hours.

Most recharge cycles will be much shorter.

**NOTE:** Recharge cycles are encouraged anytime the BDI reads below 90%.

### CAUTION!

On vehicles equipped with a Zivan charger, an intermittent audible alarm and flashing Charge Status Indicator, means that an alarm situation has occurred and there is a problem with the charger. When there is an alarm, the battery charger stops supplying current. Have the vehicle checked by a trained service technician.

**NOTE:** After charging, the BDI will read slightly high until the batteries have time to settle, which can be approximately an hour. Driving the vehicle for over a minute will obtain a more accurate reading.

### CAUTION!

- Charge batteries fully before extended periods of use.
- In hot climates, battery self-discharge will increase.
- In cold climates, batteries will freeze if not properly charged.

### Battery Charge Receptacle

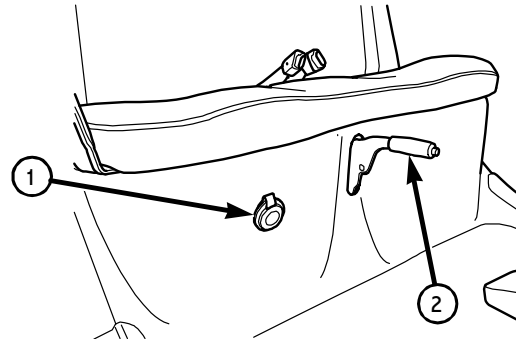


Figure 12 - Charge Receptacle

1. Charging Receptacle
2. Parking Brake

The "Battery Charge Receptacle" (see figure 12), is located on the front tub, below the passenger seat on the two-passenger model, and on the rear tub of the four-passenger model. 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

Insert the proper extension cord into the battery charger receptacle (see figure 12), and then plug into a 110-volt A/C, 15amp-breaker outlet. (GFI is recommended)

### Battery Care

The Gem vehicle is equipped with six 12-volt batteries. Two are located under the front hood, and four are located under the bench seat. To keep batteries in good working condition, follow the maintenance schedule to the above right:

Task	Monthly
1. Check water level	X
2. Wash tops and terminals of batteries.	X
3. Check terminal connection	X
4. Check hold down strap tension	X
5. Check for worn insulation or frayed wires	X

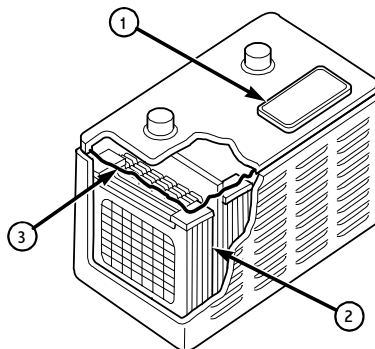


Figure 13 - Battery Water Level

0022

1. Fill cap
2. Battery plates
3. Water level



1. The water level in the batteries should be checked monthly. The level should be at least a 1/2-inch above the plates and to within 1/8-inch from the bottom of the vent well. Add water only after charging unless the water level is below the top of the plates. In this case, add just enough water to cover the plates, charge then check recheck the level.

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

<b>CAUTION!</b>
-----------------

Never charge batteries if plates are exposed above water level.
---

2. Batteries should be kept clean and free of corrosion. Wash tops and terminals of batteries with a solution of baking soda and water (1 cup baking soda per gallon of water) once per week.

**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.

<b>CAUTION!</b>
-----------------

If battery wire 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 straps should be snug to keep batteries from moving while vehicle is in motion, but not so tight as to crack or buckle the battery case.
5. Any worn insulation or frayed wires should be replaced immediately.

**NOTE:** After each use, the batteries should be placed on charge. The batteries should never be left discharged any longer than absolutely necessary.

### Battery Disposal

Lead-acid batteries are completely 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, the GEM vehicles have several features to enhance battery life.

The control system has been designed to minimize current drain during storage. A fully charged vehicle can be safely left (with the power key switch off), for up to two weeks without any significant loss of charge.

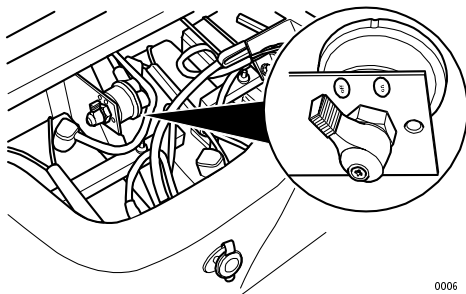


Figure 14 - Master Disconnect Switch

To eliminate battery charge loss due to control system current drain, the Master Disconnect Switch must be turned off if the vehicle will be left for more than 2 weeks.

**NOTE:** Batteries should be fully charged before storing longer than 48 hours.

For storing your vehicle for extended periods of time (60 days or more), it is recommended that you make arrangements to have the vehicle recharged every 60 days while in storage.

### **CAUTION!**

Batteries can be permanently damaged (and the warranty voided) if they are allowed to sit for an extended period of time at very low charge.

## Brake Fluid Level

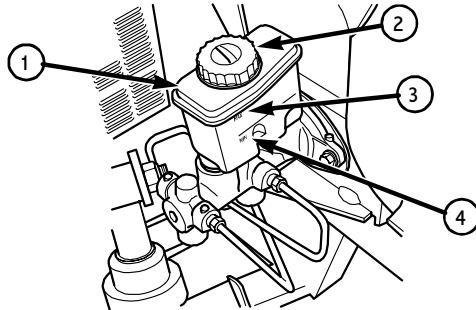


Figure 15 - Brake Fluid Reservoir

0012

- |              |                  |
|--------------|------------------|
| 1. Reservoir | 3. Maximum Level |
| 2. Cap       | 4. Minimum Level |

The Brake Fluid Reservoir is located under the hood on the bulkhead 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 full mark. If it approaches the minimum level, fill with DOT3 brake fluid and see your dealer for service immediately.

**NOTE:** The vehicle is equipped with a four-wheel hydraulic braking system, only use standard DOT3 brake fluid from an unopened container.

### CAUTION!

Brake fluid will remove paint. Immediately clean up any fluid that gets on a painted surface.

## 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 (see figure 1).

Three primary areas are affected by improper tire pressure.

### 1. Safety

Under-inflation increases tire flexing and can result in tire failure. Over-inflation results in a tire losing its ability to cushion shock. Objects on the road and chuckholes could cause tire damage that may result in tire failure. Unequal tire pressure can cause steering problems. You could lose control of your vehicle.

## 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 a need for earlier replacement. Under-inflation also increases tire rolling-resistance and results in lower 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.

## 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 original equipment dealer on any questions you may have on tire specifications or capability.

**WARNING!**

- Do not use a tire size other than that specified on your vehicle's tire label.
- Improper size tires can cause vehicle components to wear out prematurely and may change your vehicle's ride, handling, and steering behavior. In addition, it may affect the accuracy of your speedometer/odometer. Using tire sizes other than specified on your vehicle's tire label could cause you to lose control and have an accident 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 never overload them.

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

## Tire Changing and Jacking Points

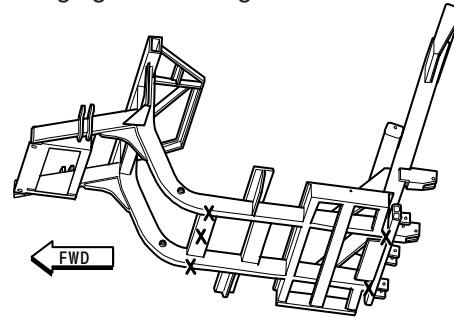


Figure 16 - Jacking Points

0066

In the event of a flat tire, GEM recommends using the GEM dealer network to change it, since 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; avoid 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 vehicle only from side of vehicle, **ON THE MAIN FRAME RAIL**, at point where the tub support and the main frame rail are welded (see fig. 16). Alternative locations would 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 other location then the proper jacking points may cause major vehicle body damage.

## Fuses

The Fuse box is located under the hood, on the passenger side, attached to the frame. You must remove the plastic fastener and lift the protective rubber cover to gain access.

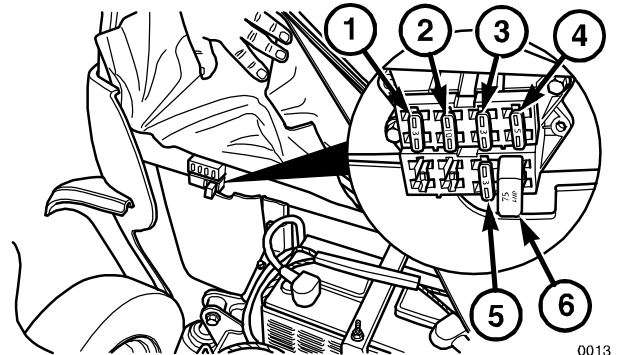


Figure 17 - Fuse Box

- |                       |                          |
|-----------------------|--------------------------|
| 1. Turn signal 3A ATC | 4. Brake 5A ATC          |
| 2. Headlights 10A ATC | 5. Accessory plug 3A ATC |
| 3. Horn 3A ATC        | 6. Window Wiper 7.5A ATC |

## Key Replacement

As a security precaution, local key duplicators do not have the blanks or the codes to make you keys. To obtain an extra or replacement key for your vehicle please call: Global Electric Motorcars, LLC at 1-866-764-0616. You will need your key code and VIN number.

## CARE AND CLEANING

### 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.

Custom ordered fabrics might require different cleaning procedures. Contact your dealer.

### 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, as they will cause scratches.

### Cleaning the Interior

Use mild liquid detergent and warm water to clean the interior. Rinse with a cloth dampened with warm or cool water.

#### CAUTION!

Do not rinse the interior of your vehicle. Direct water on the Charger Plug, 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:** It is not recommended washing 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.

## VEHICLE MAINTENANCE SCHEDULE

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



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# WARRANTIES AND CUSTOMER SERVICE

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## WARRANTIES

### 12 Month-Factory Materials and Workmanship

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

The non-transferable warranty for parts and labor shall include the GEM in its entirety. Battery and tires are excluded from warranty as they are warranted by their respective manufactures. (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.

**NOTE:** To qualify for warranty protection the selling dealer must file the warranty registration form on the Internet site GEM connect 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  
3601 7th Avenue NW  
Fargo, North Dakota 58102

Normal Service hours  
7am - 7pm M - F 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:

- a) Failures to operate, maintain, and service, as specified in the application GEM Owner's Manual.
- b) Abuse, misuse, neglect, accident, collision, or operation of other than the specified design, use and speed.
- c) Alteration or repair outside of factory specifications.
- d) 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.
- e) 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 retailers 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 our retailers, or any damage caused thereby.

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 retailers 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 retailer and transportation charges prepared by the purchaser. Your retailer 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 **Normal Service Hours**  
 3601 7 th Avenue NW **7am - 7pm M - F CST**  
 Fargo, North Dakota 58102 **1-866-764-0616**

### Normal Business Hours

Web Site            8am-5pm M-F CST  
WWW.gemcar.com    1-888-871-4367

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 Tires Warranty

The Batteries and Tires are warranted through their respective manufactures. The warranty information is located in your Owner's Manual packet.

### Extended Warranty

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

## IF YOU NEED CUSTOMER ASSISTANCE

### Prepare For Appointment

If you're having warranty work done, be sure to have the right papers with you. Take your warranty folder. All work to be performed may not be covered by the warranty, discuss additional charges with the service manager. 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 advisor know.





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## **Global Electric Motorcars, LLC**

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