



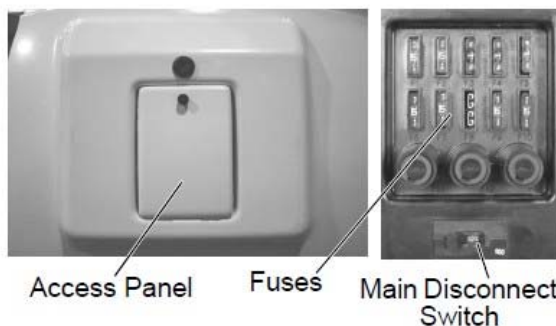
2005 to Current GEM Troubleshooting

The purpose of this document is to aid in the isolation of problems with the drive system and power system. The primary means of troubleshooting the drive and power system is via error codes displayed on the LCD display. If system problems cannot be isolated by use of error codes, contact an authorized GEM dealer.

Figure 1: LCD Display



Figure 2: Master Disconnect Switch



NOTE: The information provided in this document is a guide only. There are numerous variations in the skill level of people that view this document. This document cannot possibly accommodate all skill levels and provide advice for each. A basic understanding of electronics and troubleshooting techniques is required.

WARNING

Whenever possible, service the vehicle with the master disconnect switch turned off. If the master disconnect switch is on use extreme caution. Dangerous voltage is present. Remove all jewelry such as rings, watches, or necklaces that could contact electrical connections and conduct electricity. Severe injury, burns, or even death could occur if caution is not used.

DRIVE AND POWER SYSTEM ERROR CODES 2005 to Current

The motor controller monitors the drive system when the vehicle is powered up (key is in the ON position). The motor controller reports any problems detected by displaying error codes on the multi-purpose LCD display located in the center of the instrument pod. Error codes are explained in the table below. Error codes are displayed by a service number and an illuminated wrench icon on the LCD display. See pages below for error code definitions

If the wrench icon is on with an error code, first shut the master disconnect switch OFF in the fuse panel for 15 minutes. After the 15 minutes, turn the master disconnect back ON, then the key switch ON, and retest operation.

Error Code	Fault Description	Corrective Action
None	Display on the liquid crystal display (LCD) is blank.	Open fuse panel, and verify that Master Disconnect Switch is in the ON position. Plug the vehicle in for a standard charge period, about 8 to 10 hours, and then verify the charge cycle was completed by checking the lights on the charger. The charger lights can be viewed under the hood on the driver's side while the cord is still plugged into the vehicle. If the charge cycle was successfully completed you will see a solid GREEN light under a solid YELLOW light. If you see a RED flashing light, the charger is displaying a RED flash fault, and is not charging. Proceed with the Alternate Charge Method*. If charging correctly, check the following fuses: - Fuse F5, Display fuse - Fuse F9, Key Switch fuse - Fuse F13, Main System fuse Fuse in DC/DC Converter – NOTE: Not available in 2007 to current models.
05	Start switch failed to close.	Vehicle is experiencing an issue related to the accelerator pedal. Dealer will need to troubleshoot the accelerator pedal circuit.
06	Accelerator pedal was pushed and there is improper or no contact at the drive mode switch (faulty switch as indicated by a short inside or not in the correct position - between the positions).	Release the accelerator pedal, make sure the drive mode switch is in the correct position and then push the accelerator pedal, again. If the problem persists, turn the key switch off, turn the master disconnect switch OFF, then wait 15 minutes. Turn the master disconnect switch back ON, and the key switch on, then retest operation. If the problem persists, Dealer will need to troubleshoot the drive mode switch circuit.
08	Accelerator voltage input is too high on power up after initial key switch closure.	Vehicle is experiencing an issue related to the accelerator pedal. Dealer will need to troubleshoot the accelerator pedal circuit.
09	Improper or no contact at the drive mode switch (Faulty switch as indicated by a short inside or not in the correct position -between the positions).	Moisture inside mode switch or faulty mode switch. Check for moisture in the mode switch. If moisture is present, dry switch. Dealer will need to troubleshoot the drive mode switch circuit.
11	Accelerator pedal was pushed when the car was first turned on.	Release the accelerator pedal, engage the parking brake, select a drive mode, disengage the parking brake, and then push the accelerator pedal. If the problem persists, dealer will need to troubleshoot the accelerator pedal circuit and/or the parking brake assembly.
15	Low battery pack voltage (less than 68.3 VDC)	Charge the vehicle. If necessary, proceed with the Alternate Charge Method*.
16	Battery pack voltage is greater than 86 VDC.	Vehicle was most likely unplugged while it was still charging and then keyed on right away. Run headlights for 5 minutes, turn the key OFF for a full 10 seconds, and then turn the key ON again to retest operation. If problem persists, dealer will need to troubleshoot the Drive and Power Systems.
21	Problem with the accelerator pedal wiring.	Vehicle is experiencing an issue related to the accelerator pedal. Dealer will need to troubleshoot the accelerator pedal circuit.

23	Motor field current is too high when the start switch is closed and the reverse drive mode is selected.	Faulty Motor Controller, dealer will need to troubleshoot motor controller.
24	Motor field current is too high when the start switch is closed and the forward drive mode is selected	Faulty Motor Controller, dealer will need to troubleshoot motor controller.
27	12 VDC Buss voltage is too low (less than 9.35 VDC).	Charge the car. If the problem persists, dealer will need to troubleshoot the motor controller.
41	Open thermal protector or transistor over temperature.	The motor controller is in thermal cutback. Allow cooling and the status code should disappear. If the problem persists after the motor controller has cooled, dealer will need to troubleshoot Motor Controller.
42	Motor armature offset voltage is too high.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
43	Motor armature offset voltage is too low.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
44	Armature transistor did not turn off properly.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
45	Armature transistor did not turn off properly.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
46	"Look ahead" test for motor controller A2 voltage is less than 12.5% of battery voltage.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
49	Motor field current is too low during the run mode.	Dealer will need to troubleshoot Motor Controller and/or Motor Field circuit.
51	Motor controller is not getting 72 volts.	Turn the key switch and the Master Disconnect Switch (MDS) OFF for 15 minutes. Make sure Parking Brake is engaged. Turn on MDS and then the key switch. If the problem persists, dealer will need to troubleshoot the Drive and Power Systems.
57	Motor controller motor current sensor input is too low while running.	Turn the key and Master Disconnect switch (MDS) off for 15 minutes. Make sure Parking Brake is engaged. Turn on MDS and then the key switch. If the problem persists, dealer will need to troubleshoot the Drive and Power Systems.
64	Control detects that the line driver input is less than 12% battery volts when the key switch is turned ON.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
65	Current limit in the line contactor coil is exceeded during run mode. The line contactor will drop out and the key switch will have to be recycled to reset the control	Dealer will need to troubleshoot the contactor coil and motor controller.
66	Field transistor exceeds its current limit. The line contactor will drop out and the key switch will have to be recycled to reset the control.	Excessive motor and control heating and/or shorted field. Dealer will need to troubleshoot terminals and/or motor and controller.
76	Capacitor voltage is too high during regenerative braking.	Stop vehicle. Shut off key switch and master disconnect switch. Wait several minutes turn back on. If problem persists, dealer will need to troubleshoot the motor controller.
77	Capacitor voltage too high during motoring.	Faulty Motor Controller, dealer will need to troubleshoot motor controller
81	No speed sensor signal is detected.	Faulty wiring between speed sensor and the motor controller or faulty speed sensor. Dealer will need to troubleshoot speed sensor.
82	Armature current exceeds 280 amps for 3.5 seconds and the accelerator pedal is calling for maximum performance in the control mode.	Code can be caused by a faulty speed sensor, or user riding the brake with the accelerator pedal. Shut off key switch and engage parking brake. Turn master disconnect switch off for 15 minutes. Turn Master Disconnect Switch, and key switch back on, then verify operation. If problem persists, dealer will need to troubleshoot motor and speed sensor.

GEM Alternate Battery Charging Method

If the combined voltage of all batteries reaches 68 volts or less, a safety feature in the onboard charger will not allow the charger to activate. Use the alternate battery charging method to add a small charge to each battery separately. The onboard charger will then activate properly to recharge all batteries to a full charge

Warning: Do not proceed with the alternate battery charging method if one of the following conditions exists:

- **Battery was frozen at some point in its life.**
- **The internal plates of any battery are exposed above the water level.**

Use a 12-volt battery charger to charge 12-volt batteries. Charge each battery individually.

Use a 24-volt charger to charge 8-volt batteries. Charge in 3 groups, each consisting of 3 sequentially wired batteries.

Tip: It is not necessary to remove or disconnect battery post connections during the alternate charging method.

Alternate Battery Charging Method

1. Turn the main disconnect switch off.
2. Set the battery charger to the medium amp setting (10 to 30 amps).
3. Charge each battery for 10-20 minutes.
4. Move quickly from battery to battery, as this is only a residual charge and it will dissipate in a short period of time.
5. After charging the last battery, remove the off-board charger leads, turn the main disconnect switch on and plug the vehicle in.
6. If the on-board charger does not recognize the residual charge and activate, repeat the alternate charging method."