

# Fault Charts

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## Fault Charts

### Overview

Faults can occur during start-up, motoring and charging.

- *Start-up faults* - occur after the key is turned on. The PCU runs a check to ensure that the system is ready for operation. If it is not ready, it sends a fault signal.
- *Motoring faults* - occur after the initial start-up
- *Charging faults* - occur during charging

The charts on the following pages list possible causes and suggested solutions to the faults.

## Start Up Faults

**No Indicator Lights** If no indicator lights are displayed when the key is turned on, this could be due to the causes listed below.

| Possible Cause                               | Action  |
|--|---|
| Loose or disconnected cables feeding the PCU | Disconnect and reconnect all cables to the PCU  |
| Auxiliary 12 volt power system fault         | Check the voltage of the 12 volt battery and load test if necessary.<br><br>If the voltage is low, refer to the DC/DC Converter Diagnostic Procedure. |
| Short or open in the 12 volt circuit         | Check the voltage on the circuit.   |
| Blown 12 volt DC line fuse                   | Check the voltage on the circuit and replace fuse if necessary.   |
| Burned out indicator lights.                 | Test bulbs. (Refer to the Indicator Diagnostic Procedure) and replace bulb if necessary.  |
| PCU fault                                    | Run the DOLCOM diagnostics.<br><br>Refer to the PCU Removal and Replacement Procedure.  |

**Start Up Faults** (continued)

**Fault Indicator Remains On**

If the fault indicator remains on, it could be due to the causes listed in the chart below.

| Possible Cause  | Action  |
|---|---|
| Battery pack external ON/OFF switch is off.                             | Turn switch to the on position.   |
| Loose or disconnected cables feeding the PCU.                           | Disconnect and reconnect all cables to the PCU.   |
| Accelerator pedal not in fully off position.                            | Refer to the Accelerator Potentiometer Diagnostic Procedure.<br><br>Re-attempt normal operating procedure.  |
| State of charge on main battery pack low.                               | Check the main battery pack voltage between Pins A and B in J2 connector.<br><br>Charge main battery pack if necessary.   |
| No pre-charged voltage  | Refer to Battery Pack Diagnostic Procedure.   |
| Low auxiliary battery or auxiliary power system fault                   | Check the voltage of the 12 volt battery and load test if necessary.<br><br>If the voltage is low, refer to the DC/DC Converter/Auxiliary Battery Diagnostic Procedure. |
| Isolation fault (voltage leaking from main battery pack to the chassis) | Refer to Battery Pack Diagnostic Procedure (Voltage Leaking from Battery Pack)  |
| PCU failure   | Run the DOLCOM diagnostics<br>Refer to PCU Removal and Replacement Procedure.   |

## Start Up Faults (continued)

### **Ready and Fault Indicator Blinking**

If both the ready and fault indicator remain lit after start up, check the causes below.

| <b>Possible Cause</b>                | <b>Possible Correction</b>  |
|--------------------------------------|---|
| Main power relay may not be engaging | Refer to Battery Pack Diagnostic Procedure (Voltage Leaking to Chassis portion) |
| PCU fault                            | Run the DOLCOM diagnostics<br><br>Replace PCU if needed                         |

## Motoring Faults

### Vehicle Will Not Move

If the vehicle will not move when the accelerator is depressed, refer to the chart below for possible causes and solutions.

| Possible Cause   | Action  |
|--|---|
| PRNDL switch out of adjustment (ready light lit)                                 | Refer to PRNDL Adjustment Procedure                                   |
| Main power relay may not be engaging   | Refer to Battery Pack Diagnostic Procedure (Main Power Relay portion) |
| Accelerator potentiometer fault (fault light lit when you press the accelerator) | Refer to Accelerator Potentiometer Diagnostic Procedure               |
| PCU fault  | Replace PCU if needed   |

## Motoring Faults (continued)

### Miles Per Charge Has Decreased

If the miles per charge has decreased, it could be due to a mechanical or an electrical problem.

Following is a list of the mechanical problems that could cause decreased miles per charge. For repair procedures, refer to the vehicle's shop manual.

- Incorrect tire pressures
- Emergency brake out of adjustment
- Service brake dragging
- Wheel alignment
- Incorrect lubrication of transmission components
- Wheel bearings too tight
- Worn transmission bearings
- Worn "U" joints
- Rear axle differential

The chart below includes a list of the electrical problems that could cause decreased miles per charge. To repair these problems, refer to the appropriate procedure.

| Possible Cause  | Action  |
|---|---|
| Charging system malfunction.  | Refer to Charging System Diagnostic Procedure   |
| Battery pack failure or loss of capacity  | Refer to Battery Pack Diagnostic Procedure  |
| Individual battery failure  | Refer to Battery Removal and Replacement Procedure  |
| Motor fault   | Refer to Motor Diagnostic Procedure   |
| Malfunctioning state of charge gauge (this is not actually a cause, but it could cause the driver to assume the miles per charge is decreasing) | Ensure the vehicle has been fully charged inductively or conductively – this should reset the state of charge gauge |

**Motoring Faults (continued)**

**Vehicle Powers Down Unexpectedly** If the vehicles powers down unexpectedly while driving, check the possible causes and solutions listed below.

| Possible Cause  | Action  |
|---|---|
| Loose connector (Fault light on)  | Disconnect and reconnect all PCU cables   |
| PRNDL switch out of adjustment (Ready light on)                         | Refer to PRNDL Adjustment Procedure   |
| Thermal shutdown (Fault light on which goes to ready after cool down)   | Refer to Cooling System Diagnostic Procedure  |
| Low auxiliary battery (Fault light on or no lights)                     | Check auxiliary battery voltage and DC/DC converter<br><br>If the voltage is low, refer to the DC/DC Converter Diagnostic Procedure |
| Blown 12 volt fuse (No lights)  | Check fuse and replace if necessary   |
| Battery pack failure (Fault light on or Fault and Ready Light Blinking) | Refer to Battery Pack Diagnostic Procedure  |
| Motor fault (Fault light or no light)                                   | Refer to the Motor Diagnostic Procedure   |
| Motor encoder fault (Ready light on)                                    | Refer to the Motor Encoder Diagnostic Procedure   |
| PCU fault (Fault light or fault and ready lights)                       | Run DOLCOM diagnostics. Replace PCU if necessary.   |

## Motoring Faults (continued)

### Temperature Problems

If the temperature gauge indicates that the vehicle is running below or above the normal range, check the possible causes and solutions below.

| Possible Cause    | Action  |
|-------------------|---|
| Low coolant       | Refill coolant reservoir with proper coolant mixture (Refer to Coolant Replacement Procedure) |
| Water pump fault  | Refer to coolant pump portion of the Cooling System Diagnostic Procedure                      |
| Fan fault         | Refer to the Cooling System Diagnostic Procedure  |
| Air in the system | Refer to coolant pump portion of the Cooling System Diagnostic Procedure                      |
| PCU fault         | Replace PCU if necessary. Refer to PCU Removal and Replacement Procedure                      |

**Motoring Faults** (continued)

**Unusual Noise  
 During Motoring**

If the driver notices unusual noises while driving, check the possible causes and solutions below.

Note: Because of the lack of engine noise, it is possible to hear mechanical noise from the brakes, transmission and tires that normally would not be heard in a gasoline powered vehicle.

| Possible Cause                           | Action   |
|--|--|
| Motor noise – loose motor mounting bolts | Tighten motor mounting bolts.<br>See motor replacement procedure for specifics |
| Motor noise – motor fault                | Refer to motor Removal and Replacement procedure                               |
| PCU noise – loose PCU mounting bolts     | Tighten PCU mounting bolts.<br>See PCU replacement procedure for specifics     |
| PCU Noise – PCU fault                    | Refer to PCU removal and replacement procedure                                 |
| Vacuum pump noise                        | Check mounting bolts   |
| Power steering pump noise                | Check power steering fluid level and add if necessary                          |

## Motoring Faults (continued)

**Vehicle Movements are not Normal** If the vehicle does not drive smoothly, check the possible causes and solutions below.

| Possible Cause  | Action  |
|---|---|
| Cables to PCU are loose or disconnected (No indicator lights lit) | Disconnect and reconnect all cables to PCU                  |
| Motor encoder fault   | Refer to Motor Encoder Diagnostic Procedure                 |
| Battery pack not fully charged                                    | Charge main battery pack                                    |
| Integral charger is not fully charging main battery pack          | Use DOLCOM to check charge complete voltage                 |
| Battery pack fault  | Refer to Decreased Miles per Cdcharge Diagnostic Procedure  |
| High impedance in the power circuit causing voltage drop          | Check all battery and cable connections in the battery pack |
| PCU fault   | Run the DOLCOM diagnostics<br><br>Replace PCU if necessary  |

## Motoring Faults (continued)

**Vehicle Slips Into Charge Mode While Motoring**      If the vehicle slips into charge mode while motoring refer to PCU Removal and Replacement Procedure.

**Vehicle Indicators Will not Turn Off When Key is in Off Position**      If the vehicle indicators will not turn off when the key is in the off position, check the causes and solutions listed below.

Note: To shut off the vehicle in this condition, you must turn off the main battery pack switch.

| Possible Cause   | Action  |
|--|---|
| Main power or pre-charge relay wiring shorted                                | Replace the wiring and relay if necessary                       |
| PCU fault or integral charger within PCU is not fully charging the batteries | Replace PCU. Refer to the PCU Removal and Replacement Procedure |

**Ready Indicator Blinks**      If the ready indicator blinks during driving, check the possible causes and solutions listed below.

| Possible Cause              | Action  |
|-----------------------------|---|
| DC/DC converter not enabled | Refer to the DC/DC Converter Diagnostic Procedure.<br><br>Replace the PCU if necessary (Refer to the PCU Removal and Replacement Procedure) |

## Charging Faults

### Charge Indicator Never Lights

If the charge indicator light never lights during charging, check the possible causes and solutions below.

| Possible Cause                                       | Action   |
|--|--|
| AC voltage not present                               | <p>Check AC power to the charge cord. (Check building AC breaker, GFI and continuity of charge cord.)</p> <p>Check AC power to the J6 charger input at Pins A and B. (You should read line voltage. Pin C is the ground)</p> |
| Dead 12 volt auxiliary battery                       | <p>Check the voltage and load test if necessary</p> <p>If voltage is low, refer to the DC/DC Converter Diagnostic Procedure</p>  |
| Cables to PCU are loose or disconnected              | Disconnect and reconnect all cables to PCU   |
| Indicator is burned out.                             | <p>Check bulb (Refer to Indicator Diagnostic Procedure)</p> <p>Run DOLCOM Diagnostics to see if the vehicle is charging properly</p>   |
| Ground Fault Indicator (GFI) switch has been tripped | <b>Disconnect from AC power</b> and reset GFI switch.  |
| PCU fault.   | Replace PCU. (Refer to the PCU Removal and Replacement Procedure)  |

## Changing Faults (continued)

### Fault and Ready Light Blinking

If the fault and ready light blink during charging check the possible causes and solutions below.

| Possible Cause   | Action   |
|--|--|
| Vehicle was plugged in too long – this happens if the vehicle remains connected to AC power supply for more than 15 hours after “charge complete” indicator shows blinking | Unplug the vehicle. (This is not an actual fault, - it is the vehicle’s built-in overcharge protection.) |

### Immediately Shows "Charge Complete"

If the vehicle immediately shows "charge complete" when you begin charging, check the following causes and solutions.

| Possible Cause           | Action  |
|--------------------------|---|
| Vehicle is fully charged | Run the DOLCOM diagnostics to determine state of charge. Voltage should be 373 volts DC |
| PCU failure              | Run the DOLCOM diagnostics.   |

### Charging Faults (continued)

**Fault Light Remains Lit Longer than Five Seconds**

If the fault indicator does not turn off after five seconds, check possible causes and solutions below.

Note: *If the vehicle is conductively charged for over 16 hours, the charge and fault light will blink. Unplug the AC power source to eliminate the problem.*

| Possible Cause                                       | Action   |
|--|--|
| Start key is in the ON position                      | Turn start key to the OFF position   |
| Battery pack switch is in the OFF position           | Turn the main battery pack switch to the ON position   |
| Ground Fault Indicator (GFI) switch has been tripped | <b>Disconnect from AC power</b> and reset GFI switch and check for isolation faults                                |
| Cables to PCU are loose or disconnected              | Disconnect and reconnect all cables to PCU   |
| Indicator is burned out                              | Refer to Indicator Diagnostic Procedure  |
| Pre-charge fuse blown                                | Refer to Battery Pack Diagnostic Procedure   |
| Open circuit or blown fuse in main battery pack      | Check main fuses in the battery pack and replace if necessary.<br><br>Check battery cable and connections          |
| Isolation fault                                      | Refer to Battery Pack Diagnostic Procedure (Voltage leaking from main battery to chassis portion of the procedure) |
| PCU fault  | Run the DOLCOM diagnostics<br><br>Replace PCU. (Refer to PCU Removal and Replacement Procedure.)                   |

## Charging Faults (continued)

### Charge Indicator Does Not Blink or Fault Light is On and the Charge Light Blinks

If the charge indicator does not blink or the fault light is on and the charge light is blinking, check the possible causes and solutions below.

*Note: If the vehicle is conductively charged for over 16 hours, the charge and fault light will blink. Unplug the AC power source to eliminate the problem.*

| Possible Cause                                       | Action   |
|--|--|
| Start key is in the ON position                      | Turn start key to the OFF position   |
| Battery pack switch is in the OFF position           | Turn the main battery pack switch to the ON position   |
| Ground Fault Indicator (GFI) switch has been tripped | <b>Disconnect from AC power</b> and reset GFI switch and check for isolation faults                                |
| Cables to PCU are loose or disconnected              | Disconnect and reconnect all cables to PCU   |
| Indicator is burned out                              | Refer to Indicator Diagnostic Procedure  |
| Pre-charge fuse blown                                | Refer to Battery Pack Diagnostic Procedure   |
| Open circuit or blown fuse in main battery pack      | Check main fuses in the battery pack and replace if necessary.<br><br>Check battery cable and connections          |
| Isolation fault                                      | Refer to Battery Pack Diagnostic Procedure (Voltage leaking from main battery to chassis portion of the procedure) |
| PCU fault  | Run the DOLCOM diagnostics<br><br>Replace PCU. (Refer to PCU Removal and Replacement Procedure.)                   |

## Charging Faults (continued)

### Battery Pack Not Fully Charging

If charged with 220 volts AC or above, the vehicle may stay in trickle charge mode for a long period of time (10-20 hours). To charge in "normal mode", charge with 110 volts AC.

### 12 Volt Auxiliary Battery Loses Its Charge

If the 12 volt auxiliary battery loses its charge, check the possible causes and solutions below.

| Possible Cause  | Action  |
|---|---|
| Current drain   | Check hood light, dome light, key left on, brake light switch stuck or other accessories powered by the 12 volt auxiliary battery |
| Cable connection between auxiliary battery and PCU is loose or bad. | Tighten connection at PCU and auxiliary battery or replace cable if necessary.  |
| 12 volt auxiliary battery fault                                     | Load test and charge/replace battery if necessary.  |
| DC/DC converter is faulty (ready light will flash)                  | Refer to the DC/DC Converter Diagnostic Procedure<br><br>Replace PCU if necessary.  |