

## **Procedures Table of Contents**

Diagnostic Procedures	
Accelerator Potentiometer Diagnostic Procedure	1
Battery Pack Diagnostic Procedure	3
Voltage Leading from the Battery Pack to Chassis	4
No Pre-Charge Voltage	6
Blown Fuse	6
Main Power Relay May not be Engaging	7
Open Circuit, Blown Fuse or High Impedance in the Battery Pack	8
Charge Port Diagnostic Procedure	11
Cooling System Diagnostic Procedure	13
DC/DC Converter/Auxiliary Diagnostic Procedure	17
Indicator Diagnostic Procedure	19
Motor Diagnostic Procedure	20
	22
Motor Encoder Diagnostic Procedure	23
State of Charge Diagnostic Procedure	38

### **Removal and Replacement Procedures**

Battery Removal and Replacement Procedure	9
Coolant Removal and Replacement Procedure	16
Motor Removal and Replacement	25
Motor Encoder Removal and Replacement	26
Motor Encoder Cable Removal and Replacement	29
PCU Removal and Replacement	32

continued

# Procedures

## Table of Contents

### Miscellaneous Procedures

Charging the Vehicle	12
PRNDL Adjustment Procedure	35
Starting the Vehicle	37

## Accelerator Potentiometer Diagnostic Procedure

### Overview

There are two accelerator potentiometers (pots) that function in parallel to convey a signal from the accelerator pedal to the PCU. Sometimes these pots become "out of sync" creating a correlation fault.

### Procedure

If you get a correlation fault, you will need to check and adjust the accelerator pots by following the procedure below:

1. Ensure the key is in the OFF position.
2. Unplug the four pin packard from the black accelerator pot box to the right of the PCU.
3. Remove the lid on the black accelerator potentiometer box.
4. Ensure the accelerator pots are in the OFF position.
5. Measure resistance (ohm value) between Pin C and Pin D on the potentiometer side of the four pin packard.

Note: The resistance should be approximately 2.5 - 2.75k ohms -  
the two pots are each 5.0 - 5.5k ohms and they are wired  
in parallel to give an output of 2.5 - 2.75 k ohms.

6. Measure the ohm value from each individual pot; Pin D to Pin A and from Pin D to Pin B. (Both reading should be the .25 k ohms in the off position and 2.5k ohms - 2.75 k ohms in the full position)
7. Using your hand, push the potentiometer slide forward to 1/4, 1/2, 3/4 and full portions and take a reading at each position.
8. Measure the ohm value at each 1 /4 step position as described in step 5. (All readings should be the same.)

continue

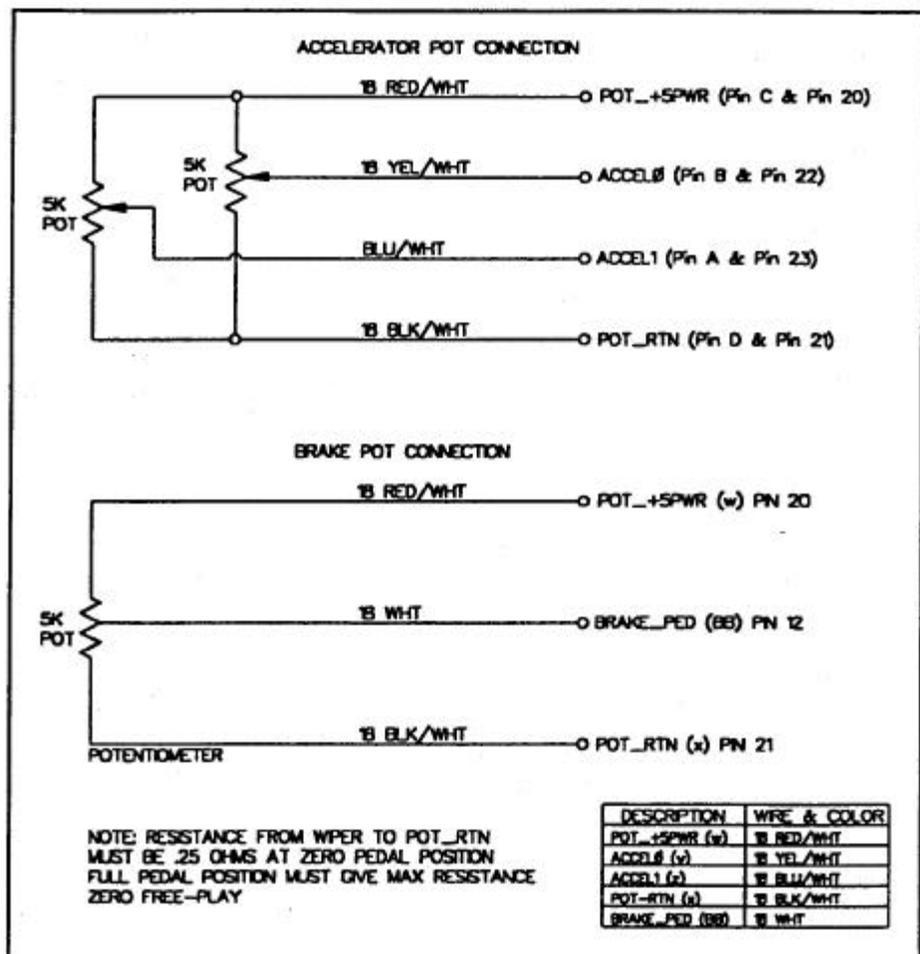
## Accelerator Potentiometer Diagnostic Procedure

### Procedure (continued)

9. Compare the readings from steps 5 and 7, if the readings are different, adjust the pots as needed.
  - Loosen the screw on the potentiometer shaft
  - Adjust the pot either up or down by turning the shaft clockwise or counter clockwise
  - Tighten the potentiometer screw and recheck the values as in steps in steps 5 and 7
10. Turn on vehicle and drive to check if fault has been removed.

### Diagram

The diagram below shows the accelerator/ brake pot connections.



**Accelerator and Brake Pot Connections**

Note: Lettered pins are on the four pin packard and the numbered pins are on the interface junction box.

## Battery Pack Diagnostic Procedure

Overview                      Several vehicle problems could result from a problem with the main battery pack. These problems include:

- Low mileage
- Fault light (vehicle will not drive)
- Vehicle runs, but dies while driving (will start again if key is reset)
- Vehicle will not drive (no lights)

When troubleshooting, you may find one of the following:

- Voltage leaking from the main battery pack to the chassis
- No pre-charge voltage
- Blown pre-charge fuse
- Main power relay may not be engaging
- Battery pack failure or loss of capacity
- High impedance in the power circuit causing voltage -drop
- Open circuit or blown fuse in the main battery pack

Procedure                      To diagnose a problem with the main battery pack, follow the steps on the following pages.

Important:      Extreme care should be taken when working with or around **the battery** pack as severe injury or death could result:

(continue )

## Battery Pack Diagnostic Procedure

**Procedure**  
(continued)

### **Voltage *Leaking from the Battery Pack to the Chassis***

1. Check voltage from Pin A to vehicle chassis and from Pin B to chassis. (Normal range is 0-5 VDC.)
  - If the voltage is between 0 and 5 VDC there is no leakage to the vehicle chassis

**Note:** Due to possible induced voltage in the system, the voltage could be higher than normal.

- If the voltage is above 5, continue through this procedure
2. Disconnect main heater electrical connection and recheck voltage from Pin A to vehicle chassis and from Pin B to chassis.
  - If there is no leakage to the chassis, replace the heater element and re-check the voltage
  - If there is leakage to the chassis continue through the procedure
3. Turn off the main battery pack switch.
4. Remove the truck bed. (Refer to the Battery Pack Removal and Replacement Procedure for details if needed.)
5. Disconnect J2 connector from PCU.
6. Turn the main battery pack switch on.

continue

## Battery Pack Diagnostic Procedure

### Procedure (continued)

#### **Voltage Leaking from the Battery Pack to the Chassis**

7. Test from battery positive on each pack to the vehicle chassis and from battery minus to the vehicle chassis.
  - If you only have voltage from one pack, continue through the procedure on the pack with voltage
  - If you read voltage to the chassis from both packs, then continue through the procedure

8. Turn off the main battery pack switch.

9. Disconnect the main fuse on the battery minus and separate the two copper bus bars.

10. Turn the main battery pack switch on.

11. Retest battery positive voltage to chassis and battery minus to chassis on each pack. (Also look for physical evidence of contact between the battery negative bus bars and the vehicle chassis and repair if necessary)

- If there is no leakage, check main fuse holder or cables to the front of the vehicle

- If there is still leaking voltage, continue through the procedure

12. Check the voltage from vehicle chassis to each battery -starting at battery+ and working through the stack. (Remove top layer of batteries to gain access to lower layer.)

Note: The lower the voltage from each battery to chassis, the closer you are to the isolation fault.

continue

## Battery Pack Diagnostic Procedure

### *Procedure No Pre-charge Voltage or Blown Pre-Charge Fuse*

1. Check to ensure there is no voltage from Pin A to Pin B in the J2 connector..
2. Remove the truck bed. (Refer to the truck bed removal portion of the Battery Removal and Replacement Procedure for more details.)
3. Ensure the main battery pack switch is off.
4. Check continuity of pre-charge fuse, and replace fuse if necessary.
5. Check continuity of pre-charge wiring to main battery pack and repair if necessary.
6. Turn the main battery pack switch on and check voltage of the main battery pack.
  - If battery voltage is present then pre-charge is ok.
  - If battery voltage is not present continue with procedure:
7. Check main battery pack for open circuit caused by:
  - Blown fuse (Four 200 amp fuses and main fuse)
  - Poor or shorted connection
  - Bad battery
  - Bad wiring
  - Discolored connections
  - Loose battery bolt

(continued)

## Battery Pack Diagnostic Procedure

### Procedure

*Main Power Relay may not be engaging*

1. Turn the main battery pack switch off.
2. Disconnect J2 from the PCU.
3. Check #4 fuse in the interface junction box and replace if necessary.
4. Apply +12 volts DC to Pin D and ground Pin C - listen for the main power relay to close.
  - If it does not close, test circuit (wiring, auxiliary relay and main contactors)
  - If it does close, the circuit is ok.

continue

## Battery Pack Diagnostic Procedure

**Procedure**     *Open circuit blown fuse or high impedance in the main battery pack*

1. Turn the main battery pack switch on and check voltage of the main battery pack.

- If battery voltage is present then pre-charge is ok.
- If battery voltage is not present continue with procedure:

2.            Check main battery pack for open circuit caused by:

- Blown fuse (Four 200 amp fuses and main fuse)
- Poor or shorted connection
- Bad battery
- Bad wiring
- Discoloration
- Burned terminals
- Loose battery bolts

3. Check physical condition of battery (no leaking contents). Replace if necessary.

## Battery Removal and Replacement

Overview                    Occasionally there may be a failed battery module which will require replacement. The battery pack contains 52 batteries (2 parallel strings of 26 batteries in series) with a total nominal voltage of 312 volts DC.

Safety                      The battery can have up to 350 volts DC at rest Extreme care should be taken when working with or around the battery pack as severe injury or death could result.

Procedure                -    Follow the steps below to remove and replace batteries in the battery pack.

Note: If you will be replacing a battery then fully charge the vehicle before removing any batteries. This will ensure that the replaced battery will be charged at the same voltage level as the existing pack.

### *Battery Removal*

1. Turn off the main battery pack switch.

2. Remove the bed of the truck:

- Disconnect the backup alarm and backup lights (Under the left rear of the bed of the truck)
- Remove the eight bolts on the bed of the truck
- Remove the conductive charging plug housing (located inside the door normally covering the gas tank orifice)
- Slide the bed to the rear of the truck to avoid damage to the spare tire removal handle
- Remove the bed

3. Remove the metal battery pack lid.

- 4. Remove the plexiglass.

5. Cover any exposed areas with appropriate nonconductive covering.

(continued)

## Battery Removal and Replacement Procedure

6. Remove the battery.

(continued)

Battery Location	Follow these steps
Top layer under the bed	Remove the copper connecting bar from the battery to be removed <ul style="list-style-type: none"> <li>Remove the battery.</li> </ul>
Bottom layer under the bed	Disconnect all necessary battery cables and tape exposed ends Remove all copper connecting bars Remove top layer of batteries and all spacers Remove the plexiglass separator from the top of the bottom layer of batteries
Under the cab	Remove the battery tray (support the tray before removing the bolts) <ul style="list-style-type: none"> <li>Remove the copper connecting bar from the battery to be removed.</li> <li>Remove the battery.</li> </ul>

### Battery Replacement

1. Test the voltage of the batteries surrounding the one to be replaced.
2. Charge the replacement battery slightly higher than the resting voltage of the surrounding batteries to ensure that its resting voltage will be similar.
3. Replace the battery and re-insert the separators.
4. Reconnect all copper connectors and cables.
  - Use new lock washers
  - Tighten the copper connectors to 80 inch lbs - do not overtighten.
4. Replace plexiglass cover and battery tray lid.
5. Replace the truck bed and reconnect backup alarm and lights as well as the conductive plug housing.

## Charge Port Diagnostic Procedure

**Overview** The charge port is the interface between the vehicle and the inductive charger. The charge port contains a microswitch that senses the presence of the charger paddle. The microswitch picks up a relay that in turn starts a sequence of events on the vehicle in order for charging to proceed.

**Procedure** To charge the vehicle:

1. Insert the inductive charger paddle into the port.  
(Ensure that the paddle is fully inserted into the port.)
2. When the paddle is inserted, you should be able to hear a relay under the hood click on. This turns the coolant pump on so that the fluid can circulate.
3. If you do not hear the relay click on, there could be a problem with the insertion of the paddle or the port itself could be faulty.
4. Replace the port if necessary.

Caution: Voltage is still present when the charge port is disconnected.

## Charging the Vehicle

**Procedure** Follow the procedure below to charge the vehicle.

<b>Action</b>	<b>Result</b>
Ensure the main battery is switched to the on position	Note: Battery Pack switch should normally be on at all time, except when repairing
Ensure that the key is in the off position	Note: The vehicle will not charge if the key is in the ON position.
<p><b><i>For Inductive Charging</i></b> Insert charge paddle into charge port (Charging will take 3-4 hours)</p> <p><b><i>For Conductive Charging</i></b> Plug vehicle into 110/220 volt outlet (use cord supplied with vehicle). (Charging will take 12 - 16 hours.)</p>	<p>Charge indicator blinks during the charge cycle.</p> <p>Charge indicator will be continuously lit when the charging is complete.</p>
Disconnect 110/220 volt AC single-phase line from charger receptacle.	

## Cooling System Diagnostic Procedure

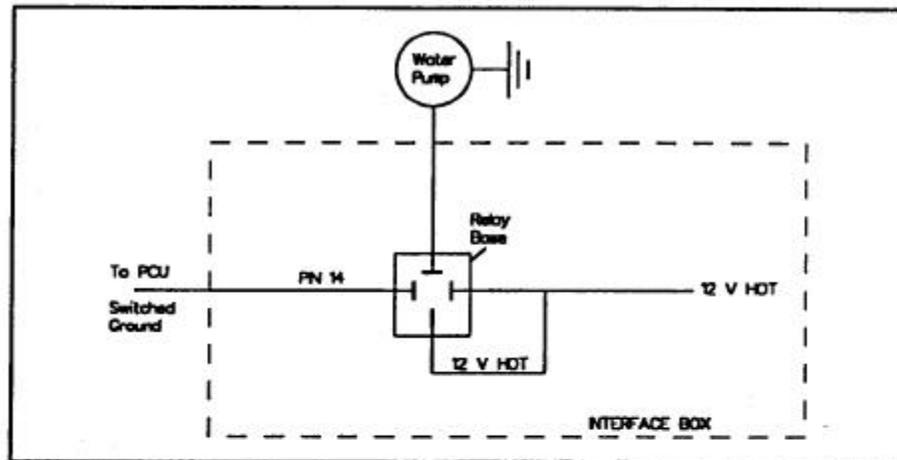
### Overview

Listed below are some of the common problems you may find with the cooling system.

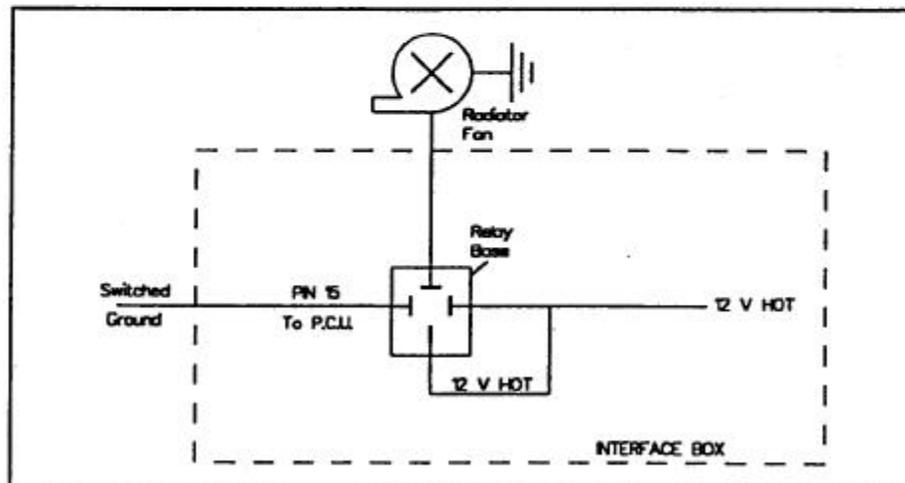
- Low Coolant Level
- Air in System
- Restrictions to Flow
- Circulation Pump Problem

### Circuit Diagram

Refer to the circuit diagram below as you work through the following procedure.



**Water Pump Wiring Diagram**



**Radiator Fan Wiring Diagram**

## Cooling System Diagnostic Procedure

### Procedure

Follow the steps below to troubleshoot and repair the cooling system.

1. Check the coolant level and refill if necessary.  
(Improper coolant level can cause the system to overheat - with possible damage to the pump.)

Note: The maximum pressure the cooling system can handle is 10 psi. The system is normally not pressurized. If using a radiator pressure tester, do not pressurize the system more than 9 psi.

2. Check for coolant flow and ensure there are no restrictions. (Restrictions will cause the system to overheat - with possible damage to the pump.) If the coolant is not flowing, move to the next step.

3. Check coolant pump operation.

If the Pump is	Then
Operating	<ul style="list-style-type: none"><li>• Press the accelerator to activate the pump (pump will not operate in trickle charge mode)</li><li>• Bleed air from the system</li><li>• Re-check for circulation to ensure there are no restrictions to flow (kinks in hoses or contamination in system)</li></ul>
Not Operating	<ul style="list-style-type: none"><li>• Test water pump circuit by grounding pin 14 in interface box (see diagram)</li><li>• Check the voltage supply to the pump (begin between pin 14 and 12 volt battery + and trace circuit to the pump) the voltage should be the same as the 12 Volt battery voltage.</li><li>• Check the fuse and relay inside the interface junction box.</li></ul> <p>If voltage is good at the pump, but it does not operate - replace the pump</p>

continue

## Cooling System Diagnostic Procedure

Procedure  
(continued)

4. Check the fan operation by grounding pin 15 in the interface box (see diagram), if it is not operating continued through the procedure. (Fan will not operate below 115° or without Pin 15 of the interface junction box is grounded)
5. Check for 12 volt DC auxiliary battery voltage at the fan.
  - *If the voltage reading is the same* as auxiliary battery voltage, replace the fan.
  - If there is no reading, check the:
    - Fuse
    - Relay

## Coolant Removal and Replacement Procedure

**Overview** To ensure the efficiency of the coolant it should be replaced every 12 months.

**Procedure** Follow the steps below to replace the coolant:

1. Move PCU to an appropriate location for coolant disposal.
2. Remove coolant caps.
3. Drain coolant.
4. Install the PCU.
5. Add new coolant.
6. Replace the coolant caps.

## DC/DC Converter/Auxiliary Battery Diagnostic Procedure

### Overview

The PCU contains the DC/DC converter which provides power for the accessories on the vehicle. It also performs the important function of charging the 12 volt auxiliary battery. If the DC/DC converter fails, the 12 volt auxiliary battery will have to provide all accessory power and will eventually go dead. Use the following steps to verify the proper operation of the DC/DC converter. (If the DC/DC converter is faulty, you may get a blinking Ready light.)

### Procedure

If you suspect that there is a problem with the 12 VDC auxiliary charger or the auxiliary battery follow the steps below.

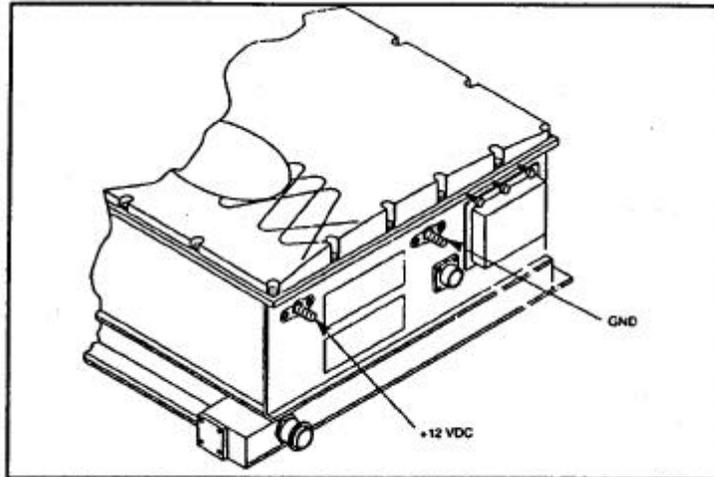
1. Measure the voltage of the auxiliary battery with the key off. Voltage should be greater than 10.5 volts DC.
  - If less than 10.5 volts DC, charge the auxiliary battery and load test. If load test fails, replace battery. If load test is ok, then proceed.
2. Turn the key to the ON position.
3. Measure the auxiliary battery voltage with volt meter. (Voltage should be greater than 13.5 volts DC)
  - If the voltage is greater than 13.5 volts then converter is functioning properly
  - If the voltage is less than 13.5 volts, continue through the procedure
4. Turn the key to the OFF position.
5. Remove the PCU ground cable.

(continue

## DC/DC Converter/Auxiliary Battery Diagnostic Procedure

### Procedure

6. Attach the positive lead of the voltmeter to the +12 VDC stud.



**12 Volt DC Power Location**

7. Attach the negative lead of the volt meter to the ground stud.
8. Turn the key to the on position and immediately (within one second) measure the voltage .

If the voltage is less than 13.5 volts DC, check to see if the fault light is lit

- Refer to Fault Light On Diagnostic Procedure
- If not, refer to the PCU Removal and Replacement Procedure

If the voltage is greater than 13.5 volts DC, check the wiring between the converter and the auxiliary battery.

9. Turn the key to the OFF position.
10. Load test the auxiliary battery and retest. Replace if necessary.

## Indicator Diagnostic Procedure

### Overview

The indicators are designed to provide the user with feedback from the PCU. The indicator lights are the fault, ready and charge complete lights.

### Procedure

To check the lights for proper operation, follow the steps below.

1. Turn the key to the OFF position.
2. Open the interface junction box.
3. Ground pin 9 with a jumper wire. The ready light should light.
4. Ground pin 10 with the jumper wire. The charge complete light should light.
5. Ground pin 11 with the jumper wire. The fault light should light.
7. If the bulbs do not light, check the 12 volt OEM fuse block and replace bulbs if necessary.
8. Refer to the master wiring diagram to check for possible open circuit.

## Motor Diagnostic Procedure

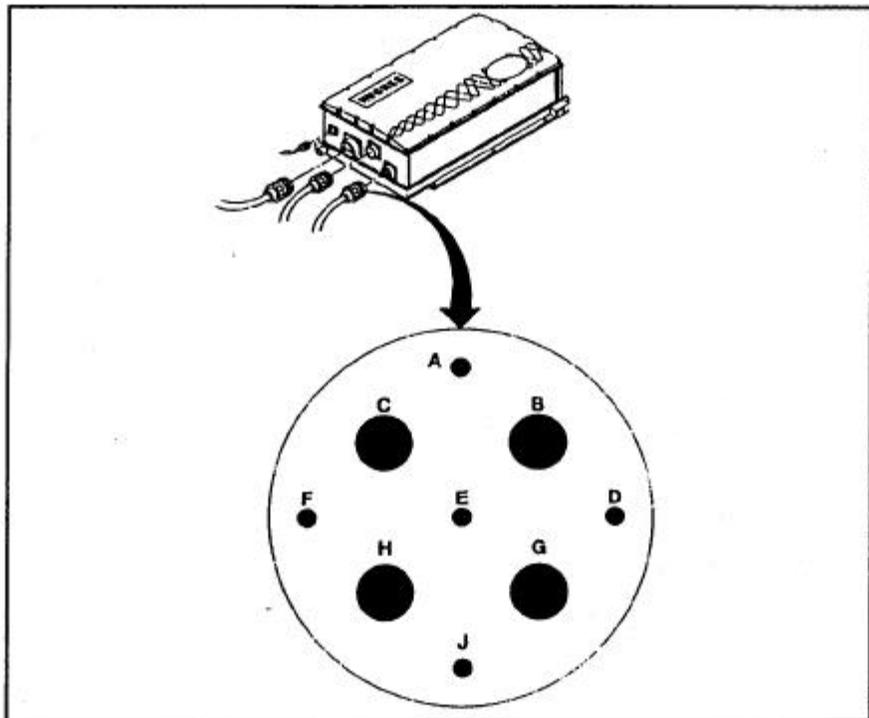
### Overview

The motor is an integral part of the drive train. It can also be a source of ground faults, isolation faults or failed windings. It is rare for the motor to fail, but it can still occur.

### Procedure

Follow the steps below to locate a motor fault.

1. Turn the key to the OFF position
2. Disconnect the three-phase AC output from J1.
3. Measure the resistance between Pins D and J on the three-phase AC output cable connector. (Should be less than 1 Ohm - if not replace the motor)



**Three-phase AC Pin Locations**

4. Measure the resistance between each pin and the chassis shield on the three phase output cable connector. (If all the measurements less than 5 M Ohms, replace motor)

continue

## Motor Diagnostic Procedure

Procedure  
(continued)

5. Measure the resistance between the following pins on the three-phase output cable connector. (Each pin should be less than 1 Ohm.)

- Pins H and B
- Pins H and G
- Pins H and C
- Pins C and G
- Pins C and B
- Pins G and B

- If they are, check for some other problem. If not, replace the

## Motor Encoder Cable Diagnostic Procedure

### Overview

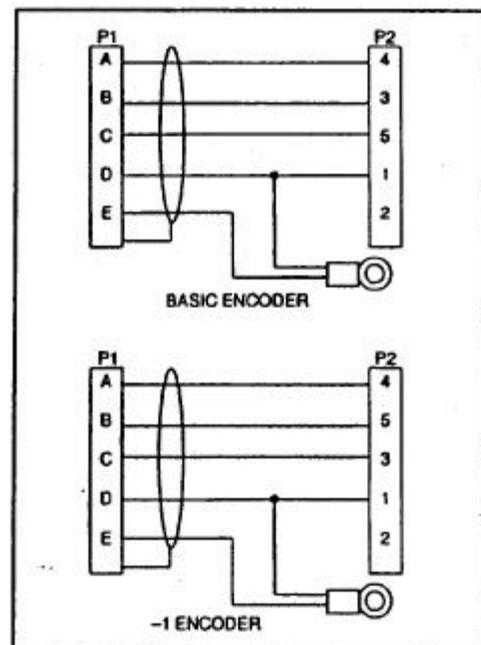
The motor encoder cable is the communications link between the motor encoder and the PCU. It can sometimes be damaged or become loose; in which case the communications will not be received by the PCU.

### Procedure

Follow the steps below to determine if there is a problem with the motor encoder cable.

1. Disconnect the motor encoder cable from the J5 connector.
2. Disconnect the motor encoder cable from the encoder (see Motor Encoder Cable Removal and Replacement procedure).
3. Measure the continuity of each wire.

- If the wires are ok, check for some other cause of the fault.
- If the wires are not ok, replace the cable (Refer to the Motor Encoder Cable Removal and Replacement procedure).



## Motor Encoder Diagnostic Procedure

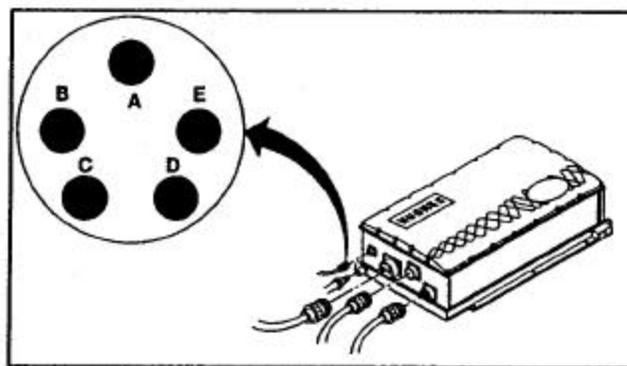
### Overview

The motor encoder communicates the motor shaft position and motor speed to the PCU. This is a critical component and the motor will not function properly without it. If the encoder is faulty, the motor and vehicle will only crawl in forward or reverse. The encoder can be checked with the following procedure.

### Procedure

Follow the steps below to determine the cause of a motor encoder fault.

1. Disconnect the motor encoder cable from the J5 connector.
2. Measure the resistance between Pins D and E of the motor encoder cable. It should be between 9.8 and 10.2 K ohms - at room temperature. (Resistance increases when the motor temperature decreases and visa versa.) The cooler the temperature not, refer to the Motor Encoder Cable Diagnostic Procedure



**Motor Encoder Cable Pin Locations**

(continue )

## Motor Encoder Diagnostic Procedure

### **Procedure** (continued)

3. Measure the resistance between Pins A and B, and Pins A and C. (Should be approx 20M Ohm)
  - If less than 20M, refer to the Motor Encoder Cable Diagnostic procedure
  - If more than 20M, continue
4. Measure the resistance between Pins A and D.
  - If less than 7M Ohms, refer to the Motor Encoder Cable Diagnostic Procedure
  - If more than 7M Ohms, check/replace the motor encoder cable. If everything appears ok, replace the PCU

## Motor Removal and Replacement

### Overview Procedure

Occasionally you may need to remove or replace the motor. To remove and replace the motor, follow the steps below.

1. Turn off the main battery switch.
2. Remove the Motor Encoder cable and the Motor AC Power cable connectors from the PCU and the two coolant hoses from the motor.
3. Properly support the transmission and the motor. Each will need to be supported separately.
4. Remove the motor bolts.

## Motor Encoder Removal and Replacement

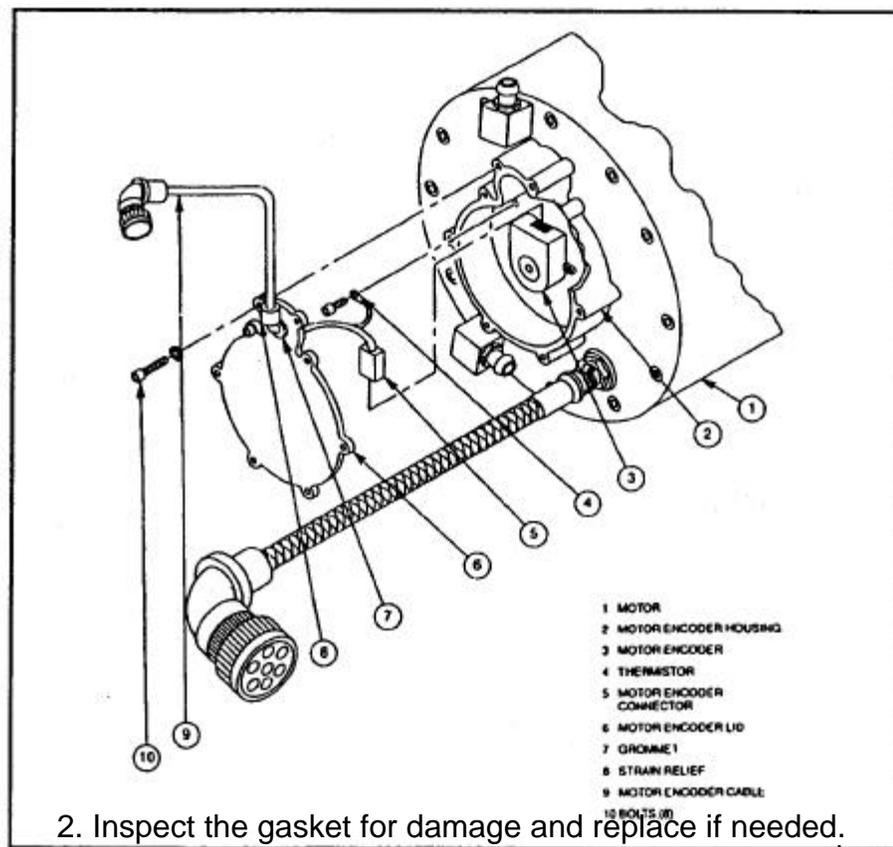
**Overview** If the motor encoder is damaged or not operating properly it can be replaced.

**Procedure** Follow the steps below to remove and replace the motor encoder. Refer to the diagrams as noted.

### Removal

1. Disassemble the motor encoder lid (6 from the motor (1).

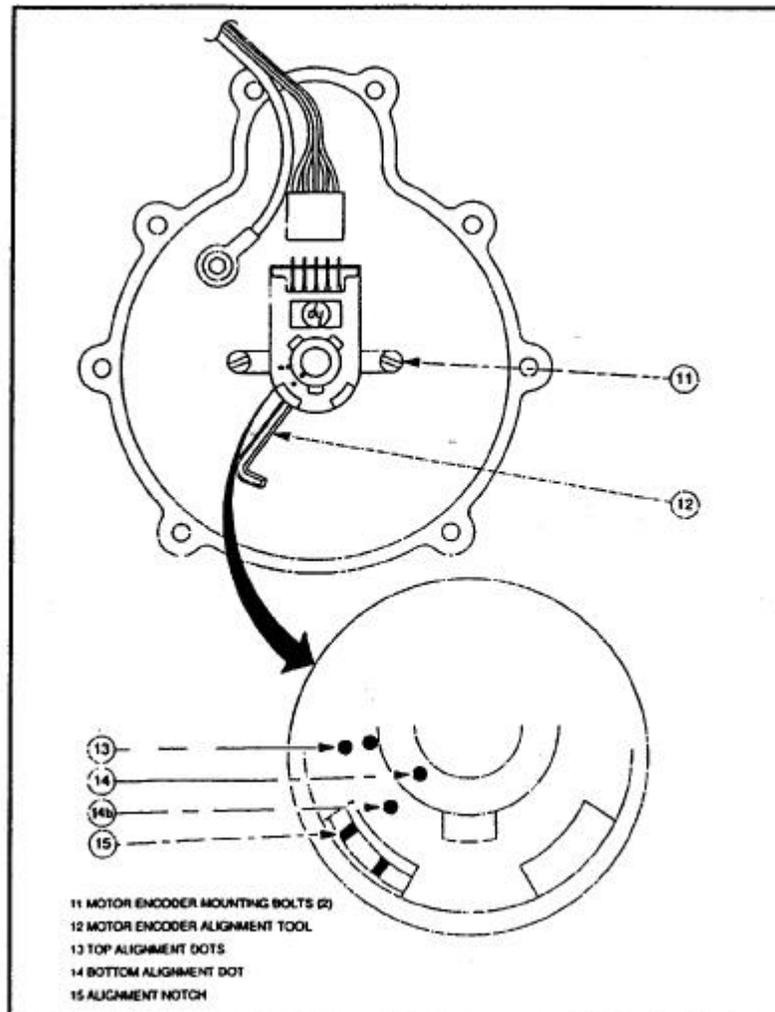
Note: Care must be taken to not damage the gasket between the motor encoder lid and the motor.



## Motor Encoder Removal and Replacement

### Procedure

3. Disconnect and remove the motor encoder connector (5) from the motor encoder (3). (Refer to diagrams on the following page)
  - Remove the mounting screws (11)
  - Push alignment notch (15) in a counter-clockwise direction with tweezers until dot 14 aligns with dot 14b. (This exposes the alignment notch.)
  - Insert the alien wrench into alignment notch and rotate encoder housing until the alien wrench engages in the alien screw
  - Loosen alien screw and remove encoder and encoder housing



## Motor Encoder Removal and Replacement

### Procedure (continued)

### Replacement

1. Clean the inside of the motor encoder housing (2). Refer to diagrams on previous page.
2. Remove the cardboard protector from the new motor encoder.
3. Add Locite to motor encoder mounting bolts (10).
4. Assemble the motor encoder (3) on the shaft. (Partially tighten motor encoder mounting bolts (10).
5. Assemble motor encoder (3) with motor encoder mounting bolts.
6. Center motor encoder (3) around shaft and tighten motor encoder mounting bolts.
7. Finger tighten adjustment screw with an allen wrench (12) in a clockwise direction. (See diagram on following page.)
  - Push alignment notch (15) in a clockwise direction with tweezers until bottom dot (14) aligns with top alignment dots (13).
  - Spin motor shaft to ensure that motor encoder wheel does not rub against motor encoder housing.
8. Assemble motor encoder lid (6) to motor (1).
9. Assemble strain relief (8) onto mounting bolt (10) and tighten bolts.

## Motor Encoder Cable Removal and Replacement

### Overview

If a fault is traced to the motor encoder cable, it can be replaced.

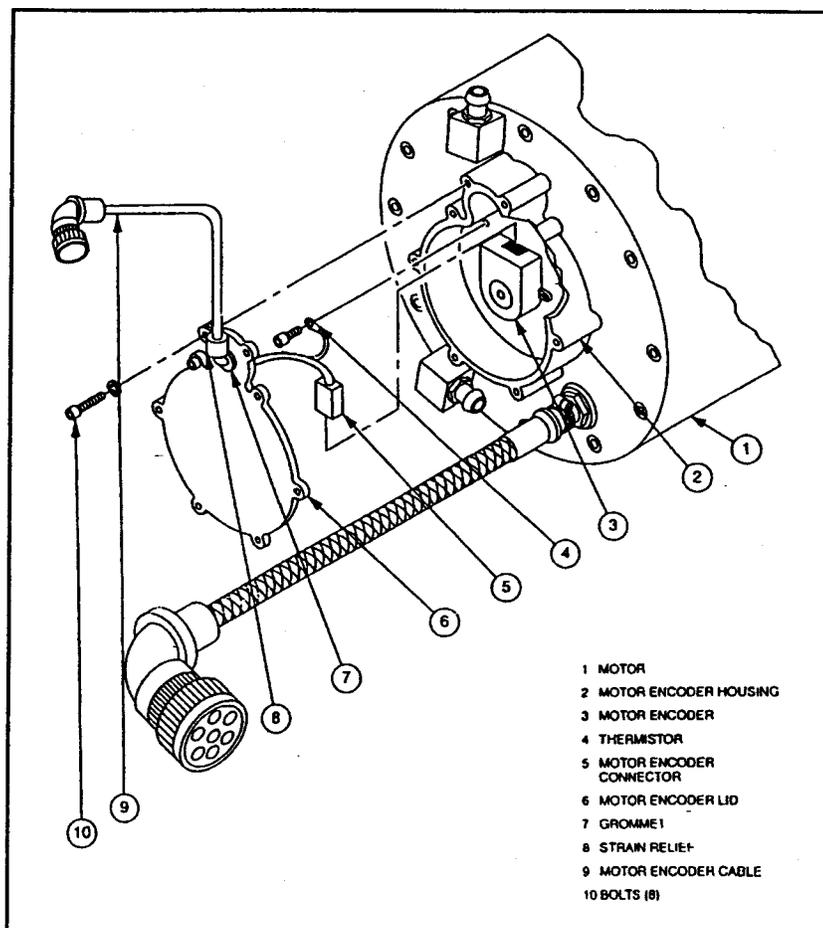
Note: **Care should be taken to not damage the gasket between the motor encoder lid and the motor.**

### Procedure

To remove and replace the motor encoder cable, follow the steps below:

#### Removal

1. Disassemble the motor encoder lid (6) from the motor (1) by removing the eight mounting bolts (10).



**Motor Encoder and Cable Assembly**

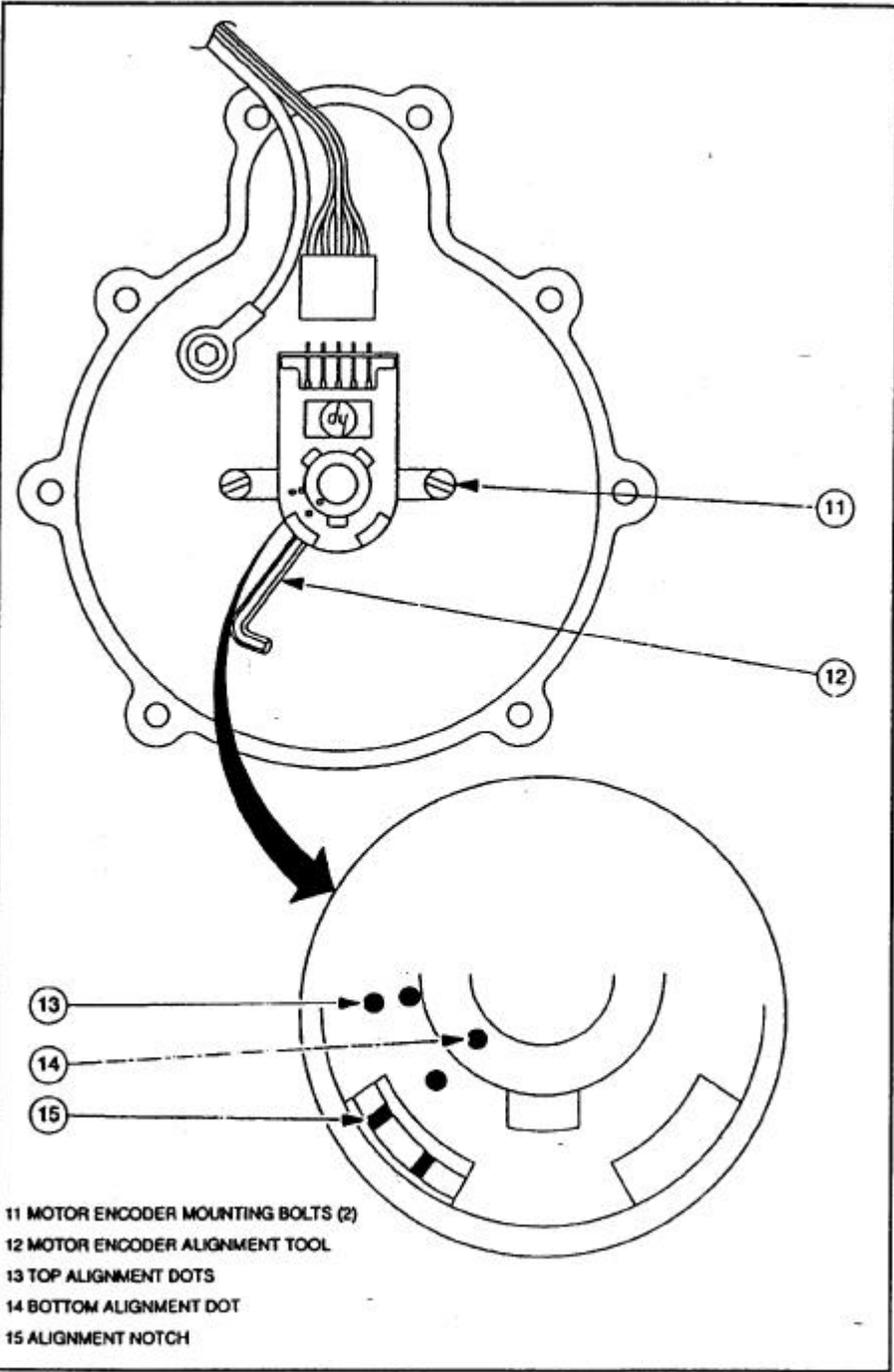
## Motor Encoder Cable Removal and Replacement Procedure

2. Inspect gasket, replace if necessary.
3. Disconnect motor encoder connector (5) from motor encoder (3)
4. Remove the thermistor (4).
5. Remove the grommet (7) from the encoder lid cutout.
6. Disconnect and remove the motor encoder cable (9) and \_ connector (5) through cutout of motor encoder lid (6).

### *Replacement*

1. Assemble encoder cable (9) and connector through grommet (7).
2. Assemble motor encoder cable (9) and connector through cutout of encoder lid.
3. Install grommet (7) in encoder lid cut out.
4. Connect motor encoder cable (9) to the motor encoder (3).
5. Install RTV (Ultra Black 598 RTV silicone or equivalent) into area between grommet (7) and motor encoder cable (9).  
(Use enough RTV to seal the gap between the grommet and the motor encoder cable and allow time to cure).
6. Assemble motor encoder lid (6) to motor (1).
7. Assemble strain relief onto mounting bolt (10).
8. Tighten eight mounting bolts (10) in a star pattern.

# Motor Encoder Cable Removal and Replacement



**Motor Encoder Assembly**

## PCIJI Removal and Replacement

### Overview

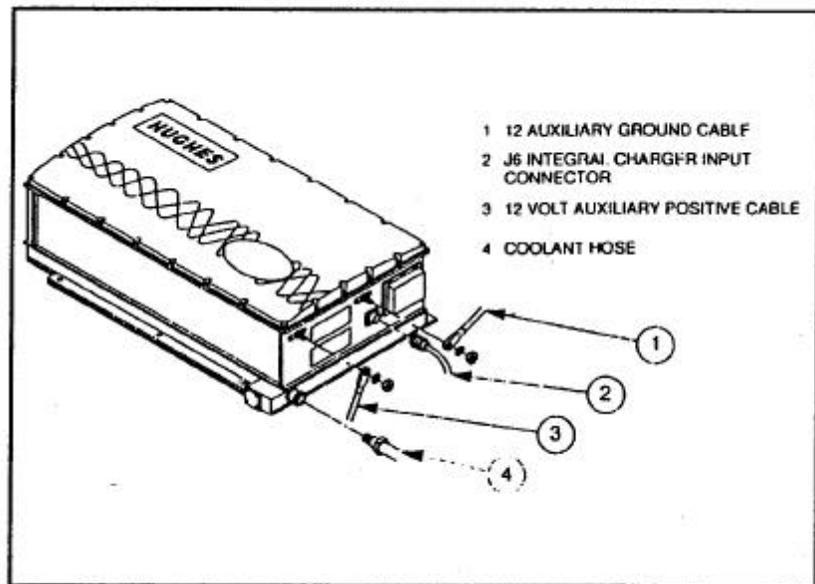
If you determine that the PCU has been damaged, it will need to be replaced with another unit. The PCU warranty will be violated if it is open. Repairs will be done at the manufacturer.

### Procedure

Follow the steps below to remove and replace the PCU.

#### Removal

1. Turn the main battery switch to the OFF position.
2. Disconnect the 12 volt auxiliary ground cable (1).



**PCU Connections**

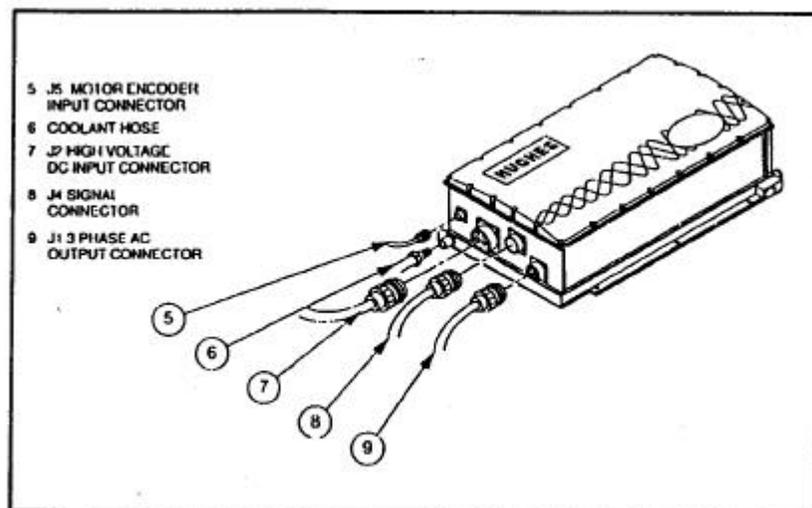
3. Remove/disconnect the 12 volt positive cable from the auxiliary battery
4. Remove/disconnect 12 volt auxiliary battery cable (1 and 3) from the PCU.

## PCU Removal and Replacement

Procedure  
(continued)

5. Disconnect the following pin connectors:

- J6 (2)
- J2 (7)
- J1 (9)
- J5 (5)
- J4 (8)



**PCU Connections**

6. Disconnect coolant hoses (4 and 6).
7. Install/connect coolant caps to hoses.
8. Install/connect coolant caps to inlet/outlet of the PCU.
9. Remove six- bolts from the mounting bracket.
10. Remove PCU.

## PCU Removal and Replacement

### Procedure (continued)

### *Replacement*

1. Ensure that the main battery switch is still off.
2. Install the inverter on the bracket and tighten the six mounting bolts to 32 Nm (24 lb-ft)
3. Remove coolant caps from PCU.
4. Connect the following:
  - Coolant hoses (4 and 6)
  - High voltage cable to J4 (7)
  - Single cable to J4 (8)
  - Three-phase output cable to J1 (9)
  - Motor encoder cable to J5 (5)
  - Integral charger input cable to J6
  - 12 volt auxiliary battery positive cable (3)
  - 12 volt auxiliary battery ground cable (1)
  - 12 volt positive auxiliary cable to auxiliary battery
5. Add coolant and bleed air from the system. (Refer to Cooling Diagnostic Procedure)
6. Fully charge vehicle to reset state of charge gauge (new PCUs will initially show a full state of charge).

## PRNDL Adjustment Procedure

### Overview

The PRNDL switch allows the driver to select the direction control of the vehicle (park, reverse, neutral, drive, two and low). The PRND2L switch may need adjusting if driver experiences "ready" light, but the vehicle will not move when put in "R", "D" "2" or "L".

### Procedure

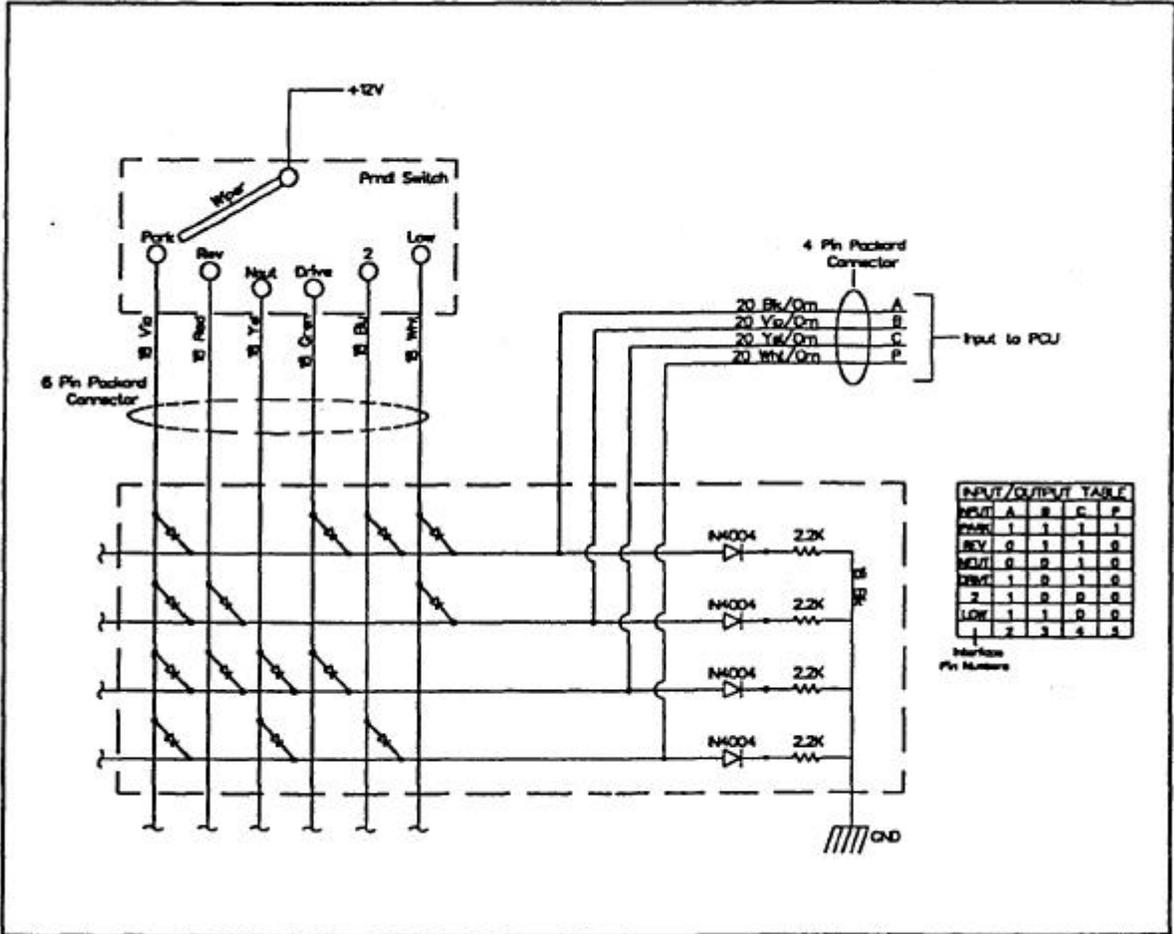
To adjust the PRNDL switch, follow the steps below.

1. Set up the DOLCOM program.
2. Switch to each PRND2L position to ensure that the physical switch selection matches the PRND2L settings on DOLCOM.
  - If they do *match* it could mean a possible PCU fault
  - If they do *not match*, continue through this procedure
3. Check PRNDL switch connections, and tighten/replace if necessary.
4. Check mechanical linkage between operating lever and switch.
5. Ensure the voltage to and through the PRNDL switch (key live 12 +) .

# PRNDL Adjustment Procedure

Diagram

The schematic below shows the prnd2l circuit. The chart provides voltage information when the vehicle is in each gear.  
 1 = +12 volts relative to ground  
 0 = 0 volts relative to ground  
 For example, when the vehicle is in Park there is +12 volts on pins 2, 3, 4, and 5.



## Starting the Vehicle

### Overview

Starting an electric vehicle is similar to starting a gasoline powered vehicle. Notice in the procedure below the slight differences.

### Procedure

Follow the procedure below to start the vehicle.

Action	Result
Insert the key into the switch	
Turn key to the on position	The fault indicator will light for five seconds while the diagnostics are being run.  Initially, you will hear the power steering pump relay close and then a few seconds later, and if no faults occur, you will hear the main solenoid contacts for the battery click and the ready indicator will light.
Place the vehicle in gear	The temperature gauge will fluctuate from minimum to maximum depending on the load and ambient temperature to which the system is subjected. The temperature indicator will normally stay in the lower half of the gauge. The PCU will shut down when the temperature of the coldplate is greater than 150° F.

## State of Charge Gauge Diagnostic Procedure

### Overview

The state of charge gauge indicates the voltage of the main battery pack.

### Procedure

To diagnose a state of charge problem, follow the steps below:

1. Fully charge the vehicle.
2. Check voltage from Pin 7 in the interface junction box to vehicle chassis.
  - If the voltage is 3.5 volts DC, the state of charge should indicate full. If the state of charge does not indicate full, continue to the next step of the procedure
  - If the voltage is not 3.5 volts DC, run the DOLCOM diagnostic procedure to check the counter. (If the counter is correct, refer to PCU Removal and Replacement Procedure)
3. Check the output voltage to the gauge.
  - If the voltage to the gauge is approximately 7.2 volts DC, replace the gauge
  - If the voltage is not approximately 7.2 volts DC, replace fuel gauge amplifier
    - Remove the circuit board from the interface junction box (5 screws and the plug)