



# Electric Step Replacement Kits

 **Before attempting any electric step assembly repair work, please read all of the following instructions.**

**Disconnect the power at the vehicle battery once the step is extended.**

Refer to the Electric Step Replacement Part Schematic, Figure 1, for item numbers referenced in these instructions.

## MOTOR ASSEMBLY

Instructions for removing and replacing the Motor Assembly.

1. On Van Steps, remove plastic splash cover if so equipped. If the step is locked in the retracted (up) position where the plastic cover cannot be removed, the step tread will have to be disassembled to access the plastic cover. To disassemble the tread, remove the (8) 1/4-20 x 1" long hex head bolts in the tread side rails connecting the tread and the sliding blocks to the side rail. This will allow the tread to be dropped out of the way to access the plastic cover. Reassemble the tread after removing the cover.
2. To remove the motor assembly from the step it is easiest if the step is partially or fully extended. If possible extend the step with the standard door switch operation. If not, begin by following the "Motor Only" instructions. Removing the motor from the gear case will allow the step to move freely.
3. **Steps using a control Unit:** Unplug the 4-way connector to the control unit (Item #15). Unplug the 2-way connector or disassemble the 2-way clamp style connector, between the motor and the control unit (Item #16).  
**Steps without a control Unit:** Cut the wires at the butt connectors approximately 12" from the motor.
4. Remove the cotter pin (Item #8) from the clevis pin (Item #9) at the linkage assembly.
5. Remove the clevis pin (Item #9) from

the cast "U" block in the end of the linkage assembly (Items #7a, 7b, or 7c). Note the direction the clevis pin goes into the cast block. If the step is in its locked position, the pin may have to be pried or driven out of the block. The step tread(s) should now swing freely, if not check for a bent step frame or jammed pivot point(s).

6. Unbolt the motor assembly from the step frame.
7. Install new motor assembly on step frame and tighten all mounting bolts.
8. Install the clevis pin (Item #9) through the drive arms attached to the step frame and the cast block in the linkage assembly (Items #7A, #7B or #7C). Be sure to reinstall the clevis pin in the same direction it was removed. Install the cotter pin (Item #8) in the clevis pin.
9. Reconnect the wiring:
  - A. Wiring to a 9513, 9516, or 9590 control unit** - Cut off the 2-way Packard style connector from the motor/control adapter pigtail (Item #16). Next, attach the two female spade connectors to the red and yellow wires and reassemble the clamp-style connector.
  - B. Wiring to toggle switch only** - Using the motor/control adapter pigtail connect the mating connector to the connector on the motor and cut off the 2-way Packard style connector from the opposite end of the adapter pigtail. connect the red and yellow pigtail wires to the vehicle switch wires using heat shrink insulated butt connectors.
  - C. Wiring to a 9506, 9507, 9508 Control Unit** - Using the motor/control adapter pigtail connect the mating end to the connector on the motor and the opposite end to the 2-way Packard style connector on the step control.

Plug in the 4-way connector between the control unit and the vehicle.

**NOTE:** On 23 and 34 Series steps, see the mounting instruction, Figure 3, when replacing a #8287 double reduction motor with a permanent magnet motor assembly.

## Motors, Motor Assemblies, Controls, Conversion Kits

<b>Motor</b>
9520, 9521
<b>Motor Assembly</b>
9501, 9502, 9503, 9504
<b>Control</b>
9506, 9507, 9508
<b>Conversion Kit</b>
9572, 9574, 9570, 9579, 9580

Motor Assemblies contain a motor, linkage, gear, gear box and hardware

Motors are packaged with spade connectors to be used with steps using a 9513 control

Conversion Kits contain a Motor Assembly, and Control

Controls are packaged with the appropriate spade connectors to be used with steps fitted with pre-1999 permanent magnet motors using a clamp-style connector.

**Note:** Any control unit or motor repair needed on steps using a Delco Field wound motor (part number 8002,8279,8278,8287) will require a conversion kit.

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**MOTOR ONLY**

**Instructions for removing and replacing the step motor.**

Proceed to the following steps after completing Motor Assembly Removal steps 1-5.

1. The motor may be removed without removing the gearbox (Item 4a or 4b). On steps using a control unit, disconnect the motor two-way connector (Item #16). Remove the three screws (Item #1) along with the motor bearing bracket (Item #2). The bearing (Item #3) may come off with the bracket, if not, remove it.
2. Lift the motor (Item 4a or 4b) from the gear case. The adaptor gear (Item #5) and adaptor gear shaft (Item #6) may come off with the motor. Note the orientation of the gear and gear shaft.
3. Replace the bearing (Item #3) on the linkage assembly shaft. Place the flange of the bearing facing down.

4. Replace the adaptor gear shaft (Item #6) and lubricate.
5. **Standard Motor**- Install new adapter gear, mesh the adapter gear teeth (item #5) to the gear teeth on the bottom of the new step motor.

**Hi-Torque Motor** - Mesh the existing adapter gear teeth (item #5) to the gear teeth on the bottom of the new step motor.

6. **Standard Motor** - Replace the motor by aligning the motor and adapter gear (item #5) so they slide over the adapter gear shaft (item #6) and align and mesh with the gear (item #11.) Align the screw holes and push the motor into the screw hole alignment pockets in the gear case.

**Hi-Torque Motor** - Install the plastic motor gear case adapter to the underside of the motor. Install the motor and adapter assembly by aligning the motor and adapter gear (item #5) so they slide over the adapter gear shaft (item #6) and align

and mesh with the gear (item #11.) Align the screw holes and push the motor into the screw hole alignment pockets in the gear case.

7. **Standard Motor** - Place the new bearing bracket (item #2) on the motor assembly and attach it with the three motor screws (item #1.) These screws must be very secure.

**Hi-Torque Motor** - Place the existing bearing bracket (item #2) on the motor assembly and attach it with the three motor screws (item #1.) These screws must be very secure.

8. Install the clevis pin (Item #9) through the drive arms attached to the step frame and the cast block in the linkage assembly (Items #7A, #7B or #7C). Be sure to reinstall the clevis pin in the same direction it was removed. Install the cotter pin (Item #8) in the clevis pin.
9. Reconnect the wiring by following the directions in Motor Assembly Removal step #9.

**CONTROL UNIT**

**Instructions for removing and replacing the control unit.**



**Control units #9506, #9507, #9508 require a normally open switch. If you are replacing a #9513, #9516, #9590 control unit you must also replace the door switch. The new control will not work with older, normally closed switches.**

Proceed to the following steps after completing Motor Assembly Removal steps 1-3.

1. **Controls prior to the 4-way Packard style connector** - Cut the molded rubber 4-way connector pigtail off just above the vehicle half of the butt connectors. Since all manufacturers use different colored wires for vehicle wiring, take a moment to note what color from the vehicle is butt connected to the white, red, brown and yellow wires of the pigtail. Strip the vehicle wires back and connect the new Packard style pigtail connector to the vehicle wiring using heat shrink insulated butt connectors. Make sure that the vehicle wires that

were connected to the old pigtail are reattached to the new pigtail in the identical way.

**NOTE: Van steps using door switch only operation will have two wires coming from the vehicle. Cut the wires just above the connector and butt connect the pigtail wires to the vehicle wiring. Make sure that the vehicle wires that were connected to the old pigtail are connected to the new pigtail in the identical way.**

2. Disconnect the black wire leading from the control unit to the understep light at the connector. Do not cut this wire.

**NOTE: Not all steps are equipped with an understep light.**

3. On steps with a blue, red, green, yellow, brown, or orange control unit, remove the screw securing the green wire from the control unit to the step frame. Save the screw for securing the green wire on the new control unit. On orange control units manufactured after 1991 remove the screw securing the 31" long 10 ga. green ground wire from the control unit to the vehicle chassis.

4. Remove the old control unit from the step frame. Save the mounting screws for mounting the new control unit to the step frame. Note the orientation of the control unit on the frame.

5. Using the screws saved from the old control, mount the new control to the step frame in the same orientation as before.

6. Reconnect the wiring:
  - A. Ground the 16 ga. green wire from the control unit to the step frame. Remove any corrosion at the attachment point. Attach it placing the external tooth lock washer supplied with the new control unit between the ring terminal on the end of the green wire and the step frame.

**B.** Attach the 31" long 12 ga. green wire to the vehicle chassis. Scrape the connection point clear for a good ground connection. On steps with a braided ground cable, the braided cable may be removed.

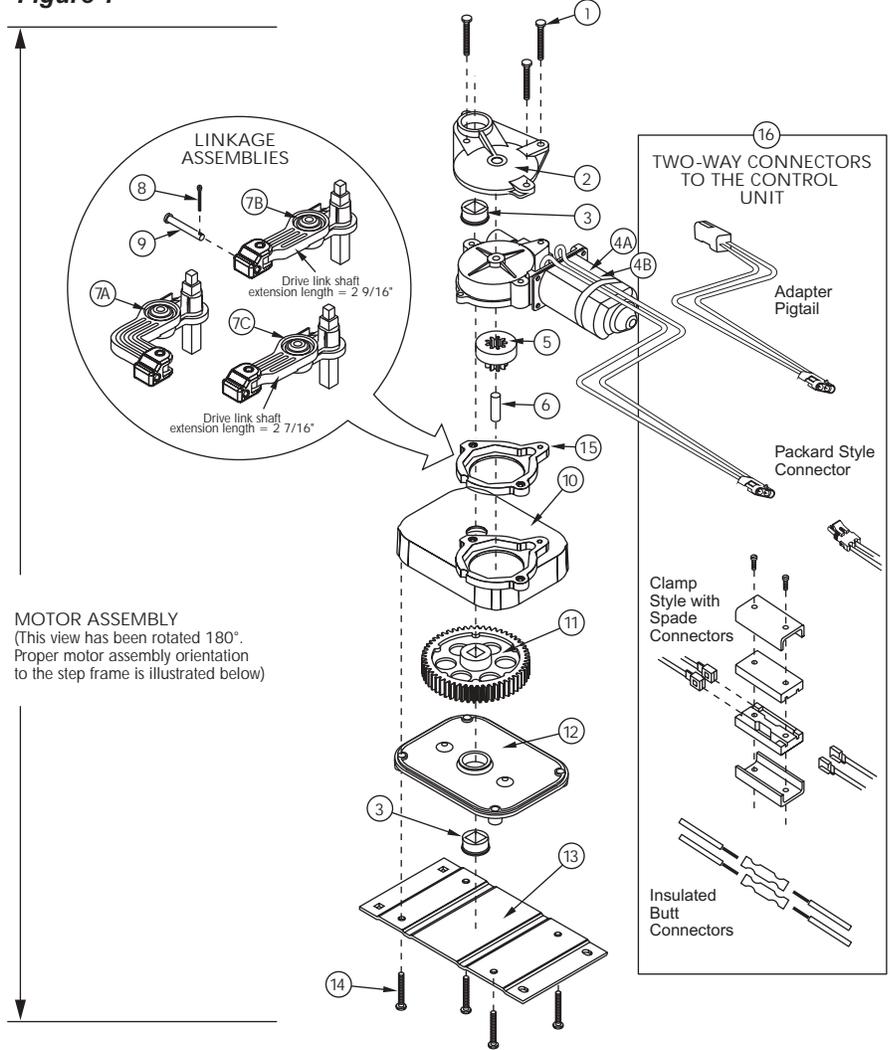
**C.** Connect the black wire from the control unit to the understep light. On steps not equipped with an understep light, wrap the black wire to protect it

FIGURE 1: PARTS KEY

**Part#Description**

- 1 #10 x 1 3/4" self-tapping hex washer-head screw
- 2 Motor bearing bracket
- 3 Bearing
- 4A Motor
- 4B Motor (high torque - for use with 23 Series steps)
- 5 Adaptor gear
- 6 Adaptor gear shaft
- 7A Linkage assy. (for motor assys. #909502 & #909503)
- 7B Linkage assembly (for motor assembly #909501)
- 7C Linkage assembly (for motor assembly #909504)
- 8 Cotter pin
- 9 Clevis pin
- 10 Gear case
- 11 Gear
- 12 Gear case cover
- 13 Motor mounting plate
- 14 1/4-20 x 1 1/4" tri-lobal thread forming screw
- 15 Motor gear case adapter

Figure 1



**MOTOR ASSEMBLY**  
(This view has been rotated 180°. Proper motor assembly orientation to the step frame is illustrated below)

from the weather and secure it to keep it from dangling.

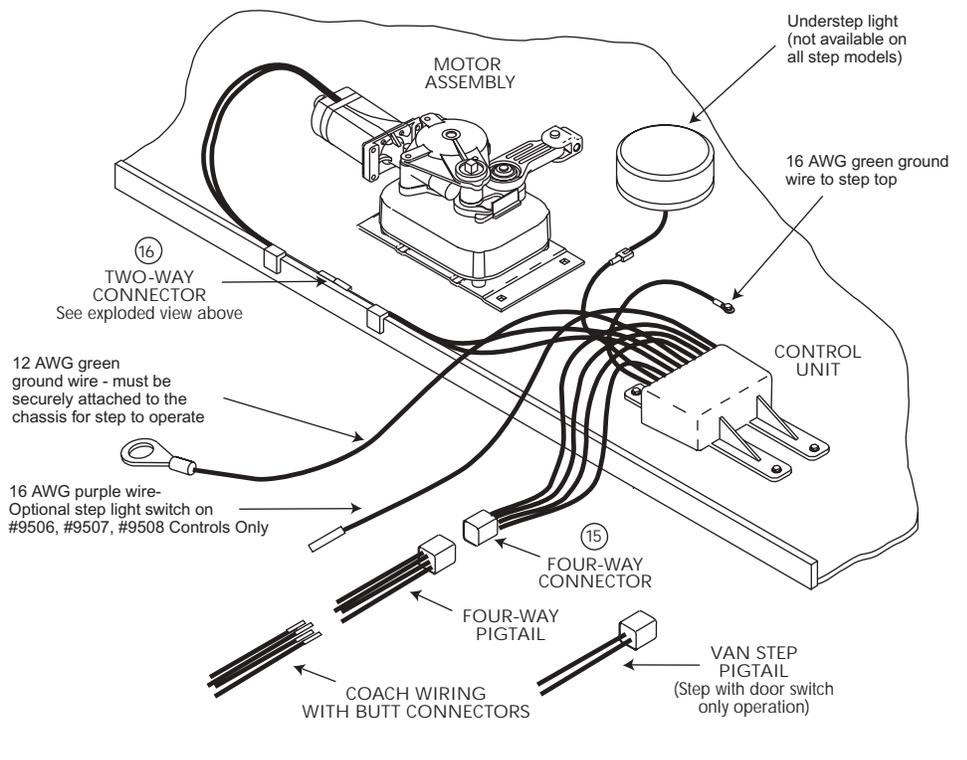
**D.** Connect the two-way connector to the step motor.

**NOTE: If using a Clamp Style Connector -** Cut off the 2-way Packard Style connector from the control unit. Next attach the two male spade connectors to the red and yellow wires from the control unit. Finally, reassemble the clamp style connector taking care that the orientation of the spade connectors match the pattern in the black plastic seal.

**NOTE: 9508 control -** Cut off the 2-way Packard style connector from the step control and the motor lead wires. Connect the red and yellow control wires to the red and yellow motor lead wires using heat shrink insulated butt connectors.

**E.** Attach the four-way connector to the vehicle wiring using the pigtail installed in step 1.

- 7. Reinstall the Splash cover if the step was so equipped.
- 8. Reconnect the vehicle battery.
- 9. Test the step functions.



Understep light (not available on all step models)

16 AWG green ground wire to step top

16 TWO-WAY CONNECTOR  
See exploded view above

12 AWG green ground wire - must be securely attached to the chassis for step to operate

16 AWG purple wire - Optional step light switch on #9506, #9507, #9508 Controls Only

15 FOUR-WAY CONNECTOR

FOUR-WAY PIGTAIL

COACH WIRING WITH BUTT CONNECTORS

VAN STEP PIGTAIL (Step with door switch only operation)

## 23 and 34 Series Step Motor Replacement

The four-way connector should be disconnected and the old motor assembly should already be removed from the step top as previously described.

1. If the step frame is mounted flush against the step mounting surface, the step will have to be removed to access the top side of the step frame.
2. The hole pattern for the new motor assembly does not line up properly with the old mounting holes. See Figure 2 for a mounting diagram for the 23 Series Step and Figure 3 for the 34 Series Step.

**NOTE:** All four mounting bolts must be used to attach the motor assembly to the step frame or the step may not operate properly and damage to the step may occur.

3. Bolt down the motor assembly and install the clevis pin and cotter pin as described in Motor Assembly replacement step #8.
4. Remount the step to the vehicle.

**NOTE:** If you are installing a control unit, it will be easier to do this while the step is removed from the vehicle.

**See Figure 3 for important information on remounting 34 Series steps flush against the step mounting surface.**

1. If the step is mounted flush against the mounting surface, the step must be removed from the vehicle before drilling the 9/32" dia. hole for attaching the motor assembly.
2. The 1/4" flat washers are used to shim the permanent magnet motor assembly away from the step top so the motor assembly will sit level. This is important for proper step operation.
3. If the step was originally installed flush against the step well, a 1/4" thick shim may be needed (not provided) so the motor assembly mounting bolt heads will clear the mounting surface.

