Detroit Speed, Inc.
Electric Headlight Door Kit
1968-82 Corvette
P/N: 122009 & 122010

The Detroit Speed Inc. Electric Headlight Door Kit replaces the stock vacuum actuated system on all 1968-82 Corvettes. When installed, this kit operates the headlight doors more reliably, smoother and in sync than the stock vacuum system. The complicated, failure prone and bulky vacuum accessories can all be eliminated. Vehicles with large engine cams with low vacuum signals will also benefit from this system since they are electronically controlled.

Figure 1 – 122010 Shown

Thank you for your purchase of Detroit Speed's C3 Headlight Door Kit. This kit replaces the stock vacuum system on 1968-82 Corvettes. No cutting, drilling, or any permanent modifications of the vehicle is required to install this system. When installed, this kit will operate the headlight doors smoothly and reliably. The bulky and failure prone original vacuum operated actuators will no longer be a problem.

The actuators are pressure sensitive to reduce the chance of personal injury or damage to the vehicle in the event that something is caught in the door during operation. If the door comes in contact with a foreign object, it will stop its operation. The lights will need to be cycled on and off to reset the mechanism. **NOTE:** The pitman arms on the actuators will not be able to be moved by hand as that could cause permanent damage to the actuators.

Item #	Description	Quantity
1	Actuator Assembly w/ Pitman Arm, Bracket & Gearbox – LH	1
2	Actuator Assembly w/ Pitman Arm, Bracket & Gearbox – RH	1
3	Pitman Arm Linkage	2
4	Headlight Kit Actuator Control Module w/ Mounting Bracket	1
5	Headlight Kit Harness Assembly	1
6	Packard Two-Terminal Connector	1
7	Rubber Grommet	1
8	Nylon Wire Tie	10
9	Square Spacer Pad	2
10	Round Bumper	2
11	Jumper Harness (122010 Only)	1
12	Hardware Kit	1
13	Instructions	1

Hardware Checklist – Detroit Speed C3 Headlight Door Kit			
Part Number	Description	Quantity	Check
	C3 Headlight Door Hardware Kit	1	
920001FS	7/64" x 3/4"L Cotter Pin	2	
950036FS	5/16"-18 x 1"L Hex Head Cap Screw	8	
960033FS	5/16"-18 Nylock Nut	8	
970027FS	5/16" SAE Flat Washer	16	

Many convenience features are integrated into this system. When the headlight switch is pulled to the "park" position, the park lamps illuminate. The headlights stay off and the headlight doors remain closed. When the switch is pulled to the "headlamps" position, the park lights stay on, the headlight doors open, and the headlamps illuminate. When the switch is pushed back to the "park" position, the headlamps turn off, but the headlamp doors remain open. This is useful to clean or service the headlamps since the doors will be open and the lenses cool. When switched to the "off" position, the park lights go out and the headlight doors close.

The module that is included with the Detroit Speed Electric Headlight Door Kit has a unique integrated failsafe protection mode. The module is designed to protect itself from damage due to a short circuit in your wiring system. If a short exists, the module will click continuously. This means a short has been detected and the module has entered into its failsafe mode. For the system to operate again, correction of the short circuit is required followed by resetting the module. To reset the module, remove the fuse from the main power wire for 10 seconds and then reinstall the fuse. If the clicking reoccurs, the short has not been repaired and needs further investigation.

IMPORTANT: This kit is designed to work with properly installed and adjusted headlight doors. This system will not work correctly with doors that bind or do not have the stops adjusted properly. The doors must open and close without binding or resistance. Because the system is pressure sensitive, binding or sticking door assemblies will cause the actuators to stop prematurely. Detroit Speed suggests lubricating all pivot points.

DO NOT open or close the headlight doors by hand. When the doors are fully open the linkage is over center and locked in place. If the doors are not in the over center position and you try to force the doors open or closed by hand, this will cause damage to the gearbox requiring you to return the gearbox/motor assembly back to Detroit Speed to have repaired at your expense.

Detroit Speed has gone to great lengths to provide you with the highest quality, best engineered product available with straightforward installation requiring minimal modification to your vehicle.

NOTE: There is an installation video available through the Detroit Speed website in the tech/install video section shown here: https://www.detroitspeed.com/1963-82-corvette-installation-videos.

Installation Instructions:

1. While it is not required, it is highly recommended to remove the hood for this installation. With the hood in place, access is extremely limited to install the new Detroit Speed electric actuators, and to route the new wiring harness. Have someone assist you to carefully remove the hood from the vehicle taking care not to damage the paint. Disconnect the battery power by removing the negative battery lead from the battery.

2. With the headlight doors in the closed position, use the following pictures and steps 3 through 6 to remove the vacuum actuators on both sides of the vehicle (Figure 1).

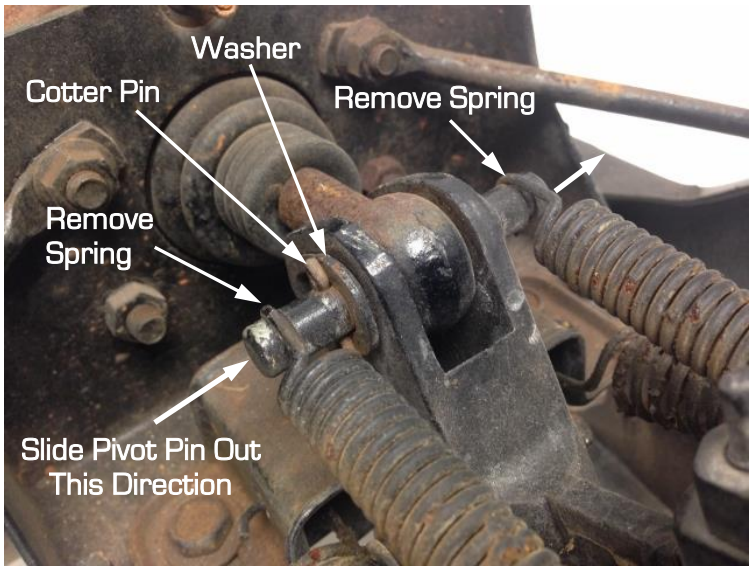


Figure 1 – Remove Actuator Springs, Cotter Pin and Linkage Pin

3. First, remove the inside pair of springs from the pivot pin with a pair of needle nose pliers (Figure 2). **NOTE:** Wear safety glasses when removing the springs.

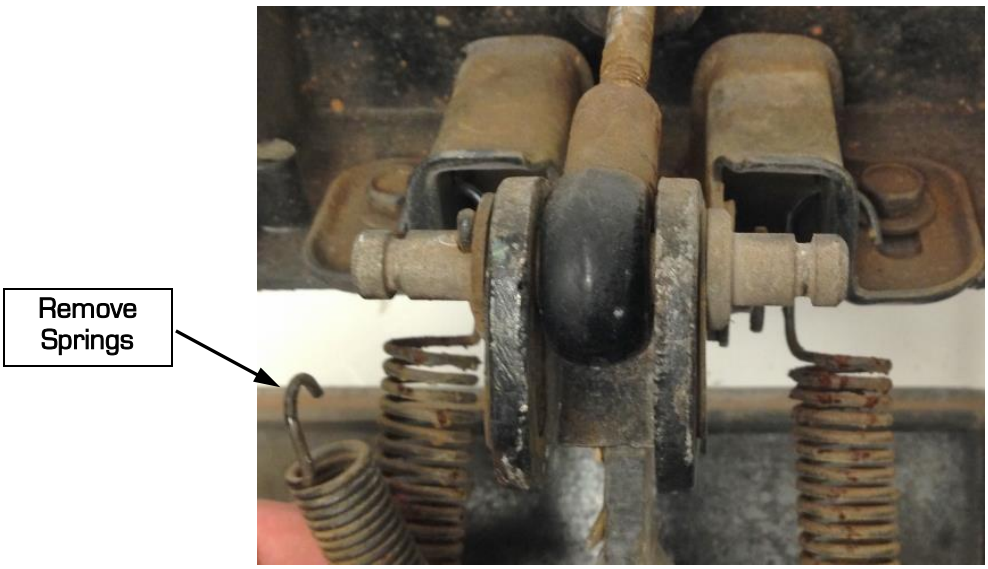


Figure 2 – Remove Springs

4. Remove the cotter pin and washer, set the washer aside as it will be used later. Slide the pivot pin out towards the center of the vehicle (Figure 3). **NOTE:** Be careful not to lose the pivot pin bushings when removing the pin as they will also be used later to install the Detroit Speed actuator kit (Figure 4).

Figure 3 – Remove the Pivot Pin

Figure 4 – Pivot Pin & Bushings

5. Remove the vacuum lines from the actuator. Remove the vacuum actuator from the headlight assembly by removing 4 hex nuts (Figure 5).

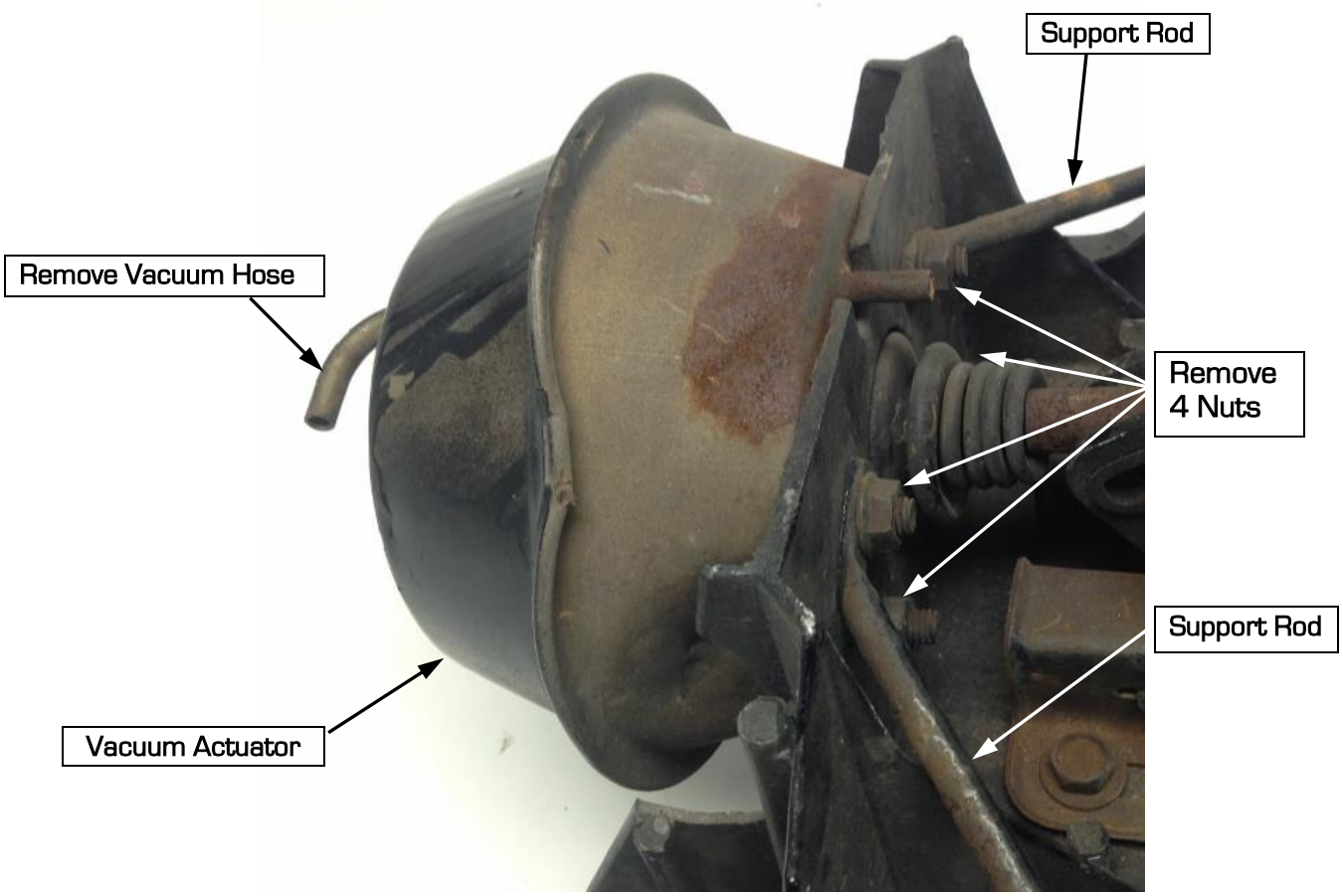


Figure 5 – Remove Vacuum Actuator

6. Remove the vacuum actuator system from the vehicle along with any tanks, hoses, etc. as they will no longer be needed. **NOTE:** If you have a 1968-72 Corvette and are still using the stock wiper system, you will still need to keep the wiper door vacuum hoses and tank to operate the wiper door. You will need to use vacuum plugs on the vacuum tank or tube where you have removed the hoses for the headlight actuators (Figure 6 on the next page).

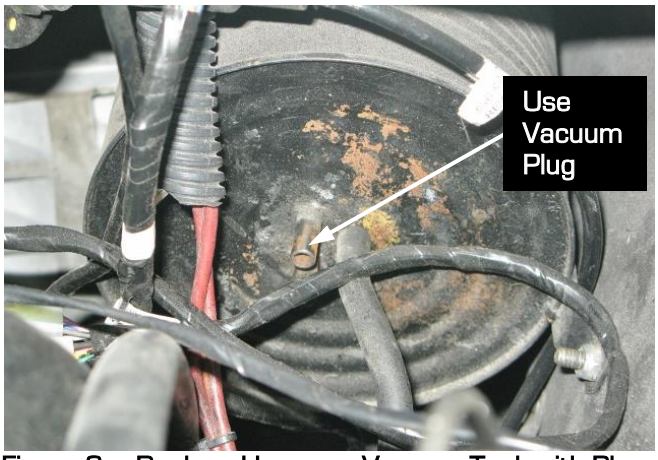


Figure 6 – Replace Hoses on Vacuum Tank with Plugs

7. Remove the clevis from the vacuum actuator by holding the vacuum pushrod with a pair of vise grips and remove the clevis from the pushrod. You will re-install this clevis onto the Detroit Speed electric actuators later on (Figure 7).


Figure 7 – Remove Clevis

8. Install the pitman arm linkage to the pitman arm by placing the threaded end of the linkage through the center hole of the mounting bracket. Remove the 5/16"-24 Nylock nut and washer on the ball joint side of the linkage. Install this end of the linkage into the pitman arm on the actuator and install the washer followed by the 5/16"-24 Nylock nut. Hold the hex nut on the ball joint with a 7/16" wrench and tighten the Nylock Nut with a 1/2" socket. Torque the 5/16"-24 Nylock nut to 20 ft.-lbs. (Figure 8).


Figure 8 – Install Pitman Arm Linkage

9. Install the factory clevis that was removed in step 7 onto the threaded end of the pitman arm linkage. Thread the clevis on all the way until it bottoms out on the threaded rod. Loosen the jam nut on the ball joint to orientate the clevis so that it is vertical and re-tighten the jam nut.

10. Remove the adjustable stop from the arm on the headlight door assembly. Move the hex jam nut from the front side to the back side of the bracket and re-install the stop (Figure 9). This will give you more adjustment once the round bumper pad is installed. The stop will need to be adjusted later when testing the opening height of the headlight door actuators.

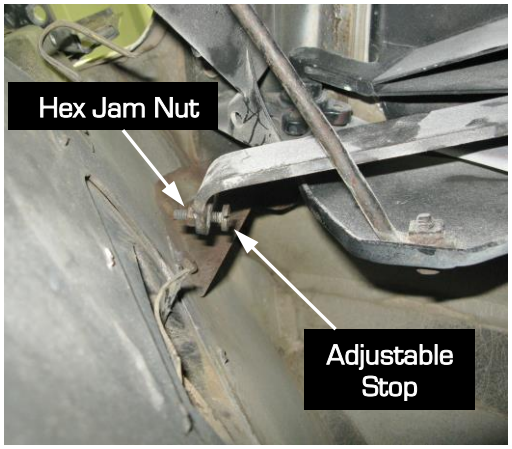


Figure 9 – Headlight Door Stop

11. Install the provided round bumper onto the adjustable stop on both sides of the vehicle (Fig. 10).


Figure 10 – Install Round Bumper

12. Install the actuator assembly into the correct side of the vehicle (Figure 11 & 12) with the provided 5/16"-18 x 1"L hex head cap screws, Nylock nuts and washers (Figure 13 on the next page). Make sure the lower 2 bolts on each side go through the support rods on the lower front side of the mount. Torque the 5/16"-18 hardware to 20 ft.-lbs.

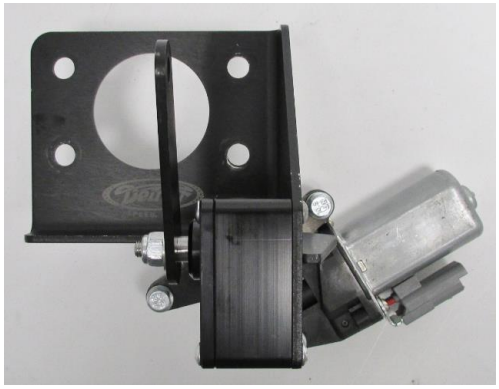


Figure 11 – LH or Driver Side Actuator

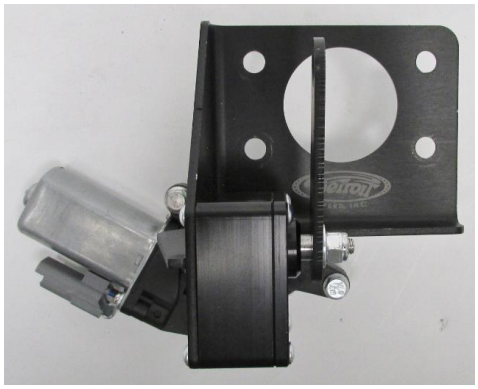


Figure 12 – RH or Passenger Side Actuator

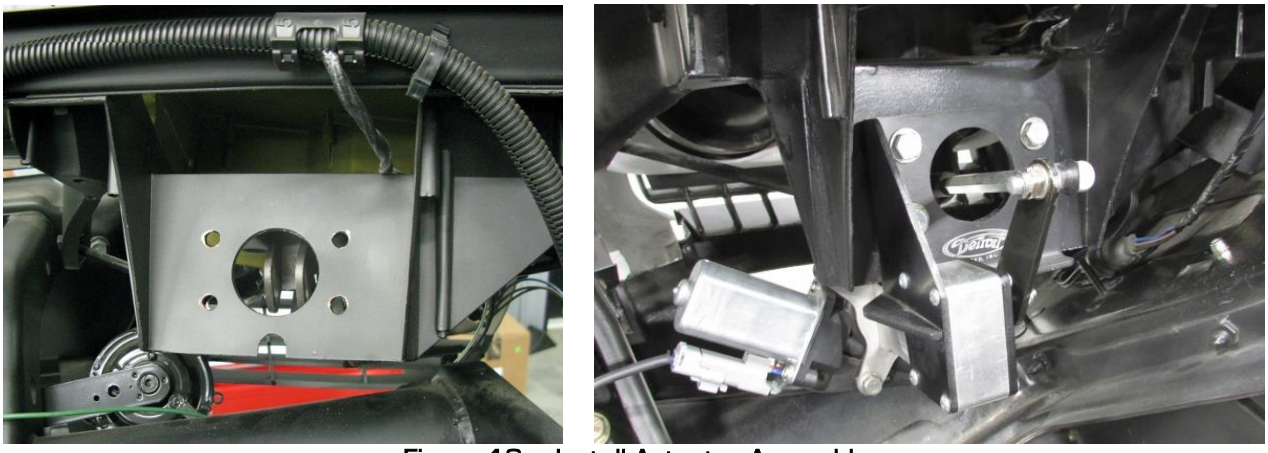


Figure 13 – Install Actuator Assembly

13. Adjust the clevis so it lines up with the mount to install the pivot pin that was removed in step 4. Once the pivot pin is installed with the bushings in place, position the washer over the cotter pin side of the pin and install the provided 7/64" x 3/4"L cotter pin. Bend the 2 halves of the cotter pin around the pivot pin in opposite directions to keep it from falling out of the pin.

14. Using a pair of needle nose pliers, re-attach the springs that were removed in step 3 back onto the pivot pin (Figure 14). **NOTE:** Wear safety glasses when re-installing the springs. Make sure the springs are in their grooves on both ends of the springs. Repeat steps 7 through 14 on the opposite side of the vehicle.

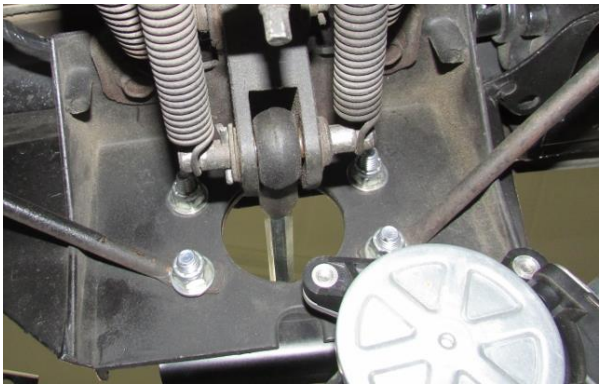


Figure 14 – Re-install Springs on Pivot Pin

15. Install the provided square spacer pads to the headlight door assembly on both sides of the vehicle (Figure 15). Make sure you clean the area with lacquer thinner or alcohol on the headlight assembly so the square pad will stick to the bracket.

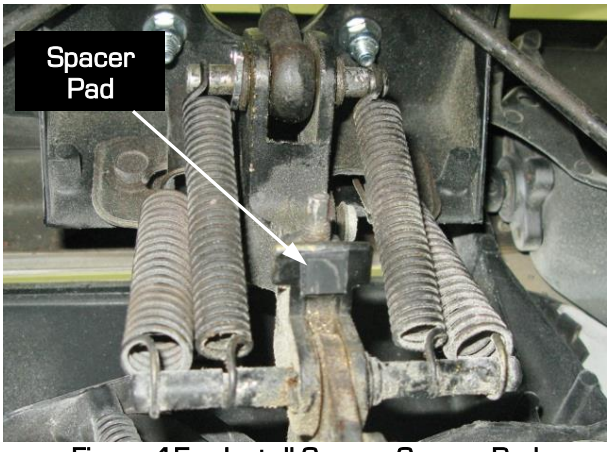


Figure 15 – Install Square Spacer Pad

16. Use a 7/32" wrench or socket to adjust the bolt to set the closed height of the headlight door so it is slightly below flush of the front end (Figure 16).

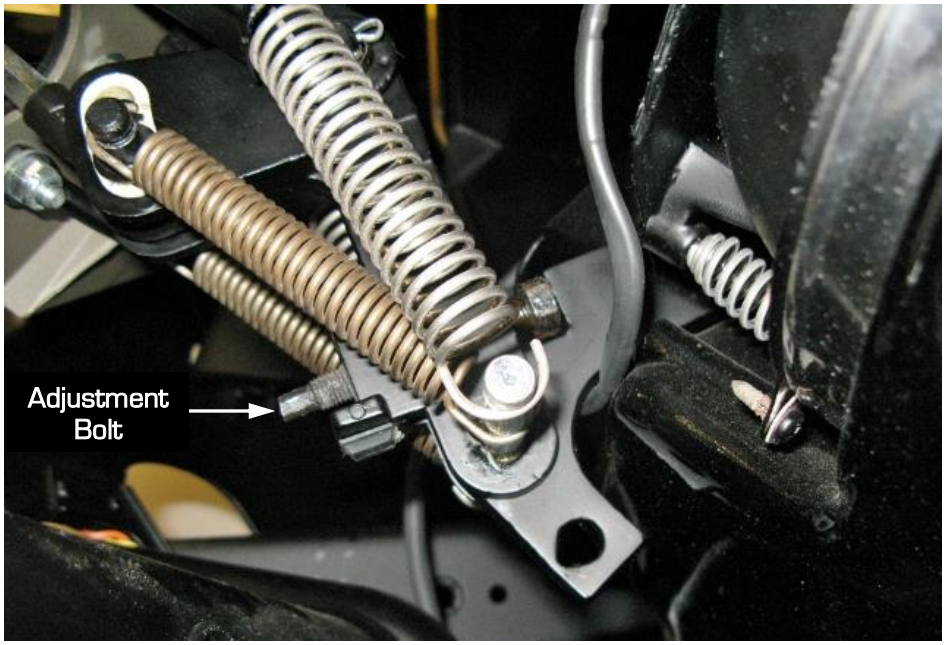


Figure 16 – Adjustment Bolt for Closed Headlight Door

17. Remove the left lower firewall insulation retaining plug from the firewall. It is located inside the vehicle just below the bottom right corner of the fuse block (the carpet may need to be pulled back slightly to gain access).

18. Drill out the existing hole using a Uni-bit or drill bit up to 1-1/8" (Figure 17). The new headlight harness can be routed through this hole or you can drill a new hole on the side of the fuse box area. Using the included firewall grommet to protect the wiring, pass the headlight motor connectors through the firewall.

Figure 17 – Route Headlight Harness

19. The connector with the yellow and orange wires connects to the driver's side actuator and the connector with the purple and green wires connects to the passenger's side actuator. Route the harness along the front end of the vehicle through the core support. Connect the wiring harness to the headlight door actuators. (Figure 18).

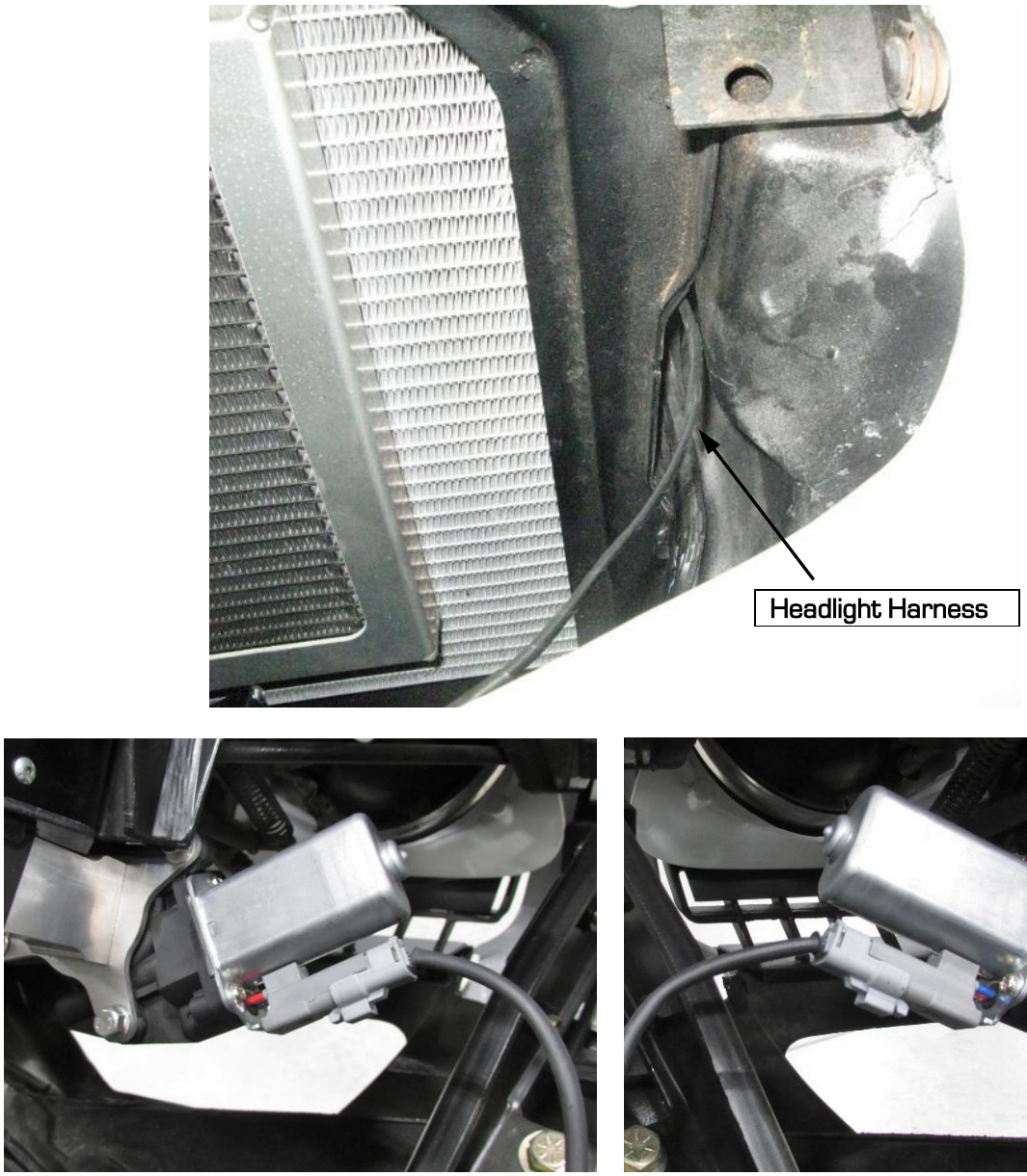


Figure 18 – Connect Harness to Actuators

20. Remove the headlight switch by removing the gauge cluster from the vehicle. **NOTE:** Detroit Speed recommends first removing the steering column. This is recommended to prevent damaging the gauge cluster while installing and removing the headlight switch. It is possible to remove the gauge cluster without taking out the column however it will make the job much more difficult. If you drop the steering column, the gauge cluster will sit on the column and distort the area around the lower collar. If you attempt to remove the headlight switch without removing the gauge cluster, it will break or crack the section of the gauge cluster between the speedometer and tachometer.

21. To remove the steering column, start by removing the 3 screws from the lower column cover. You may find the vacuum over ride switches and/or the wiper over ride electrical switch (1968-72) attached to the cover (Figure 19). Remove the lower left hand side dash vent duct.

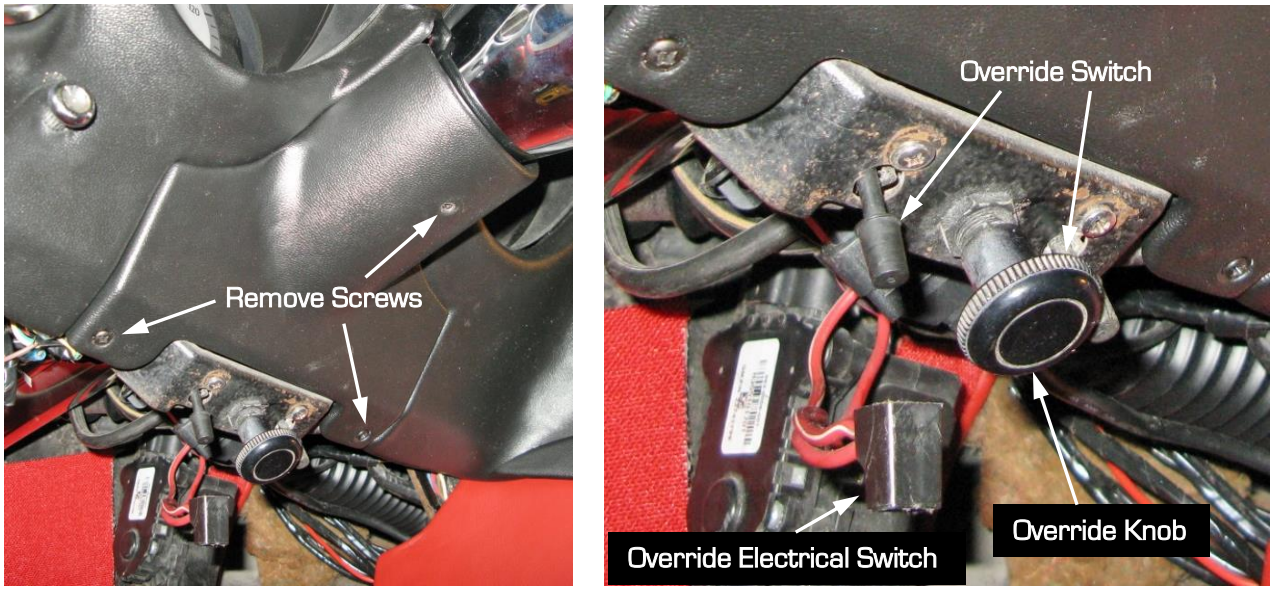


Figure 19 – Remove Lower Column Cover

22. Remove the 2 bolts holding the steering column to the support brace, Remove the 2 carriage bolts from the lower part of the column (Figure 20). **NOTE:** The steering column used in the pictures below is from an aftermarket column.

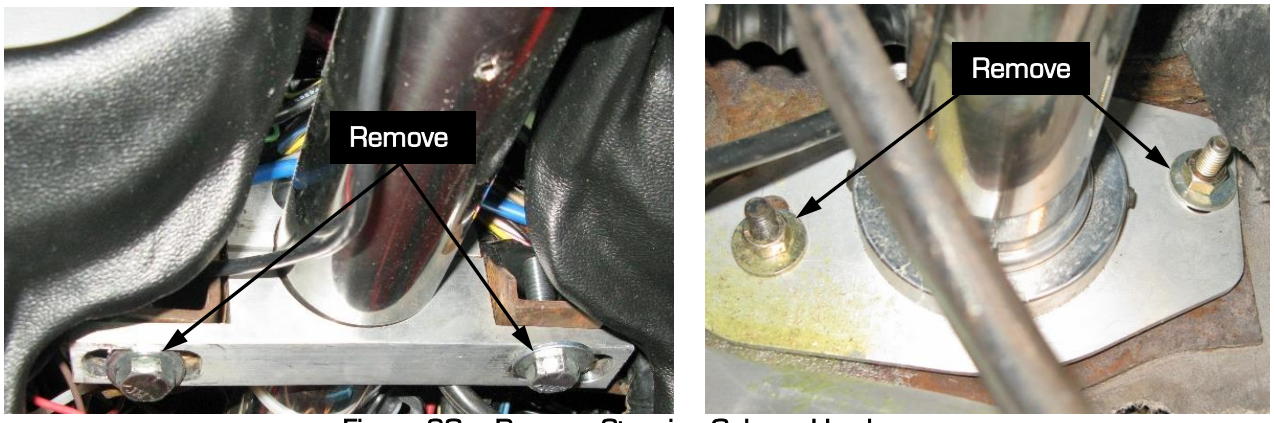


Figure 20 – Remove Steering Column Hardware

23. Remove the clips from the interlock cable pin and cable, and remove the cable from the lower column. Remove the bolt holding the "tulip flange" coupler to the lower column and separate the 2 by carefully prying them apart with a screw driver. If you have a splined U-joint, loosen the jam nut and set screw before removing the column.

24. Remove the electrical (ignition switch) switch connection from the lower part of the steering column. There are 2 halves to this connector however they will come out as one. Pull the steering column out of the car. You may need to continue to pry between the coupler and the column and wiggle the column loose. **NOTE:** With an aftermarket column you can pull the steering column out of the coupler while resting the steering wheel on the front seat (Figure 21 on the next page). By not completely removing the column from the vehicle, you can leave the electrical switch connected to the column.

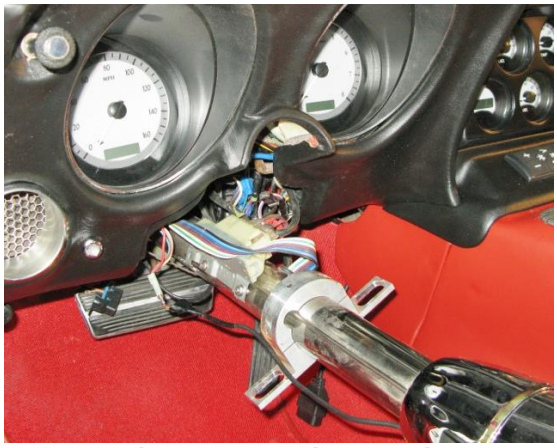


Figure 21 – Remove Steering Column

25. With the steering column out of the way, remove the gauge cluster. Remove the 3 screws around the top of the gauge cluster and 2 screws on each side. Once all the screws are removed, it should be ready to be removed from the vehicle (Figure 22). **NOTE:** For the 1968-74 application, you should remove the tachometer cable from the distributor. For all applications you should remove the speedometer cable from the transmission. You will be able to pull these cables out with the gauge cluster instead of having to reach behind the gauge cluster and unscrew or unclip them from the gauges.

Figure 22 – Remove Dash Pad

26. Unplug the headlight switch connector to have better access behind the gauge cluster. Remove the headlight switch knob by pulling the switch out as far as it will go. Pull the headlight knob out of the switch while holding down the release button on the top of the switch (Figure 23).

Figure 23 – Remove Headlight Knob

27. Remove the vacuum hoses from the back of the switch. Remove the headlight switch retaining nut using a large screwdriver or other suitable tool. Remove the headlight switch from the dash (Figure 24).

Figure 24 – Remove Retaining Nut

28. For the early & mid C3 applications, locate the light blue and brown wires and remove the terminals from the connector using a terminal removal tool or a small flat blade screwdriver (Figure 25 below & 26 on the next page). For the later C3 applications, the yellow wire and the brown wire terminals will need to be removed (Figure 27 on the next page). **NOTE:** The brown wire is also in a different location between the early and mid to late C3 vehicles.

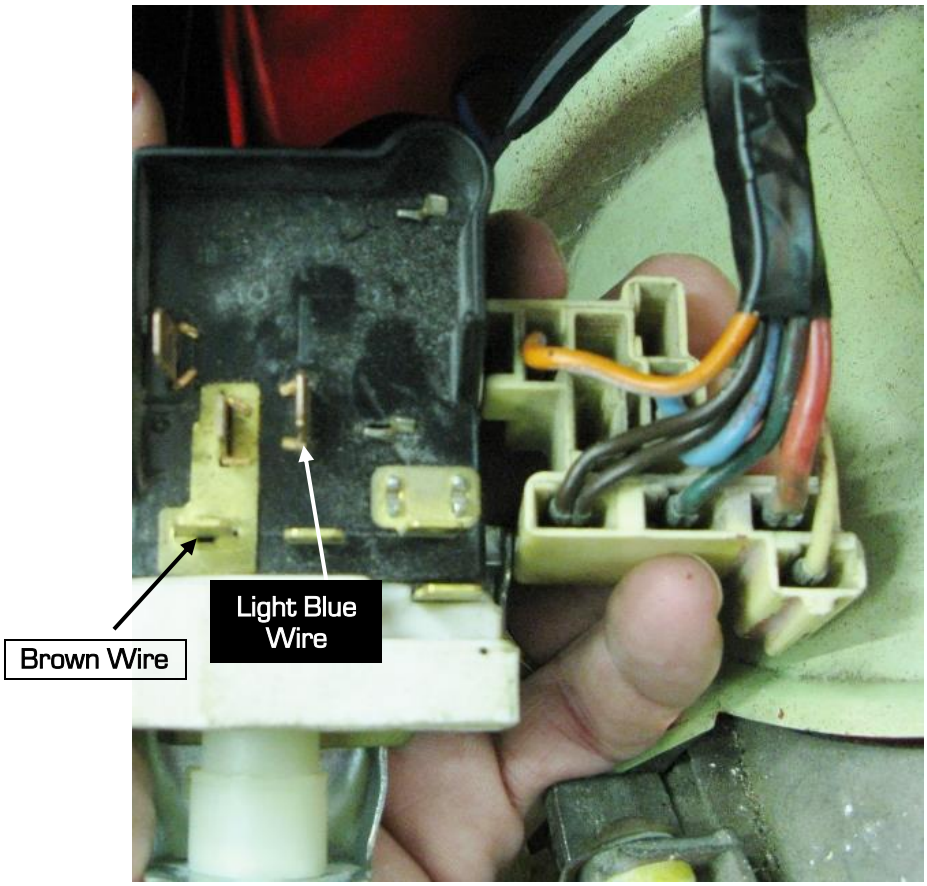


Figure 25 – Early C3 Stock Headlight Switch

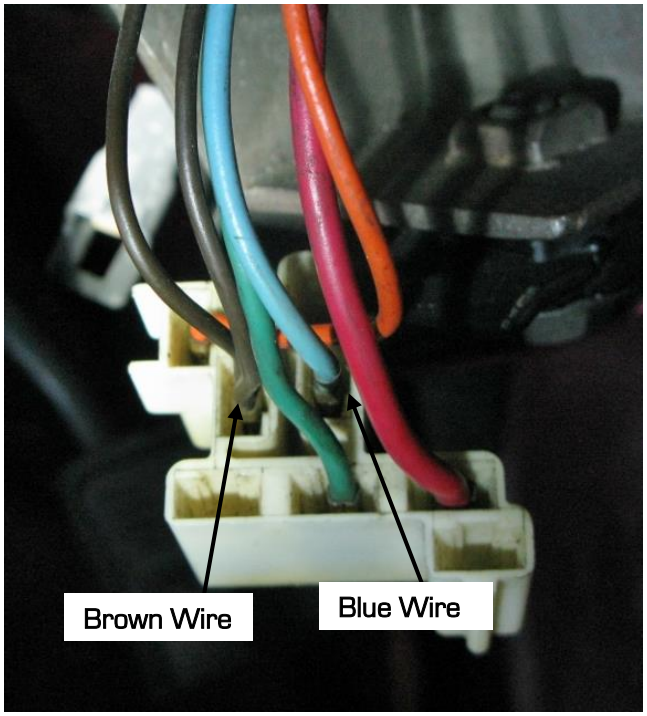


Figure 26 – Mid C3 Stock Headlight Switch

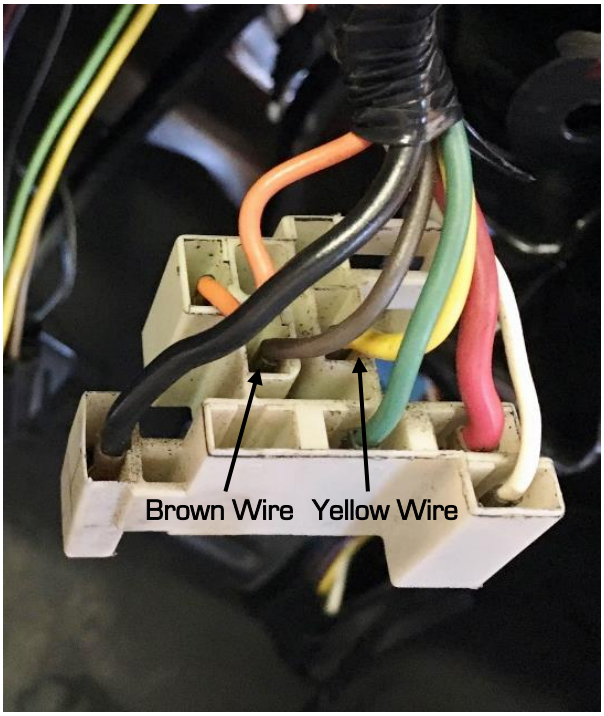


Figure 27 – Late C3 Stock Headlight Switch

29. The light blue or yellow wire is the 12 volt headlamp feed and the brown wire is the park lamp feed. There may be more than one brown wire in the connector so be sure to remove the correct one (Figure 28).

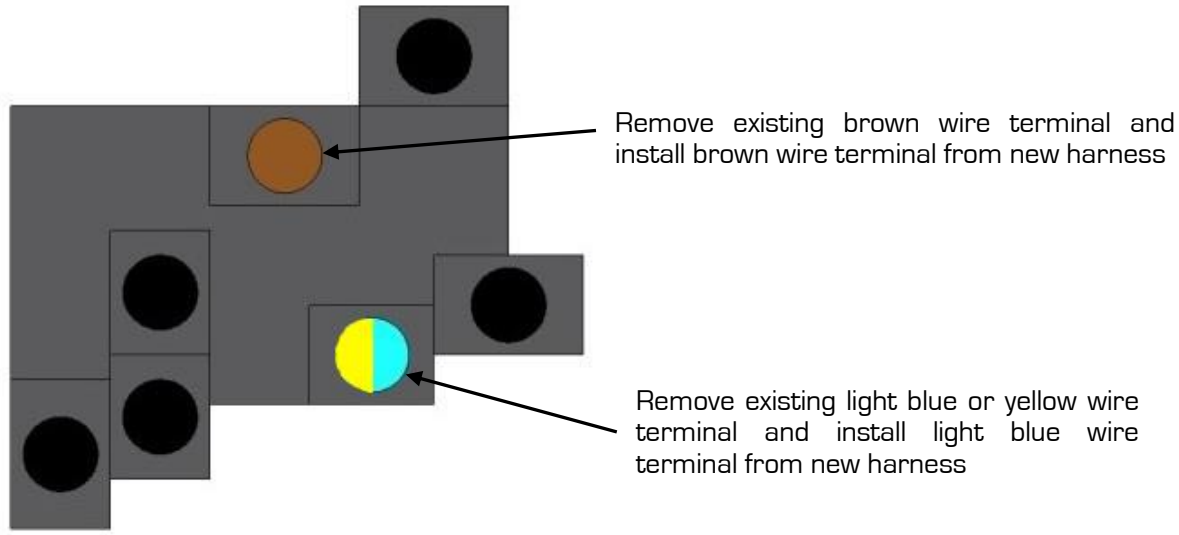


Figure 28– End View (Harness Side)

NOTE: Depending on your application, the wire colors on your connector may not match the ones above. The spades on the headlight switch will have the same function on the switch even though the wire color may not match.

30. Insert the terminal of the light blue wire on the new headlight harness into the headlight connector location where the original light blue or yellow wire was removed. Insert the terminal of the brown wire on the new headlight harness into the headlight connector location where the original brown park lamp wire was removed (Figure 29 on the next page).

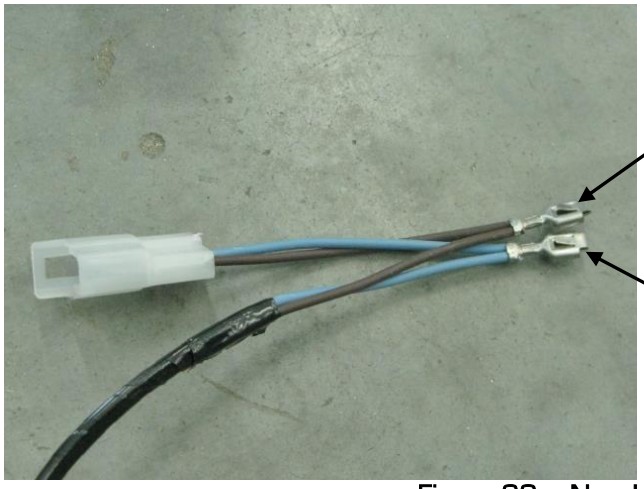


Figure 29 – New Headlight Harness

31. Install the wire terminals which were just removed from the original headlight harness connector into the included black two-terminal female Packard connector cavities (Figure 30).

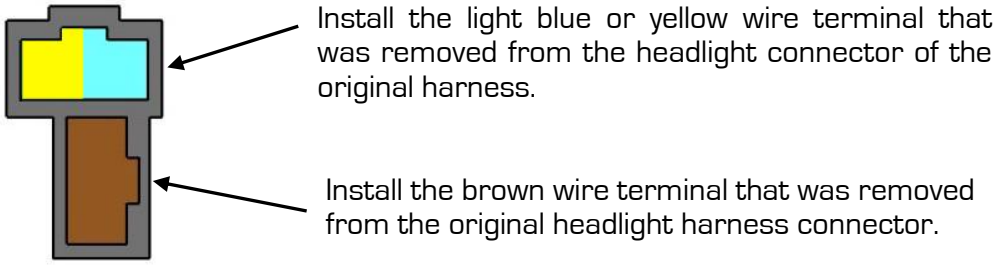


Figure 30 - End View (Harness Side)

32. Plug the black two-terminal female Packard connector into the clear two-terminal connector on the new harness (Figure 31). Make sure that the wire colors correspond with each other (light blue to light blue or yellow, brown to brown).

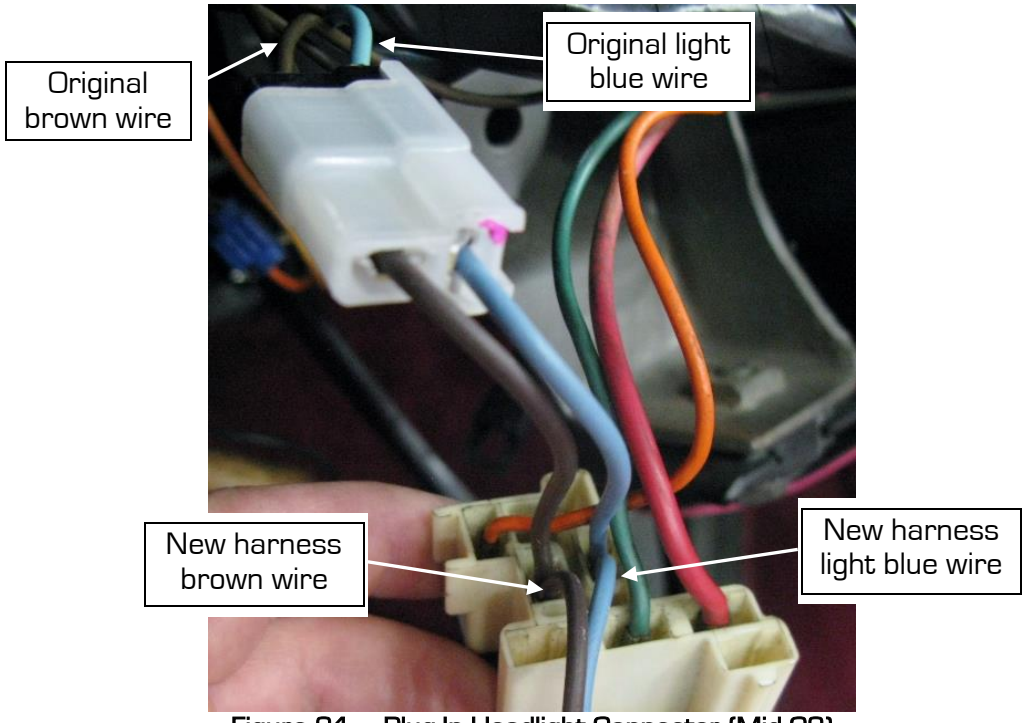


Figure 31 – Plug-In Headlight Connector (Mid C3)

33. Install the headlight control module onto the module mounting plate using the provided 8-32 hardware if not already assembled from Detroit Speed (Figure 32). Do not overtighten. **NOTE:** If you also have the Detroit Speed Wiper Kit, you can mount both control modules to the same mounting plate (Figure 33). Depending on your application, your module mounting plate may look slightly different than the pictures below.

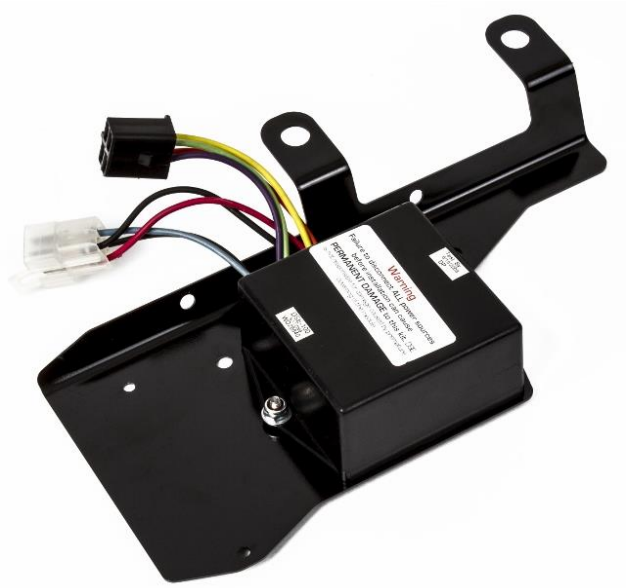


Figure 32 – Headlight Module

Figure 33 – Headlight & 1973-82 C3 Wiper Module

34. Mount the headlight control module and the mounting plate to the steering column support. Remove the 2 bolts from the column support and mount the module and mounting plate to the support using the 2 bolts that were removed (Figure 34). There are extra holes in the mounting plate so you can wire tie your harness to the mounting plate. **NOTE:** For the 1968-69 vehicles that were equipped with an under dash cross brace, you may need to bend the module plate down slightly away from the brace.

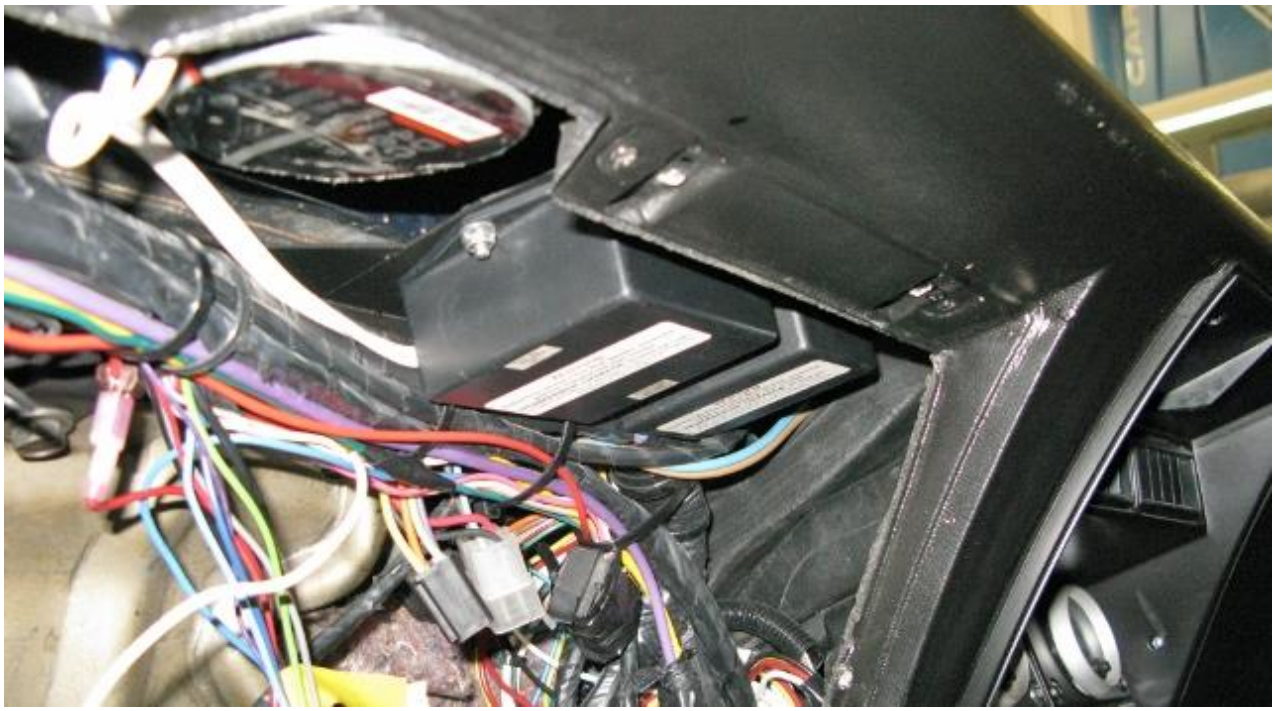


Figure 34 – Mount Headlight Module (Wiper Module also Shown)

35. Once the module is secured, plug the black connector from the module into the clear connector with the corresponding orange, yellow, green and purple wires. Plug the clear connector from the module into the black connector with the corresponding red, black, blue and brown wires on the new harness (Figure 35).

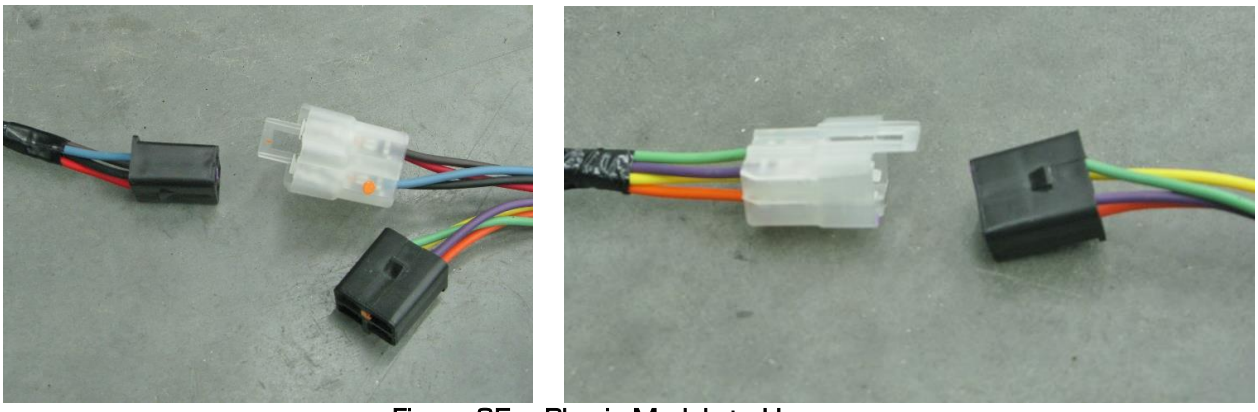


Figure 35 – Plug in Module to Harness

36. Plug the headlight switch connector back into the headlight switch. Do not install the switch back into the dash at this time. Install the headlight knob back into the unmounted switch.

37. For 1968-78 applications, attach a 12V constant power source to the module by installing the red wire with the black connector from the new harness into an open slot on the fuse block labeled "battery". For the 1979-82 applications, you will first need to plug in the provided jumper harness (Figure 36) into the black connector on the red wire from the new harness and then plug the jumper harness into the ATO style fuse block. Use an open slot labeled "battery". **NOTE:** Make sure the 10 amp fuse is installed between the power source and the module.

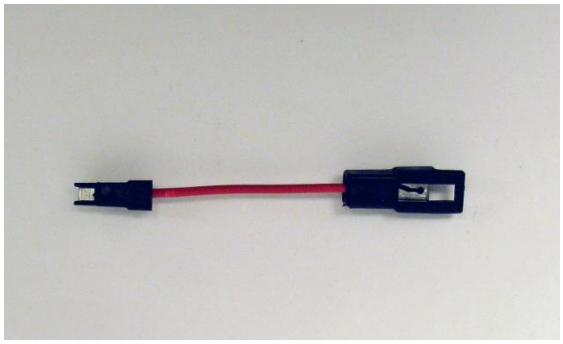


Figure 36 – 1979-82 Jumper Harness

38. Connect the black wire with the ring terminal on the new headlight harness to a suitable ground. Some vehicles have an existing ground connection behind the driver's side kick panel. Make sure to remove any paint or corrosion to ensure that a good ground connection is made.

39. Before powering the system, double-check all of the wiring connections for continuity using a multi-meter. Incorrect wiring can cause serious damage to the system.

40. Reconnect the battery. The system will cycle at this point and the doors should open slightly and go back down to the closed position.

41. Once the system has cycled, check the operation of the system by turning the headlamps on and off. If the system is operating correctly proceed to the next step. If not, check all of your wiring connections again and refer to the troubleshooting guide at the end of these instructions. **NOTE:** If you are still having problems, one solution is to bypass the fuse block and run the power and ground wires directly to the battery.

42. Adjust the height of the stops on the doors as needed by adjusting the hex jam nut and moving the stop on the arm (Refer to Figure 9) for the opened height of the headlight door. That way the headlight doors will be open at the same height. Adjust the bolt on the door linkage as needed for the closed height of the doors (Refer to Figure 16).

43. Once the operation of the system has been verified, disconnect the battery again.

44. Remove the headlight switch knob and reinstall the headlight switch into the dash. **NOTE:** Make sure the anti-rotation tab on the switch lines up with the alignment slot on the dash (Figure 37). Install the headlight switch retaining nut and install the headlight switch knob.

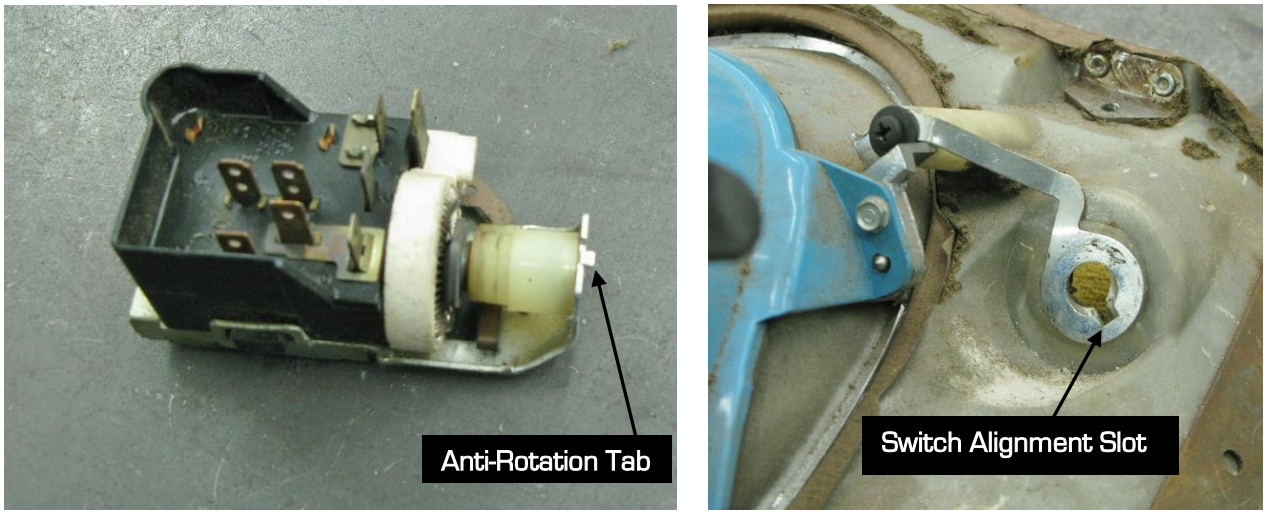


Figure 37 – Install Headlight Switch

45. Re-install the gauge cluster and the steering column by reversing the process described in steps 20-23. Secure the new wiring harness under the dash, in the engine compartment, and at the front of the vehicle with the included tie straps.

46. Reconnect the battery and install the hood. Enjoy your new Detroit Speed Electric Headlight Door Kit!

If you have any questions before or during the installation of this product please contact Detroit Speed Inc. at tech@detroitspeed.com or 704.662.3272

Headlight Troubleshooting

After all connections are made, connect the battery. The doors should go through a "power up" cycle. During this cycle, the doors will open partially, and then close. Anytime the current source to the module is disconnected and reconnected, the doors will go through the "power up" cycle. The module features a failsafe protection to protect the module from being shorted out. If a short exists, the module will beep and is followed by a series of clicks. This means a short has been detected and the module has entered into its fail safe mode. For the system to operate again, correction of the short circuit is required followed by resetting the module. To reset the module, remove the fuse from the main power wire for 10 seconds and then reinstall the fuse. If the clicking reoccurs, the short has not been repaired and needs further investigation. The following chart shows the expected voltages at the module input during typical operation. Use this to troubleshoot the wiring installation and headlight switch operation.

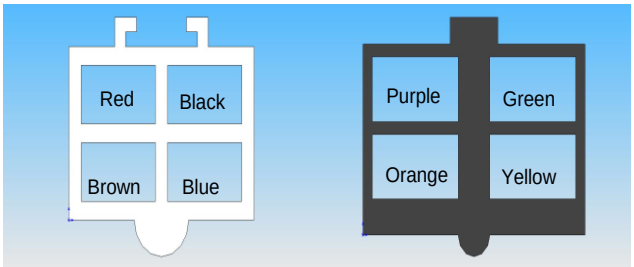
	Wire Color					
Headlight Switch Position	**Red**	**Black**	**Brown**	**Blue**	**Door Operation**	**Light Operation**
Off	+ 12 V	Ground (- 12V)	0 V	0 V	None	None
Park	+ 12 V	Ground (- 12V)	12 V	0 V	None	Park
Headlight	+ 12 V	Ground (- 12V)	12 V	12 V	Door Opens	Headlights*
Park (after headlights on)	+ 12 V	Ground (- 12V)	12V	0 V	None (Door remains open w/headlights off)	Park
Off	+ 12 V	Ground (- 12V)	0 V	0 V	Door Closes	None

* Park lights will turn off when headlights are on.

Condition	**Cause**
Module clicks continuously.	The module has entered into its failsafe mode. The module enters into this mode when it detects a short in the system. To correct, determine and repair the short that exists in the system. To return the module to its normal function, remove the 10 amp fuse for 10 seconds and reinstall the fuse. The system should go through its "power up" cycle. If it does not or the clicking continues, a short still exists in the vehicles electrical system and requires further investigation.
Doors only open or close partially.	Most issues with door operation are due to headlight door assemblies that have too much resistance, binding, or are out of adjustment. To check for correct operation of the module and actuators, disconnect the linkages from the pitman arms. With nothing attached to the motor pitman arm, have another person cycle the switch from off, to park, to headlight, and then back to off. The actuators should turn approximately one complete revolution in one direction, stop, and then turn one revolution in the opposite direction. If the actuators operate as described, intermittent problems are most likely due to doors that have too much resistance opening and/or closing.
One door opens faster/slower than the other.	One door has more/less resistance than the other. Lubricate pivot points and adjust the tension of fasteners at pivots points.
Doors do not operate at all.	Make sure the battery voltage is over 11.5 V. A low battery condition can result in inoperable doors. Check all connections. Make sure fuse is not blown and doors are not binding.
One or both doors close when the headlight switch is turned on. Door(s) open when the headlight switch is turned off.	On the driver's side, make sure the orange wire is inserted into cavity "2" and the yellow wire into cavity "1" of the connector body. The purple wire should be inserted into cavity "2" and the green wire into cavity "1" of the connector body for the passenger side. If the wires are terminated properly and the problem still exists, reversing the wires on the offending actuator(s) will solve the problem.
Doors do not go through "power up" cycle.	Check voltages at red, black, blue, and brown wires as described in above chart. If voltages are consistent with the chart, try disconnecting and reconnecting the red wire. If the doors do not operate or do not attempt to operate at this point, double check that the actuator harness is plugged into the module and the actuators. Check continuity between the actuator wires at the module pigtail and at the actuator connector.

Module Connector Pin-out (back of connector)

Red Wire	Constant 12V Battery Voltage
Black Wire	Ground
Brown Wire	Park Lamp Feed
Blue Wire	Headlight Feed
Orange Wire	LH Actuator +
Yellow Wire	LH Actuator -
Green Wire	RH Actuator +
Purple Wire	RH Actuator -



*looking from back side of connector

*If none of these suggestions solve your particular issue, please call Detroit Speed at (704) 662-3272.