Adding a "safety fuse" to the ignition circuit of 1956 to 1962 Corvettes
and
C1 Fuse Points

Rich Mozzetta, Frank Dreano, Dave Zuberer and others

http://forums.corvetteforum.com/c1-and-c2-corvettes/3503401-1956-to-1962-ignition-fuse-safety.html
http://forums.corvetteforum.com/c1-and-c2-corvettes/3181980-c1-fuse-points.html

Part 1 is for 1958 to 1962. Part 2 is for 1956 to 1957

Part 1 - 1958 to 1962

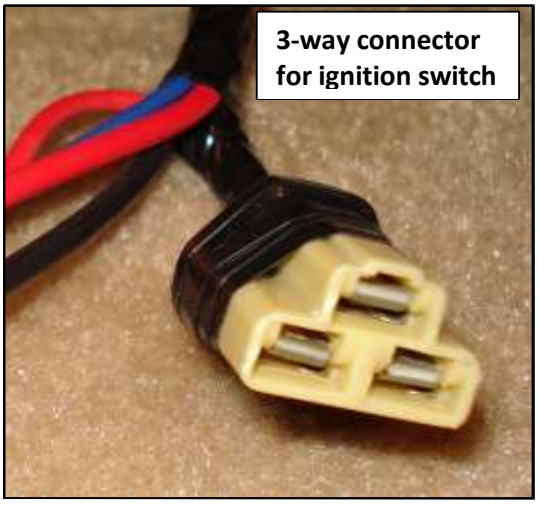
Here is a way to add a fuse to the ignition circuit on the 1958 to 1962 Corvettes. This circuit is unprotected from short circuits to ground. This can easily happen if the car has radio ignition shielding installed and the ignition wire inadvertently gets shorted to it or other grounded objects of the car. With possible interference from the under-dash wiper cabling and the metal cow- vent arms and hinges, this wire is a **susceptible failure point** in the car.

The added **Fuse Holder** is attached and placed directly into the ignition switch. This will allow the entire engine harness to be protected from the switch to the ballast resistor, wiper motor, and beyond, if any additional accessories are tied to that circuit.

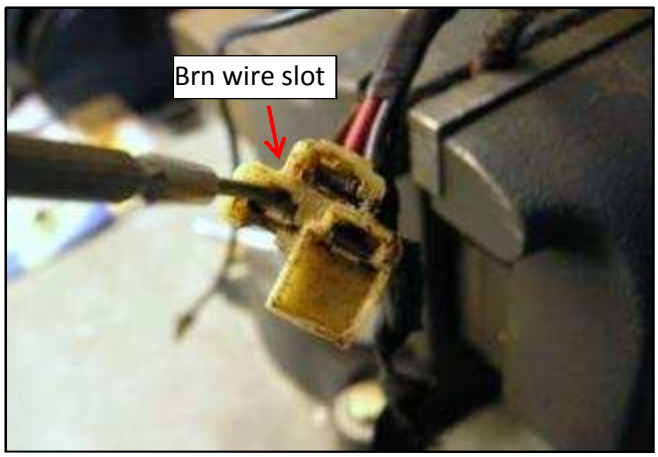
The pictures below are from an old harness (and some from a new harness) for photos of the details. Any in-car work under the instrument cluster will require access to the switch and harness.

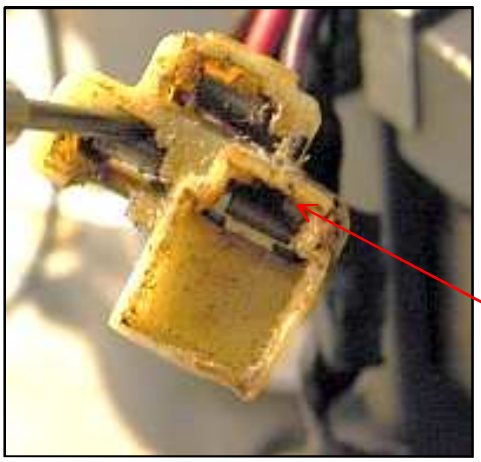
First: Disconnect the battery power from the car.

Remove the 3-prong connector from the back of the ignition switch. Unwrap the harness tape back a few inches to expose the 3 wires, **Red, Purple, and Brown**. **Brown is the ignition wire.**



Locate the Brown wire terminal space. Using a small flat pick tool or screwdriver, insert its end into the open front portion of the plug. Push in to flatten the small tab of the terminal to allow it to be removed from the wire side. Remove it from the plug.



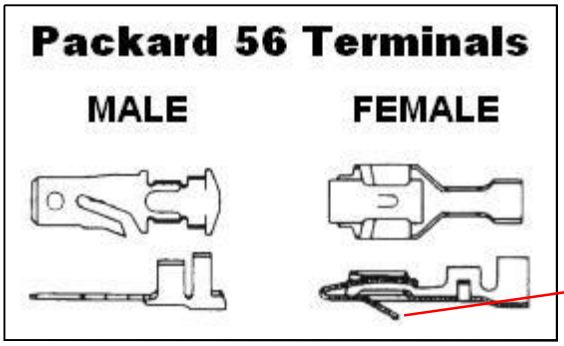


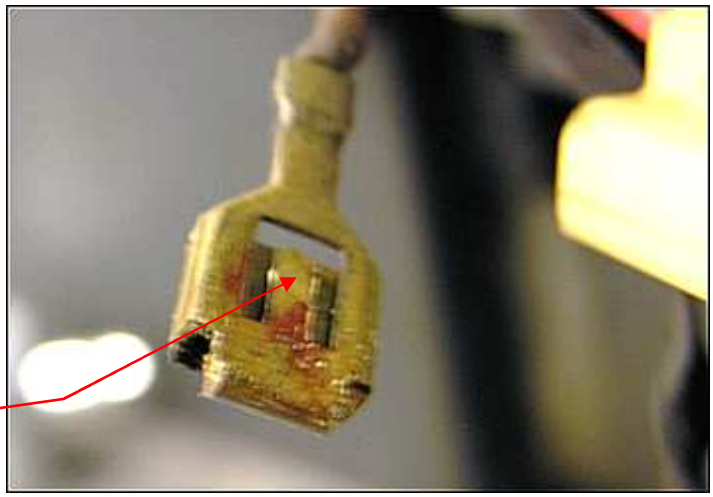
Slide thin blade in these slots to depress the locking tab on the connector. Pulling gently on the wire while you insert the blade will usually release the connector from the plug. You can see the tabs in the connector at left.

If you have an old harness, **remove one of its single plastic female terminal holders** as seen below. If not, after completion just simply use vinyl electrical tape to wrap each end of the fuse holder assembly. Alternatively, you can buy the terminals from a number of online vendors or local parts stores. A few sources are listed at the end of the document.

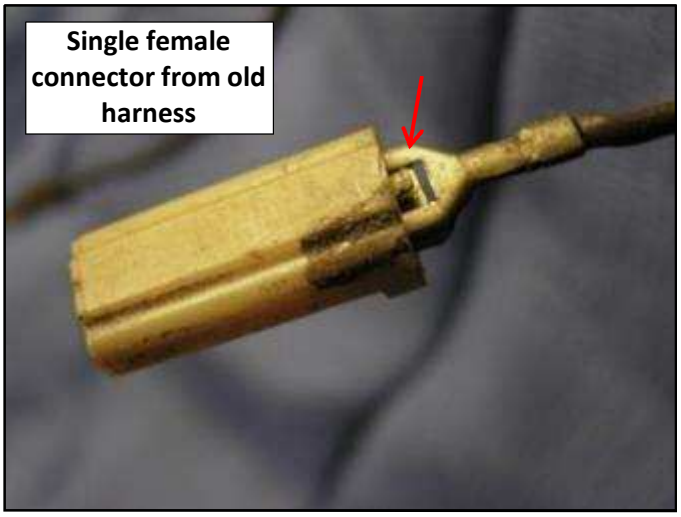
Bend the locking tab of the Brown wire terminal up a bit, and insert it into the plastic terminal holder.

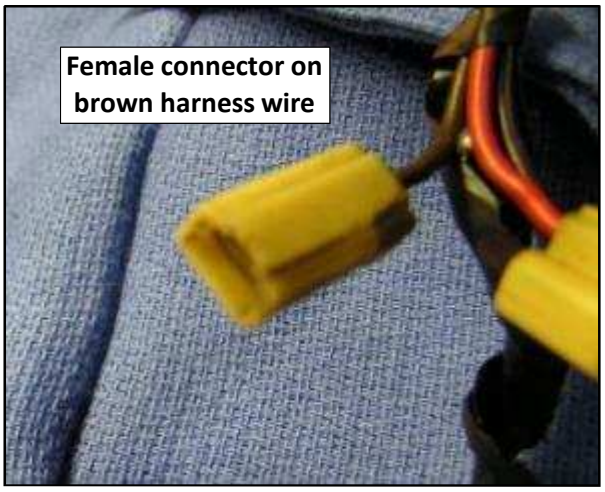
Most of the terminals and connectors in the 56-62 (and mid-year) Corvettes are the Packard Series 56 type.





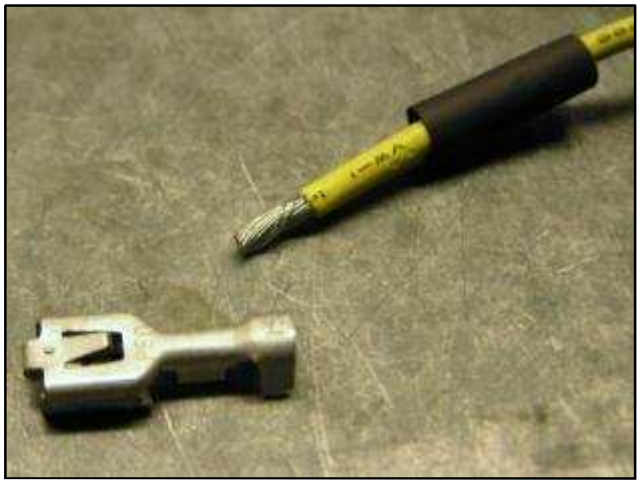
Source:
http://www.rowand.net/Shop/Tech/AutomotiveElectricalConnectors.htm



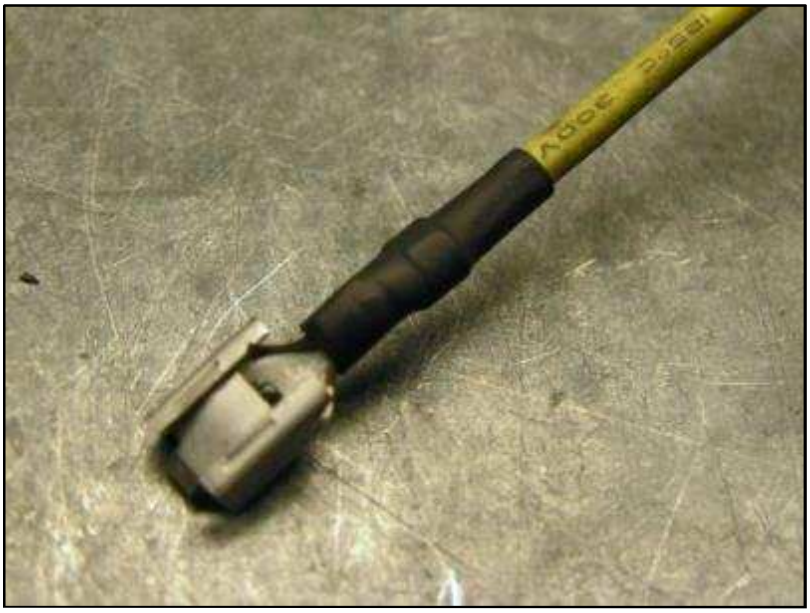


Prepare your fuse holder for use. I use NAPA 782-2001 which is rated 32v @ 20 amps. I typically use a 15-Amp fuse.

Acquire a **female terminal** from your old harness or get one at an Auto Parts store. It must be the locking tab (Packard Series 56) type. You can salvage your old terminals by spreading the brass collars, cleaning out the old wire and soldering the new wire to it.

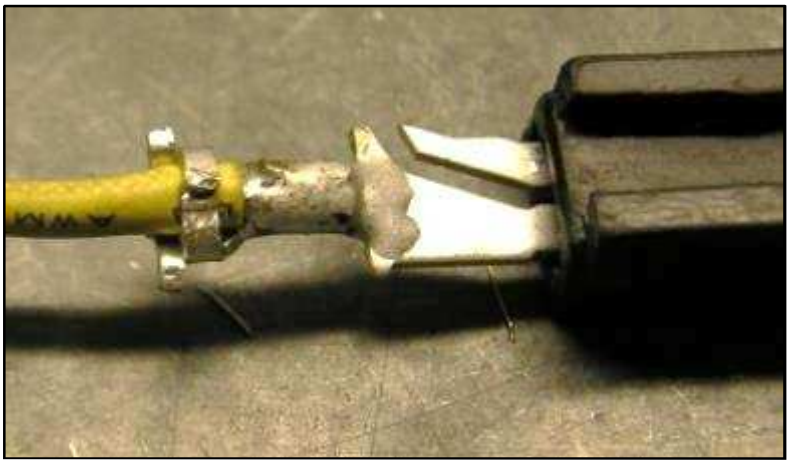


Precut and install some heat-shrink tubing onto the wire, **away from heat**. Solder the terminal to the wire and install the heat shrink. A butane lighter is convenient for heating the heat-shrink insulation.

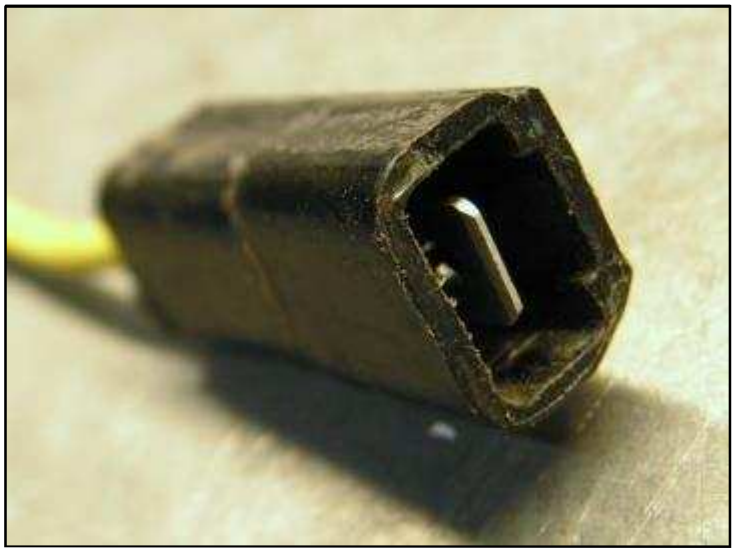


On the opposite end, Prepare a **male terminal** blade with heat shrink. If you have old harness connectors, locate a male terminal (lock tab type) with plastic insulator plug as shown below. This type is actually used on the 1963 up GM cars and Corvettes.

If not, just use a male blade type and plan to tape the connection later.

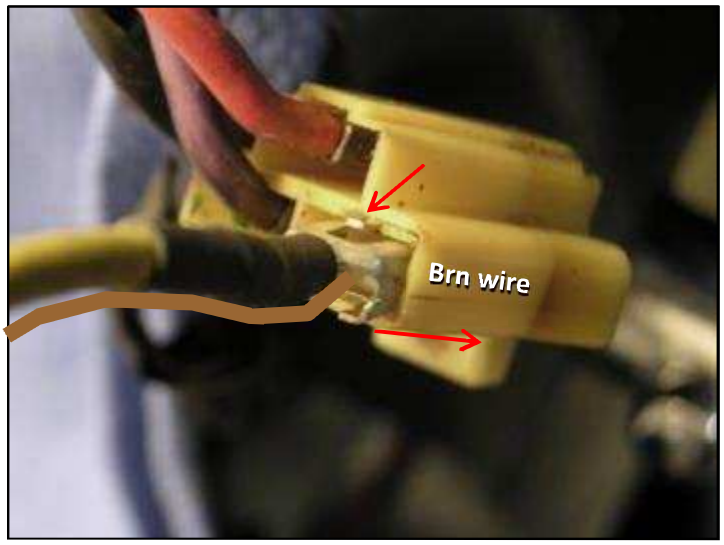


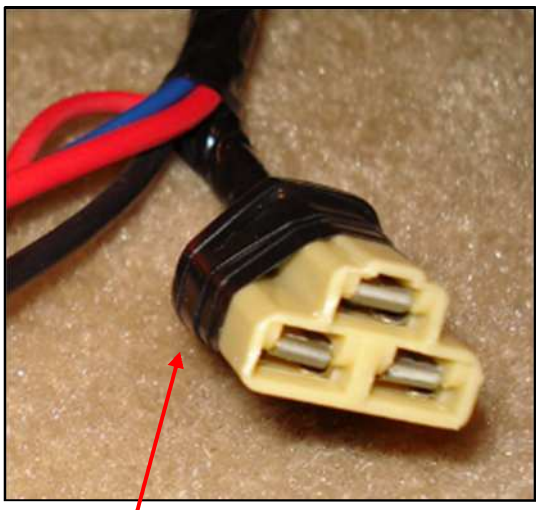
Install your chosen male terminal to the wire by soldering. Here I've used the GM type.

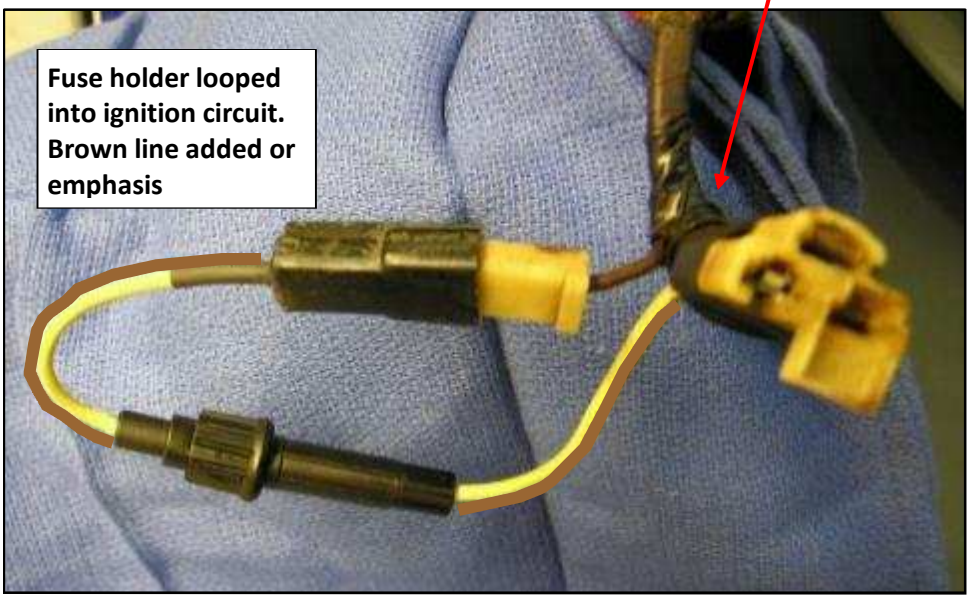


Here is the completed "plug-in-ready" fuse holder.

At the ignition switch plug, bend the lock tab of the fuse-holder female terminal slightly and install into the 3-place plug where the Brown wire terminal was originally located. **Rewrap the harness tape back around the plug**. Use electrical tape to get a good tight fit if needed. Plug the other end of the fuse-holder connector to the Brown-wire terminal that you made up.

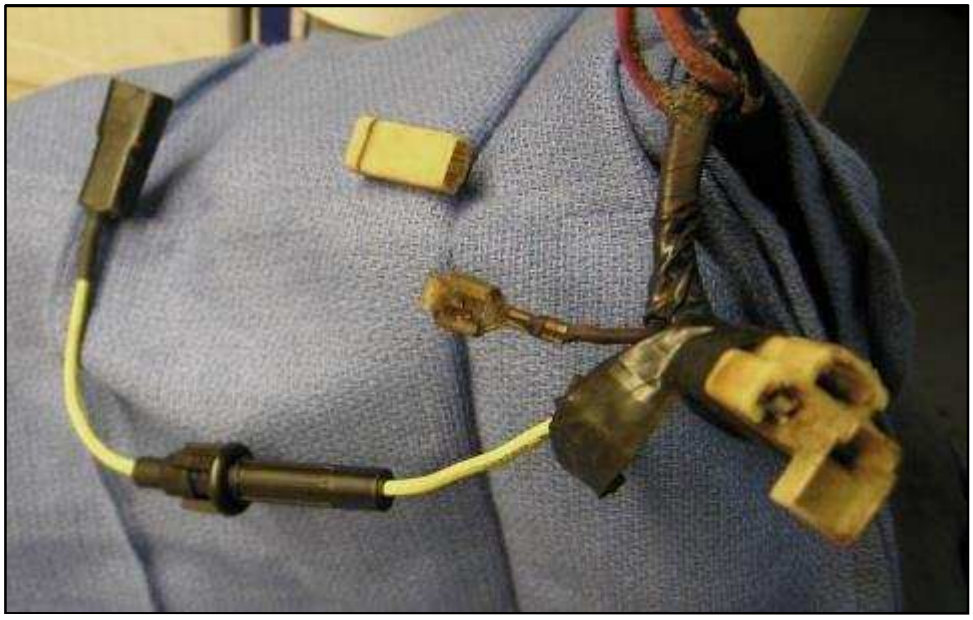






Reinstall the plug to the back of the ignition switch. Ensure the fuse is installed, reconnect the battery; check all circuits for proper operation. Start the car to ensure your wiring is correct. As a test, run the engine and wiper motor simultaneously to verify its function and the fuse is an adequate rating. You can place paper towels or cloths under the wiper blades to prevent scratches to the glass when running the wipers.

If you ever need to remove the fuse holder, just use the same method to remove and install the terminals as before.



This modification is one that **will protect just the ignition circuit**. But keep in mind that if a poor connection or fault occurs in the wiring, the engine will shut down. Be aware that this could happen. But like any motor vehicle, any failure in the ignition can shut the vehicle down. We see this happen on modern cars as well, and are aware of recalls even in today's high-tech world. Mistakes happen.

In these old Corvettes, this can also happen, without fuse protection, if the ignition wire is shorted to ground as is the case many times with these cars. The car will also shut down then, but could likely start a fire and potentially destroy the car and possibly cause injury to the occupants.

A fuse-protected ignition will simply shut down upon failure of the circuit when the fuse blows. It should protect the wiring and potentially save the car from a potential disaster.

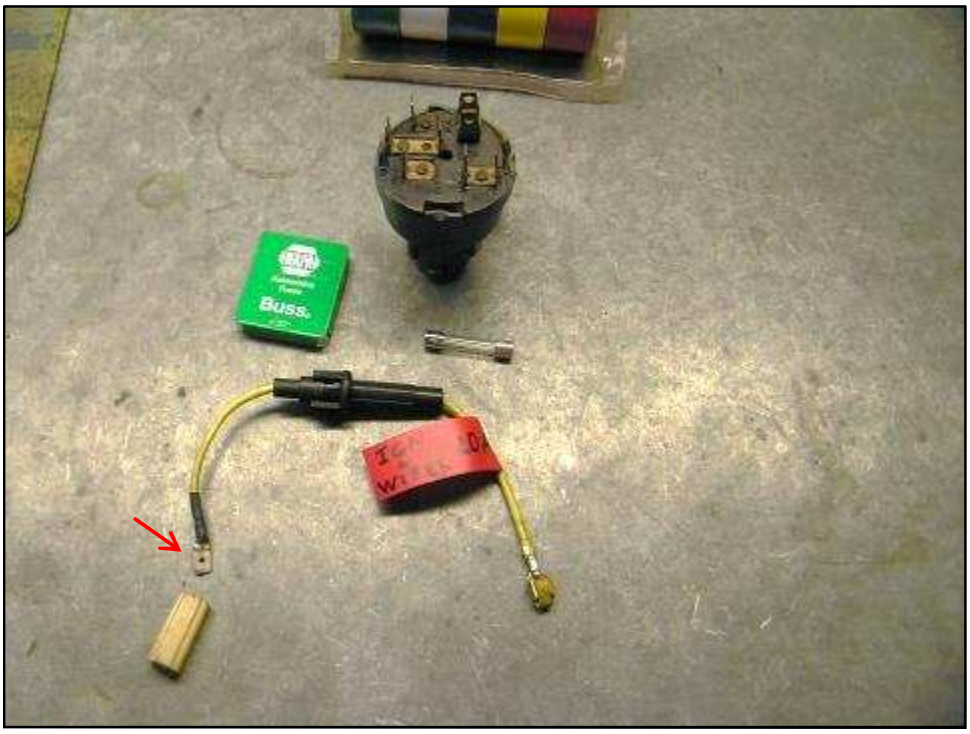
Lastly, always carry spare fuses along too.

Part 2 is for 1956 to 1957 Corvettes

Follow the same instruction as above except the ignition switch has different terminals. Pictures will show the differences.

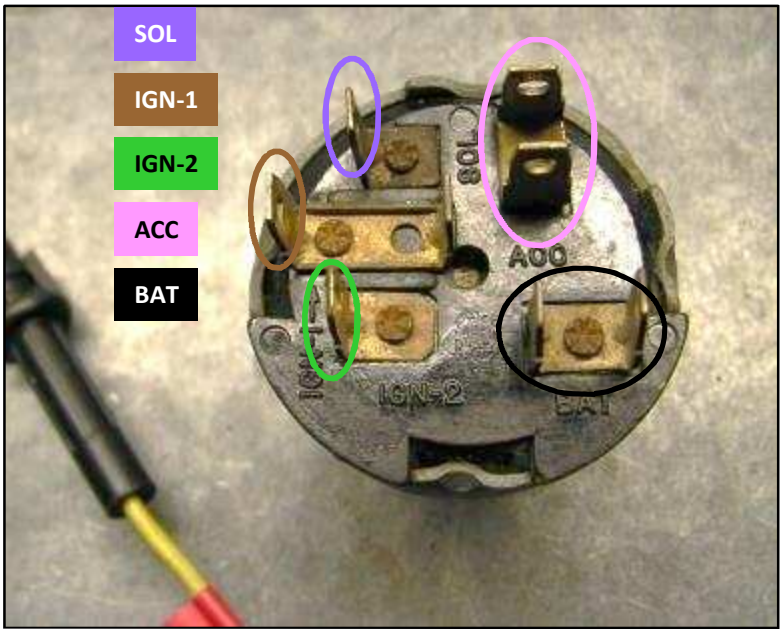
In this car, it had several additional items tied to the ignition wire so I chose a 20-A fuse. It has a fuel shutoff solenoid. If the car has Fuel Injection and a choke heater it will draw a bit more too. If it's an FI and you added an Anti-Siphon Solenoid it will draw even more. Typically a 15-A is sufficient for base cars as the Ign feed runs only the coil and the wiper motor.

Here is the fuse holder made up for the '56 I've been working on. I used a blade terminal (arrow) on one end and will tape the connection later.



Below is the '56/'57 Ignition switch. The fuse splices in to the IGN-1 terminal which is the **Brown wire**.

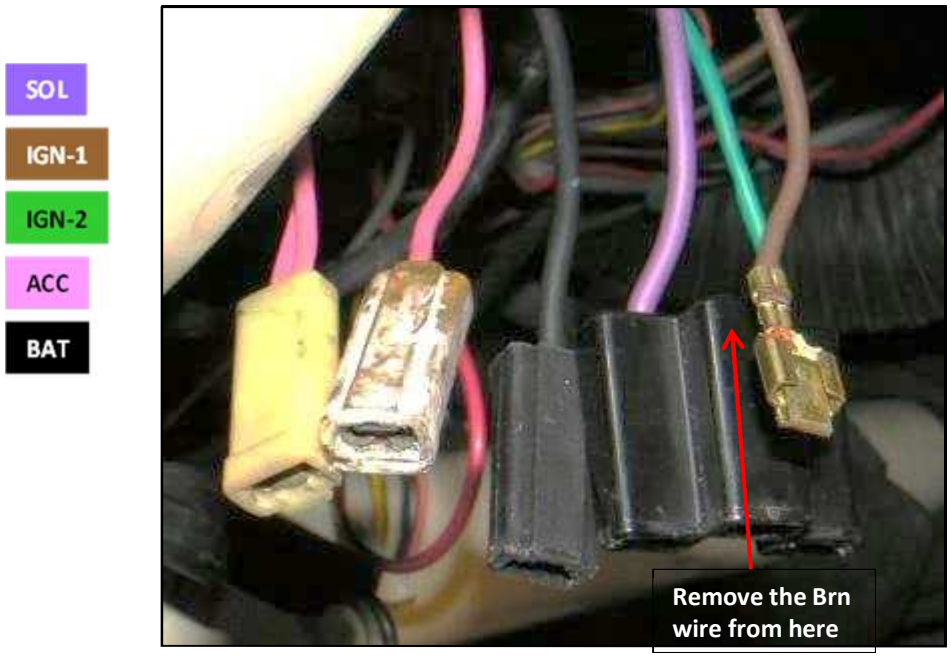
The IGN-2 terminal is a green wire which is only powered during "START"(cranking starter motor). This feeds the coil + post directly to supply full battery voltage when starting.



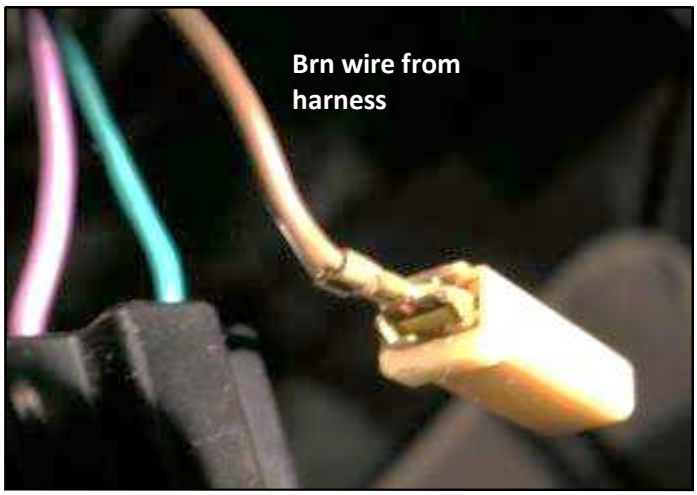
The **Purple** wire is the **Solenoid** input at the Starter. The **Black** is the **Main Feed +12V from the Ammeter**. The **Green** is the **coil +** direct feed described above. The 2 **Pink** connectors are the **ACC** (Accessory) feeds to the Auxiliary Fuse Panel for the Turn Signal flasher, Gauge power feeds, and the radio and heater if so equipped.

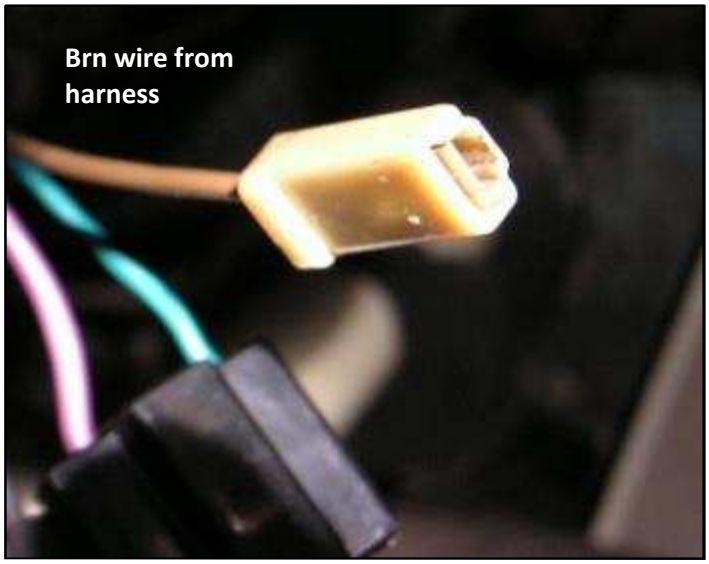
To install the fuse holder:

Remove the Brown wire terminal from the plug by inserting a pick tool as described in Part 1.

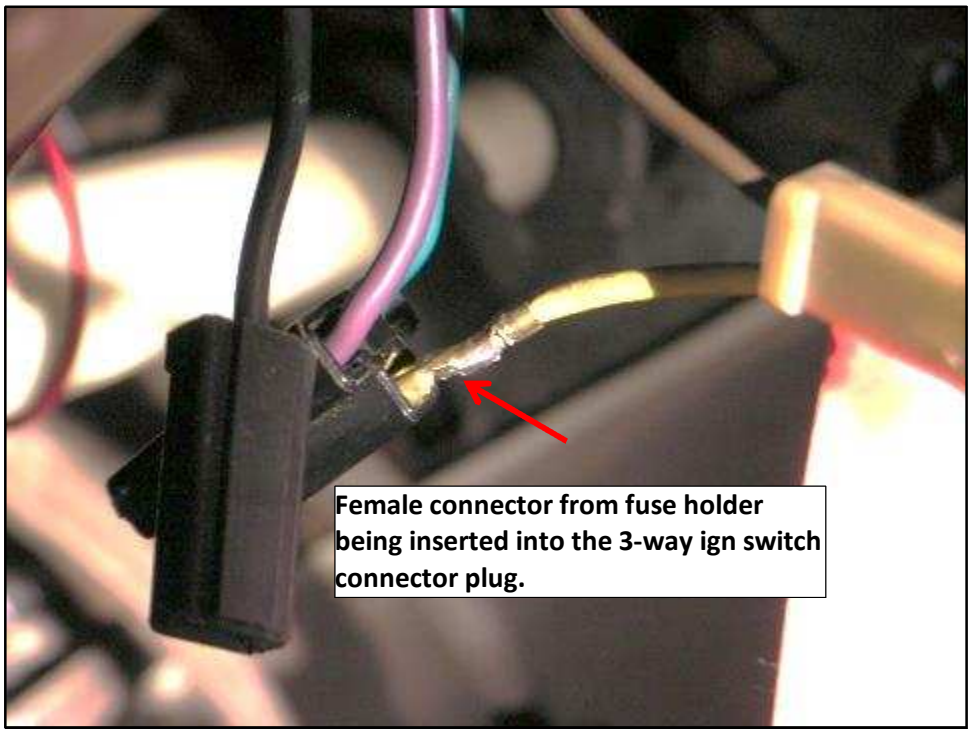


Insert the brown wire female terminal into your plastic connector after bending the lock tab back up a bit.





Insert the female terminal of the fuse holder into the 3-way connector and plug it back on to the Ignition Switch.



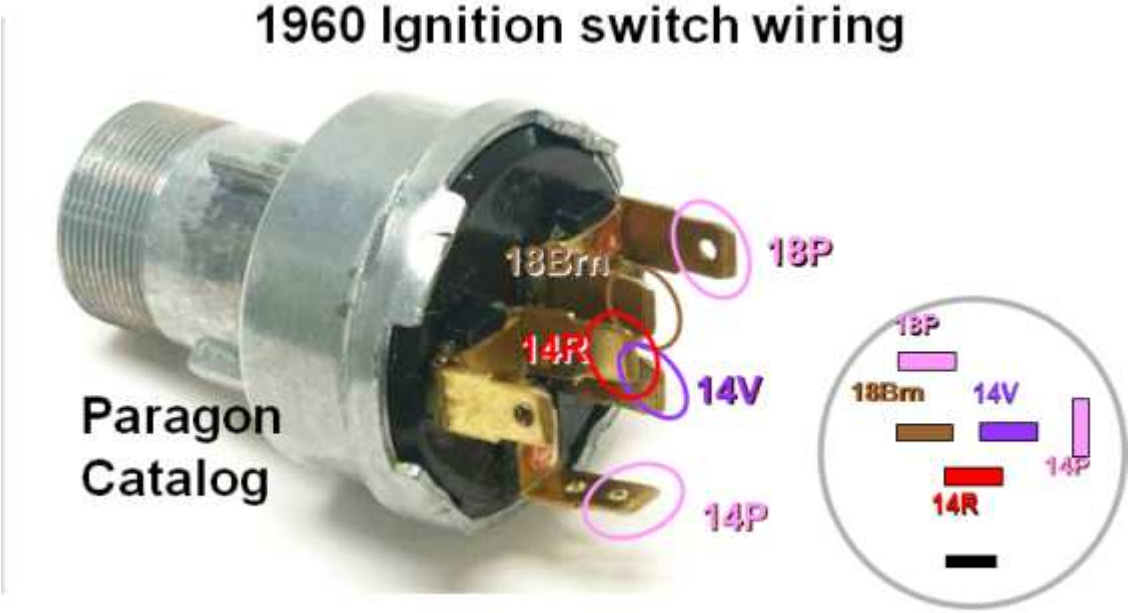
Connect the male terminal end of the fuse holder into the female connector on the Brown wire. Tape up the connection for safety. Connect the remaining wires to the switch.

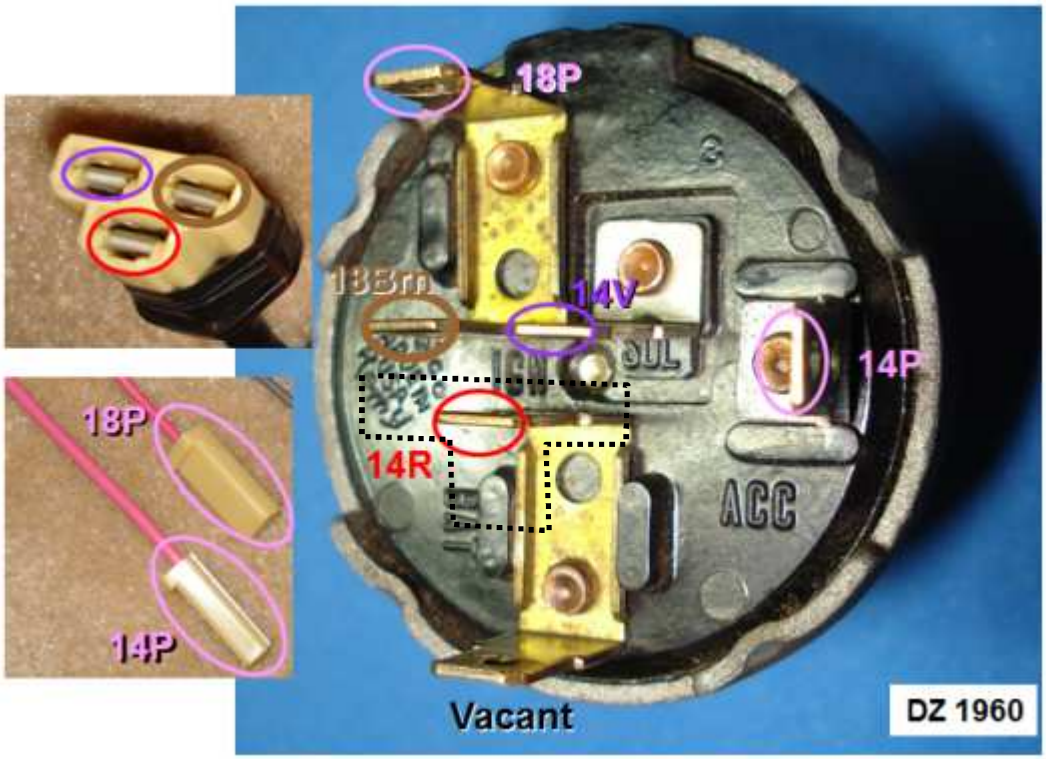
Reinstall the switch to the dash, ensure a fuse is installed and test the electrical system.

You've now protected your '56 or '57 from ignition circuit harm.

Rich

The illustration below is from DZ's 1960. The connectors are from a new Lectric Limited harness.





C1 fuse points

Frank Dreano and others

http://forums.corvetteforum.com/c1-and-c2-corvettes/3181980-c1-fuse-points.html

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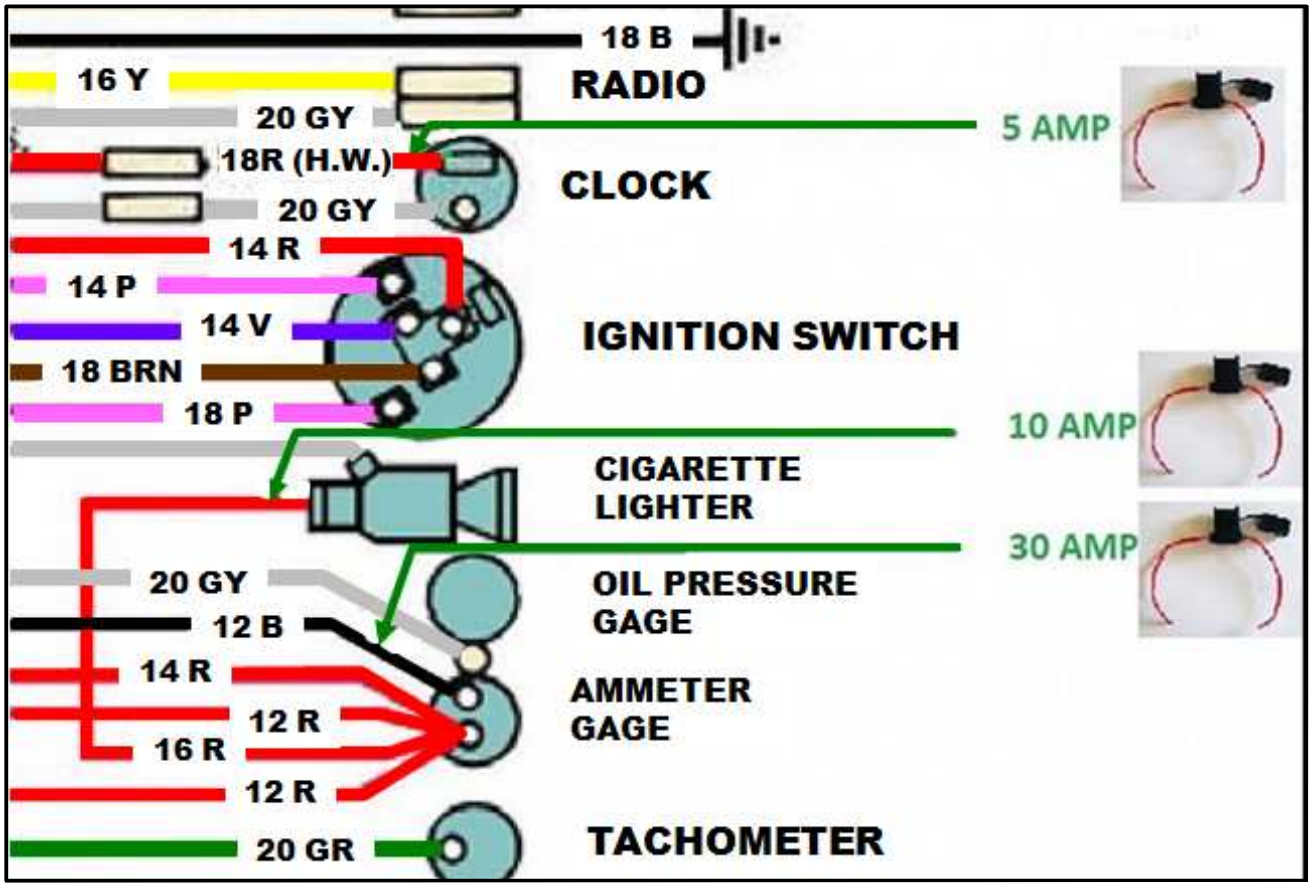
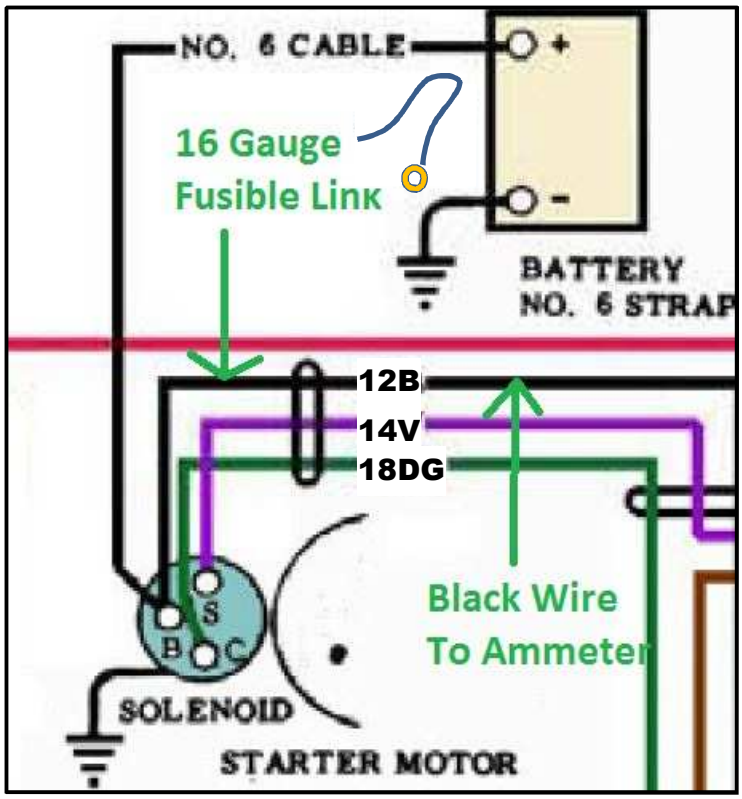
Seems I get asked about this a lot so I made a little graphic about what I did. By installing just 3 fuses under the dash (**disconnect the battery first**) you can make your C1 about 98% safer, electrically speaking. Some will go the extra length to put a 16 gauge fusible link farther up towards the battery at the starter solenoid for added protection. If you do this then get a fusible link with the big ring terminal already attached and that will go right on the starter. (I show this in the second picture - **NEVER put a fusible link in the cockpit;** ..they smoke some when blown!)

NOTE: Fuse the **BLACK** wire at the **ammeter** (not the red wires); FUSE the **RED** wires at the clock and lighter!

The fuse ratings are very conservative but should work in almost every case. For instance, my 10 AMP cigarette lighter fuse lets the lighter element heat cherry red just fine every time. A higher fuse rating will work but it might allow the old wiring to get hotter than I care for - your mileage may vary. I used 5-AMP for the clock because they are just easier to find than 2-AMP (which will also work) and are adequate protection.

I prefer the ATC blade type fuses and some even **have a light that indicates when it's blown** if you prefer. **With a little care, proper connectors, a crimping tool and some heat shrinkable insulation you do NOT have to butcher the original wiring harness!**





Mike Coletta

Very good Frankie!!! Everyone should do this at a minimum.
BTW, adding the fusible link at the starter prevents the most common short/fire caused by the ignition shielding cutting the main power feed in those cars.
Mike Coletta

rustylugnuts

What are the benefits of a fusible link vs. an inline fuse?
rustylugnuts

Frankie

A fusible link will stand temporary high-current situations without blowing - which might occur when say starting the car, or putting on high beams. Most fuses (even many slo-blo fuses) will just blow straight away in an overload situation. This is why GM started using the links in later years in particular circuits.

In some extreme cases a high current can arc through the metal vapor even when a fuse blows and still cause damage -- a fusible link breaks the circuit for good. Admittedly rare but not impossible.
Last edited by Frankie the Fink; 12-13-2012 at 10:54 AM.

AZDoug

It looks like you have a fusible link and an inline fuse in the line between starter and amp gauge.
Doug

Frankie

Yes - there is some justification for both. IF, you should have a short as Mike Coletta describes in the wire BEFORE the 30 amp dash gauge (current follows the path of least resistance) then you can still have damage. The fusible link protects the under-hood part of the wiring that the dash ammeter fuse does not. The ammeter fuse is nice because it will blow in most cases and a fuse is much more easily replaced.
I've blown my dash 30 AMP once when installing my car stereo amp...it saved my butt and was a real quick fix.

AZDoug
I used a 40-amp inline fuse in that wire; it is mounted near a shielded terminal strip I put on a flat spot near the RH female hood latch. The purpose of the terminal strip was mostly to do with the wires that go to the starter, so they could be easily replaced when they get brittle and cracked.

The terminal strip does offer advantages for remote starter activation, also.

Not exactly NCRS, but not much on my car is.

Doug

Frankie
I do think 2-AMP fusing on the main power buss for a C1 is pushing it. Conventional wisdom is 30 AMPS. C1 generators are rated at 30 or 35 amps (with a very few higher amp exceptions) depending on the car and options.

I should also add that putting the protection (whatever you prefer) CLOSEST to the source of the electricity gives the GREATEST protection. e.g., In Doug's case he may have exposure in the wire from the starter up to the hood latch fuse if that should ground out unless he has already covered that somehow. It's his call and he may be OK with that.

It's all about how much risk you are willing to accept.
Last edited by Frankie the Fink; 12-13-2012 at 12:26 PM.

AZDoug
Yes, that wire from starter to term strip has no protection, but it isn't near anything flammable, either, it would just burn, and eventually melt, but there is also nothing near it to short to, except the starter solenoid as 'glass is non-conductive.
Doug

Frankie
Quote:
Originally Posted by **AZDoug**
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Doug

Understood. I made a similar call when installing the fuse for my C1 headlight relay circuits. There is a short section of unprotected wire before the fuse. I am willing to take the risk that it will not cause a problem.

Davidf59
What is the purpose of adding these fuses? Do the C1's have a tendency to have melt-downs on the electrical components?

Davidf59
Frankie - any chance you can show a pic of the final product - placement of the fuses, etc.
Thanks
David

JohnZ
The problem with C1's is that they have **basically no protection at all for the main power circuits**, and none for any accessories that aren't fed from a fuse block. If you get a dead short, you'll fry the harness all the way from that point to the starter solenoid.

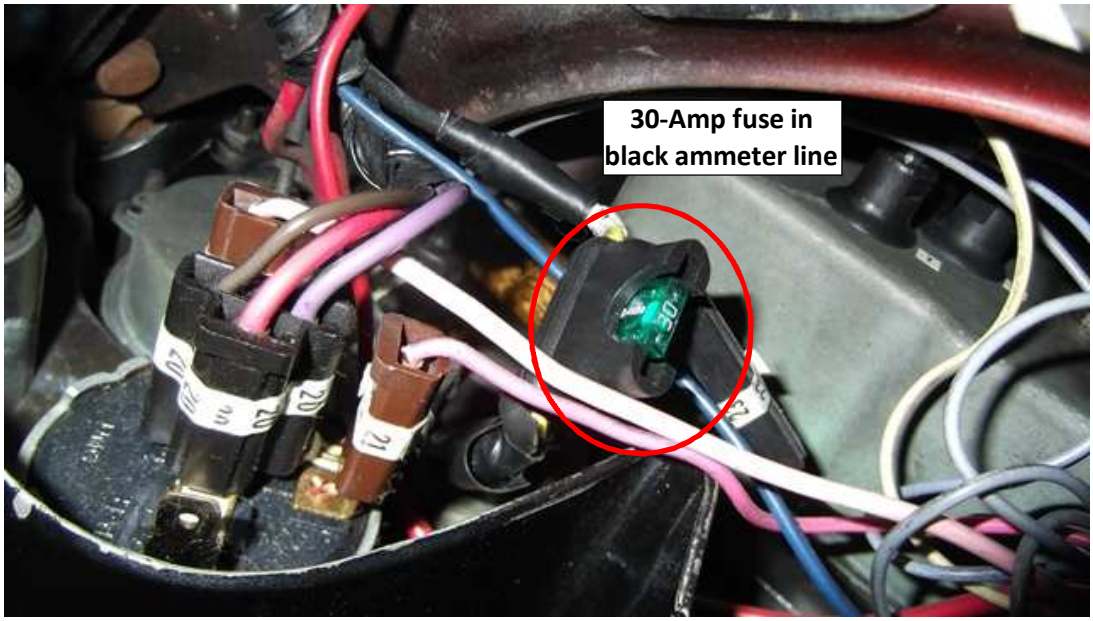
Frankie
Two under-dash shots. First is just the 30-amp ammeter fuse (green item in holder).

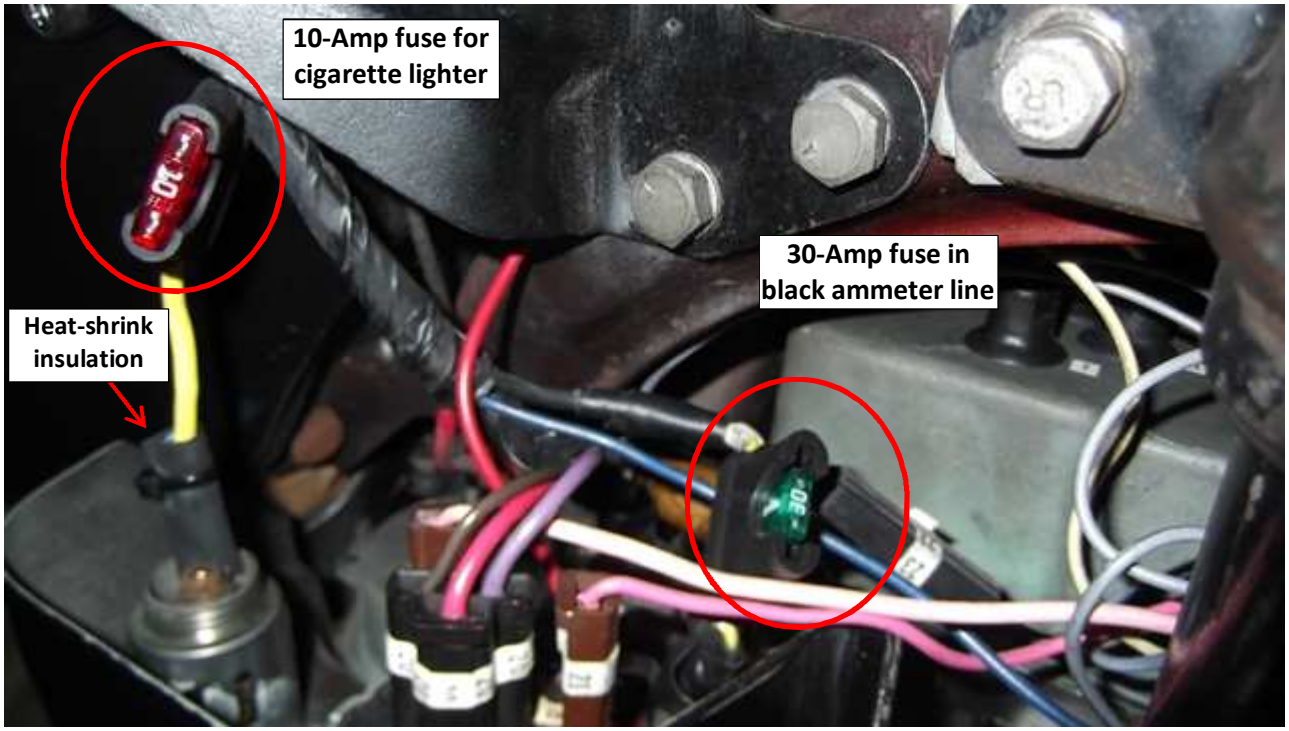
The second pic is BOTH fuses; the 10-amp cigarette lighter fuse (red in holder) in the upper left - again the 30-amp green fuse is in lower right. Note the shrinkable insulation on the lead coming out of the cigarette lighter -- muy importante.

I eliminated the clock fuse once I went quartz. No original wiring was harmed in the installation of these fuses.

Might also want to take note of the nice white wiring labels from a Radio Shack wire labeling kit. Just stick a corresponding label on the back of the dash/component where that wire should go and then keep a written legend. E.g. *Wire #12 is bulb for Hi-Beam Indicator, etc.*

Removing/replacing the dash cluster is a breeze with these puppies.





Mechron

> Quote:
> Originally Posted by **Frankie the Fink**
> *A fusible link will stand temporary high-current situations without blowing - which might occur when say starting the car, or putting on high beams. Most fuses (even many slo-blo fuses) will just blow straight away in an overload situation. This is why GM started using the links in later years in particular circuits.*
>
> *In some extreme cases a high current can arc through the metal vapor even when a fuse blows and still cause damage -- a fusible link breaks the circuit for good. Admittedly rare but not impossible.*

Everything you said is right, But rare, maybe now but not in the 70s with Ford cars; they all had fusible links between the battery and the solenoid on the fender well. I made bucks replacing those fusible links; just pull the link wire and if the insulation stretches the fusible link is blown...

Frankie
That is very true.

I meant to add somewhere above that you can preserve the original black ammeter harness wire by either: a) soldering the fuse holder lead to that original harness lead ring terminal and putting a ring terminal on the **other** end to go on the ammeter connector (you can desolder it later and preserve the original wiring if need be, or, b) crimping a ring terminal on **EACH** end of the fuse holder and use a small nut & bolt to connect one end to the original harness wiring's ring terminal. This last method is a little messier IMO but will work. You have to VERY carefully insulate everything in either case. A DOUBLE layer of heat shrinkable tubing is best.

Seems many folks don't want to add this extra protection out of fear of butchering up their dash harness and that doesn't have to be the case. The clock/lighter connectors are easy and male/female spade lug connectors can be crimped onto the fuse holder leads that work perfectly for those circuits.

For a couple of hours effort on a Saturday morning you can make a C1 a much safer car to operate.

Last edited by Frankie the Fink; 12-14-2012 at 07:19 AM.

Steve59
I took FTF's advice years ago and fused those circuits, but I also put in a power antenna and fused that, and converted my windshield washer to a power pump and fused that circuit. Got a lot of fuses under the dash but was grateful when I blew the main 30 amp fuse when I was playing with the cigarette lighter. Also, I prefer fuses that light up when blown, much easier to see under the dash.

Buggles
Thanks Frank. I have a question about the black wire on the ammeter. In the '56 and I am guessing '55 and '57 there are two black leads off the ammeter, the one to the starter solenoid and the other goes off to form part of the negative side of circuit. Should both of these be fused (together?) or just the one to the starter solenoid?
Regards,
Craig

JohnZ

Quote:

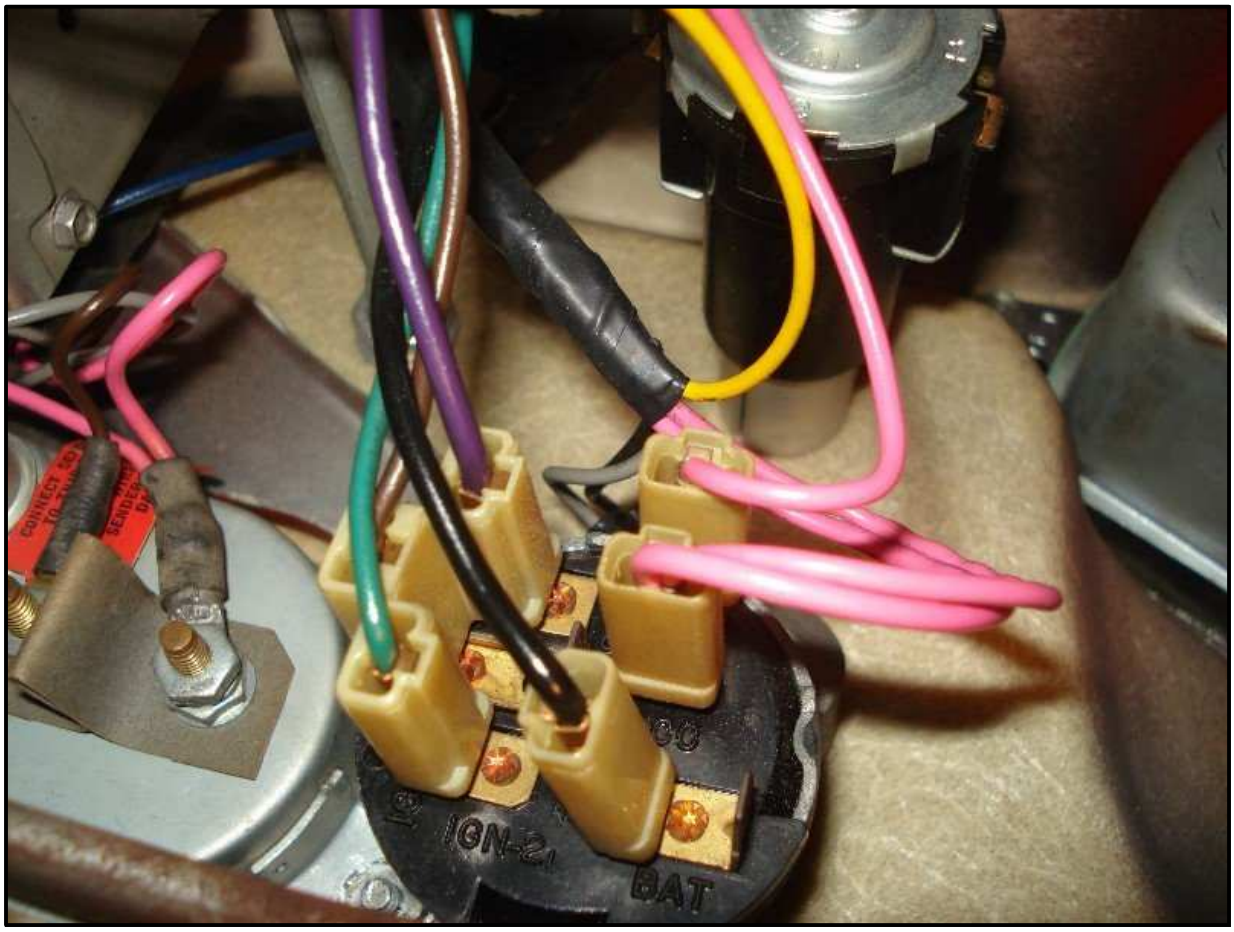
Originally Posted by **Buggles**

In the '56 and I am guessing '55 and '57 there are two black leads off the ammeter, the one to the starter solenoid and the other goes off to form part of the negative side of circuit.

There are two black wires on that ammeter terminal - one is the **main power feed from the cable stud on the starter solenoid** (which should have a fuse or fusible link at the solenoid), and the other black wire goes f**rom the ammeter to the "BAT" terminal on the ignition switch**.

’56-’57 Ignition switch

Photo courtesy of John Hinckley



Stafftech

Frankie, hoping you can answer a question for me, looking for shrinkable insulation at the local auto parts store and all they seem to have is heat shrink tubing which I am assuming is not the same, correct? If it isn't the same any ideas on where I can find shrinkable insulation? It doesn't come on any of the fusible links they have available either.

Also for the inline fuses, do I need to use the same rules for wire gage (2 sizes smaller) than I need for the fusible link? Thanks, Dan

Frankie

Heat shrink tubing will also insulate just fine. Yes, the fusible link should be 2 sizes smaller than what it protects.

Stafftech

Quote:
Originally Posted by **Frankie the Fink**
Heat shrink tubing will also insulate just fine. Yes fusible link should be 2 sizes smaller than what it protects.

Understand on the size diff for the fusible, is it the same for inline fuses?

Frankie

No - the ratings for inline fuses are in amps not wire gauge.
For inline fuse sizes in a C1 you can refer to my first post above.

stafftech

Quote:
Originally Posted by **Frankie the Fink**
No - the ratings for inline fuses are in amps not wire gauge.
For inline fuse sizes in a C1 you can refer to my first post above.

Thanks, I wasn't clear on the gage vs amp connection.

We found this reference to the **Packard Series 56 connectors** at this website:

http://www.rowand.net/Shop/Tech/images/AutomotiveElectricalConnector-ManualPage.jpg

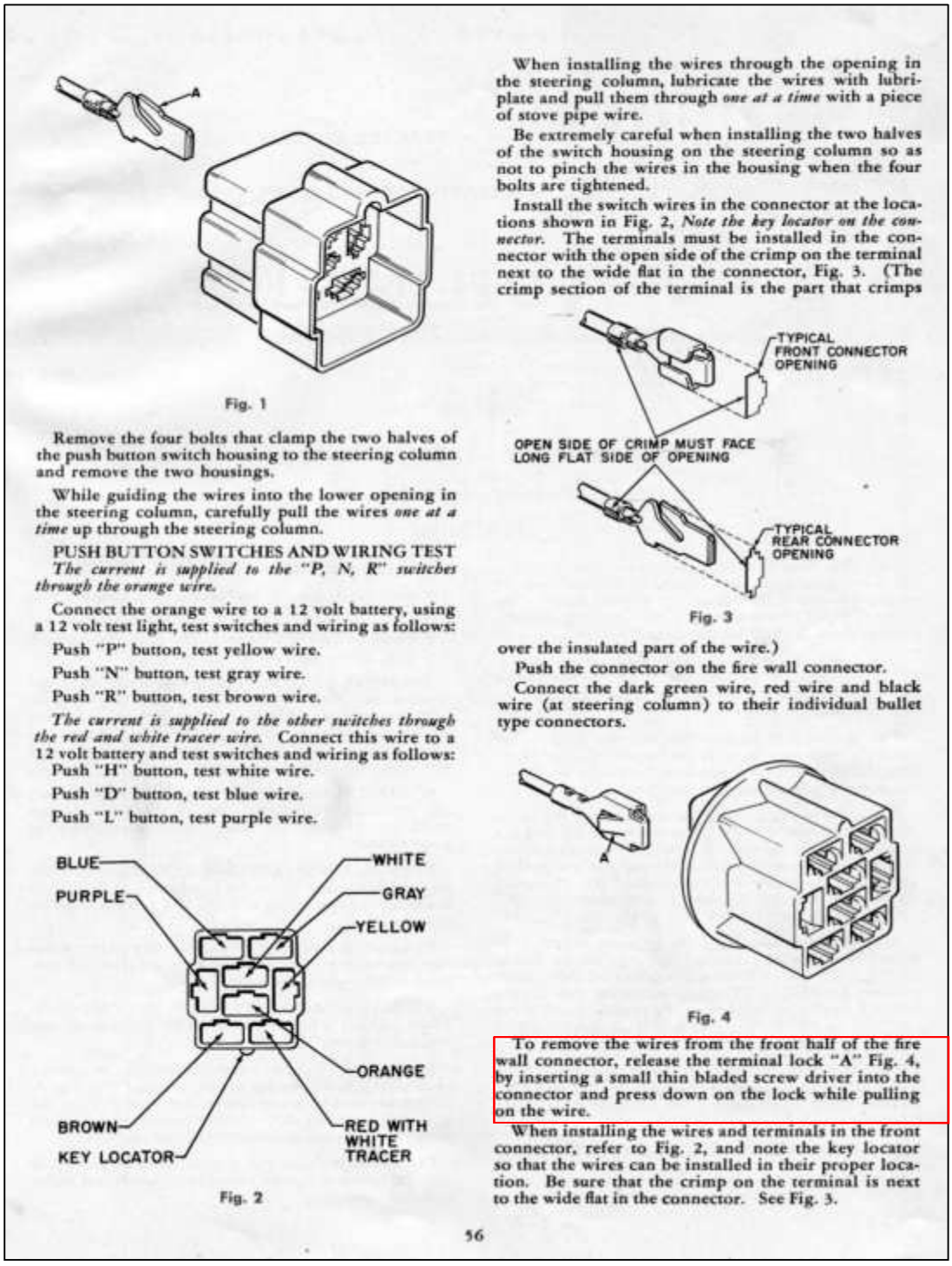


Fig. 1

Remove the four bolts that clamp the two halves of the push button switch housing to the steering column and remove the two housings.

While guiding the wires into the lower opening in the steering column, carefully pull the wires *one at a time* up through the steering column.

PUSH BUTTON SWITCHES AND WIRING TEST

The current is supplied to the "P, N, R" switches through the orange wire.

Connect the orange wire to a 12 volt battery, using a 12 volt test light, test switches and wiring as follows:

Push "P" button, test yellow wire.

Push "N" button, test gray wire.

Push "R" button, test brown wire.

The current is supplied to the other switches through the red and white tracer wire. Connect this wire to a 12 volt battery and test switches and wiring as follows:

Push "H" button, test white wire.

Push "D" button, test blue wire.

Push "L" button, test purple wire.

Fig. 2

When installing the wires through the opening in the steering column, lubricate the wires with lubriplate and pull them through *one at a time* with a piece of stove pipe wire.

Be extremely careful when installing the two halves of the switch housing on the steering column so as not to pinch the wires in the housing when the four bolts are tightened.

Install the switch wires in the connector at the locations shown in Fig. 2, *Note the key locator on the connector.* The terminals must be installed in the connector with the open side of the crimp on the terminal next to the wide flat in the connector, Fig. 3. (The crimp section of the terminal is the part that crimps

Fig. 3

over the insulated part of the wire.)

Push the connector on the fire wall connector.

Connect the dark green wire, red wire and black wire (at steering column) to their individual bullet type connectors.

Fig. 4

To remove the wires from the front half of the fire wall connector, release the terminal lock "A" Fig. 4, by inserting a small thin bladed screw driver into the connector and press down on the lock while pulling on the wire.

When installing the wires and terminals in the front connector, refer to Fig. 2, and note the key locator so that the wires can be installed in their proper location. Be sure that the crimp on the terminal is next to the wide flat in the connector. See Fig. 3.

Here are a few sources where you can get terminals and connectors:

http://terminalsu pplyco.com/Store/Default.aspx?CATDRILL=DEL010

http://www.ronfrancis.com/

http://www.texasindustrialelectric.com/_packard_terminals.asp