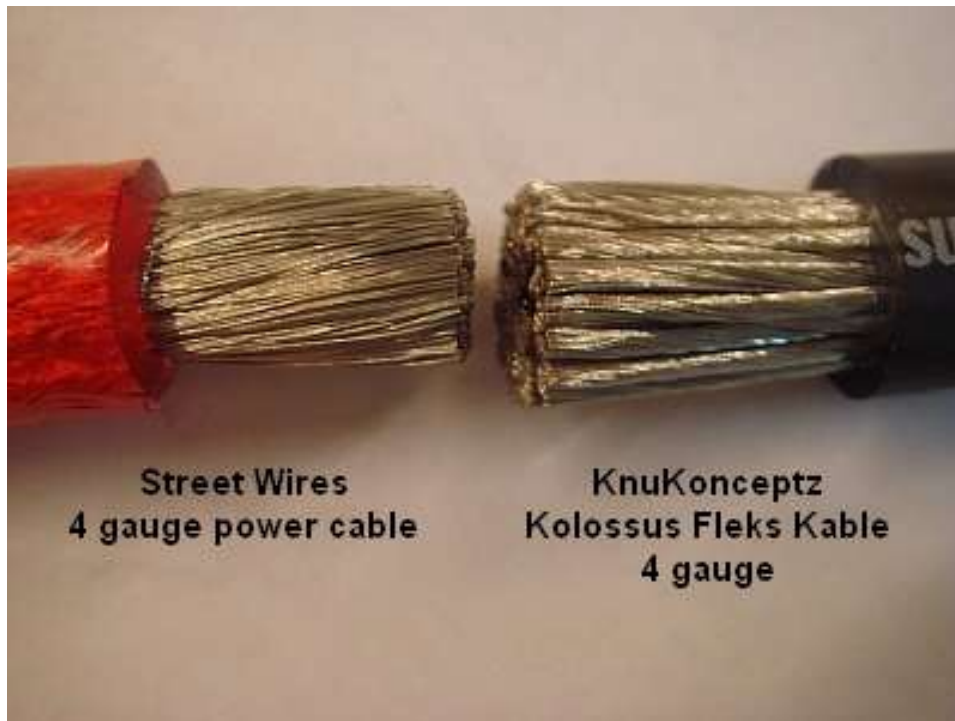


NEW ALTERNATOR WIRING UPGRADE CONFIGURATION v.4

— John Hoffman

All of the power and ground wire connections in this wiring modification use **4 gauge Kolossus Fleks Kable** by KnuKonceptz (which electrically, is actually closer to 3 gauge) It is 2068 strands of high-density, fine strand, 100% oxygen-free copper that has been tinned to prevent corrosion. It has a great outer sheath and is very flexible. I highly recommend this cable for this particular modification.

As you can see from this photo, there is much more wire in the cable to the right, even though each is the same gauge.



Battery negative terminal connections:

The 4 gauge ground wires from the negative battery terminal to frame ground and engine ground are still being used as in the original configuration, but the smaller, original factory ground wire from the battery to frame ground is now unnecessary and was removed.

In the following photo, the ground cable on the left side is still connected to the bolt of the A/C compressor mounting bracket. The cable on the right is connected to frame ground at the horn bracket mounting bolt or further down and outside the engine bay at the driver's side front tow hook bracket.



**Ground Connection
to A/C compressor bracket**

**Ground Connection
frame ground @ horn
bracket mounting bolt**



**Engine ground connection
A/C compressor bracket bolt**



I used a different type of connector, **4 gauge StreetWires Power Rings**, for these wires to increase electrical conductivity, as well as provide a stronger connection. Just one connection at the battery post to totally disconnect power.



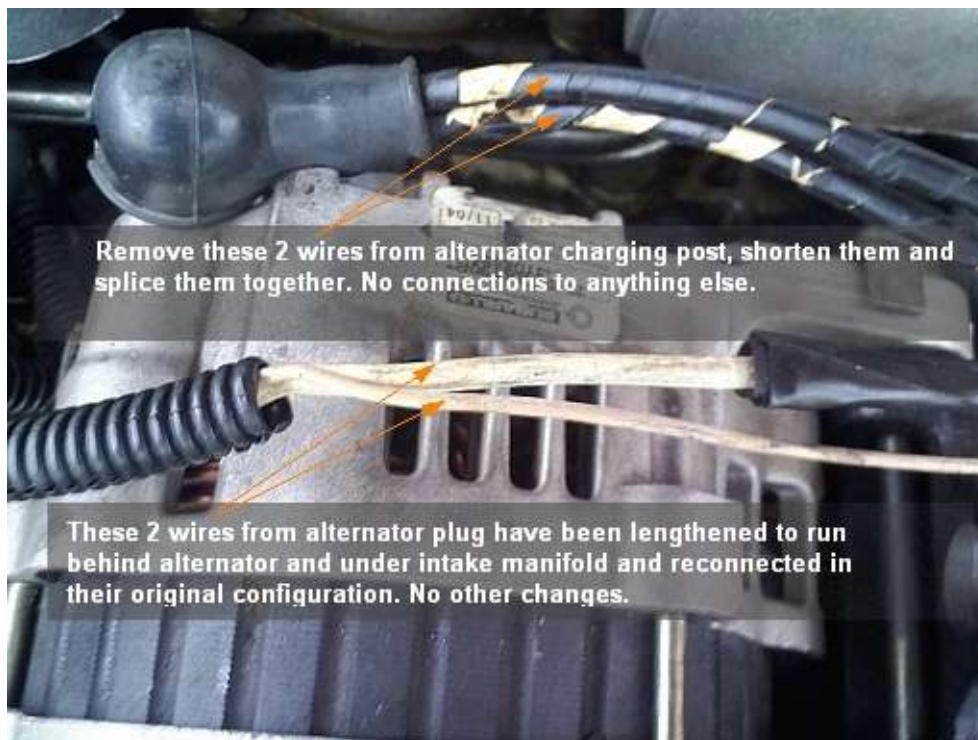
Alternator Charging Post / Alternator Plug / Battery Connections:

The plastic wiring channel which runs along the top of the engine in front of the intake manifold was opened. Inside the channel you will find two white wires with ring terminals attached to the alternator charging post. You will also find that the 2 white wires from the alternator plug on the side of the alternator runs through this channel as well. One is thicker than the other. More on that later

Once all the wires were safely removed from the plastic channel, the channel was discarded.

I removed the two white wires from the alternator post, cut off the ring terminals and shortened them almost 2 feet. One of these wires was factory-spliced into three wires close to the battery. Splice both of the white wires together, using solder or crimp connectors, protected with shrink-wrap tubing and electrical splicing tape.

The following photograph is not of my car. It was taken at to show what the stock configuration of the Subaru SVX looks like before any modifications have been done. This is what is inside that plastic channel.



The alternator plug wires were removed from the plastic channel and cut. Be sure to remember which wires are which when you add an additional length of wire to each. You can do this by doing one wire at a time. Using a longer length of wire allows you to run the wires behind the alternator and under the intake manifold and be reconnected at their original position by the battery. These wires were soldered and shrink-wrapped and encased in heat-resistant nylon expandable braided sleeving.



The same lengthening procedure was done to the two small A/C connector wires, which entered the plastic channel by the A/C compressor. These run under the intake manifold as well and are also protected with the same heat-resistant braided sleeving. They are hidden out of sight for a clean look.

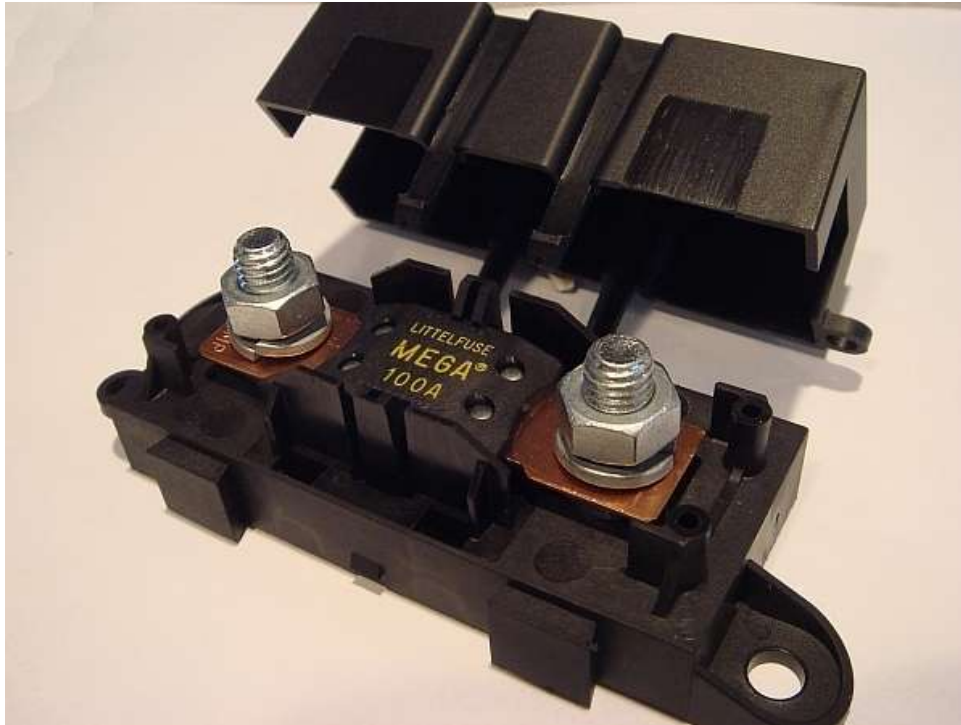
So all that remains is one single 4-gauge power wire, which runs across the top of the engine from the alternator charging lug to the positive battery post,

This single 4 gauge power wire replaces both of the original white wires originally at the alternator; one of which the original charging wire with the fusible link protection. With the two original wires disconnected from the alternator and connected only to each other, the fusible link protection remains in the circuit.



Although not necessary, additional protection is provided by a 175A Mega-Fuse. This installed as close to the battery as possible. In the event of an electrical problem, such as a short in the power wire, the fuse would blow and interrupt the circuit. If the voltage regulator in the alternator were ever to fail, the fuse would blow before damage to the electrical system could occur.

These are slo-blo fuses and will not fail during momentary high amp draw. As further testing occurs I may lower the amp rating of the fuse to 150A, 125A or 100A as needed.

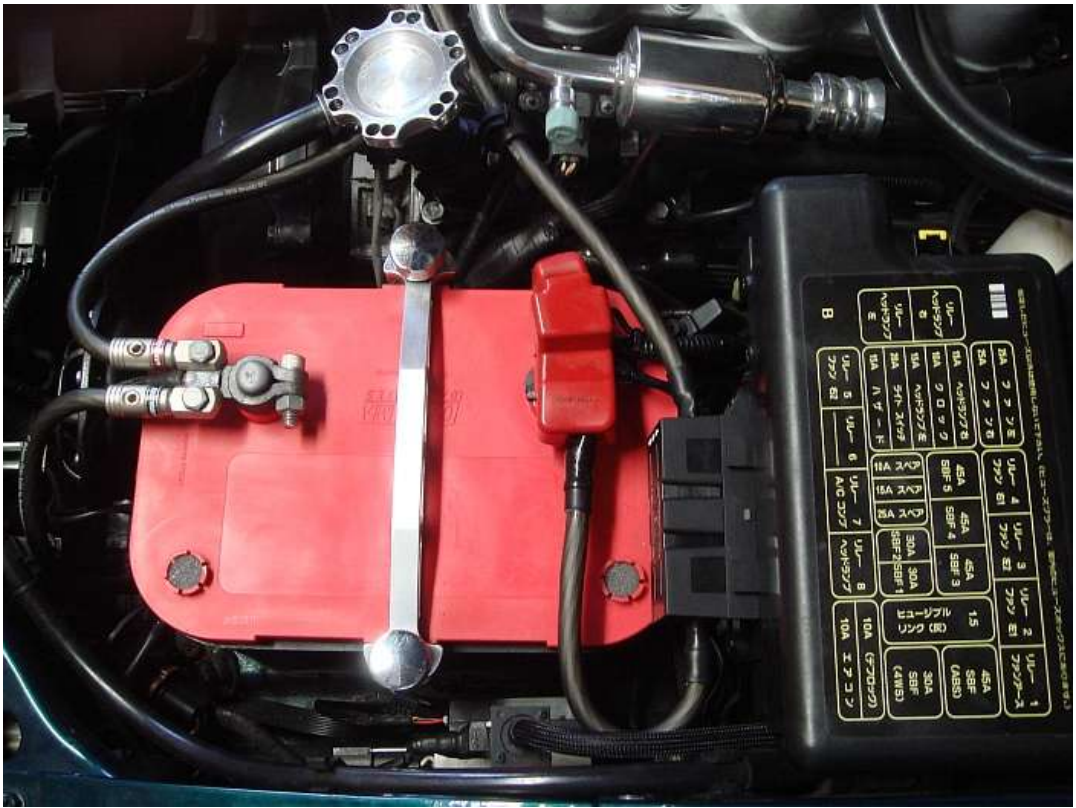


The following photos are a circuit overview of the entire wiring modification of the alternator wiring upgrade and fuse protection. It has been designed for a minimum of connections, with maximum transfer of current.

All connectors have been crimped, soldered, and sealed with heat-shrink tubing. Wire splices have been either soldered and shrink-wrapped, or use butt connectors which were crimped and covered with shrink wrap.

Electrical connections use a thin dielectric grease coating for corrosion protection.





Materials list and sources:

All 4 gauge wires are **Kolossus Fleks Kable** (which electrically is closer to 3 gauge) and is high-density, fine strand, 100% oxygen-free copper that has been tinned to prevent corrosion.

This cable runs about \$1.40 per foot. 5 feet are enough to do all three wires. **\$7.00 plus shipping**

<http://www.knukonceptz.com/productDetail.cfm?prodID=KFX4BK> or on [Ebay](#)

The heat-resistant, nylon, expandable braided sleeving used on the alternator plug wires and small A/C compressor wires is available from **CableOrganizer** in either 1/8" or 1/4" diameters. **Priced by the foot at less than .30/ft., plus shipping**

<http://cableorganizer.com/nylon/>

NOTE: If you are using this braided sleeving, the ends need to be terminated by using a match, lighter or hot knife to melt the ends and minimize fraying. Use heat-shrink tubing finish off the ends.

The battery ground wire terminals in my modification are **StreetWires 4 gauge set-screw Power Rings** are available from Crutchfield.com These run about **\$20.00 for the pair**, plus shipping.



Alternative battery ground wire set-screw terminals by KnuKonceptz can be found on ebay [HERE](#) for about **\$10.00 per pair shipped**. Ship them with the power/ ground wires and save.



These are probably as good as the Streetwire PowerLock. I ordered a set with my new cables to compare. The only difference is the size of the Allen set screw. A close of photo is below.



The price of my modification as shown is around \$75.00. You may be able to substitute some things and do it for about half of that. The Kolossus cable is a great deal for the money and highly recommended, and so is the Mega-Fuses and holder. In my application, there is not a lot of space to be able to add another kind of fuse holder close to the battery and have accessibility.

Now the heart of this system HAS to be the 160A high-output alternator, available from [Maniac Electric Motors](#). This is a top-notch rebuild which exceeds the factory unit in every way and is only \$188.00 after your core is returned.



Refer to the High-output alternator thread for much more detailed information and price comparisons. Starting around post #12

<http://www.subaru-svx.net/forum/showthread.php?t=46846>

The quality of labor and materials, the level of customer service, and the level of business ethics and integrity of this company are worthy of my highest praise. Even if you just want a stock 95A rebuild, you will get it for a lot less than you would from Subaru, with a warranty twice as long!

The Mega-Fuses by Littelfuse can be found from many sources. They are available on Ebay, Amazon.com, etc. They have ratings from 80A up to 250A. Much technical information about this fuse, the characteristics and advantages can be found in their Tech Brief below. Highly recommended is the Mega-Fuse holder

http://www.littelfuse.com/data/en/Technical_Articles/TB98-003.pdf

TEST RESULTS: 1996 SUBARU SVX

2001 Mileage: 42,000 miles

Subaru 95A alternator. The only upgrade to the vehicle for these results are: Optima "red top" battery 34-980 with 1000CA, 800CA, Reserve: 100, 4 gauge wire upgrade.

Start-up voltage in the morning, cold engine: 14.5 volts

Normal highway speeds, stereo on, no A/C: 14.1 volts

Normal highway speeds, high electrical load (high and low beams, stereo, rear defroster, air conditioning): 13.8 volts

700 rpm idle, no load: 13.9 volts

700 rpm idle, high electrical load: 13.3 volts.

My last test was turn on everything that could possibly be turned on. This full load included everything mentioned above plus hazard flashers, cruise control, room and map lights, heated mirrors, and front and rear wipers.

At highway speeds, voltage was 13.5 volts. At 750 rpm idle: 12.2 volts.

2008 Mileage: 110,000 miles

Start-up voltage in the morning, cold engine: 14.3 volts

Normal highway speeds, stereo on, no A/C: 13.4 volts

Normal highway speeds, high electrical load (high and low beams, stereo, rear defroster, air conditioning): 13.2 volts

750 rpm idle, no load: 12.4 volts

The last test was turn on everything that could possibly be turned on. This full load included everything mentioned above plus hazard flashers, cruise control, room and map lights, heated mirrors, and front and rear wipers.

At highway speeds, voltage was 12.9 volts. At 750 rpm idle: 11.8-12.0 volts.

As you can see, readings had deteriorated over the years, probably due to an aging battery and increased resistance due to corrosion and internal resistance of the wires with age.

On March 24, 2009, after the 160A high-output alternator installation and the new 4 gauge wiring upgrade, things were a little better, but not as much as I had hoped.

Start-up voltage, cold engine: 14.3 volts

Normal highway speeds, stereo on, no A/C: 13.5-13.8 volts

Normal highway speeds, high electrical load (high and low beams, stereo, rear defroster, air conditioning): 13.3 volts

750 rpm idle, no load: 12.6 volts

750 rpm idle, high load: 12.1 volts

I hadn't experienced any problems with my Optima battery; however, the battery was over 8 years old. Was a weak battery causing these unsatisfactory readings?

I had the battery load-tested and indeed it was bad. After replacing the battery with another Optima Red Top, the readings were much improved.

Start-up voltage after battery install, cold engine: 14.5 volts

Normal highway speeds, stereo on, no A/C: 13.9 volts

Normal highway speeds, high electrical load (high and low beams, stereo, rear defroster, air conditioning): 13.8 volts

750 rpm idle, no load: 13.6 volts

750rpm idle, high load: 13.4 volts

Testing your charging system with a weak battery causes poor results. All testing on charging and starting systems require a good and fully charged battery.