

Wiring Harnesses and More

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Stock Fiero Harness Differences

- How many are there?

Simple answer, too many to list or keep track of!

- So, what do we do about that?

Gather the resources needed for our application

Stock Fiero Harness Differences

- Where to find information
 - Factory Service Manuals
 - Online Service Manuals
 - i.e. Alldata diy
 - 19.99 Month, 59.99 1 Year, 129.99 3 Years
 - <http://fieroinfo.com/> - many thanks to Cowspatoot

Stock Fiero Harness Differences

- (L4 VIN R) vs (V6 VIN 9)
 - Fuel Injection wiring
 - The L4 injector shares the ECM fuse which passes through terminal F in C203
 - The V6 Injectors have one fuse per bank which passes through terminals J & K in C203
 - C203 is the stacked connector located behind the center console below the ECM
- Basic Differences between years
 - 84 models- C500 is on the Firewall
 - 86 GT models – Backup lamp wiring MT
 - 88 models – Fuel injection – engine cooling fan

Stock Fiero Harness Differences

- Difference between manual and Automatic
 - Back-up lamp switch
 - Crank (start) signal
- Proper grounding
 - Adding grounds
 - Cleaning grounds
 - Improve current ground connections

Swap Harnesses

- C203 and C500 tie-ins
- PCM application
- Common issues
- Troubleshooting and repair

C203 and C500 Connections

| C203 | | |
|---------------|-------------------|------------------|
| D | AC Relay, 85 | |
| E | Fiero Oil Send, A | |
| N | AC Relay, 30 | |
| J | TCM 31 | A/T |
| J | Trans Plug, E | A/T |
| K | StpLmp Relay, 30 | A/T |
| K | STA 1000, B+ | A/T |
| C | C1, 12 | MIL |
| G | C1, 39 | ECM VSS |
| G | STA 1000, VSS | STA 1000 VSS |
| C500 | | |
| E2 | Starter plug | M/T |
| C1 | Rev, B,2 | M/T |
| E1 | Rev, A,1 | M/T |
| D1 | C3, 49 | Cooling Request |
| C2 | ECT, C | Fiero Temp Gauge |
| C3 | C1, 25 | ECM Tach |
| C3 | Sta1000 Tach | Sta 1000 Tach |
| A4 | G, Neut Safe | A/T |
| Pin E Net/Saf | Starter plug | A/T |
| C1 | Pin B Net/Saf | A/T |
| E1 | Pin F Net/Saf | A/T |

| 2007 Impala SS E67 ECM Pinouts for LS4/F40 installation into 88 Fiero | | | | | Revision 2 - 10/18/2012 |
|---|------------|---------|---|----------------------|--|
| Fiero 203 Connector for LS4/F40 install | | | | | |
| Pin | Wire Color | Circuit | Function | Used in LS4/F40 Swap | Connection Point |
| A | Tan/Blk | | Upshift Indicator Lamp Control Feed | Not Used | |
| B | Org | | Fuel Pump fused 12V + power supply from fusebox | YES | Pin D, Fuel Pump Relay |
| C | Brn/Wht | | Service Engine Soon lamp control feed | YES | C1, Pin 12 - MIL Control at ECM |
| D | Lt-Blu | | A/C Request (12V + when A/C is selected at HVAC head) | YES | Pin A of A/C Relay |
| E | Tan | | Oil Gauge sender signal | YES | To 2nd Oil Pressure Sender @ oil pan |
| F | Pnk/Blk | | Fused ECM 12V Ignition Power (ECM Fuse) | YES | 15A Fuse - ECM, TCM & Buffer Circuit |
| G | Yel | | VSS High | YES | C1, Pin 39 (TBSS) though buffer circuit |
| H | Brn | | VSS 2000 PPM feed to Fiero ECM | Not Used | |
| J | Pnk | | Injector 2 Fused 12V ignition power | YES | 20A Fuse - Connect to Coils and Injectors 1, 3, 5, 7 |
| K | Pnk | | Injector 1 Fused 12V ignition power | YES | 20A Fuse - Connect to Coils and Injectors 2, 4, 6, 8 |
| L | Tan/Wht | | 12V + Power Feed to Fuel Pump from Relay | Not Used | Pin B of Fuel Pump Relay |
| M | Blk | | VSS Speedo Ground (connect to engine ground) | YES | Connect to GROUND |
| N | Blk | | A/C Relay Clutch 12V + power feed (hot when HVAC is on A/C) | YES | Pin D of A/C Relay |
| P | Ppl | | TCC Brake Switch Feed | Not Used | |
| R | Ppl | | VSS low | YES | Connect to GROUND |
| Fiero 500 Connector for LS4/F40 install | | | | | |
| Pin | Wire Color | Circuit | Function | Used in LS4/F40 Swap | Connection Point |
| A1 | Blk | | Trunk Release Feed | Not Used | |
| A2 | Blk | | Engine Ground | YES | Connect to GROUND |
| A4 | Yel | | Starter Solenoid Control (Auto) | Not Used | |
| B3 | Brn | | Generator Control (gauge) | YES | Splice into O6 wire at alternator connector |
| C1 | Dk-Blu | | Backup Lamp fused 12V Ignition Feed | YES | Connect to F40 Backup switch |
| C2 | Dk-Grn/Yel | | Temp Gauge Sender Signal | YES | Pin C on 1998 3 Wire ECT sensor with analog guage output |
| C3 | Wht | | Tach Feed | YES | C1, Pin 25 (TBSS and CTSV Tach output) |
| D1 | Dk-Grn/Wht | | Fan Request coolant temp switch | YES | C3, Pin 49 (D-GN.WH) - ECM low speed fan output |
| D2 | Lt-Grn/Wht | | Fan Request (for dual speed models) | Not Used | |
| D3 | Dk-Grn | | "Hot" temp warning light signal | Not Used | |
| E1 | Lt-Grn | | Backup Lamps control feed from transmission switch | YES | Connect to F40 Backup switch |
| E2 | Ppl | | Starter Solenoid Control (Manual) | YES | Connect to Starter |
| E3 | Pnk | | Ignition B+ power feed for Coil | YES | 15A fuse - Connect to MAF & DOD solenoids |
| OBD2 Data Link Connector for LS4/F40 install | | | | | |
| Pin | Wire Color | Circuit | Function | Used in LS4/F40 Swap | Connection Point |
| 1 | D-GN | 5060 | Goes to splice pack for Low Speed GMLAM communication | Not Used | |
| 4 | BK | 1450 | GROUND | YES | GROUND |
| 5 | BK/WH | 1551 | GROUND | YES | GROUND |
| 6 | TN/BK | 2500 | High Speed GMLAN Serial Data Bus + | YES | TCM Pin 7 |
| 14 | TN | 2501 | High Speed GMLAN Serial Data Bus - | YES | TCM Pin 6 |
| 16 | RD/WH | 1840 | 12V + Power Feed for Code Scanner | YES | Fiero 203, Pin F (same as ECM, TCM and VSS Buffer) |

Stock LS PCMs

- E38 is a 2 plug PCM used on 58X cars. E38 uses an LS2 timing cover but can be used on the LS4. 3 bolt 4X cam gear generally
- E67 is a 3 plug PCM also used on 58X cars. This is what a LS4 donor car would come with in the second half of 2006 and up. 1 or 3 bolt cam gears can be used as long as they are 4X.
- E40s came in the early version of the LS4s and are 24X. Also a 2 plug PCM, but are not interchangeable with the other PCM connectors. 3 bolt Cam gears, but are 1X



E38 ECM, used in 07+ New Body Pickups with 4.8, 5.3, 6.0, 6.2 engines. For 58x crankshaft reluctor engines.



E40 ECM, used in 2005 LS2, maybe others. For 24x crankshaft reluctor engines



E67 ECM, use in a lot of 06+ Cars with v6 & v8's. For engines with 58x crankshaft reluctor.

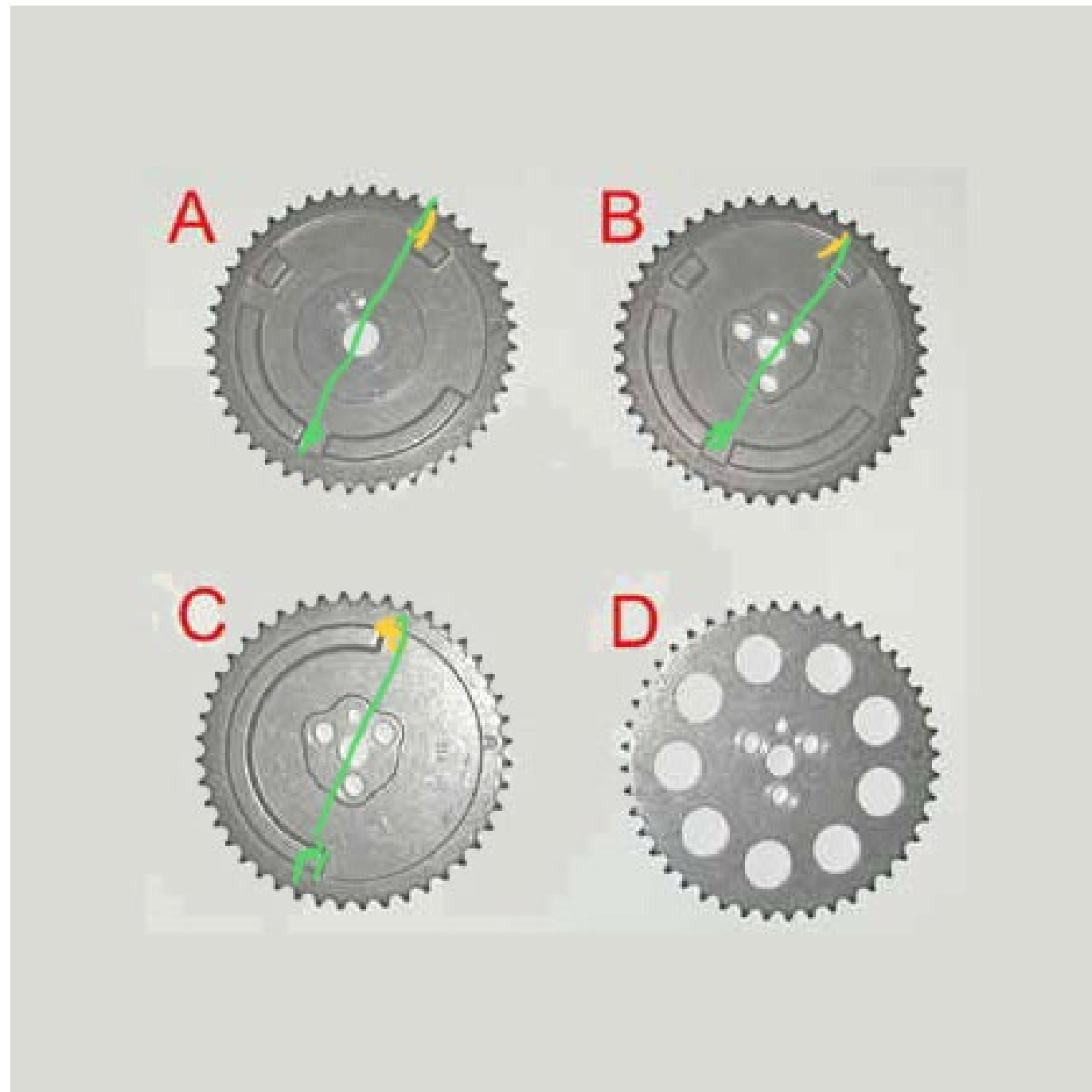
A: single Bolt 4x / 58X reluctor – Newer engines

B: 3 bolt 4x / 58X reluctor – Other LS versions

C: 3 bolt 1X / 24X reluctor – Early Gen IV

D: 3 bolt - Gen III

Green lines are drawn to show the cam gear alignment with the Cam sensor. This is important because the OS is different on the LS4 from the other LS OS



What this all means for your swap???

It all boils down to this – you have to use the correct parts together.

- Some parts are interchangeable, like the knock sensors, but cam and crank are not
- Firing order for all LS engines are the same (1-8-7-2-6-5-4-3) OS is different on the LS4 PCM and fires on #6 first - reason for different timing cover. E38s do not come with the correct OS
- LS2 and LS4 timing covers have the cam sensor 180 off from each other for clearance from the pulley and belt path. If you use the E38 with the LS2/3 timing cover, you **must** use the correct cam sensor also. The thickness or depth of the cam sensor is different between the 2 due to the shorter crank on the LS4

| <u>PCM</u> | <u>Crank Reluctor</u> | <u>Cam Gear</u> | <u>Cam / Crank Sensor</u> | <u>Cover</u> |
|------------|-----------------------|-----------------|---------------------------|--------------|
| E40 | 24X | 1X | Black / Black | LS4 |
| E38 | 58X | 4X | Light gray or tan | LS2/3 |
| E67 | 58X | 4X | Light gray or tan | LS4 |

Stand-alone Systems

PSI Harnesses – Pros - All new, good quality, affordable and still uses stock LS PCMs / Auto or Manual specific

Cons – Fit is meant for RWD setups, need to tie in the C203 and C500 connections, voids warranty if modified

Holley Performance –

- Best option for boosted applications, integrated boost controller and 2-step. Comes with pressure sensors that are common to both fuel and oil, more versatile than stock PCMs

Terminator X or X MAX – Main difference is DBW for X MAX. Single turbo or supercharger

Dominator – Similar options to Terminator but much more channels for expandable capability to run additional sensor for twin turbo. Almost too much capability for a street car, more race oriented

FiTech – Still a good off the shelf system, not as much support as Holley, and not as much versatility

Troubleshooting & Repair

- Common Issues
 - Most issues come when using a stock LS4 harness
 - Wrong / Bad sensors
 - Tuning
- Troubleshooting
 - OBDII code reader
 - HP Tuners
 - Multi-meter / Power probe/ Test light
- Repair
 - Fusible links
 - Repair of damaged wire

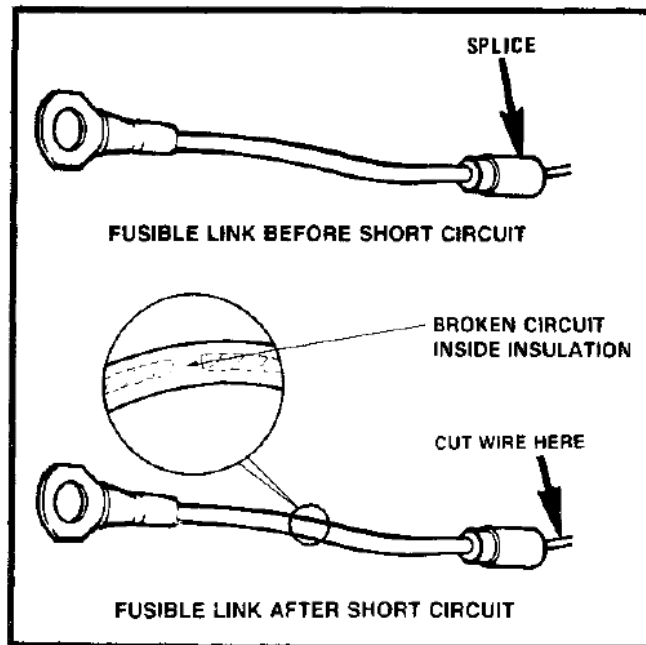
Troubleshooting & Repair

General guidelines for choosing a suitable fusible link!

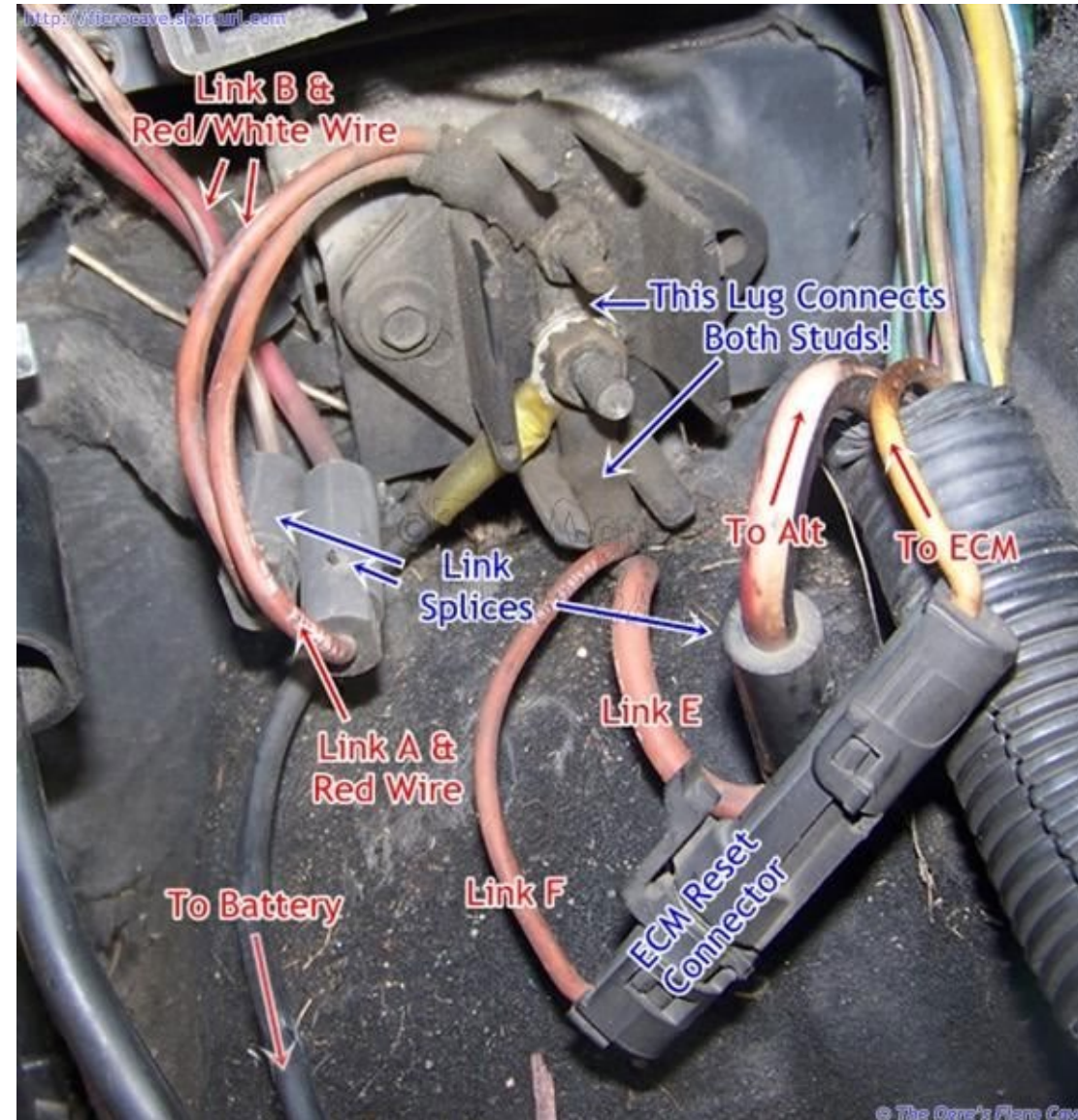
Typically, a given harness segment is protected by fusible link that is four gauge numbers smaller.

A 14-gauge wire would be protected by an 18-gauge fusible link. A 6-gauge wire would be protected by a 10-gauge link.

The length of a fusible link should not exceed 9".



Fusible links, Located below C500, in the engine bay



Troubleshooting & Repair

Repairing a damaged wire

- Factory recommended way
 - Cut, strip, overlap, crimp, solder, protective wrap
- Best non-service tech way
 - Cut, install marine grade heat shrink, strip, clean copper, twist, solder, shrink heat shrink tubing
- Things to avoid (especially in the engine bay)
 - Barrell connectors (Butt)
 - Scotch Lock Quick Splice Connectors
 - Twisting wires together then wrapping with electrical tape

| METRIC WIRE SIZES | AWG SIZES |
|-------------------|-----------|
| .22 | 24 |
| .35 | 22 |
| .5 | 20 |
| .8 | 18 |
| 1.0 | 16 |
| 2.0 | 14 |
| 3.0 | 12 |
| 5.0 | 10 |
| 8.0 | 8 |
| 13.0 | 6 |
| 19.0 | 4 |
| 32.0 | 2 |