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## Jeep JK GEN5 LT

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1-10-23

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# G5 INSTRUCTIONS INFO

**These instructions are still being revised. You may see some info from the GEN4 LS. As we move forward we will make changes and update pictures.**

**If you can, please make notes and let us know what info you need more of, or more details so we can add them in the next revision.**

**If you have good pictures of something that you think we should add, please send it to use with a description and we will add it into the next revision.**

**Also remember that this is a work in progress and not all aspects of the swap are spelled out and some the parts you will need may not be listed. Its our understanding that you have the capabilities to tackle any issues that may arise. We will help you every way we can, but please work with us before going onto the internet looking for answers or commenting on the kit.**

**Our goal is to make it as plug and play as our GEN4 conversions so any feedback is appreciated.**

**My direct email is [rpmextreme@me.com](mailto:rpmextreme@me.com)**

**Jon Schaefer**

# Overview

## *Please Read Before You Start This LT Conversion*

We recommend reading all instructions before beginning any work. These instructions assume you have a substantial amount of mechanical ability and therefore are not intended for a novice or someone without automotive repair experience. We assume no liability for installation. If you don't feel comfortable installing this kit please refer to a shop that is qualified doing engine swaps.

These instructions have been written for shops or DIY individuals with experience in general mechanics and welding. RpmExtreme also assumes that this kit will be installed in a shop environment with access to general shop equipment. If you are not familiar with JK systems, please reference the Jeep Service Manual.

The powertrain will sit in a different location and will require different driveshafts. We recommend you complete the install and then measure for new shafts with the vehicle at ride height.

You may wish to complete the outlined steps below in any order you so choose. We will try to lay them out in a logical order but you can jump around as your build progresses.

WHILE ALL CORRECT EMISSIONS EQUIPMENT IS DESIGNED TO BE INSTALLED WITH THIS KIT, THIS KIT MAY STILL NOT BE LEGAL FOR ON-ROAD USE IN ALL STATES OR COUNTRIES AND AS IS CURRENTLY INTENDED FOR OFF-ROAD USE ONLY. IT IS THE USERS RESPONSIBILITY TO COMPLY WITH ALL REGULATIONS.

WE DO NOT RECOMMEND ANY MODIFICATIONS TO ENGINE OR TRANSMISSION. TECH SUPPORT CAN NOT BE PROVIDED FOR ANY CONVERSIONS USING AFTERMARKET PERFORMANCE PARTS INCLUDING BUT NOT LIMITED TO CAMSHAFTS, HEADS, EXHAUST MANIFOLDS, AFTERMARKET EXHAUSTS, INTAKES, THROTTLE BODIES, PERFORMANCE ECU CALIBRATIONS, STROKER KITS, SUPERCHARGERS, TURBOCHARGERS, SHIFT KITS OR ANY OTHER NON PRODUCTION ITEM.

# Prepping your Jeep

Start off with a good pressure wash. Clean everything in the engine bay and underneath. Verify that all your factory options are working prior to the conversion. If you have problems with the cruise control or clock spring stock you will end up with TAP shift and cruise issues after the swap. We rely on all the factory Jeep stuff working.

If you have a aftermarket tuner or supercharger system take the time now to restore the Jeep computer back to stock. Im sure if you have a supercharger/Turbo you will want to sell the unit with the tuner. As far as your Jeep goes, after the LT swap you will not need to adjust for any gear changes on the Jeep side but you will need to adjust for tire size. The speedometer is still ran thru the Jeep side so calibrating for tires size will correct the speedometer. This can be done with a simple flash cal or AEV pro cal. The correct gearing and tire size will need to be programed into the GM computer for proper operation. This is usually done when we program your ECU so please include your tires size and gear ratio. If you change tire or gear ratio the GM ECU can be adjusted. Contact us for info. Usually we see only minor shift point issues with incorrect info but they will do best with everything dialed in.

Go ahead and reset the oil life monitor and record your mileage prior to the conversion.

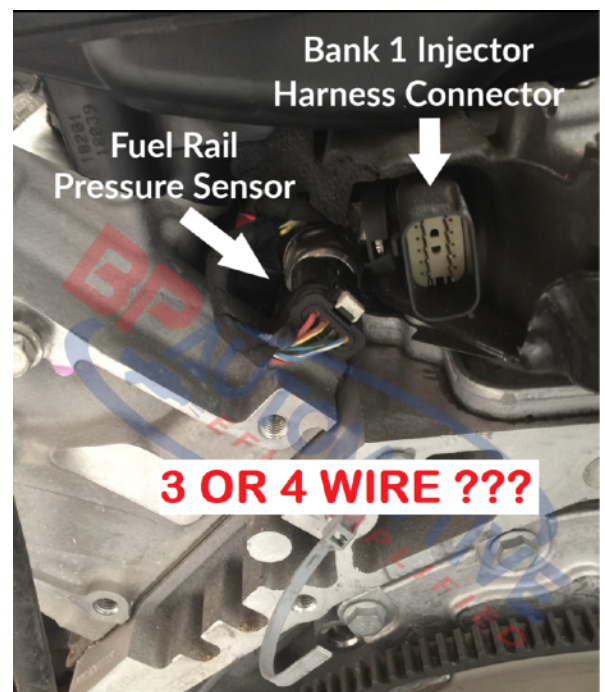
\_\_\_\_\_ Miles. \_\_\_\_\_ Date.

Take a look at any aftermarket items you have added especially wiring and lights. During the install will be a good time to clean up any wiring and route them with the frame or body. Our conversion is compatible with a sPod and is recommended if your running a lot of lights or 12 volt items.

\*\* Now is a good time to verify if you have a 3 wire or 4 wire fuel rail pressure sensor. The FRPS can be found at the back of the engine under the intake manifold on the drivers side.

4 wire sensors can only be used with 2014-2016 ECUs and 3 Wire sensors are for 2017+ ECUs. We prefer to run the 3 wire sensor and 2017 ECU with our conversions.

The 3 wire sensor part number is # **12684286**



# Supported Powertrains

We are currently supporting the GEN5 GM truck engines from 2014-2018. We support the L83 5.3 and L86 6.2 engines. Our conversion supports a 6L80E or 8L90E transmission with a truck calibration. If you have questions about this please contact us.

We support the factory Jeep 241J (non Rubicon) transfer case as well as an Atlas. The 241OR case that comes in the rubicon is not currently supported. The 241J that comes in 2012 and newer automatics is not supported and will have to be replaced with a earlier (07-11) 241J or one that was behind a 12-18 Manual trans..



# Operation

## *Operating your new LT powered Jeep*

Your new LT powered Jeep will operate very similar to what your used to but with a lot more power and drivability.

All of your gauges will operate as stock but the PRDNL will now display up to 6th or 8th gear.

The check engine light will illuminate if there is an issue on the GM side.

Tachometer and coolant temp are controlled from the GM side and will indicate current engine conditions.

The fuel gauge is controlled from the Jeep side same as before.

The speedometer is controlled from the Jeep side same as before.

Your AC and heater will operate same as before.

Your remote start (if equipped) will operate same as before.

Your cruise control will operate same as before but will also control the TAP shift.

TAP shift is a GM function of the transmission and allows driver commanded gear selection. To use this feature you will put the shifter in manual mode. Manual mode is 1 position below drive. for the guys with 07-11 this position will be 2nd gear on your shifter, for the 2012+ guys it will be in the furthest back drive position and will allow bump shift left and right. Once in manual mode you will see the current gear shown on the dash, you can use the cruise control to tap up or down thru the commanded gears. Pressing **set** will downshift and pressing **resume** will up shift. This option will be locked out when you have the cruise control turned on so we don't get overriding signals. Optionally we offer a upgraded cruise switch for 2011 and newer that has **GEAR+** and **GEAR-** buttons and the GEAR buttons will operate during cruise operation. For 2012 and newer shifters you have the ability to tap up and down with your factory shifter and this mode will operate during cruise control.

In manual mode the transmission will only shift up to the highest commanded gear. If you command 5th gear it will shift from 1-2-3-4-5. If you are driving and put it into manual mode it will indicate the current gear and wont shift any higher unless you tap up. You can also tap down to force a downshift but use caution when downshifting too much as you will get compression breaking and could over rev the engine or lose traction.

GM has some protections built in to avoid downshifting too aggressively but I would still be careful on wet pavement.

TAP shift is useful when offroad. Select manual mode and you can command 1st or second gear for slower offroad driving and more control. Most calibrations support 2nd gear start, select manual mode and from commanded 1 tap it up to 2 before you start moving, at this point it should start in 2nd and stay in 2nd making it very useful for loose terrain. More information can be found online or a GM truck owners manual.

If you have a Rubicon your lockers will operate same as before

If you have factory NAV it will operate same as before and the speed indicated will be from the Jeep. So as long as the Jeep speedo is calibrated the NAV will be accurate.

You're factory backup camera will operate as before and any aftermarket radio can use the factory CAN messages for reverse and parking brake.

If your converting from manual to auto the dash will indicate like a factory automatic and the shifter will plug in and operate like factory with shift interlock functional (07-11) only.

ABS will operate same as before

Traction control and ESP will not operate as there is no connection to the GM side to reduce throttle during wheel spin.

Fuel mileage indicator will not be accurate and will usually read much higher than actual.

The factory security system is intact and will still operate as well as the security key.

# Option Programing

## EZcanbus OBD2 Programing

Our system has the ability to reprogram special TIPM options thru the Jeep OBD2 port.

This will save you time and money by not having to send any Jeep parts to us for reprograming.

You can do the EZcan option programing before you tear down the Jeep or once you are done with the conversion. Basically this programing will set some option codes and turn off the Traction light on the dash. This has nothing to do with how the engine runs.

Start by connecting the supplied OBD2 connector harness to the X101 plug on the EZcanbus module.

Plug in the OBD2 connector the the port under the dash.

Turn on the key and wait 5 seconds.

Press the button on the connector and wait 5 seconds.

Press the button for a second time and the horn should begin to honk. \* The horn may not honk on some Jeeps, this is normal and doesn't mean the process didn't work.\*

Once the horn stops go ahead and turn off the key and remove the connector from the Jeep.

Remove the harness from the X101 plug and save the harness for future use.



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# Tuning with HP Tuners

There are two tuning options that we may send with our kits depending on how you ordered it. One option is a RTD and the other is a MPVI. Both are from HP Tuners and give us the ability to read and write calibration files to the GM ECU & TCM as well as Datalog how the engine is performing.

## MPVI

With the MPVI you will need a windows based laptop with an internet connection.

Instructions for using the MPVI can be found on our website [HERE](#)



## RTD

With a RTD device you will use a cell phone to READ, WRITE and DATALOG.

This makes it more user friendly and doesn't require a laptop to use.

Instructions for tuning with a RTD can be found [HERE](#)

IOS user guide for RTD can be found [HERE](#)

Android user guide for RTD can be found [HERE](#)



If you are reading this from the manual and not from the PDF then you can access the info at <https://www.rpmextreme.com/Page/90/HP-TUNERS-INSTRUCTIONS.aspx>

# GM Tuning Options MPVI - RTD

## HP TUNERS MPVI2+ MPVI3

The MPVI is a full calibration device with a top notch scanner software function. This is the same software that we use in house as well as 1000s of other tuners. You will need to purchase the HP Tuners MPVI2 or RTD from our website or have ordered it with your kit.

<http://www.rpmextreme.com/Product/267/HP-Tuners-MPVI2.aspx>

From there you can “tune” as many vehicles as you want by purchasing credits directly from HP Tuners website. Most vehicles require 2 credits at \$49 EA. Once you license a vehicle you can tune it as much as you want without purchasing any additional credits for it.

This software is not meant for a novice. It has the ability to make almost every change in the ECU-TCM and you could really mess stuff up if your not careful. With that being said we will walk you thru the first few tunes and will provide a “BASE” tune to get you started.

The scanner software can read every parameter in the vehicle and display it as gauges, graphs or charts. It comes in very handy when tuning or diagnosing a vehicle.

You can also save a data log and email it to us or a tuner of your choice for review.



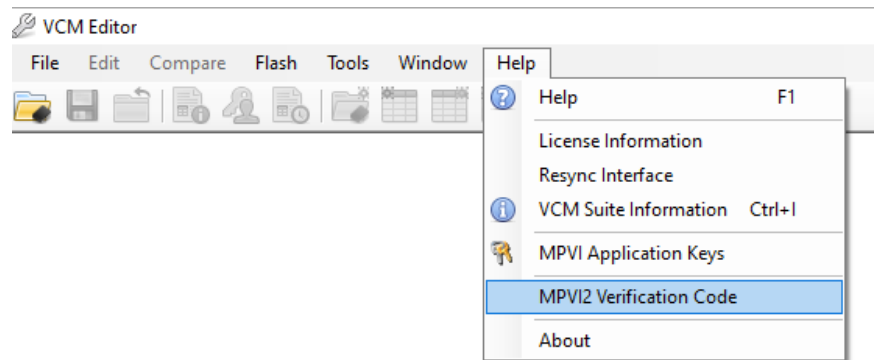
# MPVI2+ MPVI3 ACCOUNT AND DEVICE SETUP

You will need to go onto HP Tuners website ( [www.hptuners.com](http://www.hptuners.com) ) to create an account and download the software.

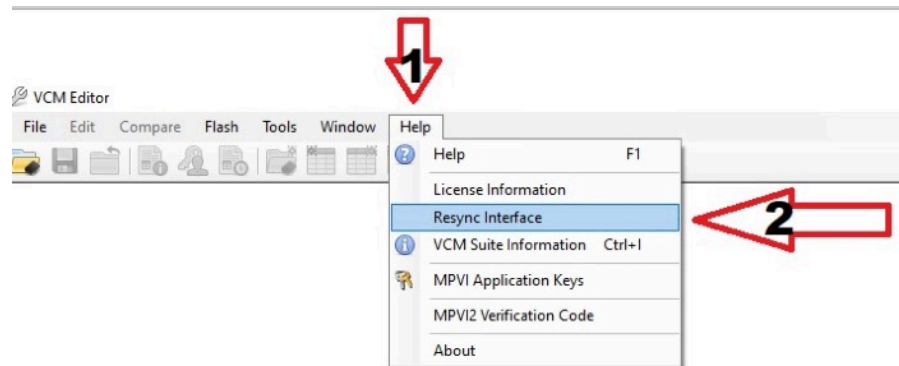
Once you have an account setup you will want to add your device. Click on your name at the top of the screen, this will take you to your account page. On the left side you will see a box called “MY DEVICES” click on it. From there you will scroll down and find the box labeled “MPVI2+/MPVI3” Input your serial number that is found on the back of the device, then input your Verification ID and then click “IMPORT” this will add the device to your account.

To find your Verification code you will need to have the software installed and the device plugged into your PC.

Open the Editor and click on help.  
From there click on MPVI2  
Verification code. It will then show  
you the code. Take this code and  
input it into your account on the HP  
Tuners website.



Once that is complete and you have  
your device registered on the website  
you can “sync” the device. Click  
“Help” and then “Resync Interface”.  
Now the credits should be loaded and  
the device is ready to use.

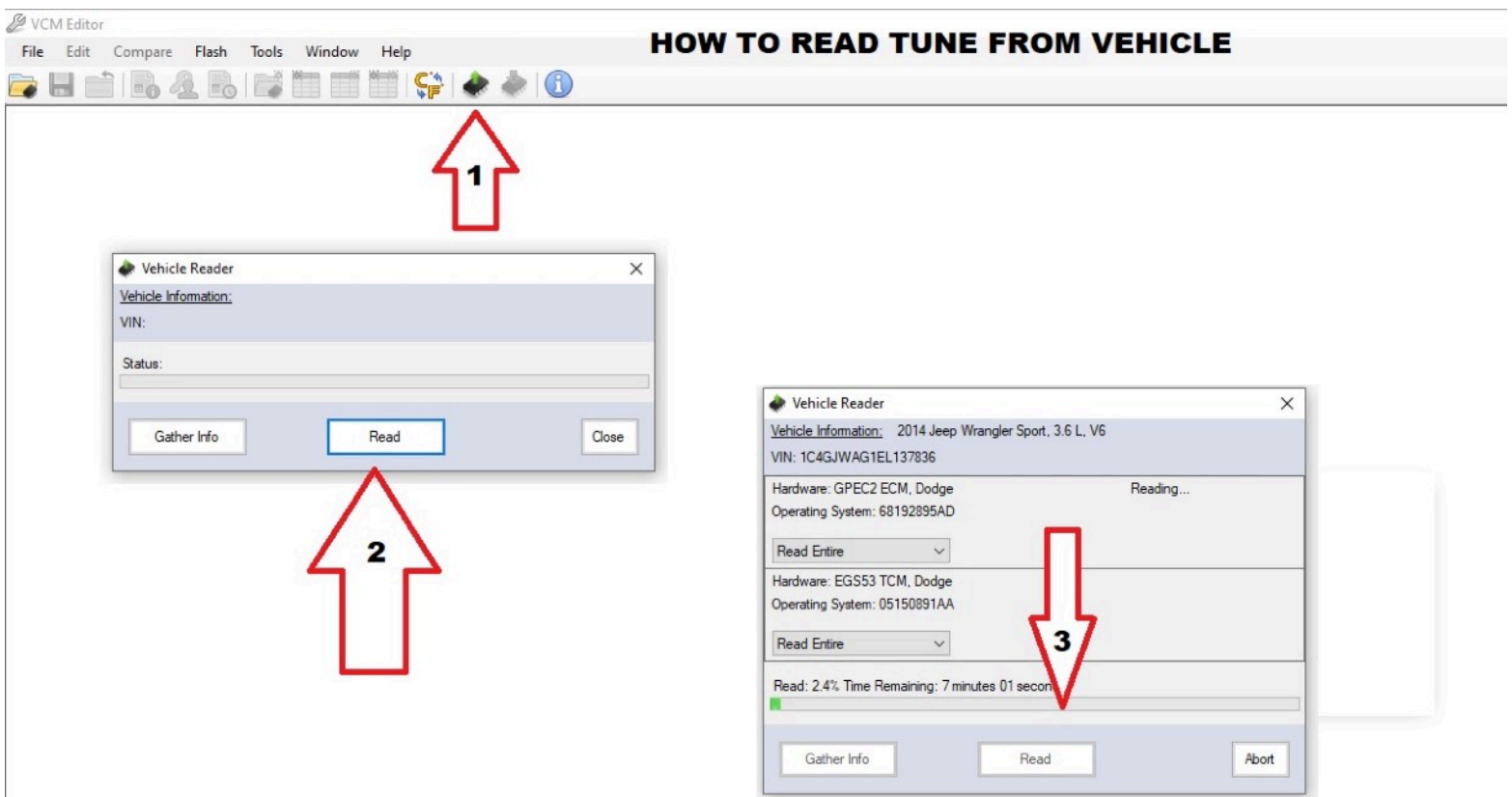


## RESYNC INTERFACE

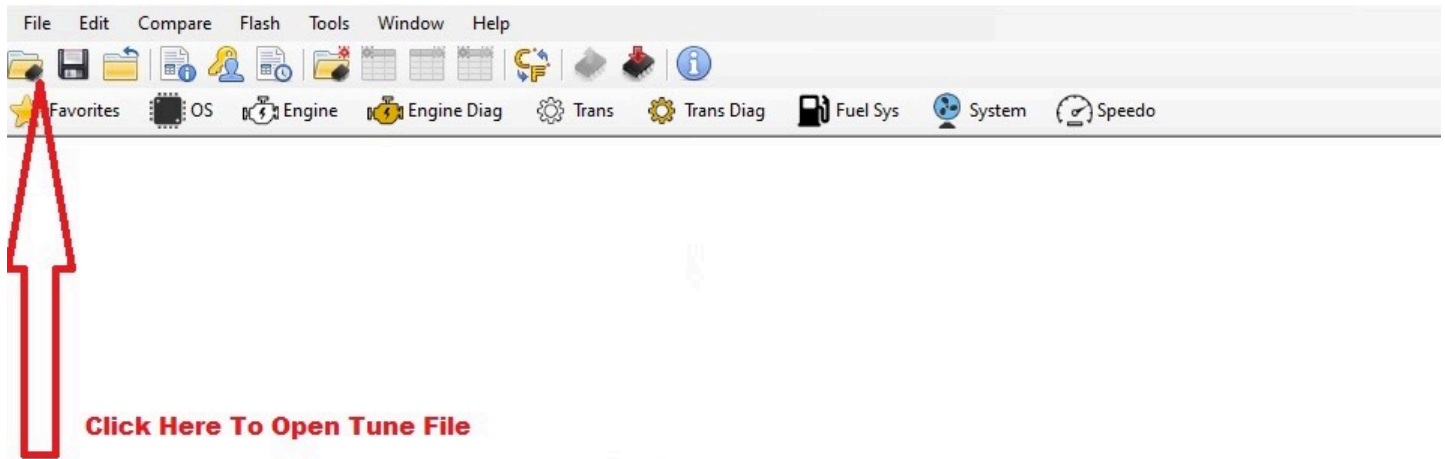
## MPVI2 READING AND WRITING CUSTOM TUNES

You will need to “READ” the stock tune from the vehicle first.

Make sure the battery is fully charged and everything is hooked up on the vehicle. Plug the HP Tuners device into the GM OBD2 port. Turn the key to “RUN”. Open the the EDITOR software and click on the icon with the computer chip with the up arrow and then the box that says “READ”. It will now read the tune file that is in the vehicle. Let it read both the ECU and TCM, once it is complete it will pop up and ask you to save the file. Save this file in a folder where it will be easy to find. Name it something like “stock-5.3-read” so you know its the stock read file. From there you will email the stock file to us ( [info@rpmextreme.com](mailto:info@rpmextreme.com) ) along with your info, (TIRE SIZE), (GEAR RATIO) and a list of any mods you have done to the engine or trans. We will make a custom tune file and email it back to you. Once you get the custom file save it in the folder with your stock tune.

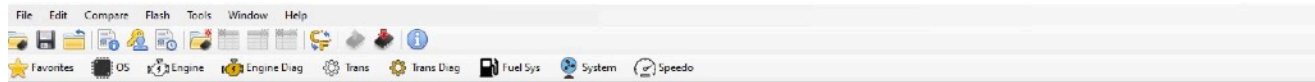
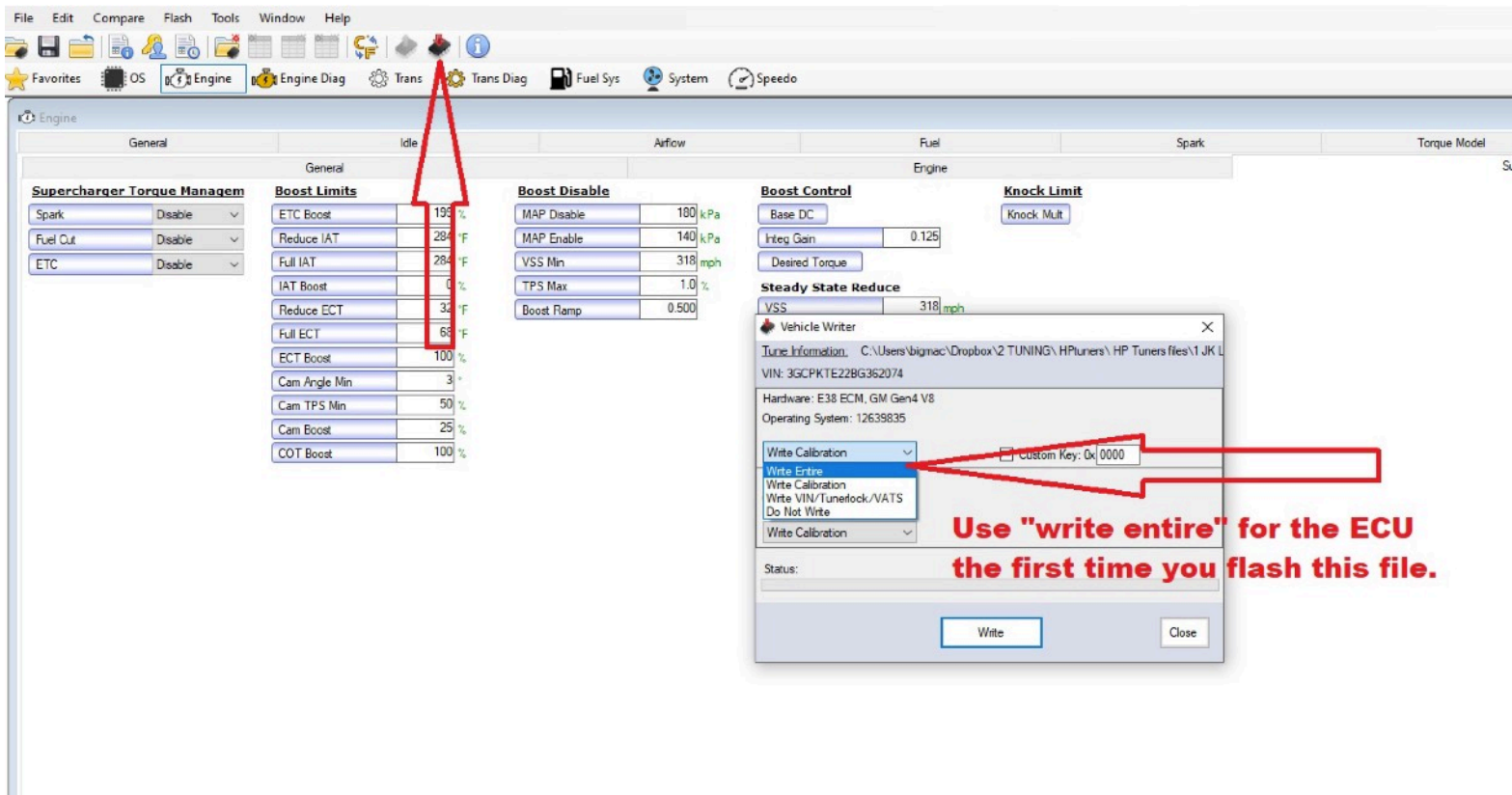


To write the custom tune to the vehicle you will need to open the file in the HP Editor. At the top click “FILE” and “OPEN”, select the custom tune. You will see it listed at the top of the page.



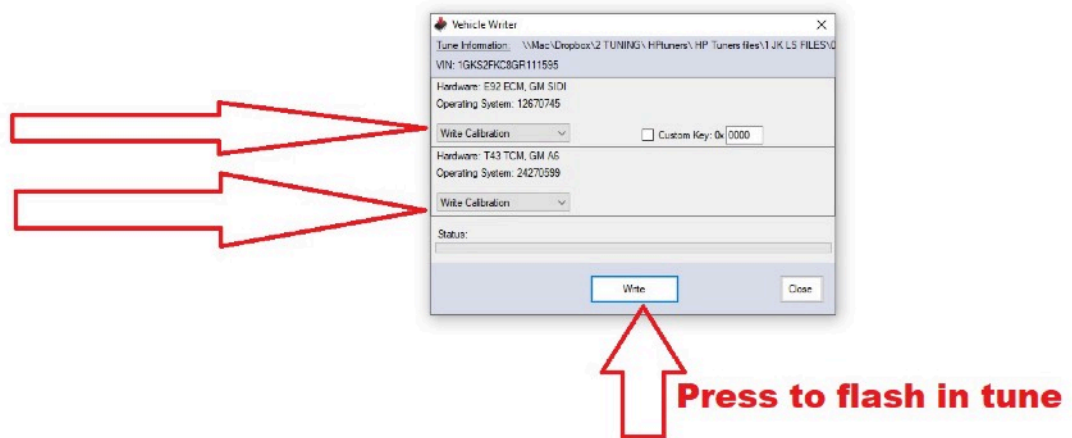
To write the custom tune to the vehicle you will click on the computer chip icon with the down arrow. A box will pop up asking to license the file. You will select to license it. You only have to do this once. Once it is licensed there will be a box showing the ECU and TCM with drop down boxes. In the ECU box use the drop down to select “Write Entire “. In the TCM box you will leave it on “Write Calibration “ Once you have the correct selection make sure the key is on and the battery is fully charged and select “WRITE” it will then write the ECU and then the TCM. You can watch the progress in the status bar. Once it is finished you can click on “close” and turn the key off. Now that it is programed you should be able to start and run the vehicle.

Special note: You only need to select “WRITE ENTIRE” the first time you flash the ECU. Any further tunes will be done with a normal “Write Calibration” unless told otherwise.



## WRITE CALIBRATION

### Normal Process for flashing in a tune

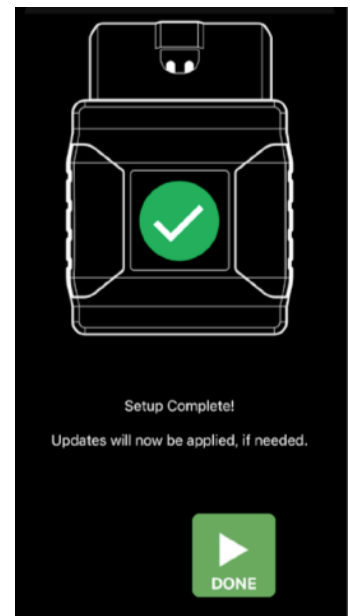
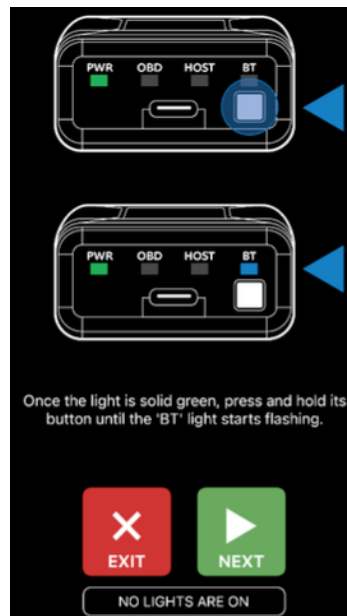


# HP Tuners RTD Device Using TDN APP

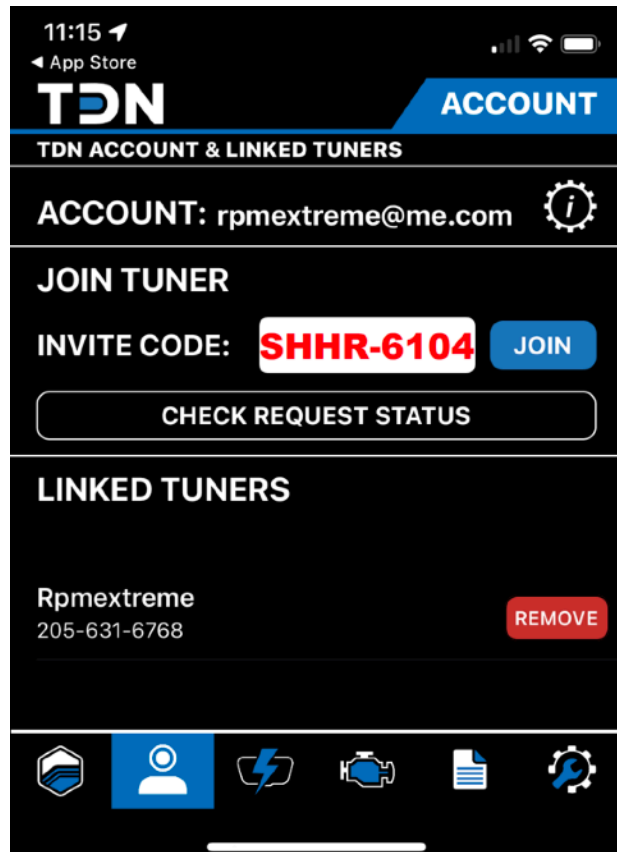
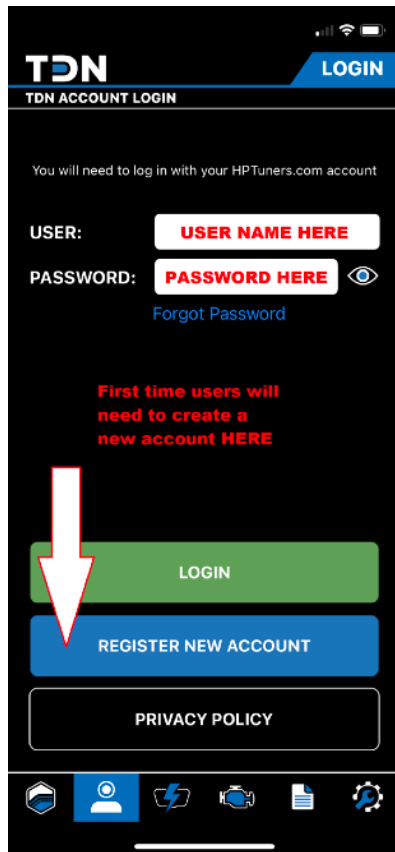
The RTD device is used with the TDN APP. The Tune Delivery Network (TDN) is an application that allows users to easily exchange tuning files and data logs with RpmExtreme. You will be using a APP on your Apple or Android cell phone to pair with the RTD device. This will allow you to read and write tunes to the vehicle as well as data log how the vehicle is running.



First you will need to go to the Apple APP Store or the Android APP Store and download the TDN APP. When you open the APP for the first time it will ask you to accept the privacy policy. Once that is done you will need to pair the RTD device with your phone using Bluetooth. Make sure your Bluetooth is turned on in your phone setting and then follow the prompts on the screen. After the RTD is linked to the phone it will attempt to synchronize the device with the server (your phone will need an internet connection). At this point it may prompt to update the device. Apply any updates at this time.



You will need to create an account with HP Tuners. Tap the ACCOUNT button and then tap REGISTER NEW ACCOUNT and follow the instructions. After your account is setup you will need to fill out the account profile and add in our INVITE CODE ( SHHR-6104). This will link your device to our server and allow us to see your tune files and data logs.



# Reading and Writing Tunes

## Reading a Tune File

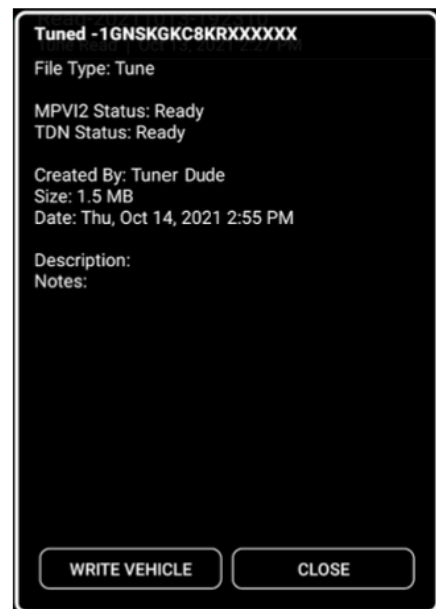
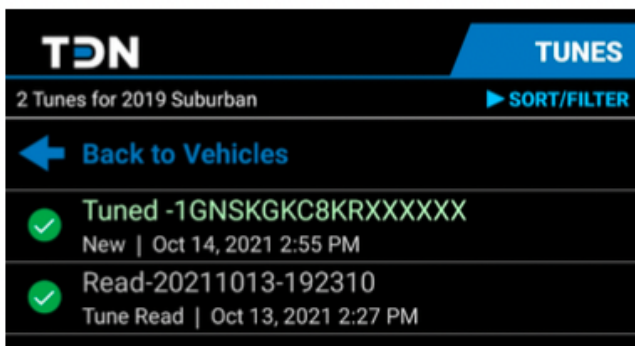
To read or write a file you will need to be sure that your vehicles battery is fully charged.

To begin tuning you will need to read the stock file from the vehicle. Do this by tapping the “FLASH” button. Once the tuning screen appears you will select the “READ VEHICLE” tab, follow the prompts and turn the key to the “RUN” position and tap OK to start the read process. Follow the prompts on the screen and when the read is finished you will want to send us a email letting us know that the tune has been read. Include in the email your details on the engine along with what tire size and gear ratio you are running. Send to [INFO@RPMEXTREME.COM](mailto:INFO@RPMEXTREME.COM)

## Writing a Custom Tune File

Once we finish your tune we will send you an email letting you know its read to flash in.

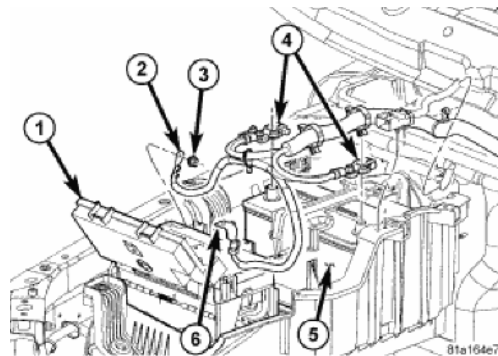
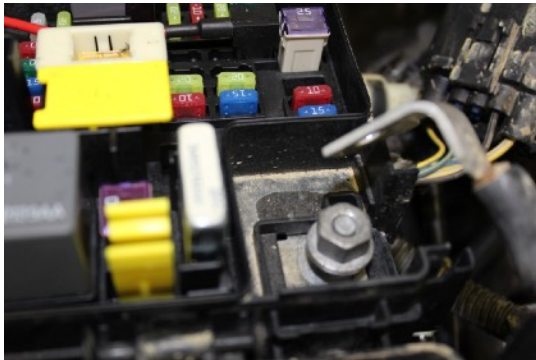
Open the APP and connect the device to the vehicle and tap the “FLASH” button. Then tap the vehicle you want to flash and then tap the new tune file that should be shown in the list. If a tune file does not show up you may need to tap the SYNC button so the device will go online and load any tune files that are on the server. Once you have the tune selected tap “WRITE VEHICLE” and follow the on screen prompts. Do not turn the key off or disconnect the device while it is writing the vehicle or it could damage the ECU-TCM



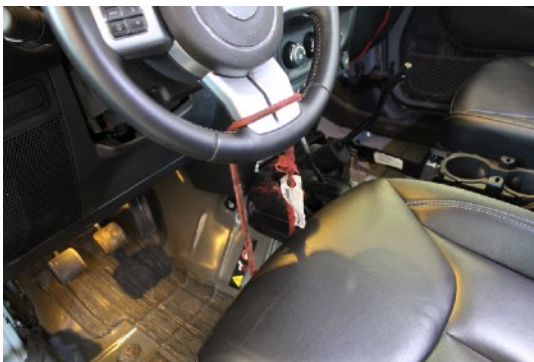
# Body Removal

Although it is not required, We recommend using a two post hoist to remove the body from the vehicle. The general procedure is outlined below: and the instructions will be written as if you have the body removed. Right and Left is viewed from the drivers seat.

1. Disconnect the battery harness from the battery, firewall, and right front fender.  
Always remove the negative first and connect it last to avoid damage to the computers.



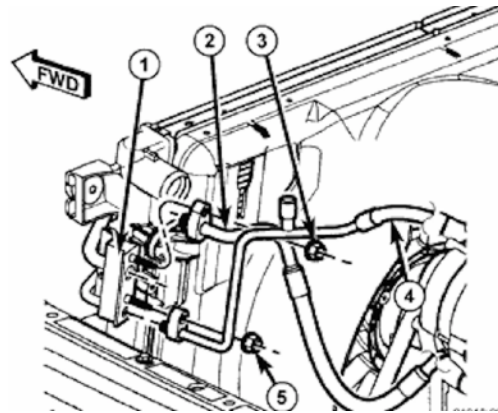
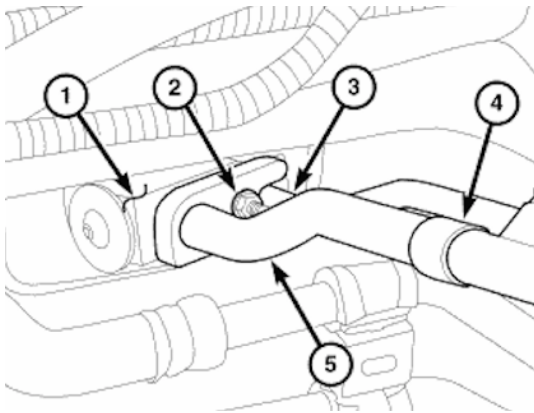
2. Disconnect the steering shaft at the firewall.  
**CAUTION** with the shaft removed the steering wheel can rotate and damage the clock spring. We recommend using a bungee strap hold the steering wheel centered and not allow it to turn.



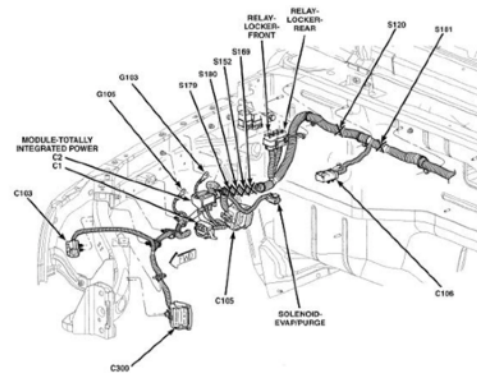
3. Disconnect the ABS Module electrical connector.  
Remove the bolt holding the unit to the plastic tray and pull straight up on the ABS unit. It should pop free from the rubber retainers. you do **not** disconnect brake lines.  
Unbolt the master cylinder and be sure to save the o-ring behind it.  
\* Lay entire assembly in towards the engine and use a bungee cord to hold out of the way.



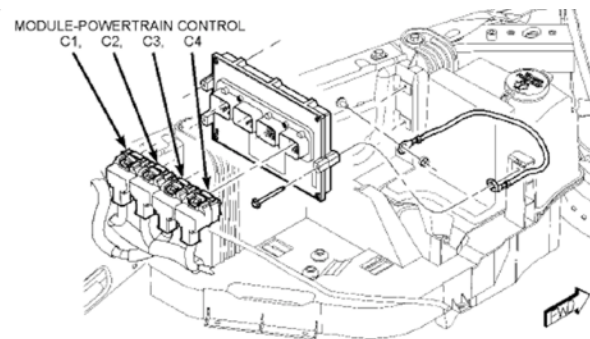
4. Discharge the AC system and remove hoses. Use proper equipment here guys.



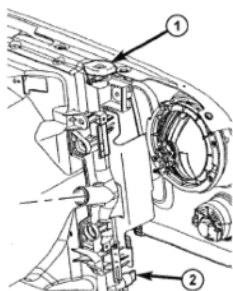
5. Unplug the 34 way Chassis connector (C300) on the lower right hand side of the radiator.



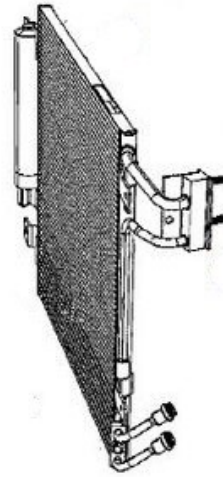
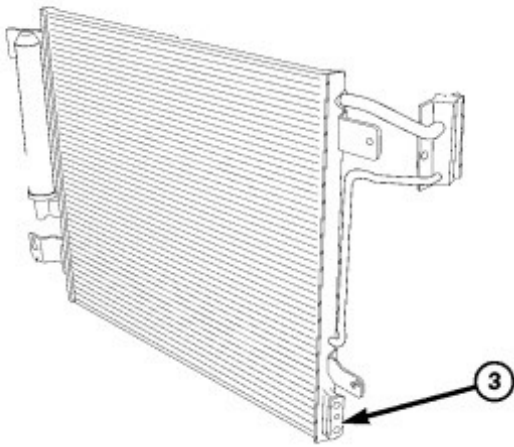
6. Unplug the Jeep computer connectors C1 C2 and C4 for 07-11 and C2 for 12+.  
One harness will stay with the body and the rest will go with the engine.



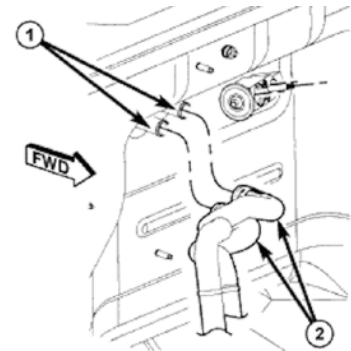
7. Disconnect the front left O2 sensor if attached to the body under the master cylinder.
8. Drain and disconnect the radiator hoses. You will be reusing the lower hose.



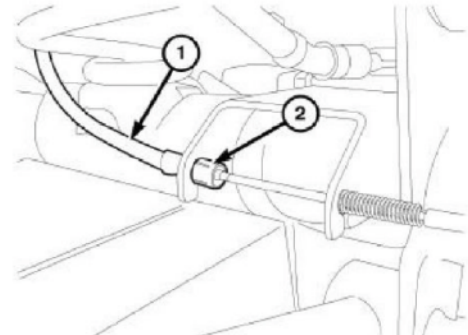
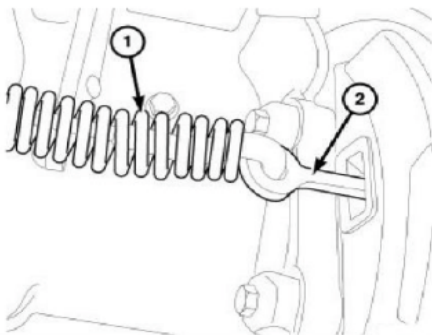
9. Disconnect the transmission cooler lines at the AC condenser (#3). (Auto only).



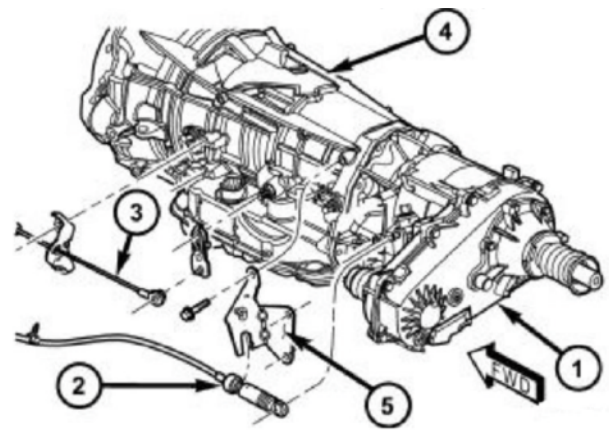
10. Remove the power steering reservoir from the body.  
11. Lay PS reservoir on the engine so it will clear the body.  
12. Disconnect the ground strap from the hood and firewall.  
13. Remove the air filter and intake assembly.  
14. Remove the heater hoses from the engine. You may be reusing these.



15. Remove the purge valve by the battery and vapor lines.  
16. Remove the electric vacuum pump and hoses 2012+ only  
17. Disconnect the parking brake cables at the rear axle.

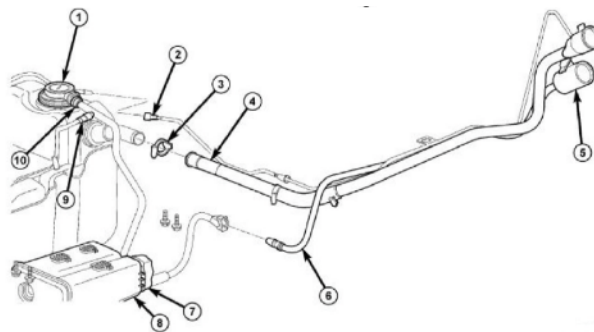


18. Disconnect the transmission and transfer case cables. #2 and #3 pictured below



19. Disconnect the transmission and transfer case cables.

20. Disconnect the fuel fill hose at #3 in the picture

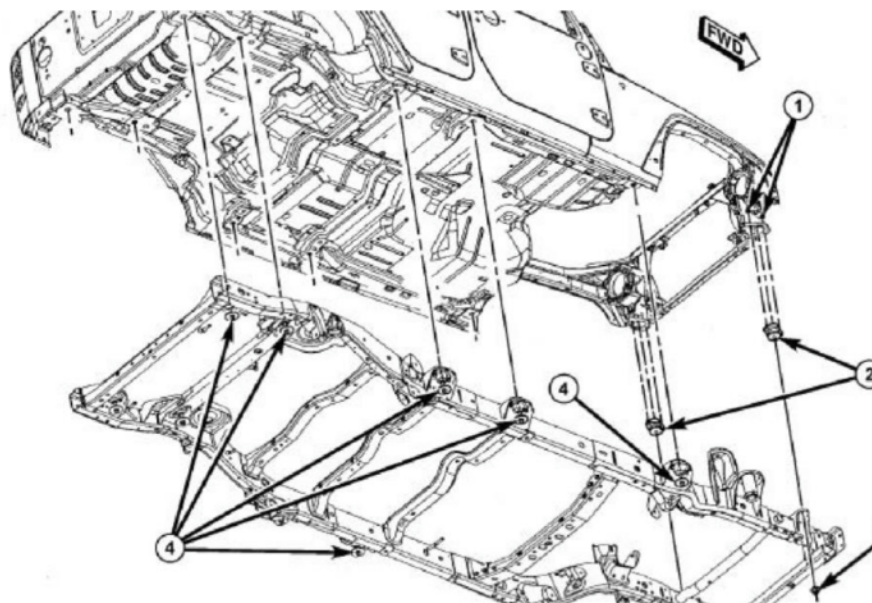


21. Disconnect the EVAP hose between the canister and the body. (#7) pictured above.

22. Disconnect the top of the rear axle vent line.

23. Remove the 2 nuts at the front body mounts.

24. Remove the body mount bolts. Some years may not have all the bolts.



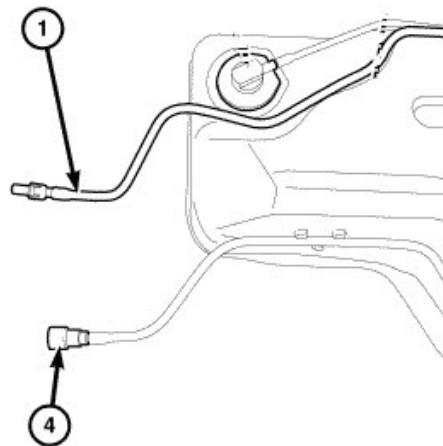


Once the body is unbolted set your 2 post lift along the factory pinch welds taking care to apply even pressure as to not bend the lower sheet metal. If you have a solid rock slider you can also lift from it. Slowly lift the body a little at a time and watch for anything you forgot to unplug or hanging up. Also watch the ABS unit to make sure it doesn't hang up or damage the brake lines during the body lift process. Keep an eye on the parking brake and shifter cables, you don't want to damage one.

Once the body is separated remove the stock powertrain and exhaust. We are not going to spell out how to do this as it should be pretty strait forward at this point.

We are not reusing anything from the engine or transmission.

You will be using a new fuel line. Its supplied in the kit and will plug in at the front of the fuel tank #1.



You will be modifying your EVAP canister and reusing it. We recommend relocating it to behind the axle on the right side.

You will be using your stock crossmember.

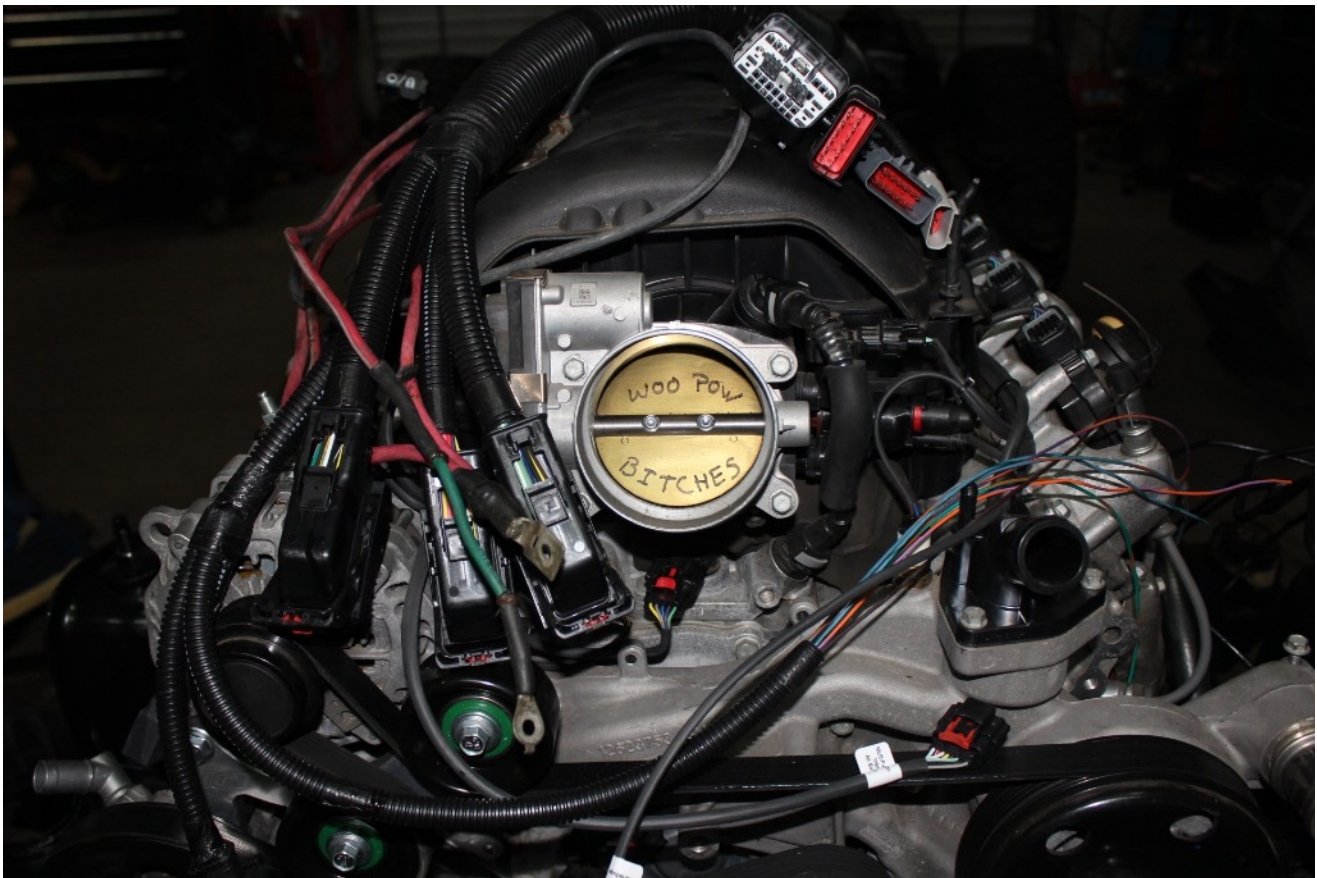
At this point you may want to roll the frame outside and pressure wash it in preparation for engine mount install. After you install the mounts grab some good chassis paint and go to town on the frame.

# Engine Prep

We usually prep out most of the engine prior to installing it into the Jeep and finish dressing it out as it sits in the frame.

We are not going to cover every step involved as every engine will be different and you're skilled enough to handle this. We will hit some of the high points.

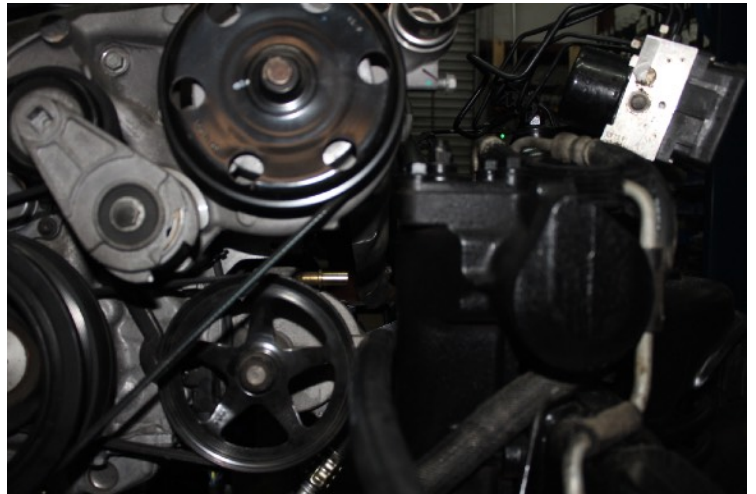
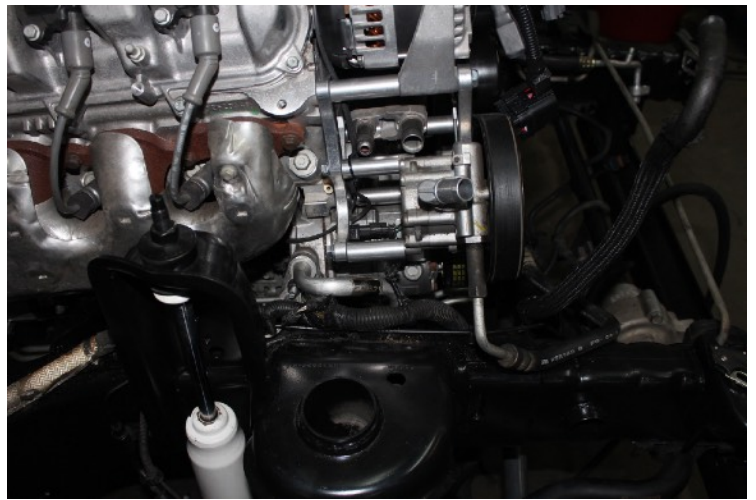
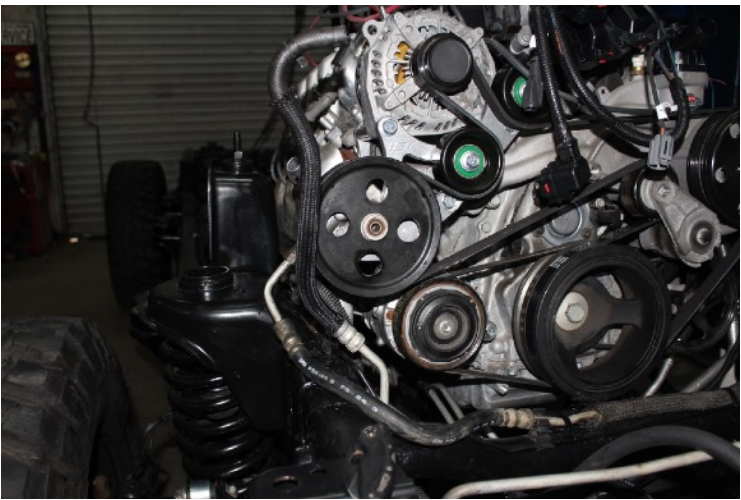
- Bolt together the engine, trans and transfer case. GM parts list is available on our website.
- Install torque converter bolts, flywheel covers and starter.



# POWER STEERING

You will need a aftermarket bracket to add power steering to your engine. We generally use the ICT Billet #551368 bracket kit and a 07-11 stock 3.8 JK pump and pressure hose.

There are other options now that these powertrains have been out. Contact us if you have any questions



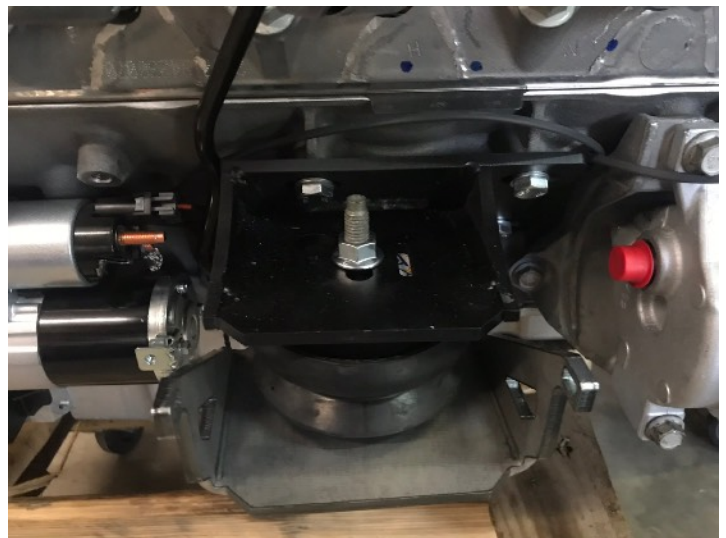
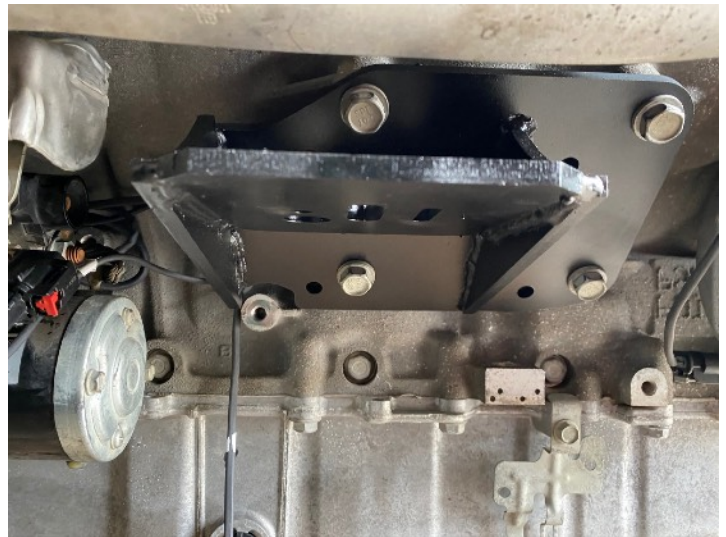
# Engine Mount - Engine Side

The engine side brackets left and right will attach directly to the engine block and will be installed with the factory hardware. The rear of the engine plate will have a notch that will fit around the “boss” on the engine block.

The rubber engine mounts will be installed to the Engine bracket with the locating pin inserted into the small hole. This will center the mount to the bracket.

The lower part of the rubber mount will drop into the lower frame mounts and the square pin will locate into the square hole.

If adjustment is needed you can rotate the rubber mount 180 degrees and the pins will fall into the slotted holes allowing for side to side movement



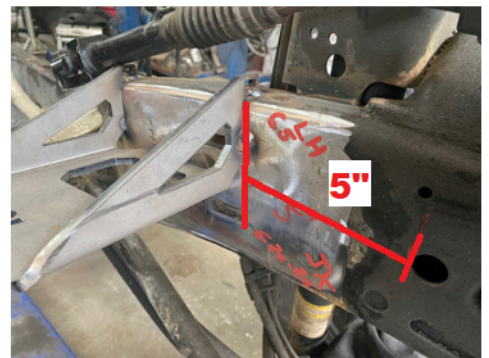
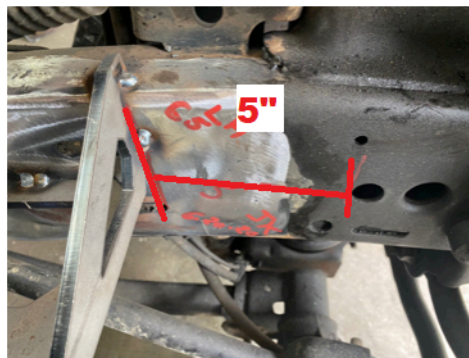
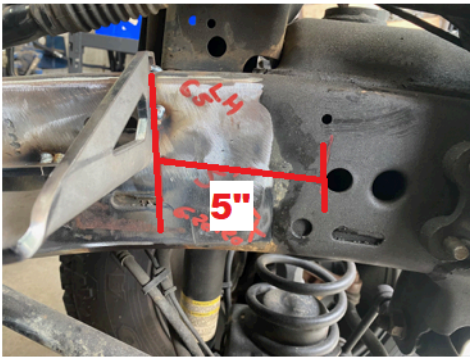
# Engine Mount - Frame Side

Use **Long** mount on the Left side and the **Short** mount on the right side.

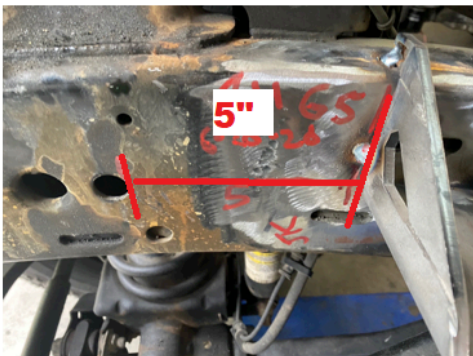
*We have found RHD Jeeps to be similar to LHD and will offset the engine to the right. Verify proper fitment and clearance prior to final welding.*

Align the mounts over the frame and hold in place with C clamps. You will see a few holes in the frame on each side, use these to measure back and set the distance for the mounts. The “**RIGHT SIDE**” mount will be set back 5 ” from the rear edge of the smaller hole and the “**LEFT SIDE**” mount will be set back 5 ” from the rear edge of the smaller hole. Again we are using the smaller size hole not the larger hole. Use a 90 degree square to draw the line. The mounts should be level with the frame and line up with the line drawn. Spot weld them to the frame and test fit the engine. Once you are happy with the placement weld them in permanently and paint. \*\*On 07-10 wranglers we recommend a small 1.25” body lift to add clearance between the engine top cover and the firewall.\*\*

## Left Hand Side \*\*\*\*\* (long mount)



## Right Hand Side \*\*\*\*\* (short mount)



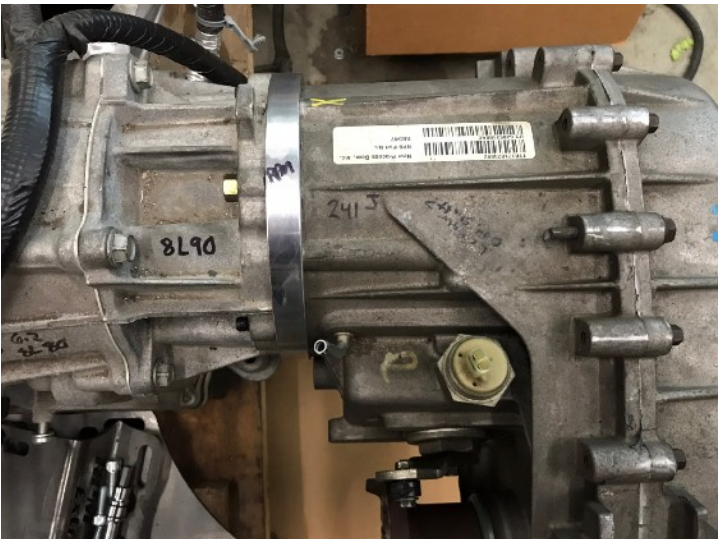
# Transfer Case Adapter 8L90

Find the aluminum transfer case adapter and hardware. This adapter will be bolted to the transfer case using the allen head bolts and the counter sunk holes. \*\*\*You will want to install the 32 spline input shaft into the transfer case before you install the adapter.\*\*\*

Align the adapter with the front of the T-case and rotate until the counter sunk holes line up. Add a drop of loctite to the allen head bolts and install.

The next step will be installing the studs into the adapter. The adapter has multiple holes so you can “clock” the T-case if needed. Normally we use the 3rd hole from left when looking at the T-case from the front. You will see that there is a group of holes together between the allen head bolts. You will want to install the studs into the same hole on each group of holes as seen in the picture below. Use a little loctite and secure the studs into the adapter.

From there you will be able to slide the Transfer case onto the back of the transmission. Use the provided nuts to secure it to the trans. Two of the studs will be used to secure the T-case shifter bracket show in a later section.



# Transfer case Shifter Bracket

Attach The T-case shifter bracket to the two studs on the transmission side of the T-case adapter. The bracket should point forward. From there you will attach the smaller cable bracket to the two slotted holes in the shifter bracket. You want the end that attaches to the cable to be toward the rear. Once you have the cable snapped into position secure the bolts. If you need to adjust the shifter you can loosen the bolts and slide the bracket.



# TRANSMISSION MOUNT

Our rubber mount will attach to the original 8L90 T-case adapter. Use the two aluminum spacers provided and attach the mount to the adapter as shown below.

Use the upper and lower crossmember plates and attach to the factory crossmember using the hardware provided. There will be two steel spacers that are used on the inside of the crossmember to keep it from collapsing when you torque the bolts down.

Once you have the powertrain dropped into place the studs should align with the slotted holes in the plate. You can use the slotted holes to align the transmission from left to right. Once in the correct position install the nut to the lower mount and secure.



# T-Case Adapter Install 6L80

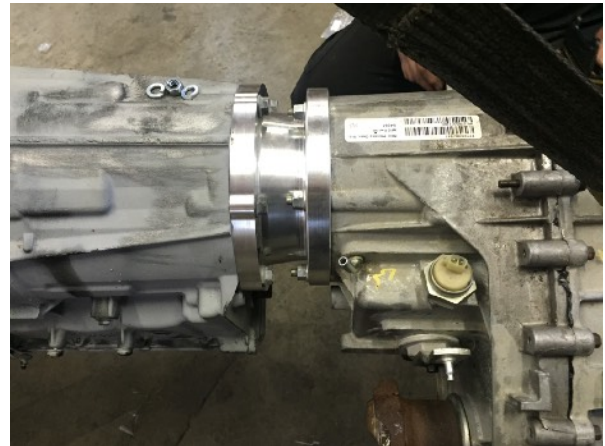
There are 2 main components included with the transfer case adapter.

One is the aluminum adapter and the other is the 32 spline input gear.

The aluminum adapter is pretty straight forward and bolts onto the 6L80E using the original hardware. If your Transmission was originally a 2WD then follow the instructions for converting it to a 4wd output.

The 32 spline input gear will require disassembly of the transfer case for installation (instruction provided separately)

Once the Transfer case has the new input shaft installed the entire assembly will bolt up to the adapter using the “upper” holes clocked as far clockwise as possible.



Install the Transfer case shifter bracket using the same nuts that hold the Transfer case onto the adapter (see pic) some light grinding may be needed to clearance the bracket.



# Shifter Bracket

2012+

You will be reusing the original Jeep shifter cable.

Attach the new shifter bracket onto the transmission using the stock hardware.

Leave the bolts slightly loose so you can slide the bracket forward and back.

Attach the cable to the bracket. It should clip in and lock.

Place the shifter in neutral

Place the transmuting arm in neutral. To do this push the arm forward until it stops, then twist it back 2 counts. you will feel it click overtime it changes gears. It will be PRNDM21.

Once in neutral on both the shifter and transmission line up the cable end and snap it on the transmission arm.

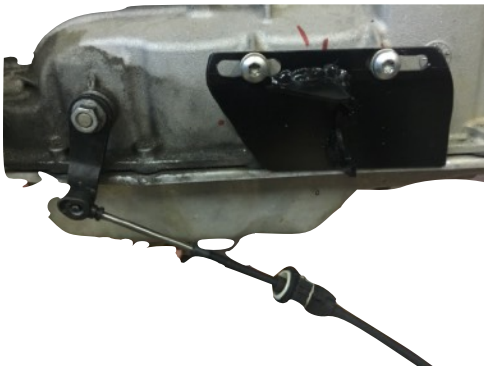
Snug up the bolts slightly. Don't torque down yet as we will be adjusting it slightly.

Inside the Jeep work it thru the gears you are wanting the drive position to be in-between neutral and drive on the shifter.

The easiest way to do this is to place the shifter in neutral but have the inside shifter not quite in the neutral position.

Loosen the shifter bracket and lightly tap it forward or back with a hammer until the inside shifter falls into the neutral position and then lock down the bolts.

You can tweak this bracket back and forth to get the desired shifter position. You're looking to have it barely drop into reverse and neutral but at full drive mode it will be in Manual and allow TAP shifting up and down.



You will know when your in Manual mode as the indicator on the dash will show 1-6

**Drive position shown on the Left and manual TAP position shown of the Right**



## *2007-2011 Shifter Bracket*

The shifter bracket is slotted and will give you ample adjustment using the factory shifter and cable. There is also adjustment in the cable at the shifter.

The shifter should line up perfectly in PRND21 with position 2 being “Manual Mode” and position 1 being “2nd Gear”



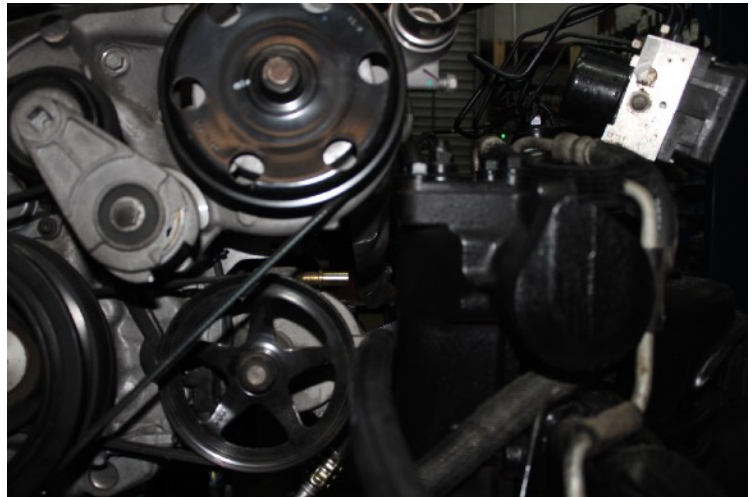
# Powertrain Install

We usually install complete powertrain as an assembly.

The motor mounts will drop into position and have alignment pins to help them locate.

Install front accessory drive and check for clearance near the steering gear box.

Once you have the powertrain aligned and looking good go ahead and tighten the bolts for the motor mounts and transmission mount.



# Harness Install (Under Hood)

## *Engine harness*

1. Start with laying engine harness along the rear of the engine with the ECU connectors to the driver's side
2. Plug in the GM oil pressure sensor
3. Lay driver's side coil/injector harness along driver's side fuel rail and tuck under injectors for a cleaner look
4. Starting from the rear, plug the injectors in from back to front
5. Plug driver's side coil connector in
6. Plug in driver's side GM coolant sensor plug
7. Plug in driver's side GM alternator
8. Continue routing harness along driver's side of engine and down the front
9. Plug in GM CAM/VVT sensor (note both styles of plugs are available) use the one that matches your engine and tuck on unused one back into the harness
10. At rear of engine, plug in DOD/AFM plug if equipped
11. Route passenger side coil/injector harness along the passenger side fuel rail and tuck under injectors for a clean look
12. Starting from the rear, plug the injectors in from back to front
13. Plug in passenger side coil connector
14. Plug in MAP sensor
15. Plug in throttle body
16. Plug in purge valve LS3 (if using a truck intake, reroute wire to drivers side and plug into purge valve)
17. Plug in MAF (Mass Air Flow Sensor) in air intake tube
18. Route transmission harness to rear of transmission and plug in (round plug)
19. Attach ground wire to passenger side rear cylinder head and secure
20. Route passenger side O2 sensor wires along passenger side of transmission
21. Route driver's side O2 sensor wire along driver's side of transmission
22. Route GM CKP (crank sensor) and knock sensor wiring along passenger side rear and above starter and plug in (be sure to keep it secured to the block and away from the heat of the exhaust manifold)
23. Plug in starter wire to the starter
24. Route canister vent valve wiring along trans harness and above fuel tank to the rear of the EVAP canister
25. Route fuel tank pressure sensor along trans harness and above fuel tank to the FTP sensor
26. Route A/C compressor wire to A/C compressor
27. Route driver's side knock sensor to driver's side. Secure away from heat
28. Route 4way & 8way & 14way plugs to the driver's side, they will be connected near the firewall factory connectors
29. Run AC pressure switch along driver's side injector harness and out to the Jeep pressure switch near the radiator.
30. The GM ECU will be mounted behind the Jeep ECU, there are a few wires to splice in so do that first. See splicing diagram
31. Mount GM ECU on bracket and install behind Jeep ECU
32. Plug in Jeep C1 & C2 connector (12+) or C1 and C3 on (07-11)

# Fuel Rail Pressure Sensor 2017+ MOD

You may need to modify our harness depending on what fuel rail pressure sensor you are running. 2014-2016 use a 4 wire sensors and 2017+ use a 3 wire sensor (12682589) . We wire our harnesses to work with both the 3 wire and 4 wire but when using a 3 wire there is a wire that will need to be removed in our harness.

If you are running a 14-16 with a 4 wire sensor and ECU there is nothing you need to do.

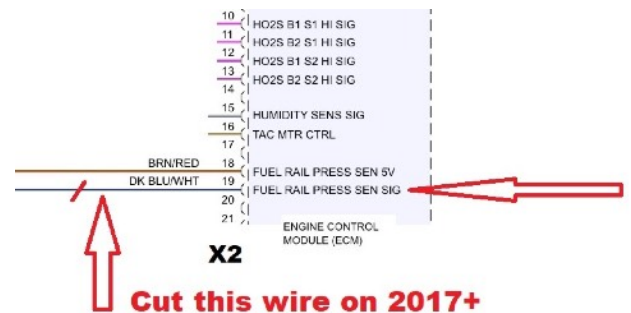
If you are running a 2017+ 3 wire sensor and ECU you will need to locate the GM ECU X2 connector, its the one in the middle of the three.

Unsnap the plastic cover from the back to expose the wires. You will see in one corner there is small "1" stamped into the plastic. This is pin-1

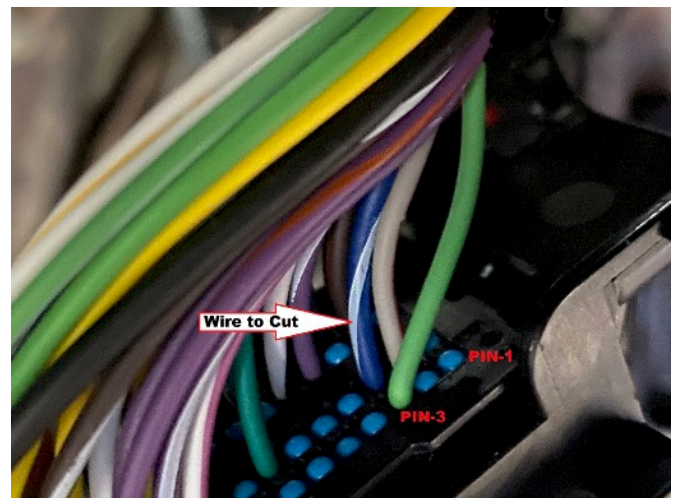
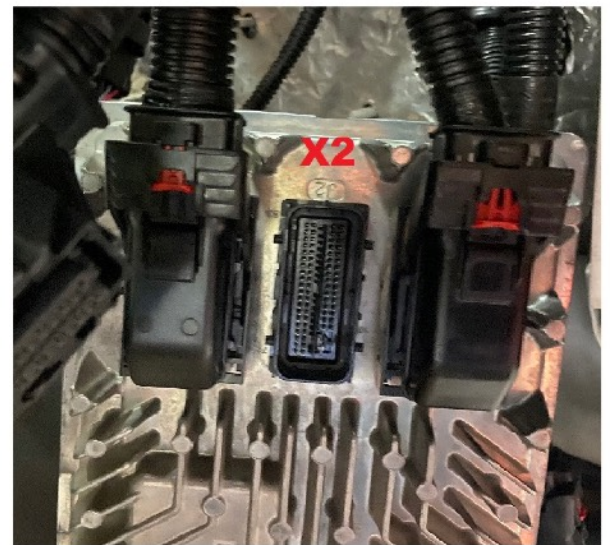
Pin 1 and pin 2 will be empty. Pin 3 will be a light green wire, on the second row next to the LT Green wire will be a Blue/White wire. This is the wire that you will want to cut apart.

Take a pair of wire cutters and snip the Blue/White wire in half and tuck the cut wire down so it wont make contact with the other half. You can add a piece of tape to the cut ends but its not necessary.

Reinstall the plastic cover and you are finished.



## 2017+ 3 Wire FRP Sensor Modification



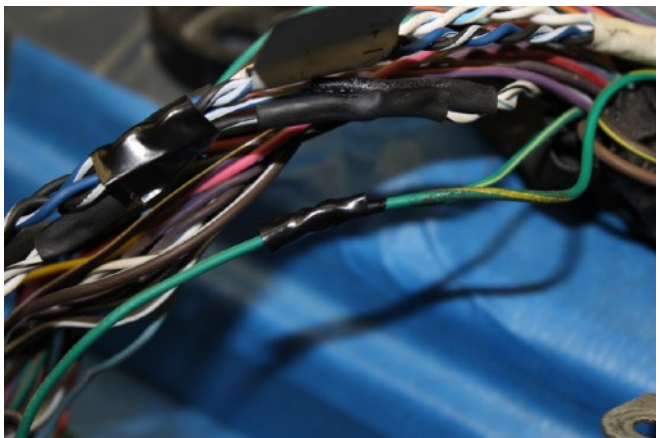
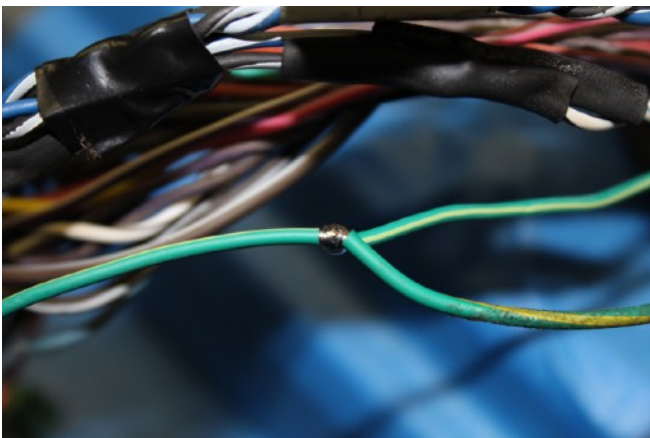
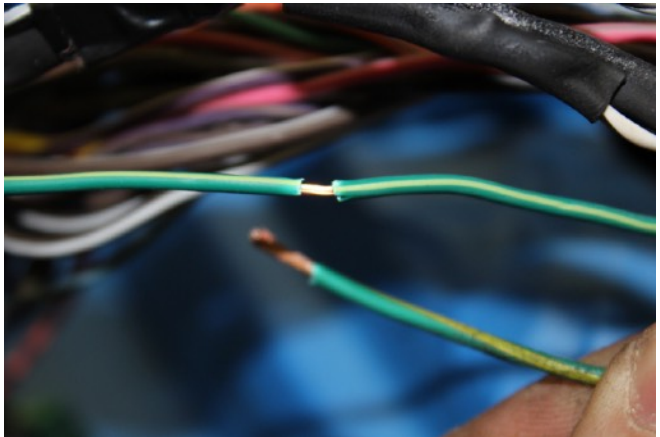
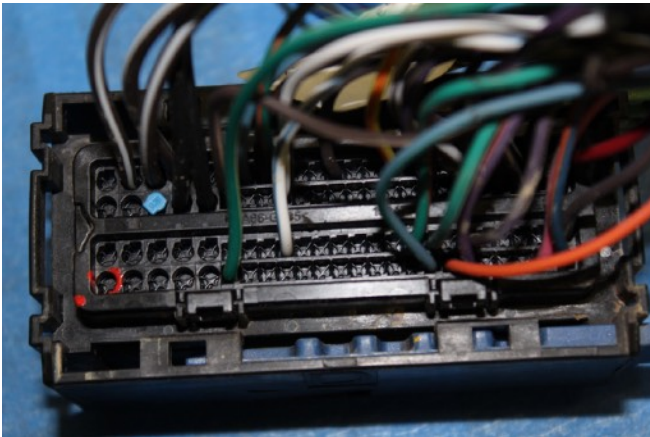
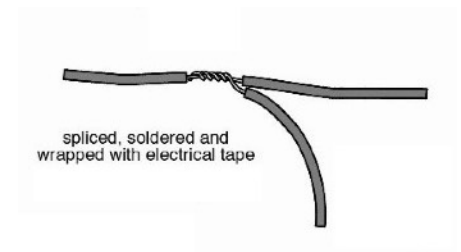
# Wire Splicing Guide 2012-18

## *Cut and splice wires 2012-18*

You will be splicing in a few wires at the factory C1 Jeep chassis side computer plug. You will see these wires coming out of our harness near the ECU. 9 of the wires will be spliced in and 4 will be cut and hooked in. Don't get overwhelmed here guys, its pretty strait forward.

Start with removing the back cover from the C1 Jeep ECU plug. You will be able to see some numbers cast into the plastic housing. Find #1 and use it as a reference (marked in red in the picture).

Follow the chart provided, find the wire you want to splice into and peel back a little insulation. Take the new wire and strip off a little insulation and wrap it around the exposed wire. Solder and tape up as seen in the picture below.



**Continue to do this for next 8 wires.**

## 2012+ Splicing Chart

C1-18 Orange/Violet	X102-2 Cruise
C1-19 Violet/Orange	X102-1 Cruise
C1-17 Lt Blue/Dk Green	X102-7 Brake switch
C1-79 Lt Blue/Orange	X103-14 A/C Control
C1-81 Dk Green/Orange	X103-8 Starter Control
C1-84 Brown	Fuel Pump Relay Control
C1-6 Dark Green/Yellow	Vacuum pump control x103-7
C1-23 Pink/Green	Run/Start
C1-75 Pink to Brn/Wht	ASD Relay Output
Brown/Yellow	GM FAN HIGH (not used)
Violet/Brown is a spare wire and not currently used	

## *Cut and attach wires 2012-18*

You will have two pair of twisted data wires to wire in. These will be a cut and solder type connection.

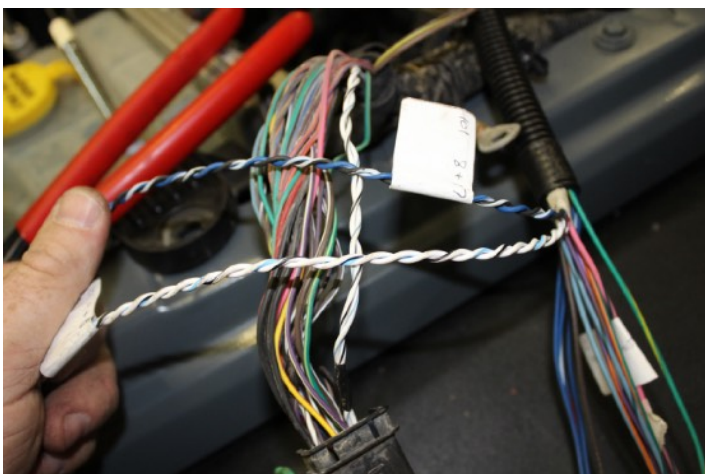
The White/Blue wire will tie into the White/Blue at C1-33 going towards the computer

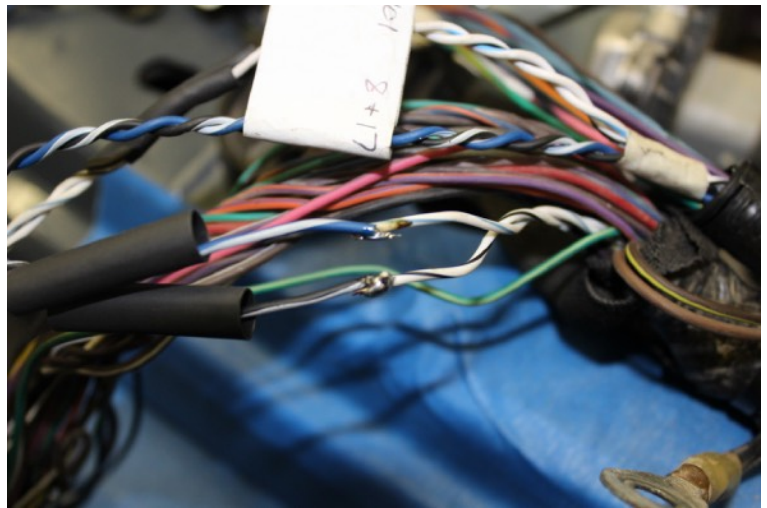
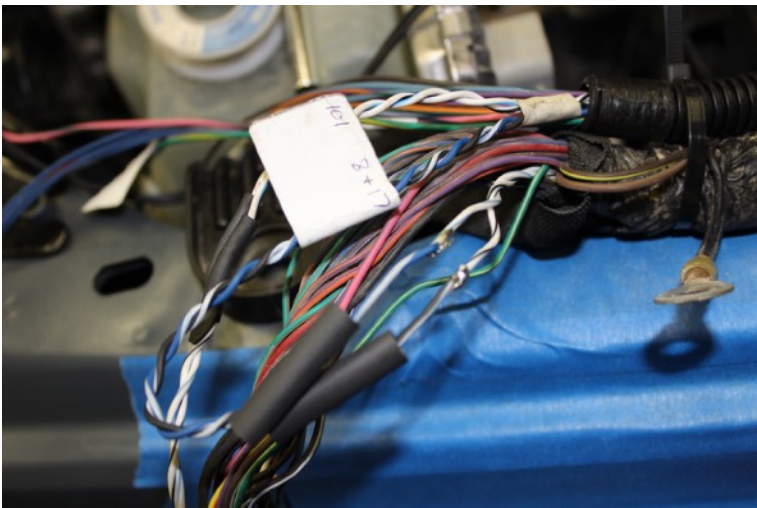
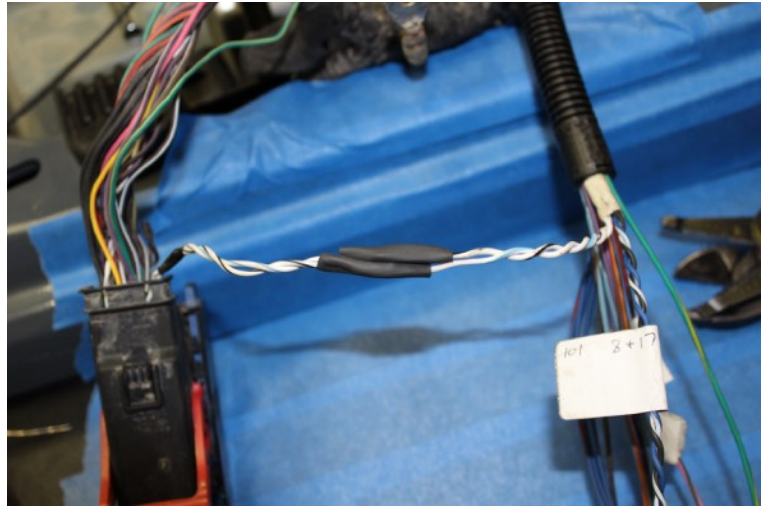
The White /Black wire will tie into the White/Black wire at C1-57 going towards the computer

The Blue/White wire will tie into the White/Blue wire running back into the harness away from the computer

The Black/White will tie into the White/Black wire running back into the harness away from the computer

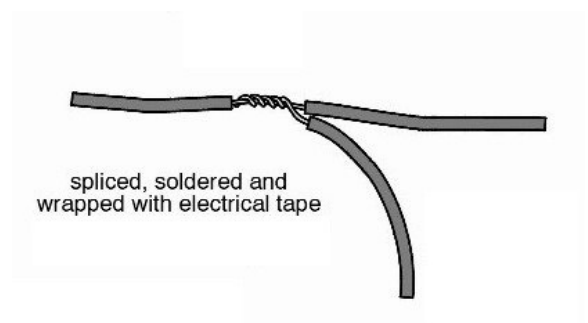
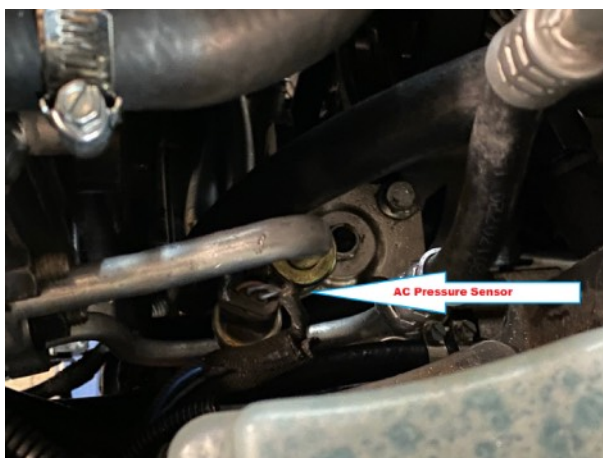
\*\* There will also be a Dark Blue wire coming from the C2 Jeep plug that will need to be spliced into the AC pressure switch center wire. \*\*





## AC Pressure Sensor Wire 12-18 JK:

There will be a single blue wire that you will run to the Jeep AC pressure sensor near the left side of the radiator. You will splice this blue wire in with the center wire on the Ac pressure sensor.

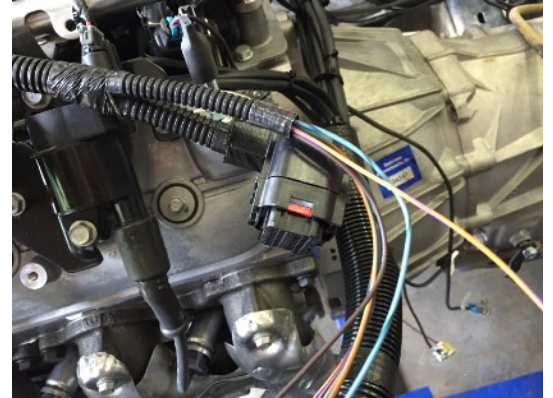


# Wire Splicing Guide 2007-11

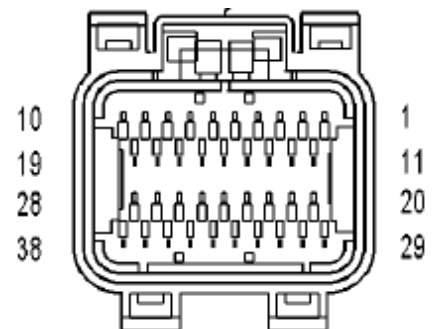
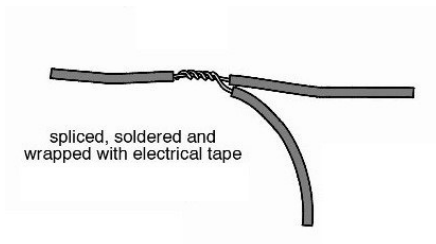
## Cut and Splice wires 2007-11

You will be splicing in a few wires at the factory C3 Jeep computer plug, you will see these wires coming out of our harness near the ECU. 6 of the wires will be spliced into the C3 connector. Don't get overwhelmed here guys, its pretty strait forward.

Start with removing the back cover from the C3 Jeep ECU plug. You will be able to see some numbers cast into the plastic housing. Find #1 and use it as a reference. The picture shown is a diagram show from the front of the connector, you can use this as reference.



Follow the chart provided, find the wire you want to splice into and peel back a little insulation. Take the new wire and strip off a little insulation and wrap it around the exposed wire. Solder and tape up as seen in the picture below.



**C3-18 Orange/Violet**

**C3-34 Violet/Orange**

**C3-14 Lt Blue/Dk Green**

**C3-11 Lt Blue/Orange**

**C3-38 Dk Green/Orange**

**C3-37 Brown**

**X102-2 Cruise**

**X102-1 Cruise**

**X102-7 Brake switch**

**X103-14 A/C Control**

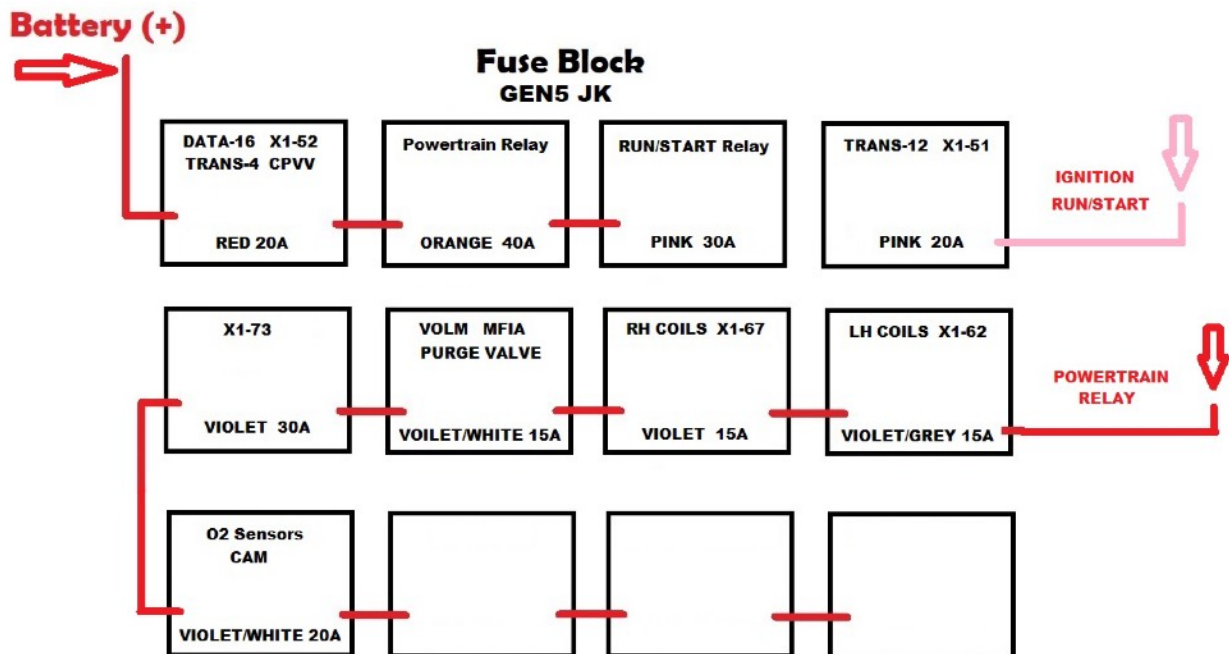
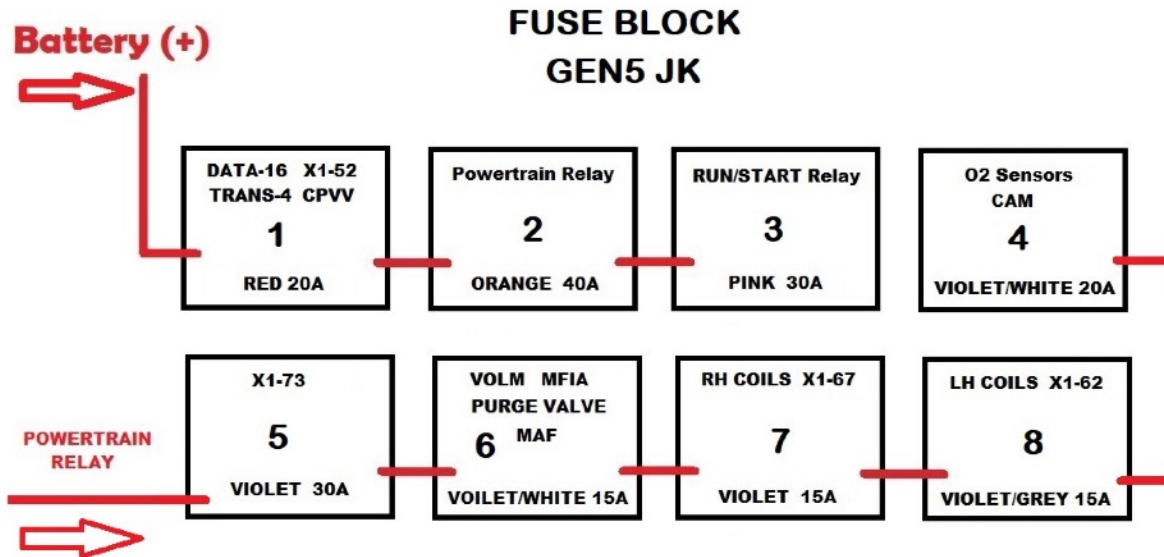
**X103-1 Starter Control**

**Fuel Pump Relay Control**

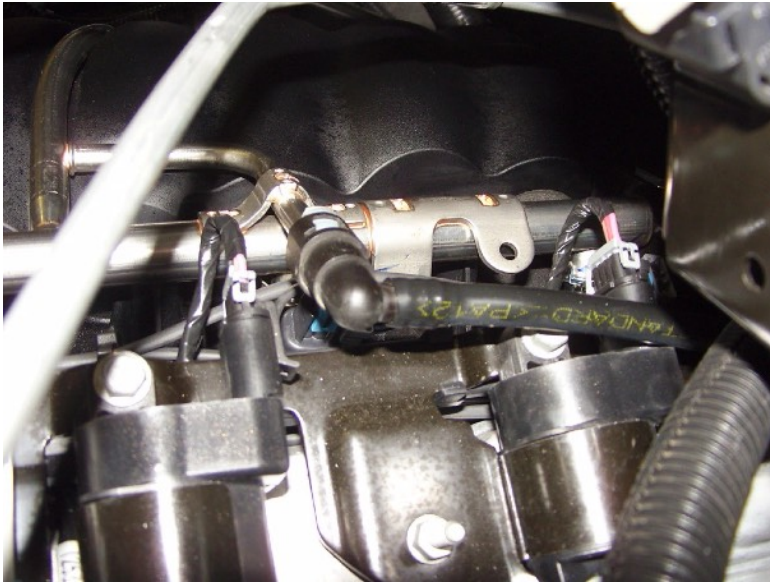
**\*Violet/Brown is a spare wire and not currently used**

# FUSE BLOCK LAYOUT

## Late vs Early Style



# Fuel Line Install



We usually start off with the engine installed and the body off. If you're doing the swap with the body on it will be a little more difficult but can be done. You want to be very careful not to route the line near the exhaust system or anything sharp.

1. Starting at the front of the fuel tank there is a 3/8 male fuel line fitting, clip on the straight end of the supplied fuel line. You can reuse the Jeep blue clip or remove it and use the one supplied with the fitting.

2. Route the fuel line forward and towards the transmission keeping it high away from the exhaust.

3. Route the fuel line up the side of the

transmission and secure it to the harness with zip ties.

4. Route it to the top of the back of the intake and run it along the top of the bell housing towards the driver's side of the engine.
5. Route it towards the fuel rail fitting and attach it making sure it has a nice smooth bend and doesn't kink.
6. Secure fuel line with zip ties or adel clamps.

**CAUTION.** Beware of heat and sharp edges. We can't be responsible if you incorrectly install the fuel line. If you wrap the fuel line around the exhaust pipe you will burn your Jeep down, Just saying...

We like to take extra time during our installs to add heat wrap to the fuel line and harness where it passes from the transmission to the fuel tank and near the exhaust. We also will add a heat shield in that area to help with heat and to hold the wires up.

The extra time you take now will be very good insurance down the road when you have the Jeep stuck in a mud hole and the exhaust is glowing cherry red.



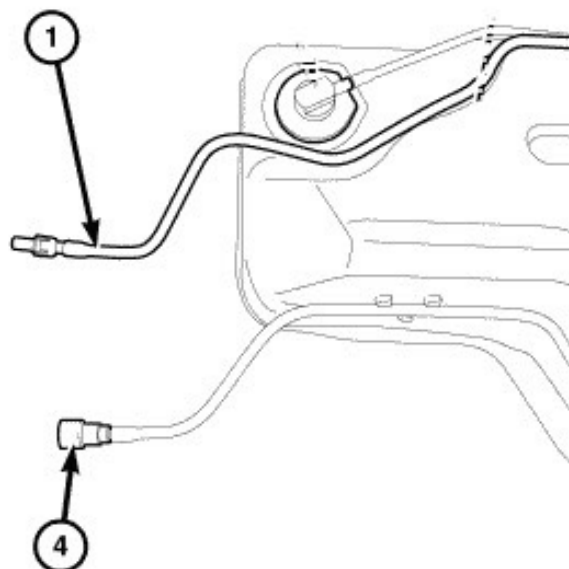
**Route the fuel line up the back of the transmission and secure along with the wiring harness.  
Be sure to watch for sharp corners and hot exhaust. You will want to secure this in a way that will protect it.**



**We usually fab up a heat shield or heat wrap the fuel and purge line as it passes from the fuel tank to the transmission. It would also be advisable to fabricate a heat shield for both catalytic converters.**



**#1 in this picture is the fuel feed line and #4 is the purge line**



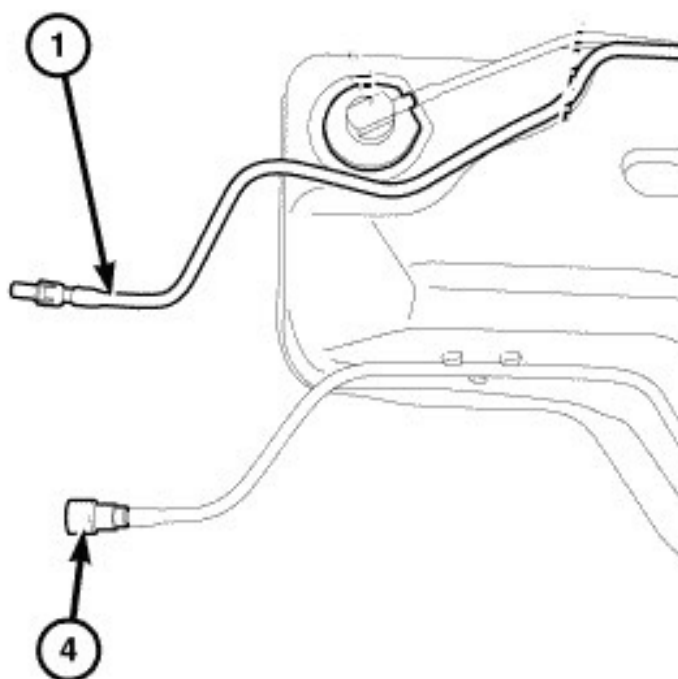
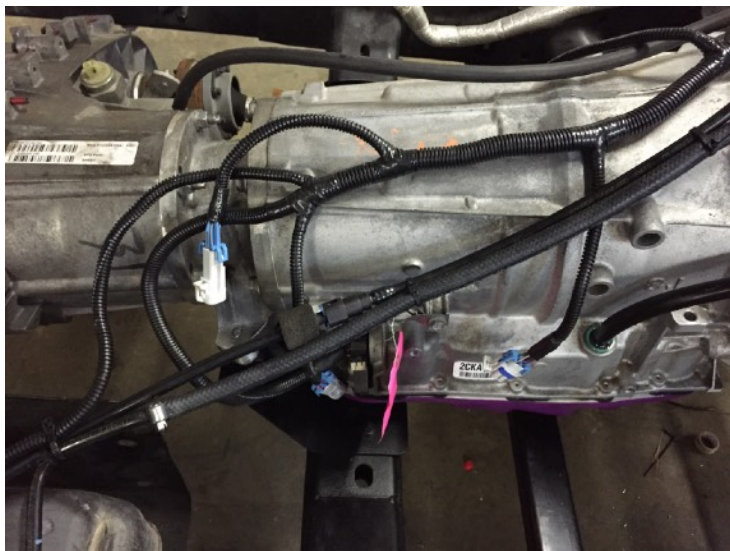
# Purge Line Install

The purge valve can be located in a few different places depending on what engine you're using. Most trucks have the purge valve on the driver's side below the throttle body.

You will want to run a hose from the fuel tank purge line. It's the 5/16 plastic hose sticking out from the front of the fuel tank. Just run a rubber hose or fab up some nice plastic 5/16 line and route it to the purge valve. Be sure to use hose that is compatible with fuel vapor.



**you can see the purge line run along with the fuel line and connect to #4 in the picture below.**



# EVAP Modification

These are the parts you need to complete this step.

EVAP vent valve 13575701 GM

Fuel Tank Pressure sensor 13502903 GM (modified)

First locate your EVAP canister.

Unplug the wire connector from the white valve

Twist the valve counter clockwise and remove it

Look inside the valve, you will see a small plunger. If you tilt the valve the plunger will open or close the port.

Put some superglue on the plunger and tilt it to the open position, let it cure.

Our goal is to lock open the valve so vapors will flow at all times.

Once you're done with that, reinstall it on the canister.

Take your new GM vent valve and install it on the port coming from the white valve we just glued open. You may need a small piece of hose to connect the two. Install the original hose to the other side of the GM vent valve. We are now using the GM valve to open and close the canister vent.

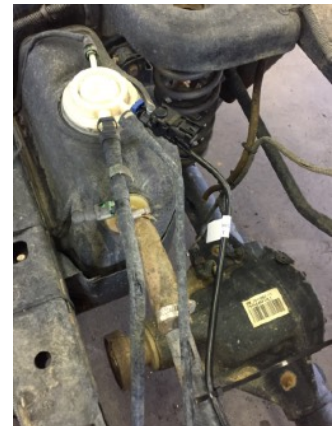
Plug the connector in from our new harness.

The FTP fuel tank pressure sensor is to be installed in the vent line of the fuel tank.

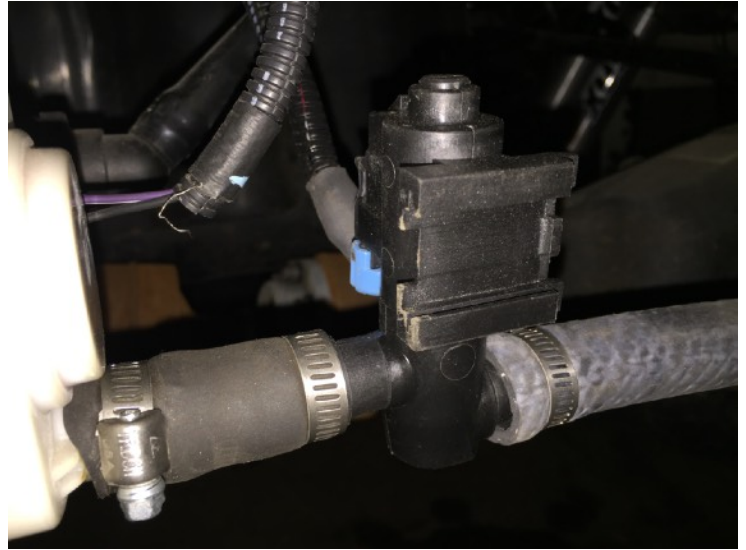
Remove the Jeep FTP sensor and install the new (modified) fuel tank pressure sensor 12+.



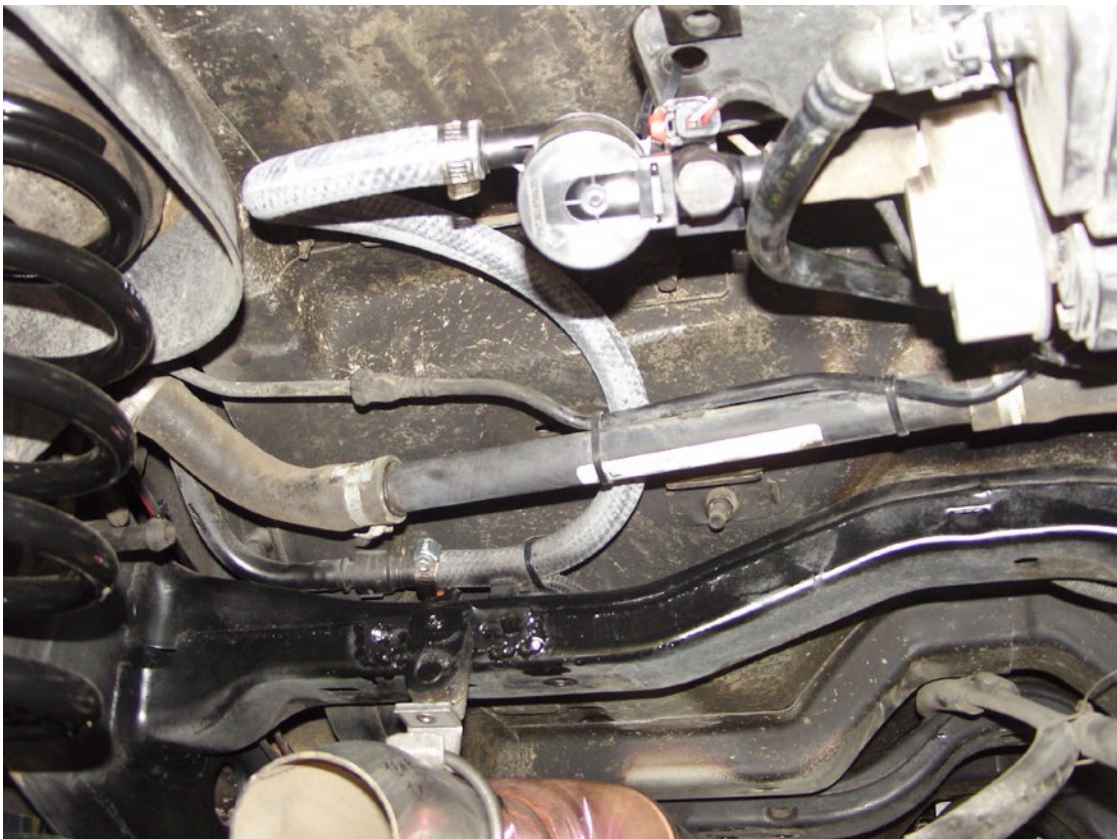
**For 07-11 install the new fuel tank pipe sensor hose in place of your original one.**



**CUT THE LARGE HOSE THAT RUNS BETWEEN THE FILLER NECK AND THE CANISTER CLOSE TO THE WHITE VALVE. ATTACHED GM VENT VALVE INLINE WITH THIS HOSE AND SECURE WITH HOSE CLAMPS. PLUG INTO THE NEW HARNESS AND SECURE.**



**IF YOU PLAN ON MOVING YOUR EVAP CANISTER NOW IS A GOOD TIME. JUST KEEP ALL THE HOSES RUNNING TO THE SAME PORTS AND YOU WILL BE FINE. WE USUALLY MOVE THE CANISTER TO THE RIGHT REAR SPRING PERCH AREA.**



# Battery Cables

## *2007-2011 3.8 Battery Cables*

You will be reusing your original 3.8 battery cables. Remove them and clean them up. Starting at the GM starter, hook up the main positive cable to the starter stud and secure. You may have to trim the little locating tab off the terminal end to get it to sit flush.



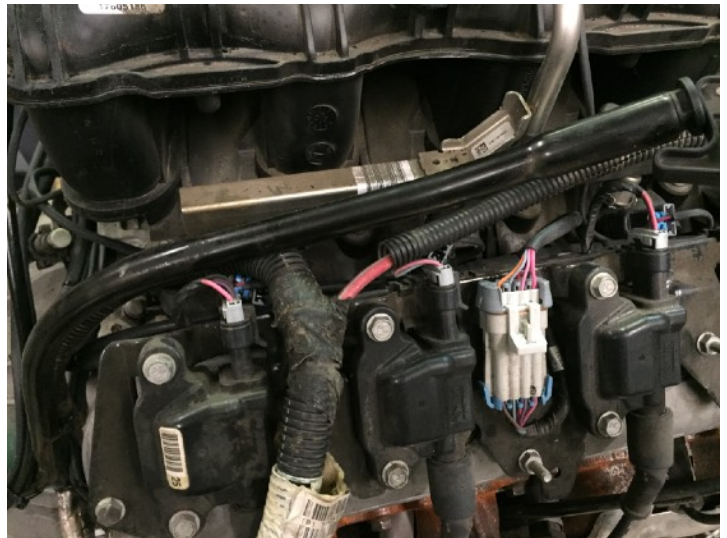
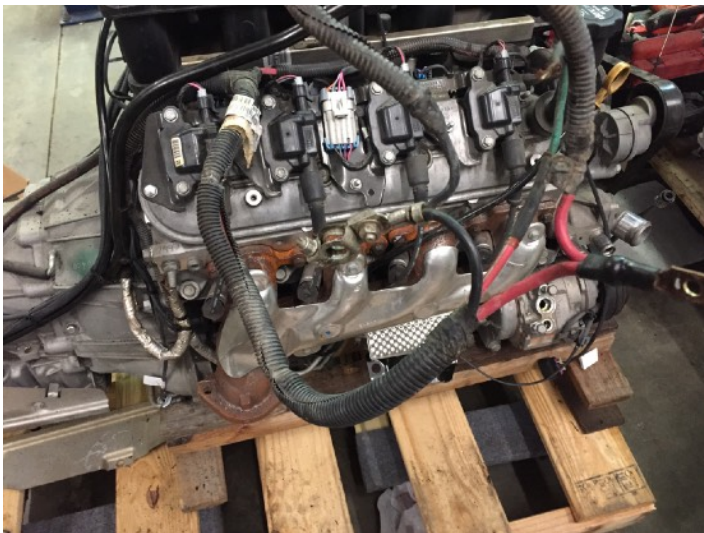
Attach the main ground wire to the engine block or rear cylinder head. You probably don't want to use a stud to attach even though we did in this picture.



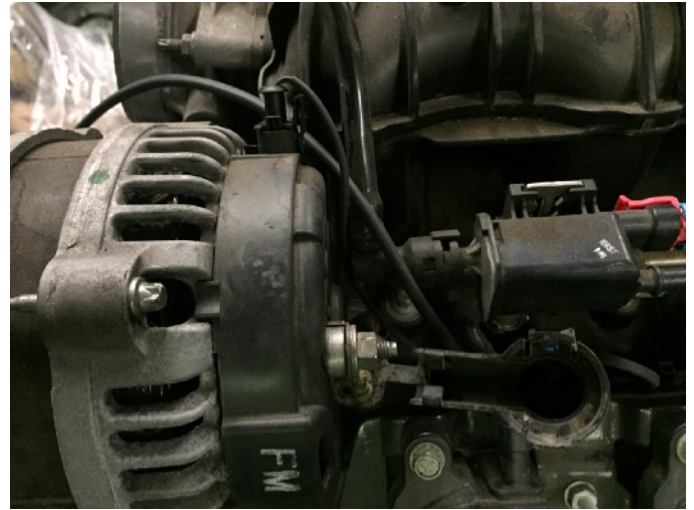
Route both wires up and over the starter to the rear of the engine and up the RH rear cylinder head. Be sure to insulate and secure the wires away from heat.



Continue running up the RH fuel injector rail and branch off the cables to the battery and TIPM.

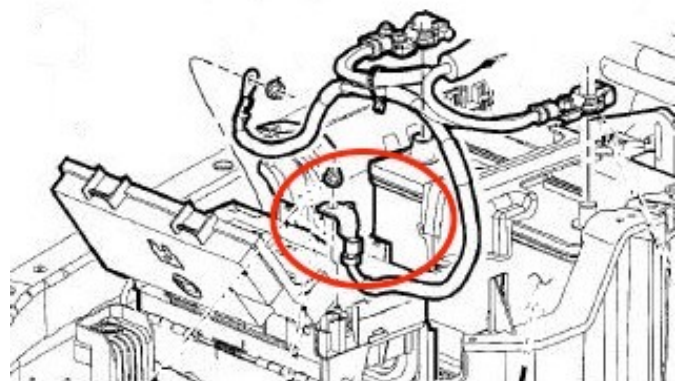
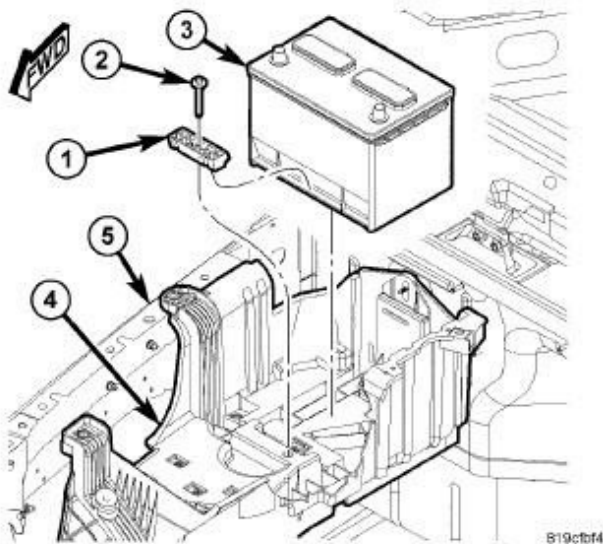


Continue routing the positive alternator to the alternator going along the right side fuel rail and under the throttle body being sure to insulate and secure it.



Attach the TIPM positive cable the TIPM (fuse box) stud and secure.

Attach the positive cable to the battery.



Attach the smaller ground wire to the inner fender stud where it was removed.



When you are ready go ahead and attach the negative cable to the battery.

**TECH TIP:** Always remove the negative cable from the battery first and install it last. This will prevent arcing and will protect the computers and electronics.

**TECH TIP:** Don't hook up the negative until you're finished with the install and ready to power everything up.

**TECH TIP:** The horn may honk and the wipers may move when you hook up the battery, this is normal, although it will freak you out.

## 2012+ 3.6 Battery Cables

You will have to remove the battery cables from the 3.6 engine harness. This is kinda a pain and will require cutting open the engine harness to remove them. If you don't want to cut open the 3.6 engine harness you can purchase a set of 3.8 cables (68058693AB)



Starting at the GM starter, hook up the main positive cable to the starter stud and secure. You may have to trim the little locating tab off the terminal end to get it to sit flush.



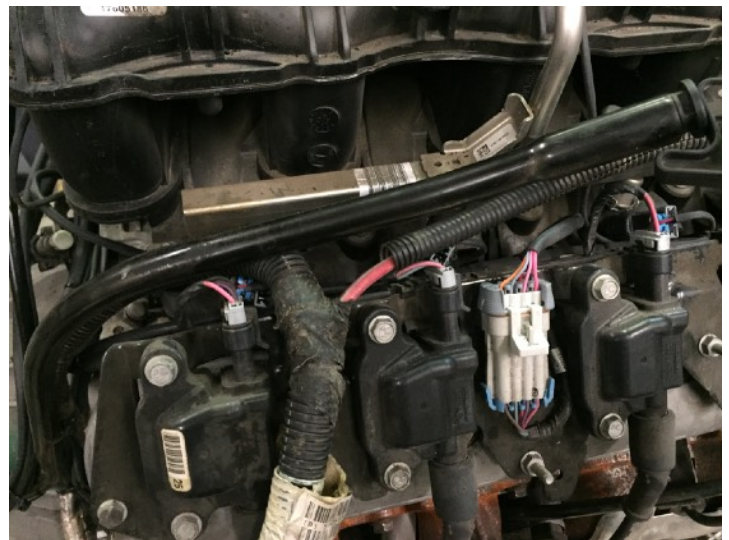
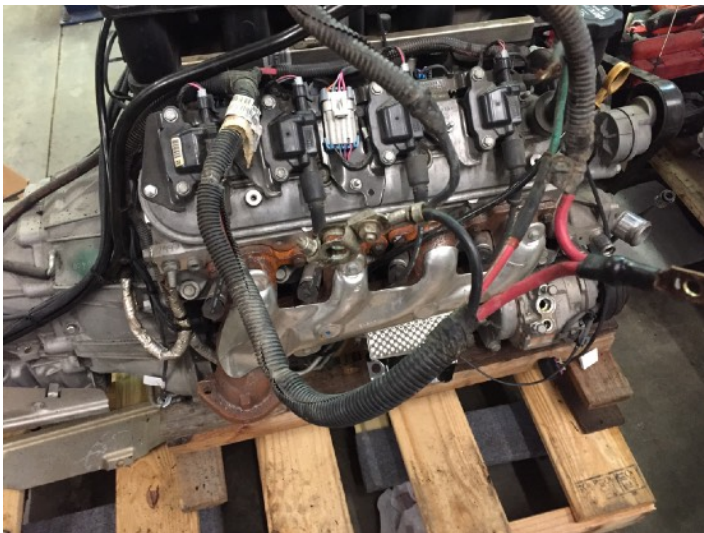
Attach the main ground wire to the engine block or rear cylinder head. You probably don't want to use a stud to attach even though we did in this picture.



Route both wires up and over the starter to the rear of the engine and up the RH rear cylinder head. Be sure to insulate and secure the wires away from heat.



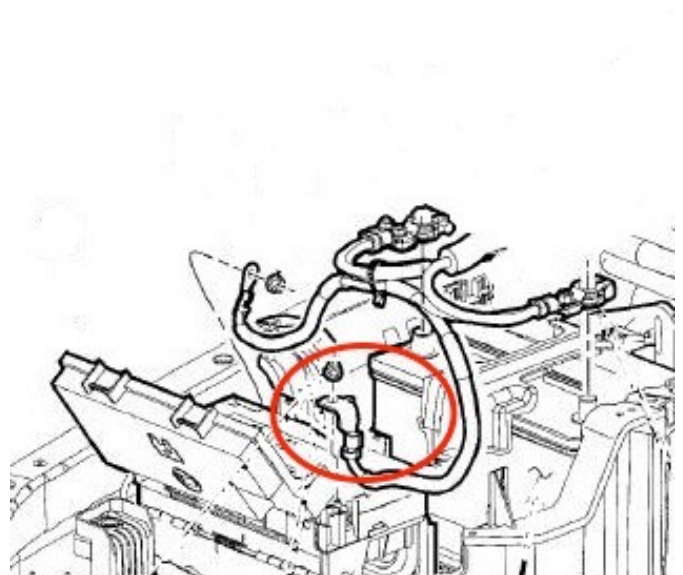
Continue running up the RH fuel injector rail and branch off the cables to the battery and TIPM.



Continue routing the positive alternator to the alternator going along the right side fuel rail and under the throttle body being sure to insulate and secure it.

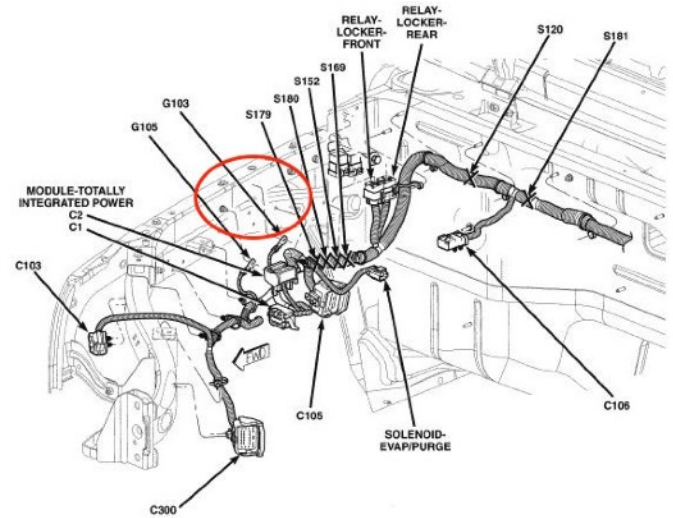


Attach the TIPM positive cable the TIPM (fuse box) stud and secure.



Attach the positive cable to the battery.

Attach the smaller ground wire to the inner fender stud where it was removed.



When you are ready go ahead and attach the negative cable to the battery.



**TECH TIP:** Always remove the negative cable from the battery first and install it last. This will prevent arcing and will protect the computers and electronics.

**TECH TIP:** Don't hook up the negative until you're finished with the install and ready to power everything up.

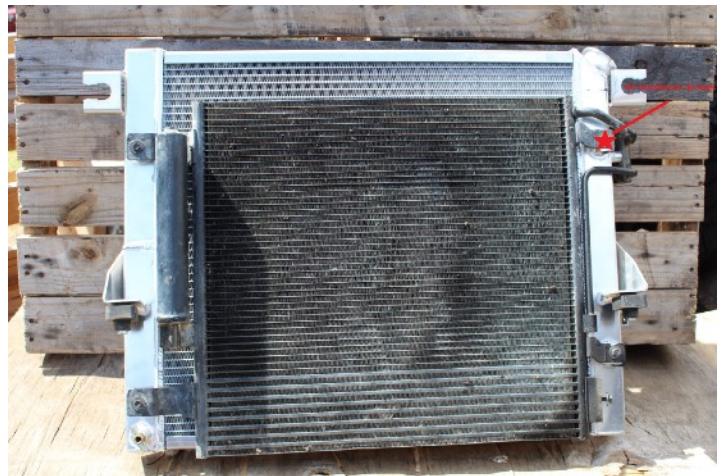
**TECH TIP:** The horn may honk and the wipers may move when you hook up the battery, this is normal, although it will freak you out.

# Radiator and AC Condenser

We offer HD Dual Pass 52mm aluminum radiator for the GEN5 conversion..

It will have a steam port fitting and will accept a factory JK fan and condenser.

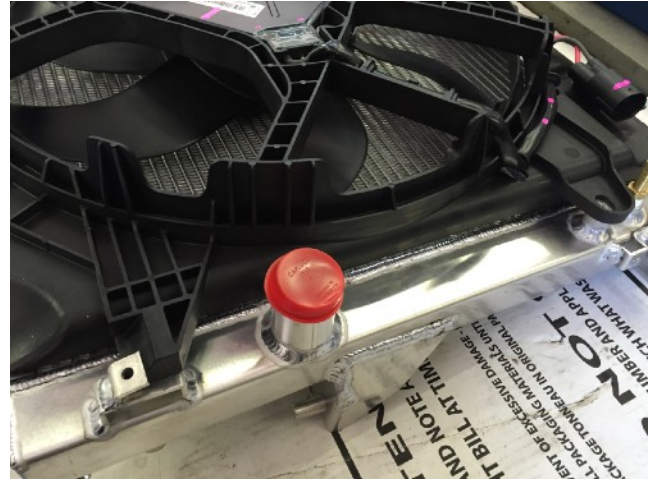
All radiators are equipped with a pressure cap. This cap (RC27) is rated at 18-21 psi. The cap contains a spring loaded pressure relief valve. This valve opens when the pressure reaches the range of 18-21 psi. A rubber gasket seals the cap to the radiator neck. This is done to prevent leakage, hold pressure and maintain a vacuum as the engine cools down to recover coolant from the expansion tank. *You may see some brown material in the radiator, this is a GM conditioner that we add. It's not dirt or rust so don't worry.*



Assemble the fan and AC condenser to the radiator using original hardware. Be sure to reuse the rubber flaps on the sides.

The condenser tubes will attach at 4 places on the front and one place on the side. You may have to slightly bend the soft aluminum tubes to get it to line up perfectly.

Check and make sure the condenser is not contacting the aluminum radiator. You can take a pry bar and lightly pry it away from the radiator so it won't rub thru. The metal tabs will keep it in place.



The fan shroud will slide into the lower tabs on the radiator and secure at the top with the original hardware. It may be necessary to clearance the plastic around the upper or lower radiator hose to allow room for the hose clamps.

Install all original plastic and rubber shields onto the radiator assembly. This will ensure the correct airflow. If you leave these out it could cause overheating and damage.

Install the radiator into the Jeep using the original rubber isolators and hardware.

Radiator hose instructions and part numbers are a few pages down.

Hook up the small coolant steam port tube from the engine to the small brass port on the radiator and route it away from any moving parts. This will allow air to purge from the engine and is necessary.



# Pentastar Fan Upgrade

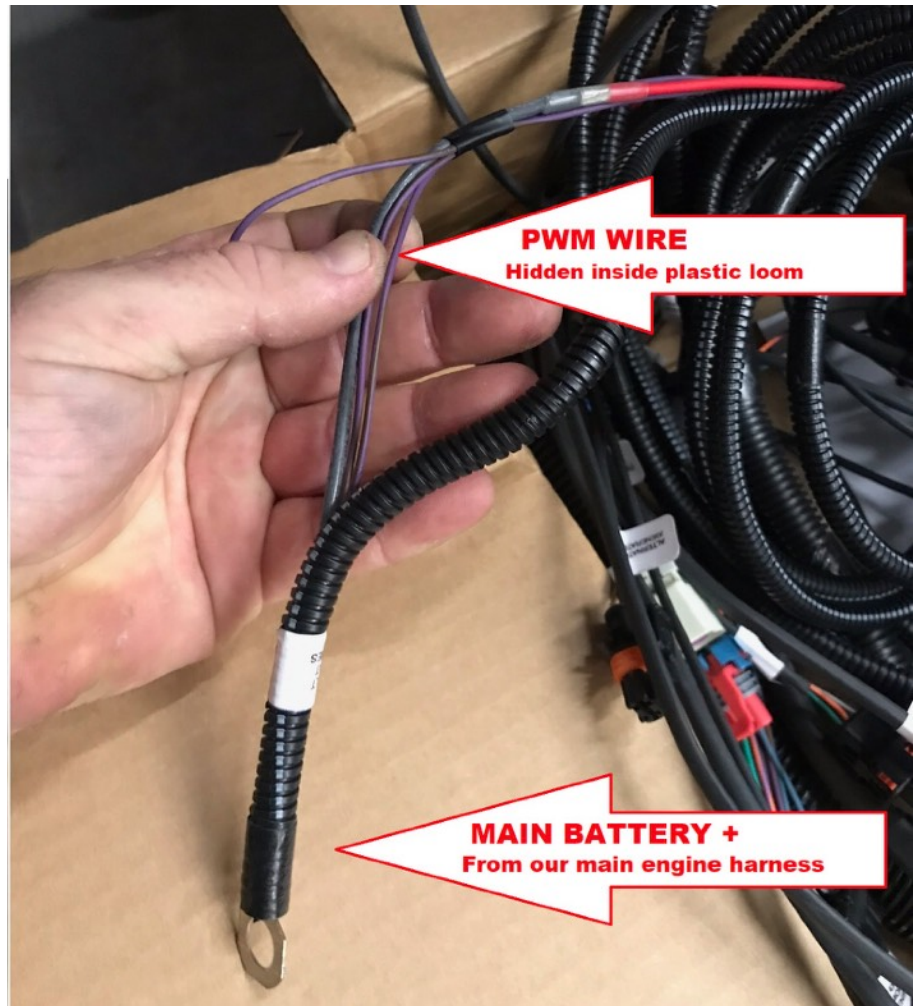
## 07-11

If you are upgrading to a PWM Pentastar fan you will need to use our plug and play fan harness. Route new fan harness from the fan along right side inner fender ending at the battery.

Attach the black wire to a ground stud on the inner fender.

Attach the red wire with fuse to the positive battery terminal.

Attach the Brown/Lt Blue wire from the fan harness to the small Violet/Brown wire that is hidden inside the wire cover on our main battery connection on the main engine harness. You may have to open up the plastic cover to find this wire.

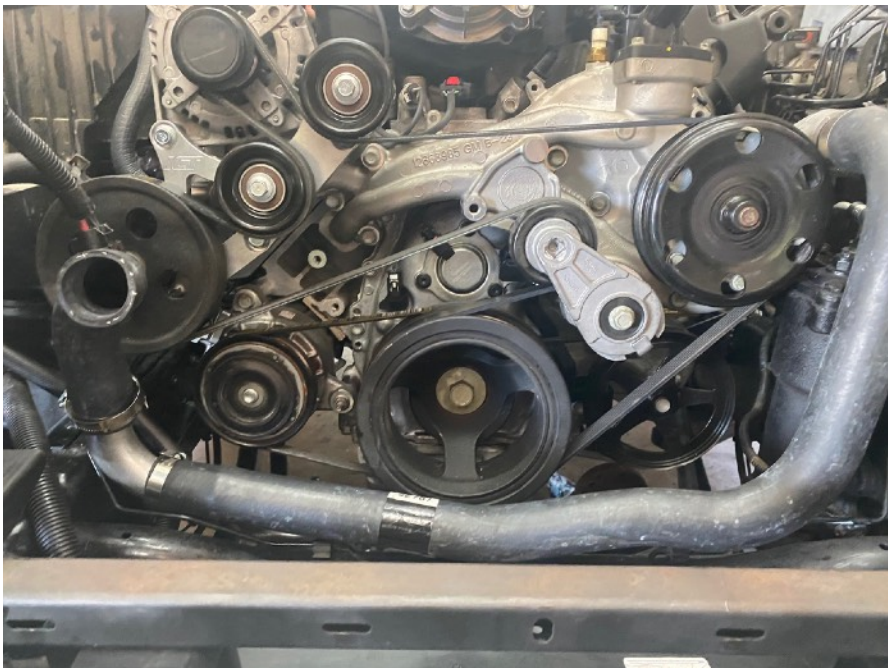
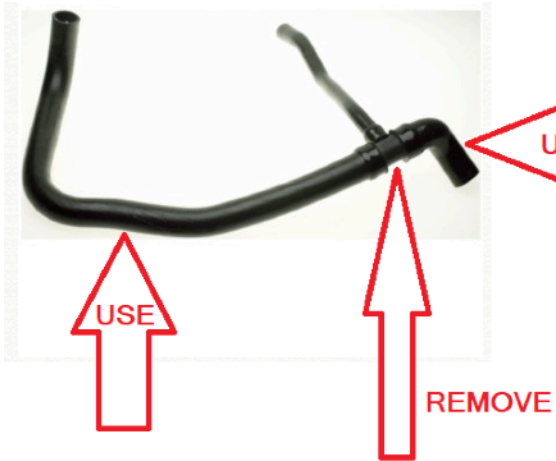


# Lower Radiator Hose L83-L86

The lower hose will require a few parts to make it work. You will need a lower hose part number NAPA 9422 OR DAYCO 52178MY OR GATES 26497BM.

You will also need a stainless 90 degree pipe. We use SUMMIT RACING 380610

On the how you will need to cut the plastic bands holding the "T" and remove the "T". Be careful to not cut into the hose itself. From there you will use the long and short end of the hose to run from the water pump to the lower radiator port. At the lower radiator port you will install the stainless 90 and use it to join the two hoses together like in the picture below. Use clamps to hold everything together. Secure the new hose assembly to the lower crossmember and make sure it will not contact any moving parts or get rubbed thru.



# Upper Radiator Hose L83-L86

If running a Truck L83 - L86 water pump use upper hose part number NAPA 8770. This hose will run from the thermostat housing to the upper port on our radiator. Secure it with good clamps and make sure it will not rub on anything.

The steam port hose will run from the thermostat housing to the upper steam port fitting on the left side of our radiator.



# AC Hoses

Bolt on our pre made hoses starting at the firewall making sure the seals are intact.

Run the smaller hose to the condenser (lower port) and bolt it up.

Run the larger hose over or under the fan shroud and down to the AC compressor and bolt it up.

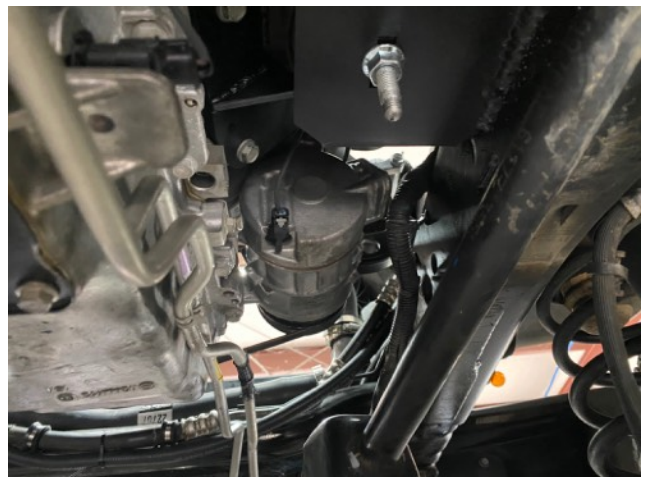
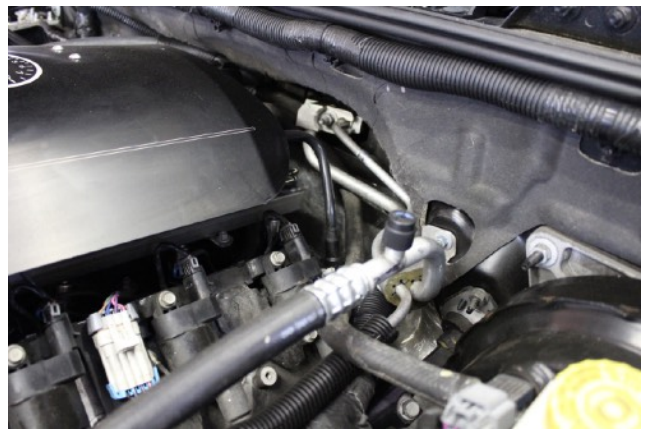
The single hose will bolt up the the condenser on the driver's side (upper port), install your factory pressure sensor and run the hose along with the larger hose to the AC compressor.

Remover your original Ac pressure switch from your old Jeep lines and install in on the port on the new lines.

If you're using a new compressor follow instructions for adding the proper amount of PAG oil.

Vacuum down the system down for 30 minutes to verify no leaks and to remove any moisture from the system

Charge the system with 525 grams of 134A. If you do a system test you should see 170-240 PSI on the high side. The high speed fan should be running when the pressures are above 220 psi.



# Heater Hoses

We usually reuse the factory Jeep heater hoses. Be sure to route them away from heat and anything sharp. It will be tight but they will reach.

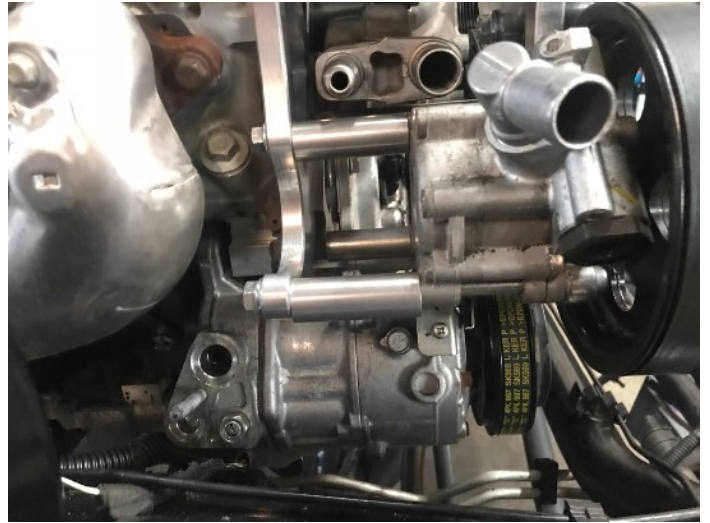
If you need to replace them or want longer hoses use NAPA 10084. They are a nice long hose with a larger end that works well with the LT water pump.

The picture will show the inlet and outlet of the pump. Run the outlet of the pump to the inlet of the heater core (lowest port).

Run the highest heater core port to the return side of the water pump fitting.

The small port on the water pump is the Inlet and the larger port is the outlet to the heater core.

Coolant will flow out of the larger port and return on the smaller one

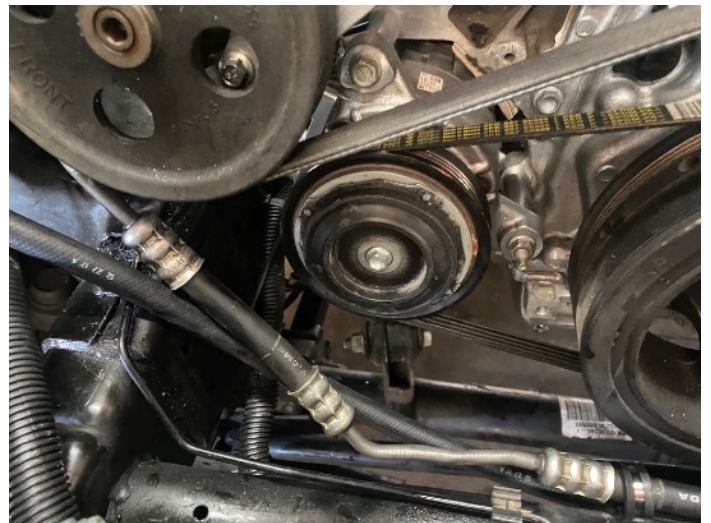
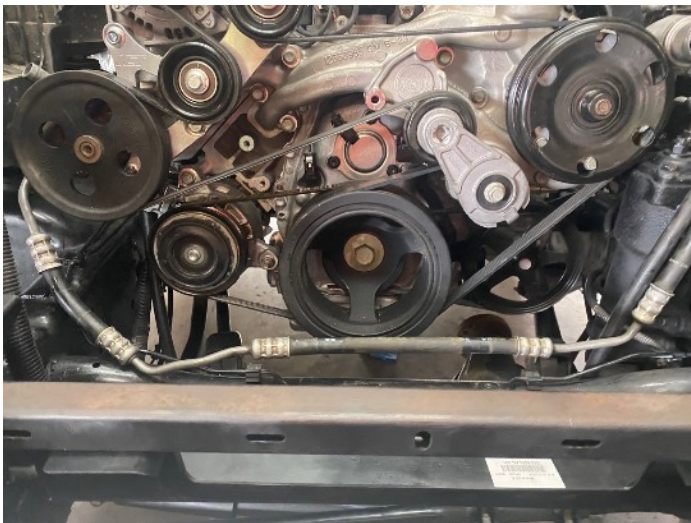
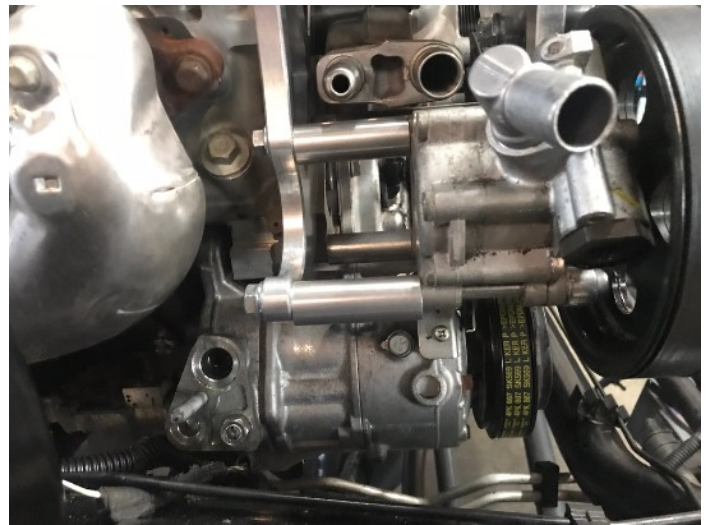
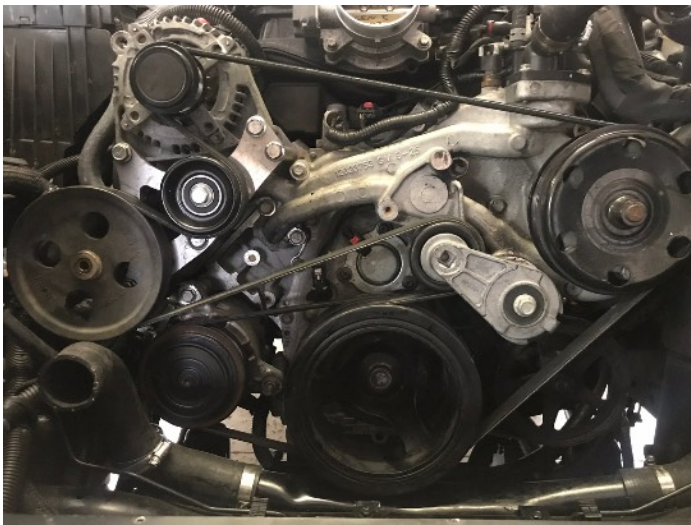


# Power Steering Hoses

\*\*\*There are several different options for adding a power steering pump to a LT engine\*\*\*

Power steering hoses will depend on which power steering pump kit you are running. Below we will show a ICT Billet pump bracket kit with a 07-11 JK factory pump. With the ICT Billet and factory JK 3.8 pump you can reuse your factory PS pressure line. Run it from the pump to the steering gearbox.

You may have to rotate the inlet fitting on the top of pump. Take some pliers and grasp the inlet fitting and rotate it so it points more towards the front. This will give you better access for the reservoir hose.



# Harness Install (under dash)

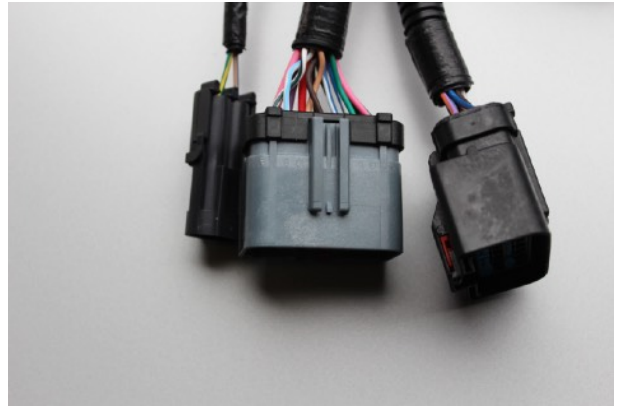
## *Jeep Side Interior Harness*

Route harness from inside and run both 14 way connectors and power wire thru firewall hole below brake booster.

You can either drill a new hole or drill out the hole where the Master cylinder would be on a manual transmission Jeep.  
Use supplied rubber grommet.



Run harness around the brake booster and plug into the two 14 way connectors on the main under hood harness.



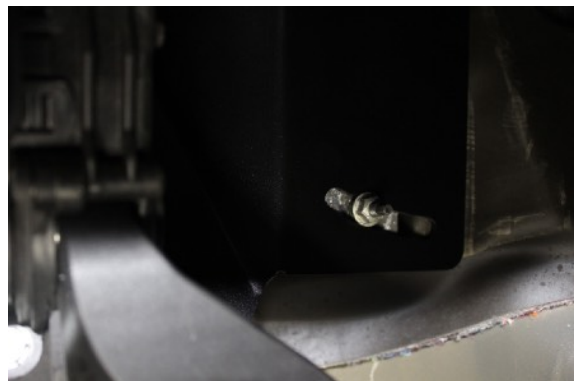
Run single power wire along firewall and attach to positive battery terminal.

Mount your GM accelerator pedal (23362231) to the APP bracket provided.



Remove and discard your original Jeep accelerator pedal. (Save hardware)

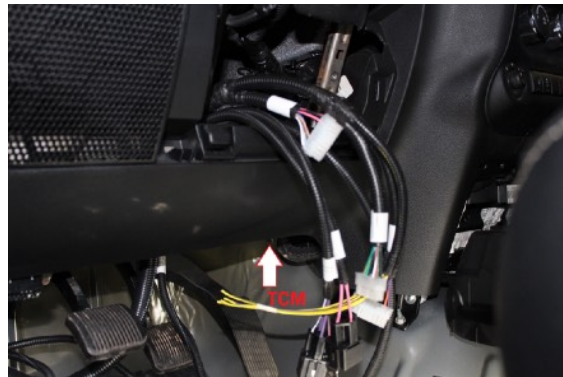
Mount the APP bracket to the original studs and secure with the original hardware. This bracket is adjustable and can be repositioned as needed.



Find the connector marked accelerator pedal and plug into the GM pedal. Secure harness up out of the way making sure it does not contact the steering shaft.



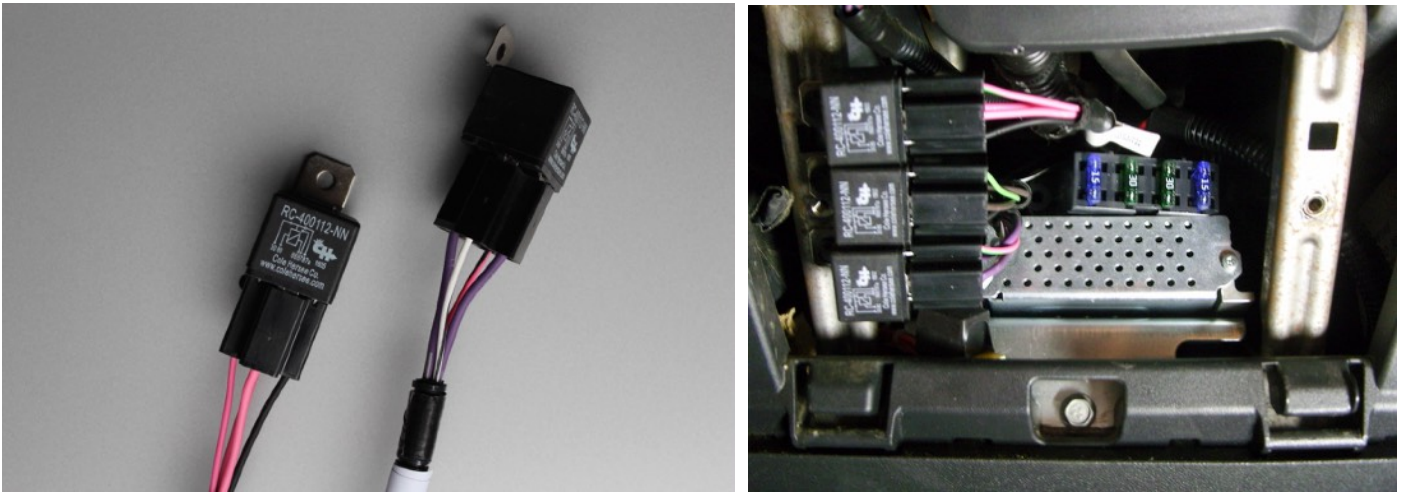
If you have an automatic now would be a good time to remove the TCM. Its located under the dash and to the right steering column. Its black plastic with 2 connectors. Just unplug the connectors and remove the TCM from the plastic mount. You will not need the module.



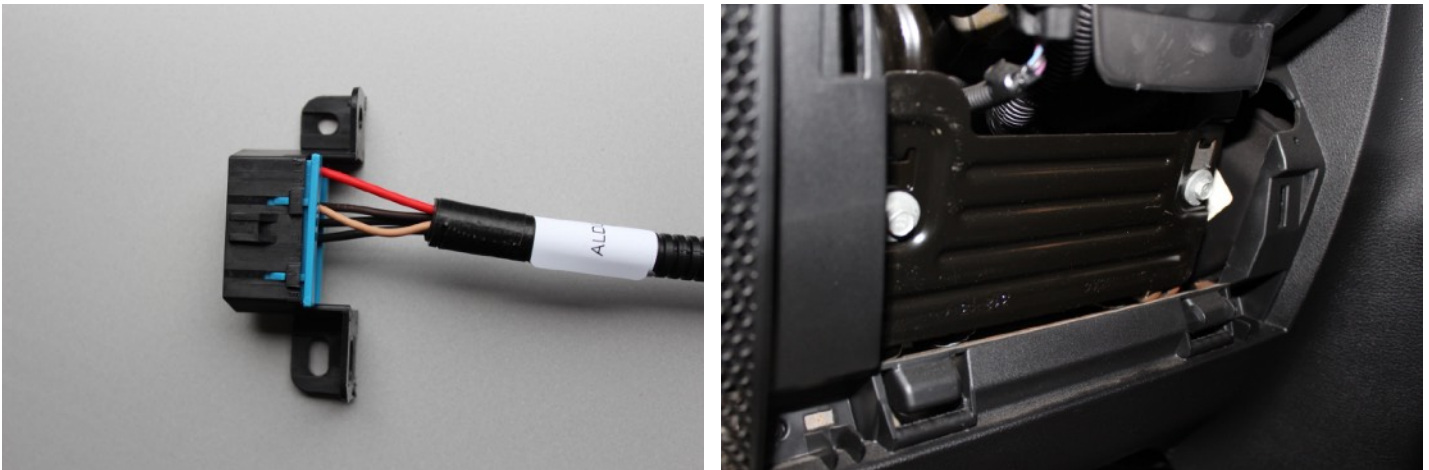
Locate the three white connectors labeled x101, x102 and x103. Plug these into the EZcanbus Module matching the positions on the labels. Mount the module under steering column or along the inner fender area making sure the harness does not rub the steering shaft. We like to keep it as high as possible just in case you get into high water.



Mount Fuses and relays under steering column or somewhere with easy access.



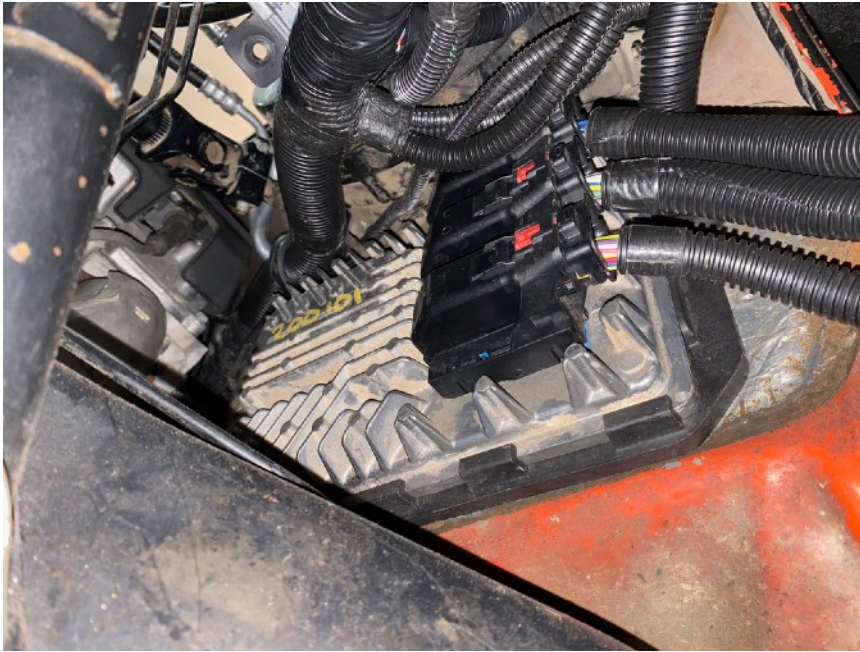
Mount (ALDL) OBD2 port under dash where you can reach it from the drivers seat. We usually mount it in front of the stock Jeep OBD2 port and screw it to the underside of the dash panel.



# ECM MOUNTING \*            \*

We have found that these OEM mounting brackets can be used to mount the ECU and TCM  
ECM Brackets, either 23302584 or 23161325. TCM bracket 22933922

We usually mount these under the brake booster on the firewall. You will have to modify the plastic bracket by trimming the “wings” off so it will lay flat against the firewall.

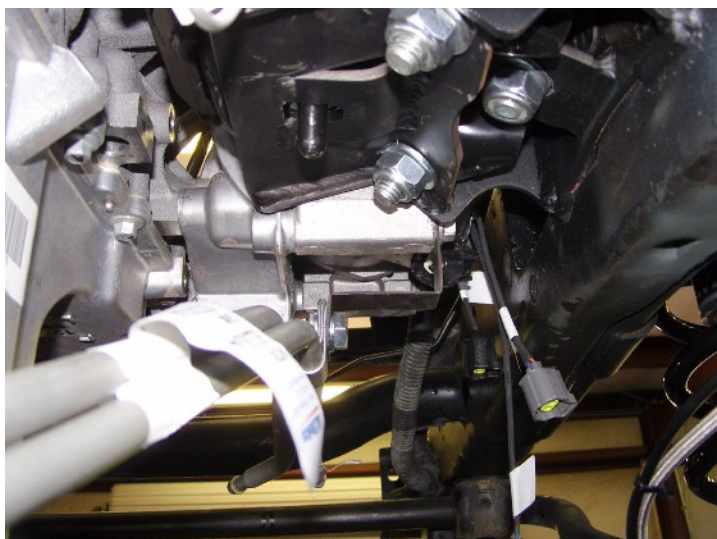
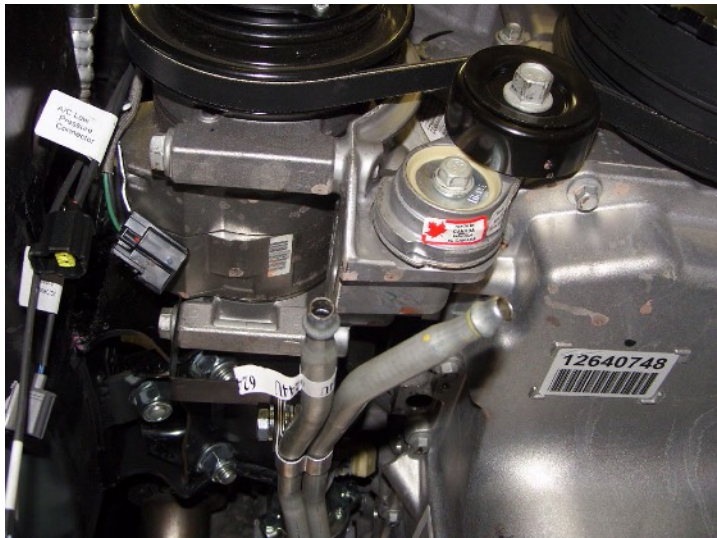


# Trans Cooler & Lines

For a 6l80e We like to use the Camaro cooler line part number **92236244**. For the 8 speed 8L90 we use **23347504**. We chose these because they fit tight to the engine and have open ends where you can attach the rubber hoses from an aftermarket transmission cooler.

These lines will run tight under the right hand side of the engine. Be sure to fab up a little bracket to keep them from moving or secure with clamps or zip ties.

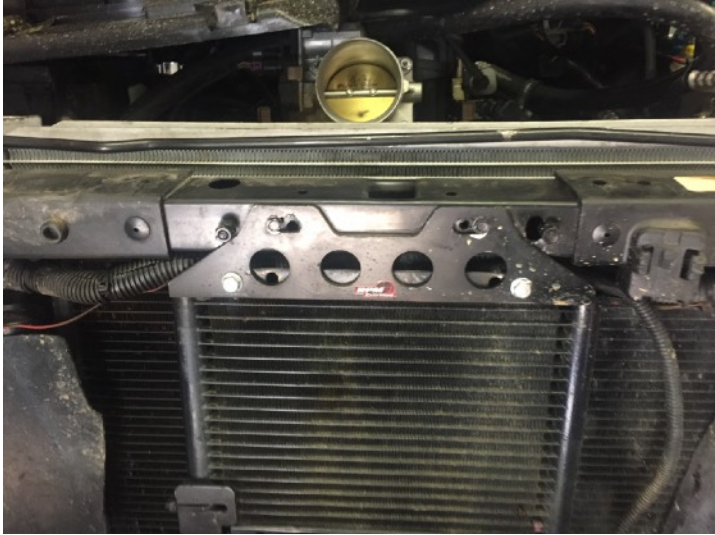
Transmission: **24265546** Fill Tube, **24271875** Indicator, Seal # **15796802**



Use a high quality universal transmission cooler with at least 20,000 BTU capacity.

Mount it in front of the condenser and secure it in place.

Run the hoses to the transmission cooler lines, clamp and secure.



# Exhaust System

You can use the factory truck exhaust manifolds. You will need the factory exhaust flanges as well.

Use the pictures below to get an idea of how the exhaust is laid out.





