

Introduction

Individuals have been successfully installing popular Chevrolet and GM engines to Jeep vehicles since the 1960's. The Jeep JK lends itself to very successful swaps. Below is a summary of the information we've gathered since our first JK conversions, and includes the valuable insights gained by us and our customers

Despite whatever your experience with this type of work may be, we strongly advise you to read these instructions well. Contained in these instructions are the requirements, tips, hints and tricks of years of performing these conversions, both in our own facility and information we've gained from discussing these swaps with our customers. Put this information to good use. Failure to implement the practices and information in these pages may jeopardize the quality of your work, as well as the product warranty.



About Your Engine Mounts

Novak's weld-in engine mounts for the Jeep JK Wranglers provide immense strength and a rapid and precise GM Gen. III+ V8 engine installation.

Ease of Installation

With the engine mounts discussed in this instruction guide, we have sought to achieve the greatest ease of installation without compromising engineering.

Strength

The Novak mounts feature a thick 3/16 steel construction and a welded box design for the maximum strength available. They employ the best engineering and geometry to assure that they'll survive even the wildest of engines.

Placement

We have predetermined engine placement for the installer. There is a very fine window in which these GM engines can properly fit into a JK Jeep, and we've done this design legwork already.

Compactness

The mounts will clear the exhaust headers blockhuggers we recommend and clearance from all other retained factory components is also excellent.

Note that sagging factory springs and / or modified axle bump stops, combined with mounting the engine too far forward could allow for axle interference with the engine oil pan. It is the responsibility of the installer to verify a safe and non-interfering installation.

Vibration Isolation

Each mount kit comes with our high-grade isolators that are gauged well for that ideal balance of isolation and firmness. The large, graded 5/8" bolts and all associated hardware are included. Additionally, Novak will always



be here to inexpensively provide replacement isolator bushings, if needed - years down the road.

Preliminaries

Body & Suspension Lifts

Contrary to conversion mythology, it is not necessary to install a body lift when installing a GM Gen. III+ engine in a JK Wrangler. It is also not necessary to install a suspension lift or extended suspension snubbers for the purpose of the conversion. A GM V8 can be installed in a factory JK Jeep so long as factory springs are not excessively fatigued or collapsed.

Air Conditioning

We recommend that you install our Air Conditioning Relocation kit, which provides a new compressor and mounts it up at the passenger side head location on Gen. III+ engines.

Jeep Transfer Cases

This guide is based on the retention of the 241J or 241OR transfer case in your Jeep. They are extremely reliable, very durable, and easily and affordably adapted to your conversion powertrain.

Your Powertrain Assembly

If you have purchased a Novak Turn-Key powertrain, you can skip the following preliminary step.

It is recommended that you pre-assemble your powertrain outside of the Jeep. Follow the instructions provided with your Novak adapter kit to assemble your chosen gearboxes behind your GM engine. You should assemble the powertrain as completely as possible, including the headers, wiring, accessories, belts, clutch releases, air intakes, etc. At Novak, we actually pre-assemble and test run our powertrains prior to installing them into the Jeep. If you assemble as much as the powertrain as you can and follow this same paradigm, asking the question, "Given battery, fuel and coolant, could I run this engine on a stand?", you will be well on your way. Because of superior access to things and for organizational purposes, you will enjoy the work more and take a few hours off of your project.

This section precedes the others in that it is a very good idea to have the powertrain assembled to the fullest extent possible prior to disabling your Jeep for the conversion process.



Note the location of the Jeep oil pressure sensor on this Gen. III+ engine (above) and the water temperature sensor (below). It may be necessary to drill and tap as per the threads in your factory or aftermarket sensor.

Begin the Conversion

As with all other Jeeps, we'll begin by disconnecting the negative battery cable and by then disconnecting the coolant, fuel, air, vacuum, exhaust and electrical circuits into the engine. Once the coolant is drained, remove the radiator, A/C condenser, transmission cooler, any winches, etc. Now, remove the grille from the fenders and front crossmember. It is not necessary to remove the hood, as it may be tilted fully out of the way against the windshield frame.

Powertrain Removal

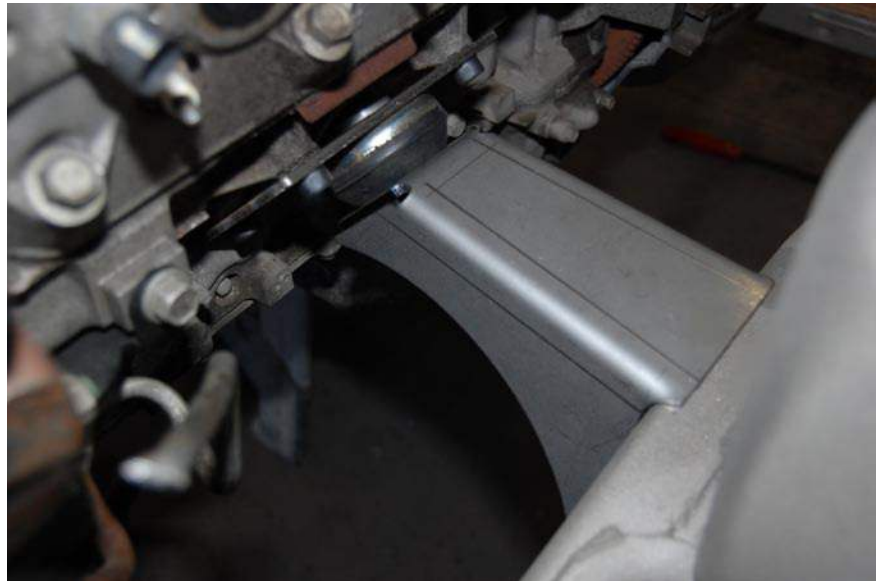
It is usually recommended to remove not just the engine, but the transmission and transfer case, even if you are retaining both of them in your conversion, such as with the NSG370 manual transmissions. Because the GM engine will relocate the geartrain forward, removal and assembly to your new engine outside of the Jeep is generally helpful and not difficult.



Drop the crossmember / skidpan assembly, supporting the transmission and transfer case with

jack stands. Disconnect the front and rear driveshafts and set them out of the way.

Disconnect the transfer case shifter and speedometer connection. Remove the transfer case from the factory transmission adapter and set it aside. Note here that it is possible to remove the transfer case with the engine and transmission assembly as you thread them up and out of the engine bay. However, generally, it is easy to remove the transfer case. Disconnect the transmission shifter assembly from its housing. This is typically done by removing its four bolts that secure the shifter assembly to the top of the transmission. Disconnect the hydraulic clutch release line.



Unbolt the factory engine mounts from the frame horns. Safely secure a lifting jig to your outgoing motor and carefully pull it from the bay. Typically, the transmission causes the powertrain to tilt back and allows it to feed out from the engine bay at the proper angle, but having an assistant or two to guide it out is helpful.

Firewall Clearance

No firewall modifications are required. Clearance with GM V8's is excellent.

Engine Plate Installation



In preparation for the installation mount the provided engine block mount plates onto the engine block bosses. Insert the provided carriage bolt through the center hole of the block plate.



Notice that these engine plates are adjustable fore and aft with three conjoined holes. We recommend you install them in the center hole location at first, and then adjust for-

ward if you have sufficient fan / radiator clearance. Use the eight factory or Novak-provided M10 (Gen III+) or 3/8" (Gen I-II) bolts. We recommend the installer use a drop of removable thread locking compound on these threads, such as Loctite Blue upon final installation, and torque to ~35 ft. lbs.



Slide the upper isolator onto the carriage bolt, with the radiused cup side towards the engine block. Note that the engine plate hole is radiused to allow the carriage bolt to droop downward. This will ease your installation as the engine is lowered into the mounts. At this point, we recommend that you temporarily wrap the carriage bolt threads with two or three wraps of vinyl tape. This will help keep the upper isolator from sliding off during as-

Preparation Details
Make sure that all A/C and heater circuits are plugged off to prevent ingress of contaminants.

Few things will add to your enjoyment of the project as much as a good pressure washing of the engine bay while it is open.

sembly.

Frame Preparation

These mounts are a purely weld-in design when replacing the factory JK engines. They require the complete removal of the factory frame horns, and will be replaced by the frame brackets as provided in the Novak kit.

Total removal of the factory V6 frame horns and steering shaft support bracket is required. We recommend a reciprocating saw with appropriate speed and blade, or a plasma cutter. Follow up with a clean grind or disk of the frame.

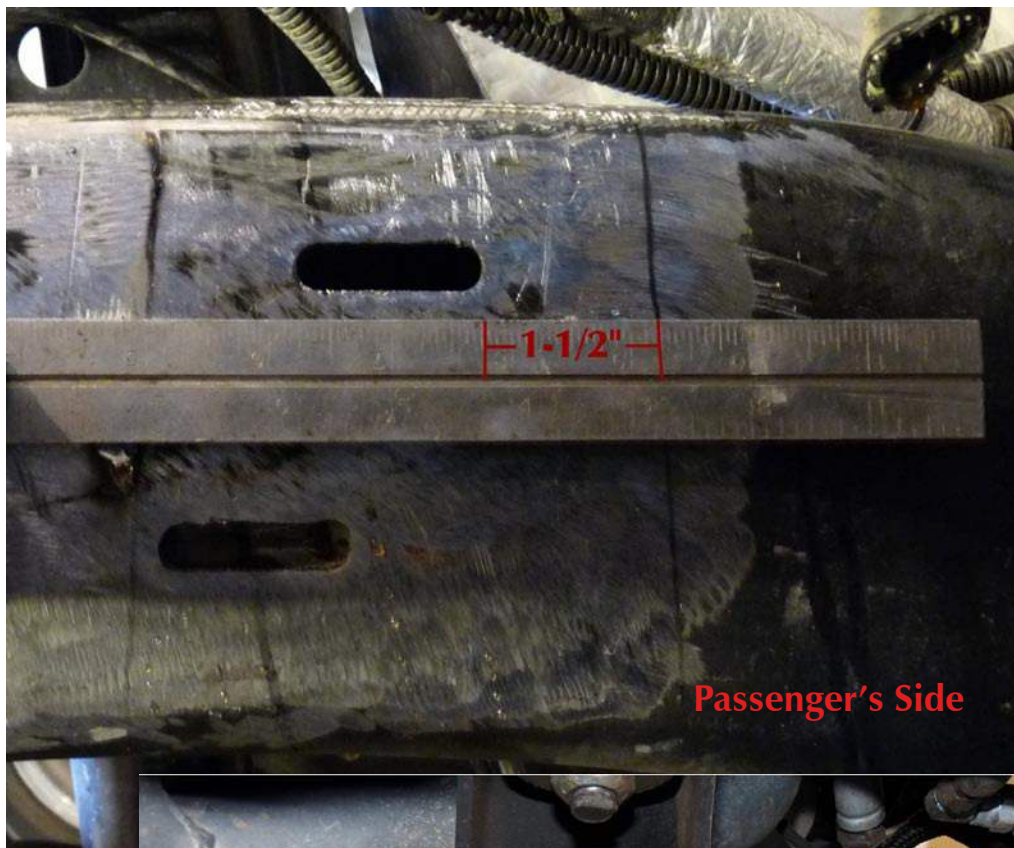
Install the Engine Mounts

Your Novak engine mounts predetermine the location of your GM engine, for height, left-right offset and longitudinal position. You'll notice that one mount is longer than another. This is the driver's side mount. You'll also notice the mounts are cut to match the wall and contour of the Jeep Wrangler frame. Position the driver's side bracket on the frame and measure 1-1/2" from the front edge of the oblong slot on the frame to the inside flank of the engine mount bracket as shown. For the passenger side, take the same measurement but from the rear edge of its slot, as shown.

We've found this to be the ideal position for the widest variety of Generation III+ conversion circumstances.

While we have determined the engine location based on a variety of installation scenarios, you may wish to temporarily tack weld the brackets to the frame rails and do a test installation of your own V8 engine and verify any particulars to your installation, such as transmission fit, radiator fit, accessories, cooling system, etc.

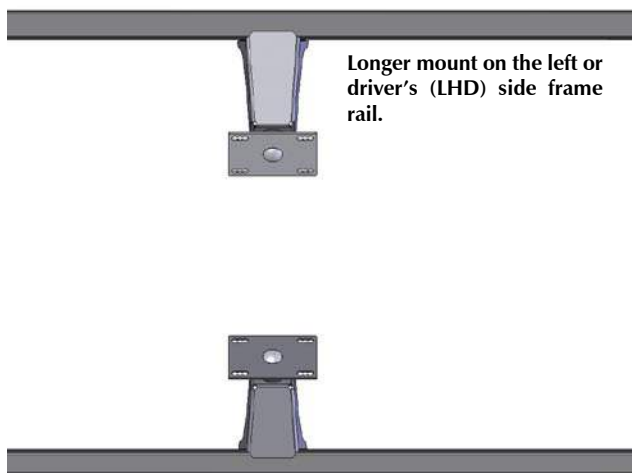
Once you're content with it all, lay MIG or stick welds along the entire edge of the brackets for a maximum strength connection to the Jeep frame. Allow your frame and bracket to air cool. Do not accelerate the cooling process with compressed air or water. We suggest you follow up by wire brushing and coating the brackets with primer and enamel as per your preference.



Passenger's Side



Driver's Side



Longer mount on the left or driver's (LHD) side frame rail.

Install the Powertrain

It's now time to finally lower your motor into the Jeep engine bay if you haven't already done so.

Very carefully and with assistance, lower your powertrain into the engine bay. You can thread your transfer case into the Jeep tunnel with someone guiding it.

Lower in your new engine. Install the underside isolator mounts and install the provided TopLock nuts under the isolator bushings. Do not squish the bushings. Tighten them only to where they just start to deform. Overly tight bushings can cause excessive engine vibrations through the Jeep and will cause premature bushing cracking and failure.

Steering

The GM power steering pump will drive the Jeep power steering gear perfectly well. You may need to have a hydraulic shop or parts house make you a high-pressure line that matches the JK power steering gear and the GM power steering pump.

The return line is simply low-pressure 3/8" hose, as is available from your local parts house. If you're feeling creative, you can even run this line through an external cooler to add to the life of your pump and gear in hard service situations.

Brakes

You can retain your factory braking system all together. No changes are necessary from the standpoint of the conversion itself.

The GM engine provides vacuum at the rear of the manifold, whether it be a Small Block Chevy or a GM Gen.III+. It may be necessary to tap for a simple, barbed brass fitting on some manifolds that had the Hydroboost brakes.

The ABS computer is separate from all systems and runs independently. No mechanical, wiring or hydraulic changes need occur here.

Cooling System

The Jeep radiator will be both inadequate, poorly configured for a GM engine and has a reputation for a lack of durability.

The Novak Radlock Radiator is a tough and very efficient radiator. It is a cross-flow design and it bolts onto the Wrangler grille without mods. With it, we have seen success with the following coolant hoses: Lower may be Napa #7473 or try a Gates #20842 or #21706. For the upper, try a Gates #21833. We have also used Gates hoses #22438 and #22437.

It is possible to run a mechanical fan and they almost always have plenty of pulling power. Electric fans are becoming more of the norm. We recommend our aggressive electric fan with integrated shroud assembly. These fans are controlled by any GM computer equipped with a circuit to trigger a fan relay. Alternatively, you can install a fan control module and install it to our fan motor per the manufacturer's recommendations.

Exhaust

JK Jeep exhaust systems are not difficult to run at all. It might be possible to use some factory manifolds with your conversion engine. The JK has a somewhat generous engine bay, but there are still space limitations. As such, we generally recommend aftermarket headers for compatibility as well as performance.

We recommend our #CCLS1 headers for Gen.III+ engines for optimal layout. Run the driver's side down and in front of the oil pan over to the passenger's side. Merge it and the passenger bank into a Y pipe and send it out as a single circuit down the passenger side, up over the axle out exiting at the rear.

Throttle Linkage

If your engine has a cable throttle linkage, you can connect your Jeep pedal to the GM throttle body. However, the majority of GM engines now feature a "throttle by wire" or electronic throttle assembly. For these systems, you will need to install the GM electronic pedal assembly and its associated Throttle Actuator Control (TAC) module, if required. Note that most Gen.IV engines do not use a separate TAC module as this function is integrated into the Gen.IV powertrain computer itself.

Air Intake

Conversion air intakes have really evolved nicely. Typically, install a 4", 90 deg. elbow at the throttle body and point it towards

the passenger side of the Jeep. You can then use a length of pipe, such as extruded aluminum and then a coupler to the Mass Airflow Sensor, which then connects to a cold-air style air filter assembly.

See the Novak air intake components page for assistance here.

Engine Height & Top Covers

Classic Small Block V8's and V6's have adequate clearance to the Jeep hood, and good clearance between the axle and suspension components. Generation III+ LS engines with their shorter intakes and shallower oil pans also have excellent suspension and hood clearance.



the adjacent image.

Generation III+ truck engines, however, are somewhat taller given their high-rise, torque increasing intake manifolds. In order to achieve maximum clearance at the bottom of the engine, we have engineered the mounts to put the engine higher towards the hood. This will probably necessitate the removal of the decorative Vortec manifold covers. This will gain the installer a needed about 1-1/2". To mitigate this problem and keep your conversion engine beautiful under your JK hood, Novak offers its decorative engine top cover in brushed, black-anodized aluminum and engraved with the Novak logo, as shown in



Conclusion

You should expect that you will gain significant power, fuel economy, reliability and general capabilities with your GM to JK Jeep conversion.



While reading through these instructions, and especially while performing the swap, it is often recognized that it is not the swap itself that provides the greatest difficulty, but in the ancillary things like linkages, clearances, and the like. Any good installation should consider all the points in this article and also allow for time, energy and funds for the dozens of variations in drivetrain conversions that cannot be anticipated.

Disclaimer & Liability Limitations

The information contained in these instructions is for guidance only, and does not guarantee or constitute a warranty of fitness, applicability or compatibility with the customer's particular project. Suitability of parts or information for an application is fully the responsibility of the reader or buyer.

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