



1987-1995 JEEP WRANGLER LS or LT SWAP ENGINE MOUNTING BRACKETS BHS522

Installation Instructions



Thank you for choosing to use Hooker Blackheart products on your 1987-1995 Jeep Wrangler LS/LT engine swap project. These engine mounting brackets are part of the most comprehensively designed engine swap system available for installing a GM LS or LT engine into this vehicle application. Installation of these engine mounting brackets requires that the stock 4 or 6 cylinder engine mounting brackets be removed/cut from the frame of the swap vehicle. It is highly recommended that the Hooker Blackheart 1987-1995 Jeep Wrangler LS/LT Engine Swap Technical Guide be read fully before beginning the installation of these components, as the information contained within it will be helpful in understanding the overall scope of the project that will be undertaken by the user.

PRE-INSTALLATION CONSIDERATIONS:

IMPORTANT! Position and support your vehicle on a suitable surface. **USE CAUTION AND WORK ONLY ON A LEVEL SURFACE USING JACKS AND JACK STANDS OF SUFFICIENT CAPACITY TO LIFT AND SUPPORT YOUR VEHICLE. NEVER WORK UNDER A VEHICLE SUPPORTED BY A FLOOR OR BUMPER JACK.** Use of a two-post under arm lift or four-post drive-on lift will considerably reduce the time and effort required to complete the installation. **MAKE SURE LIFT LOCKS ARE ENGAGED BEFORE WORKING UNDER THE VEHICLE.**

These engine mounting brackets have been designed to allow the user to install a GM LS or LT engine, backed by a GM TH350, TH400, 4L60E-4L70E, 4L80E or 6L80 transmission, into any 1987-1995 Jeep Wrangler. This can be accomplished without a body lift (excluding belly-tuck installations) and all referenced transmissions can be mounted to the stock Jeep YJ skid plate when using Novak brand transfer case adapters for the stock NP231J transfer case, a Hooker Blackheart 71223029HKR (black) or 71223030HKR (red) transmission mount and a user-supplied spacer block (specific spacer height for each transmission is given later in the installation steps). **NOTE:** New body mounts may need to be installed to achieve as-designed transmission clearances on no-body-lift installations.

The installed fore/aft location of the stock NP231J transfer case will remain in the factory stock position, when a 4L60E-4L70E transmission/ Novak transfer case adapter combination is used. The front and/or rear driveshafts may need to be modified or replaced, regardless of the transmission used, depending on the drivetrain inclination angle chosen for the installation; a stock inclination angle, transfer case drop, or belly-tuck configuration can be accommodated with the Hooker Blackheart LS/LT swap system.

A body lift will be required to install the drivetrain in a belly-tuck configuration and may be required to install a manual transmission, or transfer case other than a NP231J. A body lift will also be required for the Vortec truck engine factory intake manifold cover to clear the underside of the stock hood.

The entire Hooker Blackheart LS/LT swap system for this vehicle application is designed to maintain the factory passenger's side offset position of the drivetrain and are intended for use with driver-sided-drop transfer cases and axles only.

These brackets may be used as part of an emissions legal swap by using the engine and its entire emissions system (i.e. ECU/wiring harness, fuel tank/evaporative emissions components, exhaust manifolds and catalytic converters) from a qualified donor vehicle. Hooker Blackheart headers and Y-pipes for this application are designed for off-road/ racing use only, on vehicles that will not be used, or registered for use on public roads or highways. Documents are available from the California Air Resources Board and the EPA (for swaps in states that do not follow California emissions standards) that describe the requirements for this type of swap in detail.

Installation should only be carried out by individuals with adequate welding skills and experience. 110V welding equipment is not recommended for use in installing these components.

INSTALLATION:

NOTE: Installation of a LS or LT engine onto these engine mounting brackets will require the use of additional user-supplied parts. The specific parts needed are as follows:

Hooker Blackheart 71221018HKR clamshell (2 required, LS engines only), 71221019HKR clamshell (2 required, LT engines only) 71221016HKR (black) or 71221017HKR (red) polyurethane engine mount inserts (2 required) and 71223015HKR engine mount hardware kit (1 required).

Any questions? Please contact Technical Service: 1-866-464-6553 or 270-781-9741. For online help, please refer to: www.holley.com.

1. Disconnect the cables from the battery and remove the battery from the vehicle.
2. Recover the refrigerant from the A/C system, using suitable equipment.
3. Remove the A/C dryer and refrigerant lines.
4. Drain the coolant from the radiator/engine and remove the radiator.
5. Remove the stock wiring harness, including the fuse/relay center.
6. Remove the front and rear drive shafts.
7. Remove the engine, transmission and transfer case from the vehicle, using the prescribed steps in the Jeep YJ factory service manual.
8. Remove the throttle cable throttle pedal.
9. Clean the engine bay with a pressure washer, or by other suitable means.
10. Remove the front fenders/inner fenders.
11. Remove the factory fuel lines from the frame rail.
12. Remove the bolts that attach the brake lines to frame rails and move the brake lines a suitable distance away from the engine mounting brackets on the frame to allow you to work on the removal of the brackets.
13. Cut the engine mounting brackets off the frame and grind/sand all remnants of the brackets smooth and flat.
14. Thoroughly clean the shipping oil finish from the supplied engine mounting brackets using dish washing detergent or brake cleaning fluid and let them dry.
15. Measure and scribe a line across the top surface of the right side (passenger) frame rail 7-1/8" from the front edge of the forward-most factory frame energy management hole on the inside upper corner of the frame rail. These are a series of in-line holes located in the corners of the frame rail where it bends just before turning under the body tube. See **Figure 1** below for a visual reference.



Figure 1

16. Place the supplied right-side engine mounting bracket (the shorter of the two brackets) onto the right frame rail and line up its rear edge with the line you've scribed into the top of the frame rail before clamping it in place with a 6" heavy-duty C-clamp.
17. Using another 6" heavy-duty C-clamp, loosely clamp the supplied left-side engine mounting bracket onto the left frame rail directly across from the right side engine mounting bracket. Exact positioning of this bracket is not needed at this time, as it will be adjusted to line up with the left side engine mount as the engine is being set in the chassis for the first time.
18. Attach a Hooker Blackheart 71221018HKR (LS engines) or 71221019HKR (LT engines) clamshell cage and 71221016HKR (black), or 71221017HKR (red) poly insert to both sides of the engine per the instructions included with those products. If you are performing an LT engine installation, install the 1/8" thick spacers supplied with these engine mounting brackets between the engine block and the Hooker Blackheart 71221019HKR LT clamshell cages.
19. Attach the transmission to the engine, and then attach the appropriate Novak NP231J transfer case adapter to the transmission.
20. Hoist the engine, transmission, and transfer case adapter assembly into the vehicle frame and tilt the assembly to an approximately 5 down-angle to the rear before easing it down gently into the engine mounting brackets clamped to the frame. It is at this time that you will loosen the C-clamp on the left (driver's) side engine mounting bracket and slide it forward, or rearward, to align it with the motor mount on the left side of the engine.
21. Install the motor mount coupler bolts from the Hooker Blackheart 71223015HKR hardware kit into the engine mounting brackets/motor mounts. Install the bolt in the passenger's side bracket first and then slightly raise/lower the engine, as needed, to allow installation of the bolt in the driver's side engine mounting bracket. Be sure the engine mounting brackets are bearing against the frame rails and both C-clamps are securely tightened before lowering the weight of the engine fully onto the engine mounting brackets.
22. Attach the transmission mount bracket included with the Novak transfer case adapter in the following orientation:

TH350 install - bottom flange for transmission mounted pointing towards the **front** of the vehicle

TH400 install - bottom flange for transmission mount pointing towards the **rear** of the vehicle

4L60E/4L65E/4L70E install - bottom flange for transmission mount pointing towards the **rear** of the vehicle

4L80E install - bottom flange for transmission mounted pointing towards the **front** of the vehicle

6L80 install - bottom flange for transmission mount pointing towards the **rear** of the vehicle

23. Raise the rear of the transmission to a height that will allow the factory transmission skid plate to be installed and install the skid plate.
24. Sight through the mount attachment slots in the skid plate and determine which of the three mounting positions on the bottom of the Novak transfer case adapter mount bracket will be best for aligning the holes in the Hooker Blackheart transmission mount with the slots in the skid plate. Once that is determined, attach the Hooker Blackheart transmission mount onto the bottom of the Novak transfer case adapter mounting bracket.

All the transmissions covered in this application, except the TH350, attach to the rear pattern of slots in the stock transmission skid plate, which is located along the boxed section of the skid plate. If you are using one of the stock skid plates that did not come from the factory with a pair of slots in this location, you will need to mark the required fore/aft location of these slots on your skid plate and create them with suitable cutting tools.

Determine the correct left/right location of the slots by projecting their centerlines rearward from the front pair of slots. You'll also need to cut a square access window on the underside of skid plate to be able to install the mount attachment bolts through the skid plate.

25. Install the Hooker Blackheart transmission mount onto the transfer case mount bracket in the correct determined position.
26. Attach the mount to the skid plate after placing a user-supplied spacer block of the following height between the transmission mount and the top of the skid plate: **TH350** install - 2" tall spacer, **TH400, 4L80E or 6L80** install - 5/8" tall spacer, **4L60E/ 4L65 or 4L70E** install - 11/16" tall spacer.

The amount of engine/transmission offset designed into the Hooker Blackheart engine mounting brackets requires the transmission output shaft centerline to be slightly offset towards the driver side, relative to the mounting slots in the stock skid plate, to provide correct installed drivetrain alignment. The bottom flange of the Novak transfer case adapter mount bracket has slotted mount attachment holes in it that make this easy to accomplish. Adjust the mount on the Novak adapter bracket so as to shift the transmission output shaft centerline 1/4" (towards the driver side) off of the centerline between the two mounting slots in the skid plate.

If you cannot easily maneuver the transmission over far enough obtain that amount of offset, it indicates that a fore/aft adjustment will need to be made to the position of the driver's side engine mounting bracket on the frame rail. Position a screw jack/stand under the engine to support it and loosen the C-clamp holding the bracket to the frame slightly (do not stand or lay under the engine while doing this) and tap the bracket slightly forward on the frame to provide more transmission shift adjustment towards the driver's side, or slightly rearward on the frame to provide more transmission shift adjustment towards the

passenger's side. With the 1/4" driver's side offset of the transmission output shaft adjusted into the transmission mount assembly, re-tighten the C-clamp on the left side engine mounting bracket and ensure the bracket is bearing against the frame along both its top and side attachment surfaces.

27. Once the transmission mount assembly is adjusted with the proper offset, attach it firmly to the skid plate and double-check that both engine mounting brackets are bearing against the top and inner vertical walls of the frame rails. If so, tack-weld the engine mounting brackets to the frame rails and then remove the drivetrain from the vehicle to permit welding and painting of the mounting brackets.
28. Fully weld the mounting brackets into place on the frame rails, including plug welding the round holes on the vertical inner frame walls, and then paint them once they have cooled. Use of 110/120V input welding equipment is not recommended for this task.
29. Install the engine, transmission, transfer case adapter and transfer case into the vehicle and tighten all their attaching bolts/nuts.
30. This baseline installation mounts the drivetrain at the steepest inclination angle that is possible (6.5 degrees nominal, relative to the bottom of the frame rails) using the stock skid plate with no transfer case shims. From this point, the user has two options from which to configure the drivetrain to provide desirable U-joint working angles in the completed vehicle. These options are:
 - 1 - Shim the skid plate down and/or rotate the rear pinion with wedge shims, as needed, to obtain desirable U-joint working angles.
 - 2 - Use an aftermarket crossmember to raise the transmission mount about 1-5/16" from this baseline position to obtain a 5 degree inclination angle. This will allow an aftermarket skid plate to be used to increase ground clearance over the stock skid plate. A double-cardan type rear driveshaft set-up must be installed in order to take advantage of this benefit.
31. Install the front and rear driveshafts into the vehicle. **NOTE:** If a 4L60E transmission is being used, the stock NP231J transfer case will be in approximately the same fore/aft location as it is in a stock Jeep 4.0L/automatic installation, so the stock driveshafts may be able to be re-installed, if desired.
32. For those performing an emissions-legal LS engine change, it has been validated that stock OE 2002-2012 5.3L/6.0L Chevrolet Silverado truck exhaust manifolds (suspension and body lift required for use) and stock OE 2003-2009 5.3L/6.0L Chevy Trailblazer/EXT/SS exhaust manifolds (suspension lift only required for use) are fitment compatible with these engine mounting brackets. Fitment aside, the user must verify that they are permissible for use by the applicable governing authority of their specific state (CARB or EPA).
33. For non-registered off-road/racing vehicles that may never be used on public roads or highways, Hooker Blackheart Jeep Wrangler LS or LT engine swap headers and Y-pipe are available for use. As an alternative, Hooker cast iron LS and LT exhaust manifolds can be used, but both require the use of a suspension lift to provide adequate clearance between the front driveshaft and the exhaust system.
34. Following the installation of the exhaust system components, install the radiator, fan and shroud, battery, A/C system components and engine/transmission controller and wiring harness.
35. Install the front fenders and any fender mounted components previously removed.
36. Refer to the Hooker Blackheart 1987-1995 Jeep Wrangler LS/LT Engine Swap Technical Guide for more information that will assist you in completing the entire swap project.

COMPATIBILITY INFORMATION:

These engine mounting brackets replicate the passenger side offset of the stock Jeep 4.2/4.0L engine, which is the specific geometry needed to install the Hooker Blackheart BH13209/BH13210 headers, BH13211 Y-pipe, and BH13226 exhaust system in this vehicle application.

LIMITATION OF LIABILITY – DISCLAIMER:

The regulation of emissions production, noise levels, and safety standards is undertaken by the federal government, each of the fifty state legislatures, and by many local municipalities, towns, and counties. HOOKER™ makes no warranties of merchantability, of fitness for particular purpose, or that its products are approved for general use, or that its products comply with laws, regulations, or ordinances in the state where they may be sold to the ultimate purchaser, the consumer.

Unless expressly stated to the contrary in the catalog, instruction sheet; or price list, the entire risk as to the conformity of any company product in any such state and as to repair should the product prove to be defective or non-conforming, is on the retail purchaser, the buyer, the ultimate consumer, of such product and it is not upon the seller, distributor, or manufacturer. In this connection, the retail purchaser, the buyer, the ultimate consumer assumes the burden of the entire cost of any and all necessary service, alterations, or repair.

THE FOREGOING STATEMENT LIMITS THE LIABILITY OF THE MANUFACTURER.

California vehicle code, sections 27156 and 38391, prohibits the advertising, offering for sale, or installation of any device, which modifies a vehicle's emission control system, unless exempted, unless otherwise noted. HOOKER™ Headers that have not received an Executive Order (E.O.) exemption from these code sections are not legal for sale or use in California on vehicles originally equipped with catalytic converters, except for racing vehicles, which may never be driven upon a highway. Check with your local authorities to determine if these headers are legal for use in your particular area.

Technical Service: 1-866-464-6553, Phone: 1-270-781-9741, or Web: www.holley.com