

INSTALLATION MANUAL

FOR

ROCK KRAWLER SUSPENSION, INC.

TJ/LJ TRAIL RUNNER SYSTEMS

FIRST EDITION

1/1/18

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Dear customer: Thank you for purchasing the best system on the market for your TJ/LJ. We are sure you will be happy with this system after your installation is complete. Please take your time during the installation and be sure to do it correctly. Completely read the directions before starting your installation so you know what to expect. Remember, your personal safety depends on it. Should you have any questions during this installation feel free to give our tech line a call (518-270-9822) and we will be happy to help you.

Note: BE SURE TO CHECK ALL FASTENERS FOR PROPER TORQUE BEFORE TEST DRIVE. RECHECK AFTER 500 MILES AND BE SURE TO CHECK PERIODICALLY.

KIT SPECIFICATIONS / REQUIREMENTS

- Rock Runner Kit **REQUIRES** a minimum axle width of 65.50” WMS and a 3.5” back spaced wheel. (Can also use an axle with a width of 67.75” WMS and a 4.5” backspaced wheel or any functional equivalent for wheel to frame clearance purposes)
- We strongly recommend the use of a long travel rear sway bar.
- The axle chosen will determine your steering geometry. We recommend the track bar and the drag link match in length and angle. (We can aid you with a custom track bar per your specifications if needed for an extra charge)

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WARNING

- Properly block and secure vehicle prior to installation.
- Always wear safety glasses when using power tools
- Rock Krawler Suspension recommends the use of locktite on all hardware, unless noted otherwise.
- The use of limiting straps is recommended to avoid possible damage from over extending the suspension of your vehicle.
- Do not tighten connections until assemblies are installed in entirety.
- Read and understand all instructions, warnings and safety precautions in these instructions and your owner's manual before attempting to install these components.
- Proper installation of Rock Krawler Suspension products requires knowledge of recommended procedures for disassembly/assembly of OE vehicles and components. Access to OE shop manuals and special tools are required. Attempting to install this kit without knowledge of these procedures may affect the safety of your vehicle and or the performance of these components. Rock Krawler Suspension, Inc. strongly recommends that this system be installed by a certified mechanic with off road experience.
- Rock Krawler Suspension does not recommend combined use of suspension lifts, body lifts or other lift devices. Combined use of lifts may result in unsafe and unexpected handling characteristics. Also, many states now have laws restricting Vehicle lift, bumper heights and other alterations. Consult local laws to determine if your proposed alterations (including installation of this system) comply with your state laws.
- Rock Krawler Suspension does not condone or authorize the use of any other suspension components with its products. Should Rock Krawler Systems or components be installed in junction with other products or not per the provided instructions Rock Krawler Suspension warranty is void and is not to be held accountable for any resulting actions.

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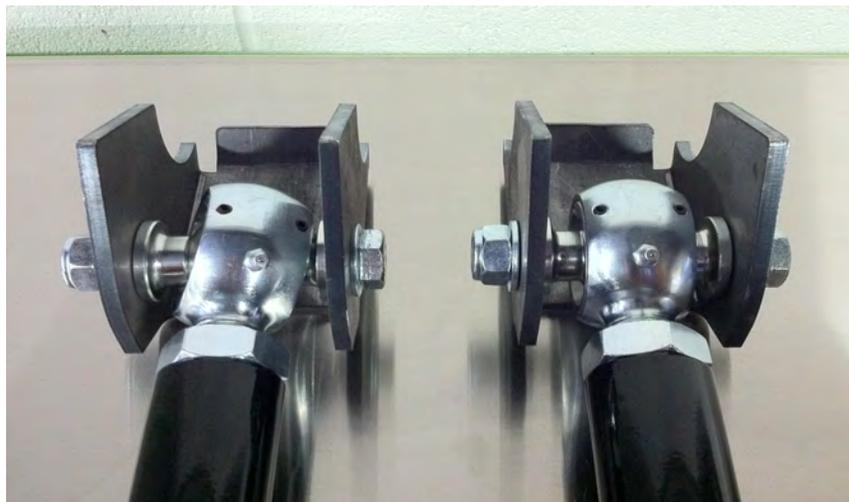
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IMPORTANCE OF JAM NUTS

This is a note about jam nuts and the consumer's responsibility. The installer is the person or persons initially responsible for the proper setup of the suspension system and/or components and the initial tightening of the jam nuts. The jam nuts not only hold the orientation of the joint it is on but it is the single component that puts the necessary pre-load on the joints threads. The consumer or vehicle owner is the person or persons responsible for maintaining the jam nuts tightness. Failure to do so will result in the rapid deterioration of the threads in the control arm and will impose a "cause for concern" for the occupants of the vehicle. Failure to comply with the warnings headed in the directions regarding the amount of threads showing past the jam nut will also result in the same "cause for concern" for the occupants of the vehicle. All of the above items are the responsibility of the vehicle owner and or installer. If a threaded section of a component is bad it will show itself defective immediately. Threads that fail over time are due to improper maintenance of jam nuts and can be proven very easily. Thread sections and jam nuts not properly maintained or setup, are not covered under warranty. This is the end user and installer's responsibility.

ORIENTATION OF JOINTS

Orient the Krawler Joint for maximum amount of movement with the head of joint perpendicular to bolt / head of the joint vertical in the bracket it is mounting in. This same rule for orientation needs to be followed for all heim joints also. The photo below shows the wrong way (LEFT SIDE) and the right way (RIGHT SIDE) to orient a joint.



^WRONG WAY^

^RIGHT WAY^

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MAINTAINING JOINTS

Krawler Joints/Pro Flex Joints, Anti-Wobble Joints and Pro Disconnect Joints

The Pro Series Krawler Joints, Pro Flex Joints, Anti-Wobble Joints and Pro Disconnect Joints are greaseable. They come pre-greased from the factory. The grease valley is machined into the housings. **We require Triple Zero (000) grade grease for lubrication of all our joints.** They will not take a lot of grease nor do they need a lot of grease. Approximately every 4 to 6 months under normal operating conditions they should be greased. This is condition and use dependent so please use common sense. Over lubrication or using the incorrect grade of grease can do damage to the joints and hydraulically displace the race way material causing a sloppy joint condition.

If the joint is not loose, it is not bad. Only if the ball is sloppy in the joint housing is it a bad joint and should be rebuilt. Krawler Joint Raceways, Pro Flex Joint Raceway, or Anti-Wobble Joint Raceways are available through Rock Krawler Suspension or an authorized dealer.

Please note: If you are not using the full range of motion of the Krawler Joint, Pro Flex Joint or Anti-Wobble Joint very often, the lubrication will not be moving inside the joint. In such cases we recommend spraying down the outside of the Joint with WD-40 or Liquid Fluid Film to ensure the race ways do not dry up. In highly corrosive environments it is also recommended to spray down the suspension components with WD-40 or Liquid Fluid Film. This will minimize corrosion of the components do to exposure to the elements.

HEIM JOINTS (Non-rebuildable spherical joints)

All Rock Krawler Heim Joints use Teflon Liners and thus are self-lubricating. They too can also benefit from spraying down the outside of them liberally with WD-40 or Liquid Fluid Film. Grease should never be applied to them! Take caution when using cleaners and detergents on your vehicle as it can ruin the adhesives used on the Teflon liners yielding a bad heim joint!

TORQUE VALUES FOR HARDWARE AND JAM NUTS

- All 14mm and 9/16" bolts are torqued to 90-100 ft-lbs.
- All 12mm and 1/2" bolts are torqued to 75-80 ft-lbs.
- All 10mm and 3/8 bolts are torqued to 30-35 ft-lbs.
- All 7/8" Jam Nuts are to be torqued 200-220 ft-lbs. Up to 5/8" of threads showing past the jam nut is safe for final adjustment. These specifications are critical for the overall longevity of the threaded section.
- All 1" Jam Nuts are to be torqued to 250-300 ft-lbs. GET YOUR BIG BOY PANTS ON! Up to 3/4" of threads showing past the jam nut is safe for final adjustment. These specifications are critical for the overall longevity of the threaded section.
- All 1 1/4" Jam Nuts are to be torqued to 275-325 ft-lbs. GET YOUR BIG BOY PANTS ON! Up to 7/8" of threads showing past the jam nut is safe for final adjustment. These specifications are critical for the overall longevity of the threaded section.

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Component Starting Lengths If you have a 3.5" System

- 3.5" TJ/LJ Front Lower Control Arms Assembled Length = 40.00"**
- 3.5" TJ/LJ Front Upper Control Arm Assembled Length = 42.8125"**
- 3.5" LJ Rear Lower Control Arm (4" Stretch) = 43.1875"**
- 3.5" LJ Rear Upper Control Arm (4" Stretch) = 47.50"**
- 3.5" TJ Rear Lower Control Arm (5" Stretch) = 33.00"**
- 3.5" TJ Rear Upper Control Arm (5" Stretch) = 38.00"**

Component Starting Lengths If you have a 4.5" System

- 4.5" TJ/LJ Front Lower Control Arms Assembled Length = 40.06"**
- 4.5" TJ/LJ Front Upper Control Arm Assembled Length = 42.875"**
- 4.5" LJ Rear Lower Control Arm (4" Stretch) = 43.25"**
- 4.5" LJ Rear Upper Control Arm (4" Stretch) = 47.56"**
- 4.5" TJ Rear Lower Control Arm (5" Stretch) = 33.06"**
- 4.5" TJ Rear Upper Control Arm (5" Stretch) = 38.06"**

Component Starting Lengths If you have a 5.5" System

- 5.5" TJ/LJ Front Lower Control Arms Assembled Length = 40.125"**
- 5.5" TJ/LJ Front Upper Control Arm Assembled Length = 42.938"**
- 5.5" LJ Rear Lower Control Arm (4" Stretch) = 43.313"**
- 5.5" LJ Rear Upper Control Arm (4" Stretch) = 47.625"**
- 5.5" TJ Rear Lower Control Arm (5" Stretch) = 33.125"**
- 5.5" TJ Rear Upper Control Arm (5" Stretch) = 38.125"**

Note: All Control Arms come pre-assembled, but they require final adjustment as specified in the directions above. These measurements are taken from the center of one bolt hole to center of the other bolt hole.

Note: All though this is a "kit", a high degree of setup knowledge is required. Since an axle swap is required there will be items you will have to figure out on your own that cannot be guaranteed by a "kit" to cover all the possible variables. You will be responsible for items such as brake lines and steering geometry to complete the project just to name a few. Only subject matter to support the components supplied in the "kit" will be addressed

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in the instructions. All other items need to be determined on your own or with the aid of a professional builder.



Start with the middle of the Vehicle

- Park vehicle on a level hard working surface and block the front wheels so the vehicle cannot move.
- If you have a 2003 or newer Wrangler with the automatic skid plate, please remove it. It will simply be in the way for the movement of the front driveshaft at your new lift height.
- You do not need to jack up the vehicle for the first part. We will be putting in your new skid plate center section and control arm mounts.
- Support the transmission and transfer case so the OEM skid plate / belly pan can be completely removed. Remove the factory skid plate and discard it. Save the OEM hardware for alignment purposes and reuse. For Rubicon models also disconnect your air pump from the skid plate and tie it up. It will be reattached to the new center skid plate member.
- Grind down the weld bungs in the frame so they are almost flush with the frame. This is required since our skid plates grab the frame by the top and the bottom which adds a tremendous amount of structure to your frame. See the picture below for further details.

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Skid Plate Weld Bungs

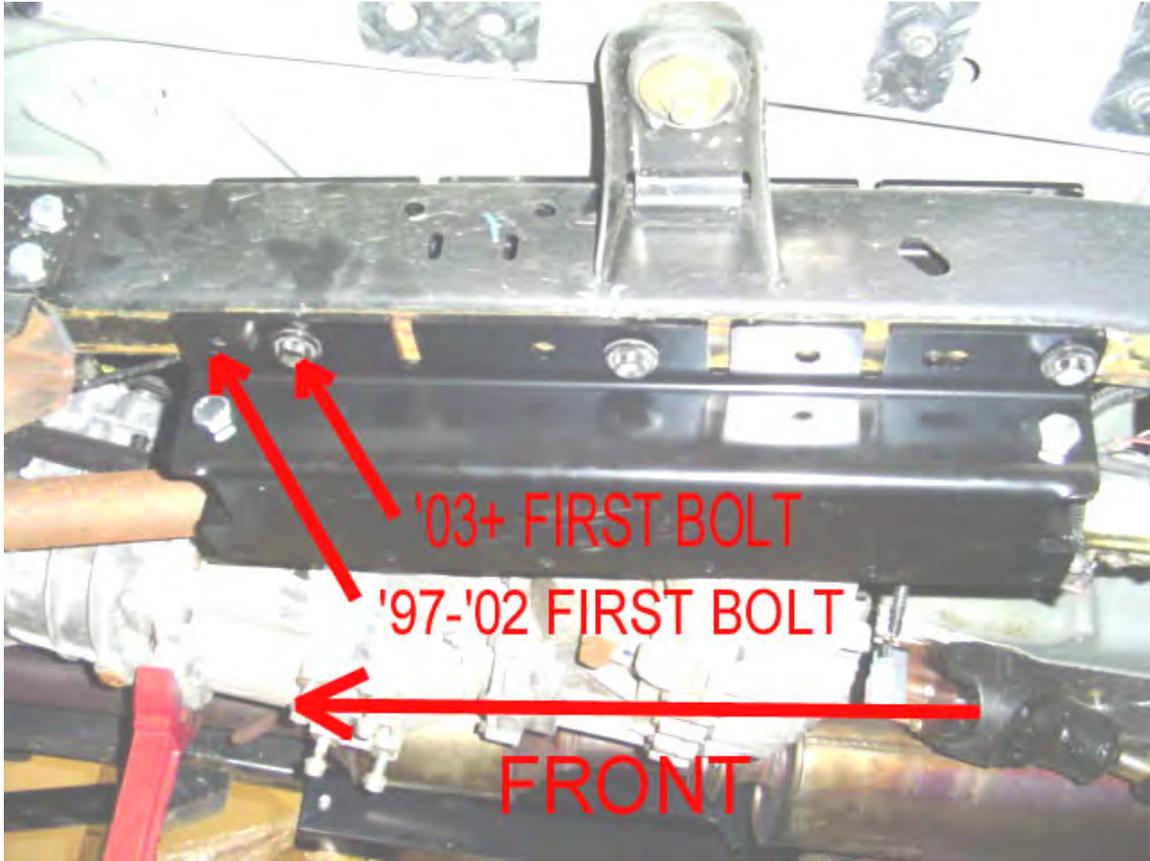
- Grab the driver's side frame rail section and get ready to put it in place.

Trail Runner Kits - The driver's side bracket contains the rear upper and lower control arm mounts. The passenger side bracket contains the front upper, the rear upper and lower control arm mounts. (UNLESS OTHERWISE ORDERED OR SPECIFIED)

Install the bracket as shown below. Please note on the 97-02 model year TJ's the most forward hole in the new bracket lines up with the front OEM skid plate bolt hole, on the -03 and newer models the first OEM skid plate bolt goes in the second hole in the new bracket. Please see picture below. Perform the same operation with the passenger side. All the brake lines and fuel lines will stay attached to the frame. On Rubicon models, please reroute the front locker lines on the inside of new frame rail brackets.

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Skid Plate Side Bracket (Driver's Side Shown)

- There are two ways to firmly attach these brackets to the frame. Weld it or bolt it.

If you are going to weld it in place, then bolt it up tight to the frame using the OEM skid plate bolts. Then, fully weld them in place along the front and rear leading edges and then down the side of brackets. Be sure to weld both on top and on the bottom of the frame. This will give you the most amount of structure. Please note to prep the surfaces for weld prior to performing that operation.

The second method is to bolt it in place. This is more cumbersome than welding, but still just as effective. In the first, third, fifth, and last holes in the frame rails, center punch the holes and drill up vertical through the frame with a 1/2" drill bit. Please note you will have to drill up through the top plate as well. This is because we know the likelihood of someone drilling vertical up through the frame and hitting a 1/2" hole in the top plate is very slim on all the holes. This is a much more sure fire way to make it happen. Once the holes are drilled simply place a

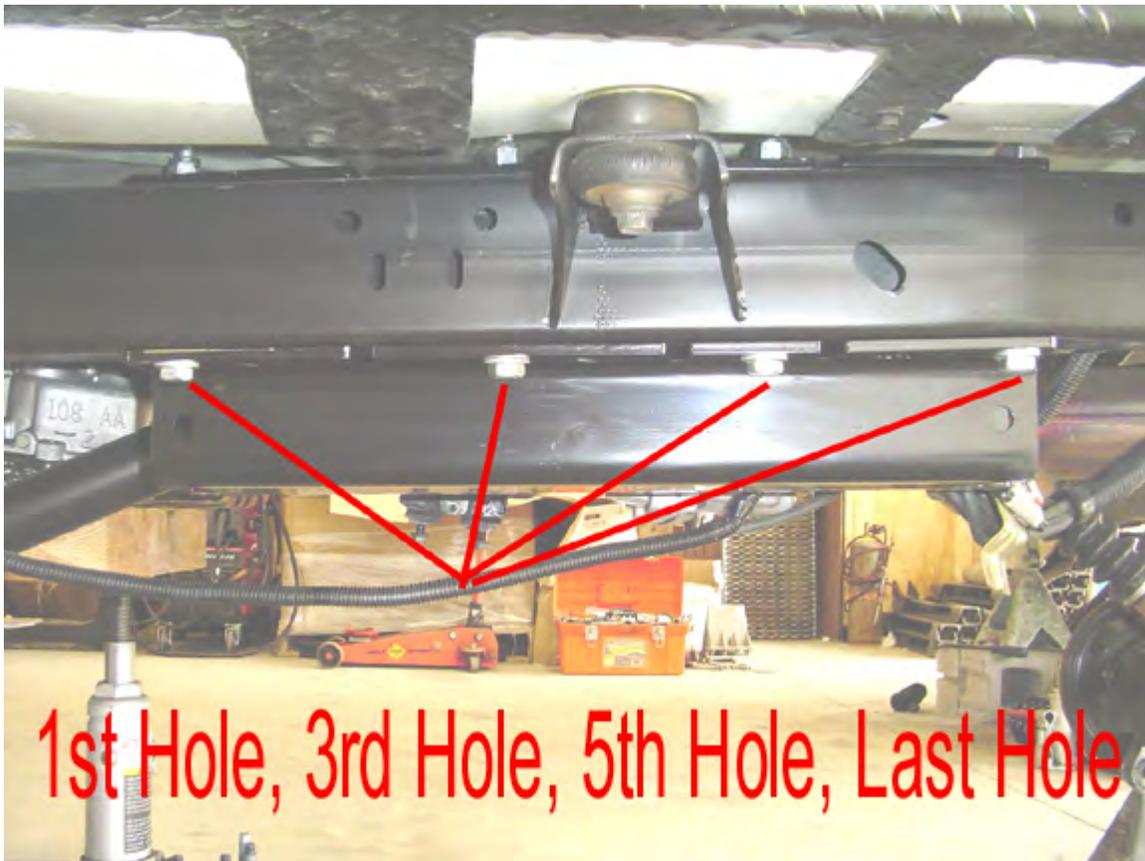
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½" x 5.5" bolt and washer up through the drilled hole and secure it with the supplied nylok nut. No washer is needed on the topside of the bracket. You should have (4) bolts holding the brackets in. Torque them to 60 foot pounds. See the picture below. Perform the same operation on the passenger's side. Please note: For the forward bolts you may have to dimple the floor pan (which really isn't hard) to gain clearance for the top of the bolt and the nut.

Please note: you will have to heat up the support bracket for the catalytic converter to move it as close to the T-Case as possible so it does not contact the new bracket.

- Now is a very good time to remove the OEM exhaust from the catalytic converter back.



Frame Rail Bolts

- Now that the frame rails are in, we can now locate the center skid plate. Grab the center skid plate. Bring it up into position and attach it to the frame rails using the supplied (12) ½" x 1.25" carriage bolts (smooth head) and the (12) supplied spiral lock washers and

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(12) ½-13 jam nuts. Then lower your t-case and transmission into place and attach it to the center skid using the OEM supplied hardware.

For Rubicon Models only, perform the following; Reattach the air pump assembly to the center skid using 3 of the four holes provided. See picture below for visual aids. Attach the air pump with the supplied (2) 5/16 x 1 bolts and nylok nuts, then on the offset side, attach with the 5/16 x 2.5 bolt, nylok nut and 5/8" O.D. by 10mm I.D. x 1.625 Tubular Spacer.



Rubicon Air Pump

Let's move to the Front End

- Make sure the vehicle is still on a level hard working surface and block the rear wheels so the vehicle cannot move. Make sure the emergency brake is applied. Raise the front of vehicle and support with safety jack stands. Locate jack stands on the frame as far forward as possible.
- Remove the OEM shock and spring tower from the frame on both sides.
- Position and weld on the newly supplied front upper coil over mounts.

Please note: There are many fender options and variables. We offer a high line version and a standard version of this tower. The high line version has much fewer alignment aids than

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does the standard version due to the number of high line options from various manufacturers.

The most rearward leg of the coil over tower should be placed 5" to the front of the furthest forward edge of the hole in your frame for the standard units (as shown in the picture below). High line owners use your discretion.



- To determine the height the front coil over tower should be at is easy for standard fender options, but tougher on high line options. (The measurement shown is merely for reference. Actual measurements will vary based on your order. For example, if you have high line fenders or standard fenders etc.) For standard applications, there is a spline on the back of the shock tower. Lower it down until the spline contacts the top of the frame. For standard fender applications there is an additional alignment aid in the mount. The hole in the top of the mount should line up roughly with the OEM hole on the inside of the fenders that allowed access to the top of the stock shock nut. For highline guys, we recommend at the very least roughing in the fenders and tacking the coil over mounts on the frame until you can verify proper up travel and down travel in the shocks. You want to shoot for 5-5.5" of total up travel in the coil over assembly at ride height.

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- Weld the front upper shock tower to the frame as show. Weld both sides of each leg down the frame using a ¼" fillet weld. Trim any excess that hangs down from the frame. Make sure to weld the bottom of the back of the spline to the top of the frame as well if so equipped...

Note: It is always a good idea to tack weld the brackets on and mock up the coil over at ride height before welding on the brackets completely.

- Position the front lower coil over mounting brackets as shown below.

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- Weld the new lower coil over mount to the axle using a 1/4" fillet weld technique down the sides and across the bottom. Apply a finish of your choice.

Note: *The new mount should be placed $\frac{3}{4}$ " away from the C on the axle. The distance between the two lower coil over mounts will be about 42.375" (center of bolt hole to center of bolt hole) and equal distance from the axle C's. To orient the brackets on your axle, set your caster to the axle manufactures specs, and make sure the top edge of the coil over mount on the axle is horizontal or set to 0 degrees with an angle finder when the caster is set per the axle recommendations.*

- Weld the new front upper control arm mount on the passenger side axle tube. Weld on using a 1/4" fillet weld. See note and picture below for placement. Apply a finish of your choice.

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Note: To set the placement of the **Trail Runner Upper Control Arm Mount** either set the mount one of two ways. Position the new mount in the same position as the factory passenger side upper mount if you are swapping in JK axles. If your axle does not have this mount factory then set your caster to the axle manufactures specs and then set the front face of the supplied bracket vertical.

- Remove the OEM front Lower Control Arm mounts from the frame.
- Install the front upper arm using a supplied 14mm x 100mm bolt to attach the frame connection. (Please note the nut for this connection is welded into the frame rail bracket) Use a supplied 14mm x 100mm bolt, washers and nylok nut to attach the axle side to the new passenger front upper control arm mount.
- Install Rock Krawler lower control arms assembled to the lengths specified above. Attach using factory hardware.

Note: Installing the skid plate end first will be easiest. You may want to tighten the lock nut at the axle connection prior to installing the arm since it is hard to get at once in the axle bracket.

- Install the coil over assembly using the supplied ½" x 2.75" bolt, washers and nylok nuts

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on both top and bottom.

Note: You want to have a minimum of 5.0" of compression. Use the spanners on the coil overs to adjust the height of the vehicle until your desired stance and lift is achieved. If you have Ressay Coil Overs – the Ressay attaches to the rearward facing side of the shock tower with the Schrader Valve in the Ressay facing up.

- Now is a good time to figure out your steering and track bar geometry depending on your axle. We do offer some custom track bar and steering linkage options depending on your axles geometry. Our techs can aid you in this process if need be.

Now Lets Start the Rear Assembly

- Park vehicle on a level, hard working surface. Raise rear of vehicle and support with safety jack stands. Locate jack stands on the frame as far back as possible.
- Install the newly supplied rear coil over mounts as shown and follow the guide lines below.



French in the mount deep enough so the edges stick out only 3/8 so you can get a nice 1/4" fillet weld all the way around the mount. The front leading edge of the mount should be

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placed 5” back for LJ and 5.5-6.0” for a TJ from the centerline of the arch of the wheel well as shown. The mount should be perpendicular to the frame and the lower legs should stick down from the frame 3/8-1/2”.

Here is what the final assembly will look like for reference.



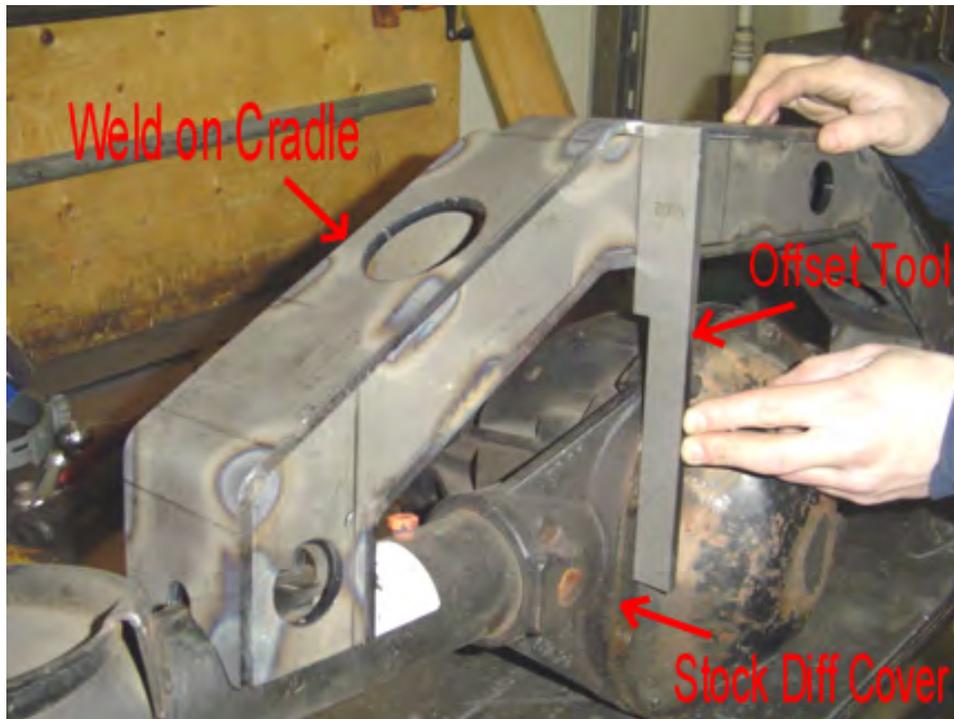
- Lets weld the supplied mounts on the rear axle. (We assume your axle already has OEM style lower control arm mounts and some form of rear sway bar or sway bar end link mounts on it – if not apply them now as well).
- Install the new weld on cradle to rear axle.

Note: Center the cradle side to side on the rear axle housing. If the axle being used is proportionally similar to a TJ/LJ/JK differential you can use the supplied offset tool. Place the thinner edge of the offset tool flat against the differential cover with the two of the covers bolts removed. Rotate the cradle back until the back flat surface of the cradle contacts the thicker portion of the offset tool as shown below. If your differential is a different size/shape then a TJ/LJ/JK you will need to set your pinion angle at ride height and position your cradle according to your upper control arm length. It is always a good idea to mock up everything before you final weld parts on.

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- Fully seam weld the cradle to the axle tubes. Replace the two bolts in your differential cover and apply a finish of your choice.



Weld On Rear Cradle

- Install the weld on cradle tie in plate, you may need to trim a little off the tie in plate for it to fit properly depending on axle. See photo below.

Note: The tie in plate should sit $\frac{1}{4}$ " inside the back face of the cradle. You should use a stitch weld technique when welding it. Be sure to cover the corners with weld well. Apply a finish of your choice.

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Cradle Tie in Plate Installed



Note: The distance between these two mounts will need to be 52.375" (center of one mount to center of the other mount). The wider the better as long as there is no interference.

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- Weld the lower coil over mounts onto the axle tube in this position using a ¼” fillet weld everywhere the mount touches the axle tube. It is a good idea to mock up these mounts with tack welds before finish welding them and verifying proper coil over fitment.
- Install the rear upper control arms. Both ends of each arm will be installed using supplied 14mm x 100mm bolts, washers, and nylok nuts.

Note: *The rear axle cradle has multiple mounting holes, this will let you adjust your axle position. Typically you will want to mount the upper control arms to the holes specified in the picture below. You can try different mounting holes to achieve different results if you feel necessary.*



Weld in cradle specified holes

- Install Rock Krawler lower control arms assembled to the lengths specified above. Attach using factory hardware.

Note: *Installing the skid plate end first will be easiest. You may want to tighten the lock nut at the axle connection prior to installing the arm since it is hard to get at once in the axle bracket.*

- Install your rear coil overs.

Note: *Using the supplied ½” x 2.75” bolts, washers and nyloc nuts attach the coil over to the upper coil over mounts. Using the supplied ½” x 2.5” bolts and washers attach the coil over to the lower coil over mounts. You want to have a minimum of 5.0” of compression. Use the*

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spanners on the coil overs to adjust the height of the vehicle until your desired stance and lift is achieved. If you got remote reservoir shocks, attach the supplied Ressy mount using the 1/4-20 self tapping bolts into the side of the frame as shown above and attach the ressy to the mount with the supplied hose clamps.

Adjusting and Dialing in your Coil Overs

- Set the Pre Load of your front and rear coil over assemblies to achieve your desired ride heights. We recommend 4.5- 5.0" of usable up travel at ride height starters. We like to see 1" – 2" of preload for your front coil overs with a maximum of 3" of pre load up front. We like to see 2"- 3" of preload for your rear coil overs with a maximum of 4" of pre load out back. If you find you are setting up your coil overs and you have no pre load or exceed the maximum recommended numbers above, you will be required to do a spring change.
- Now that you have established your ride height and pre load you can now set your transition rings/ cross over rings/ lock out rings (whatever term you are familiar with) for the coil overs. For the front end, we recommend the cross over ring be placed 1" above the plastic slider (1" gap between the slider and the slider contacting the transition rings). For the rear end, we recommend the cross over ring be placed 2" above the plastic slider (2" gap between the slider and he slider contacting the transition rings).
- If you are experiencing the coil-over bottoming out you can adjust the transition rings to compensate for this. Spin the transition rings further down the body of the coil over to lock out the softer spring rate sooner. We recommend moving them in 1/4" increments until the desired effect is achieved! The top coil is often called the tender coil and the bottom coil is called the "catch" coil. They work together when the transition rings are not contacting the slider. When the slider is contacting the transition ring the "catch" coil is the only coil functioning. If you need any further help tuning or making adjustments please give us a call.

Before Hitting the Pavement or the Trails be sure to make sure the control arms are oriented properly, all spherical joints (heim joints and Krawler Joints) are oriented correctly to allow for maximum movement without bind, and all Jam Nuts are Tight.

Vehicle should be taken to an alignment shop after installation for a full alignment. It should be set according to the axle or axle manufactures specs.

Before hitting the pavement or the trails be sure to make sure the control arms are oriented properly, all spherical joints (heim joints and Krawler Joints) are oriented correctly to allow for maximum movement without bind, and all jam nuts have locktite on them and are tight. Make sure the axles are properly centered, pinion angles are correct, there is proper slack in ABS lines, and all lines are properly routed. Go back over all your hardware and make sure each connection is tightened to its proper torque spec. Check your vehicles articulation and ensure that no moving parts contact or interfere with any other components throughout the travel.