

Overview

The Jeep Life! This is what our hobby is centered around. It is a life filled with adventure, good like-minded people, and our Jeeps. Like people, they come in all different sizes and shapes. In fact, different models completely. The uniqueness of the brand is what draws us to the hobby. In fact, the Jeep Wrangler has the most aftermarket support in the world and can be easily changed to suit ones personality. However, this can lead to its own difficulties. With so much aftermarket support, it sometimes seems daunting to choose quality parts, and decide what will work for your needs.



Since the Jeep brand has been built on the idea that it is a very capable vehicle, it only seems fitting that we tend to expand on the concept. One of the most modified systems on the Jeep seems to be the suspension system. In this article, we will take a look at suspension systems. The article will cover pros and cons of lifting the vehicle, choosing a lift height that will suit your needs, and various component operation. In the end, I hope that this article will help you make informed decisions so that you can continue to enjoy and be enthusiastic about our hobby.

Lifted or Not Lifted



One of the first things we tend to change on our Jeeps is the suspension system. More often than not we tend to replace it with something that will give our Jeeps more “ground clearance”. This coupled with larger tires, should increase the “offroad ability” of what is already an excellent platform. There are a few questions you should ask yourself prior to installing a lift. Do I really need my Jeep lifted? Do I have the money to lift my Jeep?



Depending on the size and lift type, it may alter the way the Jeep rides and handles. Suspension technology has come a long way. However, if you don't have money for a moderately priced lift, most likely the handling and ride will be compromised. However, maybe you are OK with that. First you need to ask yourself “How bad do I want that lift?” Is it bad enough that you are willing to deal with adverse effects that it may have on your Jeep? Or, am I willing to pay upwards of \$1200.00 to purchase a lift that minimizes those adverse effects? For me, the Jeep Life is deeply engrained in who I am. Lifted Jeeps and Jeep Life go hand and hand. I felt the drive to install one immediately. Add that, to my passion for wheeling and it seemed as if it was a necessity.

I also new what I would gain by putting a lift and tires on my Jeep. I didn't choose an expensive lift. I started with a budget lift that I am able to add components, down the road to enhance its performance. In the mean while; what did I gain? The sure fire answer is approach, departure, and breaker angle. Additionally, it provides the ability to install larger tires as well. All of this will make a difference on the trail. To help you gauge the difference we can compare a stock Jeep JKU sport to the same vehicle with a 2.5" lift and 35" tall tires. In Pennsylvania we rate our trails according to colors. The trails are rated green (easy), blue (intermediate), black (hard), and red (extreme). A stock Jeep with a somewhat experienced driver should be capable of completing green and blue trails. The same Jeep with a 2.5" lift and 35" tires should be capable of completing most black trails. Again, ask yourself, "Do I fit any of these criteria?" If you do, lift it!

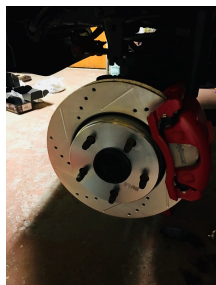


Photo courtesy of Eric Ammerman/Black Trail at AOAA Barney Rubble

What size lift is the right size

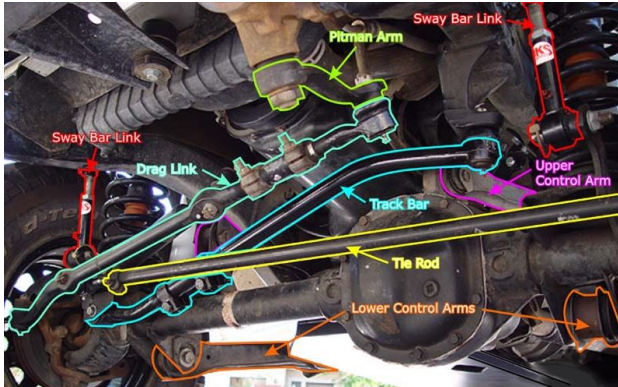
To answer this question you need to ask yourself three simple questions. What size tire do I want to upgrade to? What am I going to do with my Jeep? Finally, "What is my budget?" Prior to sorting through these questions, I do have a disclaimer. Different lifts will net different results. In laymen's terms, you can buy a 2.5" lift and end up with 3", or vice versa. Please check the maximum allowable tire size for your lift. This should be available on the manufacturers website. In all honestly, unless you are going to traverse epic trails, such as Fordyce, a 2.5" to

3.5" with 35 to 37" tall tires will provide you with plenty of excitement. Of course, if your wallet allows there are other options that will afford you a better ride and larger tires. For around 4k you can build your Jeep with 35 inch tall tires and a 2.5" to 3.5" lift. This would include wheels with the proper offset, and the programmer to adjust for the tire size difference. However, there will be some trade offs. For example; at that price you will have to run stock gearing. This maybe a little tough on a Sport or Sahara with the 3.21 gear ratio. A rubicon with either of the two options of 3.73



Power stop Z36 brake pads/Drilled and Sotted Rotors

or 4.10 gears would be better suited. Brake performance is another consideration. As the tire and wheel size mass becomes larger, the rotational mass increases. This additional weight adds stress to the braking system. However, there is some wiggle room. At minimum, a JK wrangler has a towing capacity of 2000 pounds. The brakes need to be able to handle this additional load. A Jeep JK brake system will tolerate the larger tires and wheels but you decrease overall brake performance. This can be corrected by increasing brake rotor and caliper size.



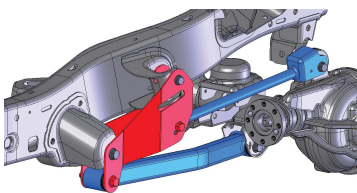
Steering geometry may be affected by larger lifts as well. Lifts that net 3.5" or more tend to create steering issues that may need to be resolved. The first issue that may need to be addressed is bump steer. Bump steer occurs when the geometry between the track bar and the drag link becomes too great. As the suspension moves up and down, the drag link length tries to change. This occurs because the drag link is fixed to a stationary point and an articulating point. This can be corrected by either a drop pitman arm or drag link flip kit.

There are many other problems that could arise and should be considered when choosing lift height. Things like sector shafts, track bar mounts, and steering stabilizers all will need to be addressed with a larger tire size such as 37" tire.

To get to the point, and answer the question how much lift to I need? If you are on a budget, 2.5" to 3.5" lift. For example, you can purchase a Rubicon express budget lift for approximately \$600.00. This will include the springs, shocks, track bar brackets, sway bar end links, bump stops and all necessary hardware. You will have enough room to fit 35" tires and increase articulation, approach and departure angle as well as break over. It will increase everything that the average Jeep enthusiast is looking for, and not to mention the cool factor. If you have little more money, you can add options like geometry correction brackets, or control arms. And, for a little more money you can upgrade your shocks. The beauty of this is that as you increase your skill level, you can add to your Jeep to match your skill level. Of course if you have a larger budget there are other lifts that will allow for a larger tire and better ride. But be forewarned, it won't only be the lift your are purchasing. There will be many other modifications that will need to be completed in order to have a Jeep that handles well and is durable.

Component Selection

Researching lift kits for a Jeep can be a daunting task. Not only are there a lot of lifts, but most lift companies offer many different component options. For example, Rubicon Express offers the above mentioned lift. However, you can build onto that lift by purchasing components such as control arms, track bars, geometry correction brackets, upgraded shocks and there are variations of springs. I will address these options, explain what they are, and hopefully be able to give you some pros and cons of each. The idea is to give you the knowledge to make informed decisions.



Picture courtesy of Quadratec

First, let's look at geometry correction brackets. As the name applies, they do just that., correct all the suspension geometry of the front suspension. Suspension geometry can be quite complex. There are angles that need to be within a certain specification or it

will affect handling and tire wear. Geometry brackets will correct both caster and the angle of the control arms. Caster is the difference in degrees when you draw a vertical line through the tire and another through the both ball joints. Caster is responsible for how well the vehicle tracks and returning the steering wheel to center. Geometry correction brackets bolt to the existing brackets. The brackets move both the upper and lower control arms forward. This corrects the caster. The other unique feature, Geometry correction brackets will correct control arm geometry. Control arms need to be perpendicular to the road. This helps to control how the axle is loaded when you brake and accelerate. Geometry correction brackets are great for correcting geometry. They are very cost effective and work very well. The only downfall, resides in the fact that the brackets are lower than the existing factory brackets that they bolt to. This tends to make them prone to hanging up on rocks.



Another option, is to replace the control arms. Control arms, control the up and down movement of the axle. On a Jeep, there are four for each axle. An upper and lower control arm on each side of the axle. Most suspension companies make control arms to compliment their suspension systems. First, I'll talk about adjustable versus non-adjustable. The benefit to having adjustable control arms is to allow adjustment for caster. By lengthening or shorting either the upper or lower

control arms will allow you to adjust and bring your caster measurement within specification. Different suspension companies use different variations. Most companies offer both fixed and adjustable upper and lower control arms. In my personal experience, I like to use adjustable upper control arms and fixed lower. This simply keeps the adjustable control arm up off the rocks and keeps the Jam nut from getting damaged. However, this may vary depending on your application.

Another option when considering control arms; long versus short. Long arms, as the name applies, means that the actual length is longer. This in turn, will increase the radius of the control arm. In laymen's terms, it means that it increases suspension travel and gets the geometry closer to where it should be. However, the only way to insure proper geometry is to use control arm drop brackets.



The last thing to consider when choosing control arms is what type of joint do you want to use. There are three basic types of joints. Heim, some variation of rubber, and hybrid joints. Stock Wrangler control arms are equipped with a rubber joint. They are vulcanized to the inside of the sleeve and to the eyelet. This works great to help isolate the vehicle from road vibrations. However, it does create binding when the suspension is near its max travel limits, thus limiting articulation. A Heim joint, is a mechanical joint that uses a "ball and socket" type design. Heim joints



tend to allow for more articulation, but transmit more vibration from the road to the driver. Another plus of Heim joints is that they are rebuildable. Finally, there is a hybrid joint called "Johnny Joint" which is proprietary to Currie Enterprises. It uses a Heim joint design but the ball is encased in urethane. This gives you the best of both worlds. Whatever you choose, be sure to do research, as I mentioned all of these options have their own pros and cons.

Track bars center the axle to the body. It is bar that runs from one corner of the axle to the opposite side on the body. Inevitably, you will need to either replace it or add a bracket. As you lift the frame away from the axle the distance between the two increases. Option one, add a bracket to either the axle or body where the track bar connects. This is the most common option with lower price lifts. I typically look for a body mounted bracket. This helps to lower the roll center of the vehicle. The second option is to replace the track bar with a longer one. In most cases these types of track bars are adjustable. Of course this makes it adjustable and allows you use it if you change your lift down the road. Either way it is important to utilize one of these two options. Proper track bar length allows the vehicle to track better. Incorrect track bar length will cause the vehicle to need constant correction from the driver and won't drive straight. It tends to make the vehicle feel like the Jeep is swaying.

A big decision that needs to be made is what type of spring do you want. The coil springs are a huge part of the suspension system. They are key in determining ride feel, ride quality, suspension travel and handling. There are three different types of springs. The first, is a linear spring. The linear spring provides the same spring rate though out its cycle. A linear spring is great for setting ride height, and consistent performance. The downside to a linear spring is the

ride quality tends to be slightly more stiff. Another choice for a spring is a progressive rate coil. This coil changes its spring rate as it becomes compressed. Pros include better ride quality. The cons are that it's not as durable as a linear spring. Both of these springs are available on lower priced lifts. The third spring is a multi rate spring. These coils are similar to progressive rate springs except that the upper coil is a different rate than the lower coil. In laymen's terms the upper portion of the coil operates at a total different rate and independent of the lower coil. This type of spring is typical of more expensive lift kits. It provides far better performance off-road, and better ride quality. Again, the only downside is durability, and fatigue over time.



Finally, we can talk about shocks. There are many different options for shocks. Like coils springs shocks play an extremely important role in ride quality and handling. First, let me state a disclaimer. Unless you are a suspension specialist, use the recommended shock for the coils you have. Different shocks have different valving. In other words, shocks typically are tuned for specific coils or situations. Additionally, they are matched for the maximum suspension travel designed into the lift. Every shock has a maximum extended and minimum compressed length that needs to be matched to the coil. That being said, you have many different

options. Most companies will provide multiple shock option for the lift you are using. The shock you choose will most likely be the most affordable for you. Using Rubicon's short arm super flex system as an example; there are three different shock options. They include mono-tube, twin- tube, and adjustable. In this case the twin tube shock is the cheaper option. The mono-tube would be the second best shock as compared to the adjustable being the best. The difference between the mono-tube and twin-tube shock is the construction. The twin-tube has multiple valves and reacts slower to changes in terrain, while the mono-tube shock has only one valve that is able to adjust more quickly. Differences in shocks can be either through construction, oil volume, tuning or dampening material. To sum up what shock is right for you; typically, you want to look for a mono-tube style shock. Additionally, the larger the oil capacity the better off you will be. And finally, if you can afford it; adjustable shocks will give you the best of both and ability to adjust your ride quality based on conditions.

To sum it up!

As I stated earlier, there are 1000's of choices when choosing a lift for Jeeps. If you don't choose wisely, you will end up with a Jeep that isn't fun to drive. Making, good informed decisions will save you money in the long run, and certainly increase the amount of enjoyment you will get from your Jeep. Remember, change what you can, accept what you can't, and be smart enough to know the difference.

Article Written 6/25/2020

Don Bray