



RHINO XTR

SUSPENSION SYSTEM

INSTALLATION INSTRUCTIONS

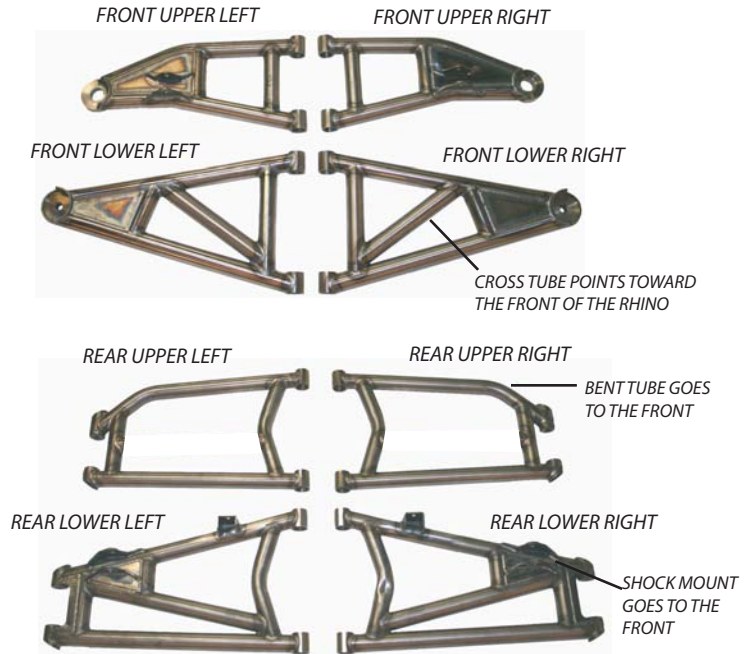
PARTS INCLUDED:

- | | |
|-------------------------|--------------------------|
| 2 FRONT UPPER A-ARMS | 2 REAR UPPER A-ARMS |
| 2 FRONT LOWER A-ARMS | 2 REAR LOWER A-ARMS |
| 2 UNI-BALL JOINTS | 4 10MM x 120MM HEX BOLTS |
| 2 UNI-BALL JOINT STUDS | 2 10MM x 55MM BOLTS |
| 2 UNI-BALL JOINT CAPS | 12 10MM NYLON LOCK NUTS |
| 2 RETAINING RINGS | 2 6MM NYLON LOCK NUTS |
| 1 FRONT SHOCK ASSEM. | 24 THICK DELRON BUSHINGS |
| 2 DELRON STEERING STOPS | 8 THIN DELRON BUSHINGS |
| 2 SHOCK MOUNT SPACERS | 4 CASTER SPACERS |
| 2 5/8 JAM NUTS | 16 GREASE FITTINGS |
| 2 10MM x 30MM BOLTS | 16 INNER PIVOT TUBES |
| 2 8MM x 20MM BOLTS | 1 AXLE KIT |
| 2 10MM x 25MM BOLTS | 6 COTTER PINS |
| 2 10MM x 18MM BOLTS | 2 5/8" TIE ROD ENDS |
| 2 10MM x 70MM HEX BOLTS | 2 TIE ROD STUDS |
| 4 BLACK ZIP TIES | 2 TIE ROD CAPS |
| | 2 TIE ROD TUBES |

TOOLS NEEDED:

- | | |
|--|--------------------|
| Floor jack and/or jack stands | DOT 4 brake fluid |
| 14mm wrench and socket | Brake bleeding kit |
| 17mm wrench and socket | |
| 19mm wrench and socket | |
| 3/8 ratchet and 3/8 breaker bar | |
| Hammer and Dead blow hammer | |
| 6mm Allen wrench or socket | |
| 8mm Allen wrench or socket | |
| High quality water proof grease w/ gun | |
| Blue thread locking lubricant | |
| Medium sized Vice-Grip pliers | |
| 12mm wrench and socket | |
| 10mm wrench and socket | |
| 24mm wrench | |
| 17mm deep socket | |
| Short 3/8 extension | |
| Internal snap ring pliers | |
| Needle nose pliers | |
| Diagonal pliers (cutters) | |
| Drill | |
| 13/32 or Y drill bit | |
| Impact wrench or large breaker bar | |
| 1 1/4" or 32mm socket | |

A-ARM LOCATIONS



BEFORE YOU START:

The installation of these a-arms is going to take the better part of a day for an installer that is mechanically inclined. Before you get started, please know that your factory wheels will not work with this kit on the rear end, and there will be some minor fender trimming so the tires will not rub at full compression. To use factory wheels on the rear end, you will need to run a wheel spacer. We recommend using 26" tires and aftermarket aluminum wheels with the minimum amount of offset (5+2) for the best in performance. Also, the factory shocks will not work. You need to have shocks that have been built specifically for the Lone Star Racing XTR A-arm Kit. We went to great lengths engineering the ideal shock specifications for proper travel, leverage ratios, and to prevent damage to other components when under severe use. Depending on the Axle Kit you specified, please see the supplement instructions on how to properly install your new axles. The following pages will outline how to install your new XTR

CLEANING/ MAINTAINING:

Use soap and water to clean, taking care not to use high pressure pointed at the pivot points. You will want to periodically grease the pivot points with fresh grease using the supplied grease fittings. The uni-ball pivots do not require any grease as they are internally and permanently lubricated. Due to the extreme use that this system will withstand, you will want to periodically check all hardware for tightness.



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FRONT SUSPENSION

1. The first thing you need to do is jack up the front end of your Rhino and rest it securely on jack stands. Make sure the Rhino is very stable once you have the tires off the ground, as you are going to be applying significant force to remove and install hardware.
2. Remove the front wheels using a 17mm socket and impact wrench. Remove the plastic dust caps over the main axle nuts if you haven't already done so previously.
3. Turn on the key of your Rhino, put it into 4WD and lock the front differential. This will help hold the axles so you can remove the large axle nuts with the 32mm socket and impact wrench.
4. Remove the brake calipers using a 12mm wrench or socket. Remove the 2 brake line clamps on each front a-arm. Save this hardware for use on installation. The brake lines will need to be removed from the calipers to remove the lines through the OEM upper a-arms. You will have to bleed the brakes before driving your rhino.
5. Remove the large axle nuts using the 32mm socket and impact wrench, then pull off the wheel hubs. Take note, there are small o-rings inside the spindle bearing carriers on the axle shaft, save these and note the position for installation later.
6. Remove the cotter pins from the ball joint studs and the tie rod studs. Don't worry about saving these, as we have included new ones for final installation.
7. Loosen the castle nuts from the upper and lower ball joints using a 19mm wrench or socket. Loosen them a few complete turns, but do not remove. Loosen the jam nut, then castle nut, and remove the tie-rod end from the spindle. You will need a decent sized hammer to remove the joints from the spindle and lower a-arm. Do not use a fork style ball joint remover unless you have new joints to replace the boots that will get torn. We recommend hitting the side of the spindle with a lot of force to jar loose the joint as shown in Fig. #1. If you have a ball joint puller you can use it, but it isn't necessary. While hitting the spindle, use some force pulling the spindle down to separate the joint. It might take several powerful blows to jar it loose. Repeat this step for the lower a-arm, hitting the side of the boss on the arm where the ball joint stud goes through the a-arm.
8. You should be able to remove the spindle from the a-arms and slide it off of the outer axle shaft stub.
9. Let the lower a-arms drop towards the floor and grasp the axle with a quick pulling motion to slide the entire shaft from the differential. It might take some force to pull the axles from the differential, but they should pop out by hand. The differential will leak a small amount of fluid once the axles are removed, so be prepared.
10. Now you can remove the bolts that hold the shocks to the chassis and a-arms, and remove the bolts that hold the a-arms to the chassis using a 14mm and 17mm wrench. You will be re-using these bolts and nuts for installation of the new XTR a-arms.
11. It is time to install the front shock assembly to the Rhino. You will need to remove the hood to do this.
12. Using the 2 aluminum spacers, 2 10mm X 55 bolts, and 2 10mm nylon lock nuts, position the shock tower on top of the existing OEM chassis, aligning it as shown in Fig. #2. Install the aluminum spacers and hardware into the original front shock location as shown and snug them up making sure the front mount bosses are correctly positioned as shown.
13. Now you will need to drill 4 holes to mount the rest of the Front Shock Assembly. Using the 13/32 or Y size drill bit, drill a hole into each of the front down tube mounts, going through the front a-arm mount plates. Use the 2 10mm X 30mm bolts and 2 nylon lock nuts to secure it to the chassis. Now you will need to drill out two more holes using the same drill bit through the center star mounting plate, and the original shock mount cross bar. Once the holes are drilled, use the 2 10mm X 18mm bolts and 2 nylon lock nuts to secure it to the chassis.
14. Now take the front lower a-arms and remove the zip ties, and slide them into the chassis and re-use the same bolts and nuts that held the stock a-arms on. * Refer to Quick Caster guide for the locations of the spacers. Tighten the bolts to approx. 35 ft lbs., and grease the zerk fittings until you see grease coming out from between the a-arm and the chassis as they hang down towards the ground. The zerk fittings should be pointing up if you installed the arms into the correct positions.



Fig. 1



Fig. 2





RHINO XTR SUSPENSION SYSTEM INSTALLATION INSTRUCTIONS

FRONT SUSPENSION CONTINUED

15. Now, you are going to remove the boots from the Rack and Pinion by cutting the zip tie and pulling the boot back to show the joint. Next, take a large pair of vice grips and lock onto the main housing of the joint and unthread the joint from the rack. The lock washers will bend themselves out of the way. Install the delron spacer on the shaft of the rack and reinstall the joint just as it was. See Fig. 3 Make sure to bend the tabs of the lock washer back on, so the joint can't loosen itself. Slide the boot back on and attach it using the supplied zip-ties. Repeat this procedure for both sides.

16. Remove the factory tie-rod ends and install the tie-rod extenders. Thread them on as far as you can on the factory tie-rod, and lock the jam nut to it. Now, thread on the jam nuts onto the large heim joints and thread the heim joint into the tie-rod extenders. Leave open threads for adjustments on the larger heim joint.

17. Take the Front Upper A-Arms and remove the zip ties, and slide them into position using the OEM bolts on the front mounts, and the 2 supplied 10mm x 70mm hex head bolts and nylon lock nuts on the rear position. Make sure the head of the bolt is towards the back of the Rhino. We did this to minimize wear on the rack and pinion boots. Tighten the bolts to approx 35 ft lbs. Now, you can grease the zerks as you did on the lowers.

18. Now, you can install the shocks using the OEM hardware. Now, the a-arms are held up, so you can easily install the front axle shafts. Do not tighten the shock bolts until the Rhino is sitting on the ground again.

19. Now, you can install the front axle shafts. Line the differential spud up into the differential and make sure the splines engage correctly, then tap on the end of the axle with a dead blow hammer to seat them into position. Make sure not to harm the threads on the axle shaft.

20. Now, you can put the uni-ball joints together, if they aren't already assembled. They go together as shown in Fig. #3a. Use the 2 10mm x 25mm bolts. Do not tighten the bolts yet. It is much easier after the stud is tightened to the spindle.

21. The next step is to slide the spindle onto the axle shaft. Make sure it seats fully into the seal. Then take the uni-ball stud and put it through the top hole in the spindle. Use the OEM castle nut and finger tighten it. Now, put the lower ball joint stud into the lower a-arm. Finger tighten the OEM castle nut to hold it in place. Now, you can install the tie-rod end stud into the joint with the cap and the 8mm x 20mm bolts just as you did with the uni-ball joint. Install the stud into the spindle, and tighten using the OEM castle nut.

22. Tighten all castle nuts to about 43 ft lbs. Do not install cotter pins yet. Use some blue lock tite on the threads of the bolts holding together the uni-ball and tie-rod end. Tighten them down to about 35 ft lbs. on the uni-ball and about 15 ft lbs. on the tie-rod end.

23. Install the small o-ring onto the axle shaft against the bearings in the spindle, then slide on the wheel hub and rotor. Tighten the large axle nuts to about 150 ft lbs.

24. Install the brake calipers.

25. Remove the OEM brake line clamps from the brake lines. Take the shorter clamp and install it in the position on the brake line that is closest to the center of the chassis. Reusing the OEM 6mm bolt, attach the line clamp to the tab on the upper a-arms using the 6mm nylon lock nuts that come with the kit. Route the lines so they point down towards the calipers and tighten the bolts as shown in Fig.#4. We cut the side tabs off of the line clamp for a cleaner look.

26. Install the front wheels and lower the front end down to the ground.

27. Now, is the time to tighten the shock bolts to about 35 ft lbs.

28. After the first ride or so, you will want to check the tightness of all hardware and tighten as required. After the castle nuts have been rechecked, you can install the cotter pins.

Fig. 3



Fig. 3a



Fig. 4





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REAR SUSPENSION

29. The rear suspension is pretty self explanatory. The new parts go in just like the old ones come out with a few exceptions. Jack up the rear end and place it on jack stands. Make sure the parking brake is on to aid in removal of parts.
30. Remove the rear tires.
31. Remove the plastic covers over the axle nuts and remove the axle nuts just as you did on the front end. Take off the wheel hubs, taking note on the o-rings. Remove the bolts through the spindle up-rights using a 14mm and 17mm wrench or socket and pull off the spindles.
32. Remove the bolts on the upper a-arms and remove the upper a-arms.
33. Pull out the axle shafts, just like you did on the front end.
34. Using a 14mm wrench and socket, remove the sway bar end links from the lower a-arms.
35. Remove the shocks and bolts, taking note on the bolts. They will be reused on the new arms. The longer bolt goes on the upper mount.
36. Now, loosen the lower a-arm bolts and remove the lower a-arms.
37. Take the new lower a-arms and cut off the zip ties, and position them into the mounts on the chassis. Reusing the same hardware, tighten the bolts to about 35 ft lbs. Grease the pivot points until you see grease coming out between the bushings and chassis. Wipe off all excess grease.
38. Now, connect the sway bar end links to the new a-arms and tighten them down. Make sure there is a washer on both sides of the tab on the a-arm.
39. Now, it is time to install the rear axle shafts. They go in just like the fronts. They might need more force due to the stronger snap ring to seat them into position.
40. Install the upper a-arms using the OEM hardware and grease the joints as you did on the lowers. Tighten the bolts to about 35 ft lbs.
41. Slide the spindle upright onto the axle shaft, making sure the larger ears are on the bottom side of the axle. Using the new 10mm X 120mm hex bolts and nylon lock nuts, secure the spindle to the upper and lower a-arms. You will need a deep socket to fit into the front upper cup to tighten the bolt.
42. Install the shocks using the OEM hardware. The longer bolt goes to the top. Do not tighten the bolts until the Rhino is back on the ground. Now would be a good time to secure the shock reservoirs if they are equipped.
43. Install the o-ring over the axle shaft and slide on the wheel hub. Tighten the hub nuts to 150 ft lbs. Install the wheels and set the Rhino back down on the ground.
44. Tighten the shock mount bolts to about 45 ft lbs. on the rear and tighten the front shock bolts to about 35 ft lbs.
45. Double check to make sure you tightened all fasteners completely, front and rear.
46. Add the proper amount of gear oil back into the differentials as specified in your owners manual.
47. Bleed the front brakes.

SETTING THE TOE

1. To set the toe of the front suspension, make sure your steering wheel is straight. With the Rhino on the ground at ride height, you will want to take a measurement from the inside edge of the wheel to the chassis on both sides. Adjust the tie-rods with a 12mm wrench so the measurement is the same. This step insures the wheels are straight with the steering wheel.
2. Next you are going to measure for the amount of toe in. Toe in is a personal preference. We recommend about an 1/8" to 1/4" of toe-in for normal riding conditions. Basically the measurement on the front of the tire needs to be 1/8" shorter than the rear of the tire. To take a measurement, you want to be at the middle of the tire as far as height is concerned and either on the wheel or very close to the wheel for your measurements. The wheel is the best to use, because it is the most consistent. You might want to have a friend help you to take the measurements. Once you have the toe set where you want it, tighten all the jam nuts without rotating the heim joint or tie-rod extender. Make sure all steering hardware is tight. Retake your measurements to make sure nothing moved.

AFTER YOUR INITIAL RIDE

After your initial ride, things are going to seat and adjust themselves slightly, so you want to make sure and go back and tighten all hardware. Also, make sure to tighten the main axle nuts to the proper spec. Now is a good time to install the cotter pins into the front ball joints and tie rod castle nuts after you have retightened them.



RHINO SUSPENSION SYSTEM INSTALLATION INSTRUCTIONS

2008 Model Supplement Instructions

Additional Parts included for 2008 model years

1. Rear extended stainless steel brake line kit

Installation Instructions:

You will have to remove the rear brake lines from the calipers, and also remove the bulkhead fitting on the chassis. Attach the rear brake lines, and route them through the clamps on the upper a-arms. Close the clamps to secure the lines, after making sure the lines don't get stretched or pinched as the suspension moves throughout the travel.

It will be necessary to bleed the rear brake system. It helps greatly to use a vacuum style bleeder to remove the large amounts of air from the new brake lines.

To replace the brake pads on the rear, it will be necessary to remove one of the a-arms from the spindle to remove the bolts from the caliper. It will also help to gain clearance for a socket wrench to be used as well. You don't need to remove both a-arms, just one.

Also, be aware the axles have changed for the 08 model years as well. Here is a chart to help you.

For the Standard axles, the 2008 models have smaller CV boot grooves on the wheel side of the axle, than the older versions. Also the lengths have changed as well. It is very important you have the right model axles for the year of your vehicle. The Heavy Duty Gorilla shafts have changed as well.

Standard Axle Shaft Sizes:

Model Year	XTR +6.5 A-Arms		MTS +3 A-Arms	
	05-07	08	05-07	08
Front Axle Shaft	22.75"	23.03"	19.30"	19.58"
Left (driver) Rear Axle Shaft	22.95"	22.53"	19.38"	18.97"
Right (pass.) Rear Axle Shaft	24.30"	24.63"	20.60"	20.93"

Shown in Overall Lengths



Rhino MTS & XTR QUICK CASTER SET UP DETAILS

FRONT LOWER A-ARMS

WHAT DOES IT DO?

Quick Caster is a feature that lets you adjust how easily your vehicle will steer. The more caster you add, the stiffer the steering wheel will turn. The less caster you add, the easier the steering wheel will turn. To adjust the settings, there are 2 black delrin spacers that are supplied to be installed on each of the **front lower** a-arms. The locations of the spacers dictate the caster setting.

DRIVING TYPE

HIGH SPEED DESERT RACING, DUNES

GENERAL RIDING, SHORT COURSE RACING, TIGHTER TRAILS, CRUISING THE NEIGHBORHOOD

HIGH POSITION

If you want the most control at high speeds over rough terrain to keep the car going in a straight line, and lessen the chance of the steering wheel popping out of your hands, you want to set the caster in the high position.

LOW POSITION (like stock)

If you want a little easier steering, and don't need as much control at high speeds over rough terrain, you want to set the caster in the medium position. This position will be used by the majority of riders.

Please note, these are just suggestions, each driver will have different preferences. There is no right or wrong here, its all in how you want your car to handle.

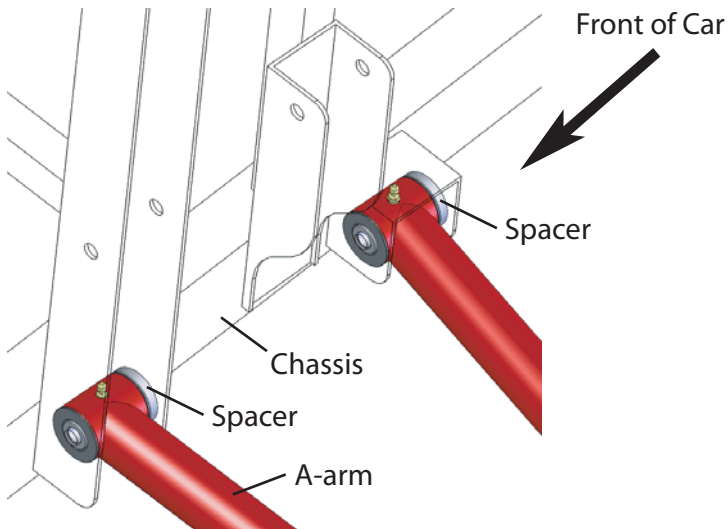
Below are close up views of the driver side front lower a-arm mounted to the chassis



Actual Caster Settings: + or - 1 Degree
(measured at ride height in Degrees)
High: 6 Positive
Low: 4 Positive (same as factory)

HIGH POSITION

SPACERS TOWARDS REAR OF CAR



LOW POSITION

SPACERS TOWARDS FRONT OF CAR

