



INSTALLATION GUIDE



#TL-RAK 6" EXTENDED ARM KIT



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INSTALLATION INSTRUCTIONS **TWISTED LABORATORIES RHINO LONG TRAVEL KIT**

Preface

These instructions have been written on the pretense impact wrenches are not available to the end user / installer of our products. If impact tools are available, certain steps can be eliminated in the removal of the wheels and spindle nuts. Twisted Laboratories LLC suggests that appropriate shop attire including safety glasses be implemented during the installation of our products. Use extreme caution while working around a vehicle supported with jack stands. Please read through the instructions entirely prior to attempting the modifications. If you do not feel that your experience level is high enough to safely install our products, we recommend that you have your dealer or a qualified technician perform the installation. It is recommended that Loctite® #262 (red) be used on all fasteners. Re-torque all bolts after 2-3 hrs. of operation. Properly align the front wheels after installation.

Rear A-Arm Removal-Both sides (skip 1-6 with impact tools)

1. Loosen lug nuts with 17mm socket but do not remove.
2. Chock front wheels and jack up the rear of the vehicle. Support with jack stands.
3. Remove lug nuts and wheels.
4. Remove dust covers from hubs to expose axle nuts.
5. Reinstall wheels and lower vehicle to ground.
6. Using a small punch or chisel, open seat on axle nuts. Loosen axle nuts with 32mm socket and breaker bar.
7. Chock front wheels and jack up the rear of the vehicle. Support with jack stands.
8. Remove lug nuts and wheels.
9. Remove axle nuts.
10. Remove wheel hubs from spindles (also known as a "knuckle").
11. Remove sway bar from a-arms.

Right side rear

12. Remove upper and lower spindle pivot bolts and remove spindle. Retain o-ring from spindle for later use.
13. Remove upper a-arm bolts at frame and remove upper a-arm.
14. Remove upper and lower shock bolts, remove shock.
15. Remove bolts from lower a-arm at frame and remove a-arm.
16. Obtain a lint-free shop towel to place in differential before removal of axle. An oil drip pan on the floor is also a good idea.
17. Grab axle firmly and hold up horizontal and push gently towards the differential. Use a QUICK pulling motion to remove axle from

differential. Place shop towel into opening on differential to avoid contamination with dirt or debris.

Left side rear

Repeat steps 12-17 for the left side rear.

Rear A-Arm Installation-Right side

1. Remove shop towel from differential. Install new right rear axle assembly into differential. Turn axle slightly to engage splines. It should slide in easily most of the way. Hold axle horizontal and straighten outside c-v joint. While pressing in gently, use a soft faced dead-blow hammer and give the outer c-v a good blow. **(Fig.1)** The axle should now be in. Gently tug on the axle to be sure that the spring clip has fully engaged.



Fig.1



Fig.2



Fig.3

2. Slide new lower a-arm into frame, and using factory bolts install. Torque bolts to 32 ft-lb. **(Fig.2)**
3. Slide new upper a-arm into frame, and using factory bolts install. Torque bolts to 32 ft-lb. **(Fig.3)**
4. Install axle into spindle and using supplied bolts attach to upper and lower a-arms. Make sure longer side is down! Torque bolts to 45 ft-lb.
5. Install o-ring over spindle. Install wheel hub and axle nut.
6. Install upper shock bolt using the appropriate spacers. (Depending on your choice of shocks, spacers may be different styles.) Torque bolt to 32 ft-lb.
7. Install lower supplied shock bolt using appropriate spacers. (Depending on your choice of shocks, spacers may be different styles.) Torque bolt to 60 ft-lb.
8. If your supplied shocks have external hose mounted reservoirs, find an appropriate place to attach them. **DO NOT OVER TIGHTEN** hose clamps on reservoir, or it will be destroyed! Make sure hose is routed away from tire and debris damage. The hose must also be kept from kinking.

Left side

Repeat steps 1-8 for left side, except use new left rear axle assembly.

Both sides

9. Attach sway bar to lower a-arms. Tighten nuts to 40 ft-lb.
10. Refill differential with SAE-80 API GL-4 Hypoid gear oil. Torque the plug to 17 ft-lb.
11. Install wheels. Tighten lug nuts.
12. Lower the vehicle to the ground.
13. Torque the lug nuts to 40 ft-lb.
14. Torque axle nuts to 190 ft-lb. Use a punch to re-stake the axle nuts.

Front A-Arm Removal-Both sides (skip 1-6 with impact tools)

1. Loosen lug nuts with 17mm socket but do not remove.
2. Chock front wheels and jack up the front of the vehicle. Support with jack stands.
3. Remove lug nuts and wheels.
4. Remove dust covers from hubs to expose axle nuts.
5. Reinstall wheels and lower vehicle to ground.
6. Using a small punch or chisel, open seat on axle nuts. Loosen spindle nuts with 32mm socket and breaker bar.
7. Chock rear wheels and jack up the front of the vehicle. Support with jack stands.
8. Remove lug nuts and wheels.
9. Remove factory brake line brackets. Discard.
10. The factory has routed the brake hoses through the upper a-arms. There are three options to deal with this.
 - a. Remove the brake line from the caliper and re-route line out of the a-arm, and re-attach the line to the caliper. **THIS OPTION WILL REQUIRE BLEEDING THE BRAKE SYSTEM! REFER TO YOUR FACTORY SHOP MANUAL FOR THIS PROCEDURE IF YOU CHOOSE THIS OPTION.**
 - b. Using a saw, cut the small bar from the center of the upper a-arm. This will allow the caliper to go through complete with **NO** disassembly, **NO** removal of brake line and **NO** bleeding.
 - c. Disassemble the caliper, and snake it through the opening in the upper a-arm. To do this, remove the two pad pins from the back side of the caliper and then unbolt the caliper from the spindle. Remove the pads and the "floating" part of the caliper. **(Fig.4)** Pass the disassembled caliper through the upper a-arm. Reassemble the caliper and install the brake pads. Reinstall the

pins into the caliper, and hand-tighten the caliper back to the spindle. Torque the pad pins to 13 ft-lb.

11. Remove the brake caliper from the spindle and place it out of the way. Place it on the frame in front of the a-arms to avoid kinking the line. Remove axle nut and remove hub/rotor assembly.

12. Remove the cotter pin from the steering arm and loosen the nut. Tap the nut with a hammer to free the ball joint, remove the nut and ball joint from the spindle.

13. Remove cotter pins and nuts from upper and lower ball joints on the spindle. Use a pickle fork to free the spindle from the ball joints.

(Fig.5)



Fig.4



Fig.5



Fig.6

14. Remove spindle, making sure to retain o-ring for re-use.

15. Remove bolts from frame on lower a-arm, and remove a-arm.

16. Remove upper and lower bolts on shock and remove shock.

17. Remove bolts from frame on upper a-arm, and remove a-arm.

18. Obtain a lint-free shop towel to place in differential before removal of axle. An oil drip pan on the floor is also a good idea.

19. Grab axle firmly and hold up horizontal and push gently towards the differential. Use a QUICK pulling motion to remove axle from differential. Place shop towel into opening on differential to avoid contamination with dirt or debris.

20. Using care not to slice the boot, cut the zip-tie on the rack boot.

Slide the boot back to expose the inline ball joint attached to the rack.

21. Use a punch to bend the retaining washer from the flats on the inline ball joint.

22. Remove the tie rod from the steering rack.

23. Remove the inline ball joint from the stock tie rod, remove the rack boot from the stock tie rod.

24. Remove circlip from lower ball joint still attached to the spindle.

25. Support the spindle in a vise and using a punch tap the ball joint out of the spindle. A bearing press can also be used. **(Fig.6)**

26. Using a 1/2" drill, ream out upper bearing hole on spindle.

Front A-Arm Installation- Both sides

1. Install factory rack boot onto the included heavy duty inline ball joint, thread supplied locknut onto the new inline ball joint and screw it into the new tie rod.
2. Place included retention washer on inline ball joint and tighten into steering rack. **(Fig.7)** Use a hammer to bend retention washer over the flats on the inline ball joint.
3. Replace rack boot and install new zip-tie.
4. Remove shop towel from differential. Install new axle assembly into differential. Turn axle slightly to engage splines. It should slide in easily most of the way. Hold axle horizontal and straighten outside c-v joint. While pressing in gently, use a soft faced dead-blow hammer and give the outer c-v a good blow. The axle should now be in. Gently tug on the axle to be sure that the spring clip has fully engaged.



Fig.7



Fig.8



Fig.9

5. Slide new lower a-arm into frame, and using factory bolts install. Torque bolts to 32 ft-lb. **(Fig.8)**
6. Slide new upper a-arm into frame, and using factory bolts install. Torque bolts to 32 ft-lb. **(Fig.9)**
7. Install supplied lower bolt and adapters in lower spindle mount and install axle through the spindle. **(Fig.10)** Place the bolt into the spherical bearing on lower a-arm. Place lower adapter and nut onto bolt. Tighten nut slightly now.
8. Install supplied upper bolt and adapters to upper spindle mount. Tighten nut slightly now. **(Fig.11)**
9. Install supplied tie rod bolt and adapters to spindle. Torque bolt to 45 ft-lb.
10. Replace o-ring onto axle (coming through spindle) and install rotor. Replace axle nut.



Fig.10



Fig.11



Fig.12

11. Torque upper and lower spindle bolts to 55 ft-lb.
12. Replace brake caliper. Torque bolts to 35 ft-lb.
13. Install upper shock bolt using the appropriate spacers. (Depending on your choice of shocks, spacers may be different styles.) Torque bolt to 32 ft-lb.
14. Install lower supplied shock bolt using appropriate spacers. (Depending on your choice of shocks, spacers may be different styles.) Torque bolt to 60 ft-lb. **(Fig.12)**
15. If your supplied shocks have external hose mounted reservoirs, find an appropriate place to attach them. **DO NOT OVER TIGHTEN** hose clamps on reservoir, or it will be destroyed! Make sure hose is routed away from tire and debris damage. The hose must also be kept from kinking.
16. Using two zip-ties, loosely attach one to the brake line approximately half-way down the tie rod. Place the second zip-tie through the first one and around the tie rod leaving it in a 2" diameter loop. Now, firmly tighten the zip tie on the brake line. The zip-tie around the tie rod **MUST** remain loose, so it will not pull on the brake line.
17. Install wheels. Tighten lug nuts.
18. Lower the vehicle to the ground.
19. Torque the lug nuts to 40 ft-lb's.
20. Torque spindle nuts to 190 ft-lb's. Using a punch, re-stake the axle nuts.

AXLE DISASSEMBLY AND REASSEMBLY INSTRUCTIONS **TWISTED LABORATORIES RHINO LONG TRAVEL KIT**

Preface

It is suggested that the axles be taken apart one at a time, and only one end at a time to avoid confusion. Replace the end onto the new axle shaft before moving onto the other end. If axle assemblies are clean and care is taken not to lose grease from the bearings, complete disassembly, cleaning and application of new grease will not be necessary. Securing the axle shaft in a vise is highly recommended. The extended front axles are the same, however the inner c-v joints differ. The rear lengths differ from left to right. It is a good idea to use a marker to identify the axle's location prior to removal.

Inner C-V Procedure- Disassembly

1. Using diagonal clippers, cut bands from the c-v joint. Take care not to slice into the boot. **(Fig.1)**
2. Slide boot down axle shaft to expose joint.
3. Using a small screwdriver or probe, remove spring retainer located inside the outer body. **(Fig.2)**
4. Pull the c-v outer body off the axle. Set aside.
5. Remove circlip from the end of the axle shaft. **(Fig.3)**
6. Slide the bearing off the axle. Take note of its orientation, as it will need to be installed in the same direction on the extended axle shaft.
7. Pull boot from axle, taking care not to lose the grease.



Fig.1

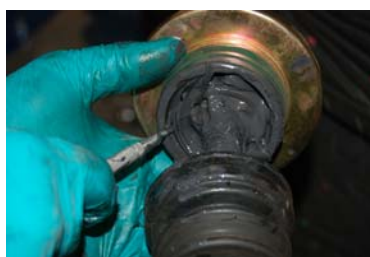


Fig.2



Fig.3

Inner C-V Procedure- Assembly

1. Slide boot over new axle shaft, taking note that the splined end of the shaft is the same as the end of the old shaft.
2. Slide the bearing onto the axle, install circlip and verify that it has seated in the groove. **(Fig.4)**
3. Slide the outer body back onto the bearing and reinstall the spring retainer. Pull on the outer body to verify the retainer has seated. **(Fig.5)**

4. Wipe grease from the inner lip of the boot and from the outer body. Slip the boot back over the outer body and seat the small end of the boot onto the groove in the axle. **(Fig.6)**
5. Apply supplied retainer bands / ties to the boot and pull tight with pliers, bend and clip off excess.



Fig.4



Fig.5



Fig.6

Outer C-V Procedure- Disassembly

1. Using diagonal clippers, cut bands from the c-v joint. Take care not to slice into the boot.
2. Slide boot down axle shaft to expose joint.
3. Hold the outer body and pull firmly straight away from the axle.
4. Using a soft-faced hammer, strike the outer body away from the axle. It may take a good blow to dislodge it. Set the c-v aside. **(Fig.7)**
5. Remove spring retainer from the axle shaft. **TAKE CARE NOT TO BEND IT, OR ASSEMBLY WILL BE DIFFICULT! (Fig.8)**
6. Pull boot from axle, taking care not to lose the grease.



Fig.7



Fig.8

Outer C-V Procedure- Assembly

1. Slide boot over new axle shaft, taking note that the splined end of the shaft is the same as the end of the old shaft. **(Fig.9)**
2. Install spring retainer and verify that it has seated in the groove. Using a small amount of grease, center the retainer on the axle.
3. Slide the outer body back onto the axle, lining up the splines. It should slide on most of the way, up to the spring retainer. **(Fig.10)** Using a soft-faced hammer, hit the end of the c-v joint until it goes over the spring retainer. It may take a good blow to install it. **(Fig.11)** Pull on the outer body to verify the retainer has seated.
4. Wipe grease from the inner lip of the boot and from the outer body. Slip the boot back over the outer body and seat the small end of the boot onto the groove in the axle.
5. Apply supplied retainer bands / ties to the boot and pull tight with pliers, bend and clip off excess.



Fig.9



Fig.10



Fig.11