



INSTALLATION MANUAL

TORQ Locker Honda Pioneer 500 Installation Instructions

By: John W. Brant

Made in USA By:





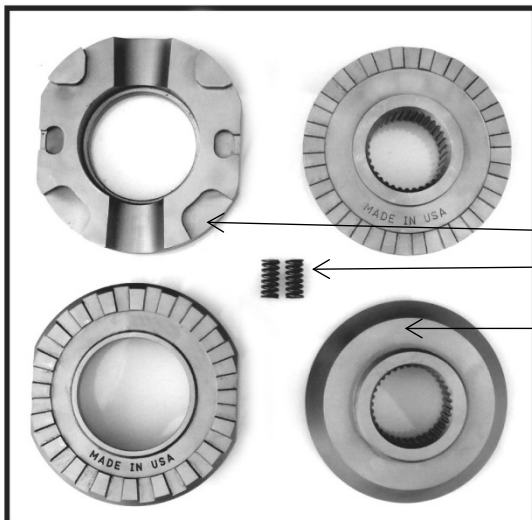
INSTALLATION MANUAL

INTRODUCTION

We suggest that you read the installation manual completely before beginning your installation to familiarize yourself with the installation steps. You should also take the TORQ-Locker apart and reassemble it several times on the bench- takes about 30 seconds- to familiarize yourself with it's assembly. Note that the two cam gears will only slide together one way.

Installation of your new locker is accomplished by removing the differential gears from the differential case and installing the TORQ Locker™ components in their place. This type of installation can be made by the weekend mechanic who is familiar with the operation of a differential and who is able to exercise appropriate care during the installation process. Normal installation takes about four to five hours when these instructions are followed. They also assume that the installer is familiar with the procedures used in removing wheels, axle shafts, etc. Shortcuts should not be attempted unless the installer is very familiar with the shop manual procedures for the vehicle. Installation will require lifting, and working under the vehicle. The Pioneer 500 weighs over 1000 lbs. You are entirely responsible to support the vehicle securely and safely, and for the results of not doing so. Take your time, do it right, do it safely!

Great care has been taken in developing these instructions for the proper installation of the TORQ Locker™; however, the final results are the responsibility of the installer. After the locker is installed, the safe operation of the vehicle is the responsibility of the driver; anyone who drives it should read the Operator's Guide at the end of this manual for additional information on how to safely operate your new TORQ Locker™- equipped vehicle.



TORQ LOCKER™ PARTS LIST

(2) Cam Gears

(2) Springs

(2) Axle Gears

Note: The TORQ Locker™ does not have spacers, as seen in The Aussie Locker™

TORQ Locker™ QUICK INSTALL OUTLINE

- 1.) **Prep machine for install:** Clean the machine first, paying particular attention to the front differential, and driveshaft where it engages engine. Engage the parking brake, drain gear lube from differential. Allow about 10 minutes to drain, then put plug back in. Remove the front skid plate. Jack up front end. Place jack stands under your machine where they will not slip.
- 2.) **Disassemble components to access the front differential:** The P-500 differential has to come straight out the front, so removing the bumper, and any other added accessories will be necessary.
 - a. **Remove Tires**
 - b. **Remove the lower control arm bolts and remove shocks:** Loosen the upper control arm mount bolts to allow free movement of the control arms. NOTE: removing shocks may not be needed for some aftermarket suspension set-ups
 - c. **Pull the axles out of differential:** Hold the lower control arm and axle and give a good pull straight away from the differential. The axle will pop out pretty easily- you can get it started with a stout flat blade screw driver and then pull the axle clear, and secure the axle and control arm up out of the way. Repeat for opposite side.
 - d. **Remove the 4wd engagement linkage, vent tube, sensor wire :** On the passenger side, remove the plastic cover (10mm bolt), disconnect 4wd shift cable and save the hardware. On the top of differential, remove the vent hose. On the drivers side, unplug the 4wd indicator wire by holding the boot and pulling straight away from differential
 - e. **Remove differential mount bolts:** Remove the two bolts that hold the front diff mount to frame. Remove nut from top rear mount bolt. Then support diff and remove the long bolt from the rear top mount.
 - f. **Remove the differential from machine:** The differential will now come straight out the front with the driveshaft attached. Do not remove driveshaft from differential. Place on a clean work surface with the 4wd linkage facing up
- 3.) **Disassemble the Differential:**
 - a. **Open the Differential Case:** Remove the plastic 4wd linkage back cover (two 10mm bolts) to gain access to the case bolt under it. Remove the front mount. Remove all the case bolts, and lift the case half straight up- there are pry-points around case to aid in separating case halves. Remove the carrier by lifting it straight up. There are thrust washers on each end of carrier that often stick to the bearings and are hard to see- locate them, and make sure that they go back in when reassembling
 - b. **Remove the Cross Pin:** Remove the cross pin retaining pin by first driving the pin IN slightly deeper, with an appropriately sized punch, and then, using a 5/32" drill bit, remove some of the factory peening- do not make the pin bore bigger. Turn the carrier over, and drive the retaining pin out. Then remove the cross pin.
 - c. **Remove the Spider Gears:** Rotate the spider gears and they will fall out. Make sure to remove the Thrust Washers from the differential case – they may have fallen off back of all the spider gears. Thrust washers are NOT used in this installation.
- 4.) **Install the TORQ Locker:**
 - a. **Prep TORQ Locker for Install:** Apply medium grease, in a very, very thin coating, to the teeth of the gears and to the backs of the axle gears.
 - b. **Install 2 Axle Gears:** Place the 2 gears in the case. Use one hand to hold the upper axle gear from falling into the middle of the case.
 - c. **Install the Cam Gears:** Place the lower Cam Gear first. Note, align the Key-Way so that the pockets of the lower cam gear are facing the opening of the differential case. Slide in the Upper Cam Gear so that the Key-Ways align.

- d. **Install the 2 Springs:** Wear eye protection! Place one end of the spring in the spring pocket, then just compress the spring with your finger/thumb and slide the other end into the opposite pocket. The spring should snap in. A small flat screwdriver can help to get that last little bit if needed. Be sure that the springs are seated in spring pockets
- e. **Install the cross pin:** Locate the retaining pin hole in cross pin, and then, with the hole oriented to the hole in carrier, slide the cross pin into the carrier, through the locker, and continue through until retaining pin hole in cross pin lines up with the hole in carrier. Drive the retaining pin in carefully until it is about 1/8" below surface of carrier. Use a center punch to lightly peen/distort the pin hole to retain the pin.

5.) Reassemble the differential:

- a. Place the shims that were on each end of carrier, back on the carrier and retain with a dab of grease. Set the carrier back into the case gently and squarely, being sure that it is fully seated with ring gear meshed with the pinion gear.
- b. Clean the case half seal area carefully and lubricate both sides with a light coat of grease. Place the upper case half carefully and squarely onto the carrier and slide it down until fully seated, being careful to avoid pinching the o-ring seal. A plastic hammer can be used to gently work the case down if needed.
- c. Place all the case bolts back into case and tighten 'finger tight'. Tighten the case bolts with a torque-wrench in a 'criss-cross' pattern in two steps, with the final torque- 12mm bolts=18 ft/lbs, and 14mm bolts= 35 ft/lbs. Reinstall the plastic backing plate.
- d. Install the front differential mount, but do not tighten at this time.

6.) Install the differential:

- a. Clean the driveshaft engine coupler and engine splines. Grease the coupler liberally. Place the differential back into machine by supporting driveshaft and carefully engaging the engine splines as you work the differential back into position. Having a helper at rear of machine to guide coupler onto shaft makes this much easier. The driveshaft may have to be rotated back and forth slightly to engage the engine splines.
- b. Install top mount bolt and nut loosely, and install front mount to frame bolts and tighten securely. Tighten the top mount long bolt and nut, and front mount long bolt and nut, to 35 ft/lbs
- c. Reassemble the 4wd shift linkage. Turn the adjusting nut until 1/8-3/16" of threads protrude, and install the plastic cover. Plug in the 4wd indicator wire. Install the vent tube.
- d. Release the axles and control arms and install the axles in differential. NOTE: Due to the possible differences in shocks and suspension set-ups, re-assemble control arms and shocks as recommended by your particular manufacturers specifications

Perform the Wheel Spin Test:

- e. **Put the vehicle in 4WD to lock the drive shaft.**
- f. **Tires must be installed to complete this test.**
- g. Rotate one of the tires until it stops against the locked drive shaft. Hold it in position and maintain moderate pressure.
- h. Rotate the other tire in the opposite direction. It should unlock and spin, with the locker clicking as the tire rotates.
- i. Rotate the first tire in the opposite direction until it stops, and again maintain pressure.
- j. Rotate the second tire in the opposite direction from the first time. It should again unlock and spin with the clicking sound.

Switch tires. Rotate and hold the second tire, and spin the first one in the opposite direction. Again switch directions. Both tires should rotate in both directions and the locker should click as they are doing so.

- 7.) **Complete Installation:** Leave the vehicle in gear, apply the emergency brake, remove the jack stands and lower the vehicle to the ground. Fill the differential with the recommended gear lube, and install the front skid plate. Install bumper/accessories that were removed.

TORQ Locker™ P500 INSTALLATION PHOTOS

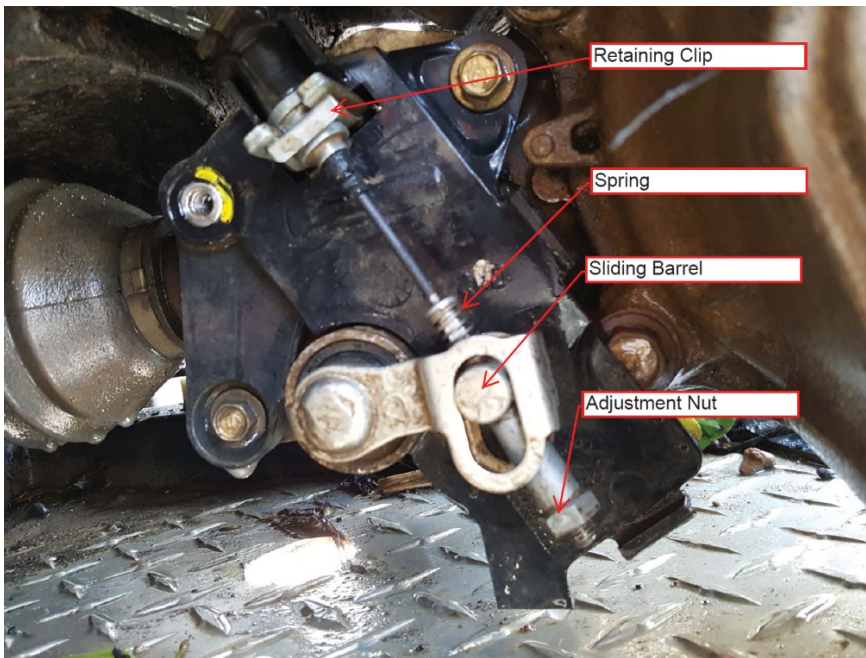
Disassemble components to access the front differential:



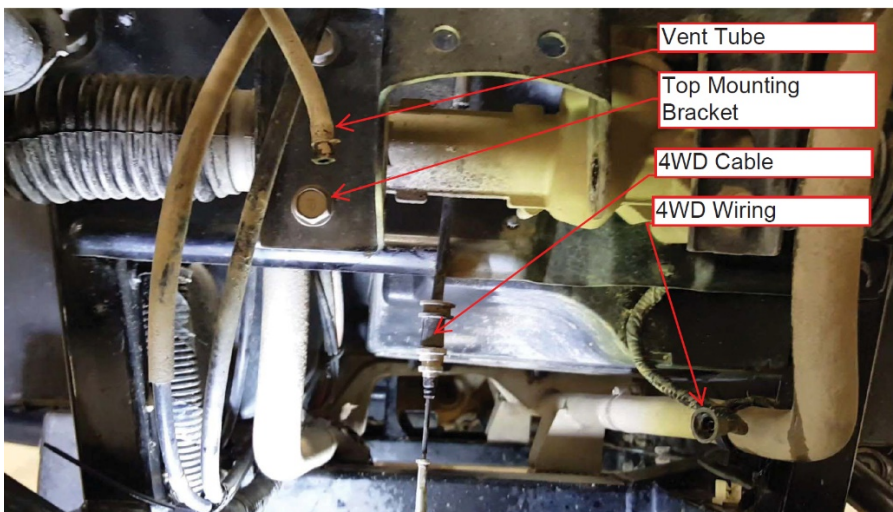
- a. **Drain differential then reinstall plug:** Don't lose the aluminum gasket!
- b. **Remove Front Skid Plate**
- c. **Lift and support the machine**
- d. **Remove bumper, wheels, winch or accessories to allow diff to come out front:** On stock P500 remove shocks. All P500's- take bolts out of lower control arms, and loosen the upper control arm bolts so arm moves freely. Pull the axles from differential. Secure the axles and lower control arms out of your way- don't overstress the brake hoses



- e. **Unbolt the front differential mount from frame:** Don't remove from diff yet. Remove the 4wd indicator wire on drivers side of differential, by grasping the boot firmly until you can feel the connector inside, and pull straight away from the differential.
- f. **Remove the 4wd linkage plastic cover:** It's on the passenger side of differential and retained with one 10mm bolt, and a friction latch.



- g. **Disconnect the 4wd shift linkage:** Remove the adjuster nut completely being careful not to lose the spring or sliding barrel, and taking note of their order of location for reassembly. Pull the cable retaining clip straight away from the differential, and move cable out of the way.



- h. **Remove the vent tube from top of diff:** Use needle-nose pliers to push the tube from nipple located on the top of the differential
- i. **Remove the top mount bolt and nut:** Remove the nut from the bolt, then support the differential and slide the bolt out.



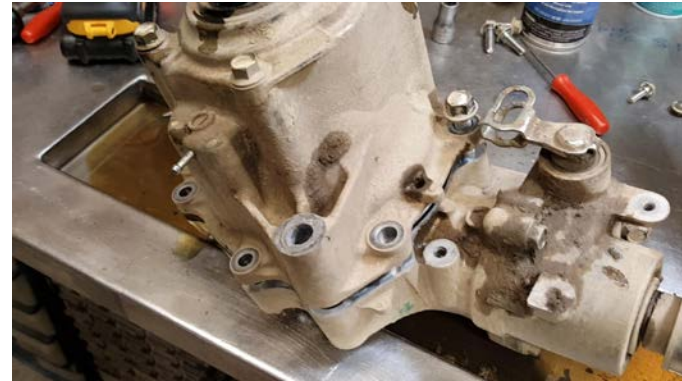
- j. **Remove the front Differential:** Still supporting the differential, pull it straight out the front of machine with the driveshaft still attached. Be careful to avoid damaging boots on the driveshaft. Place complete assembly on a clean work bench.

Disassemble the Differential:

- a. **Remove the front mount and 4wd linkage back plate:** Remove two 10mm bolts and remove the plastic plate to uncover the 14mm case bolt



- b. **Remove the case bolts and remove case half:** use the 'pry points' and/or a very thin sharp scraper at the seam to get it to start separating- BE CAREFUL! don't damage the machined surfaces, or drive it in and damage the o-ring seal.



- c. **Lift off the case half:** Lift the case half straight up- there's a thrust washer that may be stuck to bearing in case, or on the carrier- locate, and don't lose it. Set case out of way.



- d. **Lift out the carrier:** Lift carrier straight up out of case- there is a shim under it too. The shims must be re-used! Failure to install on reassembly will cause severe damage quickly!



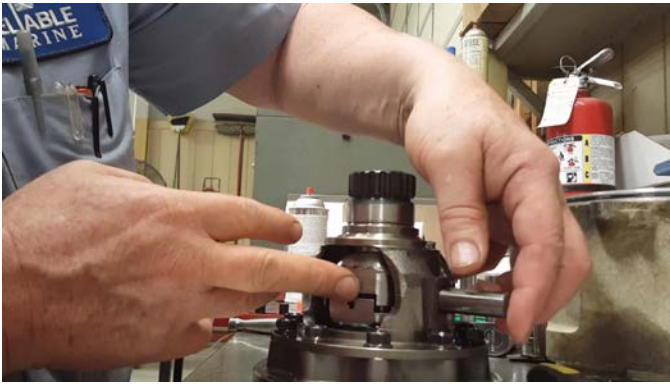
- e. **Remove the cross pin retaining pin:** Locate the retaining pin, and drive it IN gently till it bottoms in bore. Use a 5/32 drill bit to remove peening at top of pin bore- a light touch is all it takes! Don't make the bore bigger. Turn carrier over, and drive retaining pin out.



- f. **Remove the cross pin and spider gears:** Push the cross pin out, then turn the axle gears and all will fall out- 2 Cone Washers, 2 Spider Gears, 2 Drive Axle Gears. Make sure to get the cone washers out of carrier- they are NOT reused
- g. **Install the TORQ-Locker:** Place one Torq-locker axle gear in the carrier with locking teeth facing up. Place the other axle gear in the case with teeth facing down. Hold the axle gear in place, slide in lower cam gear and make sure the locking teeth are engaged with axle gear, and that the cam gear is oriented properly to allow the upper cam gear to slide in and mesh properly- it will only fit one way. See following pictures.



- h. **Install lower axle gear**
i. **Install upper axle gear:** Hold in place.
j. **Install lower cam gear**
k. **Slide in upper cam gear**



- I. **Install cross pin:** Turn locker to orient cross pin hole and install cross pin with it's retaining pin hole vertical, to line up with the retaining pin hole in carrier. Lift the upper half of TORQ locker to ease cross pin insertion. Align the cross pin retaining pin hole, then drive in retainig pin until about 1/8" below top of bore



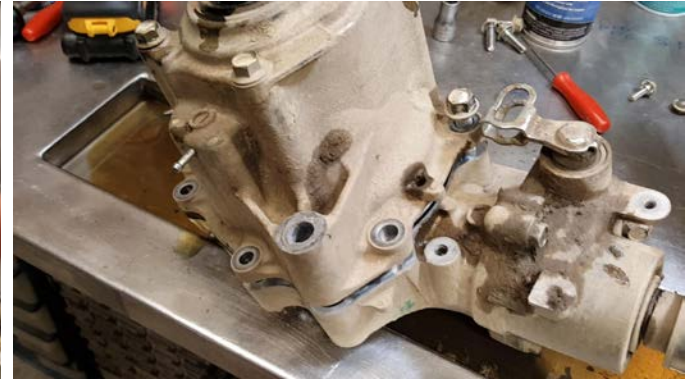
- m. **Pin driven in:** Now peen the pin bore with a center punch to retain pin, and then insert the TORQ Locker springs. Put one end of spring in lower pocket, and push in with fingers. A small screwdriver is helpful to make sure springs are seated in pockets.



- n. **Installing the Spring:** Set the spring in the bottom of the pocket and use a small screwdriver to depress the spring, and your finger to pop the spring into the pocket.



- o. **TORQ-LOCKER is installed.** Set carrier in case, don't forget the thrust differential case shims! (small diameter)



- p. **Clean & grease case mating surfaces:** Use gear oil on both surfaces and the o-ring
- q. **Set case half squarely & carefully:** Don't forget the thrust washer (large diameter)
- r. **Final Assembly:** A plastic faced hammer can be used to help work the case half down, by tapping side to side- don't force it!! Insert all the bolts, and use a hand tool to slowly and evenly snug up the bolts, making sure that the case comes together evenly. If it is 'cocked' and you continue to tighten it, it will crack the case. **TAKE YOUR TIME, DO IT RIGHT, DO IT ONCE.** Torque case bolts to specification. Install the 4wd linkage backing plate, and the front mount- don't tighten yet- and you're ready to reassemble the machine. Follow the written instructions for reassembly of the machine.



Here we are ready to install your TORQ-Locker enhanced differential!

Perform the Wheel Spin Test

- a. Jack the front end of the vehicle up on jack stands so both front wheels are off the ground and the vehicle is safely stable.
- b. **Put the vehicle in 4WD to lock the drive shaft.**
- c. **Tires must be installed to complete this test.**
- d. Rotate one of the tires until it stops against the locked drive shaft. Hold it in position and maintain moderate pressure.
- e. Rotate the other tire in the opposite direction. It should unlock and spin, with the locker clicking as the tire rotates.
- f. Rotate the first tire in the opposite direction until it stops, and again maintain pressure.
- g. Rotate the second tire in the opposite direction from the first time. It should again unlock and spin with the clicking sound.
- h. Switch tires. Rotate and hold the second tire, and spin the first one in the opposite direction. Again switch directions. Both tires should rotate in both directions and the locker should click as they are doing so.
- i. If your installation passes this “spin” test, you are ready to finish up.
- j. Any questions? Shoot us an email or give us a call. Info@torqmasters.com

TEST DRIVE

- 1.) After your installation is complete it's time to take your vehicle out for a test drive. Consult the Operator's Guide for detailed information on how to operate your vehicle on and off road.
- 2.) During your initial testing, take it easy the first few miles. Remember that a front or rear locker-equipped vehicle will have some different handling characteristics that you will quickly adapt to. Front locker applications should see no change in handling characteristics while in 2WD. It is not recommended to test a front locker in 4WD on dry pavement.
- 3.) Try your locker on a low-traction surface like a gravel parking lot to feel how the added traction feels.
- 4.) Note, there is a break-in period for your locker of about 100 miles after which the 'Click' noise should reduce slightly. The occasional 'Clunk' may be heard with this style of locker and should not be cause for concern.

NOTES & HELPFUL HINTS

- **Axle Seals:** Inspect while you are in the differential, now would be a good time to replace if needed
- **Differential case and bearings:** If there are any chips or cracks in the case, and/or the bearings are worn, replace them.
- **Check with your local Honda Dealer:** for any recalls prior to installing the TORQ Locker. If there is any front differential work to be performed under Honda Warranty, your dealer may be able to install your TORQ Locker at a discounted labor rate.

TORQ Locker™ WARRANTY

TORQ Locker™ FOUR YEAR LIMITED WARRANTY

Torq-Masters Industries warrants each new TORQ Locker™ to be free from defects in material and workmanship under normal use and service following the date of purchase of the part for a period of four years. This warranty is limited to the manufacturer's repair or replacement of the defective parts only, providing the product, including all components and parts, is returned to the manufacturer or its authorized representative, together with proof of purchase and all relevant documentation, transportation charges prepaid. This warranty excludes labor or consequential damages or injury. This warranty excludes damage to the TORQ Locker™ as a result of driveline component failures that were not manufactured by Torq-Masters Industries Inc. The decision as to whether the defective part is to be repaired or replaced will rest solely with Torq-Masters Industries, Inc.

Any failure of the product as before described must be reported to the manufacturer within fifteen (15) days of failure and an authorization code number obtained for return of the product to manufacturer or its authorized representative. Proper proof of purchase must be furnished in order to obtain an authorization code; and this code number must be included with the relevant paperwork before mentioned. Please contact us to obtain a return authorization code.

Notes:

This warranty is in lieu of all other warranties express or implied and all other obligations or liabilities on the part of the manufacturer. The manufacturer neither assumes nor authorizes any other entity or person to assume for it any other liability in connection and sale of TORQ Lockers™

This warranty covers the original purchaser only. This warranty does not cover defects caused by any of the following: modification, alteration, repair or service of the product by anyone other than by the manufacturer or its authorized representative, physical abuse to or misuse of the product, improper diagnosis, installation or operation thereof in a manner contrary to the installation manual accompanying the product, and road, offroad or accident damage. No repair or replacement of any part made under this warranty shall be deemed to alter or extend the term of the warranty in any way.

The manufacturer disclaims any implied warranties of merchantability of the goods or fitness of the goods for any purpose. The manufacturer has no liability for incidental, consequential or special damages including, but not limited to, claims of personal injury or property damage and claims of liabilities by third parties not the original purchaser to the product. While this warranty gives specific legal rights, some States have special laws regarding warranties which regulate limitation and time periods. These rights vary from state to state and purchaser is urged to review laws of his jurisdiction in the event of a warranty question.

If the purchaser disagrees with any of the terms of this warranty, please return the purchased item to Torq-Masters Industries, Inc. within five (5) business days of notification of shipment. Buyer is responsible for all shipping charges for receipt and return of product. A decision by the purchaser to retain the item purchased will be deemed acceptance of the specific terms of this warranty.

TORQ Locker™ is 100% made in the USA.

Please direct any questions to: info@torqmasters.com

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Operators Guide

Your TORQ Locker™ is designed to provide you with dramatic improvements in traction performance. However, the safe operation of your vehicle is the responsibility of the driver, and it is suggested that all drivers carefully read this TORQ Locker™ guide.

- Do not engage 4WD, with a front TORQ Locker™, when driving on dry pavement – this will put unnecessary strain on your front axle shafts and axle joints.
- Advise anyone working on your vehicle that the vehicle is locker-equipped.
- Having the proper tire air pressure is not only essential for proper locker operation but also for driving safety. Large diameter tires are especially susceptible to creating locker problems when the tire diameters are significantly different or when tires are inflated to different pressures. Tires should always be inflated to manufacturer's specifications.
- Depending on many factors you may hear a clicking sound when you are making a turn. This is normal for automatic lockers and is a positive indication that your locker is working properly.
- Additional backlash is the nature of locker design. Due to the additional backlash you may hear a "clink" or "clunk" sound from time to time. This sound is part of normal locker operation.
- Your new TORQ Locker™ provides you with dramatic increases in traction performance. You can travel further, faster and with more traction than before. With this improved capability comes new responsibilities. You can get deeper in the woods and further up the hills than before. In case of emergencies or vehicle breakdowns it is a good practice to always travel with other off roaders for safety.



Frequently Asked Questions

Q: When in 2WD what affect does the locker have? Is there any difference from stock in simply having the locker installed when in 2WD?

A: There should be no perceivable difference from stock in 2WD with a front TORQ Locker installed

Q: When in 4WD at higher speeds is there any difference in handling compared to the stock "3WD" open differential?

A: In 4WD there will be a perceivable difference compared to the stock differential because both front tires will have torque at all times. You can greatly minimize the 'locked' feeling in 4WD, by installing power steering in your Pioneer 500

Q: The cutout for the cross pin in the Cam Gear looks loose.

A: That's correct, this is by design. For the Locker to operate correctly, the Cam Gear must corkscrew about the cross pin, this drives the gears into the locked position.

Q: I can move one tire/ or the driveshaft, back and forth a quarter of a turn before the locker engages.

A: This is normal locker operation. The TORQ Locker™ adds backlash to the drivetrain.

Q: Does the TORQ Locker™ ever disengage?

A: The TORQ Locker™ never technically disengages, but it does allow for wheel speed differentiation so you can turn and steer the vehicle. The Locker achieves wheel speed differentiation through ratcheting. A slight audible click maybe noticeable at low speeds, this is an indication of the locker ratcheting.

Q: Where is the TORQ Locker™ made?

A: The TORQ Locker™ is made 100% in the USA from USA made raw materials. Our ISO 9001 certified manufacturing facility is in Rochester NY.

Q: What is the Warranty on the TORQ Locker™?

A: The TORQ Locker™ has a 4 year warranty with no tire size or horsepower limitations. The warranty does not cover damage to the locker from driveline component failures such as broken axle shafts or other differential failures.

Q: Do I need any special Gear Oil?

A: No, you can use your manufacturer's recommended gear oil.

Q: Will the TORQ Locker™ break my axle shafts?

A: The TORQ Locker™ will allow you to drive into the most extreme terrain, this extreme terrain puts more strain on your drivetrain and because of this additional strain, you could break driveline components. With modified suspensions, make sure to keep an eye on your axle shafts- look to see if the axle shafts are sliding out of the differential from too much suspension droop. If you see this we suggest adding suspension limit straps.

TORQ Locker™ is 100% made in the USA.

Please direct any questions to: info@torqmasters.com

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