

# AUSSIE LOCKER®



**TORQ-MASTERS**  
INDUSTRIES

*Front*

**XD-13527 Dana 35 Model**

## INSTALLATION MANUAL

### INSTALLATION INSTRUCTIONS FOR C-CLIP AND NON-C-CLIP AXLES

#### INTRODUCTION

Your new Torq-Masters "Aussie Locker®" will provide you with the maximum in advanced traction performance available. The Aussie Locker is an Automatic Precision Locking Differential—it does not require a switch or external electric or air control lines to activate nor does it contain friction clutch packs. Whenever terrain conditions would normally cause wheel spin to occur, the Aussie Locker automatically transfers up to 100% of the available torque to the wheel with the most traction. The result is a dramatic increase in the performance capabilities of your vehicle. This is why the Aussie Locker is called the "Traction To Go Anywhere" advanced traction enhancement system. A 4WD vehicle fitted with one Aussie Locker will, in general terms, have more than twice its original off-road capability. A 4WD vehicle with lockers in both front and rear differentials will have truly amazing traction, enabling it to travel over seemingly impossible terrain with less effort than ever before.

Installation of your new locker is accomplished by removing the differential gears from the differential case and installing the Aussie 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 two to three hours when these instructions are followed. They also assume that the installer has a shop manual covering his vehicle and that he 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 his vehicle.

Great care has been taken in developing these instructions for the proper installation of the Aussie 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 for additional information on how to safely operate your new locker-equipped vehicle.

We suggest that you read these instructions before beginning your installation to familiarize yourself with the steps performed for your particular axle type and to determine what tools you might need.



# Contents

<b>INTRODUCTION .....</b>	<b>1</b>
<b>STANDARD DIFFERENTIAL OPERATION .....</b>	<b>3</b>
<b>PRE-INSTALLATION INFORMATION .....</b>	<b>3</b>
<b>AUSSIE LOCKER PARTS .....</b>	<b>4</b>
ADDITIONAL PARTS USED .....	4
<b>SHOP MANUAL PROCEDURES .....</b>	<b>4</b>
<b>DIFFERENTIAL DESIGNS .....</b>	<b>4</b>
<b>PRELIMINARY AXLE DISASSEMBLY STEPS .....</b>	<b>5</b>
REMOVAL OF THE DIFFERENTIAL—C-CLIP AXLES .....	5
REMOVAL OF THE DIFFERENTIAL—THIN RING GEAR .....	5
REMOVAL OF THE DIFFERENTIAL—THICK RING GEAR .....	6
INTEGRAL CARRIER .....	6
REMOVABLE CARRIER (THIRD MEMBER) .....	6
<b>EXAMINATION AND PREPARATION OF THE PARTS AND THE DIFFERENTIAL CASE—ALL MODELS .....</b>	<b>7</b>
EXAMINATION OF THE PARTS .....	7
CHECKING CASE TOLERANCES .....	7
PREPARING THE REMAINDER OF THE PARTS .....	8
<b>INSTALLATION OF THE AUSSIE LOCKER .....</b>	<b>8</b>
PREPARATION .....	8
INSTALL THE LEFT SIDE C-CLIP AND FIRST CAM GEAR .....	8
INSTALL THE RIGHT SIDE C-CLIP AND SECOND CAM GEAR .....	9
ASSEMBLE THE PINS AND SPRINGS .....	9
.....	9
MEASURING THE CENTER GAP .....	9
INSTALL THE PINION SHAFT (C-CLIP/THIN RING GEAR AXLES) .....	10
THIN RING GEAR .....	10
THICK RING GEAR .....	11
ASSEMBLE THE DIFFERENTIAL CASE .....	11
INSTALL THE DIFFERENTIAL CASE—INTEGRAL CARRIER .....	11
INSTALL THE DIFFERENTIAL CASE—REMOVABLE CARRIER (THIRD MEMBER) .....	11
<b>TESTING THE LOCKER ASSEMBLY .....</b>	<b>12</b>
<b>COMPLETING YOUR ASSEMBLY .....</b>	<b>12</b>
<b>TESTING YOUR VEHICLE .....</b>	<b>12</b>
<b>NOTES .....</b>	<b>13</b>
<b>MANUFACTURERS WARRANTY STATEMENT .....</b>	<b>13</b>
<b>"AUSSIE LOCKER" TWO YEAR LIMITED WARRANTY .....</b>	<b>13</b>

## STANDARD DIFFERENTIAL OPERATION

The standard, or "open" differential provides two functions:

- 1. Transmits engine power** via the drive train to the wheels to move the vehicle; and
- 2. Allows differential action** between the two wheels—permits them to rotate at different speeds during cornering to eliminate drive train damage and tire scuffing.

The standard differential design always provides equal amounts of power to each wheel. Thus, in normal driving with no tire slippage, half (50%) of the incoming engine power is transmitted to each wheel, or 50-50. In a slippery traction situation, if one wheel spins with only 10% of the engine power applied to it, the other wheel also receives only 10% of the power, or 10-10. This means that the vehicle is trying to move with only 20% of the total power applied to the ground such that it may not move. The vehicle is stuck.

Your new Torq-Masters Aussie Locker overcomes the traction deficiencies of the open differential by providing as much as 100% of the available power to either wheel (100-0) when the other one is on a slick surface or even off the ground in a hole, yet it also allows the wheels to rotate at different speeds during a turn. This means that if one wheel is on solid ground with excellent traction and one wheel is on ice and would slip with 10% of the power applied, that the one on solid ground would receive 90% of the power and the other one would receive 10% (90-10). The 90%-power wheel will move the vehicle just fine, so you wouldn't even know that you'd have been stuck.

For you techie types, the reason that this unequal division of power can occur is that the axle shafts act like torsion bars. Power is applied to both axles; when the 10% wheel (low traction) begins to slip, the axle shaft for the 90% wheel (good traction) wraps up a little more as engine power is applied. The 10% wheel slips a little more and the 90% axle wraps up a little more until enough power is finally applied to move the vehicle. It may move before all 90% is applied, but these illustrations show the theoretical maximums that may come into play. As your vehicle climbs up a hill, this torsion bar effect transfers power back and forth instantaneously from side to side as one wheel, then the other one, slips a little and then regains traction. Your new Aussie Locker thus effortlessly and automatically gives you the most power to the wheel with the most traction, and you just keep right on going. Onward!

## PRE-INSTALLATION INFORMATION

The Torq-Masters Aussie Locker is designed to fit into a standard or "open" differential case. Limited-slip or Posi-Traction differentials use clutch packs, such that these differential cases are not compatible with the Aussie Locker. If you have a limited-slip differential you will need to purchase an equivalent open differential case, pinion shaft and side gear thrust washers and have the case installed prior to the installation of the locker. Setup of the case includes setting the differential bearing pre-load and the ring-and-pinion backlash, which generally must be done by a shop having the right knowledge and tools.

As with most factory differentials, the Aussie Locker is designed to be installed with a factory thrust washer under each axle gear. It is imperative that your thrust washers are not worn, warped, cracked or scored and that they be of the original thickness. If your washers are worn or damaged, purchase new ones. They are cheap and are good insurance. If you do not install thrust washers of the proper thickness and in good condition, the contact patterns will show the difference which will void the warranty.



## AUSSIE LOCKER PARTS

The Aussie Locker kit consists of the following parts:

Two cam gears  
Two axle gears  
Two spacers  
Four pins  
Four precision springs  
Installation Manual  
Supplemental Installation Information (if applicable)  
Operator's Guide  
Sticker

Additional parts for some models:

Cross shaft (pinion shaft)—The Dana 35 models come with a special cross shaft.

Thrust block—Future models may include a thrust block where required.



## ADDITIONAL PARTS USED

You will use your existing side gear thrust washers and cross shaft(s), assuming that they are in excellent condition. These parts must be replaced if your differential is high-mileage or if wear is evident. If you are also replacing axle shafts as part of this installation and if your differential has a thrust block, check to see if it needs to be changed or if end-play adjustment is required.

**Note: Thrust Blocks:** Toyota Land Cruiser installations **do not** use the factory thrust block; Jeep AMC-20 differentials **do** use the thrust block. (If axle shaft end play is involved (AMC-20), the thrust block is required for correct installation.)

Also note that for all differentials the spider gear thrust washers are **NOT** used.

Before starting the installation be sure that you have replacement gear oil of the type recommended by the vehicle manufacturer, and any seals that will need to be replaced. If the vehicle is to be used in hot weather we recommend the use of 85-140 gear oil, which will provide adequate lubrication and minimize any sound. Also, synthetics can be used with the Aussie Locker. **A dial caliper or a micrometer and set of feeler gauges are also needed for checking the various existing parts to determine if they need replacing.**

## SHOP MANUAL PROCEDURES

As stated above, it is important for you to have your shop manual available and know the R&R procedures that apply to your particular vehicle. The Aussie Locker instructions will describe in detail how to install your new locker, but they will only mention in general terms about how to remove backing plates (if even necessary for your vehicle), pull out the axle shafts, remove the differential case, etc. It is up to the installer to determine the proper method for axle housing and differential disassembly, and be able to remove the pinion shaft from the differential case so that the locker can be installed.

## DIFFERENTIAL DESIGNS

These instructions will assume that the installer has already consulted the shop manual and/or the internet and various club resources and determined what type of differential design is in his vehicle. There are two types of axle housing designs in which the Aussie Locker is used. These are: (1) Integral carrier, such as in the Spicer (Dana) line; and (2) Removable carrier (third member), such as in Toyota Land Cruisers (although in these vehicles the rear carrier generally is not removed from the vehicle). In turn, these two types of axles have several differential designs, including: (1) C-Clip axle shaft retention (Ford 8.8, Spicer 35, Land Cruiser with thrust block, etc.); (2) Bearing retainer axle shaft retention (Jeep AMC-20 with thrust block); (3) Full-floating axles (Land Cruiser fronts, some rears, early Dodges, etc.). The Aussie Locker design will operate with all these various types of differentials.

## PRELIMINARY AXLE DISASSEMBLY STEPS

**NOTE:** the following steps and paragraphs are suggestions that we provide to help you with the successful installation of your new Aussie Locker. You are ultimately responsible for the safe installation of your new locker and the safe operation of your new locker-equipped vehicle.

The following general steps are done prior to removing the **rear** differential; similar steps are used for the **front** unit. They are meant only as a guide to be used in disassembling the axle for your particular vehicle. Consult your shop manual for the exact steps that are needed.

1. Position the vehicle on level ground and block the front wheels.
2. Loosen the rear lug nuts by 1/2 turn if the tires will need to be removed. Generally, for C-clip axles, the tires can remain in place.
3. Release the emergency brake and put the transmission and transfer case in neutral.
4. Carefully jack up the rear axle and place it on jack stands.
5. Remove the tires (if needed).
6. Loosen the bolts around the differential cover or the around the third member. Drain the gear oil. Remove the cover.
7. If you have determined that your vehicle has a C-clip differential, proceed directly to the section below entitled C-Clip Axles.
8. Observe the ring gear to see if it is thin enough so that you can pull out the pinion shaft. If so, proceed to the section below entitled Thin Ring Gear.
9. If the ring gear is too thick to be able to pull the pinion shaft out past the teeth, proceed to the section below entitled Thick Ring Gear.

### Notes:

1. The pinion shaft is usually retained by a special bolt or by a roll pin or even by a solid pin. In some differentials a bearing cap must be removed to enable the bolt or pin to be removed using a small wrench or a long punch. Consult your shop manual for the exact procedure.
2. If you find one thrust washer, there are two (1 per each axle gear). Sometimes they "stick" to the backs of the side gears or to the case and one seems to be missing. Check very carefully.

## REMOVAL OF THE DIFFERENTIAL—C-CLIP AXLES

The following steps are a general guide to removing the differential assembly from C-clip axles. Consult your shop manual for the detailed steps required to open up the differential housing to expose the differential. C-clip axles are the easiest design for differential replacement; in these axles the differential case remains in the vehicle and the installation of your Aussie Locker is done in the vehicle rather than on the bench. Note that with only one person, removal of the tires makes sliding the axle shafts in and out easier.

1. Remove the pinion shaft.
2. Remove the thrust block (if present).
3. Push the axle shafts inward and remove the C-clips.
4. Pull each axle shaft out by about three inches.
5. Remove the spider gears and side gears and all thrust washers.
6. Proceed to the section below entitled Examination and Preparation of the Parts.

## REMOVAL OF THE DIFFERENTIAL—THIN RING GEAR

If you have determined that the ring gear is thin enough so that the pinion shaft can be removed without further disassembly, do not remove the differential case from the vehicle. Your new Aussie Locker can be installed with the differential case remaining in place. If your differential is in a third member with no removable cover on the axle housing, remove the third member from the vehicle and place it on the bench. If the ring gear is thin enough, follow instructions 1, 3 and 4 below but do not remove the differential case from the carrier. (As an example, this describes Land Cruiser front differentials which have full-floating axles.)



1. Remove the pinion shaft.
2. Pull each axle shaft out by about three inches.
3. Remove the spider gears and side gears and all thrust washers.
4. Proceed to the section below entitled Examination and Preparation of the Parts.

## REMOVAL OF THE DIFFERENTIAL—THICK RING GEAR

If the ring gear is too thick to be able to pull out the pinion shaft, the differential case must be removed from the carrier and the ring gear removed from the case. This process requires removal of the differential bearing caps and outer races. In some differentials the differential bearing pre-load and ring and pinion backlash are set by shims, while in others these values are set by bearing adjusters. Both the pre-load and backlash must be correct for your differential assembly to operate properly. Assuming that your differential has already been operating satisfactorily, the following removal steps are a guide to help you re-install your differential case into the carrier without having to measure and set up these values again. Be sure to refer to your shop manual for additional information.

## INTEGRAL CARRIER

(Carrier is a part of the axle housing—holds the axle tubes, diff case and drive gears)

1. Check your shop manual for the proper procedure for removing the differential case. In the Spicer (Dana) line, for example, the shop manual will usually recommend the use of a large tool called a "carrier spreader;" however, many mechanics will instead remove the case with a pry bar. Consult your club and internet sources for the procedure for you to use.
2. Mark the differential bearing caps as to orientation and side with a punch or marker. Remove the bearing cap bolts and caps.
3. Pull out the axle shafts by about six inches.
4. Pry out (remove) the case. As the case is being removed, **BE SURE TO NOTE THE LOCATIONS OF THE DIFFERENTIAL BEARING SHIMS** (note that in some Dana Spicer axles the shims are located under the carrier bearings and thus cannot be removed or lost unless the bearing is pressed off). It is extremely important to put these shims back in the same location and order during re-assembly.
5. Mark the differential bearing outer races as the case is coming out so that they can be re-installed on the same sides.
6. Mark the ring gear to case location.
7. Remove the ring gear from the case.
8. Remove the pinion shaft retaining pin/bolt.
9. Remove the pinion shaft.
10. Remove the spider gears and side gears and **all** thrust washers.
11. Proceed to the section below entitled Examination and Preparation of the Parts.

## REMOVABLE CARRIER (THIRD MEMBER)

(Carrier is not a part of the axle housing—holds only the diff case and drive gears)

1. If your particular axle housing has a cover, and the pinion shaft can be removed without removing the ring gear (such as in Land Cruiser rear C-clip axles), do not remove the third member but refer to "C-clip Axles" or to "Thin Ring Gear" above (depending on your particular design). Otherwise, remove the third member from the vehicle and place it on the bench. (See the shop manual for the steps required, which will include pulling the axle shafts out a few inches, disconnecting the drive shaft, draining the gear oil and unbolting the carrier.)

NOTE: If your third member has been taken out of the vehicle but has a thin ring gear such that the pinion shaft can be removed (many Land Cruiser front axles, for example), **DO NOT** remove the case from the carrier, but proceed to step 9 below.

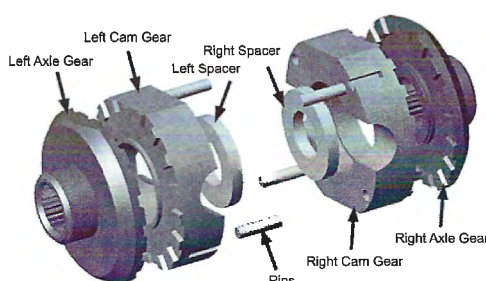
2. Mark the differential bearing caps as to orientation and side with a punch or marker. Also, **and this is extremely important**, mark the left or right side **and** rotational position of the bearing adjusters so that they can be re-installed in exactly the same way.

3. Rock the ring gear back and forth to get a feel for the amount of backlash present (usually around .008). This step will allow you to check during re-assembly that the bearing adjusters are in their correct positions and are not one turn off. (When in doubt use a dial indicator and stand to measure the before and after backlash).
4. Remove the adjuster locks, bearing cap bolts and caps.
5. Mark the differential bearing races so that they can be re-installed on the same side.
6. Lift the differential case from the third member.
7. Mark the ring gear in relation to the differential case.
8. Remove the ring gear.
9. Remove the pinion shaft.
10. Remove the spider gears and side gears and **all** thrust washers.
11. Proceed to the next section entitled Examination and Preparation of the Parts.

## EXAMINATION AND PREPARATION OF THE PARTS AND THE DIFFERENTIAL CASE—ALL MODELS

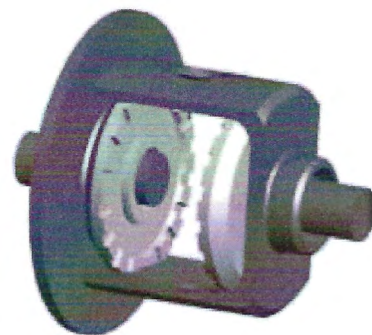
### EXAMINATION OF THE PARTS

1. Check the two large side gear thrust washers for wear, cracks, warping or galling. If they are not in excellent condition, replace them. The small washers under the spider gears will not be used.
2. Examine the pinion shaft. If it is worn by more than .002 where the side gears were located, purchase a new one from your dealer.
3. Check the hardness of the pinion shaft. In many instances we have found that the stock factory shaft is somewhat soft. Try to scratch a groove in it with a file near the center. If you can do so, the shaft is soft. If the file tends to slide and not cut, the shaft hardness is probably acceptable. If it is soft replace it, and also be sure to check the new shaft. If the old shaft is worn under the spider gears, definitely replace it.
4. Thoroughly clean the differential housing to remove any old dirt and metal particles.
5. If the installation is in the front differential, now would be the time to inspect/replace the inner axle seals.
6. Examine the differential case and bearings. If there are any chips or cracks in the case, and/or the bearings are worn, replace them—but remember that the ring and pinion backlash and bearing pre-load will need to be set up again.
7. If your differential has a thrust block and it is to be re-used (Jeep AMC-20, for example), examine the block and be sure that it is in good condition. If it needs to be replaced, be sure to set up the axle shaft end-plate again (see your shop manual).



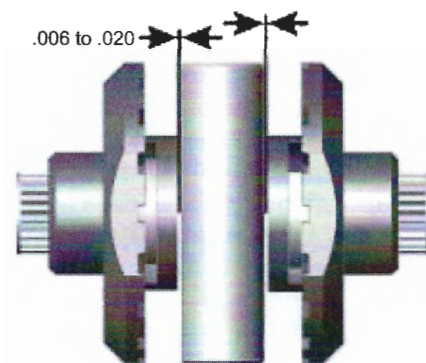
### CHECKING CASE TOLERANCES

1. Apply a thin coat of medium to heavy axle grease to the teeth of the Aussie Locker axle gears, to the back surface and around the hub in the center. Using this grease will help with holding the parts in place later on.
2. Place a thrust washer on each axle gear.
3. Install both axle gears in the differential case.
4. Place a spacer onto each axle gear, with the open end over the hub of the axle gear. The grease will hold it in place.
5. Carefully slide the pinion shaft all the way into the case (past the spacers).
6. With a screwdriver, carefully pry apart the gap between the spacers and the pinion shaft. This step will compress out the grease and help assure that the following measurement is accurate.



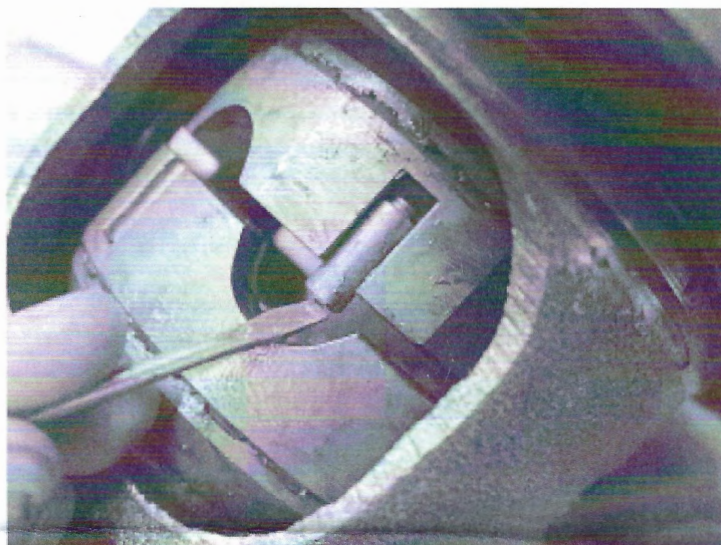


- Using feeler gauges, measure the gap between the spacers and the pinion shaft. For each spacer it should be between .006 and .020. If it is within tolerance, remove the pinion shaft and only the spacers for use later. If it is not within tolerance, either the case is worn or the thrust washers are worn. The locker needs to have this gap within tolerance to operate properly. Failure to ensure the proper tolerances will show up in marks on the locker components and will void the warranty.
- Remove the pinion shaft and spacers, but leave the axle gears and thrust washers in place.



## PREPARING THE REMAINDER OF THE PARTS

- Be sure that your work area is clean and that no dirt or metal particles are present and that the grease is clean and free from contaminants.
- Apply some grease to the teeth of the cam gears, to the slots for the pins, and to the hole in the center. The grease will help hold the parts in place and will lubricate them until the gear oil circulates.
- Apply a small amount of grease to the pins and springs.
- Install a pin into each of the long slots in the cam gears. Be sure to position the step on the pin toward the **bottom** of the slot, toward the teeth (later, the spring will snap over the step).
- Install a spacer in the center of each cam gear. Orient the spacer so that it will fit down over the hub in the center of the axle gear when installed (the same way as when the clearances were checked).



## INSTALLATION OF THE AUSSIE LOCKER

### C-CLIP AXLES

#### PREPARATION

Make a small tool from a 6" piece of coat hanger wire. Form it in a wide "U" with the ends bent up by about one inch, and a 4" middle portion. This tool will help with moving one of the spacers sideways while installing the right C-clip.

#### INSTALL THE LEFT SIDE C-CLIP AND FIRST CAM GEAR

- The axle gears and thrust washers should already be in place from checking the tolerances. Carefully push in the ring gear side axle shaft, through the axle gear splines.
- Install the C-clip on the end of the axle shaft, with the points facing downward.
- Pull (snap) the axle shaft outward to seat the C-clip onto the hub of the axle gear.
- Carefully insert one of the cam gear assemblies into the case with the teeth oriented toward the axle gear.
- Push the cam gear teeth into the axle gear teeth so that the grease "squishes" out.
- Reach into the center and push the spacer down over the C-clip and axle end. The combination of grease and the spacer over the hub should help hold the cam gear in place.

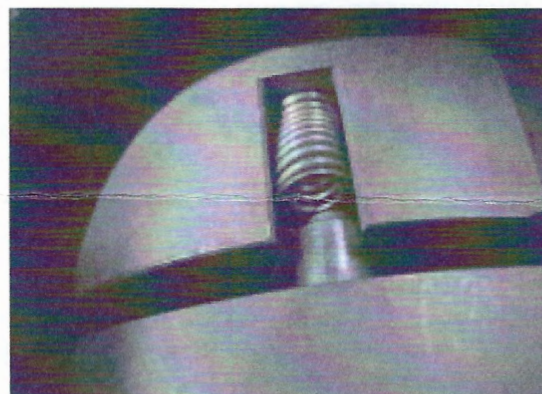


## INSTALL THE RIGHT SIDE C-CLIP AND SECOND CAM GEAR

1. Insert the second cam gear assembly into the case, with its teeth facing the axle gear. Hold it toward the middle of the case, touching the left cam gear.
2. Holding the right cam gear leftward next to the left cam gear, reach into the gap between the teeth (of the right cam gear and axle gear) with the "U" shaped tool made earlier. Twist it to slide the spacer to the **LEFT**, partially into the left cam gear. The right cam gear will now be centered on the spacer and touching the left cam gear, with a gap between the right-hand teeth.
3. Remove the tool. Everything should just sit there, held in place by the spacers and the grease. If not, the assembly may need to be held in place during the following steps.
4. With the left axle, slowly rotate the complete locker assembly until the C-clip recess in the right cam gear teeth faces toward you.
5. CAREFULLY slide in the right axle shaft. Hold the right axle gear so that it doesn't slide out of place as the axle spline comes through.
6. Look through the gap between the teeth as the axle end begins to protrude from the axle gear hub. Stop sliding the axle shaft when its C-clip groove is completely visible.
7. Carefully insert the second C-clip into the groove. The grease will help hold it in place.
8. Pull (snap) the axle shaft outward to seat the C-clip.
9. Rotate the right tire 1/4 turn until the C-clip points face downward, which will help keep it in place while the cam gear and spacer are being moved into position.
10. Carefully move the right cam gear to the right and seat it into the grease in the axle gear teeth. The spacer may remain stationary for the moment.
11. If the spacer is "stuck" to the other spacer because of the grease, use a small knife to pry them apart. Reach in through the pinion shaft recess in the axle gears and slide the spacer to the right, onto the right axle gear and over the C-clip and axle end.

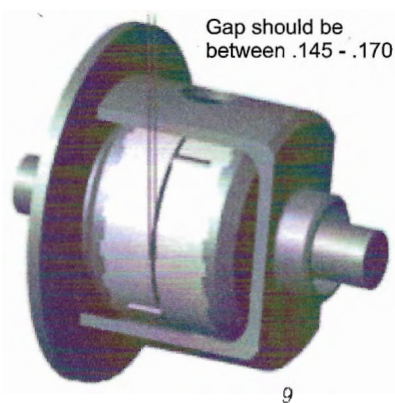
## ASSEMBLE THE PINS AND SPRINGS

1. Rotate both halves until the cam gear recesses line up. This also lines up the pin and spring holes.
2. Push one pin from the long slot across the gap and into the opposite cam gear pin hole. The visible end of the pin should have the small step on it.
3. Insert a spring into the slot just vacated by the pin. One end of the spring will fit over the step on the end of the pin and the other end will nest in the bottom of the slot.
4. Carefully rotate the whole locker assembly to expose the next slot. Repeat steps 2 and 3 three more times. Assembly of the locker itself is now complete.



## MEASURING THE CENTER GAP

This step is important because it relates to warranty issues. The gap down the center of the locker must be within tolerance for the unit to operate properly. If it is too narrow it can bind up, and if it is too loose the cam gears can become damaged. Therefore, you will need to measure how far apart the cam gears at the middle of the assembly are. **If you have a warranty claim we will ask you for this information.** If we receive the parts back we can tell if the unit was operated out of tolerance by the contact patterns, and this can void your warranty.

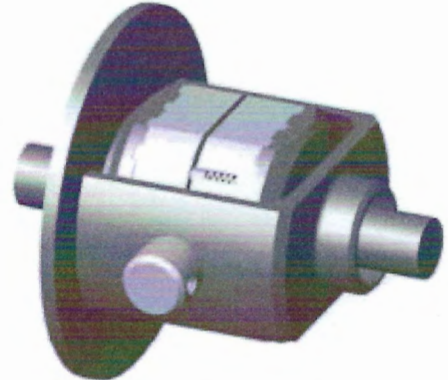


.153

1. Using a feeler gauge or dial caliper, measure the center gap. It should be between .145 and .170 wide. If it is outside these numbers either the case or thrust washers are worn or possibly other (thicker) thrust washers were installed at one time. If the gap between the spacer and pinion shaft is O.K. and this measurement is not within tolerance, re-check your installation to see if anything is out of place or if a piece of metal or dirt may be stuck somewhere.
2. Measure the center gap before buttoning everything up in case the thrust washers, etc. are bad.
3. Write the gap measurement on the form in back of this manual. **IF YOU HAVE A WARRANTY ISSUE WE MUST HAVE THIS INSTALLATION INFORMATION.**

## INSTALL THE PINION SHAFT (C-CLIP/THIN RING GEAR AXLES)

1. Rotate the drive shaft to position the differential case so that the pinion shaft hole points downward at about a 45° angle so that the pinion shaft can be inserted, and with the pinion shaft retaining lock hole exposed.
2. With either axle shaft, rotate the locker assembly until the cam gear recesses line up with the pinion shaft holes.
3. Carefully slide the pinion shaft into the case, past the spacers and into the opposite side.
4. Line up the pinion shaft lock hole and install the lock pin or bolt.
5. Proceed to the above entitled Measuring the Center Gap, and then to the section below entitled Testing the Locker Assembly.



## THIN RING GEAR

This portion of the instructions assumes that the differential case has remained in the carrier, whether or not the carrier is in the vehicle. If your differential is in a removable third member that is on the bench, perform the following installation there and then re-install the third member in the vehicle.

1. ~~Prepare all the parts for assembly as described above under Preparing the Remainder of the Parts.~~ The axle gears and thrust washers should already be in place from checking the case tolerances

NOTE: If your assembly will re-use the thrust block (Jeep AMC-20, for example), insert the thrust block into the splines in the right axle gear. It will be pushed inward later with a tool or with the axle shaft.

2. Install the left (ring gear side) cam gear assembly onto the left axle gear with the teeth meshed. Push it in so that the grease "squishes" out.
3. Reach into the center and push the spacer to the left, over the axle gear hub.
4. Install the right cam gear assembly into the case onto the right axle gear with the teeth meshed.
5. Rotate the left and right halves until the large cam gear recesses line up. Reach inside and push the right spacer to the right, over the axle gear hub.
6. With the cam gear recesses lined up, slide one of the pins in either cam gear across the center gap into the hole in the opposite cam gear. The step should now be visible on the top of the pin.
7. Insert a spring into the slot on the cam gear just vacated by the pin. One end should nest into the bottom of the slot and the other end should snap over the step on the end of the pin.
8. Repeat step 7 for the remaining three pins and springs. The assembly of the locker itself is now complete.
9. Proceed to the above entitled Measuring the Center Gap
10. Rotate the differential case so that the pinion shaft hole and lock pin holes are visible.

NOTE: If your assembly has the thrust block inserted in the right axle gear, before performing the next step use the axle shaft or a tool such as a rake handle and carefully push the block into the center. Line up its hole with the pinion shaft hole and then proceed to the next step.

11. Carefully insert the pinion shaft into the case, past the spacers. Line up the pinion shaft lock hole and install the lock pin or bolt.
12. Install the axle shafts, bearing retainers and backing plates (if applicable). If your assembly uses a thrust block, be sure that the axle shaft end play is set up correctly.
13. Install the tires. They will be needed for testing your assembly once everything is buttoned up. Don't forget to tighten up the lug nuts later on.
14. Proceed to the section below entitled Testing the Locker Assembly.



### ASSEMBLE THE DIFFERENTIAL CASE

1. Perform steps 1 - 10 immediately above under Thin Ring Gear to install the locker into the differential case. It is assumed that the case is bare and on the bench, with the axle gears and thrust washers in place from checking case tolerances.
2. Install the ring gear on the case. Be sure to orient it according to the marks made previously, and tighten the bolts as outlined in your shop manual.
3. Proceed to the section immediately below that applies to your differential design.

### INSTALL THE DIFFERENTIAL CASE—INTEGRAL CARRIER

1. The differential case and ring gear assembly is now ready to be installed in the carrier. Using the shims marked and removed previously, install the case into the carrier using the methodology determined from your shop manual and club and internet sources. This will generally involve using a carrier spreader, or pounding it in with a brass mallet. Be sure to locate the bearing races on the correct side, and watch the shims as the bearings enter the seats.
2. Install the bearing caps and torque the bolts or nuts.
3. Install the axle shafts, bearing retainers and backing plates (if applicable).
4. Proceed to the section below entitled Testing the Locker Assembly.

### INSTALL THE DIFFERENTIAL CASE—REMOVABLE CARRIER (THIRD MEMBER)

1. This section assumes that your assembly uses bearing adjusters to set backlash and pre-load and that these parts were marked and removed as described above under Removable Carrier (Third Member). If your unit is of another design, consult your shop manual for the procedure used to install the differential case into the carrier.
2. The differential case and ring gear assembly is now ready to be installed in the carrier. Place the marked bearing races on the correct sides.
3. Set the case and bearing race assembly into the bearing seats in the carrier.
4. Place the marked adjusters into the threads on the correct sides.
5. Install the marked caps and the bolts. Snug the bolts down but do not tighten them yet so that the adjusters will still rotate.
6. Rotate the left (ring gear side) adjuster inward until it stops and the ring and pinion backlash is zero (the ring gear is lightly jammed into the pinion).
7. Back off the left adjuster until it reaches the position marked previously. This is now the exact orientation where it was located originally.
8. Rotate the right adjuster inward. It will become difficult as the correct pre-load is approached. Continue turning until it reaches its marked orientation.
9. Tighten the bearing cap bolts to the torque specs defined in your shop manual. If you re-positioned everything to the marks made during disassembly, the R&P backlash and bearing pre-load should be exactly the same as before the installation began. To do a rough check, rock the ring gear back and forth. It should have the same "feel" as before—about .008 or so. If not, don't despair—just set them up again using the shop manual procedures.

NOTE: You may need a diff shop to do it, because the backlash and pre-load are especially important and need specialized knowledge. However, at this point it's not quite as bad as starting from scratch because the pinion depth is already correct.

10. Install the third member into the vehicle. Use a carrier gasket and RTV as needed, and tighten the nuts per your shop manual.
11. Install the axle shafts, bearing retainers and backing plates (if applicable).
12. Fasten the drive shaft to the yoke.
13. Install the tires. They will be needed for testing your assembly once everything is buttoned up. Don't forget to tighten up the lug nuts later on.
14. Proceed to the above entitled Measuring the Center Gap, and then to the section below entitled Testing the Locker Assembly.

## TESTING THE LOCKER ASSEMBLY

This section assumes that your new Aussie Locker has been installed and that the complete differential assembly is now in the vehicle with the tires installed.

1. Put the transmission in gear and the transfer case in 4WD to lock the drive shaft. **Tires must be installed to complete this test.**
2. Rotate one of the tires until it stops against the locked drive shaft. Hold it in position and maintain moderate pressure.
3. Rotate the other tire in the opposite direction. It should unlock and spin, with the locker clicking as the tire rotates. Note that this sound will be less with the cover on and gear oil inside.
4. Rotate the first tire in the opposite direction until it stops, and again maintain pressure.
5. Rotate the second tire in the opposite direction from the first time. It should again unlock and spin with the clicking sound.
6. 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. If your installation passes this "spin" test, you are ready to finish up.

## COMPLETING YOUR ASSEMBLY

1. Install the cover, using RTV and/or a gasket as required.
2. Add gear oil to the proper level.
3. Check to be sure that the backing plates and retainers (if applicable) and brake lines have been installed and tightened correctly. If you have pinched off the brake lines, be sure to release them.
4. Leave the vehicle in gear, and apply the emergency brake. Remove the jack stands and front wheel blocks.

## TESTING YOUR VEHICLE

1. After your installation is complete and tested as described above, it's time to take your vehicle for a spin. 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 for the first few miles. Remember that your new locker-equipped vehicle will now climb walls but that it also has some different handling characteristics. Take turns slowly at first. Remember that if you power around a turn that the inside (powered) wheel will spin up more easily than before because weight is transferring off it as the vehicle leans outward.
3. Drive it around town for a while, and then take it off road on a level surface to get a feel for how it behaves in dirt. Be careful, and have fun!
4. There is a break-in period for your locker of about 600 miles. In a very few instances you may notice some noise other than clicking while turning during this time. If you have installed your locker per these instructions, there is no need to be concerned about these additional sounds.



## NOTES

1. The Aussie Locker is slightly larger, and therefore, stronger, than some other units on the market today. In a very few instances we have seen flashing on the differential case in the area of 2mm that might be evident when you install the second came gear. A round file should be used to remove this flashing. Be sure to remove any file shavings from the grease and diff.
2. In some Toyota differentials it may be necessary to file down casting flashing and case irregularities prior to fitting parts.
3. Some Ford Dana 44 front installations may require minor grinding in the case to ensure a proper fit.
4. You can contact us at:  
engineering@aussielocker.com

### "Aussie Locker" TWO YEAR LIMITED WARRANTY

Manufacturer warrants each new Aussie Locker™ to be free from defects in material and workmanship under normal use and service following the date of purchase of the part. 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. 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. In order to obtain a return authorization code, please contact customerservice@aussielocker.com.

#### Notes:

**This warranty expressly in lieu of all other warranties expressed 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 Aussie 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 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 and/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 three (3) 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.



## Aussie Locker X D-13527 & XD-13530 Installation Supplement

### Dana 35 Models

While the installation is generally described in the manual that is included in the package, there may be some question on the sequence of parts installation in these particular models. To install your Aussie Locker in these differentials, perform the following steps in this order

Due to the overall bigger size of the Aussie Locker compared to others and due to Casting differences of the Dana 35 differential cases, it may be necessary to grind/clearance your carrier during install. Also due to the size of the locker you will not be able to rotate the Cam gears of the locker inside of the case during the installation. Go to [www.TorqMasters.com](http://www.TorqMasters.com) 'Manuals' Tab and click "Clearancing The Carrier" for more information.

1. With the case empty and still installed in vehicle, test fit the locker to find out if you will have any clearance issues. Install the axle gears and thrust washers (make sure they rotate freely), install the ring gear side cam gear (without the pins installed) then rotate cam gear until it lines up with the cross shaft hole ( if the cam will not rotate when engaged with the axle gear pull the cam gear towards the center of the carrier then rotate). Install remaining cam gear if possible and rotate until aligned with cross shaft holes. If the locker will not fit proceed to step #2. If the locker fits and rotates proceed to step #5.
2. Since it was determined that the differential carrier needs more clearance we recommend the carrier be removed from the vehicle to prevent metal shavings from contaminating the housing. (Consult your service manual for removal, making sure you mark which side your shims and bearing races came from). You may elect not to remove the carrier from the vehicle. In this case, put a solvent soaked rag inside to catch any metal filings and do a final rinse with solvent.
3. While sitting on a bench, install the locker again and mark the case where it needs to be clearanced. In most cases only a small amount of material should need to be removed—usually just smoothing down the casting is enough. Also the clearancing only needs to be done on the right ½ of the case, just enough to slide the cam gear in.
4. After clearancing the carrier, thoroughly clean and remove the metal shavings. Test fit the locker again. If all is well you can check your cross-shaft to spacer gap (Reference the installation manual "Checking case Tolerances").
5. Reinstall the case into vehicle ensuring that the shims and bearing races are located on the correct sides. Install the bearing caps, apply lock-tite to bolts and torque them to the manufacturer's specs.
6. Apply grease to the axle gears (Do not use excessive grease as this can prevent parts rotation during the spin test at the end of the installation). Install the thrust washers on the axle gears and install axle gears into case. Slide driver's side axle shaft through the axle gear, install the "C" clip, and snap back the axle (Reference the installation manual for additional "C" clip installation tips).



7. Apply grease to the cam gears and spacers. Install the spacers into the cam gears. In this application the pins will be installed after the cam gears are installed into the case. Install the ring gear side cam gear and spacer (open end of spacer covers "C" clip and axle shaft). Hold the cam gear away from the ring gear towards the center of the carrier and rotate until cross shaft holes line up (The Flats of the Cam gear will be visible). Push cam gear back towards ring gear and align teeth with axle gear.
8. Install the remaining cam gear. Rotate the cam gear to align it with the cross shaft holes (Be sure the recess in the cam gear for the "C" clip installation is facing you). Push the cam gear as far as possible towards the ring gear (to allow for axle shaft and "C" clip to be installed). Install passenger side axle shaft, looking thru the recess in the cam gear. Line up the end of the axle shaft (where the "C" clip installs) with the recess. Install the "C" clip using a small screwdriver or pick ensure "C" clip is completely seated on axle shaft. Pull the axle shaft out to ensure that the "C" clip is seated. (Reference the installation manual for additional "C" clip installation tips). Notes regarding the insertion of this cam gear – this is a tight fit, there is only a small amount of clearance 0.005-0.010", if excessive grease is used or care is not taken with dirty parts or by sliding the cam gear in an unaligned fashion this clearance may reduce and the cam gear will appear not to be able to slide past the raised section of the axle gear, in this instance squeezing the already installed parts with a screwdriver or similar will ensure the grease is squeezed out from between them and down to a thin film yielding back the necessary space. If your diff has been re-shimmed with thicker thrust washers than normal (0.030"), then it may be necessary to have these ground or replaced with thinner ones.
9. Slide the cam gear and spacer towards passenger side to engage the axle gear. (Reference the installation manual for additional "C" clip installation tips).
10. Install the pins. Apply grease to the pins, line up the cross shaft recess of both cam gears (this will align the pin holes). Install pins into the notched cam gear space with the "Step" of the pin pointing towards the teeth of its respective cam gear. (This allows a location for the springs to seat on later.) Using a pick, slide the pins into the opposing cam gear. Repeat for all four pins. (Reference the installation manual for additional tips).
11. Install the springs. Wedge a screwdriver or equivalent tool between the cam gears to spread them apart and ensure that they are engaging the axle gears. Install a spring by sliding it into the notch and engaging the step on the pin. Then with a small screwdriver compress the spring and push it completely into the notch. Repeat for all four springs. (Reference the installation manual for additional tips).
12. Install the Cross-Shaft Line up both cam gears with the holes in the carrier for the cross shaft. The new Cross shaft is drilled on both ends for either a bolt installation or roll pin installation. Set the bolt or roll pin into each of the holes to determine the best (tighter) fit. Once this is determined install the cross shaft into the carrier (You may need to push apart the spacers if the shaft does not slide completely in). Apply Lock-tite to the threads of the bolt install and torque to manufacturer's specs. (Reference the installation manual for additional tips).
13. Congratulations! You have just installed the Dana 35 Aussie Locker—one of the more difficult installations. You can now proceed to the installation manual section entitled "measuring center gap", then to "testing of the locker assembly."

Aussie lockers are 100% made in the USA.

Please direct any questions to: [info@torqmasters.com](mailto:info@torqmasters.com)

December 11, 2016 Copyright by Torq-Masters Industries Inc.  
Aussie Locker is a trade mark of Torq-Masters Industries Inc.

**RECORD AND SAVE THIS INFORMATION. FAILURE TO DO SO MAY VOID WARRANTY.**

**PLEASE RECORD AND SAVE THE FOLLOWING INFORMATION.**

**WE WILL ASK FOR THIS SHOULD YOU HAVE ANY WARRANTY QUESTIONS.**

PURCHASE DATE \_\_\_\_\_

ORDER NUMBER \_\_\_\_\_

MODEL NUMBER \_\_\_\_\_

VEHICLE MAKE & MODEL \_\_\_\_\_

SHAFT TO AXLE GEAR SPACING 0.007 2.006

INTER CAM GEAR SPACING 0.153

TIRE PRESSURE:

FRONT RIGHT \_\_\_\_\_ LEFT \_\_\_\_\_

REAR RIGHT \_\_\_\_\_ LEFT \_\_\_\_\_

UNLOCK TEST PERFORMED:

FRONT RIGHT ☐ LEFT ☐

REAR RIGHT ☐ LEFT ☐

Aussie Locker is a Registered Trademark owned by Torq-Masters Industries, Inc.  
Copyright by Torq-Masters Industries, Inc. All right reserved. May not be reproduced, copied in any  
fashion, in part or whole, or sent electronically without the express written permission of Torq-Masters  
Industries, Inc., 106 Cobblestone Court Dr. #177, Victor, NY 14560.

rev. F