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SPINNING AS ONE

One of the most effective traction aids is a locked diff, but just what's involved in fitting one?

DIY ↘

TOOLS REQUIRED:
Basic hand tools, 1/2in breaker bar, soft face mallet, sealant, thread locking compound, diff oil, wheel bearing grease.

TIME REQUIRED: 8 hours

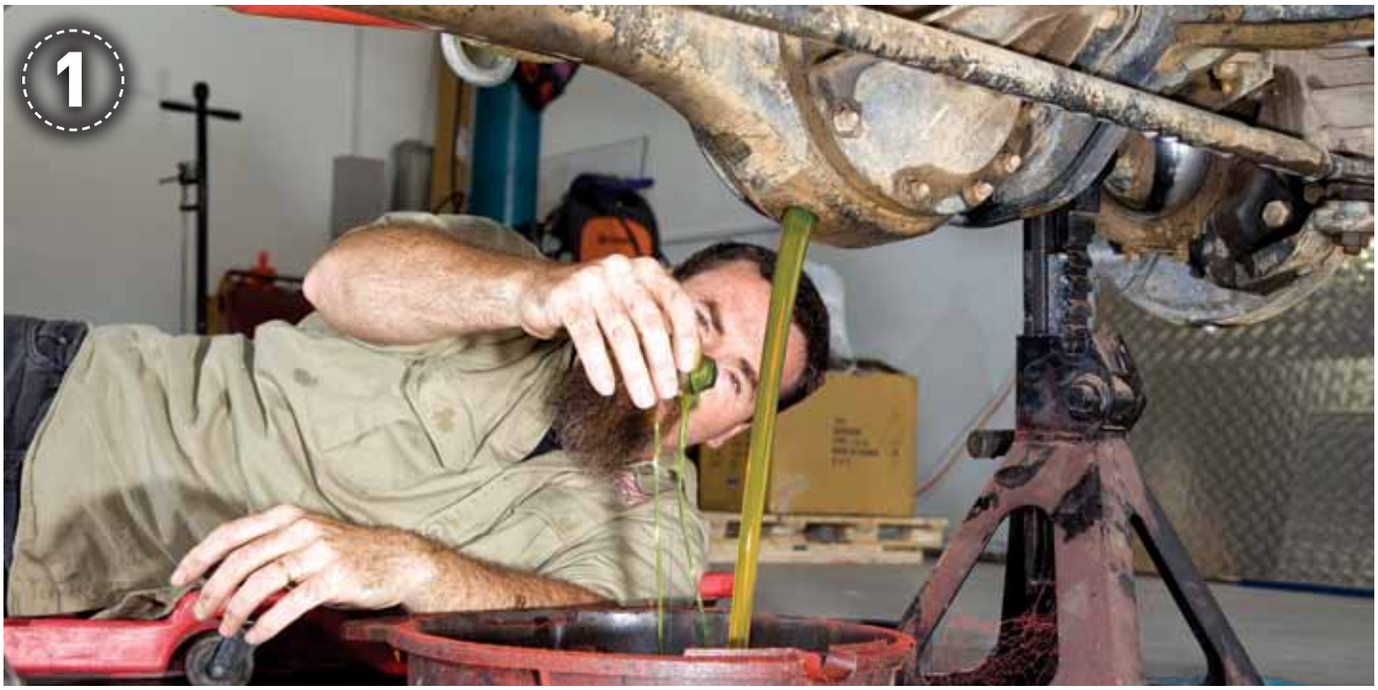
COST: 4WD Systems Lokka RRP $348.00

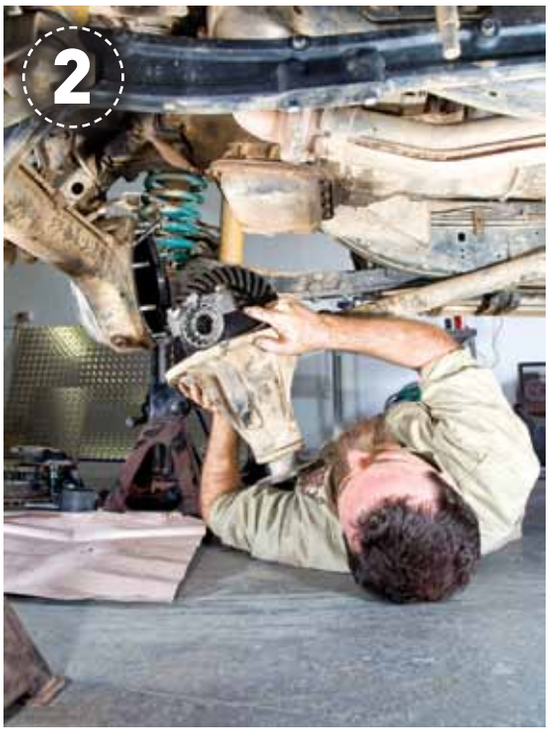
DIY DIFFICULTY

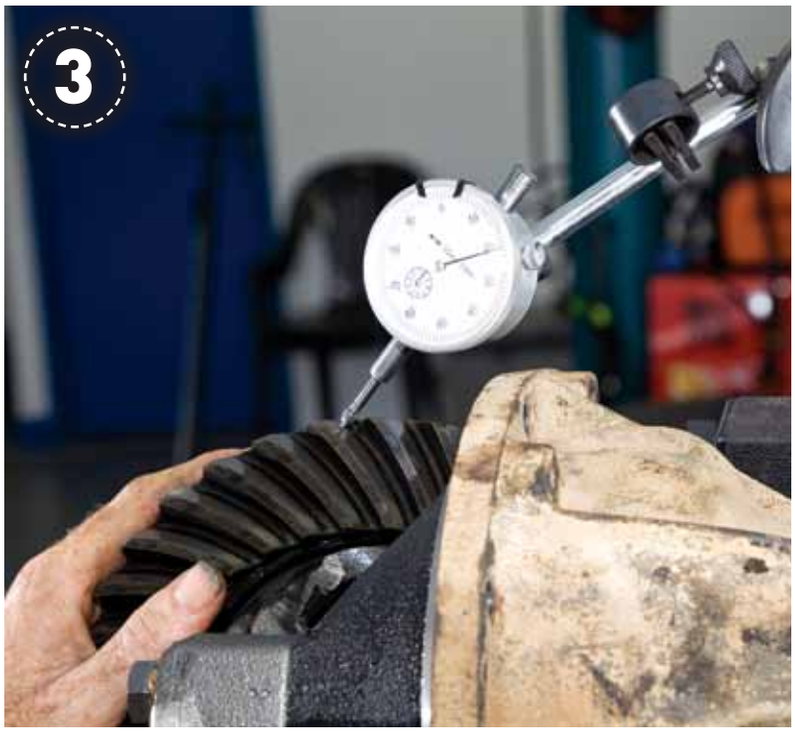
When it comes to choosing that next mod, nothing is debated more than whether or not to fit a locker to your 4WD. Cost aside, the decision becomes even more blurred when you have to decide if just the front, rear or both diffs are to receive the locker treatment. With the potential to transform just about any 4WD into an off-road weapon in a weekend, a diff lock, be it auto or manual can be the most effective modification you can do to your 4WD.

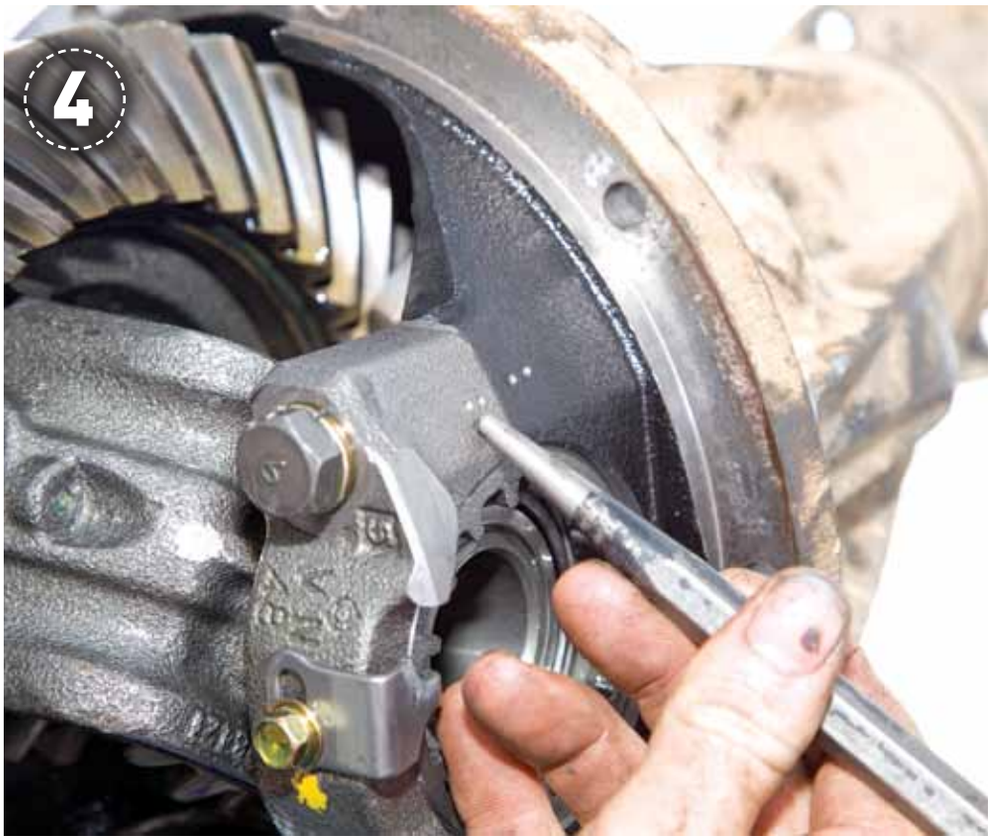
While like most critical mechanical areas on your 4WD, the diff centres need to be treated with respect - both on the tracks and in the garage. When it comes time to tinker with the diffs, there are a few steps that need to be done right or you'll simply be doing things twice!

In this DIY we'll show you a few tricks that will have you armed with the know-how to tackle an auto locker install on your truck. We've chosen to fit a 4WD Systems Lokka to the front of a GU Patrol, which is an auto locking diff centre. The 3.0L GU was already happily wearing a set of 35in Muddies and a 4in lift. Knowing that the reliable Patrol rear LSD was holding its own off-road, we decided it was time to make this GU even more capable and lock the front diff. With a free weekend set aside, we hit the spanners and got stuck into pulling the front end apart. With the right tools, you too can install that auto locking diff that you've always wanted to your 4WD. ■

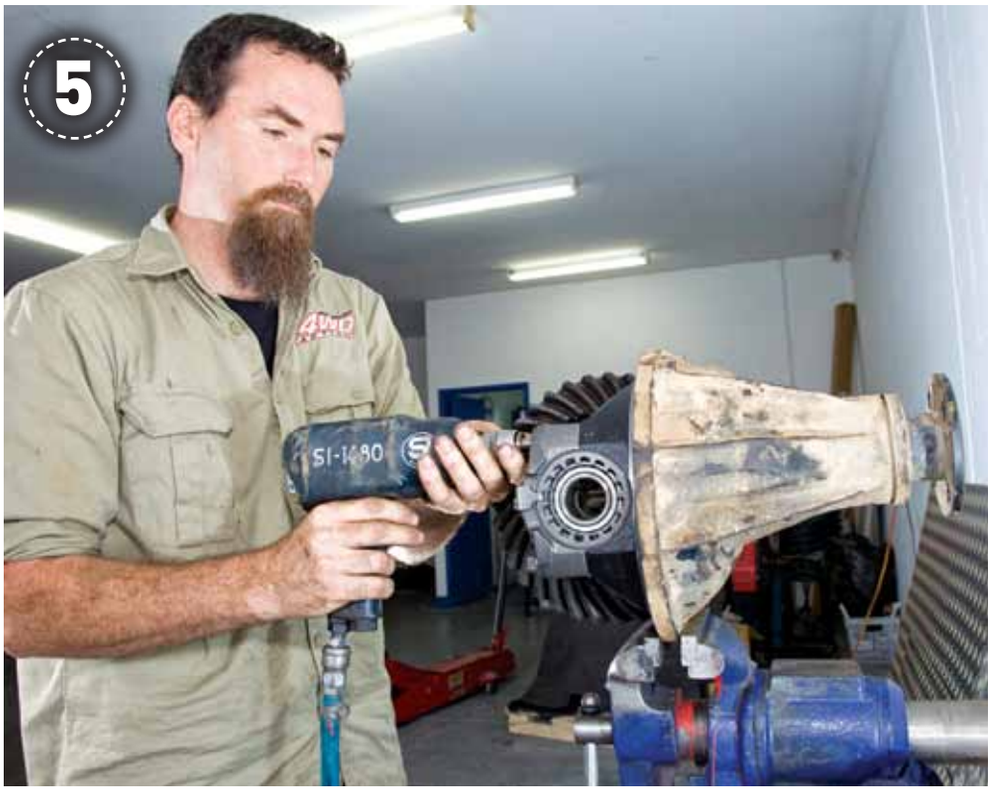








A DIFF LOCK IS ONE OF THE MOST EFFECTIVE MODIFICATIONS YOU CAN DO TO YOUR 4WD



1 First things first, to get to the diff centre, you have to remove the CVs and axles. This involves jacking the front end up, supporting it with stands and removing the front wheels. The front swivel hubs and CVs can be removed as one unit, but its a good opportunity to strip the wheel bearings down if they're due for a service soon and repack them with grease while your on the tools. You'll need to take eachswivel hub assembly apart either way to remove the CVs and axles. Start by draining the diff oil out of the housing and let it continue to drain while, you're working on each hub.
If you need to brush up on your CV and wheel bearing removal skills, check out our sister magazine 4WD Action #173 where the boys did a DIY CV swap

2 You'll then need to drop the front section of the tailshaft out and tie it up against the chassis out of the way. Once the tail shaft is clear, you'll need to undo the diff centre to diff housing retaining bolts. Get yourself positioned comfortably and lift the centre out of the housing and lower it onto the floor. This is where having your Weet-Bix comes in handy, these things are really heavy

3 With the diff centre out we can move it up to a sturdy vice and begin to mark out some reference points before we strip it down completely. Note down exactly how much backlash there is between the crownwheel and pinion gears. This is done using a dial gauge and magnetic base. Grab hold of the pinion flange and rock the crownwheel back and forth. Reading the movement on the dial gauge positioned against a tooth on the crownwheel gear.
Repeat this measurement at four points around the crownwheel approx 90° apart. This backlash measurement should be even in each position and between 0.203mm and 0.406mm

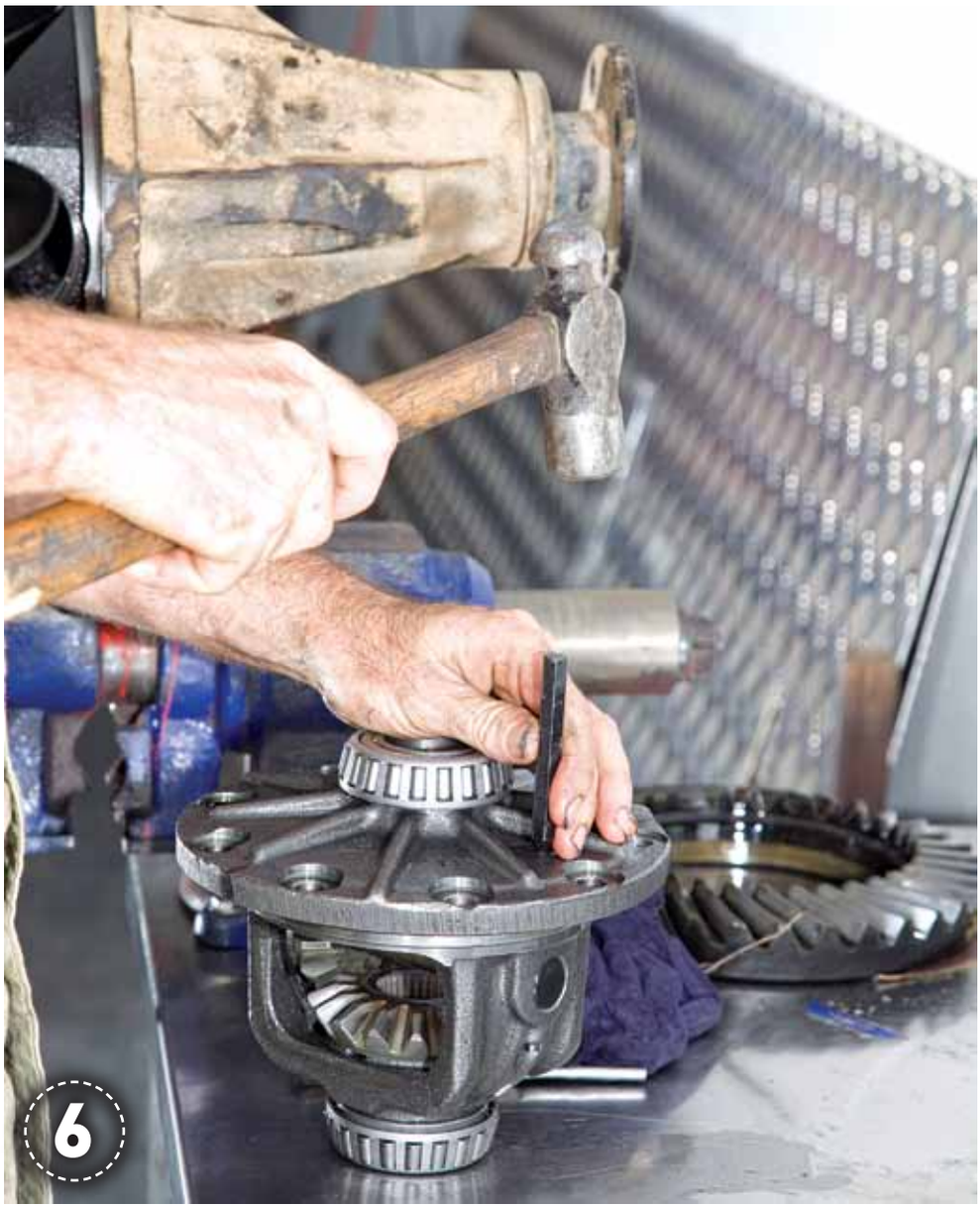
4 When stripping down most mechanical components, it's critical that they are reassembled in the same orientation as they were removed. The best was to ensure this is done is to mark the carrier bearing retainers with a centre punch. Give one mark to each left piece and two marks to each right piece.
Also mark the crownwheel to carrier location on the carrier with a permanent marker or paint pen so it to can be reassembled in the same location

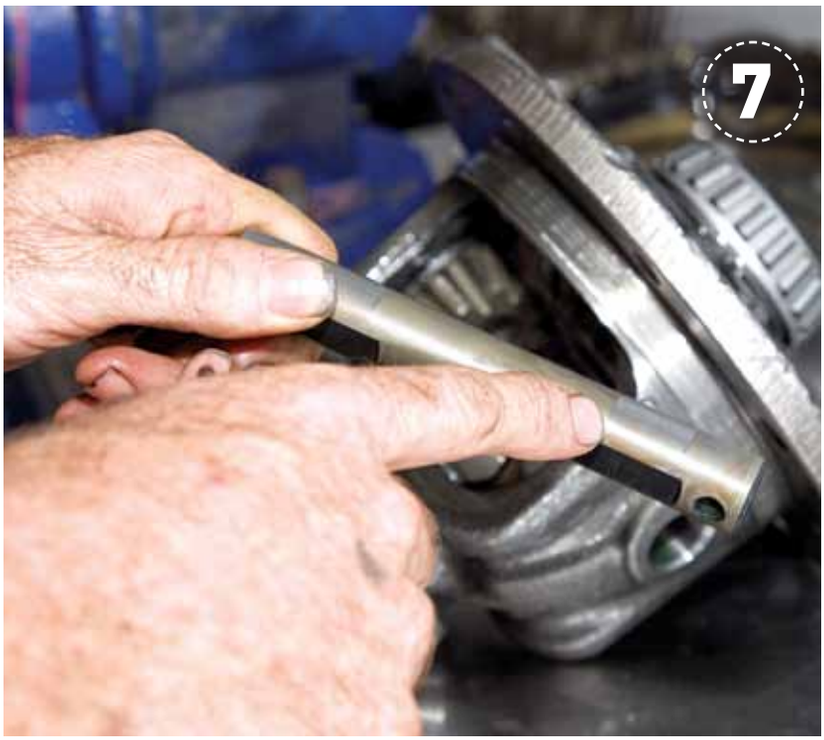
5 Now that everything is marked and measured, undo the carrier bearing retainer bolts and remove each retainer and bolt combination as one unit. At this point be careful to keep the left and right assemblies separate. Its best not to undo the carrier bearing adjustment lock tabs so that the backlash adjustment is kept as it was. Lift the crownwheel and carrier assembly away out of the diff centre and place it on the bench

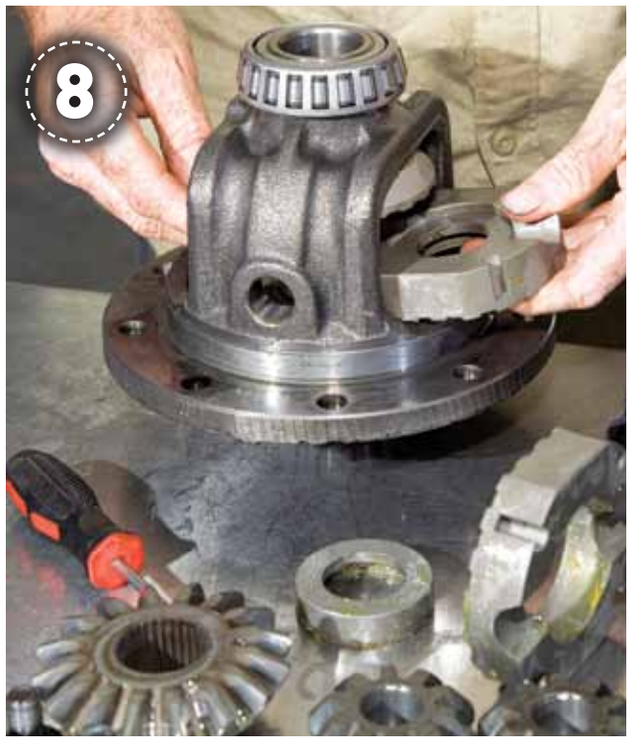
6 Undo the crownwheel bolts and persuade it away from the carrier housing with a soft mallet, setting it aside for later. Next remove the cross shaft roll pin by tapping the pin out with a pin punch and hammer.
Take a good look at the roll pin before you start belting away with the hammer as it only comes out in one direction

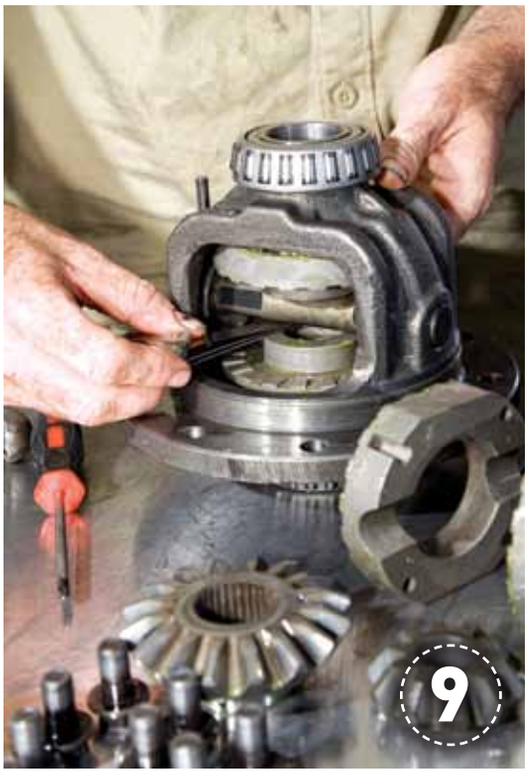
7 Slide the cross shaft out and take a good look over it for signs of wear paying particular attention around where the pinion gears spin. If there is any sign of wear, then replace this shaft as it's essential for the correct operation of the locker.
The trusty instructions state that wear of only 0.05mm is unacceptable. Rotate the side gears until the pinion gears and cup washers can be removed. Take out the remaining gears and remove the thrust washers from the base of the side gears and check their condition to make way for the auto locker components

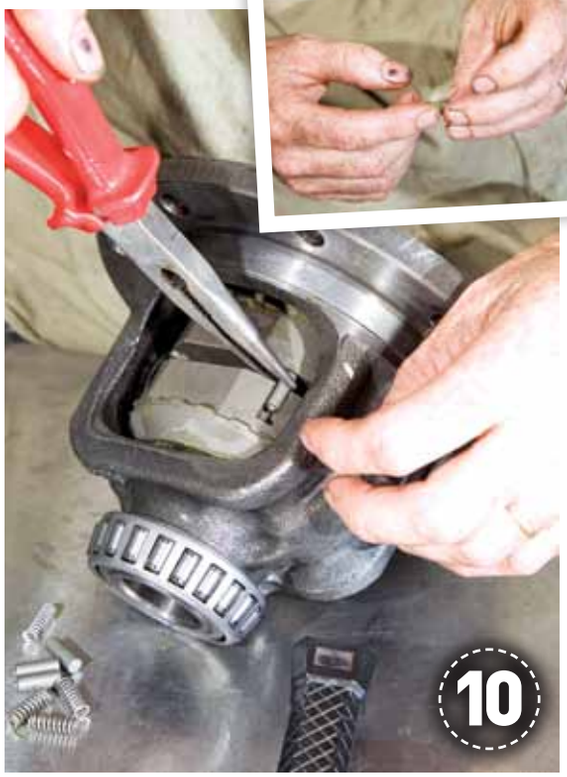
8 Alright so this is where it all starts to take shape. Apply a smear of grease to the base of the axle gear. Grease the locker spacer and fit it to axle gear. Install the locker spacer so that the flat surfaces face towards the cross shaft. Fit the axle gears into the carrier and spin them to make sure they've settled in.
Temporarily push the cross shaft in and measure the gap between the crossshaft and the spacers on both sides with a feeler gauge. It should be between 0.152mm and 0.508mm







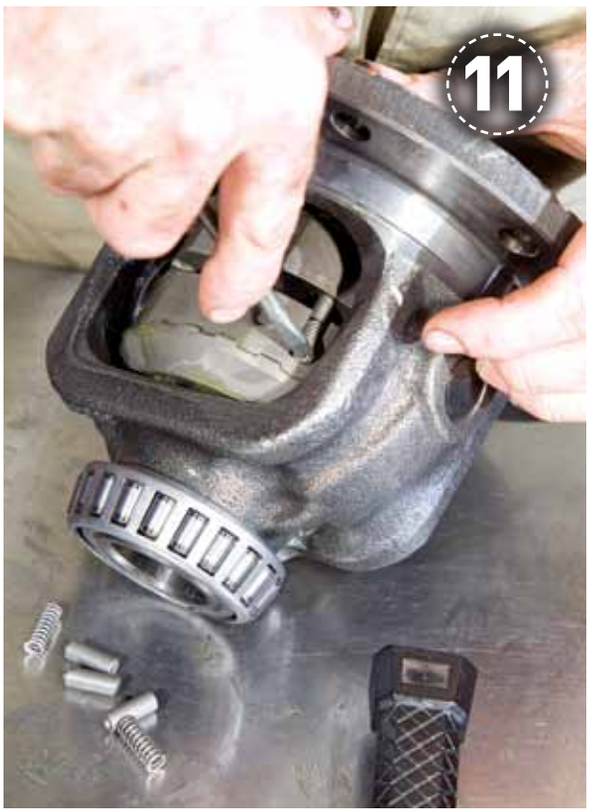


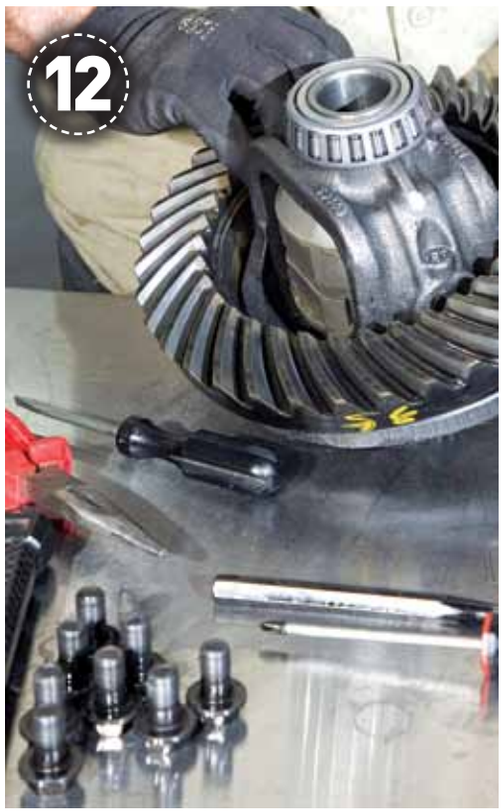


9 Take the cross shaft and spacers out and fit the cam gears in place temporarily to measure the gap between each of the cam gears. This gap should be between 3.683mm and 4.191mm. If the gaps are not within tolerance, then you'll have to replace the thrust washers equally to achieve the correct clearances. The inter-cam gear clearance is the key to optimum locker performance so it has to sit symmetrically around the cross shaft. If the clearances are within spec, then you're good to press-on and assemble the remaining locker components

10 Install the spacers, crossshaft and roll pin for the final time. Apply a smear of grease to the cam gear teeth and the small holes to help the assembly as we go on. The grease will also hold the teeth meshed together and make the next steps a bit easier.
Fit each of the small pins into the slotted holes in each cam gear with the stepped end of the pin toward the base of the slot, there will be two pins for each cam gear. A little smear of grease here will help hold everything in place

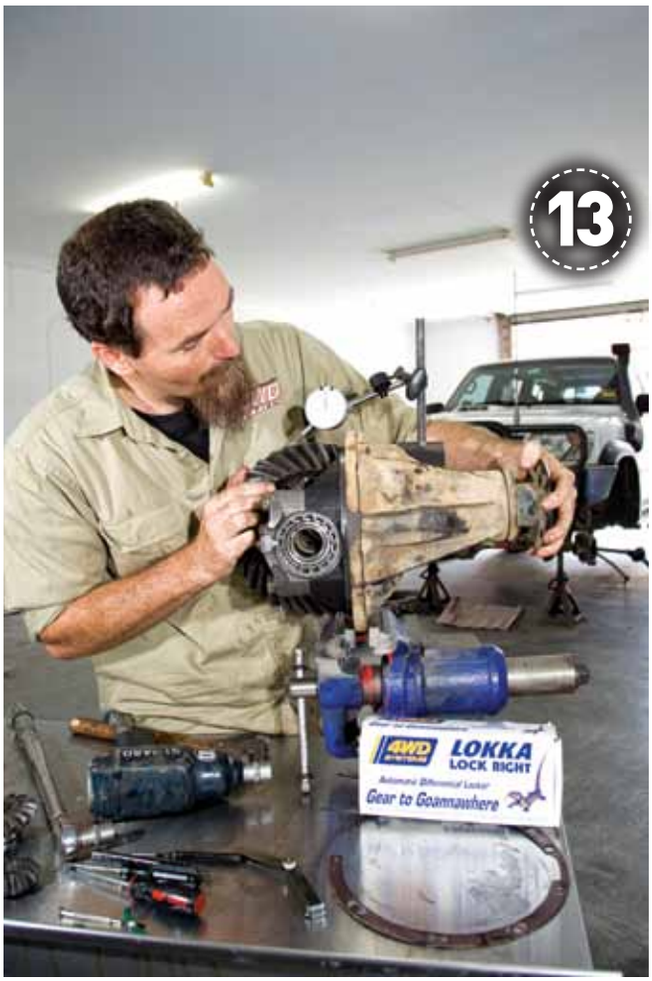
POTENTIAL TO TRANSFORM JUST ABOUT ANY 4WD INTO AN OFF-ROAD WEAPON IN A WEEKEND

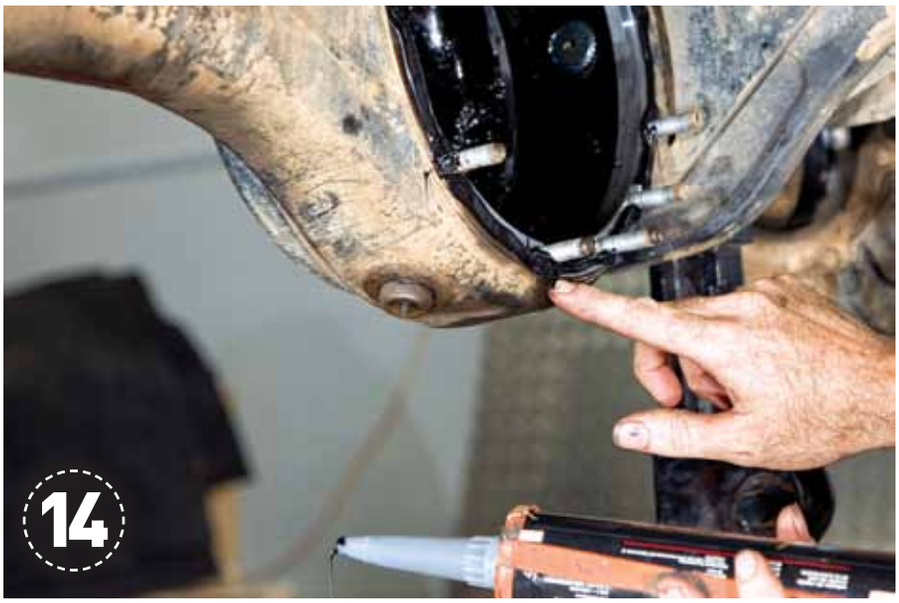




11 To complete the magic auto locking mechanism, feed a spring into each pin slot making sure that the end of each spring sits over the stepped end of the pin. Each spring is designed to keep a small amount of pressure on each pin. When the four spring and pin combinations are fitted, turn the locker assembly so that the gap between the two cam gears can be double checked. It should be within 3.683mm and 4.191mm

12 With the bulk of the auto locker install out of the way, we can start to reassemble the crownwheel and carrier bearing caps. Refit the crownwheel ensuring that you match the orientation with the marks we made earlier. Use thread locking compound on each of the bolts and tighten in sequence. Fit the carrier bearing cups and retainers to the carrier bearings and lift carrier assembly into the diff centre. Take careful note of the marks we made earlier so that everything is installed how it was before we took to the spanners. Carefully align the threaded carrier adjusters into their matching threads on the diff centre and tighten the bearing carrier caps

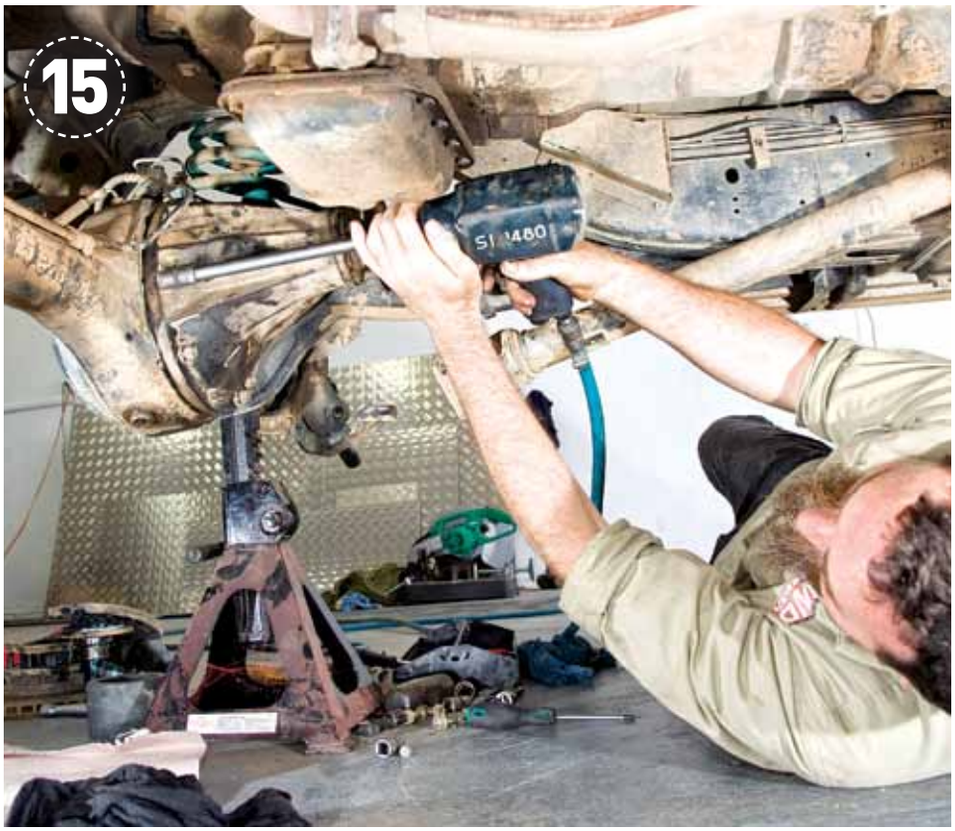




TESTING YOUR AUTO LOCKER

Before you put your new auto locker to the test off-road, it's important that you make sure its functioning exactly how it should be. 4WD Systems state that the following test will indicate a correctly functioning Lokka. Put the transmission into gear so the tailshaft can't rotate.

Hold one side wheel back and rotate the opposite wheel in the forward direction. A slight ticking noise should be heard. Rock the first wheel forward and rotate the second wheel back, again the ticking noise should be heard. Now repeat the procedure on the opposite sides. If the Lokka unlocks in all four situations then it's ready to hit the tracks



13 To ensure we're still on track for a quiet diff, check the crownwheel to pinion backlash as the carrier bearing cap bolts are tightened. Once these bolts are tight the backlash should be the same as before we disassembled the diff if all goes to plan

14 There's nothing worse than having a leaky diff right after, you've put it back in so spend a bit of time cleaning up both mating surfaces before you slot the centre back in. Using a good quality sealant, lay a bead around the circumference of the diff housing opening. It pays to spread the sealant evenly with your finger, particularly around the threaded studs to make sure you've got an even coverage

15 We're on the home stretch now, time to refit the diff centre into the housing and install the tailshaft. Next is to reassemble the front CV's, hubs and wheel bearings in the reverse order that was done to strip them down earlier. Once the front end is completely assembled the most important step is to refill the front diff with oil or else all your hard work will be rapidly undone!

THANKS

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