The AAM 925 axle used on the front of Dodge Ram trucks is a decent unit, but it does have its flaws. This axle lacks lockout hubs on the front so everything is always turning, even if you are not in 4-wheel drive. This leads to increased wear on most of the parts contained within. A common failure is the front pinion seal. The oil seal that goes around the pinion shaft (where the front driveshaft connects) in the axle housing will start to seep fluid. Eventually this seep will become a drip, and the drip will become a running leak. This will result in driving down the highway without any oil in the front axle at all, which will lead to a catastrophic and costly failure.

My front axle started to seep a small amount of oil at about 60k miles. It was only enough to get the differential housing dirty and did not drop the level in the axle. I monitored this leak for a while and just made sure to check the fluid level regularly. At around 100k miles, this seep got worse and started to drip oil (Figure 1.) Up until this point, I had never added any oil to the front differential and the level had only dropped about 1/4 inch in 40k miles of driving. I figured that a drip would decrease the level at a much higher rate and could leave me with a busted axle, so I finally decided to fix it.

The axle seals are sandwiched between the housing and the pinion flange and require the pinion flange to be removed in order to access them. The removal process is straightforward, but the installation is rather unique. Typically, you would re-torque all of the hardware to a specific measurement, but on an AAM axle, you torque the hardware until you create a certain amount of rotational drag on the pinion. This process scares many people away from doing this simple task because it is different, but the process is actually quite easy. In order to measure the rotational torque of the pinion, you need to remove everything from the axle except for the differential. This includes the wheels, brakes, unit bearings, and axle shafts. Some shops change the seal without properly measuring or re-setting the
rotational torque specs, which will lead to premature seal failure and increased bearing/gear wear inside of the axle.

The front axle seal on the AAM 925 is a two-piece design. Half of the seal sits in the axle housing around the pinion shaft, and half of it is on the pinion flange where the driveshaft attaches. The half that is in the housing can be purchased from Dodge. The half that is on the pinion flange cannot be purchased separately and requires a new pinion flange assembly to be purchased. However, you can purchase these seals individually through AAM and re-use your original pinion flange, saving you some funds. You will need a Pinion Seal, Pinion Sleeve, and a new Pinion Nut (Figure 2.)

<table>
<thead>
<tr>
<th>From Dodge</th>
<th>From AAM</th>
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<tbody>
<tr>
<td>05086697AB - Pinion Seal</td>
<td>40017140 - Pinion Seal</td>
</tr>
<tr>
<td>05086696AC - Pinion Flange</td>
<td>26060975 - Pinion Sleeve</td>
</tr>
<tr>
<td>05086704AA - Pinion Nut</td>
<td>9783762 - Pinion Nut</td>
</tr>
<tr>
<td>-or-</td>
<td>74020009 - Pinion Seal Kit</td>
</tr>
<tr>
<td></td>
<td>(Includes Seal, Sleeve, Nut, and a spacer that is not needed)</td>
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Figure 2: New Pinion Seal and Sleeve

Start by parking the truck in a level spot where it does not try to roll. The front axle is going to be disassembled and you do not want it rolling off the jack stands. Disconnect the driveshaft from the front axle by removing the four torx bolts holding it to the flange yoke (Figure 3.) There is no need to remove the driveshaft from the truck completely, so just tie it up against the frame rail out of the way.
With the truck on the ground, break all of the front wheel lug nuts loose on both sides of the truck. Lift the truck and support it with jack stands. Please do not leave the truck supported with the jack. You are going to be working under it, and if it shifts, moves, or falls, you could be seriously injured. Remove all the lug nuts from the front wheels and remove the wheels (Figure 4) from the truck.

On the back side of the brake caliper there are two bolts securing it to the front axle bracket. Remove these two bolts and slide the caliper off of the rotor. You will probably have to hit it a few times with a hammer to get it off. Once the caliper is in your hand, DO NOT allow it to hang from the brake line. You will cause stress damage in the line which could cause the line to fail when you need to utilize the brakes. Place the caliper on a stand of some sort to keep slack in the line. A 5 gallon bucket works perfectly for this (Figure 5.) Once the calipers are secured, remove the rotors and set them out of the way. They might also require a few love taps with a mallet to get free.
According to the service manual, the unit bearings must be removed and the axle shafts have to be pulled out. Unit bearings can sometimes (usually) turn into a major job to get off. I figured that the bearings could not change the rotational torque spec of the pinion that much as long as they are in good condition and the steering is straight, so I opted to leave them installed. If you choose to leave the unit bearings installed, do so at your own risk. The manual calls for them to be removed, but I feel like it is not necessary. If this alteration of the procedure causes my front axle to fail, it will be documented on CarboniteCummins.com for all to see.

Before disassembling anything else, you need to measure and record the rotational torque of the pinion. To do this, you will need a torque wrench capable of measuring around 10 inch lbs, but it cannot be the click-type. A dial torque wrench is best, but you can get by with the cheap bendy style. You can utilize a cheap torque wrench such as the 1/4” drive one I got from the local auto parts store (Figure 6.) It does not matter if it is inaccurate; it just has to be consistently inaccurate.

Attach this torque wrench to your 1 1/16" socket somehow and put it on the pinion nut. Using a slow steady motion, turn the pinion using the torque wrench and record how many inch lbs it takes to turn.
On my cheap wrench, I was at about 22 inch lbs (Figure 7.) Save **YOUR** number (not my number) somewhere because you will need it later.

![Figure 7: Initial Rotational Torque Reading](image1)

Remove the pinion nut from the pinion shaft (Figure 8.) You will need to get creative in finding a way to keep the pinion from turning while trying to remove the nut. I used a pry bar and two driveshaft bolts to hold it, but it did ruin both of the bolts.

![Figure 8: Removing Pinion Nut](image2)

Using a wheel puller, pull the pinion flange (Figure 9) off the pinion shaft. You can rent one of these at just about any local parts store. A few minor taps with a hammer might be required to help to break it free.
With the pinion flange off, you can finally see the axle seals (Figure 10.) The pinion seal will be in the housing, the pinion sleeve will be on the pinion flange. Both of these need to be replaced to properly fix this leak. Before you start changing the seals, be sure to clean any grease and dirt off the area around the seals. You do not want any debris getting into the new seal and damaging it.

Using a chisel or a similar pointy object, tap the lip around the edge of the pinion seal (Figure 11) to dislodge it from the housing. Work your way around until the seal is completely removed from the axle housing. Put a light coat of grease around the outside metal surface of the new seal. Lightly tap the new seal into the housing until it is fully seated all the way around. After it is fully seated, coat the inside rubber portion with grease.
Remove the pinion sleeve from the pinion flange by prying upwards on it with a pry bar against the pinion flange. Clean the pinion flange after the old pinion sleeve has been removed and put a light coat of grease on it. Put a light coat of grease around the inside of the new pinion sleeve and tap it into place on the pinion flange (Figure 12.) Finally, put a light coat of grease around the rubber portion of the pinion sleeve.

Clean the splines on the pinion flange and the pinion shaft with a rag and some type of oil remover. Coat these splines with a small amount of Teflon based thread sealant (Figure 13.) I used Permatex Thread Sealant with PTFT. Do not put an excessive amount of sealant on the splines, only enough to seal them from any possible oil leak. If you over-do it, you will push that excess sealant into the pinion bearings which could cause more issues later.
Reinstall the pinion flange onto the pinion shaft and lightly tap it down into position. Do not hit it hard or you will mess up the torque readings, just move it enough to get the nut started. Install a new pinion nut and start tightening it down until it touches the pinion flange.

Add 3-5 inch lbs to the rotational torque reading you recorded earlier to get the new rotational torque number. If you measured 20 inch lbs earlier, you need to re-torque the nut down to 23-25 inch lbs. My original measurement was 22 inch lbs, so my new measurement will be 25-27 inch lbs.

Using your little cheap torque wrench, measure the rotational torque of the pinion shaft. If your measurement is less than your new required number, tighten the pinion nut down a little more (5 ft lbs at a time) and re-check rotational torque. Repeat this process until the rotational torque is within spec. I got mine up to about 26 Inch lbs (Figure 14,) which is exactly what I was aiming for.

Reinstall the front drive shaft. You can reuse the torx bolts that you removed, or you can replace them with new bolts. I opted to replace all of these bolts with M8-1.25x30 grade 8.8 flange bolts (Figure 15) that I acquired from Fastenal. The flange bolts have the built-in washer under the head and these are a
perfect fit to get rid of the sub-par OEM bolts. Now I do not have to use a torx socket to remove the front drive shaft anymore.

Figure 15: New Flange Bolts in Drive Shaft

Reinstall the brake rotors, the calipers, and the front tires. After everything is back together, check the oil level in your front differential to make sure it is still full. Top off as necessary and take the truck for a drive.