(/)

Differential Information

Many customers call asking tech questions about their vehicles without knowing exactly what configuration they have on their Toyota's. Here's a brief rundown of all the factory configurations that you need to know about your vehicle.

Toyota 4x4 history/definition of terms (for North America):

- '79-85 pickups and 4Runners had front live-axle, leaf-spring suspensions.
- '86-95 4Runners, '86-95.5 mini-trucks, and '93-'98 T100's have torsion bar Independent Front Suspensions (IFS).
- '96-up 4Runners, '95.5-up Tacoma's, and 2000-up Tundra's, Sequoia's and FJ Cruiser's have coil-sprung IFS.
- "First genereation" 4Runners are '84-89, 2nd gen are '90-95, 3rd gen are '96-03, and 4th gen are '03-up.
- "Mini-trucks" are Toyota pickups prior to the '95.5 model year change to the "Tacoma."
- The "mini-trucks" are also known as the "Hilux" in other parts of the world.

What's my gear ratio?

If you think your axle gearing has not been changed since it left the factory, you can read and decipher the "axle code" from your vehicle information plate (VIN). If your differential has been removed so that you can see and count the teeth on the gears, you can divide the number of teeth on the ring gear by the number of teeth on the pinion gear to come up with the gear ratio. For example, 41/10 gives you a 4.10:1 gear ratio (the most common stock ratio). To verify gear ratios w/ the diffs on the vehicle, there is the "spin and count" method.

"Open" Differentials:

Block the tires at one end of the vehicle to keep it from rolling, and then jack up a tire on the other end. Place the transmission in neutral and release the parking brake if you are checking the rear diff. Spin the tire exactly TWO full revolutions while at the

same time counting exactly how many revolutions the driveshaft spins (marking the driveshaft and tires beforehand will make it easier to count revolutions). The number of revolutions the driveshaft spins is your gear ratio. If it spins just over 4 times, then the ratio is probably 4.10; 4-1/3 = 4.30; 4-1/2 = 4.56; just under 5 = 4.88; 5-1/3 = 5.29, etc.

Limited slip (LSD or "Posi"), Locking Differentials:

With these types of diffs, you won't be able to turn one tire w/o the tire on the opposite side of the axle turning with it. In this case, follow the directions above except raise both tires off the ground and turn them exactly ONE full revolution while counting driveshaft revolutions. Again, the number of driveshaft revolutions is your gear ratio as mentioned above.

Toyota Axle Widths:

- '79-85 front axle~ 55.5", rear axle- 55"
- '86-95 front IFS~ 59", rear axle- 58.5"
- Tacoma 4x4, rear axle- 60"
- T100 front IFS~ 65", rear axle~ 66.75"
- '90-97 Landcruiser FJ-80/FZJ-80 front axle- 63.5"

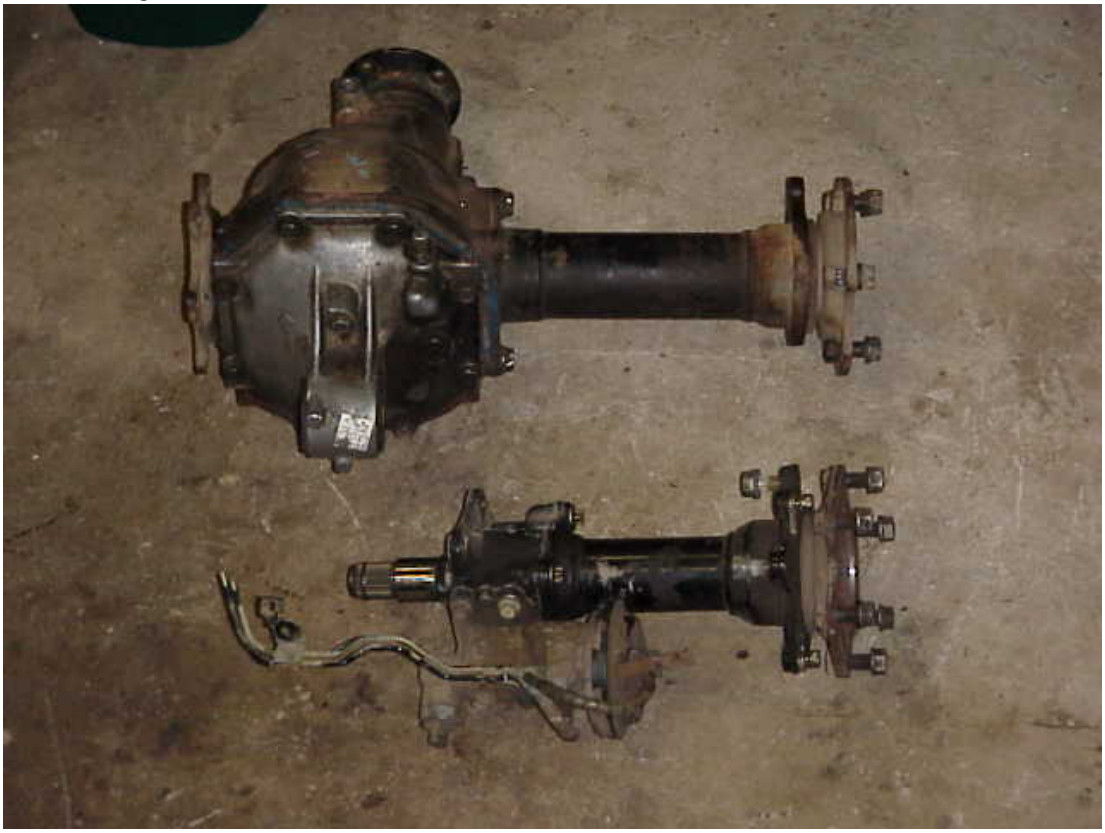
NOTE: All widths are measured wms-wms, wms=wheel mounting surface. 2wd 4runners, Tacoma PreRunners, T100's, and Tundra's use 6-lug wheels- same as the 4x4's (the other 2wd's use 5-lug).

Front Differentials:

4cyl 8" Differential: '79-85 Trucks and 4Runners all have 4-cylinder engines and use what most call the 4cyl 8" diff in the front (the same one they use in the rear). **See Pic Below**.

7.5" IFS Differential: '86-95 IFS trucks and 4Runners, and all '93-98 T100s use a 7.5" front diff that is offset to the passenger's side. Later models came with ADD (Automatic Differential Disconnect) which uses a vacuum actuated mechanism to disconnect the drivers side axle shaft from the differential. Carriers and gear sets are interchangeable between the two different versions (and also happen to be the same as used in the 2wd Toyota pickup 7.5" diffs). One difference between ADD and non-ADD diffs is that the carrier in an ADD differential has needle bearings supporting the axle shafts at the differential. The non-ADD diffs did not have this bearing and sometimes the passenger side axle flange wears the carrier and becomes loose or wobbly, eventually causing oil leaks, noise, and possible spider gear damage. ADD and non-ADD diffs are swappable as are most of their parts. This makes it possible to change your ADD diff to non-ADD by simply swapping parts as I've done in the picture to the right. This is desirable to some people since some of the ADD stubs are smaller diameter than the non-ADD stubs and are therefore slightly weaker. **See Pic Below**.

- Passenger's side
- Low pinion
- 27 spline axles
- This diff is based on the 2wd pickup 7.5" rear diff- same internals, different housing.



Late-model 7.5" Differential: '95-03 Tacoma, '00-04 Tundra and 96-02 4Runners have a high-pinion 7.5" IFS front diff offset to the drivers side. The high-pinion design is used so that the rack and pinion steering and anti-sway bar on these vehicles can run under the front driveshaft. The housing is a unique bolt-together design. The carrier inside is exactly the same as the '86-95 IFS diffs, so LSD's and lockers for it are also the same. However, since this is a high-pinion diff, the gears for it are different

(reverse-cut) than the earlier diff. There is an ADD and non-ADD version of this diff as well. These diffs use different gear sets than the earlier IFS diff because of the high-pinion design.**See Pic Below**.

- Driver's side
- High pinion
- 27 spline axles
- Bolt-together "clamshell" housing design

8" IFS Differential: '03+ 4runner, '04+ Tacoma, FJ Cruiser, '05-07 Tundra: 8" IFS diff.

- Driver's side
- Mid-pinion
- Clamshell housing
- 30 spline axles
- Carrier break: 3.91 and up, 3.73 and down

Hi-pinion 8" Differential: '90-97 Landcruiser (FJ-80 and FZJ-80) uses a high pinion, reverse-cut front diff based on the V6/Turbo rear diff. The high pinion design allows the steering on these vehicles to run behind the axle and under the driveshaft. Carriers (i.e. lockers, LSD's) from the 8" V6/Turbo diffs can be installed (direct bolt-in)

in the hi-pinion diff. The entire diff is also a direct bolt-in to all front and rear axles that use an 8" diff. This diff is desirable to some straight-axle mini-truck and 4runner owners for a couple of reasons. First, the reverse-cut design of the gears is stronger than simply using a rear diff and gears up front as the factory did since its not using the weaker "coast" side of the gears when driving forward. For this reason, this diff is generally only used in the front axle. Second, the hi-pinion design gives very good ground clearance for the pinion and driveshaft as well as improves driveshaft operating angles. In North America, almost all of these diffs came from the factory with 4.10 gears. Aftermarket gears for this diff are more expensive than most since they are either imported or custom made in limited quantities. At this time 4.88 and 5.29 are the only aftermarket ratios available. **See Pic Below**.

Rear Differentials:

8" Diff Housing (3rd member) Identification: 4cyl has 3 ribs on each side. V6/Turbo has 4 ribs on each side and the trapezoid shaped top rib. T100/Tundra/Tacoma diff has the characteristic bearing truss.
NOTE: Starting around '96, the V6 diffs started using a casting that looks nearly the same as the T100/Tundra casting from the outside. However, it doesn't have the trussed bearing cap on the inside, and the outside uses the smaller 8mm mounting studs. **See Pic Below**.

Axle Housing Identification: 4cyl/V6/E-locker has a dome-shaped cover. Diff uses 8mm studs with 12mm nuts. T100/Tundra/non-TRD Tacoma has deeper, blocky cover to accomodate the bearing truss. Diff uses 10mm studs with 14mm nuts. **See Pic Below**.

4cyl 8" Differential: All pre-'95 4-cylinder 4wd mini-trucks & 4Runners use the Toyota 8" 2-pinion differential front and rear (except turbo models). This is known as the "4cyl diff." This diff is by far the most common diff in older Toyotas. **See Pic Below**

- Ten 10mm ring gear bolts
- 27 spline pinion
- 2-pinion carrier (case)
- V6 carriers can be used in this diff if the correct bearings are used
- 4cyl diffs are swappable with the V6 and high pinion diffs.

V6/Turbo 8" Differential: '86-95 4cyl Turbo and V6* trucks and 4runners, and ALL '96+ 4Runners use the Toyota 8" 4-pinion differential in the rear. This diff is known as the "V6/Turbo diff." **See Pic Below**

- Stronger housing than the 4cyl diff
- Larger carrier bearings than the 4cyl diff
- 30 spline axles
- 27 spline pinion (pre-'96)
- Ten 10mm ring gear bolts
- 8mm axle housing studs with 12mm nuts
- 4-pinion carrier (case)
- 4cyl 8" diff carriers (cases) do not fit without custom carrier bearing adapters ($), try Inchworm Gear
- A few pre-'96 V6 trucks and 4runners have been found to have come with the 4cyl style diff from the factory. Nobody knows why.

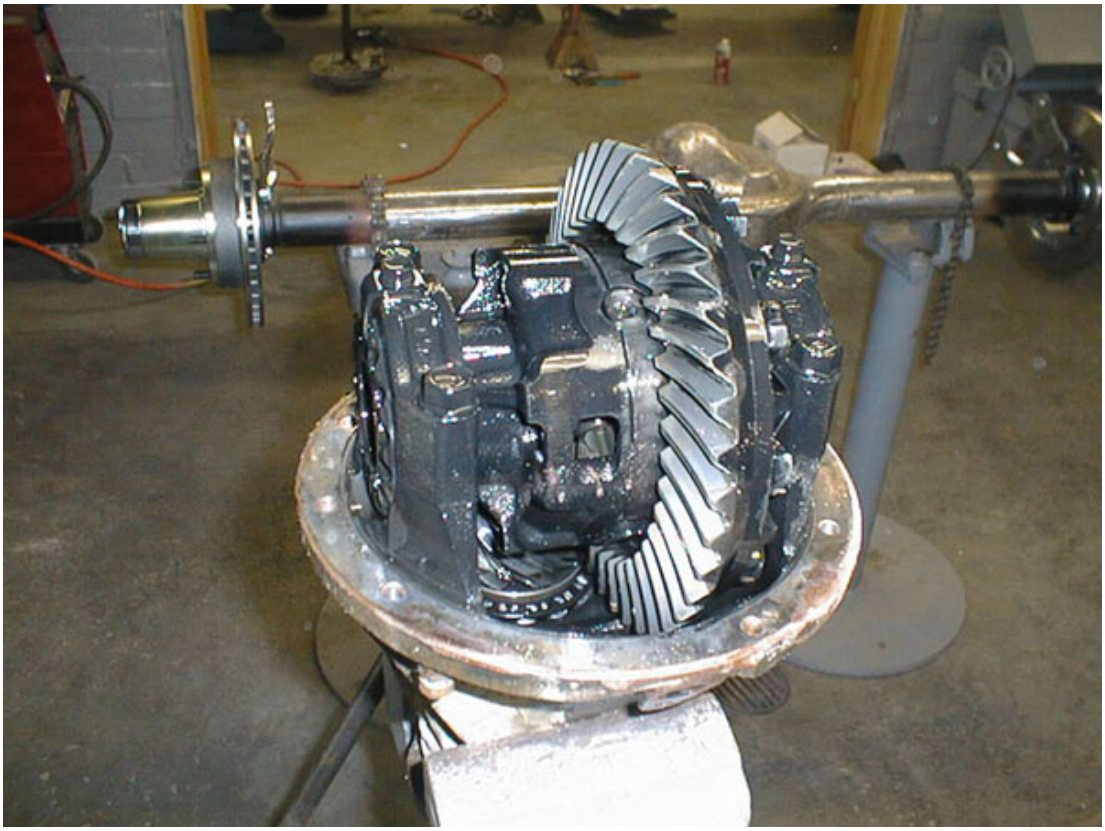
'96-up 4runner V6 diffs:

- New improved housing that looks the same as the T100/Tundra/Tacoma diff on the outside, internals are all the same as the regular V6 diff
- 30 spline pinion on OEM gears, swap pinion flange to 27 spline to use aftermarket gears

The FACTORY 4.88 V6 diff is unique!

- Axle code G144, white pinion paint code
- Generally came in 92-95 trucks/4runners with V6, auto tranny, 31" tires, and tow package.
- Housing offsets pinion towards ring gear, allowing ring gear to be thinner
- OEM Toyota gears are the ONLY gears that fit this diff due to the thinner ring gear. All other gear sets have thicker ring gears and do not fit.
- The carrier (case) is the same as the V6 diffs, so normal V6 lockers, LSD's, etc. will work in this diff

NOTE: V6 diffs are swappable with 4cyl and high pinion diffs.



T100/Tundra/Tacoma diff: All 2wd and 4wd T100's, '00-06 Tundra's, and ?? Sequoia's use a newer/stronger 8" 2-pinion diff. Tacoma 4x4's and Tacoma PreRunner's that don't come with the electric locker (aka "non-TRD), as well as V6 Tacoma 4x2's also came with this diff. This diff commonly and mistakenly called an 8.4" or 8.25" diff, possibly to imply its extra strength. The ring gear actually measures 8". The extra strength of this diff comes from the bearing cap/truss and large diameter pinion gear shaft. LSD's available is the TRD/Kazuma clutch-type 3-pinion LSD, the OEM 4-pinion Tundra TRD LSD, and the Detroit Trutrac. Lockers available are the Powertrax "Lock-right," "No-Slip," ARB Air Locker, Detroit Softlocker. This diff cannot be fitted to an older style 8" axle because it uses a larger diameter mounting bolt pattern and because more space inside the housing necessary to accommodate the large bearing cap. The different bolt pattern also makes it very impractical to swap in an electric locking Toyota diff (the whole mounting flange would have to be re-done using a special jig) **See Pic Below**.

- Carrier bearing truss and newer housing adds significant strength over V6 and 4cyl diffs
- Uses V6 carrier bearings, larger pinion bearings
- Uses shims for backlash adjustment instead of threaded adjusters
- Twelve 12mm Ring gear bolts
- 10mm axle housing studs with 14mm nuts
- 30 spline axles
- 30 spline pinion

NOTE: 4Runners do NOT use this diff at all. Late-model 4Runners still use the V6 8" diff above. This diff is NOT swappable with V6, 4cyl, high-pinion, or electric locking diffs. This diff cannot be fitted to an older style 8" axle because it uses a larger diameter mounting bolt pattern and because more space inside the housing necessary to accommodate the large bearing cap.

'07+ Tundra 5.4L V8, 10.5": The massive 10.5-inch Tundra rear ring gear, comparable to a 14-bolt or Dana 70. The big axles were offered with both 4.10 and 4.30 ring-and-pinions. Since most are found with the tow package, the majority will be 4.30:1. The

smaller 9.5-inch diff is available with 4.10 and 3.90 gears, again the lower with the tow package. We like that this low-pinion axle is not extremely low like a 14-bolt or a Ford 9-inch. This results in a higher rear driveshaft, less heat created by the gear engagement, but slightly less pinion-to-ring-gear-teeth engagement due to less hypoid drop. **See Pic Below**.

Toyota Electric-Locking Differentials

Electric Locker: A factory option on 3rd Gen. 4Runners, Tacoma 4x4's, and Tacoma PreRunner 4x2's is an electric locking rear differential. This diff is a 4-pinon design based on the Turbo/V6 8" diff and uses the same gear sets and bearings (except for the large bearing near the locking mechanism). These locking diffs can be retrofitted into 8" diff axles if the axle housing is modified. It cannot be easily retrofitted into a T100/Tundra or open-diff Tacoma style axle housing because the mounting bolt pattern is smaller. It "could" be done by an axle builder by doing major work to the mounting flange, but that is not really a practical option. **See Pic Below**.

NOTE: 30 spline pinion on OEM gears, swap pinion flange to 27 spline to use aftermarket gears.

Hi-pinion Electric Locker: A factory option on '93-97 Landcruiser FZJ-80's is a hi-pinion electric locking front differential. It can be installed into modified 8" axle housings, similar to the 4Runner/Tacoma locker mentioned above. The reverse-cut gear sets for this diff are the same as for the standard hi-pinion diff mentioned earlier. These vehicles also had an optional 8.875" REAR electric locker. This one has been retrofitted into other Landcruiser models with considerable effort, but it doesn't appear to be compatible with any non-Landcruiser vehicles. **See Pic Below**.

Tacoma Differential Codes

First Digit:

- A = 7.5" ring gear
- B = 8" ring gear

Next two digits:

- 01 = 3:42
- 02 = 3:58
- 03 = 4:10
- 04 = 4:56
- 05 = 3:15
- 06 = 3:91

Last digit:

- A = 2 Pinion, Open
- B = 4 Pinion, Open
- C = 2 Pinion OEM Limited Slip

Using the above codes would result in the following axle codes:

- B01A 3.42 2 pinion open 7.5" ring gear
- B01B 3.42 4 pinion open 8" ring gear
- B01C 3.42 2 pinion posi (OEM limited slip)

- B02A 3.58 2 pinion open 7.5" ring gear
- B02B 3.58 4 pinion open 8" ring gear
- B02C 3.58 2 pinion posi

- BO3A 4.10 2 pinion open 7.5" ring gear
- BO3B 4.10 4 pinion open 8" ring gear
- BO3C 4.10 2 pinion posi

- B04A 4.56 2 pinion open 7.5" ring gear
- B04B 4.56 4 pinion open 8" ring gear
- B04C 4.56 2 pinion posi

- B05A 3.15 2 pinion open 7.5" ring gear
- B05B 3.15 4 pinion open 8" ring gear
- B05C 3.15 2 pinion posi

- B06A 3.91 2 pinion open 7.5" ring gear
- B06B 3.91 4 pinion open 8" ring gear
- B06C 3.91 2 pinion posi

Search

Categories

Select Category

[Store](https://www.lceperformance.com/) [E-Catalog](http://online.fliphtml5.com/ddnv/tzuk/#p=1) [Tech](https://www.lcengineering.com/tech/) [Instructions](https://www.lcengineering.com/instructions/) [About Us](https://lcengineering.com/about-us/) [Contact](https://www.lcengineering.com/contact-us/)