

## AW4/A340 Tech

In this document I will try to cover the features, oddities and general info as well as address common questions.

Some of the information is repeated as it comes from several sources.

The Aisin Warner A series (AW4, A340, 30-40LE, 30-43LE) 4spd automatic transmission has electric solenoid shift control as well as still having hydraulic control which changes as you move the floor shifter positions. It was used by Jeep, Toyota, Lexus, Volvo, Suzuki, GM and .....

The transmission is a 4spd automatic with 3 electrically controlled solenoids for shifting and torque converter(TC) lock up, there is also a throttle valve(TV) cable that controls internal pressures. Two of the solenoids control the 1<sup>st</sup> thru 4<sup>th</sup> gear shifting while the third is only for TC lock up. There is still a need for a mechanical shifter, and the shifter has 6 gear positions, P-R-N-OD-3-L, P-R-N-OD-D-1/2. The numbering on the shifter depends on which brand of this transmission you have but function is still the same. The inconvenience of having a 4sp auto with only 3 forward gear selections of the shifter can create issues when used for offroading.

The 1<sup>st</sup> thru 4<sup>th</sup> gear solenoid shifting sequence is as follows:

Gear	Sol #1	Sol#2
1 <sup>st</sup>	ON	OFF
2 <sup>nd</sup>	ON	ON
3 <sup>rd</sup>	OFF	ON
4 <sup>th</sup>	OFF	OFF

TC solenoid was designed to be engaged when driving above approx. 45mph on level ground when in 3<sup>rd</sup> or 4<sup>th</sup> gear. This feature eliminates slip thus reducing heat and improving gas mileage. It is important to have this functional if you intend to do any amount of driving above 45mph whether in 4wd or not.

When using a shift controller for 1 thru 4 shifting you may notice if you have the floor shifter in OD/4<sup>th</sup> that you don't get any compression braking in 1<sup>st</sup> or 2<sup>nd</sup> gear. This is due to the design of the transmission since it has electric and hydraulic control and uses over running clutches. Compression braking can be achieved in 1<sup>st</sup> and 2<sup>nd</sup> gear by shifting the floor shifter to the 1-2/1<sup>st</sup>/L position. You cannot however shift to a gear higher than 2<sup>nd</sup> with the shift controller when the floor shifter is in this position. This works the same when the floor shifter is in the second gear position D/2. You will have compression braking in 2<sup>nd</sup> or 3<sup>rd</sup> but not 1<sup>st</sup>, and of course you will not be able to shift to 4<sup>th</sup> gear with the shift controller.

You do not need a TCM to manually control shifting, but if you have a functioning TCM then you can add a switch to choose between stock TCM control or manual control when using a shift controller system.

The Jeep AW4 has a 23 spline out that is the same as most US made transfer cases, so swapping a D300, NP241, NP231, Atlas etc. is all possible.

The Toyota also has a 23 spline output but is a different diameter than the Jeep version. This means the transfer cases are not directly swappable between the two.

Run a good transmission cooler, heat kills any automatic transmission.  
This information is from Wiki:

The Aisin-Warner four-speed automatic transmission (AW4) was co-designed by AMC and Borg Warner then built by Aisin in their new facility for use in then all new [Cherokee XJ's](#) new inline six-cylinder 4.0 L design. It was manufactured by [Aisin-Warner](#), a member of the [Toyota](#) group, in partnership with [Borg-Warner](#). It shares many parts with the Aisin [450-43LE](#) that is used in Toyota off-road vehicles.

The AW4 is also used behind the 2.5 L (150 C.I.D.) [AMC Straight-4 engine](#). It has a removable bell housing with a mount for the crankshaft position sensor. Early AW4s used 21-spline output shafts. In 1991 the AW4 was changed to a 23-spline output shaft, concurrent with adoption of the High Output (commonly known as H.O.) inline six-cylinder engine. Some sources state that the output shaft spline change occurred for the 1990 model year. The change most likely occurred during the 1990 model run with early 1990 models receiving 21-spline transmission and later models receiving 23-spline. If swapping transmissions in 1990 model year vehicles either swap the transfer case as well or make sure to check spline count. The input on the transfer case can also be changed to match the output shaft spline count. Rear-wheel-drive-only transmissions all have the same spline count on the output shaft, only 4x4 models are affected by differing spline count.

Gear Ratios for the AW4:

1st: 2.80  
2nd: 1.53  
3rd: 1.00  
4th: 0.75 (23-spline, 0.705 21-spline)

Models that used the AW4:

1987–2001 Jeep Cherokee (XJ) 4.0 L  
1993–1993.5 Jeep Grand Cherokee (ZJ) 4.0 L  
1987–1992 Jeep Comanche 2.5 L  
1987–1992 Jeep Comanche 4.0 L

Toyota\_Aisin-Warner

A family is a family of automatic [FWD/RWD/4WD](#) transmissions built by [Aisin-Warner](#). They share much in common with Volvo's AW7\* and Aisin-Warner's 03-71\* transmissions, which are found in Suzukis, Mitsubishi's, and other Asian vehicles.

A = Aisin Automatic Second last digit denotes number of gears Last digit is the Toyota series number -  
E=Electronic control -F=Four wheel drive -H=AWD Transverse mount engine -L=Lock-up torque converter

A340H[[edit](#)]

4 Speed Automatic Transmission (4x4)

Applications:

1990-1995 4x4 Trucks w/v-6  
1990-1995 4Runner (4x4)  
1998-2005 Toyota Altezza Gita Wagon (GXE15W and JCE15W)  
(Gear ratios 1st-2.80, 2nd-1.53, 3rd-1.00, 4th-0.71, Rev.-2.39)

A340F[[edit](#)]

Applications:

1985-2003 4Runner (4x4)

2000-2004 Tundra (4x4)

1985-1994 4-Pickup (4x4)

1996-1998 T-100 (4x4)

1995-2004 Tacoma (4x4)

2001-2004 Sequoia (4x4)

A340E (30-40LE)[[edit](#)]

Applications:

1987-1992 Cressida (30-40LE)

1986-1998 Toyota Supra non-turbo

1987-1998 Toyota Supra turbo

1995-2013 Toyota Tacoma 2.7L I4 (4WD), 3.0L V6, 3.4L V6

1993-1995 T100 3.0L V6

1993-1997 Previa 2.4L w/supercharger

1992-2000 Lexus SC 300 3.0L I6

1992-1999 Lexus SC 400 4.0L V8

1994-2000 Toyota Soarer 3.0L I6 (2JZ-GE)

1995-1997 Lexus LS 400 4.0L V8

1989-2002 4Runner (4x2) (30-40LE)

2001-2004 Sequoia (4x2)

2000-2004 Tundra (4x2)

2005-2007 TOYOTA COMMUTER 2.5L DIESEL

1985-1995 Toyota Pick-Up 3.0L

1991-1997 Jeep Cherokee 4.0

Ratios 1st:2.804, 2nd:1.531, 3rd:1, 4th:0.705, Reverse: 2.39300

This has some good info too. [Trans ID Reference](#)

Toyota Swap Info:

My experience: I swapped a 22RE A340F in my '82 truck. Then when I swapped to the 2RZ, I bought a RZ flex plate and bolts from eBay. I found the 22re TC that was on the installed A340F I had was a different bolt pattern and used different diameter bolts than the 2RZ unit, so I then found that the RZ TC wouldn't work on the 22RE A340F because of a different spline count. Next I tried a 3VZ TC, it had the right bolt pattern that matched the flex plate and also the spline count that matched the 22RE A340F. Good thing for my junk gathering addiction.

What I used was this: 22RE A340F & 3VZ TC & 3RZ bell housing and flex plate, confusing yes but it all bolted up.

The Toyota bell housings have the engine series designations letter cast into the top of them i.e. R, VZ, RZ.

Transmission:

There are two different spline counts on the input shaft, this applies to the TC also of course.

There are two different bolt patterns on the Toyota TC/flex plates and they use different diameter bolts, the Jeep TC has a 4 bolt pattern while the Toyota is a 6 bolt pattern.

The AW4 23 spline output is slightly larger than a Toyota 23 spline out shaft and do not interchange.  
Jeep change output shaft spline counts in 1991 from 21 to 23\*  
Jeep has two different speed sensor types\*

\* Neither of these affect manual electronic control.

#### **AW4**

1987-1990, the AW4 had a 21 spline output shaft, a 1 pulse per revolution reed switch Output Speed Sensor, no Input Speed Sensor, and a 0.705:1 OD ratio. 4.0L and 2.5L transmissions are fundamentally the same, except for the torque converter and bellhousing, which are unique for each motor.

1990.5-1996, the AW4 switched to a 23 spline output shaft and a 0.75:1 OD ratio. It was no longer available behind the 2.5L engine. Otherwise, it remained exactly the same.

1997, the AW4 is exactly the same as the 1990.5-1996 units, except the electrical connector for the wiring harness changed. A simple cut and splice will solve this problem.

1998-01, the AW4 changed electrically, but is otherwise the same as 1990.5-1997 units. The Output Speed Sensor changed from a 1pps reed switch to a 4 pulse/rev variable reluctance pickup similar to the RENIX CPS and most ABS wheel speed sensors. A 16 pulse/rev Input Speed Sensor was also added. The ISS and OSS for these years are the same part number; one may be substituted for the other for spare parts purposes.

AW4 NSS:

1987-1996 the NSS is the same. Positions for R, P/N, 1-2, and 3. No connections indicates that the shifter is in OD - OR that the NSS is dirty. The TCU can't tell, this can lead to some common transmission shifting symptoms.

1997-2001 the NSS wiring harness connector is different but the internals are the same - mostly. There is now a circuit for each gear position (1-2, 3, D) on the switch and an extra wire for the new position. This was added to improve feedback to the TCU and likely also to allow the TCU to definitively throw a DTC code if it sees no contacts shorted, which now indicates a bad NSS rather than "bad NSS or overdrive gear, we don't know."

T100 with the 3.0 has the a340F with the same speed sensor as the a340H, so in theory, just a tail housing swap is needed. Or the whole trans swap would be less involved.

The 23 spline Jeep AW4 from 96 and earlier used a 'reed' style speed sensor that is 1PPS, same as the A340H and early A340F Toyota. Then later, both Jeep and Toyota went to a magnetic 4PPS speed sensor.