

Esprit Renault Transmission

There is a lot of misleading information on the Internet about the Renault Transaxle used on the Esprit. Hopefully the following will clarify the situation.

In the mid 1980's Lotus became aware that the currently used Citroen C35 Transaxle was coming near the end of its production life. The quality of the components were deteriorating and the unit cost was rising. A long term solution had to be found to support the continuing Esprit production. The planned introduction of the revised Esprit (X180) would result in increased production and a transmission supply was required to support this plan.

Finding a transmission that could support the torque requirements of the 910 Turbo (circa 220 lb.ft) at a sensible cost was no easy task. Very few production transmissions were available that would meet with the installation and torque requirements. Following recent engineering links with Renault during the DeLorean project, our purchasing group under the control of Nick Sutton secured a deal with Renault to support a development project to produce a variant of the Renault UN1 transaxle suitable for use in the Esprit. A specification was agreed and a plan to develop and produce a Hybrid unit unique to Lotus was put into action. Renault produced a variant of the UN1 transmission with a combination of features that would provide Lotus with a unit that was best suited to the Esprit. This prototype transmission had the Renault designation UN1 - 016.

There were some limitations to what features could be included as the transmission had to be suitable to be built on the Renault UN1 production line with all the other UN1 variants. The only downside was that the gearshift shaft had to be on the L/H side of the unit. Lotus really wanted it to be on the R/H side as this would have simplified the gearshift cable routing. The gearshift cables had to come down the cold (R/H) side of the engine and cross over to the left hand side of the gearbox to connect to the standard Renault gearshift shaft.

Following initial testing at Nardo it was confirmed that the Gearbox lubricant temperature exceeded the standard Renault lubricant (Tranself TRX) maximum operating temperature. Renault advised that Lotus had to use a lubricant that they had been experimenting with at the time to ensure safe operating conditions. This lubricant became known as Mobil 630M - a modified version of Mobil 630. This synthetic lubricant known as Mobil 630M was capable of operating at the temperatures seen in the Esprit which was up to 150 Deg. C. The UN1 casing has provision for the addition of an oil cooling system. This was not used as the Synthetic Lubricant specified and tested met with the Renault requirements. When Mobil 630M production came to an end it was replaced by Castrol TAF-X 75W90.

With the Renault production specification confirmed and a new Bellhousing designed by Lotus to mate the UN1 to the Lotus 900 Series Engine the development testing and durability could begin. A test programme based on an established Renault plan was embarked on using several Lotus vehicles.

The decision was made to introduce the new transmission with the production of the Esprit Project X180. This production unit was known as the Renault UN1- 016. Due to type approval and emission requirements the USA X180 vehicles would continue with the Citroen C35 unit until this work was completed. This was not an ideal situation as it meant two variants of the X180 had to be on the production line at the same time. The transmission differences lead to different drive shafts, brakes, wheels and gearshift being produced.

The transmission testing was arduous and included testing on Autobahns, city and mountain roads as per the Renault schedule. There was also abuse testing on the Lotus track that tested both gearbox and clutch. The Renault transmission test schedule was carried out at Nardo, German Autobahns, Alpine mountains, European Cities and Millbrook Proving Ground in the UK. There was also testing on the Lotus Test Track at Hethel where the transmission and clutch were subjected to hundreds of Standing Starts and a 1000 mile abuse test of WOT shifting up the gears and severe downshifts to sign off the gearbox and clutch. Following successful USA Type Approval all cars eventually used the Renault UN1 transmission.

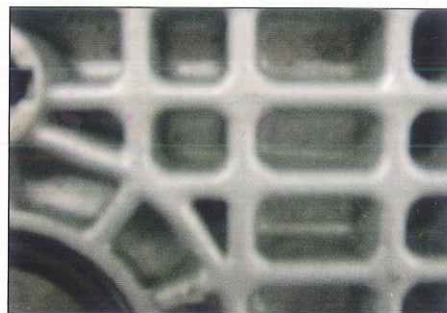
It was not long before Lotus embarked on an upgrade to the 910 engine which would increase the power and torque output that would require some upgrade to the UN1 transmission. The current UN1-016 transmission had a torque capacity of circa 230 lb.ft. (315 Nm). The upgrade to the 910 engine with the introduction of intercooling would increase the torque requirement to circa 300 lb.ft (400 Nm). Renault produced upgraded transmission components that had a capacity of 400 Nm that would satisfy both Renault (for the Alpine GTA) and Lotus for the Esprit SE which was introduced in 1989.

The new transmission had upgraded (stronger) casings and changes to the internals (shafts and bearings) to meet the increased torque requirements. The new Lotus unit would be known as the Renault UN1 - 026 and was commonly known as the High Torque unit. The visual difference in the casing can be seen on the pictures above right.

There are suggestions that any Renault UN1 could be used successfully in the Esprit. The reality is somewhat different as the Lotus variant of the UN1 has several unique components to cope with the Lotus requirement. The main difference is the Crownwheel and Pinion material. No other



Standard Casing UN1 - 016



High Torque Casing UN1 - 026

Renault vehicle unit has these components in the Lotus Ratio with 4 planet gears. Only the Lotus UN1-016, UN1-026 and the V8 UN1-027 are built to that specification. Fitting other UN1 variants and using the incorrect lubricant in the Esprit application will lead to premature wear/failure of the internal components. The gearboxes are identified with an aluminium Tag on the rear cover giving Type Number and Serial Number.

Several changes were made to the UN1 Transaxle during the production life including deletion of the mechanical speedo drive and the addition of the reverse synchro.

The introduction of the Lotus V8 required a new variant of the UN1. A new Bellhousing and a different 5th gear (0.76 instead of the 0.82) were introduced for the Esprit V8 in 1996. This Transmission is known as the Renault UN1-027.

Changes to the Renault production of the UN1 allowed Lotus to introduce some changes to the build and finally get the gearshift shaft changed to the right hand side of the gearbox. This made way for an improved gearshift that gave better and lighter shifting.

With the introduction of the 2.0 Litre Esprit GT3 in 1996 another variation of the gearbox was introduced. The Final Drive Ratio was changed to 4.11:1 to suit the 2.0 Litre engine. The 2.2 & V8 transmissions had the 3.89:1 Final Drive. The torque limit for the UN1-028 is 300 Nm due to the 4.11:1 final drive components. **Brian Angus**

Brian was a vehicle engineer at Lotus Cars for 43 years, 33 of which he spent working on Esprit and became Esprit Platform Manager.



One of the test vehicles



Renault UN1 (with R/H Shift)



Oil Cooling connections on UN1



Identification Tag